Addendum #3

Re: City of Laredo
Eastern Chacon Creek Interceptor and Drainage Improvements

All contractors, holders of plans and specifications, and all interested parties to the referenced project are hereby notified of the following revisions to the plans and/or specifications of the above referenced project:

1. Revision to Specifications
   1.1 Division A – Section A-5
       1.1.1 Replace Section A-5 with one provided herein. Updates to bid schedule and bid schedule notes.
   1.2 Division D – Technical Specifications
       1.2.1 Replace Section 201 “Fusible Polyvinylchloride Pipe for Installation by Open Cut, Horizontal Directional Drill (HDD), or Jack and Bore” with one provided herein. Subsection D 201.04 Execution, C. Fusion Process, 1. General, 1.6 Remove internal fusion bead from inside of fused pipe. This work is subsidiary to fusible PVC installation.
       1.2.2 Replace Section 218 “Testing Sewer Systems” with one provided herein. Revisions include addition of CCTV testing.

2. Revision to Construction Plans
   2.1 Replace plan sheets 1, 2, 3, 11, 14, 18, 19, 20, 22, 23, 25, 27, 28, 29, and 31 with ones provided herein. Revision clouds for clarity and address questions received from bidders.
   2.2 Addition of plan sheets 29A, 32, 33, 34, and 35

Addendum #3 is being submitted to all contractors, holders of plans and specifications, plan rooms, and all interested parties to the project and acknowledgement of same is required on the proposal forms. Bids remain due on Wednesday, July 29, 2020 at 4:00 P.M.

Recommended By:

CRANE ENGINEERING CORP.
Firm # F-3353

Edward D. Garza, P.E., CFM
Principal Engineer
To: The City of Laredo, Texas

Honorable Pete Saenz, Mayor

From: ______________________________
Contractor
Address: _______________________________
Phone: _______________________________
Fax: _______________________________

Project: Eastern Chacon Creek Interceptor and Drainage Improvements

Pursuant to Notice to Bidders, the undersigned bidder hereby proposes to furnish the labor, materials, and equipment in accordance with the plans and specifications, general conditions of the agreement, special provisions of the Agreement, and Addenda, if any. The bidder binds himself upon acceptance of his proposal to execute a contract and bonds accompanying form of performing and completing the said work within the time stated as required by the detailed specifications at the following unit prices. The quantities shown below are based on the Engineer’s estimate of quantities and it is agreed that the quantities may be increased or decreased, and may be considered necessary in the opinion of the City of Laredo, Texas to complete the work fully as planned and contemplated, and that all quantities of work, either increased or decreased, are to be performed at the unit prices set forth below (except as provided in the General Conditions of the Agreement or the specifications, the contract documents).

Acknowledgment of Addenda: (Please initial and date)
Addendum #1: _______________________________
Addendum #2: _______________________________
Addendum #3: _______________________________
Addendum #4: _______________________________
Addendum #5: _______________________________

Acknowledgment of other documents: (Please initial and date)
Wage Determination: _______________________________
Labor Provisions: _______________________________
Affirmative Action Program: _______________________________
Project: Eastern Chacon Creek Interceptor and Drainage Improvements

Form of Non-Collusive Affidavit

A F F I D A V I T

STATE OF TEXAS { } COUNTY OF WEBB { }

______________________________ being first duly sworn, deposes and says that he is _____________________________ (a Partner or Officer of the firm of, etc.)

the party making the foregoing proposal or bid, that such proposal or bid is genuine and not collusive or sham; that said Bidder has not colluded, conspired, connived or agreed, directly or indirectly, with any Bidder or Person, to put in a sham bid or to refrain from bidding, and has not in any manner, directly or indirectly, sought by agreement or collusion, or communication or conference, with any person, to fix the bid price or affiant or of any other Bidder or to fix any overhead, profit or cost element of said bid price, or of that of any other Bidder, or to secure any advantage against the City of Laredo or any person interested in the proposed Contract; and that all statements in said proposal or bid are true.

______________________________

Signature of

Bidder, if the Bidder is an individual
Partner, if the Bidder is a Partnership
Officer, if the Bidder is a Corporation

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

______________________________

Notary Public

My Commission Expires:
INFORMATION FROM BIDDERS
MUST BE COMPLETED AND SUBMITTED WITH BID PROPOSAL

Project: Eastern Chacon Creek Interceptor and Drainage Improvements

I. Are you registered to do business with the City of Laredo? _____ Yes _____ No

II. If you are registered to do business with the City of Laredo, have you completed the Traffic Management Safety Course offered through the City of Laredo?

_____ Yes Date of Completion _____/_____/_____
_____ No

III. Statement of Qualifications: (Similar Projects Completed by Bidder)

1) Name of Project: ____________________________________________
   Value of Contract: ____________________________________________
   Date Completed: ____________________________________________
   Owner Contact Info: ____________________________________________

2) Name of Project: ____________________________________________
   Value of Contract: ____________________________________________
   Date Completed: ____________________________________________
   Owner Contact Info: ____________________________________________

3) Name of Project: ____________________________________________
   Value of Contract: ____________________________________________
   Date Completed: ____________________________________________
   Owner Contact Info: ____________________________________________

Experience Data: (Include name and experience record of the Superintendent)

Financial Status: A confidential financial statement will be submitted by the apparent successful low Bidder only if the Owner deems it necessary.

NOTE: TO BE SUBMITTED UPON REQUEST

IS NOT AN ACCEPTABLE ANSWER
Project: Eastern Chacon Creek Interceptor and Drainage Improvements

Proposed Progress Schedules:

Data on Equipment to be used on the Work:
(Include the number of machines, the type, capacity, age and conditions and location)

Subcontractors:
(Submit a list of proposed Subcontractors. List sources, types and manufacturers of proposed materials)

NOTE: TO BE SUBMITTED UPON REQUEST
IS NOT AN ACCEPTABLE ANSWER
1) Refer to Section 402 for Clearing and Grubbing description. Contractor to advise Engineer which trees require pruning to allow for equipment operation. (i.e. excavators, backhoe, etc.) Provide allowance on bid schedule for this item. (Bid item #2)

2) Refer to Section 128 for description on disposal of waste material and salvageable material. This is not a pay item but subsidiary to project.

3) OSHA compliant trench safety plan by licensed Professional Engineer required for excavation greater than 20’ depth.

4) See Note #7 on Sheet 02 “Basis of Estimate and Construction Notes” stating contractor is responsible for dewatering of work area should ground water be encountered. Additionally, refer to Sheet 19 “Site Improvement Details” for trench backfill detail specific to areas groundwater is encountered.

5) Right of Entry forms must be secured if using private property to access site or for temporary yard.

6) Subsurface bores do not indicate rock but should rock be encountered, measurement and payment to be discussed and agreed upon with City of Laredo.

7) Bid Alternate #1 pertains to sewer interceptor Sta: 27+12.40 to 56+22.75. See Sheets 11-13 “Proposed Wastewater Collection Plan and Profiles”.

8) Bid Alternates #2 & #3 pertain to entire sewer interceptor Sta: 0+00 to 56.22.75 including the jack and bore (Sta: 25+01.38 to 26.66.85). See Sheets 08-15 “Proposed Wastewater Collection Plan and Profiles”.

9) Bid Alternates #4, #5, and #6 pertain to sewer interceptor proposed along an existing steep embankment Sta: 0+67.82 to 8+00.75. See Sheet 08 “Proposed Wastewater Collection Plan and Profiles”

10) For Item II-19, pattern and color specified are base bid. Contractor may provide alternative pattern and color samples for review and approval by City.

11) For Item II-7 & II-8 see Sheet 26 “Phase 1 – Box Culvert Details”

12) Item II-2 Channel cut to include haul off and disposal.

13) Abandonment of manhole includes flushing, plugging pipe openings, filling with sand or other City approved material, removal of manhole ring and cover, and placement of concrete cover comprised of 6” thick 3,000psi concrete reinforced with #4s at 8” OCEW.

14) Abandonment of sewer line includes flushing and plugging pipe at ends.

15) Channel rock rip rap bedding paid through SW3P bid item.
## CITY OF LAREDO EASTERN CHACON CREEK INTERCEPTOR AND DRAINAGE IMPROVEMENTS PROJECT

### BID SCHEDULE

#### I. Sewer Interceptor (Fusible PVC DR21-200psi rated Option 1)

<table>
<thead>
<tr>
<th>Item #</th>
<th>Description</th>
<th>Estimated Quantity</th>
<th>Unit</th>
<th>Unit Price</th>
<th>Extended</th>
</tr>
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<tbody>
<tr>
<td>1</td>
<td>Mobilization and Bonding, complete in place at _____________________________</td>
<td>1</td>
<td>LS</td>
<td>$</td>
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<tr>
<td>2</td>
<td>Clearing and Grubbing (as per section 402), complete in place at ____________</td>
<td>7</td>
<td>AC</td>
<td>$</td>
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<td>3</td>
<td>Traffic Control, complete in place at _____________________________</td>
<td>1</td>
<td>LS</td>
<td>$</td>
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<td>4</td>
<td>Trench excavation protection, complete in place at _____________________________</td>
<td>5,650</td>
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<td>5</td>
<td>36&quot; Fusible PVC DR21, Jack and Dry Bore with 42&quot; steel casing, complete in place at _____________________________</td>
<td>165</td>
<td>LF</td>
<td>$</td>
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<tr>
<td>6</td>
<td>36&quot; Fusible PVC DR21, Open Cut, complete in place at ____________________________</td>
<td>2,575</td>
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<td>7</td>
<td>30&quot; Fusible PVC DR21, Open Cut, complete in place at ____________________________</td>
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<td>LF</td>
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<td>8</td>
<td>30&quot; Fusible PVC DR21, Open Cut with 36” steel casing, complete in place at _____________________________</td>
<td>90</td>
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<td>9</td>
<td>12&quot; SDR 26 PVC, complete in place at __________________________________________</td>
<td>200</td>
<td>LF</td>
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<tr>
<td>10</td>
<td>Fiberglass Sewer Manhole (15'-25' Deep), complete in place at _________</td>
<td>3</td>
<td>EA</td>
<td>$</td>
<td>$</td>
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<tr>
<td>11</td>
<td>Fiberglass Sewer Drop Manhole (15'-25' Deep), complete in place at _______</td>
<td>1</td>
<td>EA</td>
<td>$</td>
<td>$</td>
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<tr>
<td>12</td>
<td>Fiberglass Sewer Manhole (15'-25' Deep) Bolted, complete in place at ________</td>
<td>11</td>
<td>EA</td>
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<td>$</td>
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<tr>
<td>13</td>
<td>Fiberglass Sewer Drop Manhole (15'-25' Deep) Bolted, complete in place at ______</td>
<td>2</td>
<td>EA</td>
<td>$</td>
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<tr>
<td>14</td>
<td>Fiberglass Sewer Manhole (15'-25' Deep) Bolted &amp; Vented, complete in place at ______</td>
<td>6</td>
<td>EA</td>
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<tr>
<td>15</td>
<td>Remove / Replace Existing Manhole (15'-25' deep) Bolted, complete in place at ______</td>
<td>2</td>
<td>EA</td>
<td>$</td>
<td>$</td>
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<tr>
<td>16</td>
<td>Remove / Replace Existing Drop Manhole (15'-25' deep) Bolted, complete in place at ______</td>
<td>1</td>
<td>EA</td>
<td>$</td>
<td>$</td>
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<tr>
<td>17</td>
<td>Tie Into Existing Manhole, complete in place at _________</td>
<td>1</td>
<td>EA</td>
<td>$</td>
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<tr>
<td>18</td>
<td>Fill, Abandon, and Cap Existing Manholes, complete in place at ________</td>
<td>6</td>
<td>EA</td>
<td>$</td>
<td>$</td>
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<tr>
<td></td>
<td>Description</td>
<td>Quantity</td>
<td>Unit</td>
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<tr>
<td>19</td>
<td>Cap and Abandon Existing Forcemain 1,950 LF (cap at ends and ROW lines, disconnect pipeline from source, purge, and seal at ends), complete in place at __________________________ per unit.</td>
<td>1</td>
<td>LS</td>
<td>$</td>
<td>$</td>
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<tr>
<td>20</td>
<td>Cap and Abandon Existing 18&quot; &amp; 21&quot; Sewer Mains 2,700 LF, complete in place at __________________________ per unit.</td>
<td>1</td>
<td>LS</td>
<td>$</td>
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<tr>
<td>21</td>
<td>Cap, Remove, and Dispose Existing 12&quot; Sewer Mains 300 LF, complete in place at __________________________ per unit.</td>
<td>1</td>
<td>LS</td>
<td>$</td>
<td>$</td>
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<tr>
<td>22</td>
<td>Lateral Connections / Tie In of Existing 8&quot; to 12&quot; Sewer to New Interceptor, complete in place at __________________________ per unit.</td>
<td>3</td>
<td>EA</td>
<td>$</td>
<td>$</td>
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<tr>
<td>23</td>
<td>Remove / Replace existing pavement base, and prime coat, complete in place at __________________________ per unit.</td>
<td>1,500</td>
<td>SY</td>
<td>$</td>
<td>$</td>
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<tr>
<td>24</td>
<td>Remove / Replace existing 7&quot; concrete, complete in place at ___________per unit.</td>
<td>1,200</td>
<td>SF</td>
<td>$</td>
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<td>25</td>
<td>Remove / Replace existing curb and gutter, complete in place at ___________per unit.</td>
<td>120</td>
<td>LF</td>
<td>$</td>
<td>$</td>
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<td>26</td>
<td>All Weather Road (8&quot; Flexible Base), complete in place at __________________________ per unit.</td>
<td>6,530</td>
<td>SY</td>
<td>$</td>
<td>$</td>
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<tr>
<td>27</td>
<td>Wastewater PVC Above Ground Marker, complete in place at __________________________ per unit.</td>
<td>26</td>
<td>EA</td>
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### II. Phase 1 Drainage Channel Improvements and Culvert Reconstruction

<table>
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<th>Item #</th>
<th>Description</th>
<th>Estimated Quantity</th>
<th>Unit</th>
<th>Unit Price</th>
<th>Extended</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Demolition of Century City Boulevard Crossing and Channel Concrete, complete in place at ___________________ ___________________ ___________________ per unit.</td>
<td>1</td>
<td>LS</td>
<td>$</td>
<td>$</td>
</tr>
<tr>
<td>2</td>
<td>Channel Cut (compacted measure), complete in place at ___________________ ___________________ ___________________ per unit.</td>
<td>32,150</td>
<td>CY</td>
<td>$</td>
<td>$</td>
</tr>
<tr>
<td>3</td>
<td>Channel Fill (compacted measure), complete in place at ___________________ ___________________ ___________________ per unit.</td>
<td>150</td>
<td>CY</td>
<td>$</td>
<td>$</td>
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<tr>
<td>4</td>
<td>Century City Boulevard Street Fill (compacted measure), complete in place at ___________________ ___________________ ___________________ per unit.</td>
<td>3,250</td>
<td>CY</td>
<td>$</td>
<td>$</td>
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<td>5</td>
<td>5' x 10' Box Culvert with rock bedding, complete in place at ___________________ ___________________ ___________________ per unit.</td>
<td>360</td>
<td>LF</td>
<td>$</td>
<td>$</td>
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<tr>
<td></td>
<td>Description</td>
<td>Quantity</td>
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<tr>
<td>6</td>
<td>10’ x 8’ Box Culvert with rock bedding, complete in place at ______________</td>
<td>180</td>
<td>LF</td>
<td>$</td>
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<tr>
<td>7</td>
<td>Culvert Headwall, complete in place at ______________</td>
<td>2</td>
<td>EA</td>
<td>$</td>
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<tr>
<td>8</td>
<td>Concrete Retaining Wall 2’ – 5’, complete in place at ______________</td>
<td>40</td>
<td>LF</td>
<td>$</td>
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<tr>
<td>9</td>
<td>Concrete Retaining Wall 5’ – 13’, complete in place at ______________</td>
<td>15</td>
<td>LF</td>
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<tr>
<td>10</td>
<td>Channel Concrete Rip-Rap, complete in place at ____________________________</td>
<td>39,710</td>
<td>SF</td>
<td>$</td>
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<td>11</td>
<td>Remove / Replace Existing 8’ Concrete Flume, complete in place at __________</td>
<td>75</td>
<td>LF</td>
<td>$</td>
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<tr>
<td>12</td>
<td>8” Subgrade Preparation, complete in place at _____________________________</td>
<td>690</td>
<td>SY</td>
<td>$</td>
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<tr>
<td>13</td>
<td>8” Flexible Base (Century City Blvd.), complete in place at ______________</td>
<td>690</td>
<td>SY</td>
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<td>14</td>
<td>10” 4,000psi Concrete Pavement, complete in place at ______________________</td>
<td>5,560</td>
<td>SF</td>
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<td>15</td>
<td>Stand Up Curb, complete in place at ______________</td>
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<td>LF</td>
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<td>16</td>
<td>15’ Curb Opening with Slotted Inlet Top, complete in place at ____________</td>
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<td>EA</td>
<td>$</td>
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<tr>
<td>17</td>
<td>4” Concrete Sidewalk, complete in place at _______________________________</td>
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<td>SF</td>
<td>$</td>
<td>$</td>
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<tr>
<td>18</td>
<td>ADA Ramp Type 10, complete in place at _________________________________</td>
<td>2</td>
<td>EA</td>
<td>$</td>
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<td></td>
<td>_________________________________________________________________________</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>19</td>
<td>Stamped concrete median (running brick pattern &amp; red coral color requiring 1 bag / 1 CY, complete in place at ___</td>
<td>2,320</td>
<td>SY</td>
<td>$</td>
<td>$</td>
</tr>
<tr>
<td></td>
<td>_________________________________________________________________________</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>20</td>
<td>Erosion Control Blanket (NA Green Vmax3 SC250) w/ Hydromulch and vegetative watering, complete in place at ___</td>
<td>13,930</td>
<td>SY</td>
<td>$</td>
<td>$</td>
</tr>
<tr>
<td></td>
<td>_________________________________________________________________________</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>21</td>
<td>Pedestrian Rail, complete in place at ___________________________________</td>
<td>190</td>
<td>LF</td>
<td>$</td>
<td>$</td>
</tr>
<tr>
<td></td>
<td>_________________________________________________________________________</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>22</td>
<td>Swinging Gate (painted), complete in place at ____________________________</td>
<td>1</td>
<td>EA</td>
<td>$</td>
<td>$</td>
</tr>
<tr>
<td></td>
<td>_________________________________________________________________________</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>23</td>
<td>Seal Coat, complete in place at __________________________________________</td>
<td>245</td>
<td>SY</td>
<td>$</td>
<td>$</td>
</tr>
<tr>
<td></td>
<td>_________________________________________________________________________</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>24</td>
<td>Stripping &amp; Reflectors, complete in place at ______________________________</td>
<td>1</td>
<td>LS</td>
<td>$</td>
<td>$</td>
</tr>
<tr>
<td></td>
<td>_________________________________________________________________________</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>25</td>
<td>Contingency allowance, complete in place at ______________________________</td>
<td>1</td>
<td>LS</td>
<td>$50,000</td>
<td>$50,000</td>
</tr>
<tr>
<td></td>
<td>_________________________________________________________________________</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td><strong>Total Section 2</strong></td>
<td></td>
<td></td>
<td></td>
<td>$</td>
</tr>
</tbody>
</table>

Written in words ________________________________________________________________

___________________________________________________________________________
### III. Sewer Interceptor – Alternate #1

<table>
<thead>
<tr>
<th>Item #</th>
<th>Description</th>
<th>Estimated Quantity</th>
<th>Unit</th>
<th>Unit Price</th>
<th>Extended</th>
</tr>
</thead>
<tbody>
<tr>
<td>DEDUCT</td>
<td>7 30&quot; Fusible PVC DR21, Open Cut, complete in place at ______________________</td>
<td>2,830</td>
<td>LF</td>
<td>$</td>
<td>&lt;$</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>&gt;</td>
</tr>
<tr>
<td>8</td>
<td>30&quot; Fusible PVC DR21, Open Cut with 36” steel casing, complete in place at ______________________</td>
<td>90</td>
<td>LF</td>
<td>$</td>
<td>$</td>
</tr>
<tr>
<td>ADD</td>
<td>6 36&quot; Fusible PVC DR21, Open Cut, complete in place at ______________________</td>
<td>2,830</td>
<td>LF</td>
<td>$</td>
<td>$</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>6A</td>
<td>36&quot; Fusible PVC DR21, Open Cut with 42” steel casing, complete in place at ______________________</td>
<td>90</td>
<td>LF</td>
<td>$</td>
<td>$</td>
</tr>
</tbody>
</table>

|               | Total Alternate #1 $               |

Written in words

__________________________
__________________________
### IV. Sewer Interceptor – Alternate #2

<table>
<thead>
<tr>
<th>Item #</th>
<th>Description</th>
<th>Estimated Quantity</th>
<th>Unit</th>
<th>Unit Price</th>
<th>Extended</th>
</tr>
</thead>
<tbody>
<tr>
<td>5</td>
<td><strong>DEDUCT</strong> 36&quot; Fusible PVC DR21, Jack and Dry Bore with 42&quot; steel casing, complete in place at ______________________ __________________________ per unit.</td>
<td>165</td>
<td>LF</td>
<td>$</td>
<td>&lt;$ &gt;</td>
</tr>
<tr>
<td>6</td>
<td>36&quot; Fusible PVC DR21, Open Cut, complete in place at ______________________ __________________________ per unit.</td>
<td>2,575</td>
<td>LF</td>
<td>$</td>
<td>&lt;$ &gt;</td>
</tr>
<tr>
<td>7</td>
<td>30&quot; Fusible PVC DR21, Open Cut, complete in place at ______________________ __________________________ per unit.</td>
<td>2,830</td>
<td>LF</td>
<td>$</td>
<td>&lt;$ &gt;</td>
</tr>
<tr>
<td>8</td>
<td>30&quot; Fusible PVC DR21, Open Cut with 36&quot; steel casing, complete in place at ______________________ __________________________ per unit.</td>
<td>90</td>
<td>LF</td>
<td>$</td>
<td>$</td>
</tr>
<tr>
<td>5A</td>
<td><strong>ADD</strong> 36&quot; CCFRPM Pipe, Jack and Dry Bore with 48&quot; steel casing, complete in place at ______________________ __________________________ per unit.</td>
<td>165</td>
<td>LF</td>
<td>$</td>
<td>$</td>
</tr>
<tr>
<td>6B</td>
<td>36&quot; CCFRPM Pipe, Open Cut, complete in place at ______________________ __________________________ per unit.</td>
<td>2,575</td>
<td>LF</td>
<td>$</td>
<td>$</td>
</tr>
<tr>
<td>7A</td>
<td>30&quot; CCFRPM Pipe, Open Cut, complete in place at ______________________ __________________________ per unit.</td>
<td>2,830</td>
<td>LF</td>
<td>$</td>
<td>$</td>
</tr>
<tr>
<td>8A</td>
<td>30&quot; CCFRPM, Open Cut with 42&quot; steel casing, complete in place at __________ __________________________ per unit.</td>
<td>90</td>
<td>LF</td>
<td>$</td>
<td>$</td>
</tr>
</tbody>
</table>

**Total Alternate #2 $**

Written in words ________________________________________________________________

________________________________________________________
### V. Sewer Interceptor – Alternate #3

<table>
<thead>
<tr>
<th>Item #</th>
<th>Description</th>
<th>Estimated Quantity</th>
<th>Unit</th>
<th>Unit Price</th>
<th>Extended</th>
</tr>
</thead>
<tbody>
<tr>
<td>5</td>
<td>36&quot; Fusible PVC DR21, Jack and Dry Bore with 42&quot; steel casing, complete in</td>
<td>165</td>
<td>LF</td>
<td>$</td>
<td>&lt;$ &gt;</td>
</tr>
<tr>
<td></td>
<td>place at ____________________________ per unit.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>36&quot; Fusible PVC DR21, Open Cut, complete in place at ______________________</td>
<td>2,575</td>
<td>LF</td>
<td>$</td>
<td>&lt;$ &gt;</td>
</tr>
<tr>
<td></td>
<td>per unit.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>7</td>
<td>30&quot; Fusible PVC DR21, Open Cut, complete in place at ______________________</td>
<td>2,830</td>
<td>LF</td>
<td>$</td>
<td>&lt;$ &gt;</td>
</tr>
<tr>
<td></td>
<td>per unit.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>8</td>
<td>30&quot; Fusible PVC DR21, Open Cut with 36&quot; steel casing, complete in place at</td>
<td>90</td>
<td>LF</td>
<td>$</td>
<td>$</td>
</tr>
<tr>
<td></td>
<td>____________________________ per unit.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### ADD

<table>
<thead>
<tr>
<th>Item #</th>
<th>Description</th>
<th>Estimated Quantity</th>
<th>Unit</th>
<th>Unit Price</th>
<th>Extended</th>
</tr>
</thead>
<tbody>
<tr>
<td>5A</td>
<td>36&quot; CCFRPM Pipe, Jack and Dry Bore with 48&quot; steel casing, complete in place</td>
<td>165</td>
<td>LF</td>
<td>$</td>
<td>$</td>
</tr>
<tr>
<td></td>
<td>at ____________________________ per unit.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>5B</td>
<td>36&quot; CCFRPM Pipe, Open Cut with 48&quot; steel casing, complete in place at</td>
<td>90</td>
<td>LF</td>
<td>$</td>
<td>$</td>
</tr>
<tr>
<td></td>
<td>____________________________ per unit.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>6B</td>
<td>36&quot; CCFRPM Pipe, Open Cut, complete in place at ____________________________</td>
<td>5,405</td>
<td>LF</td>
<td>$</td>
<td>$</td>
</tr>
<tr>
<td></td>
<td>per unit.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

| Total Alternate #3 | $ |

Written in words: _______________________________________________________________

__________________________________________
### VI. Sewer Interceptor – Alternate #4

<table>
<thead>
<tr>
<th>Item #</th>
<th>Description</th>
<th>Estimated Quantity</th>
<th>Unit</th>
<th>Unit Price</th>
<th>Extended</th>
</tr>
</thead>
<tbody>
<tr>
<td>DEDUCT</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>36&quot; Fusible PVC DR21, Open Cut, complete in place at _______________________</td>
<td>730</td>
<td>LF</td>
<td>$</td>
<td>&lt;$</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>&gt;</td>
</tr>
<tr>
<td>ADD</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>6C</td>
<td>36&quot; Fusible PVC DR21, Horizontal Directional Drilling, complete in place at</td>
<td>730</td>
<td>LF</td>
<td>$</td>
<td>$</td>
</tr>
<tr>
<td></td>
<td>________________ _________________ _________________ per unit.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td><strong>Total Alternate #4</strong> $</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Written in words
______________________________________________________________
______________________________________________________________

### VII. Sewer Interceptor – Alternate #5

<table>
<thead>
<tr>
<th>Item #</th>
<th>Description</th>
<th>Estimated Quantity</th>
<th>Unit</th>
<th>Unit Price</th>
<th>Extended</th>
</tr>
</thead>
<tbody>
<tr>
<td>DEDUCT</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>36&quot; Fusible PVC DR21, Open Cut, complete in place at _______________________</td>
<td>730</td>
<td>LF</td>
<td>$</td>
<td>&lt;$</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>&gt;</td>
</tr>
<tr>
<td>ADD</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>36&quot; Fusible PVC DR21, Jack and Dry Bore with 42&quot; steel casing, complete in</td>
<td>730</td>
<td>LF</td>
<td>$</td>
<td>$</td>
</tr>
<tr>
<td></td>
<td>place at ________________ _________________ _________________ per unit.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td><strong>Total Alternate #5</strong> $</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Written in words
______________________________________________________________
______________________________________________________________
### VIII. Sewer Interceptor – Alternate #6

<table>
<thead>
<tr>
<th>Item #</th>
<th>Description</th>
<th>Estimated Quantity</th>
<th>Unit</th>
<th>Unit Price</th>
<th>Extended</th>
</tr>
</thead>
<tbody>
<tr>
<td>DEDUCT</td>
<td>6 36&quot; Fusible PVC DR21, Open Cut, complete in place at_____________________</td>
<td>730</td>
<td>LF</td>
<td>$</td>
<td>&lt;$</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>&gt;</td>
</tr>
<tr>
<td>ADD</td>
<td>6D 36&quot; Fusible PVC DR21, 48&quot; diameter hand tunneling with liner plate, complete in place at_____________________</td>
<td>730</td>
<td>LF</td>
<td>$</td>
<td>$</td>
</tr>
</tbody>
</table>

Total Alternate #6 $ 

Written in words ____________________________________________________________

### IX. Alternate #7

<table>
<thead>
<tr>
<th>Item #</th>
<th>Description</th>
<th>Estimated Quantity</th>
<th>Unit</th>
<th>Unit Price</th>
<th>Extended</th>
</tr>
</thead>
<tbody>
<tr>
<td>ADD</td>
<td>26 Hydromulch with vegetative watering, complete in place at_________________</td>
<td>11,500</td>
<td>SY</td>
<td>$</td>
<td>$</td>
</tr>
</tbody>
</table>

Total Alternate #7 $ 

Written in words ____________________________________________________________
This undersigned bidder certifies that he has currently checked the bid prices contained herein and is entirely satisfied that they are correct and final.

BIDDER: ________________________________

BY: ________________________________

TITLE: ________________________________

ADDRESS: ________________________________

CITY/STATE/ZIP: ________________________________

TELEPHONE: ________________________________

NOTE #1 - PAY ITEMS: All items shall consist of furnishing all materials, labor, equipment, superintendence, and all necessary work to undertake and complete the pay item without any further compensation, adjustment, or consideration.

NOTE #2 – GENERAL NOTE: All bid items will be paid for when complete, in place, tested, and accepted by the City of Laredo.
BID BOND

Project: Eastern Chacon Creek Interceptor and Drainage Improvements

KNOW ALL MEN BY THESE PRESENTS, that we, the undersigned

____________________________________________________________________
____________________________________________________________________

as Principal, and ______________________________ as Surety, are hereby held and

firmly bound unto ______________________________ as Owner in the penal sum of

____________________________________________________________________ for payment of which, well and truly to be made, we hereby jointly and severally bid ourselves, our heirs, executors, administrations, successors and assigns.

Signed, this _____ day of ________________, 20__.

The condition of the above obligation is such that whereas the Principal has submitted

to ______________________________ a certain Bid, attached hereto and hereby made a part hereof to enter into a Contract in writing for the Eastern Chacon Creek Interceptor and Drainage Improvements Project.

NOW, THEREFORE,

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

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

The Surety, for value received, hereby stipulates and agrees that he obligations of said Surety, and its bonds shall be in no way impaired or affected by any extension of the time within which the Owner may accept such Bid; and said Surety does hereby waive notice of any such extension.
IN WITNESS WHEREOF, the Principal and the Surety have hereunto set their hands and seals and such of them as are corporations have caused their corporate seals to be hereto affixed and these presents to be signed by their proper officers, the day and year first set forth herein.

________________________  (L.S.)
Principal

________________________
Surety

By: ________________________
SECTION 201
FUSIBLE POLYVINYLCHLORIDE PIPE FOR INSTALLATION BY
OPEN CUT, HORIZONTAL DIRECTIONAL DRILL (HDD), OR JACK AND BORE

D 201.01 DESCRIPTION
A. Scope
   1. This section specifies fusible polyvinylchloride pipe, including standards for dimensionality,
testing, quality, acceptable fusion practice, safe handling, storage and installation of the pipe
by open cut, horizontal directional drilling, directional boring, or guided boring.

B. Requirements
   1. Contractor shall provide fusible polyvinylchloride pipe conforming to all standards and
      procedures, and meeting all testing and material properties as described in this specification
      for installation by horizontal directional drilling.

   2. Contractor shall be responsible for all installation processes and procedures associated with
      the installation by horizontal directional drilling in accordance with this specification.

C. Pipe Description
   1. Pipe Supplier shall furnish fusible polyvinylchloride pipe conforming to all standards and
      procedures, and meeting all testing and material properties as described in this
      specification.

   2. Pipe shall conform to the following dimensionality and general characteristics table:

<table>
<thead>
<tr>
<th>Pipe Description</th>
<th>Nominal Diameter (in.)</th>
<th>DR</th>
<th>Color</th>
<th>Pressure Class (psi)</th>
<th>Required Inner Diameter (in.)</th>
</tr>
</thead>
<tbody>
<tr>
<td>36” DR21 FPVC</td>
<td>36”</td>
<td>21</td>
<td>Green</td>
<td>200</td>
<td>34.43”</td>
</tr>
<tr>
<td>30” DR21 FPVC</td>
<td>30”</td>
<td>21</td>
<td>Green</td>
<td>200</td>
<td>28.77”</td>
</tr>
</tbody>
</table>

D 201.02 QUALITY ASSURANCE
A. References
   1. This section contains references to the following documents. They are a part of this section
      as specified and modified. Where a referenced document contains references to other
      standards, those other standards are included as references under this section as if
      referenced directly. In the event of a conflict between the requirements of this section and
      those of the listed documents, the requirements of this section shall prevail.

   2. Unless otherwise specified, references to documents shall mean the documents in effect at
      the time of design, bid, or construction, whichever is earliest. If referenced documents have
      been discontinued by the issuing organization, references to those documents shall mean
      the replacement documents issued or otherwise identified by that organization or, if there
      are no replacement documents, the last version of the document before it was discontinued.

   3. Where document dates are given in the following listing, references to those documents
      shall mean the specific document version associated with that date, regardless of whether
      the document has been superseded by a version with a later date, discontinued or replaced.
<table>
<thead>
<tr>
<th>Reference</th>
<th>Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>ANSI/AWWA C110/A21.10</td>
<td>American National Standard for Ductile-Iron and Gray-Iron Fittings, 3-inch through 48-inch, for Water and Other Liquids</td>
</tr>
<tr>
<td>AWWA C605</td>
<td>Standard for Underground Installation of Polyvinyl Chloride (PVC) Pressure Pipe and Fittings for Water</td>
</tr>
<tr>
<td>AWWA C651</td>
<td>Standard for Disinfecting Water Mains</td>
</tr>
<tr>
<td>AWWA C900</td>
<td>Standard for Polyvinyl Chloride (PVC) Pressure Pipe and Fabricated Fittings, 4 in. through 12 in. (100mm Through 300mm), for Water Distribution</td>
</tr>
<tr>
<td>AWWA C905</td>
<td>Standard for Polyvinyl Chloride (PVC Pressure Pipe and Fabricated Fittings, 14 in. through 48 in. (350mm Through 1200mm), for Water Distribution and Transmission</td>
</tr>
<tr>
<td>ASTM C923</td>
<td>Standard Specification for Resilient Connectors Between Reinforced Concrete Manhole Structures, Pipes and Laterals</td>
</tr>
<tr>
<td>ASTM D1784</td>
<td>Rigid Poly (Vinyl Chloride) (PVC) Compounds and Chlorinated Poly (Vinyl Chloride) (CPVC) Compounds</td>
</tr>
<tr>
<td>ASTM D1785</td>
<td>Poly (Vinyl Chloride) (PVC) Plastic Pipe, Schedules 40, 80, and 120</td>
</tr>
<tr>
<td>ASTM D2152</td>
<td>Test Method for Degree of Fusion of Extruded</td>
</tr>
<tr>
<td>ASTM D2241</td>
<td>Poly (Vinyl Chloride) (PVC) Pipe and Molded Fittings by Acetone Immersion</td>
</tr>
<tr>
<td>ASTM D2665</td>
<td>Poly (Vinyl Chloride) (PVC) Plastic Drain, Waste, and Vent Pipe and Fittings</td>
</tr>
<tr>
<td>ASTM D3034</td>
<td>Standard Specification for Type PSM Poly(Vinyl Chloride) (PVC) Sewer Pipe and Fittings</td>
</tr>
<tr>
<td>ASTM F477</td>
<td>Elastomeric Seals (Gaskets) for Joining Plastic Pipe</td>
</tr>
<tr>
<td>ASTM F679</td>
<td>Standard Specification for Poly(Vinyl Chloride) (PVC) Large Diameter Plastic Gravity Sewer Pipe and Fittings</td>
</tr>
<tr>
<td>ASTM F1057</td>
<td>Standard Practice for Estimating the Quality of Extruded Poly (Vinyl Chloride) (PVC) Pipe by the Heat Reversion Technique</td>
</tr>
<tr>
<td>ASTM F1417</td>
<td>Standard Test Method for Installation Acceptance of Plastic Gravity Sewer Lines Using Low-Pressure Air</td>
</tr>
<tr>
<td>UNI-B-6</td>
<td>Recommended Practice for Low-Pressure Air Testing of Installed Sewer Pipe</td>
</tr>
<tr>
<td>UNI-PUB-08</td>
<td>Tapping Guide for PVC Pressure Pipe</td>
</tr>
<tr>
<td>NSF-14</td>
<td>Plastics Piping System Components and Related Materials</td>
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<tr>
<td>PPI TR-2</td>
<td>PVC Range Composition Listing of Qualified Ingredients</td>
</tr>
</tbody>
</table>

B. Manufacturer Requirements
   A. All piping shall be made from PVC compound conforming to cell classification 12454 per ASTM D1784

C. Fusion Technician Requirements
   1. Fusion Technician shall be fully qualified by the pipe supplier to install fusible polyvinylchloride pipe of the type(s) and size(s) being used. Qualification shall be current as of the actual date of fusion performance on the project.
D. Specified Pipe Suppliers
   1. Fusible polyvinylchloride pipe shall be used as manufactured under the trade names Fusible C-900®, Fusible C-905®, and FPVC®, for Underground Solutions, Inc., Poway, CA, (858) 679-9551. Fusion process shall be as patented by Underground Solutions, Inc., Poway, CA, Patent No. 6,982,051. Owner and engineer are aware of no other supplier of fusible polyvinylchloride pipe that is an equal to this specified pipe supplier and products.

E. Warranty
   1. The pipe shall be warranted for one year per the pipe supplier’s standard terms.

   2. In addition to the standard pipe warranty, the fusion services shall be warranted for one year per the fusion service provider’s standard terms.

F. Pre-Construction Submittals
   1. The following PRODUCT DATA is required from the pipe supplier and/or fusion provider:
      1.1 Pipe Size
      1.2 Dimensionality
      1.3 Pressure Class per applicable standard
      1.4 Color
      1.5 Recommended Minimum Bending Radius
      1.6 Recommended Maximum Safe Pull Force
      1.7 Fusion technician qualification indicating conformance with this specification

   2. The following WORK PLAN AND INFORMATION is required from the contractor and/or horizontal directional drilling Contractor. This WORK PLAN AND INFORMATION shall also be supplied to the pipe supplier, should it be requested:
      2.1 Work plan shall include for each HDD installation any excavation locations and dimensions, interfering utilities, bore dimensions and locations including bend radii used, and traffic control schematics.
      2.2 A project safety and contingency plan which shall include but shall not be limited to drilling fluid containment and cleanup procedures, equipment and plan for compromised utility installations including electrical and power lines, water, wastewater and any other subsurface utility in the area.
      2.3 An HDD schedule identifying daily work hours and working dates for each installation.

G. Post-Construction Submittals
   1. The following AS-RECORDED DATA is required from the contractor and/or fusion provider to the owner or pipe supplier upon request:
      1.1 Approved datalogger device reports
      1.2 Fusion joint documentation containing the following information:
         1.2.1 Pipe Size and Thickness
         1.2.2 Machine Size
         1.2.3 Fusion Technician Identification
         1.2.4 Job Identification
         1.2.5 Fusion Joint Number
         1.2.6 Fusion, Heating, and Drag Pressure Settings
         1.2.7 Heat Plate Temperature
         1.2.8 Time Stamp
         1.2.9 Heating and Cool Down Time of Fusion
         1.2.10 Ambient Temperature
1.3 As-recorded Information
1.3.1 The as-recorded plan and profile will reflect the actual installed alignment, and reflect the horizontal offset from the baseline and depth of cover.
1.3.2 All fittings, valves, or other appurtenances will also be referenced and shown.
1.3.3 A daily project log, along with tracking log sheets, should they be used, shall be provided. Tracking log sheet data, should it be employed, shall include any and all that apply, including inclination, depth, azimuth, and hydraulic pull-back and rotational force measured.

D 201.03 PRODUCTS
A. Fusible Polyvinylchloride Pressure Pipe for Wastewater Conforming to AWAA C905 Dimensionality
   1. Fusible polyvinylchloride pipe shall conform to AWAA C905 standard.

   2. Fusible polyvinylchloride pipe shall be extruded with plain ends. The ends shall be square to the pipe and free of any bevel or chamfer. There shall be no bell or gasket of any kind incorporated into the pipe.

   3. Fusible polyvinylchloride pipe shall be manufactured in a standard 40' nominal length, or custom lengths as specified.

   4. Fusible polyvinylchloride pipe shall be green in color for wastewater use.

   5. Pipe shall be marked as follows:
      5.1 Nominal pipe size
      5.2 PVC
      5.3 Dimension Ratio, Standard Dimension Ratio, or Schedule
      5.4 AWAA pressure class
      5.5 AWAA standard designation number
      5.6 Extrusion production-record code
      5.7 Trademark or trade name
      5.8 Cell Classification 12454 and/or PVC material code 1120 may also be included

   6. Pipe shall be homogeneous throughout and be free of visible cracks, holes, foreign material, blisters, or other visible deleterious faults.

B. Fusible Polyvinylchloride Non-Pressure Pipe for Wastewater or Surface Water
   1. Fusible polyvinylchloride pipe shall conform to ASTM D3034 or ASTM F679.

   2. Fusible polyvinylchloride pipe may instead conform to AWAA C900 or AWAA C905, ASTM D2241 or ASTM D1785 for standard dimensionality, as applicable.

   3. Fusible polyvinylchloride pipe shall be extruded with plain ends. The ends shall be square to the pipe and free of any bevel or chamfer. There shall be no bell or gasket of any kind incorporated into the pipe.

   4. Fusible polyvinylchloride pipe shall be manufactured in a standard 40’ nominal length, or custom lengths as specified.

   5. Fusible polyvinylchloride pipe shall be green in color for wastewater use. Fusible polyvinylchloride pipe shall be white in color for surface or storm water use.
6. Pipe shall be marked as follows:
   6.1 Nominal pipe size
   6.2 PVC
   6.3 Dimension Ratio, Standard Dimension Ratio, or Schedule
   6.4 Pressure class or standard pressure rating
   6.5 Standard designation number or pipe type
   6.6 Extrusion production-record code
   6.7 Trademark or trade name
   6.8 Cell Classification 12454 and/or PVC material code 1120 may also be included

7. Pipe shall be homogeneous throughout and be free of visible cracks, holes, foreign material, blisters, or other visible deleterious faults.

C. Fusion Joints
   1. Unless otherwise specified, fusible polyvinylchloride pipe lengths shall be assembled in the field with butt-fused joints. The Contractor shall follow the pipe supplier’s written guidelines for this procedure. All fusion joints shall be completed as described in this specification.

D. Connections and Fittings for Pressure Applications
   1. Connections shall be defined in conjunction with the coupling of project piping, as well as the tie-ins to other piping systems.

   2. Ductile Iron Mechanical and Flanged Fittings
      2.1 Acceptable fittings for use with fusible polyvinylchloride pipe shall include standard ductile iron fittings conforming to AWWA/ANSI C110/A21.10, or AWWA/ANSI C153/A21.53 and AWWA/ANSI C111/A21.11.
      2.2 Connections to fusible polyvinylchloride pipe may be made using a restrained or non-restrained retainer gland product for PVC pipe, as well as for MJ or flanged fittings.
      2.3 Bends, tees and other ductile iron fittings shall be restrained with the use of thrust blocking or other means as indicated in the construction documents.
      2.4 Ductile iron fittings and glands must be installed per the manufacturer’s guidelines.

   3. PVC Gasketed, Push-On Fittings
      3.1 Acceptable fittings for use with fusible polyvinylchloride pipe shall include standard PVC pressure fittings conforming to AWWA C900 or AWWA C905.
      3.2 Acceptable fittings for use joining fusible polyvinylchloride pipe other sections of fusible polyvinylchloride pipe or other sections of PVC pipe shall include gasketed PVC, push-on type couplings and fittings, including bends, tees, and couplings as shown in the drawings.
      3.3 Bends, tees and other PVC fittings shall be restrained with the use of thrust blocking or other restraint products as indicated in the construction documents.
      3.4 PVC gasketed, push-on fittings and mechanical restraints, if used, must be installed per the manufacturer’s guidelines.

   4. Fusible Polyvinyl Chloride Sweeps or Bends
      4.1 Fusible polyvinyl chloride sweeps or bends shall conform to the same sizing convention, diameter, dimensional tolerances and pressure class of the pipe being joined using the sweep or bend.
4.2 Fusible polyvinyl chloride sweeps or bends shall be manufactured from the same fusible polyvinyl chloride pipe being used for the installation, and shall have at least 2 feet of straight section on either end of the sweep or bend to allow for fusion of the sweep to the pipe installation. There shall be no gasketed connections utilized with a fusible polyvinyl chloride sweep.

4.3 Standard fusible polyvinyl chloride sweep or bend angles shall not be greater than 22.5 degrees, and shall be used in nominal diameters ranging from 4 inch through 16 inch.

5. Sleeve-Type Couplings
   5.1 Sleeve-type mechanical couplings shall be manufactured for use with PVC pressure pipe, and may be restrained or unrestrained as indicated in the construction documents.
   5.2 Sleeve-type couplings shall be rated at the same or greater pressure carrying capacity as the pipe itself.

6. Expansion and Flexible Couplings
   6.1 Expansion-type mechanical couplings shall be manufactured for use with PVC pipe, and may be restrained or unrestrained as indicated in the construction documents.
   6.2 Expansion-type mechanical couplings shall be rated at the same or greater pressure carrying capacity as the pipe itself.

7. Connection Hardware
   7.1 Bolts and nuts for buried service shall be made of non-corrosive, high-strength, low-alloy steel having the characteristics specified in ANSI/AWWA C111/A21.11, regardless of any other protective coating.

E. Connections for Gravity Sanitary Sewer and Non-Pressure Applications
   The following connections are to be used in conjunction with tie-ins to other non-pressure, gravity sewer piping and/or structures, and shall be as indicated in the construction documents.
   1. PVC Gasketed, Push-On Couplings
      1.1 Acceptable couplings for joining fusible polyvinylchloride pipe to other sections of fusible polyvinylchloride pipe or other sections of PVC pipe shall include gasketed PVC, push-on type couplings as indicated in the construction documents.
      1.2 PVC gasketed, push-on fittings and/or restraint hardware must be installed per the manufacturer’s guidelines.
   2. Fusible Polyvinyl Chloride Sweeps or Bends
      2.1 Fusible polyvinyl chloride sweeps or bends shall conform to the same sizing convention, diameter, dimensional tolerances and pressure class of the pipe being joined using the sweep or bend.
      2.2 Fusible polyvinyl chloride sweeps or bends shall be manufactured from the same fusible polyvinyl chloride pipe being used for the installation, and shall have at least 2 feet of straight section on either end of the sweep or bend to allow for fusion of the sweep to the pipe installation. There shall be no gasketed connections utilized with a fusible polyvinyl chloride sweep.
      2.3 Standard fusible polyvinyl chloride sweep or bend angles shall not be greater than 22.5 degrees, and shall be used in nominal diameters ranging from 4 inch through 16 inch.
3. Sleeve-Type Couplings
   3.1 Sleeve-type mechanical couplings shall be manufactured for use with PVC pipe, and may be restrained or unrestrained as indicated in the construction documents.

4. Expansion and Flexible Couplings
   4.1 Expansion-type mechanical couplings shall be manufactured for use with PVC pipe, and may be restrained or unrestrained as indicated in the construction documents.

5. Connection Hardware
   5.1 Bolts and nuts for buried service shall be made of non-corrosive, high-strength, low-alloy steel having the characteristics specified in ANSI/AWWA C111/A21.11, regardless of any other protective coating.

6. Connection to Sanitary Sewer Manholes and Structures
   6.1 Fusible polyvinylchloride pipe shall be connected to manholes and other structures to provide a leak-free, properly graded flow into or out of the manhole or structure.
   6.2 Connections to existing manholes and structures shall be as indicated in the construction documents.
      6.2.1 For a cored or drilled opening provide a flexible, watertight connection that meets and/or exceeds ASTM C923.
      6.2.2 For a knock out opening, provide a watertight connection (waterstop or other method) meeting the material requirements of ASTM C923 that is securely attached to the pipe with stainless steel bands or other means.
      6.2.3 Grout opening in manhole wall with non-shrink grout. Pour concrete collar around pipe and outside manhole opening. Provide flexible pipe joint or flexible connector within 2 feet of the collar.
   6.3 Connections to a new manhole or structure shall be as indicated in the construction documents.
      6.3.1 A flexible, watertight gasket per ASTM C 923 shall be cast integrally with riser section(s) for all precast manhole and structures.
      6.3.2 Drop connections shall be required where shown on drawings.
      6.3.3 Grout internal joint space with non-shrink grout.

F. Drilling System Equipment
   1. General
      1.1 The directional drilling equipment, as a minimum, shall consist of a directional drilling rig of sufficient capacity to perform the bore(s) and pull-back of the pipe(s), a drilling fluid mixing & delivery system of sufficient capacity to successfully complete the crossing, a guidance system to accurately guide boring operations, and trained and competent personnel to operate the system. All equipment shall be in good, safe operating condition with sufficient supplies, materials and spare parts on hand to maintain the system in good working order for the duration of this project. All required equipment shall be included in the emergency and contingency plan as submitted per these specifications.

   2. Drilling Rig
      2.1 The directional drilling machine shall consist of a hydraulically powered system to rotate, push and pull drill pipe while delivering a pressurized fluid mixture to a drill head. The machine shall be anchored to withstand the pulling, pushing and rotating forces required to complete the project.
      2.2 The drilling rig hydraulic system shall be of sufficient pressure and volume to power drilling operations. The hydraulic system shall be free from leaks.
2.3 The drilling rig shall have a system to monitor pull-back hydraulic pressure during pull-back operations.

3. Drill Head
   3.1 The horizontal directional drilling equipment shall produce a stable fluid lined tunnel with the use of a steer-able drill head and any subsequent pre-reaming heads.
   3.2 The system must be able to control the depth and direction of the drilling operation.
   3.3 Drill head shall contain all necessary cutters and fluid jets for the operation, and shall be of the appropriate design for the ground medium being drilled.

4. Drilling Fluid System
   4.1 Drilling Fluid (Drilling Mud)
      4.1.1 Drilling fluid shall be composed of clean water and the appropriate additive(s) for the fluid to be used. Water shall be from a clean source and shall meet the mixing requirements of the mixture manufacturer(s).
      4.1.2 The water and additives shall be mixed thoroughly to assure the absence of any clumps or clods. No hazardous additives may be used.
      4.1.3 Drilling fluid shall be maintained at a viscosity sufficient to suspend cuttings and maintain the integrity of bore wall(s).
      4.1.4 Drilling fluid shall be disposed of off-site in accordance with local, state and federal requirements and/or permit conditions.
      4.1.5 No additional chemicals or polymer surfactants shall be allowed to be added to the drilling fluid unless they have been submitted per this specification.
   4.2 Mixing System
      4.2.1 A drilling fluid mixing system shall be of sufficient size to mix and deliver drilling fluid for the project.
      4.2.2 The mixing system shall be able to ensure thorough mixing of the drilling fluid. The drilling fluid reservoir tank shall be sized for adequate storage of the fluid.
      4.2.3 The mixing system shall continually agitate the drilling fluid during drilling operations.
   4.3 Drilling Fluid Delivery and Recovery System
      4.3.1 The drilling fluid pumping system shall have a minimum capacity to supply drilling fluid in accordance with the drilling equipment pull-back rating at a constant required pressure.
      4.3.2 The delivery system shall have filters or other appropriate in-line equipment to prevent solids from being pumped into the drill pipe.
      4.3.3 Used drilling fluid and drilling fluid spilled during drilling operations shall be contained and properly disposed of. The use of spill containment measures shall be maintained around drill rigs, drilling fluid mixing system, entry and exit pits and drilling fluid recycling system (if used) to prevent spills into the surrounding environment. Pumps, vacuum truck(s), and/or storage of sufficient size shall be in place to contain excess drilling fluid.
      4.3.4 A closed-loop drilling fluid system and a drilling fluid cleaning system should be used to whatever extent practical, depending upon project size and conditions. Under no circumstances shall drilling fluid that has escaped containment be reused in the drilling system.

5. Drilling Control System
   5.1 Calibration of the electronic detection and control system shall be verified prior to the start of the bore.
5.2 The drilling head shall be remotely steer-able by means of an electronic or magnetic
detection system. The drilling head location shall be monitored in three dimensions:
5.2.1 Offset from the baseline,
5.2.2 Distance along the baseline, and
5.2.3 Depth of cover.
5.3 Point of rotation of the head shall also be monitored.
5.4 For gravity application and on-grade drilling, sonde/beacon or approved equipment
applicable for grade increments of 1/10th of one percent shall be used.

G. Pipe Pull Heads
   1. Pipe pull heads shall be utilized that employ a positive through-bolt design assuring a
      smooth wall against the pipe cross-section at all times.
   2. Pipe pull heads shall be specifically designed for use with fusible polyvinylchloride pipe, and
      shall be as recommended by the pipe supplier.

H. Pipe Rollers
   1. Pipe rollers, if required, shall be of sufficient size to fully support the weight of the pipe
      during handling and pullback operations.
   2. A sufficient quantity of rollers and spacing, per the pipe supplier’s guidelines shall be used to
      assure adequate support and excessive sagging of the product pipe.

D 201.04 EXECUTION
A. Delivery and Off-Loading
   1. All pipe shall be bundled or packaged in such a manner as to provide adequate protection of
      the ends during transportation to the site. Any pipe damaged in shipment shall be replaced
      as directed by the owner or engineer.
   2. Each pipe shipment should be inspected prior to unloading to see if the load has shifted or
      otherwise been damaged. Notify owner or engineer immediately if more than immaterial
      damage is found. Each pipe shipment should be checked for quantity and proper pipe size,
      color, and type.
   3. Pipe should be loaded, off-loaded, and otherwise handled in accordance with AWWA M23,
      and all of the pipe supplier’s guidelines shall be followed.
   4. Off-loading devices such as chains, wire rope, chokers, or other pipe handling implements
      that may scratch, nick, cut, or gouge the pipe are strictly prohibited.
   5. During removal and handling, be sure that the pipe does not strike anything. Significant
      impact could cause damage, particularly during cold weather.
   6. If appropriate unloading equipment is not available, pipe may be unloaded by removing
      individual pieces. Care should be taken to insure that pipe is not dropped or damaged.
      Pipe should be carefully lowered, not dropped, from trucks.

B. Handling and Storage
   1. Any length of pipe showing a crack or which has received a blow that may have caused an
      incident fracture, even though no such fracture can be seen, shall be marked as rejected
      and removed at once from the work. Damaged areas, or possible areas of damage may be
      removed by cutting out and removing the suspected incident fracture area. Limits of the
      acceptable length of pipe shall be determined by the owner or engineer.
2. Any scratch or gouge greater than 10% of the wall thickness will be considered significant and can be rejected unless determined acceptable by the owner or engineer.

3. Pipe lengths should be stored and placed on level ground. Pipe should be stored at the job site in the unit packaging provided by the manufacturer. Caution should be exercised to avoid compression, damage, or deformation to the ends of the pipe. The interior of the pipe, as well as all end surfaces, should be kept free from dirt and foreign matter.

4. Pipe shall be handled and supported with the use of woven fiber pipe slings or approved equal. Care shall be exercised when handling the pipe to not cut, gouge, scratch or otherwise abrade the piping in any way.

5. If pipe is to be stored for periods of 1 year or longer, the pipe should be shaded or otherwise shielded from direct sunlight. Covering of the pipe which allows for temperature build-up is strictly prohibited. Pipe should be covered with an opaque material while permitting adequate air circulation above and around the pipe as required to prevent excess heat accumulation.

6. Pipe shall be stored and stacked per the pipe supplier’s guidelines.

C. Fusion Process

1. General

1.1 Fusible polyvinylchloride pipe will be handled in a safe and non-destructive manner before, during, and after the fusion process and in accordance with this specification and pipe supplier’s guidelines.

1.2 Fusible polyvinylchloride pipe will be fused by qualified fusion technicians, as documented by the pipe supplier.

1.3 Each fusion joint shall be recorded and logged by an electronic monitoring device (data logger) connected to the fusion machine.

1.4 Only appropriately sized and outfitted fusion machines that have been approved by the pipe supplier shall be used for the fusion process. Fusion machines must incorporate the following elements:

1.4.1 HEAT PLATE - Heat plates shall be in good condition with no deep gouges or scratches. Plates shall be clean and free of any debris or contamination. Heater controls shall function properly; cord and plug shall be in good condition. The appropriately sized heat plate shall be capable of maintaining a uniform and consistent heat profile and temperature for the size of pipe being fused, per the pipe supplier’s guidelines.

1.4.2 CARRIAGE – Carriage shall travel smoothly with no binding at less than 50 psi. Jaws shall be in good condition with proper inserts for the pipe size being fused. Insert pins shall be installed with no interference to carriage travel.

1.4.3 GENERAL MACHINE - Overview of machine body shall yield no obvious defects, missing parts, or potential safety issues during fusion.

1.4.4 DATA LOGGING DEVICE – An approved datalogging device with the current version of the pipe supplier’s recommended and compatible software shall be used. Datalogging device operations and maintenance manual shall be with the unit at all times. If fusing for extended periods of time, an independent 110V power source shall be available to extend battery life.

1.5 Other equipment specifically required for the fusion process shall include the following:

1.5.1 Pipe rollers shall be used for support of pipe to either side of the machine
1.5.2 A weather protection canopy that allows full machine motion of the heat plate, fusion assembly and carriage shall be provided for fusion in inclement, extreme temperatures, and/or windy weather, per the pipe supplier’s recommendations.

1.5.3 An infrared (IR) pyrometer for checking pipe and heat plate temperatures.

1.5.4 Fusion machine operations and maintenance manual shall be kept with the fusion machine at all times.

1.5.5 Facing blades specifically designed for cutting fusible polyvinylchloride pipe shall be used.

1.6 Remove internal fusion bead from inside of fused pipe.

2. Joint Recording

2.1 Each fusion joint shall be recorded and logged by an electronic monitoring device (data logger) connected to the fusion machine. The fusion data logging and joint report shall be generated by software developed specifically for the butt-fusion of fusible polyvinyl chloride pipe. The software shall register and/or record the parameters required by the pipe supplier and these specifications. Data not logged by the data logger shall be logged manually and be included in the Fusion Technician’s joint report.

D. Drilling Operations

1. General

1.1 Bore path and alignment are as indicated in the contract documents. The path of the bore may be modified based on field and equipment conditions. Entry and exit locations and control-point elevations shall be maintained as indicated in the contract documents.

1.2 Bend radii shown in the contract documents are minimum allowable radii and shall not be reduced.

2. Location and Protection of Underground Utilities

2.1 Correct location of all underground utilities that may impact the HDD installation is the responsibility of the Contractor, regardless of any locations shown on the drawings or previous surveys completed.

2.2 Utility location and notification services shall be contacted by the Contractor prior to the start of construction.

2.3 All existing lines and underground utilities shall be positively identified, including exposing those facilities that are located within an envelope of possible impact of HDD installation as determined for the project specific site conditions. It is the Contractor and HDD system operator’s responsibility to determine this envelope of safe offset from existing utilities. This will include, but is not limited to, soil conditions and layering, utility proximity and material, HDD system and equipment, and foreign subsurface material.

3. Site Location Preparation

3.1 Work site as indicated on drawings shall be graded or filled to provide a level working area. No alterations beyond what is required for operations are to be made.

3.2 Contractor shall confine all activities to designated work areas.

4. Drilling Layout and Tolerances

4.1 The drill path shall be accurately surveyed with entry and exit areas placed in the appropriate locations within the areas indicated on drawings. If using a magnetic guidance system, drill path will be surveyed for any surface geomagnetic variations or anomalies.
4.2 Instrumentation shall be provided and maintained at all times that accurately locates the pilot hole, measures drill-string axial and torsional loads and measures drilling fluid discharge rate and pressure.

4.3 Entry and exit areas shall be drilled so as not to exceed the bending limitations of the pipe as recommended by the pipe supplier.

5. Pilot Hole Bore
   5.1 Pilot hole shall be drilled along bore path. In the event that the pilot bore does deviate from the bore path, it may require contractor to pull-back and re-drill from the location along bore path before the deviation.
   5.2 The Contractor shall limit curvature in any direction to reduce force on the pipe during pull-back. The minimum radius of curvature shall be no less than that specified by the pipe supplier and as indicated on the drawings.

6. Reaming
   6.1 After successfully completing the pilot hole, the bore hole shall be reamed to a diameter which meets the requirements of the pipe being installed. The following table is offered as an estimated guide:

<table>
<thead>
<tr>
<th>Nominal Pipe Diameter</th>
<th>Bore Hole Diameter</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt; 8 inches</td>
<td>Pipe Dia. + 4 inches</td>
</tr>
<tr>
<td>8 inches to 24 inches</td>
<td>Pipe Dia. X 1.5</td>
</tr>
<tr>
<td>&gt; 24 inches</td>
<td>Pipe Dia. + 12 inches</td>
</tr>
</tbody>
</table>

   6.2 Multiple reaming passes shall be used at the discretion of the Contractor and shall conform to this specification.

   6.3 In the event of a drilling fluid fracture, returns loss or other loss of drilling fluid, the Contractor shall be responsible for restoring any damaged property to original condition and cleaning up the area in the vicinity of the damage or loss.

E. Pipe Pull-Back and Insertion
   1. Pipe shall be fused prior to insertion, if the site and conditions allow, into one continuous length.

   2. Contractor shall handle the pipe in a manner that will not over-stress the pipe prior to insertion. Vertical and horizontal curves shall be limited so that the pipe does not bend past the pipe supplier’s minimum allowable bend radius, buckle, or otherwise become damaged. Damaged portions of the pipe shall be removed and replaced.

   3. The pipe entry area shall be graded as needed to provide support for the pipe and to allow free movement into the bore hole.
       3.1 The pipe shall be guided into the bore hole to avoid deformation of, or damage to, the pipe.
       3.2 The fusible polyvinylchloride pipe may be continuously or partially supported on rollers or other Owner and Engineer approved friction decreasing implement during joining and insertion, as long as the pipe is not over-stressed or critically abraded prior to, or during installation.
       3.3 A swivel shall be used between the reaming head and the fusible polyvinylchloride pipe to minimize torsion stress on the pipe assembly.
4. Buoyancy modification shall be at the sole discretion of the Contractor, and shall not exceed the pipe supplier’s guidelines in regards to maximum pull force or minimum bend radius of the pipe. Damage caused by buoyancy modifications shall be the responsibility of the Contractor.

5. Once pull-back operations have commenced, the operation shall continue without interruption until the pipe is completely pulled through the bore hole.

6. The pipe shall be installed in a manner that does not cause upheaval, settlement, cracking, or movement and distortion of surface features. Any damages caused by the Contractor’s operations shall be corrected by the Contractor.

F. Installation Cleanup
1. Following the installation, the project site shall be returned to a condition equal to or better than the pre-construction condition of the site. All excavations will be backfilled and compacted per the construction documents and jurisdictional standards. All pavement and hardscape shall be repaired per applicable jurisdictional standards, excess materials shall be removed from the site, and disturbed areas shall be re-landscaped. All drilling fluid shall be properly disposed of per these specifications and all applicable jurisdictional laws.

2. Contractor shall verify that all utilities, structures, and surface features in the project area are sound.

G. Preparation Prior to Making Connections into Existing Piping Systems
1. Approximate locations for existing piping systems are shown in the construction documents. Prior to making connections into existing piping systems, the contractor shall:
   1.1 Field verify location, size, piping material, and piping system of the existing pipe.
   1.2 Obtain all required fittings, which may include saddles, sleeve type couplings, flanges, tees, or others as shown in the construction documents.
   1.3 Have installed all temporary pumps and/or pipes in accordance with established connection plans.

2. Unless otherwise approved, new piping systems shall be completely assembled and successfully tested prior to making connections into existing pipe systems.

H. Pipe System Connections
1. Pipe connections shall be installed per applicable standards and regulations, as well as per the connection manufacturer’s guidelines and as indicated in the construction documents. Pipe connections to structures shall be installed per applicable standards and regulations, as well as per the connection manufacturer’s guidelines.

2. If possible, pipe installed via HDD shall be filled with water prior to making any connections to the existing system or other portions of the project.

I. Tapping for Potable and Non-Potable Water Applications
1. Tapping shall be performed using standard tapping saddles designed for use on PVC piping in accordance with AWWA C605. Tapping shall be performed only with use of tap saddles or sleeves. NO DIRECT TAPPING WILL BE PERMITTED. Tapping shall be performed in accordance with the applicable sections for Saddle Tapping per Uni-Pub-8.

2. All connections requiring a larger diameter than that recommended by the pipe supplier, shall be made with a pipe connection as specified and indicated on the drawings.
3. Equipment used for tapping shall be made specifically for tapping PVC pipe:
   3.1 Tapping bits shall be slotted “shell” style cutters, specifically made for PVC pipe. ‘Hole saws’ made for cutting wood, steel, ductile iron, or other materials are strictly prohibited.
   3.2 Manually operated or power operated drilling machines may be used.

4. Taps may be performed while the pipeline is filled with water and under pressure (‘wet’ tap,) or when the pipeline is not filled with water and not under pressure (‘dry’ tap).

J. Testing
   1. Testing shall comply with all applicable jurisdictional building codes, statutes, standards, regulations, and laws.

   2. Hydrostatic Testing and Leakage Testing for Pressure Piping
      2.1 Hydrostatic and leakage testing for piping systems that contain mechanical jointing as well as fused PVC jointing shall comply with AWWA C605.
      2.2 Unless agreed to or otherwise designated by the owner or engineer, for a simultaneous hydrostatic and leakage test following installation, a pressure equal to 150% of working pressure at point of test, but not less than 125% of normal working pressure at highest elevation shall be applied. The duration of the pressure test shall be for two (2) hours.
      2.3 If hydrostatic testing and leakage testing are performed at separate times, follow procedures as outlined in AWWA C605.
      2.4 In preparation for pressure testing the following parameters must be followed:
         2.4.1 All air must be vented from the pipeline prior to pressurization. This may be accomplished with the use of the air relief valves or corporation stop valves, vent piping in the testing hardware or end caps, or any other method which adequately allows air to escape the pipeline at all high points. Venting may also be accomplished by ‘flushing’ the pipeline in accordance with the parameters and procedures as described in AWWA C605.
         2.4.2 The pipeline must be fully restrained prior to pressurization. This includes complete installation of all mechanical restraints per the restraint manufacturer’s guidelines, whether permanent or temporary to the final installation. This also includes the installation and curing of any and all required thrust blocking. All appurtenances included in the pressure test, including valves, blow-offs, and air-relief valves shall be checked for proper installation and restraint prior to beginning the test.
         2.4.3 Temporary pipeline alignments that are being tested, such as those that are partially installed in their permanent location shall be configured to minimize the amount of potentially trapped air in the pipeline.

   3. Leakage Testing for Non-Pressure Piping
      3.1 Gravity sanitary sewers that contain mechanical jointing in addition to fused PVC joints may need to be tested for excessive leakage.
      3.2 Gravity sanitary sewer leakage testing may include appropriate water or low pressure air testing. The leakage outward or inward (exfiltration or infiltration) shall not exceed 25 gallons per inch of pipe diameter per mile per day for any section of the system. An exfiltration or infiltration test shall be performed with a minimum positive head of two feet. The air test, if used, shall be conducted in accordance with one of the following Standards:
         3.2.1 ASTM F1417
         3.2.2 UNI-B-6
3.3 The testing method selected shall properly consider the existing groundwater elevations during the test.

4. Deflection Testing for Non-Pressure Piping
   4.1 After completion of the backfill, the engineer or owner may require that a deflection test be performed.
   4.2 Deflection tests should be conducted using a go/no-go mandrel. The mandrel’s outside dimension shall be sized to permit no more than 7.5 percent deflection. The percent deflection shall be established from the base inside diameter of the pipe. If the internal beading of the fused joints for the pipe is not required to be removed, the mandrel shall account for this clearance as well. The mandrel shall be approved by the owner or engineer prior to use. Lines that permit safe entry may allow other deflection test options, such as direct measurements.

5. Disinfection of the Pipeline for Potable Water Piping
   5.1 After installation, the pipeline, having passed all required testing, shall be disinfected prior to being put into service. Unless otherwise directed by the owner or engineer, the pipeline will be disinfected per AWWA C651.

6. Partial Testing
   6.1 Segments of the pipe may be tested separately in accordance with standard testing procedure, as approved by the owner and engineer. Testing of each HDD installation prior to connection to the system or other piping is preferred.

D 201.04 MEASUREMENT
Fusible PVC will be measured for payment in linear feet for the various sizes and types shown on plans along the horizontal centerline of the pipe. No deduction will be made for manholes.

D 201.04 PAYMENT
Fusible PVC pipe will be paid for at the unit price per linear foot, complete in place, as provided in the proposal and contract. The contract price per linear foot shall be the total compensation for furnishing all labor, materials, tools, equipment, and incidentals necessary to complete work, including fusion, excavation, granular embedment material, backfill, and disposal of surplus materials, in accordance with plans and specifications.
SECTION 218
TESTING SEWER SYSTEMS

D 218.01 GENERAL
1. Summary
   A. Section Includes:
      1. Deflection testing of sanitary sewer lines.
      2. Leakage testing of sanitary sewer lines.
      3. Leakage testing of sanitary sewer manholes.
      4. CCTV Test

   B. Measurement and Payment:
      1. Include costs for testing in appropriate unit prices bid for sewer line construction.

2. Submittals
   A. Submit in accordance with Standard General Conditions and Supplementary Conditions.
   B. Copies of all test results shall be submitted to the Engineer prior to acceptance of sewer system.

D 218.02 PRODUCTS  N/A

D 218.03 EXECUTION
1. General
   A. Commence test procedures when following condition are met.
      1. Pipe section to be tested is clean and free of dirt, sand, water or other foreign material. Pipe system shall be isolated from the existing waste water system.
      2. Pipe section to be tested has backfill placed and compacted
   B. Repair visible leaks in manholes and sewers regardless of results of leakage tests.
   C. Notify Engineer and City of Laredo Utilities Department in writing 48 hours before beginning tests.
   D. Contractor shall furnish and pay for all water required for testing.

2. Deflection Testing of Sanitary Sewer Lines
   A. Perform tests on sewer pipe in presence of Engineer and City of Laredo Utilities Inspector.
   B. Provide necessary test mandrel, cable, reeling equipment, and other materials and equipment required to perform tests. Provide cable at each end of test mandrel to allow withdrawal if mandrel becomes stuck.
   C. Deflection Tests shall be performed on all flexible pipes. For pipelines with inside diameters less than 27 inches, a rigid mandrel shall be used to measure deflection.
      1. Mandrel sizing. The rigid mandrel shall have an outside diameter (OD) equal to 95% of the inside diameter (ID) of the pipe. The inside diameter of the pipe, for the purposes of determining the outside diameter of the mandrel, shall be the average outside diameter minus two minimum wall thicknesses for OD controlled pipe and the average inside diameter for ID controlled pipe, all dimensions shall be per appropriate standard. Statistical or other "tolerance packages" shall not be considered in mandrel sizing.
      2. Mandrel design. The rigid mandrel shall be constructed of a metal or a rigid plastic material that can withstand 200 psi without being deformed. The mandrel shall have nine or more "runners" or "legs" as long as the total number of legs is an odd number. The barrel section of the length at least 75% of the inside diameter of the pipe. A proving ring shall be provided and used for each size mandrel in use.
3. **Method options.** Adjustable or flexible mandrels are prohibited. A television inspection is not a substitute of the deflection test. Mandrels with removable legs or runners may be accepted on a case-by-case basis.

D. The test shall be performed without mechanical pulling devices. Sewer is considered to have passed deflection test if mandrel can be drawn through sewer system being tested without aid of mechanical assistance.

E. If excessive force is required or mandrel fails to pass through, sewer shall have failed deflection test.

F. The test shall be conducted after the final backfill has been in place at least 30 days. No pipe shall exceed a deflection of 5.0%. If a pipe should fail to pass deflection test, the problem shall be corrected and a second test shall be conducted after the final backfill has been in place and additional 30 days. Correct failed sewers by excavating sewer a point of failure and for distance of 10 ft on either side, allowing sewer to return to its original round cross-section and backfill according to Specifications. Remove and replace sewers failing to return to original round cross-section or failing second deflection test at not cost to Owner. Do not use devices to generate internal pressures or vibrations to correct failed sewers.

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3. **Leakage Testing of Sanitary Sewer Lines**

A. Tests:
   1. Pressure test sanitary sewer pipe 24 inches or smaller in diameter using low pressure air test.

B. General:
   1. Conduct tests in presence of Engineer and City of Laredo Utilities Inspector.
   2. Provide piping connections between section of line being tested and air supply, test pressure equipment, weirs, meters, certified pressure gauge, and other equipment, materials, and facilities necessary to make specified test.
   3. Provide bulkheads, blocking, bracing or other temporary sectionalizing devices that may be required.
   4. Remove temporary sectionalizing devices after test complete.

C. **Low Pressure Air Test**

   1. General:
      a. Conduct required low pressure air test as specified herein.
      b. Plug pipe outlets with test plugs. Brace each plug securely to prevent blowouts during air test.
      c. Add air slowly.
      d. Pressurizing equipment shall include regulator set to avoid over-pressuring and damaging line.
      e. Safety pressure test in accordance with OSHA requirements.

   2. Air Test Procedures:
      a. The procedure for the low pressure air test shall conform to the procedures described in ASTM C-828, ASTM C-924, ASTM F-1417, or other appropriate procedures, except for testing times.
      b. The test times shall be as outlined in this section. For sections of pipe less than 36 inch average inside diameter, the pipe shall be pressurized to 3.5 psi greater than the pressure exerted by groundwater above the pipe. Once the pressure is stabilized, the minimum time allowable for the pressure to drop from 3.5 pounds per square inch gauge to 2.5 pounds per square inch gauge shall be computed from the following equation:

      \[ T = 0.085 \times D \times K \]
T = time for pressure to drop 1.0 pound per square inch gauge in seconds;  
K = 0.0049 x D x L, but not less than 1.0;  
D = average inside pipe diameter in inches;  
L = length of line of same pipe size being tested, in feet;  
Q = rate of loss, 0.0015 cubic feet per minute per square feet internal surface shall be used.

Since a K value of less than 1.0 shall not be used, there are minimum testing times for each pipe diameter as follows:

<table>
<thead>
<tr>
<th>Pipe Diameter (inches)</th>
<th>Minimum Time (seconds)</th>
<th>Length for Minimum Time (feet)</th>
<th>Time for Longer Length (seconds)</th>
</tr>
</thead>
<tbody>
<tr>
<td>6</td>
<td>340</td>
<td>398</td>
<td>0.855 (L)</td>
</tr>
<tr>
<td>8</td>
<td>454</td>
<td>298</td>
<td>1.520 (L)</td>
</tr>
<tr>
<td>10</td>
<td>567</td>
<td>239</td>
<td>2.374 (L)</td>
</tr>
<tr>
<td>12</td>
<td>680</td>
<td>199</td>
<td>3.419 (L)</td>
</tr>
<tr>
<td>15</td>
<td>850</td>
<td>159</td>
<td>5.342 (L)</td>
</tr>
<tr>
<td>18</td>
<td>1,020</td>
<td>133</td>
<td>7.693 (L)</td>
</tr>
<tr>
<td>21</td>
<td>1,190</td>
<td>114</td>
<td>10.471 (L)</td>
</tr>
<tr>
<td>24</td>
<td>1,360</td>
<td>100</td>
<td>13.676 (L)</td>
</tr>
<tr>
<td>27</td>
<td>1,530</td>
<td>88</td>
<td>17.309 (L)</td>
</tr>
<tr>
<td>30</td>
<td>1,700</td>
<td>80</td>
<td>21.369 (L)</td>
</tr>
<tr>
<td>33</td>
<td>1,870</td>
<td>72</td>
<td>25.856 (L)</td>
</tr>
</tbody>
</table>

The test may be stopped if no pressure loss has occurred during the first 25% of the calculated testing time. If any pressure loss or leakage has occurred during the first 25% of the test period, then the test shall continue for the entire test duration as outlined in this subparagraph or until failure.

c. Provide calibrated and certified test gauge at remote test plug.
   1. Gauge air pressure within test section and attach to test plug by sufficient length of hose to place gauge at ground surface. In case of test frames for individual joint testing, gauge to be remote from air supply.

d. Proceed with test after sewer and lateral installation, including backfilling, is complete and lines cleaned. Proceed as follows:
   1. Flush and clean prior to conducting low pressure air test.
   2. Isolate section of sewer line to be tested by means of inflatable stoppers of other suitable test plugs. One plug shall have inlet tap, or other provision, for connecting hose to portable air control source.
   3. If test section is below groundwater level, determine height of groundwater above spring line of pipe at each end of test section and compute average. For every foot of groundwater above pipe spring line, increase gauge test pressure by 0.43 lb/sq. in.
   4. Connect air hose to inlet tap and portable air control source. Air equipment shall consist of necessary valves and pressure gauges to control rate at which air flows into test section and to enable monitoring of air pressure within test section. Testing apparatus shall also be equipped with pressure relief device to prevent possibility of loading test section.
D 218.04 LEAKAGE TESTING OF SANITARY SEWER MANHOLES

A. After completion of manhole construction, all sealing or rehabilitation, all manholes shall be tested for water tightness and leakage separately and independently of wastewater lines by hydrostatic exfiltration testing.

B. Plug influent and effluent lines, including services lines, with suitability-sized pneumatic or mechanical plugs. Ensure plugs are properly rated for pressures required for test. Follow manufacturer's safety and installation recommendations. Place plugs a minimum of 6 inches outside of manhole walls. Brace inverts to prevent lines from being dislodged if lines entering manhole have not been backfilled.

C. Hydrostatic Exfiltration Testing:
   1. Hydrostatic exfiltration testing shall be performed as follows: all wastewater lines coming into any manhole shall be sealed with an internal pipe plug, and then the manhole shall be filled with water and maintained full for at least one hour
      a. The maximum leakage for hydrostatic testing shall be 0.025 gallons per foot diameter per foot of manhole depth per hour.
   2. If water loss exceeds amount tabulated above, locate leaks, complete repairs necessary to seal manhole and repeat test procedure until satisfactory results are obtained.
   3. For concrete manholes, a wetting period of 24 hours may be used prior to testing in order to allow saturation of the concrete.

D. Repair sewers failing air test by removing and replacing defective pipe sections or by other approved methods at Contractor's cost.
   1. Retest until acceptable test results obtained to be paid by contractor.

D 218.05 CCTV TESTING

A. Contractor will coordinate with City Utility Department to schedule a CCTV camera test of all wastewater pipe installations. City will conduct CCTV test and provide results to Contractor indicating pass or fail. Contractor will not be charged for initial CCTV test. Any additional CCTV runs required will be at Contractor’s expense.
CONSTRUCTION PLANS FOR
EASTERN CHACON CREEK INTERCEPTOR AND DRAINAGE IMPROVEMENTS
LAREDO, TEXAS

HONORABLE PETE SAENZ, ESQ.
MAYOR
CITY OF LAREDO

APPROVED CITY OF LAREDO

ROBERT A. EADS, ICMA-CM
CITY MANAGER

ROSARIO C. CABELO
DEPUTY CITY MANAGER

MICHAEL F. RODGERS
INTERIM UTILITIES DIRECTOR

JOHN PORTER, REM, CFM, CPM
DIRECTOR OF ENVIRONMENTAL SERVICES

DATE
DATE
DATE
and Drainage Improvements

W/ 30" DR21 FPVC

PROPOSED 36" STEEL CASING

INV OUT: 392.85 30"

STA: 48+05.14

INV IN: 393.79 30"

TOP: 411.13

CRANE ENGINEERING CORP.

INV OUT: 394.75 30"

STA: 49+23.99

INV IN: 394.75 30"

TOP: 411.13

STA: 47+30.83

CABLE; VERIFY DEPTH

VERIFY DEPTH

EX BURIED SPECTRUM

EX 12" WL;

DEPARTMENT REVIEW COMMENTS.

INV OUT: 396.09 30"

STA: 55+86.00

PR BOLTED SWR MH-22

INV IN: 396.77 30"

TOP: 413.33

64' B/B

STA: 56+13.14

N

O

S

S

E

C

N

E

D

L

O

ALFREDO MARTINEZ

REMOVE/REPLACE EX SWR MH

EX 8'' SS

TRENCH EXCAVATION.

EX GAS LINE

OF INDIVIDUALS WORKING IN AND AROUND

BLOCK 11

ACCORDANCE WITH OSHA STANDARDS

IMPLEMENT A TRENCH SAFETY PROGRAM IN

BLOCK 10

PROPERTY LINE

(UNPLATTED)

EX GAS LINE

CENTURY CITY UNIT I

W.C.P.R.

X

EX GAS LINE

EX GAS LINE

EX AT&T TBC

EX GAS LINE

EX AT&T TBC

TP

EX GAS LINE

EX GAS LINE

EX GAS LINE

EX SPECTRUM

EX GAS LINE

EX GAS LINE

EX AT&T TBC

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EX SPECTRUM
1. "C" is equal to the culvert top slab thickness. For precast boxes with slabs less than 8" thick, see SCP-MD standard for additional details.
2. Adjust normal curb steel bars as necessary to clear obstructions.
3. Place bars L as shown. Fill hook as necessary to maintain cover.
4. Place normal culvert curb bars H14B as shown. Adjust as necessary to clear obstructions.
5. Additional bars H14B as required to maintain 12" Max spacing.
6. Replace normal curb bars K with one bar L and two bars V as shown spaced at 12" Max. Adjust length of bars V as necessary to maintain clear cover.
7. Optional bars L are to be used only for precast box curbs with 7'-0" closure pour.
8. Quantities shown are for Contractor's information only. Quantities are per linear foot of curb length. The value in table can be interpolated for intermediate values of curb height, "C". Quantity includes bars K (when applicable).

**CONSTRUCTION NOTES:**
Adjust reinforcing steel as necessary to provide 1 1/4" cover.
For visible safety, top of the curb must not project more than 2" above the finished grade.

**MATERIAL NOTES:**
Provide Grade 40 reinforcing steel.
Provide galvanized reinforcing steel if required elsewhere in the plans.
Provide Class "C" concrete (ft. = 3,600 psi) minimum for curbs.
Provide bar splices, where required, as follows:
- Uncoated or galvanized – 94 + 1/8" Min

**GENERAL NOTES:**
- Designed according to AASHTO LRFD Bridge Design Specifications.
- These reinforced curb details have sufficient strength to be used with the strength of Type TE31 or TE31LS rating.
- These details are suitable for use with PR11, PR22 and PR3 type rails. These details are not suitable for the application of other rail types. For new construction using TE31 or TE31LS rating, use the TE31-Cul standard. This Curb is considered as part of the Box Culvert for payment.

Cover dimensions are clear dimensions, unless noted otherwise. Reinforcing bar dimensions shown are cut-to-length of bar.

**TABLE OF ESTIMATED CURB QUANTITIES**

<table>
<thead>
<tr>
<th>Curb Height</th>
<th>Conc. (CY/LF)</th>
<th>Reel Steel (LBF/FL)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1'-0&quot;</td>
<td>0.037</td>
<td>10.4</td>
</tr>
<tr>
<td>1'-6&quot;</td>
<td>0.059</td>
<td>14.5</td>
</tr>
<tr>
<td>2'-0&quot;</td>
<td>0.074</td>
<td>15.6</td>
</tr>
<tr>
<td>2'-6&quot;</td>
<td>0.093</td>
<td>19.0</td>
</tr>
<tr>
<td>3'-0&quot;</td>
<td>0.111</td>
<td>19.0</td>
</tr>
<tr>
<td>3'-6&quot;</td>
<td>0.130</td>
<td>21.3</td>
</tr>
<tr>
<td>4'-0&quot;</td>
<td>0.146</td>
<td>22.4</td>
</tr>
<tr>
<td>4'-6&quot;</td>
<td>0.167</td>
<td>24.8</td>
</tr>
<tr>
<td>5'-0&quot;</td>
<td>0.185</td>
<td>25.9</td>
</tr>
</tbody>
</table>

**EXTENDED CURB DETAILS**
FOR BOX CULVERTS WITH CURBS OVER 1'-0" TO 2'-0" TALL
FOR BOTH UPSTREAM & DOWNSTREAM