

**SAN ANTONIO WATER SYSTEM
Traders Village 36-inch Oversize
(16-inch Required) Project
SAWS Job # 09-1046
SAWS Solicitation No. B-10-022-CM
ADDENDUM NO. 1**

March 4, 2010

This addendum, applicable to work designed above, is an amendment to the bidding and specification documents and as such shall be part of and included in the Contract Documents. Acknowledge receipt of this addendum by entering the addendum number and issue date in the space provided in submitted copies of the proposal.

1.0 Clarifications:

QUESTION: "On the first page on the plans, CW4, the engineer (?) has a bull head tee beginning the project. They are not available in that size, 24"x 36". There needs to be a 24" Flg tee with a Flg X MJ reducer 36" x 24" to begin the line."

RESPONSE: The Tie-in to the 24" water main has been revised. Please see the revised plan sheet with this addendum.

QUESTION: "The contractor also mentioned that we may want to clarify that the butterfly valve at the 24" tie-in point must be flanged due to the existing CSC pipe type."

RESPONSE: The 24" and 36" Butterfly valves should be flanged. Revised Bid Proposal is attached.

QUESTION: "Should the reducer at the beginning of the project be eccentric?"

RESPONSE: The 24" x 36" reducer should be concentric. Please see the revised plan sheet with this addendum.

QUESTION: "There is no size for the CARV on the beginning of the line."

RESPONSE: A 2-inch air release valve will be required. See SAWS Specification 846.

QUESTION: "There is a 12"X8" tee and a 12"X4" tee with no gate valves attached to the branch and no plug on the end. There should be."

RESPONSE: Gate valves and plugs were omitted and have been attached to the revised drawing and updated on the revised bid proposal.

QUESTION: "Bid item 812 is 510 lf, Bid item 856 is 300 lf; There is only 510 lf of 12" pipe on the project, what is item 856 for just the steel casing?"

RESPONSE: Item 856 "12" Water Pipe in 24" Steel Casing" should read "24" Steel Casing for 12" Water Pipe". Bid Proposal has been revised.

QUESTION: "We also request clarification on the pipe restrained note. Do they want the whole job restrained?"

RESPONSE: The pipe restrained lengths are indicated on the plans with a "*". All of the 12" water main is indicated as restrained. The 36" should be restrained as noted on the plans.

QUESTION: "Is a construction trailer required for this project?"

RESPONSE: SAWS does not require a construction trailer for this project.

QUESTION: "Is cathodic protection required? If so, please provide a design for the cathodic protection system."

RESPONSE: If steel pipe is used for the project cathodic protection will be required. The design and installation of cathodic protection must be provided by the contractor and should be included as an incidental cost with the price of the water main (Item No. 812). The cathodic protection must meet NACE minimum standards and at a minimum must include jump wires at pipe joints, magnesium anodes and testing stations. SAWS Inspection Department must approve design of cathodic protection before installation.

QUESTION: "36" Butterfly Valves. According to the contractor, the SAWS detail shows a flanged valve, but the bid item is a "M.J.". Are both types accepted by SAWS?"

RESPONSE: The 36" and 24" Butterfly Valves should be flanged. See SAWS Specification 830. Bid Proposal has been revised.

QUESTION: "Will the engineer provide staking or the Contractor?"

RESPONSE: The engineer will provide 1 staking of the alignment and will require 1 week notice from the contractor before staking is to be started.

QUESTION: "What type of bedding will be required for the main?"

RESPONSE: See SAWS Specification 804

QUESTION: "Does it matter how the minimum minority rating is obtained in regards to contractors or suppliers?"

RESPONSE: The SMWB percentage can be obtained by utilizing SMWB contractors and/or SMWB suppliers.

QUESTION: "Is there a list of subcontractors and suppliers registered as SMWB's that are approved by SAWS? If so, where can it be found?"

RESPONSE: SAWS recognizes firms that are certified by the South Central Texas Regional Certification Agency (SCTRCA). SMWB certified subcontractors and suppliers can be found by visiting the SCTRCA website at www.sctrca.org.

Should you have further questions pertaining to the SWMB participation, please contact the SAWS SMWB Program Manager at 210-233-3420 or ruby.webb@saws.org. Individual questions to the SAWS SMWB Program Manager will be considered independent and private from this specific bid and therefore will not be published as an addendum or delay the bid opening of this project.

QUESTION: "Will the contractor be required to pay for the water for testing of the main?"

RESPONSE: The contractor will be required to obtain a fire hydrant meter for normal water consumption during the construction of the project. The contractor will not be required to pay for the water necessary for testing, but will be required to coordinate this usage with the SAWS Inspector.

2.0 Revisions:

- a. Replace the first 5 pages of the Proposal section with the attached revised proposal numbered BP-1 through BP-5.
- b. Replace Plan sheets CW3.0, CW4.0, CW4.1 and CW5.0 with the attached Plan sheets numbered the same.

Matt Johnson
3/4/10



ACKNOWLEDGEMENT BY BIDDER

Each bidder is requested to acknowledge receipt of this Addendum No. 1 by his/her signature affixed hereto and to file same and attach with his/her bid.

The undersigned acknowledges receipt of this Addendum No. 1 and the bid submitted herewith is in accordance with the information and stipulations set forth.

DATE

SIGNATURE

END OF ADDENDUM NO. 1

This addendum including this page is 3 pages in its entirety.

Traders Village
 36-Inch Oversized (16-Inch Required) Water Main
 SAWS Job No. 09-1046
 Solicitation No. B-10-022-CM

BID PROPOSAL

PROPOSAL OF _____, a corporation
 a partnership consisting of _____
 an individual doing business as _____

THE SAN ANTONIO WATER SYSTEM

Pursuant to Instructions and Invitations to Bidders, the undersigned proposes to furnish all labor and materials as specified and perform the work required for the construction of pipelines and appurtenances, San Antonio Water System Job Number 09-1046 in accordance with the Plans and Specifications for the following prices to wit:

1.0 BASE BIDS' QUANTITIES & PRICING

ITEM NO.	DESCRIPTION (Unit Price to be written in words)	UNIT	QTY	UNIT PRICE (Figures)	TOTAL PRICE (Figures)
812.	36" Water Pipe _____ Dollars and _____ Cents	LF	4,413	\$ _____	\$ _____
812.	12" Water Pipe _____ Dollars and _____ Cents	LF	510	\$ _____	\$ _____
856	Jacking, Boring and Tunneling 24" Steel Casing _____ Dollars and _____ Cents	LF	300	\$ _____	\$ _____
856	24" Steel Casing for 12" Water Pipe _____ Dollars and _____ Cents	LF	300	\$ _____	\$ _____
830	36" Butterfly, Flanged w/Valve Box and Marker, Complete _____ Dollars and _____ Cents	EA	3	\$ _____	\$ _____

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ITEM NO.	DESCRIPTION (Unit Price to be written in words)	UNIT	QTY	UNIT PRICE (Figures)	TOTAL PRICE (Figures)
830	24" Butterfly, Flanged w/Valve Box and Marker, Complete _____ Dollars and _____ Cents	EA	1	\$ _____	\$ _____
828	12" Gate Valve, MJ w/Valve Box and Marker, Complete _____ Dollars and _____ Cents	EA	4	\$ _____	\$ _____
828	8" Gate Valve, MJ w/Valve Box and Marker, Complete _____ Dollars and _____ Cents	EA	1	\$ _____	\$ _____
828	4" Gate Valve, MJ w/Valve Box and Marker, Complete _____ Dollars and _____ Cents	EA	1	\$ _____	\$ _____
844	4" Permanent Blow-off Assembly _____ Dollars and _____ Cents	EA	1	\$ _____	\$ _____
844	2" Permanent Blow-off Assembly _____ Dollars and _____ Cents	EA	4	\$ _____	\$ _____
834	Standard Fire Hydrant Assembly, Complete _____ Dollars and _____ Cents	EA	6	\$ _____	\$ _____
840	24" Water Tie-in to include 36" x 24" concentric flanged reducer _____ Dollars and _____ Cents	EA	1	\$ _____	\$ _____

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ITEM NO.	DESCRIPTION (Unit Price to be written in words)	UNIT	QTY	UNIT PRICE (Figures)	TOTAL PRICE (Figures)
841	Hydrostatic Pressure Test _____ Dollars and _____ Cents	EA	1	\$ _____	\$ _____
550	Trench Excavation Protection _____ Dollars and _____ Cents	LF	4,923	\$ _____	\$ _____
846	2" Air Release Valve _____ Dollars and _____ Cents	EA	1	\$ _____	\$ _____
506	TPDES SWPPP Measures (including Revegetation) _____ Dollars and _____ Cents	LS	1	\$ _____	\$ _____
530	Barricades Signs & Traffic Handling _____ Dollars and _____ Cents	LS	1	\$ _____	\$ _____
A.	Sub-Total Base Bid			\$ _____	

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ITEM NO.	DESCRIPTION & QUANTITIES (Unit Price to be written in words)	ESTIMATED UNIT	QTY	UNIT PRICE (Figures)	TOTAL PRICE (Figures)
100.	Mobilization* _____ Dollars and _____ Cents	LS	1	\$ _____	\$ _____
101.	Preparing Right-of-Way* _____ Dollars and _____ Cents	LS	1	\$ _____	\$ _____

*Mobilization lump sum bid shall be limited to a maximum 10% of the sub-total base bid amount. Preparing Right of Way lump sum bid shall be limited to a maximum of 5% of the Sub-total base bid amount. The combined total bids from Item 100 Mobilization and Item 101, Preparing Right-of Way shall not exceed fifteen percent (15%) of the Sub-total Base Bid amount. The Sub-total base bid is the amount in Line Item **A.**, and is defined as all bid items excluding Item 100, Mobilization and Item 101, Preparing Right-of-Way.

B. TOTAL BID AMOUNT
 (A., Mobilization & Preparing Right-of-Way) \$ _____

 BIDDER'S SIGNATURE & TITLE

 FIRM'S NAME (TYPE OR PRINT)

 FIRM'S ADDRESS

 FIRMS' PHONE NO./FAX NO.

 FIRM'S EMAIL ADDRESS

The Contractor herein acknowledges receipt of the following:

Addendum Nos. _____

OWNER RESERVES THE RIGHT TO ACCEPT THE OVERALL MOST RESPONSIBLE BID. The bidder offers to construct the Project in accordance with the Contract Documents for the contract price, and to complete the Project with **120 calendar days** after the start date, as set forth in the Authorization to Proceed. **The Bidder understands and accepts the provisions of the contract documents relating to liquidated damages of the project if not completed on time.**

Complete the additional requirements of the Proposal which are included on the following pages.

BID PROPOSAL

Accompanying this proposal is a Bid Bond or Certified or Cashier's Check on a State or National Bank payable to the Order of the San Antonio Water System for _____ dollars (\$_____), which amount represents five percent (5%) of the total bid price. Said bond or check is to be returned to the bidder unless the proposal is accepted and the bidder fails to execute and file a contract within 10 calendar days after the award of the Contract, in which case the check shall become the property of said San Antonio Water System, and shall be considered as payment for damages due to delay and other inconveniences suffered by said San Antonio Water System due to the failure of the bidder to execute the contract. The San Antonio Water System reserves the right to reject any and all bids.

It is anticipated that the Owner will act on this proposal within 60 calendar days after the bid opening. Upon acceptance and award of the contract to the undersigned by the Owner, the undersigned shall execute standard San Antonio Water System Contract Documents and make Performance and Payment Bonds for the full amount of the contract within 10 calendar days after the award of the Contract to secure proper compliance with the terms and provisions of the contract, to insure and guarantee the work until final completion and acceptance, and the guarantee period stipulated, and to guarantee payment of all lawful claims for labor performed and materials furnished in the fulfillment of the contract.

It is anticipated that the Owner will provide written Authorization to Proceed within 30 days after the award of the Contract.

The Contractor hereby agrees to commence work under this Contract within seven (7) calendar days after issuance by the SAWS of the written Authorization to Proceed. Under no circumstances shall the work commence prior to Contractor's receipt of SAWS issued, written Authorization to Proceed.

The undersigned certifies that the bid prices contained in the proposal have been carefully checked and are submitted as correct and final.

In completing the work contained in this proposal the undersigned certifies that bidder's practices and policies do not discriminate on the grounds of race, color, religion, sex or national origin and that the bidder will affirmatively cooperate in the implementation of these policies and practices.

Signed:

Company Representative

Company Name

Address

Please return bidder's check to:

Company Name

Address



**GOOD FAITH EFFORT PLAN FOR
CONSTRUCTION SUB-CONTRACTS
FOR**

NAME OF PROJECT: _____

SECTION A - CONTRACTOR INFORMATION:

Name of Firm: _____

Address: _____

City: _____ **State:** _____ **Zip:** _____

Contact Person: _____ **Telephone:** _____

Email Address: _____ **Fax:** _____

Is your firm Certified: Yes _____ No: _____ **If certified, Certification Number:** _____

Type of Certification: _____ **AABE** _____ **DIBE** _____ **MBE** _____ **WBE**
 _____ **SBE** _____ **VBE** _____ **HUB** _____ **DBE**

1. List ALL SUBCONTRACTORS/SUPPLIERS that will be utilized on this project/contract.

Name & Address of Company	Scope of Work/Supplies to be Performed/Provided by Firm	Estimated Contract Amount on this Project	If Firm is Certified, Provide Certification Number and attach copy of Certification Affidavit
1.			
2.			
3.			
4.			
5.			
6.			

SECTION B. – SMWB COMMITMENTS

The SMWB goal on this project is 17%

- 1. The undersigned contractor has satisfied the requirements of the BID specification in the following manner (please check the appropriate space):

_____ The contractor is committed to a minimum of ____ % SMWB utilization on this contract.

_____ The contractor (if unable to meet the SMWB goal of ____%) is committed to a minimum of _____% SMWB utilization on this contract. *(If contractor/consultant is unable to meet the goal, please fill out Section C and submit documentation demonstrating good faith efforts).*

- 2. Name and phone number of person appointed to coordinate and administer the SMWB requirements on this project.

Name: _____

Title: _____

Phone Number _____

IF THE SMWB GOAL WAS MET, PROCEED TO AFFIRMATION AND SIGN THE GFEP. IF GOAL WAS NOT MET, PROCEED TO SECTION C.

During the term of the contract, the contractor must report the actual payments to all the SMWB subcontractors on a monthly basis, on the “Subcontractor Report Form” or in other specified time intervals and format prescribed by the SAWS. Any unjustified failure to comply with the levels of SMWB participation identified in the bid and affirmed in the Good Faith Effort Plan shall be considered a material breach of contract. The SAWS reserves the right, at any time during the term of the contract to request additional information, documentation or verification of payments made to subcontractors in connection with the contract. Verification of amounts being reported may take the form of requesting copies of canceled checks paid to SMWB participants and/or confirmation inquiries directly to the SMWB participants. Proof of payments, such as copies of canceled checks must properly identify the project name or project number to substantiate SMWB payment for this project.

The completed Subcontractor Report Forms should be mailed to:

San Antonio Water System
SMWB Program
2800 U. S. Hwy 281 N., Suite 171
San Antonio, TX 78212

SECTION C – GOOD FAITH EFFORTS (Fill out only, if the SMWB goal was not achieved).

1. List all firms you contacted with subcontracting/supply opportunities for this project that will not be utilized for the contract by choice of the contractor, subcontractor, or supplier. Written notices to firms contacted by the contractor for specific scopes of work identified for subcontracting/supply opportunities must be provided to subcontractor/supplier not less than five (5) business days prior to bid/proposal due date. The following information is required for all firms that were contacted of subcontracting/supply opportunities.

Name & Address of Company	Scope of Work/Supplies to be Performed/Provided by Firm	Is Firm SMWB Certified?	Date Written Notice was Sent & Method (Fax, Letter, E-Mail, etc.)	Reason Agreement was not reached?
1.				
2.				
3.				
4.				
5.				
6.				
7.				
8.				

(Use additional sheets as needed)

In order to verify a contractor’s good faith efforts, please provide to SAWS copies of the written notices to all firms contacted by the contractor for specific scopes of work identified in relation to the subcontracting/supply opportunities in the above named project. Copies of said notices must be provided to the Business Development Liaison with five (5) business days after the bid is due. Such notices shall include information on the plans, specifications, and scope of work.

2. Did you attend the pre-proposal conference scheduled for this project? ____ Yes ____ No

3. List all SMWB listings or directories, contractor associations, and/or any other associations utilized to solicit SMWB Subcontractors/suppliers.

4. Discuss efforts made to define additional elements of the work proposed to be performed by SMWBs in order to increase the likelihood of achieving the goal:

5. Indicate advertisement mediums used for soliciting bids from SMWBs. (Please attach a copy of the advertisement(s):

AFFIRMATION

I hereby affirm that the above information is true and complete to the best of my knowledge. I further understand and agree that, this document shall be attached thereto and become a binding part of the contract.

Name and Title of Authorized Official:

Name: _____

Title: _____

Signature: _____ Date: _____

NOTE:

This Good Faith Effort Plan is reviewed by SAWS Contracting Department. For questions and/or clarifications, please contact the SMWB Program Manager, Ruby A.Perez-Webb, at (210) 233-3420. If the SMWB goal was not met, the SMWB Program Manager will evaluate the “good faith efforts” of a firm. The Good Faith Effort Plan must be approved prior to award of the contract.

Recommendation: Approval: _____ Denial: _____

Signature of Business Development Liaison: _____

Date: _____

SUBCONTRACTOR / CONSULTANT REPORT

San Antonio Water System 2800 U.S. Hwy. 281 North San Antonio, Texas 78212		1) Invoice No.	2) Job Name/Reporting Period From: _____ To: _____	3) SAWS Job Number
Instructions: All prime contractors are required to complete and submit this report until final payment of contract. To complete this report, we detailed instructions on reverse side. If you have any questions, please contact the SMWB Program Manager.				
4) Type of Contract - Select from Drop-down below: (Tab down)		5) Contractor's/Consultant's Business Name, Address, and Telephone Number	6) Date of Contract Award	7) Scheduled Date of Completion
8) Original Contract Amount	9) Current Contract Amount (Including Change Orders/Additional Addendums)		10) Total Contract Amount Rec'd to Date	11) Total Contract Amount Owed
12) Proposed Participation SBE _____% MBE _____% WBE _____%	13) Instructions for calculation of SMWB Percentage: Total dollar amount paid to SMWB divided by total dollar am		14) Name, Address, & Phone Number of Subcontractor/Sub Consultant	15) Select from Drop-down Below:
16) Description of Subcontract Work	17) Subcontract Dollars Awarded	18) Subcontract Amount Paid to Date	19) Subcontract % Paid to Date	
			SBE, MBE, WBE	
			SBE	
			MBE	
			WBE	
Company's Official Signature and Title		Date Signed	Name & Title of Individual Completing Report	

CONFLICT OF INTEREST QUESTIONNAIRE NOTE:

“Effective January 1, 2006, Chapter 176 of the Texas local Government Code requires that persons, or their agents, who seek to contract for the sale or purchase of property, goods, or services with SAWS shall file a completed conflict of interest questionnaire with the SAWS Manager of Contract Administration no later than the 7th business day after the date that the person: (1) begins contract discussions or negotiations with SAWS; or (2) submits to SAWS an application, response to a request for proposals or bids, correspondence, or another writing related to a potential agreement with SAWS. The Conflict of Business questionnaire is attached on the following page and is available from the Texas Ethics Commission at www.ethics.state.tx.us. Completed Conflict of Interest questionnaires should be included with your bid or may be delivered by hand, within 7 business days of the bid opening, to the Manager of Contract Administration. If mailing a completed Conflict of Interest questionnaire, mail to: David Gonzales, Manager, Contract Administration, 2800 U.S. Hwy 281 North, San Antonio, TX 78212. If delivering a completed Conflict of Interest questionnaire, deliver to Contract Administration, Tower 2, 1st Floor, Room 171, 2800 U.S. Hwy 281 North, San Antonio, TX 78212.

Please consult your own legal advisor if you have questions regarding the statute or form.”

CONFLICT OF INTEREST QUESTIONNAIRE

FORM CIQ

For vendor or other person doing business with local governmental entity

This questionnaire reflects changes made to the law by H.B. 1491, 80th Leg., Regular Session.

This questionnaire is being filed in accordance with Chapter 176, Local Government Code by a person who has a business relationship as defined by Section 176.001(1-a) with a local governmental entity and the person meets requirements under Section 176.006(a).

By law this questionnaire must be filed with the records administrator of the local governmental entity not later than the 7th business day after the date the person becomes aware of facts that require the statement to be filed. See Section 176.006, Local Government Code.

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

OFFICE USE ONLY

Date Received

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

2 Check this box if you are filing an update to a previously filed questionnaire.

(The law requires that you file an updated completed questionnaire with the appropriate filing authority not later than the 7th business day after the date the originally filed questionnaire becomes incomplete or inaccurate.)

3 Name of local government officer with whom filer has employment or business relationship.

Name of Officer

This section (item 3 including subparts A, B, C & D) must be completed for each officer with whom the filer has an employment or other business relationship as defined by Section 176.001(1-a), Local Government Code. Attach additional pages to this Form CIQ as necessary.

A. Is the local government officer named in this section receiving or likely to receive taxable income, other than investment income, from the filer of the questionnaire?

Yes No

B. Is the filer of the questionnaire receiving or likely to receive taxable income, other than investment income, from or at the direction of the local government officer named in this section AND the taxable income is not received from the local governmental entity?

Yes No

C. Is the filer of this questionnaire employed by a corporation or other business entity with respect to which the local government officer serves as an officer or director, or holds an ownership of 10 percent or more?

Yes No

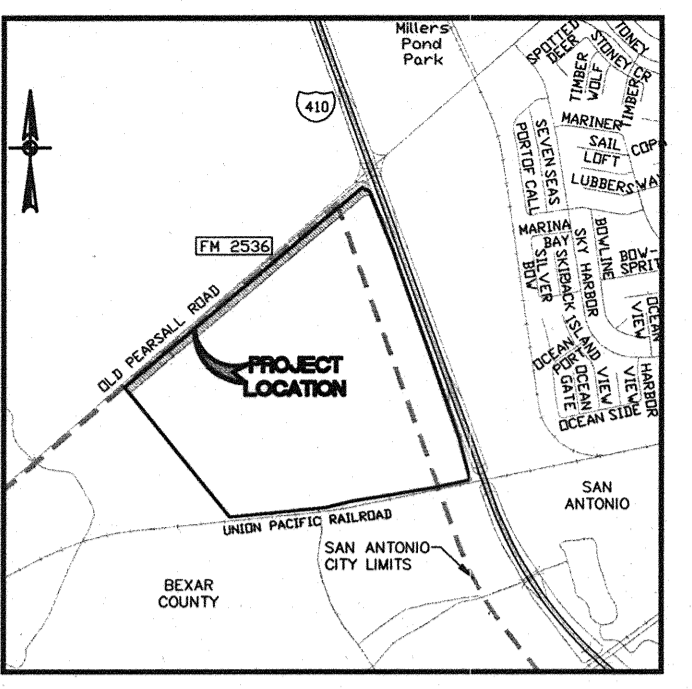
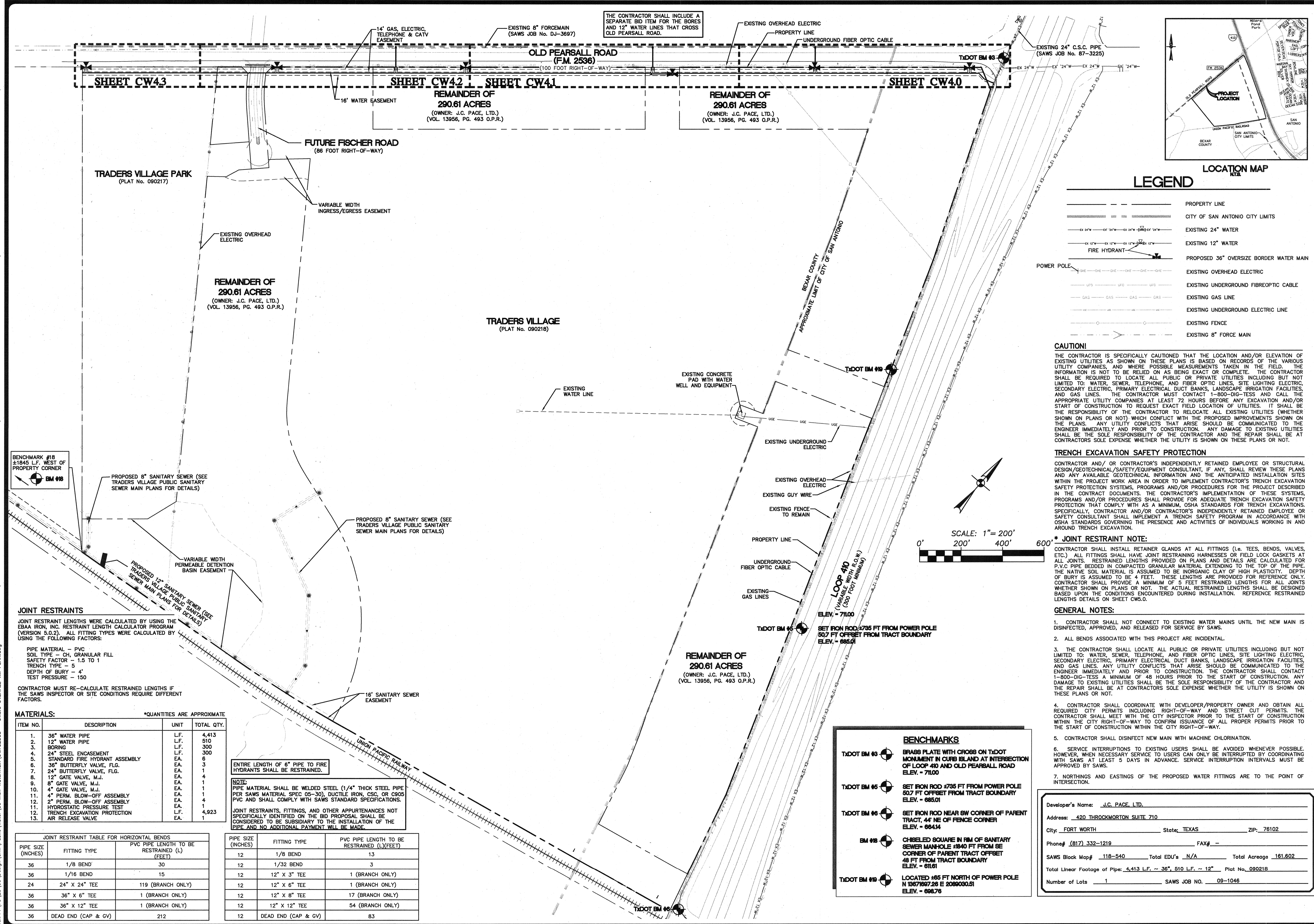
D. Describe each employment or business relationship with the local government officer named in this section.

4

Signature of person doing business with the governmental entity

Date

Addendum No. 1



LEGEND

---	PROPERTY LINE
---	CITY OF SAN ANTONIO CITY LIMITS
---	EXISTING 24" WATER
---	EXISTING 12" WATER
---	PROPOSED 36" OVERSIZE BORDER WATER MAIN
---	EXISTING OVERHEAD ELECTRIC
---	EXISTING UNDERGROUND FIBROPTIC CABLE
---	EXISTING GAS LINE
---	EXISTING UNDERGROUND ELECTRIC LINE
---	EXISTING FENCE
---	EXISTING 8" FORCE MAIN

CAUTION!
 THE CONTRACTOR IS SPECIFICALLY CAUTIONED THAT THE LOCATION AND/OR ELEVATION OF EXISTING UTILITIES AS SHOWN ON THESE PLANS IS BASED ON RECORDS OF THE VARIOUS UTILITY COMPANIES, AND WHERE POSSIBLE MEASUREMENTS TAKEN IN THE FIELD. THE INFORMATION IS NOT TO BE RELIED ON AS BEING EXACT OR COMPLETE. THE CONTRACTOR SHALL BE REQUIRED TO LOCATE ALL PUBLIC OR PRIVATE UTILITIES INCLUDING BUT NOT LIMITED TO: WATER, SEWER, TELEPHONE, AND FIBER OPTIC LINES, SITE LIGHTING ELECTRIC, SECONDARY ELECTRIC, PRIMARY ELECTRICAL DUCT BANKS, LANDSCAPE IRRIGATION FACILITIES, AND GAS LINES. THE CONTRACTOR MUST CONTACT 1-800-DIG-TESS AND CALL THE APPROPRIATE UTILITY COMPANIES AT LEAST 72 HOURS BEFORE ANY EXCAVATION AND/OR START OF CONSTRUCTION TO REQUEST EXACT FIELD LOCATION OF UTILITIES. IT SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR TO RELOCATE ALL EXISTING UTILITIES (WHETHER SHOWN ON PLANS OR NOT) WHICH CONFLICT WITH THE PROPOSED IMPROVEMENTS SHOWN ON THE PLANS. ANY UTILITY CONFLICTS THAT ARISE SHOULD BE COMMUNICATED TO THE ENGINEER IMMEDIATELY AND PRIOR TO CONSTRUCTION. ANY DAMAGE TO EXISTING UTILITIES SHALL BE THE SOLE RESPONSIBILITY OF THE CONTRACTOR AND THE REPAIR SHALL BE AT CONTRACTOR'S SOLE EXPENSE WHETHER THE UTILITY IS SHOWN ON THESE PLANS OR NOT.

TRENCH EXCAVATION SAFETY PROTECTION
 CONTRACTOR AND/OR CONTRACTOR'S INDEPENDENTLY RETAINED EMPLOYEE OR STRUCTURAL DESIGN/GEOTECHNICAL/SAFETY/EQUIPMENT CONSULTANT, IF ANY, SHALL REVIEW THESE PLANS AND ANY AVAILABLE GEOTECHNICAL INFORMATION AND THE ANTICIPATED INSTALLATION SITES WITHIN THE PROJECT WORK AREA IN ORDER TO IMPLEMENT CONTRACTOR'S TRENCH EXCAVATION SAFETY PROTECTION SYSTEMS, PROGRAMS AND/OR PROCEDURES FOR THE PROJECT DESCRIBED IN THE CONTRACT DOCUMENTS. THE CONTRACTOR'S IMPLEMENTATION OF THESE SYSTEMS, PROGRAMS AND/OR PROCEDURES SHALL PROVIDE FOR ADEQUATE TRENCH EXCAVATION SAFETY PROTECTION THAT COMPLY WITH AS A MINIMUM, OSHA STANDARDS FOR TRENCH EXCAVATIONS. SPECIALLY CONTRACTOR AND/OR CONTRACTOR'S INDEPENDENTLY RETAINED EMPLOYEE OR SAFETY CONSULTANT SHALL IMPLEMENT A TRENCH SAFETY PROGRAM IN ACCORDANCE WITH OSHA STANDARDS GOVERNING THE PRESENCE AND ACTIVITIES OF INDIVIDUALS WORKING IN AND AROUND TRENCH EXCAVATION.

*** JOINT RESTRAINT NOTE:**
 CONTRACTOR SHALL INSTALL RETAINER GLANDS AT ALL FITTINGS (i.e. TEES, BENDS, VALVES, ETC.) ALL FITTINGS SHALL HAVE JOINT RESTRAINING HARNESSES OR FIELD LOCK GASKETS AT ALL JOINTS. RESTRAINED LENGTHS PROVIDED ON PLANS AND DETAILS ARE CALCULATED FOR P.V.C. PIPE BEDDED GRANULAR MATERIAL EXTENDING TO THE TOP OF THE PIPE. THE NATIVE SOIL MATERIAL IS ASSUMED TO BE INORGANIC CLAY OF HIGH PLASTICITY. DEPTH OF BURY IS ASSUMED TO BE 4 FEET. THESE LENGTHS ARE PROVIDED FOR REFERENCE ONLY. CONTRACTOR SHALL PROVIDE A MINIMUM OF 5 FEET RESTRAINED LENGTHS FOR ALL JOINTS WHETHER SHOWN ON PLANS OR NOT. THE ACTUAL RESTRAINED LENGTHS SHALL BE DESIGNED BASED UPON THE CONDITIONS ENCOUNTERED DURING INSTALLATION. REFERENCE RESTRAINED LENGTHS DETAILS ON SHEET CW5.0.

- GENERAL NOTES:**
- CONTRACTOR SHALL NOT CONNECT TO EXISTING WATER MAINS UNTIL THE NEW MAIN IS DISINFECTED, APPROVED, AND RELEASED FOR SERVICE BY SAWS.
 - ALL BENDS ASSOCIATED WITH THIS PROJECT ARE INCIDENTAL.
 - THE CONTRACTOR SHALL LOCATE ALL PUBLIC OR PRIVATE UTILITIES INCLUDING BUT NOT LIMITED TO: WATER, SEWER, TELEPHONE, AND FIBER OPTIC LINES, SITE LIGHTING ELECTRIC, SECONDARY ELECTRIC, PRIMARY ELECTRICAL DUCT BANKS, LANDSCAPE IRRIGATION FACILITIES, AND GAS LINES. ANY UTILITY CONFLICTS THAT ARISE SHOULD BE COMMUNICATED TO THE ENGINEER IMMEDIATELY AND PRIOR TO CONSTRUCTION. THE CONTRACTOR SHALL CONTACT 1-800-DIG-TESS A MINIMUM OF 48 HOURS PRIOR TO THE START OF CONSTRUCTION. ANY DAMAGE TO EXISTING UTILITIES SHALL BE THE SOLE RESPONSIBILITY OF THE CONTRACTOR AND THE REPAIR SHALL BE AT CONTRACTOR'S SOLE EXPENSE WHETHER THE UTILITY IS SHOWN ON THESE PLANS OR NOT.
 - CONTRACTOR SHALL COORDINATE WITH DEVELOPER/PROPERTY OWNER AND OBTAIN ALL REQUIRED CITY PERMITS INCLUDING RIGHT-OF-WAY AND STREET CUT PERMITS. THE CONTRACTOR SHALL MEET WITH THE CITY INSPECTOR PRIOR TO THE START OF CONSTRUCTION WITHIN THE CITY RIGHT-OF-WAY TO CONFIRM ISSUANCE OF ALL PROPER PERMITS PRIOR TO THE START OF CONSTRUCTION WITHIN THE CITY RIGHT-OF-WAY.
 - CONTRACTOR SHALL DISINFECT NEW MAIN WITH MACHINE CHLORINATION.
 - SERVICE INTERRUPTIONS TO EXISTING USERS SHALL BE AVOIDED WHENEVER POSSIBLE. HOWEVER, WHEN NECESSARY SERVICE TO USERS CAN ONLY BE INTERRUPTED BY COORDINATING WITH SAWS AT LEAST 5 DAYS IN ADVANCE. SERVICE INTERRUPTION INTERVALS MUST BE APPROVED BY SAWS.
 - NORTHINGS AND EASTINGS OF THE PROPOSED WATER FITTINGS ARE TO THE POINT OF INTERSECTION.

Developer's Name: J.C. PACE, LTD.
 Address: 420 THROCKMORTON SUITE 710
 City: FORT WORTH State: TEXAS ZIP: 76102
 Phone# (817) 332-1219 FAX# ---
 SAWS Block Map# 118-540 Total EDU's N/A Total Acreage 161.602
 Total Linear Footage of Pipe: 4,413 L.F. ~ 36", 510 L.F. ~ 12" Plat No. 090218
 Number of Lots 1 SAWS JOB NO. 09-1046

BENCHMARKS

TxDOT BM #3	BRASS PLATE WITH CROSS ON TxDOT MONUMENT IN CURB ISLAND AT INTERSECTION OF LOOP 410 AND OLD PEARSALL ROAD ELEV. = 711.00
TxDOT BM #5	SET IRON ROD 4735 FT FROM POWER POLE 507 FT OFFSET FROM TRACT BOUNDARY ELEV. = 685.01
TxDOT BM #6	SET IRON ROD NEAR SW CORNER OF PARENT TRACT, 44' NE OF FENCE CORNER ELEV. = 684.14
BM #8	CHISELED SQUARE IN RM OF SANITARY SEWER MANHOLE #840 FT FROM SE CORNER OF PARENT TRACT OFFSET 48 FT FROM TRACT BOUNDARY ELEV. = 671.61
TxDOT BM #9	LOCATED 465 FT NORTH OF POWER POLE N 13671607.26 E 2089030.51 ELEV. = 698.76

JOINT RESTRAINTS
 JOINT RESTRAINT LENGTHS WERE CALCULATED BY USING THE EBAA IRON, INC. RESTRAINT LENGTH CALCULATOR PROGRAM (VERSION 5.0.2). ALL FITTING TYPES WERE CALCULATED BY USING THE FOLLOWING FACTORS:

- PIPE MATERIAL - PVC
 - SOIL TYPE - CH, GRANULAR FILL
 - SAFETY FACTOR - 1.5 TO 1
 - TRENCH TYPE - 5
 - DEPTH OF BURY - 4'
 - TEST PRESSURE - 150
- CONTRACTOR MUST RE-CALCULATE RESTRAINED LENGTHS IF THE SAWS INSPECTOR OR SITE CONDITIONS REQUIRE DIFFERENT FACTORS.

MATERIALS: *QUANTITIES ARE APPROXIMATE

ITEM NO.	DESCRIPTION	UNIT	TOTAL QTY.
1.	36" WATER PIPE	L.F.	4,413
2.	12" WATER PIPE	L.F.	510
3.	BORING	L.F.	300
4.	24" STEEL ENCASUREMENT	L.F.	300
5.	STANDARD FIRE HYDRANT ASSEMBLY	EA.	6
6.	36" BUTTERFLY VALVE, FLG.	EA.	3
7.	24" BUTTERFLY VALVE, FLG.	EA.	1
8.	12" GATE VALVE, M.J.	EA.	4
9.	8" GATE VALVE, M.J.	EA.	1
10.	4" GATE VALVE, M.J.	EA.	1
11.	4" PERM. BLOW-OFF ASSEMBLY	EA.	4
12.	2" PERM. BLOW-OFF ASSEMBLY	EA.	1
11.	HYDROSTATIC PRESSURE TEST	EA.	1
12.	TRENCH EXCAVATION PROTECTION	L.F.	4,923
13.	AIR RELEASE VALVE	EA.	1

ENTIRE LENGTH OF 6" PIPE TO FIRE HYDRANTS SHALL BE RESTRAINED.
 NOTE: PIPE MATERIAL SHALL BE WELDED STEEL (1/4" THICK STEEL PIPE PER SAWS MATERIAL SPEC 05-30), DUCTILE IRON, CS2, OR CS05 PVC AND SHALL COMPLY WITH SAWS STANDARD SPECIFICATIONS.
 JOINT RESTRAINTS, FITTINGS, AND OTHER APPURTENANCES NOT SPECIFICALLY IDENTIFIED ON THE BID PROPOSAL SHALL BE CONSIDERED TO BE SUBSIDIARY TO THE INSTALLATION OF THE PIPE AND NO ADDITIONAL PAYMENT WILL BE MADE.

JOINT RESTRAINT TABLE FOR HORIZONTAL BENDS

PIPE SIZE (INCHES)	FITTING TYPE	PVC PIPE LENGTH TO BE RESTRAINED (L) (FEET)
36	1/8 BEND	30
36	1/16 BEND	15
24	24" X 24" TEE	119 (BRANCH ONLY)
36	36" X 6" TEE	1 (BRANCH ONLY)
36	36" X 12" TEE	1 (BRANCH ONLY)
36	DEAD END (CAP & GV)	212

PIPE SIZE FITTING TYPE PVC PIPE LENGTH TO BE RESTRAINED (L)(FEET)

PIPE SIZE (INCHES)	FITTING TYPE	PVC PIPE LENGTH TO BE RESTRAINED (L)(FEET)
12	1/8 BEND	13
12	1/32 BEND	3
12	12" X 3" TEE	1 (BRANCH ONLY)
12	12" X 6" TEE	1 (BRANCH ONLY)
12	12" X 8" TEE	17 (BRANCH ONLY)
12	12" X 12" TEE	54 (BRANCH ONLY)
12	DEAD END (CAP & GV)	83

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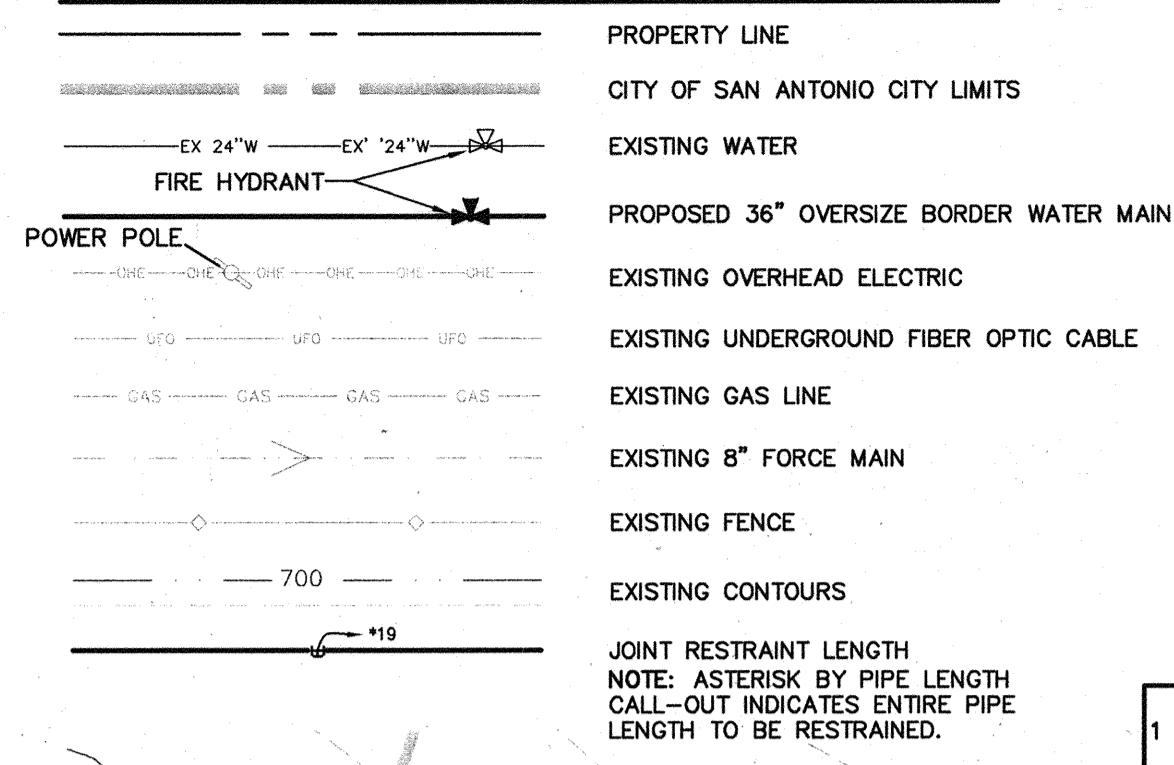
REVISIONS:

PAPE-DAWSON ENGINEERS
 555 EAST RAMSEY | SAN ANTONIO, TEXAS 78216 | PHONE: 210.375.9000 | FAX: 210.375.9010
 TEXAS BOARD OF PROFESSIONAL ENGINEERS, FIRM REGISTRATION # 470

TRADERS VILLAGE OVERALL WATER MAIN PLAN BEXAR COUNTY, TEXAS

PLAT NO. **090218**
 JOB NO. **7325-05**
 DATE **FEBRUARY 2010**
 DESIGNER **KS**
 CHECKED **JW** DRAWN **JV**
 SHEET **CW3.0**

LEGEND



EXISTING UTILITY NOTE:
THE LOCATIONS AND DEPTHS OF EXISTING UTILITIES SHOWN ON THESE PLANS ARE APPROXIMATE ONLY. ACTUAL LOCATIONS AND DEPTHS OF UTILITIES MUST BE VERIFIED BY THE CONTRACTOR PRIOR TO CONSTRUCTION. IT SHALL BE THE CONTRACTOR'S RESPONSIBILITY TO LOCATE UTILITY SERVICE LINES AS REQUIRED FOR CONSTRUCTION AND NOTIFY THE ENGINEER OF ANY CONFLICTS IMMEDIATELY. ANY DAMAGE BY THE CONTRACTOR TO THE EXISTING UTILITIES WHETHER SHOWN ON THE PLANS OR NOT, SHALL BE THE CONTRACTOR'S RESPONSIBILITY TO REPAIR, AT THE CONTRACTOR'S EXPENSE.

3' DEFLECTION NOTE:
PI'S AND PVI'S ARE SHOWN FOR PIPE JOINT DEFLECTION. DEFLECTION SHALL BE PER THE PIPE MANUFACTURER'S RECOMMENDATIONS, REGARDLESS, NO PIPE JOINT DEFLECTION SHALL EXCEED 3 DEGREES.

WATER MAIN NOTE:
THE HORIZONTAL AND VERTICAL ALIGNMENT OF THE EXISTING 24" WATER MAIN IS APPROXIMATE. THE CONTRACTOR SHALL FIELD VERIFY THE PIPE MATERIAL AND THE HORIZONTAL AND VERTICAL ALIGNMENT OF THE EXISTING 24" WATER MAIN AND FIELD ADJUST THE PROPOSED 36" WATER MAIN ACCORDINGLY. (NSPI) CONTRACTOR SHALL PROVIDE AND INSTALL FITTINGS NECESSARY TO DEFLECT AND VERTICALLY ALIGN THE PROPOSED 36" WATER MAIN TO ACHIEVE A MINIMUM OF 4' OF COVER ABOVE THE PIPE AFTER CONNECTION TO THE EXISTING 24" WATER MAIN.

TIE-IN NOTE:
UPON SUCCESSFUL HYDROSTATIC TESTING OF THE PROPOSED WATER MAIN, CHLORINATION OF THE PROPOSED WATER MAIN AND RELEASE FOR THE TIE-IN AND USE BY SAWS, THE CONTRACTOR SHALL REMOVE THE TEMPORARY BLOW OFF ASSEMBLY AND TIE TO THE EXISTING 24" WATER MAIN AS SHOWN ON THE PLANS. CONTRACTOR SHALL VERIFY THE LOCATION AND DEPTH OF THE EXISTING 24" WATER MAIN PRIOR TO THE COMMENCEMENT OF CONSTRUCTION.

CAUTION!!!
ALONG LOOP 410 THE EXISTING GAS LINE RUNS PARALLEL TO THE EXISTING 24" WATER LINE. CONTRACTOR SHALL EXERCISE EXTREME CAUTION WHEN EXCAVATING AND INSTALLING WATER LINE. IT SHALL BE THE CONTRACTOR'S RESPONSIBILITY TO LOCATE UTILITY LINES AS REQUIRED FOR CONSTRUCTION AND NOTIFY THE ENGINEER OF ANY CONFLICTS IMMEDIATELY. ANY DAMAGE BY THE CONTRACTOR TO THE EXISTING UTILITIES WHETHER SHOWN ON THE PLANS OR NOT, SHALL BE THE CONTRACTOR'S RESPONSIBILITY TO REPAIR, AT THE CONTRACTOR'S EXPENSE.

CONTRACTOR TO VERIFY THE LOCATION OF EXISTING WATER LINE AND NOTIFY ENGINEER OF ANY DISCREPANCIES.

STA. 1+06.45
POINT OF CONNECTION
CONTRACTOR SHALL TIE PROPOSED 36" WATER MAIN INTO EX. 24" C.S.C. WATER MAIN (SAWS JOB NO. 87-3225) WITH 24" X 24" TEE (FLANGED) N 13673071.64 E 2088502.35
1 ~ 24" X 36" CONCENTRIC REDUCER (FLANGED)
1 ~ 36" BUTTERFLY VALVE, FLG. CLASS E FLANGE - 150 LB BOLT PATTERN N 13673089.32 E 2088494.39
CONTRACTOR SHALL NOT CONNECT TO EX. WATER MAIN UNTIL THE NEW MAIN IS DISINFECTED, APPROVED, AND RELEASED BY SAWS.

INSTALL FOR CHLORINATION
2 ~ 1" CORP. STOP, CC X IP
2 ~ 1 1/4" SOLID CAPS, THR.
2 ~ 1" COPPER TUBING, CUT AS REQ'D
2 ~ 1" COMP. X 1 1/4" COUP., CURB STOP (SEE SAWS STD. DWG. DD-847-01)
UPON SUCCESSFUL CHLORINATION, CONTRACTOR SHALL REMOVE THE CORP. STOP AND PLUG

1 ~ 24" BUTTERFLY VALVE CLASS E FLANGE
150 LB BOLT PATTERN
N 13673066.84 E 2088503.75
1 ~ 24" CAP

THIS PORTION OF EX. 24" PIPE & CAP TO BE DEMOLISHED

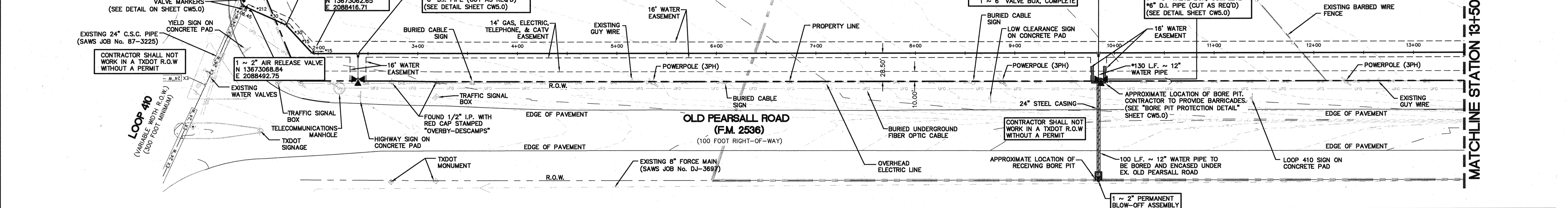
STA. 1+55.05
1 ~ 36" 1/8 BEND
N 13673058.04 E 2088455.70

STA. 2+40.00
1 ~ STD. FIRE HYDRANT
N 13673052.47 E 2088365.28
1 ~ 36" X 6" ANCHOR TEE, M.J.,
N 13673032.95 E 2088381.98
1 ~ 6" GATE VALVE, M.J.,
1 ~ 6" VALVE BOX, COMPLETE
6" D.I. PIPE (CUT AS REQ'D)
(SEE DETAIL SHEET CWS.0)

REMAINDER OF 290.61 ACRES
(OWNER: J.C. PAGE, LTD.)
(VOL. 13856, PG. 493 O.P.R.)

STA. 9+84.00
1 ~ 36" X 12" ANCHOR TEE, M.J.,
N 13672549.38 E 2087816.56
1 ~ 12" GATE VALVE, M.J.,
1 ~ 6" VALVE BOX, COMPLETE
(SEE DETAIL SHEET CWS.0)

1 ~ STD. FIRE HYDRANT
N 13672567.90 E 2087797.44
1 ~ 12" X 6" ANCHOR TEE, M.J.,
N 13672559.53 E 2087799.34
1 ~ 6" GATE VALVE, M.J.,
1 ~ 6" VALVE BOX, COMPLETE
6" D.I. PIPE (CUT AS REQ'D)
(SEE DETAIL SHEET CWS.0)



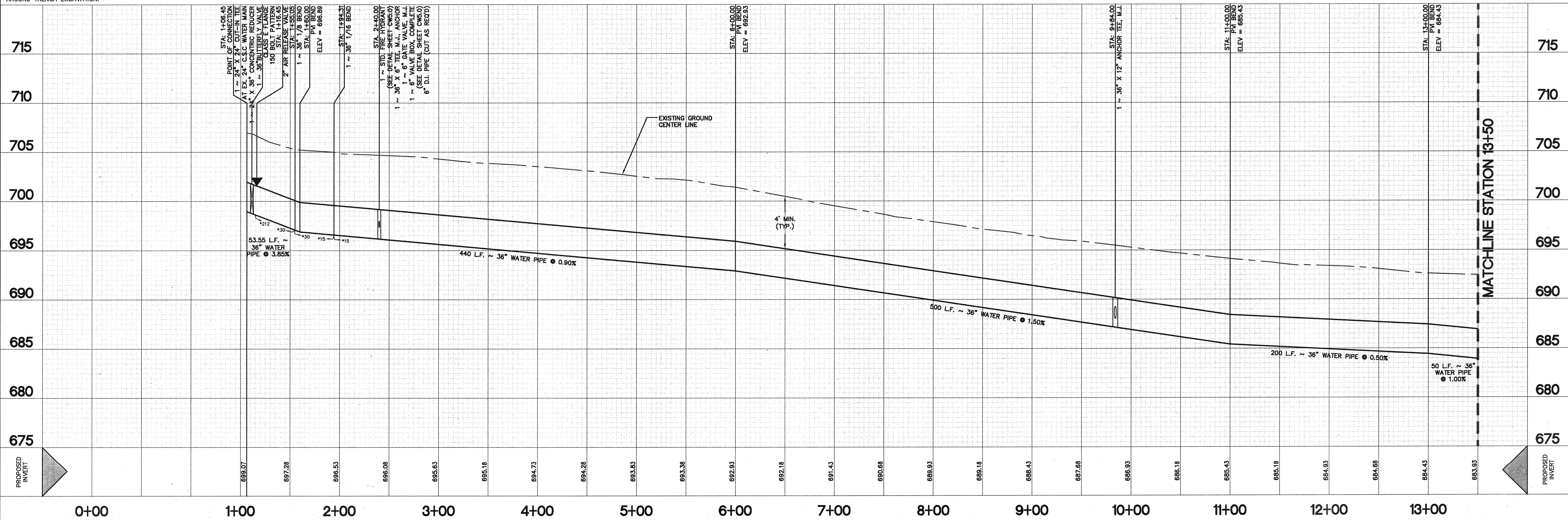
**36" OVERSIZE (16" REQUIRED) WATER MAIN
STA: 1+00 - STA. 13+00**

TRENCH EXCAVATION SAFETY PROTECTION
CONTRACTOR AND/OR CONTRACTOR'S INDEPENDENTLY RETAINED EMPLOYEE OR STRUCTURAL DESIGN/GEOTECHNICAL/SAFETY/EQUIPMENT CONSULTANT, IF ANY, SHALL REVIEW THESE PLANS AND ANY AVAILABLE GEOTECHNICAL INFORMATION AND THE ANTICIPATED INSTALLATION SITES WITHIN THE PROJECT WORK AREA IN ORDER TO IMPLEMENT CONTRACTOR'S TRENCH EXCAVATION SAFETY PROTECTION SYSTEMS, PROGRAMS AND/OR PROCEDURES FOR THE PROJECT DESCRIBED IN THE CONTRACT DOCUMENTS. THE CONTRACTOR'S IMPLEMENTATION OF THESE SYSTEMS, PROGRAMS AND/OR PROCEDURES SHALL PROVIDE FOR ADEQUATE TRENCH EXCAVATION SAFETY PROTECTION THAT COMPLY WITH AS A MINIMUM, OSHA STANDARDS FOR TRENCH EXCAVATIONS. SPECIFICALLY, CONTRACTOR AND/OR CONTRACTOR'S INDEPENDENTLY RETAINED EMPLOYEE OR SAFETY CONSULTANT SHALL IMPLEMENT A TRENCH SAFETY PROGRAM IN ACCORDANCE WITH OSHA STANDARDS GOVERNING THE PRESENCE AND ACTIVITIES OF INDIVIDUALS WORKING IN AND AROUND TRENCH EXCAVATION.

CAUTION!!!
CONTRACTOR TO EXERCISE EXTREME CAUTION WHEN WORKING UNDER AND / OR AROUND OVERHEAD ELECTRIC LINES. CONTRACTOR SHALL COORDINATE WITH CPS ENERGY TO ESTABLISH THE MAXIMUM WORKING HEIGHT FROM GROUND ELEVATION. COORDINATE ALL WORK WITH CPS ENERGY.

Developer's Name: J.C. PAGE, LTD.
Address: 420 THROCKMORTON SUITE 710
City: FORT WORTH State: TEXAS ZIP: 76102
Phone# (817) 332-1219 FAX# -
SAWS Block Map# 118-540 Total EDU's N/A Total Acreage 161.602
Total Linear Footage of Pipe: 4,413 L.F. ~ 36", 510 L.F. ~ 12" Plat No. 090218
Number of Lots 1 SAWS JOB NO. 09-1046

VERTICAL SCALE: 1" = 5'
HORIZONTAL SCALE: 1" = 50'



REVISIONS:



PAPE-DAWSON ENGINEERS
SAN ANTONIO, TEXAS 78216 | PHONE: 210.375.8000
555 EAST RAMSEY | FORT WORTH, TEXAS 76102 | FAX: 210.375.8070
TEXAS BOARD OF PROFESSIONAL ENGINEERS, FIRM REGISTRATION # 470

**TRADERS VILLAGE
36" OVERSIZE (16" REQUIRED) WATER MAIN
PLAN/PROFILE (STA. 1+00 TO STA. 13+00)
BEXAR COUNTY, TEXAS**

PLAT NO. 090218
JOB NO. 7325-05
DATE FEBRUARY 2010
DESIGNER KS
CHECKED JW DRAWN JW
SHEET CW4.0

Date: Mar 04, 2010, 9:13am User: ID: Weig File: F:\13125\05 Design\Civil\Public Water\36 Inch Watermain\PP732505-2.dwg

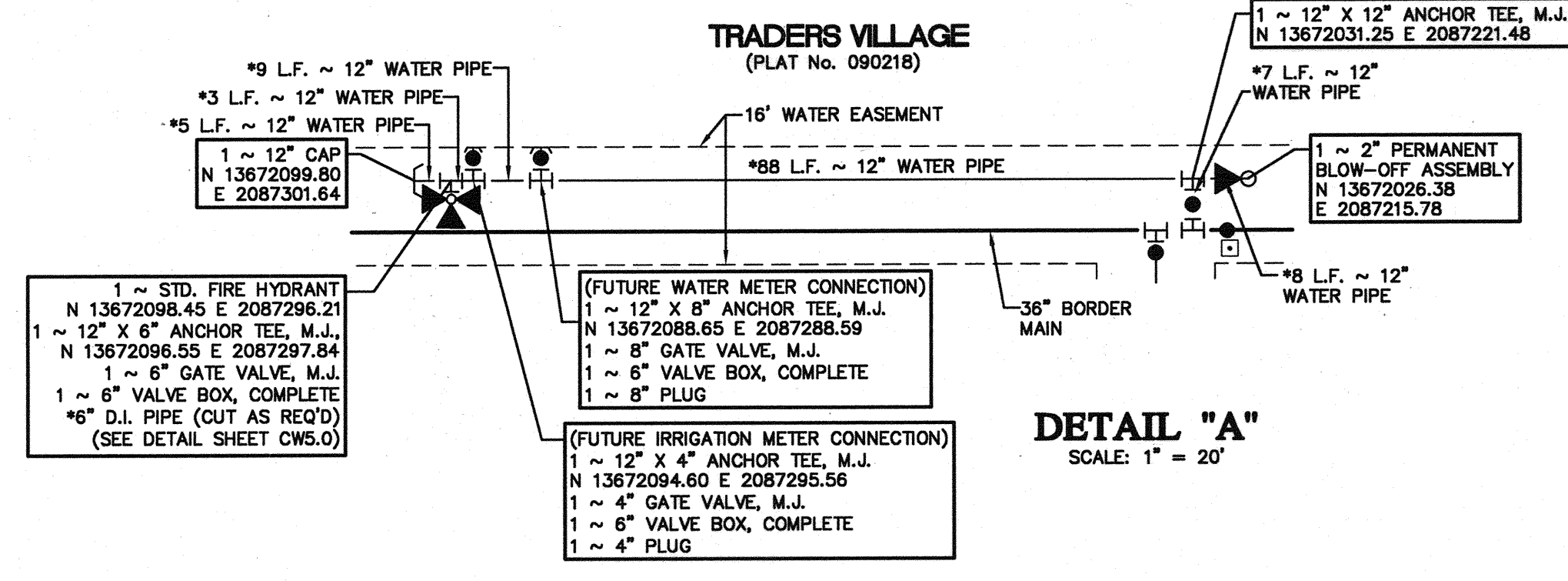
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LEGEND

- PROPERTY LINE
- CITY OF SAN ANTONIO CITY LIMITS
- EXISTING WATER
- PROPOSED 36" OVERSIZE BORDER WATER MAIN
- EXISTING OVERHEAD ELECTRIC
- EXISTING UNDERGROUND FIBER OPTIC CABLE
- EXISTING GAS LINE
- EXISTING 8" FORCE MAIN
- EXISTING FENCE
- EXISTING CONTOURS
- JOINT RESTRAINT LENGTH
- NOTE: ASTERISK BY PIPE LENGTH CALL-OUT INDICATES ENTIRE PIPE LENGTH TO BE RESTRAINED.

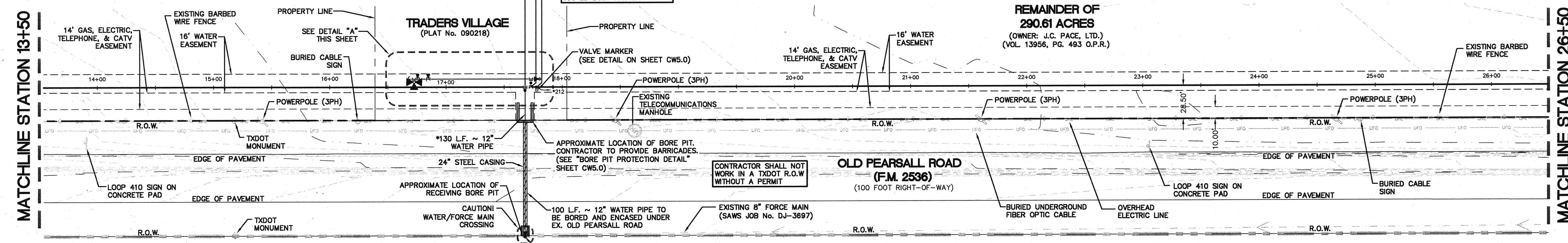
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TIE-IN NOTE:
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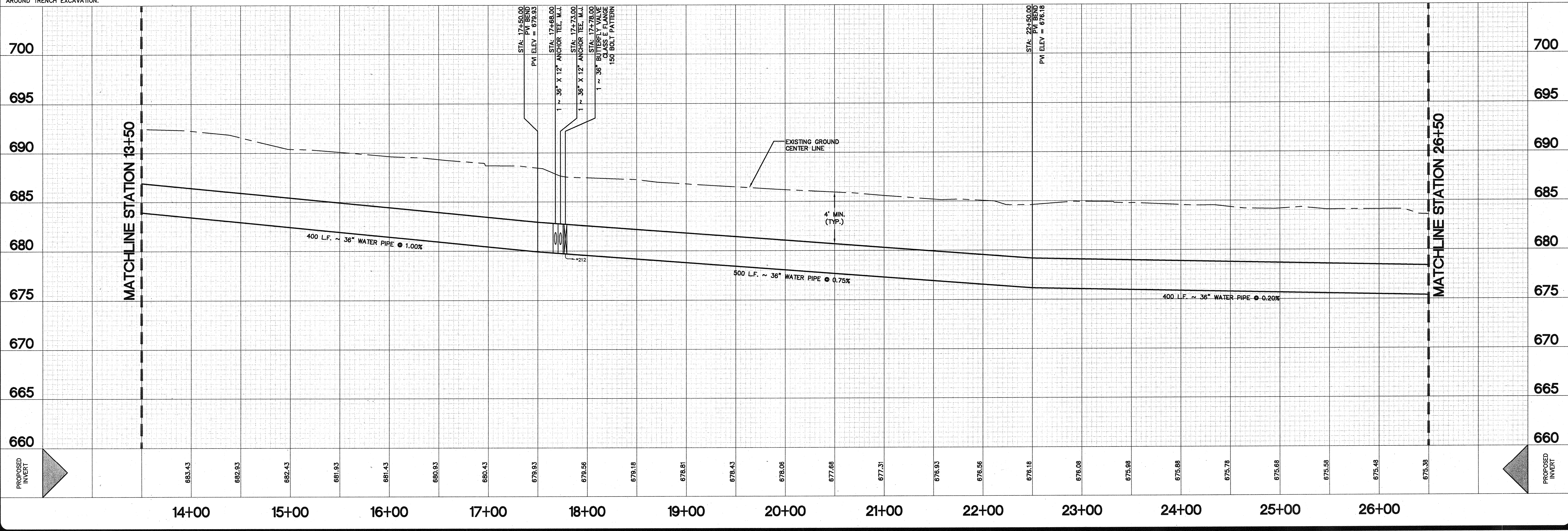


36" OVERSIZE (16" REQUIRED) WATER MAIN
STA: 13+50 - STA. 26+50

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VERTICAL SCALE: 1" = 5'
 HORIZONTAL SCALE: 1" = 50'



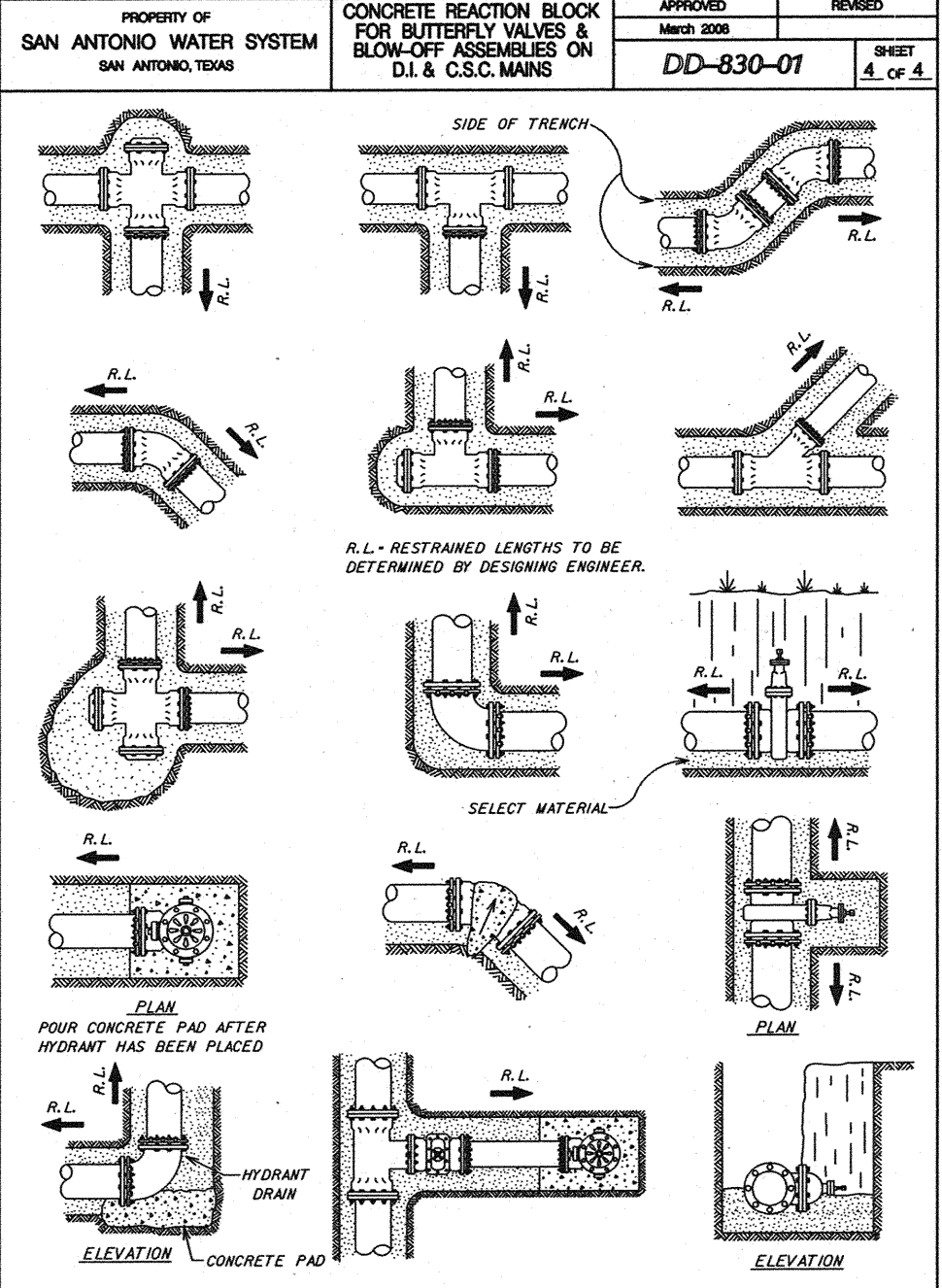
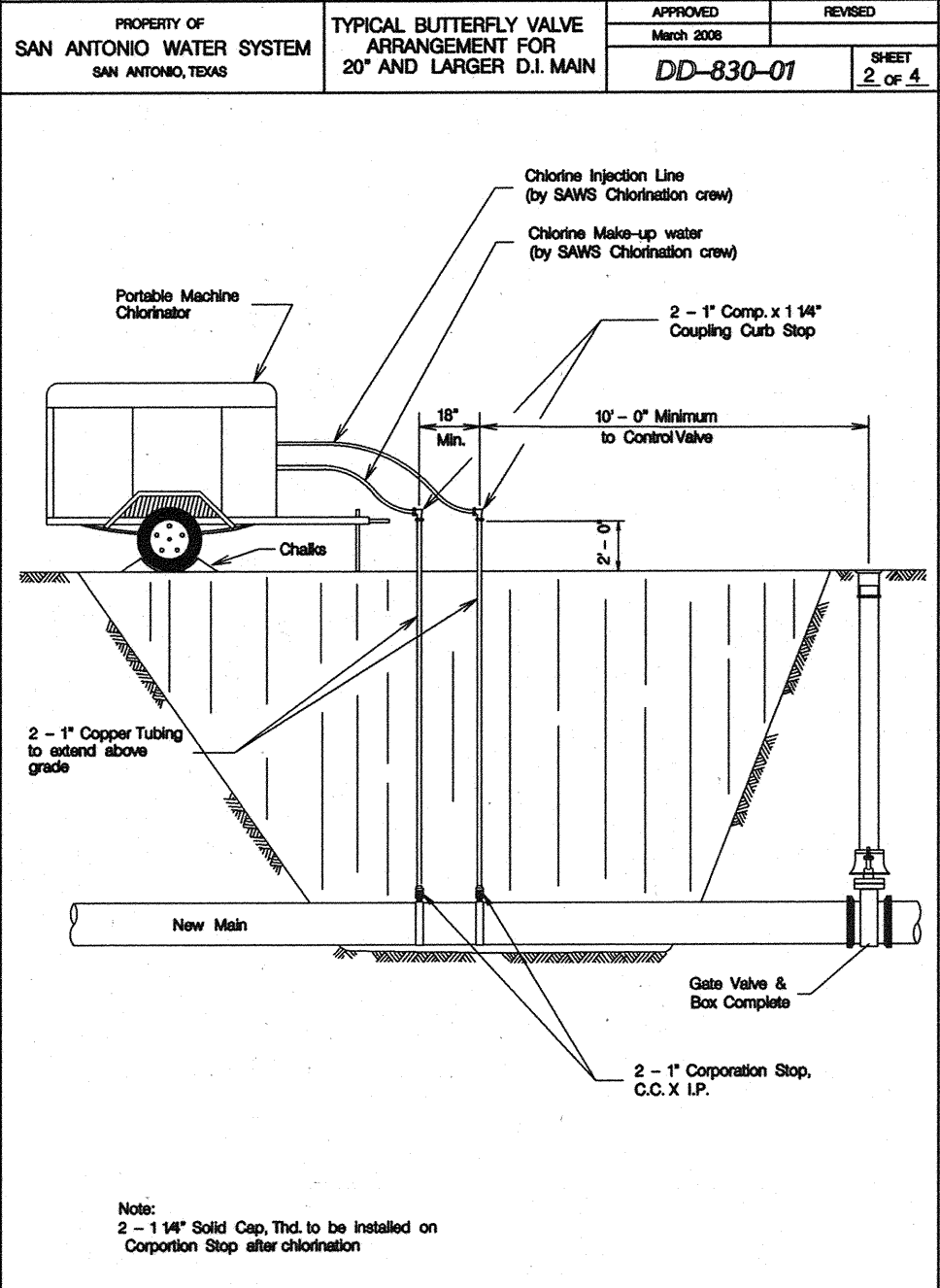
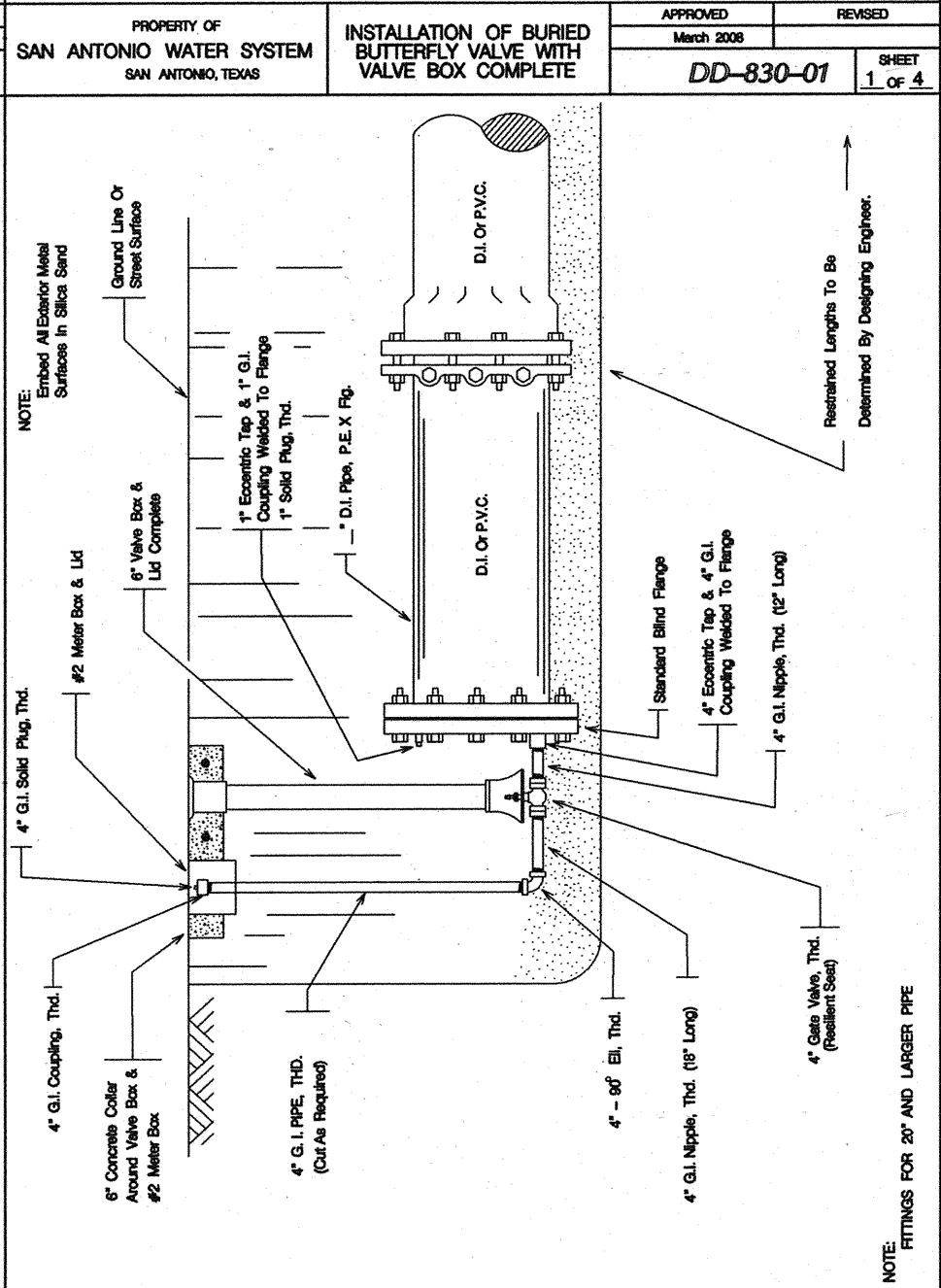
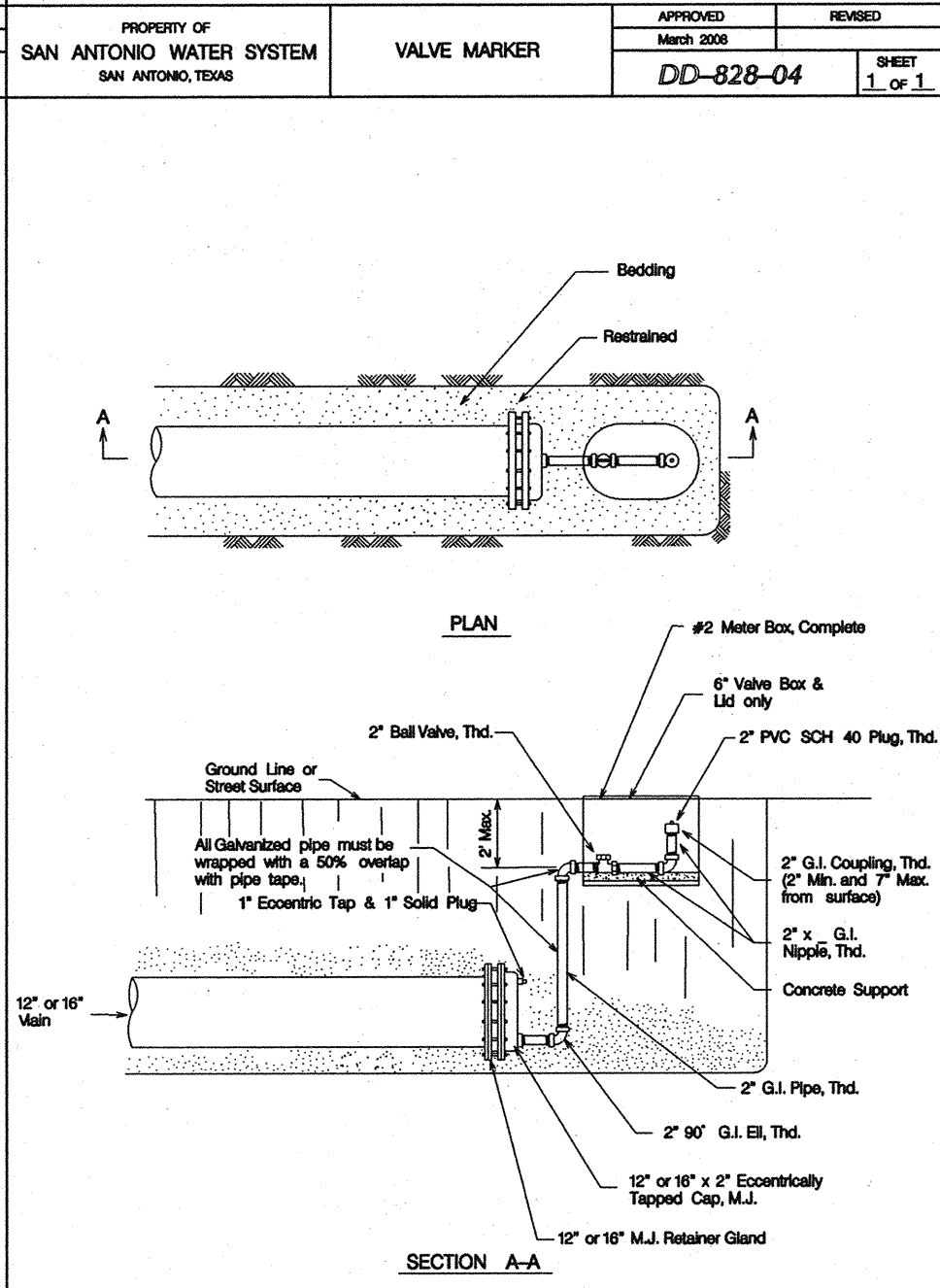
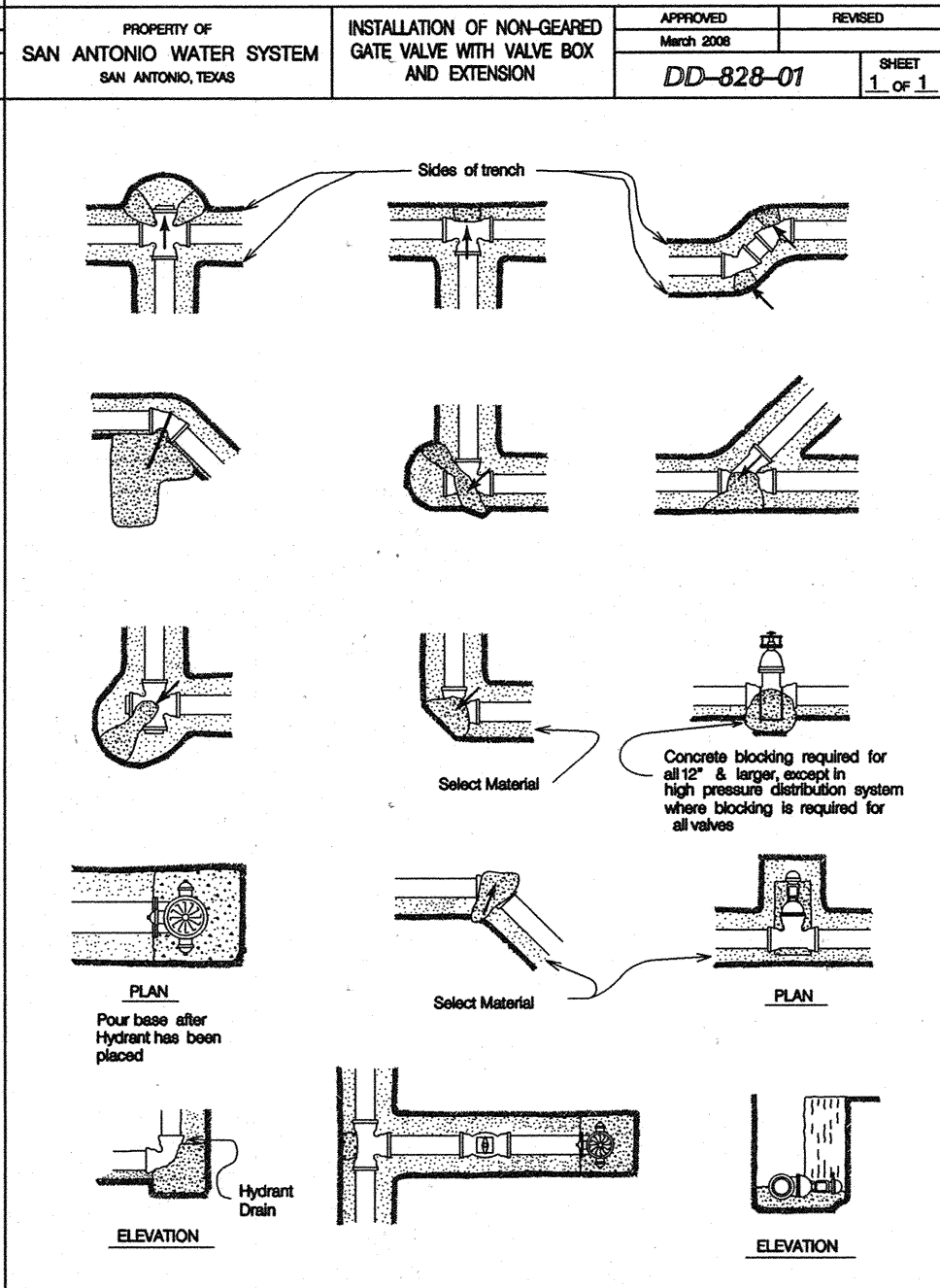
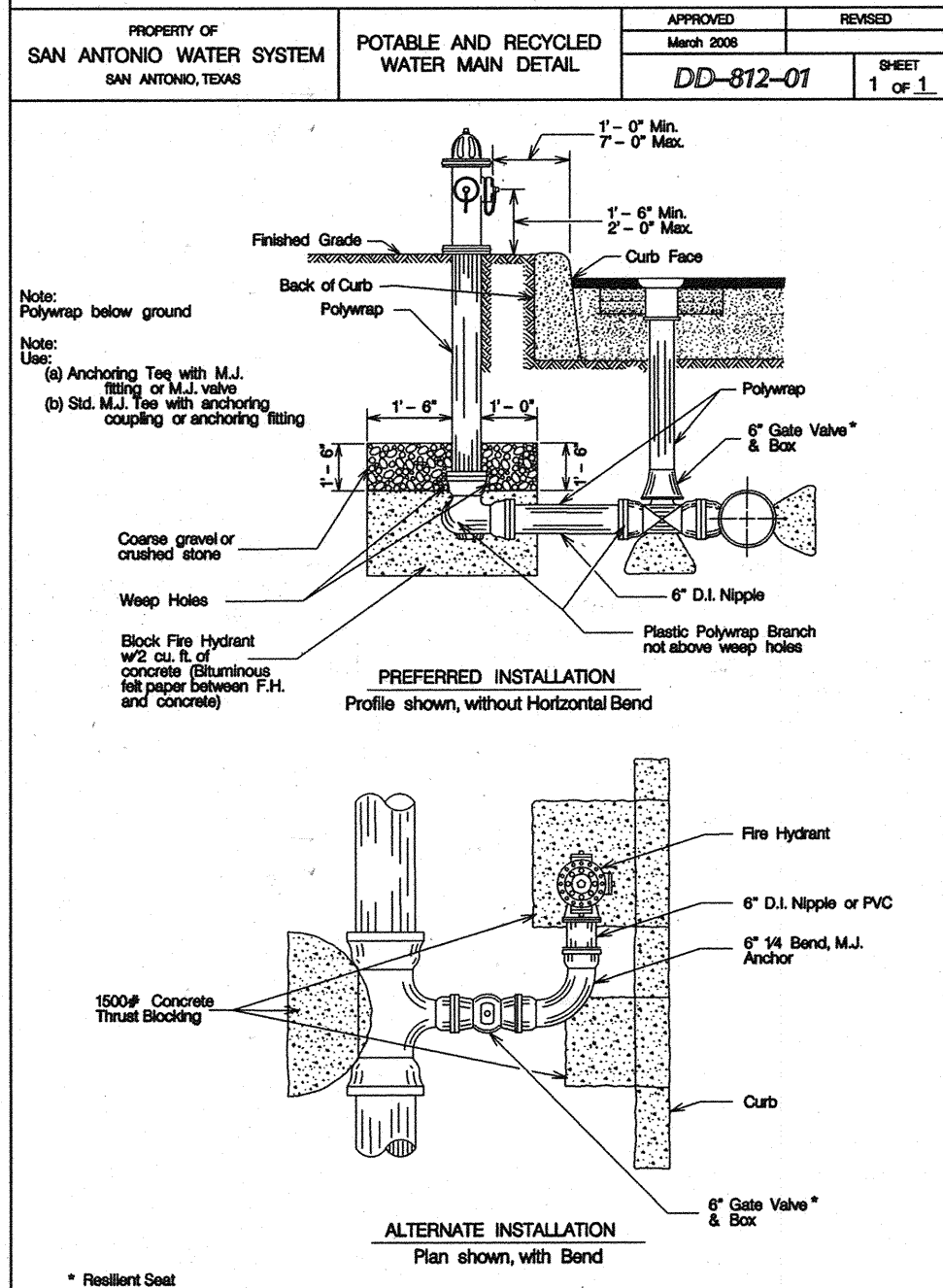
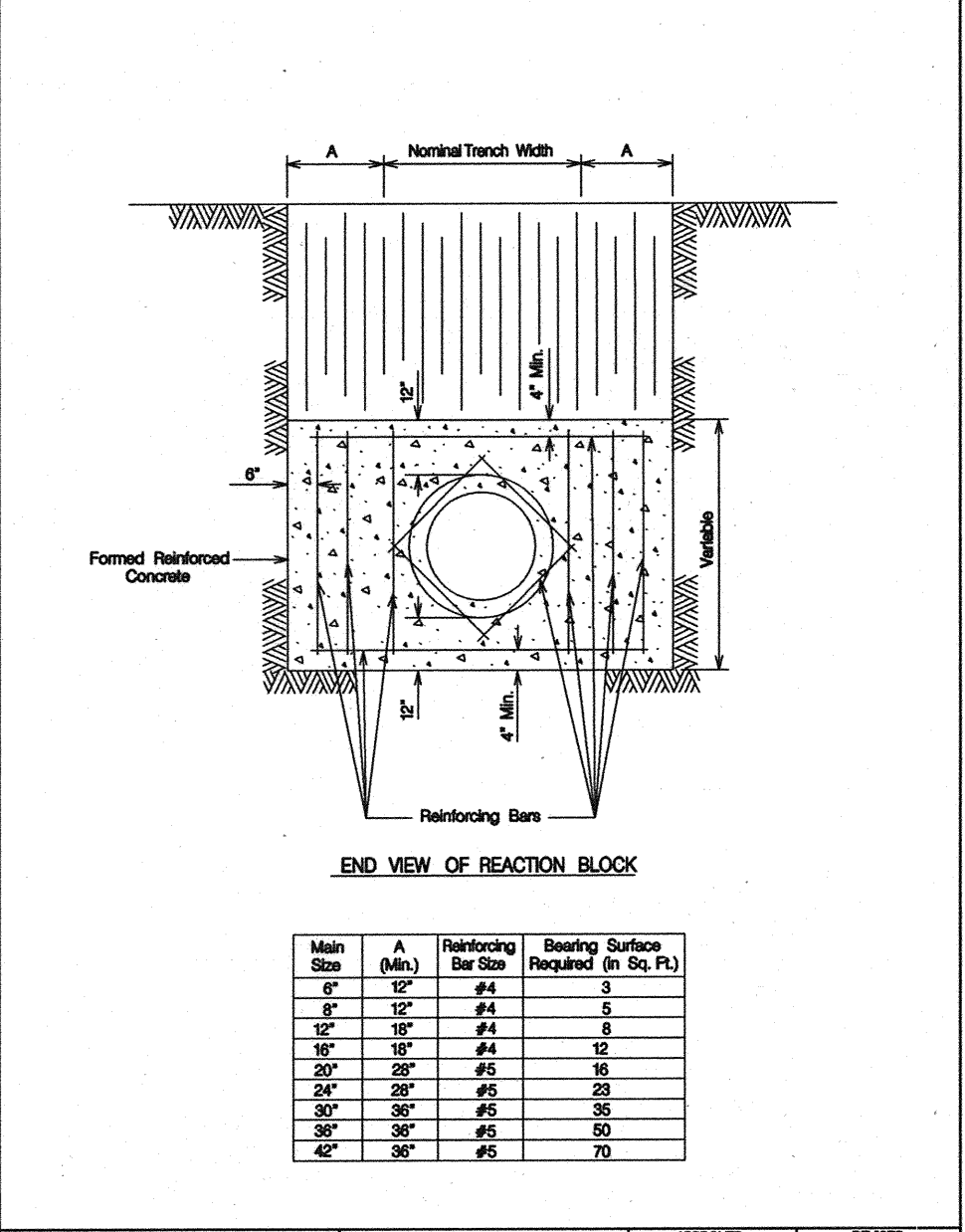
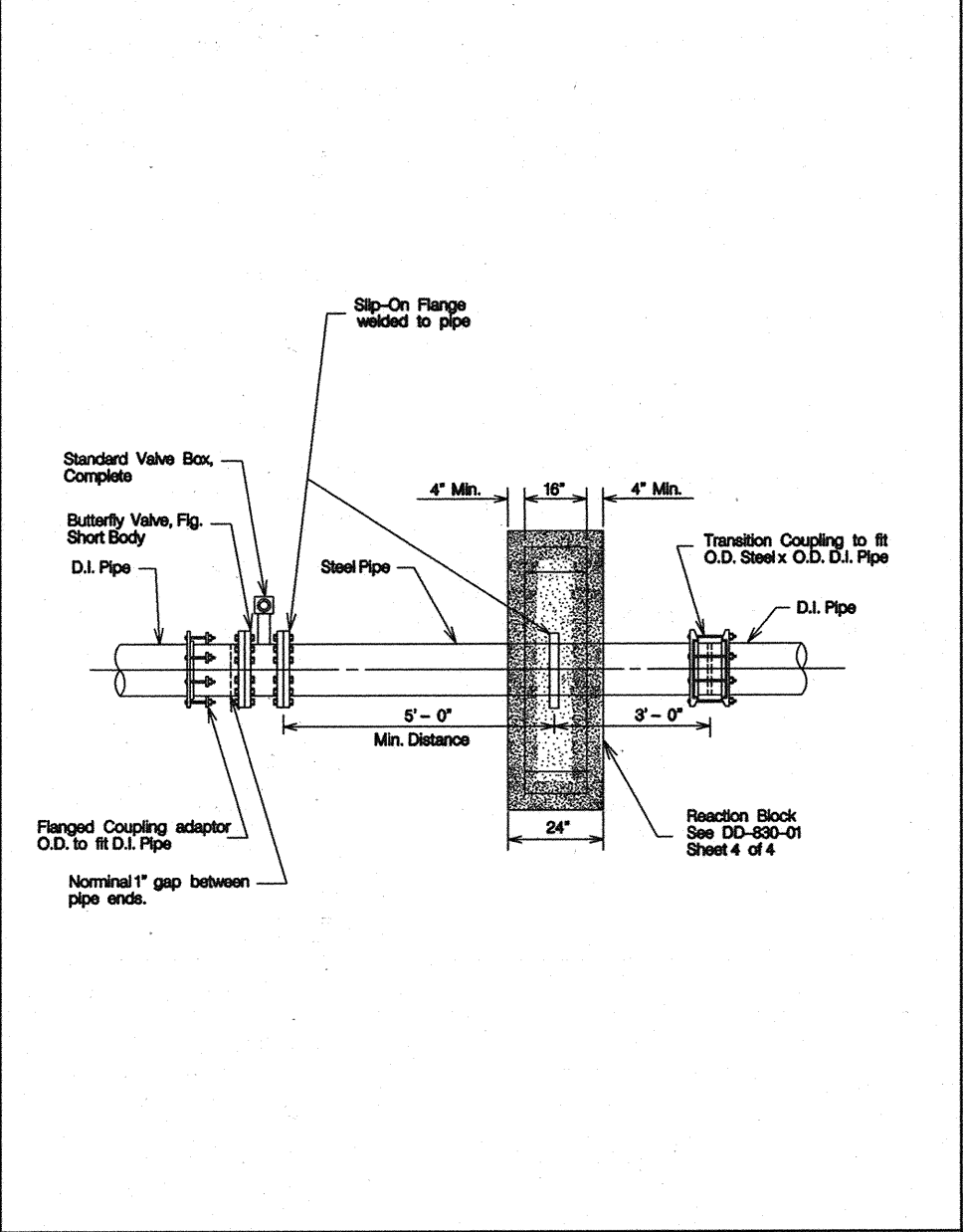
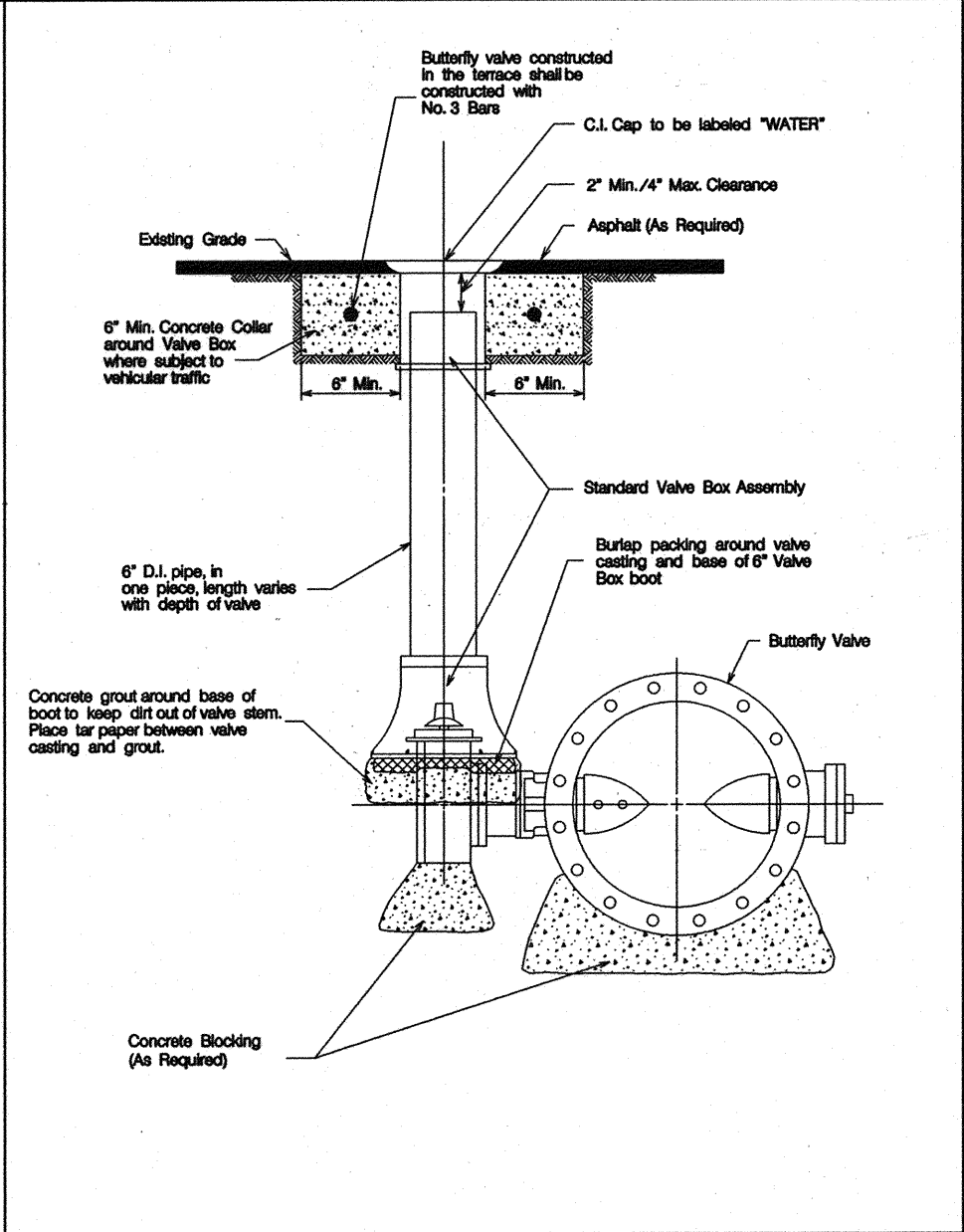
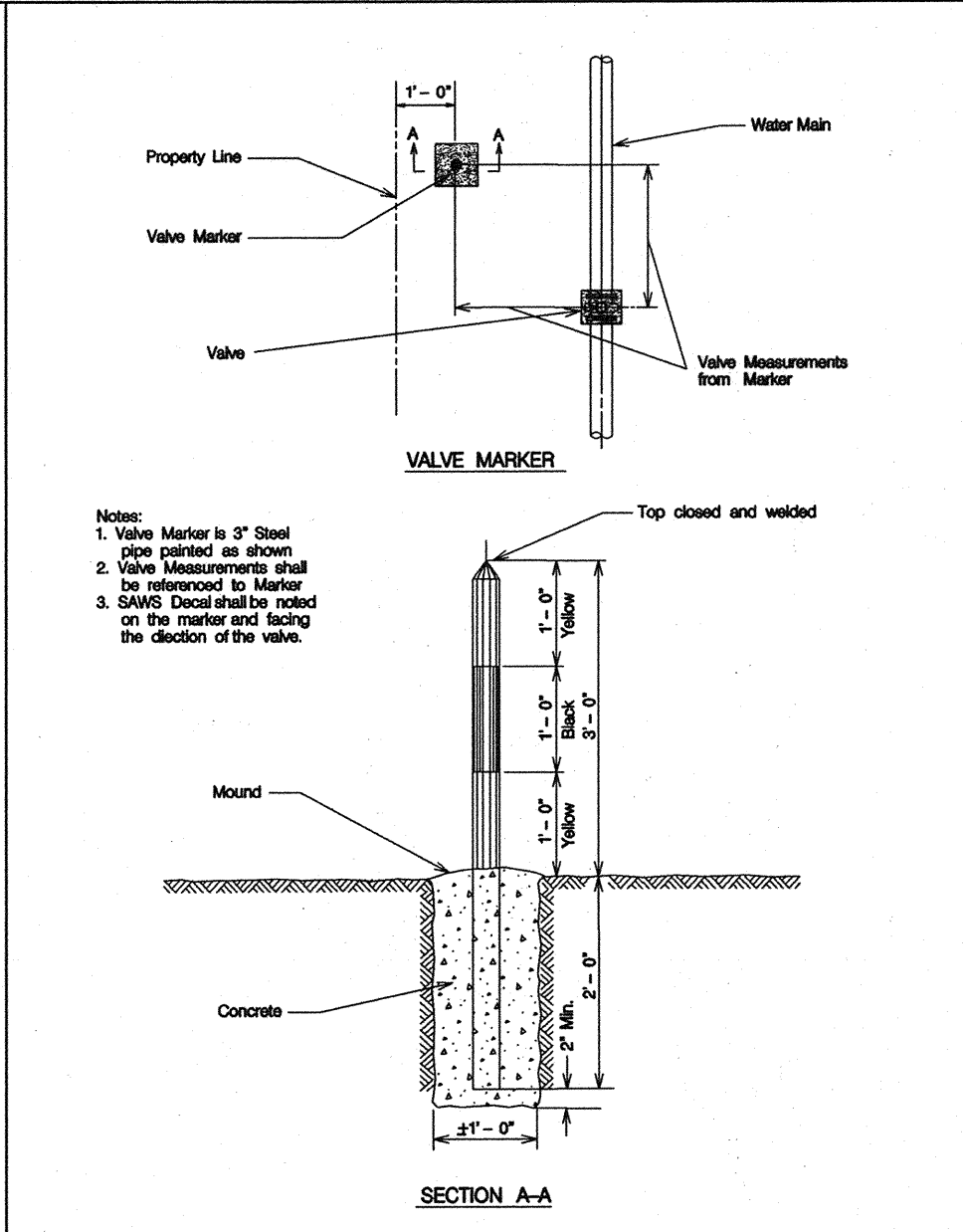
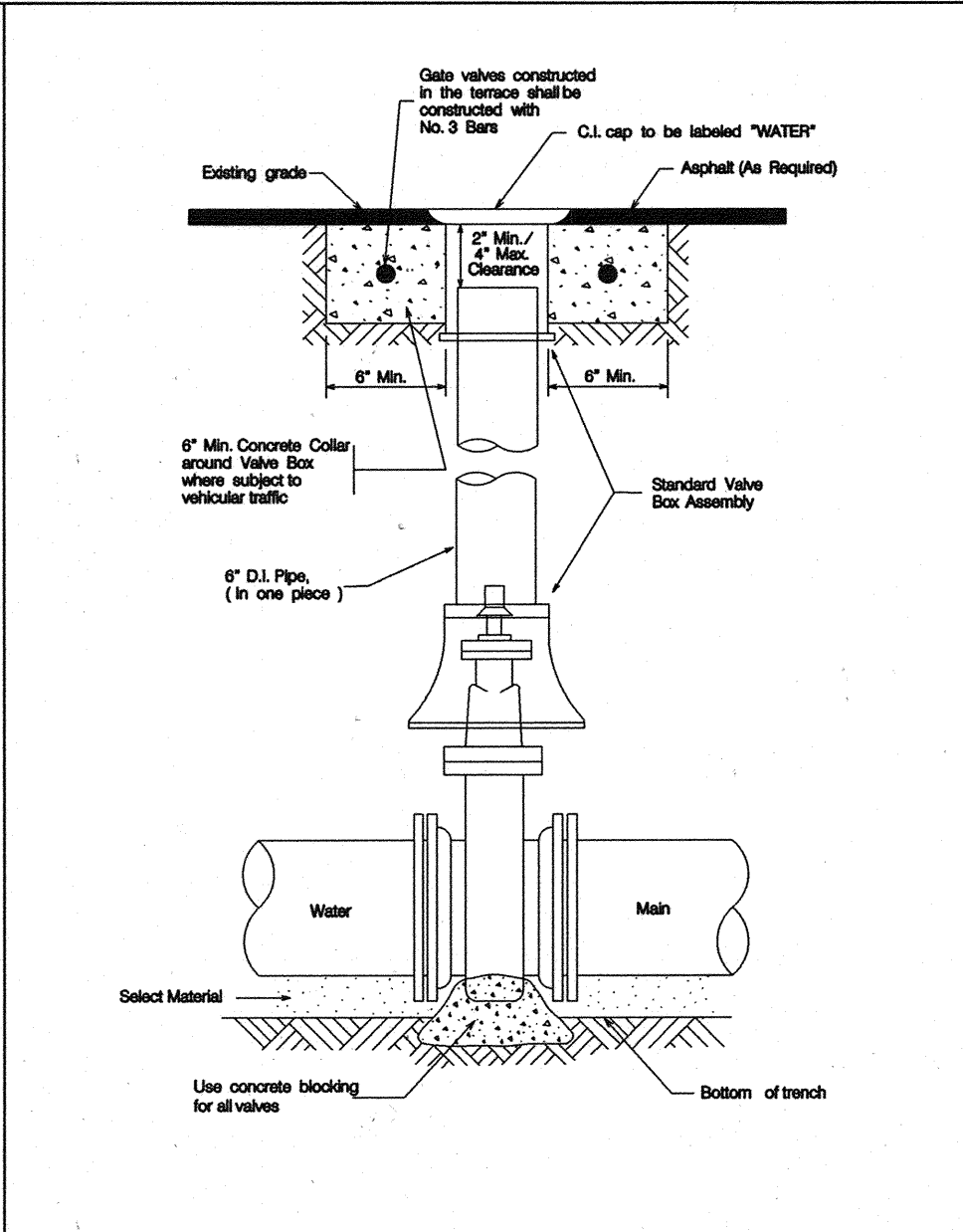
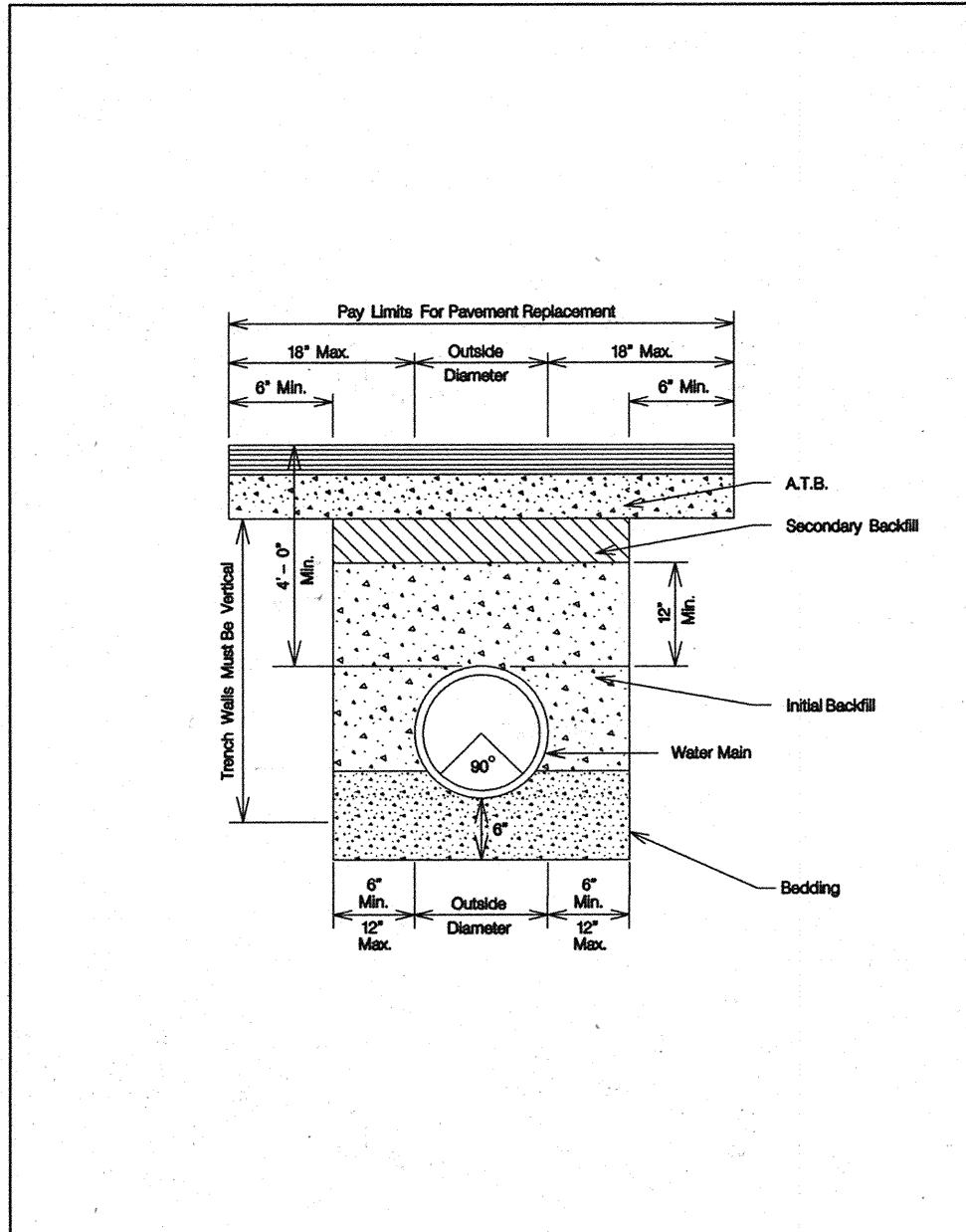
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 555 EAST RAMSEY | SAN ANTONIO, TEXAS 78216 | PHONE: 210.375.9000 | FAX: 210.375.9010
 TEXAS BOARD OF PROFESSIONAL ENGINEERS, FIRM REGISTRATION # 470

TRADERS VILLAGE
36" OVERSIZE (16" REQUIRED) WATER MAIN
PLAN/PROFILE (STA. 13+50 TO STA. 26+50)
BEXAR COUNTY, TEXAS

PLAT NO. 090218
 JOB NO. 7325-05
 DATE FEBRUARY 2010
 DESIGNER KS
 CHECKED JW DRAWN JV
 SHEET CW4.1

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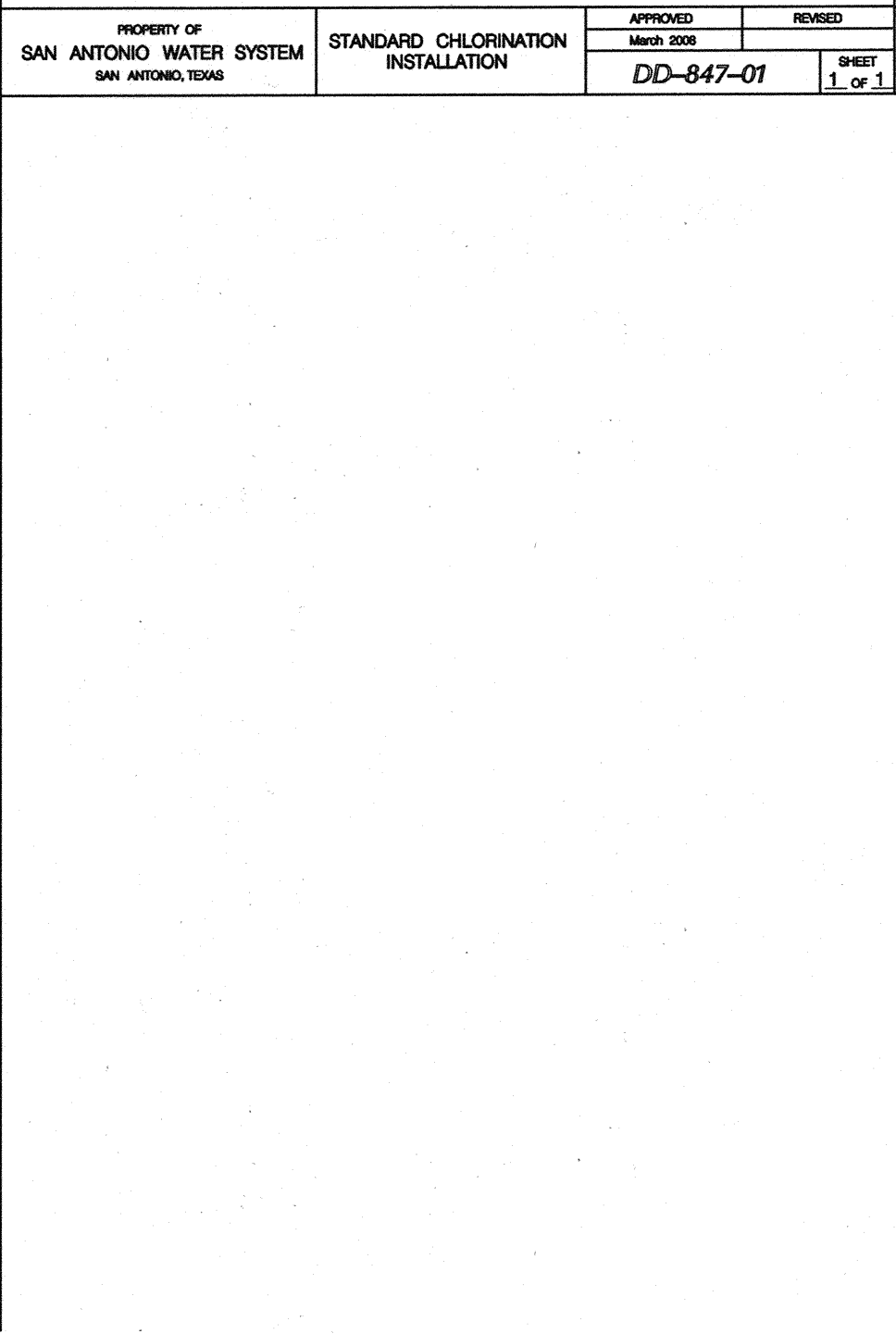
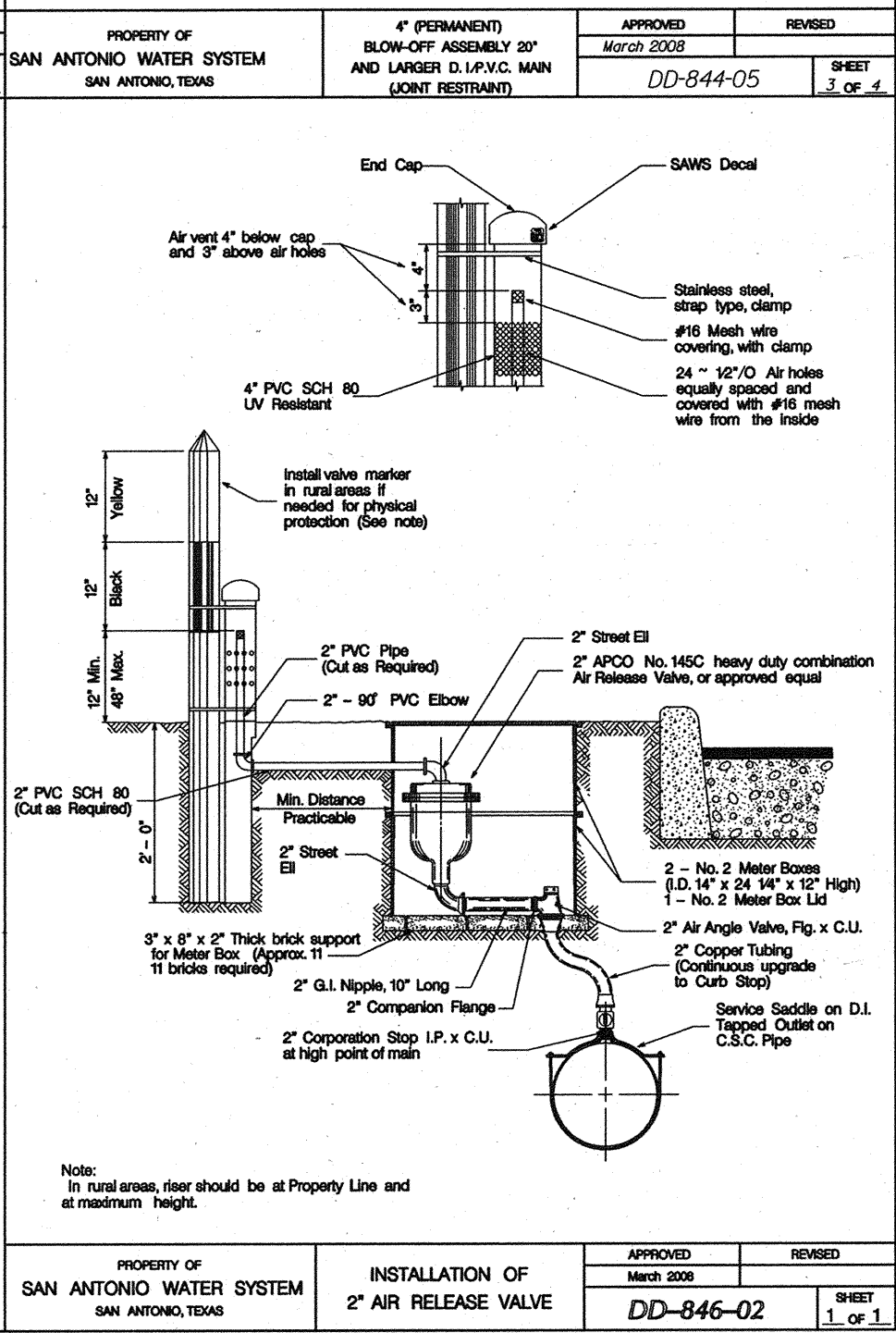
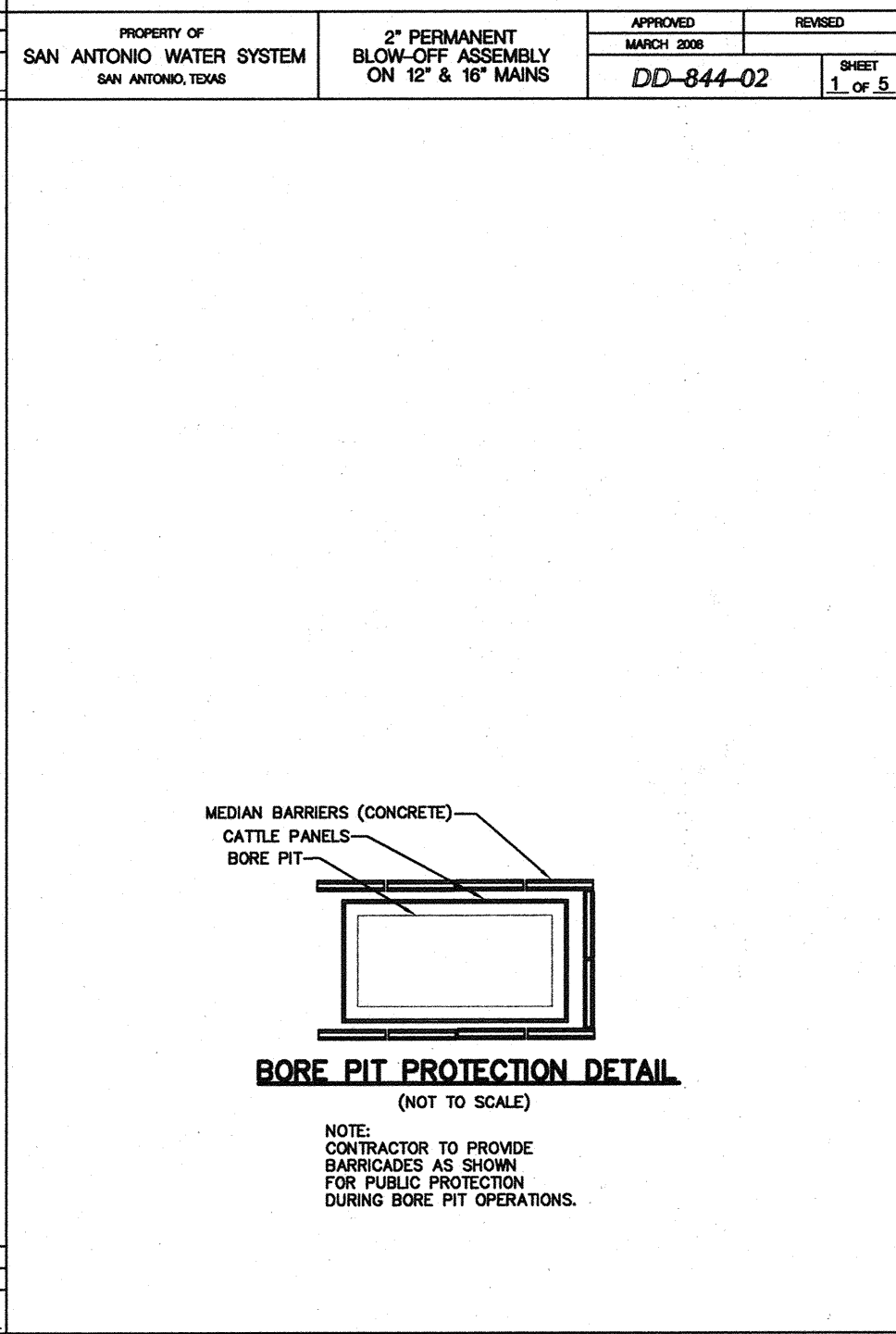
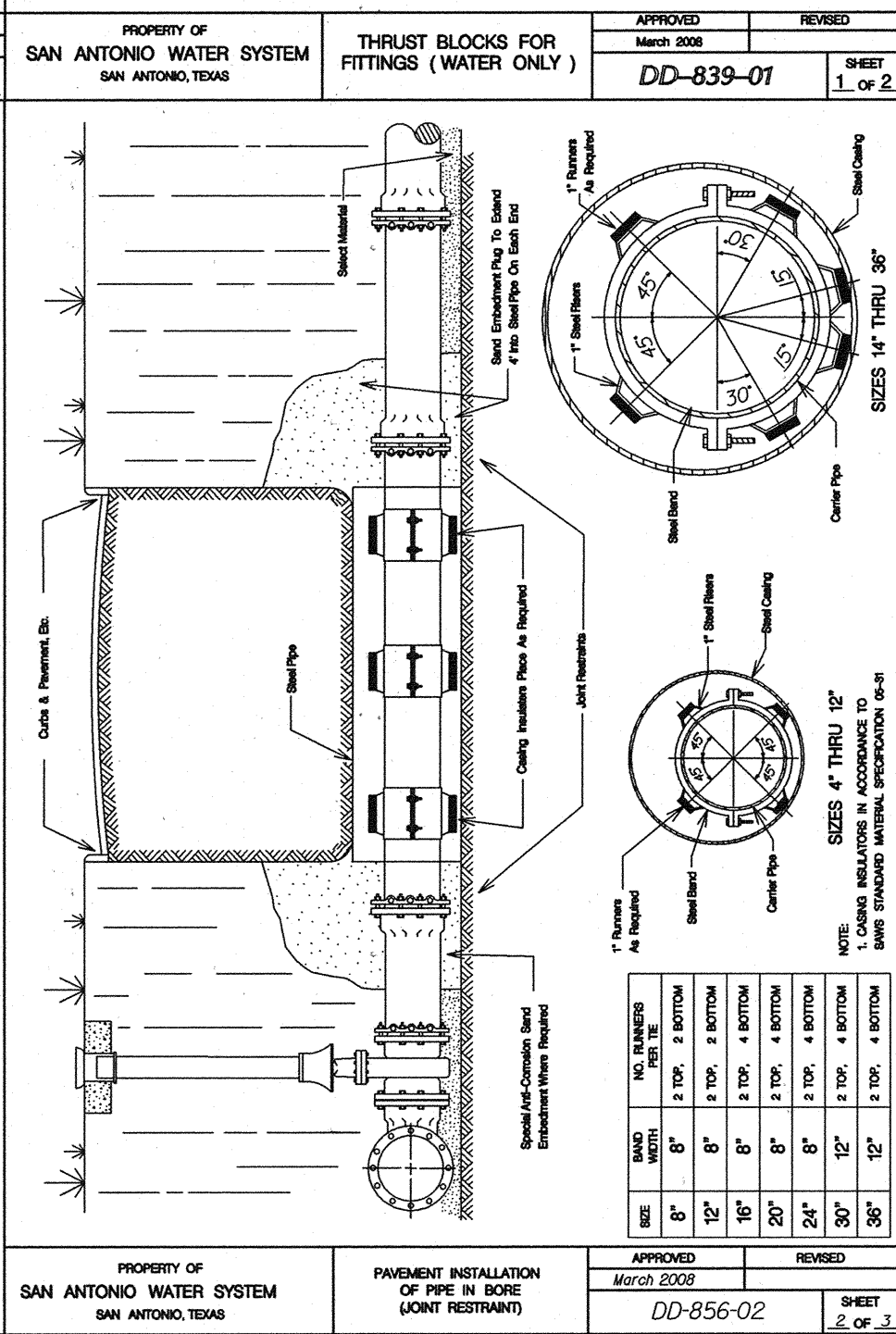
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STEEL PIPE CASING / WATER MAIN		
Pipe Size (Inches)	Pipe Thickness (Inches)	Pipe Weight (Lbs./Ft.)
6	0.375	25.03
8	0.375	33.04
12	0.375	45.55
16	0.375	62.58
20	0.375	78.60
24	0.375	94.62
30	0.375	118.65

WATER MAINS IN CONDUIT			
Water Main Size (Inches)	Nom. Dia. RCP* (Inches)	Steel Pipe Thickness (Inches)	Pipe Weight (Lbs./Ft.)
6	18	0.375	70.59
8	24	0.375	94.62
12	24	0.375	94.62
16	30	0.375	118.65
20	36	0.438	166.19
24	42	0.438	194.02
30	48	0.50	259.02
36	54	0.50	291.07

* Class II or IV Tongue and Groove, for non-railroad applications
 Note: Alignment and grade of conduit will be specified on the construction plans



REVISIONS:

PAPE-DAWSON ENGINEERS

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 TEXAS BOARD OF PROFESSIONAL ENGINEERS, P.E. REGISTRATION # 470

TRADERS VILLAGE
 36" OVERSIZE (16" REQUIRED) WATER MAIN
 DETAIL SHEET
 BEXAR COUNTY, TEXAS

PLAT NO.
 090218

JOB NO. 7325-05

DATE FEBRUARY 2010

DESIGNER KS

CHECKED JW DRAWN JV

SHEET CW5.0