CONTRACT DOCUMENTS
&
TECHNICAL SPECIFICATIONS
FOR
BID – 20-07
2020 US 77 OVERPASS UTILIES RELOCATION
FOR
CITY OF KINGSVILLE, TEXAS

City Manager
Mark McLaughlin

Mayor
Sam Fugate

Commissioner(s)
Hector Hinojosa
Dianne Luebert
Arturo Pecos
Edna Lopez

JANUARY 2020

Prepared by:

Engineering Department
400 W. King Avenue
Kingsville, Texas 78363
(361) 595-8007

STATE OF TEXAS
RUTILIO P. MORA, JR.
111588
LICENSED
PROFESSIONAL ENGINEER

Rutilio P. Mora Jr.
1/3/2020

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CONTRACT DOCUMENTS

ADVERTISEMENT AND INVITATION FOR BIDS

The City of Kingsville, Texas will receive sealed bids for **BID 20-07 "2020 US 77 Overpass Utilities Relocation"** until 2:00pm on April 22, 2020. Sealed proposals will be addressed to, Charley Sosa, Purchasing Manager, City of Kingsville, 400 W. King Ave., Kingsville, TX 78363. The bids will be publicly opened and read aloud immediately thereafter. A Pre-Bid Conference will be held at 10:00 am on April 15, 2020 at the Kingsville City Hall Community Room, 400 W. King Ave., Kingsville, TX 78363 with an on-site visit being a portion of the proceedings.

Major items of work include the following:

This project consists of relocating existing utilities which include 12" Waste Water line, 3 manholes, 8" Waste Water Force Main in 16" Dia. Steel casing, 6" Waste Water Force Main in 16" Dia. in casing, 12" water line, 12" Gate Valves, Air release valve and 20" Dia. Steel casing in accordance with the contract documents, technical specifications, and plans.

Bid/Contract Documents, including Drawings and Technical Specifications can be found on the City of Kingsville website at the following web address.

http://www.cityofkingsville.com/departments/purchasing/rfpbid-openings-fy-2020/

A bid bond by an acceptable surety, in the amount of 5% of the bid amount shall be submitted with each bid.

Attention is called to the fact that not less than, the federally determined prevailing (Davis-Bacon and Related Acts) wage rate, as issued by the Texas Department of Agriculture Office of Rural Affairs and contained in the contract documents, must be paid on this project. In addition, the successful bidder must ensure that employees and applicants for employment are not discriminated against because of race, color, religion, sex, sexual identity, gender identity, or national origin.

The City of Kingsville is an Affirmative Action/Equal Opportunity Employer that reserves the right to reject any and all bids and/ or waive any formalities in the bidding.

Bids may be held by the City for a period not to exceed 30 days from the date of the bid opening for the purpose of reviewing the bids and investigating the bidder's qualifications prior to the contract award.

City of Kingsville, Texas
Mark McLaughlin, City Manager

INSTRUCTION TO BIDDERS

Use of Separate Bid Forms:

These contract documents include a complete set of bid and contract forms which are for the convenience of the bidders and are not to be detached from the contract document, completed or executed. **Separate bid forms are provided and are to be used for preparation of the bid.**

Interpretations or Addenda:

No oral interpretations will be made to any bidder. Each request for an interpretation shall be made in writing to the City of Kingsville Engineering Department no less than four (4) days prior to the bid opening. Each interpretation made will be in the form of an Addendum to the contract documents and will be distributed to all parties holding contract documents no less than three (3) days prior to the bid opening. It is, however, the bidder's responsibility to make inquiry as to any addenda issued. All such addenda shall become part of the contract documents and all bidders shall be bound by such addenda, whether or not received by the bidders.

Inspection of Site:

Each bidder should visit the site of the proposed work and should become acquainted with the existing conditions and facilities, the difficulties and restrictions pertaining to the performance of the contract. **A Pre-Bid conference will be held on 10:00a.m. on Wednesday, April 15, 2020 at the City Hall Community Room, 400 W. King Ave., Kingsville, Texas 78363 with an on-site visit being a portion of the proceedings.** The bidder should thoroughly examine and become familiar with the drawings, technical specifications and all other contract documents. The contractor by the execution of the contract shall in no way be relieved of any obligation under it due to failure to receive or examine any form or legal document or to visit the site or the conditions existing at the site. The City will be justified in rejecting any claim based on lack of inspection of the site prior to the bid.

Bids:

A. All bids must be submitted on the forms provided and are subject to all requirements of the Contract Documents, including the Drawings.

B. All bids must be regular in every respect and no interlineation, excisions or special conditions may be made or included by the bidder.

C. Bid documents, including the bid, the bid bond, and the statement of bidder's qualifications shall be sealed in an envelope and clearly labeled with the words "Bid Documents", the project number, name of bidder and the date and time of bid opening.

D. The City may consider as irregular any bid on which there is an alteration of or departure from the bid form and, at its option, may reject any irregular bid.

E. If a contract is awarded, it will be awarded to a responsible, responsive bidder who provides goods or services at the best value for the City and the selected alternate bid items, if any. The contract will require the completion of the work in accordance with the contract documents.

Bid Modification Prior to Bid Opening:

A. Any bidder may modify his bid by telegraphic communication at any time prior to the scheduled closing time for receipt of bids, provided such telegraphic communication is received by the City prior to the closing time, and provided further, the City is satisfied that

a written confirmation of the telegraphic modification over the signature of the bidder was mailed prior to the closing time. The telegraphic communication should not reveal the bid price but should provide the addition, subtractions or other modifications so that the final prices or terms will not be known by the Owner until the sealed bid is open. If written confirmation is not received within two (2) days from the closing time, no consideration will be given to the telegraphic communication.

B. Likewise, any bidder may modify a bid by submitting a supplemental bid in person prior to the scheduled closing time for receipt of bids. Such supplemental bid should mention only additions or subtractions to the original bid so as to not reveal the final prices or terms to the City until the sealed bid is open.

Bid Bond:

A. A bid bond in the amount of 5% of the bid issued by an acceptable surety shall be submitted with each bid

B. The bid bond, or its comparable, will be returned to the bidder as soon as practical after the opening of the bids.

Statement of Bidder's Qualifications:

Each bidder shall submit on the form furnished for that purpose a statement of the bidder's qualifications. The City shall have the right to take such steps as it deems necessary to determine the ability of the bidder to perform his obligations under the contract, and the bidder shall furnish the City all such information and data for this purpose as it may request. The right is reserved to reject any bid where an investigation of the available data does not satisfy the City that the bidder is qualified to carry out properly the terms of the contract.

Unit Price:

The unit price for each of the several items in the bid shall include its pro rata share of overhead so that the sum of the products obtained by multiplying the quantity for each item by the unit price bid represents the total bid. Any bid not conforming to this requirement may be rejected as informal. Special attention is drawn to this condition, as the unit prices will be used to determine the amount of any change orders resulting from an increase or decrease in quantities.

Corrections:

Erasures or other corrections in the bid must be noted over the signature of the bidder.

Time for Receiving Bids:

Bids received prior to the advertised hour of opening shall be kept securely sealed. The officer appointed to open the bids shall decide when the specified time has arrived and no bid received thereafter will be considered; except that when a bid arrives by mail after the time fixed for opening, but before the reading of all other bids is completed, and it is shown to the satisfaction of the City that the late arrival of the bid was solely due to delay in the mail for which the bidder was not responsible, such bid will be received and considered.

Opening of Bids:

The City shall, at the time and place fixed for the opening of bids, open each bid and publicly read it aloud, irrespective of any irregularities therein. Bidders and other interested individuals may be present.

Withdrawal of Bids:

Bidder may withdraw the bid before the time fixed for the opening of bids, by communicating his purpose in writing to the locality. Upon receipt of such notice, the unopened bid will be returned to the bidder. The bid guaranty of any bidder withdrawing his bid will be returned promptly.

Award of Contract/Rejection of Bids:

A. The contract will be awarded to the responsive, responsible Bidder submitting a bid that provides goods or services at the best value for the City. The bidder selected will be notified at the earliest possible date. The City reserves the right to reject any or all bids and to waive any informality in bids received where such rejection or waiver is in its interest.

B. The City reserves the right to consider as unqualified to do the work any bidder who does not habitually perform with his own forces the major portions of the work involved in construction of the improvements embraced in this contract.

Execution of Agreement/Performance and Payment Bonds:

A. Performance and Payment Bonds are required of all Prime Contractors which enter into a formal contract in excess of $50,000 with the State, any department, board, agency, municipality, county, school district, or any division or subdivision thereof, to obtain a Payment Bond in the amount of the contract before commencing with work and a performance bond for public works contracts in excess of $100,000.

B. The failure of the successful bidder to execute the agreement and supply the required bonds within then (10) days after the prescribed forms are presented for signature, or within such extended period as the City may grant, shall constitute a default and the City may, at its option either award the contract to the next bidder to who provides goods or services at the best value for the City, or re-advertise for bids. In either case, the City may charge against the bidder the difference between the amount of the bid, and the amount for which a contract is subsequently executed irrespective of whether this difference exceeds the amount of the bid bond. If a more favorable bid is received through re-advertisement, the defaulting bidder shall have no claim against the City for a refund.

Equal Employment Opportunity:

Attention is called to the fact that not less than, the federally determined prevailing (Davis-Bacon and Related Acts) wage rate, as issued by the Texas Department of Agriculture Office of Rural Affairs and contained in the contract documents, must be paid on this project. In addition, the successful bidder must ensure that employees and applicants for employment are not discriminated against because of race, color, religion, sex, sexual identity, gender identity, or national origin.

BID PROPOSAL

Proposal of_____

a *_____ (hereinafter called "BIDDER"), organized and existing under the laws of the State of Texas to **City of Kingsville, Texas** (hereinafter called "OWNER.)"

BIDDER hereby proposes to perform all WORK for the construction of the **"2020 US 77 Overpass Utilities Relocation"** in accordance with the CONTRACT DOCUMENTS, within the time set forth therein, and at the prices stated below.

By submission of this BID, each BIDDER certifies, and in the case of a joint BID each party thereto certifies as to its own organization, that this BID has been arrived at independently, without consultation, communication, or agreement as to any matter relating to this BID with any other BIDDER or with any competitor.

BIDDER hereby agrees to commence WORK under this contract on or before a date to be specified in the NOTICE TO PROCEED and to fully complete the PROJECT within **150** consecutive calendar days thereafter. BIDDER further agrees to pay as liquidated damages, the sum of **$ 200.00** for each consecutive calendar day thereafter as provided in the General Conditions.

BIDDER acknowledges receipt of the following ADDENDUM:

_____

_____

_____

*Insert "a corporation", "a partnership", or "an Individual" as applicable.

BIDDER agrees to perform all the work described in the CONTRACT DOCUMENTS for the following amount:

BID SCHEDULE

ITEM	QUANTITY	UNIT	DESCRIPTION	UNIT PRICE	TOTAL PRICE
BASE BID – 12" WASTE WATER MAIN GRAVITY RELOCATION (EAST SIDE)- LINE A					
A-1)	640	LF	**12" SDR 26 PVC < 10' DEPTH** per plans and specifications, complete in place- materials only.	_____	_____
A-2)	3	EA	**PIPE JOINT LUBRICANT** per plans and specifications, complete in place- material only.	_____	_____
A-3)	1	EA	**12" PVC SEWER PLUG** per plans and specifications, complete in place- material only.	_____	_____
A-4)	1	EA	**DETECTABLE WARNING PLUG** per plans and specifications, complete in place- material only.	_____	_____
A-5)	3	EA	**6'X6' CONCRETE FOOTING** per plans and specifications, complete in place- material only.	_____	_____
A-6)	9	EA	**#4 STEEL REBAR** per plans and specifications, complete in place- material only.	_____	_____
A-7)	3	EA	**4' DIA. FIBERGLASS MANHOLE < 10' DEPTH** per plans and specifications, complete in place- material only.	_____	_____

A-8)	3	EA	**MANHOLE LID (30" OPENING X 4' DIA. X 6' DIA. LONG)** per plans and specifications, complete in place- material only.	_____	_____
A-9)	3	EA	**RAIN FLOW INHIBITOR STAINLESS STEEL** per plans and specifications, complete in place- material only.	_____	_____
A-10)	27	EA	**CONCRETE ADJUSTABLE RINGS** per plans and specifications, complete in place- material only.	_____	_____
A-11)	3	EA	**EPOXY COATING** per plans and specifications, complete in place- material only.	_____	_____
A-12)	2.5	TON	**ASPHALT** per plans and specifications, complete in place- material only.	_____	_____
A-13)	640	LF	**TRENCH SAFETY** per plans and specifications, complete in place.	_____	_____
A-14)	1	LS	**EROSION CONTROL** per plans and specifications, complete in place.	_____	_____
A-15)	1	LS	**TRAFFIC CONTROL** plans and specifications, complete in place.	_____	_____
A-16)	700	LF	**REMOVE/DISPOSE EXISTING UTILITY LINE & BACKFILL** per plans and specifications, complete in place- labor & equipment only.	_____	_____

A-17)	3	EA	**REMOVE/DISPOSE MANHOLES** per plans and specifications, complete in place- labor & equipment only.	_____	_____
A-18)	8	HR	**ASPHALT PAVEMENT REPAIR** per plans and specifications, complete in place- labor & equipment only.	_____	_____
A-19)	1	EA	**BYPASS PUMPING** per plans and specifications, complete in place- labor & equipment only.	_____	_____
A-20)	40	HR	**EXCAVATOR** per plans and specifications, complete in place- labor & equipment only.	_____	_____
A-21)	40	HR	**UTILITY TRUCK** per plans and specifications, complete in place- labor & equipment only.	_____	_____
A-22)	40	HR	**UTILITY TRAILER** per plans and specifications, complete in place- labor & equipment only.	_____	_____
A-23)	40	HR	**DUMP TRUCK** per plans and specifications, complete in place- labor & equipment only.	_____	_____
A-24)	40	HR	**½ TON TRUCK** per plans and specifications, complete in place- labor & equipment only.	_____	_____
A-25)	40	HR	**MINI LOADER** per plans and specifications, complete in place- labor & equipment only.	_____	_____

A-26)	40	HR	**FRONT LOADER** per plans and specifications, complete in place- labor & equipment only.	_____	_____

SUBTOTAL BASE BID "A" – (ITEMS A-1 – A-26) $_____

ITEM	QUANTITY	UNIT	DESCRIPTION	UNIT PRICE	TOTAL PRICE
BASE BID – 8" WASTE WATER FORCEMAIN RELOCATION (WEST SIDE) – LINE B					
B-1)	290	LF	**8" WASTE WATER FORCEMAIN C900 PVC PC 150 < 12' DEPTH** per plans and specifications, complete in place- material only.	_____	_____
B-2)	1	EA	**PIPE JOINT LUBRICANT** per plans and specifications, complete in place- material only.	_____	_____
B-3)	1	EA	**DETECTABLE WARNING TAPE** per plans and specifications, complete in place- material only.	_____	_____
B-4)	120	LF	**16' STEEL CASING** per plans and specifications, complete in place- material only.	_____	_____
B-5)	43	EA	**EPOXY STEEL CASING SPACERS** per plans and specifications, complete in place- material only.	_____	_____
B-6)	2	EA	**CASING END SEAL** per plans and specifications, complete in place- material only.	_____	_____

B-7)	170	LF	**TRENCH SAFETY** per plans and specifications, complete in place.	_____	_____
B-8)	1	LS	**EROSION CONTROL** per plans and specifications, complete in place.	_____	_____
B-9)	1	LS	**TRAFFIC CONTROL** per plans and specifications, complete in place.	_____	_____
B-10)	290	LF	**REMOVE/ DISPOSE EXISTING UTILITY LINE & BACKFILL** per plans and specifications, complete in place- labor & equipment only.	_____	_____
B-11)	120	HR	**16" DIA. STEEL CASING BORE** per plans and specifications, complete in place- labor & equipment only.	_____	_____
B-12)	40	HR	**EXCAVATOR** per plans and specifications, complete in place- labor & equipment only.	_____	_____
B-13)	40	HR	**UTILITY TRUCK** per plans and specifications, complete in place- labor & equipment only.	_____	_____
B-14)	40	HR	**UTILITY TRAILER** per plans and specifications, complete in place- labor & equipment only.	_____	_____
B-15)	40	HR	**DUMP TRUCK** per plans and specifications, complete in place- labor & equipment only.	_____	_____
B-16)	40	HR	**½ TON TRUCK** per plans and specifications, complete in place- labor & equipment only.	_____	_____

B-17)	40	HR	**MINI LOADER** per plans and specifications, complete in place- labor & equipment only.	_____	_____
B-18)	40	HR	**FRONT LOADER** per plans and specifications, complete in place- labor & equipment only.	_____	_____

SUBTOTAL BASE BID LINE "B" – (ITEM B-1- B-18) $_____

ITEM	QUANTITY	UNIT	DESCRIPTION	UNIT PRICE	TOTAL PRICE
BASE BID- 12" WATER LINE RELOCATION (WEST SIDE) – LINE C					
C-1)	3200	LF	**12" C900 PVC WATERLINE (MATERIAL)** per plans and specifications, complete in place- material only.	_____	_____
C-2)	8	EA	**PIPE JOINT LUBRICANT** per plans and specifications, complete in place- material only.	_____	_____
C-3)	6	EA	**5# HTH DRY GRANULAR CHLORINE-DISINFECTION** per plans and specifications, complete in place- material only.	_____	_____
C-4)	4	EA	**DETECTABLE WARNING TAPE** per plans and specifications, complete in place- material only.	_____	_____

C-5)	60	LF	**20" DIA. STEEL CASING** per plans and specifications, complete in place- material only.	_____	_____
C-6)	23	EA	**EPOXY STEEL CASING SPACERS** per plans and specifications, complete in place- material only.	_____	_____
C-7)	2	EA	**END SEAL** per plans and specifications, complete in place- material only.	_____	_____
C-8)	1	EA	**1' X 2' CONRETE FOOTING W/INTERIOR GRAVEL BEDDING** per plans and specifications, complete in place- material only.	_____	_____
C-9)	1	EA	**5' DIA. FIBERGLASS MANHOLE <10' DEPTH** per plans and specifications, complete in place- material only.	_____	_____
C-10)	1	EA	**MANHOLE LID (30" OPENING X 4" DIA. X 10' LONG)** per plans and specifications, complete in place- material only.	_____	_____
C-11)	9	EA	**CONCRETE ADJUSTABLE RINGS** per plans and specifications, complete in place- material only.	_____	_____
C-12)	1	EA	**EPOXY COATING** per plans and specifications, complete in place- material only.	_____	_____
C-13)	5	EA	**12" GATE VALVE** per plans and specifications, complete in place- material only.	_____	_____

C-14)	10	EA	**12" DIA. PVC WEDGE RESTRAINT GLAND** per plans and specifications, complete in place- material only.	_____	_____
C-15)	5	EA	**VALVE BOX TOP SECTION** per plans and specifications, complete in place- material only.	_____	_____
C-16)	5	EA	**VALVE BOX LID (WATER)** per plans and specifications, complete in place- material only.	_____	_____
C-17)	5	EA	**VALVE BOX BOTTOM SECTION** per plans and specifications, complete in place- material only.	_____	_____
C-18)	1	EA	**60" DIA. X 6' FRP MANHOLE ½ WALL** per plans and specifications, complete in place- material only.	_____	_____
C-19)	1	EA	**32" RING AND COVER (WATER)** per plans and specifications, complete in place- material only.	_____	_____
C-20)	2	EA	**12"X2" DOUBLE STRAP BRONZE SADDLE** per plans and specifications, complete in place- material only.	_____	_____
C-21)	1	EA	**2"X12" BRASS NIPPLE GBL** per plans and specifications, complete in place- material only.	_____	_____

C-22)	1	EA	**2" COMBINATION AIR RELEASE VALVE** per plans and specifications, complete in place- material only.	_____	_____
C-23)	2	EA	**MECHANICAL JOINT C153** per plans and specifications, complete in place- material only.	_____	_____
C-24)	2	EA	**12" DIA. PVC WEDGE RESTRAINT GLAND** per plans and specifications, complete in place- material only.	_____	_____
C-25)	2	EA	**GALVANIZED MALLEABLE IRON 150# 90 ELBOW** per plans and specifications, complete in place- material only.	_____	_____
C-26)	2	EA	**2"X12" GALVANIZED STL NIPPLE** per plans and specifications, complete in place- material only.	_____	_____
C-27)	2	EA	**2" GALVANIZED MALLEABLE IRON 150# COUPLING** per plans and specifications, complete in place- material only.	_____	_____
C-28)	2	EA	**2"X48" GALVANIZED READY CUT PIPE TUBE** per plans and specifications, complete in place- material only.	_____	_____
C-29)	3	EA	**BRONZE 125# THREADED NON-RISING STEM GATE** per plans and specifications, complete in place- material only.	_____	_____

C-30)	10	EA	**MECHANICAL JOINT P153 P-401 45 ELBOW** per plans and specifications, complete in place- material only.	_____	_____
C-31)	3140	LF	**TRENCH SAFETY** per plans and specifications, complete in place.	_____	_____
C-32)	1	LS	**EROSION CONTROL** per plans and specifications, complete in place.	_____	_____
C-33)	1	LS	**TRAFFIC CONTROL** per plans and specifications, complete in place.	_____	_____
C-34)	3355	LF	**REMOVE/ DISPOSE EXISTING UTILITY LINE AND BACKFILL** per plans and specifications, complete in place- labor & equipment.	_____	_____
C-35)	38	HR	**20" DIA. STEEL CASING BORE** per plans and specifications, complete in place- labor & equipment.	_____	_____
C-36)	80	HR	**EXCAVATOR** per plans and specifications, complete in place- labor & equipment.	_____	_____
C-37)	80	HR	**UTILITY TRUCK** per plans and specifications, complete in place- labor & equipment.	_____	_____
C-38)	80	HR	**UTILITY TRAILER** per plans and specifications, complete in place- labor & equipment.	_____	_____
C-39)	80	HR	**DUMP TRUCK** per plans and specifications, complete in place- labor & equipment.	_____	_____

C-40)	80	HR	**½ TON TRUCK** per plans and specifications, complete in place- labor & equipment.	_____	_____
C-41)	80	HR	**MINI- LOADER** per plans and specifications, complete in place- labor & equipment.	_____	_____
C-42)	80	HR	**FRONT LOADER** per plans and specifications, complete in place- labor & equipment.	_____	_____

SUBTOTAL BASE BID LINE "C" – (ITEM C-1 - C-42) $_____

ITEM	QUANTITY	UNIT	DESCRIPTION	UNIT PRICE	TOTAL PRICE
BASE BID- 6" WASTE WATER FORCEMAIN RELOCATION (WEST SIDE) – LINE D					
D-1)	3490	LF	**6" WASTE WATER FORCEMAIN C900 PVC PC 150 < 10' DEPTH** per plans and specifications, complete in place- material only.	_____	_____
D-2)	8	EA	**PIPE JOINT LUBRICANT** per plans and specifications, complete in place- material only.	_____	_____
D-3)	4	EA	**DETECTABLE WARNING TAPE** per plans and specifications, complete in place- material only.	_____	_____
D-4)	60	LF	**16" DIA. STEEL CASING** per plans and specifications, complete in place- material only.	_____	_____

D-5)	23	EA	**EPOXY STEEL CASING SPACERS** per plans and specifications, complete in place- material only.	_____	_____
D-6)	2	EA	**CASING END SEAL** per plans and specifications, complete in place- material only.	_____	_____
D-7)	1	EA	**12"X 2" DOUBLE STRAP BRONZE SADDLE** per plans and specifications, complete in place- material only.	_____	_____
D-8)	2	EA	**2" X 12" BRASS NIPPLE GBL** per plans and specifications, complete in place- material only.	_____	_____
D-9)	1	EA	**BRONZE 125# THREADED NON-RISING STEM GATE** per plans and specifications, complete in place- material only.	_____	_____
D-10)	3430	LF	**TRENCH SAFETY** per plans and specifications, complete in place.	_____	_____
D-11)	1	LS	**EROSION CONTROL** per plans and specifications, complete in place.	_____	_____
D-12)	1	LS	**TRAFFIC CONTROL** per plans and specifications, complete in place.	_____	_____
D-13)	3660	LF	**REMOVE/DISPOSE EXISTING UTILITY LINE & BACKFILL** per plans and specifications, complete in place- labor & equipment.	_____	_____

D-4)	38	HR	**16" DIA. STEEL CASING BORE** per plans and specifications, complete in place- labor & equipment.	_____	_____
D-14)	80	HR	**EXCAVATOR** per plans and specifications, complete in place- labor & equipment.	_____	_____
D-15)	80	HR	**UTILITY TRUCK** per plans and specifications, complete in place- labor & equipment.	_____	_____
D-16)	80	HR	**UTILITY TRAILER** per plans and specifications, complete in place- labor & equipment.	_____	_____
D-17)	80	HR	**DUMP TRUCK** per plans and specifications, complete in place- labor & equipment.	_____	_____
D-18)	80	HR	**½ TON TRUCK** per plans and specifications, complete in place- labor & equipment.	_____	_____
D-19)	80	HR	**MINI LOADER** per plans and specifications, complete in place- labor & equipment.	_____	_____
D-20)	80	HR	**FRONT LOADER** per plans and specifications, complete in place- labor & equipment.	_____	_____

SUBTOTAL BASE BID LINE "D" – (ITEM D-1 – D-20) $_____

TOTAL BASE BID – LINE "A" – "D" $_____

Respectfully submitted:

Signature	Address
Title	Date
License number (if applicable)	Date

NONCOLLUSION 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 the attached Bid and of all pertinent 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, representatives, employees or parties in interest, including this affiant, has in any way colluded, conspired, connived or agreed, directly or indirectly with another 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 an 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 _____ (Local Public Agency) 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 me this _____day of _____.

By: _____
Notary Public

My commission expires _____

CONTRACTOR CERTIFICATIONS

U.S. Department of Housing and Urban Development

CERTIFICATION OF BIDDER REGARDING CIVIL RIGHTS LAWS AND REGULATIONS

INSTRUCTIONS

CERTIFICATION OF BIDDER REGARDING Executive Order 11246 and Federal Laws Requiring Federal Contractor to adopt and abide by equal employment opportunity and affirmative action in their hiring, firing, and promotion practices. This includes practices related to race, color, gender, religion, national origin, disability, and veterans' rights.

NAME AND ADDRESS OF BIDDER (include ZIP code)

CERTIFICATION BY BIDDER

Bidder has participated in a previous contract or subcontract subject to Civil Rights Laws and Regulations.

☐ Yes ☐ No

The undersigned hereby certifies that:

☐ The Provision of Local Training, Employment. and Business Opportunities clause (Section 3 provision) is included in the Contract. A written Section 3 plan (Local Opportunity Plan) was prepared and submitted as part of the bid proceedings (if bid equals or exceeds $100,000).

☐ The Equal Opportunity clause is included in the Contract (if bid equals or exceeds $10,000).

Have you ever been or are you being considered for sanction due to violation of Executive Order 11246, as amended?

☐ Yes ☐ No

NAME AND TITLE OF SIGNER (Please type)

SIGNATURE DATE

STANDARD FORM OF AGREEMENT
BETWEEN CITY AND CONTRACTOR
ON THE BASIS OF A STIPULATED PRICE

THIS AGREEMENT is dated as of the day of in the year by and between **City of Kingsville, 400 W. King Avenue, Kingsville, Texas 78363** (hereinafter called OWNER) and _____ (hereinafter called CONTRACTOR).

CITY and CONTRACTOR, in consideration of the mutual covenants hereinafter set forth, agree as follows:

Article 1. WORK:

CONTRACTOR shall complete all Work as specified or indicated in the Contract Documents. The Work is generally described as follows:

"City of Kingsville – BID 20-07 2020 US 77 Overpass Utilities Relocation"

Article 2. ENGINEER:

The Project has been designed by:

City of Kingsville- Engineering Department
400 W. King Avenue
Kingsville, Texas 78363
(361) 595-8007

Who is hereinafter called ENGINEER and who is to act as OWNERS representative, assume all duties and responsibilities and have the rights and authority assigned to ENGINEER in the Contract Documents in connection with completion of the Work in accordance with the Contract Documents.

Article 3. CONTRACT TIME:

3.1 The Work will be completed and ready for final payment in accordance with the General Conditions within 150 calendar days from the date when the Contract Time commences to run.

3.2 Liquidated Damages. OWNER and CONTRACTOR recognize that time is of the essence of this Agreement and that OWNER will suffer financial loss if the Work is not completed within the time specified in paragraph 3.1 above, plus any extensions thereof allowed in accordance with the General Conditions.

They also recognize the delays, expense and difficulties involved in proving in a legal or arbitration proceeding the actual loss suffered by OWNER if the Work is not completed on time. Accordingly, instead of requiring any such proof, OWNER and CONTRACTOR agree that as liquidated damages for delay (but

not as a penalty) CONTRACTOR shall pay OWNER two hundred & 00/100 dollars ($200.00) for each calendar day that expires after the time specified in Article 3.1 of this Agreement for Substantial Completion until the Work is substantially complete. After Substantial Completion if CONTRACTOR shall neglect, refuse or fail to complete the remaining Work within the Contract Time or any proper extension thereof granted by OWNER, CONTRACTOR shall pay OWNER two hundred dollars ($200.00) for each calendar day that expires after the time specified in Article 3.1 of this Agreement for completion and readiness for final payment.

Article 4. CONTRACT PRICE:

4.1 OWNER shall pay CONTRACTOR for completion of the Work in accordance with the Contract Documents in current funds as follows: Per Contractors Proposal dated _____ in the Total Base Bid plus total alternative No.__ in the amount of _____, as attached and a part of this contract document.

Article 5. PAYMENT PROCEDURES:

CONTRACTOR shall submit Applications for Payment in accordance with the General Conditions. Applications for Payment will be processed by ENGINEER as provided in the General Conditions.

Article 6. INTEREST:

All moneys not paid when due as provided in the General Conditions shall bear interest at the maximum rate allowed by law at the place of the Project.

Article 7. CONTRACTORS REPRESENTATIONS:

In order to induce OWNER to enter into this Agreement CONTRACTOR makes the following representations:

7.1. CONTRACTOR has familiarized itself with the nature and extent of the Contract Documents, Work, site, locality, and all local conditions and Laws and Regulations that in any manner may affect cost, progress, performance or furnishing of the Work.

7.2 CONTRACTOR has obtained and carefully studied (or assumes responsibility for obtaining and carefully studying) all such examinations, investigations, explorations, tests, reports and studies which pertain to the subsurface or physical conditions at or contiguous to the site or otherwise may affect the cost, progress, performance or furnishing of the Work as CONTRACTOR considers necessary for the performance of furnishing of the Work at the Contract Price, within the Contract Time and in accordance with the other terms and conditions of the Contract Documents, including specifically the provisions of the General Conditions; and no additional examinations, investigations, explorations, tests, reports, studies or similar information or data are or will be required by CONTRACTOR for such purposes.

7.3 CONTRACTOR has reviewed and checked all information and data shown or indicated on the Contract Documents with respect to existing Underground Facilities at or contiguous to the site and assumes responsibility for the accurate location of said Underground Facilities. No additional examinations, investigations, explorations, tests, reports, studies or similar information or data in

respect of said Underground Facilities are or will be required by CONTRACTOR in order to perform and furnish the Work at the Contract Price, within the Contract Time and in accordance with the other terms and conditions of the Contract Documents, including specifically the provisions of the General and Special Conditions.

7.4 CONTRACTOR has correlated the results of all such observations, examinations, investigations, explorations, tests, reports and studies with the terms and conditions of the Contract Documents.

7.5 CONTRACTOR has given ENGINEER written notice of all conflicts, errors or discrepancies that he has discovered in the Contract Documents and the written resolution thereof by ENGINEER is acceptable to CONTRACTOR.

Article 8. CONTRACT DOCUMENTS:

The Contract Documents which comprise the entire agreement between CITY and CONTRACTOR concerning the Work consists of the following:

8.1 A bound set of executed documents and specifications titled:

CONTRACT DOCUMENTS
TECHNICAL SPECIFICATIONS
FOR

BID 20-07
2020 US 77 OVERPASS UTILITIES RELOCATION
FOR
CITY OF KINGSVILLE, TEXAS

City Manager
Mark McLaughlin

Mayor
Sam Fugate

Commissioner(s)
Hector Hinojosa
Dianne Leubert
Arturo Pecos
Edna Lopez

JANUARY 2020

Prepared by:

Engineering Department
400 W King Avenue
Kingsville, Texas 78363
(361) 595-8004

Together with all of the items or sections listed in the Table of Contents thereof.

8.2 A Notice of Award consisting of one page.

8.3 A Notice to Proceed with Construction consisting of one page which shall be executed at a later date.

There are no Contract Documents other than those listed above in this Article 8. The Contract Documents may only be amended, modified or supplemented as provided in the General Conditions.

8.4 A set of drawings consisting of FIVE (5) sheets titled:

Description

1. COVER SHEET
2. GENERAL NOTES
3. STA. 341+00 TO STA. 352+00
4. STA. 407+00 TO STA. 418+00
5. STA. 429+00 TO 440+00
6. STA. 440+00 TO STA. 451+00
7. STA. 451+00 TO STA. 462+00
8. STA. 462+00 TO STA. 473+00
9. STA. 12+00 TO STA. END
10. SECTIONS & DETAILS I
11. SECTIONS & DETAILS II
12. EC – SECIMENT AND WATER POLLUTION CONTROL MEASURES I
13. EC – SEDIMENT AND WATER POLLUTION CONTROL MEASURES II
14. EC – SEDIMENT AND WATER POLLUTION CONTROL MEASURES III
15. BC – GENERAL NOTES & REQUIREMENTS
16. BC – PROJECT LIMIT
17. BC – WORK ZONE SPEED LIMIT
18. BC – TEMPORARY SIGN NOTES
19. BC – TYPICAL SIGN SUPPORT
20. BC – ARROW PANEL, REFLECTIORS, WARNING LIGHTS & ATTENUATOR
21. BC – CHANNELING DEVICES I
22. BC – CHANNELING DEVICES II
23. BC – CHANNELING DEVICES III
24. TCP – CONVENTIONAL ROAD SHOULDER WORK
25. TCP – ONE-LANE TWO-WAY TRAFFIC CONTROL
26. TCP – TRAFFIC SHIFTS ON TWO-LANE ROADS
27. TCP – LANE CLOSURES FOR DIVIDED HIGHWAYS

Article 9. MISCELLANEOUS:

9.1. Terms used in this Agreement which are defined in the General Conditions will have the meanings indicated in the General Conditions.

9.2. No assignment by a party hereto of any rights or interests in the Contract Documents will be binding on another party hereto without the written consent of the party sought to be bound; and specifically but without limitation moneys that may become due and moneys that are due may not be assigned without such consent (except to the extent that the effect of this restriction may be limited by law), and unless specifically stated to the contrary in any written consent to an assignment no assignment will release or discharge the assignor from any duty or responsibility under the Contract Documents.

9.3. CITY and CONTRACTOR each binds itself, its partners, successors, assigns and legal representatives to the other party hereto, its partners, successors, assigns and legal representatives in respect of all covenants, agreements and obligations contained in the Contract Documents.

Article 10. OTHER PROVISIONS:

10.1 The successful bidder who is awarded this bid will be required to complete and return a Conflict of Interest Disclosure Form and a Form 1295- Certificate of Interested Parties.

10.2 This contract gives no rights or benefits to anyone other than the CITY and CONTRACTOR.

10.3 CONTRACTOR agrees to abide by all local, state and federal nondiscrimination and fair wages, and all other laws applicable to this contract.

IN WITNESS WHEREOF, OWNER and CONTRACTOR have signed this Agreement in five counterparts. Two counterparts each have been delivered to OWNER and CONTRACTOR and one counterpart to ENGINEER. All portions of the Contract Documents have been signed or identified by OWNER and CONTRACTOR or by ENGINEER on their behalf.

This Agreement will be effective on _____, 20____.

OWNER:
City of Kingsville, Texas

By: _____
Mark McLaughlin, City Manager

Attest: _____
Mary Valenzuela, City Secretary

Address for giving notices:

City of Kingsville
400 W. King Avenue
Kingsville, Texas 78363

CONTRACTOR:
_____

By: _____

Attest: _____

Address for giving notices:

CONSTRUCTION CONTRACT

THIS AGREEMENT made this the _____ day of _____, _____, by and between the City of Kingsville, 400 W. King Ave., Kingsville, Texas (hereinafter called CITY) and _____ (hereinafter called CONTRACTOR)

WITNESSETH, that the Contractor and the City for the considerations stated herein mutually agree as follows:

ARTICLE 1. Statement of Work. The Contractor shall furnish all supervision, technical personnel, labor, materials, machinery, tools, equipment and services, including utility and transportation services, and perform and complete all work required for the construction of the Improvements embraced in the Project; namely, **2019 US 77 Overpass Utilities Relocation** all in strict accordance with the contract documents including all addenda thereto, numbered _____, dated _____ and _____, all as prepared by The City of Kingsville – Engineering Department acting and in these contract documents preparation, referred to as the "*Engineer*".

ARTICLE 2. The Contract Price. The City will pay the Contractor for the performance of the Contract in current funds, for the total quantities of work performed at the *unit prices* stipulated in the Bid for the several respective items of work completed subject to additions and deductions as provided in_____ hereof.

Alternate Pricing Techniques: In the event the statutory provisions require the contract price to be a fixed sum, in the absence of an approved form, the following should be substituted for Article 2 above.

"**ARTICLE 2. The Contract Price.** The City will pay the Contractor for the performance of the Contract, in current funds, subject to additions and deductions as provided in Section 109 hereof, the sum of _____ Dollars ($_____)."

ARTICLE 3. The Contract. The executed contract documents shall consist of the following components:

a. This Agreement (pgs. 1-3)
b. Addenda
c. Invitation for Bids
d. Instructions to Bidders
e. Signed Copy of Bid
f. General Conditions, Part I
g. Special Conditions
h. Technical Specifications
i. Drawings (*as listed in the Schedule of Drawings*)

ARTICLE 4. Performance. Work, in accordance with the Contract dated _____, _____, shall commence on or before _____, _____, and Contractor shall complete the WORK within **150** consecutive calendar days thereafter. The date of completion of all WORK is therefore _____, _____.

This Agreement, together with other documents enumerated in this ARTICLE 3, which said other documents are as fully a part of the Contract as if hereto attached or herein repeated, forms the Contract between the parties hereto. In the event that any provision in any component part of this Contract conflicts with any provision of any other component part, the provision of the component part first enumerated in this ARTICLE 3 shall govern, except as otherwise specifically stated.

IN WITNESS WHEREOF, the parties hereto have caused this Agreement to be executed in *triplicate* original copies on the day and year first above written.

_____
(The Contractor)

By_____

Title_____

CITY OF KINGSVILLE_____
(City)

By_____
Mark McLaughlin

Title: **City Manager**_____

Corporate Certifications

I, _____, certify that I am the _____ of the corporation named as Contractor herein; that _____, who signed this Agreement on behalf of the Contractor, was then _____ of said corporation; that said Agreement was duly signed for and in behalf of said corporation by authority of its governing body, and is within the scope of its corporate powers.

Corporate
Seal

_____
(Corporate Secretary)

EQUAL OPPORTUNITY CLAUSE

(b) *Federally assisted construction contracts. Except as otherwise provided, each administering agency shall require the inclusion of the following language as a condition of any grant, contract, loan, insurance, or guarantee involving federally assisted construction which is not exempt from the requirements of the equal opportunity clause:*

The applicant hereby agrees that it will incorporate or cause to be incorporated into any contract for construction work, or modification thereof, as defined in the regulations of the Secretary of Labor at 41 CFR chapter 60, which is paid for in whole or in part with funds obtained from the Federal Government or borrowed on the credit of the Federal Government pursuant to a grant, contract, loan, insurance, or guarantee, or undertaken pursuant to any Federal program involving such grant, contract, loan, insurance, or guarantee, the following equal opportunity clause:

During the performance of this contract, the contractor agrees as follows:

(1) The contractor will not discriminate against any employee or applicant for employment because of race, color, religion, sex, sexual orientation, gender identity, or national origin. The contractor will take affirmative action to ensure that applicants are employed, and that employees are treated during employment without regard to their race, color, religion, sex, sexual orientation, gender identity, or national origin. Such action shall include, but not be limited to the following: Employment, upgrading, demotion, or transfer; recruitment or recruitment advertising; layoff or termination; rates of pay or other forms of compensation; and selection for training, including apprenticeship. The contractor agrees to post in conspicuous places, available to employees and applicants for employment, notices to be provided setting forth the provisions of this nondiscrimination clause.

(2) The contractor will, in all solicitations or advertisements for employees placed by or on behalf of the contractor, state that all qualified applicants will receive considerations for employment without regard to race, color, religion, sex, sexual orientation, gender identity, or national origin.

(3) The contractor will not discourage or in any other manner discriminate against any employee or applicant for employment because such employee or applicant has inquired about, discussed, or disclosed the compensation of the employee or applicant or another employee or applicant. This provision shall not apply to instances in which an employee who has access to the compensation information of other employees or applicants as a part of such employee's essential job functions discloses the compensation of such other employees or applicants to individuals who do not otherwise have access to such information, unless such disclosure is in response to a formal complaint or charge, in furtherance of an investigation, proceeding, hearing, or action, including an investigation conducted by the employer, or is consistent with the contractor's legal duty to furnish information.

(4) The contractor will send to each labor union or representative of workers with which he has a collective bargaining agreement or other contract or understanding, a notice to be provided advising the said labor union or workers' representatives of the contractor's commitments under this section, and shall post copies of the notice in conspicuous places available to employees and applicants for employment.

(5) The contractor will comply with all provisions of Executive Order 11246 of September 24, 1965, and of the rules, regulations, and relevant orders of the Secretary of Labor.

(6) The contractor will furnish all information and reports required by Executive Order 11246 of September 24, 1965, and by rules, regulations, and orders of the Secretary of Labor, or pursuant thereto, and will permit access to his books, records, and accounts by the administering agency and the Secretary of Labor for purposes of investigation to ascertain compliance with such rules, regulations, and orders.

(7) In the event of the contractor's noncompliance with the nondiscrimination clauses of this contract or with any of the said rules, regulations, or orders, this contract may be canceled, terminated, or suspended in whole or in part and the contractor may be declared ineligible for further Government contracts or federally assisted construction the Executive order. In addition, the applicant agrees that if it fails or refuses to comply with these undertakings, the administering agency may take any or all of the following actions: Cancel, terminate, or suspend in whole or in part this grant (contract, loan, insurance, guarantee); refrain from extending any further assistance to the applicant under the program with respect to which the failure or refund occurred until satisfactory assurance of future compliance has been received from such applicant; and refer the case to the Department of Justice for appropriate legal proceedings.

(c) Subcontracts. Each nonexempt prime contractor or subcontractor shall include the equal opportunity clause in each of its nonexempt subcontracts.

(d) Incorporation by reference. The equal opportunity clause may be incorporated by reference in all Government contracts and subcontracts, including Government bills of lading, transportation requests, contracts for deposit of Government funds, and contracts for issuing and paying U.S. savings bonds and notes, and such other contracts and subcontracts as the Deputy Assistant Secretary may designate.

(e) Incorporation by operation of the order. By operation of the order, the equal opportunity clause shall be considered to be a part of every contract and subcontract required by the order and the regulations in this part to include such a clause whether or not it is physically incorporated in such contracts and whether or not the contract between the agency and the contractor is written.

(f) Adaptation of language. Such necessary changes in language may be made in the equal opportunity clause as shall be appropriate to identify properly the parties and their undertakings.

[43 FR 49240, Oct. 20, 1978, as amended at 62 FR 66971, Dec. 22, 1997; 79 FR 72993, Dec. 9, 2014; 80 FR 54934, September 11, 2015]

A1001

Equal Opportunity Guidelines for Construction Contractors

Note: To be included in bid packet and distributed at the preconstruction conference (optional)

1. **What are the responsibilities of the offeror or bidder to ensure equal employment opportunity?**
   For contracts over $ 10,000, the offeror or bidder must comply with the "Equal Opportunity Clause" and the "Standard Federal Equal Opportunity Construction Contract Specifications."

2. **Are construction contractors required to ensure a legal working environment for all employees?**
   Yes, it is the construction contractor's responsibility to provide an environment free of harassment, intimidation, and coercion to all employees and to notify all foremen and supervisors to carry out this obligation, with specific attention to minority or female individuals.

3. **To alleviate developing separate facilities for men and women on all sites, can a construction contractor place all women employees on one site?**
   No, two or more women should be assigned to each site when possible.

4. **Are construction contractors required to make special outreach efforts to Section 3 or minority and female recruitment sources?**
   Yes, construction contractors must establish a current list of Section 3, minority and female recruitment sources. Notification of employment opportunities, including the availability of on-the-job training and apprenticeship programs, should be given to these sources. The efforts of the construction contractors should be kept in file.

5. **Should records be maintained on the number of Section 3 residents, minority and females applying for positions with construction contractors?**
   Yes, records must be maintained to include a current list of names, addresses and telephone numbers of all Section 3, minority and female applicants. The documentation should also include the results of the applications submitted.

6. **What happens if a woman or minority is sent to the union by the Contractor and is not referred back to the Contractor for employment?**
   If the unions impede the construction contractor's responsibility to provide equal employment opportunity, a written notice should be submitted to TDA.

7. **What efforts are made by construction contractors to create entry-level positions for Section 3 residents, women and minorities?**
   Construction contractors are required to develop on-the-job training programs, or participate in training programs, especially those funded by the Department of Labor, to create positions for Section 3 residents, women and minorities and to meet employment needs.

8. **Are any efforts made by the Contractor to publicize their Equal Employment Opportunity (EEO) policy?**
   Yes, the construction contractor is responsible for notifying unions and sources of training programs of their equal employment opportunity policy. Unions should be requested to cooperate in the effort of equal opportunity. The policy should be included in any appropriate manuals, or collective bargaining agreements. The construction contractor is encouraged to publicize the equal employment opportunity policy in the company newspaper and annual report. The Contractor is also responsible to include the EEO policy in all media advertisement.

9. **Are any in-service training programs provided for staff to update the EEO policy?**
   At least annually a review of the EEO policy and the affirmative action obligations are required of all personnel employees of a decision-making status. A record of the meeting including date, time, location, persons present, subject matter discussed, and disposition of the subject matter should be maintained.

10. **What recruitment efforts are made for Section 3 residents, minorities and women?**
    The construction contractor must notify both orally and in writing, Section 3, minority and female recruitment sources one month prior to the date of acceptance for apprenticeship or other training programs.

11. **Are any measures taken to encourage promotions for minorities and women?**
    Yes, an annual evaluation should be conducted for all minority and female personnel to encourage these employees to seek higher positions.

12. **What efforts are taken to ensure that personnel policies are in accordance with the EEO policy?**
    Personnel policies in regard to job practices, work assignments, etc. should be continually monitored to ensure that the EEO policy is carried out.

13. **Can women be excluded from utilizing any facilities available to men?**
    No, all facilities and company activities are non-segregated except for bathrooms or changing facilities to ensure privacy.

14. **What efforts should be utilized to include minority and female contractors and suppliers?**
    Take affirmative steps to ensure that small, minority, and women owned businesses are included on all lists for contractors/service providers. Solicit these businesses when issuing RFPs and RFQs and soliciting construction bids. Divide project activities into small tasks to allow participation. Keep records of all offers to minority and female construction contractors.

15. **If a construction contractor participates in a business related association that does not comply with equal opportunity affirmative action standards, does that show his/her failure to comply?**
    No, the construction contractor is responsible for its own compliance.

16. **Can a construction contractor hire a subcontractor who has been debarred from government contracts pursuant to EEO?**
    No. The construction contractor must suspend, terminate or cancel its contract with any Subcontractor who is in violation of the EEO policy.

17. **What effort has been taken by the construction contractor to monitor all employment to insure the company EEO policy is being carried out?**
    The construction contractor must designate a responsible individual to keep accurate records of all employees that includes specific information required by the government.

Federal Labor Standards Provisions

U.S. Department of Housing and Urban Development
Office of Labor Relations

Applicability

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

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

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

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

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

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

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

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

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

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

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

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

2. Withholding. HUD or its designee shall upon its own action or upon written request of an authorized representative of the Department of Labor withhold or cause to be withheld from the contractor under this contract or any other Federal contract with the same prime contractor, or any other Federally-assisted contract subject to Davis-Bacon prevailing wage requirements, which is held by the same prime contractor so much of the accrued payments or advances as may be considered necessary to pay laborers and mechanics, including apprentices, trainees and helpers, employed by the contractor or any subcontractor the full amount of wages required by the contract. In the event of failure to pay any laborer or mechanic, including any apprentice, trainee or helper, employed or working on the site of the work, all or part

of the wages required by the contract, HUD or its designee may, after written notice to the contractor, sponsor, applicant, or owner, take such action as may be necessary to cause the suspension of any further payment, advance, or guarantee of funds until such violations have ceased. HUD or its designee may, after written notice to the contractor, disburse such amounts withheld for and on account of the contractor or subcontractor to the respective employees to whom they are due. The Comptroller General shall make such disbursements in the case of direct Davis-Bacon Act contracts.

3. (i) Payrolls and basic records. Payrolls and basic records relating thereto shall be maintained by the contractor during the course of the work preserved for a period of three years thereafter for all laborers and mechanics working at the site of the work. Such records shall contain the name, address, and social security number of each such worker, his or her correct classification, hourly rates of wages paid (including rates of contributions or costs anticipated for bona fide fringe benefits or cash equivalents thereof of the types described in Section I(b)(2)(B) of the Davis-bacon Act), daily and weekly number of hours worked, deductions made and actual wages paid. Whenever the Secretary of Labor has found under 29 CFR 5.5 (a)(1)(iv) that the wages of any laborer or mechanic include the amount of any costs reasonably anticipated in providing benefits under a plan or program described in Section I(b)(2)(B) of the Davis-Bacon Act, the contractor shall maintain records which show that the commitment to provide such benefits is enforceable, that the plan or program is financially responsible, and that the plan or program has been communicated in writing to the laborers or mechanics affected, and records which show the costs anticipated or the actual cost incurred in providing such benefits. Contractors employing apprentices or trainees under approved programs shall maintain written evidence of the registration of apprenticeship programs and certification of trainee programs, the registration of the apprentices and trainees, and the ratios and wage rates prescribed in the applicable programs. (Approved by the Office of Management and Budget under OMB Control Numbers 1215-0140 and 1215-0017.)

(ii) (a) The contractor shall submit weekly for each week in which any contract work is performed a copy of all payrolls to HUD or its designee if the agency is a party to the contract, but if the agency is not such a party, the contractor will submit the payrolls to the applicant sponsor, or owner, as the case may be, for transmission to HUD or its designee. The payrolls submitted shall set out accurately and completely all of the information required to be maintained under 29 CFR 5.5(a)(3)(i). This information may be submitted in any form desired. Optional Form WH-347 is available for this purpose and may be purchased from the Superintendent of Documents (Federal Stock Number 029-005-00014-1), U.S. Government Printing Office, Washington, DC 20402. The prime contractor is responsible for the submission of copies of payrolls by all subcontractors. (Approved by the Office of Management and Budget under OMB Control Number 1215-0149.)

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

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

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

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

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

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

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

4. Apprentices and Trainees.

(i) Apprentices. Apprentices will be permitted to work at less than the predetermined rate for the work they performed when they are employed pursuant to and individually registered in a bona fide apprenticeship program registered with the U.S. Department of Labor, Employment and Training Administration, Office of Apprenticeship Training, Employer and Labor Services, or with a State Apprenticeship Agency recognized by the Office, or if a person is employed in his or her first 90 days of probationary employment as an apprentice in such an apprenticeship program, who is not individually registered in the program, but who has been certified by the Office of Apprenticeship Training, Employer and Labor Services or a State Apprenticeship Agency (where appropriate) to be eligible for probationary employment as an apprentice. The allowable ratio of apprentices to journeymen on the job site in any craft classification shall not be greater than the ratio permitted to the contractor as to the entire work force under the registered program. Any worker listed on a payroll at an apprentice wage rate, who is not registered or otherwise employed as stated above, shall be paid not less than the applicable wage rate on the wage determination for the classification of work actually performed. In addition, any apprentice performing work on the job site in excess of the ratio permitted under the registered program shall be paid not less than the applicable wage rate on the wage determination for the work actually performed. Where a contractor is performing construction on a project in a locality other than that in which its program is registered, the ratios and wage rates (expressed in percentages of the journeyman's hourly rate) specified in the contractor's or subcontractor's registered program shall be observed. Every apprentice must be paid at not less than the rate specified in the registered program for the apprentice's level of progress, expressed as a percentage of the

journeymen hourly rate specified in the applicable wage determination. Apprentices shall be paid fringe benefits in accordance with the provisions of the apprenticeship program. If the apprenticeship program does not specify fringe benefits, apprentices must be paid the full amount of fringe benefits listed on the wage determination for the applicable classification. If the Administrator determines that a different practice prevails for the applicable apprentice classification, fringes shall be paid in accordance with that determination. In the event the Office of Apprenticeship Training, Employer and Labor Services, or a State Apprenticeship Agency recognized by the Office, withdraws approval of an apprenticeship program, the contractor will no longer be permitted to utilize apprentices at less than the applicable predetermined rate for the work performed until an acceptable program is approved.

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

(iii) Equal employment opportunity. The utilization of apprentices, trainees and journeymen under 29 CFR Part 5 shall be in conformity with the equal employment opportunity requirements of Executive Order 11246, as amended, and 29 CFR Part 30.

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

6. Subcontracts. The contractor or subcontractor will insert in any subcontracts the clauses contained in subparagraphs 1 through 11 of this paragraph A and such other clauses as HUD or its designee may by appropriate instructions require, and a copy of the applicable prevailing wage decision, and also a clause requiring the subcontractors to include these clauses in any lower tier subcontracts. The prime contractor shall be responsible for the compliance by any subcontractor or lower tier subcontractor with all the contract clauses in this paragraph.

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

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

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

10. (i) Certification of Eligibility. By entering into this contract the contractor certifies that neither it (nor he or she) nor any person or firm who has an interest in the contractor's firm is a person or firm ineligible to be awarded Government contracts by virtue of Section 3(a) of the Davis-Bacon Act or 29 CFR 5.12(a)(1) or to be awarded HUD contracts or participate in HUD programs pursuant to 24 CFR Part 24.

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

(iii) The penalty for making false statements is prescribed in the U.S. Criminal Code, 18 U.S.C. 1001. Additionally, U.S. Criminal Code, Section 1 01 0, Title 18, U.S.C., "Federal Housing Administration transactions", provides in part: "Whoever, for the purpose of . . . influencing in any way the action of such Administration..... makes, utters or publishes any statement knowing the same to be false..... shall be fined not more than $5,000 or imprisoned not more than two years, or both."

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

B. Contract Work Hours and Safety Standards Act. The provisions of this paragraph B are applicable only where the amount of the prime contract exceeds $100,000. As used in this paragraph, the terms "laborers" and "mechanics" include watchmen and guards.

(1) Overtime requirements. No contractor or subcontractor contracting for any part of the contract work which may require or involve the employment of laborers or mechanics shall require or permit any such laborer or mechanic in any workweek in which he or she is employed on such work to work in excess of 40 hours in such workweek unless such laborer or mechanic receives compensation at a rate not less than one and one-half times the basic rate of pay for all hours worked in excess of 40 hours in such workweek.

(2) Violation; liability for unpaid wages; liquidated damages. In the event of any violation of the clause set forth in subpara-

graph (1) of this paragraph, the contractor and any subcontractor responsible therefor shall be liable for the unpaid wages. In addition, such contractor and subcontractor shall be liable to the United States (in the case of work done under contract for the District of Columbia or a territory, to such District or to such territory), for liquidated damages. Such liquidated damages shall be computed with respect to each individual laborer or mechanic, including watchmen and guards, employed in violation of the clause set forth in subparagraph (1) of this paragraph, in the sum of $10 for each calendar day on which such individual was required or permitted to work in excess of the standard workweek of 40 hours without payment of the overtime wages required by the clause set forth in sub paragraph (1) of this paragraph.

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

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

C. Health and Safety. The provisions of this paragraph C are applicable only where the amount of the prime contract exceeds $100,000.

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

(2) The Contractor shall comply with all regulations issued by the Secretary of Labor pursuant to Title 29 Part 1926 and failure to comply may result in imposition of sanctions pursuant to the Contract Work Hours and Safety Standards Act, 40 USC 3701 et seq.

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

Title 29 — LABOR

Subtitle A — Office of the Secretary of Labor

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

Sec.

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

SOURCE: The provisions of this Part 3 appear at 29 F.R. 97, Jan. 4, 1964, unless otherwise noted.

Section 3.1 Purpose and Scope.

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

Section 3.2 Definitions.

As used in the regulations in this part:

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

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

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

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

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

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

(g) The term "Federal agency" means the United States, the District of Columbia, and all executive departments, independent establishments, administrative agencies, and instrumentality's of the United States and of the District of Columbia, including corporations, all or substantially all of the stock of which is beneficially owned by the United States, by the District of Columbia, or any of the foregoing departments, establishments, agencies, and instrumentality's.

{29 FR 97, Jan. 4, 1964, as amended at 33 FR 32575, Nov. 27, 1973}

Section 3.3 Weekly statement with respect to payment of wages.

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

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

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

(d) Upon a written finding by the head of a Federal agency, the Secretary of Labor may provide reasonable limitations, variations, tolerances, and exemptions from the requirements of this section subject to such conditions as the Secretary of Labor may specify.
{29 F.R. 95, Jan. 4, 1964, as amended at 33 F.R. 10186, July 17, 1968}

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

(a) Each weekly statement required under §3.3 shall be delivered by the contractor or subcontractor, within seven days after the regular payment date of the payroll period, to a representative of a Federal or State agency in charge at the site of the building or work, or if there is no representative of a Federal or State agency at the site of the building or work, the statement shall be mailed by the contractor or subcontractor, within such time, to a Federal or State agency contracting for or financing the building or work. After such examination and check as may be made, such statement, or a copy thereof, shall be kept available, or shall be transmitted together with a report of any violation, in accordance with applicable procedures prescribed by the United States Department of Labor.

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

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

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

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

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

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

(d) Any deduction constituting a contribution on behalf of the person employed to funds established by the employer or representatives of employees, or both, for the purpose of providing either from principal or income, or both, medical or hospital care, pensions, or annuities on retirement, death benefits, compensation for injuries, illness, accidents, sickness, or disability, or for insurance to provide any of the foregoing, or unemployment benefits, vacation pay, savings accounts, or similar payments for the benefit of employees, their families and dependents: Provided, however, That the following standards are met: (1) The deduction is not otherwise prohibited by law; (2) it is either: (i) Voluntarily consented to by the employee in writing and in advance of the period in which the work is to be done and such consent is not a condition either for the obtaining of or for the continuation of employment, or (ii) provided for in a bona fide collective bargaining agreement between the contractor or subcontractor and representatives of its employees; (3) no profit or other benefit is otherwise obtained, directly or indirectly, by the contractor or subcontractor or any affiliated person in the form of commission, dividend, or otherwise; and (4) the deductions shall serve the convenience and interest of the employee.

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

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

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

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

(i) Any deductions to pay regular union initiation fees and membership dues, not including fines or special assessments:

Provided, however, that a collective bargaining agreement between the contractor or subcontractor and representatives of its employees provides for such deductions and the deductions are not otherwise prohibited by law.
(j) Any deduction not more than for the "reasonable cost" of board, lodging, or other facilities meeting the requirements of section 3(m) of the Fair Labor Standards Act of 1938, as amended, and Part 531 of this title. When such a deduction is made the additional records required under §516.27(a) of this title shall be kept.

(k) Any deduction for the cost of safety equipment of nominal value purchased by the employee as his own property for his personal protection in his work, such as safety shoes, safety glasses, safety gloves, and hard hats, if such equipment is not required by law to be furnished by the employer, if such deduction is not violative of the Fair Labor Standards Act or prohibited by other law, if the cost on which the deduction is based does not exceed the actual cost to the employer where the equipment is purchased from him and does not include any direct or indirect monetary return to the employer where the equipment is purchased from a third person, and if the deduction is either (1) voluntarily consented to be the employee in writing and in advance of the period in which the work is to be done and such consent is not a condition either for the obtaining of employment or its continuance; or (2) provided for in a bona fide collective bargaining agreement between the contractor or subcontractor and representatives of its employees.
{36 F.R. 9770, May 28, 1971.}

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

Any contractor or subcontractor may apply to the Secretary of Labor for permission to make any deduction not permitted under §3.5. The Secretary may grant permission whenever he finds that:

(a) The contractor, subcontractor, or any affiliated person does not make a profit or benefit directly or indirectly from the deduction either in the form of a commission, dividend, or otherwise;

(b) The deduction is not otherwise prohibited by law;

(c) The deduction is either (1) voluntarily consented to by the employee in writing and in advance of the period in which the work is to be done and such consent is not a condition either for the obtaining of employment or its continuance, or (2) provided for in a bona fide collective bargaining agreement between the contractor or subcontractor and representatives of its employees; and
(d) The deduction serves the convenience and interest of the employee.

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

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

(a) The application shall be in writing and shall be addressed to the Secretary of Labor.

(b) The application need not identify the contract or contracts under which the work in question is to be performed. Permission will be given for deductions on all current and future contracts of the applicant for a period of 1 year. A renewal of permission to make such payroll deduction will be granted

upon the submission of an application which makes reference to the original application, recites the date of the Secretary of Labor's approval of such deductions, states affirmatively that there is continued compliance with the standards set forth in the provisions of §3.6, and specifies any conditions which have changed in regard to the payroll deductions.
{36 F.R. 9770, May 28, 1971.}

(c) The application shall state affirmatively that there is compliance with the standards set forth in the provisions of §3.6. The affirmation shall be accompanied by a full statement of the facts indicating such compliance.

(d) The application shall include a description of the proposed deduction, the purpose to be served thereby, and the classes of laborers or mechanics from whose wages the proposed deduction would be made.

(e) The application shall state the name and business of any third person to whom any funds obtained from the proposed deductions are to be transmitted and the affiliation of such person, if any, with the applicant.

Section 3.8 Action by the Secretary of Labor upon applications.

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

Section 3.9 Prohibited payroll deductions.

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

Section 3.10 Methods of payment of wages.

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

Section 3.11 Regulations part of contract.

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

SECTION 504 CERTIFICATION

POLICY OF NONDISCRIMINATION ON THE BASIS OF DISABILITY

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

(Name) _____

(Address) _____

_____

City State Zip

Telephone Number ( ) _____ - _____ Voice

( ) _____ - _____ TDD

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

SECTION 504 CERTIFICATION

POLICY OF NONDISCRIMINATION ON THE BASIS OF DISABILITY

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

(Name) _____

(Address) _____

_____

City State Zip

Telephone Number ( ) _____ - _____ Voice

( ) _____ - _____ TDD

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

U.S. DEPARTMENT OF HOUSING AND URBAN DEVELOPMENT
CONTRACTOR'S CERTIFICATION

CONCERNING LABOR STANDARDS AND PREVAILING WAGE REQUIREMENTS

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

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

   (a) The Labor Standards provisions are included in the aforesaid contract,

   (b) Correction of any infractions of the aforesaid conditions, including infractions by any subcontractors and any lower tier subcontractors, is Contractor's responsibility.

2. Certifies that:

   (a) Neither Contractor nor any firm, partnership or association in which it has substantial interest is designated as an ineligible contractor by the Comptroller General of the United States pursuant to Section 5.6(b) of the Regulations of the Secretary of Labor, Part 5 (29 CFR, Part 5) or pursuant to Section 3(a) of the Davis-Bacon Act, as amended.

   (b) No part of the aforementioned contract has been or will be subcontracted to any subcontractor if such subcontractor or any firm, corporation, partnership or association in which such subcontractor has a substantial interest is designated as an ineligible contractor pursuant to any of the aforementioned regulatory or statutory provisions.

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

4. Certifies that:

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

   (b) The undersigned is (choose one):

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

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

NAME	TITLE	ADDRESS

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

NAME	ADDRESS	NATURE OF INTEREST

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

NAME	ADDRESS	TRADE CLASSIFICATION

(Contractor)

Date _____

By _____

BID BOND

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

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

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

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

(SEAL)

_____

(SEAL)

Attest: By: _____

Affix Corporate Seal

Attest: By: _____

Affix Corporate Seal

Attest: By: _____

Countersigned

By _____

* Attorney-in-Fact, State of _____

CERTIFICATE AS TO CORPORATE PRINCIPAL

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

Corporate Seal

Title: _____

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

INSERT CERTIFICATE OF LIABILITY INSURANCE

PAYMENT BOND

KNOW ALL MEN BY THESE PRESENTS that:

_____
(Name of Contractor or Company)

_____
(Address)

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

and _____
(Name of Surety Company)

_____
(Address)
hereinafter called Surety, are held and firmly bound unto

_____
(Name of Recipient)

_____
(Recipient's Address)

hereinafter called OWNER, in the penal sum of $ _____

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

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

_____
(Project Name)
_____

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

PROVIDED, FURTHER, that the said Surety, for value received hereby stipulates and agrees that no change, extension of time, alteration or addition to the terms of the contract or to WORK to be performed

thereunder or the SPECIFICATIONS accompanying the same shall in any way affect its obligation on this BOND, and it does hereby waive notice of any such change, extension of time, alteration or addition to the terms of the contract or to the WORK or to the SPECIFICATIONS.

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

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

ATTEST: _____
(Principal)

_____ By _____ (s)
(Principal Secretary)

(SEAL)

_____
(Witness as to Principal) (Address)

_____ _____
(Address)

ATTEST: _____
(Surety)

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

_____ _____
(Address) (Address)

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

PERFORMANCE BOND

KNOW ALL MEN BY THESE PRESENTS that:

_____
(Name of Contractor or Company)

_____
(Address)

a _____ hereinafter called Principal, and

_____
(Name of Surety Company)

_____
(Address)

hereinafter called Surety, are held and firmly bound unto

CITY OF KINGSVILLE, TEXAS
(Name of Recipient)

400 WEST KING AVENUE, KINGSVILLE, TEXAS 78363
(Grant Recipient's Address)

hereinafter called OWNER, in the penal sum of $ _____

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

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

_____

_____

_____

NOW THEREFORE, if the Principal shall well, truly and faithfully perform its duties in all the undertakings, covenants, terms, conditions, and agreements of said contract during the original term

thereof, and any extensions thereof which may be granted by the OWNER, with or without notice to the Surety and during the one year guaranty period, and if he shall satisfy all claims and demands incurred under such contract, and shall fully indemnify and save harmless the OWNER from all costs and damages which it may suffer by reason of failure to do so, and shall reimburse and repay the OWNER all outlay and expense which the OWNER may incur in making good any default, then this obligation shall be void, otherwise to remain in full force and effect.

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

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

IN WITNESS WHEREOF, this instrument is executed in _____

counterparts, each one of which shall be deemed an original, this the _____

day of _____.

ATTEST: _____
(Principal)

_____ By _____(s)
(Principal Secretary)

(SEAL)

_____ _____
(Witness as to Principal) (Address)

_____ _____
(Address)

_____

ATTEST: _____
(Surety)

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

_____ _____
(Address) (Address)

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

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

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

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

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

(SEAL)

_____

(SEAL)

Attest: By: _____

Affix
Corporate
Seal

Attest: By: _____

Affix
Corporate
Seal

Attest: By: _____

Countersigned

By _____

* Attorney-in-Fact, State of Texas

CERTIFICATE AS TO CORPORATE PRINCIPAL

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

Corporate
Seal

Title: _____

* Power-of-attorney for person signing for Surety Company must be attached to bond.

GENERAL CONDITIONS

GENERAL CONDITIONS
FOR CONSTRUCTION

1. Contract and Contract Documents

(a) The Plans, Specifications and Addenda shall form part of this contract and the provisions thereof shall be binding upon the parties as if they were herein fully set forth.

2. Definitions

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

(a) The term "Contract" means the Contract executed between the City of Kingsville, hereinafter called the "City" or "Owner" and (_____), hereinafter called "Contractor", of which these GENERAL CONDITIONS, form a part.

(b) The term "Project Area" means the area within the specified Contract limits of the Improvements contemplated to be constructed in whole or in part under this contract.

(c) The term "Engineer" means the City of Kingsville Engineer, Engineer in charge, serving the City with architectural or engineering services, his successor, or any other person or persons, employed by the City for the purpose of directing or having in charge the work embraced in this Contract.

(d) The term "Contract Documents" means and shall include the following: Executed Contract, Addenda (if any), Invitation for Bids, Instructions to Bidders, Signed Copy of Bid, General Conditions, Special Conditions, Technical Specifications, and Drawings (as listed in the Schedule of Drawings).

3. Supervision by Contractor

(a) Except where the Contractor is an individual and personally supervises the work, the Contractor shall provide a competent superintendent, satisfactory to the Engineer, on the work at all times during working hours with full authority to act as Contractor's agent. The Contractor shall also provide adequate staff for the proper coordination and expediting of his work.

(b) The Contractor shall be responsible for all work executed under the Contract. Contractor shall verify all figures and elevations before proceeding with the work and will be held responsible for any error resulting from his failure to do so.

4. Subcontracts

(a) No proposed subcontractor shall be disapproved by the City except for cause.

(b) The Contractor shall be as fully responsible to the City for the acts and omissions of his subcontractors, and of persons either directly or indirectly employed by them.

(c) Nothing contained in the Contract shall create any contractual relation between any subcontractor and the City.

5. Fitting and Coordination of Work

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

6. Payments to Contractor

(a) Partial Payments

1) The Contractor shall prepare the requisition for partial payment as of the last day of the month and submit it, with the required number of copies, to the Engineer for approval. The amount of the payment due the Contractor shall be determined by adding to the total value of work completed to date, the value of materials properly stored on the site and deducting (1) ten percent (10%) of the total amount, to be retained until final payment, and (2) the amount of all previous payments. The total value of work completed to date shall be based on the estimated quantities of work completed and on the unit prices contained in the agreement. The value of materials properly stored on the site shall be based upon the estimated quantities of such materials and the invoice prices. Copies of all invoices shall be available for inspection of the Engineer.

2) Monthly or partial payments made by the City to the Contractor are advanced for the purpose of assisting the contractor to expedite the work of construction. The Contractor shall be responsible for the care and protection of all materials and work upon which payments have been made until final acceptance of such work and materials by the City. Such payments shall not constitute a waiver of the right of the City to require the fulfillment of all terms of the Contract and the delivery of all improvements embraced in this Contract complete and satisfactory to the City in all details.

(b) Final Payment

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

2) Before paying the final estimate, City shall require the Contractor to furnish releases or receipts from all subcontractors having performed any work and all persons having supplied materials, equipment (installed on the Project) and services to the Contractor. The City may make payment in part or in full to the Contractor without requiring the furnishing of such releases or receipts and any payments made shall in no way impair the obligations of any surety or sureties furnished under this Contract.

3) Any amount due the City under Liquidated Damages shall be deducted from the final payment due the contractor.

(c) Payments Subject to Submission of Certificates

Each payment to the Contractor by the City shall be made subject to submission by the Contractor of all written certifications required of it and its subcontractors.

(d) Withholding Payments

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

7. Changes in the Work

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

(b) Except for the purpose of affording protection against any emergency endangering health, life, limb or property, the Contractor shall make no change in the materials used or in the specified manner of constructing and/or installing the improvements or supply additional labor, services or materials beyond that actually required for the execution of the Contract, unless in pursuance of a written order from the City authorizing the Contractor to proceed with the change. No claim for an adjustment of the Contract Price will be valid unless so ordered.

(c) If applicable unit prices are contained in the Contract, the City may order the Contractor to proceed with desired unit prices specified in the Contract; provided that in case of a unit price contract the net value of all changes does not increase the original total amount of the agreement by more than twenty-five percent (25%) or decrease the original the total amount by eighteen percent (18%).

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

1) A detailed description of the change in the work.

2) The Contractor's proposal (if any) or a confirmed copy thereof.

3) A definite statement as to the resulting change in the contract price and/or time.

4) The statement that all work involved in the change shall be performed in accordance with contract requirements except as modified by the change order.

5) The procedures as outlined in this Section for a unit price contract also apply in any lump sum contract.

8. Claims for Extra Cost

(a) If the Contractor claims that any instructions by Drawings or otherwise involve extra cost or extension of time, he shall, within ten days after the receipt of such instructions, and in any event before proceeding to execute the work, submit his protest thereto in writing to the City, stating clearly and in detail the basis of his objections. No such claim will be considered unless so made.

(b) Claims for additional compensation for extra work, due to alleged errors in ground elevations, contour lines, or bench marks, will not be recognized unless accompanied by certified survey data, made prior to the time the original ground was disturbed, clearly showing that errors exist which resulted, or would result, in handling more material, or performing more work, than would be reasonably estimated from the Drawings and maps issued.

(c) Any discrepancies which may be discovered between actual conditions and those represented by the Drawings and maps shall be reported at once to the City and work shall not proceed except at the Contractor's risk, until written instructions have been received from the City.

(d) If, on the basis of the available evidence, the City determines that an adjustment of the Contract Price and/or time is justifiable, a change order shall be executed.

9. Termination, Delays, and Liquidated Damages

(a) Right of the City to Terminate Contract for Convenience

City may at any time and for any reasons terminate Contractor's services and work at City's convenience upon providing written notice to the Contractor specifying the extent of termination and the effective date. Upon receipt of such notice, Contractor shall, unless the notice directs otherwise, immediately discontinue the work and placing of orders for materials, facilities and supplies in connection with the performance of this Agreement.

Upon such termination, Contractor shall be entitled to payment only as follows: (1) the actual cost of the work completed in conformity with this Agreement; plus, (2) such other costs actually incurred by Contractor as are permitted by the prime contract and approved by City; (3) plus ten percent (10%) of the cost of the work referred to in subparagraph (1) above for overhead and profit. There shall be deducted from such sums as provided in this subparagraph the amount of any payments made to Contractor prior to the date of the termination of this Agreement. Contractor shall not be entitled to any claim or claim of lien against City for any additional compensation or damages in the event of such termination and payment.

(b) Right of the City to Terminate Contract for Cause

In the event that any of the provisions of this contract are violated by the Contractor, or by any subcontractors, the City may serve written notice upon the Contractor and the Surety of its intention to terminate the contract. The notices shall contain the reasons for such intention to terminate the contract, and unless such violation or delay shall cease and satisfactory arrangement of correction be made within ten days, the contract shall, upon the expiration of said ten (10) days, cease and terminate. In the event of any such termination, the City shall immediately serve notice thereof upon the Surety and the Contractor. The Surety shall have the right to take over and perform the contract. Provided, however, that if the Surety does not commence performance thereof within ten (10) days from the date of the mailing to such Surety of notice of termination, the City may take over the work and complete the project by bid/contract or by force account at the expense of the Contractor and his Surety shall be liable to the City for any excess cost incurred. In such event the City may take possession of and utilize in completing the work, such materials, appliances, and facility as may be on the site of the work and necessary therefore.

(c) Liquidated Damages for Delays.

If the work is not completed within the time stipulated in the applicable bid for Lump Sum or Unit Price Contract provided, the Contractor shall pay to the City as fixed, agreed, and liquidated damages (it being impossible to determine the actual damages occasioned by the delay) the amount of **$200.00** for each calendar day of delay, until the work is completed. The Contractor and Contractor's sureties shall be liable to the City for the amount thereof.

(d) Excusable Delays.

1) The right of the Contractor to proceed shall not be terminated nor shall the Contractor be charged with liquidated damages for any delays in the completion of the work due to:

2) Any acts of the Government, including controls or restrictions upon or requisitioning of materials, equipment, tools, or labor by reason of war, national defense, or any other national emergency;

3) Any acts of the City;

4) Causes not reasonably foreseeable by the parties to this Contract at the time of execution which are beyond the control and without the fault or negligence of the Contractor, including, but not restricted to, acts of God, terrorism, war, acts of another Contractor in the performance of some other contract with the City, fires, floods, epidemics, quarantine, restrictions, strikes, freight embargoes, and weather of unusual severity such as hurricanes, tornadoes, cyclones and other extreme weather conditions.

5) Provided, however, that the Contractor promptly notifies the City within ten (10) days in writing of the cause of the delay. Upon receipt of such notification, the City shall ascertain the facts and the cause and extent of delay. If, upon the basis of the facts and the terms of this contract, the delay is properly excusable, the City shall extend the time for completing the work for a period of time commensurate with the period of excusable delay.

10. Assignment or Novation

The Contractor shall not assign nor transfer, whether by assignment or novation, any of its rights, duties, benefits, obligations, liabilities, or responsibilities under this Contract without the written consent of the City. No assignment or novation of this Contract shall be valid unless the assignment or novation expressly provides that the assignment of any of the Contractor's rights or benefits under the Contract is subject to a prior lien for labor performed, services rendered, and materials, tools, and equipment supplied for the performance of the work under this Contract in favor of all persons, Contractors, or corporations rendering such labor or services or supplying such materials, tools, or equipment.

11. Technical Specifications and Drawings

Anything mentioned in the Technical Specifications and not shown on the Drawings or vice versa shall be of like effect as if shown on or mentioned in both. In case of difference between Drawings and Technical Specifications, the Technical Specifications shall govern. In case of any discrepancy in Drawings, or Technical Specifications, the matter shall be immediately submitted to the City for review. Contractor shall be liable for any issues or expenses in the event the discrepancy is not submitted to the City.

12. Shop Drawings

(a) All required shop drawings, machinery details, layout drawings, etc. shall be submitted to the Engineer in hard copies for approval sufficiently in advance of requirements to afford ample time for checking,

including time for correcting, resubmitting and rechecking if necessary. The Contractor may proceed, only at Contractor's own risk, with manufacture or installation of any equipment or work covered by said shop drawings, etc. until they are approved and no claim, by the Contractor, for extension of the contract time shall be granted by reason of his failure in this respect.

(b) Any drawings submitted without the Contractor's stamp of approval will not be considered and will be returned to him for proper resubmission. If any drawings show variations from the requirements of the Contract because of standard shop practice or other reason, the Contractor shall make specific mention of such variation in his letter of transmittal in order that, if acceptable, suitable action may be taken for proper adjustment of contract price and/or time, otherwise the Contractor will not be relieved of the responsibility for executing the work in accordance with the Contract even though the drawings have been approved.

(c) If a shop drawing is in accordance with the contract or involves only minor adjustment in the interest of the City not involving a change in contract price or time, the engineer may approve the drawing. The approval shall not relieve the Contractor from responsibility to adhere to the contract or for any error in the drawing.

13. Requests for Supplementary Information

It shall be the responsibility of the Contractor to make timely requests of the City for any additional information which should be furnished by the City under the terms of this Contract, and which is required in the planning and execution of the work. Such requests may be submitted from time to time as the need approaches, but each shall be filed in ample time to permit appropriate action to be taken by all parties involved so as to avoid delay. Each request shall be in writing, and list the various items and the latest date by which each will be required by the Contractor. The first list shall be submitted within two weeks after Contract award and shall be as complete as possible at that time. The Contractor shall, if requested, furnish promptly any assistance and information the Engineer may require in responding to these requests of the Contractor. The Contractor shall be fully responsible for any delay in his work or to others arising from his failure to comply fully with the provision of this section.

14. Materials and Workmanship

(a) Unless otherwise specifically provided for in the technical specifications, all workmanship, equipment, materials and articles incorporated in the work shall be new and the best grade of the respective kinds for the purpose. Where equipment, materials, articles or workmanship are referred to in the technical specifications as "equal to" any particular standard, the Engineer shall decide the question of equality.

(b) The Contractor shall furnish to the City for approval the manufacturer's detailed specifications for all machinery, mechanical and other special equipment, which he contemplates installing together with full information as to type, performance characteristics, and all other pertinent information as required, and shall likewise submit for approval full information concerning all other materials or articles which he proposes to incorporate.

(c) Machinery, mechanical and other equipment, materials or articles installed or used without such prior approval shall be at the risk of subsequent rejection.

(d) Materials specified by reference to the number or symbol of a specific standard, shall comply with requirements in the latest revision thereof and any amendment or supplement thereto in effect on the date of the Invitation for Bids, except as limited to type, class or grade, or modified in the technical specifications shall have full force and effect as though printed therein.

(e) The City may require the Contractor to dismiss from the work such employee or employees as the City or the Engineer may deem unqualified.

15. Samples, Certificates and Tests

(a) The Contractor shall submit all material or equipment samples, certificates, affidavits, etc., as called for in the contract documents or required by the Engineer, promptly after award of the contract and acceptance of the Contractor's bond. No such material or equipment shall be manufactured or delivered to the site, except at the Contractor's own risk, until the required samples or certificates have been approved in writing by the Engineer. Any delay in the work caused by late or improper submission of samples or certificates for approval shall not be considered just cause for an extension of the contract time.

(b) Each sample submitted by the Contractor shall carry a label giving the name of the Contractor, the project for which it is intended, and the name of the producer. The accompanying certificate or letter from the Contractor shall state that the sample complies with contract requirements, shall give the name and brand of the product, its place of origin, the name and address of the producer and all specifications or other detailed information which will assist the Engineer in making a prompt decision regarding the acceptability of the sample. It shall also include the statement that all materials or equipment furnished for use in the project will comply with the samples and/or certified statements.

(c) Approval of any materials shall be general only and shall not constitute a waiver of the City's right to demand full compliance with Contract requirements. After actual deliveries, the Engineer will have such check tests made as he deems necessary in each instance and may reject materials and equipment and accessories for cause, even though such materials and articles have been given general approval. If materials, equipment or accessories which fail to meet check tests have been incorporated in the work, the Engineer will have the right to cause their removal and replacement by proper materials or to demand and secure such reparation by the Contractor as is equitable.

(d) Except as otherwise specifically stated in the Contract, the costs of sampling and testing will be divided as follows:

1) The Contractor shall furnish without extra cost, including packing and delivery charges, all samples required for testing purposes, except those samples taken on the project by the Engineer;

2) The Contractor shall assume all costs of re-testing materials which fail to meet contract requirements;

3) The Contractor shall assume all costs of testing materials offered in substitution for those found deficient;

4) The City will pay all other expenses.

16. Permits and Codes

(a) The Contractor shall give all notices required by and comply with all applicable federal and state laws, ordinances, and codes of the Local Government. All construction work and/or utility installations shall comply with all applicable ordinances, and codes including all written waivers. Before installing any work, the Contractor shall examine the drawings and technical specifications for compliance with applicable ordinances and codes and shall immediately report any discrepancy to the City. Where the

requirements of the drawings and technical specifications fail to comply with such applicable ordinances or codes, the City will adjust the Contract by Change Order to conform to such ordinances or codes (unless waivers in writing covering the difference have been granted by the governing body or department) and make appropriate adjustment in the Contract Price or stipulated unit prices.

(b) Should the Contractor fail to observe the foregoing provisions and proceed with the construction and/or install any utility at variance with any applicable ordinance or code, including any written waivers (notwithstanding the fact that such installation is in compliance with the drawings and technical specifications), the Contractor shall remove such work without cost to the City.

(c) The Contractor shall at his own expense, secure and pay for all permits for street pavement, sidewalks, shed, removal of abandoned water taps, sealing of house connection drains, pavement cuts, buildings, electrical, plumbing, water, gas and sewer permits required by the local regulatory body or any of its agencies.

(d) The Contractor shall comply with applicable local laws and ordinances governing the disposal of surplus excavation, materials, debris and rubbish on or off the Project Area and commit no trespass on any public or private property in any operation due to or connected with the Improvements contained in this Contract.

(e) The Contractor will be required to make arrangements for and pay the water, electrical power, or any other utilities required during construction.

(f) During construction of this project, the Contractor shall use every means possible to control the amount of dust created by construction. Prior to the close of a day's work, the Contractor, if directed by the City, shall moisten the surrounding area to prevent a dusty condition.

17. Care of Work

(a) The Contractor shall be responsible for all damages to person or property that occur as a result of its fault or negligence in connection with the prosecution of the work and shall be responsible for the proper care and protection of all materials delivered and work performed until completion and final acceptance.

(b) In an emergency affecting the safety of life, limb or property, including adjoining property, the Contractor, without special instructions or authorization from the City is authorized to act to prevent such threatened loss or injury. Contractor shall follow all instructions of City.

(c) The Contractor shall avoid damage as a result of his operations to existing sidewalks, streets, curbs, pavements, utilities (except those which are to be replaced or removed), adjoining property, etc., and shall be responsible for completely repairing any damage thereto caused by the operations.

(d) The Contractor shall shore up, brace, underpin, secure, and protect as maybe necessary, all foundations and other parts of existing structures adjacent to, adjoining, and in the vicinity of the site, which may be in any way affected by the excavations or other operations connected with the construction of the improvements included in this Contract. The Contractor shall be responsible for the giving of any and all required notices to any adjoining or adjacent property owner or other party before the commencement of any work. The Contractor shall indemnify and save harmless the City from any damages on account of settlements or the loss of lateral support of adjoining property and from all loss or expense and all damages for which the City may become liable in consequence of such injury or damage to adjoining and adjacent structures and their premises.

18. Accident Prevention

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

(b) The Contractor shall exercise proper precaution at all times for the protection of persons and property and shall be responsible for all damages to persons or property, either on or off the site, which occur as a result of his prosecution of the work.

(c) The Contractor shall maintain an accurate record of all cases of death, occupational disease, or injury requiring medical attention or causing loss of time from work, arising out of and in the course of employment on work under the Contract. The Contractor shall promptly furnish the City with reports concerning these matters.

(d) The Contractor shall indemnify and hold harmless the City from any claims for damages resulting from property damage, personal injury and/or death suffered or alleged to have been suffered by any person as a result of any work conducted under this contract.

(e) The Contractor shall provide trench safety for all excavations more than five feet deep prior to excavation. All OSHA Standards for trench safety must be adhered to by the Contractor.

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

19. Sanitary Facilities

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

20. Use of Premises

(a) The Contractor shall confine equipment, storage of materials, and construction operations to the contract limits as shown on the drawings and as prescribed by ordinances or permits, or as may be desired by the City, and shall not unreasonably encumber the site or public rights of way with materials and construction equipment.

(b) The Contractor shall comply with all reasonable instructions of the City and all existing federal, state and local regulations regarding signs, advertising, traffic, fires, explosives, danger signals, and barricades.

21. Removal of Debris, Cleaning, Etc.

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

22. Inspection

(a) All materials and workmanship shall be subject to inspection, examination, or test by the City and Engineer at any and all times during manufacture or construction and at any and all places where such manufacture or construction occurs. The City shall have the right to reject defective material and workmanship or require its correction. Unacceptable workmanship shall be satisfactorily corrected. Rejected material shall be promptly segregated and removed from the Project Area and replaced with material of specified quality without charge. If the Contractor fails to proceed at once with the correction of rejected workmanship or defective material, the City may by contract or otherwise have the defects remedied or rejected materials removed from the Project Area and charge the cost of the same against any Monies which may be due the Contractor, without prejudice to any other rights or remedies of the City.

(b) The Contractor shall furnish promptly all materials reasonably necessary for any tests which may be required. All tests by the City will be performed in such manner as not to delay the work unnecessarily and will be made in accordance with the provisions of the technical specifications.

(c) The Contractor shall notify the City sufficiently in advance of back filling or concealing any facilities to permit proper inspection. If any facilities are concealed without approval or consent of the City, the Contractor shall uncover for inspection and recover such facilities at Contractor's expense, when so requested by the City.

(d) Should it be considered necessary or advisable by the City at any time before final acceptance of the entire work to make an examination of work already completed, the Contractor shall on request promptly furnish all necessary facilities, labor, and material. If such work is found to be defective in any important or essential respect, due to fault of the Contractor or subcontractors, the Contractor shall defray all the expenses of such examination and of satisfactory reconstruction. If, however, such work is found to meet the requirements of the Contract, the actual cost of labor and material necessarily involved in the examination and replacement, shall be reimbursable and if completion of the work of the entire Contract has been delayed, a suitable extension of time will be approved.

(e) Inspection of materials and appurtenances to be incorporated in the improvements included in this Contract may be made at the place of production, manufacture or shipment, whenever the quantity justifies it, and such inspection and acceptance, unless otherwise stated in the technical specifications, shall be final, except as regards to: (1) latent defects, (2) departures from specific requirements of the Contract, (3) damage or loss in transit, or (4) fraud or such gross mistakes as amount to fraud. Subject to the requirements contained in the preceding sentence, the inspection of materials as a whole or in part will be made at the Project Site.

(f) Neither inspection, testing, approval nor acceptance of the work in whole or in part, by the City or its agents shall relieve the Contractor or its sureties of full responsibility for materials furnished or work performed not in strict accordance with the Contract.

23. Review by City

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

24. Final Inspection

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

25. Deduction for Uncorrected Work

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

26. Insurance

The Contractor shall not commence work under this contract until all required insurance under this paragraph has been secured and approved by the City.

(a) Worker's Compensation Insurance: The Contractor shall procure and shall maintain during the life of this contract Worker's Compensation Insurance as required by the State of Texas for all of his employees to be engaged in work at the site of the project under this contract and, in case of any such work sublet, the Contractor shall require the subcontractor similarly to provide Worker's Compensation Insurance for all of the employees to be engaged in such work unless such employees are covered by the protection afforded by the Contractor's Worker's Compensation Insurance.

(b) Contractor's Public Liability and Property Damage Insurance and Vehicle Liability Insurance: Please see the following Exhibit for the City of Kingsville's Insurance Requirements:

EXHIBIT

INSURANCE REQUIREMENTS

I. CONTRACTOR'S LIABILITY INSURANCE

A. Contractor must not commence work under this contract until all insurance required has been obtained and such insurance has been approved by the City. Contractor must not allow any subcontractor to commence work until all similar insurance required of any subcontractor has been obtained.

B. Contractor must furnish to the City's Risk Manager and Public Works Director, 1 copy of Certificates of Insurance (COI) with applicable policy endorsements showing the following minimum coverage by an insurance company(s) acceptable to the City's Risk Manager. The City of Kingsville must be listed as an additional insured on the General Liability and Auto Liability

policies **by endorsement**, and a waiver of subrogation is required on all applicable policies including Workers' Compensation. **Endorsements** must be provided with COI. Project name and or number must be listed in Description Box of COI.

TYPE OF INSURANCE	MINIMUM INSURANCE COVERAGE
30-written day notice of cancellation, required on all certificates or by applicable policy endorsements	**Bodily Injury and Property Damage** Per occurrence - aggregate
Commercial General Liability including: 1. Commercial Broad Form 2. Premises – Operations 3. Products/ Completed Operations 4. Contractual Liability 5. Independent Contractors	$1,000,000 Per Occurrence $2,000,000 Aggregate
AUTO LIABILITY (including) 1. Owned 2. Hired and Non-Owned 3. Rented/Leased	$1,000,000 Combined Single Limit
WORKERS' COMPENSATION EMPLOYER'S LIABILITY	Statutory $500,000 /$500,000 /$500,000

C. In the event of accidents of any kind related to this agreement, Contractor must furnish the Risk Manager with copies of all reports of any accidents within 10 days of the accident.

II. ADDITIONAL REQUIREMENTS

A. Applicable for paid employees, Contractor must obtain workers' compensation coverage through a licensed insurance company. The coverage must be written on a policy and endorsements approved by the Texas Department of Insurance. The workers' compensation coverage provided must be in an amount sufficient to assure that all workers' compensation obligations incurred by the Contractor will be promptly met.

B. Contractor shall obtain and maintain in full force and effect for the duration of this Contract, and any extension hereof, at Contractor's sole expense, insurance coverage written on an occurrence basis, by companies authorized and admitted to do business in the State of Texas and with an A.M. Best's rating of no less than A- VII.

C. Contractor shall be required to submit a copy of the replacement certificate of insurance to City at the address provided below within 10 days of the requested change. Contractor shall pay any costs incurred resulting from said changes. All notices required by this exhibit shall be given to City at the following address:

City of Kingsville
Attn: Risk Manager
P.O. Box 1458
Kingsville, TX 78364

D. **Contractor agrees that with respect to the above required insurance, all insurance policies are to contain or be endorsed to contain the following required provisions:**

- List the City of Kingsville and its officers, officials, employees, volunteers, and elected representatives as additional insured by endorsement, as respects operations, completed operation and activities of, or on behalf of, the named insured performed under contract with the City, with the exception of the workers' compensation policy;

- Provide for an endorsement that the "other insurance" clause shall not apply to the City of Kingsville where the City is an additional insured shown on the policy;

- Workers' compensation and employers' liability policies will provide a waiver of subrogation in favor of the City. An All States Endorsement will be required for companies not domiciled in Texas; and

- Provide thirty (30) calendar days advance written notice directly to City of any suspension, cancellation, non-renewal or material change in coverage, and not less than ten (10) calendar days advance written notice for nonpayment of premium.

E. Within five (5) calendar days of a suspension, cancellation, or non-renewal of coverage, Contractor shall provide a replacement Certificate of Insurance and applicable endorsements to City. City shall have the option to suspend Contractor's work should there be a lapse in coverage at any time during this contract. Failure to provide and to maintain the required insurance shall constitute a material breach of this contract.

F. In addition to any other remedies the City may have upon Contractor's failure to provide and maintain any insurance or policy endorsements to the extent and within the time herein required, the City shall have the right to order Contractor to stop work hereunder, and/or withhold any payment(s) if any, which become due to Contractor hereunder until Contractor demonstrates compliance with the requirements hereof.

G. Nothing herein contained shall be construed as limiting in any way the extent to which Contractor may be held responsible for payments of damages to persons or property resulting from Contractor's or its subcontractor's performance of the work covered under this contract.

H. It is agreed that Contractor's insurance shall be deemed primary and non-contributory with respect to any insurance or self-insurance carried by the City of Kingsville for liability arising out of operations under this contract.

I. It is understood and agreed that the insurance required is in addition to and separate from any other obligation contained in this contract.

(c) Proof of Insurance: The Contractor shall furnish the City with certificates showing the type, amount, class of operations covered, effective dates and date of expiration of policies. Such certificates shall also contain substantially the following statement: "The insurance covered by this certificate will not be canceled or materially altered, except after ten (10) days written notice has been received by the City."

27. Warranty of Title

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

28. Warranty of Workmanship and Materials

Neither the final certificate of payment nor any provision in the Contract nor partial or entire use of the improvements included in this Contract by the City or the public shall constitute an acceptance of work not done in accordance with the Contract or relieve the Contractor of liability in respect to any express warranties or responsibility for faulty materials or workmanship. The Contractor shall promptly remedy any defects in the work and pay for any damage to other work resulting therefrom which shall appear within a period of **12** months from the date of final acceptance of the work.

29. Job Offices

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

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

30. Partial Use of Site Improvements

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

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

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

31. Local Program Liaison

For purposes of this Agreement, the City's Capital Improvement's Manager or equivalent authorized person will serve as the Local Program Liaison and primary point of contact for the Contractor. All required progress reports and communication regarding the project shall be directed to this liaison and other local personnel as appropriate.

32. Records Retention

(a) The Contractor shall retain all required records for three years after the City makes its final payment and all pending matters are closed.

(b) Contractor shall include the substance of this clause in all subcontracts it awards.

33. Conflicts of interest.

(a) Governing Body. No member of the governing body of the City and no other officer, employee, or agent of the City, who exercises any functions or responsibilities in connection with administration, construction, engineering, or implementation of this award, shall have any personal financial interest, direct or indirect, in the Contractor or this Contract; and the Firm shall take appropriate steps to assure compliance.

(b) Other Local Public Officials. No other public official, who exercises any functions or responsibilities in connection with the planning and carrying out of administration, construction, engineering or implementation of this award, shall have any personal financial interest, direct or indirect, in the Contractor or this Contract; and the Contractor shall take appropriate steps to assure compliance.

34. Debarment and Suspension (Executive Orders 12549 and 12689)

The Contractor certifies, by entering into this Contract, that neither it nor its principals are presently debarred, suspended, or otherwise excluded from or ineligible for participation in federally-assisted programs under Executive Orders 12549 (1986) and 12689 (1989). The term "principal" for purposes of this Contract is defined as an officer, director, owner, partner, key employee, or other person with primary management or supervisory responsibilities, or a person who has a critical influence on or substantive control over the operations of the Contractor. The Contractor understands that it must not make any award or permit any award (or contract) at any tier to any party which is debarred or suspended or is otherwise excluded from or ineligible for participation in Federal assistance programs under Executive Order 12549, "Debarment and Suspension."

35. Procurement of Recovered Materials

The Contractor shall comply with section 6002 of the Solid Waste Act, as amended by the Resource Conservation and Recovery Act, procuring only items designated in guidelines of the Environmental Protection Agency (EPA) at 40 CFR part 247 that contain the highest percentage of recovered materials practicable, consistent with maintaining a satisfactory level of competition, where the purchase price of the item exceeds $10,000 or the value of the quantity acquired by the preceding fiscal year exceeded $10,000 as long as such procurement is economically feasible.

36. [For Contracts > $100K] Overtime Requirements

No Contractor or subcontractor contracting for any part of the Contract work which may require or involve the employment of laborers or mechanics, including watchmen and guards, shall require or permit any laborer or mechanic in any workweek in which he is employed on such work to work in excess of 40 hours in such work week unless such laborer or mechanic receives compensation at a rate not less than one and one-half times his basic rate of pay for all hours worked in excess of 40 hours in such work week, as the case may be.

37. [For Contracts > $150K] Clean Air Act and the Federal Water Pollution Control Act

The Contractor or subcontractor shall comply with all applicable standards, orders or regulations issued pursuant to the Clean Air Act (42 U.S.C. 7401–7671q) and the Federal Water Pollution Control Act as amended (33 U.S.C. 1251–1387). Violations must be reported to the Federal awarding agency and the Regional Office of the Environmental Protection Agency (EPA).

38. Contract Documents and Drawings

The City will furnish the Contractor without charge **5** copies of the Contract Documents, including Technical Specifications and Drawings. Additional copies requested by the Contractor will be furnished at cost.

39. Contract Period

The work to be performed under this contract shall commence within the time stipulated by the City in the Notice to Proceed, and shall be fully completed within **150** calendar days thereafter.

40. Liquidated Damages

Since the actual damages for any delay in completion of the work under this contract are impossible to determine, the Contractor and his Sureties shall be liable for and shall pay to the City the sum of Two-Hundred Dollars ($200) as fixed, agreed and liquidated damages for each calendar day of delay from the above stipulated time for completion.

SPECIAL CONDITIONS

SPECIAL CONDITIONS

DESCRIPTION OF WORK:

"2020 US 77 OVERPASS UTILITIES RELOCATION"

The Contractor shall furnish all labor, materials, equipment, tools, services and supervision necessary to perform all the work as described in the Proposal and shall deliver the work complete in all respects and in full accordance with the Contract Documents. All incidental services and materials which may be reasonably inferred as necessary to accomplish the intended end result shall be provided by the Contractor whether or not specifically shown on the Drawings or itemized in the Specifications.

CONSTRUCTION SEQUENCE:

Within ten (10) days after receiving a written "Notice to Proceed" the Contractor will be expected to pursue continuous progress of the overall Project from beginning of the work to completion. The Contractor will, in general, be left to schedule his work as he sees fit in so far as the Owner remains satisfied that an orderly progress is being made on the project to the extent of finishing within the stated contract time.

The Contractor will, however, be required to coordinate the sequencing of this work with the Owner and various utility companies, and any other individual or entity which may suffer inconvenience or damage as a result of a lack of cooperation in the construction of the project.

TIME OF COMPLETION:

Construction time is to start ten (10) days after receipt of a written "Notice to Proceed". All items of work contemplated in these Specifications and the accompanying drawings are to be fully complete in the number of days specified in the bid proposal. After the notification of final completion and a final inspection, Contractor shall have thirty (30) days to remedy any incomplete or defective work.

PROJECT MEETINGS:

Prior to starting work, the Contractor shall attend a pre-construction conference to review the Contractor's schedules, to establish procedures for processing applications for payment, and to establish a working understanding between Owner, Engineer and Contractor. Representatives of all parties shall be in attendance. Other meetings will be scheduled during the construction as need dictates.

LIQUIDATED DAMAGES FOR DELAY:

The Contractor agrees that a delay in substantial completion of the project beyond the total number of days anticipated for substantial completion plus such extensions to the allotted time as may be provided for in the General Conditions shall cause a damage to the Owner and that the Owner may withhold, permanently, from the Contractor's total compensation a sum of two hundred dollars ($200.00) per calendar day as the stipulated damages for such delay.

GUARANTEES:

The Contractor shall provide a warranty which shall guarantee work against defective materials and workmanship for a period of one (1) year from the date of issue of certificate of acceptance. Neither final acceptance nor final payment or any provision in the contract documents will relieve Contractor of above guarantee. Failure to repair or replace defect upon notice entitles Owner to repair or replace same and recover reasonable cost thereof from the Contractor and/or his surety.

PERMITS AND RIGHT-OF-WAY:

The Owner will provide right-of-way for the purpose of construction without cost to the Contractor by securing permits in areas of public dedication or by obtaining easements across privately owned property. It shall be the responsibility of the Contractor prior to the initiation of construction on easements through private property, or upon areas of public dedication, to familiarize himself with the requirements of the pertinent easement or permit and to abide by all of the stated terms of such easements or permits. The Contractor shall give notice of intent to begin construction on privately owned property or permitted areas as required by the relevant easement or permit but in no case less than 48 hours before commencing work.

MATERIALS AND EQUIPMENT:

Incorporate into work only new materials and equipment of domestic manufacture unless otherwise designated. Store these materials and equipment in manner to protect them from damage.

REPAIR OF DAMAGE:

Driveways, curbs, culverts, yards or items of private or public ownership, if damaged during the course of construction of this project, shall be, to the greatest extent practicable, repaired or replaced to the condition of such items before their being damaged, at no cost.

SITE MAINTENANCE AND CLEAN-UP:

Maintain work site during construction neat and free of trash, rubbish or other debris. In cleanup operations, remove from site temporary structures, rubbish and waste materials, and leave site in a neat and presentable condition throughout. Dispose of excavated material beyond that which is needed to bring site to required final elevations.

MEASUREMENT AND PAYMENT:

Estimated quantities shown in the Contract Documents are provided solely for the purpose of allowing a uniform comparison of submitted bids. Payment will be made on either the basis of actual measured quantities or a lump sum as may be relevant to the particular item. For those items for which payment is based on actual measured quantities, the Contractor shall verify all measurements at the site and shall be responsible for the correctness of same. Unit prices shall then be used to calculate payment. Methods of measurement shall be given in the Technical Specifications for each measured item.

RETAINAGE:

The Owner will retain from the Contractor's monthly estimate and request for payment an amount equal to 10% of the invoice amount. This 10% shall be retained by the Owner until final acceptance of the total project and then paid to the Contractor.

PAYMENT FOR MATERIALS ON SITE:

Contractor shall present to the Owner with his monthly estimate of production and request for payment a list of all material delivered to the project site, but not installed, with the total invoice cost of that material and the Owner shall pay to the Contractor the invoice cost of such material as has been verified by the Engineer to be "on site", less a 10% retainage. "On site" shall mean on or immediately adjacent to the work area or point of material installation, or a central storage yard or office area which has been set up for the project in the immediate project area. This does not include material in transit to the job site, material stored in yards or areas located in other towns, or materials stored in a manufacturer's warehouse, even though Contractor may have been invoiced for such material. Materials considered as consumables, i.e. chlorine for disinfection, testing pipe and equipment, etc., shall not be considered as material on-site, and only principle material items shall be considered for payment for material on-site.

STATE SALES TAX:

The improvements proposed for construction under the terms of these Contract Documents shall become a part of the utility system of the Owner. The Owner qualifies as an exempt organization under the Limited Sales Excise Tax Rules and Regulations of the State of Texas. Since the Owner and the Contractor shall be exempt from the state sales tax, the state sales tax shall not be included in the Bid.

Prior to the execution of the Contract, the Contractor shall obtain a Limited Sales Tax Permit and shall show evidence of this permit when signing the Contract. The Contractor shall then issue Resale Certificates in lieu of payment of the sales tax, on material purchased for incorporation into the project. These instructions are in strict compliance with the State Sales Tax Code, Section 151.311. The Contractor is assumed to be fully aware of the sales tax regulations and agrees to cooperate fully with the Owner claiming its lawful exemption from the state sales tax.

TRAFFIC CONTROL:

It will be the Contractor's responsibility to adequately provide for the safety of the public during the course of the construction of the project to include flagmen. No separate compensation will be paid to the Contractor for traffic control.

MATERIALS TESTING:

The Owner will provide for the initial testing of materials to be incorporated into the project to such extent as may be desired including the testing of concrete samples taken at the time of concrete placement. The Contractor shall be responsible for supplying samples of materials as may be required for testing. Any re-testing required shall be at the Contractor's expense as stated in the General Conditions.

WATER FOR CONSTRUCTION:

Water used for the mixing of concrete, jetting or flooding trenches, or testing, or any other purposes incidental to this project, will be furnished by the Contractor. If water is obtained from the Owner's water supply, the Contractor shall make the necessary arrangements for securing and transporting such water and shall take such water in a manner and at such times that will not produce a harmful drain or decrease pressure in the Owner's water system. There will be no charge to Contractor for water used in the construction of this project.

LINES AND GRADES:

Detailed construction staking shall be the full responsibility of the Contractor.

LOCATION OF AND DAMAGE TO EXISTING UTILITIES:

The Contractor shall be solely responsible for all above ground utilities, structures, and appurtenances in regard to protection and replacement or repair of same. The Contractor shall also be solely responsible for visible below ground utilities, structures and appurtenances that may be accurately located by removing manhole covers, valve box covers, and other access point coverings, with a reasonable effort on the part of two workmen, using hand tools for such removal and inspection. The cost of protecting, replacing, or repairing the utilities, structures, and appurtenances covered by this paragraph shall be borne solely by the Contractor and shall be included in the prices bid for the various affected items in the Contract.

The Contractor shall notify all private and public utilities 48 hours prior to performing any work in the vicinity of said utilities. Such 48-hour notice shall not include Saturdays, Sundays and holidays.

In those instances where faults, caverns or subsidence zones are encountered during construction, the design engineer will make the necessary adjustments and/or modifications to ensure proper installation. This subject is further defined in the detailed specification list which governs this project.

CONTRACTOR'S FIELD ADMINISTRATION STAFF:

The Contractor shall employ for this project, as its field administration staff, superintendents and foremen who are careful and competent and acceptable to the Owner. The criteria upon which the Owner shall make this determination shall include the following:

A. The superintendent shall have at least five (5) years experience in the day-to-day field management and oversight of projects of a similar size and complexity to the project which is the subject of this Contract. This experience shall include, but is not limited to, scheduling of manpower and materials, safety, coordination of subcontractors, and familiarity with the submittal process, federal and state wage rate requirements, and contract close-out procedures.

B. The foreman shall have at least five (5) years experience in oversight and management of the work of various subcontractors and crafts. Should the scope of the project be such that a foreman is not required, the Contractor's superintendent shall assume the responsibilities of a foreman.

Documentation concerning these matters shall be reviewed by the Owner. The Contractor's field administration staff, and any subsequent substitutions or replacements thereto, shall be approved by the Owner in writing prior to such superintendent or foreman assuming responsibilities on the project.

Such written approval of field administration staff is a prerequisite to the Owner's obligation to execute a contract for this project. If such approval is not obtained, the award may be rescinded. Further, such written approval is also necessary prior to a change in field administration staff during the term of this Contract. If the Contractor fails to obtain prior written approval of the Owner concerning any substitutions or replacements in its field administration staff for this project, the award may be rescinded. Further, such written approval is also necessary prior to a change in field administration staff during the term of this Contract. If the Contractor fails to obtain prior written approval of the Owner concerning any substitutions or replacements in its field administration staff for this project during the term of the Contract, such a failure will constitute a basis to annul the Contract.

CHARACTER OF WORKMEN AND CONDITION OF EQUIPMENT:

The Contractor shall employ such superintendents, foremen, and workmen as are careful and competent and the Engineer may demand the dismissal of any person or persons employed by the Contractor, in, about or on the work who shall misconduct himself or be incompetent or negligent in the proper performance of his or their duties or neglect or refuse to comply with the directions of the Engineer, and such person or persons shall not be employed thereon again without the written consent of the Engineer. All workmen shall have sufficient skill and experience to perform properly the work assigned them.

The Contractor shall furnish such equipment as is considered necessary for the prosecution of the work in an acceptable manner and at a satisfactory rate of progress. All equipment, tools and machinery used for handling materials and executing any part of the work shall be subject to the approval of the Engineer and shall be maintained in a satisfactory working condition. Equipment on any portion of the work shall be such that no injury to the work or adjacent property will result from its use.

AS-BUILT DRAWINGS:

Contractor shall maintain daily a set of "As-Built" drawings detailing the location and depths of new and existing utilities. The completed set of "As-Builts" shall be submitted to the ENGINEER at the completion of the project.

STATEMENT OF BIDDER'S QUALIFICATIONS

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

Date: _____

Bidder (Legal Name of Firm):_____

Date Organized:_____

Address :_____

_____:_____

Date Incorporated_____

Federal ID Number: _____

Number of Years in contracting business under present name_____

List all other names under which your business has operated in the last 10 years:

_____

_____

Work Presently Under Contract:

Contract	Amount $	Completion Date

Type of work performed by your company: _____

Total Staff employed by Firm (Break down by Managers and Trades on separate sheet):

_____

_____

_____

Have you ever failed to complete any work awarded to you?☐ Yes ☐ No
(If yes, please attach summary of details on a separate sheet. Include brief explanation of cause and resolution)

Have you ever defaulted on a contract?☐ Yes ☐ No
(If yes, please attach summary of details on a separate sheet.)

Has your organization had any disbarments or suspensions that have been imposed in the past five years or that was still in effect during the five-year period or is still in effect? ☐ Yes ☐ No

(If yes, list and explain; such list must include disbarments and suspensions of officers, principals, partners,
members, and employees of your organization.)

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

Project Amount $ Mo/Yr. Completed

_____

_____

_____

Major equipment available for this contract: _____

_____

_____

Are you in compliance with all applicable EEO requirements? ☐ Yes ☐ No
(If no, please attach summary of details on a separate sheet.))

Bank References

Address: _____ Contact Name: _____

City & State: _____Zip: _____Phone Number: _____

Credit available: $ _____

Has the firm or predecessor firm been involved in a bankruptcy or reorganization? ☐ Yes ☐ No
(If yes, please attach summary of details on a separate sheet.)

List on a sheet attached hereto all judgements, claims, arbitration proceedings, or suits pending or outstanding against bidder over the last five (5) years with amount of claim and brief description.

List on a sheet attached hereto all lawsuits or requested arbitration with regard to construction contracts which bidder has initiated within the last five (5) years and brief explanation of claim and outcome.

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

Signed this _____ day of _____, 20____.

_____
Signature

_____

Printed Name and Title

_____
Company Name

Notary Statement:

_____, being duly sworn, says that he/she is the _____Position/Title_____of_____ (Firm Name), and hereby swears that the answers to the foregoing questions and all statements therein contained are true and correct. He/she hereby authorizes and requests any person, firm, or corporation to furnish any information requested City of _____ in verification of the recitals comprising this Statement of Bidder's Qualifications.

Subscribed and sworn before me this _____day of _____, 20____.

Notary Public

_____
Signature

_____
Printed Name

My Commission Expires: _____,

The penalty for making false statements is prescribed in the U. S. Criminal Code, 18 U.S.C. 1001.

Section 4 — Buy America Guidelines

Overview

Buy America requires the use of domestic steel and iron in Title 23 funded highway contracts. The use of foreign steel or iron materials or products in a Federal-aid project is prohibited with few exceptions (e.g., temporary basis; manufactured products that are not predominantly steel and iron; minimal use; nationwide or individual waivers (very rare); etc.). Section 1518 of MAP-21 has modified 23 U.S.C. 313 to require Buy America on the basis of a contract's associated NEPA document. All contracts, irrespective of funding source, are subject to Buy America compliance if any contract to construct a portion of the NEPA project is or has been funded under Title 23. If a non-federal aid contract is awarded without the Buy America provisions on or after December 3 1, 2013, all subsequent contracts within the scope of the NEPA document would become ineligible for federal aid participation.

On federal—aid projects, utility facility owners will use domestically manufactured products that are composed predominately of steel and/or iron to incorporate into the permanent installation of the utility facility — in compliance with the Buy America provisions of 23 CFR 635.410 as amended. Examples of such products may include poles, cross arms, and structural support members; towers and girders used to comprise transmission towers and stand—alone structures; conductor support cables; high—strength bolts used as anchor bolts and anchor rods; iron or steel baseplates; encasement pipes, pipes and valves; rebar and other reinforcing iron/ steel for all cast—in—place and precast installations; conduit and ducting; fire hydrants; manhole covers, rims, and drop—inlet grates.

Utility agreements executed before Dec. 31, 2013, are not subject to Buy America requirements.

The date of the original Utility agreement will be used as the date to determine Buy America compliance if the Utility Agreement is amended after December 31, 2013,

unless the amendment includes major changes in the scope of work.

Non-domestic iron and steel materials may be used provided the cost of such materials does not exceed one-tenth of one percent (0.1%) of the individual Utility Agreement amount, or $2, 500.00 whichever is greater, per 23 CFR 635.410 (b) (4). The De Minimis equation is calculated by the following formula: Combined Cost of Only those Materials that are subject to Buy America and are Non-Compliant (limited to the individual Utility Agreement) divided by the Total Utility Relocation Cost (cited in the individual Utility Agreement).

Documentation Requirements for Buy America

The supplier must furnish the following for verifying compliance with Buy America requirements (domestic origin) of steel and iron material:

- *Form 1818 Material Statement* – this form is to be completed and furnished by the supplier of materials. This form, when completed, should contain certification by the utility with attached evidence of compliance from the supplier / manufacturer.

- And one of the following (or a combination):

  - The Mill Test Report (MTR) issued and signed by the initial fabricator stating that the materials subject to Buy America were melted and manufactured in the United Stated; written certification from the factory(s).

  - Written certification signed by the vendor on company letterhead, or other acceptable documentation, signed by an authorized representative of the vendor declaring that all supplied materials subject to the Buy America provisions are fully compliant.

  - Other written statements on company letterhead, or other acceptable documentation, signed by an authorized representative, from the manufacturers providing any additional treatment to the fabricated material (such as blasting, galvanizing or painting) stating that all treatment processes occurred in the United States.

Additional Consideration to Certification Methods

Utility owners will bear responsibility to ensure all materials permanently incorporated into their utility relocations are either compliant or not required to be compliant with Buy America requirements.

Where a utility purchases manufactured products from a vendor for use by the owner in its relocation activities, a certification from the vendor to the utility that the materials meet Buy America requirements shall be deemed to constitute compliance by the utility owner.

Where a utility owner obtains construction services in connection with utility relocation work and the provider of construction services is also responsible for sourcing of manufactured products used in connection with that project, a certification from the provider of construction services that the materials provided meets Buy America requirements is sufficient.

Materials purchased from a TxDOT approved supplier of the same or similar item will not require any supporting documentation other than a certified Form 1818 Material Statement by the utility. Certification from the supplier is not required.

Materials purchased by the TxDOT highway contractor from a TxDOT approved supplier for utility relocations included in the highway contract will not require any supporting documentation from the utility owner.

Exceptions to Buy America Provisions

- Buy America does not apply to existing utility materials which are relocated from one location to another within the project limits.
- Buy America does not apply to any materials required for maintenance and temporary installations.
- Buy America does not apply to any materials necessary to repair equipment that was discovered or damaged during construction and requires immediate action to restore to safe conditions or to minimize adverse public impact.
- Buy America does not apply if the utility relocation effort is not eligible for federal reimbursement when State law prohibits TxDOT from reimbursing utilities. For example, if the utility owner does not have a compensable property interest and is there— fore required to pay for 100% of the relocation effort, then the materials associated with that relocation are not subject to Buy America.
- Per 23 CFR 635.410, the work to be performed under the utility agreement may include foreign iron and steel products if the cost of Buy America compliant materials will cause the cost of the work to increase by at least 25%. To determine applicability of this provision, one of the following two procedures shall be used, per TxDOT policy:
- l. If the utility company will use a contractor or developer or concessioner to perform the work included in the utility agreement,

the following procedures apply: Demonstration of meeting the 25% excess cost requirement must be accomplished by receiving two separate bids each from at least two qualified contractors for the work. Requests for bids from the qualified contractors must conform to 23 CFR 635.410 (b)(3). One bid from each contractor will include a cost of performing the work described in the utility agreement using Buy America compliant material and the other bid will include a cost for the same work assuming foreign materials. If the bid with the Buy America compliant materials is at least 25% greater than the bid that includes foreign material, then the contract can be awarded to the lowest bid based on materials that are not compliant with Buy America.

- 2. If the utility company will perform work in the utility agreement with its own forces, the following procedures apply: Demonstration of meeting the 25% excess cost requirement must be accomplished by receiving two separate bids from vendors or manufacturers listing the cost of Buy America compliant materials on one bid document and listing the cost of non-compliant materials on a separate bid document. The utility company will take the cost of the Buy America compliant materials and use it to create the total estimated cost of the work included in the utility agreement. The utility company will do the same with the cost of the noncompliant materials. If the cost of the work included in the utility agreement with Buy America compliant materials is at least 25% greater than the cost using the materials that are not compliant with Buy America, then the non-compliant materials may be used.

ATTORNEY'S REVIEW CERTIFICATION

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

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

Attorney's signature: _____ Date: _____

Print Attorney's Name: _____

Texas State Bar Number: _____

TECHNICAL SPECIFICATIONS

SECTION 021020
SITE CLEARNG AND STRIPPING

1. DESCRIPTION

This specification shall govern all work necessary for clearing, grubbing and stripping of objectionable matter as required to complete the project, and shall include removing and disposing of trees, stumps, brush, roots, vegetation, rubbish and other objectionable matter from the project site.

2. CONSTRUCTION METHODS

The site shall be cleared of all trees, stumps, brush, roots, vegetation, rubbish and other objectionable matter as indicated on the drawings and/or as directed by the Engineer or his designated representative. Tree stumps and roots shall be grubbed to a minimum depth of 2 feet below natural ground or 2 feet below base of subgrade, whichever is lower. Areas that underlie compacted backfill shall be stripped of all vegetation, humus and other objectionable matter encountered within the top six (6) inches of the soil. All material removed from the site under this operation shall become the Contractor's responsibility. The material shall be disposed of either at a disposal site indicated on the drawings or at a disposal site obtained by the Contractor.

3. MEASUREMENT AND PAYMENT

Unless otherwise specified on the Bid Form, site clearing and stripping or clear right-of-way shall be measured by the acre.

Payment shall be full compensation for all labor, equipment, tools and incidentals necessary for removing, handling, and disposing of objectionable matter from the site as indicated above.

SECTION 021040
SITE GRADING

1. DESCRIPTION

This specification shall govern all work necessary for backfill and grading of the site to complete the project.

2. CONSTRUCTION METHODS

Prior to site grading, the site shall be cleared in accordance with City Standard Specification Section 021020 "Site Clearing and Stripping". Unless specified otherwise on the drawings, the existing surface shall be loosened by scarifying or plowing to a depth of not less than six (6) inches. The loosened material shall be recompacted with fill required to bring the site to the required grades and elevations indicated on the plans.

Fill shall be uniform as to material, density and moisture content. Fill shall be free of large clods, large rocks, organic matter, and other objectionable material. No fill that is placed by dumping in a pile or windrow shall be incorporated into a layer in that position; all such piles and windrows shall be moved by blading or similar method. All fill shall be placed in layers approximately parallel to the finish grade in layers not to exceed six (6) inches of uncompacted depth, unless indicated otherwise on drawings.
The fill shall be compacted to a density which approximates that of natural ground unless indicated otherwise on drawings.

The Engineer may order proof rolling to test the uniformity of compaction. All irregularities, depressions and soft spots that develop shall be corrected by the Contractor.

Excess material from excavation, which is not incorporated into the site as fill, shall be become property of the Contractor and disposed of away from the job site, unless indicated otherwise on the drawings.

3. MEASUREMENT AND PAYMENT

Unless otherwise specified on the Bid Form, site grading shall not be measured for pay, but shall be considered subsidiary to other work.

SECTION 021080
REMOVING OLD STRUCTURES (S-55)

1. DESCRIPTION

This specification shall provide for the removal and disposal of old structures or portions of old structures, as noted on the plans, and shall include all excavation and backfilling necessary to complete the removal. The work shall be done in accordance with the provisions of these specifications.

2. METHOD OF REMOVAL

Culverts or Sewers. Pipe shall be removed by careful excavation of all dirt on top and the sides in such manner that the pipe will not be damaged. Removal of sewer appurtenances shall be included for removal with the pipe. Those pipes which are deemed unsatisfactory for reuse by the Engineer may be removed in any manner the Contractor may select.

Concrete Structures. Concrete structures or concrete portions of structures shall be removed by blasting and/or sledging the concrete into sizes not larger than one cubic foot.

Portions of the old structure shall be removed to the lines and dimensions shown on the plans, and these materials shall be disposed of as shown on the plans or as directed by the Engineer. Any portion of the existing structure, outside of the limits designated for removal, damaged during the operations of the Contractor shall be restored to its original condition at his entire expense. Explosives shall not be used in the removal of portions of the existing structure unless approved by the Engineer, in writing.

Concrete portions of structures below the permanent ground line, which will not interfere in any manner with the proposed construction, may be left in place, but removal shall be carried at least 2 feet below the permanent ground line and neatly squared off. Reinforcement shall be cut off close to the concrete.

Steel Structures. Steel structures or steel portions of structures shall be dismantled in sections as determined by the Engineer. The sections shall be stored. Rivets and bolts connecting steel railing members, steel beams of beam spans and steel stringers of truss spans shall be removed by butting the heads with a "cold cut" and punching or drilling from the hole, or by such other method as will not injure the members for re-use and will meet the approval of the Engineer.

The removal of rivets and bolts from connections of truss members, bracing members, and other similar members in the structure will not be required unless specifically called for on the plans or special provisions and the Contractor shall have the option of dismantling these members by flame-cutting the members immediately adjacent to the connections.

Flame-Cutting will not be permitted, however, when plans or special provisions call for the structure unit to be salvaged in such manner as to permit re-erection. In such case, all members shall be carefully matchmarked with paint in accordance with diagram furnished by the Engineer prior to dismantling, and all rivets and bolts shall be removed from the connections in the manner specified in the first portion of this paragraph.

Timber Structures Timber structures or timber portions of structures shall be removed in such manner as to damage the timber for further use as little as possible. All bolts and nails shall be removed from such lumber as deemed salvable by the Engineer.

Unless otherwise specified on the plans, timber piles shall be either pulled or cut off at the point not less than 2 feet below ground line, with the choice between these two methods resting with the Contractor, unless otherwise specified.

Brick or Stone Structures. Brick or stone structures or stone portions of structures shall be removed by blasting and/or sledging the masonry into sizes not larger than one cubic foot.

Portions of such structures below the permanent ground line, which will not in any manner interfere with the proposed construction, may be left in place, but removal shall be carried at least 2 feet below the permanent ground line and neatly squared off.

Salvage. All material such as pipe, timbers, railings, etc., which the Engineer deems as salvable for reuse, and all structural steel shall be in the property of City unless otherwise specified and delivered to a designated storage area.

The I-beams, stringers, etc., which are specified to be dismantled without damage for reuse, and all steel members when matchmarked and dismantled for reuse, shall be blocked off the ground in an upright position to protect the members against further damage.

Materials, other than structural steel, which are not deemed salvable by the Engineer, shall become the property of the Contractor and shall be removed to suitable disposal sites off of the right-of-way arranged for by the Contractor, or otherwise disposed of in a manner satisfactory to the Engineer.

Where temporary structures are necessary for a detour adjacent to the present structure, the Contractor will be permitted to use the material in the old structure for the detour structure, but he shall dismantle and stack or dispose of the material as required above as soon as the new structure is opened for traffic.

The bidder's attention is called to the section, "Use of Explosive" in the "General Provisions and Requirements", regarding the use of explosives.

Backfill. All excavation made in connection with this specification and all openings below the natural ground line caused by the removal of old structures or portions thereof shall be backfilled to the level of the original ground line, unless otherwise provided on the plans.

That portion of the backfill which will support any portion of the roadbed or embankment shall be placed in layers of the same depth as those required for placing embankment. Material in each layer shall be wetted uniformly, if required, and shall be compacted to the density required in the adjoining embankment. In places inaccessible to blading and rolling equipment, mechanical or hand tamps or rammers shall be used to obtain the required compaction.

That portion of the backfill which will not support any portion of the roadbed or embankment shall be placed as directed by the Engineer in such manner and to such state of compaction as will preclude objectionable amount of settlement.

3. MEASUREMENT AND PAYMENT

Measurement and payment for removal of structures shall be considered subsidiary to appropriate bid item for which the work is a component of.

END OF SECTION

SECTION 022020
EXCAVATION AND BACKFILL FOR UTILITIES

1. DESCRIPTION

This specification shall govern all work for excavation and backfill for utilities required to complete the project.

2. CONSTRUCTION

(1) Unless otherwise specified on the drawings or permitted by the Engineer, all pipe and conduit shall be constructed in open cut trenches with vertical sides. Trenches shall be sheathed and braced as necessary throughout the construction period. Sheathing and bracing shall be the responsibility of the Contractor (refer to Section 022022 "Trench Safety for Excavations" of the City Standard Specifications).

Trenches shall have a maximum width of one foot beyond the horizontal projection of the outside surfaces of the pipe and parallel thereto on each side unless otherwise specified.

The Contractor shall not have more than 200 feet of open trench left behind the trenching operation and no more than 500 feet of ditch behind the ditching machine that is not compacted as required by the plans and specifications. No trench or excavation shall remain open after working hours.

For all utility conduit and sewer pipe to be constructed in fill above natural ground, the embankment shall first be constructed to an elevation not less than one foot above the top of the pipe or conduit, after which excavation for the pipe or conduit shall be made.

If quicksand, muck, or similar unstable material is encountered during the excavation, the following procedure shall be used unless other methods are called for on the drawings. If the unstable condition is a result of ground water, the Contractor, prior to additional excavation, shall control it. After stable conditions have been achieved, unstable soil shall be removed or stabilized to a depth of 2 feet below the bottom of pipe for pipes 2 feet or more in height; and to a depth equal to the height of pipe, 6 inches minimum, for pipes less then2 feet in height. Such excavation shall be carried at least one foot beyond the horizontal limits of the structure on all sides. All unstable soil so removed shall be replaced with suitable stable material, placed in uniform layers of suitable depth as directed by the Engineer, and each layer shall be wetted, if necessary, and compacted by mechanical tamping as required to provide a stable condition. For unstable trench conditions requiring outside forms, seals, sheathing and bracing, any additional excavation and backfill required shall be done at the Contractor's expense.

(2) Shaping of Trench Bottom. The trench bottom shall be undercut a minimum depth sufficient to accommodate the class of bedding indicated on the plans and specifications.

(3) Dewatering Trench. Pipe or conduit shall not be constructed or laid in a trench in the presence of water. All water shall be removed from the trench sufficiently prior to the pipe or conduit planing operation to insure a relatively dry (no standing water), firm bed. The trench shall be maintained in such dewatered condition until the trench has been backfilled to a height at lease one foot above the top of pipe. Removal of water may be accomplished by bailing, pumping, or by installation of well-points, as conditions warrant. Removal of well points shall be at rate of 1/3 per 24 hours (every third well-point). The Contractor shall prevent groundwater from trench or excavation dewatering operations from discharging directly into the storm water system. Groundwater from dewatering operations shall be sampled and tested, if applicable, and disposed of, in accordance with City Standard Specification Section 022021 "Control of Ground Water".

(4) Excavation in Streets. Excavation in streets, together with the maintenance of traffic where specified, and the restoration of the pavement riding surface, shall be in accordance with drawing detail or as required by other applicable specifications.

(5) Removing Abandoned Structures. When abandoned masonry structures or foundations are encountered in the excavation, such obstructions shall be removed for the full width of the trench and to a depth one foot below the bottom of the trench. When abandoned inlets or manholes are encountered and no plan provision is made for adjustment or connection to the new utility, such manholes and inlets shall be removed completely to a depth one foot below the bottom of the trench. In each instance, the bottom to the trench shall be restored to grade by backfilling and compacting by the methods provided hereinafter for backfill. Where the trench cuts through utility lines which are known to be abandoned, these lines shall be cut flush with the sides of the trench and blocked with a concrete plug in a manner satisfactory to the Engineer.

(6) Protection of Utilities. The Contractor shall conduct his work such that a reasonable minimum of disturbance to existing utilities will result. Particular care shall be exercised to avoid the cutting or breakage of water and gas lines. Such lines, if broken, shall be restored promptly by the Contractor. When active wastewater lines are cut in the trenching operations, temporary flumes shall be provided across the trench while open, and the lines shall be restored when the backfilling has progressed to the original bedding line of the sewer so cut.

The Contractor shall inform utility owners sufficiently in advance of the Contractor's operations to enable such utility owners to reroute, provide temporary detours, or to make other adjustments to utility lines in order that the Contractor may proceed with his work with a minimum of delay. The Contractor shall not hold the City liable for any expense due to delay or additional work because of utility adjustments or conflicts.

(7) Excess Excavated Material. All materials from excavation not required for backfilling the trench shall be removed by the Contractor from the job site promptly following the completion of work involved.

(8) Backfill

A. Backfill Procedure Around Pipe (Initial Backfill)

All trenches and excavation shall be backfilled as soon as is practical after the pipes or conduits are properly laid. In addition to the specified pipe bedding material, the backfill around the pipe as applicable shall be granular material as shown on the standard details or as described in the applicable specification section, and shall be free of large hard lumps or other debris. If indicated on the plans, pipe shall be encased with cement-stabilized sand backfill as described below. The backfill shall be deposited in the trench simultaneously on both sides of the pipe for the full width of the trench, in layers not to exceed ten (10) inches (loose measurement), wetted if required to obtain proper compaction, and thoroughly compacted by use of mechanical tampers to a density comparable to the adjacent undisturbed soil or as otherwise specified on the plans, but not less than 95% Standard Proctor density. A thoroughly compacted material shall be in place between the external wall of the pipe and the undisturbed sides of the trench and to a level twelve (12) inches above the top of the pipe.

B. Backfill Over One Foot Above Pipe (Final Backfill)

UNPAVED AREAS: The backfill for that portion of trench over one (1) foot above the pipe or conduit not located under pavements (including waterlines, gravity wastewater lines, wastewater force mains and reinforced concrete storm water pipe) shall be imported select material or clean, excess material from the excavation meeting the following requirements:

Free of hard lumps, rock fragments, or other debris,
No clay lumps greater than 2" diameter
Moisture Content: +/-3%

Backfill material shall be placed in layers not more than ten (10) inches in depth (loose measurement), wetted if required to obtain proper compaction, and thoroughly compacted by use of mechanical tampers to the natural bank density but not less than 95% Standard Proctor density, unless otherwise indicated. Flooding of backfill is not allowed. Jetting of backfill may only be allowed in sandy soils and in soils otherwise approved by the Engineer. Regardless of backfill method, no lift shall exceed 10 inches and density shall not be less than 95% Standard Proctor density.

A period of not less than twenty-four (24) hours shall elapse between the time of jetting and the placing of the top four (4) feet of backfill. If jetting is used, the top four (4) feet of backfill shall be placed in layers not more than 10 inches in depth (loose measurement), wetted if required to obtain proper compaction, and thoroughly compacted by use of mechanical tampers to the natural bank density but not less than 95% Standard Proctor density (ASTM D698).

PAVED AREAS: At utility line crossings under pavements (including waterlines, gravity wastewater lines, wastewater force mains, and reinforced concrete storm water pipe), and where otherwise indicated on the drawings, trenches shall be backfilled as shown below:

From top of initial backfill (typically twelve (12) inches above top of the pipe) to three (3) feet below bottom of road base course, backfill shall be select material meeting the requirements of 022100 "Select Material".

Asphalt Roadways

The upper three (3) feet of trench below the road base course shall be backfilled to the bottom of the road base course with cement-stabilized sand containing a minimum of 2 sacks of Standard Type I Portland cement per cubic yard of sand and compacted to not less than 95% Standard Proctor density.

Concrete Roadways

The Contractor may elect to backfill the upper three (3) feet of trench below the road base course with cement stabilized sand as noted above, or in the case of storm water pipe or box installation the Contractor may backfill and compact select material to 98% Standard Proctor density (ASTM D698) following City Standard Specification Section 022100.

3. MEASUREMENT AND PAYMENT

Unless otherwise specified on the Bid Form, excavation and backfill for utilities, including select material or cement-stabilized sand backfill, shall not be measured and paid for separately. It shall be considered subsidiary to the items for which the excavation and backfill is required.

SECTION 022021
CONTROL OF GROUND WATER

1. GENERAL

1.1 SECTION INCLUDES

A. Dewatering, depressurizing, draining, and maintaining trenches, shaft excavations, structural excavations, and foundation beds in a stable condition, and controlling ground water conditions for tunnel excavations.

B. Protection of excavations and trenches from surface runoff.

C. Disposing of removed ground water by approved methods.

1.2 REFERENCES

A. ASTM D 698 - Test Methods for Moisture-Density Relations of Soils and Soil-Aggregate Mixtures, Using 5.5-1b (2.49 kg) Rammer and 12-inch (304.8 mm) Drop.

B. Federal Regulations, 29 CFR Part 1926, Standards-Excavation, Occupational Safety and Health Administration (OSHA).

C. Federal Register 40 CFR (Vol. 55, No. 222) Part 122, EPA Administered Permit Programs (NPDES), Para. 22.26(b)(14) Storm Water Discharge.

1.3 DEFNITIONS

A. Ground water control includes both dewatering and depressurization of water-bearing soil layers.

1. Dewatering includes lowering the water table and intercepting seepage which would otherwise emerge from slopes or bottoms of excavations, or into tunnels and shafts, and disposing of removed ground water by approved methods. The intent of dewatering is to increase the stability of tunnel excavations and excavated slopes; prevent dislocation of material from slopes or bottoms of excavations; reduce lateral loads on sheeting and bracing; improve excavating and hauling characteristics of excavated material;

prevent failure or heaving of the bottom of excavations; and to provide suitable conditions for placement of backfill materials and construction of structures, piping and other installations.

2. Depressurization includes reduction in piezometric pressure within strata not controlled by dewatering alone, as required to prevent failure or heaving of excavation bottom or instability of tunnel excavations.

B. Excavation drainage includes keeping excavations free of surface and seepage water.

C. Surface drainage includes the use of temporary drainage ditches and dikes and installation of temporary culverts and sump pumps with discharge lines as required to protect the Work from any source of surface water.

D. Equipment and instrumentation for monitoring and control of the ground water control system includes piezometers and monitoring wells, and devices, such as flow meters, for observing and recording flow rates.

1.4 PERFORMANCE REQUIREMENTS

A. Conduct subsurface investigations as needed to identify ground water conditions and to provide parameters for design, installation, and operation of ground water control systems.

B. Design a ground water control system, compatible with requirements of Federal Regulations 29 CFR Part 1926 and City Standard Specification Section 022022 - Trench Safety for Excavations, to produce the following results:

1. Effectively reduce the hydrostatic pressure affecting:
   a) Excavations (including utility trenches);
   b) Tunnel excavation, face stability or seepage into tunnels.

2. Develop a substantially dry and stable subgrade for subsequent construction operations.

3. Preclude damage to adjacent properties, buildings, structures, utilities, installed facilities, and other work.

4. Prevent the loss of fines, seepage, boils, quick condition, or softening of the foundation strata.

5. Maintain stability of sides and bottom of excavations.

C. Provide ground water control systems which may include single-stage or multiple-stage well point systems, eductor and ejector-type systems, deep wells, or combinations of these equipment types.

D. Provide drainage of seepage water and surface water, as well as water from any other source entering the excavation. Excavation drainage may include placement of drainage materials, such as crushed stone and filter fabric, together with sump pumping.

E. Provide ditches, berms, pumps and other methods necessary to divert and drain surface water away from excavations.

F. Locate ground water control and drainage systems so as not to interfere with utilities, construction operations, adjacent properties, or adjacent water wells.

G. Assume sole responsibility for ground water control systems and for any loss or damage resulting from partial or complete failure of protective measures, and any settlement or resultant damage caused by the ground water control operations. Modify ground water control systems or operations if they cause or threaten to cause damage to new construction, existing site improvements, adjacent property, or adjacent water wells, or affect potentially contaminated areas. Repair damage caused by ground water control systems or resulting from failure of the system to protect property as required.

H. Provide an adequate number of piezometers installed at the proper locations and depths as required to provide meaningful observations of the conditions affecting the excavation, adjacent structures, and water wells.

I. Provide environmental monitoring wells installed at the proper locations and depths as required to provide adequate observations of hydrostatic conditions and possible contaminant transport from contamination sources into the work area or into the ground water control system.

J. Decommission piezometers and monitoring wells installed during design phase studies and left for Contractors monitoring and use, if applicable.

1.5 ENVIRONMENTAL REQUIREMENTS

A. Comply with requirements of agencies having jurisdiction.

B. Comply with Texas Commission on Environmental Quality (TCEQ) regulations and Texas Water Well Drillers Association for development, drilling, and abandonment of wells used in dewatering system.

C. Prior to beginning construction activities, file Notice of Intent (NOI) for Storm Water Discharges Associated with Construction Activity under the Texas Pollutant Elimination System (TPDES) General Permit No. TXRI 50000, administered by the Texas Commission on Environmental Quality (TCEQ). The general permit falls under the provisions of Section 402 of the Clean Water Act and Chapter 26 of the Texas Water Code.

D. Prepare submittal form and submit to TCEQ along with application fee.

E. Upon completion of construction, file Notice of Termination (NOT) for Storm Water Discharges Associated with Construction Activity under the TPDES General Permit with the TCEQ.

F. Obtain all necessary permits from agencies with control over the use of ground water and matters affecting well installation, water discharge, and use of existing storm drains and natural water sources. Because the review and permitting process may be lengthy, take early action to pursue and submit for the required approvals.

G. Monitor ground water discharge for contamination while performing pumping in the vicinity of potentially contaminated sites.

H. Conduct sampling and testing of ground water and receiving waters as outlined in Article 3 below.

2. PRODUCTS

2.1 EQUIPMENT AND MATERIALS

A. Equipment and materials are at the option of Contractor as necessary to achieve desired results for dewatering.

B. Eductors, well points, or deep wells, where used, shall be furnished, installed and operated by an experienced contractor regularly engaged in ground water control system design, installation, and operation.

C. All equipment must be in good repair and operating order.

C. Sufficient standby equipment and materials shall be kept available to ensure continuous operation, where required.

3. EXECUTION

3.1 GROUND WATER CONTROL

A. Perform a subsurface investigation by borings as necessary to identify water bearing layers, piezometric pressures, and soil parameters for design and installation of ground water control systems. Perform pump tests, if necessary, to determine the drawdown characteristics of the water bearing layers.

B. Provide labor, material, equipment, techniques and methods to lower, control and handle ground water in a manner compatible with construction methods and site conditions. Monitor effectiveness of the installed system and its effect on adjacent property.

C. Install, operate, and maintain ground water control systems in accordance with the ground water control system design. Notify the City's Construction Inspector in writing of any changes made to accommodate field conditions and changes to the Work. Revise the ground water control system design to reflect field changes.

D. Provide for continuous system operation, including nights, weekends, and holidays. Arrange for appropriate backup if electrical power is primary energy source for dewatering system.

E. Monitor operations to verify that the system lowers ground water piezometric levels at a rate required to maintain a dry excavation resulting in a stable subgrade for prosecution of subsequent operations.

F. Where hydrostatic pressures in confined water bearing layers exist below excavation, depressurize those zones to eliminate risk of uplift or other instability of excavation or installed works. Allowable piezometric elevations shall be defined in the ground water control system design.

G. Remove ground water control installations.

1. Remove pumping system components and piping when ground water control is no longer required.

2. Remove piezometers and monitoring wells when directed by the City Engineer.

3. Grout abandoned well and piezometer holes. Fill piping that is not removed with cement bentonite grout or cement-sand grout.

H. During backfilling, dewatering may be reduced to maintain water level a minimum of 5 feet below prevailing level of backfill. However, do not allow that water level to result in uplift pressures in excess of 80 percent of downward pressure produced by weight of structure or backfill in place. Do not allow water levels to rise into cement stabilized sand until at least 48 hour after placement.

I. Provide a uniform diameter for each pipe drain run constructed for dewatering. Remove pipe drain when it has served its purpose. If removal of pipe is impractical, provide grout connections at 50-foot intervals and fill pipe with cement-bentonite grout or cement-sand grout when pipe is removed from service.

J. Extent of construction ground water control for structures with a permanent perforated underground drainage system may be reduced, such as for units designed to withstand hydrostatic uplift pressure. Provide a means for draining the affected portion of underground system, including standby equipment. Maintain drainage system during operations and remove it when no longer required.

K. Remove system upon completion of construction or when dewatering and control of surface or ground water is no longer required.

L. In unpaved areas, compact backfill to not less than 95 percent of Standard Proctor maximum dry density in accordance with ASTM D 698. In paved areas (or areas to receive paving), compact backfill to not less than 98 percent of Standard Proctor maximum dry density in accordance with ASTM D 698.

3.2 REQUIREMENTS FOR EDUCTOR, WELL PONTS, OR DEEP WELLS

A. For above ground piping in ground water control system, include a 12-inch minimum length of clear, transparent piping between every eductor well or well point and discharge header so that discharge from each installation can be visually monitored.

B. Install sufficient piezometers or monitoring wells to show that all trench or shaft excavations in water bearing materials are pre-drained prior to excavation. Provide separate piezometers for monitoring of dewatering and for monitoring of depressurization. Install piezometers and monitoring wells for tunneling as appropriate for Contractor's selected method of work.

C. Install piezometers or monitoring wells not less than one week in advance of beginning the associated excavation (including trenching).

D. Dewatering may be omitted for portions of underdrains or other excavations, but only where auger borings and piezometers or monitoring wells show that soil is pre-drained by an existing system such that the criteria of the ground water control system design are satisfied.

E. Replace installations that produce noticeable amounts of sediments after development.

F. Provide additional ground water control installations, or change the methods, in the event that the installations according to the ground water control system design do not provide satisfactory results based on the performance criteria defined by the ground water control system design and by these specifications.

3.3 EXCAVATION DRANAGE

A. Contractor may use excavation drainage methods if necessary, to achieve well drained conditions. The excavation drainage may consist of a layer of crushed stone and filter fabric, and sump pumping in combination with sufficient wells for ground water control to maintain stable excavation and backfill conditions.

3.4 MANTENANCE AND OBSERVATION

A. Conduct daily maintenance and observation of piezometers or monitoring wells while the ground water control installations or excavation drainage are operating in an area or seepage into tunnel is occurring. Keep system in good condition.

B. Replace damaged and destroyed piezometers or monitoring wells with new piezometers or wells as necessary to meet observation schedule.

C. Cut off piezometers or monitoring wells in excavation areas where piping is exposed, only as necessary to perform observation as excavation proceeds. Continue to maintain and make observations, as specified.

D. Remove and grout piezometers inside or outside the excavation area when ground water control operations are complete. Remove and grout monitoring wells when directed by the City Engineer.

3.5 MONITORNG AND RECORDING

A. Monitor and record average flow rate of operation for each deep well, or for each well point or eductor header used in dewatering system. Also monitor and record water level and ground water recovery. These records shall be obtained daily until steady conditions are achieved, and twice weekly thereafter.

B. Observe and record elevation of water level daily as long as ground water control system is in operation, and weekly thereafter until the Work is completed or piezometers or wells are removed, except when City Engineer determines that more frequent monitoring and recording are required. Comply with Construction Inspector's direction for increased monitoring and recording and take measures as necessary to ensure effective dewatering for intended propose.

3.6 SAMPLING, TESTNG AND DISPOSAL OF GROUND WATER

A. It is the intent that the Contractor discharge groundwater primarily into the existing storm water system in accordance with City Ordinance, Article XVI, Section 55- 203, only if the groundwater is uncontaminated and the quality of the ground water is equal to or better than the quality of the receiving stream.

B. The Contractor shall prevent ground water from trench or excavation dewatering operations from discharging directly into the storm water system prior to testing and authorization. Ground water from dewatering operations shall be sampled and tested, and disposed of by approved methods.

C. Laboratory analysis of groundwater and receiving water quality is to be performed by the Contractor at the Contractor's expense, prior to commencing discharge, and groundwater analysis shall be performed by the Contractor at a minimum of once per week. Contractor shall coordinate with the City Storm Water Department on all laboratory analysis. Laboratory analysis of groundwater shall also be performed at each new area of construction prior to discharge from that location.

D. Sample containers, holding times, preservation methods, and analytical methods, shall either follow the requirements in 40 CFR Part 136 (as amended), or the latest edition of "Standard Methods for the Examination of Water and Wastewater." Any laboratory providing analysis must be accredited or certified by the Texas Commission on Environmental Quality according to Title 30 Texas Administrative Code (30 TAC) Chapters 25 for the matrices, methods, and parameters of analysis, if available, or be exempt according to 30 TAC 525.6.

E. Analysis of the ground water discharge shall show it to be equal to or better than the quality of the first natural body of receiving water. This requires testing of both the receiving water and a sample of the ground water. All parts of this procedure shall be complete prior to any discharge of ground water to the storm water system.

F. Steps to Determine Legitimate Discharge:

1. Identify the First Receiving Water.
   a) When the first body of water is a fresh water system (Nueces River or Oso Creek), the analysis typically fails because the local ground water will likely be too high in Total Dissolved Solids (TDS). In the case of a perched aquifer, the ground water may turn out fairly fresh, but local experience shows this to be unlikely.
   b) If the receiving water is a marine environment, proceed with Step 2 below to compare the ground water quality to receiving water quality.

1. Compare Ground Water Discharge Quality to Receiving Water Quality.
   The following table, Ground Water Discharge Limits, indicates that the parameters to compare to the receiving water are Total Dissolved Solids (TDS) and Total Suspended Solids (TSS). If the ground water results are equal to or better than the receiving water, then the discharge may be authorized as long as the discharge does not exceed the other parameters which would indicate hydrocarbon contamination. Note that the receiving water only needs to be tested initially as a baseline and the ground water shall be tested weekly to ensure compliance.

GROUND WATER DISCHARGE LIMITS

Parameter	Ground Water Monitoring Frequency	Receiving Water Monitoring Frequency	Maximum Limitation
Total Dissolved Solids (TDS)	Initial + Weekly	Once Prior to Discharge	< Receiving Water
Total Suspended Solids (TSS)	Initial + Weekly	Once Prior to Discharge	< Receiving Water
Total Petroleum Hydrocarbons	Initial + Weekly		15 mg/L
Total Lead	Initial + Weekly		0.1 mg/L
Benzene	Initial + Weekly		0.005 mg/L
Total BTEX	Initial + Weekly		0.1 mg/L
Polynuclear Aromatic Hydrocarbons	Initial + Monthly		0.01 Mg/L

2. Analyze Ground Water for Hydrocarbon Contamination.

   All other parameters listed on the Ground Water Discharge Limits table must be analyzed prior to ground water discharge to the storm water system. If no limits are exceeded, ground water discharge to the storm water system may be authorized following notification to the MS4 operator (City of Corpus Christi) and all Pollution Prevention Measures for the project are in place. Analytical results shall be on-site or readily available for review by local, state or federal inspectors. Note that this step is frequently done simultaneously with Step 2 above to shorten analytical processing time.

3. Pollution Prevention Measures.

   A storm water pollution prevention plan or pollution control plan shall be developed and implemented prior to any ground water discharges to the storm water system. The plan's objectives are to limit erosion and scour of the storm water system, and minimize Total Suspended Solids (TSS) and other forms of contamination, and prevent any damage to the storm water system.

Note that ground water discharges must cease immediately upon the first recognition of contamination, either by sensory or analytical methods. If the discharge of groundwater results in any damages to the storm water system, the responsible party shall remediate any damage to the storm water system and the environment to the satisfaction of the Storm Water Department and/or any State or Federal Regulatory Agency.

4. MS4 Operator Notification.
The MS4 operator shall be notified prior to ground water discharge to the storm water system. Contractor shall contact the designated City MS4 representative to request authorization to discharge ground water to the storm water system.

Notification shall include:

Project Name:
Responsible Party:
Discharge Location:
Receiving Water:
Estimated Time of Discharge:
Linear Project: Yes / No
Pollution Prevention Measures Implemented:
Statement indicating all sampling and testing has been conducted and meets the requirements of a legitimate discharge.

G. Discharges to Wastewater System

In the event that the groundwater does not equal or exceed the receiving water quality and alternative disposal option would include pumping to the nearest sanitary sewer system. Discharge to the sanitary sewer system requires a permit from the Wastewater Department. If discharging to temporary holding tanks and trucking to a sanitary sewer or wastewater treatment plant, the costs for these operations shall be negotiated.

Contractor shall contact the Pretreatment Group for City Utility Operations to obtain a Wastewater Discharge Permit Application for authorization to discharge to the wastewater system. Authorization approval will include review of laboratory analysis of the ground water and estimated flow data. Note that groundwater discharges must cease immediately upon the first recognition of contamination, either by sensory or analytical methods. If the discharge of groundwater results in any damages to the wastewater collection system or wastewater overflows, the responsible party shall remediate any damage to the wastewater collection system and the environment to the satisfaction of the Wastewater Department and/or any State or Federal Regulatory Agency.

H. Other groundwater disposal alternatives or solutions may be approved by the Engineer on a case by case basis.

3.7 SURFACE WATER CONTROL

A. Intercept surface water and divert it away from excavations through the use of dikes, ditches, curb walls, pipes, sumps or other approved means.

B. Divert surface water into sumps and pump into drainage channels or storm drains, when approved by the City Engineer. Provide settling basins when required by the City Engineer.

C. Storm water that enters the excavation can be pumped out as long as care is taken to minimize solids and mud entering the pump suction and flow is pumped to a location that allows for sheet flow prior to entering a storm water drainage ditch or storm water inlet. An alternative to sheet flow is to pump storm water to an area where ponding occurs naturally without leaving the designated work area or by manmade berm(s) prior to entering the storm water system. Sheet flow and ponding is required to allow solids screening and/or settling prior to entering the storm water system. Storm water or groundwater shall not be discharged to private property.

4. MEASUREMENT AND PAYMENT

Unless otherwise specified on the Bid Form, control of ground water will not be measured and paid for separately, but shall be considered subsidiary to other bid items.

SECTION 022022
TRENCH SAFETY FOR EXCAVATIONS

1. DESCRIPTION

This specification shall govern all work for providing for worker safety in excavations and trenching operations required to complete the project.

2. REQUIREMENTS

Worker Safety in excavations and trenches shall be provided by the Contractor in accordance with Occupational Safety and Health Administration (OSHA) Standards, 29 CPR Park 1926 Subpart P - Excavations.

It is the sole responsibility of the Contractor, and not the City or Engineer, to determine and monitor the specific applicability of a safety system to the field conditions to be encountered on the job site during the project.

The Contractor shall indemnify and hold harmless the City and Engineer from all damages and cost that may result from failure of methods or equipment used by the Contractor to provide for worker safety.

Trenches as used herein, shall apply to any excavation into which structures, utilities, or sewers are placed regardless of depth.

Trench Safety Plan as used herein, shall apply to all methods and materials used to provide for worker safety in excavation and trenching operations required during the project.

3. MEASUREMENT AND PAYMENT

Measurement of Trench Safety Plan shall be by the linear foot of trench or excavation, regardless of depth. Measurement shall be taken along the center line for trenches and along the longest horizontal distance across the bottom for other shape of excavations.

Payment for Trench Safety Plan shall be at the unit price bid and shall fully compensate the Contractor for all work, equipment, materials, personnel, and incidentals as required to provide for worker safety in trenches and excavations for the project.
Revision current for Texas H.B. No. 1569, dated 5/23/89.

END OF SECTION

SECTION 022040
STREET EXCAVATION

1. DESCRIPTION

This specification shall govern all work for Street Excavation required to complete the project.

2. CONSTRUCTION METHODS

(A) Stripping and Excavation

Strip the top 6 inches in all areas to underlay compacted fill, curbs, base or pavement, by removing all humus, vegetation and other unsuitable materials. Unless otherwise noted, remove existing trees, shrubs, fences, curb, gutter, sidewalk, drives, paving, pipe and structures and other items within the graded area which interfere with new construction of finished grading.

All suitable excavated materials shall be utilized, insofar as practicable, in constructing the required roadway sections or in uniformly widening embankments, flattening slopes, etc., as directed by the Engineer, provided that the material meets the requirements for roadway embankment as specified in Article 3 below. Unwanted or unsuitable roadway excavation and roadway excavation in excess of that needed for construction shall become the property of the Contractor to be disposed of by him outside the limits of the right-of-way at a location suitable to the Engineer. "Unsuitable" material encountered below subgrade elevation in roadway cuts, when declared unwanted by the Engineer, shall be replaced as directed by the Engineer with suitable material from the roadway excavation or with other suitable material.

Maintain moisture and density until covered and protected by the subbase or base course. Remove soft or wet areas found at any time, replace with suitable material, and recompact (especially utility trenches).

(B) Subgrade Preparation

That area shown on the drawings for street construction shall be cut to grade, scarified to a depth not less than 6 inches, or as otherwise indicated on the drawings, and compacted to 95% Standard Proctor density (ASTM D698) to within 0 to +3% of optimum moisture. The section may be accepted if no more than 1 in 5 of the most recent moisture or density tests is beyond ±1%deviation from the required moisture or density requirement. Irregularities exceeding h inch in 16 feet shall be corrected. Soft areas found at anytime shall be removed, replaced with suitable material and compacted (especially at utility trenches). The correct moisture density relationship shall be maintained until the subgrade is protected. Excessive loss of moisture shall be prevented by sprinkling, sealing, or covering with a subsequent layer.

Should the subgrade, due to any reason or cause, lose the required stability, density, or moisture before it is protected by placement of the next layer, it shall be re-compacted and refinished and retested at the expense of the Contractor until acceptable to the City.

(C) Curb Backfill and Topsoil (Sidewalk* Parkways, Islands, etc.)

Fill and compact areas behind curbs and adjacent to sidewalks and driveways within 48 hours after completion of concrete work. The top 6 inches (where disturbed by construction or where unsatisfactory material is exposed by excavation) of finish earth grade shall be clean excavated material or topsoil capable of supporting a good growth of grass when fertilized and seeded or sodded. It shall be free of concrete, asphalt, shell, caliche, debris and any other material that detracts from its appearance or hampers the growth of grass. Topsoil shall meet the requirements specified in City Standard Specification Section 028020 "Seeding".

(D) Matching Grades at Right-of-Way. Line

Finish grade at the property line shall be as shown on the drawings. The Engineer may require a reasonable amount of filling on private property where the sidewalk grade is above the property elevation. Use suitable material from the excavation. Unless otherwise directed, cuts at right-of way lines shall be made at a slope of three horizontal to one vertical (3:1) or flatter.

(E) Drainage

During construction, the roadbed and ditches shall be maintained in such condition as to insure proper drainage at all times, and ditches and channels shall be so constructed and maintained as to avoid damage to the roadway section.

All slopes which, in the judgment of the Engineer, require variation, shall be accurately shaped, and care shall be taken that no material is loosened below the required slopes. All breakage and slides shall be removed and disposed of as directed.

SELECTION OF ROADBED MATERIALS

Where shown on the plans, Select Material shall be utilized to improve the roadbed, in which case the work shall be performed in such manner and sequence that suitable materials may be selected, removed separately, and deposited in the roadway within limits and at elevations required. Material used for roadway embankment shall meet the requirements of City Standard Specification Section 022100 Select Material.

GEOGRID

If indicated on the drawings, geogrid shall be placed in the base layer according to the pavement details to provide a mechanically-stabilized aggregate base layer within the pavement structure. Geogrid shall be "Tensar TX5 Triaxial Geogrid", or pre-approved equivalent. Use (and approval)

of a different product must be supported by documentation showing that the alternate pavement section will meet or exceed the required number of 18-kip equivalent single axle loads (ESAL) and structural number (SN) over the stated pavement design life, and the pavement design must be sealed and signed by a Texas professional engineer. Documentation must also include the structural design value used for the geogrid structural contribution, based on and supported by validated test data. Alternate pavement designs shall utilize the same structural design values for other pavement structural components (HMAC, base, sub-base) as used in the original pavement design, and the pavement designs must be approved by the Engineer and the geotechnical consultant.

Contractor shall take care to protect geogrid from damage. Overlap edges of geogrid in accordance with the manufacturer's recommendations, but not less than 12 inches. Do not drive tracked equipment directly on the geogrid. Provide at least 6 inches of compacted aggregate base material over the geogrid before driving any tracked equipment over the geogrid area. Standard highway-legal rubber-tired trucks may drive over the geogrid at very slow speeds (less than 5 mph). Avoid turns and sudden starts and stops when driving on the geogrid. Any damaged geogrid shall be replaced by the Contractor at no additional cost to the City. Proper replacement shall consist of replacing the affected area adding 3 feet of geogrid in each direction beyond the limits of the affected area.

MEASUREMENT AND PAYMENT

Unless otherwise specified on the Bid Form, street excavation shall be measured and paid for by the square yard to the limits shown on the drawings including excavation for street transitions. Payment shall be full compensation for furnishing all labor, materials, tools, equipment, borrow material and incidentals necessary to complete the work.

Unless otherwise specified on the Bid Form, compacted subgrade shall be measured and paid for by the square yard to the limits shown on the drawings. Payment shall be full compensation for furnishing all labor, materials, tools, equipment, bon-ow material and incidentals necessary to complete the work.

Unless otherwise specified on the Bid Form, geogrid shall be measured and paid for by the square yard to the limits shown on the drawings, excluding overlaps. Payment shall be full compensation for furnishing all labor, materials, tools, equipment, and incidentals necessary to complete the work.

All work required for disposing of waste, including hauling will not be paid for directly but shall be considered subsidiary to the various contract items.

SECTION 022080
EMBANKMENT

1. DESCRIPTION

This specification shall govern all work for Embankment required to complete the project.

CONSTRUCTION METHODS

Prior to placing embankment, the area to be covered shall be stripped of all vegetation and the material so removed shall be disposed of off the job site. Washes, gulleys, wet areas, and yielding areas shall be corrected as directed by the Engineer.

Unless otherwise indicated on the drawings, the surface of the ground which is to receive embankment shall be loosened by scarifying or plowing to a depth of not less than 6 inches. The loosened material shall be recompacted with the new embankment as hereinafter specified. Embankment shall be placed in layers not to exceed ten (10) inches uncompacted (loose) depth for the full width of the embankment, unless otherwise noted.

Where embankment is adjacent to a hillside or old roadbed, the existing slope shall be cut in steps to not less than the vertical depth of an uncompacted layer. The fill material shall be placed from the low side and compacted. Each layer shall overlap the existing embankment by at least the width indicated by the embankment slope.

Trees, stumps, roots, vegetation, debris or other unsuitable materials shall not be placed in embankment.

Each layer of embankment shall be uniform as to material, density and moisture content before beginning compaction. Where layers of unlike materials about each other, each layer shall be feather-edged for at least 100 feet or the material shall be so mixed as to prevent abrupt changes in the soil. No material placed in the embankment by dumping in a pile or windrow shall be incorporated in a layer in that position, but all such piles or windrows shall be moved by blading or similar methods. Clods or lumps of material shall be broken and the embankment material mixed by blading, harrowing, disking or similar methods to the end that a uniform material of uniform density is secured in each layer. Except as otherwise required by the drawings, all embankments shall be constructed in layers approximately parallel to the finished grade and each layer shall be so constructed as to provide a uniform slope of 1/4 inch per foot from the centerline of the embankment to the outside.

Each layer shall be compacted to the required density and moisture by any method, type and size of equipment that will give the required compaction. Prior to and in conjunction with the rolling operation, each layer shall be brought to the moisture content necessary to obtain the required density and shall be kept leveled with suitable equipment to insure uniform compaction over the

entire layer. For each layer of earth embankment and select material, it is the intent of this specification to provide the density as required herein; unless otherwise shown on the drawings. Soils for embankment shall be sprinkled with water as required to provide not less than optimum moisture and compacted to the extent necessary to provide not less than 95% Standard Proctor density (ASTM D698). Field density determinations will be made in accordance with approved methods.

After each layer of earth embankment or select material is complete, tests, as necessary, will be made by the Engineer. If the material fails to meet the density specified, the course shall be reworked as necessary to obtain the specified compaction, and the compaction method shall be altered on subsequent work to obtain specified density. Such procedure shall be determined by, and subject to, the approval of the Engineer.

The Engineer may order proof rolling to test the uniformity of compaction of the embankment layers. All irregularities, depressions, weak or soft spots which develop shall be corrected immediately by the Contractor.

Should the embankment, due to any reason or cause, lose the required stability, density or moisture before the pavement structure is placed, it shall be recompacted and refinished at the sole expense of the Contractor. Excessive loss of moisture in the subgrade shall be prevented by sprinkling, sealing or covering with a subsequent layer of granular material.

SELECTION OF MATERIAL

In addition to the requirement in the excavation items of the specifications covering the general selection and utilization of materials to improve the roadbed, embankments shall be constructed in proper sequence to receive the select material layers shown on drawings, with such modifications as may be directed by the Engineer. The layer of embankment immediately preceding the upper layer of select material shall be constructed to the proper section and grade within a tolerance of not more than 0.10 foot from the established section and grade when properly compacted and finished to receive the select material layer. Select material, when specified, shall meet the requirements in City Standard Specification Section 022100 "Select Material".

MEASUREMENT AND PAYMENT

Unless otherwise specified on the Bid Form, embankment shall not be measured and paid for separately, but shall be subsidiary to other items of work.

SECTION 022100
SELECT MATERIAL (S-15)

1. DESCRIPTION

This specification shall govern the use of select material to be used to treat designated sections of roadways, embankments, trenches, etc. Select material shall be a mixture of sand and clay or other suitable granular material. The material shall be free from vegetation, debris and clay lumps. That portion of the select material passing a 40-mesh sieve shall have a liquid limit of 45 maximum, a plasticity index range from 6 to 13, and a calculated linear shrinkage of 8.5 maximum.

2. CONSTRUCTION METHODS

Select material shall be mixed uniformly and placed in layers not to exceed 6" loose depth. The material shall be brought to approximately optimum moisture content and compacted to 95% Standard Proctor Density. Each layer shall be complete before the succeeding layer is placed.

The finished surface of the select material shall conform to the grade and section shown on the plans.

3. MEASUREMENT & PAYMENT

Select material shall not be measured and paid for separately. It shall be considered subsidiary to the items for which the select material is required.

END OF SECTION

SECTION 022420
SILT FENCE

1. DESCRIPTION

This specification shall govern all work necessary for providing and installing silt fencing required to control sedimentation and erosion during construction of the project.

2. MATERIAL REQUIREMENTS

A. Geotextile shall meet the requirements for temporary silt fence per AASHTO M288.

B. Fence Reinforcement Materials:

Silt fence reinforcement shall be one of the following systems.

Type 1: Self-Supported Fence - This system consists of fence posts, spaced no more than 81/2 feet apart, and geotextile without net reinforcement. Fence posts shall be a minimum of 42 inches long, embedded at least one (1) foot into the ground, and constructed of either wood or steel. Soft wood posts shall be at least 3 inches in diameter or nominal 2 x 4 inches in cross section and essentially straight. Hardwood posts shall be a minimum of 1.5 * 1.5 inches in cross section. Fabric attachment may be by staples or locking plastic ties at least every 6 inches, or by sewn vertical pockets. Steel posts shall be T or L shaped with a minimum weight of 1.3 pounds per foot. Attachment shall be by pockets or by plastic ties if the posts have suitable projections.

Type 2: Net-Reinforced Fence - This system consists of fence posts, spaced no more than 8-1/2 feet apart, and geotextile with an attached reinforcing net. Fence posts shall meet the requirements of Self-Supported Fence. Net reinforcement shall be galvanized welded wire mesh of at least 12.5-gauge wire with maximum opening size of4 x 2 inches. The fabric shall be attached to the top of the net by crimping or cord at least every 2 feet, or as otherwise specified.

Type 3: Triangular Filter Dike - This system consists of a rigid wire mesh, at least 6-gauge, formed into an equilateral triangle cross-sectional shape with sides measuring 18 inches, wrapped with geotextile silt fence fabric. The fabric shall be continuously wrapped around the dike, with a skirt extending at least 12 inches from its upslope comer.

C. Packaging Requirements: Prior to installation, the fabric shall be protected from damage due to ultraviolet light and moisture by either wrappers or inside storage.

D. Certification and Identification: Each lot or shipment shall be accompanied by a certification of conformance to this specification. The shipment must be identified by a ticket or by labels securely affixed to the fabric rolls. This ticket or label must list the following information:

a. Name of manufacturer or supplier
b. Brand name and style
c. Manufacturer's lot number or control number
d. Roll size (length and width)
e. Chemical composition

3. MEASUREMENT AND PAYMENT

Unless otherwise specified on the Bid Form, silt fence shall be measured by the linear foot. Payment shall be at the bid price for the unit of measurement specified and shall be full compensation for furnishing all labor, materials, tools, equipment and incidentals necessary to complete the work. Payment shall include, but not be limited to, placing, maintaining and removing the silt fence.

SECTION 025205

PAVEMENT REPAIR CURB GUTTER SIDEWALK AND DRIVEWAY REPLACEMENT

1. DESCRIPTION

This specification shall govern the removal and replacing of all types of pavements and surfacing required to complete the project.

2. MATERIALS

Unless otherwise specified on the drawings, materials and proportions used along with this specification shall conform to the respective following specifications:

City Standard Specifications
Section 022020 "Excavation and Backfill for Utilities"
Section 022100 "Select Material"
Section 025223 "Crushed Limestone Flexible Base"
Section 025424 "Hot Mix Asphaltic Concrete Pavement"
Section 025610 "Concrete Curb and Gutter"
Section 025612 "Concrete Sidewalks and Driveways"
Section 025620 "Portland Cement Concrete Pavement"
Section 030020 "Portland Cement Concrete", Class "A"
Concrete Section 032020 "Reinforcing Steel"
Section 038000 "Concrete Structures".

3. METHOD OF CUTTING

The outline of the trench shall be marked upon the surface of the pavement to be cut, and all cuts into the pavement shall be saw-cut as nearly vertical as it is possible to make them. All unwanted materials removed shall be disposed of by the Contractor and shall not be used as backfill material.

4. BACKFILL OF TRENCH

Excavation and backfilling of trench shall be in accordance with City Standard Specification Section
022020 "Excavation and Backfill for Utilities."

5. REPLACNG STREET AND OTHER PAVEMENT

All pavements, driveways, sidewalks, and curbs and gutters which are cut shall be replaced in a workmanlike manner, with like or better materials or per pavement repair details to be provided on the drawings The installation of a utility that crosses the ROW at a perpendicular or near perpendicular angle and has an OD of 6" or less will not be permitted to be installed by cutting the road section. Street excavation/cut for a utility in an asphalt roadway shall include a full lane overlay or pavement repair for parallel cuts, or a 12' wide pavement repair for perpendicular cuts. Street excavation/cut for a utility in a concrete roadway shall include full panel replacement. The drawings and/or permit application should include a site specific pavement cut and restoration plan that indicates the general nature of the pavement and roadway (for examples, concrete arterial, asphalt residential) to be cut and restored, the existing pavement section (if known), the location and approximate area of the excavation/pavement repair, including the approximate length and width of the pavement repair in relation to the roadway travel lane(s).

6. REPLACING DRIVEWAY PAVEMENT

On all concrete driveway pavements, the replacement shall consist of a reinforced Class "A" concrete slab with a minimum thickness of six (6) inches. The type of finish for the replaced section shall be the same as that appearing on the old pavement. Reinforcement shall be #4 bars at 12 inches each way with additional diagonal bars as indicated on the drawings. Any other type shall be replaced with like or better replacement. Replacement shall, in general, be to original joint or score mark.

7. REPLACNG SIDEWALKS

On all sidewalk pavements, the replacement shall consist of a reinforced Class "A" concrete slab four (4) inches thick. The type of finish for the replaced section shall be the same as that appearing on the old sidewalk. Replacement shall, in general, be to original joint or score marks. Reinforcement shall be 4" x 4" - W2.9 x W2.9 welded wire fabric located at mid-depth in the slab.

8. REPLACNG CURB AND GUTTER

On all curb and gutter, the replacement shall consist of a section conforming in all details to the original section or to City of Kingsville Standard curb and gutter section, if required by the Engineer. Cuts through the curb shall be replaced with Class "A" concrete. Preserve the original steel reinforcing and reinforce all new curbs with three #4 bars. Adjust grades for positive drainage. Replacement shall, in general, be to original joint or score mark. For jointed concrete roadways, the joints in curb or in curb and gutter should match the concrete roadway joints.

9. REPAIRNG STREET SHOULDERS AND UNMPROVED STREETS

On streets or roads without curb and gutter where a shoulder is disturbed, it shall be restored to like or better condition. The shoulder surface shall be rolled to an acceptably stable condition.

10. MEASUREMENT AND PAYMENT

Unless otherwise specified on the Bid Form, pavement repair shall be measured by the square yard of the type of repair specified; curb and gutter replacement shall be measured by the linear foot; and sidewalk and driveway replacement shall each be measured by the square foot. Payment will be made at the unit price bid for the completed work and shall be full compensation for all labor, materials, equipment, tools, and incidentals required to complete the work. No separate measurement or payment will be made for subgrade compaction, sand leveling course, geogrid, ordinary backfill, cement-stabilized sand backfill, flexible base, prime coat, hot-mix asphaltic concrete, etc.

SECTION 025223
CRUSHED LMESTONE FLEXIBLE BASE

1. DESCRIPTION

This Specification shall govern all work for furnishing and placing Crushed Limestone Flexible Base required to complete the project.

2. MATERIAL

Crushed Limestone Flexible Base shall consist of crushed limestone produced from oversize quarried aggregate, sized by crushing and produced from a naturally occurring single source, meeting the requirements for Type 'A' material as specified in Texas Department of Transportation (TxDOT) Specification Item 247 "Flexible Base". Crushed gravel or uncrushed gravel shall not be acceptable. No blending of sources and/or additive materials will be allowed. The material shall be free of vegetation and shall be approved by the Engineer. All acceptable material shall be screened and the oversize shall be crushed and returned to the screened material in such a manner that a uniform product will be produced which meets all of the physical requirements for Grade 1-2 as specified in TxDOT Specification Item 247 "Flexible Base".

3. TESTNG

The City will engage a laboratory and pay for one test each gradation, liquid limit, plasticity index, modified proctor, moisture-density relation, CBR, and necessary field densities. The Engineer may call for additional tests at any time. The cost of all retests, in case of failure to meet specifications, will be deducted from the Contractor's payment. The City will pay for proctor and soil constants and abrasion tests at the rate described in the materials testing schedule. If material changes, the Contractor shall pay the cost of additional tests required by the Engineer. The Engineer may waive testing and/or lime admix for small amounts for unimportant uses.

4. CONSTRUCTION METHODS

Prior to placement of flexible base, the surface of the previous underlying course shall be finished true to line and grade as established, and in conformity with the typical section shown on the drawings. Grade tolerance shall be generally 1/2 inch, and highs and lows must approximately balance. If called for in the drawings or elsewhere in the contract documents, geogrid, as specified in City Standard Specification Section 022040 "Street Excavation", shall be placed as indicated.

Flexible base shall be delivered and spread the same day if possible (no later than the next day).

Base shall be mixed as required to produce a uniform mixture with water. Base shall be placed in uniform lifts not to exceed 10-inch loose lifts or 8-inch compacted lifts. Moisture and density requirements shall be as indicated on the drawings, typical minimum 98% Modified Proctor

(ASTM DI 557) under flexible pavements or typical minimum 98% Standard Proctor (ASTM D698) under concrete pavement and to within ± 2% of optimum moisture. The section may be accepted if no more than 1 of the 5 most recent moisture or density tests is outside of the specified limits, and the failed test is within +1 % deviation from specified moisture or density requirements.

The surface of the compacted base, after meeting moisture and density requirements, shall be primed in accordance with City Standard Specification Section 025412 "Prime Coat".

On completion of compaction and priming, the surface shall be smooth and conform to lines, grades, and sections shown on the drawings. Areas with any deviation in excess of 1/4 inch in cross-section and in lengths of 16 feet measured longitudinally shall be corrected by loosening, adding or removing material, reshaping, and recompacting by repriming and rolling.

Moisture and density shall be maintained until the paving is complete. Excessive loss of moisture shall be prevented by sprinkling, sealing, or covering with a subsequent layer. Should the base, due to any reason or cause, lose the required stability, density, or moisture before it is protected by placement of the next layer, it shall be re-compacted, refinished, and retested at the expense of the Contractor until acceptable to the City.

5. MEASUREMENT AND PAYMENT

Unless otherwise specified on the Bid Form, crushed limestone flexible base shall be measured by the square yard complete in place. Payment shall be full compensation for all materials, royalty, hauling, placing, compacting, labor, equipment, tools, and incidentals necessary for the completion of work.

Prime shall be measured and paid under separate bid item if specified on the Bid Form.

Geogrid shall be measured and paid under separate bid item if specified on the Bid Form.

SECTION 025404
ASPHALTS. OILS AND EMULSIONS

1. DESCRIPTION

This specification shall govern all work for asphalt cement, cut-back and emulsified asphalts, performance-graded asphalt binders, and other miscellaneous asphaltic materials required to complete the project.

2. MATERIALS

When tested according to Texas Department of Transportation Test Methods, the various materials shall meet the applicable requirements of TxDOT Specification Item 300, "Asphalts, Oils, and Emulsions" (Latest Edition).

3. STORAGE. HEATING AND APPLICATION TEMPERATURES

Store and apply asphaltic materials in accordance with TxDOT Item 300 (Latest Edition) at the lowest temperature yielding satisfact01Y results. Follow the manufacturer's instructions for any agitation requirements in storage and in application and storage temperatures.

4. MEASUREMENT AND PAYMENT

Unless otherwise specified on the Bid Form, asphalts, oils and emulsions shall not be measured and paid for separately, but shall be considered subsidiary to the appropriate bid item.

SECTION 025412
PRIME COAT

1. DESCRIPTION

This specification shall consist of an application of asphalt material on the completed base course and/or other approved area in accordance with this specification.

Prime Coat shall not be applied when the air temperature is below 60^0 F and falling, but it may be applied when the air temperature is above 50^0 F and is rising; the air temperature being taken in the shade and away from artificial heat. Asphalt material shall not be placed when general weather conditions, in the opinion of the Engineer, are not suitable.

2. MATERIALS

The asphalt material used for the prime coat shall be MC-30 medium-curing cutback asphalt or AE-P asphalt emulsion prime, unless otherwise specified, and when tested by approved laboratory methods shall meet the requirements of City Standard Specification Section 025404 "Asphalts, Oils and Emulsions". Blotter material shall be native sand.

3. CONSTRUCTION METHODS

When, in the opinion of the Engineer, the area and/or base is satisfactory to receive the prime coat, the surface shall be cleaned of dirt, dust, and other deleterious matter by sweeping or other approved methods. If found necessary by the Engineer, the surface shall be lightly sprinkled with water just prior to application of the asphalt material. The asphalt material shall be applied on the clean surface by an approved type of self-propelled pressure distributor so operated as to distribute the material in the quantity specified, evenly and smoothly under a pressure necessary for proper distribution. The Contractor shall provide all necessary facilities for determining the temperature of the asphalt material in all of the heating equipment and in the distributor, for determining the rate at which it is applied, and for securing uniformity at the junction of two distributor loads.

All storage tanks, piping, retorts, booster tanks and distributors used in storing or handling asphalt material shall be kept clean and in good operating condition at all times, and they shall be operated in such manner that there will be no contamination of the asphalt material with foreign material. It shall be the responsibility of the Contractor to provide and maintain in good working order a recording thermometer at the storage-heating unit at all times. The distributor shall have been recently calibrated and the Engineer shall be furnished an accurate and satisfactory record of such calibration. After beginning of the work, should the yield on the asphalt material applied appear to be in error, the distributor shall be calibrated in a manner satisfactory to the Engineer before proceeding with the work.

Prime shall be applied at a temperature within the recommended range per City Standard Specification Section 025404 "Asphalts, Oils and Emulsions", with that range being 70 to 150 degrees F. Application rate shall be not less than 0.15 gallon per square yard, unless othrlwise specified.

The Contractor shall be responsible for the maintenance of the surface until the Engineer accepts the work.

No traffic hauling or placement of any subsequent courses shall be permitted over the freshly applied prime coat until authorized by the Engineer. Spread blotter material before allowing traffic to use a primed surface.

Allow sufficient time for the prime coat to cure properly before applying surface treatment or asphaltic concrete pavement.

4. MEASUREMENT AND PAYMENT

Unless otherwise specified on the Bid Form, prime coat shall be measured by the gallon of asphalt material applied. Payment shall include furnishing, heating, hauling and distributing the asphalt material as specified; for furnishing, spreading and removing sand blotter material; for all freight involved; and for all manipulation, labor, materials, tools, equipment and incidentals necessary to complete the work.

SECTION 025414
AGGREGATE FOR SURFACE TREATMENT

1. DESCRIPTION

This specification establishes the requirements for surface aggregate to be used in the construction of surface treatments and seal coats. The type, grade, and surface aggregate classification (SAC) of aggregate shall be as specified in the applicable specification or as shown on the drawings.

2. AGGREGATE

A. Materials. Furnish uncontaminated materials of uniform quality throughout that meet the requirements of the drawings and specifications. Materials shall meet the applicable requirements of TxDOT Specification Item 302 "Aggregates for Surface Treatments" (latest edition).

3. MEASUREMENT AND PAYMENT

Unless otherwise specified on the Bid Form, aggregate for surface treatment and seal coats shall not be measured and paid separately, but shall be subsidiary to the construction in which these materials are used.

SECTION 025416
SEAL COAT

1. DESCRIPTION

This specification shall consist of a surface treatment composed of a single or multiple application of asphalt covered with aggregate for the sealing of existing pavements in accordance with this specification.

Seal coats shall not be applied when the air temperature is below 60^0F and falling, but may be applied when the air temperature is above 50^0F and rising; the air temperature being taken in the shade and away from artificial heat. Asphaltic material shall not be placed when general weather conditions, in the opinion of the Engineer, are not suitable.

2. MATERIALS

(1) Asphaltic Materials. The asphaltic material used shall be AC-5 (AC-3 in winter) or other approved material as prescribed in Standard Specification Section 025404 "Asphalts, Oils and Emulsions", whichever is called for on the plans.

(2) Aggregate.

Single Course - The aggregate used shall be Type PA (pre-coated aggregate), Grade 5 (1/2" maximum size), as described in specification Section 025414 "Aggregate For Surface Treatment".

Multiple Course - The aggregate used for multiple course seal coat shall be the same as for single course, except Grade 4 (5/8" maximum size) aggregate will be required for the first course, and Grade 5 (1/2" maximum size) aggregate will be required for the second and third (surface) courses, as shown in the plans and specifications.

3. CONSTRUCTION METHODS

The area to be treated shall be cleaned of dirt, dust or other deleterious matter by sweeping or other approved methods. If it is found necessary by the Engineer, the surface shall be lightly sprinkled with water just prior to the application of asphaltic material. Asphaltic material shall be applied on the cleaned surface by an approved type of self-propelled pressure distributor, so operated as to distribute the material in the quantity specified, evenly and smoothly, under a pressure necessary for proper distribution. The Contractor shall provide all necessary facilities for determining the temperature of the asphaltic material in all of the heating equipment and in the distributor, for determining the rate at which it is applied, and for securing uniformity at the junction of two distributor loads.

The distributor shall have been recently calibrated and the Engineer shall be furnished an accurate and satisfactory record of such calibration. After beginning the work, should the yield on the asphaltic material appear to be in error, the distributor shall be calibrated in a manner satisfactory to the Engineer before proceeding with the work. Asphaltic material may be applied for the full width of the seal coat in one application unless the width exceeds 26 feet. Asphaltic material shall not be applied until immediate covering with aggregate is assured. Immediately after the application of asphalt, the aggregate shall be evenly spread over the surface. Mechanical spreading devices shall be of a type approved by the Engineer. The cover material must be evenly and accurately distributed to the end that an even and smooth surface is obtained. Immediately after the aggregate has been applied, the surface shall be adequately raked and broomed to insure uniformity. As soon as proper distribution of aggregate can be obtained, the surface shall be flat-rolled with a roller having a gross weight of not less than four (4) tons and not more than ten (10) tons. The Contractor shall so arrange his work that the rolling of all aggregate applied that day shall be completed on the road before daylight. The asphalt and aggregate shall be applied at the approximate rate indicated on plans within the limits of the following schedule or as directed by the Engineer.

	Gallons of Asphalt Per Square Yard		Aggregate Cu.Yd. to Sq.Yd.	
	Min.	Max.	Min.	Max.
Asphalt Cement..	0.15	0.30	1:200	1:100

The Contractor shall be responsible for the maintenance of the surface until the work is accepted by the Engineer. All holes or failures in the seal coat surface shall be repaired by use of additional asphalt and aggregate, and all fat or bleeding surfaces shall be covered with approved cover material in such manner that the asphaltic material will not adhere to or be picked up on the wheels of vehicles.

All storage tanks, piping, retorts, booster tanks and distributors used in storing or handling asphaltic material shall be kept clean and in good operating condition at all times, and they shall be operated in such manner that there will be no contamination of the asphalt with foreign material. It shall be the responsibility of the Contractor to provide and maintain in good working order a recording thermometer at the storage heating unit at all times.

The temperature of application shall be within the limits recommended in City Standard Specification Section 025404 "Asphalts, Oil and Emulsions", with that being 220 to 300 degrees F for AC-3, and 275 to 350 degrees F for AC-5.

4. MEASUREMENT AND PAYMENT

Unless otherwise indicated in the Bid Form, seal coat will be measured by the square yard in place to the limits shown on the plans and as directed by the Engineer.
Payment shall be full compensation for cleaning and sprinkling the existing surface; for furnishing, preparing, hauling and placing all materials; for all freight involved; and for all manipulations, labor, tools, equipment and incidentals necessary' to complete the work.

SECTION 025424
HOT MIX ASPHALTIC CONCRETE PAVEMENT (Class A.)

1. DESCRIPTION

This specification shall govern all work required for furnishing and laying Hot Mix Asphalt Concrete (HMAC) surface, binder and base courses required to complete the project.

All subsurface utilities must be inspected, tested, and accepted prior to any paving.

2. MATERIALS

2.1. Aggregate. The aggregate shall consist of a blend of course aggregate, fine aggregate and, if required, a mineral filler.

2.1.1. Coarse Aggregate shall consist of that fraction of aggregate retained on a No. 10 sieve and shall consist of crushed furnace slag, crushed stone, or crushed gravel.

Deleterious material in course aggregate shall not exceed 2% per TxDOT Test Method TEX-217-F.

Course aggregate shall be crushed such that a minimum of 85% of the particles have more than one crushed face, unless noted otherwise on the plans.

Los Angeles abrasion losses for course aggregate shall not exceed 40% by weight for the surface course and 45% for the binder and base courses per TxDOT Test Method TEX-410-A.

Polish Value not less than 30 for aggregate used in the surface course per TxDOT Test Method TEX-438-A.

2.1.2. Fine Aggregate is defined as the fraction passing a No. 10 sieve and shall be of uniform quality.

Fine aggregate shall consist of screenings of material that pass the Los Angeles abrasion requirements in paragraph 2.1.1 above. Screenings shall be blended with a maximum of 15% uncrushed aggregate or field sand for Type D mixes, or a maximum of 10% uncrushed aggregate or field sand for Type A, B, and C mixes.

Grading of fine aggregate shall be as follows:

Sieve Size	Percent Passing by Weight
No. 10	100
No. 200	0-15

2.1.3. Filler shall consist of dry stone dust, Portland cement, hydrated lime, or other mineral dust approved by the Engineer.

Grading of filler shall be as follows:

Sieve Size	Minimum Percent Passing by Weight
No. 30	95
No. 80	75
No. 200	55

2.2. Reclaimed Asphalt Pavement (RAP). Reclaimed asphalt pavement may be incorporated into the hot mix asphalt concrete furnished for the project, provided that the mixture is designed per the TxDOT Methods and meets the applicable provisions of said TxDOT Item 340 and this specification.

2.3. Asphalt. Asphalt Material shall be in accordance with Standard Specification Section 025404 "Asphalt, Oils and Emulsions" and AASHTO.

2.3.1. Paving Mixture:

APPLICATION	ASPHALT GRADE
Residential or low volume	PG 64-22
Collector	
Surface Course	PG 70-22
Binder Course	PG 64-22
Arterial	
Surface Course	PG 76-22
Binder Course	PG 64-22
Base Courses	PG 64-22

2.3.2. Tack Coat shall consist of an emulsion, SS-I diluted with equal volume of water and applied at a rate ranging from 0.05 to 0.15 gallon per square yard.

3. PAVING MIXTURE

3.1. Mix Design. The mixture shall be designed in accordance with TxDOT Bulletin C-14 and TxDOT Test Method TEX-204-F to conform to the requirements of this specification. The Contractor shall furnish the mix design for the job-mix to be used for the project, unless shown otherwise on the drawings. The mix design shall be submitted prior to placement of the mixture.

The design procedures are actually intended to result at a job-mix with properties in compliance with these specifications, and when properly placed the job-mix will be durable and stable. The sieve analysis of the job-mix shall be within the range of the Master Gradation and Tolerances specified herein. The job-mix shall meet the density and stability requirements as specified and shall be included with the mix design as submitted per above.

If the specific gravity of any of the types of aggregates differs by more than 0.3, use volume method.

Plot sieve analysis of job-mix; percent passing versus size on four-cycle semi-log paper or other appropriate type paper. Show tolerance limits and Limits of Master Gradation.

3.2. Master Gradation of Aggregate. The aggregate for the type of mix specified shall be within the following tabulated limits per TxDOT Test Method TEX-200-F (Dry Sieve Analysis):

Sieve Size	Type			
	A Course Surface	B Fine Surface	C Course Surface	D Fine Surface
1-1/2"	100			
1-1/4"	95-100			
1"		100		
7/8"	70-90	95-100	100	
5/8"		75-95	95-100	
1/2"	50-70			100
3/8"		60-80	70-85	85-100
1/4"				
No. 4	30-50	40-60	43-63	50-70
No. 10	20-34	27-40	30-40	32-42
No. 40	5-20	10-25	10-25	11-26
No. 80	2-12	3-13	3-13	4-14
No. 200	1-6*	1-6*	1-6*	1-6*
VMA % minimum	11	12	13	14

* 2-8 when TxDOT Test Method Tex-200-F, Part (Washed Sieve Analysis) is used.

3.3. Tolerances. The mixture delivered to the job site shall not vary from the job-mix by more than the tolerances specified below. The gradation of the produced mix shall not fall outside the Master Grading Limits, with the following exceptions: for Type B material coarser than 3/8" and for Type D material coarser than #4. Variations from job-mix shall not exceed the following limits, except as noted above:

Item:	Tolerances Percent by Weight or Volume
1" to No. 10	Plus or Minus 5.0
No. 40 to No. 200	Plus or Minus 3.0
Asphalt Weight	Plus or Minus 0.5
Asphalt Volume	Plus or Minus 1.2

3.4. Mix Properties. The mixture shall have a minimum Hveem stability of 40 for Type A, B, and C mixes, and 35 for Type D mixes per TxDOT Test Method TEX-208-F at an optimum density of 96% (plus or minus 1.5) of theoretical maximum density per TxDOT Test Methods TEX-227-F and TEX-207-F.

3.5. Sampling and Testing of Raw Materials. The Contractor shall sample materials as necessary to produce a mix in compliance with these specifications.

4. EQUIPMENT

4.1. Mixing Plants. Mixing plants shall be either the weigh batching type or the drum mix type. Both types shall be equipped with satisfactory conveyors, power units, aggregate handling equipment, aggregate screens and bins (weigh batch only), and pollution control devices as required.

4.2. Truck Scales. A set of truck scales, if needed for measurement, shall be placed at a location approved by the Engineer.

4.3. Asphalt Material Heating Equipment. Asphalt material heating equipment shall be adequate to heat the required amount of material to the desired temperature. Agitation with steam or air will not be permitted. The heating apparatus shall be equipped with a recording thermometer with a 24-hour continuous chart that will record the temperature of the asphalt at the highest temperature.

4.4. Surge-Storage System. A surge-storage system may be used provided that the mixture coming out of the bins is of equal quality to that coming out of the mixer. The system shall be equipped with a gob hopper, rotating chute or other devices designed to minimize segregation of the asphalt mixture.

4.5. Laydown Machine. The laydown machine shall be capable of producing a surface that will meet the requirements of the typical cross section, of adequate power to propel the delivery vehicles, and produce the surface tolerances herein required. It shall be wide enough to lay a 28-foot street (back-to-back of curbs) in a maximum of two passes.

4.6. Rollers. All rollers shall be self-propelled and of any type capable of obtaining the required density. Rollers shall be in satisfactory operating condition and free from fuel, hydraulic fluid, or any other fluid leaks.

5. STORAGE PROPORTIONNG AND MIXING

5.1. Storage and Heating of Asphalt Materials. Asphalt cement shall not be heated to a temperature in excess of that recommended by the producer. Asphalt storage equipment shall be maintained in a clean condition and operated in such a manner that there will be no contamination with foreign matter.

5.2. Feeding and DIYing of Aggregates. The feeding of various sizes of aggregate to the dryer shall be done in such a manner that a uniform and constant flow of materials in the required proportions will be maintained. In no case shall the aggregate be introduced into the mixing unit at a temperature in excess of 350 degrees F.

5.3. Proportioning. All materials shall be handled and proportioned in a manner that yield an acceptable mixture as herein specified and as defined by the job-mix.

5.4. Mixing.

5.4. l. Weigh Batch Plant. In charging the weigh box and in charging the pugmill from the weigh box, such methods or devices shall be used as necessary to minimize segregation of the mixture.

5.4.2. Drum Mix Plant. The amount of aggregate and asphalt cement entering the mixer and the rate of travel through the mixer shall be coordinated so that a uniform mixture of the desired gradation and asphalt content will be produced.

5.4.3. The mixture produced from each type of plant shall not vary from the job-mix by more than the tolerances and restrictions herein specified. The mixture when discharged from the plant shall have a moisture content not greater than one percent by weight of total mix when determined by TxDOT Test Method TEX-212-F.

5.4.4. The mixture produced from each type of plant shall be at a temperature between 250 and 325 degrees F. After a target mixing temperature has been established, the mixture when discharged from the mixer shall not vary from this temperature by more than 25 degrees F.

6. CONSTRUCTION METHODS

6.1. Construction Conditions. For mat thicknesses greater than 1.5 inches, the asphalt material may be placed with a laydown machine when the air temperature is 40 degrees F and rising but not when the air temperature is 50 degrees F and falling. In addition, mat thickness less than and including 1.5 inches shall not be placed when the temperature of the surface on which the mat is placed is below 50 degrees F.

All subsurface utilities shall be inspected, tested, and accepted prior to paving.

6.2. Prime Coat. If a prime coat is required, it shall be applied and paid for as a separate item conforming to the requirements of City Standard Specification Section 025412 "Prime Coat", except the application temperature shall be as provided above. The tack coat or asphaltic concrete shall not be applied on a previously primed flexible base until the primed base has completely cured to the satisfaction of the Engineer.

6.3. Tack Coat. Before the asphalt mixture is laid, the surface upon which the tack coat is to be placed shall be thoroughly cleaned to the satisfaction of the Engineer. The surface shall be given a uniform application of tack coat using materials and rates herein specified and/or as shown on the plans. The tack coat shall be rolled with a pneumatic tire roller as necessary.

Tack coat is required before any pavement course not placed immediately following the previous course placement.

6.4. Transporting Asphalt Concrete. The asphalt mixture shall be hauled to the job site in tight vehicles previously cleaned of all foreign matter. In cool weather or for long hauls, canvas covers and insulated truck beds may be necessary. The inside of the bed may be given a light coating of lime water or other suitable release agent necessary to prevent from adhering. Diesel oil is not allowed.

6.5. Placing. The asphalt mixture shall be spread on the approved prepared surface with a laydown machine or other approved equipment in such a manner that when properly compacted, the finished surface will be smooth and of uniform density, and meet the requirements of the typical cross section as shown on the plans.

6.5.1. Flush Structures. Adjacent to flush curbs, gutters, liners and structures, the surface shall be finished uniformly high so that when compacted, it will be slightly above the edge of the curb and flush structure.

6.5.2. Construction joints of successive courses of asphaltic material shall be offset at least six inches. Construction joints on surface courses shall coincide with lane lines, or as directed by the Engineer, but shall not be in the anticipated wheel path of the roadway.

6.6. Compacting. The asphalt mixture shall be compacted thoroughly and uniformly with the necessary rollers to obtain the required density and surface tolerances herein described and any requirements as shown on the plans. Regardless of the method of compaction control followed, all rolling shall be completed before the mixture temperature drops below 175 degrees F.

6.7. In-Place Density. In-place density control is required for all mixtures except for thin, irregular level-up courses. Material should be compacted to between 96% and 92% of maximum theoretical density or between 4% and 8% air voids. Average density shall be greater than 92% and no individual determination shall be lower than 90%. Testing shall be in accordance with TxDOT Test Methods TEX-207-F and TEX-227-F.

Pavement specimens, which shall be either cores or sections of the compacted mixture, will be tested as required to determine the percent air voids. Other methods, such as nuclear determination of in-place density, which correlate satisfactorily with actual project specimens may be used when approved by the Engineer.

6.8. Thickness. The total compacted average thickness of the combined HMAC courses shall not be less than the amount specified on the drawings. No more than 10% of the measured thickness(es) shall be more than 1/4 inch less than the plan thickness(es). If so, the quantity for pay shall be decreased as deemed appropriate by the Engineer.

6.9. Surface Smoothness Criteria and Tests. The pavement surface after compaction, shall be smooth and true to the established lines, grade and cross-section. The surface shall be tested by the City with the Mays Roughness Meter. The Mays Roughness Value for each 600-foot section shall not exceed ninety inches per mile per traffic lane.

For each 600-foot section not meeting this criteria, the Engineer shall have the option of requiring that section to be reworked to meet the criteria, or paying an adjusted unit price for the surface course. The unit price adjustment shall be made on the following basis:

Adjusted Unit Price = (Adjustment Factor) X Surface Course Unit Bid Price

The adjustment factor shall be:

For Residential Streets:

Adjustment Factor = 1.999 - 0.0111 M

For All Other Class Streets (Non-Residential)

Adjustment Factor = 1.287 - 0.0143 M

Where M = Mays Roughness Value

In no case shall the Contractor be paid more than the unit bid price. If the surface course is an inverted penetration (surface treatment) the Mays Roughness Value observed will be reduced by ten inches per mile, prior to applying the above criteria.

Localized defects (obvious settlements, humps, ridges, etc.) shall be tested with a ten-foot straightedge placed parallel to the roadway centerline. The maximum deviation shall not exceed 1/8 inch in ten feet. Areas not meeting this criteria shall be corrected to the satisfaction of the Engineer.

Pavement areas having surface irregularities, segregation, raveling or otherwise deemed unacceptable by the Engineer shall be removed and replaced by the Contractor in a manner approved by the Engineer, at no additional cost to the City.

6.10. Opening to Traffic. The pavement shall be opened to traffic when directed by the Engineer. The Contractor's attention is directed to the fact that all construction traffic allowed on pavement open to the public will be subject to the State laws governing traffic on highways.

If the surface ravels, it will be the Contractor's responsibility to correct this condition at his expense.

7. MEASUREMENT AND PAYMENT

Unless otherwise specified on the Bid Form, hot mix asphaltic concrete pavement shall be measured by the square yard of the type and thickness of "Hot Mix Asphaltic Concrete" as shown on the drawings.

The Contractor shall provide the Engineer with copies of the "pay ticket" identifying the truck and showing the gross empty weight of the truck with driver as it arrives at the plant and the gross loaded weight of the truck with driver as it leaves the plant. The measured amount will be the difference of the loaded and empty trucks converted to tons.

Payment shall be full compensation for quarrying, furnishing all materials, freight involved; for all heating, mixing, hauling, cleaning the existing base course or pavement, tack coat, placing asphaltic concrete mixture, rolling and finishing; and for all manipulations, labor, tools, equipment, and incidentals necessary to complete the work except prime coat when required.

Prime coat, performed where required, will be measured and paid for in accordance with the provisions governing City Standard Specification Section 025412 "Prime Coat".

All templates, straightedges, scales, and other weight and measuring devices necessary for the proper construction, measuring and checking of the work shall be furnished, operated and maintained by the Contractor at his expense.

Any paving placed prior to inspection, testing, and acceptance of underground utilities may be rejected by the City and will be replaced at the Contractor's expense after correcting any subsurface utility defects. Pavement that fails to meet the in place density criteria may be rejected by the City and will be replaced at the Contractor's expense, or such pavement may, at the City's discretion, be accepted by the City and the unit price for payment shall be reduced as deemed appropriate by the Engineer.

SECTION 025610
CONCRETE CURB AND GUTTER

1. DESCRIPTION

This specification shall consist of Portland cement concrete combined concrete curb and gutter or separate concrete curb with or without reinforcing steel as required, constructed on an approved subgrade or foundation material in accordance with these specifications, in conformity with the lines and grades established by the Engineer and details shown on the drawings.

2. MATERIALS

Unless otherwise specified on the drawings, materials and proportions for concrete used in construction under this specification shall conform to the requirements as specified for Class "A" Concrete under City Standard Specification Section 030020 "Portland Cement Concrete". Reinforcing steel shall conform to the requirements as specified in City Standard Specification Section 032020 "Reinforcing Steel". Expansion joint filler shall be redwood material meeting the requirements specified in City Standard Specification Section 038000 "Concrete Structures".

3. CONSTRUCTION METHODS

The foundation shall be excavated and shaped to line, grade and cross-section, and hand tamped and sprinkled. If dry, the subgrade or foundation material shall be sprinkled lightly with water and compacted to not less than 98% Standard Proctor density, or as required on the drawings. Flexible base shall be compacted to specified density and moisture immediately before concrete is deposited thereon.

Outside forms shall be of wood or metal, of a section satisfactory to the Engineer, straight, free of warp, and of a depth equal to the depth of the curb and gutter. They shall be securely staked to line and grade and maintained in a true position during the depositing of concrete. Inside forms for the curb shall be approved material, shall be of such design as to provide the curb required, and shall be rigidly attached to the outside forms. For reinforced concrete roadways, all jointing must be reflected through the curb, including redwood expansion joints and construction joints. Driveway gutter shall be placed integrally with the driveway as shown on the City Standard Details.

The reinforcing steel shall be placed in position as shown on the typical details. Care shall be exercised to keep all reinforcing steel in its proper location.

Concrete for curb and gutter shall be mixed in a manner satisfactory to the Engineer. The curb and gutter shall be placed in sections of the length indicated on the plans, and each section shall be

separated by a pre-molded insert or board joint of cross-section specified for the curb and gutter, and of the thickness indicated on the drawings.

After the concrete has been struck off and after it has become sufficiently set, the exposed surfaces shall be thoroughly worked with a wooden float. The exposed edges shall be rounded by the use of an edging tool to the radius indicated on the drawings. All exposed surfaces of curb and gutter, or curb, shall be brushed to a smooth and uniform surface.

The completed curb and gutter shall be cured with Type 2, white pigmented curing compound unless shown otherwise on the drawings. Other methods of curing as outlined in City Standard Specification Section 038000 "Concrete Structures" will be acceptable with a required curing period of 72 hours.

The area behind the curb shall be backfilled, tamped, and sloped as directed as soon as possible and no later than 48 hours after the removal of forms. Backfill shall be placed to the full height of the curb, or as otherwise specified.

4. MEASUREMENT AND PAYMENT

Unless otherwise specified on the Bid Form, concrete curb and gutter or concrete curb will be measured by the linear foot for each type of curb, complete in place. Payment shall be full compensation for preparing the subgrade; for furnishing and placing all materials including reinforcing steel and expansion joint material; for furnishing, placing, shaping and tamping backfill; and for all manipulation, labor, tools, equipment and incidentals necessary to complete the work.

SECTION 025802
TEMPORARY TRAFFIC CONTROLS DURING CONSTRUCTION

1. DESCRIPTION

This specification shall govern all work required for Temporary Traffic Controls during construction. The work shall include furnishing, installing, moving, replacing, and maintaining all temporary traffic controls including, but not limited to, barricades, signs, barriers, cones, lights, signals, temporary detours, temporary striping and markers, flagger, temporary drainage pipes and structures, blue business signs, and such temporary devices as necessary to safely complete the project.

2. MATERIALS

Traffic control devices shall conform to the latest edition of the "Texas Manual on Uniform Traffic Control Devices", unless indicated otherwise on the Traffic Control Plan.

3. METHODS

Sufficient traffic control measures shall be used to assure a safe condition and to provide a minimum of inconvenience to motorists and pedestrians.

If the Traffic Control Plan (TCP) is included in the drawings, any changes to the TCP by the Contractor shall be prepared by a Texas licensed professional engineer and submitted to the City Engineer for approval, prior to construction. If the TCP is not included in the drawings, the Contractor shall provide the TCP prepared by a Texas licensed professional engineer and submit the TCP to the City Engineer for approval, prior to construction.

The Contractor is responsible for implementing and maintaining the traffic control plan and will be responsible for furnishing all traffic control devices, temporary signage and ATSSA certified flaggers. The construction methods shall be conducted to provide the least possible interference to traffic so as to permit the continuous movement of traffic in all allowable directions at all times. The Contractor shall cleanup and remove from the work area all loose material resulting from construction operations at the end of each workday.

All signs, barricades, and pavement markings shall conform to the BC standard sheets, TCP sheets and the latest version of the "Texas Manual on Uniform Traffic Control Devices".

The Contractor may be required to furnish additional barricades, signs, and warning lights to maintain traffic and promote motorist's safety. Any such additional signs and barricades will be considered subsidiary to the pay item for traffic control. All signs, barricades, and posts will be either new or freshly painted.

The contractor and any traffic control subcontractor must be ATSSA certified for Traffic Control. A competent person, responsible for implementation of the TCP and for traffic safety, shall be designated by the Contractor.

The name and off-hours phone number of the competent person shall be provided in writing at the Pre-Construction Conference.

The competent person shall be on site, during working hours and on call at all times in the event of off-hour emergency.

4. MEASUREMENT AND PAYMENT

Unless otherwise specified on the Bid Form, temporary traffic controls during construction shall be measured as a lump sum. Payment shall include, but not be limited to, furnishing, installing, moving, replacing and maintaining all temporary traffic controls including, but not limited to, barricades, signs, banners, cones, lights, signals, temporary striping and markers, flaggers, removable and non-removable work zone pavements markings and signage, channelizing devices, temporary detours, temporary flexible-reflective roadway marker tabs, temporary traffic markers, temporary drainage pipes and structures, blue business signs, and such temporary devices and relocation of existing signs and devices. Payment shall be full compensation for all labor, equipment, materials, personnel, and incidentals necessary to provide a safe condition during construction of all phases and elements of the project and to complete the work.

Payment will be made on the following basis: The initial monthly estimate will include 50% of the lump sum bid amount minus retention (typically 5%). The balance will be paid with the final estimate, upon completion of the project.

SECTION 026201
WATERLINE RISER ASSEMBLIES

1. DESCRIPTION

This specification shall govern all work and materials required for proper installation of riser assemblies for waterline testing.

2. MATERIALS

Riser assemblies for 4" diameter and larger waterlines shall consist of (in order):

M. J. Plug or Cap, drilled and tapped (2")
2" x 6" Galvanized Nipple
2" Galvanized 90^0 Bend
2" x 3' Galvanized Nipple
2" Straight Coupling
2" x 3' Galvanized Nipple
2" Brass Gate Valve

3. CONSTRUCTION METHODS

The Contractor shall install riser assemblies on each end of waterlines to be tested. Note that this includes all 2" service connections. The assembly shall be wrapped in polyethylene, and concrete thrust blocking shall be applied at the base.

After the line is tested and ready for connection to the existing water system, the Contractor shall remove the riser assembly. The riser assemblies shall remain the property of the Contractor.

4. MEASUREMENT AND PAYMENT

Unless otherwise specified on the Bid Form, waterline riser assemblies shall not be measured for payment. Payment for materials and labor shall be considered subsidiary to the payment for the waterline pipe.

SECTION 026202
HYDROSTATIC TESTING OF PRESSURE SYSTEMS

1. DESCRIPTION

This specification shall govern all work necessary for hydrostatic testing the completed pressure system. The Contractor shall provide all tools, equipment, materials, labor, etc., as necessary, except as noted, and accomplish all testing under this specification.

2. MATERIALS

Water for filling the line and making tests will be furnished by the Contractor through a standard meter connection. A meter and gauges for testing shall be supplied by the Contractor. A test pump with appropriate connector points as approved by the Water Superintendent for the installation of meter and gauge shall be furnished by the Contractor. The meter shall be directly connected to the main or pipe being tested by the use of copper tubing or an approved reinforced hose. The meter shall be protected against extreme pressures by the use of a one-inch (l ") safety relief valve set at the test pressure plus ten pounds per square inch (psi) and furnished by the Contractor.

3. TEST PROCEDURE

Tests shall be made only after completion of backfill as specified, and not until at least thirty-six (36) hours after the last concrete thrust block has been cast. Contractor shall coordinate hydrostatic testing with the proposed construction sequencing and phasing.

Each section of pipeline shall be slowly filled with water and the specified test pressure, measured at the point of lowest elevation, shall be applied. During the filling of the pipe and before applying the specified test pressure, all air shall be expelled from the pipeline.

During the test, all exposed pipe, fittings, valves, hydrants and joints shall be carefully examined. If found to be leaking, they shall be corrected immediately by the Contractor. If the leaking is due to cracked or defective material, the defective material shall be removed and replaced by the Contractor with sound material.

All pipes shall be subjected to two hydrostatic tests. The first hydrostatic test shall be a two-hour test at a pressure of 150 psi. The second test shall be no less than 48 hours after successful completion of the first hydrostatic test. The second hydrostatic test shall be for a 24-hour period at City operating pressure for waterlines or at 50 psi for wastewater force mains and effluent lines.

The maximum allowable leakage shall be as follows:

Ductile Iron Pipe, AWWA C6OO

$$L = \frac{S\,D\,(P)^{1/2}}{133{,}200} \quad \textit{or} \quad L = \frac{N\,D\,(P)^{1/2}}{7{,}400}$$

Asbestos- Cement Pipe, AWWA C603

$$L = \frac{N\,D\,(P)^{1/2}}{4{,}000}$$

PVC Pipe -Uni-bell equation 99

$$L = \frac{N\,D\,(P)^{1/2}}{7{,}400}$$

WHERE:

L = Maximum Allowable Leakage (gallons/hour)
S = Length of Pipe Tested (feet)
N = Number of Joints in Tested Line (pipe and fittings)
D = Nominal Diameter of Pipe (inches)
P = Average Test Pressure (psi)

If the pressure system fails to meet the leakage requirements, the Contractor shall make the required repairs to the system and the system shall be retested. This procedure shall be repeated until the system complies with leakage requirements. The cost of each retest shall be $100.

4. MEASUREMENT AND PAYMENT

Unless otherwise specified on the Bid Form, hydrostatic testing of pressure systems will not be measured for pay, but shall be subsidiary to the installation of the pressure system component.

SECTION 026206
DUCTILE IRON PIPE AND FITTINGS

1. DESCRIPTION

This specification shall govern all work necessary for furnishing all ductile iron pipe and fittings required to complete the project.

2. GENERAL

All ductile iron pipe shall conform to AWWA C151. The interior of pipe and fittings (excluding fittings for Waste Water force mains) shall have a shop- applied cement- mortar lining (40 mils thick) in accordance with AWWA C104. The exterior of pipe and fittings shall have a coating of coal tar enamel of approximately 1 mil thick or as specified in AWWA C105. Ductile iron pipe shall be wrapped in two plys of 8-mil polyethylene in accordance with Section 026402 'Waterlines" of the City Standard Specifications.

3. FITTINGS

All fittings shall be ductile iron and in accordance with AWWA C153. Fittings shall have a pressure rating of 250 p.s.i for sizes through 12" and 150 p.s.i for 14" and larger sizes, unless shown differently on drawings. Unless noted otherwise on the drawings, Mechanical joints shall be used.

4. JOINTS

Joints for pipe shall be mechanical type or push- on type such as "Tyton Joint", Or approval equal; joints for fittings shall be mechanical joints, unless shown otherwise on drawings.

Mechanical joints shall conform to AWWA Cl53. Mechanical joints shall be furnished complete with joint material, Cor-ten nuts, Cor-ten bolts, glands and gaskets.

When restrained joints are indicated on the drawings, restrained joints for pipe and fittings of 12" diameter and less shall be mechanical joint with retainer gland Series 1100 by EBAA Iron or approved equal, with a minimum of 250 psi rated working pressure. Restrained joints for pipe and fittings over 12" in diameter shall wedge action restraints as One- Lok by Cigma core or approved equal.

Gaskets shall be of synthetic rubber. An analysis of the material used in each size gasket showing the type of synthetic rubber and that no natural rubber is present shall be supplied

5. PIPE

Pressure class ductile iron pipe requirements:

Diameter (inches)	Pressure (psi)	Class (inches)	Wall Thickness (feet)	Range of Maximum Allowable Depth Cover (feet)
	4#	350	0.25	60+
	6	350	0.25	30 -65
	8	350	0.25	20 -50
	10#	350	0.26	15 -45
	12	350	0.28	15 - 44
	14#	300	0.30	13 - 42
	16	300	0.32	13 - 39
	18	300	0.34	13 -36
	20	300	0.36	13 -35
	24	250	0.37	11 -29
	24+	x	x	x

* Range of maximum allowable depth of pipe where:

A= Ground water, or unstable bottom, or quick condition.
B= Ideal trench conditions, and sand encasement is at an average density in excess of 90% Standard Proctor.

Pipe sizes not typically specified on City projects, but shown for reference.

x Requires special evaluation.

The face of bells shall be plainly marked by color coding for classes so as to be readily identified in the field.

6. CERTIFICATIONS

A certification shall accompany each order of pipe and fittings furnished to job site. Certification shall include the following items: indicate that pipe complies with Part 3 of this specification; indicate that fittings and joints comply with Part 4 of this specification (it should be noted that the supplier shall furnish sufficient technical material for the Engineer to determine whether or not push-on joints can comply with the "or equal" clause); and a copy of a lab analysis of the material used in each size gasket showing the type of synthetic rubber and that no natural rubber is present.

7. MEASUREMENT

Unless specified otherwise in the Special Provision, Ductile Iron Pipe will be subsidiary to the other work (waterline, sanitary force main, etc.). Fittings will be measured as individual units for each size and type installed. Measurement of pipe shall be up to, but not include, the fittings.

8. PAYMENT

Payment for fittings shall include all labor, materials, equipment, and incidentals required to complete work.

END OF SECTION

SECTION 026210
POLYVNYL CHLORDE PIPE
(AWWA C900 and C905 Pressure Pipe for Municipal Water Mains and Wastewater Force Mains)

1. DESCRIPTION

This specification shall govern all work necessa1Y for furnishing all PVC pipe (AWWA C900 and C905) required to complete the project.

2. MATERIAL

PVC pipe shall be made of Class 12454-A or Class 12454-B virgin compounds, as defined in ASTM DI 784 with an established hydrostatic-design-basis of 4000 psi for water at 73.4 degrees F.

3. DMENSIONS

Pipe shall be manufactured to ductile iron pipe equivalent outside diameters.

4. JOINT

Pipe shall have a gasket bell end with a thickened wall section integral with the pipe barrel. The use of solvent weld pipe shall not be allowed.

5. GASKETS

Gaskets for jointing pipe shall be in accordance with ASTM F477 (High Head).

6. PIPE PRESSURE CLASS AND DMENSION RATIO

Unless indicated otherwise on the drawings, pipe shall have a dimension ratio (DR) of 18 and in accordance with:

Pipe Size	Designation
	AWWA
4" to 12"	C900
Over 12"	AWWA C905

7. CAUSE FOR REJECTION

Pipe shall be clearly marked in accordance with AWWA Requirements. Unmarked or scratched pipe shall be rejected.

8. CERTIFICATION

The contractor shall furnish in duplicate to the Engineer a copy of the manufacturer's affidavit of compliance with this specification, to include gaskets. Certification shall accompany each delivery of materials.

9. MEASUREMENT AND PAYMENT

Unless otherwise specified in the Bid Form, PVC pipe (AWWA C900 or C905) will be measured by the linear foot along the centerline for each size of pipe installed. Measurement of pipe shall be up to, but not include, the fittings.

Payment shall include all labor, materials, tools and equipment for the completed installation, backfilling and testing of the PVC pipe, together with all incidentals necessary to install the pipe complete in place, per linear foot.

SECTION 026402
WATERLNES

1. DESCRIPTION

This specification, in conjunction with the City of Kingsville Water Distribution System Standards, shall govern all work necessary for the installation of all waterline facilities required to complete the project.

2. MATERIALS

Concrete: Concrete shall have a minimum compressive strength of 3000 psi at 28 days.

Bedding Sand for Encasement: Bedding sand and initial backfill around the pipe shall be granular material of low plasticity as indicated on the drawings.

Ductile Iron Pipe and Fittings: See City Standard Specification Section 026206.

Polyvinyl Chloride Pipe: See City Standard Specification Section 026210.

Tapping Sleeves and Valves: See City Standard Specification Section 026409.

Gate Valves for Waterlines: See City Standard Specification Section 026411.

Fire Hydrants: See City Standard Specification Section 026416.

3. CONSTRUCTION METHODS

(1) HANDLING MATERIALS

a) General: The Contractor shall be responsible for the safe storage of all materials furnished to, or by him, and accepted by him, until it has been incorporated into the completed project.

All material found during the progress of the work to have cracks, flaws or other defects will be rejected, and the Contractor shall remove such defective material from the site of the work.

b) Unloading and Distribution of Materials at Work Site: Pipe and other materials shall be unloaded at point of delivery, hauled to and distributed at the job site by the Contractor. Materials shall at all times be handled with care and in accordance with

manufacturer's recommendations. Care shall be taken not to scratch PVC pipe. Excessive scratching shall be considered cause for rejection of PVC pipe. Materials may be unloaded opposite or near the place where it is to be installed provided that it is to be incorporated into the work within 10 days. The Contractor shall not distribute material in such a manner as to cause undue inconvenience to the public.

c) Storing Materials: Materials that are not to be incorporated into the work within 10 days shall be stored on platforms. The interior of pipes and accessories shall be kept free from dirt and foreign matter.

(2) ALIGNMENT AND GRADE

a) General: All pipes shall be laid and maintained to the required lines and grades. Fittings, valves and hydrants shall be at the required locations with joints centered, spigots home and all valve and hydrant stems plumb.

Temporary support and adequate protection of all underground and surface utility structures encountered in the progress of the work shall be furnished by the Contractor.

Where the grade or alignment of the pipe is obstructed by existing utility structures such as conduits, ducts, pipes, connections to sewers or drains, the obstruction shall be permanently supported, relocated, removed, or reconstructed by the Contractor at the Contractor's expense, in cooperation with the owners of such utility structures.

One (1) 20-ft. section of waterline pipe shall be centered over/under gravity wastewater line at all gravity wastewater line crossings. Waterline shall be ductile iron pipe with mechanical joint fittings, in accordance with City Standard Specification Section 026206, wherever new waterline crosses under new gravity wastewater line.

Maintain a minimum of six inches (2 feet usual) vertical clearance between outsides of pipes where a new waterline crosses over a new wastewater line. Maintain a minimum of twelve inches vertical clearance between outsides of pipes where a new waterline crosses under a new wastewater line.

Alternatively, at gravity wastewater line crossings, the proposed PVC waterline may be encased in a 20-ft. joint of ductile iron pipe with a minimum pressure rating of 150 psi that is at least two nominal sizes larger than the carrier pipe. The carrier pipe shall be supported in the casing at five foot (5) intervals with spacers, or shall be filled to

the spring line with clean washed sand, graded as shown in the City Standard Water Details. The casing pipe shall be centered under the gravity wastewater line as indicated on the drawings, and both ends of the casing shall be sealed with cement grout or manufactured seal.

b) Deviation from Drawings: No deviation from the line and grade shown on the plans may be made without the written consent of the Engineer.

c) Depth of Cover: Depth of cover will be measured from the established street grade or the surface of the permanent improvement, or from finished grade to the top of the pipe barrel. Unless otherwise shown on drawings, the minimum depth of cover shall be 36 inches. Waterlines 12" and larger located under streets shall have 48 inches of cover at all points.

(3) TRENCH EXCAVATION AND BACKFILL

See City Standard Specification Section 022020, "Excavation and Backfill for Utilities" and applicable City Standard Details for Water.

(4) POLYETHYLENE WRAPPING

All ductile iron pipe, valves and fittings, except pipe or valves which are laid in encasement pipe or in concrete valve boxes, shall be wrapped in polyethylene. The polyethylene material shall have a thickness of 8 mils and may be either clear or black. The wrapping shall be lapped in such manner that all surfaces of pipe, valves and fittings, including joints, shall have a double thickness of polyethylene. If a single longitudinal lap is made using a double thickness of polyethylene, it shall be lapped a minimum of 18 inches and the lap shall be placed in the lower quadrant of the pipe and in such a manner that backfill material cannot fall into the lap. The polyethylene shall be secured in place with binder twine at not more than 6-foot intervals. If wrapping is applied before the pipe is placed in the trench, then special care shall be taken in handling the pipe so that the wrapping will not be damaged. Care shall also be exercised in backfilling around the pipe and fittings and in blocking fittings so as not to damage the wrapping. Any wrapping that may be damaged shall be repaired in a manner satisfactory to the Engineer and so as to form the best protection to the pipes.

(5) SAND ENCASEMENT

All pipe and fittings that are not enclosed in concrete valve boxes or laid in encasement pipe, shall be completely encased with a minimum of eight inches (8") of sand on the bottom and sides of waterlines smaller than 16 inches in diameter, and twelve inches (12") over the top of the waterline, unless otherwise indicated on the drawings.

This encasement includes the bottom, sides and top of pipe and fittings including bells, so that all portions will be encased with sand to insulate the pipe from the natural ground and from the backfill. The sand shall be compacted to a minimum of 90% Standard Proctor density. Provide twelve inches (12") of sand encasement all around the pipe for 16-inch diameter and larger waterlines.

Sand shall be placed in a manner that will not injure the polyethylene wrapping and shall be compacted under, around the side, and over the pipe in a manner that will reduce settlement to a minimum and as approved by the Engineer.
In order to reduce the amount of sand required, the trench bottom may be excavated in a rounded manner so as to maintain at least a minimum of eight inches of sand between the excavation and the pipe (twelve inches for 16-inch diameter and larger waterlines), unless otherwise indicated on the drawings.

(6) LOWERING PIPE AND ACCESSORIES IN THE TRENCH

a) General: The trench shall be excavated true and parallel to the pipe center line with a minimum clearance of eight inches below the pipe bottom and with a like clearance

from the bottom of the bell to the bottom of the bell hole. The trench shall then be refilled to the proper grade with sand as specified. The placing of the encasing material shall be done in such a manner to be free of all-natural soil rock or other foreign matter.

After final grading in the trench of the encasing material, bell holes shall be excavated at each joint.

Proper implements, tools and facilities satisfactory to the Engineer shall be provided and used by the Contractor for the safe and efficient execution of the work. All pipe, fittings, valves, hydrants and accessories shall be carefully lowered into the trench by means of a den-ick, ropes or other suitable equipment, in such a manner as to prevent damage to pipe and fittings. Under no circumstances shall pipe or accessories be dropped or dumped into the trench.

b) Inspection of Pipe and Accessories: The pipe and accessories shall be inspected for defects prior to lowering in the trench. Any defective, damaged or unsound pipe shall be replaced.

c) Clean Pipe: All foreign matter or dirt shall be removed from the interior of the pipe prior to lowering into the trench. Pipe shall be kept clean both in and out of the trench at all times during the laying.

(7) JOINTNG PIPES

All pipes shall be made up in accordance with manufacturer's recommendation. Pipe deflection shall not exceed 75% of the maximum amount recommended by the manufacturer.

(8) CONCRETE THRUST BLOCKS

Temporary thrust blocks or other means of carrying thrust loads generated by hydrostatic testing shall be provided at all ends of lines to be tested. Details of the end connections and method of temporary blocking shall be submitted to the Engineer for approval. After satisfact01Y completion of the hydrostatic testing, this temporary blocking shall be removed so that connections may be made with existing lines. This work is subsidiary to waterline installation and no separate payment will be made for it.

Temporary thrust blocks are not allowed for long term use.

(9) METAL HARNESS

Metal harness, tie rods and clamps, or swivel fittings shall be used to prevent pipe movement. Steel rods and clamps shall be galvanized or otherwise rust proofed, or coated with hot coal tar enamel, then wrapped with two layers of polyethylene wrapping.

(10) STERILIZATION

a) Fittings: Valves, hydrants and fittings shall be stored on timbers and kept clean. Where soil or other substance has come in contact with the water surfaces of the fittings, the interior shall be washed and sterilized with 2% solution of calcium hypochlorite.

b) Pipe: As each joint of pipe is laid, the Contractor, unless otherwise directed by the Engineer, shall throw powdered calcium hypochlorite (70%) through the length of the joint (one pound for each 1,680 gallons of water to give 50 ppm). When the waterline is complete, and before testing, the waterline shall be slowly filled with water between valves and allowed to stand for 48 hours. After the sterilization period is completed, lines shall be flushed by the Contractor under the direct supervision of a representative of the City Water Department. The Engineer will take sample for testing two hours after refilling. If the sample does not pass State Health Department purification standards, the procedure shall be repeated. The entire procedure shall be coordinated under the supervision of the Water Division Superintendent/Engineer.

During the sterilization process, valves shall be operated only under the supervision of the Water Division Superintendent/Engineer. There shall be a base fee of $100 paid by the Contractor to the City for each retest that is required.

(11) HYDROSTATIC TESTING WATER SYSTEM

See City Standard Specification Section 026202, "Hydrostatic Testing of Pressure Systems".

(12) WATER SERVICE CONNECTIONS

See Standard Specification Section 026404, "Water Service Lines".

4. MEASUREMENT AND PAYMENT

Unless otherwise specified on the Bid Form, waterlines will be measured by the linear foot for each size installed. Payment for waterlines will be made under the appropriate pipe material item and shall include, but not be limited to, trenching, dewatering, bedding, pipe (except for fittings), restraints, temporary thrust blocking, backfill, sterilization, and hydrostatic testing. Payment shall be full compensation for all labor, materials, tools, equipment and incidentals required to complete the work.

SECTION 026409
TAPPNG SLEEVES AND TAPPNG VALVES

1. DESCRIPTION

This specification shall govern all work and materials required for furnishing and installing tapping sleeves, sleeves and valves required to complete the project.

2. MATERIALS

Tapping sleeves shall have a Class 125 ANSI B16.1 outlet flange of cast iron, ductile iron or stainless steel. Sleeves shall be of ductile iron or 304 or 316 stainless steel. Lugs, bolts, washers and nuts shall be of 304 or 316 stainless steel. Iron sleeves shall be of the mechanical joint or caulked joint type as manufactured by American Flow Control or approved equal. Stainless steel sleeves shall be of the compression gasket type capable of providing full support of the tapped pipe, as manufactured by Sigma Corp, or approved equal. Gasket materials shall be of material suitable for potable water systems.

Tapping sleeves shall be sized for the type and size of pipe to be tapped. The class of asbestos cement pipe that will most likely be encountered in the water will be Class 200 for pipes 6 inches in diameter and smaller, and Class 150 for larger pipes. It should be understood that existing pipes to be tapped may not be of the type of material and/or size that is shown on the drawings. The proper size and type of tapping sleeve shall be provided and installed regardless of what is encountered.

Tapping valves shall conform to AWWA Standards and City Standard Specification Section 026411, "Gate Valves for Waterlines".

Valve boxes shall be as described in City Standard Specification Section 026411, "Gate Valves for Waterlines".

3. CONSTRUCTION METHODS

Construction methods shall adhere to those set out in City Standard Specification Section 026402 "Waterlines", and City Standard Specification Section 022020 "Excavation and Backfill for Utilities".

4. MEASUREMENT AND PAYMENT

Unless otherwise specified on the Bid Form, tapping sleeves and tapping valves shall be measured on a per each basis for each size installed. Payment for tapping sleeves and tapping valves shall include, but not be limited to, furnishing and installing the valves complete in-place including joint materials, cast iron valve box, box extension, cover, concrete collar, and all other related items such as bolting, wrapping, cement-stabilized sand encasing, backfilling and compacting; and shall be full compensation for all labor, material, tools, equipment and incidentals required to properly install the valves as indicated and specified.

SECTION 026411
GATE VALVES FOR WATER-LNES

1. DESCRPTION

This specification shall govern all work necessary to provide and install all gate valves and valve boxes required to complete the project.

2. MATERIALS

Gate Valves

All valves shall meet the following requirements. Gate valves shall conform to AWWA Standard C515.

1) The gate valves shall be ductile iron resilient wedge (C515) with non-rising stems.

2) Valve ends shall be flanged or mechanical joint type or a combination of these as indicated or specified. A complete set of joint materials shall be furnished with each valve, except for bell ends and flanges.

3) Valves 16 inches and larger shall be furnished for horizontal installation — lay over.

4) Stem seals shall be the O-ring type on valves through 12-inch size. Valves 16 inches and larger may be equipped with stuffing boxes.

5) Valves shall open left (counter clockwise). Valves over 18 inches shall have the main valve stem furnished with a combination hand wheel and operating nut.

6) Tapping valves to be used with tapping saddles shall have one end mechanical joint.

7) No position indicator will be required.

8) Within 30 days after award of contract, the Contractor shall submit in triplicate, for approval, the following:

a) Certified drawings of each size and type of valve 16 inches and larger showing principal dimensions, construction details, and materials used.

b) On all size valves, the composition of bronze to be offered for various parts of the valve, complete with minimum tensile strength in psi, the minimum yield strength in psi, and the minimum elongation in 2" per cent.

3. CONSTRUCTION METHODS

Gate Valves

Gate valves shall be installed as indicated on the drawings.

Cast Iron Valve Boxes

Valve boxes shall be installed as indicated on the drawings. When valves are in the street right-o of way, the top of box shall be set flush with the pavement or surrounding ground. In cultivated areas, the top of box shall be set twelve inches (12") below natural ground and long enough to be raised to natural ground at a future date.

4. MEASUREMENT AND PAYMENT

Unless otherwise specified on the Bid Form, gate valves for waterlines will be measured as a unit for each gate valve and valve box installed. Payment shall include, but not be limited to, furnishing and installing the valves complete in-place including joint materials, cast iron valve box, box extension, cover, concrete collar, and all other related items such as bolting, wrapping, cement stabilized sand encasing, backfilling and compacting; and shall be full compensation for all labor, material, tools, equipment and incidentals required to properly install the valves as indicated and specified.

SECTION 026602
WASTEWATER FORCE MAIN

DESCRIPTION

This specification shall govern all work required for the installation of all wastewater force mains required to complete the project.

GENERAL REQUREMENTS

1. All work shall be done in a workmanlike manner, in accordance with the drawings and specifications.

2. Prior to construction, the Contractor shall submit, for approval, certificates of inspection in duplicate to the Engineer from the pipe and fittings manufacturer(s) that said materials supplied have been inspected at the plant and meet the requirements of this specification.

3. It shall be the responsibility of the Contractor to keep on hand extra fittings and pipe, as he may deem necessary to make adjustments due to unknown obstructions, or to replace defective materials without delay to the project. When defective materials are discovered, they shall be immediately marked and removed from job site.

4. All pipe and fittings shall be clearly marked with trademark of manufacturer, batch number, location of plant, ASTM/ANSI/AWWA designation, size, pressure rating, class/SDR, and pressure rating.

5. Wastewater marking tape shall be continuously applied along the top of the force main, except at joints. The tape shall be green and 2 inches wide and state "Sewer".

MATERIALS

A. **Ductile Iron Pipe Fittings**: See City Standard Specification Section 026206.

B. **PVC Pipe (AWWA C900 or C905):** see City Standard Specification Section 026210.

C. **Concrete:** Concrete shall have a minimum compressive strength of 3000 PSI at 28 days.

D. **Bedding Sand for Encasement:** Sand shall be as indicated on the drawings.

E. **Non-Standard Fittings:** Fittings having non-standard dimensions or fabricated especially for this project shall have a minimum pressure rating of 250 psi and durability comparable to that of the system.

Drawings and specifications for non-standard fittings shall be submitted for approval of the Engineer prior to construction. Couplings and adapters for DIP and PVC connections shall be considered non-standard fittings.

F. **Ceramic Epoxy Lining for Ductile Iron Pipe Fittings**: When indicated in the drawings or Special Provisions, the interior of DI pipe and fittings shall be furnished with a factory applied ceramic epoxy lining. Lining material shall be Protecto 401 Ceramic Epoxy Lining, of 40 mils nominal dry thickness. The epoxy shall be fused to the interior of the pipe by heat, forming a securely bonded lining.

1. **Operating Limits:** The lining shall have the capability of withstanding operating temperatures from 0^0 F to 170^0 F and withstanding sewage with a minimum pH of 4.0.

2. **Application:** The interior surface of each pipe shall be blast-cleaned to remove high temperature oxide film and to form an anchor pattern over the entire surface prior to heating and lining. Epoxy lining is to cover the inner surface of the pipe, extending from the plain or beveled end to the rear of the gasket socket.

3. **Adhesion:** Pipe shall be checked at the point of manufacture to assure bond of the lining to the pipe. Any indication of separation of lining from pipe is cause for rejection. .

4. **Entrapped Material**: Any sizeable protrusion in the lining, obviously caused by lining over foreign materials, shall be cause for rejection.

5. **Separations:** Linings which have separations caused during the lining operation shall be rejected.

6. **Damages to Lining:** Injurious mechanical damage, such as chuck marks and gouges, extending to bare metal are not acceptable. The pipe having such a defect shall be rejected.

7. **Lining Thickness:** Linings of nominal 40 mil thickness shall generally equal or exceed 40 mil throughout the pipe. At pipe ends, lining thickness may taper for a distance of 4 inches from the ends, to a minimum of 20 mil thickness. However, the lining shall not deviate by more than 5 mil from the 40 mil nominal thickness as required through the pipe. The lining thickness of each pipe and fitting shall be taken at the point of manufacture using a general electric magnetic dry film thickness device, digital coating thickness gauge, Positector 2000, or approved equal.

Pipe and/or fittings with a lining thickness less than the minimum specified shall be rejected.

8. **Bell and Plain End Overcoat:** The bell socket and the last 2 inches of the plain end of each pipe shall be coated on the inside and outside with a factory applied mastic or epoxy coating. This coating shall be a minimum of 10 mil thickness and shall be Koppers 300M, Industrial Ruff Stuff, Roskote Mastic A-938, or equal.

9. **Pinholes and/or Holidays:** The inside surface of each pipe or fitting shall be free of pinholes, holiday discontinuities and any blister type surface imperfections. The manufacturer shall check each pipe and fitting for holidays at the point of manufacture with a high voltage holiday detection device. Tinker & Rasor Model AP-W, or approved equal. Testing shall be conducted at the voltage as calculated in Section 3: Testing and Voltages of the "Recommended Practice for High Voltage Electrical Inspection of Pipeline Coatings Prior to Installation" as published by the National Association of Corrosion Engineers (NACE) Technical Practices Committee. All actual holiday testing procedures shall conform to NACE standard RP-02-74 and American Society for Testing Materials (ASTM) Designation: G62(latest) "Standard Test Methods for Holiday Detection in Pipeline Coatings." No holidays, misses or skips larger than a pinhole will be accepted for repair. A maximum of 6 holidays, as defined in ASTM Standard G62 and as determined by the detection test described above, on any one standard pipe length, fitting or special may be repaired with epoxy.

10. **Independent Testing Laboratory Representation**: All testing as specified herein including the lining thickness test and the holiday test shall be witnessed by a representative from an approved independent testing laboratory. The independent laboratory shall be a member of the American Council of Independent Laboratories. Manufacturer must submit for approval by the City the name of the testing laboratory and actual qualifications of actual representative that will witness the testing. The manufacturer shall furnish three (3) copies of report by independent testing laboratory depicting results of all testing witnessed by the independent laboratory.

11. **Field Testing:** Each pipe and fitting is subject to inspection in the field by the City for conformance to these specifications prior to installation. Any defects as specified herein with any pipe or fittings shall be grounds for rejection.

12. **Sealing Cut Ends and Repairing Field Damaged Areas:** Remove burrs from field cut ends and smooth out edge of epoxy lining. Remove all traces of oil or lubricant used during field cutting operation.

All areas of loose lining associated with the cutting operation shall be removed and the exposed metal cleaned by sanding or scraping. For larger areas, roughen the bare pipe surface with a small chisel to provide an anchor pattern for the epoxy. The epoxy lining shall be "stripped" back by chiseling, cutting or scraping about 1" to 2" into well adhered lined area before patching. After removal of loose lining and dirt, the area to be patched shall be "scratched" or "gouged" to offer an anchor pattern for the epoxy. Include an overlap of 1 " to 2" of roughened epoxy lining in the area to be epoxy coated. The roughening shall be done with a rough grade emery paper (40 grit), rasp, or small chisel. Avoid honing, buffing, or wire brushing since these tend to make surface to be repaired too smooth. With the area to be sealed or repaired absolutely clean and suitably "roughened," apply a thick coat of two-part coal tar epoxy. The detailed mixing and application procedure for the epoxy shall follow the epoxy manufacturer's instructions. This heavy coat of epoxy shall be "worked" into the scratched surface by brushing. The Contractor shall maintain a supply of epoxy on the job site as required to seal cut ends and repair damaged pipe when encountered. Epoxy shall be of the type recommended or supplied by the pipe manufacturer.

13. **Warranty:** A five year warranty shall be furnished by the manufacturer on the serviceability of the lining. This warranty shall include, but not be limited to the statement, at any time up to the end of the fifth year from the date of pipe shipment:

    a. The lining shall not have disbound.

    b. The lining shall not have suffered any appreciable underfilm migration.

    c. The interior pipe metal, at points of pinholes or holidays, shall not have suffered detrimental deterioration.

    d. The lining shall have maintained its smooth surface characteristics.

    Contractor and/or manufacturer shall not make any exemption or exception to the above stated conditions or warranty within the limits as stated in this specification section.

14. Certification: The manufacturer shall furnish notarized certificates of compliance stating that the lining conforms to all requirements of these specifications.

CONSTRUCTION METHODS

4.1 HANDLING AND STORAGE OF MATERIALS

A. **General:** The Contractor shall be responsible for the safe storage of all materials furnished to or by him and accepted by him until the materials have been incorporated in the completed project.

All material found during the progress of the work to have cracks, flaws or other defects will be rejected, and the Contractor shall remove such defective material from the site of the work.

B. **Unloading and Distribution of Materials at Work Site**: Pipe and other materials shall be unloaded at point of delive1Y, hauled to, and distributed at the job site by the Contractor. Materials shall at all times be handled with care and in accordance with manufacturer's recommendations. Care shall be taken not to scratch PVC pipe. Excessive scratching shall be considered cause for rejection of PVC pipe. Materials may be unloaded opposite or near the place where it is to be installed provided that it is to be incorporated into the work within ten days. The Contractor shall not distribute material in such a manner as to cause undue inconvenience to the public.

C. **Storing Materials:** Materials that are not to be incorporated into the work within 10 days shall be stored on platforms. The interior of pipes and accessories shall be kept free from dirt and foreign matter.

4.2 NSTALLATION

A. **Alignment and Grade:** All pipes shall be laid and maintained to the required line and grade.

Temporary support and adequate protection of all underground and surface utility structures encountered in the progress of the work shall be furnished by the Contractor.

Where the grade or alignment of the pipe is obstructed by existing utility structures such as conduits, ducts, pipes, connections to sewers or drains, the obstruction shall be permanently supported, relocated, removed, or reconstructed by the Contractor at the Contractor's expense, in cooperation with the owners of such utility structures.

Force Mains shall be laid with no less than 36 inches of cover, unless indicated otherwise in the drawings. Greater depths will be permitted when required to avoid conflicts with existing structures.
Lines shall be laid to grade which permit entrapped air to flow to a high point for release through an air release valve as shown on the drawings. The Contractor shall investigate well in advance of pipe laying for conflicts which may necessitate the readjustment of planned line and grade.

B. **Trench Excavation and Backfill:** See City Standard Specification Section 022020 "Excavation and Backfill for Utilities and Sewers", and drawings.

C. **Force Main Connection to Existing Manhole:** Where new force main is connected to existing manhole, the manhole shall be prepared to receive the proposed force main and restored after connection. Manhole inverts shall be repaved as necessary to provide a smooth flowing system.

D. **Polyethylene Encasement:** All metallic pipe, valves and fittings, except those which occur in encasement pipe or in concrete valve boxes, shall be wrapped in polyethylene. The polyethylene material shall have a thickness of 8 mils and may be either clear or black. The wrapping shall be lapped in such a manner that all surfaces of pipe valves and fittings, including joints, shall have a double thickness of polyethylene. If a single longitudinal lap is made using a double thickness of polyethylene, it shall be lapped a minimum of 18 inches and the lap shall be placed in the lower quadrant of the pipe and in such a manner that backfill material cannot fall into the lap. The polyethylene shall be secured in place with binder twine at not more than 6-foot intervals. If wrapping is applied before the pipe is placed in the trench, then special care shall be taken in handling the pipe so that the wrapping will not be damaged. Care shall also be exercised in backfilling around the pipe and fittings and in blocking fittings so as not to damage the wrapping. Any wrapping that may be damaged shall be repaired in a manner satisfactory to the Engineer and so as to form the best protection to the pipes.

E. **Sand Encasement**: Sand shall be granular soil of low plasticity such that 30% minimum passes a #4 sieve and no more than 20 % passes a #200 sieve, and the plasticity index (PI) shall not exceed 10. Soils with a Unified Classification of SW and SP, or AASHTO Classification of A3 and some A2 soil shall be required.

F. **Pre-Placement Inspection:** Prior to lowering into trench, all pipe and accessories shall be inspected for defects. All foreign matter or dirt shall be removed from the interior of the pipe prior to lowering into trench. Pipe shall be kept clean at all times during the laying.

G. **Jointing Pipe and Fittings:** All pipes and fittings shall be made up in accordance with manufacturer's recommendation. Pipe deflection shall not exceed 75% of the maximum amount recommended by the manufacturer.

H. **Concrete Thrust Blocks:** Temporary thrust blocks or other means of carrying thrust loads generated by hydrostatic testing shall be provided at all ends of lines to be tested. Details of the end connections and method of temporary blocking shall be submitted to the Engineer for approval. After satisfactory completion of the hydrostatic test, this temporary blocking shall be removed so that connections may be made with existing lines. This work is subsidiary and no separate payment will be made for it.

I. **Restrained Joints and Fittings:** Metal harness, tie rods and clamps or restrained fittings shall be used to prevent movement when soil conditions will not withstand thrust blocking. Steel rods and clamps shall be galvanized or otherwise rust-proofed or coated with hot coal tar enamel then wrapped with two layers of polyethylene wrapping.

4.3 HYDROSTATIC TESTNG WASTEWATER FORCE MAIN

See City Standard Specification Section 026202, Hydrostatic Testing of Pressure Systems.

5. MEASUREMENT AND PAYMENT

Unless otherwise specified in the Bid Form, wastewater force mains will be measured by the linear foot along the centerline of pipe. Payment shall include, but not be limited to, trenching, dewatering, pipe, bedding, thrust blocks, fittings, restraints and backfill, and shall be full compensation for all labor, materials, equipment, tools and incidentals required to complete the work at the unit price bid.

SECTION 027200
CONTROL OF WASTEWATER FLOWS
(TEMPORARY BYPASS PUMPING SYSTEMS)

1. GENERAL

1.1 DESCRIPTION

A. This specification shall govern all work necessary for designing, installing, implementing, operating, and maintaining a temporary bypass pumping and flow control system, as provided by the Contractor for the purpose of diverting wastewater flow around the work area for the duration necessary to complete the work (i.e., control of wastewater flows). The Contractor shall furnish all materials, labor, equipment, power, maintenance, and incidentals required to maintain continuous and reliable wastewater service in all lines for the duration of the project.

1.2 SUBMITTALS

A. **Bypass Pumping Plan Form:** It shall be the Contractor's responsibility to legibly and thoroughly complete, in its entirety, the attached Bypass Pumping Plan Form and submit it to the Engineer and/or the appropriate City staff for review and approval, prior to the installation of any pumping system proposed for use.

Unless the bypass pumping is associated with an emergency work order, the standard approval protocol is as follows: The Contractor prepares and submits the plan to the Engineer a minimum of 7 days prior to mobilizing to site. The Engineer reviews the bypass plan and coordinates approval with Engineering Services and the Operating Department. Engineer and City will put forth a reasonable level of effort to expedite the review and approval process. No deviation from the procedure shall be allowed.

B. **Bypass Pumping Plan Schematic:** In addition to the above referenced form, the Contractor shall also furnish a sufficiently detailed schematic drawing identifying the approximate location of all bypass pumping system components. The schematic drawing shall clearly label parallel/crossing streets, identify landmark structures, and depict the locations of all pumps and piping.

At a minimum, the bypass pumping plan schematic drawing and associated attachments should include the following items:

1) Pump curves showing designed operation point for this specific project
2) Approximate location of bypass system pumping component
3) Location of manhole or access point for suction and discharge
4) Configuration, routing, location and depth of the suction and discharge piping
5) General arrangement/type of additional support equipment.

6) Temporary pipe supports, anchoring and thrust restraint blocks, if required
7) Traffic Control Plan and Traffic Department permit if the bypass is within the right of-way.
8) Description of the method for removing pressure and all wastewater from existing force mains being taken out of service, if necessary.
9) All other City-department and Regulatory requirements.
10) Sewer plugging locations, method, and types of plugs
11) Method of protecting discharge manholes or structures from erosion and damage.

1.3 RESPONSIBILITY / AUTHORITY

A. It is essential to the operation of the existing wastewater system that there is no interruption in the flow of wastewater throughout the duration of the project. The Contractor shall be completely responsible for designing, scheduling, providing, installing, operating, fueling and maintaining the temporary bypass pumping system in a manner that does not cause or contribute to overflows, releases, or spills of wastewater from the wastewater or bypass system. The Contractor shall neither anticipate nor expect any. assistance from the City of Kingsville departments for any of the bypass operation.

B. Contractor shall provide a responsible employee to man the bypass system 24 hours per day, 7 days per week during operation. The monitoring employee shall be properly trained, experienced, and mechanically qualified such that they can quickly and effectively address any potential emergency and non-emergency situations associated with the bypass system which must remain in operation. The wastewater and bypass systems should be inspected at least once every 2 hours. The Contractor shall be responsible for ensuring that the wastewater collection system is not compromised during bypass installation or operation, and contractor shall ensure that the system operates properly during this period.

C. The Contractor shall consider and be responsible for the impacts on the collection system area, both upstream and downstream of the bypass and shall maintain the system in a manner that will protect public and private property from damage and flooding. Upstream impacts may include, but are not limited to backups and overflows. Downstream impacts may include, but are not limited to surcharges and overflows.

D. Contractor shall make all eff rt to minimize spills of raw wastewater during the improvements and bypassing. All spills and sanitary sewer overflows shall immediately be reported to the City at 361-595-8040 and the Contractor shall be solely responsible for wash down, clean-up and disinfection of said spillages or overflows to the satisfaction of the owner at no additional cost to the City of Kingsville.

E. The City is permitted through the Texas Commission on Environmental Quality to operate the wastewater system. The final authority comes from the City as to the operation of the wastewater system and as such it reserves the right to halt the bypassing operation at any time in order to maintain public health and safety.

2. PRODUCTS

2.1 MATERIALS

A. Bypass Pumps

a. Pumps shall be fully automatic self-priming pumps that do not require the use of foot-valves or vacuum pumps in the priming system. The pumps may be electric or diesel powered. Pre-approved manufacturers are Godwin or Rain-for-Rent. Approved equals may be considered by the Engineer if they meet all requirements in this specification but Contractor shall provide submittal package for Engineer's review and approval prior to installation. Pumps shall be equipped with critically silenced, sound attenuated enclosures with a maximum 65 dB (10-feet from pump), a diesel day tank with a minimum 24-hour runtime without refuel, and automatic start/stop controls for each pump.

b. Pumping capacity of the bypass pump shall be capable of handling the flow conditions at all times and shall provide a minimum of 1.5 times the existing capacity of whatever line or lift station is being bypassed.

c. The Contractor shall have adequate standby equipment available and ready for immediate operation and use in the event of an emergency or breakdown. In critical installations, as determined by the Engineer, one standby pump for each size pump utilized shall be installed at the mainline flow bypassing locations, ready for use in the event of primary pump failure.

B. Suction and Discharge Piping: Determined according to pump size, flow calculations, system operating conditions, manhole depth, and length of suction piping in accordance with the pump manufacturers specifications and recommendations. In order to prevent the accidental spillage of flows, all discharge systems shall be temporarily constructed of heavy-duty pipe with positive restrained joints.

a. High Density Polyethylene (HDPE)

i. Homogeneous throughout, free of visible cracks, discoloration, pitting, varying wall thickness, holes, foreign material, blisters, or other deleterious faults. Defective areas shall be cut out and butt-fusion welded as per manufacturer's recommendations.

ii. Assembled and joined at site using couplings, flanges, or butt-fusion method to provide leak proof joint, as per manufacturer's recommendations and ASTM D2657.

iii. Fusing must be performed by personnel certified as fusion technicians by manufacturer of HDPE pipe and/or fusing equipment. Fused joints shall be watertight and have tensile strength equal to that of pipe.

iv. HDPE is required to be used in or adjacent to environmentally sensitive areas.

b. Polyethylene Plastic Pipe (PE)
    i. High density solid wall and following ASTM F714 Polyethylene (PE) Plastic Pipe (SDR-DR) based on outside diameter, ASTM D1248 and ASTM D3550
    ii. Homogeneous throughout, free of visible cracks, discoloration, pitting, varying wall thickness, holes, foreign material, blisters, or other deleterious faults.

c. Quick-Disconnect Steel Galvanized Pipe and Heavy-Duty Flexible Hoses
    i. Must consist of heavy-duty steel with high tensile strength, x-ray welded, abrasion resistant and suitable for intended service with a maximum pressure rating of at least 174 PSI
    ii. Bauer quick-disconnect fittings/joints shall be restrained and watertight. Joints shall consist of vacuum sealing O-rings to help pumps prime faster and perform at their designed flow rates with no leaks, even at high pressure ratings.
    iii. Joints shall provide 30-degree articulation at every coupling and shall not require perfect alignment to make each connection.
    iv. The galvanized couplings shall not be hindered by sand, mud, and grit.

d. Valves and Fittings
    i. Contractor shall provide valves and fittings as necessary and in accordance with the approved pipe materials shown above.

e. Plugs
    i. Selected and installed according to size of line to be plugged, pipe, manhole configurations, and based on specific application.
    ii. Prior to use, Engineer may inspect plugs for defects which may lead to failure.
    iii. Contractor shall provide additional plugs in the case of failure

f. Miscellaneous
    i. When temporary piping crosses local streets/roadways and private driveways, Contractor shall provide traffic ramps or covers designed, installed, and maintained for H-20 loading requirements while in use.

3. EXECUTION

3.1 SCHEDULING & COORDINATION

A. Unless the bypass pumping is associated with an emergency work order, the Contractor shall provide a minimum of 48 hour notice to the Engineer and

Wastewater Department for the startup of bypass operations once the completed bypass plan has been approved by the design engineer. Unless needed otherwise for emergency work, no bypassing shall be initiated on Friday, Saturday or Sunday, or the day immediately preceding a City holiday.

B. Inclement Weather: The Contractor shall not be allowed to commence bypass operation should inclement weather be forecast for the period of the scheduled improvements.

C. Under special circumstances, as identified by the Engineer, where critical lines with large service areas are being bypassed, the Contractor is responsible for setting up a meeting between the Engineer/City/Operating Department to affirm and coordinate the approved bypass plan and to verify the intended site installation conforms to the approved plan. Engineer may also require the bypass system to be in service for at least 24-hours prior to taking existing gravity lines or force mains out of service to demonstrate reliability.

D. Before beginning bypass operations, the Engineer/City Operating Department must be notified for field verification of pumps, piping, and equipment, etc., to ensure the site installation conforms to the approved plan.

E. Before beginning bypass operations, the Contractor shall confirm appropriate emergency contact information has been provided to the City and Engineer on the Bypass Pumping Plan Form including emergency cell phone number of bypass operators/monitors responsibly manning the bypass system 24 hours per day along with the project superintendent and pump supplier.

F. The Contractor can work extended hours, if approved by the Engineer, to perform the improvements during the bypass operation. Work during extended hours cannot create a nuisance for the neighbors.

G. Once a lift station is taken out of service and bypass operations begun, work shall be continuous on the lift station improvements until all improvements are completed and the lift station is returned to normal service.

H. The Contractor shall cease bypass pumping operations and return flows to the new and/or existing wastewater system when directed by the Owner. This may be expected if the bypass system is not in accordance with this specification or if inclement weather is in the forecast.

3.2 INSTALLATION & OPERATIONS

A. Installation of Temporary Force Mains

a. Force mains may be placed along shoulder of road, medians, and/or outside of pavement. Do not place in streets or sidewalks without Engineers approval.

b. When temporary' piping crosses local streets/roadways and/or private driveways, Contractor shall provide traffic ramps or covers designed, installed, and maintained for H-20 loading requirements while in use.

c. When traffic ramps cannot be used, install temporary piping in trenches and cover with temporary pavement, as approved by the Engineer.

B. Discharge piping to gravity lines or manholes shall be designed in such a manner as to prevent discharge from contacting manhole walls or benching with as minimal turbulence as possible.

C. Plugging or blocking of wastewater flows shall incorporate a primary and secondary plugging device. When plugging or blocking is no longer needed for performance and acceptance of work, it is to be removed in a manner that permits the wastewater flow to slowly return to normal without surge, to prevent surcharging or causing other major disturbances downstream.

D. The Contractor shall not cut existing force mains or gravity lines until it is determined that the containment area in place is sufficient for handling any wastewater within the pipe.

E. Some locations may require multiple bypass systems. If bypass system is provided with air release valves, then the valve drains shall be piped to a manhole for discharge.

F. Upon completion of the bypass pumping operations, remove piping, restore property to pre-construction condition and restore pavement.

4. MEASUREMENT AND PAYMENT

Unless otherwise specified in the Bid Form, Control of Wastewater Flows (Temporary Bypass Pumping Systems) shall not be measured for pay but will be considered subsidiary to the applicable pay item, to include all material, labor, equipment and supervision necessary to complete the bypass design, planning, coordination, installation, operation, maintenance and removal.

BYPASS PUMPING PLAN FORM

Date: _____

Project Title: _____ No.: _____

Engineer: _____ Contractor: _____

Service Area: _____ Lift Station No. (if applicable): _____ Start Date & Time: _____ Completion Date & Time: _____

Sewer Line Size being Bypassed: _____ Estimated Peak Flow: _____

Line Plugging Method & Locations: _____

Suction Manhole or Lift Station Number and Depth: _____

Discharge Manhole or Lift Station Number and Depth: _____

Maximum Surcharge Depth Allowed: _____

Bypass Force main Size, Material & Length: _____

Pump Description: (Self-Priming, Critically Silenced, and Automatic Level Controls Required)

Make, Model, Suction/Discharge Size: _____ Diesel or Electric

Total Number of Pumps/Standby Pumps: _____

Total & Firm Capacity (GPM @ TDH): _____

Vacuum Trucks (if required, number and capacity): _____

Contractor Personnel Manning Bypass System (24 hours/day):

Name: _____ Phone: _____

Name: _____ Phone: _____

Emergency Contacts:

Name: _____ Phone: _____

Name: _____ Phone: _____

Additional Notes:

_____

_____

Required Checklist:

YES	NO	
☐	☐	Schematic drawing providing details of proposed bypass pumping system, routing of bypass lines (using manhole numbers and/or lift station names as applicable), equipment location, and proposed sequencing.
☐	☐	Has traffic control plan been appropriately modified to facilitate the bypass pumping equipment?
☐	☐	Pumps: Self-priming & Critically Silenced. Provide pump curve with Bypass plan. (Requirement).
☐	☐	Contractor shall coordinate with Supplier for appropriate instruction and training on pump operation.
☐	☐	Have emergency and/or backup provisions been made for quick pump change out in the case of system failure?
☐	☐	Contractor has confirmed no rain (less than h-in) in the forecast?

Prepared by:

_____

Contractor Representative Date

Reviewed by:

_____

Wastewater Representative Date

SECTION 027202
MANHOLES

1. DESCRIPTION

This specification shall govern the furnishing of all materials and construction of manholes composed of a concrete base and concrete walls as shown on the drawings, to the lines, grades and dimensions shown on drawings or established by the Engineer.

2. MATERIALS

Concrete for cast-in-place storm water manholes and storm water junction boxes shall be Class C (3,600 psi at 28 days). Manholes for wastewater shall be made from fiberglass only, in accordance with City Standard Specification Section 027205 "Fiberglass Manholes".

Mortar for plastering shall be one (1) part Portland cement to three (3) parts clean hard and sharp mortar sand, free of all foreign substances or injurious alkalis.

Reinforcing steel, where used, shall conform to the requirements of Section 032020 "Reinforcing Steel". All wastewater manhole rings and covers for streets shall be East Jordan Iron Works, Inc. or pre-approved equal, and shall have the seating surface of ring and cover machined to secure a snug fit per the City Standard Wastewater Details. Steps are not required for wastewater and storm water manholes.

Joint material for precast concrete manholes shall be Ram-Nek Flexible Plastic Gaskets as manufactured by K. T. Snyder Company, Houston, Texas, or an approved equal.

3. EXCAVATION

The Contractor shall do all necessary excavation for the various manholes, conforming to size and dimensions shown on plans plus a maximum of four (4) feet working room. Excavation shall not be carried to greater depth than required. Subgrade under manhole footings shall be compacted to not less than 95% Standard Proctor density. Shoring shall be the responsibility of the Contractor and shall be installed as necessary. Shoring shall not be removed or backfilled around until entire manhole is completed, unless authorized by the Engineer. Shoring shall remain in place at least twenty-four (24) hours after concrete work has been completed.

4. CONCRETE MANHOLES (STORM WATER ONLY)

(1) Formed-in-Place Manholes:

Where formed concrete is used, forms shall be built to dimensions shown on the standard details. Inserts and openings shall be formed so concrete will not be injured during process of stripping forms. Forms shall be braced and tied to prevent spreading or bulging, and shall meet approval of the Engineer prior to placing concrete. Forms shall remain in place for minimum of twenty-four (24) hours, and shall be removed within a maximum time of seven (7) days after completion of concrete work. Reinforcing steel, if required, shall be as shown on the plans.
The bottom of manholes shall be carefully formed and inverted smoothly when finished, with pipes cut to fit inside surface of walls.

(2) Precast Manholes

Precast manholes shall allow unobstructed view of all pipes connected to the manhole. Precast manholes shall be designed to support HS-20 traffic loading and designed by a Texas licensed professional engineer. The upper 18 inches of the corbel shall be brick to facilitate subsequent grade adjustment. Either concentric or eccentric cones may be required. Where not specified, eccentric cones shall be used. Manhole designs shall be submitted for approval by the Engineer.

5. GENERAL CONSTRUCTION METHODS

All items shall be installed as the work progresses and as shown on the standard details. Work shall be completed and finished in a careful workmanlike manner, with special care being given to sealing joints around all pipe extending through walls of the manholes. After finishing walls, the bottom of the manhole shall be completed by adding sufficient concrete to shape the bottom in conformity with requirements on the plans. Where old manholes are adjusted to meet new lines and grades, all old masonry or concrete shall be thoroughly cleaned and wetted before joining new masonry or concrete to it. HDPE adjustment rings are to be used to match roadway grade. A maximum of 18" of adjustment rings may be utilized.

6. BACKFILLNG/LEAKAGE TESTNG

Backfilling around the manholes shall commence as soon as concrete or masonry has been allowed to cure the required time and forms and shoring have been removed. Backfill shall be placed in layers of not more than six inches (6") and compacted to a minimum of 95% Standard Proctor density before next layer is installed. Wastewater manholes shall withstand a leakage test not to exceed the values stated in City Standard Specification Section 027205 "Fiberglass Manholes", except that an additional 10 percent of loss will be permitted for each additional two feet head over a basic two-foot internal head.

7. MEASUREMENT AND PAYMENT

Unless otherwise specified on the Bid Form, manholes shall be measured by each individual structure built, and paid for at the unit price bid per each, of the size, type and depth specified, complete in-place, and meeting the approval of the Engineer. "Complete in-place" shall mean all labor, materials, tools, equipment and incidentals necessary to furnish and install the manholes, excavation, compaction, backfilling, dewatering, concrete foundation, connections, adjustment rings, ring and cover, concrete work, leakage testing, video inspection, and adjust the manholes to finish grade.

Extra depth for wastewater manholes over six feet in depth shall be measured by the vertical foot and shall be paid for at the price bid per vertical foot for "Extra Depth for Manholes".

Rehabilitation of existing manholes with fiberglass inserts shall be measured by each individual structure rehabilitated, and paid for at the unit price bid per each, of the size, type and depth specified, complete in-place, and meeting the approval of the Engineer. "Complete in-place" shall mean all labor, materials, tools, equipment and incidentals necessary to furnish and install the rigid fiberglass manhole inserts, make connections, grout the annular space, backfilling, adjustment rings, ring and cover, concrete work, leakage testing, and adjust the manholes to finish grade.

SECTION 027203
VACUUM TESTING OF WASTEWATER MANHOLES AND STRUCTURES

1. DESCRIPTION

This specification governs all work and materials necessary to perform vacuum testing of new or existing wastewater manholes. Manholes may be tested after installation with all connections (existing and/or proposed) in place. Vacuum testing may be performed prior to or after backfilling by the installer. Final acceptance, in accordance with the requirements of this specification, will consist of vacuum testing of the completed and installed structure (manhole) in place to include manhole/adjustment rings and manhole casting.

2. MATERIALS

Vacuum testing shall consist of a minimum of the following:

(a) Engine.

(b) Vacuum Pump.

(c) Hose.

(d) Test Head device capable of sealing opening in manhole casting as required.

(e) Pneumatic Test Plugs - these plugs shall have a sealing length equal to or greater than the diameter of the connecting pipe to be sealed.

3. PROCEDURE

(a) The test head shall be placed at the top of the manhole in accordance with the manufacturer's recommendations.

(b) A vacuum of 10 inches of mercury shall be drawn on the manhole, the valve on the vacuum line of the test head closed, and the vacuum pump shut off. The time shall be measured for the vacuum to drop to 9 inches of mercury.

(c) The manhole shall pass if the time for the vacuum reading to drop from 10 inches of mercury to 9 inches of mercury meets or exceeds the values indicated in Table 1.

(d) If the manhole fails the initial test, necessary repairs shall be made by an approved method. The manhole shall then be retested until a satisfactory test is obtained.

TABLE 1 - Minimum Test Times for Various Manhole Diameters (ASTM C1244)

Depth	Diameter (inches)				
(feet)	42	48	54	60	72
	Time (seconds)				
8	17	20	23	26	33
10	21	25	29	33	41
12	25	30	35	39	49
14	30	35	41	46	57
16	34	40	46	52	67
18	38	45	52	59	73
20	42	50	53	65	81
22	46	55	64	72	89
24	51	59	64	78	97
26	55	64	75	85	105
28	59	69	81	91	113
30	68	74	87	98	121

4. TESTING AND CERTIFICATION

(a) Testing shall be done by the Contractor and witnessed by the Engineer or his designated representative. All manholes and structures shall be tested as finished and completed for final acceptance.

(b) ANY DEFECTIVE WORK OR MATERIALS shall be corrected or replaced by the Contractor and retested. This shall be repeated until all work and materials are acceptable.

5. MEASUREMENT AND PAYMENT

Unless otherwise indicated on the Bid Form, vacuum testing of wastewater manholes and structures will not be measured for pay. Such items shall be considered subsidiary to pay items applicable for Fiberglass Manholes, complete and in-place.

SECTION 027205
FIBERGLASS MANHOLES

1. DESCRIPTION

This specification shall govern all work required for providing, installing and adjusting fiberglass manholes required to complete the project.

2. GENERAL

Fiberglass manholes shall be installed at the locations indicated on the drawings.

3. MATERIALS

A. Manholes

Fiberglass manholes shall be fabricated in accordance with ASTM D3753-"Standard Specification for Glass-Fiber-Reinforced Polyester Manholes and Wetwells," latest edition, and the referenced design criteria as follows:

1. ASTM C581 Standard Practice for Determining Chemical Resistance of Thermosetting Resins Used in Glass-Fiber-Reinforced Structures Intended for Liquid Service
2. ASTM D695 Standard Test Method for Compressive Properties of Rigid Plastics
3. ASTM D790 Standard Test Methods for Flexural Properties of Unreinforced and Reinforced Plastics and Electrical Insulating Materials
4. ASTM C923 Standard Specification for Resilient Connectors Between Reinforced Concrete Manhole Structures, Pipes and Laterals
5. ASTM D2412 Standard Test Method for Determination of External Loading Characteristics of Plastic Pipe by Parallel-Plate Loading
6. ASTM D2583 Standard Test Method for Indentation Hardness of Rigid Plastics by Means of a Barcol Impressor
7. ASTM D2584 Standard Test Method for Ignition Loss of Cured Reinforced Resins
8. ASTM D3034 Standard Specification for Type PSM Poly (Vinyl Chloride) (PVC) Sewer Pipe and Fittings
9. ASTM F794 Standard Specification for Poly (Vinyl Chloride) (PVC) Profile Gravity Sewer Pipe and Fittings Based on Controlled Inside Diameter
10. ASTM C32 Standard Specification for Sewer and Manhole Brick (Made From Clay or Shale)

The minimum wall thickness for all fiberglass manholes at all depths shall be 0.50 inch. The inside diameter of the manhole barrel shall be a minimum of 48 inches or as otherwise specified on the drawings, but shall not be less than 1.5 times the nominal pipe diameter of the largest pipe, whichever is larger. A concentric reducer over the barrel shall have a minimum inside diameter of 31.75 inches at the top, unless otherwise indicated on the drawings.

B. Manhole Pipe Connectors

Manhole pipe connectors for Sanitary Sewer Application shall be made of corrosion resistant plastic. The connector shall eliminate leaks around the pipe entering the manhole wall and shall permit pipe movement without loss of seal integrity, and shall be in conformance with ASTM D3212. Material for elastomeric seal in push-on points shall meet the requirements of ASTM F477. Material for rubber sleeve shall meet the requirements of ASTM C443. Manhole pipe connectors between 4 inches and 15 inches shall be Inserta Tee from Fowler Mfg., or approved equal.

Manhole pipe connection for Storm Sewer Application shall be made with Ram-Nek flexible plastic gasket material as manufactured by K.T. Snyder Company of Houston, Texas, or approved equal, and wrapped with Class 'A' Subsurface Drainage Geotextile, AASHTO M288.

C. Manhole Base

Concrete shall be Class 'A' in accordance with City Standard Specification Section 030020 "Portland Cement Concrete".

Caulk for seal between fiberglass manhole and concrete cast-in-place base shall be Epo-Flex epoxy (gun grade consistency) as manufactured by Dewey Supply of Corpus Christi, Texas, or approved equal.

Precast reinforced concrete manhole base shall be in accordance with the requirements of ASTM C478, as shown on the construction plans and detail drawings.

D. Inflow Inhibitors

Inflow inhibitors shall be installed in sanitary manholes. They shall be of316 stainless steel with an equivalent thickness of not less than 18 gauge, and load tested in excess of 3000 pounds. The inhibitor shall rest on the lip of the seating surface of the manhole ring and shall not exceed a depth of 6.5 inches. The seating surface of the inhibitor shall have an

attached gasket on the weight-bearing side. The inhibitor shall have a gas relief valve made of Nitrite and shall operate at a one (1) psi differential pressure. The inhibitor shall be fitted with a handle of 3/16 plastic coated stainless steel cable attached to the insert body with a 6# 316 stainless steel rivet. The inhibitor shall be constructed of materials that withstand highly corrosive sewer gases.

E. Ring and Cover

Manhole ring and cover for all manholes shall be for street application and shall be as indicated on the drawings. Manholes 5 feet in diameter and larger shall require a nominal 3foot ring and cover, as specified on the drawings. HDPE adjustment rings are to be used for grade adjustments. A maximum of 18" of adjustment rings may be utilized.

F. Flowable Grout

Flowable grout (or flowable fill) shall consist of a mixture containing Portland cement, fly ash, sand, water, and "Darafill" admixture (or approved equivalent), in the amounts shown below (or otherwise proportioned to provide 100 psi compressive strength at 28 days), to achieve a paste-like consistency immediately prior to placing the flowable grout. The flowable grout mixture shall be supplied by an approved ready-mix supplier. The manufacturer's representative shall be consulted for any final adjustments to improve the flowability of the mixture. Commercially produced flowable grout may be used with approval of the Engineer.

100 lbs/ CY Portland Cement
300 lbs/ CY Fly Ash
2100 lbs/ CY sand
250 lbs/ CY Water
6 oz/ CY "Darafill" admixture, as manufactured by Grace Construction Products, or approved equivalent.

4. CONSTRUCTION METHODS

General: The limits of excavation shall allow for placing and removing forms, installing sheeting, shoring, bracing, etc. The Contractor shall pile excavated material in a manner that will not endanger the work and will avoid obstructing sidewalks, driveways, power poles, drainage structures, streets, etc. Subgrade under manhole footings shall be compacted to not less than 95% Standard Proctor density.

Vertical Sides: When necessary to protect other improvements, the Contractor shall maintain vertical sides on the excavation. The limits shall not exceed three feet outside the

footing on a vertical plane parallel to the footing except where specifically approved otherwise by the Engineer. The Contractor shall provide and install any sheeting, shoring, and bracing as necessary to provide a safe work area as required to protect workmen, structures, equipment, power poles, etc. The Contractor shall be responsible for the design and adequacy of all sheeting, shoring and bracing. The sheeting, shoring, and bracing shall be removed as the excavation is backfilled.

Sloping Sides: In unimproved areas where sufficient space is available, the Contractor will be allowed to back slope the sides of the excavation. The back slope shall be such that the excavation will be safe from caving. Safety requirements shall govern the back slope used.

De-watering: The Contractor shall keep the excavation free from water by use of cofferdams, bailing, pumping, well pointing, or any combination, as the particular situation may warrant. All de-watering devices shall be installed in such a manner as to provide clearance for construction, removal of forms, and inspection of exterior of form work. It is the intent of these specifications that the foundation be placed on a firm dry bed. The foundation bed shall be kept in a de-watered condition for a sufficient period of time to insure the safety of the structure, but in no case shall de-watering be terminated sooner than seven (7) days after placing concrete. All de-watering methods and procedures are subject to the approval of the Engineer. The excavation shall be inspected and approved by the Engineer before work on the structure is started. The Contractor shall provide a relatively smooth, firm foundation bed for footings and slabs that bear directly on the undisturbed earth without additional cost to the City, regardless of the soil conditions encountered. The Engineer will be the sole judge as to whether these conditions have been met. The Contractor shall pile excavated material in a manner that will not create an unsafe condition.

Unauthorized Over-Excavation: Excavation for slabs, footings, etc., that rest on earth, shall not be carried below the elevation shown on the drawings. In the event the excavation is carried below the indicated elevation, the Contractor shall bring the slab, footing, etc., to the required grade by filling with concrete.

Wall Preparation for Pipe Penetrations: For sanitary sewer application, pipe penetrations for pipe sizes 4-inch through 15-inch shall be made with appropriately sized core drill bits recommended by the manufacturer. Pipe penetrations other than described above and as authorized by the Engineer shall be made as follows: cut shall be equal to the outside diameter of pipe to pass through it, plus 1/2 inch. Cuts are to be made using electric or gasoline powered circular saw with masonry blade. Impact type tools shall not be used.

Handling: Manholes shall be handled and stored in a safe manner as necessary to prevent damaging either the manhole or the surroundings. If manhole must be moved by rolling, the ground which it traverses shall be smooth and free of rocks, debris, etc. Manholes shall be lifted as specified by the manufacturer.

Height Adjustment: If necessary', utilize HDPE adjustment rings to adjust the manhole to the correct grade elevation. A maximum of 18" of adjustment rings may be utilized.

Installation: Lower manhole into wet concrete until it rests at the proper elevation, and a minimum of six (6) inches into concrete, then plumb.

Backfill Material: Unless shown otherwise on the drawings, initial backfill around manholes (from subgrade to five feet (5') above the top of the concrete footing) shall be flowable grout. The remaining final backfill around manholes shall be cement-stabilized sand, or approved equal, containing a minimum of 2 sacks of standard Type I or Type Il Portland cement per cubic yard of sand, free of large hard lumps, rock fragments or other debris. The material shall be free of large lumps or clods which will not readily break down under compaction. This material shall be subject to approval by the Engineer. Backfill material shall be free of vegetation or other extraneous material. Topsoil should be stockpiled separately and used for finish grading around the structure, if necessary.

Schedule of Backfilling: The Contractor may begin backfilling around manhole as soon as the concrete has been allowed to cure and the forms removed.

Compaction: Backfill shall be placed in layers not to exceed 6 inches compacted thickness and mechanically tamped to at least 95% Standard Proctor density (ASTM D698). Backfill shall be placed in such a manner as to prevent any wedging action against the structure.

Contractor shall follow operational requirements for bypass pumping as set forth in City Standard Specification Section 027200 "Control of Wastewater Flows".

TESTNG

Manholes shall be tested for leakage by either of two tests as specified by the Engineer.

Water Leakage Test:

The Contractor shall provide water, labor, and materials for testing.

Testing shall be as follows:

1. With sewers plugged, the manhole shall be filled with water.
2. The manhole shall be checked after 24 hours have elapsed.
3. Water loss shall not exceed 2.4 gallons per foot of depth for the 24-hour period for 4-foot diameter manholes, or 3.0 gallons per foot of depth for the 24-hour period for 5-foot diameter manholes. Water loss shall not exceed 0.6 gallon per foot of diameter per foot of depth for the 24-hour period for all sizes of sanitary manholes.

4. If the manhole is within 9 feet of a waterline that is not or cannot be encased, the manhole shall be tested for no leaks and no noticeable loss of water shall be experienced for the 24-hour period.

If water loss is excessive, the Contractor shall correct the problem and the manhole shall be retested.

Vacuum Test:

Vacuum testing shall be in accordance with City Standard Specification Section 027203 "Vacuum Testing of Wastewater Manholes and Structures".

6. GRADE ADJUSTMENT OF EXISTNG FIBERGLASS MANHOLES

The adjustment of the ring and cover is to be achieved by removal or addition of HDPE grade adjustment rings that rest above the fiberglass corbel. If the ring and cover must be lowered to the extent that the new elevation cannot be achieved by removal of adjustment rings and it is necessary to remove a section of the fiberglass manhole, this work shall be done as described below.

Note that manhole repair kits are available for this work.

Remove the appropriately sized section of the existing manhole from the vertical manhole wall at least 6 inches below the seam where the corbel meets the vertical wall.

Excavate evenly around the manhole as required.

Mark, cut and remove the required section of the manhole. Make a square cut as necessary for a good butt splice.

Grind and clean ends of fiberglass that are to be re-united.

Replace and align the top. Fiberglass a 6-inch strip along the outside seam all around with two layers of mat with one layer of woven roving sandwiched between.

After the outside has set, go on the inside and fill any voids in the seam with epoxy or material provided by the manhole manufacturer for use in such application.

After the putty has set, fiberglass a 6-inch strip on the inside as previously done on the outside.

After curing, backfill with cement-stabilized sand, as described above, compacted to a minimum of 95% Standard Proctor density (ASTM D698) or as directed by the Engineer or his designated representative.

7. MEASUREMENT AND PAYMENT

Unless otherwise specified on the Bid Form, fiberglass manholes shall be measured per each for each size (diameter) of manhole indicated.

Payment shall be made at the unit price bid and shall fully compensate the Contractor for all materials, labor, tools, equipment, and incidentals required to complete the work. Payment shall

include, but not be limited to; excavation, dewatering, compaction, concrete foundation, manhole assembly, connections, cast iron frame and cover, adjustment to finish grade, concrete work, backfill, leakage testing, bypass pumping, and other work as required to complete the fiberglass manhole.

Extra depth for a sanitary manhole over 6 feet in depth will be measured by the vertical foot of depth in excess of 6 feet and bid as "Extra Depth for Manhole (Wastewater)".

Rehabilitation of existing manholes with fiberglass inserts shall be measured by each individual structure rehabilitated, and paid for at the unit price bid per each, of the size, type and depth specified, complete in-place, and meeting the approval of the Engineer. "Complete in-place" shall mean all labor, materials, tools, equipment and incidentals necessary to furnish and install the rigid fiberglass manhole inserts, make connections, grout the annular space with flowable grout, backfilling, leakage testing, and adjust the manholes to finish grade.

SECTION 027602
GRAVITY WASTEWATER LINES

1. DESCRIPTION

This specification shall govern all work required for furnishing, handling and installing gravity wastewater lines required to complete the project.

2. MATERIALS

A. Pipe and Fittings:

1. POLY-VNYL CHLORIDE (PVC) PIPE and fittings shall be in accordance with the following:

6" Gravity Sewer Pipe	ASTM D3034	DR 26	
8" Gravity Sewer Pipe	ASTM D3034	DR 26	
10" Gravity Sewer Pipe	ASTM D3034	DR 26	
12" Gravity Sewer Pipe	ASTM D3034	DR 26	
15" Gravity Sewer Pipe	ASTM D3034	DR 26	
18" Gravity Sewer Pipe	ASTM F679	DR 26	
24" Gravity Sewer Pipe	ASTM F679	DR 26	
30" Gravity Sewer Pipe	ASTM F679	DR 26	
36" Gravity Sewer Pipe	ASTM F679	DR 26	PS115
42" Gravity Sewer Pipe	ASTM F679	DR35	PS46
48" Gravity Sewer Pipe	ASTM F679	DR35	PS46

Pipe and fittings shall have push-on compression gasket joints in accordance with ASTM D3212 and shall be a non-blue color.

2. POLY-VNYL CHLORIDE (PVC) PRESSURE PIPE shall be AWWA C900 or C905 integral green (non-blue color) with a minimum pressure rating of not less than 150 psi, made of Class 12454-A or Class 12454-B virgin compounds, as defined in ASTM DI 784. One (1) 20-ft. section of PVC pressure pipe, with appropriate adapters or as an encasing pipe over the carrier pipe, shall be used for gravity wastewater lines at all waterline crossings, and shall be centered under/ over the waterline as indicated on the drawings.

Maintain a minimum of 2 feet vertical clearance between outsides of pipes where a new waterline crosses over a new non-pressurized wastewater line. Maintain a minimum of 6 inches vertical clearance between outsides of pipes where a new waterline crosses over a pressurized wastewater line. In all instances of water crossing wastewater, center a joint of water pipe over the wastewater pipe such that a minimum of 9 feet of horizontal offset exists from each water joint to the wastewater carrier pipe.

Alternatively, at waterline crossings, the PVC gravity wastewater pipe may be encased in a 20-ft. joint of pressure pipe with a minimum pressure rating of 150 psi that is at least two nominal sizes larger than the carrier pipe. The carrier pipe shall be supported in the casing at five foot (5') intervals with spacers, or shall be filled to the spring line with clean washed sand. The casing pipe shall be centered under/ over the waterline as indicated on the drawings, and both ends of the casing shall be sealed with cement grout or manufactured seal.

B. Bedding and Backfill Materials:

1. BEDDNG AND NITIAL BACKFILL is that material from beneath the pipe to an elevation 12 inches above the top of the pipe. The bedding and initial backfill material shall be in accordance with Table 1 on Wastewater Standard Details, Sheet 3, unless otherwise specified.
2. FNAL BACKFILL is that material placed on the initial backfill. The material shall be in accordance with City Standard Specification Section 022020 "Excavation and Backfill for Utilities" and as shown on the standard details.

3. CONSTRUCTION METHODS

A. Trench Excavation:

See City Standard Specification Section 022020 "Excavation and Backfill for Utilities."

B. Handling of Materials:

1. HANDLNG AND CARE of pipe shall be the responsibility of the Contractor. Pipe shall be unloaded at the point of delivery, hauled to and distributed at the site by the Contractor. Materials shall be handled with care and in accordance with the manufacturer's recommendations.

2. STORAGE AND SECURITY of materials shall be provided by the Contractor.

Any material delivered to the site that is not to be incorporated into the work within 10 working days shall be properly stored off the ground.
Stacking and handling of materials shall be done as recommended by the manufacturer.

3. REJECTED OR DEFECTIVE materials are those having cracks, flaws or other defects. Rejected materials shall be marked by the Engineer and removed from the job site by the end of the day by the Contractor.

4. DISTRIBUTION OF MATERIALS at the work site shall be allowed provided that they are incorporated into the work within 10 working days. Materials shall not be placed on private property, unless written permission has been obtained from the owner by the Contractor. Materials shall not be placed within five feet of the back of curb or edge of pavement without permission of the Engineer or the designated representative.

C. Alignment and Grade:

1. All pipe shall be laid and maintained to the required line and grade.

2. NO DEVIATIONS from design line and grade shall be allowed, unless authorized by the Engineer.

3. The Contractor shall provide offsets and cut sheets. The Contractor may use batter boards, laser, or other approved methods necessary to construct the wastewater line to design line and grade.

D. Pipe Placement:

1. GENERAL: Proper implements, tools, etc., shall be used by the Contractor for safe and efficient execution of work. All pipes shall be carefully lowered into the trench by suitable equipment in such a manner as to prevent damage. Under no circumstances shall pipe be dropped or dumped into the trench. The Contractor shall not lay pipe in the trench until the bedding and condition of the trench have been approved by the Engineer. The trench shall be free of water and maintained in that condition until the pipe has been laid, the joints have been completed, and the initial backfill has been completed. All pipe markings shall be placed face up for inspection prior to backfill.

2. CLEAN PIPE: All foreign matter or dirt shall be removed from the interior of the pipe before lowering pipe into trench. The interior of pipe shall be maintained free of dirt during the remaining installation operations.

E. Jointing Pipe:

POLY-VNYL CHLORIDE (PVC) shall have mating surfaces of the gasketed joint wiped clean of dirt and foreign matter. A lubricant recommended by the coupling manufacturer shall be applied to the bell and spigot mating surfaces just prior to joining. The spigot shall then be centered on grade into the bell of the previous pipe and shall be shoved home to compress the joint and to assure a tight fit between the inner surfaces. Pipe shall not be assembled in reverse order by pushing bell onto spigot. When the pipe is being thusly installed, bell holes shall be excavated in the bedding material. When the joint has been made, the bell hole shall be carefully filled with material to provide for adequate support of the pipe. The spigot shall be centered within 1/4 inch of the home line marked on the spigot.

F. Bedding and Initial Backfill:

POLY-VNYL CHLORIDE (PVC) PIPE: Bedding and initial backfill of PVC pipe shall be in accordance with the details provided in the drawings. Bedding shall be well tamped regardless of type. The type of bedding required shall depend upon the depth of cut and ground water condition and shall be as specified below:

BOTTOM OF TRENCH m GROUNDWATER

Depth of Cut	Required Bedding
Less than 20 feet	Gravel or Crushed Stone
Over 20 feet	Crushed Stone

BOTTOM OF TRENCH NOT GROUND WATER

Depth of Cut	Required Bedding
Less than 15 feet	Sand, Gravel, or Crushed Stone
Less than 20 feet	Gravel or Crushed Stone
Over 20 feet	Crushed Stone

G. Final Backfill:

See City Standard Specification Section 022020 "Excavation and Backfill for Utilities."

H. Bypass Pumping:

Contractor shall follow operational requirements for bypass pumping as set forth in Specification Section 027200 Control of Wastewater Flows.

4. TESTNG AND CERTFICATION

A. Leakage Testing: (Required for all types of pipe)

1. EQUIPMENT FOR LEAKAGE TESTNG shall be furnished and installed by the Contractor. The Contractor shall test the entire system for leaks. This work shall be witnessed by the Engineer.

2. POLY-VNYL CHLORIDE (PVC) PIPE shall be tested in accordance with Uni-Bell Plastic Pipe Association - Standard UM-B-6 'Recommended Practice for Low Pressure Air Testing of Installed Sewer Pipe"; the r requirements of which are summarized by the following equation:

$T = 0.00237D^2L$ [Equation 1]

Where: T = Minimum allowable time (seconds) for a pressure drop of one (1) psi gage pressure
D = Nominal pipe diameter (inches)
L = Length of pipe run (feet)

The test section shall be plugged and subjected to a test pressure not in excess of five (5) psi. The time required for a one (1) psi pressure drop shall be measured and shall not exceed the value obtained in Equation 1 above.

B. Deflection Testing: (Required for PVC Pipe)

1. EQUIPMENT FOR DEFLECTION TESTNG shall be provided by the Contractor. Mandrels shall be provided by the Contractor and will be of machined rigid corrosion-resistant pipe with a length not less than 1.5 diameters. Mandrels will be sized for SDR 26 PVC pipe at 5% deflection. The outside diameter of the standard mandrels shall be as follows:

Nominal Size (inches)	Mandrel O.D. (inches)
8	7.11
10	8.87
12	10.55
15	12.90
18	15.76
21	18.56
24	20.87
27	23.51
30	27.14

2. TESTNG shall be done by the Contractor and witnessed by the Engineer. All pipe shall be tested for deflection no less than 30 days after placement of backfill. The Contractor may wish to check pipe immediately after backfilling for job control. However, this shall not qualify as acceptance testing. No pipe can be tested for formal acceptance until it has been in place, complete with backfill, for at least 30 days.

3. Belly: Pipe shall be rejected if belly exceeds 5% based on the readings from the video inspection.

C. Retesting:

ANY DEFECTIVE WORK OR MATERIALS shall be or replaced by the Contractor and retested. This shall be repeated until all work and materials are acceptable

D. Cleaning and Televising:

All wastewater lines and manholes installed on this project shall be cleaned and televised in accordance with Standard Specification Section 027611 "Cleaning and Televised Inspection of Conduits".

5. SOIL BORINGS

The City does not assume responsibility for subsurface information. Soil data and other subsurface information, if shown on the drawings or in the appendix, are without warranty as to correctness of fact or interpretation.

6. BRACNG AND SHORNG

Trenching operation shall comply with Worker Safety Requirements for Excavation and Trenching Operations. If, for whatever reason, the trench width at the top of pipe must exceed that width indicated in the bedding details, the Contractor shall modify bedding as required by the Engineer to accommodate the additional load on the pipe.

7. MEASUREMENT AND PAYNIENT

Unless otherwise specified on the Bid Form, gravity wastewater lines shall be measured by the linear foot for each size and depth of wastewater line installed, as follows:

A. Between centers of manholes.
B. From the center of a manhole to the end of the line.
C. From the end of an existing stub to the end of the line or center of the existing manhole.

Depth shall be measured from flow line of pipe to ground surface over centerline of the pipe at the time of construction. Measurements to be made at manholes, at intervals not to exceed fifty feet, and at breaks in ground profile.

Bedding shall not be measured for pay, but shall be considered subsidiary to pipe, unless included as a separate bid item in the Bid Form.

Unless otherwise specified on the Bid Form, de-watering shall not be measured for pay, but shall be considered subsidiary unless included as a separate bid item in the Bid Form for well-pointing.

Payment shall be full compensation for all labor, materials, equipment, pipe, bedding, de-watering, hauling, trench excavation and backfill, leakage and deflection testing, cleaning, televising, bypass pumping, and all cleaning up and other incidentals necessary to install the pipe complete in-place.

SECTION 027604

DISPOSAL OF WASTE FROM WASTEWATER CLEANING OPERATIONS

1. SCOPE:

This specification governs all work required for disposal of waste from wastewater cleaning operations required to complete the project.

2. METHODS:

Grit, rubble, dislodged bricks and other such inorganic waste that is removed during cleaning shall not be allowed to continue downstream of the operation. Organic solids that remain in suspension would be allowed to continue downstream through the wastewater system.

A weir or other suitable trap shall be installed and maintained by the Contractor for the collection of such waste.

This material shall be de-watered and delivered by the Contractor to a facility that is authorized to receive it.

The Contractor has the option of using the City's de-watering facilities. The City has six drying beds, each with a 1-foot high containment wall each with an area of about 2,300 square feet. These drying beds are at the South Wastewater Treatment Plant, FM 1717 Kingsville, Texas. The Contractor would be required to haul and handle the material to, at and from the facility as well as the restoration of drying beds. Restoration of the drying beds includes the removal of all the dewatered material and the replacement of the existing sand bed with new sand. All work required within the treatment plant, including the replacement of sand shall be in accordance with the requirements set forth by the Plant Supervisor. The use of the drying beds would be subject to prior approval of the facility and the associated de-watering fees.

If the City's facilities are used for de-watering or disposal of waste, the Contractor shall be responsible for making contact with the appropriate Solid Waste or Wastewater Officials or both, making all arrangements for the use of City facilities, scheduling of delivery and pickup, etc. Materials and handling operations shall meet the requirements set forth by said Officials. Failure to meet these requirements shall be cause for rejection of the materials by either the landfill or the treatment plant operations. Proper disposal of this waste shall be responsibility of the Contractor. The Contractor shall provide the Engineer with written documentation of the proper disposal of this waste.

3. MEASUREMENT & PAYMENT:

Unless otherwise specified on the Bid Form, this work shall be considered subsidiary to the project.

SECTION 030020
PORTLAND CEMENT CONCRETE

1. DESCRIPTION

This specification shall govern for the materials used; for the storing and handling of materials; and for the proportioning and mixing of concrete for culverts, manholes, inlets, curb and gutter, sidewalks, driveways, curb ramps, headwalls and wingwalls, riprap, and incidental concrete construction.

The concrete shall be composed of Portland cement, aggregates (fine and coarse), admixtures if desired or required, and water, proportioned and mixed as hereinafter provided.

2. MATERIALS

(1) Cement

The cement shall be either Type I, Il or Ill Portland cement conforming to ASTM Designation: C150, modified as follows:

> Unless otherwise specified by the Engineer, the specific surface area of Type I and Il cements shall not exceed 2000 square centimeters per gram (Wagner Turbidimeter — TxDOT Test Method Tex-310-D). For concrete piling, the above limit on specific surface area is waived for Type Il cement only. The Contractor shall furnish the Engineer, with each shipment, a statement as to the specific surface area of the cement expressed in square centimeters per gram.

For cement strength requirements, either the flexural or compressive test may be used.

Either Type I or Il cement shall be used unless Type Il is specified on the plans. Except when Type Il is specified on the plans, Type Ill cement may be used when the anticipated air temperature for the succeeding 12 hours will not exceed 60^0F. Type Ill cement may be used in all precast prestressed concrete, except in piling when Type Il cement is required for substructure concrete.

Different types of cement may be used in the same structure, but all cement used in any one monolithic placement shall be of the same type and brand. Only one brand of each type will be permitted in any one structure unless otherwise authorized by the Engineer.

Cement may be delivered in bulk where adequate bin storage is provided. All other cement shall be delivered in bags marked plainly with the name of the manufacturer and the type of cement. Similar information shall be provided in the bills of lading accompanying each shipment of packaged or bulk cement. Bags shall contain 94 pounds net. All bags shall be in good condition at time of delivery.

All cement shall be properly protected against dampness. No caked cement will be accepted.

Cement remaining in storage for a prolonged period of time may be retested and rejected if it fails to conform to any of the requirements of these specifications.

(2) Mixing Water

Water for use in concrete and for curing shall be free from oils, acids, 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 S04.

Water from municipal supplies approved by the State Health Department will not require testing, but water from other sources will be sampled and tested before use in structural concrete.

Tests shall be made in accordance with the "Method of Test for Quality of Water to be Used in Concrete" (AASHTO Method T26), except where such methods are in conflict with provisions of this specification.

(3) Coarse Aggregate

Coarse aggregate shall consist of durable particles of gavel, crushed blast furnace slag, crushed stone, or combinations thereof; free from frozen material or injurious amount of salt, alkali, vegetable matter, or other objectionable material either free or as an adherent coating; and its quality shall be reasonably uniform throughout. It shall not contain more than 0.25 percent by weight of clay lumps, nor more than 1.0 percent by weight of shale, nor more than 5 percent by weight of laminated and/or friable particles when tested in accordance with TxDOT Test Method Tex-413-A. It shall have a wear of not more than 40 percent when tested in accordance with TxDOT Test Method Tex-410-A.

Unless otherwise specified on the plans, coarse aggregate will be subjected to five cycles of the soundness test in accordance with TxDOT Test Method Tex-411-A. The loss shall not be greater than 12 percent when sodium sulfate is used, or 1 8 percent when magnesium sulfate is used.

Permissible sizes of aggregate shall be governed by Table 4 and Table 1, except that when exposed aggregate surfaces are required, coarse aggregate gradation will be as specified on the plans.

When tested by approved methods, the coarse aggregate, including combinations of aggregates when used, shall conform to the grading requirements shown in Table 1.

TABLE 1
Coarse Aggregate Gradation Chart

Percent Retained on Each Sieve										
Aggregate Grade No.	Nominal Size	2-1/2 In.	2 In.	1-1/2 In.	1 In.	3/4 In.	1/2 In.	3/8 In.	No. 4	No. 8
1	2 in.	0	0 to 20	15 to 50		60 to 80			95 to 100	
2 (467)*	1-1/2 in.		0	0 to 5		30 to 65		70 to 90	95 to 100	
4 (57)*	1 in.			0	0 to 5		40 to 75		90 to 100	95 to 100
8	3/8 in.						0	0 to 5	24 to 80	90 to 100

*Numbers in parenthesis indicate conformance with ASTM C33.

The aggregate shall be washed. The Loss by Decantation (TxDOT Test Method Tex-406-A) plus the allowable weight of clay lumps, shall not exceed one percent, or the value shown on the plans, whichever is smaller.

(4) Fine Aggregate

Fine aggregate shall consist of clean, hard, durable and uncoated particles of natural or manufactured sand or a combination thereof, with or without a mineral filler. It shall be free from frozen material or injurious amounts of salt, alkali, vegetable matter or other objectionable material and it shall not contain more than 0.5 percent by weight of clay lumps. When subjected to the color test for organic impurities (TxDOT Test Method Tex-408-A), it shall not show a color darker than standard.

The fine aggregate shall produce a mortar having a tensile strength equal to or greater than that of Ottawa sand mortar when tested in accordance with TxDOT Test Method Tex-317-D.

Where manufactured sand is used in lieu of natural sand for slab concrete subject to direct traffic, the acid insoluble residue of the fine aggregate shall be not less than 28 percent by weight when tested in accordance with TxDOT Test Method Tex-612-J.

When tested by approved methods, the fine aggregate or combination of aggregates, including mineral filler, shall conform to the grading requirements shown in Table 2.

TABLE 2

Fine Aggregate Gradation Chart

	Percent Retained on Each Sieve							
Aggregrate Grade No.	3/8 In.	No. 4	No. 8	No. 16	No. 30	No. 50	No. 100	No. 200
1	0	0 to 5	0 to 20	15 to 50	35 to 75	70 to 90	90 to 100	97 to 100

NOTE 1: Where manufactured sand is used in lieu of natural sand, the percent retained on the No. 200 sieve shall be 94 to 100.

NOTE 2: Where the sand equivalent value is greater than 85, the retainage on the No. 50 sieve may be 70 to 94 percent.

Fine aggregate will be subjected to the Sand Equivalent Test (TxDOT Test Method Tex-203-F). The sand equivalent shall not be less than 80 nor less than the value shown on the plans, whichever is greater.

For concrete Classes 'A' and 'C', the fineness modulus as defined below for fine aggregates shall be between 2.30 and 3.10.

The fineness modulus will be determined by adding the percentages by weight retained on the following sieves, and dividing by 100; Nos. 4, 8, 16, 30, 50 and 100.

(5) Mineral Filler

Mineral filler shall consist of stone dust, clean crushed sand, or other approved inert material.

(6) Mortar (Grout)

Mortar for repair of concrete shall consist of 1 part cement, 2 parts finely graded sand, and enough water to make the mixture plastic. When required to prevent color difference, white cement shall be added to produce the color required. When required by the Engineer, latex adhesive shall be added to the mortar.

(7) Admixtures

Calcium Chloride will not be permitted. Unless otherwise noted, air-entraining, retarding and water reducing admixtures may be used in all concrete and shall conform to the following requirements:

A "water-reducing, retarding admixture" is defined as a material which, when added to a concrete mixture in the correct quantity, will reduce the quantity of mixing water required to produce concrete of a given consistency and will retard the initial set of the concrete.

A "water-reducing admixture" is defined as a material which, when added to a concrete mixture in the correct quantity, will reduce the quantity of mixing water required to produce concrete of a given consistency.

(a) Retarding and Water-Reducing Admixtures. The admixture shall meet the requirements for Type A and Type D admixture as specified in ASTM Designation: C494, modified as follows:

(1) The water-reducing retarder shall retard the initial set of the concrete a minimum of 2 hours and a maximum of 4 hours, at a specified dosage rate, at a temperature of 90^0F.

(2) The cement used in any series of tests shall be either the cement proposed for specific work or a "reference" Type I cement from one mill.

(3) Unless otherwise noted on the plans, the minimum relative durability factor shall be 80.

The air-entraining admixture used in the referenced and test concrete shall be neutralized Vinsol resin.

(b) Air-Entraining Admixture. The admixture shall meet the requirements of ASTM Designation: C260, modified as follows:

(1) The cement used in any series of tests shall be either the cement proposed for specific work or a "reference". Type I cement from one mill.

(2) Unless otherwise noted on the plans, the minimum relative durability factor shall be 80.

The air-entraining admixture used in the referenced concrete shall be neutralized Vinsol resin.

3. STORAGE OF CEMENT

All cement shall be stored in well-ventilated weatherproof buildings or approved bins, which will protect it from dampness or absorption of moisture. Storage facilities shall be ample, and each shipment of packaged cement shall be kept separated to provide easy access for identification and inspection.

The Engineer may permit small quantities of sacked cement to be stored in the open for a maximum of 48 hours on a raised platform and under waterproof covering.

4. STORAGE OF AGGREGATE

The method of handling and storing concrete aggregate shall prevent contamination with foreign materials. If the aggregates are stored on the ground, the sites for the stockpiles shall be clear of all vegetation and level. The bottom layer of aggregate shall not be disturbed or used without recleaning.

When conditions require the use of two or more sizes of aggregates, they shall be separated to prevent intermixing. Where space is limited, stockpiles shall be separated by physical barriers.

Methods of handling aggregates during stockpiling and subsequent use shall be such that segregation will be minimized.

Unless otherwise authorized by the Engineer, all aggregate shall be stockpiled at least 24 hours to reduce the free moisture content.

5. MEASUREMENT OF MATERIALS

The measurement of the materials, except water, used in batches of concrete, shall be by weight. The fine aggregate, coarse aggregate and mineral filler shall be weighed separately. Where bulk cement is used, it shall be weighed separately, but batch weighing of sacked cement will not be required. Where sacked cement is used, the quantities of material per batch shall be based upon using full bags of cement. Batches involving the use of fractional bags will not be permitted.

Allowance shall be made for the water content in the aggregates.

Bags of cement varying more than 3 percent from the specified weight of 94 pounds may be rejected, and when the average weight per bag in any shipment, as determined by weighing 50 bags taken at random, is less than the net weight specified, the entire shipment may be rejected. If the shipment is accepted, the Engineer will adjust the concrete mix to a net weight per bag fixed by an . average of all individual weights which are less than the average weight determined from the total number weighed.

6. CLASSIFICATION AND MIX DESIGN

It shall be the responsibility of the Contractor to furnish the mix design, using a coarse aggregate factor acceptable to the Engineer, for the class(es) of concrete specified. The mix shall be designed by a qualified concrete technician to conform with the requirements contained herein and in accordance with the THD Bulletin C-11. The Contractor shall perform, at his own expense, the work required to substantiate the design, except the testing of strength specimens, which will be done by the Engineer. Complete concrete design data shall be submitted to the Engineer for approval.

It shall also be the responsibility of the Contractor to determine and measure the batch quantity of each ingredient, including all water, so that the mix conforms to these specifications and any other requirements shown on the plans.

Trial batches will be made and tested using all of the proposed ingredients prior to placing the concrete, and when the aggregate and/or brand of cement or admixture is changed. Trial batches shall be made in the mixer to be used on the job. When transit mix concrete is to be used, the trial designs will be made in a transit mixer representative of the mixers to be used. Batch size shall not be less than 50 percent of the rated mixing capacity of the truck.

Mix designs from previous or concurrent jobs may be used without trial batches if it is shown that no substantial change in any of the proposed ingredients has been made.

The coarse aggregate factor shall not be more than 0.82, except that when the voids in the coarse aggregate exceed 48 percent of the total dry loose volume, the coarse aggregate factor shall not exceed 0.85. The coarse aggregate factor shall not be less than 0.70 for Grades 1, 2 and 3 aggregates.

If the strength required for the class of concrete being produced is not secured with the cement specified in Table 4, the Contractor may use an approved water-reducing or retarding admixture, or he shall furnish aggregates with different characteristics which will produce the required results. Additional cement may be required or permitted as a temporary measure until the redesign is checked.

Water-reducing or retarding agents may be used with all classes of concrete at the option of the Contractor.

Whenwater-reducing or retarding agents are used at the option of the Contractor, reduced dosage of the admixture will be permitted.

Entrained air will be required in accordance with Table 4. The concrete shall be designed to entrain 5 percent air when Grade 2 coarse aggregate is used and 6 percent when Grade 3 coarse aggregate is used. Concrete as placed in the structure shall contain the proper amount as required above with a tolerance of plus or minus 1.5 percentage points. Occasional variations beyond this tolerance will not be cause for rejection. When the quantity of entrained air is found to be above 7 percent with Grade 2 coarse aggregate or above 8 percent for Grade 3 coarse aggregate, additional test beams or cylinders will be made. If these beams or cylinders pass the minimum flexural or compressive requirements, the concrete will not be rejected because of the variation in air content.

7. CONSISTENCY

In cases where the consistency requirements cannot be satisfied without exceeding the maximum allowable amount of water, the Contractor may use, or the Engineer may require,

an approved water reducing or retarding agent, or the Contractor shall furnish additional aggregates or aggregates with different characteristics, which will produce the required results. Additional cement may be required or permitted as a temporary measure until aggregates are changed and designs checked with the different aggregates or admixture.

The consistency of the concrete as placed should allow the completion of all finishing operations without the addition of water to the surface. When field conditions are such that additional moisture is needed for the final concrete surface finishing operation, the required water shall be applied to the surface by fog spray only, and shall be held to a minimum. The concrete shall be workable, cohesive, possess satisfactory finishing qualities, and of the stiffest consistency that can be placed and vibrated into a homogenous mass. Excessive bleeding shall be avoided. Slump requirements will be as specified in Table 3.

TABLE 3
Slump Requirements

Concrete Designation	Desired Slump	Max. Slump
Structural Concrete:		
(1) Thin-Walled Sections (9" or less)	4 inches	5 inches
(2) Slabs, Caps, Columns, Piers, Wall Sections over 9", etc.	3 inches	4 inches
Underwater or Seal Concrete	5 inches	6 inches
Riprap, Curb, Gutter and Other Miscellaneous Concrete	2.5 inches	4 inches

NOTE: No concrete will be permitted with slump in excess of the maximums shown.

8. QUALITY OF CONCRETE

General

The concrete shall be uniform and workable. The cement content, maximum allowable water-cement ratio, the desired and maximum slump and the strength requirements of the various classes of concrete shall conform to the requirements of Table 3 and Table 4 and as required herein.

During the process of the work, the Engineer or his designated representative will cast test cylinders or beams as a check on the compressive or flexural strength of the concrete actually placed. Test cylinders must be picked up by the testing lab within 24 hours.

A test shall be defined as the average of the breaking strength of two cylinders or two beams, as the case may be. Specimens will be tested in accordance with TxDOT Test Methods Tex-418-A or Tex-420-A.

Test beams or cylinders will be required as specified in the contract documents. For small placements on structures such as manholes, inlets, culverts, wingwalls, etc., the Engineer may vary the number of tests to a minimum of one for each 25 cubic yards placed over a several day period.

All test specimens, beams or cylinders, representing tests for removal of forms and/or falsework shall be cured using the same methods, and under the same conditions as the concrete represented.

'Design Strength" beams and cylinders shall be cured in accordance with THD Bulletin C-11.

The Contractor shall provide and maintain curing facilities as described in THD Bulletin C-11 for the purpose of curing test specimens. Provision shall be made to maintain the water in the curing tank at temperatures between 70^0F and 90^0F.

When control of concrete quality is by twenty-eight-day compressive tests, job control will be by seven-day compressive tests which are shown to provide the required twenty-eight-day strength, based on results from trial batches. If the required seven-day strength is not secured with the cement specified in Table 4, changes in the batch design will be made.

TABLE 4

Class of Concrete	Sacks cement per C.Y. (min)	Minimum Compressive Strength (fc) 28-Day (psi)	Min. Beam Strength 7-Day (psi)	Maximum Water-Cement Ratio (gal/sack)	Coarse Aggregate No.
A*	5.0	3000	500***	6.5	2-4-8****
B*	4.5	2500	417	8.0	2-4-8****
C*	6.0	3600	600***	6.0	1-2-4**
D	6.0	3000	500	7.0	2-4
S	6.5	4000	570	5.0	2-4

Classes of Concrete

*Entrained Air (slabs, piers and bent concrete).
**Grade 1 Coarse Aggregate may be used in foundation only (except cased drilled shafts).
***When Type II Cement is used with Class C Concrete, the 7-day beam break requirement will be 550 psi; with Class A Concrete, the minimum 7-day beam break requirement will be 460 psi.
****Permission to use Grade 8 Aggregate must have prior approval of the Engineer.

9. MIXING CONDITIONS

The concrete shall be mixed in quantities required for immediate use. Any concrete which is not in place within the limits outlined in City Standard Specification Section 038000 "Concrete Structures", Article "Placing Concrete-General", shall not be used. Retamping of concrete will not be permitted.

In threatening weather, which may result in conditions that will adversely affect the quality of the concrete to be placed, the Engineer may order postponement of the work. Where work has been started and changes in weather conditions require protective measures, the Contractor shall furnish adequate shelter to protect the concrete against damage from rainfall, or from freezing temperatures. If necessary to continue operations during rainfall, the Contractor shall also provide protective coverings for the material stockpiles. Aggregate stockpiles need be covered only to the extent necessary to control the moisture conditions in the aggregates to adequately control the consistency of the concrete.

10. MIXING AND MIXNG EQUIPMENT

All equipment, tools, and machinery used for hauling materials and performing any part of the work shall be maintained in such condition to insure completion of the work underway without excessive delays for repairs or replacements.

The mixing shall be done in a batch mixer of approved type and size that will produce uniform

distribution of the material throughout the mass. Mixers may be either the revolving drum type or the revolving blade type, and shall be capable of producing concrete meeting the requirements of these specifications.

After all the ingredients are assembled in the drum, the mixing shall continue not less than 1 minute for mixers of one cubic yard or less capacity plus 15 seconds for each additional cubic yard or portion thereof.

The mixer shall operate at the speed and capacity designated by the Mixer Manufacturers Bureau of the Associated General Contractors of America. The mixer shall have a plate affixed showing the manufacturer's recommended operating data.

The absolute volume of the concrete batch shall not exceed the rated capacity of the mixer.

The entire contents of the drum shall be discharged before any materials are placed therein for the succeeding batch.

The first batch of concrete materials placed in the mixer for each placement shall contain an extra quantity of sand, cement and water sufficient to coat the inside surface of the drum.

Upon the cessation of mixing for any considerable length of time, the mixer shall be thoroughly cleaned.

The concrete mixer shall be equipped with an automatic timing device which is put into operation when the skip is raised to its full height and dumping. This device shall lock the discharging mechanism and prevent emptying of the mixer until all the materials have been mixed together for the minimum time required, and it shall ring a bell after the specified time of mixing has elapsed.

The water tank shall be arranged so that the amount of water can be measured accurately, and hen the tank starts to discharge, the inlet supply shall cut off automatically.

Whenever a concrete mixer is not adequate or suitable for the work, it shall be removed from the site upon a written order from the Engineer and a suitable mixer provided by the Contractor.

Pick-up and thro-over blades in the drum of the mixer which are worn down more than 10 percent in depth shall be repaired or replaced with new blades.

Improperly mixed concrete shall not be placed in the structure.

Job mix concrete shall be concrete mixed in an approved batch mixer in accordance with the requirements stated above, adjacent to the structure for which the concrete is being mixed, and moved to the placement site in non-agitating equipment.

11. READY-MIX PLANTS

A. General. It shall be the Contractor's responsibility to furnish concrete meeting all requirement of the governing specification sections, and concrete not meeting the slump, workability and consistency requirements of the governing specification sections shall not be placed in the structure or pavement.

Ready-Mixed Concrete shall be mixed and delivered by means of one of the following approved methods.

(1) Mixed completely in a stationary mixer and transported to the point of delivery in a truck agitator or a truck mixer operating at tuck agitator or tuck mixer agitation speed. (Central-Mix Concrete)

(2) Mixed complete in a tuck mixer and transported to the placement site at mixing and/or agitating speed (Transit-Mix Concrete), subject to the following provisions:

(a) Truck mixers will be permitted to transport concrete to the job site at mixing speed if equipped with double actuated counters which will separate revolutions at mixing speed from total revolutions.

(b) Truck mixers equipped with a single actuated counter counting total revolutions of the drum shall mix the concrete at the plant not less than 50 nor more than 70 revolutions at mixing speed, transport it to the job site at agitating speed and complete the required mixing before placing the concrete.

(3) Mixed completely in a stationery mixer and transported to the job site in approved non-agitating. trucks with special bodies. This method of transporting will be permitted for concrete pavement only.

B. Equipment.

(1) Batching Plant. The batching plant shall be provided with adequate bins for batching all aggregates and materials required by the specifications.

Bulk cement shall be weighed on a scale separate from those used for other materials and in a hopper entirely free and independent of that used for weighing the aggregates.

(2) Mixers and Agitators.

(a) General: Mixers shall be of an approved stationary or truck-type capable of combining the ingredients into a thoroughly mixed and uniform mass.

Facilities shall be provided to permit ready access to the inside of the drum for inspection, cleaning and repair of blades.

Mixers and agitators shall be subject to daily examination for changes in condition due to accumulation of hardened concrete and/or wear of blades, and any hardened concrete shall be removed before the mixer will be permitted to be used. Worn blades shall be repaired or replaced with new in accordance with the manufacturer's design and arrangement for that particular unit when any part or section is worn as much as 10 percent below the original height of the manufacturer's design.

(b) Stationary Mixers: These shall conform to the requirements of Article "Mixing and Mixing Equipment". Truck mixers mounted on a stationary base will not be considered as a stationary mixer.

(c) Truck Mixers: In addition, truck mixers shall comply with the following requirements:

An engine in satisfactory working condition and capable of accurately gauging the desired speed of rotation shall be mounted as an integral part of the mixing unit for the purpose of rotating the drum. Truck mixers equipped with a transmission that will govern the speed of the drum within the specified revolutions per minute (rpm) will not require a separate engine.

All tuck mixers shall be equipped with actuated counters by which the proper number of revolutions of the drum, as specified in Article 11. A. above, may be readily verified. The counters shall be read and recorded at the start of mixing at mixing speeds.

Each until shall have adequate water supply and accurate metering or gauging devices for measuring the amount used.

(d) Agitators: Concrete agitators shall be of the truck type, capable of maintaining a thoroughly mixed and uniform concrete mass and discharging it within the same degree of uniformity specified for mixers. Agitators shall comply with all of the requirements for truck mixers, except for the actual mixing requirements.

C. Operation of Plant and Equipment.

Delivery of ready-mixed concrete shall equal or exceed the rate approved by the Engineer for continuous placement. In all cases, the delivery of concrete to the placement site shall assure compliance with the time limits in the applicable specification for depositing successive batches in any monolithic unit. The Contractor shall satisfy the Engineer that adequate standby trucks are available.

A standard ticket system will be used for recording concrete batching, mixing and delivery date.

Tickets will be delivered to the job inspector.

Loads arriving without ticket and/or in unsatisfactory condition shall not be used.

When a stationary mixer is used for the entire mixing operation, the mixing time for one cubic yard of concrete shall be one minute plus 15 seconds for each additional cubic yard or portion thereof. This mixing time shall start when all cement, aggregates and initial water have entered the drum.

The mixer shall be charged so that some of the mixing water will enter the drum in advance of the cement and aggregate. All of the mixing water shall be in the drum by the end of the first one-fourth of the specified mixing time. Water used to flush down the blades after charging shall be accurately measured and included in the quantity of mixing water. The introduction of the initial mixing water, except blade wash down water and that permitted in this Article, shall be prior to or simultaneous with the charging of the aggregates and cement.

The loading of truck mixers shall not exceed 63 percent of the total volume of the drum. When used as an agitator only, the loading shall not exceed 80 percent of the drum volume.

When Ready-Mix Concrete is used, additional mortar (one sack cement, three parts sand and sufficient water) shall be added to the batch to coat the drum of the mixer or agitator tuck, and this shall be required for every load of Class C concrete only and for the first batch from central mix plants.

A portion of the mixing water, required by the batch design to produce the desired slump, may be withheld and added at the job site, but only with permission of the Engineer and under his supervision. When water is added under the above conditions, it shall be thoroughly mixed as specified below for water added at the job site.

Mixing speed shall be attained as soon as all ingredients are in the mixer, and each complete batch (containing all the required ingredients) shall be mixed not less than 70 nor more than 100 revolutions of the drum at mixing speed except that when water is added at the job site, 25 revolutions (minimum) at mixing speed will be required to uniformly disperse the additional water throughout the mix. Mixing speed shall be as designated by the manufacturer.

All revolutions after the prescribed mixing time shall be at agitating speed. The agitating speed shall be not less than one (1) nor more than five (5) rpm. The drum shall be kept in continuous motion from the time mixing is started until the discharge is completed.

12. PLACING, CURING AND FINISHING

The placing of concrete, including construction of forms and falsework, curing and finishing, shall be in accordance with City Standard Specification Section 038000 "Concrete Structures".

13. MEASUREMENT AND PAYMENT

Unless otherwise specified on the Bid Form, the quantities of concrete of the various classifications which will constitute the completed and accepted structure(s) in-place will be measured by the cubic yard, per each, square foot, square yard or linear foot, as the case may be. Measurement will be as shown on the drawings and/or in the Bid Form.

Payment shall be full compensation for furnishing, hauling, mixing, placing, curing and finishing all concrete; all grouting and pointing; furnishing and placing drains; furnishing and placing metal flashing strips; furnishing and placing expansion joint material required by this specification or shown on the plans; and for all forms and falsework, labor, tools, equipment and incidentals necessary to complete the work.

SECTION 032020
REINFORCING STEEL

1. DESCRIPTION

This specification shall govern the furnishing and placing of reinforcing steel, deformed and smooth, of the size and quantity designated on the plans and in accordance with these specifications.

2. MATERIALS

Unless otherwise designated on the plans, all bar reinforcement shall be deformed, and shall conform to ASTM Designation: A 615, Grades 60 or 75, and shall be open hearth, basic oxygen, or electric furnace new billet steel.

Large diameter new billet steel (Nos. 14 and 18), Grade 75, will be permitted for straight bars only.

Where bending of bar sizes No. 14 or No. 18 of Grade 60 is required, bend testing shall be performed on representative specimens as described for smaller bars in the applicable ASTM Specification. The required bend shall be 90 degrees around a pin having a diameter of 10 times the nominal diameter of the bar.

Spiral reinforcement shall be smooth (not deformed) bars or wire of the minimum diameter shown on the plans, and shall be made by one or more of the following processes: open hearth, basic oxygen, or electric furnace. Bars shall be rolled from billets reduced from ingots and shall comply with ASTM Designation: A 306, Grade 65 minimum (references to ASTM Designation: A 29 is voided). Dimensional tolerances shall be in accordance with ASTM Designation: A 615, or ASTM DesiB1ation: A 615, Grade 60, except for deformations. Wire shall be cold-drawn from rods that have been hot-rolled from billets and shall comply with ASTM Designation: A 185.

In cases where the provisions of this specification are in conflict with the provisions of the ASTM Designation to which reference is made, the provisions of this specification shall govern.

Report of chemical analysis showing the percentages of carbon, manganese, phosphorus and sulphur will be required for all reinforcing steel when it is to be welded.

The nominal size and area and the theoretical weight of reinforcing steel bars covered by this specification are as follows:

Bar Size Number	Nominal Diameter, In.	Nominal Area, Sq. In.	Weight per Linear Foot, Pounds
2	0.250	0.050	0.167
3	0.375	0.110	0.376
4	0.500	0.200	0.668
5	0.625	0.310	1.043
6	0.750	0.440	1.502
7	0.875	0.600	2.044
8	1.000	0.790	2.670
9	1.128	1.000	3.400
10	1.270	1.270	4.303
11	1.410	1.560	5.313
14	1.693	2.250	7.600

Smooth round bars shall be designated by size number through No. 4. Smooth bars larger than No. 4 shall be designated by diameter in inches.

When wire is ordered by gauge numbers, the following relation between gauge number and diameter, in inches, shall apply unless otherwise specified:

Gauge Number	Equivalent Diameter, Inches	Gauge Number	Equivalent Diameter, Inches
0	0.3065	8	0.1620
1	0.2830	9	0.1483
2	0.2625	10	0.1350
3	0.2437	11	0.1205
4	0.2253	12	0.1055
5	0.2070	13	0.0915
6	0.1920	14	0.0800
7	0.1770		

3. BENDING

The reinforcement shall be bent cold, true to the shapes indicated on the plans. Bending shall preferably be done in the shop. Irregularities in bending shall be cause for rejection.

Unless otherwise shown on the plans, the inside diameter of bar bends, in terms of the nominal bar diameter (d), shall be as follows:

Bends of 90 degrees and greater in stirrups, ties and other secondary bars that enclose another bar in the bend:

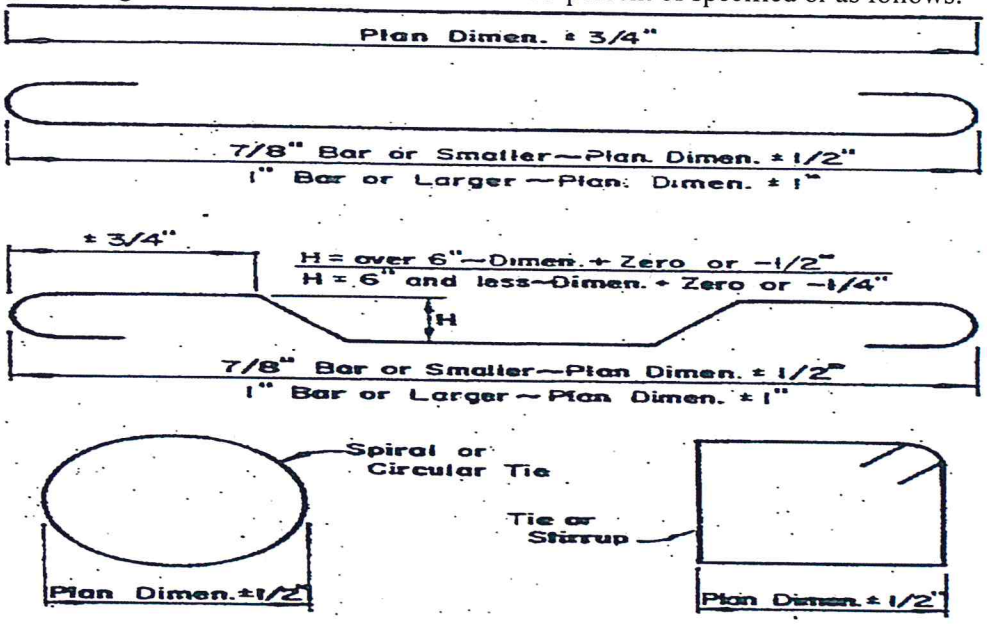
	Grade 60
#3, #4, #5	4d
#6, #7, #8	5d

All bends in main bars and in secondary bars not covered above:

	Grade 60	Grade 75
#3 thru #8	6d	--
#9, #10	8d	--
#11	8d	8d
#14, #18	10d	--

4. TOLERANCES

Fabricating tolerances for bars shall be within 3 percent of specified or as follows:



5. STORING

Steel reinforcement shall be stored above the surface of the ground upon platforms, skids or other supports, and shall be protected as far as practicable from mechanical injury and surface deterioration caused by exposure to conditions producing rust. When placed in the work, reinforcement shall be free from dirt, paint, grease, oil, or other foreiB1 materials. Reinforcement shall be free from injurious defects such as cracks and laminations. Rust, surface seams, surface irregularities or mill scale will not be cause for rejection, provided the minimum dimensions, cross sectional area and tensile properties of a hand wire crushed specimen meets the physical requirements for size and grade of steel specified.

6. SPLICES

No splicing of bars, except when provided on the plans or specified herein, will be permitted without written approval of the Engineer.

Splices will not be permitted in main reinforcement at points of maximum stress. When permitted in main bars, splices in adjacent bars shall be staggered a minimum of two splice lengths.

TABLE 1
Minimum Lap Requirements

Lap		Uncoated	Coated
Lap in inches	≥	40d	60d

Where: d = bar diameter in inches

Welding of reinforcing bars may be used only where shown on the plans or as permitted herein. All welding operations, processes, equipment, materials, workmanship and inspection shall conform to the requirements of the drawings and industry standards. All splices shall be of such dimension and character as to develop the full strength of bar being spliced.

End preparation for butt welding reinforcing bars shall be done in the field. Delivered bars shall be of sufficient length to permit this practice.

For box culvert extensions with less than one foot of fill, the existing longitudinal bars shall have a 20-diameter lap with the new bars. For box culvert extensions with more than one foot of fill, a minimum of 6 inches lap will be required.

Unless otherwise shown on the plans, dowel bars transferring tensile stresses shall have a minimum embedment equal to the minimum lap requirements shown in Table 1. Shear transfer dowels shall have a minimum embedment of 12 inches.

7. PLACING

Reinforcement shall be placed as near as possible in the position shown on the plans. Unless otherwise shown on the plans, dimensions shown for reinforcement are to the centers of the bars. In the plane of the steel parallel to the nearest surface of concrete, bars shall not vary from plan placement by more than one-twelfth of the spacing between bars. In the plane of the steel perpendicular to the nearest surface of concrete, bars shall not vary from plan placement by more than one-quarter inch. Cover of concrete to the nearest surface of steel shall meet the above requirements but shall never be less than one inch or as otherwise shown on the plans.

Vertical stirrups shall always pass around the main tension members and be attached securely thereto. The reinforcing steel shall be spaced its required distance from the form surface by means of approved galvanized metal spacers, metal spacers with plastic coated tips, stainless steel spacers, plastic spacers, or approved pre-cast mortar or concrete blocks. For approval of plastic spacers on the project, representative samples of the plastic shall show no visible indications of deterioration after immersion in a 5 percent solution of sodium hydroxide for 120 hours.

All reinforcing steel shall be tied at all intersections, except that where spacing is less than one foot in each direction, alternate intersections only need be tied.

Before any concrete is placed, all mortar shall be cleaned from the reinforcement. Precast mortar or concrete blocks to be used for holding steel in position adjacent to formed surfaces shall be cast in molds meeting the approval of the Engineer and shall be cured by covering with wet burlap or cotton

mats for a period of 72 hours.

The blocks shall be cast in the form of a frustum of a cone or pyramid with the smaller face placed against the forms.

A suitable tie wire shall be provided in each block, to be used for anchoring to the steel. Except in unusual cases, and when specifically otherwise authorized by the Engineer, the size of the surface to be placed adjacent to the forms shall not exceed two and one-half inches square or the equivalent thereof in cases where circular or rectangular areas are provided. Blocks shall be cast accurately to the thickness required, and the surface to be placed adjacent to the forms shall be a true plane free of surface imperfections.

Reinforcement shall be supported and tied in such manner that a sufficiently rigid case of steel is provided. If the cage is not adequately supported to resist settlement or floating upward of the steel, overturning of truss bars or movement in any direction during concrete placement, permission to continue concrete placement will be withheld until corrective measures are taken. Sufficient measurements shall be made during concrete placement to insure compliance with the first paragraph of Article 7 of this specification.

Mats of wire fabric shall overlap each other sufficiently to maintain a uniform strength and shall be fastened securely at the ends and edges.

No concrete shall be deposited until the Engineer has inspected the placement of the reinforcing steel and given permission to proceed.

8. MEASUREMENT AND PAYMENT

Unless otherwise specified on the Bid Form, reinforcing steel is considered subsidiary to the various items shown in the Bid Form and shall not be measured and paid for as a separate item.

SECTION 038000
CONCRETE STRUCTURES

1. DESCRIPTION

This specification shall govern for construction of all types of structures involving the use of structural concrete, except where the requirements are waived or revised by other governing specifications.

All concrete structures shall be constructed in accordance with the design requirements and details shown on the plans; in conformity with the pertinent provisions of the items contracted for; the incidental specifications referred to; and in conformity with the requirements herein.

2. MATERIALS

(1) Concrete. All concrete shall conform to the provisions of City Standard Specification Section 030020 "Portland Cement Concrete".

The class of concrete for each type of structure or unit shall be as specified on the plans or by pertinent governing specifications.

(2) Expansion Joint Material.

(a) Preformed Fiber Material. Preformed fiber expansion joint material shall be of the dimensions shown on the plans. The material shall be one of the following types, unless otherwise noted on the plans:

1. Preformed Bituminous Fiber Materials shall meet the requirements of ASTM Designation: DI 751 "Standard Specification for Preformed Expansion Joint Filler for Concrete Paving and Structural Construction (Non-extruding and Resilient Bituminous Types)".

2. Preformed Non-Bituminous Fiber Material shall meet the requirements ofASTM Designation: DI 751 "Standard Specification for Preformed Expansion Joint Filler for Concrete Paving and Structural Construction (Non-extruding and Resilient Bituminous Types) ", except that the requirements pertaining to bitumen content, density and water absorption shall be voided.

3. Redwood.

(b) Joint Sealing Materials. Unless otherwise shown on the drawings, joint sealing material shall conform to the following requirements. The material shall adhere to the sides of the concrete joint or crack and shall form an effective seal against infiltration of water and incompressibles. The material shall not crack or break when exposed to low temperatures.

1. Class I-a. (Two-Component, Synthetic Polymer, Cold-Extruded Type). Curing is to be by polymerization and not by evaporation of solvent or fluxing of harder particles. This type is specifically designed for vertical or sloping joints and hence not self-leveling. It shall cure sufficiently at an average temperature of 77 degrees F ± 3 degrees F in a maximum of 24 hours. For performance requirements see under 2.(2)(b)2. below.

2. Class I-b. (Two-Component, Synthetic Polymer, Cold-Pourable, Self-Leveling Type). Curing is to be by polymerization and not by evaporation of solvent or fluxing of harder particles. It shall cure sufficiently at an average temperature of 77 degrees F ± 3 degrees F in a maximum of 3 hours.

Performance Requirements: Class I-a and Class I-b joint materials, when tested in accordance with TxDOT Test Method Tex-525-C, shall meet the above curing times and the following requirements:

It shall be of such consistency that it can be mixed and poured, or mixed and extruded into joints at temperatures above 60 degrees F.

Penetration, 77° F . :	
150 gm. cone, 5 sec., max, cm	0.90
Bond and Extension 75%, O° F, 5 cycles:	
Dry Concrete Blocks	Pass
Wet Concrete Blocks	Pass
Steel Blocks...(Primed if specified by manuf.).	Pass
Flow at 200° F	None
Water Content % by weight, max	5.0
Resilience:	
Original sample min. % (cured)	50
Oven aged at 158° F min. %	50
For Class 2-a Material Only:	
Cold Flow (10 min.)	None

(c) Asphalt Board. Asphalt Board shall consist of two liners of 0.016-inch asphalt impregnated paper, filled with a mastic mixture of asphalt and vegetable fiber and/or mineral filler. Boards shall be smooth, flat and sufficiently rigid to permit installation.

When tested in accordance with TxDOT Test Method Tex-524-C, the asphalt board shall not deflect from the horizontal more than one inch in three and one-half inches (1 " in 3 h').

(d) Rebonded Neoprene Filler. Rebonded neoprene filler shall consist of ground closed-cell neoprene particles, rebonded and molded into sheets of uniform thickness, of the dimensions shown on plans.

Filler material shall have the following physical properties and shall meet the requirements of ASTM Designation: D 1752 "Standard Specification for Preformed Sponge Rubber and Cork Expansion Joint Fillers for Concrete Paving and Structural Construction", Type 1, where applicable:

PROPERTY	METHOD	REQUIREMENT
Color	ASTM DI 752,Type 1	Black
Density	ASTM D1752, Type 1	40 lb./ft^3 Min.
Recovery	ASTM DI 752,Type 1	90%Min.
Compression	ASTM D1752,Type 1	50 to 500 psi
Extrusion	ASTM DI 752, Type 1	0.25 inch Max.
Tensile Strength	ASTM D1752, Type 1	20 psi Min.
Elongation		75% Min.

The manufacturers shall furnish the Engineer with certified test results as to compliance with the above requirements and a 12 inch x 12 inch x 1 inch sample from the shipment for approval.

(3) Curing Materials.

(a) Membrane curing materials shall comply with ASTM Designation: C 309 "Standard Specification for Liquid Membrane-Forming Compounds for Curing Concrete", Type 1 clear or translucent, or Type 2 white-pigmented. The material shall have a minimum flash-point of 80 degrees F when tested by the "Pensky-Martin Closed Cup Method".

It shall be of such consistency that it can be satisfactorily applied as a fine mist through an atomizing nozzle by means of approved pressure spraying equipment at atmospheric temperatures above 40 degrees F.

It shall be of such nature that it will not produce permanent discoloration of concrete surfaces nor react deleteriously with the concrete or its components. Type 1 compound shall contain a fugitive dye that will be distinctly visible not less than 4 hours nor more than 7 days after application. The compound shall produce a firm, continuous, uniform moisture impermeable film free from pinholes and shall adhere satisfactorily to the surfaces of damp concrete. It shall, when applied to the damp concrete surface at the rate of coverage specified herein, be dry to the touch in not more than 4 hours, and shall adhere in a tenacious film without running off or appreciable sagging. It shall not disintegrate, check, peel or crack during the required curing period.

The compound shall not peel or pick up under traffic and shall disappear from the surface of the concrete by gradual disintegration.

The compound shall be delivered to the job only in the manufacturer's original containers, which shall be clearly labeled with the manufacturer's name, the trade name of the material, and a batch number or symbol with which test samples may be correlated.

The water retention test shall be in accordance with TxDOT Test Method Tex-219-F. Percentage loss shall be defined as the water lost after the application of the curing material was applied. The permissible percentage moisture loss (at the rate of coverage specified herein) shall not exceed the following:

24 hours after application.....2 percent
72 hours after application.....4 percent

Type 1 (Resin Base Only) curing compound will be permitted for slab concrete in bridge decks and top slabs of direct traffic culverts.

(b) Mat curing of concrete is allowed where permitted by Table 1 in this specification or where otherwise approved by the Engineer.

3. EXPANSION JOINTS

Joints and devices to provide for expansion and contraction shall be constructed where and as indicated herein or on the plans.

All open joints and joints to be filled with expansion joint material, shall be constructed using forms adaptable to loosening or early removal. To avoid expansion or contraction damage to the adjacent concrete, these forms shall be loosened as soon as possible after final concrete set to permit free movement without requiring full form removal.

Prior to placing the sealing material, the vertical facing the joint shall be cleaned of all laitance by sandblasting or by mechanical routing. Cracked or spalled edges shall be repaired. The joint shall be blown clean of all foreign material and sealed. Where preformed fiber joint material is used, it shall be anchored to the concrete on one side of the joint by light wire or nails, to prevent the material from falling out. The top one inch (1") of the joint shall be filled with joint sealing material.

Finished joints shall conform to the indicated outline with the concrete sections completely separated by the specified opening or joint material.

Soon after form removal and again where necessary after surface finishing, all projecting concrete shall be removed along exposed edges to secure full effectiveness of the expansion joints.

4. CONSTRUCTION JOINTS

The joint formed by placing plastic concrete in direct contact with concrete that has attained its initial set shall be deemed a construction joint. The term "monolithic placement" shall be interpreted to mean at the manner and sequence of concrete placing shall not create construction joints.

Construction joints shall be of the type and at the locations shown on the plans. Additional joints will not be permitted without written authorization from the Engineer, and when authorized, shall have details equivalent to those shown on the plans for joints in similar locations.

Unless otherwise provided, construction joints shall be square and normal to the forms. Bulkheads shall be provided in the forms for all joints, except when horizontal.

Construction joints requiring the use of joint sealing material shall be as detailed on the plans. The material will be specified on the plans without referenced to joint type.

A concrete placement terminating at a horizontal construction joint shall have the top surface roughened thoroughly as soon as practicable after initial set is attained. The surfaces at bulkheads shall be roughened as soon as the forms are removed.

The hardened concrete surface shall be thoroughly cleaned of all loose material, laitance, dirt or foreign material, and saturated with water so it is moist when placing fresh concrete against it. Forms shall be drawn tight against the placing of the fresh concrete.

5. FORMS

(1) General. Except where otherwise specified, forms may be of either timber or metal.

Forms for round columns exposed to view shall be of steel, except that other materials will be allowed with written permission of the Engineer.

Forming plans shall be submitted to the Engineer for approval as specified. Forms shall be designed for the pressure exerted by a liquid weighing 150 pounds per cubic foot. The rate of placing the concrete shall be taken into consideration in determining the depth of the equivalent liquid. For job fabricated forms, an additional live load of 50 pounds per square foot shall be allowed on horizontal surfaces. The maximum unit stresses shall not exceed 125 percent of the allowable stresses used by the Texas Department of Transportation for the design of structures.

Commercially produced structural units used in formwork shall not exceed the manufacturer's maximum allowable working load for moment, shear or end reaction. The maximum working load shall include a live load of 35 pounds per square foot of horizontal form surface, and sufficient details and data shall be submitted for use in checking formwork details for approval.

Forms shall be practically mortar-tight, rigidly braced and strong enough to prevent bulging between supports, and maintained to the proper line and grade during concrete placement. Forms shall be maintained in a manner that will prevent warping and shrinkage.

Offset at form joints shall not exceed one-sixteenth of an inch (1/16").

Deflections due to cast-in-place slab concrete and railing shown in the dead load deflection diagram shall be taken into account in the setting of slab forms.

All forms and footing areas shall be cleaned of any extraneous matter before placing concrete.

Permission to place concrete will not be given until all such work is completed to the satisfaction of the Engineer.

If, at any stage of the work, the forms show signs of bulging or sagging, the portion of the concrete causing such condition shall be removed immediately, if necessary, and the forms shall be reset and securely braced against further movement.

(2) Timber Forms. Lumber for forms shall be properly seasoned, of good quality, and free from imperfections which would affect its strength or impair the finished surface of the concrete. The lumber used for facing or sheathing shall be finished on at least one side and two edges and shall be sized to uniform thickness.

Form lining will be required for all formed surfaces, except for the inside of culvert barrels, inlets and manholes; surfaces that are subsequently covered by backfill material or are completely enclosed; and, any surface formed by a single finished board. Lining will not be required when plywood forms are used.

Form lining shall be of an approved type such as Masonite or plywood. Thin membrane sheeting, such as polyethylene sheets, shall not be used for form lining.

Forms may be constructed of plywood not less than one-half inch in thickness, with no form lining required. The grain of the face plies on plywood forms shall be placed parallel to the span between the supporting studs or joists.

Plywood used for forming surfaces that remain exposed shall be equal to that specified as B-B Plyform Class I or Class Il Exterior, of the U. S. Department of Commerce, National Bureau of Standards and Technology, latest edition.

Forms or form lumber to be reused shall be maintained clean and in good condition. Any lumber which is split, warped, bulged, marred, or has defects that will produce inferior work, shall not be used and, if condemned, shall be promptly removed from the work.

Studs and joists shall be spaced so that the facing form material remains in true alignment under the imposed loads.

Wales shall be spaced close enough to hold forms securely to the designated lines and scabbed at least 4 feet on each side of joints to provide continuity. A row of wales shall be placed near the bottom of each placement.

Facing material shall be placed with parallel and square joints and securely fastened to supporting studs.

Forms for surfaces receiving only an ordinary finish and exposed to view shall be placed with the form panels symmetrical, i.e., long dimensions set in the same direction. Horizontal joints shall be continuous.

Molding specified for chamfer strips or other uses shall be made of materials of a grade that will not split when nailed and which can be maintained to a true line without warping. Wood molding shall be mill cut and dressed on all faces. Unless otherwise provided, forms shall be filleted at all sharp corners and edges with triangular chamfer strips measuring three-quarter inch (3/4") on the sides.

Forms for railing and ornamental work shall be constructed to standards equivalent to first-class millwork. All moldings, panel work and bevel strips shall be straight and true with nearly mitered joints designed so the finished work is true, sharp and clean cut.

All forms shall be constructed to permit their removal without marring or damaging the concrete. The forms may be given a slight draft to permit ease of removal.

Metal form ties of an approved type or a satisfactory substitute shall be used to hold forms in place and shall be of a type that permits ease of removal of the metal as hereinafter specified.

All metal appliances used inside of forms for alignment purposes shall be removed to a depth of at least one-half inch (1/2") from the concrete surface. They shall be made so the metal may be removed without undue chipping or spalling, and when removed, shall leave a smooth opening in the concrete surface. Burning off of rods, bolts or ties will not be permitted.

Any wire ties used shall be cut back at least one-half inch (1/2") from the face of the concrete.

Devices holding metal ties in place shall be capable of developing the strength of the tie and adjustable to allow for proper alignment.

Metal and wooden spreaders which are separate from the forms shall be removed entirely as the concrete is being placed.

Adequate clean-out openings shall be proved for narrow walls and other locations where access to the bottom of the forms is not readily attainable.

Prior to placing concrete, the facing of all forms shall be treated with oil or other bond breaking coating of such composition that it will not discolor or otherwise injuriously affect the concrete surface. Care shall be exercised to prevent coating of the reinforcing steel.

(3) Metal Forms. The foregoing requirements for timber forms regarding design, mortar-tightness, filleted corners, beveled projections, bracing, alignment, removal, reuse and wetting shall also apply to metal forms, except that these will not require lining, unless specifically noted on the plans.

The thickness of form metal shall be as required to maintain the true shape without warping or bulging. All bolt and rivet heads on the facing sides shall be countersunk. Clamps, pins or other connecting devices shall be designed to hold the forms rigidly together and to allow removal without injury to the concrete. Metal forms which do not present a smooth surface or line up properly shall not be used. Metal shall be kept free from rust, grease or other foreign materials.

6. PLACING REINFORCEMENT

Reinforcement in concrete structures shall be placed carefully and accurately and rigidly supported as provided in the City Standard Specification Section 032020 "Reinforcing Steel". Reinforcing steel supports shall not be welded to I-beams or girders.

7. PLACING CONCRETE-GENERAL

The minimum temperature of all concrete at the time of placement shall be not less than 50 degrees F.

The consistency of the concrete as placed should allow the completion of all finishing operations without the addition of water to the surface. When conditions are such that additional moisture is needed for finishing, the required water shall be applied to the surface by fog spray only, and shall be held to a minimum amount. Fog spray for this purpose maybe applied with hand operated fogging equipment.

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**	**Maximum Time**
Non-Agitated Concrete:	
Above 80 degrees F	15 minutes
Up to 80 degrees F	30 minutes
Agitated Concrete:	
Above 90 degrees F	45 minutes
75 degrees F to 90 degrees F	60 minutes
35 degrees F to 74 degrees F	90 minutes

The use of an approved retarding agent in the concrete will permit the extension of each of the above temperature-time maximums by 30 minutes for direct traffic culverts, and one hour for all other concrete except that the maximum time shall not exceed 30 minutes for non-agitated concrete.

Before starting work, the Contractor shall inform the Engineer fully of the construction methods he proposes to use, the adequacy of which shall be subject to the approval of the Engineer.

The Contractor shall give the Engineer sufficient advance notice before placing concrete in any unit of the structure to permit the inspection of forms, reinforcing steel placement, and other preparations. Concrete shall not be placed in any unit prior to the completion of formwork and placement of reinforcement therein.

Concrete mixing, placing and finishing shall be done during daylight hours, unless adequate provisions are made to light the entire site of all operations.

Concrete placement will not be permitted when impending weather conditions will impair the quality of the finished work. If rainfall should occur after placing operations are started, the Contractor shall provide ample covering to protect the work. In case of drop in temperature, the provisions set forth in Article "Placing Concrete in Cold Weather" of this specification shall be applied.

The placing of concrete shall be regulated so the pressures caused by the plastic concrete shall not exceed the loads used in form design.

The method of handling, placing and consolidation of concrete shall minimize segregation and displacement of the reinforcement, and produce a uniformly dense and compact mass. Concrete shall not have a free fall of more than 5 feet, except in the case of thin walls such as in culverts. Any hardened concrete spatter ahead of the plastic concrete shall be removed.

The method and equipment used to transport concrete to the forms shall be capable of maintaining the rate of placement approved by the Engineer. Concrete may be transported by buckets, chutes, buggies, belt conveyors, pumps or other acceptable methods.

When belt conveyors or pumps are used, sampling for testing will be done at the discharge end. Concrete transported by conveyors shall be protected from sun and wind, if necessary, to prevent loss of slump and workability. Pipes through which concrete is pumped shall be shaded and/or wrapped with wet burlap, if necessary, to prevent loss of slump and workability. Concrete shall not be transported through aluminum pipes, tubes or other aluminum equipment.

Chutes, troughs, conveyors or pipes shall be arranged and used so that the concrete ingredients will not be separated. When steep slopes are necessary, the chutes shall be equipped with baffle boards or made in short lengths that reverse the direction of movement, or the chute ends shall terminate in vertical downspouts. Open troughs and chutes shall extend, if necessary, down inside the forms or through holes left in them. All transporting equipment shall be kept clean and free from hardened concrete coatings. Water used for cleaning shall be discharged clear of the concrete.

Each part of the forms shall be filled by depositing concrete as near its final position as possible. The coarse aggregate shall be worked back from the face and the concrete forced under and around the reinforcement bars without displacing them. Depositing large quantities at one point and running or working it along the forms will not be allowed.

Concrete shall be deposited in the forms in layers of suitable depth but not more than 36 inches in thickness, unless otherwise directed by the Engineer.

The sequence of successive layers or adjacent portions of concrete shall be such that they can be vibrated into a homogenous mass with the previously placed concrete without a cold joint. Not more than one hour shall elapse between adjacent or successive placements of concrete. Unauthorized construction joints shall be avoided by placing all concrete between the authorized joints in one continuous operation.

An approved retarding agent shall be used to control stress cracks and/or unauthorized cold joints in mass placements where differential settlement and/or setting time may induce stress cracking.

Openings in forms shall be provided, if needed, for the removal of laitance of foreign matter of any kind.

All forms shall be wetted thoroughly before the concrete is placed therein.

All concrete shall be well consolidated and the mortar flushed to the form surfaces by continuous working with immersion type vibrators. Vibrators which operate by attachment to forms or reinforcement will not be permitted, except on steel forms. At least one stand-by vibrator shall be provided for emergency use in addition to those required for placement.

The concrete shall be vibrated immediately after deposit. Prior to the beginning of work, a systematic spacing of the points of vibration shall be established to insure complete consolidation and thorough working of the concrete around the reinforcement, embedded fixtures, and into the corners and angles of the forms.

Immersion type vibrators shall be inserted vertically, at points 18 to 30 inches apart, and slowly withdrawn. The vibrator may be inserted in a sloping or horizontal position in shallow slabs. The entire depth of each lift shall be vibrated, allowing the vibrator to penetrate several inches into the preceding lift. Concrete along construction joints shall be thoroughly consolidated by operating the vibrator along and close to but not against the joint surface, The vibration shall continue until thorough consolidation, and complete embedment of reinforcement and fixtures is produced, but not long enough to cause segregation. Vibration maybe supplemented by hand spading or rodding, if necessary, to insure the flushing of mortar to the surface of all forms.

Slab concrete shall be mixed in a plant located off the structure. Carting or wheeling concrete batches over completed slabs will not be permitted until they have aged at least four (4) full curing days. If carts are used, timber planking will be required for the remainder of the curing period. Carts shall be equipped with pneumatic tires. Curing operations shall not be interrupted for the purpose of wheeling concrete over finished slabs.

After concrete has attained its initial set, at least one (1) curing day shall elapse before placing strain on projecting reinforcement to prevent damage to the concrete.

The storing of reinforcing or structural steel on completed roadway slabs generally shall be avoided and, when permitted, shall be limited to quantities and distribution that will not induce excessive stresses.

8. PLACING CONCRETE IN COLD WEATHER

(1) Cast-in-Place Concrete. Concrete maybe placed when the atmospheric temperature is not less than 35 degrees F. Concrete shall not be placed in contact with any material coated with frost or having a temperature less than 32 degrees F.

Aggregates shall be free from ice, frost and frozen lumps. When required, in order to produce the minimum specified concrete temperature, the aggregate and/or the water shall be heated uniformly, in accordance with the following:

> The water temperature shall not exceed 180 degrees F, and/or the aggregate temperature shall not exceed 150 degrees F. The heating apparatus shall heat the mass of aggregate uniformly. The temperature of the mixture of aggregates and water shall be between 50 degrees F and 85 degrees F before introduction of the cement.
>
> All concrete shall be effectively protected as follows:

(a) The temperature of slab concrete of all unformed surfaces shall be maintained at 50 degrees F or above for a period of 72 hours from time of placement and above 40 degrees F for an additional 72 hours.

(b) The temperature at the surface of all concrete in piers, culverts walls, retaining walls, parapets, wingwalls, bottoms of slabs, and other similar formed concrete shall be maintained at 40 degrees F or above for a period of 72 hours from time of placement.

(c) The temperature of all concrete, including the bottom slabs of culverts placed on or in the ground, shall be maintained above 32 degrees F for a period of 72 hours from time of placement.

Protection shall consist of providing additional covering, insulated forms or other means, and if necessary, supplementing such covering with artificial heating. Curing as specified under Article "Curing Concrete" of this specification shall be provided during this period until all requirements for curing have been satisfied.

When impending weather conditions indicate the possibility of the need for such temperature protection, all necessary heating and covering material shall be on hand ready for use before permission is granted to begin placement.

Sufficient extra test specimens will be made and cured with the placement to ascertain the condition of the concrete as placed, prior to form removal and acceptance.

(2) Precast Concrete. A fabricating plant for precast products which has adequate protection from cold weather in the form of permanent or portable framework and covering, which protects the concrete when placed in the forms, and is equipped with approved steam curing facilities, may place concrete under any low temperature conditions provided:

(a) The framework and covering are placed and heat is provided for the concrete and the forms within one hour after the concrete is placed. This shall not be construed to be one hour after the last concrete is placed, but that no concrete shall remain unprotected longer than one hour.

(b) Steam heat shall keep the air surrounding the concrete between 50 degrees F and 85 degrees F for a minimum of three hours prior to beginning the temperature rise which is required for steam curing.

(c) For fabricating plants without the above facilities and for job site precast products, the requirements of the Article "Curing Concrete" of this specification shall apply.

The Contractor is responsible for the protection of concrete placed under any and all weather conditions. Permission given by the Engineer for placing concrete during freezing weather will in no way relieve the Contractor of the responsibility for producing concrete equal in quality to that placed under normal conditions. Should concrete placed under such conditions prove unsatisfactory, it shall be removed and replaced at no additional cost.

9. PLACING CONCRETE IN WATER

Concrete shall be deposited in water only when specified on the plans or with written permission by the Engineer. The forms or cofferdams shall be sufficiently tight to prevent any water current passing through the space in which the concrete is being deposited. Pumping will not be permitted during the concrete placing, nor until it has set for at least 36 hours.

The concrete shall be placed with a tremie, closed bottom-dump bucket, or other approved method, and shall not be permitted to fall freely through the water nor shall it be disturbed after it has been placed. The concrete surface shall be kept approximately level during placement.

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.

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.

The placing operations shall be continuous until the work is complete.

10. PLACING CONCRETE BOX CULVERTS

In general, construction joints will be permitted only where shown on the plans.

Where the top slab and walls are placed monolithically in culverts more than 4 feet in clear height, an interval of not less than one (1) nor more than two (2) hours shall elapse before placing the top slab to allow for shrinkage in the wall concrete.

The base slab shall be finished accurately at the proper time to provide a smooth uniform surface. Top slabs which carry direct traffic shall be finished as specified for roadway slabs in Article "Finish of Roadway Slabs". Top slabs of fill type culverts shall be given a reasonably smooth float finish.

11. PLACING CONCRETE IN FOUNDATIONS AND SUBSTRUCTURE

Concrete shall not be placed in footings until the depth and character of the foundation has been inspected by the Engineer and permission has been given to proceed.

Placing of concrete footings upon seal concrete courses will be permitted after the caissons or cofferdams are free from water and the seal concrete course cleaned. Any necessary pumping or bailing during the concreting operation shall be done from a suitable sump located outside the forms.

All temporary wales or braces inside cofferdams or caissons shall be constructed or adjusted as the work proceeds to prevent unauthorized construction joints in footings or shafts.

When footings can be placed in a dry excavation without the use of cofferdams or caissons, forms may be omitted, if desired by the Contractor and approved by the Engineer, and the entire excavation filled with concrete to the elevation of the top of footing; in which case, measurement for payment will be based on the footing dimensions shown on the plans.

12. TREATMENT AND FINISHNG OF HORIZONTAL SURFACES EXCEPT ROADWAY SLABS

All unformed upper surfaces shall be struck off to grade and finished. The use of mortar topping for surfaces under this classification will not be permitted.

After the concrete has been struck off, the surface shall be floated with a suitable float. Sidewalks shall be given a wood float or broom finish, or may be striped with a brush, as specified by the Engineer. Other surfaces shall be wood float finished and striped with a fine brush leaving a fine grained texture.

13. FINISH OF ROADWAY SLABS

As soon as the concrete has been placed and vibrated in a section of sufficient width to permit working, the surface shall be approximately leveled, struck off and screeded, carrying a slight excess of concrete ahead of the screed to insure filling of all low spots.

The screed shall be designed rigid enough to hold true to shape and shall have sufficient adjustments to provide for the required camber. A vibrating screed may be used if heavy enough to prevent undue distortion. The screeds shall be provided with a metal edge.

Longitudinal screeds shall be moved across the concrete with a saw-like motion while their ends rest on headers or templates set true to the roadway grade or on the adjacent finished slab.

The surface of the concrete shall be screeded a sufficient number of times and at such intervals to produce a uniform surface, true to grade and free of voids.

If necessary, the screeded surface shall be worked to smooth finish with a long handled wood or metal float of the proper size, or hand floated from bridges over the slab.

When required by the Engineer, the Contractor shall perform sufficient checks with a long handled 10-foot straightedge on the plastic concrete to insure that the final surface will be within the tolerances specified below. The check shall be made with the straightedge parallel to the centerline. Each pass thereof shall lap half of the preceding pass. All high spots shall be removed and all depressions over one-sixteenth inch (1/16") in depth shall be filled with fresh concrete and floated. The checking and floating shall be continued until the surface is true to grade and free of depressions, high spots, voids or rough spots.

Rail support holes shall be filled with concrete and finished to match the top of the slab.

Surface Texturing.

Perform surface texturing using a either carpet drag or metal tinning as indicated on the drawings. Complete final texturing before the concrete has attained its initial set. Draw the carpet drag longitudinally along the pavement surface with the carpet contact surface area adjusted to provide a satisfactory coarsely textured surface. A metal-tine texture finish is required using a tinning machine unless otherwise shown on the plans. Provide the metal-tine finish immediately after the concrete surface has set enough for consistent tinning. Operate the metal-tine device to obtain grooves spaced at 1 in., approximately 3/16 in. deep, with a minimum depth of 1/8 in., and approximately 1/12 in. wide. Do not overlap a previously tined area. Use manual methods for achieving similar results on ramps and other irregular sections of pavements. Repair damage to the edge of the slab and joints immediately after texturing. Do not tine pavement that will be overlaid.

Upon completion of the floating and/or straight edging and before the disappearance of the moisture sheen, the surface shall be given a broom or burlap drag finish. The grooves of these finishes shall be parallel to the structure centerline.

It is the intent that the average texture depth resulting from the number of tests directed by the Engineer be not less than 0.035 inch with a minimum texture depth of 0.030 inch for any one test when tested in accordance with TxDOT Test Method Tex-436-A. Should the texture depth fall below that intended, the finishing procedures shall be revised to produce the desired texture.

After the concrete has attained its final set, the roadway surface shall be tested with a standard 10foot straightedge. The straightedge shall be placed parallel to the centerline of roadway to bridge any depressions and touch high spots. Ordinates of irregularities measured from the face of the straightedge to the surface of the slab shall not exceed one-eighth of an inch (1/8"), making proper allowances for camber, vertical curvature and surface texture. Occasional variations, not exceeding three-sixteenth of an inch (3/16") will be acceptable, if in the opinion of the Engineer it will not affect the riding qualities.

When directed by the Engineer, irregularities exceeding the above requirements shall be corrected.

In all roadway slab finishing operations, camber for specified vertical curvature and transverse slopes shall be provided.

14. CURING CONCRETE

The Contractor shall inform the Engineer fully of the methods and procedures proposed for curing; shall provide the proper equipment and material in adequate amounts; and shall have the proposed methods, equipment and material approved prior to placing concrete.

Inadequate curing and/or facilities, therefore, shall be cause for the Engineer to stop all construction on the job until remedial action is taken. All concrete shall be cured for a period of four (4) curing days except as noted herein.

EXCEPTIONS TO 4-DAY CURING

Description	Required Curing
Upper Surfaces of Bridge Slabs and	8 curing days (Type I or Ill) cement
Top Slabs of Direct Traffic Culverts	10 curing days (Type Il cement)
Concrete Piling (non-prestressed)	6 curing days

When the air temperature is expected to drop below 35 degrees F, the water curing mats shall be covered with polyethylene sheeting, burlap-polyethylene blankets or other material to provide the protection required by Article "Placing Concrete in Cold Weather" of these specifications.

A curing day is defined as a calendar day when the temperature, taken in the shade away from artificial heat, is above 50 degrees F for at least 19 hours (colder days if satisfactory provisions are made to maintain the temperature of all surfaces of the concrete above 40 degrees F for the entire 24 hours). The required curing period shall begin when all concrete therein has attained its initial set.

The following methods are permitted for curing concrete subject to the restrictions of Table I and the following requirements for each method of curing.

(1) Form Curing. When forms are left in contact with the concrete, other curing methods will not be required except for cold weather protection.

(2) Water Curing. All exposed surfaces of the concrete shall be kept wet continuously for the required curing time. The water used for curing shall meet the requirements for concrete mixing water as specified in the specification Section 030020 "Portland Cement Concrete". Seawater will not be permitted. Water which stains or leaves an unsightly residue shall not be used.

(a) Wet Mat. Cotton mats shall be used for this curing method. They shall be placed as soon as possible after the surface has sufficiently hardened to prevent damage to the concrete. (See Article, "Placing Concrete" of this specification.) Damp burlap blankets made from nine-ounce stock may be placed on the damp concrete surface for temporary protection prior to the application of the cotton mats which may be placed dry and wetted down after placement.

The mats shall be weighted down adequately to provide continuous contact with all concrete surfaces where possible. The surfaces of the concrete shall be kept wet for the required curing time. Surfaces which cannot be cured by contact shall be enclosed with mats and 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. This curing method shall consist of overlapping sprays or sprinklers that keep all unformed surfaces continuously wet.

(c) Ponding. This curing method requires the covering of the surfaces with a minimum of two inches (2") of clean granular material, kept wet at all times, or a minimum of one-inch (1") depth of water. Satisfactory provisions shall be made to provide a dam to retain the water or saturated granular material.

(3) Membrane Curing. This consists of curing concrete pavement, concrete pavement (base), curbs, gutters, retards, sidewalks, driveways, medians, islands, concrete riprap, cement-stabilized riprap, concrete structures and other concrete as indicated on the plans by impervious membrane method.

Unless otherwise provided herein or shown on the plans, either Type I-D or Type 2 membrane curing compound may be used where permitted except that Type I-D (Resin Base Only) will be required for slab concrete in bridge decks and top slabs of direct traffic culverts.

TABLE 1

		REQUIRED		PERMITTED	
	STRUCTURE UNIT DESCRIPTION	WATER FOR CURING	MEMBRANE FOR INTERIM CURING	WATER FOR CURING	MEMBRANE FOR INTERIM CURING
1	Top slabs of direct traffic culverts	X	X		
2	Top surface of any concrete unit upon which concrete is to be placed and bonded at a later interval (Stub walls, risers, et.). Other superstructure concrete (wing walls, parapet walls, etc.)	X			

3	Concrete pavement (base), curbs, gutters, retards, sidewalks, driveways, medians, islands, concrete structures, concrete riprap, etc.			X*	X*
4	All substructure concrete, culverts, box sewers. Inlets, manholes, retaining walls			X*	X*

*Polyethylene sheeting, burlap-polyethylene mats or laminated mats to prevent outside air from entering will be considered equivalent to water or membrane curing for items 3 and 4.

Membrane curing shall not be applied to dry surfaces, but shall be applied just after free moisture has disappeared. 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.

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. Unless otherwise noted herein or on the plans, the choice of membrane type shall be at the option of the Contractor. Only one type of curing compound will be permitted on any one structure.

The membrane curing compound shall be applied after the surface finishing has been completed, and immediately after the free surface moisture has disappeared. The surface shall be sealed with a single uniform coating of curing compound applied at the rate of coverage recommended by the manufacturer and directed by the Engineer, but not less than 1 gallon per 180 square feet of area. The Contractor shall provide satisfactory means and facilities to properly control and check the rate of application of the compound.

The compound shall be thoroughly agitated during its use and shall be applied by means of approved mechanical power pressure sprayers. The sprayers used to apply the membrane to concrete pavement or concrete pavement (base) shall travel at uniform speed along the forms and be mechanically driven. The equipment shall be of such design that it will insure uniform and even application of the membrane material. The sprayers shall be equipped with satisfactory atomizing nozzles. Only on small miscellaneous items will the Contractor be permitted to use hand-powered spray equipment. For all spraying equipment, the Contractor shall provide facilities to prevent the loss of the compound between the nozzle and the concrete surface during the spraying operations.

The compounds shall not be applied to a dry surface. If the surface of the concrete has become dry, it shall be moistened prior to application of membrane by fogging or mist application. Sprinkling or coarse spraying will not be allowed.

At locations where the coating shows discontinuities, pinholes or other defects, or if rain falls on the newly-coated surface before the film has dried sufficiently to resist damage, an additional coat of the compound shall be applied immediately at the same rate of coverage specified herein.

To insure proper coverage, the Engineer shall inspect all treated areas after application of the compound for the period of time designated in the governing specification for curing, either for membrane curing or for other methods. Should the foregoing indicate that any area during the curing period is not protected, an additional coat or coats of the compound shall be applied immediately, and the rate of application of the membrane compound shall be increased until all areas are uniformly covered.

When temperatures are such as to warrant protection against freezing, curing by this method shall be supplemented with an approved insulating material capable of protecting the concrete for the specified curing period.

If at any time there is reason to believe that this method of curing is unsatisfactory or is detrimental to the work, the Contractor, when notified, shall immediately cease the use of this method and shall change to curing by one of the other methods specified under this contract.

15. REMOVAL OF FORMS

Except as herein provided, forms for vertical surfaces may be removed when the concrete has aged not less than one day (24 hours) when Type I and Type Il cement is used, and not less than one-half day (12 hours) when Type Ill cement is used, provided it can be done without damage to the concrete.

Forms for inside curb faces may be removed in approximately three hours provided it can be done without damage to the curb.

16. FINISHING EXPOSED SURFACES

Concrete shall be finished as required in the specification Section for the respective item or as otherwise specified on the plans.

An ordinary surface finish shall be applied to all concrete surfaces either as a final finish or preparatory to a higher finish.

Ordinary Surface Finish shall be as follows:

After form removal, all porous or honey-combed areas and spalled areas shall be corrected by chipping away all loose or broken material to sound concrete.

Feather edges shall be eliminated by cutting a face perpendicular to the surface. Shallow cavities shall be repaired using adhesive grout or epoxy grout. If judged repairable by the Engineer, large defective areas shall be corrected using concrete or other material approved by the Engineer.

Holes and spalls caused by removal of metal ties, etc., shall be cleaned and filled with adhesive grout or epoxy grout. Exposed parts of metal chairs on surfaces to be finished by rubbing, shall be chipped out to a depth of one-half inch (1/2") and the surface repaired.

All fins, runs, drips or mortar shall be removed from surfaces which remain exposed. Form marks and chamfer edges shall be smoothed by grinding and/or dry rubbing.

Grease, oil, dirt, curing compound, etc., shall be removed from surfaces requiring a higher grade of finish. Discolorations resulting from spillage or splashing of asphalt, paint or other similar material shall be removed.

Repairs shall be dense, well bonded and properly cured, and when made on surfaces which remain exposed and do not require a higher finish, shall be finished to blend with the surrounding concrete.

17. MEASUREMENT AND PAYMENT

Unless otherwise specified on the Bid Form, no direct measurement or payment will be made for the work to be done or the equipment to be furnished under this specification, but it shall be considered subsidiary to the particular items required by the plans and the contract documents.

SECTION 131000

GALVANIZED STEEL WATER STORAGE TANK

1. SCOPE:

The specifications presented are intended to present a minimum level of quality in procedure which must be equaled or exceeded by installation of an 84,000-gallon hot dip galvanized and or factory powder coated bolted steel water storage tank for which this set of specifications is applicable. The bolted steel tank shall conform to the requirements of A.W.W.A. D103-09 and TCEQ.

2. GENERAL:

The Engineer's selection of galvanized bolted steel tank construction for this facility has been predicated upon the design criteria and construction methods specified. Deviations from the specified design and construction details will not be permitted.

3. SUBMITTALS:

Three (3) copies of the shop drawings covering tank, anchorage, accessories, and appurtenances provided shall be submitted to the Engineer.

Shop Drawings: Submit shop drawings of the bolted steel reservoir and all accessories for review and approval by the engineer prior to beginning any related shop fabrication or erection. Include sufficient data to show that the reservoir and accessories conform to the requirements to theses Specifications.

Submittals shall include:

a. Design calculations signed by a civil or structural engineer registered in the state of Texas.

b. Fabrications and erection drawings and details for the reservoir and all accessories.

c. Certified mill tests on steel plates and structural members demonstrating that the physical and chemical requirements of this specifications have been met.

4. QUALIFICATIONS OF TANK MANUFACTURER:

The tank manufacturer shall be a specialist in the design, fabrication, and erection of factory-

powder coated bolted steel tanks. The manufacturer shall be quality certified, having an active API-Q1 Certification and ISO-9001 Registration. The tank manufacturer must have a minimum of five years' experience in the manufacturing of bolted steel tanks and have in the last two years manufactured at least five tanks of similar size and use.

DESIGN CRITERIA:

The following data and information are supplied as a basis for design and erection of the tank and appurtenances:

Job Site Location:	Kingsville Water well No. 23
1. Product to be stored:	Potable Water
2. Storage Capacity:	84,000 gallons (Nominal)
3. Tank Diameter:	29'-8 1/2" I.D.
4. Tank Height:	16'-1 (minimum)
5. Minimum freeboard:	6" (minimum)
6. Deck Load:	15 PSF
7. Design Standard:	A.W.W.A. D103-09
8. Allowable Soil Bearing:	2500 PSF
9. Wind speed:	130 MPH (when erected)

5. PRODUCTS:

A, Tank Structure: The materials, design, fabrication, and erection of the galvanized bolted steel tank shall conform to AWWA D103-97, to the Principles of Standard Specification 12B of the American Petroleum Institute, Components such as bottom sections, wall sections and roof section shall conform to the dimensional standards for the principles of the Standard Specification 12B of the American Petroleum Institute. Walls are to be composed of standard side sheets having normal dimensions of 5 feet in width and 8 feet in height. Special heights or width may be used with standard API joint details. Tank Wall shall be properly design to resist the maximum anticipated dead and live loads, both when thank is empty and when filled with water, having a specific gravity of 1.0. Bottoms and roofs are to be composed of API standard pie shaped sections. Anchor bolts, if required, are recommended to be set outside of the tank bottom with suitable lugs to be attached to the tank wall.

1. Coating (Inside and Outside):
   A. General: All metal plates, supports, members and miscellaneous parts, except bolts, shall be either Hot Dip Galvanized (Section 10.3) or Factory Powder Coated (Section 10.6) in accordance with A.W.W.A. D103-09, Section 10: Coatings. Field coating, other than touch-up, will not be permitted.

B. Surface Preparation for Factory Powder Coated System:

a. Prior to application of coating, all metal plate, supports, members and miscellaneous parts, other than fasteners shall be thoroughly cleaned by a hot-rinse wash process followed immediately by hot air drying.

b. All steel surfaces shall be sandblasted to equivalent of a SP 6 commercial blast metal finish. The surface anchor pattern shall be no less than 1.5 mils.

c. All steel surfaces shall receive an iron phosphate coating applied with a power spray washer with not less than 25 psi pressure, followed by a warm water rinse and by an acidulated sealant. Then spray a final De-ionized water rinse to prevent rusting prior to the powder coating application.

d. All steel surfaces shall drip dry for seven (7) minutes prior to entering the dry off oven for eight (8) minutes at 425 degrees F.

C. Coating:

a. All interior steel surfaces, support members and miscellaneous parts shall receive 5 mils minimum average dry film thickness using Dupont "Tank Tan" (An NSF 61 Approved, Thermal Set Epoxy Powder Coating).

b. All exterior steel surfaces, support members and miscellaneous parts shall receive 3 mils minimum average dry film thickness using Dupont "Superior Sand" (A Thermal Set TGlC-Polyester Powder Coating).

c. "Factory Powder Coated System". All interior and exterior surfaces including edges are to be "Holiday Free".

2. Steel
   a. Sheet. Steel sheets shall conform to or shall be at least equal to hot-rolled quality per ASTM A570 Grade 33 with a minimum yield strength of 33,000 psi. Minimum thickness shall be 12 gauge (0.0972" minimum).
   b. Plate. Steel plates shall conform to or at least be equal to the requirements of ASTM A36 with a minimum yield strength of 36,000 psi.
   c. Rolled Structural Shapes. Rolled structural shapes shall conform to ASTM A36.
3. Bolts
   a. Galvanized bolts, nuts and washers used in tank joints shall be minimum h inch bolt diameter and shall meet the minimum requirements of API 12B, Appendix A, except that bolt heads and nuts may be other than square at the option of tank manufacturer.

b. Other bolts shall conform to or at least be equal to the latest revision of ASTM A307.

4. Gaskets: All bolted connections shall incorporate EPDM prefabricated gasket minimum width 1-3/4". A single piece double-punched gasket shall be used at vertical seams which require two vertical rows of punching. Field caulking will be allowed when joining a discontinuous gasket section and at certain joint connections. Neoprene backed steel washers shall be provided at all bolts in contact with the stored liquid.

5. Multiple Row Punching: All sheets in the shell of the tank that require multiple vertical row punching (double or triple) must be in single stroke to insure proper alignment.

B. Accepted Manufacturers: The steel tank and accessories furnished under this section shall be as manufactured by Columbian TecTank Company, Kansas City, Kansas, Superior Tank Co. Inc, or an approved equal.

6. APPURTENANCES:

A. The contractor shall furnish and install the appurtenances as shown on the contract drawings and as specified below. Unless otherwise noted, standard appurtenances shall be as follows:

1. Hatch: The tank roof hatch shall have a curbed, upward opening 30" square. The curb shall extend at least four inches above the roof surface. The hatch cover lip shall be hinged and provisions made for locking. The hatch cover lip should extend for a distance of two inches down on the outside of the curb.

2. Inlet and Outlet Connections: Inlet, outlet, and overflow connections shall conform to the sizes and locations specified on the plan sheets. Also provide a 1-inch NPT tank connection for sampling.

3. Vent: A mushroom-screened vent shall be furnished above maximum water level and shall conform to the size specified on the plan sheets. The overflow pipe shall not be considered to be a tank vent. The vent shall be 316 stainless steel 16 x 16 x 0.018 wire and so designed and constructed as to prevent the entrances of birds, animals, or insects.

4. Outside Tank Ladder: An outside galvanized steel welded ladder with safety cage, meeting OSHA specifications, shall be furnished at the location designated on the plans. Latter shall have lockable closure at the bottom.

5. Perimeter Deck Rail: Galvanized handrails & toe board for the deck perimeter shall be furnished on each side of the ladder entry at the location designed on the plans. Handrails and toe board shall meet OSHA requirements.

6. Interior Tank Ladder: An inside OSHA galvanized steel welded ladder with a Safe T-Climb assembly shall be furnished at the location designated on the plans. Contractor shall place Buna N prefabricated gaskets between the ladder and tank wall at all areas in contact with the stored liquid.

7. Level Indicator: A liquid level indicator with Type 316 stainless steel internals and complete with float and target board assembly.

8. Internal Nozzle with Overflow Weir Cone: The internal galvanized nozzle with overflow weir shall conform to the size and location specified on the plan sheets. Overflow pipe assembly shall be coated per project requirements.

9. Shell Manhole: Provide a 30"x46" flush cleanout.

B. Tank Foundation

1. Steel Bottom Tanks: The foundation shall be installed per AWWA D03-87, Section

2. The existing foundation shall be leveled with differential not exceeding V 1/8 inch in any 30-foot circumference under the shell. The levelness on the circumference shall not vary more than Y 1/4 inch from an established plane.

C. Shipping: All plates, supports, members, and miscellaneous parts shall be packaged for shipment in such manner to prevent abrasion or scratching of the tank surface. Erection: Field erection of galvanized bolted steel tanks shall be in strict accordance with the tank manufacturer's recommendations. Particular care shall be exercised in handling and bolting of the tank plates, supports, and members to avoid abrasion or scratching of the tank surface.

F. Testing: Following completion of erection and cleaning of the tank, the tank shall be tested for liquid-tightness in accordance with Technical Specification 151100. Any leaks disclosed by this test shall be corrected by the erection contractor in accordance with the tank manufacturer's recommendations. The Owner shall provide clean water free of charge at the time of erection completion, for hydrostatically testing the tank. Filling and emptying the tank shall be the responsibility of the Contractor. For the Factory Powder Coated System. Prior to placing water in the tank, a "holiday" inspection of the entire tank, corners included, will be provided and performed by the manufacturer in the presence of the owner.

7. WARRANTY:

The tank manufacturer shall warrant the tank against any defects in workmanship and materials for a period of one (1) year from date of shipment. In the event a defect should appear, it shall be reported in writing to the manufacturer during the warranty period.

8. MEASUREMENT AND PAYMENT:

Measurement and payment for this item shall be made by lump sum and shall include but not be limited to foundation, piping, fittings, filling, disinfection, testing, concrete splash blocks, and incidentals required to fully complete the work as intended.

SECTION 151100

DISINFECTION AND HYDRO TESTING

1. DESCRIPTION

The specifications presented in this item are intended to present a minimum level of quality in procedure which must be equaled or exceeded by disinfection and hydro testing for which this set of specifications is applicable.

2. DISINFECTION

All inside surfaces of the tank shall be disinfected in accordance AWWA Std. C652-92, DISINFECTION OF WATER STORAGE FACILITIES, using the No. 2 Method as described in Section 4.2 of Std. C652-92. Generally, this method consists of a spray application of a solution of calcium hypochlorite (HTH) containing approximately 65% available chlorine by weight. The solution of 200 mg/L (1.9 oz./50 gal. water) available chlorine shall be applied directly to all interior surfaces, including those above the high water level.

The surfaces disinfected shall remain in contact with the chlorine solution for at least one (1) hour. These surfaces shall then be thoroughly flushed by hosing down all surfaces with clean potable water.

3. TESTING

A. The Contractor will fill the tank to overflow immediately after completion of the disinfection operations.

B. While the tank is at overflow, the water compartment will be inspected for leaks by the Engineer.

C. If leaks resulting from the Contractor' s work are found, then the tank will be drained and the necessary remedial work will be performed by the Contractor at his own expense. The Contractor will once again disinfect the tank as specified in Section 213-2.

D. After hydro testing and before the tank is placed in service, water from the full tank shall be sampled and tested by the Contractor in accordance with TCEQ requirements. Testing of the water to be paid for by the Contractor.

E. Should the tests fail, then the tank will be drained (by Contractor) and the disinfection procedures as outlined above shall be repeated by the Contractor until acceptable test samples are obtained.

F. Contractor shall dispose of heavily chlorinated water in accordance with AWWA Standards for Disinfection of Water-Storage Facilities.

4. MEASUREMENT AND PAYMENT

No separate measurement and payment will be made for this item but considered subsidiary to those items of which it is a component part.

SECTION 055420
FRAMES, GRATES, RINGS AND COVERS

1. DESCRIPTION

This specification shall govern for the furnishing and installation of frames, grates, rings and covers for inlets, manholes and other structures in accordance with those details. Steel shall conform to the requirements of ASTM Designation: A36 "Standard Specification for Carbon Structural Steel".

2. MATERIALS

Welded steel grates and frames shall conform to the member size, dimensions and details shown on the plans and shall be welded into an assembly in accordance with those details. Steel shall conform to the requirements of ASTM Designation: A36.

Castings, whether Carbon-Steel, Gray Cast Iron or Ductile Iron, shall conform to the shape and dimensions shown on the plans and shall be clean substantial castings, free from burnt-on sand or blow holes, and shall be reasonable smooth. Runners, risers, fins, and other cast-on pieces shall be removed from the castings and such areas ground smooth. 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 contact area. Pairs of machined castings shall be matchmarked to facilitate subsequent identification at installation.

Steel castings shall conform to the requirements of ASTM Designation: A27 "Standard Specification for Steel Castings, Carbon, for General Application". Grade 70-36 shall be furnished unless otherwise specified.

Cast Iron castings shall conform to the requirements of ASTM Designation: A48 "Standard Specification for Gray Iron Castings", Class 30.

Ductile iron castings shall conform to the requirements of ASTM Designation: A536 "Standard Specification for Ductile Iron Castings". Grade 60-40-18 shall be used otherwise specified.

3. CONSTRUCTION METHODS

Frames, grates, rings and covers shall be constructed of the materials as specified and in accordance with the details shown on the plans, and shall be placed carefully to the lines and grades indicated on the plans or as directed by the Engineer.

All welding shall conform to the requirements of the latest American Welding Society Specifications. Frames, grates, rings and covers shall be given one coat of a commercial grade red lead and oil paint and two coats of commercial grade aluminum paint. Painting on gray iron castings will not be required, except when used in conjunction with structural steel shapes. Commercial grade galvanized bolts and nuts shall be used. The zinc coating shall be uniform in thickness, smooth and continuous.

4. MEASUREMENT AND PAYMENT

Unless otherwise specified on the Bid Form, frames, grates, rings and covers will not be measured for payment, but shall be considered subsidiary to other bid items.

DRAWINGS

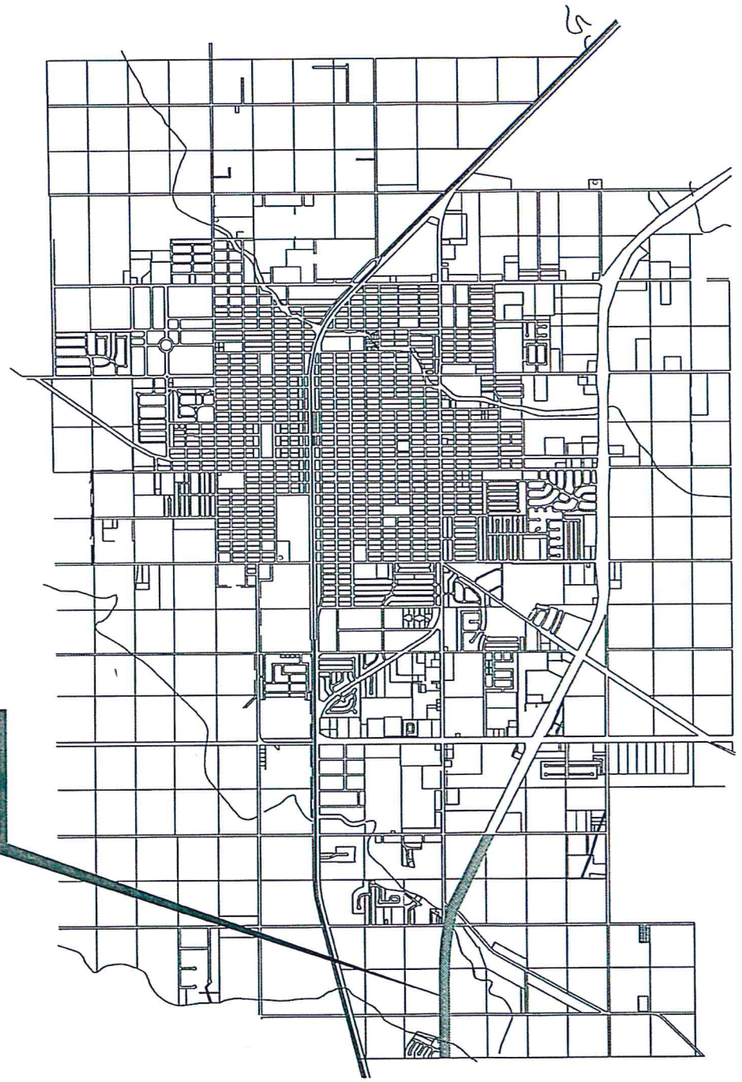
CITY OF KINGSVILLE

2020 US 77 OVERPASS UTILITIES RELOCATION PROJECT

MAYOR
SAM FUGATE

CITY MANAGER
MARK MCLAUGHLIN

CITY COMMISSIONERS
HECTOR M. HINOJOSA
DIANNE LEUBERT
ARTURO PECOS
EDNA LOPEZ



PROJECT LOCATION
US 77 FROM
TRANT RD. TO C.R. 2120

LOCATION MAP
NOT TO SCALE

NOVEMBER 2019

SHEET INDEX

THE SEAL APPEARING ON THIS DOCUMENT WAS AUTHORIZED BY RUTILIO P. MORA JR, P.E. NO. 111588 ON 1–03–20. ALTERATION OF A SEALED DOCUMENT WITHOUT PROPER NOTIFICATION TO THE RESPONSIBLE ENGINEER IS AN OFFENSE UNDER THE TEXAS ENGINEERING PRACTICE ACT.

STATE OF TEXAS
RUTILIO P. MORA JR
111588
LICENSED
PROFESSIONAL ENGINEER

Rutilio P. Mora Jr. 1/3/2020
RUTILIO P. MORA JR, P.E. NO. 111588

CITY OF KINGSVILLE
ENGINEERING DEPARTMENT
400 West King
Kingsville, Texas 78363
Office 361.595.8007
Fax 361.595.8035

Drawn by: J. RAMIREZ
Date: 07/29/2019
Checked by: R. MORA
Job:
Scale: N.T.S.

2019- JANUARY 2020
US 77 OVERPASS UTILITIES RELOCATION
COVER SHEET

SHEET
1

GENERAL CONSTRUCTION NOTES:

1. ALL IMPROVEMENTS TO BE IN ACCORDANCE WITH CITY OF KINGSVILLE CODES.
2. CONTRACTOR TO VERIFY LOCATION AND ELEVATION OF EXISTING FACILITIES PRIOR TO CONSTRUCTION.
3. CONTRACTOR TO PLAN AND PERFORM HIS WORK IN A MANNER THAT WILL PERMIT SAFE PUBLIC TRAFFIC MOVEMENT ON ALL STREETS.
4. TEMPORARY TRAFFIC CONTROL DURING CONSTRUCTION TO BE IN ACCORDANCE WITH SPECIFICATIONS.
5. CONTRACTOR SHALL PROVIDE PROTECTIVE DEVICES SUCH AS SIGNS. LIGHTS. AND SIGNALS FOR THE SAFETY OF THE PUBLIC AND WORKERS, AS REQUIRED, AND AS DIRECTED BY CITY/TXDOT REPRESENTATIVE.
6. CONTRACTOR TO BE RESPONSIBLE FOR PROTECTION AND/OR SAFETY OF THE WORK SITE, WORKERS. SUBCONTRACTORS, MATERIALS AND/OR EQUIPMENT.
7. CONSTRUCTION STAKING SHALL BE PROVIDED BY THE CONTRACTOR AND AT CONTRACTOR'S EXPENSE. BASE LINES ARE STAKED AS SHOWN ON PLANS. ALL DIMENSIONS ARE TO BACK OF CURBS UNLESS SHOWN OTHERWISE.
8. MATERIAL TESTING SHALL BE PROVIDED BY THE CITY OF KINGSVILLE. RE-TEST DUE TO FAILURES TO BE AT CONTRACTOR'S EXPENSE.
9. CONTRACTOR SHALL SUBMIT A TRAFFIC CONTROL PLAN FOR APPROVAL BY THE CITY ENGINEERING OFFICE PRIOR TO CONSTRUCTION. CONTRACTOR MAY CLOSE STREETS TO THRU TRAFFIC IN 1000' INCREMENTS AS LONG AS ACCESS IS MAINTAINED TO ALL RESIDENCES, BUSINESSES. & ADJOINING STREETS. TRAFFIC CONTROL PLAN WILL BE IN ACCORDANCE WITH TXDOT'S B & C SHEETS 1 THRU 12 AND THE TEXAS MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES.
10. CONTRACTOR SHALL BE RESPONSIBLE FOR OBTAINING ALL PERMITS REQUIRED AND AT CONTRACTOR'S EXPENSE.
11. ANY DAMAGE TO EXISTING PAVEMENT, DRAINAGE OR EXISTING STRUCTURES SHALL BE REPAIRED TO PRE-CONSTRUCTION CONDITION AT CONTRACTOR'S EXPENSE.
12. THESE PLANS. PREPARED BY THE CITY OF KINGSVILLE ENGINEERING DEPARTMENT DO NOT EXTEND TO OR INCLUDE DESIGNS OR SYSTEMS PERTAINING TO THE SAFETY OF THE CONSTRUCTION CONTRACTOR OR ITS EMPLOYEES, AGENTS OR REPRESENTATIVES IN THE PERFORMANCE OF THE WORK. THE SEAL OF CITY OF KINGSVILLE'S REGISTERED PROFESSIONAL ENGINEER(S) HEREON DOES NOT EXTEND TO ANY SUCH SAFETY SYSTEMS THAT MAY NOW OR HEREAFTER BE INCORPORATED IN THESE PLANS. THE CONSTRUCTION CONTRACTOR SHALL PREPARE OR OBTAIN THE APPROPRIATE SAFETY SYSTEMS, INCLUDING THE PLANS AND SPECIFICATIONS REQUIRED BY THE HOUSE BILLS 662 AND 665 ENACTED BY THE TEXAS LEGISLATURE IN THE 70TH LEGISLATURE REGULAR SESSION."
13. CONTRACTOR SHALL GIVE NOTICE TO ALL AUTHORIZED INSPECTORS, SUPERINTENDENTS OR PERSONS IN CHARGE OF PRIVATE AND PUBLIC UTILITIES AFFECTED BY HIS OPERATIONS PRIOR TO COMMENCEMENT OF WORK. NOTIFY TEXAS ONE CALL FOR UTILITY LOCATIONS PRIOR TO ANY & ALL EXCAVATIONS. COORDINATION OF ALL RELOCATION OF UTILITY POLES, ETC. TO BE THE RESPONSIBILITY OF THE CONTRACTOR.
14. CONTRACTOR TO COORDINATE WITH THE CITY OF KINGSVILLE ON WORK SCHEDULES, TESTING, GENERAL INSPECTION, AND EXISTING LINES. CONTRACTOR SHALL RECEIVE APPROVAL FROM AUTHORIZED CITY REPRESENTATIVE PRIOR TO BACKFILL OF PROPOSED UTILITIES. ANY UNINSPECTED WORK SHALL BE REEXCAVATED AND BACKFILLED AT CONTRACTOR'S EXPENSE.
15. CONTRACTOR TO EXERCISE CAUTION WHEN WORKING NEAR EXISTING FACILITIES AND/OR UTILITIES. ALL DAMAGE TO BE REPAIRED AT CONTRACTOR'S EXPENSE. ALL COSTS FOR INTERRUPTION OF GAS. ELECTRICAL. COMMUNICATIONS AND/OR WATER SERVICE DUE TO CONTRACTOR'S WORK SHALL BE BORNE BY THE CONTRACTOR.
16. INFORMATION ON EXISTING UTILITIES IS FROM BEST AVAILABLE INFORMATION OF RECORD AND SPOT FIELD LOCATIONS. CONTRACTOR IS RESPONSIBLE FOR FIELD LOCATION OF THESE UNDERGROUND UTILITIES AS REQUIRED AT NO SEPARATE PAY. CITY OF KINGSVILLE PERSONNEL WILL BE AVAILABLE FOR ASSISTANCE AND OPERATION OF VALVES AS REQUIRED. CONTRACTOR TO COORDINATE WITH OTHER UTILITY COMPANIES. INCLUDING AEP ON ELECTRICAL UTILITIES, CENTERPOINT ON GAS UTILITIES AND SOUTHWESTERN BELL ON TELEPHONE UTILITIES.
17. ALL SPOIL MATERIAL AND DEBRIS SHALL BE DISPOSED OF BY CONTRACTOR. FURNISHING AND TRANSPORTATION OF ALL OFFSITE MATERIAL TO BE AT CONTRACTOR'S EXPENSE.
18. UPON COMPLETION OF CONSTRUCTION, CONTRACTOR SHALL RETURN THE SITE TO ORIGINAL CONTOURS UNLESS DIFFERENT FINISHED ELEVATIONS ARE SHOWN ON PLANS. CONTRACTOR TO INSURE NO AREAS OF PONDING ARE PRESENT.
19. CONTRACTOR TO INSURE SAME DAY ACCESS TO SCHOOL, ALL RESIDENCES AND BUSINESSES ADJACENT TO CONSTRUCTION.
20. DEMOLITION, REMOVAL & DISPOSAL OF ALL EXCESS CONCRETE. CURBS, RUBBLE, ETC. TO BE AT CONTRACTOR'S EXPENSE.
21. CONCRETE NOTES:
    a. ALL CONCRETE WORK TO BE FORMED. UNLESS OTHERWISE APPROVED.
    b. ALL CONCRETE TO BE 3000 PSI MINIMUM AT 28 DAYS, UNLESS OTHERWISE SHOWN. STRENGTH TO BE DETERMINED BY CYLINDER BREAK TEST.
    c. ALL REINFORCING STEEL TO BE ASTM A-615, GRADE 60. UNLESS OTHERWISE SHOWN.
    d. ALL EXPOSED CONCRETE WORK TO BE CHAMFERED.
22. CONTRACTOR SHALL BE RESPONSIBLE FOR PLACING SILT FENCE IN AREAS OF DISTURBED SOIL TO PREVENT EROSION.
23. ALL STEEL AND IRON MATERIALS USED IN THIS PROJECT SHALL MEET BUY AMERICA REQUIREMENTS AS INDICATED IN THE SPECIAL CONDITIONS OF THE CONTRACT DOCUMENTS.

REVISION:	DATE:	DESCRIPTION:
1	01/06/2020	NOTE REVISION

CALL BEFORE YOU DIG!

Texas 811 Texas — Know what's below. Call before you dig.

PARTICIPANTS REQUEST 48 HOURS NOTICE BEFORE YOU DIG, DRILL OR BLAST - STOP AND CALL

811

THE LONE STAR NOTIFICATION COMPANY AT 1-800-669-8344

PAVING CONSTRUCTION NOTES:

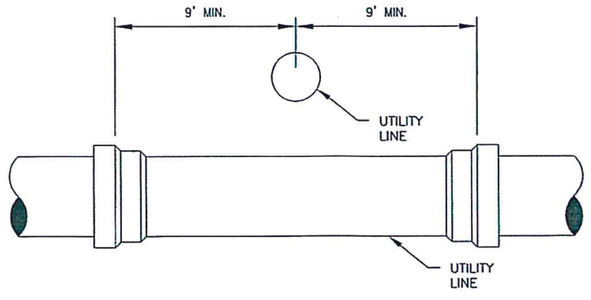
1. HOT MIX ASPHALT CONCRETE TO BE IN ACCORDANCE WITH SPECIFICATION TYPE "D". PRIMER COAT IS REQUIRED OVER FINISH COMPACTED MATERIAL. THE TACK COAT OR ASPHALTIC CONCRETE SHALL NOT BE APPLIED ON A PREVIOUSLY PRIMED FLEXIBLE BASE UNTIL THE PRIMED BASE HAS COMPLETELY CURED TO THE SATISFACTION OF THE ENGINEER. BEFORE THE TACK COAT IS LAID, THE SURFACE SHALL BE THOROUGHLY CLEANED TO THE INSPECTORS SATISFACTION. THE SURFACE SHALL BE GIVEN A UNIFORM APPLICATION OF TACK COAT. TACK COAT SHALL BE ROLLED WITH A PNEUMATIC TIRE ROLLER AS NECESSARY.
2. SUBGRADE EXCAVATION AND RECOMPACTION TO BE INCLUDED IN PRICE BID PER SQUARE YARD FOR "LIME - TREATED SUBGRADE".
3. CONTRACTOR TO BACK FILL BEHIND CURBS AND WALKS PRIOR TO PLACING & COMPACTING BASE MATERIAL AND SHAPE TO INSURE PROPER DRAINAGE.
4. NO TRAFFIC SHALL BE ALLOWED ON THE FINISHED WEARING SURFACE UNTIL AT LEAST 12 HOURS AFTER COMPLETION OF ROLLING.
5. HOT MIX ASPHALT CONCRETE TRANSPORT TRUCKS TO BE EQUIPPED WITH CANVAS COVERS TO BE UTILIZED DURING MATERIAL HAULING. MATERIAL DELIVERED TO SITE AT IMPROPER TEMPERATURE SHALL BE REJECTED. HOT MIX SHALL BE LAID AT A MINIMUM TEMPERATURE OF 250°F.
6. WHEN TYING INTO EXISTING CURB, EXPOSE REBAR AND FORM EXPANSION JOINT.
7. ANY SETTLEMENT UNDER PAVEMENT DUE TO INADEQUATE COMPACTION OF UTILITY LINE BACK FILL SHALL BE CAUSE FOR RECOMPACTION AND REPLACEMENT OF PAVEMENT.

WATERLINE CONSTRUCTION NOTES:

1. ALL WATER LINES TO BE PVC C-900 CLASS 150 UNLESS OTHERWISE NOTED.
2. DOUBLE CHECK VALVE WILL BE REQUIRED WHEN FILLING NEW WATERLINE FOR PRESSURE TESTING. AND AS PART OF CONSTRUCTION METER FOR THE ENTIRE PROJECT.
3. ALL WATER & WASTEWATER COLLECTION LINE CROSSINGS TO BE CONSTRUCTED IN ACCORDANCE WITH TCEQ REGULATION, CHAPTER 290 & 317.
4. WATERLINE TO BE BEDDED IN SAND.
5. CONTRACTOR TO FIELD LOCATE EXISTING METERS & PROPOSED SERVICE CONNECTION LOCATIONS PRIOR TO CONSTRUCTION OF MAIN.
6. CONTRACTOR TO VERIFY THE LOCATION OF ALL EXISTING LINES TO BE TIED IN TO NEW MAIN PRIOR TO SETTING LOCATION OF TIE-IN TEE & VALVE ON MAIN. CONTRACTOR TO COORDINATE WITH CITY OF KINGSVILLE MAINTENANCE DEPT. PRIOR TO UTILITY WORK TO ASSURE EXISTING VALVES ARE LOCATED FOR ISOLATION PURPOSES. SEE GENERAL CONSTRUCTION NOTE #16.
7. WATERLINE MAINS-TO BE HYDROSTATIC & BACTERIOLOGICAL TESTED PER CITY OF KINGSVILLE REQUIREMENTS PRIOR TO TIE-INS.
8. CONTRACTOR TO FIELD VERIFY AND ADJUST AS NEEDED ANY CONNECTION OF NEW WATERLINE TO EXISTING WATERLINE.

WASTEWATER COLLECTION LINE CONSTRUCTION NOTES:

1. 12" WASTEWATER COLLECTION LINE TO BE SDR 26.
2. CONTRACTOR TO PROVIDE DEFLECTION TEST IN ACCORDANCE WITH TCEQ CHAPTER 217.57
3. CONTRACTOR TO PROVIDE LOW PRESSURE AIR TEST IN ACCORDANCE WITH TCEQ CHAPTER 217.57 (B) 30 DAYS AFTER INSTALLATION. NO WATER TEST ALLOWED.
4. CONTRACTOR TO FIELD VERIFY THE LOCATION OF EXISTING UTILITIES & FACILITIES PRIOR TO CONSTRUCTION.
5. ALL CROSSING OF WASTEWATER COLLECTION LINES AND WATERLINES CONSTRUCTED IN ACCORDANCE WITH TCEQ REGULATIONS CHAPTER 290 AND 217.
6. CONTRACTOR TO PROVIDE LEAKAGE TEST FOR MANHOLE IN ACCORDANCE WITH TCEQ CHAPTER 217.58 (B) (2) NO WATER TEST ALLOWED.



NOTES:

1. THE SEPARATION OF WATER AND SANITARY SEWER LINES AND THE MATERIAL USED SHALL BE IN ACCORDANCE WITH THE "RULES & REGULATIONS FOR PUBLIC WATER SYSTEMS" OF TEXAS COMMISSION ON ENVIRONMENTAL QUALITY AND THE CITY WATER DETAILS.
2. WHENEVER WATER & SANITARY SEWER MAINS OR SERVICES CROSS, ONE JOINT OF C900 PVC WATER LINE SHALL BE CENTERED OVER THE SANITARY SEWER LINE IN ADDITION TO ANY REQUIREMENTS AS DICTATED BY ITEM 1 ABOVE.
3. CONTRACTORS MAY BE REQUIRED BY THE CITY INSPECTOR TO INSTALL CENTERED JOINTS OF DUCTILE IRON PIPE AT WATERLINE CROSSINGS OF EXISTING HAZARDOUS PRODUCT FLOWLINES.
4. A VERTICAL SEPARATION MUST BE AT LEAST TWO FEET BETWEEN THE OUTSIDE DIAMETERS OF PIPES. A HORIZONTAL SEPARATION MUST BE AT LEAST FOUR FEET BETWEEN THE OUTSIDE DIAMETERS OF PIPES. THE FORCEMAIN AND WATER LINE MUST BE BOTH AT LEAST 150 PSI PRESSURE RATING FOR PIPES AND JOINTS.

LEGEND

WATER VENT PIPE	WATER MANHOLE
FIRE HYDRANT	WATER METER
WATER VALVE BOX	WATER VALVE
WATER MARKER POST	ELECTRIC PEDESTAL
CATHODIC PROTECTION	ELECTRIC MANHOLE
PHOTO TAKEN HERE	ELECTRIC METER
WASTEWATER MANHOLE	ELECTRIC PULLBOX
SEWER CLEAN OUT	HIGH MAST LIGHTING TOWER
STORM MANHOLE	ELECTRICAL PEDESTAL
STORM SEWER INLET	ELECTRIC TRANSFORMER
STORM CLEAN OUT	TRAFFIC CAMERA
GAS MANHOLE	LUMINAIRE STANDARD
GAS METER	SIGNAL CONTROL PANEL
GAS VALVE	POWER POLE
GAS TEST STATION	POWER POLE WITH RISER
CATV PEDESTAL	ILLUMINATION POLE
CATV SERVICE BOX	GUY ANCHOR
TELEPHONE MANHOLE	GUY POLE DEADMAN
TELEPHONE PEDESTAL	SOLAR PANEL
TELEPHONE MARKER POST	TRAFFIC SIGNAL PEDESTAL
TELEPHONE POLE	TRAFFIC SIGNAL BOX
TELEPHONE HAND HOLE	STREET SIGN
FIBER OPTIC HAND HOLE	TRAFFIC SIGNAL POLE
FIBER OPTIC MARKER POST	GENERIC MANHOLE
FIBER OPTIC MANHOLE	LEVEL 'A' TEST HOLE
RAILROAD SIGNAL	CONTROL POINT
TOWER	

W	PROPOSED WATER LINE
WW	PROPOSED WASTE WATER LINE
FM	PROPOSED FORCE MAIN
FO	FIBER OPTICS LINE
OHE	OVERHEAD ELECTRIC LINE
	PROPOSED AIR RELEASE VALVE
	PROPOSED 45° ELBOW
	PROPOSED 90° ELBOW
	PROPOSED WATER VALVE
	PROPOSED CASING
	PROPOSED PAVEMENT REPAIR
	PROPOSED WASTEWATER MANHOLE

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STATE OF TEXAS — RUTILIO P. MORA JR — 111588 — LICENSED PROFESSIONAL ENGINEER

Rutilio P. Mora Jr 1/10/2020

RUTILIO P. MORA JR, P.E. NO. 111588

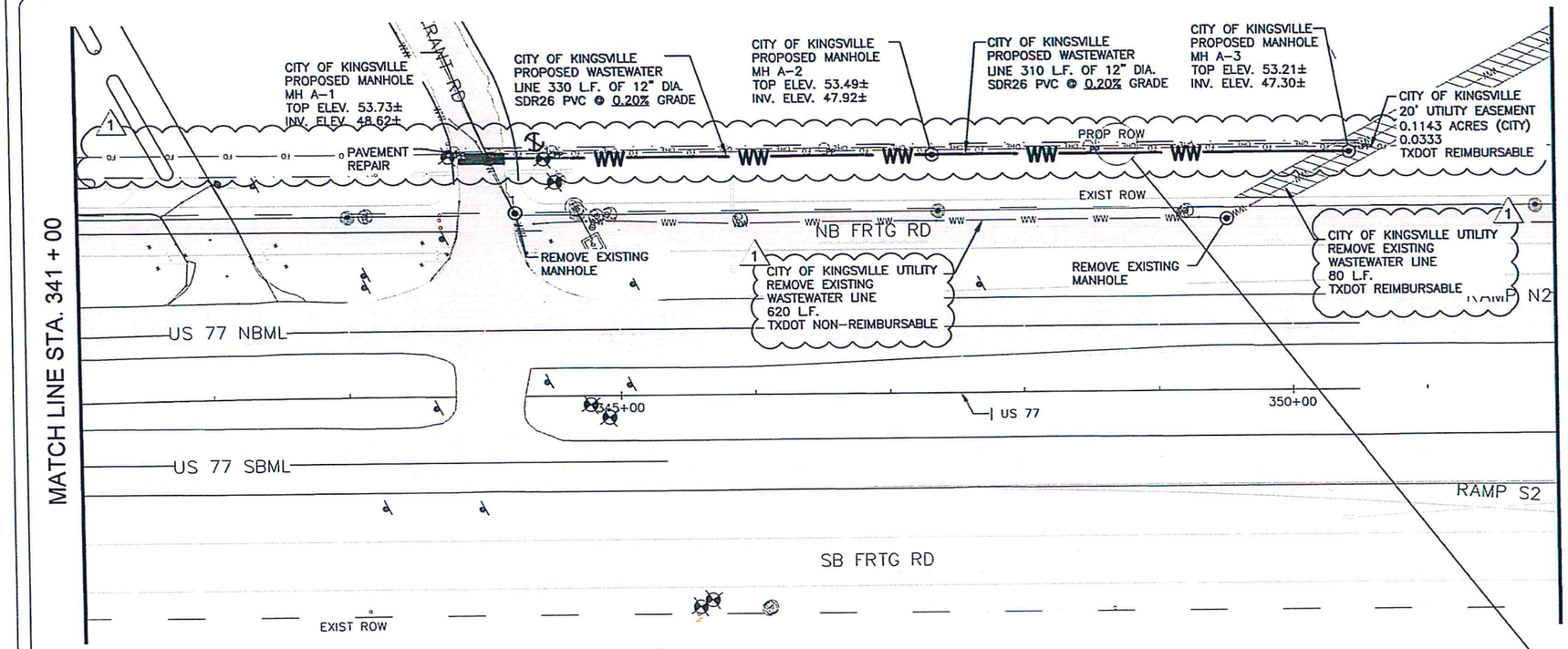
CITY OF KINGSVILLE
ENGINEERING DEPARTMENT
400 West King
Kingsville, Texas 78363
Office 361.595.8007
Fax 361.595.8035

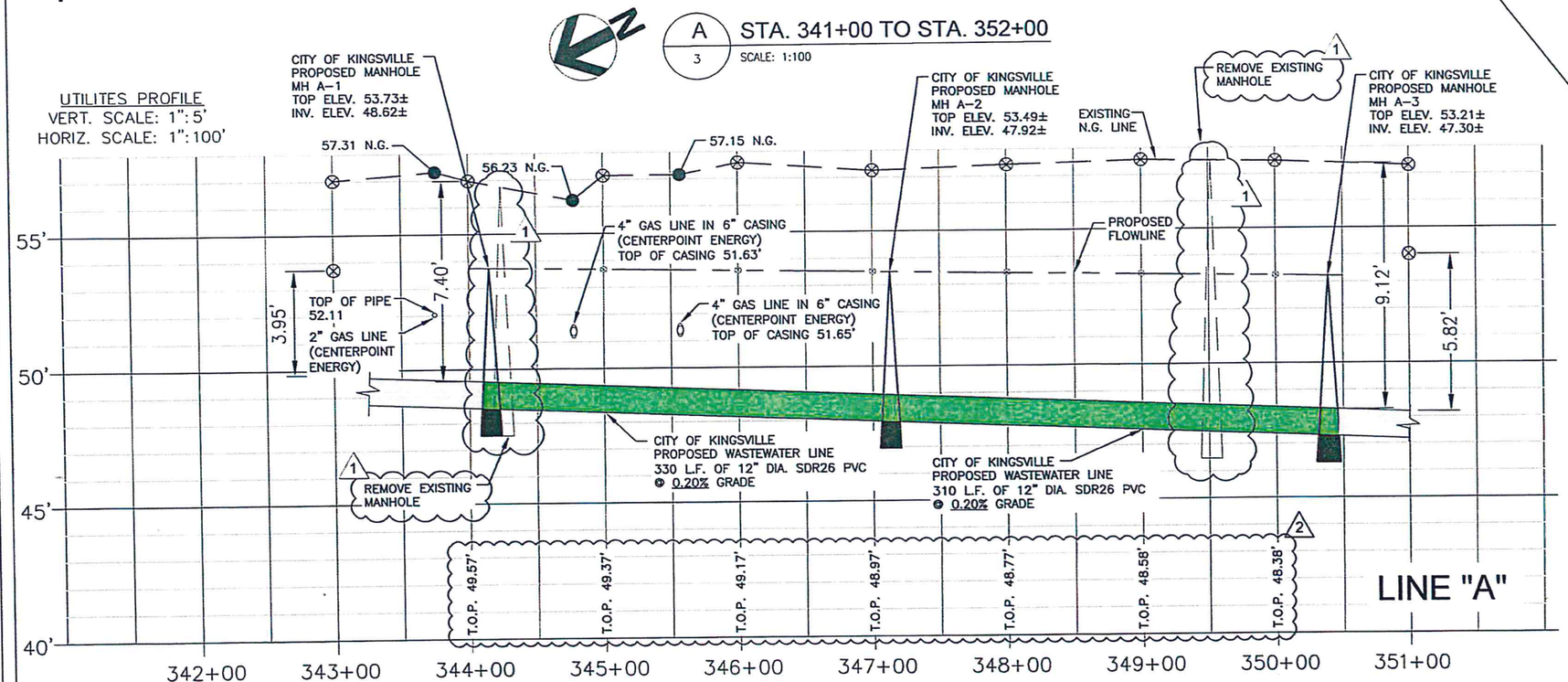
Kingsville TEXAS

Drawn by: J. RAMIREZ
Date: 07/29/2019
Checked by: R. MORA
Job:
Scale: N.T.S.

2019-JANUARY 2020
US 77 OVERPASS UTILITIES RELOCATION
GENERAL NOTES

SHEET 2



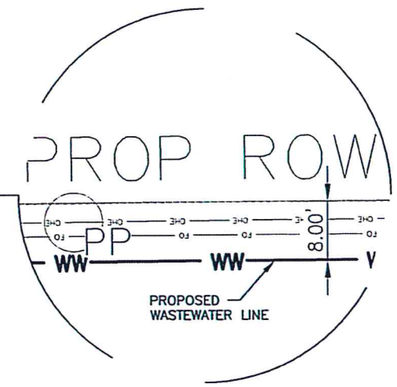


PROJECT BENCHMARKS

PRIMARY BENCHMARK:
BARF
N: 17064963.289
E: 1194269.474
ELEVATION: 56.846
DESCRIPTION: BRASS DISK ON A SECTIONAL ROD W/LID, 1.2 FEET EAST OF THE WEST RIGHT OF WAY FENCE, 90 FEET WEST OF THE WEST EDGE OF SOUTH BOUND US 77, 154 FEET SOUTH OF A CORNER IN THE WEST RIGHT OF WAY FENCE. TO REACH FROM US 77 & KING ST. IN KINGSVILLE, GO SOUTH ON US 77 FOR 2.5 MILES TO THE BM ON THE RIGHT. (KLEBERG CO.)

SECONDARY BENCHMARK:
M1380
N: 17057496.843
E: 1190747.035
ELEVATION: 57.305
DESCRIPTION: BRASS DISK (NGS) ON A STAINLESS STEEL ROD W/LID SOUTH OF KINGSVILLE ON THE EAST SIDE OF BUS. 77, 1.4 FEET SOUTH OF A DELINEATOR POST, 4.0 FEET NORTH OF A POWER POLE 76.4 FEET EAST OF THE CENTER OF BUS. 77. TO REACH FROM BUS. 77 AND FM 772, GO NORTH ON BUS. 77 FOR 0.72 MILES TO THE BM ON THE RIGHT. (KLEBERG CO.)

REVISION:	DATE:	DESCRIPTION:
1	01/06/2020	LINEAR FOOTAGE REVISION EXISTING MANHOLES SHOWN FIBER OPTICS LINE, POWER POLES AND OVERHEAD ELECTRIC LINES ADDED
2	01/31/2020	TOP OF PIPE ELEVATION ADDED



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STATE OF TEXAS
RUTILIO P. MORA JR
111588
LICENSED
PROFESSIONAL ENGINEER

Rutilio P. Mora Jr 2/10/2020
RUTILIO P. MORA JR, P.E. NO. 111588

CITY OF KINGSVILLE
ENGINEERING DEPARTMENT
400 West King
Kingsville, Texas 78363
Office 361.595.8007
Fax 361.595.8035

Drawn by: J. RAMIREZ
Date: 07/29/2019
Checked by: R. MORA
Job:

2019- JANUARY 2020
US 77 OVERPASS UTILITIES RELOCATION
STA. 341+00 TO STA. 352+00 - LINE "A"

SHEET
3

MATCH LINE STA. 407 + 00

ESCON CREEK

PROP ROW

15.46'
16.02'
16.15'
16.44'
16.56'
12.05'
11.69'
11.61'
10.53'
10.41'

US 77 SBML

SB FRTG RD

EXIST ROW

STA. 410+36.8
FORCEMAIN
TIE-IN

1 CITY OF KINGSVILLE TO REMOVE EXISTING FORCEMAIN 290 L.F. TXDOT NON-REIMBURSABLE

1 CITY OF KINGSVILLE PROPOSED FORCEMAIN 290 L.F. OF 8" DIA. PVC C-900 PC 150 NON-REIMBURSABLE

CITY OF KINGSVILLE PROPOSED 120 L.F. OF 16" DIA. STEEL CASING 0.25" THK. NON-REIMBURSABLE

STA. 413+40
FORCEMAIN
TIE-IN

S CREEK ST

CITY OF KINGSVILLE EXISTING FORCEMAIN TXDOT NON-REIMBURSABLE

MATCH LINE STA. 418 + 00

N

A 4 STA. 407+00 TO STA. 418+00
SCALE: 1:100

UTILITES PROFILE
VERT. SCALE: 1":10'
HORIZ. SCALE: 1":100'

50'
40'
30'
20'
10'

408+00 409+00 410+00 411+00 412+00 413+00 414+00 415+00 416+00 417+00 418+00

3'

EXISTING N.G. LINE

STA. 410+36.8
FORCEMAIN
TIE-IN

2 CITY OF KINGSVILLE PROPOSED FORCEMAIN 290 L.F. OF 8" DIA. PVC C-900 PC 150 @ 0.000% GRADE NON-REIMBURSABLE

2 T.O.P. 19.13'

STA. 413+40
FORCEMAIN
TIE-IN

CITY OF KINGSVILLE PROPOSED 120 L.F. OF 16" DIA. STEEL CASING 0.25" THK. NON-REIMBURSABLE

CITY OF KINGSVILLE EXISTING LIFT STATION

CITY OF KINGSVILLE EXISTING FORCEMAIN 1,100 L.F. OF 6" DIA PVC C-900 TXDOT NON-REIMBURSABLE

LINE "B"

REVISION:	DATE:	DESCRIPTION:
1	01/05/2020	LINEAR FOOTAGE REVISION
2	01/31/2020	TOP OF PIPE ELEVATION ADDED

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STATE OF TEXAS
RUTILIO P. MORA JR
111588
LICENSED
PROFESSIONAL ENGINEER

Rutilio P. Mora Jr. 2/10/2020

RUTILIO P. MORA JR, P.E. NO. 111588

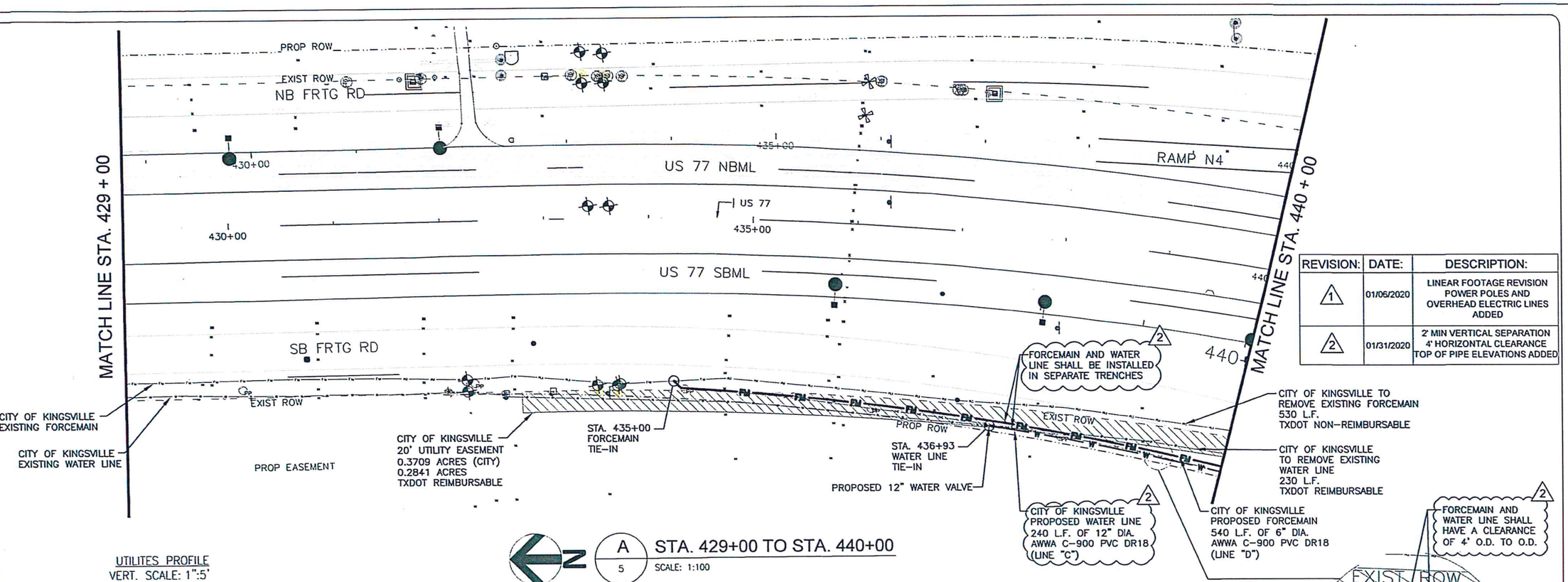
CITY OF KINGSVILLE
ENGINEERING DEPARTMENT
400 West King
Kingsville, Texas 78363
Office 361.595.8007
Fax 361.595.8035

Kingsville TEXAS

Drawn by: J. RAMIREZ
Date: 07/29/2019
Checked by: R. MORA
Job:

2019- JANUARY 2020
US 77 OVERPASS UTILITIES RELOCATION
STA. 341+00 TO STA. 352+00 - LINE "B"

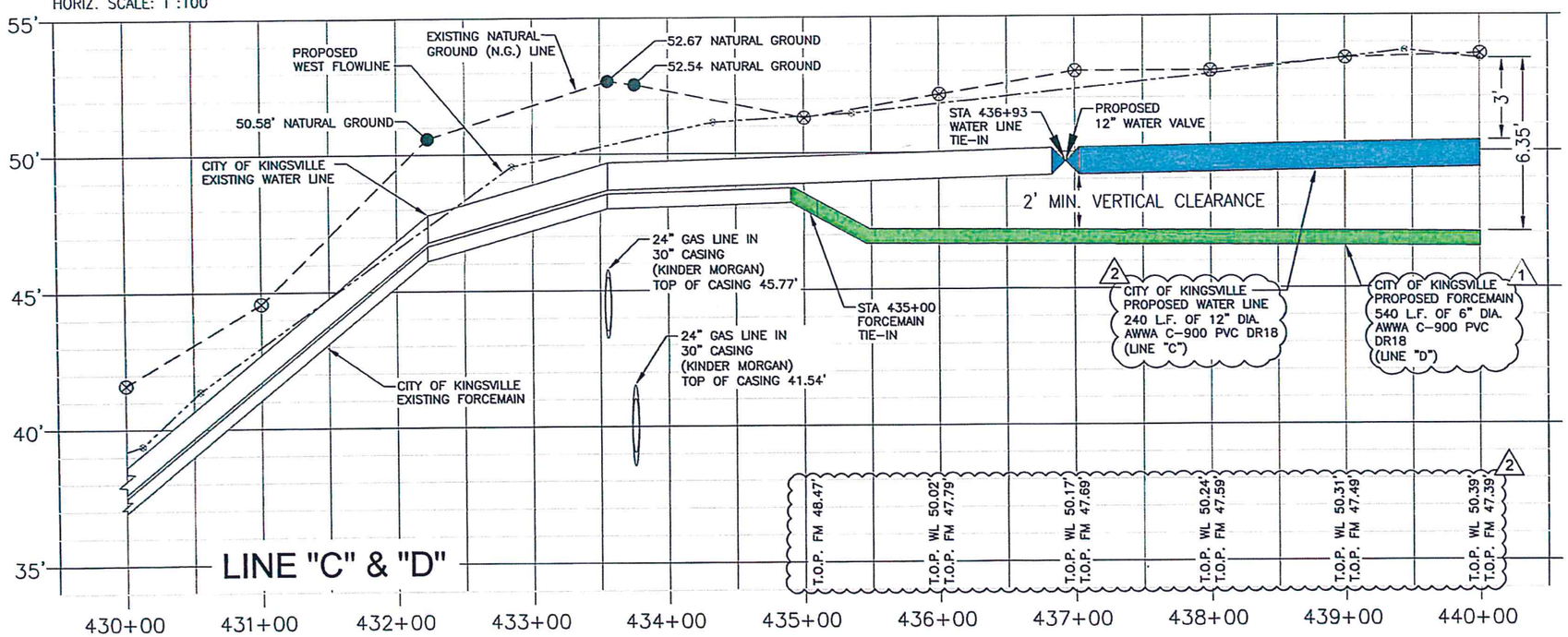
SHEET
4

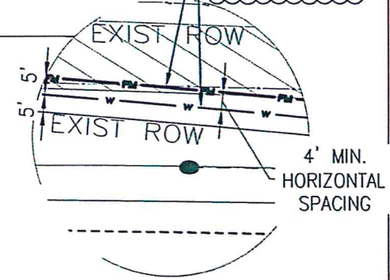


REVISION:	DATE:	DESCRIPTION:
1	01/06/2020	LINEAR FOOTAGE REVISION POWER POLES AND OVERHEAD ELECTRIC LINES ADDED
2	01/31/2020	2' MIN VERTICAL SEPARATION 4' HORIZONTAL CLEARANCE TOP OF PIPE ELEVATIONS ADDED

A / 5 — STA. 429+00 TO STA. 440+00
SCALE: 1:100

UTILITES PROFILE
VERT. SCALE: 1":5'
HORIZ. SCALE: 1":100'





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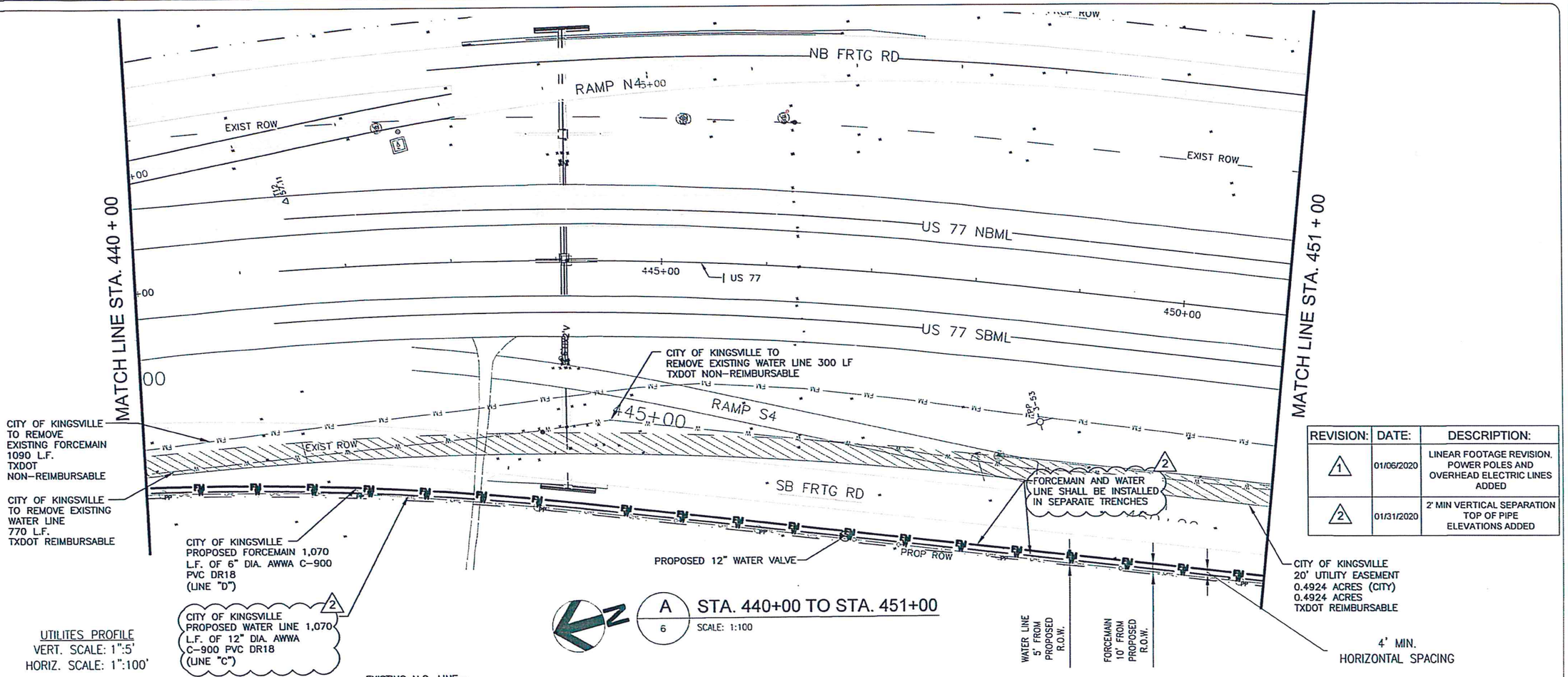
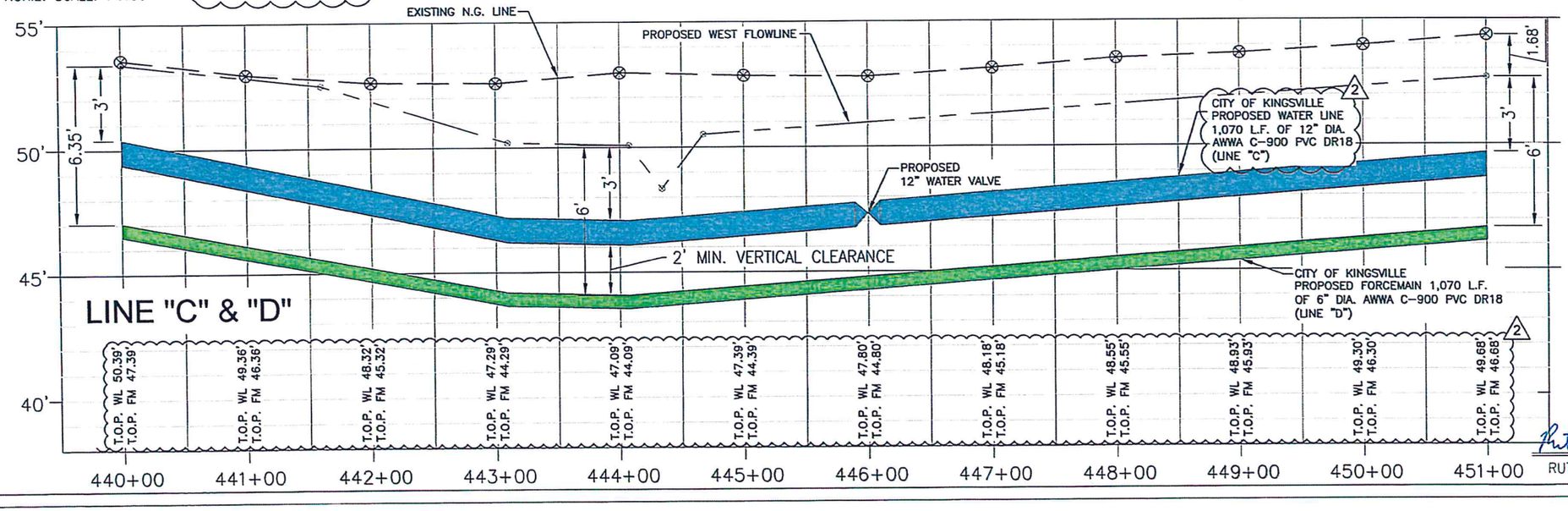
US 77 OVERPASS UTILITIES RELOCATION
STA. 429+00 TO STA. 440+00 - LINE "C" & "D"

SHEET 5



A / 6 STA. 440+00 TO STA. 451+00
SCALE: 1:100

UTILITES PROFILE
VERT. SCALE: 1":5'
HORIZ. SCALE: 1":100'



REVISION:	DATE:	DESCRIPTION:
1	01/06/2020	LINEAR FOOTAGE REVISION. POWER POLES AND OVERHEAD ELECTRIC LINES ADDED
2	01/31/2020	2' MIN VERTICAL SEPARATION TOP OF PIPE ELEVATIONS ADDED

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400 West King
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2019- JANUARY 2020
US 77 OVERPASS UTILITIES RELOCATION
STA. 440+00 TO STA. 451+00 - LINE "C" & "D"

SHEET
6

REVISION:	DATE:	DESCRIPTION:
1	01/06/2020	LINEAR FOOTAGE REVISION, POWER POLES AND OVERHEAD ELECTRIC LINES ADDED
2	01/31/2020	2' MIN VERTICAL SEPARATION TOP OF PIPE ELEVATIONS ADDED

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Fax 361.595.8035

NB FRTG RD

EXIST ROW

US 77 NBML

US 77

455+00

460+00

US 77 SBML

MATCH LINE STA. 451 + 00

MATCH LINE STA. 462 + 00

EXIST ROW

SB FRTG RD

PROP ROW

CITY OF KINGSVILLE TO REMOVE EXISTING FORCEMAIN 1100 L.F. TXDOT NON-REIMBURSABLE

CITY OF KINGSVILLE TO REMOVE EXISTING WASTEWATER LINE 1100 L.F. TXDOT REIMBURSABLE

CITY OF KINGSVILLE PROPOSED FORCEMAIN 1,100 L.F. OF 6" DIA. AWWA C-900 PVC DR18 (LINE "D")

CITY OF KINGSVILLE PROPOSED WATER LINE 1,100 L.F. OF 12" DIA. AWWA C-900 PVC DR18 (LINE "C")

PROPOSED FIBERGLASS MANHOLE

PROPOSED 2" AIR RELEASE VALVE

PROPOSED 12" WATER VALVE

FORCEMAIN AND WATER LINE SHALL BE INSTALLED IN SEPARATE TRENCHES

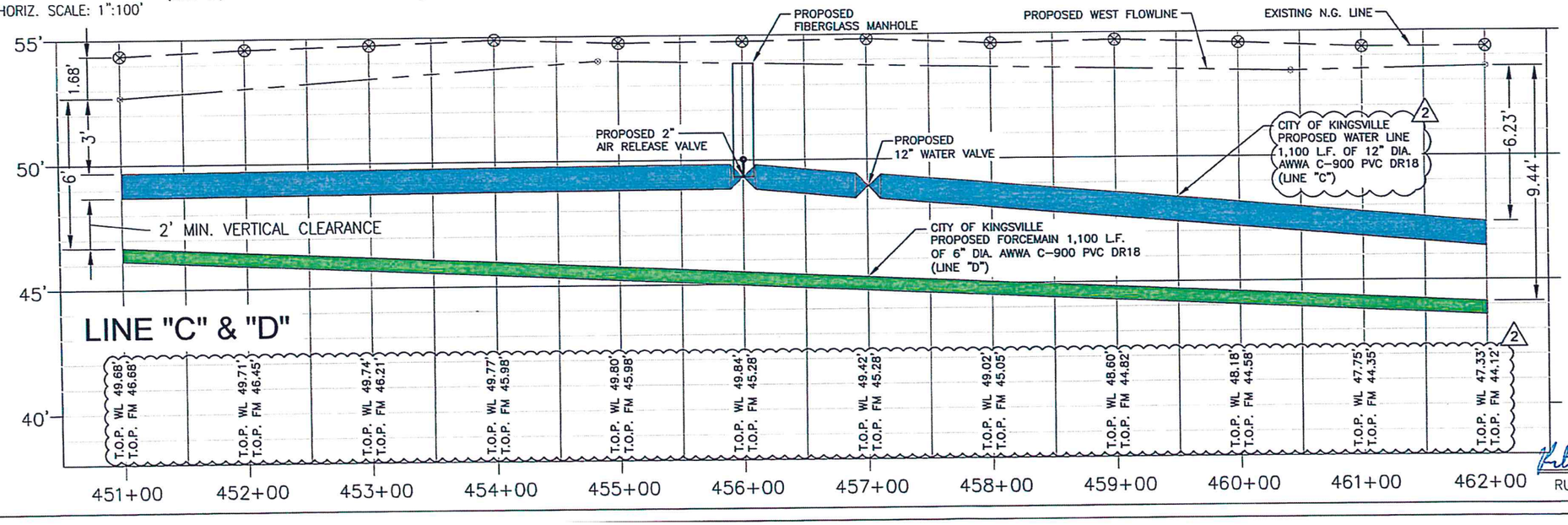
CITY OF KINGSVILLE 20' UTILITY EASEMENT
0.5040 ACRES (CITY)
0.5040 ACRES TXDOT REIMBURSABLE

WATER LINE 5' FROM PROPOSED R.O.W.

FORCEMAIN 10' FROM PROPOSED R.O.W.

A / 7 STA. 451+00 TO STA. 462+00
SCALE: 1:100

UTILITES PROFILE
VERT. SCALE: 1":5'
HORIZ. SCALE: 1":100'



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LICENSED
PROFESSIONAL ENGINEER

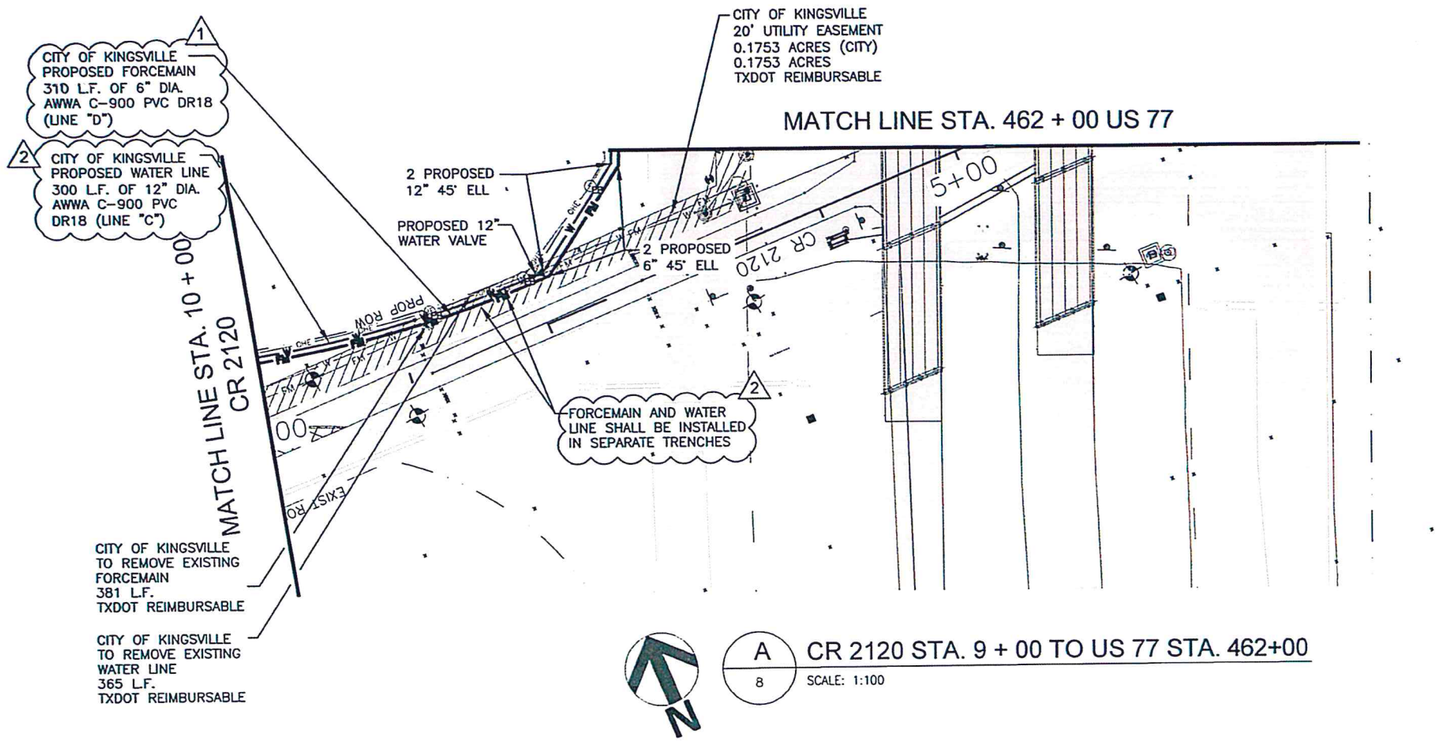
Rutilio P. Mora Jr 2/10/2020

RUTILIO P. MORA JR, P.E. NO. 111588

Drawn by: J. RAMIREZ
Date: 07/29/2019
Checked by: R. MORA
Job:

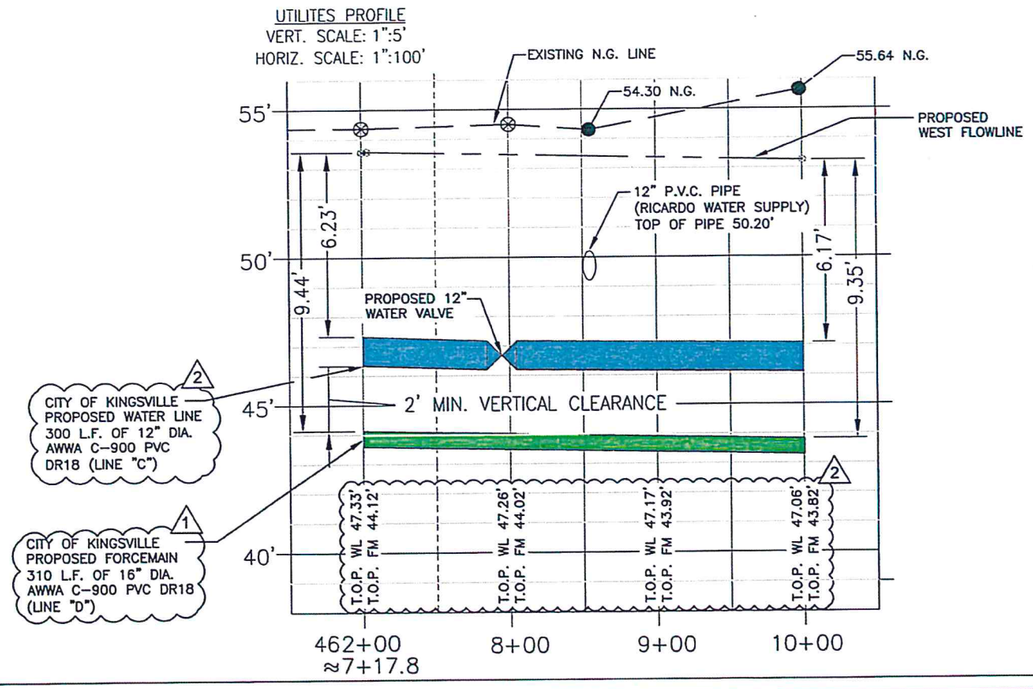
2019- JANUARY 2020
US 77 OVERPASS UTILITIES RELOCATION
STA. 451+00 TO STA. 462+00 - LINE "C" & "D"

SHEET 7



A 8 CR 2120 STA. 9 + 00 TO US 77 STA. 462+00

SCALE: 1:100



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2	01/31/2020	2' MIN VERTICAL SEPARATION TOP OF PIPE ELEVATIONS ADDED

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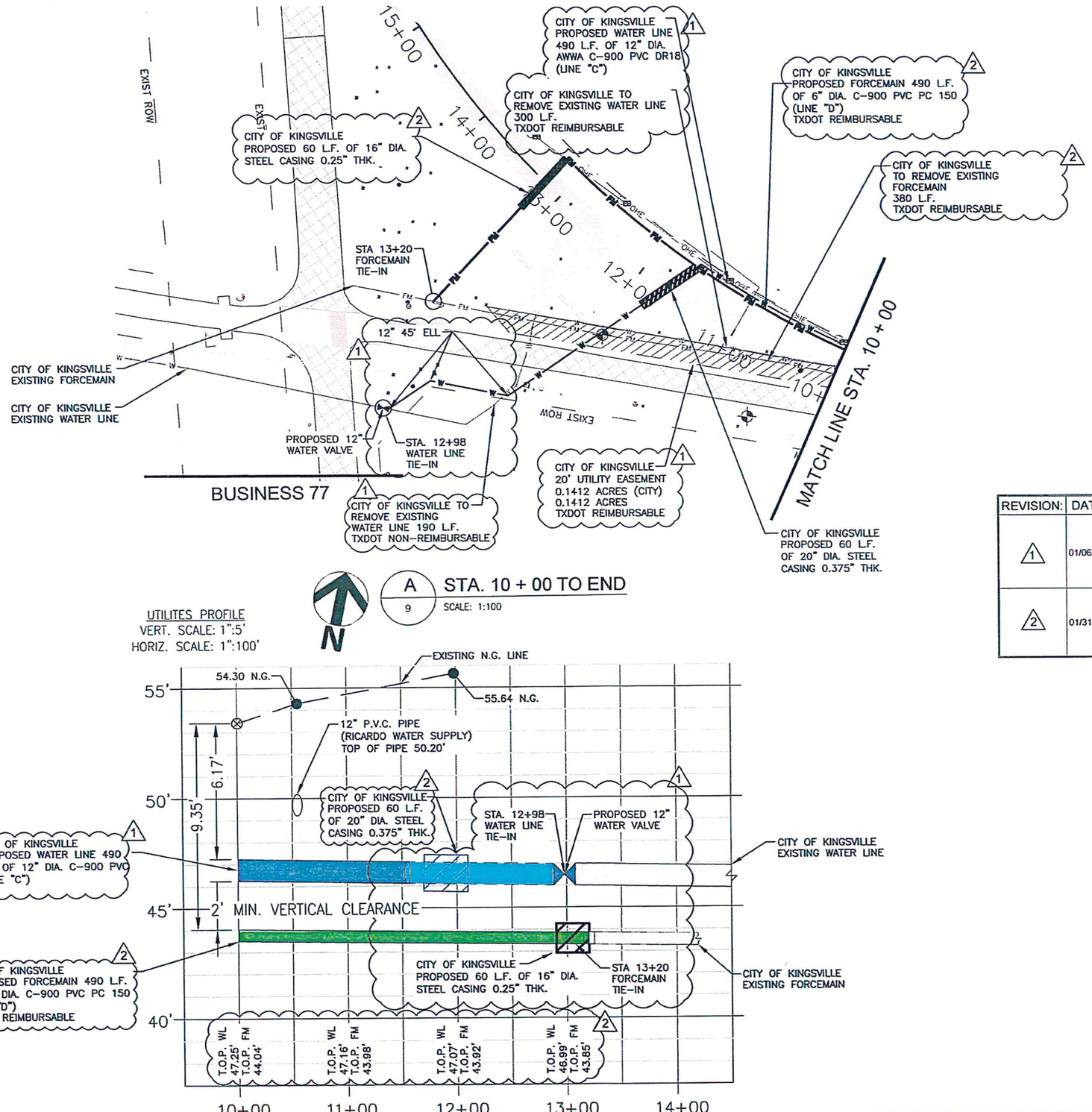
2019- JANUARY 2020
US 77 OVERPASS UTILITIES RELOCATION
CR 2120 STA 9+00 TO US 77 STA 462+00 - LINE "C" & "D"

SHEET 8



A 9 STA. 10 + 00 TO END

SCALE: 1:100

REVISION:	DATE:	DESCRIPTION:
1	01/06/2020	FORCE MAIN, WATER LINE AND LINEAR FOOTAGE REVISION POWER POLES AND OVERHEAD ELECTRIC LINES ADDED
2	01/31/2020	2' MIN VERTICAL SEPARATION TOP OF PIPE ELEVATIONS ADDED FORCE MAIN AND CASING REVISION

THE SEAL APPEARING ON THIS DOCUMENT WAS AUTHORIZED BY RUTILIO P. MORA JR, P.E. NO. 111588 ON 1-03-20. ALTERATION OF A SEALED DOCUMENT WITHOUT PROPER NOTIFICATION TO THE RESPONSIBLE ENGINEER IS AN OFFENSE UNDER THE TEXAS ENGINEERING PRACTICE ACT.

STATE OF TEXAS
RUTILIO P. MORA JR
111588
LICENSED
PROFESSIONAL ENGINEER

Rutilio P. Mora Jr 2/10/2020

RUTILIO P. MORA JR, P.E. NO. 111588

CITY OF KINGSVILLE
ENGINEERING DEPARTMENT
400 West King
Kingsville, Texas 78363
Office 361.595.8007
Fax 361.595.8035

Drawn by: J. RAMIREZ
Date: 07/29/2019
Checked by: R. MORA
Job:

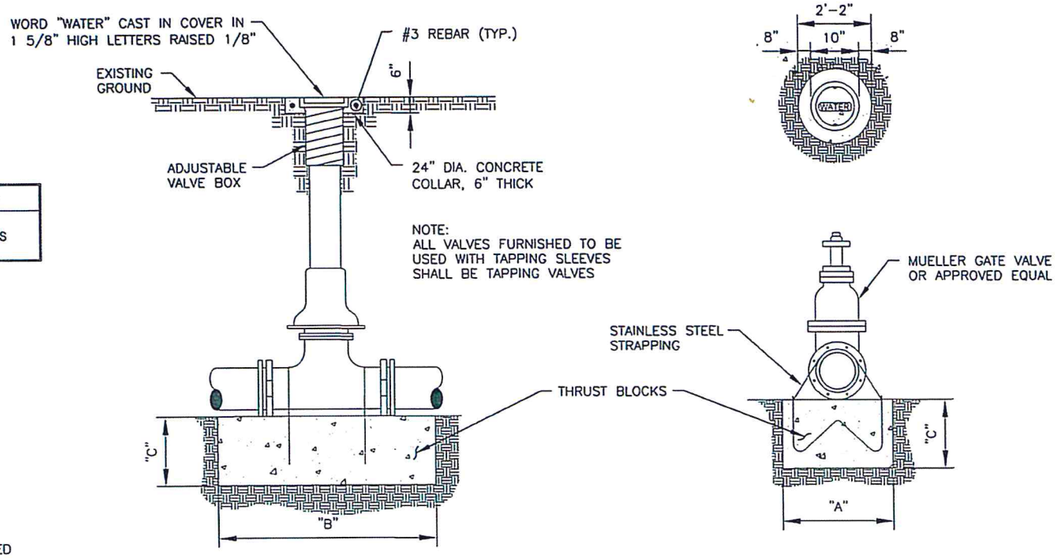
2019- JANUARY 2020
US 77 OVERPASS UTILITIES RELOCATION
STA. 12 +00 TO END - LINE "C" & "D"

SHEET 9

1 / 10 COVER (PLAN VIEW)

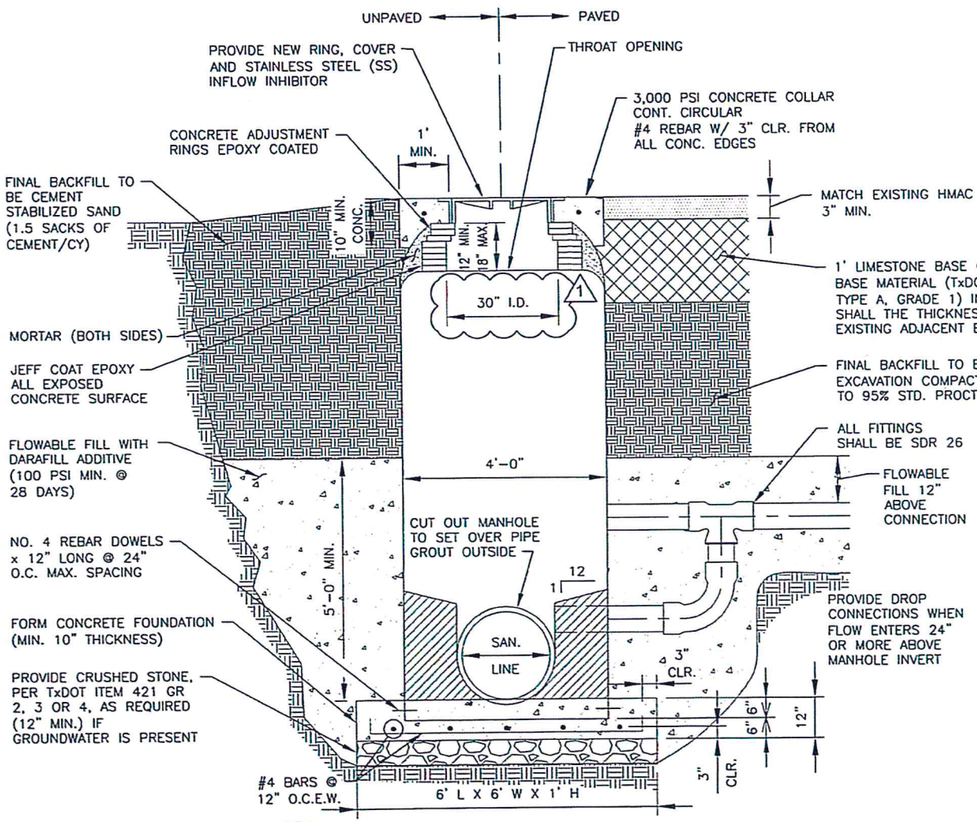
SCALE: NOT TO SCALE

REVISION:	DATE:	DESCRIPTION:
1	01/06/2020	CALLOUT REVISIONS



2 / 10 WATER VALVE DETAIL

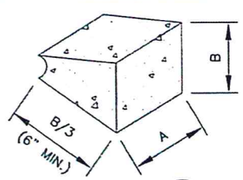
SCALE: NOT TO SCALE



3 / 10 FIBERGLASS MANHOLE DETAIL

SCALE: NOT TO SCALE

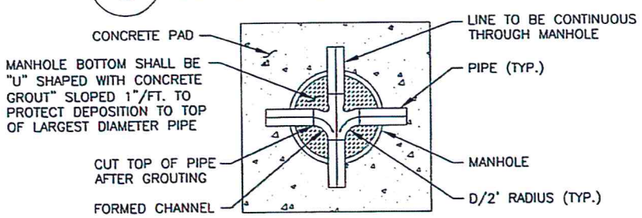
MINIMUM DIMENSIONS FOR THRUST BLOCKING										
FITTING SIZE	TEES & PLUGS		90° BENDS		45° BENDS & WYES		REDUCERS & 22 1/2° BENDS		11 1/4° BENDS	
	A	B	A	B	A	B	A	B	A	B
4"	1'-7"	1'-2"	1'-9"	1'-6"	1'-8"	0'-10"	1'-7"	0'-6"	0'-6"	0'-6"
6"	2'-0"	1'-11"	2'-5"	2'-2"	1'-10"	1'-7"	1'-9"	0'-10"	1'-0"	0'-6"
8"	2'-8"	2'-6"	3'-2"	3'-0"	2'-5"	2'-1"	1'-9"	1'-6"	1'-0"	1'-0"
10"	3'-4"	3'-3"	4'-0"	3'-10"	3'-0"	2'-9"	2'-2"	1'-11"	1'-6"	1'-0"
12"	4'-0"	3'-10"	4'-8"	4'-8"	3'-8"	3'-3"	2'-7"	2'-3"	2'-0"	1'-0"
14"	5'-5"	3'-10"	6'-6"	4'-11"	4'-9"	3'-5"	3'-5"	2'-5"	2'-0"	1'-6"
20"	5'-0"	5'-0"	6'-0"	6'-0"	5'-0"	4'-0"	3'-6"	3'-0"	3'-0"	2'-0"
24"	6'-0"	6'-0"	7'-0"	7'-0"	5'-0"	5'-0"	4'-6"	3'-0"	3'-0"	3'-0"
30"	7'-6"	7'-6"	8'-0"	8'-0"	6'-3"	6'-3"	4'-9"	4'-6"	3'-3"	3'-3"



NOTES:
1. FITTINGS TO BE SEPARATED FROM BLOCKS WITH AN APPROVED BOND BREAKER, SUCH AS POLYETHELENE – 2 LAYERS 8 MIL.
2. ALL BLOCKS TO BEAR AGAINST UNDISTURBED MATERIAL.
3. DESIGN IS BASED ON 2000 PSF SOIL BEARING CAPACITY.
4. ALL THRUST BLOCKS MUST BE PROPERLY FORMED.

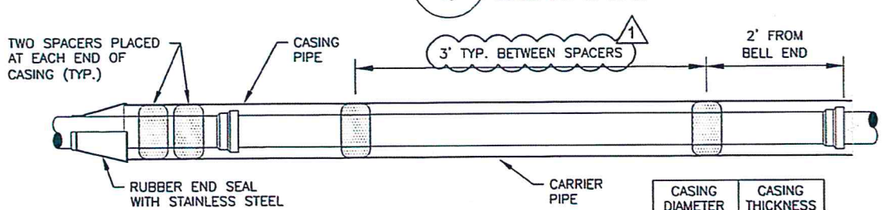
4 / 10 THRUST BLOCK DETAIL

SCALE: NOT TO SCALE



5 / 10 WASTEWATER MANHOLE BOTTOM (PLAN VIEW)

SCALE: NOT TO SCALE



CASING DIAMETER	CASING THICKNESS
16"	0.25"
20"	0.375"

6 / 10 CASING DETAIL

SCALE: NOT TO SCALE

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Rutilio P. Mora Jr 1/10/2020

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CITY OF KINGSVILLE
ENGINEERING DEPARTMENT
400 West King
Kingsville, Texas 78363
Office 361.595.8007
Fax 361.595.8035

Drawn by: J. RAMIREZ
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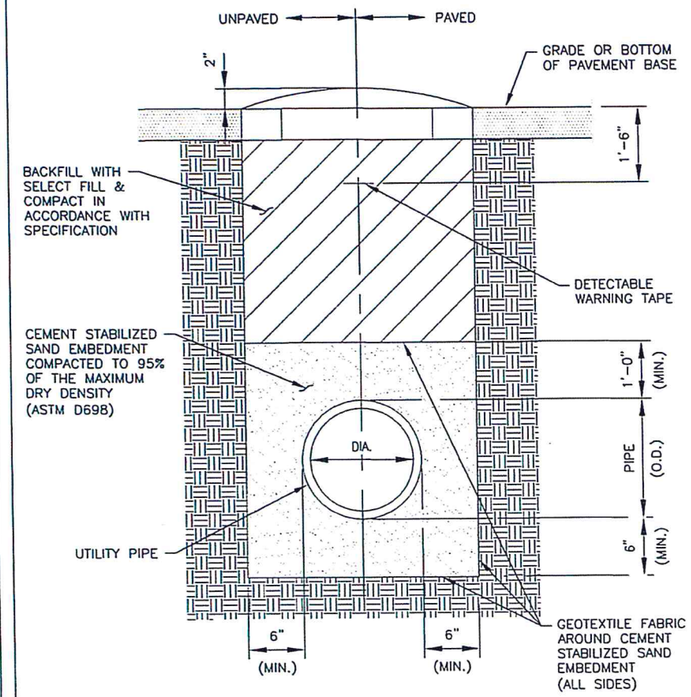
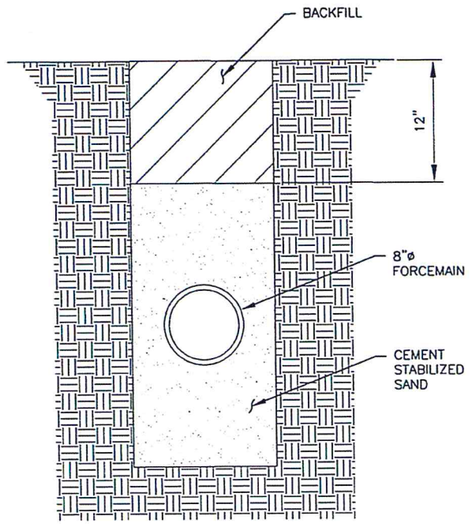
Checked by: R. MORA
Job:
Scale: N.T.S.

2019- JANUARY 2020
US 77 OVERPASS UTILITIES RELOCATION
SECTIONS & DETAILS I

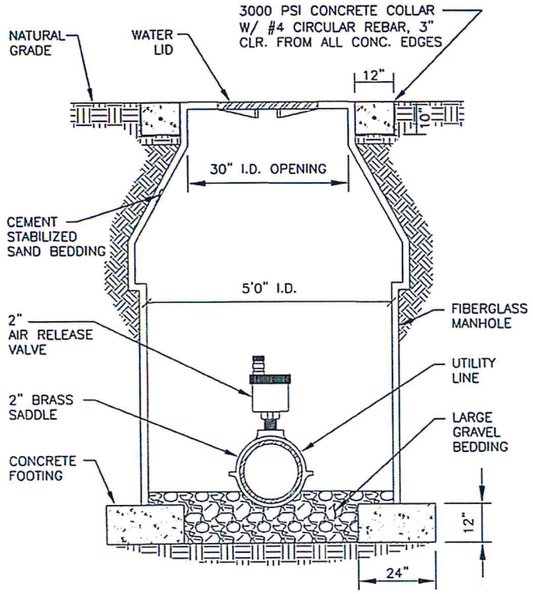
SHEET 10



1 / 11 UTILITY BEDDING DETAIL
SCALE: NOT TO SCALE

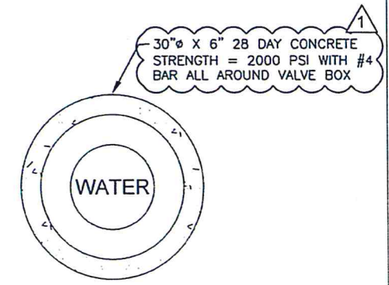


1A / 11 UTILITY BEDDING DETAIL (AT DITCH CROSSING)
SCALE: NOT TO SCALE



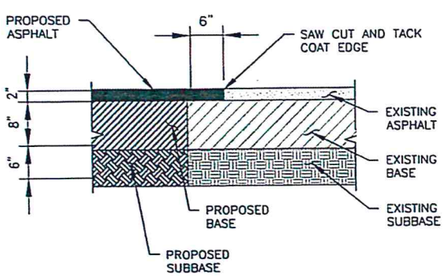
2 / 11 AUTOMATIC 2" AIR RELEASE VALVE
SCALE: NOT TO SCALE

NOTE:
1. VALVE EXTENSION TO BE USED ONLY WHEN TOP OF GATE VALVE IS DEEPER THAN 5 FEET FROM FINISHED GRADE
2. ALL VALVE OPERATING NUT EXTENSIONS ARE TO BE MADE OF STEEL, SIZED AS NOTED, AND PAINTED WITH TWO (2) COATS OF METAL PAINT
3. EXTENSIONS SHALL BE A MINIMUM OF ONE (1) FOOT LONG
4. VALVE BOX LIDS LOCATED ON VALVE TO ISOLATE FIRE SUPPRESSION LINES FROM PUBLIC WATER LINES SHALL BE AMPro USA, USA, LL562 LOCKABLE LID

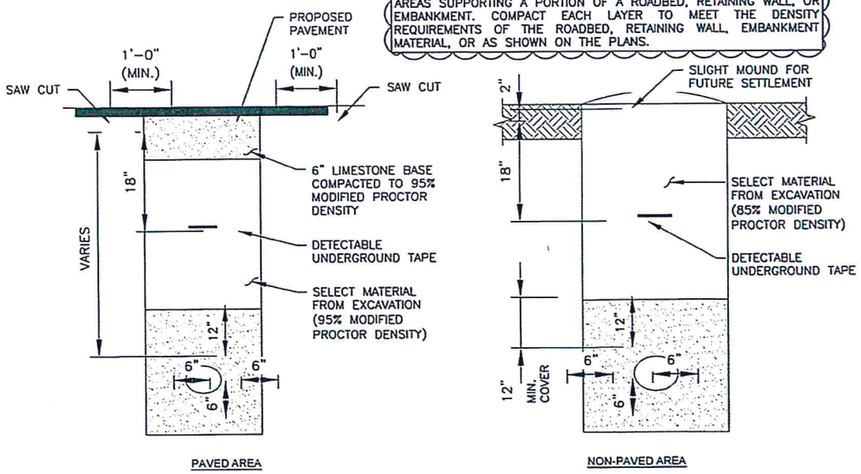


A / 11 SECTION
SCALE: NOT TO SCALE

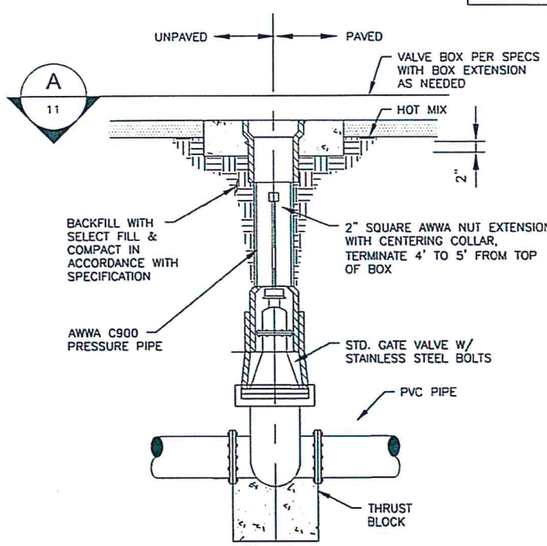
REVISION:	DATE:	DESCRIPTION:
1	01/06/2020	CALLOUT REVISIONS



3 / 11 TYPICAL ASPHALT PAVEMENT REPAIR DETAIL
SCALE: NOT TO SCALE



4 / 11 BEDDING & BACKFILL DETAILS
SCALE: NOT TO SCALE



5 / 11 TYPICAL CONCRETE PAVEMENT EDGE SECTION
SCALE: NOT TO SCALE

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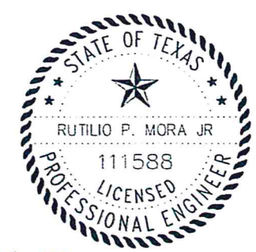

Rutilio P. Mora Jr 1/10/2020
RUTILIO P. MORA JR, P.E. NO. 111588

CITY OF KINGSVILLE
ENGINEERING DEPARTMENT
400 West King
Kingsville, Texas 78363
Office 361.595.8007
Fax 361.595.8035

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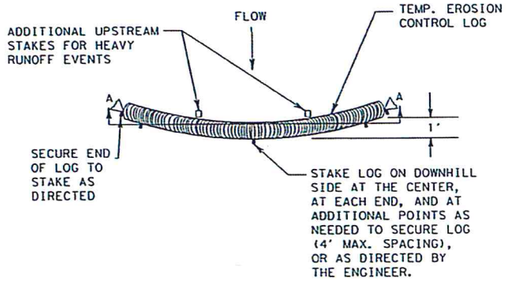
Checked by: R. MORA
Job:
Scale: N.T.S.

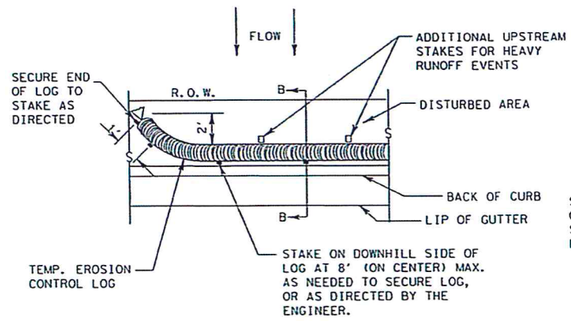
2019- JANUARY 2020
US 77 OVERPASS UTILITIES RELOCATION
SECTIONS & DETAILS II

SHEET 11

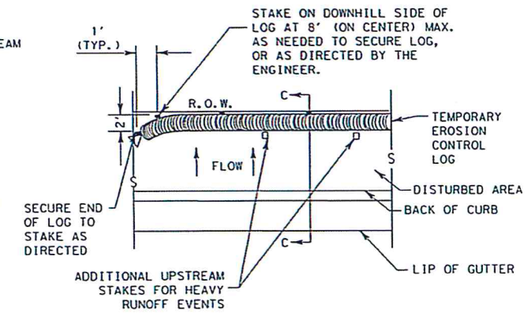
DATE:
FILE:



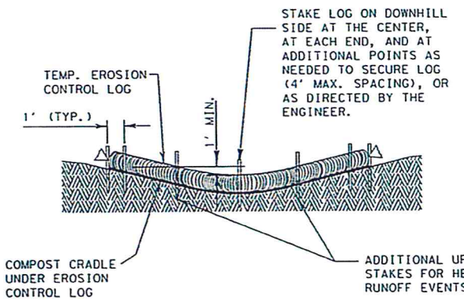
PLAN VIEW



PLAN VIEW



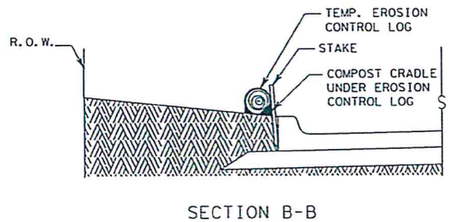
PLAN VIEW



SECTION A-A

EROSION CONTROL LOG DAM

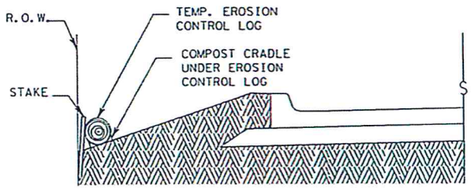
CL-D



SECTION B-B

EROSION CONTROL LOG AT BACK OF CURB

CL-BOC



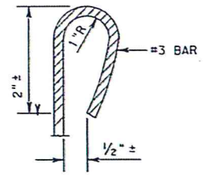
SECTION C-C

EROSION CONTROL LOG AT EDGE OF RIGHT-OF-WAY

CL-ROW

LEGEND

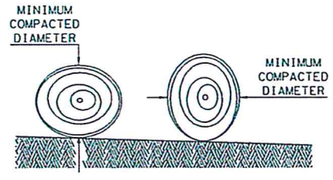
- CL-D — EROSION CONTROL LOG DAM
- CL-BOC — EROSION CONTROL LOG AT BACK OF CURB
- CL-ROW — EROSION CONTROL LOG AT EDGE OF RIGHT-OF-WAY
- CL-SST — EROSION CONTROL LOGS ON SLOPES STAKE AND TRENCHING ANCHORING
- CL-SSL — EROSION CONTROL LOGS ON SLOPES STAKE AND LASHING ANCHORING
- CL-DI — EROSION CONTROL LOG AT DROP INLET
- CL-CI — EROSION CONTROL LOG AT CURB INLET
- CL-GI — EROSION CONTROL LOG AT CURB & GRATE INLET



REBAR STAKE DETAIL

GENERAL NOTES:

1. EROSION CONTROL LOGS SHALL BE INSTALLED IN ACCORDANCE WITH MANFACTURER'S RECOMMENDATIONS, OR AS DIRECTED BY THE ENGINEER.
2. LENGTHS OF EROSION CONTROL LOGS SHALL BE IN ACCORDANCE WITH MANUFACTURER'S RECOMMENDATIONS AND AS REQUIRED FOR THE PURPOSE INTENDED.
3. UNLESS OTHERWISE DIRECTED, USE BIODEGRADABLE OR PHOTODEGRADABLE CONTAINMENT MESH ONLY WHERE LOG WILL REMAIN IN PLACE AS PART OF A VEGETATIVE SYSTEM. FOR TEMPORARY INSTALLATIONS, USE RECYCLABLE CONTAINMENT MESH.
4. FILL LOGS WITH SUFFICIENT FILTER MATERIAL TO ACHIEVE THE MINIMUM COMPACTED DIAMETER SPECIFIED IN THE PLANS WITHOUT EXCESSIVE DEFORMATION.
5. STAKES SHALL BE 2" X 2" WOOD OR #3 REBAR, 2'-4' LONG, EMBEDDED SUCH THAT 2" PROTRUDES ABOVE LOG, OR AS DIRECTED BY THE ENGINEER.
6. DO NOT PLACE STAKES THROUGH CONTAINMENT MESH.
7. COMPOST CRADLE MATERIAL IS INCIDENTAL & WILL NOT BE PAID FOR SEPARATELY.
8. SANDBAGS USED AS ANCHORS SHALL BE PLACED ON TOP OF LOGS & SHALL BE OF SUFFICIENT SIZE TO HOLD LOGS IN PLACE.
9. TURN THE ENDS OF EACH ROW OF LOGS UPSLOPE TO PREVENT RUNOFF FROM FLOWING AROUND THE LOG.
10. FOR HEAVY RUNOFF EVENTS, ADDITIONAL UPSTREAM STAKES MAY BE NECESSARY TO KEEP LOG FROM FOLDING IN ON ITSELF.



DIAMETER MEASUREMENTS OF EROSION CONTROL LOGS SPECIFIED IN PLANS

SEDIMENT BASIN & TRAP USAGE GUIDELINES

An erosion control log sediment trap may be used to filter sediment out of runoff draining from an unstabilized area.

Log Traps: The drainage area for a sediment trap should not exceed 5 acres. The trap capacity should be 1800 CF/Acre (0.5" over the drainage area).

Control logs should be placed in the following locations:
1. Within drainage ditches spaced as needed or min. 500' on center
2. Immediately preceding ditch inlets or drain inlets
3. Just before the drainage enters a water course
4. Just before the drainage leaves the right of way
5. Just before the drainage leaves the construction limits where drainage flows away from the project.

The logs should be cleaned when the sediment has accumulated to a depth of 1/2 the log diameter.

Cleaning and removal of accumulated sediment deposits is incidental and will not be paid for separately.

SHEET 1 OF 3

Texas Department of Transportation | Design Division Standard

TEMPORARY EROSION, SEDIMENT AND WATER POLLUTION CONTROL MEASURES

EROSION CONTROL LOG

EC(9)-16

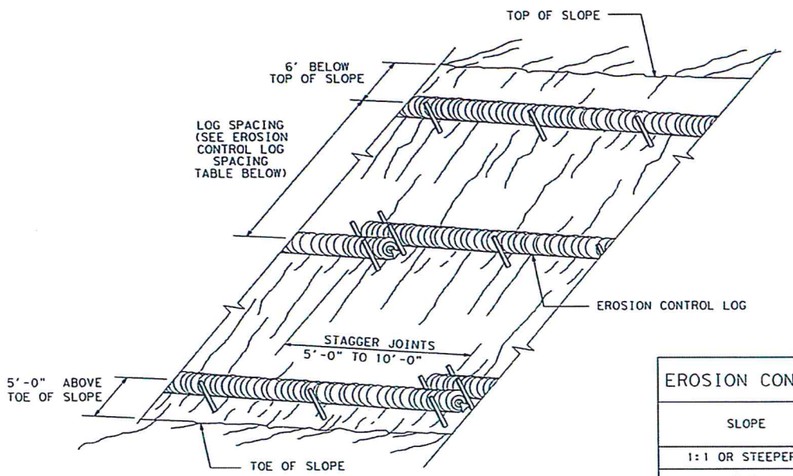
FILE: ec916	DN: TxDOT	CK: KW	DW: LS/PT	CK: LS
© TxDOT: JULY 2016	CONT	SECT	JOB	HIGHWAY
REVISIONS	DIST	COUNTY		SHEET NO.

CITY OF KINGSVILLE
ENGINEERING DEPARTMENT
400 West King
Kingsville, Texas 78363
Office 361.595.8007
Fax 361.595.8035

Drawn by: J. RAMIREZ
Date: 07/29/2019
Checked by: R. MORA
Job:

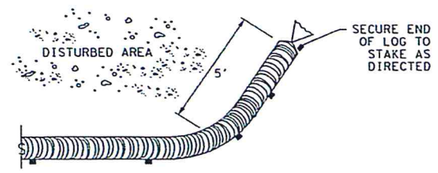
2019-JANUARY 2020
US 77 OVERPASS UTILITIES RELOCATION
EC - SEDIMENT AND WATER POLLUTION CONTROL MEASURES

SHEET 12



EROSION CONTROL LOGS ON SLOPES
STAKE AND TRENCHING ANCHORING

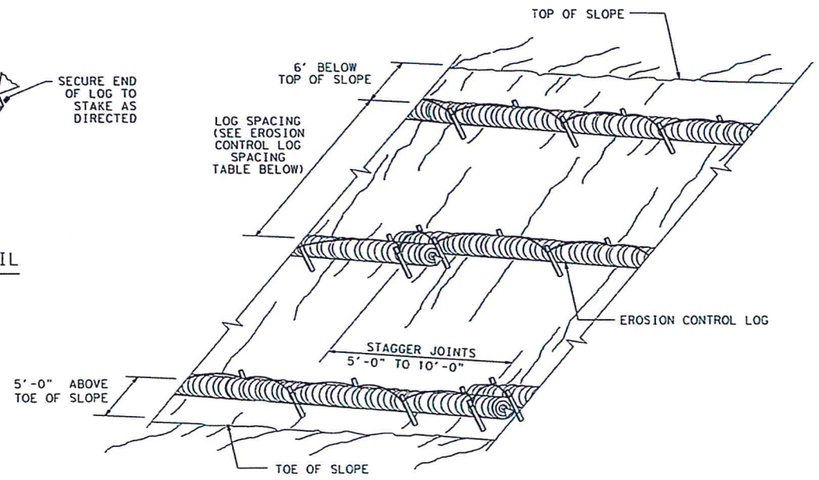
CL-SST



END SECTION RAP DETAIL

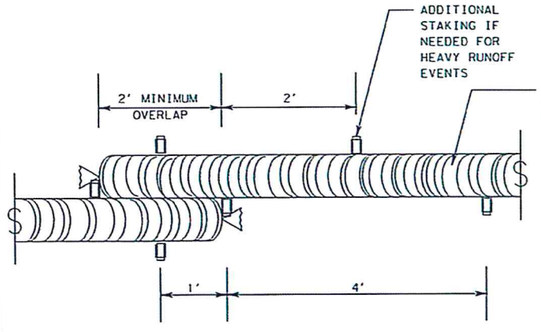
EROSION CONTROL LOG SPACING TABLE				
SLOPE	LOG DIAMETER			
	6"	8"	12"	18"
1:1 OR STEEPER	5'	10'	15'	20'
2:1	10'	20'	30'	40'
3:1	15'	30'	45'	60'
4:1 OR FLATTER	20'	40'	60'	80'

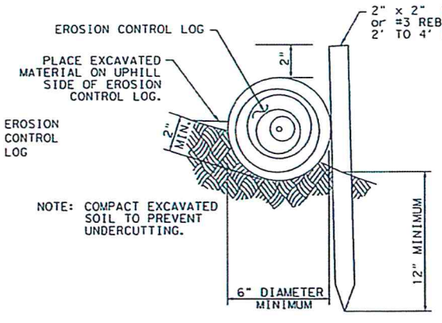
* ADJUSTMENTS CAN BE MADE FOR SOIL TYPE:
SOFT, LOAMY SOILS-ADJUST ROWS CLOSER TOGETHER;
HARD, ROCKY SOILS- ADJUST ROWS FARTHER APART



EROSION CONTROL LOGS ON SLOPES
STAKE AND LASHING ANCHORING

CL-SSL

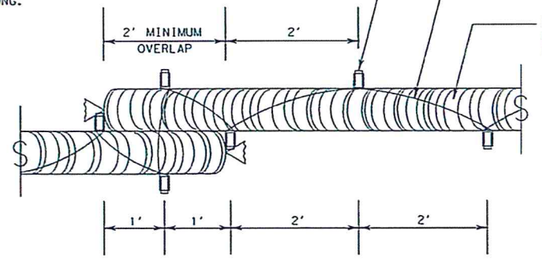




STAKE AND TRENCHING ANCHORING DETAIL

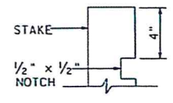
CL-SST

TRENCH DEPTH TABLE	
LOG DIAMETER	DEPTH
6"	2"
8"	3"
12"	4"
18"	5"

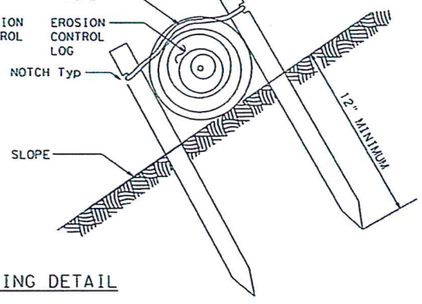


STAKE AND LASHING ANCHORING DETAIL

CL-SSL



STAKE NOTCH DETAIL



SHEET 2 OF 3

Texas Department of Transportation | Design Division Standard

TEMPORARY EROSION, SEDIMENT AND WATER POLLUTION CONTROL MEASURES

EROSION CONTROL LOG

EC(9)-16

FILE: ec116	DN: TxDOT	CK: KM	DW: LS/PT	CK: LS
© TxDOT: JULY 2016	CONT	SECT	JOB	HIGHWAY
REVISIONS				
	DIST	COUNTY		SHEET NO.

DATE:
FILE:

CITY OF KINGSVILLE
ENGINEERING DEPARTMENT
400 West King
Kingsville, Texas 78363
Office 361.595.8007
Fax 361.595.8035

Drawn by: J. RAMIREZ
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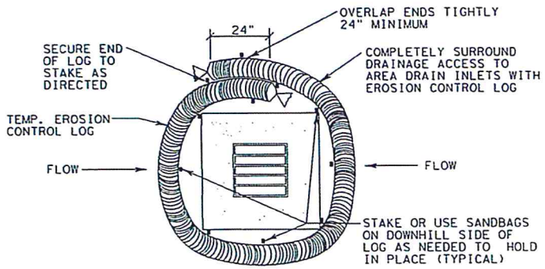
Job:

2019- JANUARY 2020
US 77 OVERPASS UTILITIES RELOCATION
EC - SEDIMENT AND WATER POLLUTION CONTROL MEASURES II

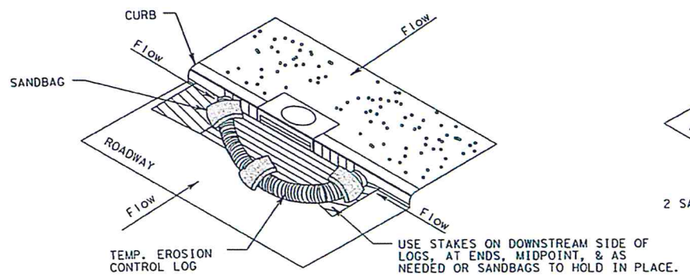
SHEET 13

DATE:
FILE:



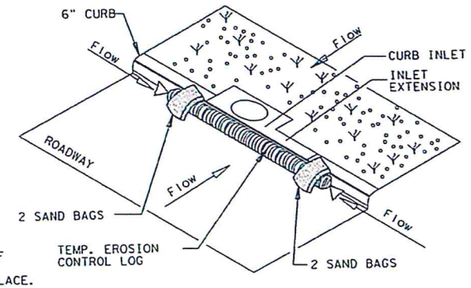
EROSION CONTROL LOG AT DROP INLET

CL-DI



EROSION CONTROL LOG AT CURB INLET

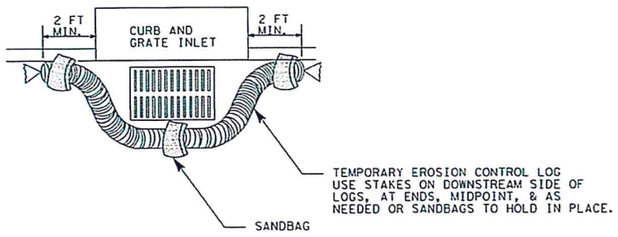
CL-CI



EROSION CONTROL LOG AT CURB INLET

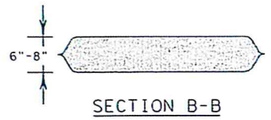
CL-CI

NOTE:
EROSION CONTROL LOGS USED AT CURB INLETS SHOULD ONLY BE USED IF THEY WILL NOT IMPEDE TRAFFIC OR FLOOD THE ROADWAY OR WHEN THE STORM SEWER SYSTEM IS NOT FULLY FUNCTIONAL.

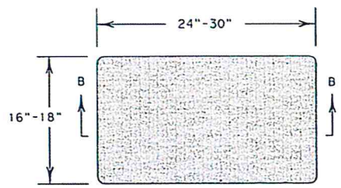


EROSION CONTROL LOG AT CURB & GRADE INLET

CL-GI



SECTION B-B



SANDBAG DETAIL

SHEET 3 OF 3

Texas Department of Transportation — Bridge Division Standard

TEMPORARY EROSION, SEDIMENT AND WATER POLLUTION CONTROL MEASURES

EROSION CONTROL LOG

EC(9)-16

FILE: ec916	DN: TxDOT	CK: KM	DW: LS/PT	CK: LS
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CITY OF KINGSVILLE
ENGINEERING DEPARTMENT

400 West King
Kingsville, Texas 78363
Office 361.595.8007
Fax 361.595.8035

Drawn by: J. RAMIREZ
Date: 07/29/2019
Checked by: R. MORA
Job:

2019- JANUARY 2020
US 77 OVERPASS UTILITIES RELOCATION
EC - SEDIMENT AND WATER POLLUTION CONTROL MEASURES III

SHEET
14

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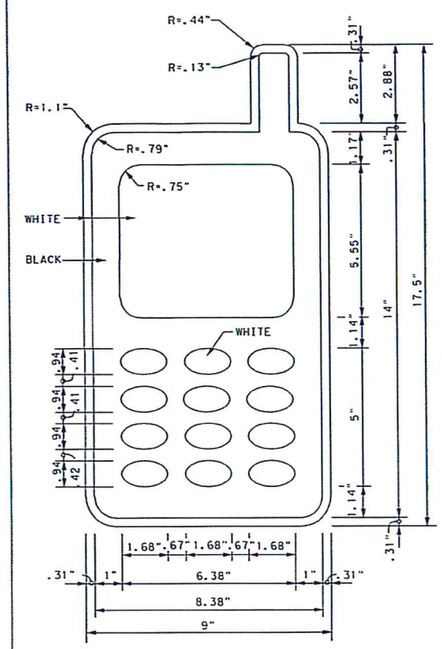
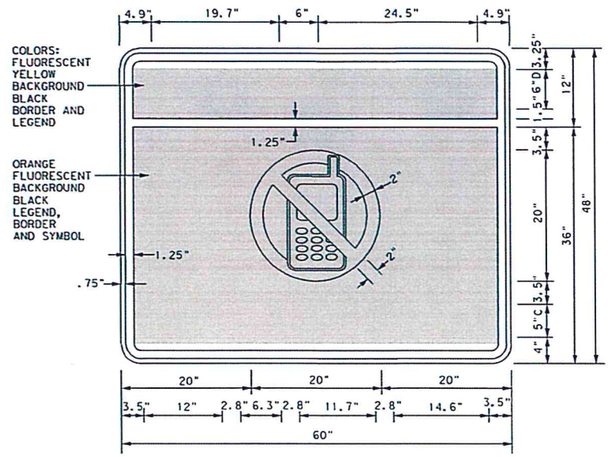
BARRICADE AND CONSTRUCTION (BC) STANDARD SHEETS GENERAL NOTES:

1. The Barricade and Construction Standard Sheets (BC sheets) are intended to show typical examples for placement of temporary traffic control devices, construction pavement markings, and typical work zone signs. The information contained in these sheets meet or exceed the requirements shown in the "Texas Manual on Uniform Traffic Control Devices" (TMUTCD).
2. The development and design of the Traffic Control Plan (TCP) is the responsibility of the Engineer.
3. The Contractor may propose changes to the TCP that are signed and sealed by a licensed professional engineer for approval. The Engineer may develop, sign and seal Contractor proposed changes.
4. The Contractor is responsible for installing and maintaining the traffic control devices as shown in the plans. The Contractor may not move or change the approximate location of any device without the approval of the Engineer.
5. Geometric design of lane shifts and detours should, when possible, meet the applicable design criteria contained in manuals such as the American Association of State Highway and Transportation Officials (AASHTO), "A Policy on Geometric Design of Highways and Streets," the TxDOT "Roadway Design Manual" or engineering judgment.
6. When projects abut, the Engineer(s) may omit the END ROAD WORK, TRAFFIC FINES DOUBLE, and other advance warning signs if the signing would be redundant and the work areas appear continuous to the motorists. If the adjacent project is completed first, the Contractor shall erect the necessary warning signs as shown on these sheets, the TCP sheets or as directed by the Engineer. The BEGIN ROAD WORK NEXT X MILES sign shall be revised to show appropriate work zone distance.
7. The Engineer may require duplicate warning signs on the median side of divided highways where median width will permit and traffic volumes justify the signing.
8. All signs shall be constructed in accordance with the details found in the "Standard Highway Sign Designs for Texas," latest edition. Sign details not shown in this manual shall be shown in the plans or the Engineer shall provide a detail to the Contractor before the sign is manufactured.
9. The temporary traffic control devices shown in the illustrations of the BC sheets are examples. As necessary, the Engineer will determine the most appropriate traffic control devices to be used.
10. As shown on BC(2), the OBEY WARNING SIGNS STATE LAW sign, STAY ALERT TALK OR TEXT LATER (see Sign Detail G20-10T) and the WORK ZONE TRAFFIC FINES DOUBLE sign with plaque shall be erected in advance of the CSJ limits. However, the TRAFFIC FINES DOUBLE sign will not be required on projects consisting solely of mobile operation work, such as striping or milling edgeline rumble strips. The BEGIN ROAD WORK NEXT X MILES, CONTRACTOR and END ROAD WORK signs shall be erected at or near the CSJ limits.
11. Except for devices required by Note 10, traffic control devices should be in place only while work is actually in progress or a definite need exists.
12. The Engineer has the final decision on the location of all traffic control devices.
13. Inactive equipment and work vehicles, including workers' private vehicles must be parked away from travel lanes. They should be as close to the right-of-way line as possible, or located behind a barrier or guardrail, or as approved by the Engineer.

WORKER SAFETY APPAREL NOTES:

1. Workers on foot who are exposed to traffic or to construction equipment within the right-of-way shall wear high-visibility safety apparel meeting the requirements of ISEA "American National Standard for High-Visibility Apparel," or equivalent revisions, and labeled as ANSI 107-2004 standard performance for Class 2 or 3 risk exposure. Class 3 garments should be considered for high traffic volume work areas or night time work.





3.0" Radius, 1.25" Border, 0.75" Indent, Black on Yellow;
[STAY ALERT] Font: D
3.0" Radius, 1.25" Border, 0.75" Indent, Black on Orange;
[TALK OR TEXT LATER] Font: C specified length;

SIGN DETAIL (G20-10T)

Only pre-qualified products shall be used. The "Compliant Work Zone Traffic Control Devices List" (CWZTCD) describes pre-qualified products and their sources and may be found on-line at the web address given below or by contacting:

Texas Department of Transportation
Traffic Operations Division - TE
Phone (512) 416-3118

THE DOCUMENTS BELOW CAN BE FOUND ON-LINE AT http://www.txdot.gov
COMPLIANT WORK ZONE TRAFFIC CONTROL DEVICES LIST (CWZTCD)
DEPARTMENTAL MATERIAL SPECIFICATIONS (DMS)
MATERIAL PRODUCER LIST (MPL)
ROADWAY DESIGN MANUAL - SEE "MANUALS (ONLINE MANUALS)"
STANDARD HIGHWAY SIGN DESIGNS FOR TEXAS (SHSD)
TEXAS MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES (TMUTCD)
TRAFFIC ENGINEERING STANDARD SHEETS

SHEET 1 OF 12

Texas Department of Transportation | Traffic Operations Division Standard

BARRICADE AND CONSTRUCTION GENERAL NOTES AND REQUIREMENTS

BC(1)-14

FILE: bc-14.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
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REVISIONS				
4-03 5-10 8-14	DIST	COUNTY		SHEET NO.
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95				

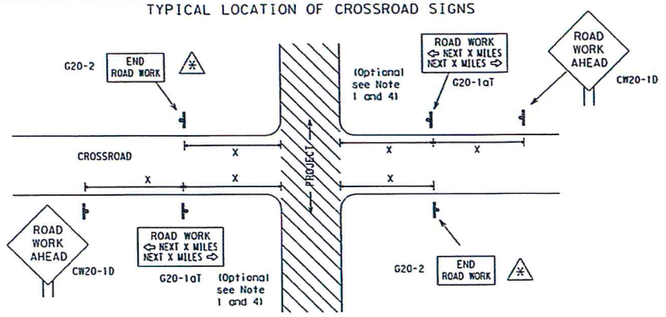
CITY OF KINGSVILLE
ENGINEERING DEPARTMENT
400 West King
Kingsville, Texas 78363
Office 361.595.8007
Fax 361.595.8035

Drawn by: J. RAMIREZ
Date: 07/29/2019
Checked by: R. MORA
Job:

2019- JANUARY 2020
US 77 OVERPASS UTILITIES RELOCATION
BC - GENERAL NOTES AND REQUIREMENTS

SHEET 15

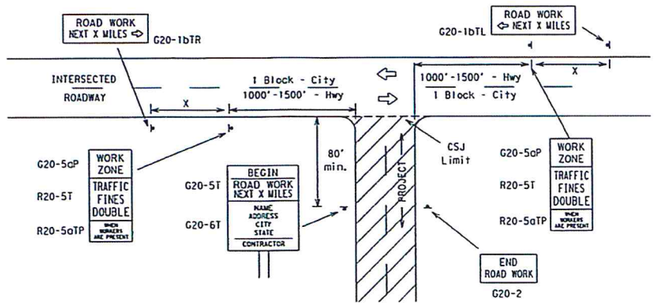
TYPICAL LOCATION OF CROSSROAD SIGNS



(*) May be mounted on back of "ROAD WORK AHEAD" (CW20-1D) sign with approval of Engineer. (See note 2 below)

1. The typical minimum signing on a crossroad approach should be a "ROAD WORK AHEAD" (CW20-1D) sign and a (G20-2) "END ROAD WORK" sign, unless noted otherwise in plans.
2. The Engineer may use the reduced size 36" x 36" ROAD WORK AHEAD (CW20-1D) sign mounted back to back with the reduced size 36" x 18" "END ROAD WORK" (G20-2) sign on low volume crossroads (see Note 4 under "Typical Construction Warning Sign Size and Spacing"). See the "Standard Highway Sign Designs for Texas" manual for sign details. The Engineer may omit the advance warning signs on low volume crossroads. The Engineer will determine whether a road is low volume. This information shall be shown in the plans.
3. Based on existing field conditions, the Engineer/Inspector may require additional signs such as FLAGGER AHEAD, LOOSE GRAVEL, or other appropriate signs. When additional signs are required, these signs will be considered part of the minimum requirements. The Engineer/Inspector will determine the proper location and spacing of any sign not shown on the BC sheets, Traffic Control Plan sheets or the Work Zone Standard Sheets.
4. The "ROAD WORK NEXT X MILES" (G20-1aT) sign shall be required at high volume crossroads to advise motorists of the length of construction in either direction from the intersection. The Engineer will determine whether a roadway is considered high volume.
5. Additional traffic control devices may be shown elsewhere in the plans for higher volume crossroads.
6. When work occurs in the intersection area, appropriate traffic control devices, as shown elsewhere in the plans or as determined by the Engineer/Inspector, shall be in place.

T-INTERSECTION



CSJ LIMITS AT T-INTERSECTION

1. The Engineer will determine the types and location of any additional traffic control devices, such as a flagger and accompanying signs, or other signs, that should be used when work is being performed at or near an intersection.
2. If construction closes the road at a T-intersection the Contractor shall place the "CONTRACTOR NAME" (G20-6T) sign behind the Type 3 Barricades for the road closure (see BC(10) also). The "ROAD WORK NEXT X MILES" left arrow (G20-1bTL) and "ROAD WORK NEXT X MILES" right arrow (G20-1bTR)" signs shall be replaced by the detour signing called for in the plans.

TYPICAL CONSTRUCTION WARNING SIGN SIZE AND SPACING[1,5,6]

SIZE			SPACING	
Sign Number or Series	Conventional Road	Expressway/ Freeway	Posted Speed	Sign Spacing "X" Δ
			MPH	Feet (Apprx.)
CW20[4] CW21 CW22 CW23 CW25	48" x 48"	48" x 48"	30	120
			35	160
			40	240
CW1, CW2, CW7, CW8, CW9, CW11, CW14	36" x 36"	48" x 48"	45	320
			50	400
			55	500[2]
			60	600[2]
CW3, CW4, CW5, CW6, CW8-3, CW10, CW12	48" x 48"	48" x 48"	65	700[2]
			70	800[2]
			75	900[2]
			80	1000[2]
			*	*[3]

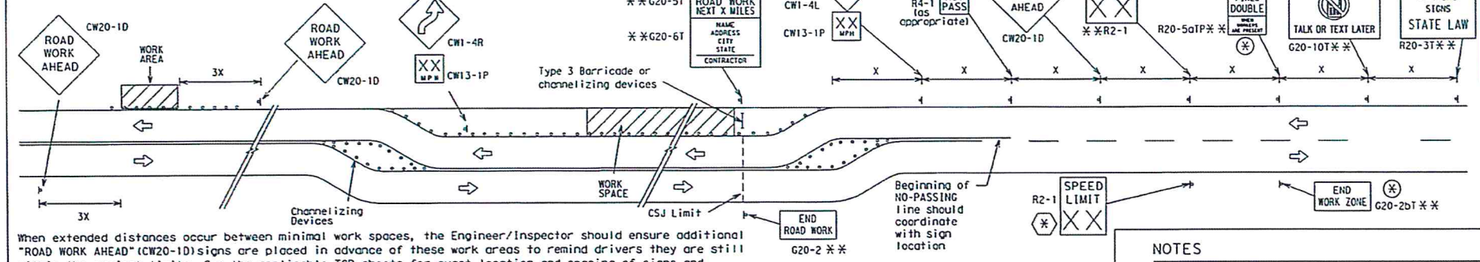
* For typical sign spacings on divided highways, expressways and freeways, see Part 6 of the "Texas Manual on Uniform Traffic Control Devices" (TMUTCD) typical application diagrams or TCP Standard Sheets.

Δ Minimum distance from work area to first Advance Warning sign nearest the work area and/or distance between each additional sign.

GENERAL NOTES

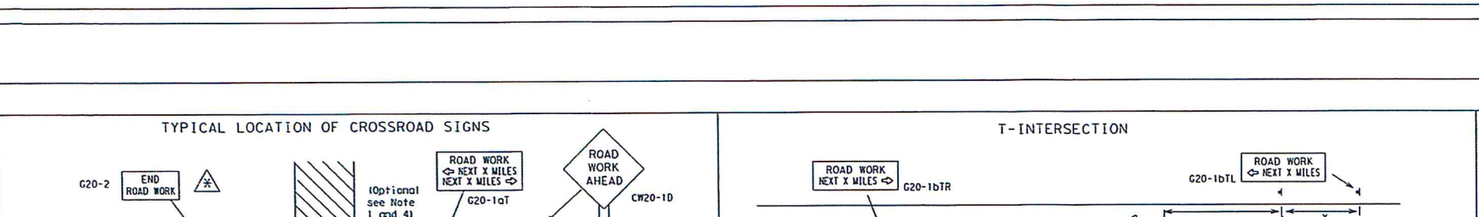
1. Special or larger size signs may be used as necessary.
2. Distance between signs should be increased as required to hove 1500 feet advance warning.
3. Distance between signs should be increased as required to have 1/2 mile or more advance warning.
4. 36" x 36" "ROAD WORK AHEAD" (CW20-1D) signs may be used on low volume crossroads at the discretion of the Engineer. See Note 2 under "Typical Location of Crossroad Signs".
5. Only diamond shaped warning sign sizes are indicated.
6. See sign size listing in "TMUTCD", Sign Appendix or the "Standard Highway Sign Designs for Texas" manual for complete list of available sign design sizes.

WORK AREAS IN MULTIPLE LOCATIONS WITHIN CSJ LIMITS

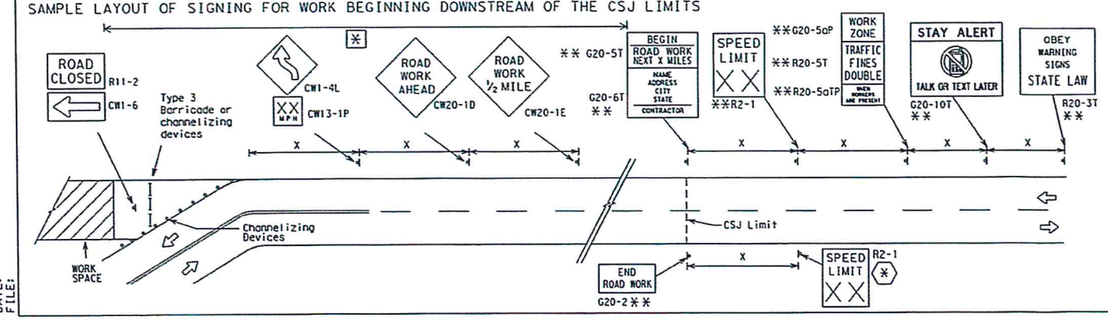


When extended distances occur between minimal work spaces, the Engineer/Inspector should ensure additional "ROAD WORK AHEAD" (CW20-1D) signs are placed in advance of these work areas to remind drivers they are still within the project limits. See the applicable TCP sheets for exact location and spacing of signs and channelizing devices.

SAMPLE LAYOUT OF SIGNING FOR WORK BEGINNING AT THE CSJ LIMITS



SAMPLE LAYOUT OF SIGNING FOR WORK BEGINNING DOWNSTREAM OF THE CSJ LIMITS



NOTES

The Contractor shall determine the appropriate distance to be placed on the G20-1 series signs and "BEGIN ROAD WORK NEXT X MILES" (G20-5T) sign for each specific project. This distance shall replace the "X" and shall be rounded to the nearest whole mile with the approval of the Engineer. No decimals shall be used.

(*) The "BEGIN WORK ZONE" (G20-9TP) and "END WORK ZONE" (G20-2bT) shall be used as shown on the sample layout when advance signs are required outside the CSJ Limits. They inform the motorist of entering or leaving a part of the work zone lying outside the CSJ Limits where traffic fines may double if workers are present.

** Required CSJ Limit signing. See Note 10 on BC(1). TRAFFIC FINES DOUBLE signs will not be required on projects consisting solely of mobile operations work.

(XX) Area for placement of "ROAD WORK AHEAD" (CW20-1D) sign and other signs or devices as called for on the Traffic Control Plan.

(*) Contractor will install a regulatory speed limit sign at the end of the work zone.

LEGEND	
⊢⊣	Type 3 Barricade
○○○	Channelizing Devices
⊥	Sign
X	See Typical Construction Warning Sign Size and Spacing chart or the TMUTCD for sign spacing requirements.

SHEET 2 OF 12

Texas Department of Transportation — Traffic Operations Division Standard

BARRICADE AND CONSTRUCTION PROJECT LIMIT

BC(2)-14

FILE: bc-14.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
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REVISIONS 9-07 8-14 7-13	DIST	COUNTY		SHEET NO.
96				

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CITY OF KINGSVILLE
ENGINEERING DEPARTMENT
400 West King
Kingsville, Texas 78363
Office 361.595.8007
Fax 361.595.8035

Drawn by: J. RAMIREZ
Date: 07/29/2019
Checked by: R. MORA
Job:

2019- JANUARY 2020
US 77 OVERPASS UTILITIES RELOCATION
BC - PROJECT LIMIT

SHEET 16

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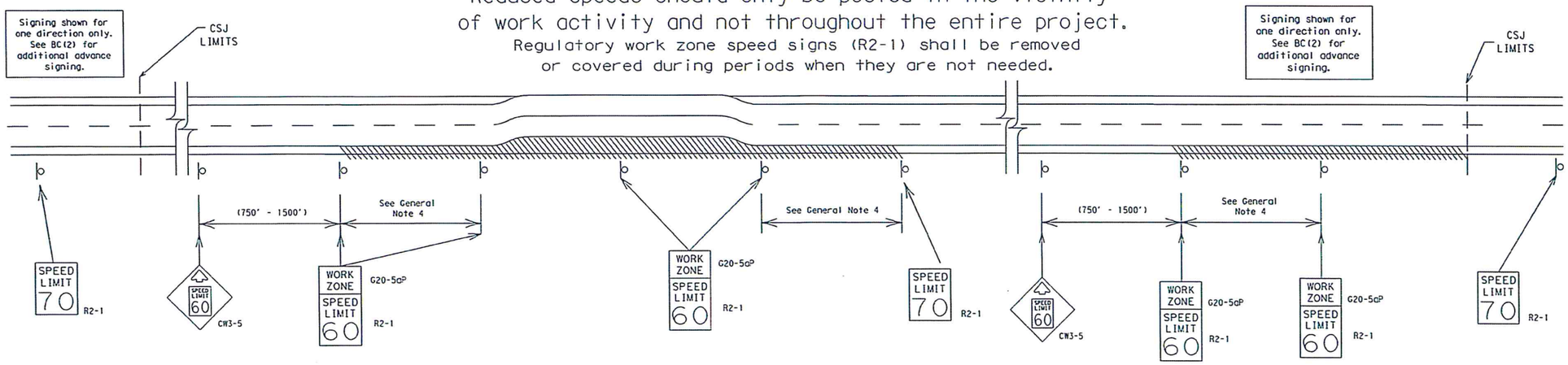
TYPICAL APPLICATION OF WORK ZONE SPEED LIMIT SIGNS

Work zone speed limits shall be regulatory, established in accordance with the "Procedures for Establishing Speed Zones," and approved by the Texas Transportation Commission, or by City Ordinance when within Incorporated City Limits.

Reduced speeds should only be posted in the vicinity of work activity and not throughout the entire project.

Regulatory work zone speed signs (R2-1) shall be removed or covered during periods when they are not needed.



GUIDANCE FOR USE:

LONG/INTERMEDIATE TERM WORK ZONE SPEED LIMITS

This type of work zone speed limit should be included on the design of the traffic control plans when restricted geometrics with a lower design speed are present in the work zone and modification of the geometrics to a higher design speed is not feasible.

Long/Intermediate Term Work Zone Speed Limit signs, when approved as described above, should be posted and visible to the motorist when work activity is present. Work activity may also be defined as a change in the roadway that requires a reduced speed for motorists to safely negotiate the work area, including:

a) rough road or damaged pavement surface
b) substantial alteration of roadway geometrics (diversions)
c) construction detours
d) grade
e) width
f) other conditions readily apparent to the driver

As long as any of these conditions exist, the work zone speed limit signs should remain in place.

SHORT TERM WORK ZONE SPEED LIMITS

This type of work zone speed limit may be included on the design of the traffic control plans when workers or equipment are not behind concrete barrier, when work activity is within 10 feet of the traveled way or actually in the travelled way.

Short Term Work Zone Speed Limit signs should be posted and visible to the motorists only when work activity is present. When work activity is not present, signs shall be removed or covered.
(See Removing or Covering on BC(4)).

GENERAL NOTES

1. Regulatory work zone speed limits should be used only for sections of construction projects where speed control is of major importance.
2. Regulatory work zone speed limit signs shall be placed on supports at a 7 foot minimum mounting height.
3. Speed zone signs are illustrated for one direction of travel and are normally posted for each direction of travel.
4. Frequency of work zone speed limit signs should be:
   40 mph and greater 0.2 to 2 miles
   35 mph and less 0.2 to 1 mile
5. Regulatory speed limit signs shall have black legend and border on a white reflective background (See "Reflective Sheeting" on BC(4)).
6. Fabrication, erection and maintenance of the "ADVANCE SPEED LIMIT" (CW3-5) sign, "WORK ZONE" (G20-5aP) plaque and the "SPEED LIMIT" (R2-1) signs shall not be paid for directly, but shall be considered subsidiary to Item 502.
7. Turning signs from view, laying signs over or down will not be allowed, unless as otherwise noted under "REMOVING OR COVERING" on BC(4).
8. Techniques that may help reduce traffic speeds include but are not limited to:
   A. Law enforcement.
   B. Flagger stationed next to sign.
   C. Portable changeable message sign (PCMS).
   D. Low-power (drone) radar transmitter.
   E. Speed monitor trailers or signs.
9. Speeds shown on details above are for illustration only. Work Zone Speed Limits should only be posted as approved for each project.
10. For more specific guidance concerning the type of work, work zone conditions and factors impacting allowable regulatory construction speed zone reduction see TxDOT form #1204 in the TxDOT e-form system.

Texas Department of Transportation | Traffic Operations Division Standard

BARRICADE AND CONSTRUCTION WORK ZONE SPEED LIMIT

BC(3)-14

FILE: bc-14.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
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CITY OF KINGSVILLE
ENGINEERING DEPARTMENT
400 West King
Kingsville, Texas 78363
Office 361.595.8007
Fax 361.595.8035

Drawn by: J. RAMIREZ
Date: 07/29/2019
Checked by: R. MORA
Job:

2019- JANUARY 2020
US 77 OVERPASS UTILITIES RELOCATION
BC - WORK ZONE SPEED LIMIT

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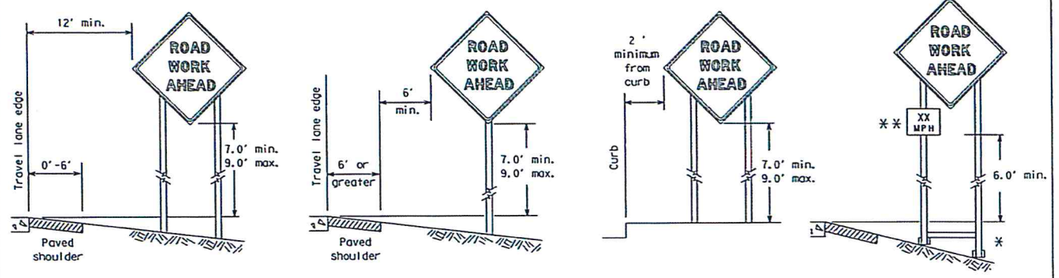
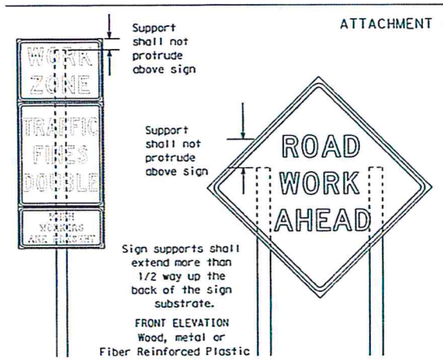
TYPICAL MINIMUM CLEARANCES FOR LONG TERM AND INTERMEDIATE TERM SIGNS



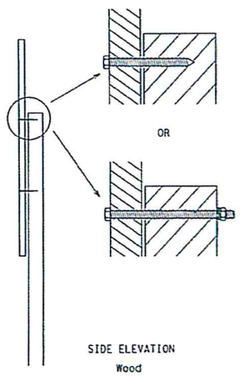
* When placing skid supports on unlevel ground, the leg post lengths must be adjusted so the sign appears straight and plumb. Objects shall NOT be placed under skids as a means of leveling.

** When plaques are placed on dual-leg supports, they should be attached to the upright nearest the travel lane. Supplemental plaques (advisory or distance) should not cover the surface of the parent sign.

ATTACHMENT FOR SIGN SUPPORTS



Splicing embedded perforated square metal tubing in order to extend post height will only be allowed when the splice is made using four bolts, two above and two below the spice point. Splice must be located entirely behind the sign substrate, not near the base of the support. Splice insert lengths should be at least 5 times nominal post size, centered on the splice and of at least the same gauge material.

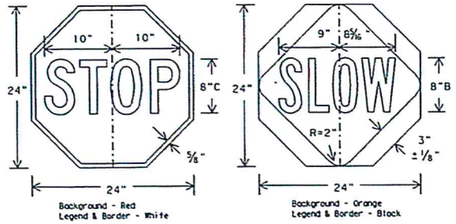


Attachment to wooden supports will be by bolts and nuts or screws. Use TxDOT's or manufacturer's recommended procedures for attaching sign substrates to other types of sign supports

Nails shall NOT be allowed. Each sign shall be attached directly to the sign support. Multiple signs shall not be joined or spliced by any means. Wood supports shall not be extended or repaired by splicing or other means.

STOP/SLOW PADDLES

1. STOP/SLOW paddles are the primary method to control traffic by flaggers. The STOP/SLOW paddle size should be 24" x 24" as detailed below.
2. When used at night, the STOP/SLOW paddle shall be retroreflectorized.
3. STOP/SLOW paddles may be attached to a staff with a minimum length of 6' to the bottom of the sign.
4. Any lights incorporated into the STOP or SLOW paddle faces shall only be as specifically described in Section 6E.03 Hand Signaling Devices in the TMUTCD.



CONTRACTOR REQUIREMENTS FOR MAINTAINING PERMANENT SIGNS WITHIN THE PROJECT LIMITS

1. Permanent signs are used to give notice of traffic laws or regulations, call attention to conditions that are potentially hazardous to traffic operations, show route designations, destinations, directions, distances, services, points of interest, and other geographical, recreational, or cultural information. Drivers proceeding through a work zone need the same, if not better route guidance as normally installed on a roadway without construction.
2. When permanent regulatory or warning signs conflict with work zone conditions, remove or cover the permanent signs until the permanent sign message matches the roadway condition.
3. When existing permanent signs are moved and relocated due to construction purposes, they shall be visible to motorists at all times.
4. If existing signs are to be relocated on their original supports, they shall be installed on crashworthy bases as shown on the SMD Standard sheets. The signs shall meet the required mounting heights shown on the BC Sheets or the SMD Standards. This work should be paid for under the appropriate pay item for relocating existing signs.
5. If permanent signs are to be removed and relocated using temporary supports, the Contractor shall use crashworthy supports as shown on the BC sheets or the CWZTCD. The signs shall meet the required mounting heights shown on the BC Sheets or the SMD Standards during construction. This work should be paid for under the appropriate pay item for relocating existing signs.
6. Any sign or traffic control device that is struck or damaged by the Contractor or his/her construction equipment shall be replaced as soon as possible by the Contractor to ensure proper guidance for the motorists. This will be subsidiary to Item 502.

GENERAL NOTES FOR WORK ZONE SIGNS

1. Contractor shall install and maintain signs in a straight and plumb condition and/or as directed by the Engineer.
2. Wooden sign posts shall be painted white.
3. Barricades shall NOT be used as sign supports.
4. All signs shall be installed in accordance with the plans or as directed by the Engineer. Signs shall be used to regulate, warn, and guide the traveling public safely through the work zone.
5. The Contractor may furnish either the sign design shown in the plans or in the "Standard Highway Sign Designs for Texas" (SHSD). The Engineer/Inspector may require the Contractor to furnish other work zone signs that are shown in the TMUTCD but may have been omitted from the plans. Any variation in the plans shall be documented by written agreement between the Engineer and the Contractor's Responsible Person. All changes must be documented in writing before being implemented. This can include documenting the changes in the Inspector's TxDOT diary and having both the Inspector and Contractor initial and date the agreed upon changes.
6. The Contractor shall furnish sign supports listed in the "Compliant Work Zone Traffic Control Device List" (CWZTCD). The Contractor shall install the sign support in accordance with the manufacturer's recommendations. If there is a question regarding installation procedures, the Contractor shall furnish the Engineer a copy of the manufacturer's installation recommendations so the Engineer can verify the correct procedures are being followed.
7. The Contractor is responsible for installing signs on approved supports and replacing signs with damaged or cracked substrates and/or damaged or marred reflective sheeting as directed by the Engineer/Inspector.
8. Identification markings may be shown only on the back of the sign substrate. The maximum height of letters and/or company logos used for identification shall be 1 inch.
9. The Contractor shall replace damaged wood posts. New or damaged wood sign posts shall not be spliced.

DURATION OF WORK (as defined by the "Texas Manual on Uniform Traffic Control Devices" Part 6)

1. The types of sign supports, sign mounting height, the size of signs, and the type of sign substrates can vary based on the type of work being performed. The Engineer is responsible for selecting the appropriate size sign for the type of work being performed. The Contractor is responsible for ensuring the sign support, sign mounting height and substrate meets manufacturer's recommendations in regard to crashworthiness and duration of work requirements.
   a. Long-term stationary - work that occupies a location more than 3 days.
   b. Intermediate-term stationary - work that occupies a location more than one daylight period up to 3 days, or nighttime work lasting more than one hour.
   c. Short-term stationary - daytime work that occupies a location for more than 1 hour in a single daylight period.
   d. Short, duration - work that occupies a location up to 1 hour.
   e. Mobile - work that moves continuously or intermittently (stopping for up to approximately 15 minutes.)

SIGN MOUNTING HEIGHT

1. The bottom of Long-term/Intermediate-term signs shall be at least 7 feet, but not more than 9 feet, above the paved surface, except as shown for supplemental plaques mounted below other signs.
2. The bottom of Short-term/Short Duration signs shall be a minimum of 1 foot above the pavement surface but no more than 2 feet above the ground.
3. Long-term/Intermediate-term Signs may be used in lieu of Short-term/Short Duration signing.
4. Short-term/Short Duration signs shall be used only during daylight and shall be removed at the end of the workday or raised to appropriate Long-term/Intermediate sign height.
5. Regulatory signs shall be mounted at least 7 feet, but not more than 9 feet, above the paved surface regardless of work duration.

SIZE OF SIGNS

1. The Contractor shall furnish the sign sizes shown on BC (2) unless otherwise shown in the plans or as directed by the Engineer.

SIGN SUBSTRATES

1. The Contractor shall ensure the sign substrate is installed in accordance with the manufacturer's recommendations for the type of sign support that is being used. The CWZTCD lists each substrate that can be used on the different types and models of sign supports.
2. "Mesh" type materials are NOT an approved sign substrate, regardless of the tightness of the weave.
3. All wooden individual sign panels fabricated from 2 or more pieces shall have one or more plywood cleat, 1/2" thick by 6" wide, fastened to the back of the sign and extending fully across the sign. The cleat shall be attached to the back of the sign using wood screws that do not penetrate the face of the sign panel. The screws shall be placed on both sides of the splice and spaced at 6" centers. The Engineer may approve other methods of splicing the sign face.

REFLECTIVE SHEETING

1. All signs shall be retroreflective and constructed of sheeting meeting the color and retro-reflectivity requirements of DMS-8300 for rigid signs or DMS-8310 for roll-up signs. The web address for DMS specifications is shown on BC(1).
2. "Mesh" type materials are NOT an approved sign substrate, regardless of the tightness of the weave.
3. White sheeting, meeting the requirements of DMS-8300 Type A, shall be used for signs with a white background.
4. Orange sheeting, meeting the requirements of DMS-8300 Type B_{FL} or Type C_{FL}, shall be used for rigid signs with orange backgrounds.

SIGN LETTERS

1. All sign letters and numbers shall be clear, and open rounded type uppercase alphabet letters as approved by the Federal Highway Administration (FHWA) and as published in the "Standard Highway Sign Design for Texas" manual. Signs, letters and numbers shall be of first class workmanship in accordance with Department Standards and Specifications.

REMOVING OR COVERING

1. When sign messages may be confusing or do not apply, the signs shall be removed or completely covered.
2. Long-term stationary or intermediate stationary signs installed on square metal tubing may be turned away from traffic 90 degrees when the sign message is not applicable. This technique may not be used for signs installed in the median of divided highways or near any intersections where the sign may be seen from approaching traffic.
3. Signs installed on wooden skids shall not be turned at 90 degree angles to the roadway. These signs should be removed or completely covered when not required.
4. When signs are covered, the material used shall be opaque, such as heavy mil black plastic, or other materials which will cover the entire sign face and maintain their opaque properties under automobile headlights at night, without damaging the sign sheeting.
5. Burlap shall NOT be used to cover signs.
6. Duct tape or other adhesive material shall NOT be affixed to a sign face.
7. Signs and anchor stubs shall be removed and holes backfilled upon completion of work.

SIGN SUPPORT WEIGHTS

1. Where sign supports require the use of weights to keep from turning over, the use of sandbags with dry, cohesionless sand should be used.
2. The sandbags will be tied shut to keep the sand from spilling and to maintain a constant weight.
3. Rock, concrete, iron, steel or other solid objects shall not be permitted for use as sign support weights.
4. Sandbags should weigh a minimum of 35 lbs and a maximum of 50 lbs.
5. Sandbags shall be made of a durable material that tears upon vehicular impact. Rubber (such as tire inner tubes) shall NOT be used.
6. Rubber ballasts designed for channelizing devices should not be used for ballast on portable sign supports. Sign supports designed and manufactured with rubber bases may be used when shown on the CWZTCD list.
7. Sandbags shall only be placed along or laid over the base supports of the traffic control device and shall not be suspended above ground level or hung with rope, wire, chains or other fasteners. Sandbags shall be placed along the length of the skids to weigh down the sign support.
8. Sandbags shall NOT be placed under the skid and shall not be used to level sign supports placed on slopes.

FLAGS ON SIGNS

1. Flags may be used to draw attention to warning signs. When used the flag shall be 16 inches square or larger and shall be orange or fluorescent red-orange in color. Flags shall not be allowed to cover any portion of the sign face.

Texas Department of Transportation | Traffic Operations Division Standard

BARRICADE AND CONSTRUCTION TEMPORARY SIGN NOTES

BC(4)-14

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REVISIONS 9-07 8-14 7-13	DIST	COUNTY		SHEET NO.
98				

DATE:
FILE:

CITY OF KINGSVILLE
ENGINEERING DEPARTMENT
400 West King
Kingsville, Texas 78363
Office 361.595.8007
Fax 361.595.8035

Drawn by: J. RAMIREZ
Date: 07/29/2019
Checked by: R. MORA
Job:

2019-JANUARY 2020
US 77 OVERPASS UTILITIES RELOCATION
BC - TEMPORARY SIGN NOTES

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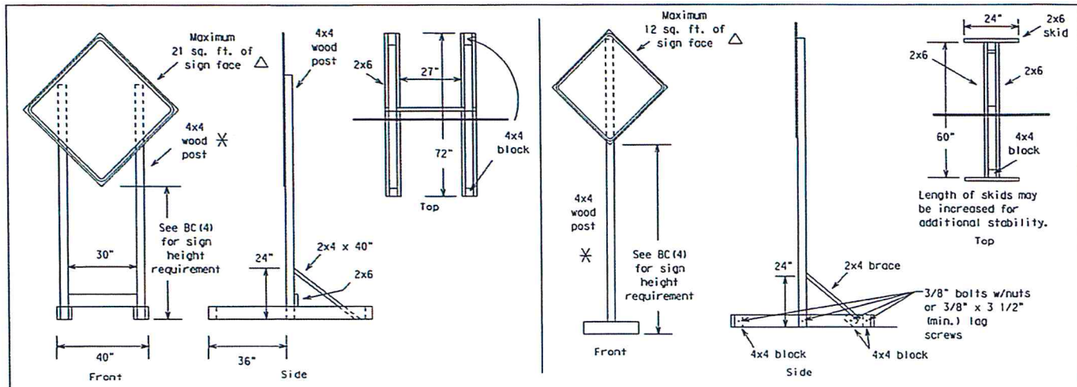
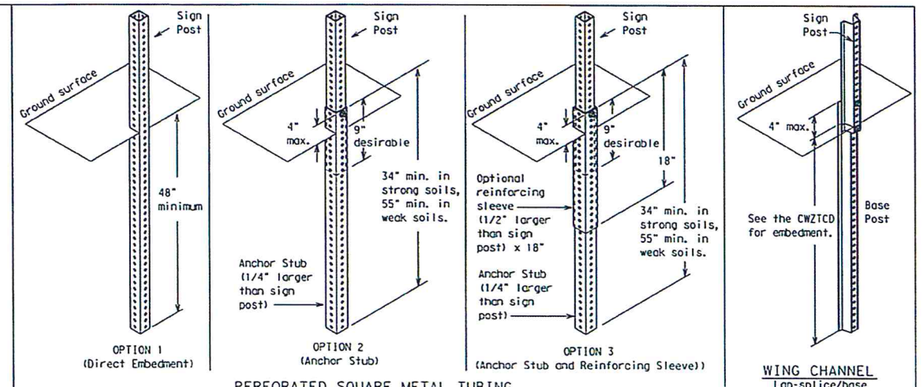


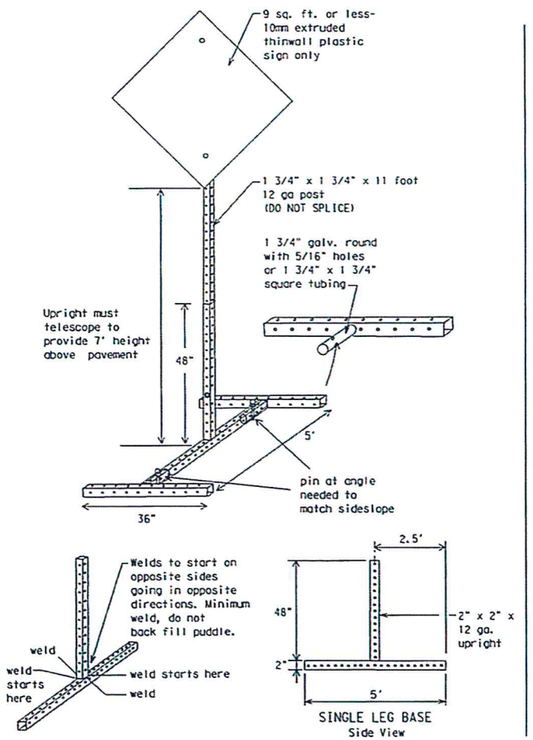
SKID MOUNTED WOOD SIGN SUPPORTS

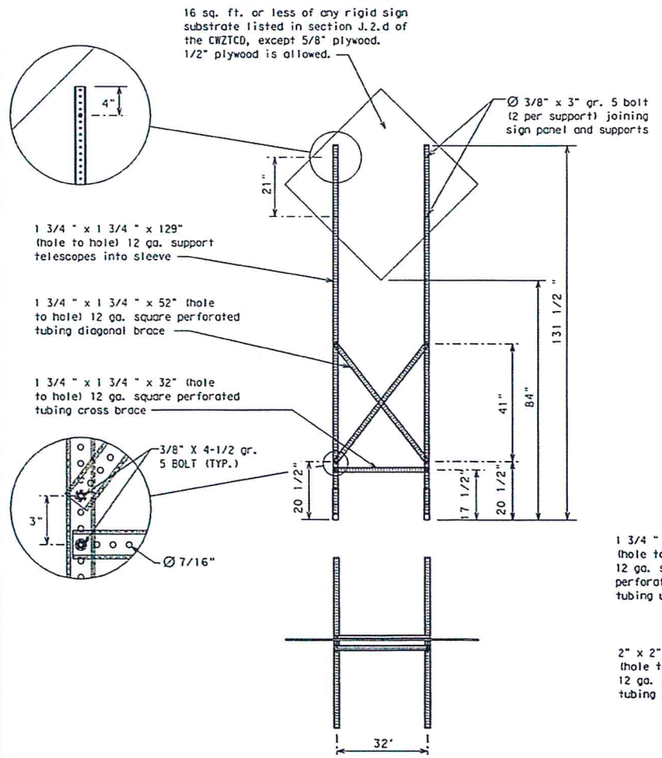
LONG/INTERMEDIATE TERM STATIONARY - PORTABLE SKID MOUNTED SIGN SUPPORTS □



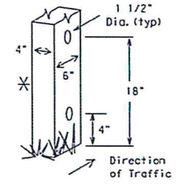
GROUND MOUNTED SIGN SUPPORTS

Refer to the CWZTCD and the manufacturer's installation procedure for each type sign support.
The maximum sign square footage shall adhere to the manufacturer's recommendation.
Two post installations can be used for larger signs.



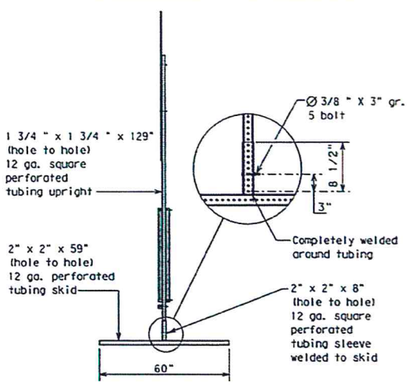


SKID MOUNTED PERFORATED SQUARE STEEL TUBING SIGN SUPPORTS



Nominal Post Size	Number of Posts	Maximum Sq. feet of Sign Face	Minimum Soil Embedment	Drilled Hole(s) Required
4 x 4	1	12	36"	NO
4 x 4	2	21	36"	NO
4 x 6	1	21	36"	YES
4 x 6	2	36	36"	YES

WOOD POST SYSTEM FOR GROUND MOUNTED SIGN SUPPORTS



WEDGE ANCHORS

Both steel and plastic Wedge Anchor Systems as shown on the SMD Standard Sheets may be used as temporary sign supports for signs up to 10 square feet of sign face. They may be set in concrete or in sturdy soils if approved by the Engineer. (See web address for "Traffic Engineering Standard Sheets" on BC(1)).

OTHER DESIGNS

MORE DETAILS OF APPROVED LONG/INTERMEDIATE AND SHORT TERM SUPPORTS CAN BE FOUND ON THE CWZTCD LIST. SEE BC(1) FOR WEBSITE LOCATION.

GENERAL NOTES

1. Nails may be used in the assembly of wooden sign supports, but 3/8" bolts with nuts or 3/8" x 3 1/2" lag screws must be used on every joint for final connection.
2. No more than 2 sign posts shall be placed within a 7 ft. circle, except for specific materials noted on the CWZTCD List.
3. When project is completed, all sign supports and foundations shall be removed from the project site. This will be considered subsidiary to Item 502.

□ See BC(4) for definition of "Work Duration."

⁂ Wood sign posts MUST be one piece. Splicing will NOT be allowed. Posts shall be painted white.

△ See the CWZTCD for the type of sign substrate that can be used for each approved sign support.

SHEET 5 OF 12

Texas Department of Transportation | Traffic Operations Division Standard

BARRICADE AND CONSTRUCTION TYPICAL SIGN SUPPORT

BC(5)-14

FILE: bc-14.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
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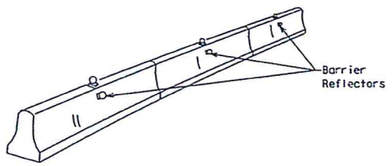
CITY OF KINGSVILLE
ENGINEERING DEPARTMENT
400 West King
Kingsville, Texas 78363
Office 361.595.8007
Fax 361.595.8035

Drawn by: J. RAMIREZ
Date: 07/29/2019
Checked by: R. MORA
Job:

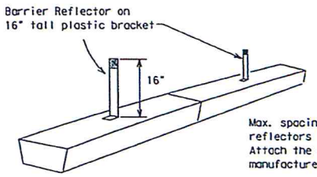
2019- JANUARY 2020
US 77 OVERPASS UTILITIES RELOCATION
BC - TYPICAL SIGN SUPPORT

1. Barrier Reflectors shall be pre-qualified, and conform to the color and reflectivity requirements of DMS-8600. A list of prequalified Barrier Reflectors can be found at the Material Producer List web address shown on BC(1).
2. Color of Barrier Reflectors shall be as specified in the TMUTCD. The cost of the reflectors shall be considered subsidiary to Item 512.

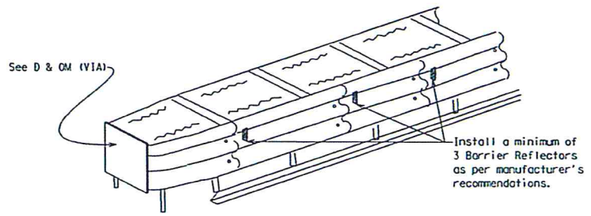


CONCRETE TRAFFIC BARRIER (CTB)

3. Where traffic is on one side of the CTB, two (2) Barrier Reflectors shall be mounted in approximately the midsection of each section of CTB. An alternate mounting location is uniformly spaced at one end of each CTB. This will allow for attachment of a barrier grapple without damaging the reflector. The Barrier Reflector mounted on the side of the CTB shall be located directly below the reflector mounted on top of the barrier, as shown in the detail above.
4. Where CTB separates two-way traffic, three barrier reflectors shall be mounted on each section of CTB. The reflector unit on top shall have two yellow reflective faces (Bi-Directional)while the reflectors on each side of the barrier shall have one yellow reflective face, as shown in the detail above.
5. When CTB separates traffic traveling in the same direction, no barrier reflectors will be required on top of the CTB.
6. Barrier Reflector units shall be yellow or white in color to match the edgeline being supplemented.
7. Maximum spacing of Barrier Reflectors is forty (40) feet.
8. Pavement markers or temporary flexible-reflective roadway marker tabs shall NOT be used as CTB delineation.
9. Attachment of Barrier Reflectors to CTB shall be per manufacturer's recommendations.
10. Missing or damaged Barrier Reflectors shall be replaced as directed by the Engineer.
11. Single slope barriers shall be delineated as shown on the above detail.



LOW PROFILE CONCRETE BARRIER (LPCB)



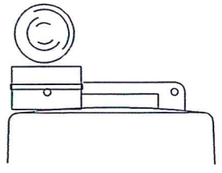
DELINEATION OF END TREATMENTS

END TREATMENTS FOR CTB'S USED IN WORK ZONES

End treatments used on CTB's in work zones shall meet crashworthy standards as defined in the National Cooperative Highway Research Report 350. Refer to the CWZTCD List for approved end treatments and manufacturers.

BARRIER REFLECTORS FOR CONCRETE TRAFFIC BARRIER AND ATTENUATORS

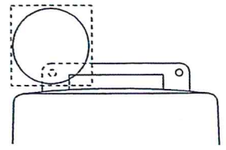
WARNING LIGHTS



Type C Warning Light or approved substitute mounted on a drum adjacent to the travel way.

1. Warning lights shall meet the requirements of the TMUTCD.
2. Warning lights shall NOT be installed on barricades.
3. Type A-Low Intensity Flashing Warning Lights are commonly used with drums. They are intended to warn of or mark a potentially hazardous area. Their use shall be as indicated on this sheet and/or other sheets of the plans by the designation "FL". The Type A Warning Lights shall not be used with signs manufactured with Type B_{FL} or C_{FL} Sheeting meeting the requirements of Departmental Material Specification DMS-8300.
4. Type-C and Type D 360 degree Steady Burn Lights are intended to be used in a series for delineation to supplement other traffic control devices. Their use shall be as indicated on this sheet and/or other sheets of the plans by the designation "SB".
5. The Engineer/Inspector or the plans shall specify the location and type of warning lights to be installed on the traffic control devices.
6. When required by the Engineer, the Contractor shall furnish a copy of the warning lights certification. The warning light manufacturer will certify the warning lights meet the requirements of the latest ITE Purchase Specifications for Flashing and Steady-Burn Warning Lights.
7. When used to delineate curves, Type-C and Type D Steady Burn Lights should only be placed on the outside of the curve, not the inside.
8. The location of warning lights and warning reflectors on drums shall be as shown elsewhere in the plans.

WARNING LIGHTS MOUNTED ON PLASTIC DRUMS



Warning reflector may be round or square. Must have a yellow reflective surface area of at least 30 square inches

1. Type A flashing warning lights are intended to warn drivers that they are approaching or are in a potentially hazardous area.
2. Type A random flashing warning lights are not intended for delineation and shall not be used in a series.
3. A series of sequential flashing warning lights placed on channelizing devices to form a merging taper may be used for delineation. If used, the successive flashing of the sequential warning lights should occur from the beginning of the taper to the end of the merging taper in order to identify the desired vehicle path. The rate of flashing for each light shall be 65 flashes per minute, plus or minus 10 flashes.
4. Type C and D steady-burn warning lights are intended to be used in a series to delineate the edge of the travel lane on detours, on lane changes, on lane closures, and on other similar conditions.
5. Type A, Type C and Type D warning lights shall be installed at locations as detailed on other sheets in the plans.
6. Warning lights shall not be installed on a drum that has a sign, chevron or vertical panel.
7. The maximum spacing for warning lights on drums should be identical to the channelizing device spacing.

WARNING REFLECTORS MOUNTED ON PLASTIC DRUMS AS A SUBSTITUTE FOR TYPE C (STEADY BURN) WARNING LIGHTS

1. A warning reflector or approved substitute may be mounted on a plastic drum as a substitute for a Type C, steady burn warning light at the discretion of the Contractor unless otherwise noted in the plans.
2. The warning reflector shall be yellow in color and shall be manufactured using a sign substrate approved for use with plastic drums listed on the CWZTCD.
3. The warning reflector shall have a minimum retroreflective surface area (one-side) of 30 square inches.
4. Round reflectors shall be fully reflectorized, including the area where attached to the drum.
5. Square substrates must have a minimum of 30 square inches of reflectorized sheeting. They do not have to be reflectorized where it attaches to the drum.
6. The side of the warning reflector facing approaching traffic shall have sheeting meeting the color and retroreflectivity requirements for DMS 8300-Type B or Type C.
7. When used near two-way traffic, both sides of the warning reflector shall be reflectorized.
8. The warning reflector should be mounted on the side of the handle nearest approaching traffic.
9. The maximum spacing for warning reflectors should be identical to the channelizing device spacing requirements.

DATE:
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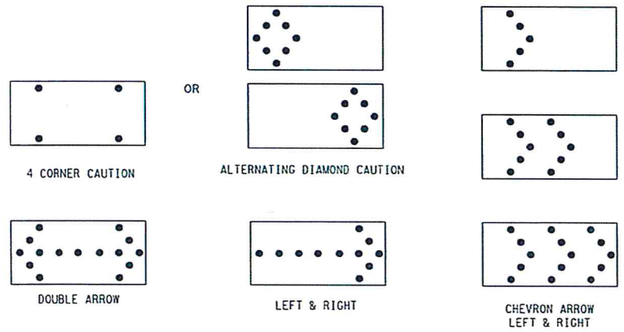
Arrow Boards may be located behind channelizing devices in place for a shoulder taper or merging taper, otherwise they shall be delineated with four (4) channelizing devices placed perpendicular to traffic on the upstream side of traffic.

1. The Flashing Arrow Board should be used for all lane closures on multi-lane roadways, or slow moving maintenance or construction activities on the travel lanes.
2. Flashing Arrow Boards should not be used on two-lane, two-way roadways, detours, diversions or work on shoulders unless the "CAUTION" display (see detail below) is used.
3. The Engineer/Inspector shall choose all appropriate signs, barricades and/or other traffic control devices that should be used in conjunction with the Flashing Arrow Board.
4. The Flashing Arrow Board should be able to display the following symbols:



5. The "CAUTION" display consists of four corner lamps flashing simultaneously, or the Alternating Diamond Caution mode as shown.
6. The straight line caution display is NOT ALLOWED.
7. The Flashing Arrow Board shall be capable of minimum 50 percent dimming from rated lamp voltage. The flashing rate of the lamps shall not be less than 25 nor more than 40 flashes per minute.
8. Minimum lamp "on time" shall be approximately 50 percent for the flashing arrow and equal intervals of 25 percent for each sequential phase of the flashing chevron.
9. The sequential arrow display is NOT ALLOWED.
10. The flashing arrow display is the TxDOT standard; however, the sequential Chevron display may be used during daylight operations.
11. The Flashing Arrow Board shall be mounted on a vehicle, trailer or other suitable support.
12. A Flashing Arrow Board SHALL NOT BE USED to laterally shift traffic.
13. A full matrix PCMS may be used to simulate a Flashing Arrow Board provided it meets visibility, flash rate and dimming requirements on this sheet for the same size arrow.
14. Minimum mounting height of trailer mounted Arrow Boards should be 7 feet from roadway to bottom of panel.

REQUIREMENTS			
TYPE	MINIMUM SIZE	MINIMUM NUMBER OF PANEL LAMPS	MINIMUM VISIBILITY DISTANCE
B	30 x 60	13	3/4 mile
C	48 x 96	15	1 mile

ATTENTION
Flashing Arrow Boards shall be equipped with automatic dimming devices.

WHEN NOT IN USE, REMOVE THE ARROW BOARD FROM THE RIGHT-OF-WAY OR PLACE THE ARROW BOARD BEHIND CONCRETE TRAFFIC BARRIER OR GUARDRAIL.

FLASHING ARROW BOARDS

TRUCK-MOUNTED ATTENUATORS

1. Truck-mounted attenuators (TMA) used on TxDOT facilities must meet the requirements outlined in the National Cooperative Highway Research Report No. 350 (NCHRP 350) or the Manual for Assessing Safety Hardware (MASH).
2. Refer to the CWZTCD for the requirements of Level 2 or Level 3 TMAs.
3. Refer to the CWZTCD for a list of approved TMAs.
4. TMAs are required on freeways unless otherwise noted in the plans.
5. A TMA should be used anytime that it can be positioned 30 to 100 feet in advance of the area of crew exposure without adversely affecting the work performance.
6. The only reason a TMA should not be required is when a work area is spread down the roadway and the work crew is an extended distance from the TMA.

SHEET 7 OF 12

Texas Department of Transportation — Traffic Operations Division Standard

BARRICADE AND CONSTRUCTION ARROW PANEL, REFLECTORS, WARNING LIGHTS & ATTENUATOR

BC(7)-14

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CITY OF KINGSVILLE
ENGINEERING DEPARTMENT
400 West King
Kingsville, Texas 78363
Office 361.595.8007
Fax 361.595.8035

Drawn by: J. RAMIREZ
Date: 07/29/2019
Checked by: R. MORA
Job:

2019-JANUARY 2020
US 77 OVERPASS UTILITIES RELOCATION
BC - ARROW PANEL, REFLECTORS, WARNING LIGHTS & ATTENUATOR

SHEET 20

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GENERAL NOTES

1. For long term stationary work zones on freeways, drums shall be used as the primary channelizing device.
2. For intermediate term stationary work zones on freeways, drums should be used as the primary channelizing device but may be replaced in tangent sections by vertical panels, or 42" two-piece cones. In tangent sections one-piece cones may be used with the approval of the Engineer but only if personnel are present on the project at all times to maintain the cones in proper position and location.
3. For short term stationary work zones on freeways, drums are the preferred channelizing device but may be replaced in tapers, transitions and tangent sections by vertical panels, two-piece cones or one-piece cones as approved by the Engineer.
4. Drums and all related items shall comply with the requirements of the current version of the "Texas Manual on Uniform Traffic Control Devices" (TMUTCD) and the "Compliant Work Zone Traffic Control Devices List" (CWZTCD).
5. Drums, bases, and related materials shall exhibit good workmanship and shall be free from objectionable marks or defects that would adversely affect their appearance or serviceability.
6. The Contractor shall have a maximum of 24 hours to replace any plastic drums identified for replacement by the Engineer/Inspector. The replacement device must be an approved device.

GENERAL DESIGN REQUIREMENTS

Pre-qualified plastic drums shall meet the following requirements:

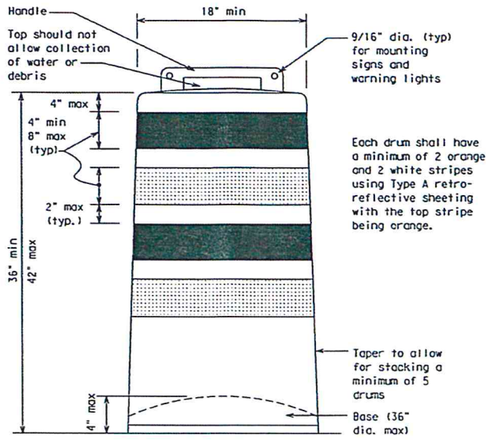
1. Plastic drums shall be a two-piece design; the "body" of the drum shall be the top portion and the "base" shall be the bottom.
2. The body and base shall lock together in such a manner that the body separates from the base when impacted by a vehicle traveling at a speed of 20 MPH or greater but prevents accidental separation due to normal handling and/or air turbulence created by passing vehicles.
3. Plastic drums shall be constructed of lightweight flexible, and deformable materials. The Contractor shall NOT use metal drums or single piece plastic drums as channelization devices or sign supports.
4. Drums shall present a profile that is a minimum of 18 inches in width at the 36 inch height when viewed from any direction. The height of drum unit (body installed on base) shall be a minimum of 36 inches and a maximum of 42 inches.
5. The top of the drum shall have a built-in handle for easy pickup and shall be designed to drain water and not collect debris. The handle shall have a minimum of two widely spaced 9/16 inch diameter holes to allow attachment of a warning light, warning reflector unit or approved compliant sign.
6. The exterior of the drum body shall have a minimum of four alternating orange and white retroreflective circumferential stripes not less than 4 inches nor greater than 8 inches in width. Any non-reflectorized space between any two adjacent stripes shall not exceed 2 inches in width.
7. Bases shall have a maximum width of 36 inches, a maximum height of 4 inches, and a minimum of two footholds of sufficient size to allow base to be held down while separating the drum body from the base.
8. Plastic drums shall be constructed of ultra-violet stabilized, orange, high-density polyethylene (HDPE) or other approved material.
9. Drum body shall have a maximum unballasted weight of 11 lbs.
10. Drum and base shall be marked with manufacturer's name and model number.

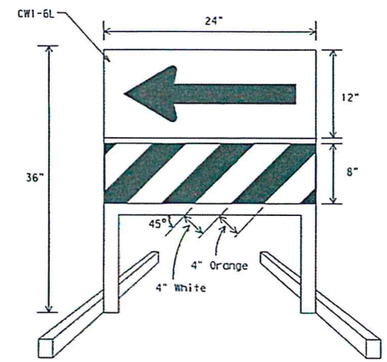
RETROREFLECTIVE SHEETING

1. The stripes used on drums shall be constructed of sheeting meeting the color and retroreflectivity requirements of Departmental Materials Specification DMS-8300, "Sign Face Materials." Type A reflective sheeting shall be supplied unless otherwise specified in the plans.
2. The sheeting shall be suitable for use on and shall adhere to the drum surface such that, upon vehicular impact, the sheeting shall remain adhered in-place and exhibit no delaminating, cracking, or loss of retroreflectivity other than that loss due to abrasion of the sheeting surface.

BALLAST

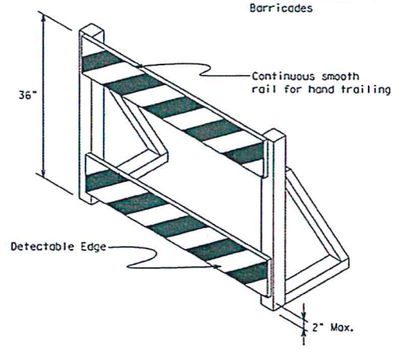
1. Unballasted bases shall be large enough to hold up to 50 lbs. of sand. This base, when filled with the ballast material, should weigh between 35 lbs (minimum) and 50 lbs (maximum). The ballast may be sand in one to three sandbags separate from the base, sand in a sand-filled plastic base, or other ballasting devices as approved by the Engineer. Stacking of sandbags will be allowed, however height of sandbags above pavement surface may not exceed 12 inches.
2. Bases with built-in ballast shall weigh between 40 lbs. and 50 lbs. Built-in ballast can be constructed of an integral crumb rubber base or a solid rubber base.
3. Recycled truck tire sidewalls may be used for ballast on drums approved for this type of ballast on the CWZTCD list.
4. The ballast shall not be heavy objects, water, or any material that would become hazardous to motorists, pedestrians, or workers when the drum is struck by a vehicle.
5. When used in regions susceptible to freezing, drums shall have drainage holes in the bottoms so that water will not collect and freeze becoming a hazard when struck by a vehicle.
6. Ballast shall not be placed on top of drums.
7. Adhesives may be used to secure base of drums to pavement.





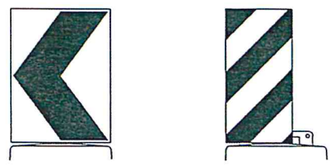
DIRECTION INDICATOR BARRICADE

1. The Direction Indicator Barricade may be used in tapers, transitions, and other areas where specific directional guidance to drivers is necessary.
2. If used, the Direction Indicator Barricade should be used in series to direct the driver through the transition and into the intended travel lane.
3. The Direction Indicator Barricade shall consist of One-Direction Large Arrow (CW1-6) sign in the size shown with a black arrow on a background of Type B_{FL} or Type C_{FL} Orange retroreflective sheeting above a rail with Type A retroreflective sheeting in alternating 4" white and orange stripes sloping downward at an angle of 45 degrees in the direction road users are to pass. Sheeting types shall be as per DMS 8300.
4. Double arrows on the Direction Indicator Barricade will not be allowed.
5. Approved manufacturers are shown on the CWZTCD List. Ballast shall be as approved by the manufacturers instructions.



DETECTABLE PEDESTRIAN BARRICADES

1. When existing pedestrian facilities are disrupted, closed, or relocated in a TTC zone, the temporary facilities shall be detectable and include accessibility features consistent with the features present in the existing pedestrian facility.
2. Where pedestrians with visual disabilities normally use the closed sidewalk, a device that is detectable by a person with a visual disability traveling with the aid of a long cane shall be placed across the full width of the closed sidewalk.
3. Detectable pedestrian barricades similar to the one pictured above, longitudinal channelizing devices, some concrete barriers, and wood or chain link fencing with a continuous detectable edging can satisfactorily delineate a pedestrian path.
4. Tape, rope, or plastic chain strung between devices are not detectable, do not comply with the design standards in the "Americans with Disabilities Act Accessibility Guidelines for Buildings and Facilities (ADAAG)" and should not be used as a control for pedestrian movements.
5. Warning lights shall not be attached to detectable pedestrian barricades.
6. Detectable pedestrian barricades may use 8" nominal barricade rails as shown on BC(10) provided that the top rail provides a smooth continuous rail suitable for hand trailing with no splinters, burrs, or sharp edges.



Plywood, Aluminum or Metal sign substrates shall NOT be used on plastic drums

SIGNS, CHEVRONS, AND VERTICAL PANELS MOUNTED ON PLASTIC DRUMS

1. Signs used on plastic drums shall be manufactured using substrates listed on the CWZTCD.
2. Chevrons and other work zone signs with an orange background shall be manufactured with Type B_{FL} or Type C_{FL} Orange sheeting meeting the color and retroreflectivity requirements of DMS-8300, "Sign Face Material," unless otherwise specified in the plans.
3. Vertical Panels shall be manufactured with orange and white sheeting meeting the requirements of DMS-8300 Type A Diagonal stripes on Vertical Panels shall slope down toward the intended traveled lane.
4. Other sign messages (text or symbolic) may be used as approved by the Engineer. Sign dimensions shall not exceed 18 inches in width or 24 inches in height, except for the R9 series signs discussed in note 8 below.
5. Signs shall be installed using a 1/2 inch bolt (nominal) and nut, two washers, and one locking washer for each connection.
6. Mounting bolts and nuts shall be fully engaged and adequately torqued. Bolts should not extend more than 1/2 inch beyond nuts.
7. Chevrons may be placed on drums on the outside of curves, on merging tapers or on shifting tapers. When used in these locations they may be placed on every drum or spaced not more than on every third drum. A minimum of three (3) should be used at each location called for in the plans.
8. R9-9, R9-10, R9-11 and R9-11a Sidewalk Closed signs which are 24 inches wide may be mounted on plastic drums, with approval of the Engineer.

SHEET 8 OF 12

Texas Department of Transportation | Traffic Operations Division Standard

BARRICADE AND CONSTRUCTION CHANNELIZING DEVICES

BC(8)-14

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CITY OF KINGSVILLE
ENGINEERING DEPARTMENT
400 West King
Kingsville, Texas 78363
Office 361.595.8007
Fax 361.595.8035

Drawn by: J. RAMIREZ
Date: 07/29/2019
Checked by: R. MORA
Job:

2019-JANUARY 2020
US 77 OVERPASS UTILITIES RELOCATION
BC - CHANNELING DEVICES I

SHEET 21

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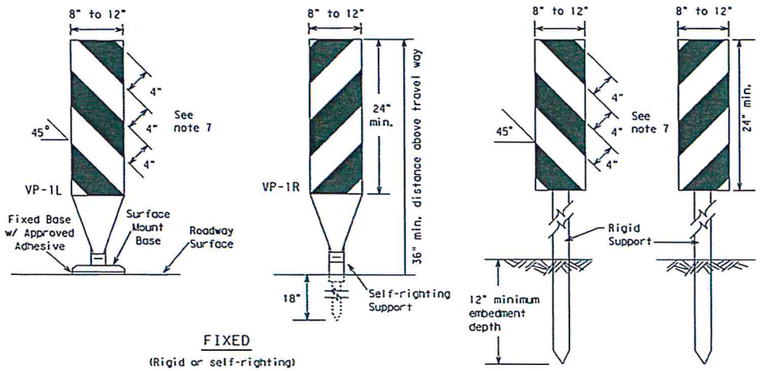
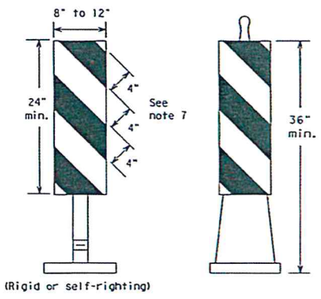
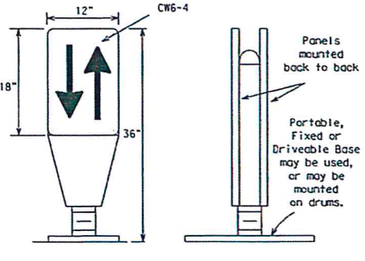




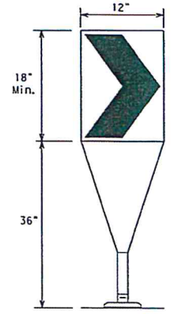
1. Vertical Panels (VP's) are normally used to channelize traffic or divide opposing lanes of traffic.
2. VP's may be used in daytime or nighttime situations. They may be used at the edge of shoulder drop-offs and other areas such as lane transitions where positive daytime and nighttime delineation is required. The Engineer/Inspector shall refer to the Roadway Design Manual Appendix B "Treatment of Pavement Drop-offs in Work Zones" for additional guidelines on the use of VP's for drop-offs.
3. VP's should be mounted back to back if used at the edge of cuts adjacent to two-way two lane roadways. Stripes are to be reflective orange and reflective white and should always slope downward toward the travel lane.
4. VP's used on expressways and freeways or other high speed roadways, may have more than 270 square inches of retroreflective area facing traffic.
5. Self-righting supports are available with portable base. See "Compliant Work Zone Traffic Control Devices List" (CWZTCD).
6. Sheeting for the VP's shall be retroreflective Type A conforming to Departmental Material Specification DMS-8300, unless noted otherwise.
7. Where the height of reflective material on the vertical panel is 36 inches or greater, a panel stripe of 6 inches shall be used.

VERTICAL PANELS (VPs)



1. Opposing Traffic Lane Dividers (OTLD) are delineation devices designed to convert a normal one-way roadway section to two-way operation. OTLD's are used on temporary centerlines. The upward and downward arrows on the sign's face indicate the direction of traffic on either side of the divider. The base is secured to the pavement with an adhesive or rubber weight to minimize movement caused by a vehicle impact or wind gust.
2. The OTLD may be used in combination with 42" cones or VPs.
3. Spacing between the OTLD shall not exceed 500 feet. 42" cones or VPs placed between the OTLD's should not exceed 100 foot spacing.
4. The OTLD shall be orange with a black non-reflective legend. Sheeting for the OTLD shall be retroreflective Type B_{FL} or Type C_{FL} conforming to Departmental Material Specification DMS-8300, unless noted otherwise. The legend shall meet the requirements of DMS-8300.

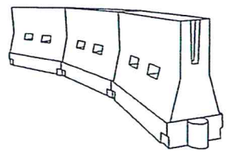
OPPOSING TRAFFIC LANE DIVIDERS (OTLD)



Fixed Base w/ Approved Adhesive (Driveable Base, or Flexible Support can be used)

1. The chevron shall be a vertical rectangle with a minimum size of 12 by 18 inches.
2. Chevrons are intended to give notice of a sharp change of alignment with the direction of travel and provide additional emphasis and guidance for vehicle operators with regard to changes in horizontal alignment of the roadway.
3. Chevrons, when used, shall be erected on the outside of a sharp curve or turn, or on the far side of an intersection. They shall be in line with and at right angles to approaching traffic. Spacing should be such that the motorist always has three in view, until the change in alignment eliminates its need.
4. To be effective, the chevron should be visible for at least 500 feet.
5. Chevrons shall be orange with a black nonreflective legend. Sheeting for the chevron shall be retroreflective Type B_{FL} or Type C_{FL} conforming to Departmental Material Specification DMS-8300, unless noted otherwise. The legend shall meet the requirements of DMS-8300.
6. For Long Term Stationary use on tapers or transitions on freeways and divided highways self-righting chevrons may be used to supplement plastic drums but not to replace plastic drums.

CHEVRONS



LONGITUDINAL CHANNELIZING DEVICES (LCD)

1. LCDs are crashworthy, lightweight, deformable devices that are highly visible, have good target value and can be connected together. They are not designed to contain or redirect a vehicle on impact.
2. LCDs may be used instead of a line of cones or drums.
3. LCDs shall be placed in accordance to application and installation requirements specific to the device, and used only when shown on the CWZTCD list.
4. LCDs should not be used to provide positive protection for obstacles, pedestrians or workers.
5. LCDs shall be supplemented with retroreflective delineation as required for temporary barriers on BC(7) when placed roughly parallel to the travel lanes.
6. LCDs used as barricades placed perpendicular to traffic should have at least one row of reflective sheeting meeting the requirements for barricade rails as shown on BC(10) placed near the top of the LCD along the full length of the device.

WATER BALLASTED SYSTEMS USED AS BARRIERS

1. Water ballasted systems used as barriers shall not be used solely to channelize road users, but also to protect the work space per the appropriate NCHRP 350 crashworthiness requirements based on roadway speed and barrier application.
2. Water ballasted systems used to channelize vehicular traffic shall be supplemented with retroreflective delineation or channelizing devices to improve daytime/nighttime visibility. They may also be supplemented with pavement markings.
3. Water ballasted systems used as barriers shall be placed in accordance to application and installation requirements specific to the device, and used only when shown on the CWZTCD list.
4. Water ballasted systems used as barriers should not be used for a merging taper except in low speed (less than 45 MPH) urban areas. When used on a taper in a low speed urban area, the taper shall be delineated and the taper length should be designed to optimize road user operations considering the available geometric conditions.
5. When water ballasted systems used as barriers have blunt ends exposed to traffic, they should be attenuated as per manufacturer recommendations or flared to a point outside the clear zone.

If used to channelize pedestrians, longitudinal channelizing devices or water ballasted systems must have a continuous detectable bottom for users of long canes and the top of the unit shall not be less than 32 inches in height.

HOLLOW OR WATER BALLASTED SYSTEMS USED AS LONGITUDINAL CHANNELIZING DEVICES OR BARRIERS

GENERAL NOTES

1. Work Zone channelizing devices illustrated on this sheet may be installed in close proximity to traffic and are suitable for use on high or low speed roadways. The Engineer/Inspector shall ensure that spacing and placement is uniform and in accordance with the "Texas Manual on Uniform Traffic Control Devices" (TMUTCD).
2. Channelizing devices shown on this sheet may have a driveable, fixed or portable base. The requirement for self-righting channelizing devices must be specified in the General Notes or other plan sheets.
3. Channelizing devices on self-righting supports should be used in work zone areas where channelizing devices are frequently impacted by errant vehicles or vehicle related wind gusts making alignment of the channelizing devices difficult to maintain. Locations of these devices shall be detailed elsewhere in the plans. These devices shall conform to the TMUTCD and the "Compliant Work Zone Traffic Control Devices List" (CWZTCD).
4. The Contractor shall maintain devices in a clean condition and replace damaged, nonreflective, faded, or broken devices and bases as required by the Engineer/Inspector. The Contractor shall be required to maintain proper device spacing and alignment.
5. Portable bases shall be fabricated from virgin and/or recycled rubber. The portable bases shall weigh a minimum of 30 lbs.
6. Pavement surfaces shall be prepared in a manner that ensures proper bonding between the adhesives, the fixed mount bases and the pavement surface. Adhesives shall be prepared and applied according to the manufacturer's recommendations.
7. The installation and removal of channelizing devices shall not cause detrimental effects to the final pavement surfaces, including pavement surface discoloration or surface integrity. Driveable bases shall not be permitted on final pavement surfaces. The Engineer/Inspector shall approve all application and removal procedures of fixed bases.

Posted Speed *	Formula	Minimum Desirable Taper Lengths ** 10' Offset	11' Offset	12' Offset	Suggested Maximum Spacing of Channelizing Devices: On a Taper	On a Tangent
30	$L = \frac{WS^2}{60}$	150'	165'	180'	30'	60'
35		205'	225'	245'	35'	70'
40		265'	295'	320'	40'	80'
45	$L = WS$	450'	495'	540'	45'	90'
50		500'	550'	600'	50'	100'
55		550'	605'	660'	55'	110'
60		600'	660'	720'	60'	120'
65		650'	715'	780'	65'	130'
70		700'	770'	840'	70'	140'
75		750'	825'	900'	75'	150'
80		800'	880'	960'	80'	160'

** Taper lengths have been rounded off.
L = Length of Taper (FT.) W = Width of Offset (FT.)
S = Posted Speed (MPH)

SUGGESTED MAXIMUM SPACING OF CHANNELIZING DEVICES AND MINIMUM DESIRABLE TAPER LENGTHS

SHEET 9 OF 12

Texas Department of Transportation — Traffic Operations Division Standard

BARRICADE AND CONSTRUCTION CHANNELIZING DEVICES

BC(9)-14

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CITY OF KINGSVILLE
ENGINEERING DEPARTMENT
400 West King
Kingsville, Texas 78363
Office 361.595.8007
Fax 361.595.8035

Drawn by: J. RAMIREZ
Date: 07/29/2019
Checked by: R. MORA
Job:

2019- JANUARY 2020
US 77 OVERPASS UTILITIES RELOCATION
BC - CHANNELING DEVICES II

SHEET 22

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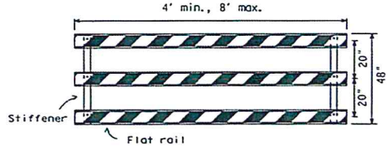
TYPE 3 BARRICADES

1. Refer to the Compliant Work Zone Traffic Control Devices List (CWZTCD) for details of the Type 3 Barricades and a list of all materials used in the construction of Type 3 Barricades.
2. Type 3 Barricades shall be used at each end of construction projects closed to all traffic.
3. Barricades extending across a roadway should have stripes that slope downward in the direction toward which traffic must turn in detouring. When both right and left turns are provided, the chevron striping may slope downward in both directions from the center of the barricade. Where no turns are provided at a closed road striping should slope downward in both directions toward the center of roadway.
4. Striping of rails, for the right side of the roadway, should slope downward to the left. For the left side of the roadway, striping should slope downward to the right.
5. Identification markings may be shown only on the back of the barricade rails. The maximum height of letters and/or company logos used for identification shall be 1".
6. Barricades shall not be placed parallel to traffic unless an adequate clear zone is provided.
7. Warning lights shall NOT be installed on barricades.
8. Where barricades require the use of weights to keep from turning over, the use of sandbags with dry, cohesionless sand is recommended. The sandbags will be tied shut to keep the sand from spilling and to maintain a constant weight. Sand bags shall not be stacked in a manner that covers any portion of a barricade rails reflective sheeting. Rock, concrete, iron, steel or other solid objects will NOT be permitted. Sandbags should weigh a minimum of 35 lbs and a maximum of 50 lbs. Sandbags shall be made of a durable material that tears upon vehicular impact. Rubber (such as tire inner tubes) shall not be used for sandbags. Sandbags shall only be placed along or upon the base supports of the device and shall not be suspended above ground level or hung with rope, wire, chains or other fasteners.
9. Sheeting for barricades shall be retroreflective Type A conforming to Departmental Material Specification DMS-8300 unless otherwise noted.

Barricades shall NOT be used as a sign support.

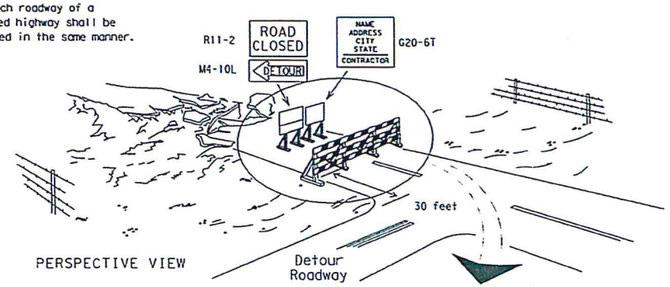
TYPICAL STRIPING DETAIL FOR BARRICADE RAIL



Stiffener may be inside or outside of support, but no more than 2 stiffeners shall be allowed on one barricade.

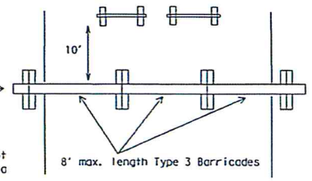
TYPICAL PANEL DETAIL
FOR SKID OR POST TYPE BARRICADES

Each roadway of a divided highway shall be barricaded in the same manner.



PERSPECTIVE VIEW

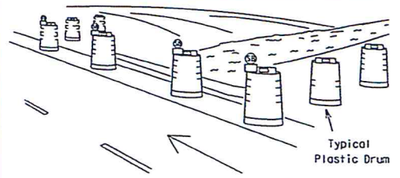
The three rails on Type 3 barricades shall be reflectorized orange and reflective white stripes on one side facing one-way traffic and both sides for two-way traffic.
Barricade striping should slant downward in the direction of detour.



PLAN VIEW

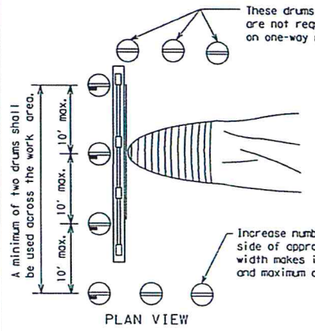
1. Signs should be mounted on independent supports at a 7 foot mounting height in center of roadway. The signs should be a minimum of 10 feet behind Type 3 Barricades.
2. Advance signing shall be as specified elsewhere in the plans.

TYPE 3 BARRICADE (POST AND SKID) TYPICAL APPLICATION



PERSPECTIVE VIEW

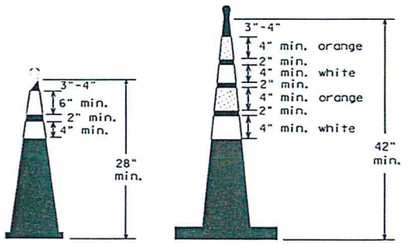
1. Where positive redirectional capability is provided, drums may be omitted.
2. Plastic construction fencing may be used with drums for safety as required in the plans.
3. Vertical Panels on flexible support may be substituted for drums when the shoulder width is less than 4 feet.
4. When the shoulder width is greater than 12 feet, steady-burn lights may be omitted if drums are used.
5. Drums must extend the length of the culvert widening.



PLAN VIEW

LEGEND	
	Plastic drum
	Plastic drum with steady burn light or yellow warning reflector
SB	Steady burn warning light or yellow warning reflector

CULVERT WIDENING OR OTHER ISOLATED WORK WITHIN THE PROJECT LIMITS



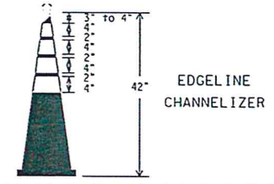
Two-Piece cones | One-Piece cones | Tubular Marker

28" Cones shall have a minimum weight of 9 1/2 lbs.

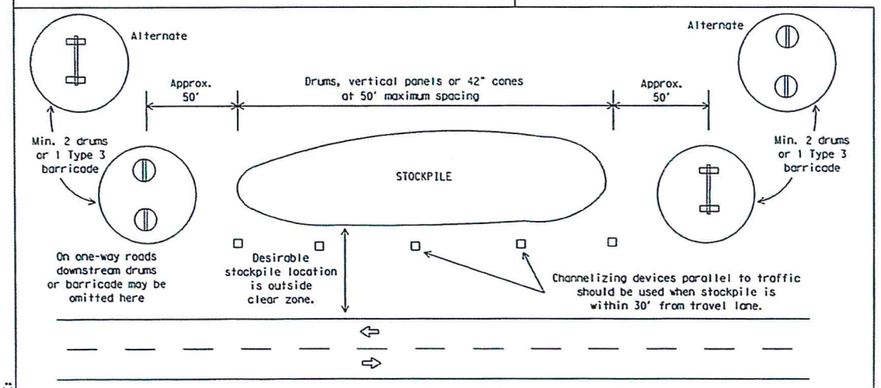
42" 2-piece cones shall have a minimum weight of 30 lbs. including base.

1. Traffic cones and tubular markers shall be predominantly orange, and meet the height and weight requirements shown above.
2. One-piece cones have the body and base of the cone molded in one consolidated unit. Two-piece cones have a cone shaped body and a separate rubber base, or ballast, that is added to keep the device upright and in place.
3. Two-piece cones may have a handle or loop extending up to 8" above the minimum height shown, in order to aid in retrieving the device.
4. Cones or tubular markers used at night shall have white or white and orange reflective bands as shown above. The reflective bands shall have a smooth, sealed outer surface and meet the requirements of Departmental Material Specification DMS-8300 Type A.
5. 28" cones and tubular markers are generally suitable for short duration and short-term stationary work as defined on BC(4). These should not be used for intermediate-term or long-term stationary work unless personnel is on-site to maintain them in their proper upright position.
6. 42" two-piece cones, vertical panels or drums are suitable for all work zone durations.
7. Cones or tubular markers used on each project should be of the same size and shape.

THIS DEVICE SHALL NOT BE USED ON PROJECTS LET AFTER MARCH 2014.



1. This device is intended only for use in place of a vertical panel to channelize traffic by indicating the edge of the travel lane. It is not intended to be used in transitions or tapers.
2. This device shall not be used to separate lanes of traffic (opposing or otherwise) or warn of objects.
3. This device is based on a 42 inch, two-piece cone with an alternate striping pattern: four 4 inch retroreflective bands, with an approximate 2 inch gap between bands. The color of the band should correspond to the color of the edgeline (yellow for left edgeline, white for right edgeline) for which the device is substituted or for which it supplements. The reflectorized bands shall be retroreflective Type A conforming to Departmental Material Specification DMS-8300, unless otherwise noted.
4. The base must weigh a minimum of 30 lbs.



TRAFFIC CONTROL FOR MATERIAL STOCKPILES

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SHEET 10 OF 12

Texas Department of Transportation | Traffic Operations Division Standard

BARRICADE AND CONSTRUCTION CHANNELIZING DEVICES

BC(10)-14

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CITY OF KINGSVILLE
ENGINEERING DEPARTMENT
400 West King
Kingsville, Texas 78363
Office 361.595.8007
Fax 361.595.8035

Drawn by: J. RAMIREZ
Date: 07/29/2019
Checked by: R. MORA
Job:

2019- JANUARY 2020
US 77 OVERPASS UTILITIES RELOCATION
BC - CHANNELING DEVICES III

SHEET 23

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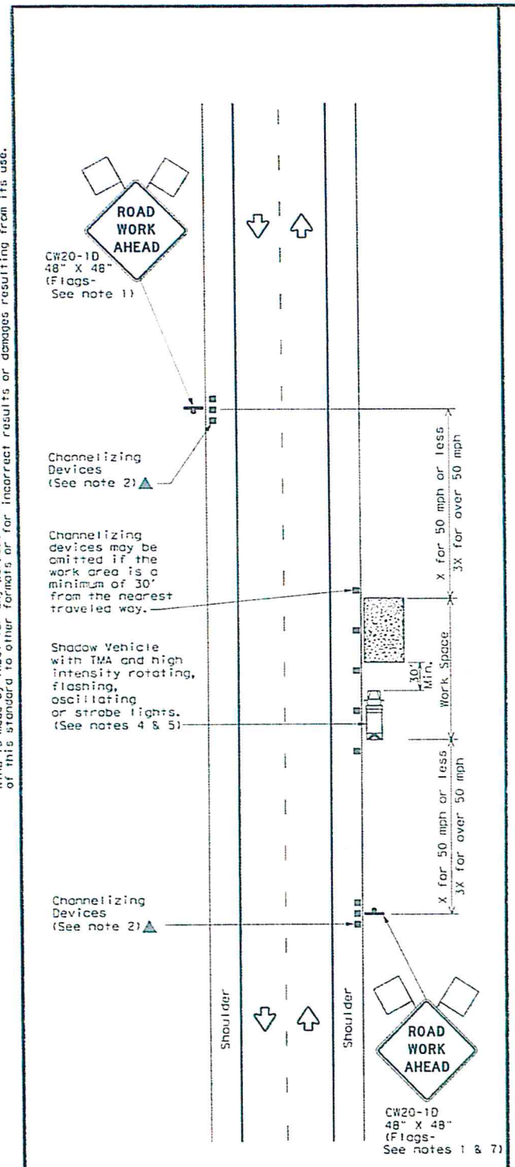
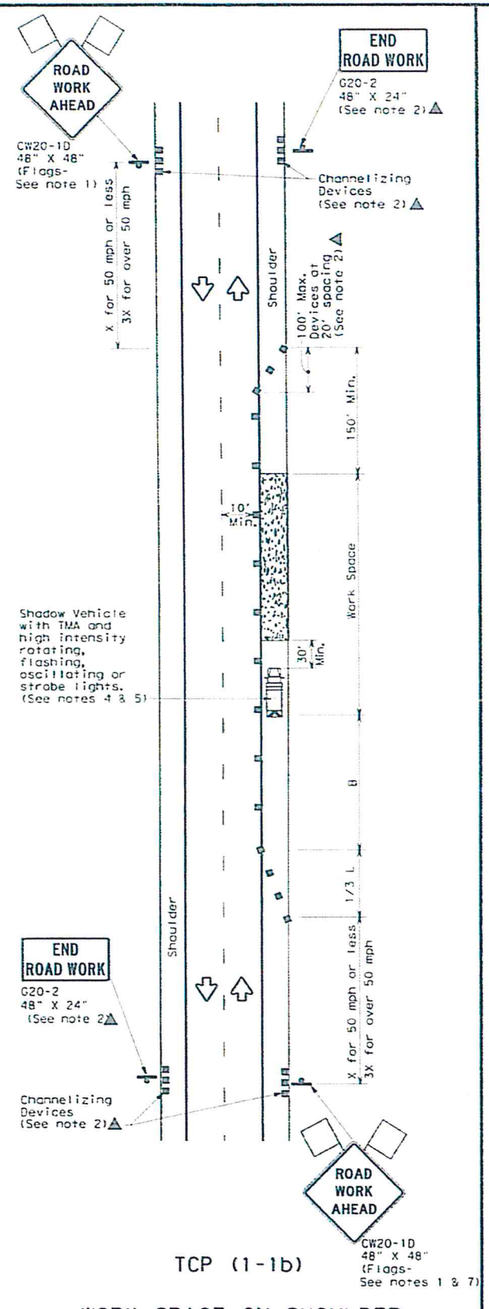


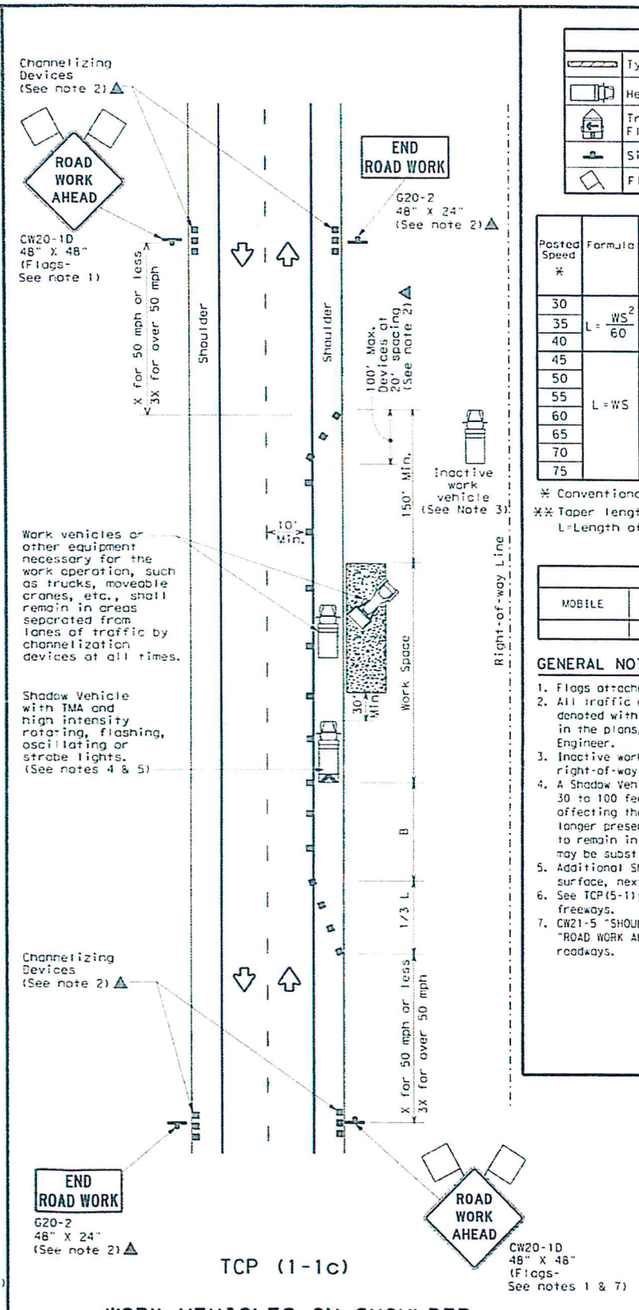
TCP (1-1a)

WORK SPACE NEAR SHOULDER
Conventional Roads



TCP (1-1b)

WORK SPACE ON SHOULDER
Conventional Roads



TCP (1-1c)

WORK VEHICLES ON SHOULDER
Conventional Roads

LEGEND			
	Type 3 Barricade		Channelizing Devices
	Heavy Work Vehicle		Truck Mounted Attenuator (TMA)
	Trailer Mounted Flashing Arrow Board	M	Portable Changeable Message Sign (PCMS)
	Sign		Traffic Flow
	Flag		Flagger

Posted Speed *	Formula	Minimum Desirable Taper Lengths ** 10' Offset	11' Offset	12' Offset	Suggested Maximum Spacing of Channelizing Devices On a Taper	On a Tangent	Minimum Sign Spacing "X" Distance	Suggested Longitudinal Buffer Space "B"
30	$L=\frac{WS^2}{60}$	150'	165'	180'	30'	60'	120'	90'
35		205'	225'	245'	35'	70'	160'	120'
40		265'	295'	320'	40'	80'	240'	155'
45	L=WS	450'	495'	540'	45'	90'	320'	195'
50		500'	550'	600'	50'	100'	400'	240'
55		550'	605'	660'	55'	110'	500'	295'
60		600'	660'	720'	60'	120'	600'	350'
65		650'	715'	780'	65'	130'	700'	410'
70		700'	770'	840'	70'	140'	800'	475'
75		750'	825'	900'	75'	150'	900'	540'

* Conventional Roads Only
** Taper lengths have been rounded off.
L=Length of Taper(FT) W=Width of Offset(FT) S=Posted Speed(MPH)

TYPICAL USAGE				
MOBILE	SHORT DURATION	SHORT TERM STATIONARY	INTERMEDIATE TERM STATIONARY	LONG TERM STATIONARY
	✓	✓		

GENERAL NOTES

1. Flags attached to signs where shown are REQUIRED.
2. All traffic control devices illustrated are REQUIRED, except those denoted with the triangle symbol may be omitted when stated elsewhere in the plans, or for routine maintenance work, when approved by the Engineer.
3. Inactive work vehicles or other equipment should be parked near the right-of-way line and not parked on the paved shoulder.
4. A Shadow Vehicle with a TMA should be used anytime it can be positioned 30 to 100 feet in advance of the area of crew exposure without adversely affecting the performance or quality of the work. If workers are no longer present but road or work conditions require the traffic control to remain in place, Type 3 Barricades or other channelizing devices may be substituted for the Shadow Vehicle and TMA.
5. Additional Shadow Vehicles with TMAs may be positioned off the paved surface, next to those shown in order to protect wider work spaces.
6. See TCP(5-1)for shoulder work on divided highways, expressways and freeways.
7. CW21-5 "SHOULDER WORK" signs may be used in place of CW20-1D "ROAD WORK AHEAD" signs for shoulder work on conventional roadways.

Texas Department of Transportation | Traffic Operations Division Standard

TRAFFIC CONTROL PLAN CONVENTIONAL ROAD SHOULDER WORK

TCP(1-1)-18

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CITY OF KINGSVILLE
ENGINEERING DEPARTMENT
400 West King
Kingsville, Texas 78363
Office 361.595.8007
Fax 361.595.8035

Drawn by: J. RAMIREZ
Date: 07/29/2019
Checked by: R. MORA
Job:

2019- JANUARY 2020
US 77 OVERPASS UTILITIES RELOCATION
TCP - CONVENTIONAL ROAD SHOULDER WORK

SHEET 24

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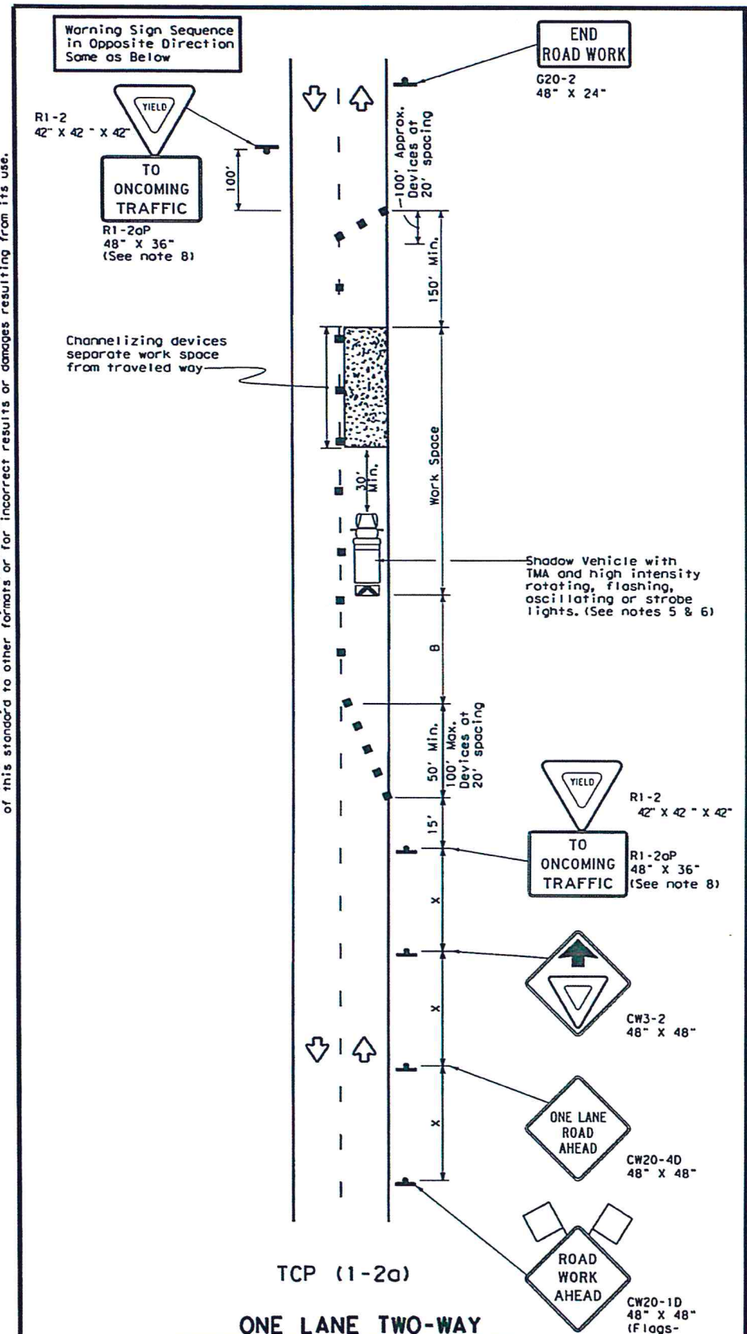
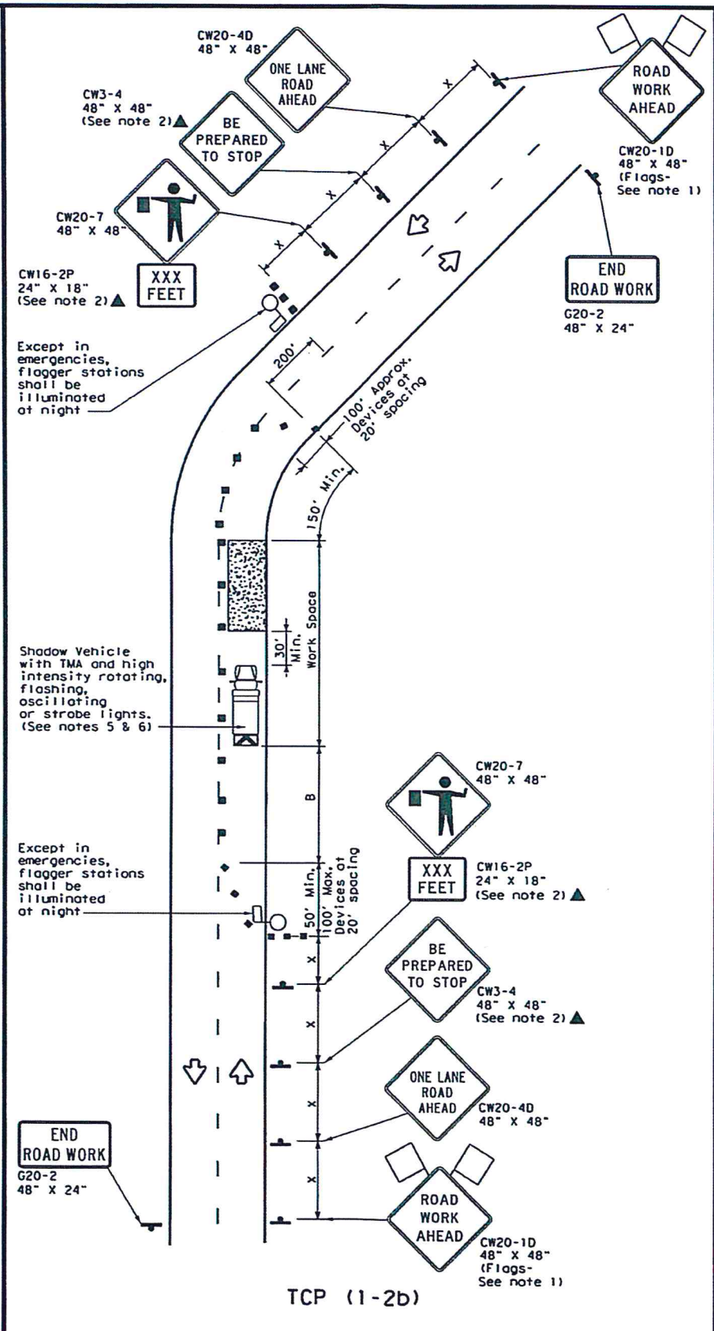


TCP (1-2a)

ONE LANE TWO-WAY CONTROL WITH YIELD SIGNS

(Less than 2000 ADT - See note 7)



TCP (1-2b)

ONE LANE TWO-WAY CONTROL WITH FLAGGERS

LEGEND

	Type 3 Barricade	■ ■	Channelizing Devices
	Heavy Work Vehicle		Truck Mounted Attenuator (TMA)
	Trailer Mounted Flashing Arrow Board	M	Portable Changeable Message Sign (PCMS)
	Sign		Traffic Flow
	Flag		Flagger

Posted Speed *	Formula	Minimum Desirable Taper Lengths ** 10' Offset	11' Offset	12' Offset	Suggested Maximum Spacing of Channelizing Devices On a Taper	On a Tangent	Minimum Sign Spacing "X" Distance	Suggested Longitudinal Buffer Space "B"	Stopping Sight Distance
30	$L=\frac{WS^2}{60}$	150'	165'	180'	30'	60'	120'	90'	200'
35		205'	225'	245'	35'	70'	160'	120'	250'
40		265'	295'	320'	40'	80'	240'	155'	305'
45	L=WS	450'	495'	540'	45'	90'	320'	195'	360'
50		500'	550'	600'	50'	100'	400'	240'	425'
55		550'	605'	660'	55'	110'	500'	295'	495'
60		600'	660'	720'	60'	120'	600'	350'	570'
65		650'	715'	780'	65'	130'	700'	410'	645'
70		700'	770'	840'	70'	140'	800'	475'	730'
75		750'	825'	900'	75'	150'	900'	540'	820'

* Conventional Roads Only

** Taper lengths have been rounded off.
L=Length of Taper(FT) W=Width of Offset(FT) S=Posted Speed(MPH)

TYPICAL USAGE

MOBILE	SHORT DURATION	SHORT TERM STATIONARY	INTERMEDIATE TERM STATIONARY	LONG TERM STATIONARY
	✓	✓		

GENERAL NOTES

1. Flags attached to signs where shown are REQUIRED.
2. All traffic control devices illustrated are REQUIRED, except those denoted with the triangle symbol may be omitted when stated elsewhere in the plans, or for routine maintenance work, when approved by the Engineer.
3. The CW3-4 "BE PREPARED TO STOP" sign may be installed after the CW20-4D "ONE LANE ROAD AHEAD" sign, but proper sign spacing shall be maintained.
4. Sign spacing may be increased or an additional CW20-1D "ROAD WORK AHEAD" sign may be used if advance warning ahead of the flagger or R1-2 "YIELD" sign is less than 1500 feet.
5. A Shadow Vehicle with a TMA should be used anytime it can be positioned 30 to 100 feet in advance of the area of crew exposure without adversely affecting the performance or quality of the work. If workers are no longer present but road or work conditions require the traffic control to remain in place, Type 3 Barricades or other channelizing devices may be substituted for the Shadow Vehicle and TMA.
6. Additional Shadow Vehicles with TMAs may be positioned off the paved surface, next to those shown in order to protect wider work spaces.

TCP (1-2a)

7. R1-2 "YIELD" sign traffic control may be used on projects with approaches that have adequate sight distance. For projects in urban areas, work spaces should be no longer than one half city block. In rural areas on roadways with less than 2000 ADT, work spaces should be no longer than 400 feet.
8. R1-2 "YIELD" sign with R1-2aP "TO ONCOMING TRAFFIC" plaque shall be placed on a support at a 7 foot minimum mounting height.

TCP (1-2b)

9. Flaggers should use two-way radios or other methods of communication to control traffic.
10. Length of work space should be based on the ability of flaggers to communicate.
11. If the work space is located near a horizontal or vertical curve, the buffer distances should be increased in order to maintain adequate stopping sight distance to the flagger and a queue of stopped vehicles (see table above).
12. Channelizing devices on the center-line may be omitted when a pilot car is leading traffic and approved by the Engineer.
13. Flaggers should use 24" STOP/SLOW paddles to control traffic. Flags should be limited to emergency situations.

Texas Department of Transportation | Traffic Operations Division Standard

TRAFFIC CONTROL PLAN ONE-LANE TWO-WAY TRAFFIC CONTROL

TCP(1-2)-18

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CITY OF KINGSVILLE
ENGINEERING DEPARTMENT
400 West King
Kingsville, Texas 78363
Office 361.595.8007
Fax 361.595.8035

Drawn by: J. RAMIREZ
Date: 07/29/2019
Checked by: R. MORA
Job:

2019- JANUARY 2020
US 77 OVERPASS UTILITIES RELOCATION
TCP - ONE-LANE TWO-WAY TRAFFIC CONTROL

SHEET 25

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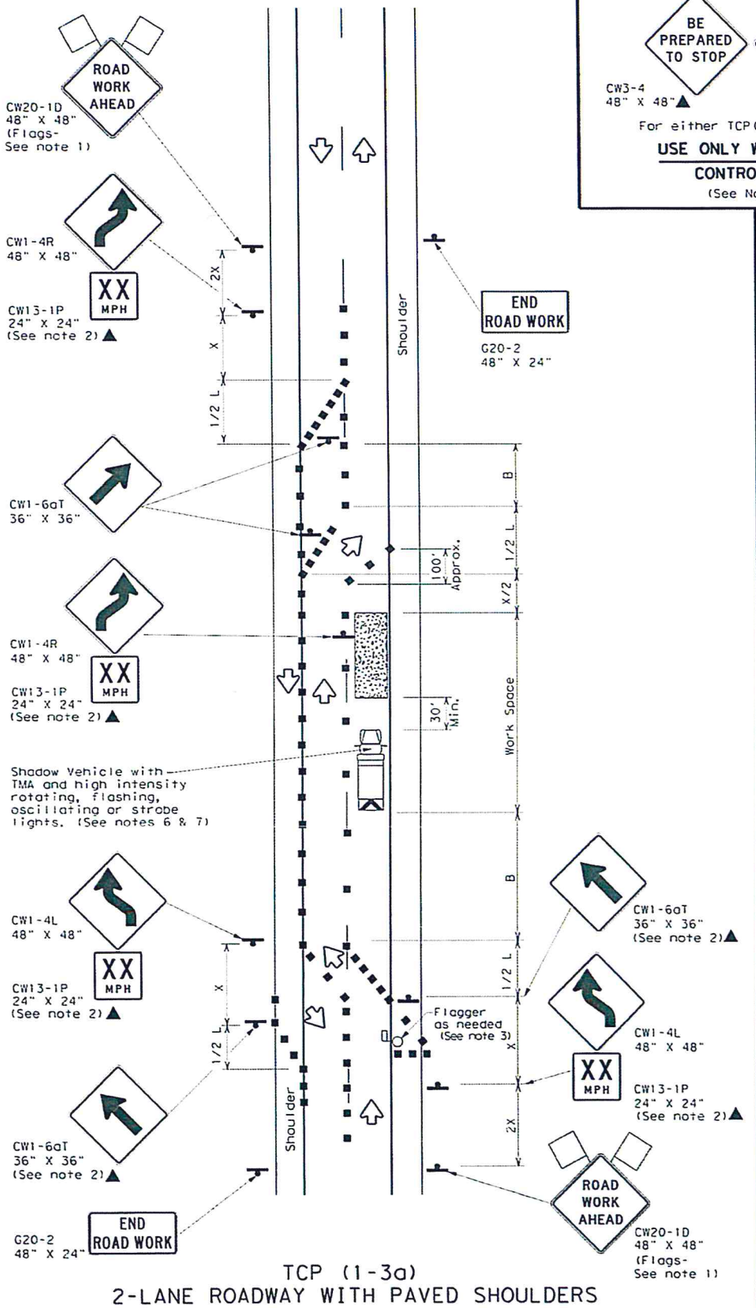


TCP (1-3a)
2-LANE ROADWAY WITH PAVED SHOULDERS

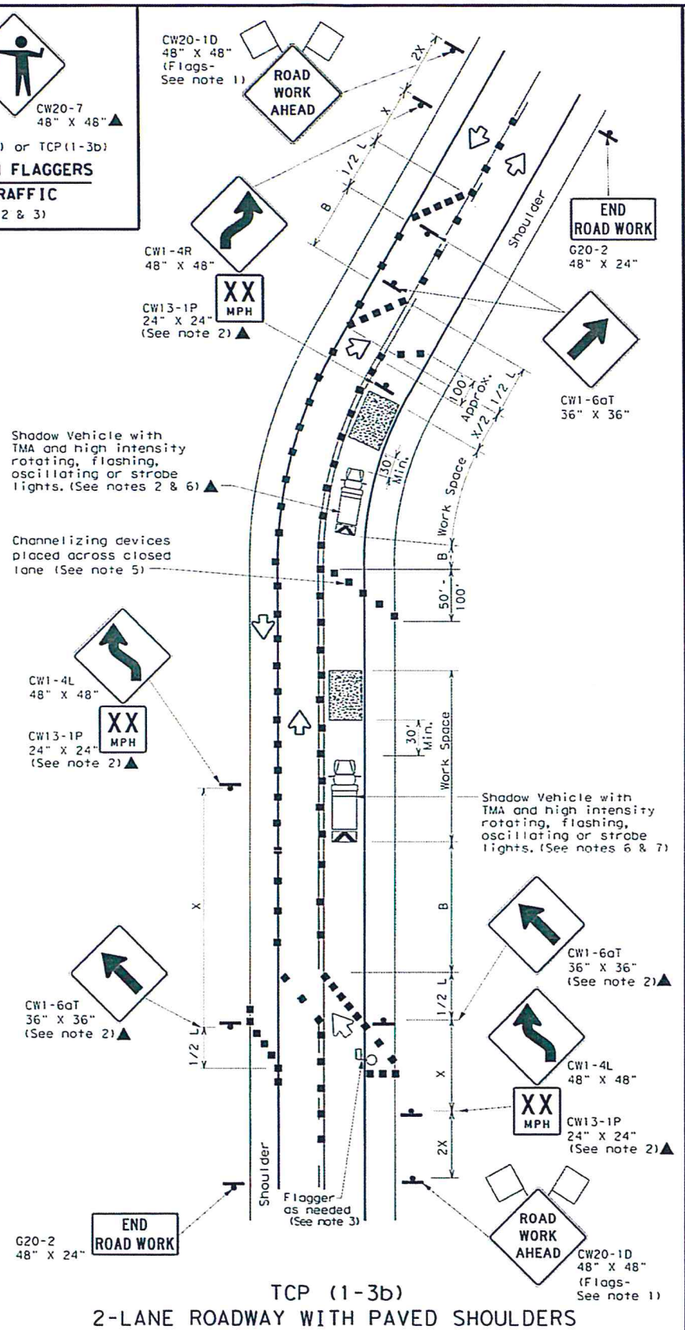
ONE LANE CLOSED
ADEQUATE FIELD OF VIEW

BE PREPARED TO STOP
CW3-4 48" X 48"

CW20-7 48" X 46"

For either TCP(1-3a) or TCP(1-3b)

USE ONLY WHEN FLAGGERS CONTROL TRAFFIC
(See Notes 2 & 3)



TCP (1-3b)
2-LANE ROADWAY WITH PAVED SHOULDERS

ONE LANE CLOSED
INADEQUATE FIELD OF VIEW

LEGEND			
	Type 3 Barricade		Channelizing Devices
	Heavy Work Vehicle		Truck Mounted Attenuator (TMA)
	Trailer Mounted Flashing Arrow Board	M	Portable Changeable Message Sign (PCMS)
	Sign		Traffic Flow
	Flag		Flagger

Posted Speed *	Formula	Minimum Desirable Taper Lengths ** 10' Offset	11' Offset	12' Offset	Suggested Maximum Spacing of Channelizing Devices On a Taper	On a Tangent	Minimum Sign Spacing "X" Distance	Suggested Longitudinal Buffer Space "B"
30	$L=\frac{WS^2}{60}$	150'	165'	180'	30'	60'	120'	90'
35		205'	225'	245'	35'	70'	160'	120'
40		265'	295'	320'	40'	80'	240'	155'
45	L=WS	450'	495'	540'	45'	90'	320'	195'
50		500'	550'	600'	50'	100'	400'	240'
55		550'	605'	660'	55'	110'	500'	295'
60		600'	660'	720'	60'	120'	600'	350'
65		650'	715'	780'	65'	130'	700'	410'
70		700'	770'	840'	70'	140'	800'	475'
75		750'	825'	900'	75'	150'	900'	540'

* Conventional Roads Only

** Taper lengths have been rounded off.
L=Length of Taper(FT) W=Width of Offset(FT) S=Posted Speed(MPH)

TYPICAL USAGE				
MOBILE	SHORT DURATION	SHORT TERM STATIONARY	INTERMEDIATE TERM STATIONARY	LONG TERM STATIONARY
	✓	✓		

GENERAL NOTES

1. Flags attached to signs where shown are REQUIRED.
2. All traffic control devices illustrated are REQUIRED, except those denoted with the triangle symbol may be omitted when stated elsewhere in the plans, or for routine maintenance work, when approved by the Engineer.
3. Flagger control should NOT be used unless roadway conditions or heavy traffic volume require additional emphasis to safely control traffic. Additional flaggers may be positioned in advance of traffic queues to alert traffic to reduce speed.
4. DO NOT PASS, PASS WITH CARE and construction regulatory speed zone signs may be installed downstream of the ROAD WORK AHEAD signs.
5. When the work zone is made up of several work spaces, channelizing devices should be placed laterally across the closed lane to re-emphasize closure. Laterally placed channelizing devices should be repeated every 500 to 1000 feet in urban areas and every 1/4 to 1/2 mile in rural areas.
6. A Shadow Vehicle with a TMA should be used anytime it can be positioned 30 to 100 feet in advance of the area of crew exposure without adversely affecting the performance or quality of the work. If workers are no longer present but road or work conditions require the traffic control to remain in place, Type 3 Barricades or other channelizing devices may be substituted for the Shadow Vehicle and TMA.
7. Additional Shadow Vehicles with TMAs may be positioned off the paved surface, next to those shown in order to protect wider work spaces.
8. Where traffic is directed over a yellow centerline, channelizing devices which separate two-way traffic should be spaced on tapers at 20', or 15' if posted speed are 35 mph or slower, and for tangent sections, at 1/2S where S is the speed in mph. This tighter device spacing is intended for the area of conflicting markings not the entire work zone.

Texas Department of Transportation — Traffic Operations Division Standard

TRAFFIC CONTROL PLAN TRAFFIC SHIFTS ON TWO LANE ROADS

TCP(1-3)-18

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CITY OF KINGSVILLE
ENGINEERING DEPARTMENT
400 West King
Kingsville, Texas 78363
Office 361.595.8007
Fax 361.595.8035

Drawn by: J. RAMIREZ
Date: 07/29/2019
Checked by: R. MORA
Job:

2019- JANUARY 2020
US 77 OVERPASS UTILITIES RELOCATION
TCP - TRAFFIC SHIFTS ON TWO LANE ROADS

SHEET 26

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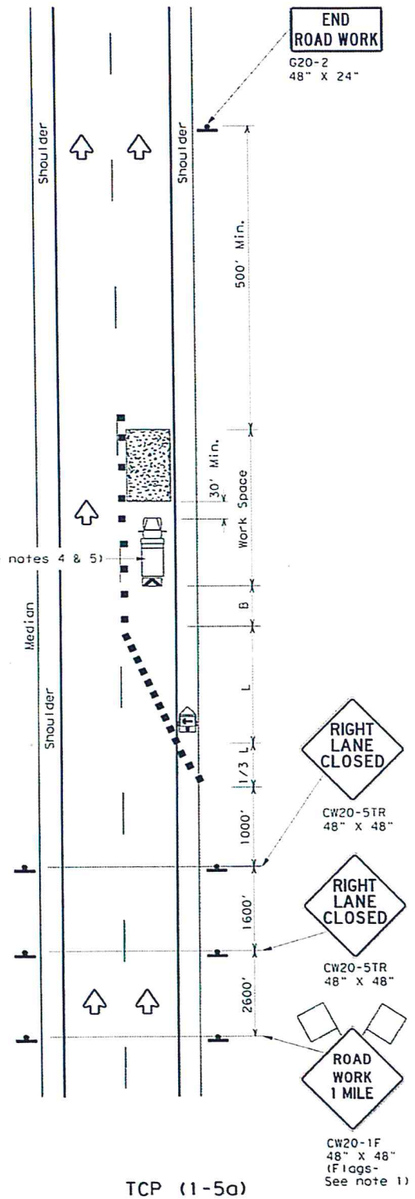
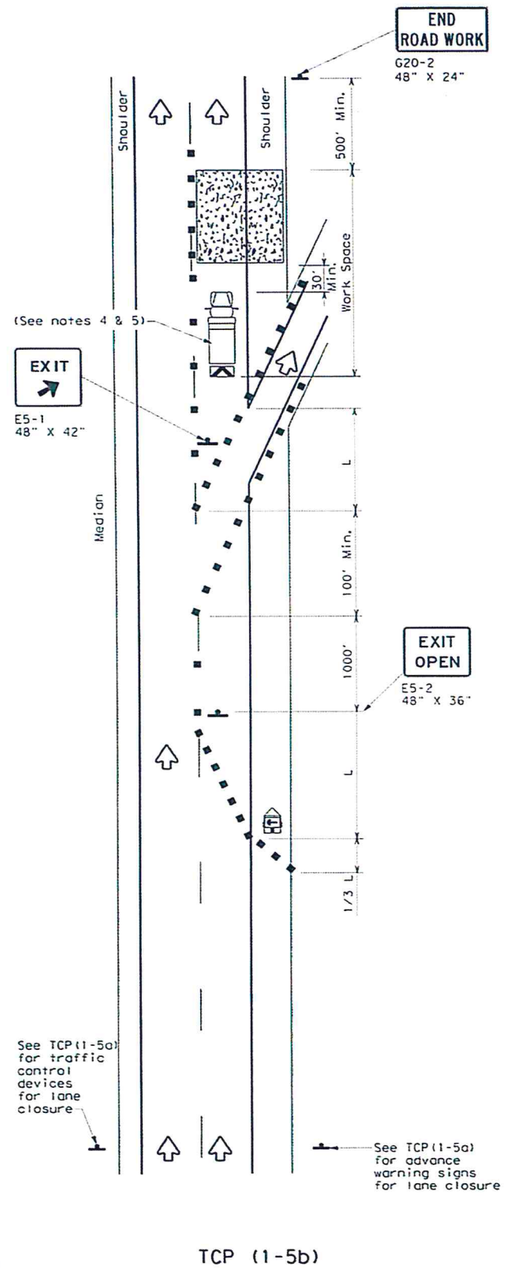


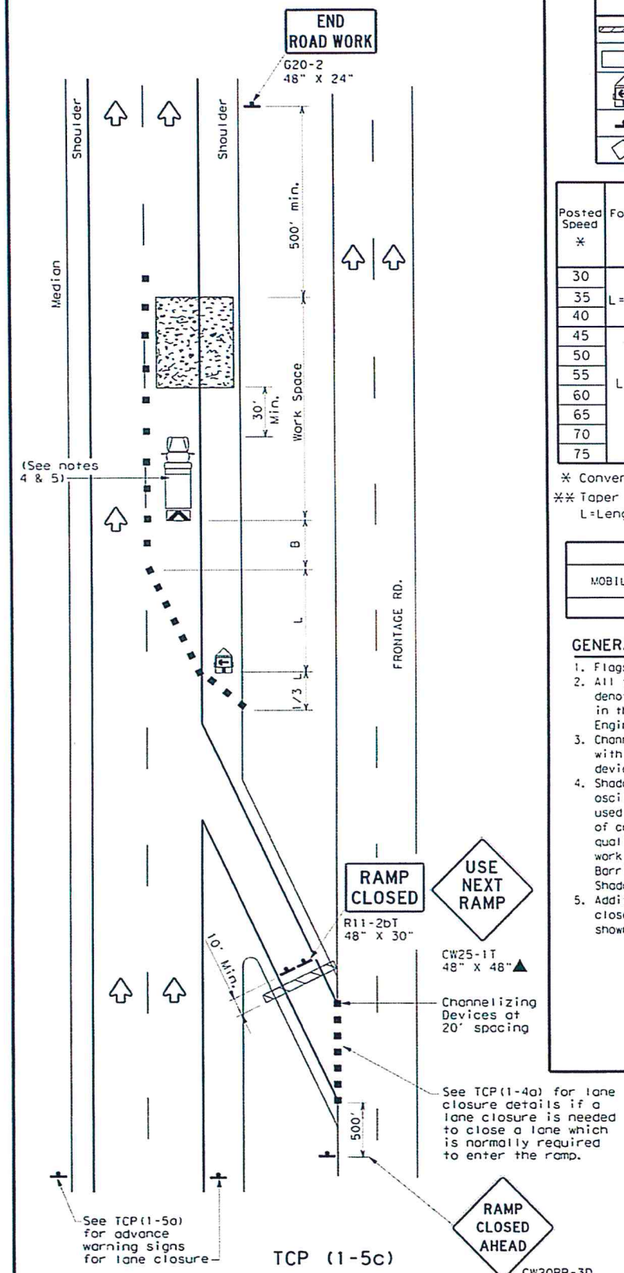
TCP (1-5a)

ONE LANE CLOSURE



TCP (1-5b)

LANE CLOSURE NEAR EXIT RAMPS



TCP (1-5c)

LANE CLOSURE NEAR ENTRANCE RAMPS

LEGEND			
	Type 3 Barricade		Channelizing Devices
	Heavy Work Vehicle		Truck Mounted Attenuator (TMA)
	Trailer Mounted Flashing Arrow Board	M	Portable Changeable Message Sign (PCMS)
	Sign		Traffic Flow
	Flag		Flagger

Posted Speed *	Formula	Minimum Desirable Taper Lengths ** 10' Offset	11' Offset	12' Offset	Suggested Maximum Spacing of Channelizing Devices On a Taper	On a Tangent	Minimum Sign Spacing "X" Distance	Suggested Longitudinal Buffer Space "B"
30	$L=\frac{WS^2}{60}$	150'	165'	180'	30'	60'	120'	90'
35		205'	225'	245'	35'	70'	160'	120'
40		265'	295'	320'	40'	80'	240'	155'
45	L=WS	450'	495'	540'	45'	90'	320'	195'
50		500'	550'	600'	50'	100'	400'	240'
55		550'	605'	660'	55'	110'	500'	295'
60		600'	660'	720'	60'	120'	600'	350'
65		650'	715'	780'	65'	130'	700'	410'
70		700'	770'	840'	70'	140'	800'	475'
75		750'	825'	900'	75'	150'	900'	540'

* Conventional Roads Only

** Taper lengths have been rounded off.
L=Length of Taper(FT) W=Width of Offset(FT) S=Posted Speed(MPH)

TYPICAL USAGE				
MOBILE	SHORT DURATION	SHORT TERM STATIONARY	INTERMEDIATE TERM STATIONARY	LONG TERM STATIONARY
		✓		

GENERAL NOTES

1. Flags attached to signs where shown, are REQUIRED.
2. All traffic control devices illustrated are REQUIRED, except those denoted with the triangle symbol may be omitted when stated elsewhere in the plans, or for routine maintenance work, when approved by the Engineer.
3. Channelizing devices used to close lanes may be supplemented with the Chevron Alignment Sign placed on every other channelizing device. Chevrons may be attached to plastic drums as per BC Standards.
4. Shadow Vehicle with TMA and high intensity rotating, flashing, oscillating or strobe lights. A Shadow Vehicle with a TMA should be used anytime it can be positioned 30 to 100 feet in advance of the area of crew exposure without adversely affecting the performance or quality of the work. If workers are no longer present but road or work conditions require the traffic control to remain in place, Type 3 Barricades or other channelizing devices may be substituted for the Shadow Vehicle and TMA.
5. Additional Shadow Vehicles with TMAs may be positioned in each closed lane, on the shoulder or off the paved surface, next to those shown in order to protect a wider work space.

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TRAFFIC CONTROL PLAN LANE CLOSURES FOR DIVIDED HIGHWAYS

TCP(1-5)-18

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CITY OF KINGSVILLE
ENGINEERING DEPARTMENT
400 West King
Kingsville, Texas 78363
Office 361.595.8007
Fax 361.595.8035

Drawn by: J. RAMIREZ
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