

CITY OF SAN ANTONIO CAPITAL IMPROVEMENTS MANAGEMENT SERVICES



SPECIFICATIONS FOR GOLIAD ROAD (SE MILITARY DRIVE TO LOOP 410)

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CITY OF SAN ANTONIO, TEXAS
GOVERNING SPECIFICATIONS, SPECIAL PROVISIONS AND SPECIAL SPECIFICATIONS
FOR
GOLIAD ROAD
(SE MILITARY DRIVE TO LOOP 410)

ALL SPECIFICATIONS, SPECIAL PROVISIONS, AND SPECIAL SPECIFICATIONS APPLICABLE TO THIS PROJECT ARE IDENTIFIED AS FOLLOWS:

STANDARD SPECIFICATIONS:

- CITY OF SAN ANTONIO – STANDARD SPECIFICATIONS FOR CONSTRUCTION (JUNE 2008 OR LATEST REVISIONS AND ADDITIONS)
- TEXAS DEPARTMENT OF TRANSPORTATION STANDARD SPECIFICATIONS FOR CONSTRUCTION AND MAINTENANCE OF HIGHWAYS, STREETS, AND BRIDGES (JUNE 1, 2004)
- SAN ANTONIO WATER SYSTEM – STANDARD SPECIFICATIONS FOR WATER AND SANITARY SEWER CONSTRUCTION (JUNE 2009 OR LATEST REVISIONS AND ADDITIONS)
- CITY PUBLIC SERVICE (CPS) ENERGY – REQUIREMENTS AND SPECIFICATIONS FOR CONSTRUCTION OF NATURAL GAS DISTRIBUTION FACILITIES

CITY OF SAN ANTONIO STANDARD SPECIFICATIONS FOR CONSTRUCTION

100	MOBILIZATION
101	PREPARING RIGHT OF WAY
103	REMOVE CONCRETE
104	STREET EXCAVATION
105	CHANNEL EXCAVATION
106	BOX CULVERT EXCAVATION AND BACKFILL
107	EMBANKMENT
200	FLEX BASE
203	TACK COAT
205	HOT MIX ASHALTIC CONCRETE PAVEMENT
209	CONCRETE PAVEMENT
210	ROLLING
220	BLADING
300	CONCRETE
301	REINFORCING STEEL
302	METAL FOR STRUCTURES

303 WELDED WIRE FLAT SHEETS
306 STRUCTURAL EXCAVATION
307 CONCRETE STRUCTURES
308 DRILLED SHAFTS AND UNDER-REAMED FOUNDATIONS
309 PRECAST REINFORCED CONCRETE BOX CULVERT
311 CONCRETE SURFACE FINISH
400 EXCAVATION, TRENCHING AND BACKFILLING
401 REINFORCED CONCRETE PIPE
403 STORM SEWER JUNCTION BOXES AND INLETS
407 CONCRETE ENCASEMENT, CRADLES, SADDLES AND COLLARS
409 CAST IRON CASTINGS
410 SUBGRADE FILLER
500 CONCRETE CURB, GUTTER AND CONCRETE CURB AND GUTTER
502 CONCRETE SIDEWALKS
503 ASPHALTIC CONCRETE, PORTLAND CEMENT CONCRETE, AND GRAVEL DRIVEWAYS
504 CONCRETE MEDIANS AND ISLANDS
505 CONCRETE RIPRAP
506 CONCRETE RETAINING WALL COMBINATION TYPE
507 CHAIN LINK WIRE FENCE
512 ADJUSTING EXISTING MANHOLES AND VALVE BOXES
515 TOPSOIL
516 SODDING
525 CONCRETE TRAFFIC BARRIERS (PORTABLE)
526 FIELD OFFICE
530 BARRICADES, SIGNS AND TRAFFIC HANDLING
531 SIGNS
533 CLEANING AND REMOVAL OF PAVEMENT MARKINGS AND MARKERS
535 HOT APPLIED THERMOPLASTIC PAVEMENT MARKINGS
536 PREFORMED PAVEMENT MARKINGS
537 RAISED PAVEMENT MARKERS
540 TEMPORARY EROSION, SEDIMENTATION AND WATER POLLUTION PREVENTION AND CONTROL
550 TRENCH EXCAVATION SAFETY PROTECTION
551 TEMPORARY SPECIAL SHORING
554 EROSION CONTROL MATTING
556 CAST IN PLACE DETECTABLE WARNING SURFACE TILES
600 TRAFIC SIGNAL GENERAL CONDITIONS

- 615 TRAFFIC SIGNAL CONTROLLER CABINET
- 618 CONDUIT
- 620 ELECTRICAL CONDUCTORS
- 624 GROUND BOXES
- 628 ELECTRICAL SERVICES
- 633 BATTERY BACKUP SYSTEM FOR TRAFFIC SIGNAL
- 655 CONTROLLER FOUNDATION AND PEDESTAL POSTS
- 656 FOUNDATIONS FOR TRAFFIC CONTROL DEVICES
- 680 INSTALLATION OF HIGHWAY TRAFFIC SIGNALS
- 681 TEMPORARY TRAFFIC SIGNALS
- 682 VEHICLE AND PEDESTRIAN SIGNAL MODULE
- 683 LED COUNTDOWN PEDESTRIAN SIGNAL MODULE
- 684 TRAFFIC SIGNAL CABLES
- 685 FLASHING BEACON ASSEMBLIES
- 686 TRAFFIC SIGNAL POLE ASSEMBLIES (STEEL)
- 687 PEDESTAL POLE ASSEMBLY
- 688 PEDESTRIAN DETECTORS AND VEHICLE LOOP DETECTORS
- 691 SPREAD SPECTRUM RADIOS FOR TRAFFIC SIGNALS
- 692 COMMUNICATION CABLE
- 693 INTERNALLY LIGHTED STREET NAME SIGN ASSEMBLIES
- 695 EMERGENCY VEHICLE TRAFFIC SIGNAL PRIORITY CONTROL SYSTEM
- 700 COST LOADED PROJECT SCHEDULES
- 1000 WEB PORTAL

SPECIAL PROVISIONS:

SPECIAL PROVISIONS WILL GOVERN AND TAKE PRECEDENCE OVER THE SPECIFICATIONS ENUMERATED HEREON WHEREVER IN CONFLICT THEREWITH.

CITY OF SAN ANTONIO

- SP COSA ITEM 401 – REINFORCED CONCRETE PIPE (MAY 2009)
- SP COSA ITEM 403 – STORM SEWER JUNCTION BOXES AND INLETS (MAY 2009)
- SP COSA ITEM 502 – CONCRETE SIDEWALKS (MAY 2009)
- SP COSA ITEM 503 – ASPHALTIC CONCRETE, PORTLAND CEMENT CONCRETE, AND GRAVEL DRIVEWAYS (MAY 2009)
- SP COSA ITEM 505 – CONCRETE RIPRAP (MAY 2009)
- SP COSA ITEM 526 – FIELD OFFICE (JUNE 2010)

SP COSA ITEM 700 – PROJECT SCHEDULES (FEBRUARY 2010)

BID ITEM SUMMARY REVISIONS (MAY 2009)

SP COSA ITEM 403 – STORM SEWER JUNCTION BOXES AND INLETS - MANHOLE VERTICAL
STACK

SPECIAL SPECIFICATIONS:

THE SPECIFICATION ITEMS LISTED BELOW ARE THOSE UNDER WHICH PAYMENT IS TO BE MADE. THESE TOGETHER WITH SUCH OTHER PERTINENT ITEMS, IF ANY, AND INCLUDING THE SPECIAL PROVISIONS CONSTITUTES THE COMPLETE SPECIFICATIONS FOR THIS PROJECT.

CITY OF SAN ANTONIO

SS COSA 696 RADAR VEHICLE DETECTION DEVICES (RVDD)

SS COSA 800 PROJECT SIGNS

SS COSA 801 TREE AND LANDSCAPE PROTECTION

SS COSA 802 TREE PRUNING, SOIL AMENDING AND FERTILIZATION

SS COSA 805 TREES, PLANTS AND GROUND COVERS

SS ITEM 6000 TEMPORARY CHAIN LINK FENCE

SS ITEM 6001 WOODEN PRIVACY FENCE (6' HIGH)

SS ITEM 6002 TEMPORARY DRAINAGE STRUCTURES

SS ITEM 6003 ADJUSTING OF VEHICULAR GATES

SS ITEM 6004 UTILITY POLE BRACING

SS ITEM 6006 PIPE AND STRUCTURE REMOVAL

SS SPL WIRELESS ETHERNET BRIDGE

**SAN ANTONIO WATER SYSTEM STANDARD SPECIFICATIONS
FOR WATER AND SANITARY SEWER CONSTRUCTION**

- 100 MOBILIZATION
- 101 PREPARATION OF RIGHT OF WAY
- 550 TRENCH EXCAVATION SAFETY PROTECTION
- 818 PVC (C-900) PIPE INSTALLATION
- 824 SERVICE SUPPLY LINES (WATER)
- 826 VALVE BOX ADJUSTMENTS
- 828 GATE VALVES
- 833 METER AND METER BOX INSTALLATION
- 834 FIRE HYDRANTS
- 836 GREY-IRON AND DUCTILE-IRON FITTINGS
- 840 WATER TIE-INS
- 841 HYDROSTATIC TESTING OPERATIONS
- 844 BLOW-OFF ASSEMBLIES
- 848 SANITARY SEWERS
- 851 ADJUSTING EXISTING MANHOLES
- 852 SEWER MANHOLES
- 855 RECONSTRUCTION OF EXISTING MANHOLES
- 856 JACKING, BORING OR TUNNELING PIPE
- 864 BYPASS PUMPING

SPECIAL SPECIFICATIONS:

THE SPECIFICATION ITEMS LISTED BELOW ARE THOSE UNDER WHICH PAYMENT IS TO BE MADE. THESE TOGETHER WITH SUCH OTHER PERTINENT ITEMS, IF ANY, AND INCLUDING THE SPECIAL PROVISIONS CONSTITUTES THE COMPLETE SPECIFICATIONS FOR THIS PROJECT.

SAN ANTONIO WATER SYSTEM (SAWS)

- 3000 HANDLING ASBESTOS CEMENT PIPE

**CPS ENERGY
REQUIREMENTS AND SPECIFICATIONS FOR
THE CONSTRUCTION OF NATURAL GAS DISTRIBUTION FACILITIES**

EXHIBIT GAS-1	ADDITIONS TO PROJECT BID DOCUMENTS
EXHIBIT GAS-2	SPECIFICATIONS FOR CONSTRUCTION OF NATURAL GAS DISTRIBUTION FACILITIES
EXHIBIT GAS-3	DESIGN STANDARDS FOR STEEL GAS PIPING
EXHIBIT GAS-4	DESIGN STANDARDS FOR POLYETHYLENE GAS PIPING
EXHIBIT GAS-5	COMPENSATION SCHEDULE
EXHIBIT GAS-6	JOB SKETCH FOR: GOLIAD ROAD
EXHIBIT GAS-7	COVERED TASKS REGULATED BY 49 CFR PART 192

CITY OF SAN ANTONIO

SPECIAL PROVISIONS

**THE FOLLOWING ITEMS ARE SPECIAL PROVISIONS TO
THE CITY OF SAN ANTONIO
STANDARD SPECIFICATIONS FOR CONSTRUCTION
DATED JUNE 2008**

1. Item 401 Reinforced Concrete Pipe	Page 2
2. Item 402 High Density Corrugated Polyethylene Pipe	Page 2
3. Item 403 Storm Sewer Junction Boxes and Inlets	Page 3
4. Item 404 Corrugated Metal Pipe	Page 3
5. Item 405 Fiber Reinforced Concrete Pipe	Page 4
6. Item 502 Concrete Sidewalks	Page 4
7. Item 503 Asphaltic Concrete, Portland Cement Concrete and Gravel Driveways	Page 5
8. Item 505 Concrete Riprap	Page 5
9. Item 520 Hydromulching	Page 5
10. Item 523 Adjusting of Vehicular & Pedestrian Gates	Page 6
11. Bid Item Summary Revisions	Page 8

General

Throughout the City of San Antonio Standard Specifications for Construction (June 2008) replace the following:

- “Item 407 Frames, Grates, Rings and Covers” with “Item 409 Cast Iron Castings”
- “Item 304 Expansion Joint Material” with “Item 307.2.E, Expansion Joint Material”
- “Item 305, Membrane Curing” with “Item 307.2.H, Membrane Curing”

Update: May 2009

Item 401 Reinforced Concrete Pipe

Delete in its entirety:

Section 401.6 Payment

Add:

Section 401.6 Payment:

The work performed and materials furnished in accordance with this Item and measured as provided under "Measurement" will be paid for at the unit price bid for "Reinforced Concrete Pipe", "Reinforced Concrete Pipe (Arch)", or "Reinforced Concrete Pipe (Elliptical)" of the size and D-load specified or of the size and class specified. This price is full compensation for excavation and backfilling; constructing, furnishing, transporting, placing and joining pipes; shaping the bed; cutting pipes on skew or slope; connecting to new or existing structures; breaking back, removing and disposing of portions of the existing structure; replacing portions of the existing structure; cutting pipe ends skew or slope; and equipment, labor, tools and incidentals required to complete the work.

Protection methods for excavations greater than 5 ft. deep will be measured and paid for as required under Item 550, "Trench Excavation Safety Protection", or Item 551, "Special Shoring". When jacking, boring, or tunneling is used at the Contractor's option, payment will be made under this Item. When jacking, boring, or tunneling is required, payment will be made under Item 406, "Jacking, Boring or Tunneling Pipe or Box".

Item 402 High Density Corrugated Polyethylene Pipe

Delete in its entirety:

Section 402.7 Payment A & B

Add:

Section 402.7 Payment:

The work performed and materials furnished in accordance with this Item and measured as provided under "Measurement" will be paid for at the unit price bid for "High Density Corrugated Polyethylene Pipe" of the size and backfill specified. This price is full compensation for excavation and backfilling; furnishing, transporting, placing and joining pipes; shaping the bed; cutting pipes on skew or slope; connecting to new or existing structures; breaking back, removing and disposing of portions of the existing structure; replacing portions of the existing structure; cutting pipe ends skew or slope; and equipment, labor, tools and incidentals required to complete the work.

Protection methods for excavations greater than 5 ft. deep will be measured and paid for as required under Item 550, "Trench Excavation Safety Protection", or Item 551, "Special Shoring". When jacking, boring, or tunneling is used at the Contractor's option, payment will be made under this Item. When jacking, boring, or tunneling is required, payment will be made under Item 406, "Jacking, Boring or Tunneling Pipe or Box".

Update: May 2009

Item 403 Storm Sewer Junction Boxes and Inlets

Section 403.6 Bid Item

Delete:

Items 403.7 – 403.14

Add:

Item 403.7 – Inlet Type I (Complete)(10 ft)

Item 403.8 – Inlet Type II (Complete)(10 ft)

Item 403.9 – Inlet Extensions (10 ft)

Item 403.10 – Inlet (Complete)(5')(TxDOT)

Item 403.11 – Inlet (Extension)(5')(TxDOT)

Item 403.12 – Special Inlet (Complete)

Note: See Bid Item Summary revisions.

Item 404 Corrugated Metal Pipe

Delete in its entirety:

Section 404.6 Payment

Add:

Section 404.6 Payment:

The work performed and materials furnished in accordance with this Item and measured as provided under “Measurement” will be paid for at the unit price bid for “Corrugated Metal Pipe,” “Corrugated Metal Pipe Arch,” “Spiral Rib Corrugated Metal Pipe,” or “Spiral Rib Corrugated Metal Pipe Arch” of the type, size and coating specified. This price is full compensation for excavation and backfilling; furnishing, transporting, placing and joining pipes; shaping the bed; cutting pipes on skew or slope; connecting to new or existing structures; breaking back, removing and disposing of portions of the existing structure; replacing portions of the existing structure; cutting pipe ends skew or slope; and equipment, labor, tools and incidentals required to complete the work.

Protection methods for excavations greater than 5 ft. deep will be measured and paid for as required under Item 550, “Trench Excavation Safety Protection”, or Item 551, “Special Shoring”. When jacking, boring, or tunneling is used at the Contractor’s option, payment will be made under this Item. When jacking, boring, or tunneling is required, payment will be made under Item 406, “Jacking, Boring or Tunneling Pipe or Box”.

Item 405 Fiber Reinforced Concrete Pipe

Delete in its entirety:

Section 405.6 Payment

Add:

Section 405.6 Payment:

The work performed and materials furnished in accordance with this Item and measured as provided under "Measurement" will be paid for at the unit price bid for "Fiber Reinforced Concrete Pipe" of the backfill type, size and D-load class specified. This price is full compensation for excavation and backfilling for Type I, Type II and Type III; constructing, furnishing, transporting, placing and joining pipes; shaping the bed; cutting pipes on skew or slope; connecting to new or existing structures; breaking back, removing and disposing of portions of the existing structure; replacing portions of the existing structure; cutting pipe ends skew or slope; and equipment, labor, tools and incidentals required to complete the work.

Item 502 Concrete Sidewalks

Delete first paragraph from 502.4.F.Joints:

Add :

Section 502.4.F Joints:

Unless otherwise specified on the plans or as agreed to by the Engineer, tooled joints with rounded edges will be placed at intervals equal to the sidewalk width and will be opened with one-half inch (1/2") radius by one and one-half inch (1 1/2") depth and closed by one-half inch (1/2") radius by one-inch (1") depth.

Section 502.6 Payment:

Delete from first paragraph: "removal and disposal of existing concrete;"

Update: May 2009

Item 503 Asphaltic Concrete, Portland Cement Concrete and Gravel Driveways

Delete in its entirety:

Section 503.6 Payment

Add :

Section 503.6 Payment:

The work performed as prescribed by this item will be paid for at the contract unit price bid per square yard for “Portland Cement Concrete Driveway”, Portland Cement Concrete Driveway – Commercial”, “Asphaltic Concrete Driveway”, or “Gravel Driveway”, which price shall be full compensation for preparing the subgrade, for furnishing and placing all materials, manipulations, labor, tools, equipment and incidentals necessary to complete the work.

Item 505 Concrete Riprap

Delete in its entirety:

Section 505.4.A Concrete Reinforcement

Add :

Section 505.4.A Concrete Reinforcement:

Unless otherwise shown on the plans, reinforce concrete riprap with 6 x 6 – W6 x W6 welded wire fabric or with No. 4 reinforcing bars spaced at a maximum of 18 in. in each direction unless otherwise shown. A combination of welded wire fabric and reinforcing bars may be provided when both are permitted. Provide a minimum 6-in. lap at all splices. At the edge of the riprap, provide a minimum horizontal cover of 1 in. and a maximum cover of 3 in. Place the first parallel bar no more than 6 in. from the edge of concrete. Use approved supports to hold the reinforcement approximately equidistant from the top and bottom surface of the slab. Adjust reinforcement during concrete placement to maintain correct position. Reinforcement protruding from existing riprap shall be thoroughly cleaned.

Item 520 Hydromulching

Section 520.4 Construction (D) Slurry:

Delete: “Annual Ryegrass (Oct. through March 15) 20 lbs per 1,000 sqft”.

Add: “Annual Ryegrass (Oct. through March 15) 5-10 lbs per 1,000 sqft”.

Item 523 Adjusting of Vehicular & Pedestrian Gates

Delete in its entirety:

Item 523 Adjusting of Vehicular & Pedestrian Gates

Add:

523.1. DESCRIPTION: *This item shall govern for the adjustment of manual or motorized, chain link or wrought iron, vehicular or pedestrian gates made necessary by the construction of new driveways or sidewalk entrances.*

523.2. MATERIALS: Additional materials needed to perform chain link fences gate adjustments shall conform to those specified in Item 507, "Chain Link Wire Fence". Materials used to adjust wrought iron gates shall be of the same type of material and configuration as the existing gate including any masonry. A combination of new and existing materials may be used if approved by the Engineer and property owner.

523.3. EQUIPMENT: Provide the machinery, tools and equipment necessary for proper prosecution of the work. All machinery, tools and equipment used shall be maintained in a satisfactory and workmanlike manner.

523.4. CONSTRUCTION: Approval from the property owner and Engineer shall be obtained by the Contractor in order to perform the necessary work required. The Contractor shall adjust gates vertically and or relocated gates horizontally by removing the existing gate from the gate posts and relocating and/or replacing (if necessary) the existing hinges, sliding mechanism, or rollers at a level such that the gate shall be provided with the necessary clearance to operate properly. Contractor shall coordinated extent of adjustments to be made with the property owner and Engineer prior to commencing any gate adjustments. Contractor shall notify property owner or tenant 48 hours in advance of any gate adjustments.

All fabric, posts, braces, gates, fittings, bolts, tension wire, tracks, wheels, rollers, operating mechanism, electrical service, wiring and miscellaneous hardware shall be carefully removed in such a manner that they will not be marred or damaged. After removal of the existing gate has been complete, any material deemed not useable shall be replaced by the Contractor with new material of the same design and quality as the existing material. A new gate constructed of the same type of material and configuration as the existing gate may be installed if so desired by the Contractor. All fences and gates shall be cut and welded by a qualified welder.

If necessary, the existing fence may be extended, reinforced, or offset in a manner that will not detract from the decorative appeal of the fence. All extensions and offsets of existing fences and gates shall be approved by the property owner.

All gates adjusted vertically shall be extended vertically so that the height of the gate will match existing fence height. Gates that are adjusted vertically shall be provided with a concrete channel for track, gate, sliding mechanism as detailed on plans or as approved by the Engineer and property owner.

All welding will be performed in a workman-like manner with solid joints of minimum protrusion. The adjusted gate will be constructed in such a manner to have minimal flexure.

Any excessive splatter of the weld will be ground off. Existing wrought iron fences and gates will be cleaned and any surface imperfections, any rust and paint will be removed completely. All surfaces of the existing gates will be roughened to accept a new coat of paint. All newly added areas will be completely primed and painted to match existing paint. A second coat will be required to cover any holidays or spots of insufficient coverage. The existing fence and gate will be spot primed in areas where surface imperfections or rust have been removed.

Painting will be by hand or spray. Areas to be painted shall be primed in accordance with paint manufacturer's recommendations. Two coats of paint shall be applied to the existing fence and gate and all newly added parts. The final surface will be of even color with out streaks, drips bubbles, or any other surface imperfection. Paint used shall match existing paint in color and texture. Color shall be approved in writing by the property owner.

523.5 MEASUREMENT: Vehicular and pedestrian gates will be measured for each driveway or sidewalk entrance and/or exit of each type that is adjusted. Additional fencing that may be required for relocation or adjustment of gates will be subsidiary to gate adjustments or gate relocation and will not be measured as a separate pay item.

523.6 PAYMENT: The work performed and the materials furnished as prescribed by this item will be paid for at the bid price per gate for "Adjusting of Vehicular & Pedestrian Gates," which price shall be full compensation for removing and installing the existing gate and for furnishing all additional materials, all labor, tools, equipment and incidentals necessary to complete the work.

523.7 Bid Item:

Item 523.1 – Adjusting Chain Link Vehicular Gate – Each

Item 523.2 – Adjusting Chain Link Vehicular Gate (Motorized) - Each

Item 523.3 – Adjusting Chain Link Pedestrian Gate – Each

Item 523.4 – Adjusting Wrought Iron Vehicular Gate – Each

Item 523.5 – Adjusting Wrought Iron Vehicular Gate (Motorized) - Each

Item 523.6 – Adjusting Wrought Iron Pedestrian Gate – Each

Bid Item Summary Revisions

Replace Item 403.7 with Item 403.7 – Inlet Type I (Complete)(10 ft) - Each

Replace Item 403.8 Item 403.8 – Inlet Type II (Complete)(10 ft) - Each

Replace Item 403.9 Item 403.9 – Inlet Extensions (10 ft) - Each

Replace Item 403.10 Item 403.10 – Inlet (Complete)(5')(TxDOT) - Each

Replace Item 403.11 Item 403.11 – Inlet (Extension)(5')(TxDOT) - Each

Replace Item 403.12 Item 403.12 – Special Inlet (Complete) - Each

Delete Items 403.13 & 403.14

Add Item 523.1 – Adjusting Chain Link Vehicular Gate – Each

Add Item 523.2 – Adjusting Chain Link Vehicular Gate (Motorized) - Each

Add Item 523.3 – Adjusting Chain Link Pedestrian Gate – Each

Add Item 523.4 – Adjusting Wrought Iron Vehicular Gate – Each

Add Item 523.5 – Adjusting Wrought Iron Vehicular Gate (Motorized) - Each

Add Item 523.6 – Adjusting Wrought Iron Pedestrian Gate – Each

Replace Item 682.1 with Item 682.1 – Install Vehicle Signal Section with Back Plate (3 second) – Each

Replace Item 682.2 with Item 682.2 – Install Vehicle Signal Section with Back Plate (4 second) – Each

Replace Item 682.3 with Item 682.3 – Install Vehicle Signal Section with Back Plate (5 second) – Each

Replace Item 682.4 with Item 682.4 – Install Pedestrian Signal Section (12 inch) LED (2 Ind) – Each

Add Item 682.5 – Louver (12 inch)(Adjustable) – Each

THE FOLLOWING ITEMS ARE SPECIAL PROVISIONS TO
THE CITY OF SAN ANTONIO
STANDARD SPECIFICATIONS FOR CONSTRUCTION
DATED JUNE 2008

1. Item 526 Field Office.....2 Pages

General

1. None

Standard Specifications

1. Delete Item 526 – Field Office (*dated June 2008*) in its entirety and replace with Item 526 – Field Office (*dated June 2010*) shown on the attached document.

ITEM

526 FIELD OFFICE

526.1. DESCRIPTION: *This item shall govern the erection or furnishing of a building to be used by the inspection force as a Field Office where the total contract amount (including Joint Bid Utilities) is one million dollars or greater.*

526.2. EQUIPMENT:

- A. General.** Furnish facilities after the receipt of the notice to proceed and before beginning physical work on the project. Provide field offices of the type specified near the worksite at a location acceptable to the Engineer. The Contractor may make use of permanent buildings or rental space meeting the requirements for field offices instead of portable buildings if approved. Maintain and clean the field office bi-weekly until the City accepts the project. Furnish other equipment as required.
- B. Damage.** Immediately repair or replace the facility if it is damaged in any manner. Payment for repair will be made at no cost to the City.
- C. Right-Of-Way.** When facilities are allowed in the right of way, remove buildings and other facilities and restore the right of way before project acceptance.
- D. Parking and Fencing.** Provide 6" compacted gravel parking area for the sole use of at least 2 City-owned vehicles. Situate the area near the field office at a location acceptable to the Engineer. Maintain the parking area until the project is completed and restore the area to a condition acceptable to the Engineer upon project completion. Enclose the field office and the parking area with a 6-ft. chain-link fence, a top-mounted 3-strand barbed wire, and a 12-ft. gate.
- E. Field Office.**

Provide field offices with roofs, floors, doors, and screened windows. The building shall be a minimum of 10 feet by 16 feet by 8 feet high with not less than three glass windows and one door. Ensure the floor has an impervious floor covering.

Ensure that the field office is weatherproof, piped for potable water, and electrically wired by certified personnel. Furnish and install adequate outlets, lighting, air conditioning, heating, and ventilation.

Provide a partitioned rest room furnished with rest room supplies, a lavatory and a flush toilet connected to a sewer or septic tank. A portable toilet may be used when approved by the Engineer.

Provide secured and controlled access to the field office through the use of security measures such as bars, alarms, or security fencing. Furnish steps to the building if deemed necessary by the Engineer.

Provide workbenches and tables at least 3 ft. wide and 6 ft. long, chairs, and filing cabinets in the quantity acceptable to the Engineer. Provide solar screens, blinds, or shades if deemed necessary by the Engineer.

Provide a telephone and service unless otherwise directed.

Provide all of the following in accordance with the requirements therein:

- computers (laptop or desktop) meeting the minimum requirements of Item 1000, “Web Portal” or as designated on the plans,
- printer scanner, and
- Internet service. The Internet service must be a provided on a line separate from required phone service.
- Digital camera with memory card 2GB or greater and appropriate software.

526.3. MEASUREMENT: No measurement will be made under this item.

526.4. PAYMENT: No payment will be made under this item. The Field Office and items listed above are not a pay item and shall remain the property of the contractor after completion of this project.

526.5. BID ITEM:

N/A

THE FOLLOWING ITEMS ARE SPECIAL PROVISIONS TO
THE CITY OF SAN ANTONIO
STANDARD SPECIFICATIONS FOR CONSTRUCTION
DATED JUNE 2008

1. Item 700 Project Schedules.....7 Pages

General

1. None

Standard Specifications

1. Delete Item 700 - Cost Loaded Schedules (*dated June 2008*) in its entirety and replace with Item 700 – Project Schedules (*dated February 2010*) shown on the attached document.

ITEM 700
✦
PROJECT SCHEDULES

This item shall govern the creation, maintenance, and delivery of Critical Path Method (CPM) project schedules.

CRITICAL PATH METHOD PROJECT SCHEDULE

The Contractor shall create and maintain a Critical Path Method (CPM) Project Schedule showing the manner of execution of work that the contractor intends to follow in order to complete the contract within the allotted time. The project schedule shall employ computerized CPM for the planning, scheduling and reporting of the work as described in this specification. The CPM project schedule shall be prepared using the Precedence Diagram Method (PDM). The Contractor shall create and maintain the schedule using Primavera Project Manager 5.x or above or Primavera Contractor 4.1 or above. For construction contracts under \$300K and project durations 90 days or less, the project schedule can be created and maintained in Microsoft Project software. The observance of the requirements herein is an essential part of the work to be done under the contract. No direct compensation will be allowed for fulfilling these requirements, as such work is considered subsidiary to the various bid items of the contract.

PERSONNEL

The Contractor shall provide an individual, referred to hereafter as the Scheduler, to create and maintain the Project Schedule. The Scheduler shall be proficient in Critical Path Method (CPM) analysis as demonstrated through certification from Project Management Institute (PMI), Association for the Advancement of Cost Engineering (AACE) or possess sufficient experience to be

able to perform required tasks on the specified software and be able to prepare and interpret reports from the software. The Scheduler shall be made available for discussion or meetings when requested by the City.

PROJECT SCHEDULE

1. GENERAL:

At least twenty (20) calendar days prior to the pre-construction conference, the Contractor shall submit a Project Schedule, which shall show the sequence and interdependence of activities required for complete performance of the work. All schedule submittals shall be in the electronic form to include PDF plots of the schedule, a PDF plot defining the Critical Path and two week look-ahead, and include the native Primavera file format. The Contractor shall submit the schedule to the Web-portal and Project Manager via electronic mail, CD-Rom, floppy disc, or any other electronic media acceptable to the City. The City will review the Project Schedule within twenty (20) calendar days for compliance with the specifications and notify the Contractor at the pre-construction conference of its acceptability. No work shall begin until the City has accepted the Project Schedule.

2. SEQUENCE:

The Project Schedule shall show the sequence and interdependence of activities required for complete performance of the work. The Contractor shall be responsible for assuring all work sequences are logical and show a coordinated plan of the work. The purpose of

the City requiring the Project Schedule shall be to:

- a. Ensure adequate planning during the execution and progress of the work in accordance with the allowable number of calendar days and all milestones.
- b. Assure coordination of the efforts of the Contractor, City, Utilities and others that may be involved in the project and that activities are included in the schedule highlighting coordination points with others,
- c. Assist the Contractor and City in monitoring the progress of the work and evaluating proposed changes to the contract, and
- d. Assist the City in administering the contract time requirements.

3. ACTIVITIES:

Each activity on the Project Schedule shall include:

- a. An activity number utilizing an alphanumeric designation system that is agreeable to the City;
- b. Concise description of the work represented by the activity; and
- c. Activity durations in whole work days with a maximum of twenty (20) work days. Durations greater than twenty (20) work days may be used for non-construction activities (mobilization, submittal preparation, curing, etc.), and other activities mutually agreeable between the City and Contractor.

The Contractor shall provide to the City a legend for all abbreviations. The activities shall be coded so that organized plots of the

Project Schedule may be produced. Typical activity coding includes traffic control phase, location and work type. Show an estimated production rate per working day for each work activity. Activity durations shall be based on production rates shown.

4. WORK DURATION AND RESOURCES:

The schedule layout shall be grouped by Project and then by Work Breakdown Structure (WBS) for organizational purposes. The original and remaining duration shall be displayed. The grouping band will, by default, report work days planned. One additional level of effort activity shall be added to the schedule as a "time calculator" with a seven-day calendar without holidays. The calculation of their days will show up in the duration columns in Primavera.

If specified by general note, the Contractor shall plan and incorporate major resources into the Project Schedule. Major resources are defined as crews and equipment that constrain the Contractor from pursuing available work. The resources shall accurately represent the Contractor's planned equipment and manpower to achieve the productivity rates specified above.

Work shall be scheduled based upon the Contractor's standard work week utilizing the appropriate calendar assignments in Primavera software. If the Contractor's initial baseline plan is to perform the Work on a six or seven-day work week, then the appropriate calendar in Primavera must be used and the Engineer must be notified in writing through the Submittal process. This does not affect the total calendar days allotted by the contract.

Assign working calendars for the days you plan to work. Designate all City holidays (12) as non-working days (holidays). For dates beyond the current calendar year assume that

the City holidays are the same as the current calendar year.

Seasonal weather conditions shall be considered and included in the Project Schedule for all work influenced by temperature and/or precipitation. Seasonal weather conditions shall be determined by an assessment of average historical climatic conditions. Average historical weather data is available through the National Oceanic and Atmospheric Administration (NOAA). These effects will be simulated through the use of work calendars for each major work type (i.e., earthwork, concrete paving, structures, asphalt, drainage, etc.). Project and work calendars should be updated each month to show days actually able to work on the various work activities.

Total float is defined as the amount of time between the early start date and the late start date, or the early finish date and the late finish date, for each and every activity in the schedule. Float time in the Project Schedule is a shared commodity between the City and the Contractor.

Only City responsible delays in activities that affect milestone dates or the contract completion date, as determined by CPM analysis, will be considered for a time extension.

5. OTHER REQUIREMENTS:

Code and organize all work by Work Breakdown Structure (WBS). An example WBS will be provided by the City.

Percent complete type shall be Duration Percent Complete.

Duration type shall be Fixed Units

Submittals shall be included in the schedule with a logical tie to what each drives.

Proposed Change Orders shall be added the schedule identifying it as a Proposed Change Order. This task must be linked to the schedule with logical ties and approved by the City. Upon approval of Change Order, task will be renamed identifying work performed and Change Order number and resources will be added to the task.

Constraints are limited to project start, project finish, material delivery, and use on Submittals. If a schedule requires additional constraints, then an explanation shall accompany the schedule Submittal.

The schedule shall include activity milestones for material delivery.

Default progress is disallowed.

If work is performed out of sequence, then an explanation must be included in the project narrative.

JOINT REVIEW, REVISION AND ACCEPTANCE

Within twenty (20) calendar days of receipt of the Contractor's proposed Project Schedule, the City shall evaluate the schedule for compliance with this specification, and notify the Contractor of its findings. If the City requests a revision or justification, the Contractor shall provide a satisfactory revision or adequate justification to the satisfaction of the City within seven (7) calendar days. If the Contractor submits a Project Schedule for acceptance, which is based on a sequence of work not shown in the plans, then the Contractor shall notify the City in writing, separate from the schedule submittal.

The City's review and acceptance of the Contractor's Project Schedule is for conformance to the requirements of the

contract documents only. Review and acceptance by the City of the Contractor's Project Schedule does not relieve the Contractor of any of its responsibility for the Project Schedule or of the Contractor's ability to meet interim milestone dates (if specified) and the contract completion date, nor does such review and acceptance expressly or by implication warrant, acknowledge or admit the reasonableness of the logic, durations, manpower or equipment loading of the Contractor's Project Schedule. In the event the Contractor fails to define any element of work, activity or logic and the City review does not detect this omission or error, such omission or error, when discovered by the Contractor or City shall be corrected by the Contractor at the next monthly schedule update and shall not affect the project completion date.

Acceptance by the City of a Baseline or project update schedule that exceeds contractual time does not alleviate the Contractor from meeting the contractual completion date.

Payment may be delayed until acceptable baseline or updated schedule is received and accepted by the City.

UPDATES

The Project Schedule shall be updated on a monthly basis. The Project Schedule update shall be submitted one week prior to the pay application submittal. The Contractor shall meet with the City each month at a scheduled update meeting to review actual progress made through the Data Date of the schedule update as determined by the Project Manager. The review of progress will include dates activities actually started and/or completed, the percentage of work completed, the remaining duration of each activity started and/or completed, and the amount of work to complete with an analysis of the relationship

between the remaining duration of the activity and the quantity of material to install over that given period of time with a citation of past productivity. The monthly schedule update shall include a progress narrative explaining progress, identifying progress made out of sequence, defining the Critical Path, identification of any potential delays, etc. The Project Schedule Narrative template will be required for the narrative.

The project schedule update layout shall be grouped by Project, then WBS. The layout shall include the following columns:

- a. Activity ID
- b. Activity Description
- c. Original Durations
- d. Remaining Durations
- e. Start and Finish Dates
- f. Baseline Start and Finish Dates
- g. Total Float
- h. Performance Percent Complete
- i. Display logic and target bars in the Gantt bar chart view

PROJECT SCHEDULE REVISIONS

If the Contractor desires to make major changes in the Project Schedule, the Contractor shall notify the City in writing and submit the proposed schedule revision. The written notification shall include the reason for the proposed revision, what the revision is comprised of, and how the revision was incorporated into the schedule. Major changes are hereby defined as those that may affect compliance with the contract requirements or those that change the critical path. All other changes may be accomplished through the monthly updating process without written notification.

TIME IMPACT ANALYSIS

The Contractor shall notify the City when an impact may justify an extension of contract time or adjustment of milestone dates. This notice shall be made in writing as soon as

possible, but no later than the end of the next estimate period after the commencement of an impact or the notice for a change is given to the Contractor. Not providing notice to the City within twenty (20) calendar days after receipt will indicate the Contractor's approval of the time charges as shown on that time statement. Future consideration of that statement will not be permitted and the Contractor forfeits his right to subsequently request a time extension or time suspension unless the circumstances are such that the Contractor could not reasonably have knowledge of the impact by the end of the next estimate period.

When changes are initiated or impacts are experienced, the Contractor shall submit to the City a written time impact analysis describing the influence of each change or impact. A "time impact analysis" is an evaluation of the effects of changes in the construction sequence, contract, plans, or site conditions on the Contractor's plan for constructing the project, as represented by the schedule. The purpose of the time impact analysis is to determine if the overall project has been delayed, and if necessary, to provide the Contractor and the City a basis for making adjustments to the contract.

A time impact analysis shall consist of one or all of the steps listed below:

1. Establish the status of the project before the impact using the most recent project schedule update prior to the impact occurrence.
2. Predict the effect of the impact on the most recent project schedule update prior to the impact occurrence. This requires estimating the duration of the impact and inserting the impact into the schedule update. Any other changes made to the schedule including modifications to the

calendars or constraints shall be noted.

3. Track the effects of the impact on the schedule during its occurrence. Note any changes in sequencing, and mitigation efforts.
4. Compare the status of the work prior to the impact (Step 1) to the prediction of the effect of the impact (Step 2), and to the status of the work during and after the effects of the impact are over (Step 3). Note that if an impact causes a lack of access to a portion of the project, the effects of the impact may extend to include a reasonable period for remobilization.

The time impact analysis shall be electronically submitted to the City. If the Project Schedule is revised after the submittal of a time impact analysis but prior to its approval, the Contractor shall promptly indicate in writing to the City the need for any modification to its time impact analysis. One (1) copy of each time impact analysis shall be submitted within fourteen (14) calendar days after the completion of an impact. The City may require Step 1 and Step 2 of the time impact analysis be submitted at the commencement of the impact, if needed to make a decision regarding the suspension of contract time. Approval or rejection of each time impact analysis by the City shall be made within fourteen (14) calendar days after receipt unless subsequent meetings and negotiations are necessary.

MEASUREMENT and PAYMENT

Project Schedule will not be measured or paid for directly, but shall be included in the unit price bid for the items of construction in which the operations occur.

PROJECT SCHEDULE NARRATIVE

PROJECT NAME:	
CONTRACTOR NAME:	
PERIOD ENDING:	
SUBMITTAL DATE:	
PREPARED BY:	

Evaluation Summary	
NTP:	
Data Date:	
Contractual Completion Date:	
Current Scheduled Completion Date:	
Previous Period Scheduled Completion Date:	
Contract Calendar Days:	

Yes	No	
		Contractor has included both a hard copy (pdf) and the native Primavera file format?
		Project calendars have been updated to reflect actual charged working days for the progress period, according to the contract time statement?
		Schedule update reflects approved change orders for the progress period?
		Have any major changes been made to the schedule? <i>(A major change is defined as those that may affect compliance with the contract requirements or those that change the critical path. If yes, written notification is required to include the reason for the proposed revision, what the revision is comprised of, and how the revision was incorporated into the schedule.)</i> If yes, provide details in Section 3 & 5 below.
		Are any delays included in this schedule submittal for which the Contractor intends to submit a Time Impact Analysis (TIA) for a claim delay? If yes, provide details in Section 6 below.

1. Identify general progress for the update period.
2. Identify work performed out of sequence and provide an explanation for the reason.

3. Describe any changes made to the project's logic and the reason for the change(s).
4. Identify any new constraints used and provide an explanation for their use.
5. Define the critical path of the project, including any changes from the previous update.
6. Identify any delays that have occurred for the progress period, the reason for the delay, and current status.
7. Identify any potential delays and possible mitigation efforts.
8. Other comments.

Special Provision

Item 403 Storm Sewer Junction Boxes and Inlets – Manhole Vertical Stack

Item 403.1 Description; add to this item as follows:

Construct pre-cast manhole vertical stack, including excavation, and backfilling; furnishing and installing frames, rings and covers.

Item 403.2 Materials; add to this item as follows:

H. Manhole vertical stacks that are required on top of box culverts as shown on the plans and quantity summary are to be pre-cast.

Item 403.3 Construction; add to this item as follows:

J. Manhole vertical stack construction on box culverts shall be the same as the city standard for junction boxes. Please refer to standard junction box details.

Item 403.4 Measurement; add to this item as follows:

Manhole vertical stacks on top of box culverts shall be measured as per each.

Item 403.5 Payment; add to this item as follows:

D. Payment for manhole vertical stacks on top of a box culvert will be made at the unit price bid for “Manhole Vertical Stack”.

Item 403.6 Bid Items; add to this item as follows:

Item 403.15 – Manhole Vertical Stack – Short Stack (24-inch Opening)

Item 403.15 – Manhole Vertical Stack – Normal Stack (48-inch Opening)

CITY OF SAN ANTONIO
SPECIAL SPECIFICATIONS

ITEM 696**RADAR VEHICLE DETECTION DEVICES (RVDD)**

696.1. DESCRIPTION: *Furnish and install Radar Vehicle Detection Devices (RVDD), including: Radar Advance Detection Devices (RADD) and/or Radar Presence Detection Devices (RPDD) to detect vehicles on a roadway via processing of radar electromagnetic waves and provides detector outputs to a traffic signal controller or similar device.*

696.2. DEFINITIONS

- A. RADAR:** Radio detection and ranging. High frequency electromagnetic energy waves used to detect, identify, and determine the range, direction, and/or speed of an object such as a motor vehicle.
- B. Radar Vehicle Detection Device (RVDD):** Device that emits electromagnetic waves and senses return waves from passing and/or approaching vehicles. The RVDD shall be spatially monostatic; the transmitter and receiver shall be located on the same sensor device.
- C. Radar Advance Detection Device (RADD):** Device that accurately and continuously detects, tracks, and identifies speed of approaching vehicles simultaneously to an intersection in the selected direction of travel. The RADD is capable of detection as described in section 696.3.A. The RADD shall maintain detection of a vehicle moving within 100 ft. to 500 ft. from the device as programmed by the user.
- D. Radar Presence Detection Device (RPDD):** Device that accurately and continuously detects and tracks approaching vehicles simultaneously to an intersection in the selected direction of travel. The RPDD is capable of true presence detection as described in section 696.3.B. The RPDD shall maintain detection of a vehicle moving or stopped within a programmed detection zone set up by the user.
- E. Interface Module:** Device that interfaces with the cabinet detector rack allowing for contact closure to occur on a selected detector channel.
- F. Communications Link:** The communications connection between the RVDD processor unit and a local area network (LAN) or laptop computer.
- G. Detection Accuracy:** The measure of the basic operation of a detection system (shows detection when a vehicle is in the detection zone and shows no detection when there is not a vehicle in the detection zone).
- H. Passage Detection:** The ability of a vehicle detector to detect the passage of a vehicle moving through the zone of detection and to ignore the presence of a vehicle stopped within the zone of detection.
- I. Presence Detection:** The ability of a vehicle detector to sense that a vehicle, whether moving or stopped, has appeared in its zone of detection.
- J. Delay Timing:** When selected, applies delayed contact closure to the associated detector channel input. When a vehicle is detected by the RVDS, the delay timing must time out before contact closure is removed from the associated detector channel.
- K. Extension Timing:** When selected, applies additional contact closure to the associated detector channel input. When a vehicle is no longer detected within a detection zone, extension timing must time out before contact closure is removed from the associated detector channel.

696.3. FUNCTIONAL CAPABILITIES

A. Radar Advance Detection Device (RADD) Capabilities and Requirements

1. The RADD shall provide passage detection and contact closure to the interface module for vehicles approaching the intersection (the unit).
2. The RADD shall provide vehicle detection, tracking, and speed of moving vehicles approaching an intersection at a range of 100 feet to 500 feet from the radar sensor.
3. The RADD system software shall be capable of creating multiple detection zones within the detection range and applying conditional logic to the detection zones, allowing contact closure to occur only when logic conditions are achieved by the RADD. The user shall be able to apply logic gating such as: “and”, “or” to a detection zone from the software GUI provided with the system. Conditional logic programming will allow the user to control when contact closure occurs to the detector rack interface module.
4. The RADD system software shall be capable of minimum and maximum speed settings to create a desired speed range for contact closure to the detector channel. Vehicles detected within the minimum and maximum speed settings will apply contact closure to the assigned detector channel input.
5. Detection accuracy will be determined by the detection of any moving vehicle or cluster of vehicles within a defined detection zone and within the minimum and maximum speed parameters programmed for the detection zone. With four (4) detection zones programmed, each zone 100 feet in length, a minimum of 95% detection accuracy shall be required for each zone. Detection zones will be set up between 100 feet and 500 feet. Conditional logic for each zone shall be set up in the “or” gate position allowing for contact closure to occur when vehicle speed conditions are met in the detection zone.
6. The RADD shall be capable of delay timing as defined in 696.2.J of this specification. As a minimum the user shall be able to program and select extension timing from 0-25 seconds in one-tenth (0.1) second increments from the GUI provided with the RVDS system.
7. The RADD shall be capable of extension timing as defined in 696.2.K of this specification. As a minimum the user shall be able to program and select extension timing from 0-25 seconds in one-tenth (0.1) second increments from the GUI provided with the RADD system.
8. The RADD shall be capable of adjusting the extension time automatically based on speed of a moving vehicle.
9. Radar Presence Detection Device (RPDD) Functional Capabilities and Requirements
10. The RPDD shall provide presence detection and contact closure to the interface module for vehicles approaching an intersection. Presence detection shall operate as defined in 696.2.I of this specification.
11. The RPDD shall, as a minimum detect vehicles within a 100 feet, 90 degree cone of detection from the sensor. Stop bar radar units shall be able to detect vehicles in 10 lanes of detection. The number of lanes used and detection zones shall be set up and selected from the GUI.
12. The RPDD shall be able to assign up to 4 detector outputs per unit and capable of using 2 or 4 channel interface modules to the detector rack.
13. The RPDD shall be able to distinguish and omit wrong way traffic from activating an assigned detector output.

14. The RPDD shall as a minimum, maintain a detection accuracy of 95% for each detection zone set-up on the GUI.

696.4. MATERIALS: Provide components necessary for RVDD installation. A RVDD shall consist of the following components: Radar sensor (1), detector rack interface module (1), power and surge protection panel or module (1), and all associated equipment required to set up and operate in a field environment including software, serial and Ethernet communications ports, cabling, electrical connectors, and mounting hardware.

A. RVDD Interface Module

1. The RVDD interface module must comply and operate with NEMA TS-2 Type 1 detector rack or Type 170/2070 input file.
2. The RADD shall be capable of 16 contact closure inputs to the detector rack. The user shall be able to assign each contact closure to an associated detector channel. The contact closure shall occur through the interface modules or controller module plugged into the rack.
3. All components of the RVDD housed in the controller cabinet shall be rated to operate in a temperature range from -34°C to +74°C (-30°F to +165°F) at 0 percent to 95 percent relative humidity, non-condensing.
4. The RVDD shall provide a “fail safe” operation that triggers when communication between the radar vehicle sensor and the interface module is broken. Contact closure will occur on all programmed detector channels associated with the interface module when the fail safe is triggered and will remain in this state until communication is reestablished between the interface module and the radar vehicle sensor.
5. The RVDD shall be capable of either “pulse mode” or “presence mode” operation. In the pulse mode, when a vehicle is detected and conditional logic is satisfied, contact closure will occur for approximately 125 ms. In the presence mode, contact closure will occur for as long as a vehicle is detected and conditional logic programming is satisfied.

B. RVDD Sensor

1. The RVDD shall be able to operate in all types of weather conditions including: rain, snow, sleet, ice, fog, and wind blown dust. The RVDD shall be able to operate normally and with no degraded performance when the radar vehicle sensor is encased in a 1/2 inch ice.
2. The RVDD shall be rated to operate in a temperature range from -34°C to 60°C (-30°F to 140°F) at 0 percent to 95 percent relative humidity.
3. The RVDD shall comply with all applicable Federal Communications Commission (FCC) requirements. The manufacturer will provide documentation of compliance with FCC specifications. Each RVDD will be FCC certified under CFR 47, Part 15, Section 15.245, as a field disturbance sensor or Section 15.249 as an intentional radiator. This certification will be displayed on an external label on each device according to the rules set forth by the FCC.
4. The RVDD shall maintain frequency stability without the use of manual tuning elements by the user.

C. Power and Surge Protection

1. Lightning and surge protection will be provided for power connections and communications links to the RVDD meeting or exceeding EN 61000-4-5 class specifications.

D. Software and Communication Requirements

1. The RVDD system software shall utilize a GUI that runs in a Microsoft Windows Mobile and Microsoft Windows XP environment or newer Microsoft operating system. The GUI shall graphically illustrate vehicle movement and directionality when detection is achieved by the RVDD. The software shall be capable of auto configuration upon set up of the RVDD.
 2. Programmed parameters from the GUI to the sensor shall be stored in non-volatile memory devices such as Flash RAM or EEPROM within the sensor. The RVDD shall not rely on batter backup or the use of a super capacitor to retain memory.
 3. The RVDD shall provide a RS232 serial communications link allowing the user to interface with a laptop computer and operate the GUI. The RS232 serial port shall be full duplex and will support true RTS/CTS hardware handshaking for interfacing to various communications devices.
 4. The RVDD shall provide an Ethernet communications link allowing the user to interface the system and operate the GUI via a LAN and using TCP/IP protocol.
 5. The RVDD firmware shall be upgradeable by external, local, or remote download via serial or Ethernet ports.
 6. The serial and Ethernet communications ports as a minimum will support the following baud rates: 9600, 19200, 38400, 57600, and 115200. The user shall be able to select the desired baud rate from the GUI.
 7. The operator shall be able to save configurations settings to a file or reload the configurations settings to the RVDD from a saved file using the GUI.
 8. The RPDD software shall allow for a virtual connection option so that the software can be used without connecting to an actual sensor.
- E. Cabling:** The cable end connector shall meet the MIL-C-26482 specification and shall be designed to interface with the appropriate MIL-C-26482 connector. The connector back shell shall be an environmentally sealed shell that offers excellent immersion capability. All conductors that interface with the connector shall be encased in a single jacket and the outer diameter of this jacket shall be within the back shell's cable O.D. range to ensure proper weather sealing. The back shell shall have a strain relief with enough strength to support the cable slack under extreme weather conditions. The cable shall conform to the following specifications:

1. Radar Advance Detection Device (RADD) Cabling

- a. Shielded, twisted pairs with a drain wire
- b. Nominal Capacitance Conductor to Conductor @ 1 KHz \leq 26 pF/Ft
- c. Nominal Conductor DC resistance at 20°C (68°F) \leq 15 ohms/1000 Ft
- d. Single continuous run with no splices allowed.
 - If communication is conducted over the RS-485 bus, the communication cable can be terminated only at the two farthest ends of the cable and the operational baud rate and cable lengths shall not exceed the following limits:

Baud Rate*	Cable Length
115.2 Kbps	300 ft
57.6 Kbps	600 ft
38.4 Kbps	800 ft
19.2 Kbps	1000 ft
9.6 Kbps	2000 ft

**Note: These represent Maximum data rates. The data rate used should be the minimum data rate required for operation.*

- e. RVDS supplied shall use 24 VDC, the power cable shall meet the following specifications:
- Two shielded, twisted pairs with two drain wires connected in parallel
 - Nominal capacitance conductor to conductor @ 1 KHz \leq 26 pF/Ft
 - Nominal conductor DC resistance @ 20°C (68°F) \leq 15 ohms/1000
 - The cable length shall not exceed 600 ft.
- f. If a cable length of 600 ft to 2,000 ft is required, the power cable shall meet the following specifications:
- 10 AWG conductor size/gauge
 - Two conductor count
 - Stranded Cable Type
 - Bare Copper Material
 - 600 Volt Range
 - 90°C Temperature Rating
 - PVC/Nylon insulation material
 - PVC jacketing material
 - 40 Amps per conductor
- g. Both communication and power conductors may be bundled together in the same cable as long as the above-mentioned conditions are met.

2. Radar Presence Detection Device (RPDD) Cabling

- a. The RS-485 conductors shall be a twisted pair.
- b. The RS-485 conductors shall have nominal capacitance conductor to conductor of less than 71 pF/Ft at 1 KHz.
- c. The RS-485 conductors shall have nominal conductor DC resistance of less than 16.5 ohms/ (304.8 m) at 20°C (68°F).
- d. The power conductors shall be one twisted pair with nominal conductor DC resistance of less than 11.5 ohms/ (304.8 m) at 20°C (68°F).

- e. Each wire bundle or the entire cable shall be shielded with an aluminum/Mylar shield with a drain wire.
- f. The cable O.D. shall not exceed 0.4 inches.
- g. The cable length shall not exceed 2,000 ft (609.6 m) for the operational baud rate of RS-485 communications (9.6 Kbps).
- h. The RVDS shall use 24 VDC and the cable length shall not exceed 500 ft (182.9 m).
- i. Both communication and power conductors can be bundled together in the same cable as long as the above-mentioned conditions are met.

696.5. EQUIPMENT: Provide the machinery, tools, and equipment necessary for proper prosecution of the work. All machinery, tools, and equipment used shall be maintained in a satisfactory and workmanlike manner.

696.6. CONSTRUCTION: Install RVDD in accordance with the details shown on the plans and the requirements of this item

A. Manufacturing and Testing

1. The internal electronics of the RVDD shall utilize automation for the surface mount assembly. The RPDD shall comply with the requirements set forth in IPC-A-610C Class 2 and the RADD with the requirements in IPC-A-610C Class 3, Acceptability of Electronic Assemblies.
2. The RVDD shall undergo a rigorous sequence of operational testing to ensure product functionality and reliability. Testing shall include the following:
 - a. Functionality testing of all internal sub-assemblies
 - b. Unit level burn-in testing of duration 48 hours or greater
 - c. Final unit functionality testing prior to shipment.

B. Installation and Training

1. When requested by COSA personnel or purchasing agency, the supplier of the RVDD shall supervise the installation and testing of the radar equipment.
2. If requested by COSA personnel or purchasing agency, up to two days of training shall be provided to personnel of COSA in the operation, setup, and maintenance of the RVDD. Instruction and materials shall be provided for a maximum of 20 persons and shall be conducted at a location selected by COSA. COSA or purchasing agency shall be responsible for the cost of training.
3. Instruction personnel are required to be certified by the equipment manufacturer. The User's Guide is not an adequate substitute for practical, classroom training and formal certification by an approved agency.
4. Formal levels of factory authorized training are required for installers, contractors, and system operators. All training must be certified by the manufacturer.

C. Warranty, Maintenance, and Support

1. The RVDD shall be warranted to be free of defects in material and workmanship for a period of 5 years from date of shipment from the supplier's facility. During the warranty period, the supplier shall repair with new or refurbished materials, or replace at no charge, any product containing a warranty defect or fails to operate properly after installation provided the product is returned FOB to the supplier's factory or authorized

repair site. Product repair or replaced under warranty by the supplier will be returned with transportation prepaid. This warranty does not apply to products damaged by accident, improper operation, abuse, serviced by unauthorized personnel or unauthorized modification.

2. If a RVDD fails with no visible or physical damage to any electronic/electrical component of the system or its wiring, then the unit is considered to have failed under normal operating conditions. A blown fuse or surge protection device failure shall be considered to have failed under normal operating conditions. Acts-of-God will not be accepted as excusable unit failures of the RVDD system.
3. Repair or full replacement will be required if a RVDD fails to operate as specified under normal operating conditions. Repaired or replaced components of the RVDD will be provided at no cost to COSA. The replaced or repaired units will inherit the remainder of the failed unit's warranty.
4. During the warranty period, technical support shall be available from the supplier via telephone within 4 hours of the time a call is made by a user, and this support shall be available from factory certified personnel or factory certified installers.
5. Ongoing software support by the supplier shall include firmware updates for the RVDD processor unit and external software needed to set up and operate the RVDD system. These updates shall be provided free of charge during the warranty period. The update of the RVDD software shall be tested and approved by COSA before installation.
6. The supplier shall maintain a program for technical support and software updates following expiration of the warranty period. This program shall be made available to COSA in the form of a separate agreement for continuing support.
7. The supplier shall maintain an adequate inventory of parts to support maintenance and repair of the radar system.

696.7. MEASUREMENT: The Radar Vehicle Detection Device will be measured as each major system component furnished, installed, made fully operational, and tested in accordance with this specification or as directed by the Engineer.

The RVDD communication and power cable(s) shall be measured by the linear foot of the type furnished and installed.

This is a plans quantity measurement item. Unless modified by Change Order, the quantity to be paid is the quantity shown in the proposal and/or in the "Estimate and Quantity" sheet of the contract plans. Additional measurements or calculations will be made if adjustments to the quantities are required.

696.8. PAYMENT: The work performed and materials furnished in accordance with this item and measured as provided under "Measurement" will be paid for at the unit price bid for each item listed in Section 696.9, "Bid Items". These prices are full compensation for furnishing, placing, and testing all materials and equipment, and for all tools, labor, equipment, hardware, operational software packages, supplies, support, personnel training, shop drawings, documentation, and incidentals.

The power and surge protection panel or module, software, serial and Ethernet communication ports, electrical connectors, all interfaces required for the field and remote communications links, and any other auxiliary equipment required for a complete and fully functional RVDD system shall be subsidiary to the price of the "RVDD Setup System".

A power cable meeting the specifications outlined in Section 696.4 "Materials" shall be included with the communication cable and is considered subsidiary to the price of the communication cables.

696.9. BID ITEMS:

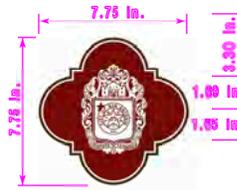
- Item 696.01 - Radar Presence Detection Device (RPDD) – per each
- Item 696.03 - Radar Advance Detection Device (RADD) – per each
- Item 696.06 - RVDD Interface Module (2-Channel) – per each
- Item 696.08 - RVDD Interface Module (4-Channel) – per each
- Item 696.11 - RVDD Setup System – per each
- Item 696.16 - RVDD Communication and Power Cable (Type) – per linear foot
- Item 696.21 - Install Radar Vehicle Detection Device – per each
- Item 696.26 - Install RVDD Communications and Power Cable – per linear foot

ITEM 800

PROJECT SIGNS

- 800.1 DESCRIPTION:** This item shall consist of providing, installing, maintaining and (at the completion of the project) removing two (2) 4'x8' project signs. The signs shall conform to the configuration and details indicated in a special sheet in the project specifications titled "PROJECT SIGN DETAILS." These signs shall be installed at locations to be determined by the inspector.
- 800.2 MATERIAL:** The signs shall be made of 3/4" plywood, grade A-C or better and each shall be mounted on two (2) 4"x 4"x 12' - 0" posts.
- 800.3 INSTALLATION:** The installation will require embedding all posts a minimum of 3' - 0" below the ground.
- 800.4 PAYMENT:** No direct payment will be made to the contractor for the work and materials required in providing, installing, maintaining, and removing the signs. Such work and materials shall be considered subsidiary to the several items of work for which unit prices are provided in the proposal.

96 in.



CITY OF SAN ANTONIO



PROJECT NAME
 \$ AMOUNT CAPITAL IMPROVEMENTS PROJECT
 FUNDING SOURCE: _____
 ENGINEER/ARCHITECT: _____
 CONTRACTOR: _____

CITY OF SAN ANTONIO
**CAPITAL IMPROVEMENTS
 MANAGEMENT SERVICES**

48 in.

4.85 in.

CITY MANAGER
 Sheryl Sculley

MAYOR
 Julián Castro

1.65 in.

1.65 in.

CITY ENGINEER/
 CIMS DIRECTOR
 Mike Frisbie, P.E.

1.65 in.

3.83 in.

CITY COUNCIL
 Diego M. Bernal
 Ivy R. Taylor
 Rebecca Viagran
 Rey Saldaña
 Shirley Gonzales

1.65 in.

CITY COUNCIL

Ray Lopez
 Cris Medina
 Ron Nirenberg
 Elisa Chan
 Carlton Soules

30.8 in.

18.2 in.

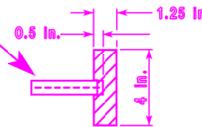
WHITE BACK-GROUND

FOR MORE INFORMATION CALL 207-8140
 AFTER HOURS EMERGENCIES CALL 311 AND REFER TO PROJECT: PROJECT NAME



LEFT BORDER SHALL BE DETERMINED USING THE LONGEST LINE CENTERED ON THE SIGN PROVIDING EQUAL BORDERS

EXTERIOR TYPE HIGH DENSITY OVERLAID PLYWOOD OR OTHER APPROVED MATERIAL SUITABLE FOR SIGNS.



PROVIDE ADEQUATE SUPPORTS FOR SIGN AS SITE CONDITIONS MAY REQUIRE AND KEEP SIGN PROPER DISTANCE ABOVE PREVAILING GRADE TO PERMIT PUBLIC VIEWING

GRADE

ABCDEFGHIJKLMNOPQRSTUVWXYZ
 abcdefghijklmnopqrstuvwxyz
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ITEM 801

TREE AND LANDSCAPE PROTECTION

This item shall govern the placing of protection for trees and other landscape plant material or natural areas to be protected during construction. No site preparation work shall begin in areas where tree preservation and treatment measures have not been completed and approved. *Where removal of trees is indicated on the drawings, they shall be marked as directed by the engineer or designated representatives.* This item shall also govern the excavation, filling, *trenching and boring* around trees described on the plans, and for furnishing all materials, water, labor, tools, equipment and supplies required as specified by this item or as indicated on the plans.

Reference Standards: City of San Antonio Tree Preservation ordinance # 85262

MATERIALS:

LEVEL I FENCE PROTECTION (Detail 1.1.2):

Fabric: Fabric (4 foot height or 1.2 m) shall consist of orange plastic fencing as shown on the plans and shall be woven with 2-inch (50 mm) mesh openings such that in a vertical dimension of 23 inches (584 mm) along the diagonals of the openings there shall be at least seven meshes.

1. Installation Posts: Installation posts shall be a minimum of 72 inches (1.5 m) long and steel “T” shaped with a minimum weight of 1.3 pounds per linear foot (6.3 kg per meter).
2. Tie Wire: Wire for attaching the fabric to the t-posts shall be not less than No. 12 gauge galvanized wire. Sufficient fastening material shall be furnished to provide for the securing of the fabric to the “T” line posts.
3. Used Materials: Previously-used materials, meeting the above requirements and when approved by the Engineer, may be used.

LEVEL IIA FENCE PROTECTION (Detail 1.1.3):

Materials same as Level I -OR-

LEVEL IIB FENCE PROTECTION (Detail 1.1.4):

1. Sleeve: 2x4 lumber to a height of 4 feet above the root crown.
2. 2x4 shall be utilized as called for on plan.
3. Tie Wire: Wire for securing the 2x4s shall not be less than No. 12 gauge.

OTHER MATERIALS:

1. Tree Dressing - Asphaltic Tree Wound Paint

CONSTRUCTION METHODS:

LEVEL I FENCE PROTECTION:

All trees and shrubs in the proximity of the construction site shall be protected prior to beginning any development activity.

Protective fencing shall be erected outside the dripline at locations shown in the plans or as directed by the Inspector and/or City Arborist or in accordance with the details shown on the plans at the drip line of trees (Root Protection Zone, RPZ) and/or landscape plant material including natural areas. Fencing shall be maintained and repaired by the contractor during site construction.

Protective fence locations in close proximity to street intersections or drives shall adhere to the City of San Antonio’s site distance criteria.

The protective fencing shall be erected before site work commences and shall remain in place during the entire construction phase. Access to fenced areas will be permitted only with the approval of the engineer.

The installation posts will be placed every 6 feet (2 m) around the drip line or RPZ and embedded to 18 inches (457 mm) deep. Fabric attachment shall be attached to the installation posts by the use of sufficient wire ties to securely fasten the fabric to the “T” posts as to hold the fabric in a stable and upright position.

1. Do not clear, fill or grade in the RPZ of any tree.
2. Do not store, stockpile or dump any job material, soil or rubbish under the spread of the tree branches.
3. Do not park or store any equipment or supplies under the spread of the tree branches.
4. Do not set up any construction operations under the spread of the tree branches. (E.g. pipe cutting and threading, mortar mixing, painting or lumber cutting)
5. Do not nail or attach temporary signs, meters, switches, wires, bracing or any other item to the trees.
6. Do not permit runoff from waste materials including solvents, concrete washouts, asphalt tack coats (MC-30 oil), etc. to enter the RPZ. Barriers are to be provided to prevent such runoff substances from entering the RPZ whenever possible, including in an area where rain or surface water could carry such materials to the root system of the tree.

The contractor shall avoid cutting roots larger than one inch in diameter when excavation occurs near existing trees. Excavation in the vicinity of trees shall proceed with caution. The contractor shall contact the city inspector.

Remove all trees, shrubs or bushes to be cleared from protected root zone areas as directed by engineer by hand.

Trees damaged or lost due to contractor’s negligence during construction shall be mitigated at the contractor’s expense and to the engineer’s satisfaction.

Any tree removal shall be approved by the city arborist prior to its removal.

Cover exposed roots at the end of each day with soil, mulch or wet burlap.

In critical root zone areas that cannot be protected during construction and where heavy traffic is anticipated, cover those areas with (8) inches of organic mulch to minimize soil compaction. This (8) inch depth of mulch shall be maintained throughout construction.

Water all trees, most heavily impacted by construction activities, deeply once a week during periods of hot dry weather. Spray tree crowns with water periodically to reduce dust accumulation on the leaves.

When installing concrete adjacent to the root zone of a tree, use a plastic vapor barrier behind the concrete to prohibit leaching of lime into the soil. See related specifications.

When an excavation or embankment is placed within the dripline of any tree greater than (8) inches in diameter, a Tree well shall be constructed to protect the tree as indicated, when the cut or fill exceeds (8) inches. See related specifications.

Where paving or filling is necessary within the dripline of any tree (8) inches or greater, a permeable pavement and aeration system must be installed as indicated. See related specifications.

CONSTRUCTION METHODS:

LEVEL II A FENCE PROTECTION:

Protective fencing shall be erected within the RPZ at locations shown in the plans or as directed by the Inspector and/or City Arborist or in accordance with the details shown on the plans at the drip line of trees (Root Protection Zone, RPZ) and/or landscape plant material including natural areas. Fencing shall be maintained and repaired by the contractor during site construction.

Fabric: Fabric (4 foot height or 1.2 m) shall consist of orange plastic fencing as shown on the plans and shall be woven with 2-inch (50 mm) mesh openings such that in a vertical dimension of 23 inches (584 mm) along the diagonals of the openings there shall be at least seven meshes.

1. Installation Posts: Installation posts shall be a minimum of 72 inches (1.5 m) long and steel "T" shaped with a minimum weight of 1.3 pounds per linear foot (6.3 kg per meter).
2. Tie Wire: Wire for attaching the fabric to the t-posts shall be not less than No. 12 gauge galvanized wire. Sufficient fastening material shall be furnished to provide for the securing of the fabric to the "T" line posts.
3. Used Materials: Previously-used materials, meeting the above requirements and when approved by the Engineer, may be used.

LEVEL II B FENCE PROTECTION:

Trunk protection shall be erected at locations shown in the plans or as directed by the Inspector and/or City Arborist shall be maintained and repaired by the contractor during site construction.

1. Installation Sleeve: 2x4 lumber to a height of 4 feet above the root crown.
2. Tie Wire for securing the 2x4s shall not be less than No. 12 gauge

MEASUREMENT:

Protective fencing will be measured by the linear foot of accepted work, complete in place for the duration of construction activity.

PAYMENT:

Tree and Landscape Protective Fencing will be paid for at the unit price bid per linear foot (meter), which price shall be full compensation for furnishing and placing all materials, manipulation, labor, tools, equipment and incidentals necessary to complete the work.

BID ITEMS

Item 801.1: Level I Protective Fencing - per linear foot (meter)

Item 801.2: Level IIA Protective Fencing - per linear foot (meter)

Item 801.3: Level IIB Protective Fencing - per linear foot (meter)

ITEM 802

TREE PRUNING, SOIL AMENDING AND FERTILIZATION

PART 1 GENERAL

1.01 DESCRIPTION:

The purpose of this specification is to describe a procedure for maintaining preserved trees before, during and after construction and for furnishing all materials, water, labor, tools, equipments and supplies required as specified by this item or as indicated on the plans.

1.02 REFERENCE STANDARDS:

The contractor shall comply with the applicable provisions and recommendations of the publication listed below and these shall be utilized as reference standards, and form a part of this specification to the extent indicated by reference:

American National Standard Institute - ANSI A300-2002

PART 2 PRODUCTS

2.01 MATERIALS:

1. Tree pruning paint: Any latex, oil or asphalt base wound dressing.
2. Soil amendment: Organic soil amendment with nitrogen content 10% or less.
3. Commercial fertilizer: Urea form based liquid suspension, which is soil injected. Salt Index is less than 3.5 (True Green, Boost) and a longevity period of up to 2 years.
4. Mulch: Shredded wood residue with size of pieces not more than 6 inches in length.
5. Water-By truck for trees.

PART 3 EXECUTION

3.01 CARE OF TREES PRIOR TO AND DURING CONSTRUCTION:

1. Prior to erecting tree enclosure and the start of any phase of construction, arborist will provide mycorrhizal inoculation and deep root fertilization to the tree roots, using 3 lbs. of actual nitrogen per 1000 square feet of root area in a slow release soil injection method. Then a certified arborist will perform pruning before construction to remove dead wood, improve the health of the trees to better tolerate the stresses endured during construction activities. In addition all pruning shall adhere to the standard practices in the American National Standard Institute ANS/A300-1995, and to improve the level of safety
 - a. Crown Cleaning – shall consist of the removal of dead, dying, and diseased wood one inch in diameter and greater. Many of the existing trees are above and within the proposed walkway. This dead wood shall be removed to improve safety and liability issues.
2. No site preparation work shall begin in areas where tree preservation and treatment measures have not been completed and approved.
 - a. Crown Raising – shall consist of removing lower limbs to provide a clearance specification of 8 feet over walkways and 13 feet over the

main road for vehicle clearance. Branches may be tied back instead of removed, in order to alleviate conflict. These specifications should protect the existing trees. Tree contractor is to be briefed by Project Engineer/Arborist prior to project commencement. All pruning and removals shall be overseen by a Certified Arborist. The awarded company shall have a Certified Arborist on staff to be able to bid on this Project.

3. No pruning or removal of limbs shall be allowed to provide clearance for work unless approved by the engineer.
4. Removal of limbs which are 6 inches in diameter or greater is prohibited without consent of the City Arborist. Occasional branches, up to 1/4 inch in diameter, which are dead, dying, diseased may remain when it is not practical to remove it.
5. Oak wounds must be painted with wound paint within 30 minutes to prevent infection of the Oak Wilt fungal organism.
6. Soil amendments will be applied within the drip line (RPZ).
7. Soil fertilization will be completed by a soil injection method, which will occur at a spacing of 3 feet on center around the tree within the drip line (Root Protection Zone, RPZ) only for those trees specified.
8. Excavate within drip line of trees only where required. Where excavating for new construction is required within drip line of trees, hand excavate to minimize damage to root systems. Use narrow spading forks and comb soil to expose roots. Relocate roots back into backfill areas wherever possible. If large main lateral roots are encountered, expose beyond excavation limits as required to bend and relocate without breaking. If root relocation is not practical, then contact Client representative for approval to cut roots 1/2" or greater. If approved, clean cut roots using handsaw or chainsaw approximately 3 inches back from new construction. Where existing grade is above new finish grade, carefully excavate within the drip line to the new finish grade. Carefully hand excavate an additional 8 inch below the finish grade. Use narrow line spading forks to comb the soil to expose the roots and prune the exposed root structure as recommended by the Arborist. After pruning and treatment is complete, backfill to within the finish grade with 8" of approved landscape fill material. Temporarily support and protect roots against damage until permanently relocated and do not allow exposure of root to air to occur beyond 12 hours. Cover with damp soil, peat moss, 8"bark or gunny sacks in order to keep moist so as not to dry out and permanently cover roots as soon as possible. Where it has been determined that trenching for utilities can seriously impact the roots of a desirable tree, then bore or tunnel under tree to minimize root impact.
9. The Contractor shall be responsible for coordinating all construction activities that may impact trees with clients representative and the Arborist, who will do the necessary pruning and deep root fertilization deemed necessary by the Arborist.

3.02 POST CONSTRUCTION CARE OF TREES:

1. The Contractor shall water when it is necessary to supplement natural rainfalls required preventing excess drying of the tree root area.

2. The Contractor is responsible for a fall and spring fertilization of the following year using a deep root fertilization method on trees deemed necessary by the Client.
3. The Contractor shall perform post construction care under the supervision of the arborist.

3.03 QUALITY ASSURANCE:

All tree pruning and fertilization work shall be performed by a single firm specializing in tree pruning work, with a minimum of 3 years experience in the acceptable performance of similar work to that specified. Pruning is to be performed by personnel who, by training and on the job experience, are familiar with the techniques and hazards of this work. The firm performing the work shall have the following minimum qualifications and certifications.

NAA - National Arborist Association Certified or
ISA - International Society of Arborists Certification
Be licensed for application and use of pesticides
Meet state requirements for insurance
Must be bonded

The Arborist shall:

- a. Establish lines of communication for all work which may potentially impact trees, under story, or areas that are to be protected from construction activity.
- b. Locate and properly identify or mark in the field trees, under story and areas that are to be protected from construction activity and are the responsibility of the Prime Contractor to protect.
- c. Identify limits and extent of protective fencing around these trees, under story vegetation and other areas.

LEVEL II:

3.04 CARE OF TREES PRIOR TO AND DURING CONSTRUCTION:

1. Prior to erecting tree enclosure and the start of any phase of construction; provide mycorrhizal inoculation and deep root fertilization to the tree roots, using 3 lbs. of actual nitrogen per 1000 square feet of root area. Then pruning will be performed by a certified arborist before construction to remove dead wood, improve the health of the trees to better tolerate the stresses endured during construction activities. In addition all pruning shall adhere to the standard practices in the American National Standard Institute ANS/A300-1995, and to improve the level of safety
2. No site preparation work shall begin in areas where tree preservation and treatment measures have not been completed and approved.
3. No pruning or removal of limbs shall be allowed to provide clearance for work unless approved by the engineer.
4. Removal of limbs which are 6 inches in diameter or greater is prohibited without consent of the City Arborist. Occasional branches, up to 1/4 inch in diameter, which are dead, dying, diseased may remain when it is not practical to remove it.
5. Oak wounds must be painted with wound paint within 30 minutes to prevent infection of the Oak Wilt fungal organism.

6. Excavate within drip line of trees only where required. Where excavating for new construction is required within drip line of trees, hand excavate to minimize damage to root systems. Use narrow spading forks and comb soil to expose roots. Relocate roots back into backfill areas wherever possible. If large main lateral roots are encountered, expose beyond excavation limits as required to bend and relocate without breaking. If root relocation is not practical, then contact Client representative for approval to cut roots 1/2" or greater. If approved, clean cut roots using a handsaw or chainsaw approximately 3 inches back from new construction. Where existing grade is above new finish grade, carefully excavate within the drip line to the new finish grade. Carefully hand excavate an additional 8 inch below the finish grade. Use narrow line spading forks to comb the soil to expose the roots and prune the exposed root structure as recommended by the Arborist. After pruning and treatment is complete, backfill to within the finish grade with 8" of approved landscape fill material. Temporarily support and protect roots against damage until permanently relocated and do not allow exposure of root to air to occur beyond 12 hours. Cover with damp soil, peat moss, bark or gunny sacks in order to keep moist so as not to dry out and permanently cover roots as soon as possible. Where it has been determined that trenching for utilities can seriously impact the roots of a desirable tree, then bore or tunnel under tree to minimize root impact.
7. Water deeply trees that are substantially trimmed or within drip line of excavation work for the duration of this contract.
8. Water deeply trees that show signs of stress and are located in areas where the groundwater table has been lowered due to construction activities.
9. The Contractor shall be responsible for coordinating all construction activities that may impact trees with clients representative and the Arborist, who will do the necessary pruning and deep root fertilization deemed necessary by the Architect.

3.05 POST CONSTRUCTION CARE OF TREES:

1. The Contractor shall water when it is necessary to supplement natural rainfalls required preventing excess drying of the tree root area. Barring natural rainfall, the Contractor should apply 1" per week over entire root protection zone.
2. The Arborist shall monitor and authorize for removal the trees which show symptoms of stress, which might be indicated by branch die back chlorosis or fringe browning of the leaves. This would indicate that the crown is not in equilibrium with roots and additional pruning would be necessary. Subsequent pruning should remove only as much green wood as deemed necessary to reestablish equilibrium. If trees die during construction due to contractor negligence up to a one year post construction period, the Contractor will be required to replace trees at his or her own expense as called for in Paragraph 3.6.
3. The Contractor shall perform post construction care under the supervision of an arborist.

3.06 QUALITY ASSURANCE:

Same as Level I

3.07 MEASUREMENT:

"Maintenance Pruning" Soil Amendment, and Fertilization" , ½" or larger of dead, diseased wood.

"Maintenance Pruning" 1" or larger of dead, diseased wood.

3.08 PAYMENT:

Work performed and materials furnished as prescribed by this item and measured as provided under "Measurement" will be paid for as follows:

"Level I Pruning, Soil Amendment, and Fertilization" Will be paid for at the unit price bid per each tree receiving "Level I Pruning, Soil Amendment, and Fertilization" of the size called for , which price shall be full compensation for furnishing all materials; preparation, hauling, handling charges, placement, labor, tools, and incidentals necessary to complete the work.

Level II Pruning will be paid for at the contract lump sum price bid, which price shall be full compensation for work herein specified, including the furnishing of all materials, equipment, tools, labor, and incidentals necessary to complete the work.

3.09 BID ITEM:

Item 802.1 - Level I Pruning, Soil Amendment, and Fertilization - per each tree

Item 802.2 - Level II Pruning - per Lump Sum

ITEM 805

TREES, PLANTS AND GROUND COVERS

PART 1 GENERAL

1.01 The requirements of Division 0, "Bidding Requirements, Contract Forms, And Conditions of the Contract", and Division 1, "General Requirements", shall apply to all work required by this Section.

1.02 **SECTION INCLUDES:**

The Contractor shall provide trees, plants and ground covers as shown and specified. The work includes:

- A. Soil preparation.
- B. Large specimen trees, small flowering trees, plants and ground covers.
- C. Planting mixes.
- D. Mulch and planting accessories.
- E. Existing tree care.
- F. Maintenance.
- G. Backfill for large and small trees.

1.03 **RELATED SECTIONS:**

Item 800 – Tree Survey
Item 801 – Tree and Landscape Protection
Item 802 – Tree Pruning, Soil Amending & Fertilization
Item 803 - Tree Transplanting
Item 804 – Sodding & Seeding

1.04 **QUALITY ASSURANCE:**

- A. Comply with Division 2 "Site Work".
- B. Plant names indicated comply with "Standardized Plant Names" as adopted by the latest edition of the American Joint Committee of Horticultural Nomenclature. Names of varieties not listed conform generally with names accepted by the nursery trade. The Contractor shall provide stock true to botanical name and legibly tagged.
- C. The Contractor shall comply with sizing and grading standards of the latest edition of "American Standard for Nursery Stock". A plant shall be dimensioned as it stands in its natural position.
- D. All plants shall be nursery grown under climatic conditions similar to those in the locality of the project for a minimum of two (2) years.
- E. Stock furnished shall be at least the minimum size indicated. Larger stock is acceptable, at no additional cost to the Owner, and providing that the larger

plants will not be cut back to sizes indicated. Provide plants indicated by two measurements so that only a maximum of 25% are of the minimum size indicated and 75% are of the maximum size indicated.

- F. The Contractor shall provide "specimen" plants with a special height, shape, or character of growth. Tag specimen trees or shrubs at the source of supply. The Engineer will inspect specimen selections at the source of supply for suitability and adaptability to selected location. When specimen plants cannot be purchased locally, provide sufficient photographs of the proposed specimen plants for approval.
- G. Plants may be inspected and approved at the place of growth, for compliance with specification requirements for quality, size and variety.

Such approval shall not impair the right of inspection and rejection upon delivery at the site or during the progress of the work.

1.05 SUBMITTALS:

- A. The Contractor shall submit the following materials certification: Topsoil source and pH value.
- B. The Contractor shall provide plant material record drawings:
 - 1. Legibly mark drawings to record actual construction.
 - 2. Indicate horizontal and vertical locations, referenced to permanent surface improvements.
 - 3. Identify field changes of dimension and detail and changes made by Change Order.

1.06 DELIVERY, STORAGE AND HANDLING:

- A. The Contractor shall take all precautions customary in good trade practice in preparing plants for moving. Workmanship that fails to meet the highest standards will be rejected. Dig, pack, transport and handle plants with care to ensure protection against injury. Inspection certificates required by law shall accompany each shipment invoice or order to stock and on arrival, the certificate shall be filed with the Engineer. Protect all plants from drying out. If plants cannot be planted immediately upon delivery, properly protect them with soil, wet peat moss, or in a manner acceptable to the Landscape Architect. Water heeled-in plantings daily. No plant shall be bound with rope or wire in a manner that could damage or break the branches.
- B. The Contractor shall cover plants transported on open vehicles with a protective covering to prevent wind burn.
- C. The Contractor shall provide dry, loose friable topsoil for planting bed mixes. Frozen or muddy topsoil is not acceptable.

1.07 PROJECT CONDITIONS:

- A. Work notification: The Contractor shall notify Engineer at least seven (7) working days prior to installation of plant material.

- B. The Contractor shall protect existing utilities, paving and other facilities from damage caused by landscaping operations.
- C. A complete list of plants, including a schedule of sizes, quantities, and other requirements is shown on the plans. In the event that quantity discrepancies or material omissions occur in the plant materials list, the planting plans shall govern. It is the Contractor's responsibility to verify all quantities.
- D. The irrigation system will be installed prior to planting. The Contractor shall locate, protect and maintain the irrigation system during planting operations. Repair irrigation system components damaged during planting operations at the Contractor's expense.

1.08 WARRANTY:

- A. The Contractor shall warrant plant material to remain alive and be in healthy, vigorous condition for a period of one (1) year after completion and acceptance of entire project for operation and maintenance.

Inspection of plants will be made by the Landscape Architect at completion of planting.

- B. The Contractor shall replace, in accordance with the plans and specifications, all plants that are dead or, as determined by the Landscape Architect, are in an unhealthy or unsightly condition, and have lost their natural shape due to dead branches, or other causes due to the Contractor's negligence. Until issuance of the Certificate of Substantial Completion the Contractor shall replace all damage or loss to trees, plants or ground covers caused by fires, floods, freezing rains, lightning storms, or winds over 75 mph, winter kill caused by extreme cold and severe winter conditions, acts of vandalism or negligence. The cost of such replacement(s) is at the Contractor's expense. The Contractor shall warrant all replacement plants for one (1) year after completion and acceptance of the entire project for operation and maintenance.
- C. Warranty shall not include damage or loss to trees, plants or ground covers caused by fires, floods, freezing rains, lightning storms, or winds over 75 mph, winter kill caused by extreme cold and severe winter conditions not typical of planting area; acts of vandalism or negligence on the part of the Owner.
- D. The Contractor shall remove and immediately replace all plants, as determined by the Landscape Architect, to be unsatisfactory during the initial planting installation.

1.09 MEASUREMENT AND PAYMENT:

Measurement and payment will be as outlined in Section "Measurement and Payment" of Part 1, General Provisions.

PART 2 PRODUCTS

2.01 MATERIALS:

- A. Plants: The Contractor shall provide plants typical of their species or variety; with normal, densely-developed branches and vigorous, fibrous root systems. Provide only sound, healthy, vigorous plants free from defects, disfiguring knots, sun scald injuries, frost cracks, abrasions of the bark, plant diseases, insect

eggs, borers, and all forms of infestation. All plants shall have a fully developed form without voids and open spaces. Plants held in storage will be rejected if they show signs of growth during storage.

1. The Contractor shall dig balled and burlapped plants with firm, natural balls of earth of sufficient diameter and depth to encompass the fibrous and feeding root system necessary for full recovery of the plant. Provide ball sizes complying with the latest edition of the "American Standard for Nursery Stock". Cracked or mushroomed balls are not acceptable. All trees shall be nursery grown.
2. Container-grown stock: Plants shall be grown in a container for sufficient length of time for the root system to have developed to hold its soil together, firm and whole.
 - a. No plants shall be loose in the container.
 - b. Container stock shall not be pot bound.
3. The Contractor shall provide tree species that mature at heights over 25'-0" with a single main trunk unless multitrunks are specified. Trees that have the main trunk forming a "Y" shape are not acceptable.
4. Plants planted in rows shall be matched in form.
5. Plants larger than those specified in the plant list may be used when acceptable to the Landscape Architect.

If the use of larger plants is acceptable, increase the spread of roots or root ball in proportion to the size of the plant.
6. The height of the trees, measured from the crown of the roots to the top of the top branch, shall not be less than the minimum size designated in the plant list.
7. Shrubs and small plants shall meet the requirements for spread and height indicated in the plant list.
 - a. The measurements for height shall be taken from the ground level to the average height of the top of the plant and not the longest branch.
 - b. Single stemmed or thin plants will not be accepted.
 - c. Side branches shall be generous, well twigged, and the plant as a whole well-bushed to the ground.
 - d. Plants shall be in a moist, vigorous condition, free from dead wood, bruises, or other root or branch injuries.

2.02 ACCESSORIES:

- A. A minimum of six (6) inches of topsoil, after settling occurs, shall be furnished in all shrub beds and raised planters shall be filled with good friable topsoil as

called for on the plans. Topsoil furnished shall be natural, fertile, friable soil, possessing characteristics of representative productive soils in the vicinity. It shall be obtained from naturally well drained areas. Topsoil shall be without admixture of sub-soil and free from nut grass (*Cyperus rotundus*) and other objectionable grass, weeds and toxic substances. Topsoil shall be approved by the Landscape Architect.

- B. Commercial fertilizer shall be Carefree, Vertagreen, or approved equal, organic fertilizer containing the following minimum percentages of available plant food by weight: 15-5-5 or 16-8-8 Nitrogen-Phosphorus. Mixed Nitrogen, not less than 50% from organic source. Inorganic chemical nitrogen shall not be derived from the sodium form of nitrate or from the ammonia nitrate. It shall be delivered to the site in unopened containers, each bearing the manufacturer's guaranteed analysis. Any fertilizer which becomes caked or otherwise damaged, making it unsuitable for use, will not be accepted.
- C. Soil conditioner shall be two (2") inches of compost or approved equivalent as provided by Garden-Ville/Horticultural Products, Route 3, Box 210 TA, San Antonio, Texas 78218, (210) 651-6115 or Landscape Architect approved equal. Compost is to be worked into the first four (4") inches of topsoil.
- D. Sand shall be sharp, clean sand.
- E. Mulch shall be four (4) inches of native bark for surface dressing of shrub beds as provided by Garden-Ville/Horticultural Products, Route 3, Box 210 TA, San Antonio, Texas 78218, (210) 651-6115 or Landscape Architect approved equal or that shall be furnished from the onsite stockpile.
- F. Water shall be free of substances harmful to plant growth. Hoses or other methods of transportation furnished by Contractor.
- G. Backfill shall be provided for each new large specimen tree and small tree as called out on the planting plan and shall be landscape Garden Mix as provided by Curlex Erosion Control Matting or equivalent as provided by Garden-Ville/Horticultural Products, Route 3, box 210 TA, San Antonio, Texas 78218, (210) 651-6115 or Landscape Architect approved equal.
- H. Edging shall be Shawtown Root Barrier Panels by NDS or equivalent to be provided on all sides of Bamboo Planting. For more information call (800) 726-1994.

PART 3 EXECUTION

3.01 INSPECTION:

- A. The Contractor shall examine proposed planting areas and conditions of installation. The Contractor shall not start planting work until unsatisfactory conditions are corrected.
- B. Any ground cover or shrub plantings that are having existing infestation of nut grass, Bermuda grass, Johnson grass or other objectionable grasses or weeds shall be first treated with "round up" as manufactured by Monsanto, or Landscape Architect approved equal. Treatment shall be in strict accordance to manufacturer's specifications and shall be accomplished to allow sufficient time

for a complete kill prior to starting any soil preparation and planting in treated planting areas.

- C. Planting shall be performed only by experienced workmen familiar with planting procedures under the supervision of a qualified supervisor.
- D. Locate plants as indicated or as approved in the field after staking by the Contractor. If obstructions are encountered that are not shown on the plans, do not proceed with planting operations until alternate plant locations have been selected.
- E. The Contractor shall excavate circular plant pits with vertical sides, except for plants specifically indicated to be planted in beds. Provide shrub pits at least 12" greater than the diameter of the root system and 24" greater for trees. Depth of pit shall accommodate the root system. Scarify the bottom of the pit to a depth of 4". Remove excavated materials from the site.
- F. Soil Preparation: Soil used in planting shall be topsoil as hereinbefore specified, or suitable existing soil either of which shall be thoroughly mixed with the following materials and in the proper proportions: 1 cu. yd. topsoil; 6 cu. ft. shredded pine bark; 1/4 cu. yd. sand; 3 lbs sulphur; 6 lbs. fertilizer, as specified.

3.02 **INSTALLATION:**

- A. The Contractor shall set plant material in the planting pit to proper grade and alignment. Set plants upright, plumb, and faced to give the best appearance or relationship to each other or adjacent structure. No filling will be permitted around trunks or stems. Backfill the pit with planting mixture. Do not use frozen or muddy mixtures for backfilling. Form a ring of soil around the edge of each planting pit to retain water.

- B. After balled and burlapped plants are set, muddle planting soil mixture around bases of balls and fill all voids.

Remove all burlap, ropes and wires from the tops of balls.

- C. The planting beds for ground cover areas, outline of which are shown on the plans, shall be prepared in the following manner. Apply 6 lbs. of hereinbefore specified fertilizer per 100 sq. ft. area, 2" sand, 2" shredded native bark and then thoroughly till the area to a depth of 8" using a roto tiller or similar equipment that will thoroughly pulverize the soil and evenly mix in the fertilizer. Roots, stones, grade stakes or other objects 1" in maximum dimension or larger shall be removed from the beds and disposed of off the site.

The Contractor shall space ground cover plants in accordance with indicated dimensions. Adjust spacing as necessary to evenly fill planting bed with indicated quantity of plants. Plant to within 12" of the trunks of trees and shrubs within planting bed and to within 6" of edge of bed.

- D. Mulching:

- 1. The Contractor shall mulch existing trees, new trees and shrub planting pits and shrub beds with required mulching material three (3) inches deep immediately after planting. Thoroughly water mulched areas. After watering, rake mulch to provide a uniform finished surface.

2. The Contractor shall mulch ground cover beds with required pine bark material 2" deep immediately after planting.

E. Pruning:

The Contractor shall prune branches of deciduous stock, after planting, to balance the loss of roots and preserve the natural character appropriate to the particular plant requirements. In general, remove 1/4 to 1/3 of the leaf bearing buds, proportion in all cases shall be acceptable to the Landscape Architect. Remove or cut back broken, damaged, and unsymmetrical growth of new wood.

F. Care of Existing Trees:

Item 801 – Tree & Landscape Protection
Item 802 – Tree Pruning, Soil Amending & Fertilization

3.03 **MAINTENANCE:**

- A. The Contractor shall maintain plantings until completion and acceptance of the entire project.
- B. Maintenance shall include pruning, cultivating, weeding, watering and application of appropriate insecticides and fungicides necessary to maintain plants free of insects and disease.
 1. The Contractor shall re-set settled plants to proper grade and position. Restore planting saucer and adjacent material and remove dead material.
 2. The Contractor shall tighten and repair guy wires and stakes as required.
 3. The Contractor shall correct defective work as soon as possible after deficiencies become apparent and weather and season permit.
 4. The Contractor shall water trees, plants and ground cover beds within the first twenty four (24) hours of initial planting, and not less than twice per week until final acceptance for operation and maintenance.

3.04 **ACCEPTANCE:**

- A. Site visit to determine acceptance of planted areas will be made by the Landscape Architect, upon the Contractor's request. **Provide notification at least ten (10) working days before requested inspection date.**

Planted areas will be accepted provided all requirements, including maintenance, have been complied with and plant materials are alive and in a healthy, vigorous condition.

- B. Upon acceptance, the Owner will assume plant maintenance.

3.05 **CLEANING:**

- A. The Contractor shall perform cleaning during installation of the work and upon completion of the work. Remove from site all excess materials, soil, debris and equipment. Repair damage resulting from planting operations.

END OF SECTION

SPECIAL SPECIFICATION

ITEM

6000 TEMPORARY CHAIN LINK FENCE

- 6000.1.** **DESCRIPTION:** *This item shall govern for temporary chain link fabric supported on temporary posts (with above ground temporary base) with bracing and accessories as specified herein, erected complete in place as shown on the plans or as directed by the inspector.*
- 6000.2.** **MATERIALS:** All fencing materials shall comply with the requirements of this item. Materials may be new or used but shall be approved by the inspector prior to use.
- A. **General.** Furnish materials in accordance with the following:
 - 1. **Galvanizing.** Texas Department of Transportation Item 445, "Galvanizing."
 - B. **Fabric.** Provide wire fabric with:
 - 1. Nine (9) gauge (0.148 in. diameter) steel wire with a minimum breaking strength of 1,290 lb. meeting ASTM A 392 Class 1 or ASTM A 491;
 - 2. Mesh size of 2 in. +/- 1/8 in. between parallel wires with at least 7 meshes in a vertical dimension of 23 in. along the diagonals of the openings; and
 - 3. Knuckled selvages at the top and bottom edge of the fabric, unless otherwise shown on the plans.
 - C. **Posts.** Provide 1 5/8 in. O.D. (2.27 lbs/lf) line posts. Do not provide rerolled or open-seam posts. Use material meeting ASTM F 1083 for all posts.
 - D. **Post Caps.** Provide malleable iron post caps designed to exclude all moisture.
 - E. **Top Rail.** Provide top rail manufactured from 1.66 in. O.D. standard weight (Schedule 40) steel pipe weighing 2.27 lb per foot or high-strength pipe weighing 1.82 lb. per foot. Use material meeting ASTM F 1083 for all top rail pipes. Provide pipe in sections at least 18 ft. long joined with outside steel sleeve couplings at least 6 in. long with a minimum wall thickness of 0.70 in. Use couplings designed to allow for expansion of the top rail.
 - F. **Tension Wire.** Use 7 gauge (0.177-in.) carbon steel wire with a minimum

breaking strength of 1,950 lb. for the bottom edge of all fence fabric, and for the top edge of fence fabric when a top rail is not specified.

- G. **Truss Bracing.** Provide truss bracing as needed.
- H. **Stretcher Bars.** Provide stretcher bars made of flat steel at least 3/16 in. by 3/4 in. and not more than 2 in. shorter than the fabric height. Provide 1 stretcher bar for each end post and 2 stretcher bars for each pull post.
- I. **Tie Wire.** Wire for attaching fabric to tension wire and to top rail shall be not less than No. 9 gauge galvanized wire, or fastenings in accordance with the manufacturer's standard design. Sufficient fastening material shall be furnished to provide for attaching the fabric to the tension wire and to the top rail and posts at 12" O.C. spacing.
- J. **Braces and Cables.** Braces and cables shall be installed at all corner, tension, and terminal posts and shall be extended to adjacent line posts. Braces and trussing material shall be high carbon steel of good commercial quality and shall meet the dimensions as needed. Brace rods shall be 3/8 in. diameter and be equipped with turnbuckles. Cables shall be 3/8 in. diameter and shall be composed of seven wires. Cables shall be installed as needed and shall include the use of 3/8 in. drop-forged eye-and-eye, or eye-and-clevis turnbuckles.
- K. **Steel Pipe.** All steel pipe, except for thin-wall, high strength pipe, used for top rails, line posts, tension, and terminal posts, and braces shall conform to the requirements of ASTM A 120. Thin-wall, high strength pipe shall be manufactured by cold rolling using steel strip conforming to ASTM A 569.
- L. **Galvanizing and Aluminum Coating.** Hot-dip galvanize all materials. Fabric and tension wire may be aluminum coated or alloy-coated if approved.
 - 1. **Fabric**
 - a. **Galvanizing.** Hot-dip galvanize in accordance with ASTM A 392, Class I.
 - b. **Aluminum Coating.** Aluminum-coat in accordance with ASTM A 491.
 - c. **Alloy Coating.** Coat with zinc-5% aluminum-mischmetal alloy (Zn-5Al-MM) in accordance with ASTM F 1345, Class I.
 - 2. **Posts**
 - a. **Inside and Outside Galvanizing.** Hot-dip galvanize inside and outside in conformance with ASTM F 1083.

- b. **Alloy Coating.** Coat inside and out with (Zn-5A1-MM) in accordance with ASTM F 1043, Class C.

3. Braces

- a. **Galvanizing.** Hot-dip galvanize braces inside and out in conformance with ASTM F 1083.
- b. **Alloy Coating.** Coat inside and outside with Zn-5A1-MM in accordance with ASTM F 1043, Class C.

4. **Fittings, Bolts, and Other Miscellaneous Hardware.** Galvanize all fittings, bolts and miscellaneous hardware in conformance with TxDOT Item 445 “Galvanizing.”

5. **Tension Wire.** Zinc-coated tension wire with a minimum coating of 0.80 oz./sq. ft. or aluminum-coat with a minimum coating of 0.30 oz./sq. ft.

6000.3. EQUIPMENT: Provide the machinery, tools and equipment necessary for proper prosecution of the work. All machinery, tools and equipment used shall be maintained in a satisfactory and workmanlike manner.

6000.4. CONSTRUCTION: Erect temporary chain link fence to the lines and grades established on the plans or as directed by the inspector.

- A. **Clearing and Grading.** Clear all brush, rocks, and debris as necessary and/or directed by the inspector. Follow the finished ground elevations for fencing panels.
- B. **Erection of Posts.** Install posts along open area (10 ft. maximum spacing) and match to existing fence on each side to fully enclose open area.
- C. **Erection of Fabric.** Place the fabric with the cables drawn taut with the turnbuckles. Secure one end and apply enough tension to the other end to remove all slack before making attachments. Cut the fabric and independently attach each span at the pull posts.

Follow the contour of the site with the bottom edge of fabric located approximately 2 in. above the grade. Grade uneven areas so the maximum distance between the bottom of the fabric and ground is 6 in. or less. Fasten fabric at 12 in. intervals to the top and bottom tension wires between posts. When top rail is used, fasten the fabric in the same manner. Use steel wire fabric ties of 9 gauge steel or larger.

Fasten fabric to terminal posts by steel stretcher bars and stretcher bar bands fitted with carriage bolts and nuts of the size and spacing as needed. Use stretcher bars

to fasten end posts, pull posts, and corner posts with stretcher bar bands at intervals of at most 15 in. Attach stretcher bars to terminal posts with 1 in. x 1/8 in. flat steel bands with 3/8 in carriage bolts at intervals up to 15 in.

6000.5. MEASUREMENT: “Temporary Chain Link Fence” of the height specified, will be measured by the linear foot of fence at the bottom of the fabric along the center line of the fence from center to center of end posts. “Temporary Chain Link Fence” shall include all end posts and tension posts, complete in place with all bracing and accessories.

6000.6. PAYMENT: “Temporary Chain Link Fence” measured as prescribed above, will be paid for a at the contract unit price bid per linear foot for “Temporary Chain Link Fence” of the height specified, which price shall be full compensation for furnishing and installing all fencing materials, end posts, tension posts, line posts, caps, tension wires, top rail, and connection fittings and for all manipulation, labor, tools, equipment, and incidentals necessary to complete the work.

6000.7. BID ITEM:

Item 6000.1 – Temporary Chain Link Fence (___ ft. High)

SPECIAL SPECIFICATION

ITEM

6001 WOODEN PRIVACY FENCE

6001.1. DESCRIPTION: *This item shall govern for the removing and replacing of the wooden privacy fence, maximum six feet high, at the locations designated on the plans, and for furnishing and installing any additional materials required as specified by this item.*

6001.2. MATERIALS: All materials furnished shall be equal to or better than the materials of the existing fence unless specifically designated otherwise on the plans. Use only new materials.

Concrete shall be in accordance with Item 300, "Concrete," Class "B". Wood shall be Wolmanized pine, cedar or as specified. The timber shall be sound and free from all decay, shakes, splits or any other defects, which would make it structurally unsuitable for the intended purpose. Post shall be (nominal) 4x4 by 8' cedar. Backer rails shall be nominal 2x4 by 8' pine. Pickets shall be nominal 1x4 by 6' cedar, dog-eared on one end. Fasteners shall be steel common nails

6001.3. EQUIPMENT: Provide the machinery, tools and equipment necessary for proper prosecution of the work. All machinery, tools and equipment used shall be maintained in a satisfactory and workmanlike manner.

6001.4. CONSTRUCTION: Fence shall be erected to lines and grades indicated on the plans.

A. Erection of Posts: Posts shall be set plumb and permanently positioned and anchorages firmly set before fabric is placed. Posts shall be set in concrete, unless otherwise indicated on the Drawings. Concrete footings shall be carried to a depth of 24 inches and width of 12 inches minimum. Where rock is encountered within the required depth to which the post is to be erected, a hole of a diameter slightly larger than the largest dimension of the post may be drilled into the rock and the post grouted in. The regular dimensioned concrete footing as indicated on the Drawings shall then be placed between the top of the rock and required grade indicated on the Drawings. Posts shall be approximately centered in their footings. All concrete shall be placed promptly and compacted by tamping or other approved methods. Concrete shall be finished in a dome and shall be cured a minimum of 48 hours before further work is done on the posts.

B. Erection of Wood Fencing Material: After all posts have been permanently positioned and anchorages firmly set, two (2) backer rails shall be placed and fastened between each post and pickets fastened to the backer rails. No gap shall be present between pickets.

6001.5. MEASUREMENT: The work performed and the materials furnished as prescribed by this item will be paid for at the bid price per linear foot for "Wooden Privacy Fence", which price shall be full compensation for removing and reinstalling the existing fence gate and for furnishing all additional materials, all labor, tools, equipment and incidentals necessary to complete the work. Fence will be measured by the linear foot of fence at the bottom of the fence along the centerline of the fence from center to center of end post. "Wooden Privacy Fence" shall include all posts, backer rails, and pickets, complete in place.

6001.6. PAYMENT: "Wooden Privacy Fence" measured as prescribed above, will be paid for at the

contract unit price bid per linear foot for “Wooden Privacy Fence”. The price shall be full compensation for furnishing and installing all fencing materials, end posts, backer rails, and pickets; digging post holes ‘ furnishing and placing concrete for posts; all hauling and hauling charges; and for all manipulation, labor, tools, equipment, and incidentals necessary to compete the work.

6001.7. BID ITEM:

Item 6003.1 – Wooden Privacy Fence – per linear foot

SPECIAL SPECIFICATION

ITEM

6002 TEMPORARY DRAINAGE STRUCTURES

6002.1. DESCRIPTION: *Provide for temporary drainage during construction. Install structures, pipes, and connections, including excavation and backfilling. Remove temporary structures when no longer needed.*

6002.2. MATERIALS: Furnish materials in accordance with the following:

- Item 300, “Concrete”
- Item 301, “Reinforcing Steel”
- Item 306, “Structural Excavation”
- Item 307, “Concrete Structures”
- Item 401, “Reinforced Concrete Pipe”
- Item 403, “Storm Sewer Junction Boxes and Inlets”
- Item 404, “Corrugated Metal Pipe”
- Item 407, “Concrete Encasement, Cradles, Saddles, and Collars”
- Item 409, “Cast Iron Castings”
- Item 505, “Concrete Riprap.”

6002.3. EQUIPMENT: Provide the machinery, tools and equipment necessary for proper prosecution of the work. All machinery, tools and equipment used shall be maintained in a satisfactory and workmanlike manner.

6002.4. CONSTRUCTION: Before starting work, obtain approval for proposed construction methods. Approval of construction methods and equipment does not relieve the Contractor’s responsibility for safety or correctness of methods, adequacy of equipment, or completion of work in full accordance with the Contract.

Construct precast junction boxes and inlets in accordance with Item 403. Construct cast-in-place junction boxes, inlets, and structures in accordance with Item 403. Install pipe in accordance with Items 401 and 404. Install precast box culverts in accordance with Item 309. Construct cast-in-place box culverts in accordance with Item 307. Install Concrete Riprap in accordance with Item 505.

Construct each temporary drainage structure as indicated in the plans. Layouts depicted in the plans are intended to provide for the temporary conveyance of stormwater in the location shown. Contractor is expected to provide and place the materials necessary to allow the temporary drainage structures to convey stormwater during construction for the duration of the specified construction phase. Pipe and structures connections shall be watertight.

Remove temporary structures when no longer needed.

6002.5. MEASUREMENT: This Item will be measured by each structure, complete in place.

6002.6. PAYMENT: The work performed as prescribed by this item will be paid for at the contract unit price bid per each “Temporary Drainage Structure” which price shall be full compensation for all

excavation, including saw cutting of surfaces as required, reinforced concrete and disposal of material excavated; for furnishing and placing all materials and for all labor, tools, equipment, incidentals necessary to complete the work and removal of such structures when no longer needed.

6002.7. BID ITEM:

Item 6002.1 – Type 1, Inlet (size) and Pipe (size) – per each

Item 6002.2 – Type 2, Headwall and Pipe (size) – per each

Item 6002.3 – Type 3, Headwall and Box Culvert (size) – per each

Item 6002.4 – Type 4, Riprap and Pipe (size) – per each

Item 6002.5 – Type 5, Existing Pipe to New Pipe Connection – per each

Item 6002.6 – Type 6, Existing Box Culvert to New Box Culvert Connection – per each

SPECIAL SPECIFICATION

ITEM

6003 ADJUSTING OF VEHICULAR GATES

6003.1. DESCRIPTION: *This item shall govern for the height adjustment of manual Vehicular Gates made necessary by the construction of new driveway.*

6003.2. MATERIALS: No materials should be needed but if any damage is made to the gates during the adjustment any additional materials furnished shall be equal to or better than the materials of the existing gates unless specifically designated otherwise on the plans.

6003.3. EQUIPMENT: Provide the machinery, tools and equipment necessary for proper prosecution of the work. All machinery, tools and equipment used shall be maintained in a satisfactory and workmanlike manner.

6003.4. CONSTRUCTION: Approval from the property owner shall be obtained by the Engineer, in order to perform the necessary work required. The Contractor shall remove the existing gate from the gate posts, relocate and/or replace (if necessary) the existing hinges at a level such that the gate will provide the necessary clearance to properly operate. In addition, the center rest shall be lowered, if necessary. The gate shall then be reinstalled and shall be operative.

6003.5. MEASUREMENT: Vehicular gates will be measured by each gate that is adjusted.

6003.6. PAYMENT: The work performed and the materials furnished as prescribed by this item will be paid for at the bid price per gate for "Adjusting of Vehicular Gates", which price shall be full compensation for removing and reinstalling the existing gate and for furnishing all additional materials, all labor, tools, equipment and incidentals necessary to complete the work.

6003.7. BID ITEM:

Item 6003.1 – Adjusting of Vehicular Gate at STA 44+54.57 (Ten Bears) – per each

SPECIAL SPECIFICATION

ITEM

6004 UTILITY POLE BRACING

6004.1. DESCRIPTION: *Describes the temporary supports for utility poles at locations directed by the facility operator(s), in order to maintain such poles in their existing upright position without disturbing attached wires and equipment. The Contractor shall provide all labor, material, equipment, insurance, and incidentals required to construct, install and maintain an effective support system that will meet the stated objective.*

6004.2. EQUIPMENT: Provide the machinery, tools and equipment necessary for proper prosecution of the work. All machinery, tools and equipment used shall be maintained in a satisfactory and workmanlike manner.

6004.3. CONSTRUCTION: Where directed by the utility representative, the Contractor shall furnish, install and remove utility pole supports and maintain utility poles. Alternate methods proposed by the Contractor will be permitted if approved by the facility operator.

6004.4. MEASUREMENT: This Item will be measured by number of utility poles supported. The Contractor" will be paid only once for each utility pole supported and maintained regardless of the number of construction operations that have an impact on each pole structure, complete in place.

6004.5. PAYMENT: The work performed as prescribed by this item will be paid for at the contract unit price bid per each "Utility Pole Bracing" which price shall be full compensation for all labor, material, equipment, insurance, and incidentals necessary to furnish, install, maintain and remove utility pole supports to completely support, maintain, protect, and accommodate the integrity of utility poles without disruption of service to customers. Additional cost associated with working around utility pole supports, poles and appurtenances shall be subsidiary to this Item

6004.6. BID ITEM:

Item 6004.1 – Utility Pole Bracing – per each

SPECIAL SPECIFICATION

ITEM

6006 PIPE AND STRUCTURE REMOVAL

6006.1. DESCRIPTION: *Remove existing drainage structures at locations shown on the plans or as directed by the Engineer.*

6006.2. MATERIALS:

A. Pipe. Pipes shall be considered to include existing drainage pipes and conduits which are not to remain in service and of varying depths, materials and condition at the locations indicated on the plans.

B. Structures. Structures will include drainage structures at the locations indicated on the plans whether above or below ground including, but not limited to: headwalls, inlets, grates, catch basins, toe-downs, aprons, and riprap.

C. Hazardous Materials. If the Contractor encounters hazardous substances, industrial waste, other environmental pollutants, underground storage tanks, or conditions conducive to environmental damage, Contractor shall immediately stop work in the area affected and report the condition to the Owner's representative in writing. Contractor shall not be responsible for or required to conduct any investigation, site monitoring, containment, cleanup, removal, restoration or other remedial work of any kind or nature (the "remedial work") under any applicable level, state or federal law, regulation or ordinance, or any judicial order. If the Contractor agrees in writing to commence and/or prosecute some or all of the remedial work, all costs and expenses, to include any extension of the contract time, of such remedial work shall be paid by Owner to Contractor as additional compensation.

6006.3. EQUIPMENT: Provide the machinery, tools and equipment necessary for proper prosecution of the work. All machinery, tools and equipment used shall be maintained in a satisfactory and workmanlike manner.

6006.4. CONSTRUCTION: The existing pipe and structures shall be broken up, removed, and disposed of by the Contractor in accordance with federal, state, and local regulations. Remove pipes and structures in proper sequence to maintain traffic and drainage.

6006.5. MEASUREMENT: This Item will be measured by each structure at the location indicated, removed completely.

6006.6. PAYMENT: The work performed as prescribed by this item will be paid for at the contract unit price bid per each "Pipe and Structure Removal" at the location indicated, which price shall be full compensation for all work herein specified, including the furnishing of all materials, equipment, labor, and incidentals necessary to complete the work.

6006.7. BID ITEM:

Item 6006.1 – Pipe and Structure Removal at Station 02+98 (Complete) – per each

Item 6006.2 – Pipe and Structure Removal at Station 18+15 (Complete) – per each

Item 6006.3 – Pipe and Structure Removal at Station 22+30 (Complete) – per each

Item 6006.4 – Pipe and Structure Removal at Station 31+80 (Complete) – per each

Item 6006.5 – Pipe and Structure Removal at Station 36+83 (Complete) – per each

Item 6006.6 – Pipe and Structure Removal at Station 49+34 (Complete) – per each

Item 6006.7 – Pipe and Structure Removal at Station 55+92 (Complete) – per each

SAN ANTONIO WATER SYSTEM
SPECIAL SPECIFICATIONS

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ITEM NO. 3000 SPECIFICATIONS FOR HANDLING ASBESTOS CEMENT PIPE

INTRODUCTION

This item shall govern the uncovering, dislodging, handling, removing, transporting, and disposing of asbestos cement (AC) pipe and other asbestos containing materials (ACM). AC pipe is also known as transite pipe. AC pipe typically contains from 15% to 20% chrysotile and crocidolite asbestos and is considered to be an asbestos-containing material. The disturbance and/or removal of this material is governed by the National Emissions Standards for Hazardous Air Pollutants (NESHAP) 40 Code of Federal Regulations (CFR) 61; by the Occupational Safety and Health Administration (OSHA) 29 CFR 1926.1101; the State of Texas Occupation Code, Chapter 1954 and Health and Safety Code Chapters 361 and 363; and the Texas Administrative Code (TAC), 25 TAC Chapter 295 and 30 TAC Chapter 330.3 and 330.171. The material is classified by definition under 40 CFR 61, Subpart M, Section 61.141 as Category II, non-friable ACM, unless, when dry, it can be crumbled, pulverized, or reduced to powder by hand pressure. At that time, it becomes classified as regulated ACM (RACM) and subject to regulation under Subpart M. It is the intent of this specification to define procedures that maintain the AC pipe in an intact state. Contractors shall not use procedures that subject the AC pipe to forces that will crumble, pulverize, or reduce to powder the AC pipe. By using procedures that have a low to no probability of fiber release, the pipe retains its classification as Category II, non-friable ACM. These procedures will protect workers from the health risk associated with airborne asbestos.

References to the City of San Antonio (COSA) pertain only to those joint bid projects, where joint jurisdiction occurs due to the contract's binding agreement. Definitions used and incorporated as part of this specification are located in Appendix One. Applicable standards and guidelines used and incorporated as part of this specification are located in Appendix Two.

3000.1 DESCRIPTION

This item shall consist of the uncovering, dislodging, handling, removing, transporting, and disposing of AC pipe, joints, wrappings and other ACM. To comply with NESHAP and OSHA requirements, this project will require workers trained in using wet technique procedures to dislodge and remove AC pipe, AC pipe joints, valves (any type) containing ACM, and any surrounding soils that may contain ACM. The Contractor shall develop an Asbestos Removal Work Plan, herein referred to as "the Plan", (see Appendix Three, Example Procedures) that provides specific and detailed procedures they and/or any of their subcontractors will follow to maintain the AC pipe in an intact state. The Plan shall specify the wet techniques to be followed when the pipe collars are dislodged. The Plan shall include procedures/actions to be followed if the intact AC pipe becomes broken and the possibility exists of asbestos fibers becoming airborne. By regulatory definition, if and when the pipe and/or collar are broken, they become a regulated ACM (RACM) and subject to NESHAP. The Plan shall state or reference procedures in the contractor's Safety and health program document that they will follow to comply with the federal OSHA asbestos standard. Finally, the Plan shall contain provisions for the

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environmentally compliant disposal of the intact AC pipe and any RACM created during the removal process. The Plan shall be provided to the San Antonio Water System (SAWS) at the pre-construction (pre-con) meeting for its review and approval prior to initiating uncovering operations to verify the contractor has met the contractual requirements. No handling and disposing of SAWS AC pipe will begin without approval from SAWS. Any ACM encountered that is not SAWS pipe and not previously identified by SAWS or shown on SAWS plans will be not be authorized for disposal payment. Preparation and submission of the Plan shall be considered subsidiary to the work required and no direct payment will be made.

If the project is joint bid with COSA, the Plan shall also be submitted to COSA Environmental representatives for their review and approval, as required. The Contractor shall comply with the COSA and any other agencies requirements. Any uncovering, dislodging, handling, or disposing of AC pipe and associated written handling and removal plans, such as an abatement plan, required by another agency will be paid for by that agency using their specification/bid item number. Again, no handling and disposing of SAWS AC pipe will begin without approval from SAWS.

To meet and/or exceed NESHAP and OSHA guidelines, the contractor may subcontract the AC pipe handling plan and work to an Environmental Protection Agency (EPA) accredited and Texas Department of State Health Services (DSHS) licensed asbestos abatement contractor, DSHS licensed asbestos consultant, and DSHS air monitoring technician.

NESHAP guidelines apply to facility projects in which the combined amount of regulated asbestos containing material (RACM) is at least 260 linear feet (LF) or 35 cubic feet or 160 square feet. This means that if the combined amount of RACM is at least 260 linear feet of the AC pipe, including AC collars, and it is expected to become or becomes crumbled, pulverized, or reduced to powder, then the project is subject to the NESHAP provisions of reporting and asbestos emission control paragraphs in 40 CFR Section 61.145. If the DSHS RACM limit of 260 LF is exceeded, the contractor is responsible for any DSHS administrative fees and fines. The contractor shall be responsible for submitting the DSHS notification with copies to SAWS and COSA Environmental Division for joint bid projects.

If the scope of the project may involve the threshold amount (260 linear feet or greater), a Demolition/Renovation Notification Form will be sent to DSHS by the Contractor. This form shall be post-marked no later than 10 working days prior to the start of any asbestos handling work.

All projects involving AC pipe require that NESHAP and OSHA standards are met and/or exceeded. The contractor shall perform all work in a manner that meets or exceeds those standards. The contractor shall have and follow a written Plan that describes their detailed handling and disposal procedures of the AC pipe. The contractor shall submit copies of the Plan to SAWS for review and approval and for joint bids, COSA Environmental representatives, as required. OSHA requires that during any ACM disturbance, regardless of amount, the asbestos worker(s) shall be protected from potential airborne asbestos exposure in excess of the permissible exposure limit or excursion limit as stipulated in 29 CFR 1926.1101.

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MEASUREMENT

3000.2 SUBMITTALS AND NOTICES

- A. At the Pre-construction Conference/Meeting the following shall be submitted for review and approval to SAWS, and when applicable COSA Environmental representatives, as required:
1. The Plan in accordance with: NESHAP, OSHA, this Special Specifications, Item Number 3000, and State requirements. The number of copies submitted of the Plan is the same as the number of copies required under other bid submittal requirements with one copy being submitted electronically. The work plan shall provide detailed procedures for retaining the AC pipe's Category II, non-friable NESHAP classification. The contractor shall incorporate working with ACM and complying with mandated OSHA requirements for Class II, asbestos work in their project specific Safety and Health Plan. The guidance provided in these special specifications is not intended and does not constitute an asbestos abatement project design as described under 25 TAC, Chapter 295.
 2. Submit proof satisfactory to SAWS, and as applicable, COSA Environmental representatives, that required permits, site location, and arrangements for transport and disposal of asbestos containing waste material (ACWM) have been made that meet Texas environmental statutes and regulations. Include the name of the transporter, their Texas asbestos transporter license number, and the name of the approved landfill where the AC pipe and ACM waste will be buried.
- B. During Asbestos Handling and Disposal Activities: Submit copies to SAWS and if applicable, COSA Environmental representatives of all transport manifests, trip tickets, and disposal receipts for all ACWM removed from the work area during the project. The Contractor will sign manifests as the SAWS's representative (generator) for the AC pipe and provide copies to the SAWS Construction Inspection Department for final payment.

3000.3 CONSTRUCTION REQUIREMENTS

- A. The Work includes all work specified herein, to include mobilization and demobilization, labor, materials, overhead, profit, taxes, transportation, disposal fees, administrative fees, and incidental cost. Estimating areas, quantities, and weight are the sole responsibility of the Contractor.
- B. The Contractor shall remove and double bag with 6-mil polyethylene sheeting to yield a total of at least 12-mil, the asbestos pipe in the trench or immediately when it comes out of the trench, seal, label, transport, and dispose of all Category II non-friable ACM and RACM in compliance with applicable current Federal, State and local regulations, laws, ordinances, rules, standards and regulatory agency recommended requirements.
- C. The Contractor shall notify SAWS and, if applicable COSA representatives, at least 72 hours prior to beginning uncovering, dislodging, handling, and removing the AC pipe. AC pipe uncovering, dislodging, handling, and/or removing shall be conducted during regular business hours, 8 a.m. to 5 p.m., Monday-Friday. No uncovering, dislodging, handling, and or removing of AC pipe outside of the normal business

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hours or during the weekend is allowed unless special circumstances require the contractor to do so and the work has been approved in writing at least 72 hours before the commencement of the work.

- D. Time is of the essence in removing the ACM from the project area. All work must be completed within the time period specified in the contract. SAWS, and if applicable COSA representative will be responsible for coordinating this work in high-density areas, such as schools, church facilities, and residential areas.
- E. All notifications required to state regulatory agencies will be made by the Contractor with copies provided to SAWS and as applicable, COSA representatives, including but not limited to the DSHS Demolition/Renovation Notification Form. If 260 linear feet or greater of RACM pipe will become crumbled, pulverized, or reduced to powder, the project is subject to NESHAP regulations and a Demolition/Renovation Notification Form will be sent to DSHS by the Contractor. This form will need to be post-marked no later than 10 working days prior to the start of any asbestos disturbance.
- F. The Contractor shall have an on-site supervisor, who is an OSHA Competent Person, present on the job site at all times that the AC pipe work is in progress. This supervisor shall be thoroughly familiar with and experienced at asbestos pipe handling using wet techniques and shall be familiar with and shall enforce the use of all safety procedures and equipment. He/she shall be knowledgeable of all applicable EPA, OSHA, and DSHS asbestos requirements and guidelines.
- G. The Contractor has: sole and primary responsibility for the “means and/or methods” of the work; an obligation to SAWS to inspect all stages of the work; and sole responsibility to supervise the performance of the work. Certain work practices for AC pipe disturbance are prohibited as per Section 3000.5.C.
- H. The Contractor shall be responsible for site safety and for taking all necessary precautions to protect the Contractor’s, SAWS, and COSA personnel and the public from airborne asbestos exposure and/or injury. The Contractor shall be responsible for maintaining the integrity of the work area.
- I. The Contractor shall confine operations at the site to the area requiring interface with the AC pipe and the general site area in close proximity to the project. The Contractor will not unreasonably encumber the site with materials or equipment. If ACWMs are required to be stored overnight in a secured area, the waste material and waste containers shall be labeled according to OSHA and EPA, and the State of Texas requirements, & containerized to preclude unauthorized disturbance of the ACWMs.
- J. The Contractor shall be responsible for obtaining and coordinating waste disposal and transport of ACWM to a Texas Commission on Environmental Quality (TCEQ) permitted asbestos waste landfill. Waste manifests shall be generated for the transport of the AC pipe and ACWMs from the project site to the landfill disposal site. The Contractor will sign the manifests as the SAWS’s representative (generator) for the AC pipe and provide copies to the SAWS Construction Inspection Department for final payment.

3000.4 SITE SECURITY

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The Contractor shall demarcate the area of AC pipe interface (“regulated area”) with barrier tape and warning signs, per OSHA regulation 29 CFR 1926.1101. Access to the regulated area will be limited to authorized personnel and visitors. The contractor shall identify in their site specific safety and health plan how they intend to limit access and who is authorized to be in the demarcated area.

3000.5 AC PIPE HANDLING

- A. General: Any project involving AC pipe, the Contractor shall comply with OSHA standards and shall develop a Safety and Health Plan that complies with SAWS Specification 902, Construction Safety and Health Program requirements.
- B. The Contractor shall uncover, dislodge, handle, remove, transport, and dispose of all AC pipe specified in the SAWS bid documents/plans for this project using wet technique procedures. All work involving AC pipe and other ACM products must be addressed in the Plan. The Contractor shall take precautions to prevent damage to adjacent structures and material/finished material not required for AC pipe handling.
- C. Prohibited Work Practices and Engineering Controls: Contractors shall not use procedures that subject the AC pipe to forces that will crumble, pulverize, or reduce to powder the AC pipe. The following work practices and engineering controls shall **not** be used for work related to AC pipe or for work which disturbs ACM, regardless of asbestos exposure or the results of Initial Exposure Assessments:
1. High-speed abrasive disc saws and sanders not equipped with point of cut ventilator or enclosures with HEPA filtered exhaust air.
 2. Carbide-tipped cutting blades.
 3. Electrical drills, chisels, and rasps used to make field connections in AC pipe.
 4. Shell cutters used to cut entry holes in AC pipe.
 5. A hammer and chisel without using wet techniques to remove pipe connections.
 6. Compressed air used to remove asbestos or material containing asbestos.
 7. Dry sweeping, dry shoveling, or other dry clean-up of dust and ACM debris.
 8. Employee rotation as a means of reducing employee exposure to asbestos.
- D. General Removal Work Practices: See Appendix Three for an example of the detailed general work practices a contractor could use in preparing an Asbestos Removal Work Plan. If the contractor uses the example, they must expand upon the provisions in the appendix to describe its specific procedures. The appendix is provided for illustrative purposes only. If the contractor employs this example, SAWS requires greater site specific detail to be included in the Plan submitted for approval.
- E. Disposal bags for RACM shall be 6-mil polyethylene and labeled as required by EPA regulation 40 CFR 61.150 (a)(1)(iv) or OSHA requirement 29 CFR 1926.1101(k)(8).
- F. Stick-on labels identifying the generator’s name (SAWS) and address and the project site location shall be applied to any asbestos waste disposal bag that contains RACM, as per EPA or OSHA and Department of Transportation requirements.
- G. Abandonment of AC water mains/pipes:

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1. The Contractor is responsible for isolating the existing mains to remain in place by capping, plugging and blocking as necessary. The opening of an abandoned AC water main and all other openings or holes shall be blocked off by manually forcing cement grout or concrete into & around the openings in sufficient quantity to provide a permanent watertight seal. Abandonment of AC water mains will be considered subsidiary to the work required, & no direct payment will be made.
2. Abandonment of Valves that contain ACM: Valves to be abandoned in the execution of the work shall have the valve box and extension packed with sand to within eight inches (8") of the street surface. The remaining eight inches (8") shall be filled with 3,000 psi concrete or an equivalent sand-cement mix and finished flush with the adjacent pavement or ground surface. The valves covers shall be salvaged & returned to SAWS. The abandonment of valves containing ACM will be considered subsidiary to the work required, & no direct payment will be made.
3. Verification of Removal & Clean-up Procedures: The Contractor's on-site Competent Person shall inspect the work area, verify, and certify that no residual AC pipe fragments and debris remain.

H. Disposal Procedures: Submit copies to SAWS Environmental Division and, if applicable COSA Environmental representatives, of all transport manifests, trip tickets, and disposal receipts for all asbestos waste materials removed from the work area during the project. The Contractor will sign manifests as the SAWS representative (generator) for the AC pipe and provide copies to SAWS Construction Inspections for final payment.

3000.6 Payment

The work performed as prescribed by these items shall be paid at the line item price bid, per each work order, for "Removal, Transportation, and Disposal," which price shall be full compensation for the work herein specified including the furnishing of all materials, equipment, tools and for the material disposal, submittals, and labor necessary to complete the work. One Asbestos Removal Work Plan (see Appendix Three) for the entire contract to generally cover all work orders shall be submitted to SAWS for review and approval. No payment will be made for the Plan. If a site specific asbestos removal work plan is additionally required at the discretion of SAWS, it will be incidental to the removal, transportation, and disposal of AC pipe, and no separate payment will be made.

3000.7 Bid Item - Removal, Transportation, and Disposal

Removal, Transportation, and Disposal – Per each work order.

STANDARD PLAN NOTE:

Asbestos Cement (AC) pipe, also known as transite pipe, contains asbestos-containing material (ACM) and is located within the project limits. Special waste management procedures and health and safety requirements are applicable when handling, removing, and disposing of this pipe. Payment for such work is to be made under Special Specification Item No 3000, "Special Specification for Handling Asbestos Cement Pipe".

Appendix One

DEFINITIONS

As used anywhere in Item No. 3000, Specifications for Handling Asbestos-Cement Pipe, including all appendices, the following shall be defined to mean:

- A. Amended Water – Water to which a surfactant (wetting agent) has been added to increase the ability of the liquid to penetrate ACM.
- B. Approval – Means the SAWS contract requirements have been met but does not mean that the SAWS stipulates any written documents adequately comply with federal and state occupational safety and health regulatory requirements.
- C. Asbestos – A group of naturally occurring silicate minerals and includes chrysotile, amosite, crocidolite, tremolite asbestos, anthophyllite asbestos, actinolite asbestos, and any of these minerals that has been chemically treated and/or altered.
- D. Asbestos Containing Material (ACM) – Material or products that contain more than 1.0% of any kind of asbestos.
- E. Asbestos Containing Waste Material (ACWM) – Asbestos containing material or asbestos contaminated objects requiring disposal.
- F. Authorized Personnel – Any person authorized by the Contractor and required by work duties to be present in the regulated area.
- G. Authorized Visitor – SAWS representatives, and any representative of a regulatory or other agency having jurisdiction over the project.
- H. Asbestos Consultant – A person licensed by the Texas Department of State Health Services to perform the following asbestos abatement related functions in public buildings:
 - (1) Project design; (2) Asbestos surveys and condition assessment of ACM; (3) Asbestos Management Planning; (4) The collection of bulk material samples, airborne substance samples and the planning of sampling strategies; (5) Owner-representative services for asbestos abatement projects or O&M programs, including air monitoring and project management; (6) Consultation regarding regulatory compliance and all aspects of technical specifications and contract documents; and (7) The selection, fit testing, and appropriate use of personal protection equipment & the development of asbestos related engineering controls.
- I. Abatement Contractor – The company, agency, or entity licensed by the Texas Department of State Health Services that has been retained to perform asbestos abatement and other associated functions.
- J. Class II Asbestos Work (OSHA Standard) – Activities involving the removal of ACM, which is not thermal system insulation or surfacing material. This includes, but is not limited to, the removal of asbestos containing wallboard, floor tile and sheeting, roofing and siding shingles, and construction mastics.

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- K. Competent Person – An individual who is capable of identifying existing asbestos hazards in the workplace, can select the appropriate control strategy for asbestos exposure, and who has the authority to take prompt corrective measures to eliminate them.
- L. Friable Asbestos – Asbestos containing material, that when dry, can be crumbled, pulverized, or reduced to powder by hand pressure and includes previously non-friable material that has become damaged to the extent that, when dry, it may be crumbled, pulverized, or reduced to powder by hand pressure.
- M. NESHAP – The National Emission Standards for Hazardous Air Pollutants (40 CFR Part 61).
- N. OSHA – The Occupational Safety and Health Administration.
- O. Regulated Area – An area established by the Contractor or employer to demarcate areas where asbestos work is conducted and any adjoining area where debris and waste from such asbestos work accumulate; and an area within which airborne concentrations of asbestos exceed or there is a reasonable possibility they may exceed the permissible exposure limit.
- P. Regulated Asbestos Containing Material (RACM) – (1) Friable asbestos material; (2) Category I non-friable ACM that has become friable; (3) Category I non-friable ACM that will be or has been subjected to sanding, grinding, cutting, or abrading; or, (4) Category II non-friable ACM that has a high probability of becoming or has become crumbled, pulverized, or reduced to powder by forces expected to act on the material in the course of the demolition or renovation operations regulated by 40 CFR Part 61, Subpart M.
- Q. Staging area – A pre-selected area where wrapped or containerized asbestos containing waste material will be placed prior to removal from the project site.
- R. Surfactant – A chemical wetting agent added to water to improve penetration.
- S. Uncovering operations – The use of mechanical, pneumatic, and/or manual procedures that disturb the material and/or soil above and/or around the AC pipe that would expose personnel to the AC pipe.

Appendix Two

APPLICABLE STANDARDS AND GUIDELINES

All work under these specifications shall be done in strict accordance with all applicable Federal, State, and local regulations, standards, and codes governing asbestos disturbance, handling, removal and disposal. Work activities shall also comply with SAWS and City of San Antonio Specifications related to safety and health.

The most recent edition of any relevant regulation, standard, or code shall be in effect. Where there is a conflict between the regulations, standards, codes, and/or these specifications, the most stringent requirements shall apply.

As a minimum, the Contractor shall comply with the applicable portions of the following:

- A. Occupational Safety and Health Administration (OSHA) including but not limited to:
 - 1. Title 29 Code of Federal Regulations (CFR) Section 1926 – Safety and Health Regulations for Construction
 - 2. Title 29 CFR Section 1926.1101 – Safety and Health Regulations for Construction - Asbestos.
 - 3. Title 29 CFR Section 1910.134 – Occupational Health and Safety Standards - Respiratory Protection.
 - 4. Title 29 CFR Section 1910.1020 – Occupational Health and Safety Standards - Access to Employee Exposure and Medical Records.
 - 5. Title 29 CFR Section 1910.1200 – Occupational Health and Safety Standards - Hazard Communication.
- B. Environmental Protection Agency (EPA) including but not limited to:
 - Title 40 Code of Federal Regulations Part 61 Subpart M – National Emission Standard for Asbestos.
- C. Texas Statutes, including but not limited to:
 - 1. Occupation Code, Chapter 1954, Asbestos Health Protection
 - 2. Health and Safety Code Chapters 361 and 363, Solid Waste
- D. Texas Administrative Code including but not limited to:
 - 1. Department of State Health Services, Title 25, Chapter 295, Subchapter C – Texas Asbestos Health Protection.
 - 2. Texas Administrative Code, Title 30, Chapter 330 Municipal Solid Waste.
- E. Department of Transportation – Hazardous Materials Regulations 49 CFR, Parts 170 – 180.
- F. SAWS Specification 902 Safety and Health Program

Appendix Three

Example of Procedures for Handling SAWS AC Pipe

The following is an example of procedures for handling SAWS AC pipe. A contractor could use them as a basis for preparing an Asbestos Removal Work Plan. The contractor must expand upon the provisions of this appendix to describe its specific procedures. This appendix is provided for illustrative purposes only. The contractor is required to develop a site specific Asbestos Removal Work Plan that complies with the provisions of this specification. If the contractor employs this example, SAWS will require greater site specific detail to be included in the plan submitted for approval.

Scope of Work: Describe the work and be specific as to the intended involvement with the existing AC pipe. For example: abandoning/removing X feet of AC pipe; tying into a section of an existing waterline and replacing one section (X feet) of pipe to make the connection; or connecting into an existing section of AC pipe by tapping into the AC pipe.

1. Excavation to pipe

- Excavate to within X inches/feet of the section of AC pipe to be replaced/removed. Depending upon the depth of the excavation, shoring may be needed following company procedures (provide or reference those procedures).
- Once the pipe is located, excavate (by machine or hand) on one/both sides of the pipe to expose the collars and pipe. Dig the earth from around the collars by hand to create a clearance space completely around the collar. **DO NOT SCRAPE OR ABRASE THE PIPE WITH THE EXCAVATION DEVICE(S).**
- Set up pumps to evacuate any residual water when the AC pipe is dislodged.

2. Wet method use

- Make the amended water solution by mixing 1 ounce of a liquid detergent (Dawn, Joy, other) with 2 to 3 gallons of water in a 2 to 3 gallon mist sprayer. Other size sprayers may be used.
- Wet each portion of the pipe, normally just the collar, to be removed with the amended water (water/soap) solution.
- Use the mist sprayer to produce a “mist” application and continuously wet the collars throughout the wrapping, cracking, and removal process. A worker shall be assigned to and is responsible for this procedure during the entire dislodging process.

3. Only cracking AC pipe collars is approved

- Wrap wet towels/burlap/other defined absorbent material around the collar. Wrap the collar with at least two layers of 6-mil polyethylene sheeting to provide a total of at least 12-mil. It is recommended that additional poly be used on the collars to minimize possible tearing of the plastic.

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- Place another layer of wet towels/burlap/ other defined absorbent material on the wrapped collar.
- Use the flat head end of a sledgehammer to crack the collar while continuously “misting” the collar. Strike the collar on the side of the section of pipe to be removed to prevent the remaining section of pipe from being broken.
- Put all of the pieces of collar into a 6-mil polyethylene waste bag. Look for small pieces that may have been generated during the cracking process, wet them, and place them in the waste bag.

NOTE: When the collars are cracked and removed from a shutdown waterline, residual water may drain from the dislodged AC pipe. Follow company safety procedures to control the water (provide or reference those procedures).

4. Double bag all AC waste materials

- All visible AC pipe materials including collars, towels, rubber gloves, gaskets, and other items suspected of containing asbestos shall be double bagged using two (2) 6-mil AC waste bags. The inner bag contents shall be mist sprayed with amended water or mixed with water from the trench prior to closing to maintain the contents wet. Close the bag when it is half full by twisting the top of the bag and sealing with moisture resistant tape.
- If the asbestos waste bag is small enough, it may be placed inside the section of intact pipe before the pipe is wrapped in at least two layers of 6-mil poly. If placing the waste bag inside the pipe, do not force it causing it to tear.

5. Removal of pipe and waste bag from trench

- All sections of “intact” pipe shall be wrapped in a minimum of two (2) layers of 6-mil poly sheets (12-mil total) while in the trench and lifted out of the trench using only nylon slings. If the trench contains water, the pipe shall be lifted out of the trench using only nylon slings and placed on a minimum of two (2) layers of 6-mil poly sheets (12-mil total) on the ground next to the trench.
- Wrap each pipe segment in at least 12-mil of poly and secure with tape.
- Lift the ACM waste bag(s) from the trench and move it/them to a secure location to prevent accidental contact with the bag(s) that would cause it/them to tear.

NOTE: Any valves, bends, tees, fittings, or other items that have AC pipe connected shall be wrapped whole as required with the same minimum total of 12-mil of poly material.

6. AC Pipe and Waste Storage/Transfer

- Wrapped AC pipe and ACM waste bags shall be stored in a secure area away from traffic that could damage the wrapped pipe and/or waste bags while awaiting transport to the permitted landfill.
- If daily transport to a permitted landfill cannot be provided, a roll-off type dumpster/disposal container may be used to hold only the wrapped AC pipe and bagged RACM waste to prevent damage to the wrapping.

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- DO NOT TOSS THE PIPE OR WASTE BAGS INTO THE ROLL-OFF OR DISPOSAL CONTAINER.
 - DO NOT MIX SPOILS WITH THE AC WRAPPED PIPE AND AC WASTE.
- All wrapped or bagged materials shall be moved to the AC pipe/waste fenced holding area for storage. If a roll-off or other type disposal container is used, place the wrapped pipe and waste bags in the roll-off/container using methods that do not cause the wrapping/bagging to be torn.
 - Any bagged or wrapped materials that are torn in handling shall be mended and taped. If the tear is too extensive for a simple tape repair, wrap/bag with an additional equivalent of 12-mil minimum thickness of poly wrap/bagging.

7. AC Pipe and Waste Disposal

The wrapped AC pipe and ACM bagged waste shall be transported to an approved AC waste landfill with the manifests being generated at the time of transfer. Include the name of the transporter, their Texas asbestos transporter license number, and the name of the permitted landfill where the AC pipe and ACM waste will be buried.

**CPS ENERGY
REQUIREMENTS AND SPECIFICATIONS
FOR CONSTRUCTION OF
NATURAL GAS DISTRIBUTION FACILITIES
ON THE
GOLIAD RD. – SE MILITARY TO 410 ACCESS RD.**

CPS Energy

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**CPS ENERGY
EXHIBIT GAS-1**

ADDITIONS TO THE PROJECT BID DOCUMENTS

1. MINIMUM REQUIREMENTS FOR BIDDING ON CPS WORK

A. Contractor used for the gas pipeline work must have performed utility gas pipeline work within the past (3) three years of similar technical scope and magnitude as the services to be performed under this contract. With their bid, Contractor shall provide evidence of qualifications in this regard and of any licenses, permits or registrations possessed that pertain to the services or are required in the specifications. Contractor may contact CPS Energy prior to the letting of this project to determine if their previous experience meets this requirement.

B. The Contractor shall have a program complying with 49 CFR Part 199, "Control of Drug Use in Natural Gas, Liquefied Natural Gas, and Hazardous Liquid Pipeline Operations" and 49 CFR Part 40, "Procedures for Transportation Workplace Drug and Alcohol Testing Programs" to test employees for the presence of prohibited drugs as prescribed and to provide an employee assistance program. The Contractor agrees to provide CPS Energy with an affidavit prior to the date of execution of the Contract which states that Contractor and its employees have complied with all applicable laws, statutes, and regulations pertaining to ensuring a drug free workplace including, but not limited to, the requirements of Part 199 and Part 40. Furthermore, the Contractor agrees to allow CPS Energy Human Resources personnel periodic on-site access to Contractor's records documenting compliance with Part 199 and Part 40. Contractor will provide the name and contact person for the agency or consortium used by the Contractor to comply with this requirement prior to the date of execution of the Contract.

C. The Contractor agrees to provide CPS Energy with an affidavit prior to the date of execution of the contract which states that Contractor and its employees have complied with all applicable laws, statutes, and regulations pertaining to ensuring a drug free workplace including, but not limited to, the requirements of 49 CFR as amended by the Research and Special Programs Administration (RSPA).

D. CPS Energy requires the following to verify Contractor and Sub-Contractor compliance with all applicable laws, statutes and regulations pertaining to the qualification of pipeline personnel including, but not limited to the applicable requirements of 49 CFR Part 192 – Subpart N -“Qualification of Pipeline Personnel” as adopted by the Railroad Commission of Texas (RCC) within the Pipeline Safety Rules.

1. ***A Notarized Affidavit* that states the company placing the bid and its sub-contractors are in compliance with 49 CFR 192 and RRC Pipeline Safety Rules pertaining to the qualification of pipeline personnel.**

- 2. A current copy of its Operator Qualification Plan, unless currently on file, and approval of its plan by a CPS Energy Gas Operation's Representative. A copy of CPS Energy Covered Tasks is shown in Exhibit Gas-7 - CPS Energy Covered Tasks Regulated by 49 CFR Part 192.**
- 3. Current listing of employees and qualifications.**

E. The Contractor shall submit a copy of SMWBA Form 101 to CPS Energy prior to date of execution of the contract.

F. Prospective Contractors bidding on the Project shall submit to CPS Energy through Bexar County a properly executed Certificate of Insurance from its insurance agent or carrier of such insurance coverages as required and set forth in the Project Contract Documents prior to award of the contract. Failure to provide proof of insurance will result in the Contractor not being approved for award of the CPS Energy utility work on the Project.

ADDITIONS TO THE PROJECT CONTRACT DOCUMENTS

1. DEFINITION OF TERMS

Add to the City of San Antonio Article I. Contract Definitions:

49. CPS – CPS Energy Board, a municipal agency of the City of San Antonio.

2. LAWS TO BE OBSERVED

The Contractor shall make himself familiar with and at all times shall observe and comply with all Federal, State, and local laws, ordinances, and regulations which in any manner affect the conduct of the work and shall indemnify and save harmless CPS Energy and its representatives against any claim arising from the violation of any such law, ordinance, or regulation, whether by himself or by his employees.

3. PERMITS, LICENSES AND TAXES

The Contractor and his subcontractors shall procure all permits and licenses, pay all charges, fees, and taxes, and give all notices necessary and incident to the due and lawful prosecution of the work and upon request by the City Engineer give evidence of the same.

4. RESPONSIBILITY FOR DAMAGE CLAIMS

The Contractor agrees to indemnify and save harmless CPS Energy, its agents, and employees from all suits, action or claims and from all liability and damages for any and all injuries or damages sustained by any person or property of any character in consequence of any neglect in the performance of the contract by the Contractor and from any claims or amounts arising or recovered under the "Workers' Compensation Laws"; Chapter 101, Texas Civil Practice and Remedies Code (Texas Tort Claims Act), or any other laws. He shall further so indemnify and be responsible for all damages or injury to property of any character occurring during the prosecution of the work to the extent resulting in whole or in part from any act, omission, neglect or misconduct on his part in the manner or method of executing the work; or from failure to properly execute the work; or from defective work or materials purchased by Contractor, except those claims for damages caused solely by the negligence of CPS Energy. Contractor shall not be released from these responsibilities until all claims have been settled and suitable evidence to the effect furnished to CPS Energy. The indemnification provided herein shall survive the termination of this Contract.

5. CONTRACTOR REQUIREMENT

A. The Contractor shall abide by the regulations promulgated in 49 Code of Federal Regulations Part 40 and 49 Code of Federal Regulations Part 199 and any modifications thereto listed below in this Article. CPS Energy will require such compliance to be a part of this Contract and will immediately terminate this Contract if Contractor is found to not be in compliance with said regulations. Contractor shall indemnify CPS Energy against any fines, penalties, damages, costs or attorney fees based upon any violation by Contractor of the same.

B. The Contractor shall abide by the regulations promulgated by the Federal Highway Administration (FHWA) which states that contractors subject to FHWA mandates shall be in compliance with those parts of 49 Code of Federal Regulations (CFR) which relate to the illegal use of alcohol and controlled substances.

6. PROSECUTION AND PROGRESS

All workers or subcontractors employed by the Contractor shall have such skill and experience as will enable them to properly perform the duties assigned them.

7. WARRANTY

The Contractor shall warrant all components, materials and workmanship for a period of at the least one (1) year from the date of final completion of gas pipeline work by Contractor. The Contractor warrants the title and guarantees the equipment, materials and workmanship furnished under this Contract to be specified and to be free from defects in design, workmanship and materials. If within the warranty period the work fails to meet the provisions of this guarantee, CPS Energy shall notify the Contractor thereof immediately and the Contractor shall promptly correct any defects, including nonconformance with the Contract Documents, by adjustment, repair or replacement F.O.B. the Project site of all defective work at its sole costs.

8. INSURANCE

The Contractor agrees to keep in full force during the performance of services hereunder insurance sufficient to fully protect CPS Energy from all damages, claims, suits and/or judgements, caused or claimed to have been caused by or in connection with the performance or failure to perform any services undertaken by Contractor, his subcontractor, or their agents, or employees.

9. COORDINATION

All questions about the gas construction shall be addressed to Brad Carr, CPS Energy Gas Construction, at (210) 353-4251. Design and engineering questions may be addressed to the CPS Energy Gas Engineering Division, Civic Improvements Section, at (210) 353-2430.

**CPS ENERGY
EXHIBIT GAS-2
SPECIFICATIONS FOR CONSTRUCTION OF
NATURAL GAS DISTRIBUTION FACILITIES**

1. GENERAL

The work to be done includes mobilization and clearing right-of-way where necessary; receiving, transporting and unloading all materials from a designated CPS Energy center; stringing pipe, welding steel pipe and pipe fittings, and fusing high density polyethylene gas pipe and pipe fittings; excavating trenches and ditching for the burial of the gas piping facilities; installation of gas piping into the excavation along with required appurtenances such as anodes, anodes lead wires, and tracer wires; backfilling of ditches, repair of damage to any street, road, highway, sidewalk, drainage structures, driveways, signs, other utilities, fencing, or other existing structures; clean-up of right-of-way and any other item enumerated in these specifications.

The work shall conform with Title 49 of the Code of Federal Regulations, Part 192, "Transportation of Natural and Other Gas by Pipeline: Minimum Federal Safety Standards" and to the CPS Energy design standards attached to this document as Exhibits GAS-3 and GAS-4, as applicable.

2. ROUTE OF THE GAS LINE

Construction of the gas line will, in general, follow the route shown on Exhibit GAS-6 (CPS Energy Job Sketch). Gas services to be installed, relocated or adjusted are also indicated on Exhibit GAS-6, as applicable.

CPS Energy reserves the right to make any changes in the routing which may be deemed necessary and such changes shall in no manner alter the terms or compensations payable under this contract except as they are affected by linear measurements of work completed.

All gas lines shall be installed in a separate trench apart from any other utility lines unless joint trenching with other utilities is specifically required on the CPS Energy Job Sketch or prior written approval is obtained from the CPS Energy representative allowing joint trench construction.

3. RIGHT-OF-WAY

The CPS Energy Job Sketch will indicate the planned route of the gas lines to be installed. The construction plans will show as much information as can be reasonably obtained by CPS Energy regarding the location of other existing buried utilities and structures in/or crossing the rights-of-way, but CPS Energy assumes no responsibility for the correctness or completeness of this information. Contractor will be held responsible for locating all such utilities and structures and for avoiding damage to them and for making repairs or paying for any damage thereto. CPS Energy will provide and furnish all necessary right-of-way, federal, state, county and city roadway crossing permits, which shall be necessary for the construction.

Most of CPS Energy's gas facilities are constructed within public rights-of-way; however, CPS Energy may acquire easements on private property for construction of gas distribution facilities when public rights-of-way are not available or unusable. When gas facilities are planned for construction within easements on private property, the exact boundaries of such easements will be shown on the CPS Energy Job Sketch, and CPS Energy will survey and stake the easement boundaries in the field. Contractor shall preserve such field staking of easement boundaries. If the Contractor's construction activities disturb the field survey stakes, then the Contractor shall be responsible for resurveying the easement boundary when necessary. Contractor shall comply with all reasonable requirements of landowners, tenants or lessees which are designed to reduce interference of construction. It will be the Contractor's responsibility to limit traffic on the right-of-way to only such vehicles as may be necessary for construction. Contractor will be held liable for damage claims arising from grass and brush fires that may be set during his operations.

In addition, the term "right-of-way" shall also apply to those portions of public streets, roads or highways in which sections of the utility lines will be constructed. The Contractor working in any public right-of-way is responsible for the safe movement of traffic (pedestrian and/or vehicular) through the construction area. The Contractor shall meet all requirements for barricading and traffic control as specified in the Texas Manual on Uniform Traffic Control Devices (TMUTCD).

4. MATERIALS TO BE FURNISHED BY CPS

CPS Energy agrees to furnish all steel pipe, polyethylene (plastic) gas pipe, casing pipe, valves, valve boxes, stop cocks, service risers, couplings, casing insulators, casing end seals, steel pipe insulating joints, miscellaneous pipe fittings, anodes, cathodic protection test lead boxes, pipeline warning signs, gas pipe tracer wire, tracer wire clamps, pipe coating primer, and pipe coating tape and/or shrink sleeves necessary to complete the job except when these materials are to be specifically provided by the Contractor in accordance with written requirements of the Compensation Schedule (Exhibit GAS-5) or CPS Energy Job Sketch (Exhibit GAS-6).

5. CLEARING, GRADING AND PREPARATION OF RIGHT-OF-WAY

The Contractor shall clear and grade right-of-way sufficiently for his need and for hauling and stringing pipe and other material but not to exceed the width of right-of-way. Contractor shall be responsible for any damages outside of right-of-way limits. Contractor shall perform all necessary grading and compaction at road, stream, and gully crossings and at other locations where needed to permit the passage of equipment, cars, and trucks. Before any brush or timber is cut to clear right-of-way, approval from CPS Energy in writing must be obtained. All brush and timber cut to clear right-of-way must be removed from the right-of-way and disposed of to the satisfaction of the CPS Energy representative. Any trimming of an oak tree will require the contractor to follow **oak wilt suppression procedures**:

- Avoid pruning or wounding any oaks unless absolutely necessary.
- If pruning is required, request assistance as soon as possible from the CPS Energy Tree & ROW Maintenance Section or one of the Inspectors listed below.

- Any pruning wounds or damage caused by equipment (trucks, diggers, trenchers, backhoes, etc.) must be painted immediately, within a minimum of one hour. This includes any cracked or ripped limbs and wounds to trunks, limbs or root flares which may have been damaged by passing equipment.
- Within a known infection center, all tools must be disinfected with a 10% clorox and water solution or Lysol spray before using these tools on any other oak tree.

Requests for Assistance From the Tree & ROW Maintenance Section

When assistance is required, please provide as much notice as possible or call as soon as damage occurs. Contact names and numbers are listed below:

	Office	Radio#	Cellular	Pager#
Section Office	353-3593	2400		
James F. Koenig	353-3798	2401	844-5457	1336
Terri Minnia	353-5218	2405	394-3580	2241
Margie Regalado	353-5243	2403	394-3579	2428
Clyde Stroud	353-5218	2404	394-3578	2301
Ed Scott	353-5243	2402	275-6935	2852

The Contractor shall promptly repair all bridges, private roads, fences, buildings or other property damaged by him in the progress of the work. Permission must be secured from owner before private roads or bridges are used or blocked.

The Contractor will be notified prior to construction of all known requirements or restrictions of right-of-way by CPS Energy.

The Contractor will be responsible for all preparation of right-of-way. This will include construction operations by removing and disposing of all obstructions from the right-of-way and/or gas easement where removal of such obstructions is not otherwise provided for in the plans and specifications.

Such obstructions shall be considered to include, but not be limited to, remains of houses not completely removed by others, foundations, floor slabs, concrete, brick, lumber, plaster, cisterns, septic tanks, basements, abandoned utility pipes or conduits, equipment or other foundations, fences, retaining walls, outhouses, shacks, and all other debris, as well as buried concrete slabs, curbs, driveways and sidewalks.

This item shall also include the removal of trees, stumps, bushes, shrubs, brush, roots, vegetation, logs, rubbish, paved parking areas, miscellaneous stone, brick, drainage structures, manholes, inlets, abandoned railroad tracks, scrap iron and all debris, whether above or below ground, except live utility facilities.

It is the intent of this specification to provide for the removal and disposal of all obstructions to the new construction, together with other objectionable materials, not specifically provided elsewhere by the plans and specifications.

Unless otherwise shown on the plans, all fences along the right-of-way and/or easement which are damaged or temporarily removed by the Contractor shall be replaced by the Contractor to an equal or better condition at no additional cost to CPS Energy.

Unless otherwise indicated on the plans, all underground obstructions shall be removed to in areas to be excavated to 2 feet below the lowest elevation of the excavation.

Holes remaining after removal of all obstructions, objectionable material, vegetation, etc., shall be backfilled and tamped as directed by the inspector, and the entire area shall be bladed to prevent ponding of water and to provide drainage.

All asphaltic material shall be deposited or recycled at a facility authorized to accept the asphalt for such purposes.

If the contractor encounters hazardous substances, industrial waste, other environmental pollutants, underground storage tanks, or conditions conducive to environmental damage, Contractor shall immediately stop work in the area affected and report the condition to the Owner's representative in writing. Contractor shall not be responsible for or required to conduct any investigation, site monitoring, containment, cleanup, removal, restoration or other remedial work of any kind or nature (the "remedial work") under any applicable level, state or federal law, regulation or ordinance, or any judicial order. If the contractor agrees in writing to commence and/or prosecute some or all of the remedial work, all costs and expenses, to include any extension of the contract time, of such remedial work shall be paid by Owner to Contractor as additional compensation.

6. UNLOADING, HAULING, AND STRINGING MATERIALS

The Contractor shall unload from trucks and string on the right-of-way, as needed, all gas pipe and other materials in such manner as to prevent damage to same. Pipe shall be unloaded with proper equipment, and not dropped from trucks.

When materials in storage are issued to the Contractor, such materials shall become the responsibility of the Contractor, and adequate methods of inventory and material transfer will be set up by the Contractor. The Contractor and CPS Energy jointly shall inspect materials, which have been stockpiled by CPS Energy prior to hauling. After this inspection, the Contractor shall pay CPS Energy delivered cost of any materials lost or damaged beyond use during the construction operation.

Under no circumstances shall pipe be strung in advance of right-of-way clearing operations.

Stringing of pipe on right-of-way shall be done in such a manner as to cause minimum interference with the normal use of driveways, streets, roads, highways, and land crossed. The Contractor shall prevent entrance of dirt or debris into pipe during stringing.

7. LOCATING EXISTING CPS GAS FACILITIES

The Contractor shall be required to locate all existing gas facilities as needed for the construction and installation of new gas facilities. Upon request by the Contractor, the

CPS Energy inspector will provide copies of the appropriate gas maps to facilitate locating activities for the existing gas facilities at the job site, however; CPS Energy does not guarantee the accuracy of such gas facilities map information. The Contractor shall use conventional pipe locating equipment and techniques in conjunction with information from the gas facilities maps to determine the actual location of existing gas facilities. The Contractor shall be solely liable for any damages to existing gas facilities and any damages to other infrastructure such as the street, drainage structures or other utilities, that are incurred by the Contractor.

8. TRENCHING (CONVENTIONAL OPEN EXCAVATION)

A. Equipment and General Methods - Contractor shall use such equipment and methods that may be required to excavate the trench or ditch along the route specified on the CPS Energy Job Sketch, regardless of the type of soil or rock encountered and regardless of the depth of excavation necessary. Contractor shall furnish all equipment, materials and supplies that may be necessary for the completion and maintenance of the trench or ditch, including water control, shoring, coffer dams and sheet piling.

B. Survey Stakes - Contractor shall carefully preserve all survey stakes set by CPS Energy, CPS Energy representatives, or consulting engineers and shall be liable for any extra expense due to Contractor's failure to maintain such stakes.

C. Trench Specifications - The trench or ditch shall have sufficient width and be of such depth to allow installation of piping and valves at depths specified on the CPS Energy Job Sketch and/or the CPS Energy Design Standards. When surfaced streets are cut, the paving shall be cut in neat lines defining the width of the trench to be excavated. The cut shall extend entirely through the asphaltic surfacing and shall break the base material to a sufficient depth to assure the removal of the surfacing and base without breaking beyond the lines of the trench. Concrete saws, pneumatic paving chisels, or mechanically operated drop blades may be used for asphalt surface cutting as approved by the governmental authority exercising jurisdiction. A concrete saw must be used to cut concrete driveways, streets, or other concrete surfaces.

D. Blasting - No blasting will be permitted by CPS Energy.

E. Hand Ditch Requirement - In all cases where shrubbery, trees, or valuable growing timber is encountered in the right-of-way, and in any location where, in the opinion of the CPS Energy representative, the use of ditching equipment may result in unnecessary damage or injury to property crossed by the right-of-way, CPS Energy may require the Contractor to excavate the trench or ditch by hand or other approved method.

F. Temporary Bridges - When the trench or ditch is excavated where it is desirable for a property owner, tenant or other pedestrians to have a passageway across the excavation, the Contractor shall provide safe, temporary bridges or provide other safe means of crossing the ditch.

No streets or driveways shall be blocked at night, except with owner's permission, and any street or driveway opened shall be provided with a strong temporary bridge to allow

traffic to move safely. Open trenches and test holes shall be properly marked by means of barricades and warning lights.

G. Additional Depth of Trench - Where trenching across or adjacent to, or within the right-of-way of roads or highways, railroads, drainage ditches, creeks, ravines, and other water courses and also at points where the contour of the earth may require extra depth, Contractor shall excavate to such additional depth as may be necessary to meet the requirements of CPS Energy and any public or private authority having jurisdiction over same.

H. Dust Suppression - Whenever trenching activities create significant amounts of dust or other undesirable emissions into the atmosphere, then the Contractor may be required, at the sole discretion of the CPS Energy inspector, to take necessary action to reduce such emissions.

I. Trench Excavation Safety - The Contractor must comply with 29 CFR Part 1926, Occupational Safety and Health Standards; Subpart P - Excavations. Contractor and/or Contractor's independently retained employee or safety consultant, if any, shall review the construction plans and any available geotechnical information and the anticipated installation sites within the project work area in order to develop the Contractor's trench excavation safety plan and procedures. The plans and procedures shall, at a minimum, comply with OSHA's standards for trench excavations. Specifically, the Contractor and/or the Contractor's independently retained employee or safety consultant shall develop and implement a trench safety program in accordance with OSHA's standards governing the presence and activities of individuals working in and around trench excavation.

9. TRENCHLESS CONSTRUCTION METHODS

The use of guided or directional boring equipment to install new gas distribution facilities is acceptable to CPS Energy provided that the Contractor demonstrates to the satisfaction of the CPS Energy representative that such equipment is capable of installing the gas pipe along a controlled and relatively constant horizontal and vertical alignment for the specific soil conditions that are encountered at each job site. Special provisions must be made to insure that the gas pipe is not damaged as it is pulled or otherwise inserted into the bored hole. The bored hole must be at least one nominal pipe size larger than the gas pipe that is to be installed (i.e. a 4-inch gas pipe requires at least a 6-inch bored hole). When the bored hole is known to have significant deflections, the bored hole must then be at least two nominal pipe sizes larger than the gas pipe.

When such equipment is used to install polyethylene gas pipe, a fusible link shall be used between the pull head and the gas pipe at all times to prevent damage to the gas pipe during the pull-back operation. The fusible link shall be at least 2 feet in length and it shall be a section of CPS Energy polyethylene pipe that is one nominal pipe size smaller than the gas main being installed. The CPS Energy representative shall inspect the fusible link and the leading edge of the installed gas pipe for any significant gouges or scrapes in the outside wall of the pipe or excessive change in length of the fusible link. If such damages to the fusible link or pipe are found to exist, then the Contractor shall remove and replace all of the damaged pipe at the

Contractor's expense, and the Contractor shall reimburse CPS Energy for the cost of the damaged pipe (including CPS Energy inventory and handling expenses).

When such equipment is used to install steel gas pipe, the CPS Energy representative shall inspect the installed gas pipe for any significant gouges or scrapes in the protective coating on the outside wall of the steel pipe. If such damages to the coating are found to exist, then the Contractor shall repair all of the damaged coating at the Contractor's sole expense.

Whenever gas service lines are planned for installation along a section of gas main that is being installed with guided or directional boring equipment, the Contractor shall excavate at least one service tap location prior to pulling the gas main into the bored hole. The purpose of this excavation is to provide the CPS Energy representative with an intermediate inspection hole where the gas pipe can be inspected during the pipe insertion process. Preferably, the intermediate inspection hole shall be located near the middle of the directionally bored section. If several gas service connections are planned along the insertion route, then the CPS Energy representative shall select the location of the service tap that the Contractor must excavate for the intermediate inspection hole before the gas pipe insertion process.

Gas mains and services that are installed by guided or directional boring equipment shall not be routinely installed at depths greater than seven (7) feet unless one of the following conditions apply:

- 1) The CPS Energy Job Sketch (Exhibit Gas - 6) specifically requires installation depths in excess of seven (7) feet.
- 2) Installation depths in excess of seven (7) feet are the shallowest depths necessary to achieve acceptable clearance between the gas pipe and another buried utility or structure while maintaining the minimum burial depth requirements for the gas pipe.
- 3) The CPS Energy representative approves such installations even though conditions described in Items 1) and 2) above are not applicable.

When guided or directional boring equipment is used to install gas distribution facilities special provisions (if any) in the Compensation Schedule (Exhibit Gas-5) for additional compensation due to extra depth of cover shall not apply.

The method of gas service replacement by Insertion involves sliding a new polyethylene service pipe of smaller diameter into the existing steel service pipe. This is an acceptable method of installation provided that the ends of the existing steel pipe are reamed and fitted with bushings for the pipe to be inserted without damage, and a shrink sleeve is applied to keep components in place and prevent damage thereafter. In order to reduce stress on the service line being inserted from the main, the horizontal distance between the end point of the new service alignment and the point of insertion should be, at least, twice the perpendicular distance between the lines (See Insertion Detail, page 19 of 20, exhibit Gas-3). Tracer wires will be inserted through the existing service along with the new pipe. An electrical continuity test will be conducted on each installed tracer wire to verify that the tracer wire has not been "shorted" against the existing steel service during the installation procedure.

10. STORM WATER POLLUTION PREVENTION PLAN

The gas utility construction work shall be performed in accordance with the City of San Antonio Storm Water Pollution Prevention Plan (SWPPP).

11. PROTECTION OF GAS PIPE ENDS

During the course of construction, diligent care shall be exercised to keep the gas pipelines clean. At the end of each day's work and at the other times that the ends of the installed pipe are left unattended, the pipe ends shall be securely closed to prevent the entrance of water, animals, trash or any other obstructions, and shall not be opened until work is resumed.

If there is reasonable cause to believe that water, trash or other obstruction is in a portion of the lines, the Contractor shall take whatever steps are necessary to assure CPS Energy that there is no water, trash or other obstruction in the line or to remove the water or other foreign matter if it is in the lines. Any and all work required to assure CPS Energy that the gas pipes are clear of debris and other such matter or to remove such obstructions shall be at the Contractor's expense.

12. WELDING

Welding shall be in accordance with API Standard 1104, 17th Edition, dated September, 1994.

Welds shall be made the "shielded metal-arc" process. All equipment and welding rods will be furnished by the Contractor. Brand of welding rods proposed to be used by the Contractor shall be approved by CPS Energy prior to use.

Where determined by the CPS Energy representative to be necessary, back-welding or inside-welding of all tube turns, ells, etc., in the pipe lines shall be required by the Contractor as part of the work covered by the Contract. Back-welding shall be performed at the sole expense of the Contractor.

All welds shall be made with not less than three (3) beads. The second or "Hot Pass Bead", should be run on the full circumference of the pipe as soon as practical. The intent of the above is that the Hot Pass or second bead shall be run before the Stringer Bead has cooled.

Prior to being permitted to weld on the line, each welder shall qualify in accordance with Section 3.0 of API Standard 1104 referred to previously and shall pass the tests listed in paragraph 3.4 of the API Standard. The Contractor will conduct, or make arrangements for, and stand the expense of the qualification tests of the welders. The qualifying tests will be conducted in the presence of the CPS Energy representative.

Each welder will be assigned a specific number and it shall be his duty to personally affix such number in crayon on each weld for future identification. Steel die stamping shall not be used.

CPS Energy rights of welding inspection shall be as given in Section 5.1 of API Standard 1104. Unless otherwise directed, the Contractor will test all welds with soapsuds while subjected to an internal air pressure of 90 psig prior to field coating the joints.

Pin holes, leaks, cold laps, rivers, undercutting or any defects whatsoever occurring in any weld shall, at the discretion of the CPS Energy representative, be repaired by cutting out the entire weld and completely rewelding at no additional expense to CPS Energy. Whenever it thus becomes necessary to remove a weld from the completed line, replacement shall be made, at the sole expense of the Contractor, by welding into the line a pup joint having a minimum length of ten (10) feet.

13. RADIOGRAPHIC INSPECTION

This Section applies when radiographic inspection is specified in the contract documents.

A. Standards and Codes - The latest available edition of the following referenced documents shall be applied when required:

1. Department of Transportation, Title 49, Part 192 - "Transportation of Natural and Other Gas by Pipeline: Minimum Federal Safety Standards."
2. Recommended Practice No. SNT-TC-1A, Supplement A - "Radiographic Testing Method."
3. ANSI B31.8, "Gas Transmission and Distribution Piping Systems."
4. ASME Code Section V, "Nondestructive Examination."
5. United States Nuclear Regulatory Commission, Title 10, Chapter 1, CFR - Energy and other federal, state and local regulations for protection against radiation hazards.

B. Radiographic Procedure - All radiographic inspections shall be performed in accordance with written procedures per Section 8.2 of API Standard 1104. Contractor shall provide a copy of the written procedure to the CPS Energy representative who shall determine the acceptance of the procedure.

C. Personnel Qualifications - Radiographic certification shall be the result of a qualification and certification program that incorporates the requirements of Recommended Practice SNT-TC-1A, Supplement A in accordance with Section 8.7 of API Standard 1104.

D. Equipment and Material - Contractor shall furnish all equipment and materials necessary for the performance of the radiographic inspection. Such materials and equipment include all film and supplies for the processing, film identification, recording, filing and storage of same. Also, Contractor shall provide all barriers, warning systems, film badges, documentation and records as is necessary for the protection and personnel monitoring of every person near a radiation source.

E. Production Radiography Procedures - Contractor will notify the CPS Energy representative if any welds fail to meet the specification. All repaired welds or welded joints, which have been completely replaced, shall be radiographed.

F. Film Identification Procedure - Film identification shall be in accordance with Section 8.6 of API Standard 1104. The exact method of identification will be approved by the CPS Energy representative prior to the start of radiographic inspection.

G. Radiographic Reports and File - Contractor shall be responsible for furnishing the CPS Energy representative with a report for each calendar day the unit is on the project. All radiographs made by Contractor shall be delivered to the CPS Energy representative and shall become the property of CPS Energy.

14. PRESSURE TESTING

A. General - The Contractor shall demonstrate to the satisfaction of the CPS Energy representative, by performing a pressure test, that the mains and/or services installed do not leak and that they will operate safely at the desired maximum allowable operating pressure. Pressure tests are performed to verify satisfactory workmanship and the strength of materials. To the extent practical, the test shall be conducted to the entire pipeline so as to minimize the number of untested tie-in connections. All joints used to tie-in a test segment of pipeline after the test shall be soap bubble tested at not less than its operating pressure. The Contractor shall be responsible for locating and repairing any leaks or failures, which are revealed by the test.

The Contractor shall furnish all supervision, labor, materials and equipment to perform the pressure test required, including but not limited to, pumps, compressors, pigs, test instrumentation and water. Pressure test specifications will be indicated on the CPS Energy Job Sketch (Exhibit GAS-6). The specifications will indicate the minimum and maximum test pressure, test fluid and test duration, as appropriate. The Contractor shall conduct the test in accordance with the applicable requirements of Title 49 CFR 192 and shall take all necessary safety precautions to protect construction personnel and the general public during the course of the test. The Contractor shall be responsible for obtaining all permits necessary to conduct the test except for the Railroad Commission of Texas test water discharge permit that is required for hydrostatic pressure tests.

B. Standard Air Test - A standard air test will generally be specified for gas mains and services to be operated at pressures of 60 psig or less. This test will be indicated on the CPS Energy Job Sketch without a test duration period. The minimum test pressure shall be 90 psig and shall not exceed 120 psig. The test duration shall be a time sufficient to insure discovery of all potentially hazardous leaks. At the minimum, each weld, butt fusion and any other fitting and connection shall be soap bubble tested at the specified test pressure. The test pressure shall be measured with a dial type gauge and shall be monitored during the course of the test to detect leakage. Upon completion of the test(s), the Contractor shall sign and date, in the appropriate location, the "as built" job sketch to indicate successful completion of the test. Pending acceptance by the CPS Energy representative, the CPS Energy representative shall also sign the "as built" job sketch at the appropriate location.

C. High Pressure Test - When the CPS Energy Job Sketch specifies a test pressure greater than 90 psig or if a specific test duration period is specified, then the following requirements for a High Pressure Test shall also apply.

Prior to initiating any work required for a High Pressure Test, the Contractor must hold a pre-test meeting with the CPS Energy representative and a CPS Energy engineer from the Gas Engineering Division. At this meeting, the Contractor will be required to discuss all aspects of plans for conducting the High Pressure Test. The key points of discussion for hydrostatic pressure tests will include the following: 1) optimum direction and injection rate for filling the pipe section with water while minimizing air entrapment; 2) optimum direction and discharge location for safely and completely draining the pipe section; 3) the type, quantity and condition of pipeline pigs; 4) installation and use of temporary pig launchers and/or receivers; 5) capacities of water pumping equipment; 6) pressurization procedures; 7) written test documentation; 8) limitations on refilling and/or discharging test water during the pressure test without invalidating the test and causing the test to be restarted; 9) test water stabilization period after filling the pipe section; 10) appropriate procedure for dewatering the pipe section to minimize the amount of water that remains in the pipe; 11) any other critical aspects of the High Pressure Test.

The test medium may be either air or water and will be specified on the CPS Energy Job Sketch. A hydrostatic test shall be conducted in general conformance with API Recommended Practice 1110. Air tests shall also be conducted in conformance with API RP 1110 with regard to safety and instrumentation.

All filling and pressurization procedures are subject to the approval of the CPS Energy representative. When a hydrostatic test is to be performed, the Contractor shall fill the pipeline in such a manner that no air is entrapped, making use of pipeline pigs as necessary. The Contractor shall be required to furnish all pipeline pigging equipment, including appropriate styles and types of pipeline pigs and temporary pig traps and launchers. The CPS Energy representative must inspect all pigging equipment, and such equipment must be acceptable to the CPS Energy representative prior to use by the Contractor.

The Contractor shall allow a suitable time for temperature stabilization of the test fluid. The stabilization period shall be a minimum of twenty-four (24) hours after the filling operation is complete for a hydrostatic test, and the stabilization period shall be a minimum of eight (8) hours after the pipeline is pressurized to the minimum test pressure for all High Pressure Tests performed with air or other compressed gases. At the sole discretion of the CPS Energy representative, the stabilization period may be reduced for short sections of pipe such as offsets and valve complexes.

The Contractor shall note each significant step or event during the filling, pressurization and testing operation and comments shall be added for any incidents which may affect the results of the tests. Where the specified test duration is two hours or less, deadweight pressure, pipe temperature and ambient temperature measurements shall be recorded at 15 minute intervals. Where the specified test duration is greater than two hours, these measurements shall be recorded at 30 minute intervals.

Upon completion of the test, the Contractor shall obtain the approval of the CPS Energy representative prior to depressurizing the pipeline. The Contractor shall then depressurize, dewater, clean and dry the pipeline to the satisfaction of the CPS Energy

representative. Water shall be disposed of in the manner required by any permits and to the satisfaction of the CPS Energy representative.

D. Test Records - The Contractor shall submit to the CPS Energy representative all documentation associated with the test, including a completed Form I, "Hydrostatic Test Record and Certification" of Appendix I, API RP 1110, (or substantially similar documentation), testing logs and all recorder charts. All documentation shall be labeled to identify the pipeline section that was tested, and it must be signed and dated by the Contractor and approved by the CPS Energy representative.

15. COATING OF PIPE

The Contractor will be furnished coated and wrapped pipe in accordance with such specifications as CPS Energy may in its sole discretion determine. The Contractor will be responsible for coating all field joints and repairing damaged and defective coating on the pipe regardless of the nature, extent or cause of such damage or defect in the coating. However, if the damaged or defective coating is of such magnitude as requires an extra or additional charge by the Contractor, then the Contractor shall first refer such matter to the CPS Energy representative and not proceed until the Contractor has obtained prior written authorization from CPS Energy to do so, in which event the provisions of the Contract relating to extra or additional work shall be applicable.

Coating materials for coating field joints and repairing damaged or defective coating will be furnished by CPS Energy.

For coating field joints, the coating on the pipe must be cut back a distance of 8" to 12" from the joint. The edge of the enamel and felt wrapping shall be feathered at these points to assure a firm bond between the original coating and the field coating. After the joints are welded and tested, and the welds cleaned and brushed, the bare ends of the pipe shall be thoroughly cleaned, then immediately given a hand-brushed coat of primer to dry surfaces. Care shall be exercised to prevent primer from being applied too heavily, especially at the base of the welds; any runs or sags which have dried or dead primer shall be scraped off and the pipe reprimed. After the tape primer has dried to a tacky consistency, apply cold wrap tape with a 30 percent overlap taking care not to create any voids between the pipe and tap coating. No primer or coating will be applied to wet or damp pipe.

After the field joints have been coated and immediately before the pipe is lowered into the ditch, the entire coating will be tested to locate breaks or pinholes and other flaws in the enamel with an approved "holiday" detector in good working condition capable of producing the testing voltage in pulsating cycles at very low amperage. The voltage used shall not exceed 14,000 volts for pipe coatings of 3/32. All defective places will be plainly marked immediately after they are detected. The Contractor will furnish the holiday detector, and will check the coating for holidays in the presence of the CPS Energy representative.

All repairs to damaged coating which exceeds 2 square inches will be made by breaking out the old coating, scraping the pipe to bare metal, feathering the edges to assure a firm bond and repriming. After the primer has dried to a tacky consistency, apply cold wrap tape taking care not to create any voids between the pipe and the tape coating. For repairs less than 2 square

inches, the pipe need not be scraped to bare metal and primed; however, the good enamel around the damaged portion shall be feathered before the cold wrap is applied.

Compression type couplings, valves, welded fittings, etc., will receive a cold applied mastic after the pipe is in the ditch and they have been tested for leaks. A plastic wrap supplied by CPS Energy will be placed over the mastic to protect the coating during backfilling.

Handling of Coated Pipe - Coated pipe shall be handled only with suitable equipment in such a manner as to prevent damage to the coating. The coated pipe shall be placed on skids alongside the ditch until it is to be welded and lowered into the ditch. The skids shall be of sufficient width or padded with sandbags or resilient pads to prevent the skid edges from cutting the coating and wrapping. The skids shall be arranged to permit the coated pipe to bear on the full width of the skid.

At all times, coated and wrapped pipe shall be carefully handled with wide rubber, leather, composition, or canvas slings or belts containing no protruding rivets or belts that may injure the coating. Wire rope, tongs, chairs, hooks, and bare cables shall not be permitted to come into contact with the coating. Coated pipe shall not be handled when the temperature is low enough to cause cracking of the enamel.

16. CATHODIC PROTECTION

The Contractor shall install packaged anodes, insulating joints and insulating flange sets as provided for in the exhibits. Welding machines will not be used to test insulation or otherwise be grounded across insulating devices. Insulation will be checked by the CPS Energy representative and declared acceptable only after testing establishes satisfactory performance.

17. POLYETHYLENE GAS PIPE

Polyethylene pipe, which is commonly referred to as plastic, PE or HDPE pipe, shall be handled only with suitable equipment in such a manner as to prevent damage to the pipe such as fracture, kinking, deep gouges or cuts. The polyethylene pipe shall not be subjected to abuse by dropping, throwing or dragging except over smooth non-scratching terrain or surface.

An insulated copper wire shall be installed with all polyethylene pipe for the purpose of locating the pipe after backfilling. This wire shall be installed with 2 to 6 inches separation between the tracer wire and the polyethylene pipe. Under no circumstances shall the tracer wire be taped or otherwise secured against the outside wall of the polyethylene pipe or spirally wrapped around the pipe.

Fusion of polyethylene pipe joints shall be done by the Contractor in accordance with requirements of D.O.T., Title 49, Part 192 - Transportation of Natural Gas by Pipeline: Minimum Federal Safety Standards, Paragraphs 192.281, 192.283, 192.285, 192.287.

Prior to starting production fusing under this contract each Contractor employee that will be making polyethylene fusion joints shall qualify according to Paragraph 192.285 of the D.O.T. code using a CPS Energy approved procedure. Qualifying tests will be conducted in the presence of the CPS Energy representative.

The Contractor shall furnish all specialty tools and equipment that are required to handle, install, butt fuse and squeeze-off polyethylene pipe. The Contractor shall insure that all specialty tools and equipment are specifically designed for use on polyethylene piping systems and are in good working condition. The CPS Energy representative shall be allowed to inspect all specialty tools and equipment furnished by the Contractor. The CPS Energy representative may disallow the use of any specialty tools or equipment that are not specifically designed for use on high density polyethylene piping systems or are deemed to not be in good working condition. CPS Energy routinely uses the Steve Vick 6" Mark II Coil Trailer for handling large diameter coiled pipe, McElroy equipment for making butt fusions on polyethylene pipe and Mustang squeeze-off tools for stopping the flow of gas in existing polyethylene piping systems. The Contractor shall be required to provide copies of the original manufacturer's literature for all comparable equipment from other manufacturers. At the sole discretion of CPS Energy, comparable equipment from other manufacturers may be approved for use by the Contractor.

All polyethylene pipe joints shall be tested with soap and water with the line having an internal pressure of between 90 and 120 psig. All pressure tests on polyethylene pipe must be observed and approved by the CPS Energy representative. It shall be the Contractor's responsibility to coordinate pressure tests on polyethylene pipe so that such test can be performed with a CPS Energy representative present.

18. LOWERING IN AND BACKFILLING

The ditch shall be free of rocks and clods before the pipe is lowered into the ditch. No pipe will be lowered into the ditch until the ditch has been inspected and approved by the CPS Energy representative.

All stumps and roots found in the ditch line shall be cut so that they will not come in contact with the pipe. All loose rocks, stones, blocks, skids, chocks, tools, heavy clods, tree limbs, and other items, which may damage the pipe, shall be removed from the bottom of the ditch before the pipe is lowered in.

The ditch shall be excavated with sufficient depth to allow for a minimum thickness of four (4) inches of pit run sand to be placed in the ditch below the pipe. Pit run sand placed in the ditch to cushion the pipe shall be leveled and tamped so that the weight of the pipe is as evenly distributed as possible on solid ground.

Backfilling shall be so conducted that the ditch shall be neatly backfilled and compacted. Rock, gravel or like materials shall not be backfilled directly onto the pipe. The Contractor shall provide and shall haul sufficient pit run sand to be backfilled around and over the pipe to form a protective padding or cushion between the pipe and the rock, gravel and other such unexcavated materials. After the pipe has a six (6) inch minimum cover of pit run sand, the remaining backfill may contain rocks and gravel, except that large rocks in excess of four (4) inches in diameter, width or length, shall not be backfilled into the ditch. Such rocks shall be removed from the right-of-way and disposed of to the satisfaction of the landowner, tenant, and/or CPS Energy representative. Care shall be exercised to prevent hand shovels and tampers from damaging the pipe.

Trenches in public roadways will be backfilled and paved in accordance with the requirements of the governmental authority having jurisdiction over the street or road.

Where paving is cut, backfilling and finishing of the top of the trench will be in accordance with the requirements of the authority having jurisdiction over the pavement. On state highways, U.S. highways, expressways and freeways and their frontage roads, and any streets or roadways that are being maintained or rebuilt by the Texas Department of Transportation (TxDOT), the TxDOT specifications and requirements for backfilling trenches will apply. On county roads, private roads, streets in incorporated townships, driveways or paved parkways the backfill will be a mixture of concrete or other material mixtures with depths as required by the authority having jurisdiction and shall be placed in trench to within one and one-half (1-1/2) inches of the surface of the existing pavement. The Contractor shall apply final and finishing topping to cuts in paving with hot mix, hot lay asphalt. Inspection and approval by the authority having jurisdiction over the pavement shall be obtained by the Contractor before the job will be accepted as completed by CPS Energy.

Backfill in public and private thoroughfares shall be hydra-tamped with special care to prevent settlement or damage to other buried utilities.

The Contractor shall not use soil from the right-of-way except from the spoil bank. Any surplus soil shall be disposed of by the Contractor.

When crossing drainage ditches and minor streams, the Contractor shall furnish and install all materials necessary for bank reinforcement. Such backfill must be properly maintained by the Contractor until the entire job has been completed and accepted by an authorized representative of CPS Energy. No reimbursement will be made for repairing of backfill due to floods and/or other conditions occurring before final acceptance.

The Contractor shall control the ditching and backfilling so as to have a minimum amount of open ditch commensurate with good construction practices.

As soon as backfill is completed on a section of line, Contractor shall immediately clean up the right-of-way, removing all surplus and defective materials to CPS Energy-designated locations. Disposal of all refuse such as brush, broken skids, rock, etc., shall be to the satisfaction of the CPS Energy representative. Insofar as possible, the earth on both sides of the line ditch which has been disturbed during the construction of the line shall be leveled, and the ditch line shall be left in a condition satisfactory to the CPS Energy representative. All temporary fills and bridges shall be removed and the area cleaned to the satisfaction of the CPS Energy representative. The Contractor shall, at his expense, furnish, haul and install black top soil on the ditch line and right-of-way area where necessary in the opinion of the CPS Energy representative to leave such area in the same condition as existed prior to the commencement of the work and/or to obtain the minimum required cover for the utility lines as specified.

Upon completion of all backfilling and cleaning of the right-of-way, permanent repairs shall be made to all fences by using equivalent or new fencing materials. All fence repairs must be satisfactory to CPS Energy representative. These repairs are to be made by Contractor at no extra compensation.

19. FINAL PIPING CONNECTIONS AND/OR TIE-INS

The Contractor will make all connections of new gas lines to existing gas lines. This includes all necessary preparations for tie-ins and purging for all sections of gas lines installed by the Contractor. The Contractor will be required to weld short stop fittings and other necessary fittings on existing steel gas lines that will be used by CPS Energy personnel to control the flow of gas into the new gas lines. CPS Energy personnel will control the flow of gas on all operative gas facilities while the Contractor is making final piping connections and/or tie-ins.

The Contractor shall be responsible for insuring that all tie-ins between new and existing gas mains are performed in a safe manner. The Contractor shall furnish all necessary equipment and instrumentation that is required to insure that the final tie-in welds and/or fusions between new and existing gas facilities are performed in a safe manner. Such equipment and instrumentation may include pneumatic air movers, combustible gas indicators (CGI's), oxygen monitors, self-contained breathing apparatus and fire retardant clothing for construction personnel, and fire extinguishers.

20. REMOVAL OF EXISTING PIPE

The asphaltic wrap on pipe removed under this contract may contain asbestos. In handling the pipe (including the excavation, cutting, removal, loading and unloading of such pipe), Contractor shall observe all State and Federal worker protection regulations and standards, and all environmental and public safety standards that are applicable to such work, including the OSHA standard found at 29 CFR Section 1926.1101, and following, that relates to the occupational exposure standard to asbestos for the construction industry.

The Contractor will indicate in its bid the manner in which the pipe shall be managed after removal. For example, Contractor shall indicate whether the pipe will be disposed at a licensed landfill facility, will be recycled as pipe by Contractor, will be sold to and recycled as pipe by a third party, will be recycled by a third party as scrap metal, etc. If dealing with a third party, Contractor shall identify the various third parties Contractor will rely upon to provide the indicated services.

For all pipe removed from the ground under the terms of this contract, Contractor shall place the following notice, beginning approximately two (2), feet from each end of the pipe, in stenciled or comparable lettering, i.e. not attached labels, of not less than 3 inches in height;

PIPE WRAP MAY CONTAIN ASBESTOS

Upon removal of the pipe from the ground, ownership of the pipe is transferred to the Contractor.

21. PURGING NEW GAS FACILITIES

CPS Energy personnel will purge the new gas mains, and the Contractor will purge all new gas service lines or existing gas service lines that have been tied-over to the new gas mains or otherwise adjusted.

22. GOODWILL OF GAS CUSTOMERS & RESIDENTS IN THE WORK AREA

The Contractor shall make reasonable efforts to create goodwill among the property owners, tenants and lessees along the right-of-way of the gas construction project.

For this reason, no gas service shall be cut-off after 2:30 p.m. each day. All gas services that have been cut-off during the day must be restored before 4:00 p.m. that same day. If the Contractor is consistently late in restoring gas service by 4:00 p.m., the contract may, at CPS Energy's discretion, be adjusted to reflect an earlier cut-off time.

When customer gas service is to be interrupted, the Contractor must use CPS Energy approved door-hangers to inform the customers of the impending construction activity. The door-hangers must be placed on the front door of each residence at least 48 hours prior to construction, and the Contractor must contact each customer by telephone or in person before the gas service is cut off.

The Contractor shall provide approved sanitary facilities in sufficient quantities and at such locations as may be needed for workers on the job.

24. WORKDAYS, WORKING HOURS AND HOLIDAYS

Normal working hours for this contract shall be from 7:30 a.m. to 4:00 p.m. Work days shall include Monday through Friday, except for holidays. Holidays shall include the following days: New Year's Day, San Jacinto Day (observed on Friday of Fiesta Week), Memorial Day, Independence Day, Labor Day, Thanksgiving Day, Friday after Thanksgiving Day, and Christmas Day. If the holiday falls on a Saturday, it will be observed on the preceding Friday. If the holiday falls on a Sunday, it will be observed on the following Monday. Christmas Eve and New Year's Eve will be observed as holidays when Christmas Day and New Year's Day fall on Tuesday through Friday. Exceptions to these working hours and work days will be allowed by CPS Energy when required by the governing entity, mutually agreed upon by both Contractor and CPS Energy or the customer approves or requests work to be performed outside of these established times. **At the sole discretion of CPS Energy, service renewal work can be suspended during periods of extremely cold weather.**

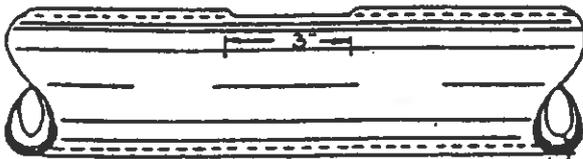
25. ACCEPTANCE

The CPS Energy representative will make all inspections and final acceptance of the work performed by the Contractor for CPS Energy.

As required by CPS Energy, Contractor shall maintain and provide a copy of the "as-built" job sketch and all associated documents once the work is completed.

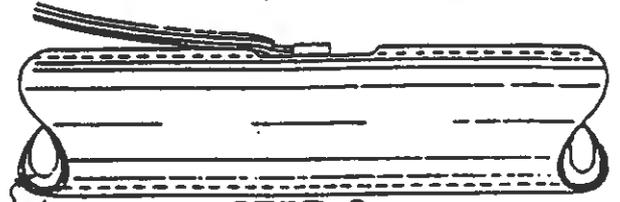
**CPS
Design Standards
(Steel Gas Pipe)
Exhibit GAS-3**

Remove a section of coating 3" long and file pipe bright so that a space 1" wide and 2" long is clean and dry.



STEP 1

Strip 1/2" of insulation from wire and place copper sleeve on #10 and smaller wire.

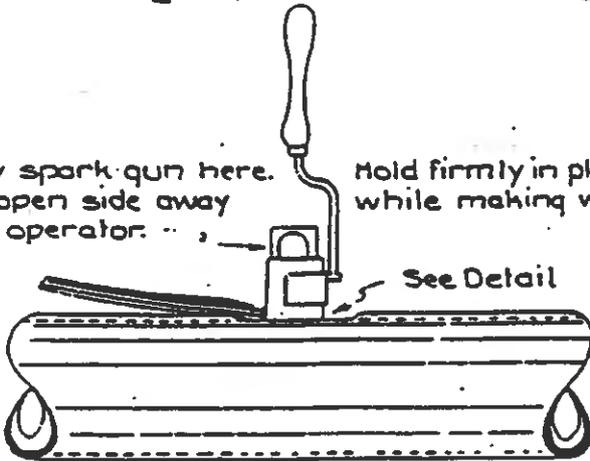


STEP 2

Pipe coating

Apply spark gun here. Keep open side away from operator.

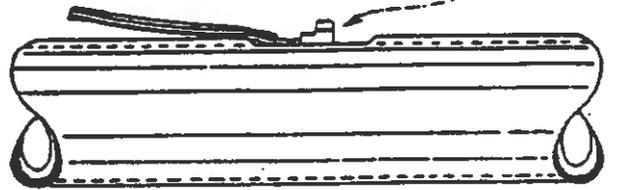
Hold firmly in place while making weld.



STEP 3

See Detail

Remove slag with hammer and paint thoroughly with primer.

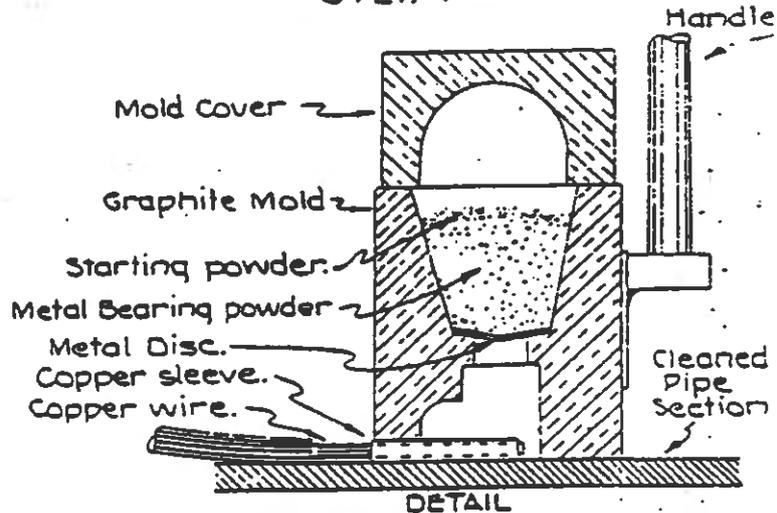


STEP 4

Repair pipe coating with care. Cover entire weld.



STEP 5



DETAIL

IMPORTANT

1. REMOVE RED CAP OF CADWELD CARTRIDGE AND DUMP ALL OF CONTENTS INTO MOLD. THE CHARGE WILL NOT IGNITE WITHOUT THE FINE STARTING POWDER ON TOP.
2. THE CARTRIDGES MUST BE KEPT DRY AT ALL TIMES.

Cadweld mold with sleeve for #10 wire and smaller.

CITY PUBLIC SERVICE BOARD
SAN ANTONIO, TEXAS
GAS DEPARTMENT

COPPER WIRE CONNECTION TO PIPE USING CADWELD.

DRAWING DS-32
INSTRUCTION SHEET - TYPE TB-3 WELDER

PREPARATION OF SURFACE:

To obtain a good weld, surface must be bright clean and dry.

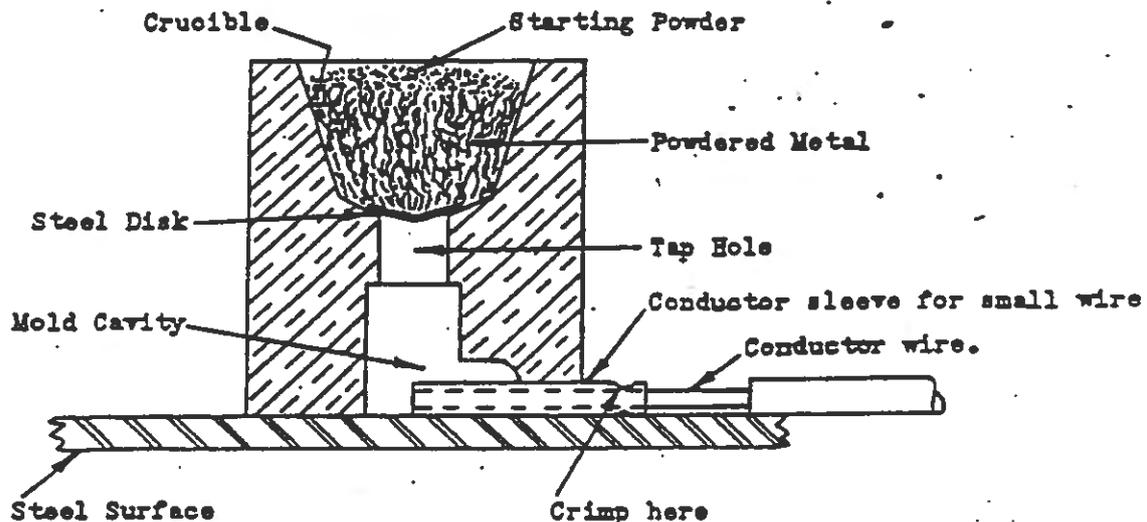
Steel surface should be ground or filed to remove all scale, rust, grease and dirt.

Galvanized steel must be cleaned with emery cloth to remove oxide.

PREPARATION OF WIRE:

Strip the insulation from the conductor and scrape until wire is bright and clean.

For #10 and smaller sizes, place the wire in a copper sleeve, ends flush, and crimp the sleeve tightly to the wire at the insulation to provide additional mechanical strength at the weld.

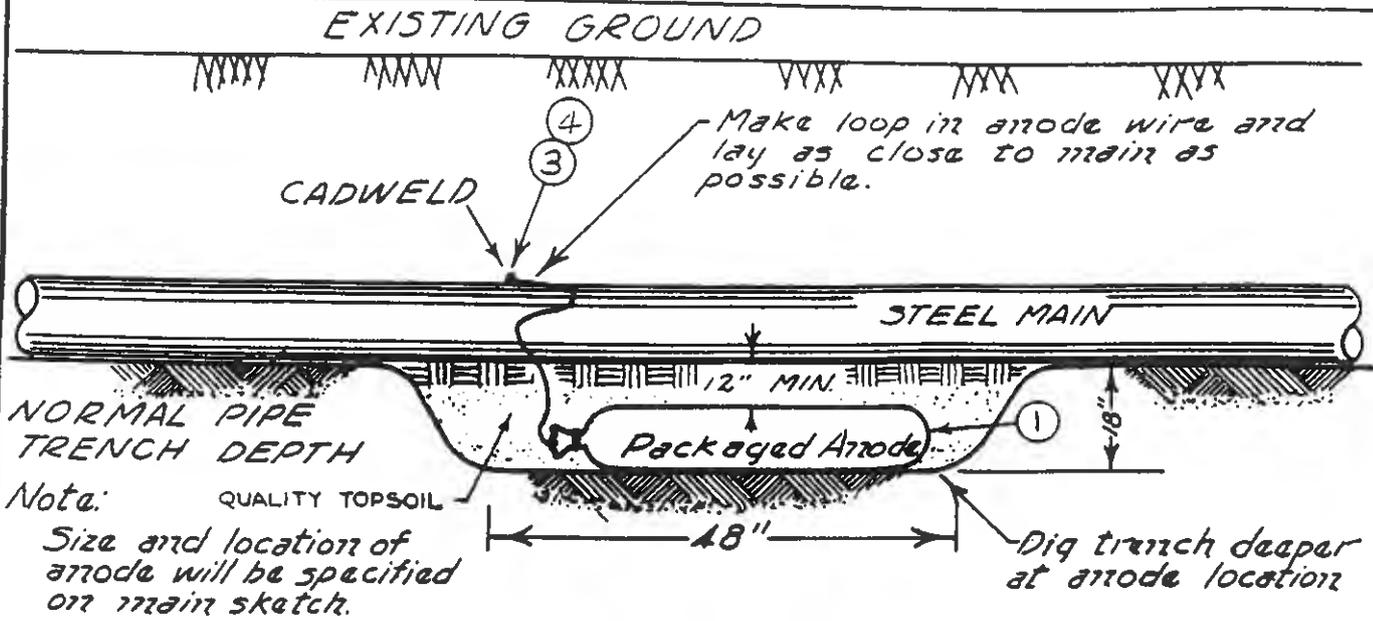
**WELDING PROCEDURE:**

- (1) PLACE WELDER OVER CLEAN STEEL SURFACE and insert the wire until it is under the CENTER of the tap hole.
- (2) COVER TAP HOLE WITH STEEL DISK.
- (3) DUMP CARTRIDGE IN CRUCIBLE AND CLOSE COVER. (Tap bottom of cartridge to be sure starting powder is emptied). Replace empty cartridge in box to keep remaining cartridges in an upright position.
- (4) HOLD DOWN ON WELDER TO PREVENT LEAKS AND IGNITE WITH FLINT GUN. Jerk gun away to prevent fouling. Should gun become fouled, soak in Spirits of Ammonia.
- (5) DO NOT REMOVE WELDER UNTIL METAL HAS SOLIDIFIED.
- (6) ALL SLAG MUST BE CLEANED FROM MOLD BEFORE MAKING NEXT WELD.

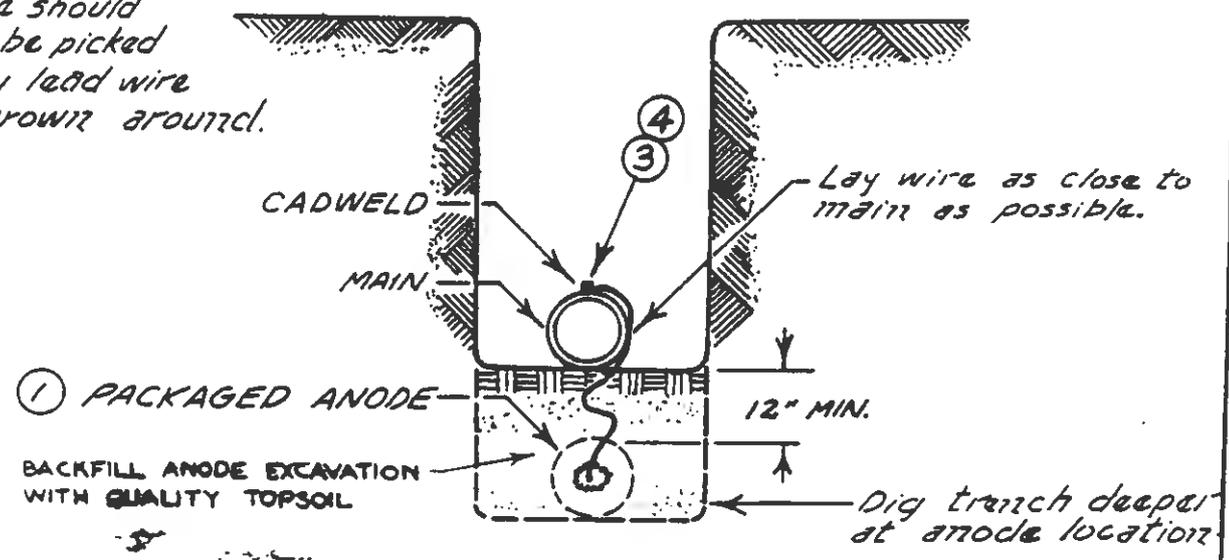
Note: Wet or damp molds produce porous welds. Mold can be dried out by firing a charge before making the desired weld.

4.5

PACKAGED ANODES



Anode should never be picked up by lead wire or thrown around.

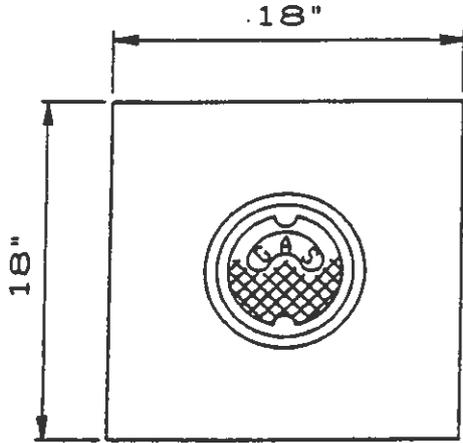


NOTES:

- a. Cadweld connection to be primed and coated carefully.
- b. Packaged anode should be covered with fine soil containing no rocks, clods, or sand.
- c. Pour 5 gallons of water over anode location and tamp thoroughly.
- d. Provide test leads when specified. (See test lead standard)
- e. Anode specification sheet will be attached to main order, and is to be completed by the main construction foreman.

	DATE	APPROVED	CITY PUBLIC SERVICE BOARD CONSTRUCTION STANDARD (GAS)	DRAWING DS-33
ISSUED	9-1-70	CJH		G-S-171-1-2
REVISED	11-1-77	JL		

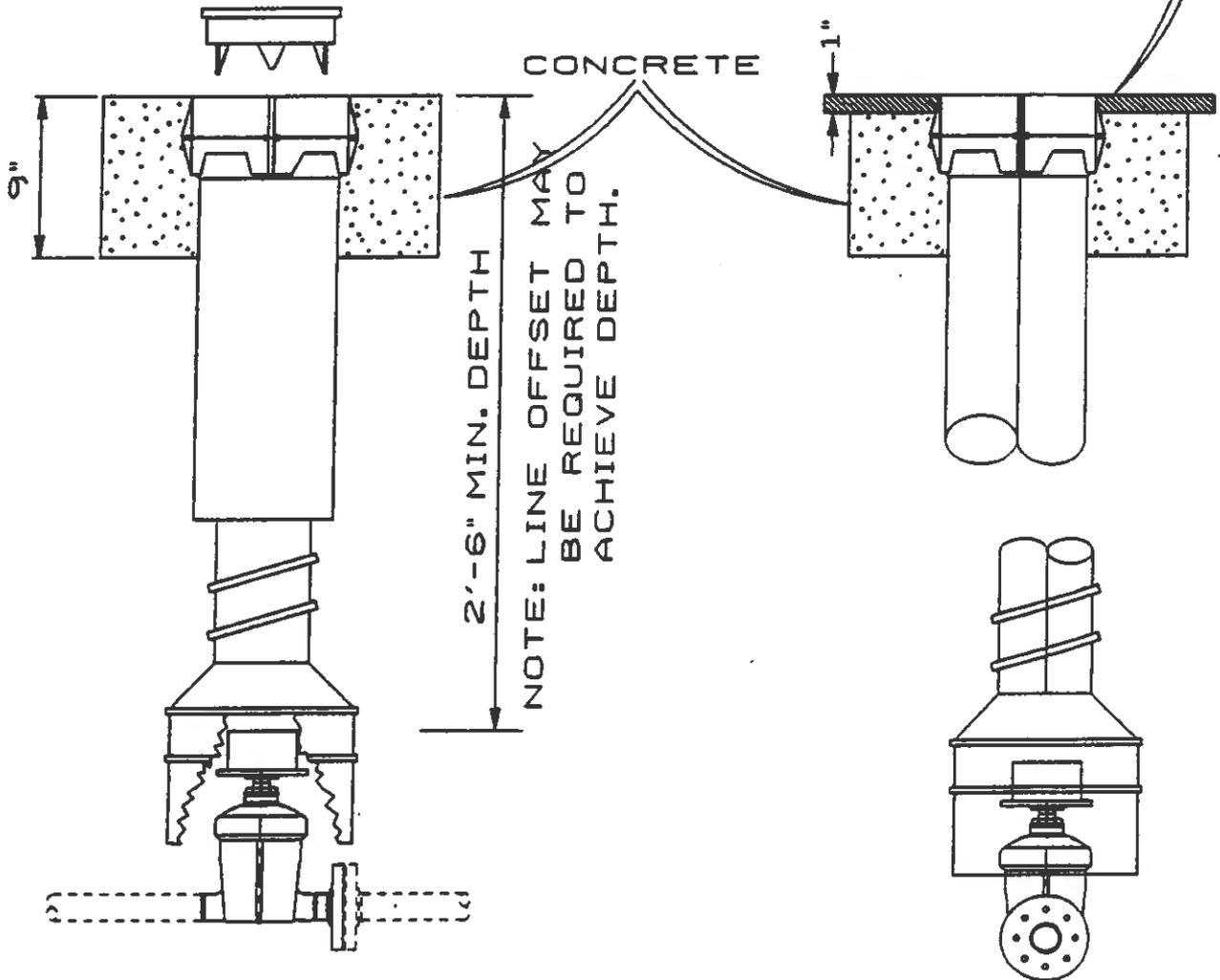
VALVE, STEEL
(WELD x FLANGE)



CAM UNITS
VGS2WXF
VGS4WXF

NOTE: TAMP & BACKFILL
VALVE BOX ABOVE
PIPE.

OPTIONAL METHOD FOR
ASPHALT STREETS

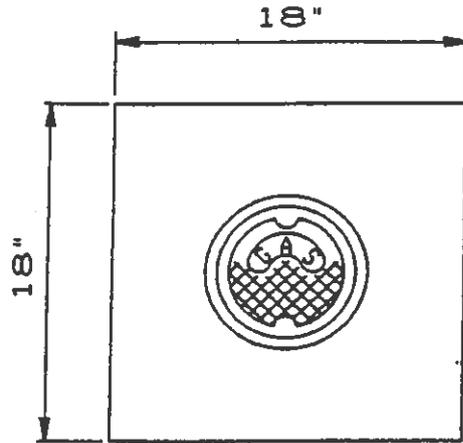


NOTE: COAT VALVE UP TO TOP OF PACKING GLAND.

AVAILABLE SIZES: 2, 4 Page 5 of 19

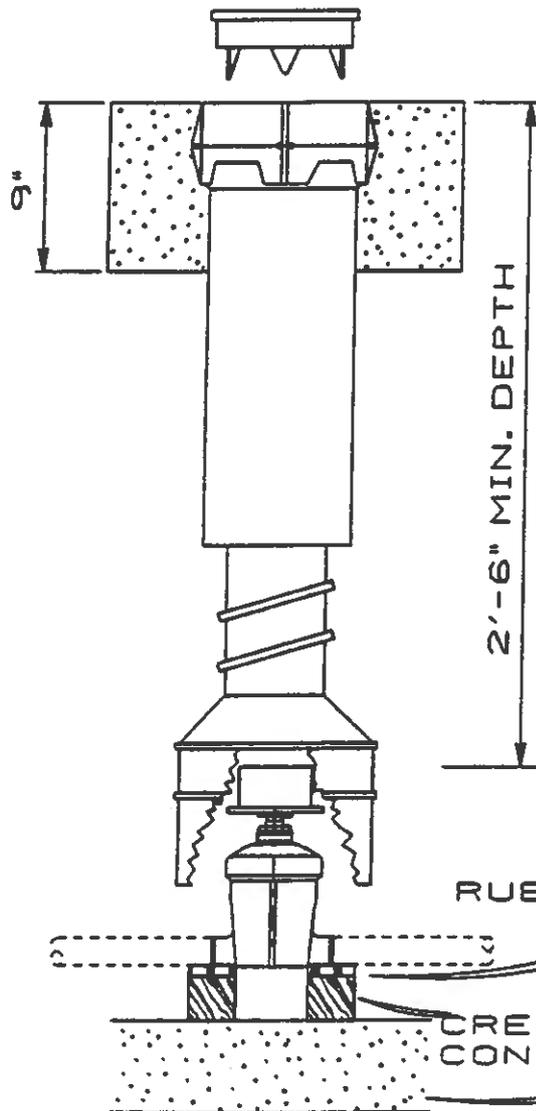
ISSUED	DATE	APPROVED	CITY PUBLIC SERVICE CONSTRUCTION STANDARD (GAS)	G - S - 127 - 1 - 0
REVISID				DRAWING DS-36

VALVE, STEEL
(WELD x WELD)



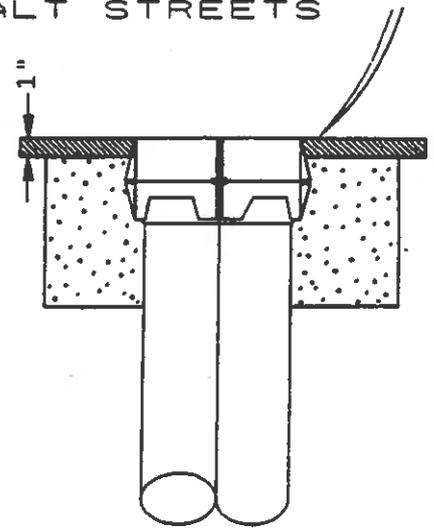
CAM UNITS	
VGS2WE	VGS8WE
VGS4WE	VGS12WE
VGS6X8WE	VGS16WE

OPTIONAL METHOD FOR ASPHALT STREETS



CONCRETE

NOTE: LINE OFFSET MAY BE REQUIRED TO ACHIEVE DEPTH.



RUBBER SUPPORTS

CREOSOTE TIMBER CONCRETE SUPPORT

NOTE: ITEMS 6 AND 11 ARE TO BE INSTALLED FOR 12" VALVES, OR LARGER. COAT VALVE UP TO TOP OF PACKING GLAND.

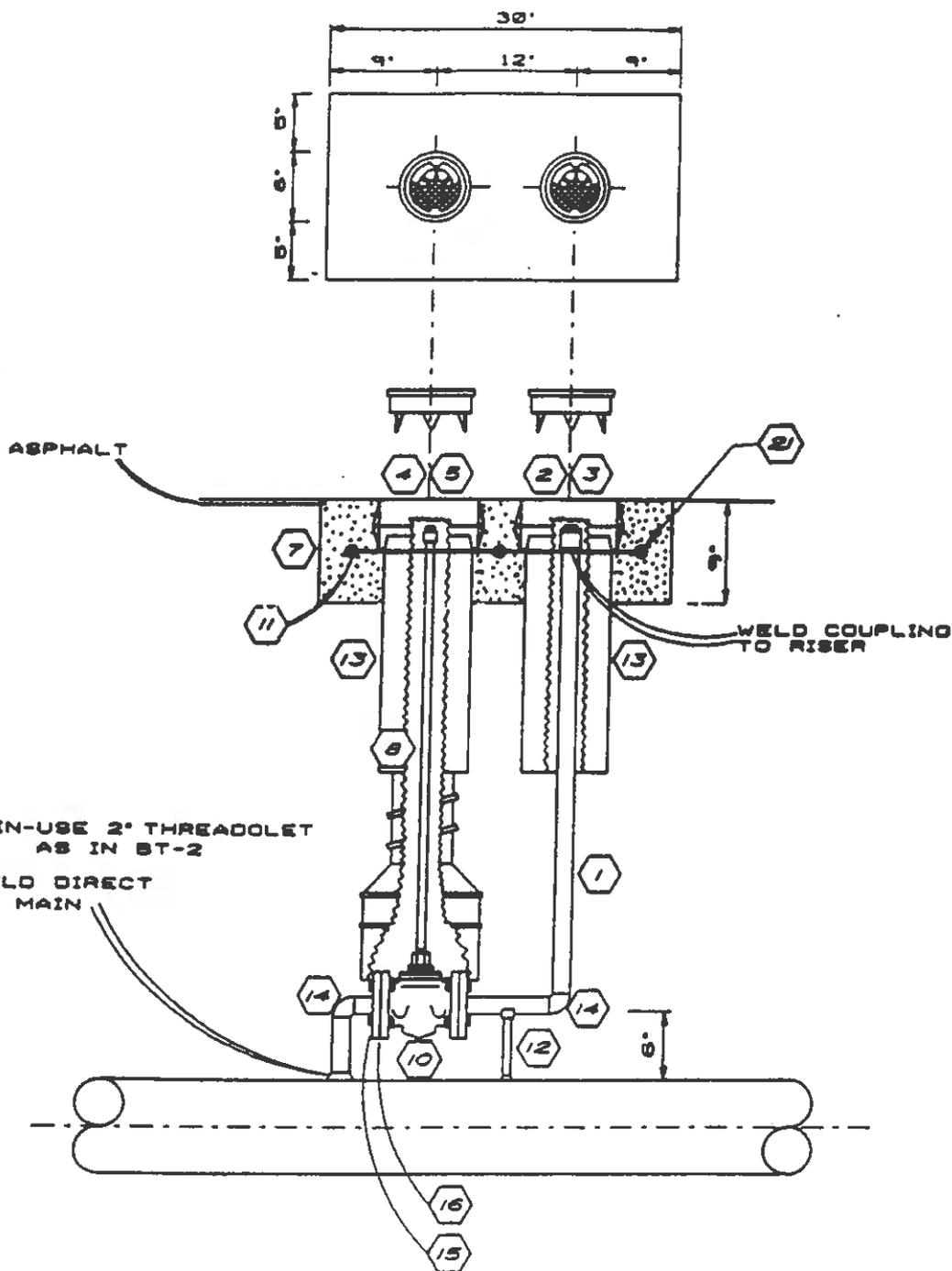
AVAILABLE SIZES: 2, 4, 8x6, 8, 12

Page 6 of 19

ISSUED	DATE	APPROVED	CITY PUBLIC SERVICE CONSTRUCTION STANDARD (GAS)	0 - 3 - 127 - 2 - 0 DRAWING DS-37
REVISION				

TEST RISER 2 IN.

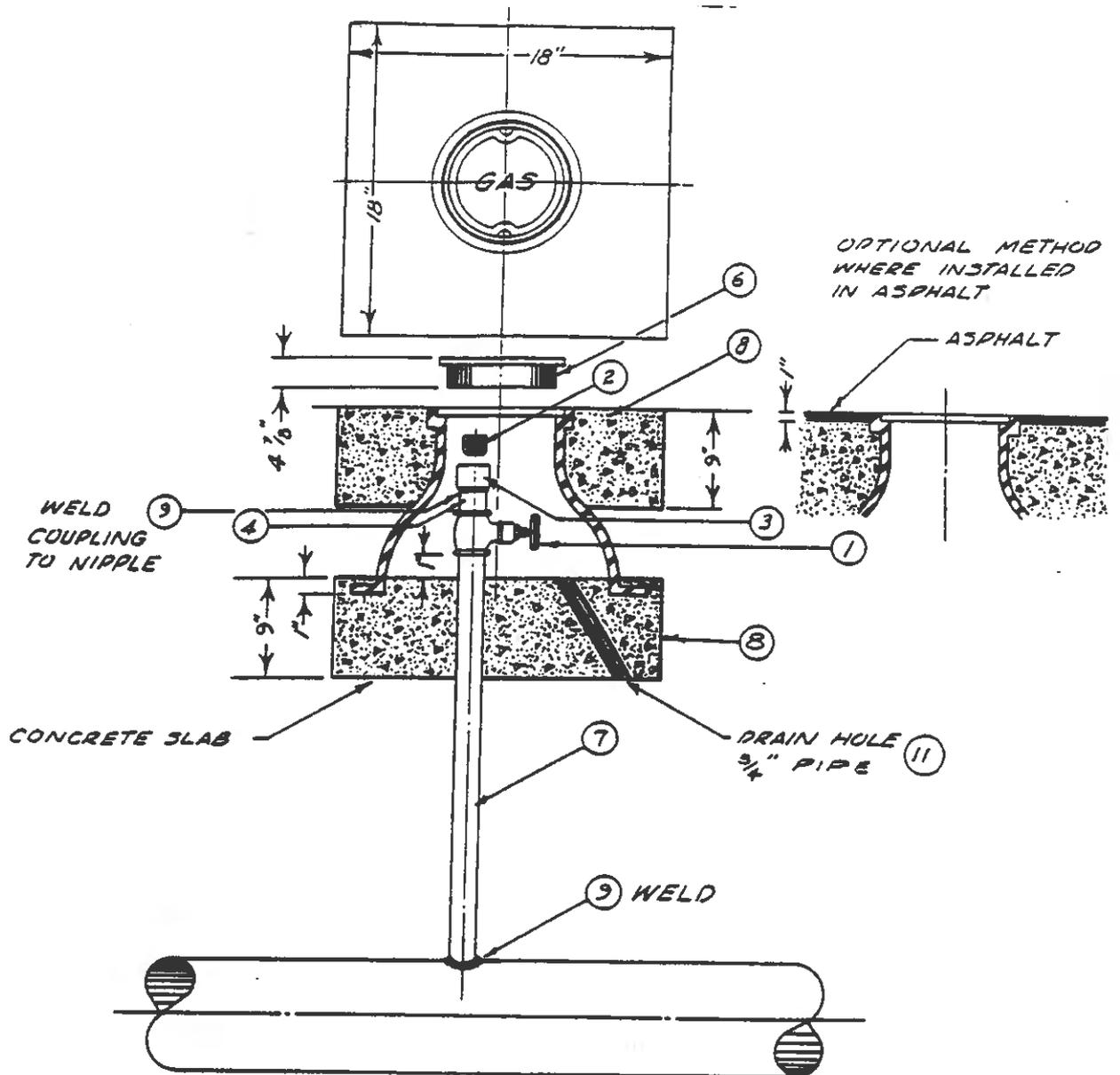
EXHIBIT DST-3



ISSUED	DATE	APPROVED	CITY PUBLIC SERVICE CONSTRUCTION STANDARD (GAS)	0 - 9 - 142 - 1 - 1 PLANNER, M. BLYTHE
REVIS	9/2/92	<i>D. Voyer</i>		

4.5

TEST RISER, 1 IN.

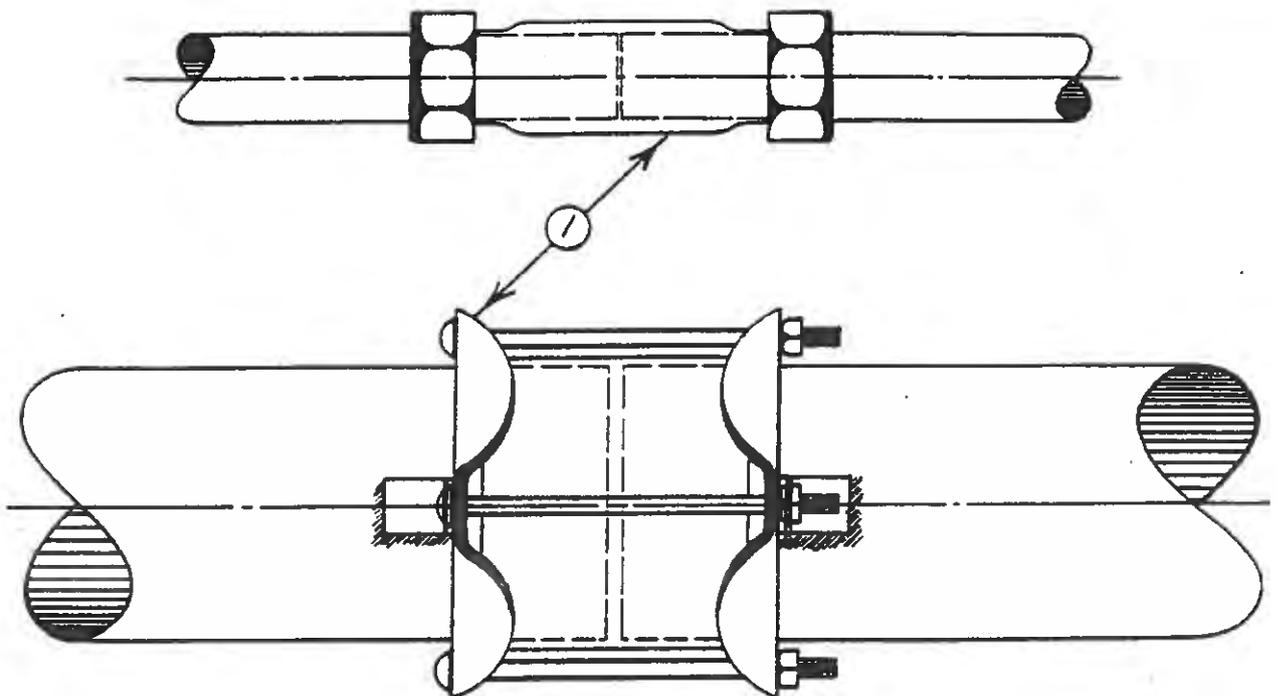


	DATE	APPROVED	CITY PUBLIC SERVICE BOARD CONSTRUCTION STANDARD (GAS)	DRAWING DS-39
ISSUED	9-1-70	WHP		G-S-141 -1-0
REVISED				

4.5

COUPLING, BONDED

WITH WELD LUGS



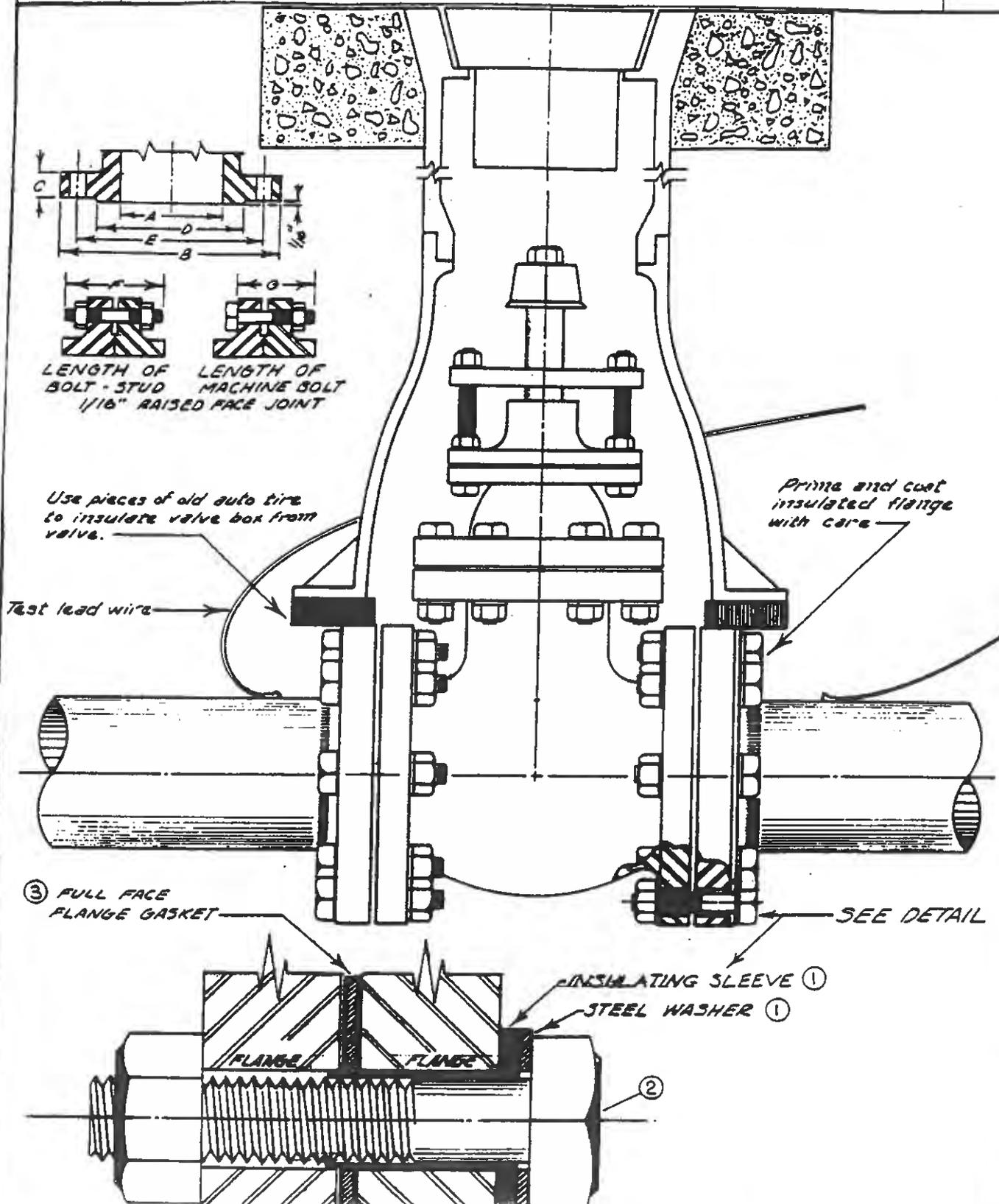
- NOTE: 1 All couplings to be centered over pipe joint with minimum spacing between pipe ends. Spacing shall not exceed 1".
 2 File pipe to bright finish over areas covered by bonding gaskets. Area should be a minimum of 2-1/2" wide.
 3 Lubricate gaskets with soap water before installing.
 4 Tighten all bolts on coupling uniformly.

AVAILABLE SIZES: 3/4" , 1" , 1-1/4" , 1-1/2"
 2" , 4" , 8" , 12" , 16" , 18" , 20" , 24" , 30"

	DATE	APPROVED	CITY PUBLIC SERVICE BOARD CONSTRUCTION STANDARD (GAS)	DRAWING DS-40
ISSUED	9-1-70	CJH		G-S-051-1-1
REVISED				

4.5

INSULATE FLANGE



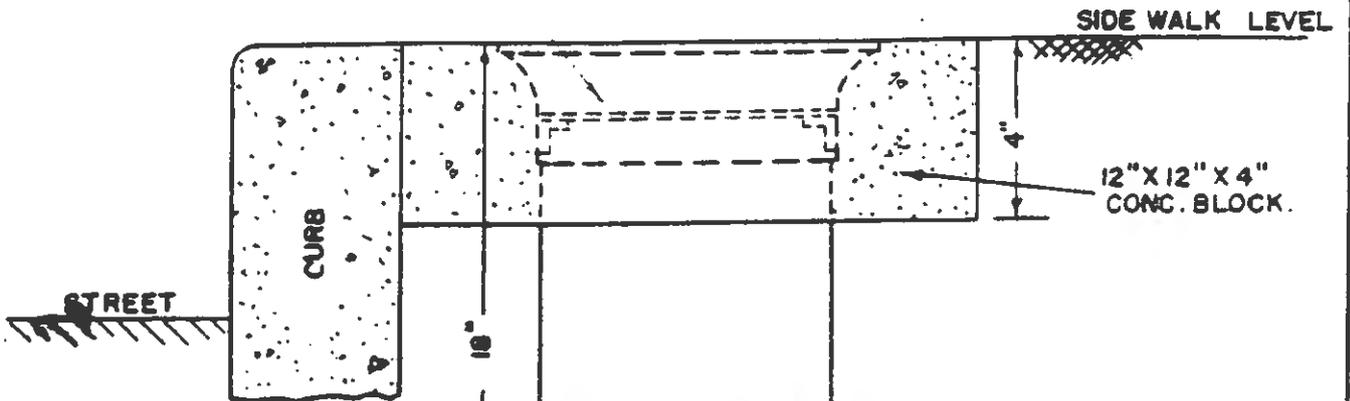
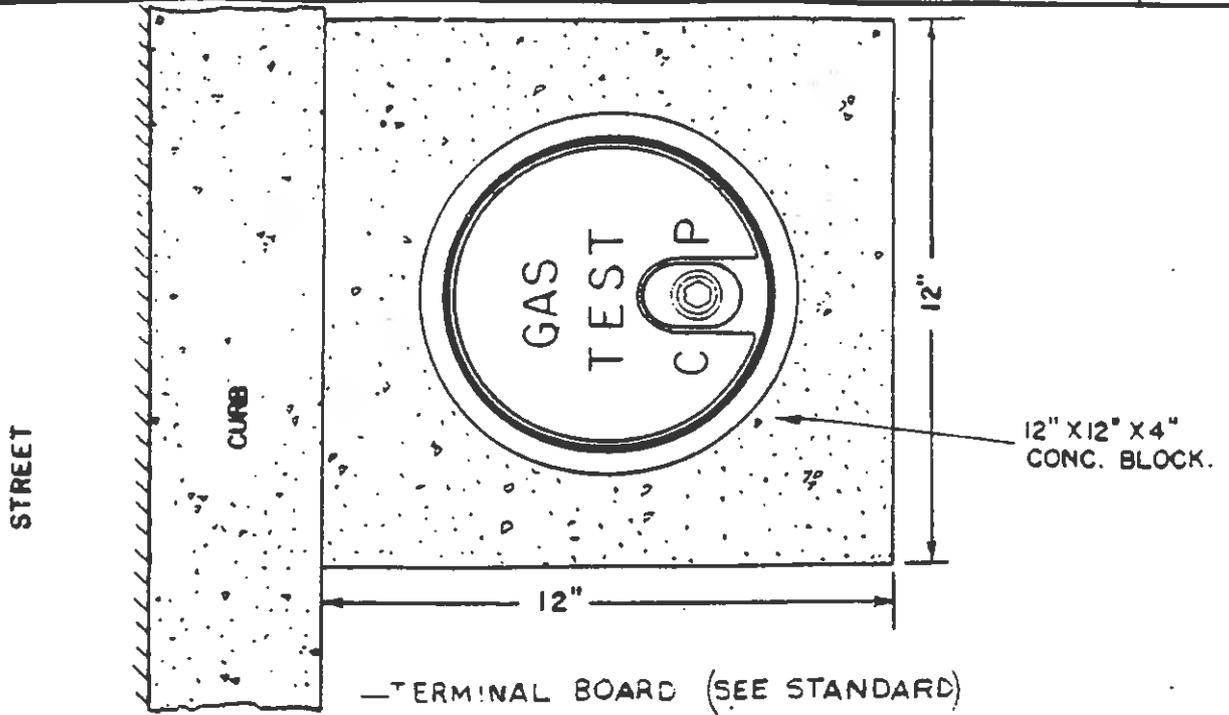
Available Sizes:

150# Flg (2, 4, 8, 12, 16); 150# Exist Flg (2, 4, 8, 12, 16); 300# Flg (8, 12, 16, 20)

ISSUED	DATE	APPROVED	CITY PUBLIC SERVICE BOARD CONSTRUCTION STANDARD (GAS)	DRAWING DS-41 G-S-118-1-1
REVISED	9-1-70	CJW		

4.5

CATHODIC PROTECTION TEST POINT



NOTE:

1. BE SURE BOTTOM OF TEST LEAD OPEN IS AT LEAST 6" BELOW END OF TEST POINT BARREL.

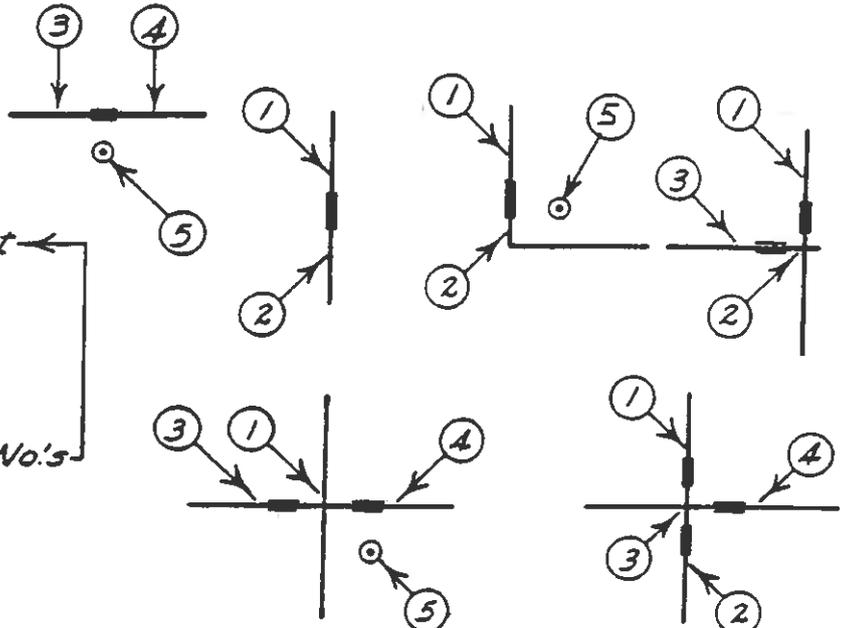
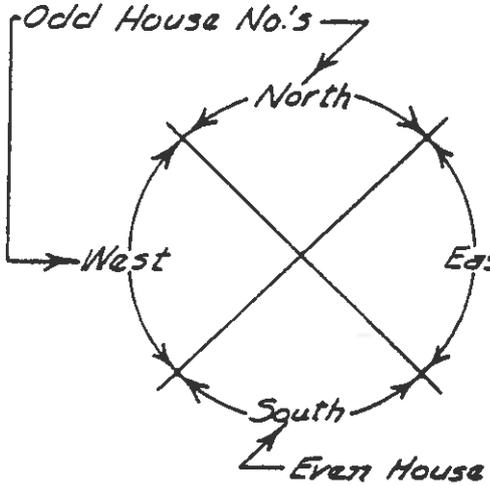
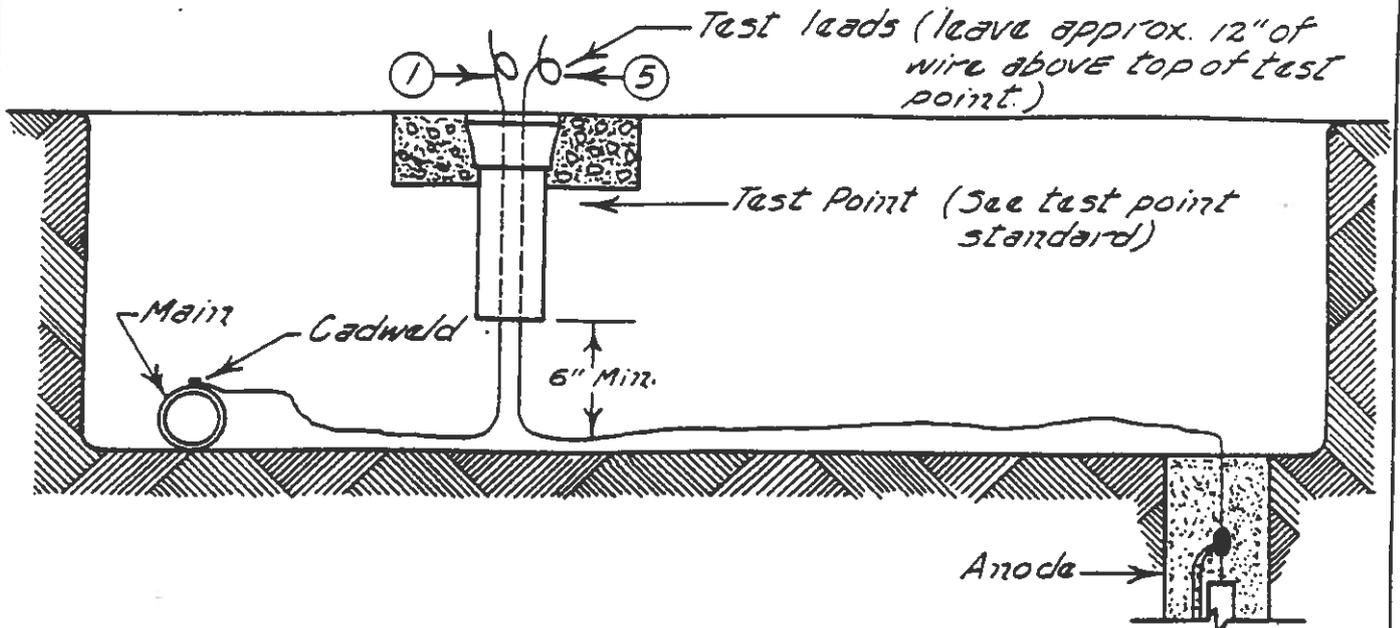
2. TEST POINT RECORD SHEETS WILL BE ATTACHED TO MAIN ORDER AND ARE TO BE COMPLETED BY MAIN FOREMAN.

TEST LEADS (NO 10 TYPE TW COPPER WIRE)

	DATE	APPROVED	CITY PUBLIC SERVICE BOARD	DRAWING DS-42
ISSUED	9-1-70	JH		G-S-182-2-0
REVISED				

4.5

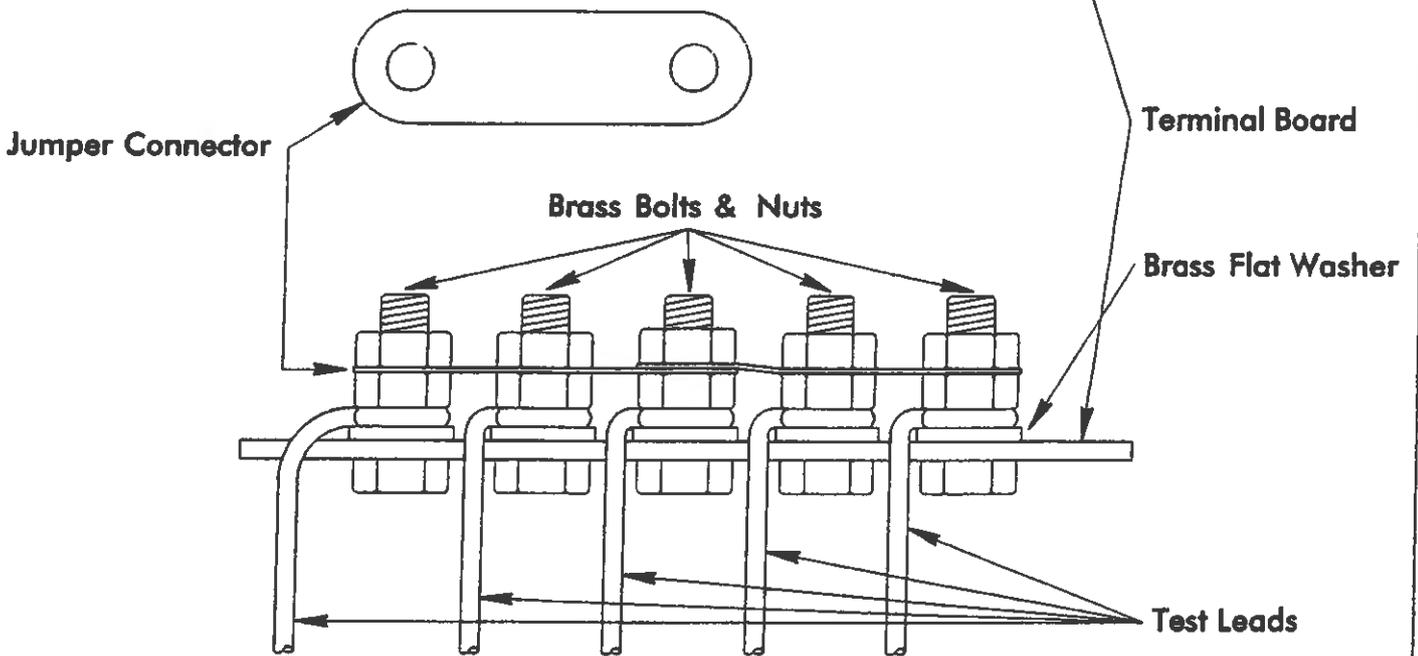
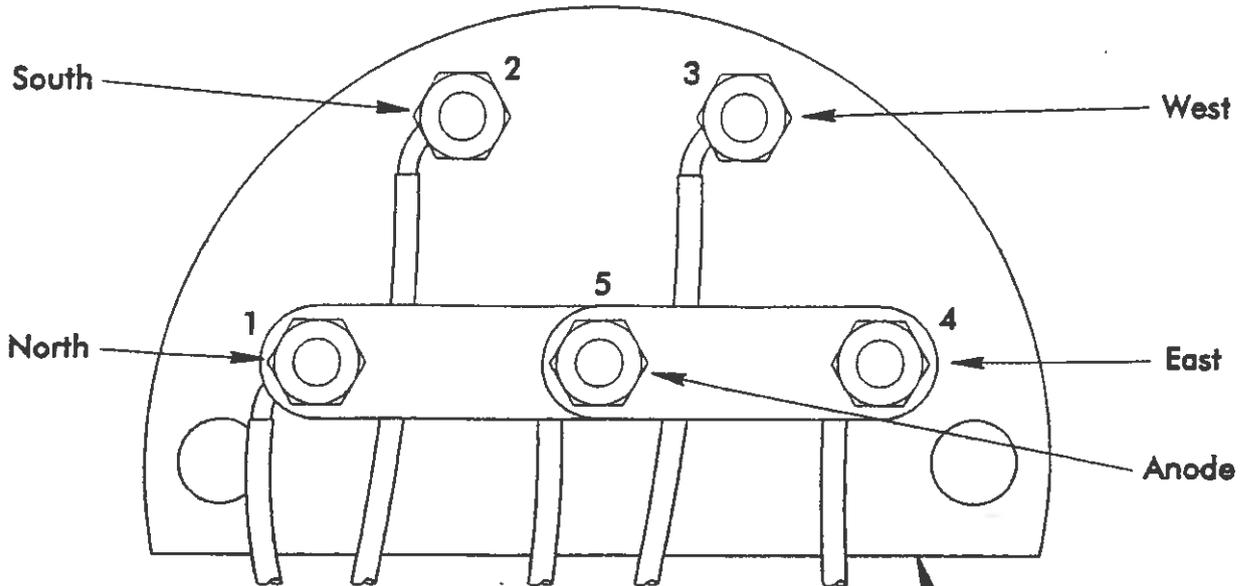
CATHODIC PROTECTION TEST LEAD CONNECTION TO MAIN



NOTES

1. All test leads to be No. 10 type TW solid copper wire.
2. Test point record cards will be attached to main order, and are to be completed by the main foreman.
3. All test leads should be tagged with a metal tag about 6" from end of lead according to the following numbering code:
 - 1 North
 - 2 South
 - 3 West
 - 4 East
 - 5 Anode

	DATE	APPROVED	CITY PUBLIC SERVICE BOARD	DRAWING DS-43
ISSUED	9-1-70	CJH		
REVISED				G-S-182-1-0

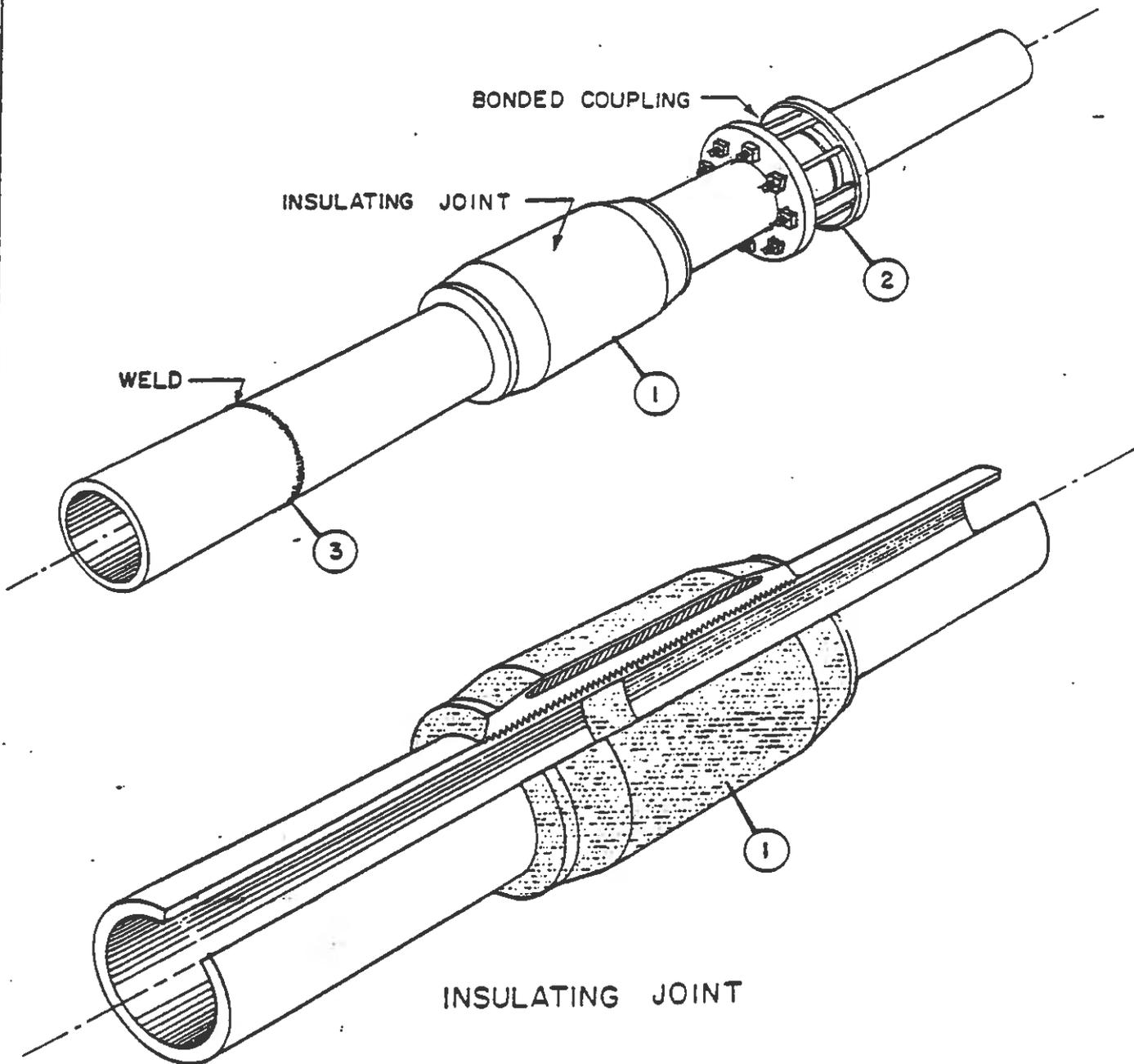


Note:
Connect test leads on top side of terminal board

	Date	Approved
Issued	11-28-94	<i>M. Kotare</i>
Revised		

4.5

INSULATING JOINT 8" & 12"

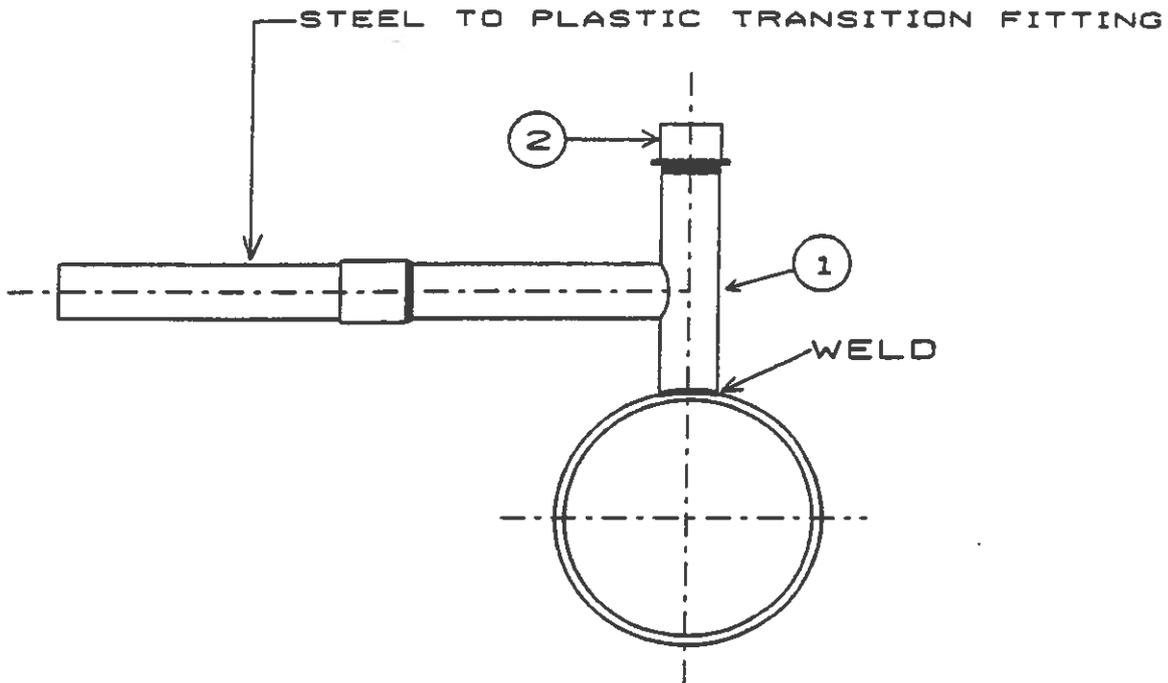


AVAILABLE SIZES: 8" & 12"

Page 14 of 19

ISSUED	DATE 6/5/00	APPROVED R.R. J	CITY PUBLIC SERVICE BOARD CONSTRUCTION DRAWING (GAS)	DRAWING DS-45
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TEE SERVICE WELDED TRANSITION
STEEL TO PLASTIC



SIZE SERVICE	DRILL SIZE
1"	$\frac{7}{8}$ "
1- $\frac{1}{4}$ "	1- $\frac{1}{8}$ "

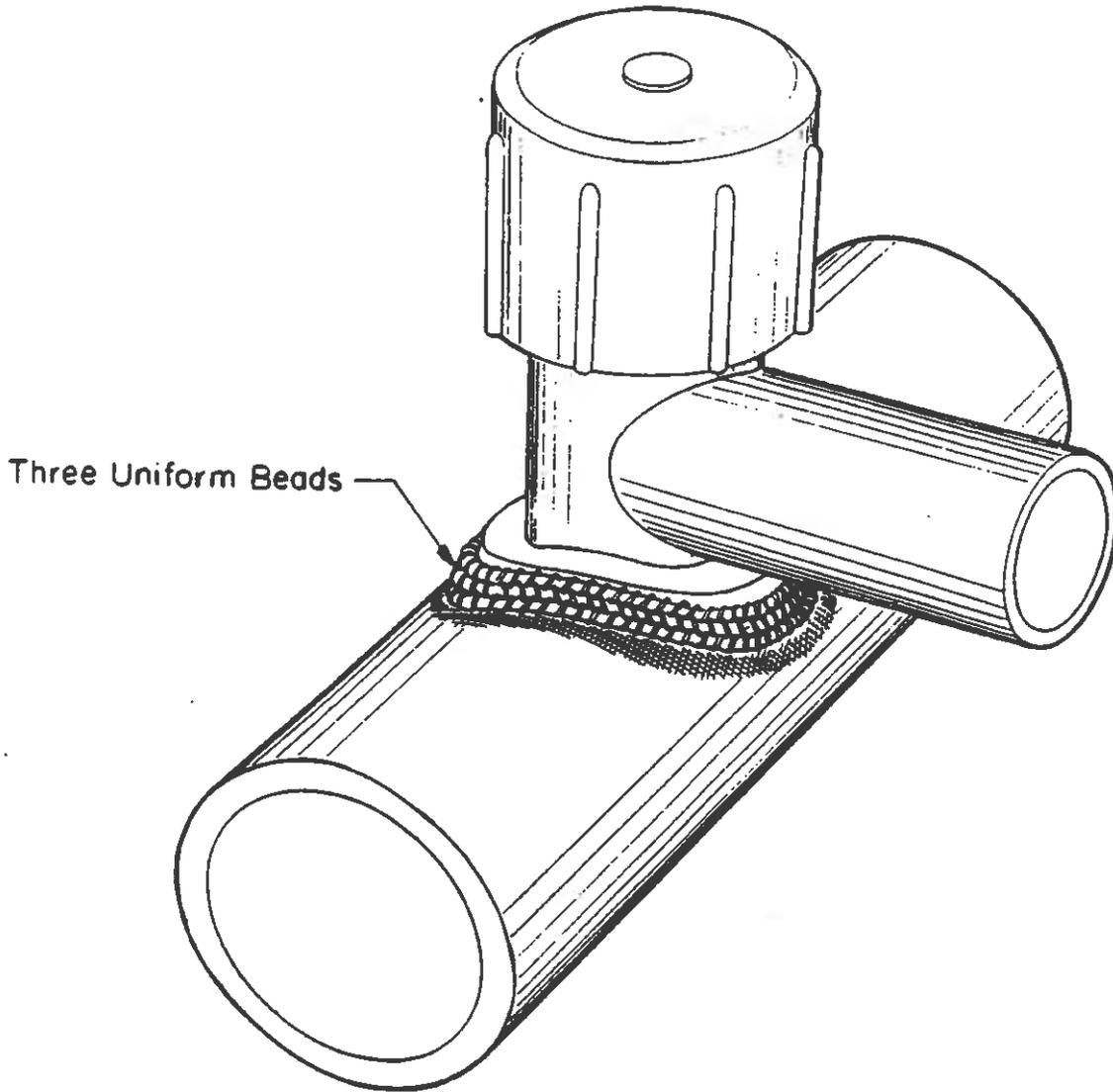
TEE SERVICE WELDED TRANSITION STEEL TO PLASTIC 1"
C.P.S. STOCK #520700204
TEE SERVICE WELDED TRANSITION STEEL TO PLASTIC 1- $\frac{1}{4}$ "
C.P.S. STOCK #520700220

	DATE	APPROVED	CITY PUBLIC SERVICE CONSTRUCTION STANDARD (GAS)	0 - 8 - 127 - 2 - 0 DRAWING DS-49
ISSUED				
REVISED				

**CPS
Design Standards
(Plastic Gas Pipe)
Exhibit GAS-4**

4.5

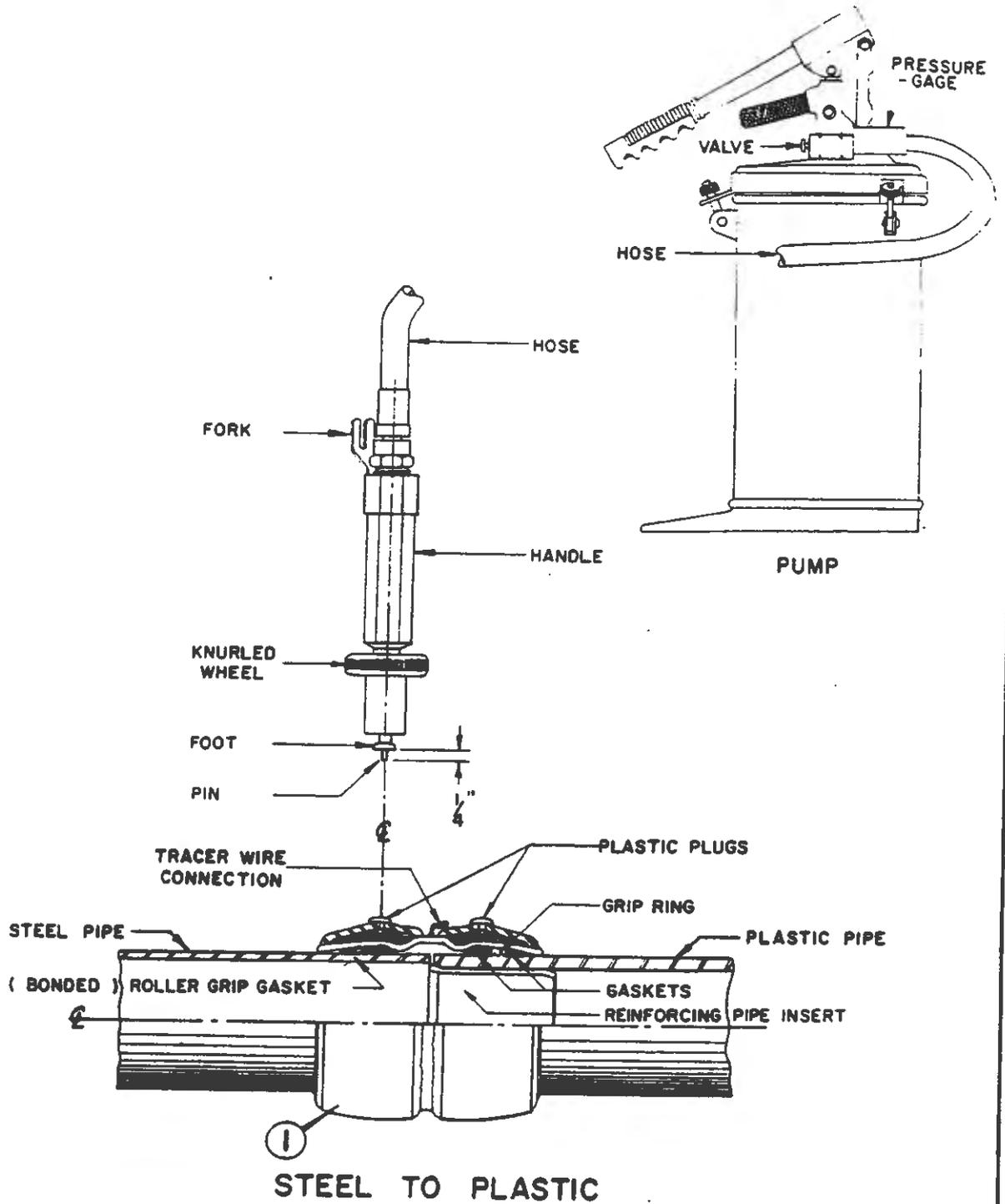
PLASTIC PIPE, TAPPING TEE



	DATE	APPROVED	CITY PUBLIC SERVICE BOARD CONSTRUCTION STANDARD (GAS)	DRAWING DS-21
ISSUED	3/03	R.K.L.		G-S-505-6-0
REVISED				

4.5

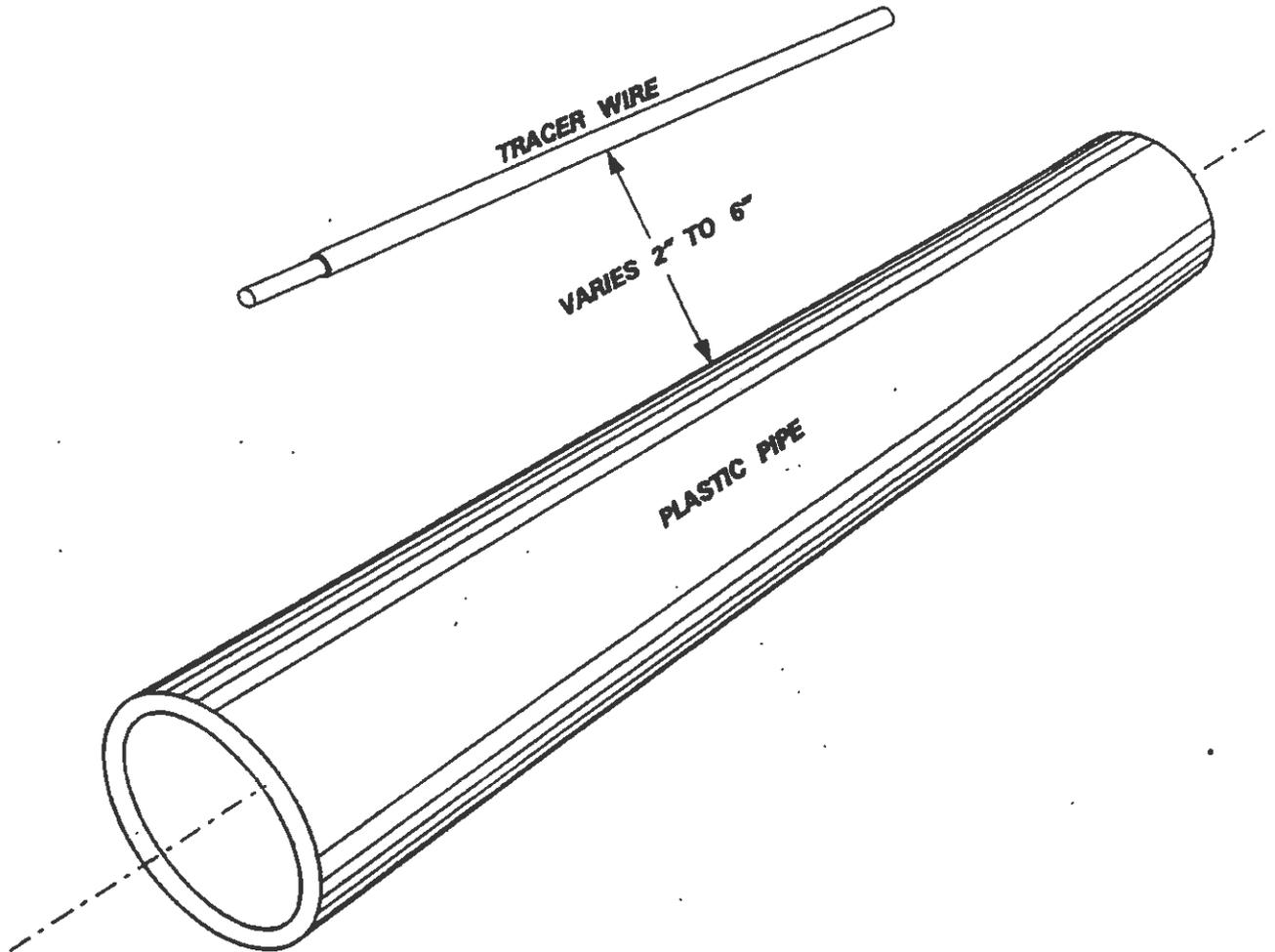
POSI-HOLD COUPLING INSTALLATION



ISSUED	DATE	APPROVED	CITY PUBLIC SERVICE BOARD CONSTRUCTION DRAWING (GAS)	DRAWING DS-24
REVISED	5/10	<i>DAV</i>		G-S-507-8-0

4.5

PLASTIC PIPE & TRACER WIRE

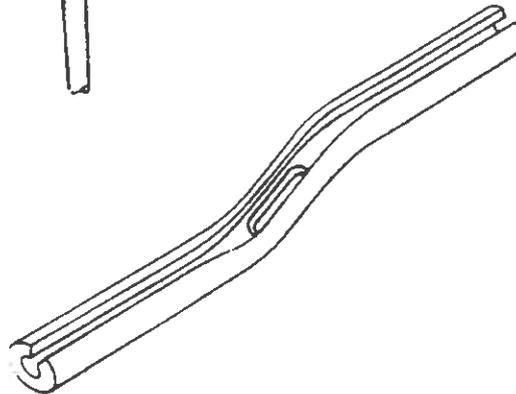
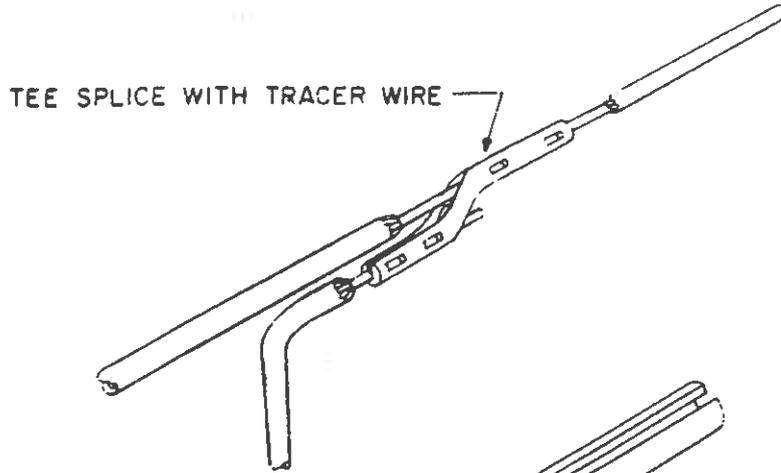


NOTE: THERE IS TO BE 2" TO 6" OF SEPARATION BETWEEN PIPE AND TRACER WIRE.

	DATE.	APPROVED	CITY PUBLIC SERVICE CONSTRUCTION STANDARD	G-S-501-2-1
ISSUED	6-6-80	D.R.S.		
REVISED				
			DATE: 18-Dec-82 12:47	

4 5

TEE SPLICE



TEE SPLICE

NOTE:

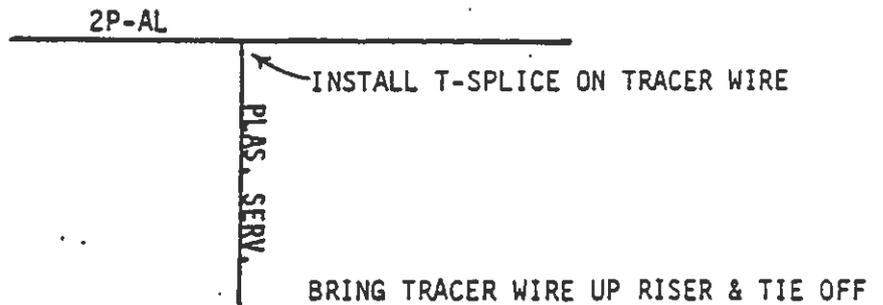
1. APPLY PIPELINE TAPE WRAP PRIMER (ALLOW TO DRY UNTIL TACKY)
2. USE PIPELINE TAPE WRAP ONLY (CIGARETTE WRAP)

	DATE	APPROVED	CITY PUBLIC SERVICE BOARD CONSTRUCTION DRAWING (GAS)	DRAWING DS-27
ISSUED	6/15/00	A.R.S.		G-S-541-1-0
REVISED				

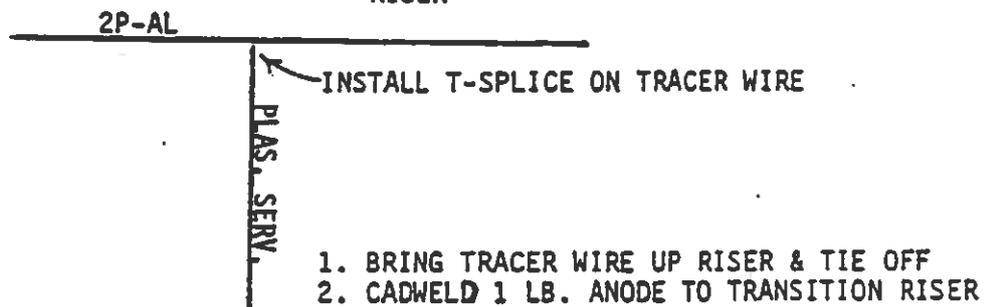
DRAWING DS-28
 EXAMPLES FOR ANODELESS RISERS
 (Page 1 of 2)

4/1/03

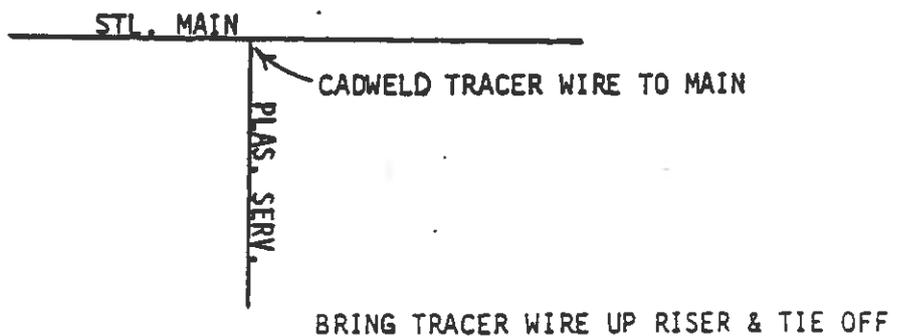
- ① ANODELESS TRACER WIRE ON PLASTIC MAIN - PLASTIC SERVICE WITH ANODELESS RISER



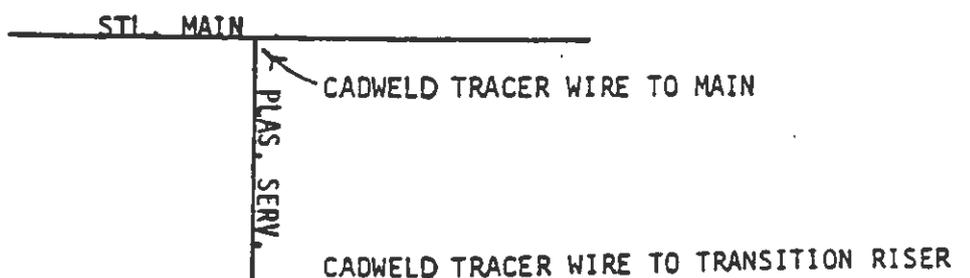
- ② ANODELESS TRACER WIRE ON PLASTIC MAIN - PLASTIC SERVICE WITH STEEL TRANSITION RISER



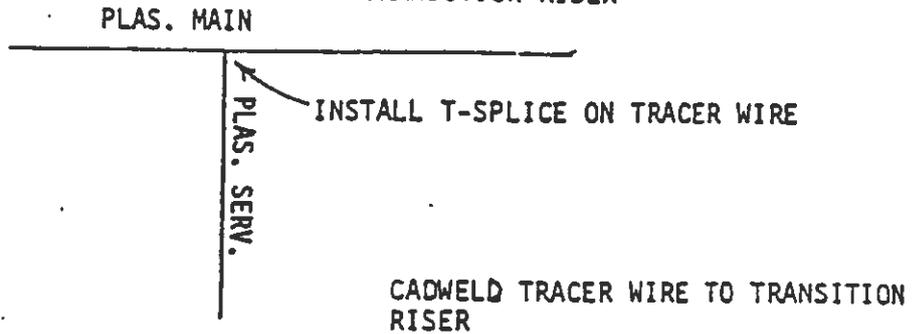
- ③ STEEL MAIN - PLASTIC SERVICE WITH ANODELESS RISER - ALSO RERUNS



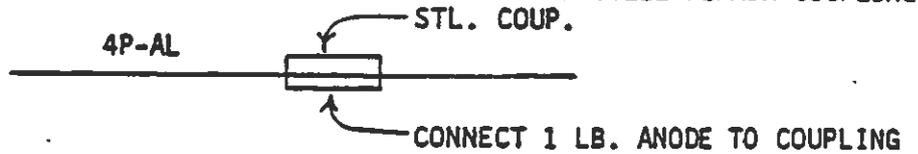
- ④ STEEL MAIN - PLASTIC SERVICE WITH STEEL TRANSITION RISER



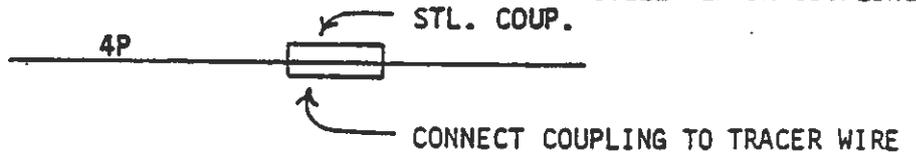
- ⑤ PROTECTED TRACER WIRE ON PLASTIC MAIN - 2" OR 4" PLASTIC SERVICE WITH STEEL TRANSITION RISER



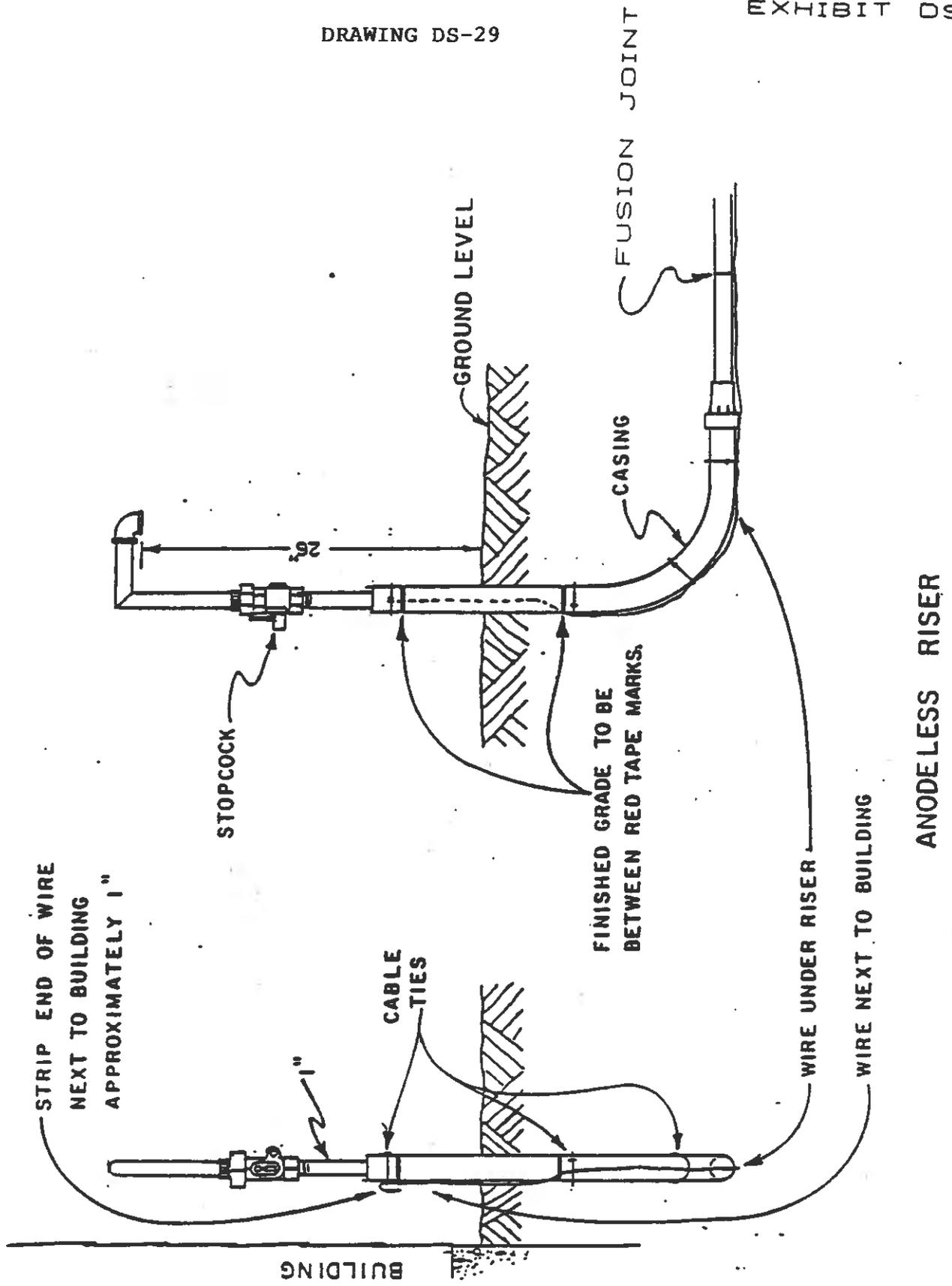
- ⑥ ANODELESS TRACER WIRE ON PLASTIC MAIN OR SERVICE WITH STEEL REPAIR COUPLING



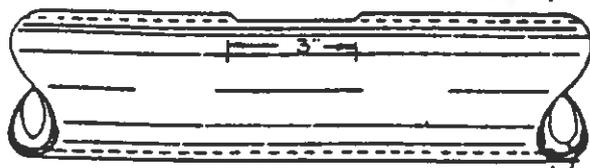
- ⑦ PROTECTED TRACER WIRE ON PLASTIC MAIN OR SERVICE WITH STEEL REPAIR COUPLING



NOTE - NEVER CADWELD TRACER WIRE TO THE NEW ANODELESS SERVICE RISER

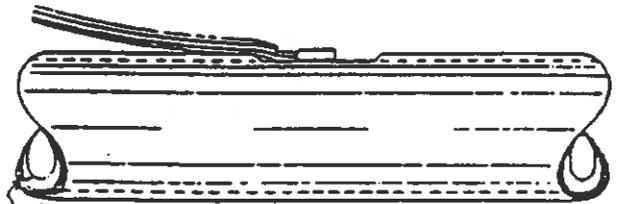


Remove a section of coating 3" long and file pipe bright so that a space 1" wide and 2" long is clean and dry.



STEP 1

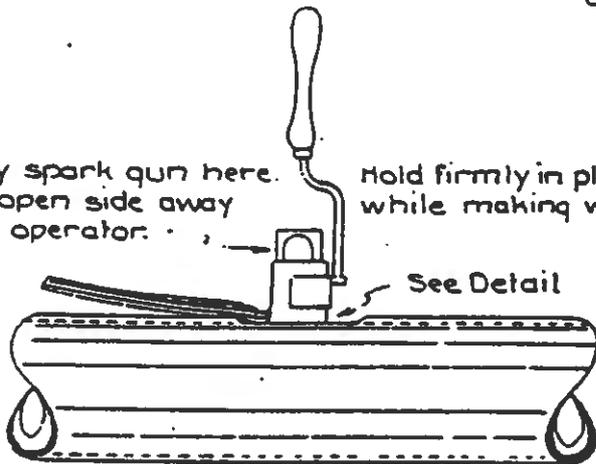
Strip 1/2" of insulation from wire and place copper sleeve on #10 and smaller wire.



STEP 2

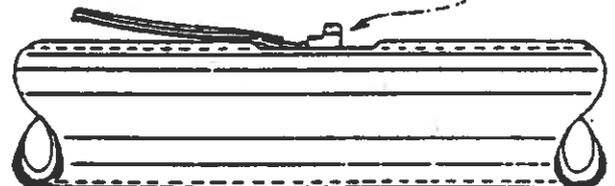
Apply spark gun here. Keep open side away from operator.

Hold firmly in place while making weld.



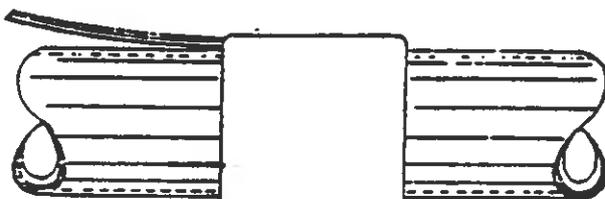
STEP 3

Remove slag with hammer and paint thoroughly with primer.

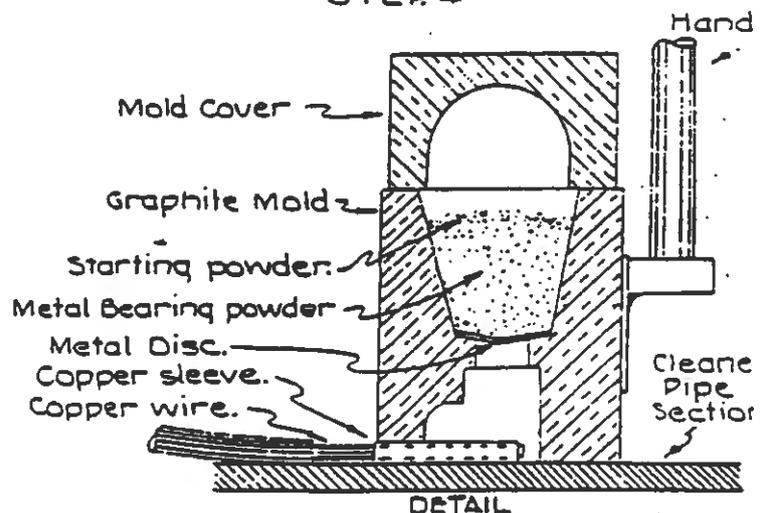


STEP 4

Repair pipe coating with care. Cover entire weld.



STEP 5



DETAIL

IMPORTANT

1. REMOVE RED CAP OF CADWELD CARTRIDGE AND DUMP ALL OF CONTENTS INTO MOLD. THE CHARGE WILL NOT IGNITE WITHOUT THE FINE STARTING POWDER ON TOP.
2. THE CARTRIDGES MUST BE KEPT DRY AT ALL TIMES.

Cadweld mold with sleeve for #10 wire and smaller.

CITY PUBLIC SERVICE BOARD

SAN ANTONIO, TEXAS
GAS DEPARTMENT

COPPER WIRE CONNECTION TO PIPE USING CADWELD.

INSTRUCTION SHEET - TYPE TB-3 WELDER**PREPARATION OF SURFACE:**

To obtain a good weld, surface must be bright clean and dry.

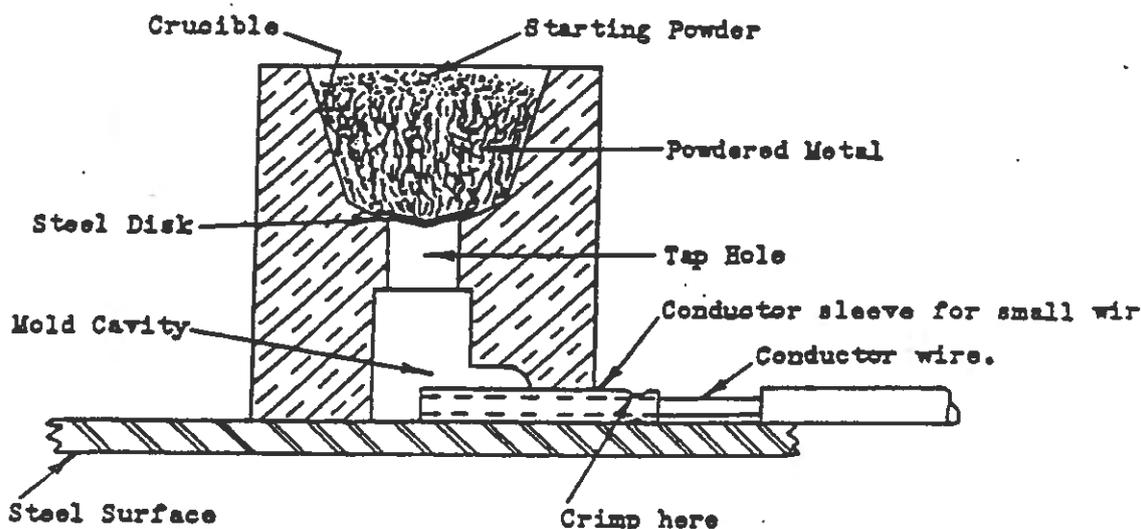
Steel surface should be ground or filed to remove all scale, rust, grease and dirt.

Galvanized steel must be cleaned with emery cloth to remove oxide.

PREPARATION OF WIRE:

Strip the insulation from the conductor and scrape until wire is bright and clean.

For #10 and smaller sizes, place the wire in a copper sleeve, ends flush, and crimp the sleeve tightly to the wire at the insulation to provide additional mechanical strength at the weld.

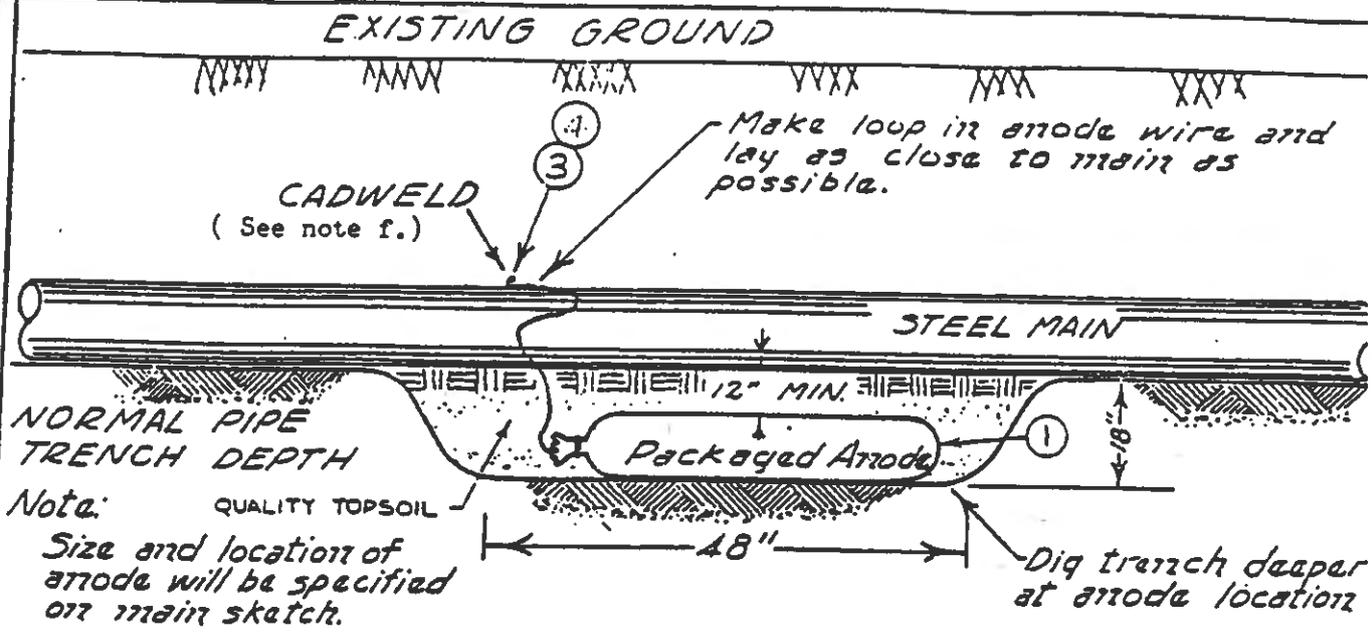
**WELDING PROCEDURE:**

- (1) PLACE WELDER OVER CLEAN STEEL SURFACE and insert the wire until it is under the CENTER of the tap hole.
- (2) COVER TAP HOLE WITH STEEL DISK.
- (3) DUMP CARTRIDGE IN CRUCIBLE AND CLOSE COVER. (Tap bottom of cartridge to be sure starting powder is emptied). Replace empty cartridge in box to keep remaining cartridges in an upright position.
- (4) HOLD DOWN ON WELDER TO PREVENT LEAKS AND IGNITE WITH FLINT GUN. Jerk gun away to prevent fouling. Should gun become fouled, soak in Spirits of Ammonia.
- (5) DO NOT REMOVE WELDER UNTIL METAL HAS SOLIDIFIED.
- (6) ALL SLAG MUST BE CLEANED FROM MOLD BEFORE MAKING NEXT WELD.

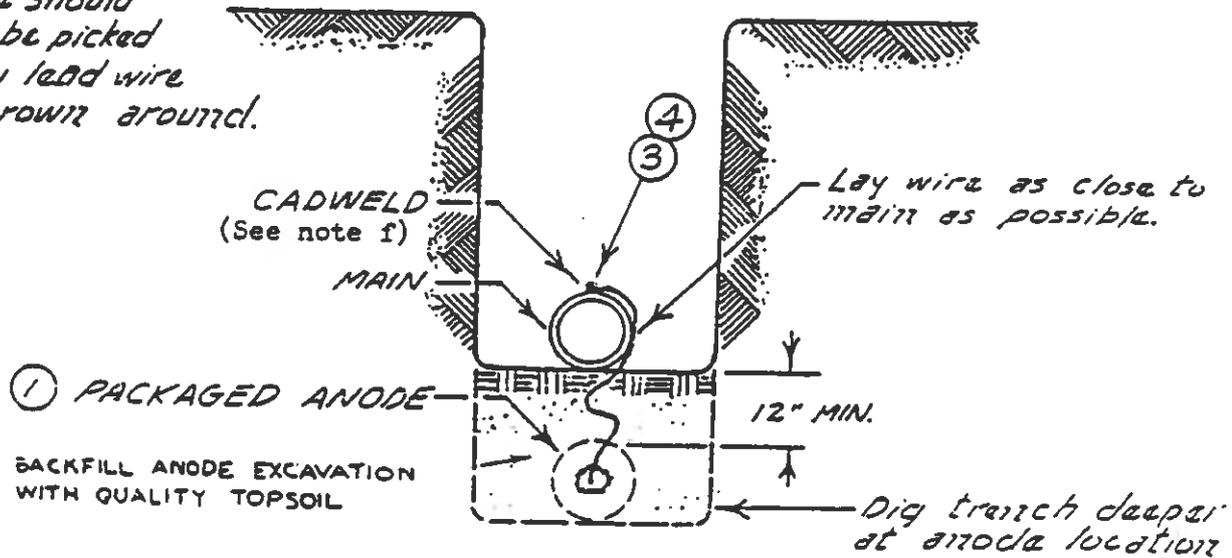
Note: Wet or damp molds produce porous welds. Mold can be dried out by firing a charge before making the desired weld.

4.5

PACKAGED ANODES



Anode should never be picked up by lead wire or thrown around.



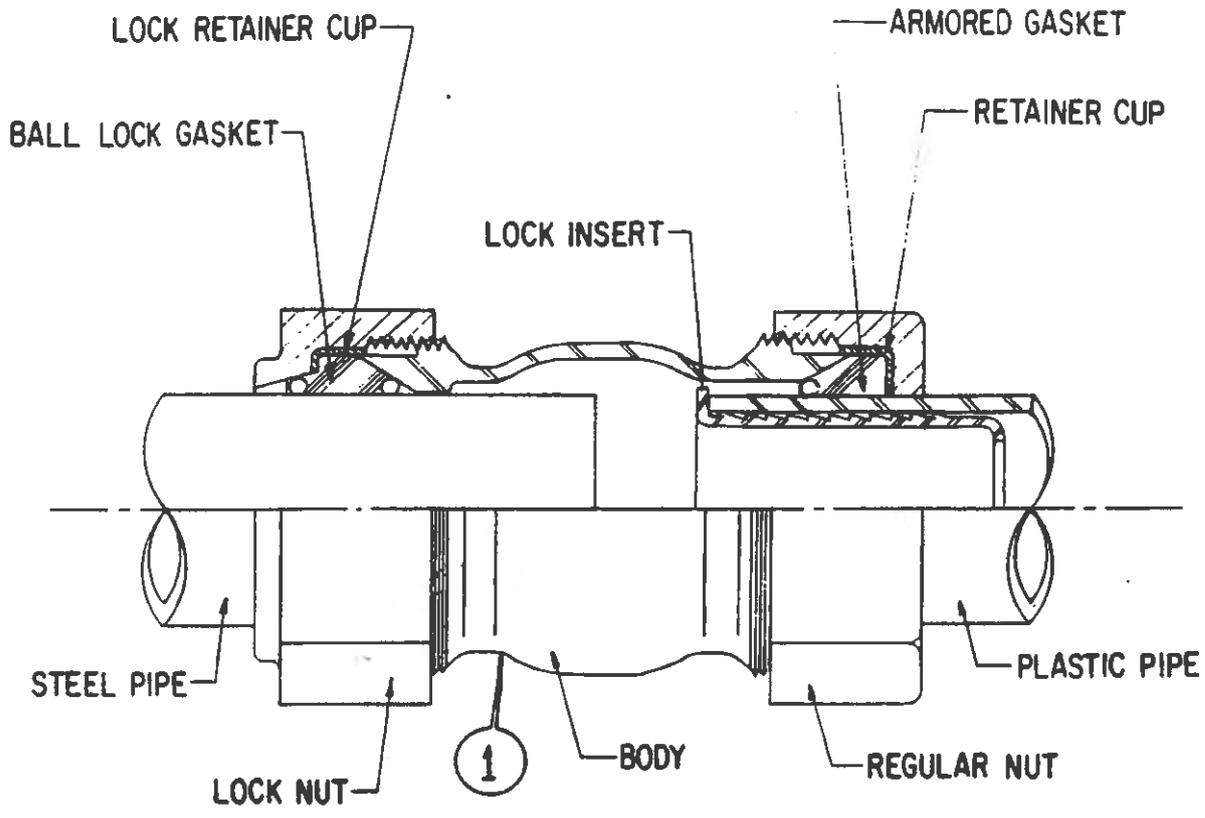
NOTES:

- a. Cadweld connection to be primed and coated carefully.
- b. Packaged anode should be covered with fine soil containing no rocks, clods, or sand.
- c. Pour 5 gallons of water over anode location and camp thoroughly.
- d. Provide test leads when specified. (See test lead standard)
- e. Anode specification sheet will be attached to main order, and is to be completed by the main construction foreman.
- f. Where plastic main is installed in place of steel, use tee splice to connect anode wire to tracer wire.

ISSUED	DATE	APPROVED	CITY PUBLIC SERVICE BOARD CONSTRUCTION STANDARD (GAS)	DRAWING DS-33
REVISED	12-14-77	242		G-S-171-1-2

4.5

PLASTI-LOK TRANSITION COUPLING INSTALLED



STEEL TO PLASTIC

AVAILABLE SIZES: 1", 1 1/4", 2"

	DATE	APPROVED	CITY PUBLIC SERVICE BOARD CONSTRUCTION DRAWING (GAS)	DRAWING DS-34
ISSUED	9/81	ARB		G-S-507-4-Ø
REVISED				

**CPS ENERGY
EXHIBIT GAS-5
COMPENSATION SCHEDULE
CONSTRUCTION OF NATURAL GAS DISTRIBUTION FACILITIES**

PROJECT NAME: Goliad Rd. – SE Military to 410 Access Rd., Base Bid

W.R. #: 1743809

NOTE A: For each of the items below, the Contractor's work is to include: trenching, joining, testing, coating steel, connecting new pipe to existing pipe and all necessary fittings for tie-ins such as, stopper fittings and 3-way stopper tees, sand padding, backfilling and compacting to consistency of original soil, Installing all necessary cathodic protection devices such as CPTLB's and anodes, replacing paving, curbs, and sidewalks removed or damaged during construction, and cleanup as may be necessary in each instance.

NOTE B: Trenching is considered to be the normal method of service installation and is required on all service adjustments. A gas service can be rerun by INSERTION, when the old service is PULLED from the riser to one foot inside the property line, ONLY at the discretion of the CPS Inspector.

NOTE C: Bid quantities shown are estimates by CPS. Per foot prices shall be applied to the actual distance measured along the top of the trench or the actual length of the bore, as applicable.

NOTE D: Unit prices shall include insurance costs. CPS' insurance requirements are specified in Exhibit GAS-1.

<u>ITEM NO.</u>	<u>DESCRIPTION</u>	<u>UNIT</u>	<u>UNIT PRICE</u>	<u>BID QUANTITY</u>	<u>TOTAL PRICE</u>
1.	Rerun and Lower Gas Service Off New Main (Main to 1 Ft. Inside Property Line), Sizes 1" thru 4" (including replacing riser if necessary).				
	Short Side	1 ea.	\$ _____	X 24	= \$ _____
2.	Cut Back, Pump Test and Tie Existing Service to New Main, Sizes 1" thru 4"	1 ea.	\$ _____	X 12	= \$ _____
3.	Install Gas Main or Casing (Distance As Measured Along the Top of Trench)				
	2" Plastic Pipe and Tracer Wire	1 ft.	\$ _____	X 82	= \$ _____
	6" Plastic Pipe and Tracer Wire	1 ft.	\$ _____	X 7184	= \$ _____

The COST to abandon the existing main(s) is not an ADDITIONAL item and is to be included in the Unit Price(s) for this item.

4. Street Restoration Adjustment, when required.
To be used as directed by the CPS Energy Representative.

Flowable Fill	1 CY.	\$ _____	X 40	= \$ _____
Asphalt	1 SY.	\$ _____	X 193	= \$ _____

**CPS ENERGY
EXHIBIT GAS-5
COMPENSATION SCHEDULE
CONSTRUCTION OF NATURAL GAS DISTRIBUTION FACILITIES**

TOTAL COST: \$ _____

COMPANY: _____

PREPARED BY: _____

TITLE: _____

DATE: _____

**CPS ENERGY
EXHIBIT GAS-5
COMPENSATION SCHEDULE
CONSTRUCTION OF NATURAL GAS DISTRIBUTION FACILITIES**

PROJECT NAME: Goliad Rd. – SE Military to 410 Access Rd., Additive Alternate 1

W.R. #: 1743809

NOTE A: For each of the items below, the Contractor's work is to include: trenching, joining, testing, coating steel, connecting new pipe to existing pipe and all necessary fittings for tie-ins such as, stopper fittings and 3-way stopper tees, sand padding, backfilling and compacting to consistency of original soil, Installing all necessary cathodic protection devices such as CPTLB's and anodes, replacing paving, curbs, and sidewalks removed or damaged during construction, and cleanup as may be necessary in each instance.

NOTE B: Trenching is considered to be the normal method of service installation and is required on all service adjustments. A gas service can be rerun by INSERTION, when the old service is PULLED from the riser to one foot inside the property line, ONLY at the discretion of the CPS Inspector.

NOTE C: Bid quantities shown are estimates by CPS. Per foot prices shall be applied to the actual distance measured along the top of the trench or the actual length of the bore, as applicable.

NOTE D: Unit prices shall include insurance costs. CPS' insurance requirements are specified in Exhibit GAS-1.

<u>ITEM NO.</u>	<u>DESCRIPTION</u>	<u>UNIT</u>	<u>UNIT PRICE</u>	<u>BID QUANTITY</u>	<u>TOTAL PRICE</u>
1	Rerun and Lower Gas Service Off New Main (Main to 1 Ft. Inside Property Line), Sizes 1" thru 4" (including replacing riser if necessary).				
	Short Side	1 ea.	\$ _____	X 4	= \$ _____
2	Rerun and Lower Longhorn Gas Service Off New Main (Main to 3 Ft. Inside R.O.W.), Sizes 1" thru 4" (including replacing riser if necessary).				
	Long Side	1 ea.	\$ _____	X 2	= \$ _____
3	Install Gas Main or Casing (Distance As Measured Along the Top of Trench)				
	4" Plastic Pipe and Tracer Wire	1 ft.	\$ _____	X 196	= \$ _____
	6" Plastic Pipe and Tracer Wire	1 ft.	\$ _____	X 535	= \$ _____

The COST to abandon the existing main(s) is not an ADDITIONAL item and is to be included in the Unit Price(s) for this item.

**CPS ENERGY
EXHIBIT GAS-5
COMPENSATION SCHEDULE
CONSTRUCTION OF NATURAL GAS DISTRIBUTION FACILITIES**

<u>ITEM NO.</u>	<u>DESCRIPTION</u>	<u>UNIT</u>	<u>UNIT PRICE</u>	<u>BID QUANTITY</u>	<u>TOTAL PRICE</u>
4.	Install Gas Main by Directional Drilling. Includes all costs for installation and restoration including cost of bore pits.				
	6" Plastic Pipe and Tracer Wire	1 ft.	\$ _____	X 303	= \$ _____

The COST to abandon the existing main(s) is not an ADDITIONAL item and is to be included in the Unit Price(s) for this item.

5.	Street Restoration Adjustment, when required. To be used as directed by the CPS Energy Representative.				
	Flowable Fill	1 CY.	\$ _____	X 5	= \$ _____
	Asphalt	1 SY.	\$ _____	X 32	= \$ _____

TOTAL COST: \$ _____

COMPANY: _____

PREPARED BY: _____

TITLE: _____

DATE: _____

**CPS ENERGY
EXHIBIT GAS-5
COMPENSATION SCHEDULE
CONSTRUCTION OF NATURAL GAS DISTRIBUTION FACILITIES**

PROJECT NAME: Goliad Rd. – SE Military to 410 Access Rd., Additive Alternate 2

W.R. #: 1743809

NOTE A: For each of the items below, the Contractor's work is to include: trenching, joining, testing, coating steel, connecting new pipe to existing pipe and all necessary fittings for tie-ins such as, stopper fittings and 3-way stopper tees, sand padding, backfilling and compacting to consistency of original soil, Installing all necessary cathodic protection devices such as CPTLB's and anodes, replacing paving, curbs, and sidewalks removed or damaged during construction, and cleanup as may be necessary in each instance.

NOTE B: Trenching is considered to be the normal method of service installation and is required on all service adjustments. A gas service can be rerun by INSERTION, when the old service is PULLED from the riser to one foot inside the property line, ONLY at the discretion of the CPS Inspector.

NOTE C: Bid quantities shown are estimates by CPS. Per foot prices shall be applied to the actual distance measured along the top of the trench or the actual length of the bore, as applicable.

NOTE D: Unit prices shall include insurance costs. CPS' insurance requirements are specified in Exhibit GAS-1.

<u>ITEM NO.</u>	<u>DESCRIPTION</u>	<u>UNIT</u>	<u>UNIT PRICE</u>	<u>BID QUANTITY</u>	<u>TOTAL PRICE</u>
1.	Rerun and Lower Longhorn Gas Service Off New Main (Main to 1 Ft. Inside Property Lines), Sizes 1" thru 4" (including replacing riser if necessary).				
	Short Side	1 ea.	\$ _____	X 2	= \$ _____
2.	Rerun and Lower Longhorn Gas Service Off New Main (Main to 3 Ft. Inside R.O.W.), Sizes 1" thru 4" (including replacing riser if necessary).				
	Long Side	1 ea.	\$ _____	X 2	= \$ _____
3.	Install Gas Main or Casing (Distance As Measured Along the Top of Trench)				
	2" Plastic Pipe and Tracer Wire	1 ft.	\$ _____	X 33	= \$ _____
	4" Plastic Pipe and Tracer Wire	1 ft.	\$ _____	X 57	= \$ _____
	6" Plastic Pipe and Tracer Wire	1 ft.	\$ _____	X 1295	= \$ _____

The COST to abandon the existing main(s) is not an ADDITIONAL item and is to be included in the Unit Price(s) for this item.

**CPS ENERGY
EXHIBIT GAS-5
COMPENSATION SCHEDULE
CONSTRUCTION OF NATURAL GAS DISTRIBUTION FACILITIES**

<u>ITEM NO.</u>	<u>DESCRIPTION</u>	<u>UNIT</u>	<u>UNIT PRICE</u>	<u>BID QUANTITY</u>	<u>TOTAL PRICE</u>
4.	Street Restoration Adjustment, when required. To be used as directed by the CPS Energy Representative.				
	Flowable Fill	1 CY.	\$ _____	X 20	= \$ _____
	Asphalt	1 SY.	\$ _____	X 93	= \$ _____

TOTAL COST: \$ _____

COMPANY: _____

PREPARED BY: _____

TITLE: _____

DATE: _____

EXHIBIT GAS-7

CPS Energy Covered Tasks Regulated by 49 CFR Part 192

<u>Tasks Regulated By 49 CFR Part 192</u>	<u>CFR 192</u>	<u>ReQual Interval</u>	<u>Tasks Regulated By 49 CFR Part 192</u>	<u>CFR 192</u>	<u>ReQual Interval</u>
Examining PE pipe for defects	192.59	3 year		192.287	3 year
Visually inspecting metallic components for defects	192.144	3 year		192.305	3 year
Welding	192.225	6 month		192.307	3 year
	192.225	-----		192.309 192.713	3 year
	192.241	3 year		192.311	3 year
	192.243	3 year	Installation of pipe in a ditch	192.319	3 year
	192.243	3 year	Inserting PE pipe into a casing	192.321	3 year
Repair or removal of weld defects	192.245 192.715	6 month	Installing customer meters and regulators	192.357	3 year
Making welded joints	192.273	6 month	Installation of service lines	192.361	3 year
Inspecting welded joints	192.273	3 year	Installation and maintenance of cathodic protection systems	192.453	3 year
Joining PE pipe by heat fusion or mechanical joint	192.281	1 year		192.457	-----
Qualifying PE pipe joining procedures	192.283	1 time		192.457	3 year
	192.285	-----	Inspecting pipe coating	192.459 192.461	3 year
	192.285	-----		192.465	3 year
Testing cathodic protection system with pipe-to-soil reads	192.465	3 year	Line locating and marking pipelines	192.614	3 year
Inspect interference bonds, diodes & reverse current switches	192.465	3 year		192.615	-----
Remedial actions to correct cathodic protection deficiencies	192.465	3 year		192.615	3 year
Connecting test lead wires to the pipeline ^{1,2}	192.471	-----	Making safe a pipeline emergency	192.615	3 year
Taking action to minimize the effect of stray currents	192.473	3 year		192.615	-----
	192.475	3 year		192.619 192.621	3 year
Cleaning and coating pipe for control of atmospheric corrosion	192.479	3 year		192.625	3 year
	192.479	3 year		192.625	3 year
	192.479 192.483	3 year	Tapping pipelines under pressure	192.627	3 year

Covered Tasks (cont)

Pipeline pressure testing	192.503	3 year	Purging of pipelines	192.629	3 year
	192.605	3 year			
	192.605	-----			
²	192.605	-----	Abandoning or deactivating pipeline facilities	192.727	3 year
Starting up and shutting down any part of a pipeline	192.605	3 year			3 year
Taking precautions against hazardous atmospheres in trenches ^{2,3}	192.605	-----			3 year
Recognizing safety-related conditions that require reporting	192.605	3 year			3 year
	192.605	3 year			3 year
	192.605	3 year	Prevention of accidental ignition	192.751	3 year
	192.613	3 year			

¹ Not an operations or maintenance task

² Does not affect the operation or integrity of the pipeline

³ Not an activity performed on the pipeline

⁴ Not required by CFR Part 192

Any Contractor employed by CPS Energy to perform a covered task will have their employees qualified by an approved consortium or training provider. CPS Energy will require Contractor to supply a list of all qualified personnel and may require the Contractor to supply the qualified employee with a qualification card stating tasks that employee is qualified for, the qualification date, qualification method and the name of the qualifier.

CPS Energy will accept qualification of Contractor employees by any approved combination of the following methods:

- (a) approved qualification and training program (i.e. TEEX/TGA)
- (b) approved certifications (i.e. AWS Certified Welding Inspector, ASNT)
- (c) field evaluation
- (d) work performance history (See Note); and
- (e) other forms of assessment approved by CPS Energy

Contractor employee will be subject, at a minimum, to the same requalification intervals as CPS Energy employees. CPS Energy shall have the right to require removal of any employee of Contractor, or of Subcontractors, who in the CPS Energy representative's opinion, may be incompetent or unqualified to perform work.

Note: Work performance history cannot be the sole method for qualifying an employee after October 28, 2002.