ENGINEERING DIVISION
LIBRARY

920.001

SPECIAL PROVISIONS
FOR

Van Buren Street Utility Relocations

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Flood Control District of MC Library
Please Return to
2801 W. Durango
Phoenix, AZ 85009

CONTRACT NO. FCD 86-6

SUPPLEMENTARY TO MARICOPA ASSOCIATION OF GOVERNMENTS UNIFORM STANDARD SPECIFICATIONS FOR PUBLIC WORKS CONSTRUCTION EDITION OF 1979 AND REVISIONS AND SUPPLEMENTS THERETO.

A109.505

SPECIAL PROVISIONS
FOR

Van Buren Street Utility Relocations

CONTRACT NO. FCD 86-6

SUPPLEMENTARY TO MARICOPA ASSOCIATION OF GOVERNMENTS UNIFORM STANDARD SPECIFICATIONS FOR PUBLIC WORKS CONSTRUCTION EDITION OF 1979 AND REVISIONS AND SUPPLEMENTS THERETO.

FLOOD CONTROL DISTRICT OF MARICOPA COUNTY
CONTRACT FCD 86-6

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INVITATION FOR BIDS
(Construction Contract)

Ref. Invitation FCD 86-6
Date: April 21, 1986
Issued by: Flood Control District of Maricopa County

Vicinity: Van Buren Street at the Agua Fria River. Avondale, Arizona.

SEALED BIDS, IN SINGLE COPY FOR THE WORK DESCRIBED HEREIN WILL BE RECEIVED UNTIL 2:00 PM, LOCAL TIME AT THE PLACE OF THE BID OPENING, MAY 13, 1986, IN THE OFFICE OF THE FLOOD CONTROL DISTRICT OF MARICOPA COUNTY, 3335 WEST DURANGO STREET, PHOENIX, ARIZONA, 85009, AND AT THAT TIME PUBLICLY OPENED.

A PRE-BID CONFERENCE WILL BE HELD ON MAY 1, 1986, AT 10:00 AM, IN THE FLOOD CONTROL DISTRICT OF MARICOPA COUNTY CONFERENCE ROOM, 3335 WEST DURANGO STREET. IT IS IN THE BEST INTEREST OF PROSPECTIVE BIDDERS TO ATTEND THE PRE-BID CONFERENCE.

BID SECURITY IN AN AMOUNT OF NOT LESS THAN FIVE PERCENT (5%) OF THE TOTAL BID PRICE MUST BE SUBMITTED WITH EACH BID. THE BID SECURITY MAY BE IN THE FORM OF A BID BOND, CASHIER'S CHECK, POSTAL MONEY ORDER, OR CASH. THE BID SECURITY WILL BE MADE PAYABLE TO THE FLOOD CONTROL DISTRICT OF MARICOPA COUNTY AS A GUARANTEE THAT IF THE WORK IS AWARDED TO THE BIDDER, HE WILL WITHIN TEN (10) DAYS FROM THE DATE OF SUCH AWARD, ENTER INTO PROPER CONTRACT AND BOND CONDITIONS FOR THE FAITHFUL PERFORMANCE OF THE WORK. OTHERWISE, SAID AMOUNT WILL BE FORFEITED TO THE FLOOD CONTROL DISTRICT. BID SECURITY WILL BE RETURNED AS PRESCRIBED BY MAG 103.

THE SUCCESSFUL BIDDER SHALL BE REQUIRED TO FURNISH PERFORMANCE AND PAYMENT BONDS IN PENAL SUMS NOT LESS THAN ONE HUNDRED PERCENT (100%) RESPECTIVELY, OF THE ORIGINAL AMOUNT OF THE CONTRACT.

DESCRIPTION OF WORK: CONSTRUCTION OF APPROXIMATELY 2,595 L.F. OF 12" WATERLINE; CONSTRUCTION OF APPROXIMATELY 1,603 L.F. OF 16" D.I.P. WATERLINE CONSTRUCTION OF APPROXIMATELY 1,657 L.F. OF 6" SEWER FORCE MAIN; EXCAVATION AND BACKFILL OF APPROXIMATELY 35,580 C.Y. TRENCH, PLUS OTHER INCIDENTAL WORK.

THE WORK SHALL COMMENCE WITHIN SEVEN (7) CALENDAR DAYS AND BE COMPLETED WITHIN SEVENTY-FIVE (75) CALENDAR DAYS AFTER RECEIPT OF THE NOTICE TO PROCEED.

NOTICE: THE BID SCHEDULE, SPECIAL PROVISIONS, INSTRUCTIONS TO BIDDERS, UNIFORM STANDARD SPECIFICATIONS FOR PUBLIC WORKS CONSTRUCTION, EDITION OF 1979 (MAG) AND DRAWINGS LISTED UNDER THE CONTENTS WILL BE INCORPORATED IN AND BECOME A PART OF THE RESULTANT CONTRACT.

CHERIE ELLIG, CLERK
BOARD OF DIRECTORS
FLOOD CONTROL DISTRICT OF
MARICOPA COUNTY

FLOOD CONTROL DISTRICT OF MARICOPA COUNTY
INVITATION FOR BIDS, FCD 86-6
INSTRUCTIONS TO BIDDERS

1. Explanation to Bidders. Any explanations desired by the bidder, questions, or items for clarification regarding the meaning or interpretation of the invitation for bids, drawings, specifications, etc., may be addressed to the Chief Engineer and General Manager, preferably in writing, prior to the pre-bid conference. Any answers, interpretations, or clarifications affecting the cost will be addressed to all bidders in an addendum to the invitation. The receipt of an addendum by the bidder must be acknowledged in the space provided on the bid form or by letter or telegram received before the time set for the bid opening. Oral explanations or instructions given before the award of the contract will not be binding.

2. Conditions Affecting the Work. It is in the best interest of the bidders to attend the pre-bid conference. Bidders should visit the site and take such other steps as may be reasonably necessary to ascertain the nature and the location of the work, the general and local conditions which can affect the work and the cost thereof. Failure to do so will not relieve bidders from responsibility for estimating properly the difficulty or cost of successfully performing the work. (See MAG 102.4)

3. Bidder's Qualifications. Before a bid is considered for award, a bidder may be requested by the Chief Engineer and General Manager of the Flood Control District to submit a statement regarding his previous experience in performing comparable work, his business and technical organization, financial resources, and plant available to be used in performing the work.

4. Bid Guarantee. Where a bid guarantee is required by the invitation for bids, failure to furnish a bid guarantee in the proper form and amount by the time set for opening of bids, may be cause for rejection of the bid.

   If the successful bidder, upon acceptance of his bid by the Flood Control District with the period specified herein for acceptance (sixty days if no period is specified) fails to execute such further contractual documents, if any, and give such bond(s) as may be required by the terms of the bid as accepted within the time specified (ten days if no period is specified) after receipt of the forms by him, his contract may be terminated for default. In such event he shall be liable for any cost of procuring the work which exceeds the amount of his bid, and the bid guarantee shall be available toward offsetting such difference.

5. Preparation of Bids. Bids shall be submitted on the forms furnished, or copies thereof, and must be manually signed. If erasures or other changes appear on the forms, each erasure or change must be initialed by the person signing the bid. Unless specifically authorized in the invitation for bids, telegraphic bids will not be considered.

   No bid will be considered unless all items in the bid schedule are priced. In case of an error in the extension of price, the unit price shall govern. The quantities listed on the bid schedule on which unit prices are requested are estimates only.

   Unless called for, alternate bids will not be considered.

   Modifications of bids already submitted will be considered if received at the office designated in the invitation for bids by the time set for opening bids.

6. Submission of Bids. Bids must be sealed, addressed to the Chief Engineer and General Manager, Flood Control District of Maricopa County, 3335 West Durango, Phoenix, Arizona 85009, and marked to identify the bid to the referenced Contract FCD Number. Failure to appropriately identify the bid may result in a premature opening of, or a failure to open, such bid. The name of the bidder shall be on the outside of the envelope. (See MAG 102.9)

7. Withdrawal of Bids or Modifications. Bids may be withdrawn by written request received from the bidder prior to the time set for opening of bids.

8. Public Opening of Bids. Bids will be publicly opened at the time and place set for the opening in the invitation for bids. Their content will be made public for the information of bidders and others interested, who may be present either in person or by representative.

9. Award of Contract. Award and execution of a contract shall be in accordance with MAG Section 103.

10. Specifications. Specifications referred to herein shall include all revisions and amendments in effect on the date of issuance of the invitation for bids. These instructions, Special Instructions to Bidders, and the herein contained Construction Special Provisions supplement the Uniform Standard Specifications herein referred to by "MAG" section number or paragraph number; however, in case of conflict, these instructions and Special Provisions supersede the Uniform Standard Specifications (MAG).

FLOOD CONTROL DISTRICT OF MARICOPA COUNTY
INVITATION FOR BIDS, FCD 86-6
SPECIAL INSTRUCTIONS TO BIDDER

Contract Plans, Special Provisions and Contract Documents: Plans, Special Provisions, and forms for proposal, Bidding Schedule, Contract Agreement and Performance Bond may be obtained from the Flood Control District of Maricopa County, 3335 West Durango Street, Phoenix, Arizona, upon payment of $8.00 by check payable to the FLOOD CONTROL DISTRICT OF MARICOPA COUNTY. This payment will not be refunded.

APPROXIMATE QUANTITIES FOR PRINCIPAL ITEMS

QUANTITY	UNIT	DESCRIPTION
1603	L.F.	16" D.I.P. Waterline, Class 52
403	L.F.	16" Waterline
2595	L.F.	12" Waterline, Class 200 PVC
1657	L.F.	6" Sewer Force Main, Class 200 PVC
160	L.F.	36" Pipe sleeve
2	each	6" Fire Hydrant
35,580	C.Y.	Trench Excavation & Backfill

and such other pertinent items as are necessary for the completion of the project as shown on the plans or as called for in the Special Provisions or in the Maricopa Association of Governments Uniform Standard Specifications for Public Works Construction.

Location of Work: The proposed work is located on Van Buren Street at the Agua Fria River crossing, Avondale, Arizona

FLOOD CONTROL DISTRICT OF MARICOPA COUNTY
(Construction Contract)

BID FORM

Project: Van Buren Street
Utility Relocation

Invitation FCD 86-6
Date: April 21, 1986

Location: Van Buren Street at the Agua Fria River crossing, Avondale, Arizona

To: Chief Engineer and General Manager
Flood Control District of Maricopa County
3335 West Durango Street
Phoenix, Arizona 85009

The following Proposal is made on behalf of _____

_____and no others. The Total Contract amount of this proposal is (in words)_____

_____ and_____/100 dollars, (in figures)

_____, this amount being the sum total of the extended amount for each pay item on the Bidding Schedule.

Evidence of authority to submit the Proposal is herewith furnished. The Proposal is in all respects fair and is made without collusion on the part of any person, firm, or corporation mentioned above, and no member or employee of the Flood Control District Board of Directors is personally or financially interested, directly or indirectly in the Proposal, or in any purchase or sale of any materials or supplies for the work in which it relates or in any portion of the profits thereof.

The Undersigned certifies that the approved Plans, Uniform Standard Specifications for Public Works Construction, 1979 Edition (MAG) and revisions and supplements thereto, together with the Special Provisions, forms of Contract and Bond authorized by the Board of Directors and constituting essential parts of this Proposal, have been carefully examined, and also that the site of the work has been personally inspected.

The Undersigned declares that the amount and nature of the work to be done is understood and that at no time will misunderstanding of the Plans, Specifications, Special Provisions, or conditions to be overcome, be pled. On the basis of the Plans, Specifications, Special Provisions, the forms of Contract, and the Bond proposed for use, the Undersigned proposes to furnish

all the necessary machinery, equipment, tools, apparatus, and other means of construction, to do all the work and to furnish all the materials in the manner specified and to finish the entire project within the time hereinafter proposed and to accept, as full compensation therefor, the sum of various products obtained by multiplying each unit price, herein bid for work or materials, by the quantity thereof actually incorporated in the completed project, as determined by the Chief Engineer and General Manager, Flood Control District of Maricopa County.

The Undersigned understands that the quantities mentioned herein are approximate and are subject to increase or decrease and hereby proposes to perform all quantities of work, as either increased or decreased, in accordance with the provisions of the Specifications, at the unit price bid in the Bidding Schedule.

BIDDING SCHEDULE

Project: Van Buren Street Utility Relocations

Contract: FCD 86-6

Item No.	Approximate Quantity	Unit	Description	Unit Cost (in writing) and /100 dollars	Unit Cost	Extended Amount
1	1	L.S.	Removal of Existing Foundations			
2	1,603	L.F.	16" D.I.P. Waterline Class 52			
3	403	L.F.	16" Waterline			
4	2,595	L.F.	12" Waterline-Class 200 PVC			
5	1,657	L.F.	6" Sewer Force Main Class 200 PVC			
6	57	L.F.	6" D.I.P. Waterline			
7	160	L.F.	36" Pipe Sleeve			
8	1	each	8" Tapping sleeve and Valve			
9	2	each	6" Gate Valve			

BIDDING SCHEDULE

Project: Van Buren Street Utility Relocations

Contract: FCD 86-6

Item No.	Approximate Quantity	Unit	Description	Unit Cost (in writing) and /100 dollars	Unit Cost	Extended Amount
10	1	each	Valve Box and Cover Def. 391-2			
11	2	each	Valve Box and Cover Type A			
12	2	each	6" Fire Hydrant Complete			
13	34	L.F.	Sanitary Sewer Encase-ment- Type A			
14	18	L.F.	Sanity Sewer Encase-ment-Type B			
15	17	S.Y.	Pavement Replacement Type B			
16	13	S.Y.	Pavement Replacement "T" Top			
17	35,580	C.Y.	Trench Excavation and Backfill			

BIDDING SCHEDULE

Project: Van Buren Street Utility Relocations

Contract: FCD 86-6

Item No.	Approximate Quantity	Unit	Description	Unit Cost (in writing) and /100 dollars	Unit Cost	Extended Amount
18	1000	Lb.	Last Iron Fittings (Contingent Item)			

The Bidder hereby acknowledges receipt of and agrees his proposal is based on the following Addenda

_____

Total _____

The Undersigned further proposes to execute the Contract Agreement and furnish satisfactory Bonds within ten (10) days from the date of award, time being of the essence. The undersigned further proposes to begin the work as specified in the Contract attached hereto, and to complete the work within the time limits as specified in the Special Provisions and maintain at all times a Contract Bond, approved by the Board of Directors, in an amount equal to one hundred percent (100%) of the total bid. This bond shall serve not only to guarantee the completion of the work on the part of the Undersigned, but also to guarantee the excellence of both workmanship and material and the payment of all obligations incurred, said Bond to be in full force and effect until the work is finally accepted and the provisions of the Plans, Specifications and Special Provisions are fulfilled.

A Proposal guaranty in the amount and character named in the Invitation for Bids is enclosed amounting to not less than five percent (5%) of the total bid, which Proposal guaranty is submitted as a guaranty of the good faith of the Bidder and that the Bidder will enter into written contract, as provided, to do the work, if successful in securing the award thereof; and it is hereby agreed that if at any time other than as provided in the Proposal requirements and conditions the Undersigned should withdraw this Proposal, or if the Proposal is accepted and there should be failure on the part of the Undersigned to execute the Contract and furnish satisfactory Bond as herein provided, the Flood Control District of Maricopa County in either of such events, shall be entitled and is hereby given the right to retain the said Proposal guaranty as liquidated damages.

Date: _____, 19___.

IF BY AN INDIVIDUAL:

_____ _____
(Name) (Address)

IF BY A FIRM OR PARTNERSHIP:

_____ _____
(Firm Name) (Firm Address)

By: _____

*Name and Address of Each Member:

_____ _____

_____ _____

_____ _____

_____ _____

_____ _____

_____ _____

Date_____, 19___.

IF BY A CORPORATION:

_____ _____

(Corporate Name) (Corporation Address)

By: _____

**Incorporated under the Laws of _____

Names and Addresses of Officers:

_____ _____

(President) (Address)

_____ _____

(Secretary) (Address)

_____ _____

(Treasurer) (Address)

*The name and post office address of each member of the firm or partnership must be shown.

**The name of the State under which the Corporation was chartered and names, title, and business address of the President, Secretary, and Treasurer must be shown.

AFFIDAVIT BY CONTRACTOR
CERTIFYING THAT THERE WAS NO COLLUSION
IN BIDDING FOR CONTRACT FCD 86-6

STATE OF ARIZONA)
) ss.
COUNTY OF MARICOPA)

_____, being first duly sworn, deposes and says:

That he is _____ of _____
(Title) (Name of Business)

That neither he, nor anyone associated with the said _____

_____, has directly or indirectly, entered
(Name of Business)

into any agreement, participated in any collusion, or otherwise taken any action in restraint of free competitive bidding in connection with the above-mentioned project.

_____
(Name)

_____
(Title)

_____
(Name of Business)

Subscribed and sworn to before me this _____ day of _____,

19___. My commission expires: _____ 19____.

_____
(Notary Public)

CONSTRUCTION SPECIAL PROVISIONS
FLOOD CONTROL DISTRICT OF MARICOPA COUNTY
FOR
VAN BUREN STREET UTILITY RELOCATIONS
CONTRACT FCD 86-6

GENERAL CONDITIONS

1.1 Maricopa Association of Governments (MAG) "Uniform Standard Specifications for Public Works Construction", 1979 edition and 1985 revisions and City of Phoenix 1985 Supplement, where not modified by the Drawings or exceeded herein, are made part of this Specification. Maricopa Association of Governments "Uniform Standard Details for Public Works Construction", 1979 edition and current revisions and City of Phoenix 1985 Supplement, where not modified by the Drawings or exceeded herein, are made part of this Specification where referenced as "MAG Standard Details".

1.2 Work Standards: The Contractor shall comply with Sections 103 and 107 of the Contract Work Hours and Safety Standards Act (40 U.S.C. 327-330) as supplemented by Department of Labor Regulations (29 CFR Part 5).

1.2.1 Contract Time: The Contractor shall start work within seven (7) calendar days and complete all work on the project within seventy-five (75) days after the date of Notice to Proceed, and shall include twenty-one (21) days during which period of time Mountain Bell and Southwest Gas will construct their facilities upon a contractor-prepared trench initial granular bedding between Station 17+32 and Station 32+35.

1.2.2 Water, Light, Power, Heat and Telephone: All water for construction purposes, drinking water, lighting, temporary electric power, heat and telephone service shall be arranged for and provided for the requirements of the work by the Contractor at his expense.

1.3 Progress Schedule: The Contractor shall submit his proposed work progress schedule to the Chief Engineer and General Manager for approval before starting the work. The Contractor shall attach to the schedule evidences of coordination with City of Avondale Public Works, Southwest Gas and Mountain Bell.

1.3.1 Item Comments: The herein contained Construction Special Provisions supplement the Uniform Standard Specifications; however, in case of conflict, these Special Provisions supersede the Uniform Standard Specifications.

1.3.2 General Comment: The cost of all work required under this contract as shown on the plans, for which there are no specific items shown on the Bidding Schedule, shall be included in the prices bid for related items.

1.4 Subsection 101.2 - Definitions and Terms: Change the definition of Budget Project to read as follows: A project financed by funds set aside in the annual budget or likewise approved by the Board of Directors of the Flood Control District of Maricopa County.

1.4.1 Change the definition of Engineer to read as follows: The Chief Engineer and General Manager of the Flood Control District of Maricopa County acting directly or through his duly authorized representative.

1.4.2 Change the definition of Owner to read as follows: The Flood Control District of Maricopa County, acting through its legally constituted officials, officers or employees.

1.5 Section 102 - Addenda & Submission of Bidding Schedule: It shall be the responsibility of prospective bidders to determine, prior to submission of a bid, if any addenda have been issued. This may be accomplished by calling (602)262-1501. Any addendum issued, if not already bound into the Special Provisions, must be included as a part of the Special Provisions, and any quantities on the Bidding Schedule requiring change shall be adjusted by pen and ink to the new figure.

1.5.1 Bids that do not include appropriate addenda and show appropriate changes to the Bidding Schedule shall be invalid.

1.5.2 Section 102.4 Examination of Plans, Special Provisions and Site of Work: Soil reports, including logs of test holes, are available for inspection. Contact Earl Kirby, Deputy Chief, Construction Division, FCD, 262-1501.

1.6 Section 102.5 - Preparation of Proposal: The bidder's Arizona State Contractor's License number and classifications need not be shown on the proposal. The possession of such a license is no longer a bidding requirement; however, the Contractor may be required to provide certification of prior satisfactory completion for similar construction.

1.7 Subsection 103.6 - Contractor's Insurance: Concurrently with the execution of the contract, the Contractor shall furnish a Certificate of Insurance. The types of insurance and the limits of liability shall be as indicated thereon, i.e.,

$1,000,000	bodily injury per person
$5,000,000	bodily injury each occurrence
$1,000,000	property damage

1.8 Subsection 104.1.2 - Maintenance of Traffic: Modify the first sentence as follows: "The Contractor's operations shall be in accordance with the Traffic Barricade Manual, Phoenix, Arizona, Revised July 1980, the policies of the Maricopa County Highway Department, the City of Avondale and Section 401." For road closures contact K. C. Bone, Traffic Division, MCHD 233-8676.

1.9 Subsection 104.2.2 - Due to Physical Conditions: The site is in the bottom of the Aqua Fria River Bed, in immediate proximity to an existing surface water pond, and experiences surface water runoff of widely varying magnitudes. Additionally, it is likely that ground water may be encountered within the excavation and slope instability due to varying moisture contents

and geological conditions. No adjustment in contract price or time will be made because of "unusual" ground water or geological conditions, or because of any surface water floods with a peak flow of 5,000 cfs or less.

1.10 Subsection 105.2 - Plans and Shop Drawings: The number of copies of plans/shop drawings required for review and/or approval shall be as follows:

Initial submittal: Three (3) copies. One (1) copy will be returned to the Contractor.

Final submittal: Five (5) copies. Two (2) copies will be returned to the Contractor.

1.11 Subsection 105.6 - Cooperation with Utilities: An attempt has been made to determine the location of all underground utilities and drainage pipes, culverts and structures; however, it shall be the Contractor's responsibility to cooperate with the pertinent utility companies so that any obstructing utility installation may be adjusted. Should the Contractor's operations result in damage to any utility, the location of which has been brought to his attention, he shall assume full responsibility for such damage. The following phone numbers should put the Contractor in contact with the proper personnel:

Flood Control District	262-1501
Mountain Bell Telelphone Company	263-3219
Salt River Project	273-2202
Arizona Public Service	271-7014
City of Avondale Public Works Department	932-1909
Location Staking (APS, Mt. Bell, SRP)	
Blue Stakes	263-1100
Maricopa County Highway Department	233-8791
Southwest Gas Corporation	484-5264

1.11.1 The scope of work includes coordination of the Cathodic Protection System proposed for the waterline with Southwest Gas.

1.11.2 The scope of work includes preparing an excavation trench including placement on an initial backfill of a 4-inch thick initial granular bedding in the trench for use by Mountain Bell and Southwest Gas to construct their facilities. The Contractor shall cooperate with the utilities to assure that the utilities have free and reasonable access to the trench bottom and are not impeded by the Contractor's work during the alloted period of construction for the utilities. Additionally, the Contractor shall coordinate the placement of the bedding and backfill over the utility lines to assure that the facilities, including protective coverings, are not damaged.

1.11.3 The initial granular bedding and the balance of the bedding to one foot above the top of the conduit shall be river-run sand with a minimum of 95% passing the No. 4 sieve.

1.11.4 Under this paragraph, the scope of work for contractor-prepared trench excavation, bedding and backfill is between Station 17+32 and Station 32+35.

1.12 Subsection 105.6 - Construction Stakes, Lines and Grades: The project control line and bench mark elevation are shown on the drawings and will be established by the Engineer. The Contractor shall establish offset stakes and temporary bench marks for referencing the designated construction lines and grades. The Contractor shall provide all rough grade, fine grade, and structural reference lines and shall be responsible for their conformance with the plans and specifications. The Contractor shall verify existing ground elevations shown on the trench cross sections prior to starting trench excavation.

1.12.1 Survey work by the Contractor shall be performed by a qualified and experienced surveyor under the supervision of a licensed land surveyor.

1.12.2 No separate payment will be made for construction surveying and the cost thereof shall be included in the price bid for related items of work.

1.13 Section 107.2 - Permits: The Contractor shall be responsible for obtaining all permits and licenses, pay all charges, fees, taxes and give all notices necessary and incidental to the due and lawful prosecution of the work. Permits for earth moving may be obtained from the Bureau of Air Pollution Control, Maricopa County Department of Health Services, 1845 East Roosevelt, telephone number 258-6381.

1.14 Section 108.5 - Limitation of Operations: Should the Contractor elect to perform any work after regular working hours, on weekends, or legal holidays, any charges incurred by the District for inspection of the work, surveys, or tests of materials will be deducted from monies due or to become due to the Contractor.

1.15 Section 108.9 - Failure to Complete on Time: The actual cost per calender day incurred by the District for Consultant Administrative and Inspection Services on this project will be added to the daily charges as indicated by TABLE 108, LIQUIDATED DAMAGES, and will be deducted from monies due or to become due to the Contractor for each and every calender day that work shall remain uncompleted after the time specified for the completion of the work in the proposal, or as adjusted by the Engineer. Nothing contained in this provision shall prohibit the District from deducting from monies due or to become due to the Contractor and any other costs incurred by the District directly attributable to the delay in completing this contract.

1.16 Section 109.4 - Due to Physical Conditions: Pay quantities for trench excavation are based on the in-place volume of excavation from the existing grade to the theoretical limit of excavation shown on the drawings, between Station 17+32 and Station 32+35. No separate payment will be made for excavation for draining an existing pond, or for temporary embankments constructed for protection from surface water runoff.

WATERLINE CONSTRUCTION

1.1 Maricopa Association of Governments (MAG) "Uniform Standa i Specifications for Public Works Construction", 1979 edition and 1985 revisio s and City of Phoenix 1985 Supplement, where not modified by the Drawings r exceeded herein, are made part of this Specification. Maricopa Association f Governments "Uniform Standard Details for Public Works Construction", 19 9 edition and current revisions and City of Phoenix 1985 Supplement, where n t modified by the Drawings or exceeded herein, are made part of th s Specification where referenced as "MAG Standard Detail".

1.2 Work Specified Herein: Construction of a 12" bypass waterline a d placement in service. Construction of new 16" waterline in sleeves.

1.3 Related Work Specified Elsewhere: CATHODIC PROTECTION SYST M (SACRIFICIAL ANODE) SECTION 618 for Reinforced Concrete Pipe Sleeves.

1.4 Verification of Dimensions: Before proceeding with any work, th s Contractor shall carefully check and verify all dimensions and shall repo t any variation to the Engineer. This verification includes depth of existi g utility sizes and types of pipe and joints at connection points.

1.5 Submittals: Submit drawings in accordance with requiremer s described in the General and Special Conditions. Obtain approval of drawi s prior to proceeding. Submit six (6) copies of catalogue cuts for each type f the following materials:

Fire hydrants
Corp stops, curb stops
Fittings and bolts
Valves, tapping sleeves, and tapping valves
Valve boxes
Pipe and pipe certifications, including joint details

1.6 Drawings of Record: This Contractor shall provide and k p up-to-date a complete record set of drawings. The set of drawings shall e kept on the site and shall be used as a records set.

1.6.1 Record drawings shall also serve as work progress sheets d Contractor shall make neat, legible annotations thereon daily as work proce s showing the work as actually installed. These drawings shall be available t all times for inspection.

1.6.2 Permanent structures of easily identifiable nature (i.e., corner f building, perpendicular dimensions from paved walks, curbs, etc.). Rec d drawings shall also show location and depth of existing utilities encounte d in the work.

1.6.3 On or before date of final inspection, this Contractor shall deli r corrected and complete drawings to the Engineer. Delivery of the drawi gs will not relieve this Contractor of responsibility of furnishing informat n and data that may be omitted from the drawings.

1.7 Scheduling: The Contractor shall not cause the water service crossing the Agua Fria to be disrupted for a period exceeding two (2) hours in any one-week period. The timing of any disruption shall be scheduled with the City of Avondale. The 16-inch line shall not be out of service for a period greater than thirty (30) days, and no work shall be performed which would endanger the operation of the bypass line.

PART 2 - PRODUCTS

2.1 Bypass Waterline: MAG Section 750, Class 52, Cement Lined. Ductile Iron Pipe (DIP); Flanged or Restrained Joints for Fire Hydrant Lines; AWWA C-900 Polyvinyl Chloride (PVC), IPS, Pressure Pipe, Class 200 Restrained Joints for DIP shall be Lok-Tyton, Lok-Ring, Super-Lox or approved equal.

2.2 16" Waterline: MAG Section 750, Class 52, Ductile Iron Pipe, Mechanical Joint, Cement Lined.

2.3 Polywrap: MAG Section 610.5.2.

2.4 Tapping Sleeve Valves and Valve Boxes: MAG Section 630.

2.5 Water Taps & Service Taps: MAG Section 631.

2.6 Fire Hydrants: MAG Section 756, Contractor furnished.

PART 3 - EXECUTION

3.1 Trenching: Conform to MAG Section 601; 4-inch initial granular bedding under pipe larger than 6" and all backfill shall be granular material. Water settling is not permitted.

3.2 Waterlines: MAG Section 610; Ductile Iron pipe valves and fittings shall be polyethylene encased. 16-inch line shall have Cathodic Protection System with sacrificial anodes.

3.3 Valves: MAG Section 610.3.

3.4 Tapping sleeves, valves and valve boxes shall be installed in accordance with Section 630 except as follows. In paragraph 630.4 the Contractor will be responsible for making the actual wet tap.

3.5 Waterline Testing and Disinfection: MAG Section 610 and 611 Contractor to provide witten report of duration of test, pressures during test and leakage for each line tested. Chlorine residual at beginning and end of disinfection shall be reported. Bacteriological analysis of samples taken from the completed lines shall be performed by an approved laboratory and paid for by the Contractor.

3.5.1 Pressure testing, leakage testing and bacteriological testing shall be satisfactorily completed prior to removal of any of the 16-inch line. Leakage testing shall be performed on the existing 16-inch line prior to removal to serve as a base line to measure leakage after the Contractor completes his work on the line. The allowable leakage for the 16-inch line after the Contractor has completed his work shall be less than the greater of base line leakage or the leakage allowable under paragraph 610.14.

3.6 Waterline Sleeve: At the Contractor's option, the sleeve at Sta. 268+ may be either 36" RCP, as called for on the plans, or a 36" split metal casing may be substituted in order to avoid disturbing the in-place waterline. After installation, the seams of the split metal casing shall be welded for the full length of the pipe. All other details for support and plugging shall remain as shown on the plans. No extra payment will be made for the substitution of the 36" split metal casing. Payment for the 36" split metal casing will be made the same as bid per lineal foot for 36" Reinforced Concrete Pipe, D-1350. Details of the 36" split metal casing shall be submitted to the Engineer and approval obtained prior to installation. Skids shall be installed as shown on the plans for either 36" RCP sleeve or the 5/16" steel split metal sleeve. The Contractor must insure that the polyethylene protective wrapping on the waterline is protected during the welding of the sleeve, if the split casing option is used.

FORCE MAIN CONSTRUCTION

PART 1 - GENERAL

1.1 Work included: Sanitary Sewer Force main including connections to existing force main.

1.2 Related Work Performed Elsewhere: SANITARY SEWERS: Manhole construction, pavement replacement, trenching excavation and backfill.

1.3 Quality Assurance:

1.3.1 Leakage Testing: MAG 610.14 except as follows: Pipe lines shall be tested for leakage to 800 percent of the maximum working pressure of 11 psi (85 psi) for a minimum period of four hours. The Contractor may accept the existing line and its calculated amount of allowable leakage based on 20' pipe lengths or he may test the existing line and deduct the amount of leakage measured in the existing line from the leakage for the entire force main. Pressure gauges shall be furnished by the Contractor.

1.3.2 Compaction Testing: Shall conform to requirements of Section: SANITARY SEWERS except no testing is required on the ABC backfill required to be placed around pipe.

1.4 Submittals:

1.4.1 Shop Drawings and Product Data Sheets shall be submitted for the following: PVC pipe and valves.

1.5 Certificates shall be furnished by the suppliers of the following products stating that the materials supplied to this project meet these specifications and the approved submittals.

PART 2 - PRODUCTS

2.1 Pipe: PVC Pressure Pipe, Class 200, AWWA C-900, IPS with rubber gasket joints meeting ASTM F 477 and D-3139 for joint performance.

PART 3 - EXECUTION

3.1 Pipeline: MAG Section 610 waterline construction, except that disinfection is not required.

CATHODIC PROTECTION SYSTEM
(SACRIFICIAL ANODE)

PART 1 - GENERAL

1. APPLICABLE PUBLICATIONS: The publications listed below form a part of this specification to the extent referenced. The publications are referred to in the text by the basic designation only.

1.1 American Society for Testing and Materials (ASTM) Publication:

B418-80	Cast and Wrought Galvanize Zinc Anodes for Use in Saline Electrolytes.

1.2 National Association of Corrosion Engineers (NACE) Publication:

RP-01-69	Recommended Practice-Control of External Corrosion on Underground or Submerged Metallic Piping Systems (Rev. 1976).

1.3 National Electrical Manufacturers Association (NEMA) Standard:

TC 2-1978 Incl. Rev. 1 thru 4	Electrical Plastic Tubing (EPT) and Conduit (EPC 40 and EPC 80).

1.4 National Fire Protection Association (NFPA) Standard:

No. 70-1981	National Electrical Code.

1.5 Underwriters Laboratories Inc. (UL) Publications:

UL 6	Rigid Metal Conduit (Oct. 23, 1981, 9th Ed.).
UL 510	Insulating Tape (Jan. 26, 1982, 5th Ed.; Rev. Mar. 16, 1982).
UL 514	Outlet Boxes and Fittings (May 14, 1979, 6th Ed., Rev. thru Jun. 1 1982).

2. GENERAL REQUIREMENTS:

2.1 Services of Corrosion Engineer: The Contractor shall obtain the services of a corrosion engineer to supervise and inspect the installation of the cathodic protection system. Corrosion Engineer refers to a person, who, by reason of his knowledge of the physical sciences and the principles of engineering and mathematics, acquired by professional education and related practical experience, is qualified to engage in the practice of corrosion control on buried or submerged metallic piping systems and metallic tanks.

Such person may be a licensed professional engineer or may be a person certified as being qualified by the National Association of Corrosion Engineers if such licensing or certification includes suitable experience in corrosion control on buried or submerged metallic piping systems and metallic tanks.

2.1.1 Evidence of qualifications of the corrosion engineer shall be submitted by the Contractor.

2.1.2 The corrosion engineer shall insure that the cathodic protection system is installed, tested, and placed into service in accordance with the requirements specified.

2.1.3 Prior to excavation in the vicinity of the 16-line, the Corrosion Engineer shall determine if a discontinuity exists either in the existing bonded joints for the pipe line or in the continuous anode collector wire which parallels the pipe line.

3. SUBMITTALS:

3.1 Shop Drawings: Shop drawings shall be submitted in accordance with the SPECIAL PROVISIONS and shall consist of a complete list of equipment and materials including manufacturer's descriptive and technical literature, catalog cuts, and installation instructions. Shop drawings shall also contain complete wiring and schematic diagrams and any other details required to demonstrate that the system has been coordinated with the existing system and will function properly as a unit. Catalogue cuts and tests on the existing system are attached.

3.2 Performance Test Reports: Upon completion and testing of the installed system, test reports shall be submitted in booklet form tabulating all field tests and measurements performed.

PART 2 - PRODUCTS

4. ANODES:

4.1 Magnesium Anodes: Magnesium anodes shall be Type II, Type III, or magnesium-manganese corresponding to the applicable chemical composition listed in the following table:

ELEMENT	PERCENT BY WEIGHT TYPE II	TYPE III	MG-MN ALLOY
Aluminum	5.3 - 6.7	5.3 - 6.7	0.010 Max.
Zinc	2.5 - 3.5	2.5 - 3.5	
Manganese	0.15 Min.	0.15 Min.	0.50 - 1.30
Copper	0.05 Max.	0.02 Max.	0.02 Max.
Silicon	0.30 Max.	0.10 Max.	
Iron	0.003 Max.	0.003 Max.	0.03 Max.
Nickel	0.003 Max.	0.002 Max.	0.001 Max.
Others	0.30 Max.	0.30 Max.	0.05 each or 0.30 Max. Total
Magnesium	Balance	Balance	Balance

4.2 Anode Size: Anode weight base shall be 17 lbs., with a gross weight of 45 lbs. packaged in backfill, approximately 7-1/2 inches by 24 inches in size.

4.3 Connecting Wire: Wire shall be No. 12 AWG solid copper wire, not less than 10 feet long, unspliced, complying with NFPA No. 70, Type TW or RHH insulation. Connecting wires for magnesium anodes shall be factory installed with the place of emergence from the anode in a cavity sealed flush with a dielectric sealing compound.

4.4 Artificial Backfill:

4.4.1 Anodes shall be factory packaged with an artificial backfill in a water permeable fabric sack or cardboard container. Anodes shall be packaged on a vibrating platform to attain dense packing, and centering shall be assured by means of spacers.

4.4.2 Artificial backfill shall have the following composition:

Material	Approximate Percent by Weight
Gypsum	75
Bentonite	20
Sodium Sulfate	5
Total	100

5. MISCELLANEOUS MATERIALS:

5.1 Electrical Wire: Wire shall be No. 4, 10 & 12 AWG stranded copper wire with NFPA No. 70, Type TW or RHW-USE insulation, colored as shown to match existing wire. Connecting wire splicing shall be copper compression connections made for the purpose or exothermic welds following instructions of the manufacturer. Split-bolt connections shall not be used.

5.2 Conduit: Rigid galvanized steel conduit and accessories shall conform to UL 6. Non-metallic conduit shall conform to NEMA TC 2.

5.3 Test Boxes and Junctions Boxes: Boxes shall be outdoor type conforming to UL 514.

5.4 Joint, Patch, Seal, and Repair Coating:

5.4.1 Sealing and dielectric compound shall be a black, rubber based compound that is soft, permanently pliable, tacky, moldable, and unbacked. Compound shall be applied as recommended by the manufacturer, but not less than 1/2-inch thick.

5.4.2 Coating compound shall be cold-applied coal-tar base mastic, hot-applied coal-tar enamel, or an approved pipeline wrapping.

5.4.3 Pressure-sensitive vinyl plastic electrical tape shall conform to UL 510.

5.5 Preformed Sheaths: Sheaths for encapsulating electrical wire splices to be buried underground shall fit the insulated wires entering the spliced joint.

5.6 Epoxy Potting Compound: Compound for encapsulating electrical wire splices to be buried underground shall be a two package system made for the purpose.

5.7 Test Stations: Test stations shall be complete with an insulated terminal block having the indicated number of terminals and shall be provided with a lockable cover and have a cast-in legend, "C.P. Test".

5.8 Copper-Copper Sulfate Reference Electrode: 2" x 8" electrode packaged in special backfill, total weight approximately 15 lbs., with lead wire to test station.

PART 3 - EXECUTION

6. INSTALLATION:

6.1 Anode Installation: Anodes of the size indicated shall be installed at the locations shown. Locations may be changed to clear obstructions if approved. Anodes shall be installed as indicated in a dry condition after any plastic or waterproof protective covering has been completely removed from the water permeable, permanent container housing the anode metal. The anode connecting wire shall not be used for lowering the anode into the hole. The annular space around the anode shall be backfilled with fine earth in 6-inch layers and each layer shall be hand tamped. Care must be exercised not to strike the anode or connecting wire with the tamper. Approximately 5 gallons of water shall be applied to each filled hole after anode backfilling and

tamping has been completed to a point about 6 inches above the anode. After the water has been absorbed by the earth, backfilling shall be completed to the ground surface level.

6.1.1 Single anodes spaced as shown shall be connected through a test station to the pipeline, allowing adequate slack in the connecting wire to compensate for movement during backfill operation.

6.1.2 Groups of anodes in quantity and location shown shall be connected to a collector cable. The collector cable shall make contact with the structure to be protected only through a test station.

6.1.3 Resistance wires shall not be used to reduce the current output of individual or group anodes.

6.1.4 Connections to ferrous pipe shall be made by exothermic weld methods manufactured for the type of pipe.

6.1.5 Electric arc welded connections and other types of welded connections to ferrous pipe and structures shall be approved before use.

6.2 Test Station: Test stations shall be of the type and location shown and shall be curb box mounted. Buried electrically insulating joints shall be provided with test wire connections brought to a test station. A 4" PVC 4' long conduit shall extend down from curb box. Curb box shall be mounted in a 12" x 12" x 6" thick concrete base.

6.3 Reference Electrode: Install over pipeline near test station.

7. PIPE JOINTS:

7.1 Electrical Continuity: Underground pipe shall be electrically continuous except at places where electrically insulating joints are specified. Pipe joined by means other than welding shall meet electrical continuity requirements:

7.1.1 The following mechanical joints that are not factory designed to provide electrical continuity shall be bonded by installing a metallic bond across the joint. The bonding connections shall be made by the exothermic welding process.

7.1.2 Mechanical joints designed to provide electrical continuity shall meet manufacturer's published standards.

7.2 Coating: Mechanical joints and fittings of either the electrically conductive or insulating type shall be coated with an underground type dielectric coating system. Where external electrical continuity bonds are installed across mechanical joints, all bare or exposed metal, welds, bare wire and exposed coupling parts shall be coated with a coating system.

7.2.1 Couplings and fittings which have a low profile exterior designed to permit tape coating shall be primed and wrapped with an underground type pipe tape following recommendations of the coupling or fitting manufacturer.

7.2.2 Couplings and fittings that cannot be properly taped shall be enclosed in a spaced mold manufactured for the purpose and filled with polyurethane foam having a cellular structure that will not absorb water or cold applied dielectric compound.

8. CRITERIA OF PROTECTION: Criteria for determining the adequacy of protection on a buried pipe shall be in accordance with NACE RP-01 and shall be selected by the corrosion engineer as applicable.

8.1 Iron and Steel: One of the following methods shall apply:

8.1.1 A negative voltage of at least minus 0.85 volt as measured between the pipe and a saturated copper-copper sulphate reference electrode contacting the earth directly over the pipe. Determination of this voltage shall be made with the cathodic system in operation.

8.1.2 A negative voltage shift of at least 300 millivolts as measured between the pipe and a saturated copper-copper sulphate reference electrode contacting the earth directly over the pipe. Determination of this voltage shift shall be made with the protective current applied. These criteria apply to pipes not in electrical contact with dissimilar metals.

8.1.3 A minimum polarization voltage shift of 100 millivolts as measured between the pipe and a saturated copper-copper sulphate reference electrode contacting the earth directly over the pipe. This polarization voltage shift shall be determined by interrupting the protective current and measuring the polarization decay. When the protective current is interrupted, an immediate voltage shift will occur. The voltage reading, after the immediate shift, shall be used as the base reading from which to measure polarization decay.

9. TESTS AND MEASUREMENTS:

9.1 Baseline Potentials: After backfill of the pipe and anodes is completed, but before the anodes are connected to the pipe, the static potential-to-soil of the pipe shall be measured. The locations of these measurements shall be identical to the locations specified for pipe-to-reference electrode potential measurements. The initial measurements shall be recorded.

9.2 Insulation Testing: Before the anode system is connected to the pipe, an insulation test shall be made at each insulating joint or fitting. This test shall demonstrate that no metallic contact, or short circuit exists between the two insulated sections of the pipe. Any insulating fittings installed and found to be defective shall be reported to the Contracting Officer.

9.3 Anode Output: As the anodes or groups of anodes are connected to the pipe, current output shall be measured with an approved low resistance ammeter. The values obtained and the date, time, and location shall be recorded.

9.4 Pipe-to-Reference Electrode Potential Measurements: Upon completion of the installation and with the entire cathodic protection system in operation, electrode potential measurements shall be made using a copper-copper sulphate reference electrode and a potentiometer-voltmeter, or a direct current voltmeter having an internal resistance (sensitivity) of not less than 100,000 ohms per volt and a full scale of 1 or 2 volts. The locations of these measurements shall be identical to the locations used for the baseline potentials. The values obtained and the date, time, and locations of measurements shall be recorded.

9.5 Location of Measurements:

9.5.1 For coated piping or conduit, measurements shall be taken from the reference electrode located in contact with the earth, directly over the pipe. Connection to the pipe shall be made at service risers, valves, test leads, or by other means suitable for test purposes. Measurements shall be made at intervals not exceeding 400 feet. In no case shall less than three measurements be made over any length of line. Additional measurements shall be made at each distribution service riser, with the reference electrode placed directly over the service line.

9.6 Interference Testing: Before final acceptance of the installation, interference tests shall be made with respect to any foreign pipes in cooperation with the owner of the foreign pipes. A full report of the tests giving all details shall be made.

9.7 Recording Measurements: All pipe-to-soil potential measurements including initial potentials where required shall be recorded. Contractor shall locate, correct and report to Owner any short circuits to foreign pipes encountered during checkout of the installed cathodic protection system. Pipe-to-soil potential measurements are required on as many pipes as necessary to determine the extent of protection or to locate short-circuits.

5 April 1982

Contractors Excavating, Inc.
114 South 43rd Street
Phoenix, AZ 85034

Reference: Shop Drawings of Materials, Cathodic Protection for Water System Improvements, City of Avondale, FmHA Project No. 02-39-866000233

Dear Sirs:

Please find enclosed shop drawings of materials per Special Provisions. These shop drawings of materials are submitted for your approval per specifications referenced above.

Very Truly Yours,
GOUDY ENGINEERING, INC.

Harlan C. Goudy
President

HCG/mp

goudy engineering, inc.
7840 EAST BROADWAY • SUITE 201 • TUCSON, ARIZONA 85710 • (602) 298-1104

5 April 1982

Contractors Excavating, Inc.
114 South 43rd Street
Phoenix, AZ 85034

Reference: Cathodic Protection, Certification of Experience and Qualification, per Specification FmHA Project No. 02-39-866000233, Section 16D, paragraph 4.2 and 4.3, page 16D-4

Gentlemen:

This letter of certification is submitted for your approval per above referenced specifications.

GOUDY ENGINEERING, INC.

1. Years of experience - 6 years

2. Completed Jobs - Engineering design, testing and installation.

Year	Owner	Description of Cathodic Protection
1977	State of Arizona	Gas lines at Arizona Childrens Colony
1978	U.S. Air Force	All underground metallic lines at Williams Air Force Base
1978	U.S. Government, Bureau of Reclamation	Steel cylinder, motar coated pipe 29,000 ft of 66" Dia water pipe at Farmington, New Mexico
1978	U.S. Government, Bureau of Reclamation	Steel cylinder, butyl-rubber coated pipe, 102" Dia water pipe, 54,000 ft.
1978	U.S. Government, Bureau of Reclamation	Steel cylinder, butyl-rubber coated pipe, 90" Dia water pipe, 58,000 ft.

Certificated by: Harlan C. Goudy Corrosion Specialist No. 2385

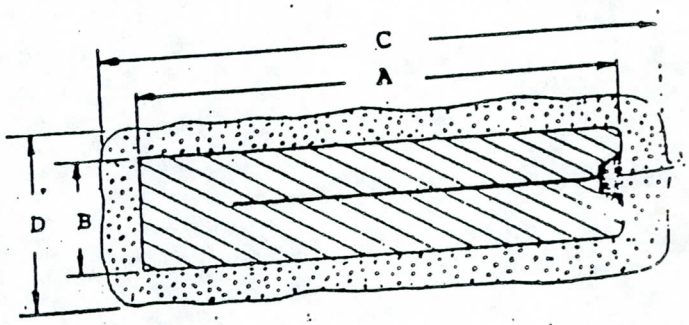
Very Truly Yours,

Harlan C. Goudy, PE
President

HCG/mp

MAGNESIUM ANODES

ANODE WT.	BARE A	BARE B	PACKAGED C	PACKAGED D	PACK. WT.
1	12	1 1/4	14	2 3/4	4
3	9 1/2	2 5/8	12 1/2	4 5/8	10
5	15 3/4	2 5/8	17 3/4	4 3/8	16
9	16 3/4	3 3/8	20 3/4	5 3/8	27
17	16	4 3/4	18	6 3/4	45
32	19	5 3/4	23	7 3/4	72
50	17 1/2	7 5/8	21 1/2	9 5/8	105



CHEMICAL COMPOSITION

Al	5.3 - 6.7%
Mn	0.15% Min.
Zn	2.5 - 3.5%
Si	0.10% Max.
Cu	0.02% Max.
Ni	0.002% Max.
Fe	0.003% Max.
Other	0.30% Max.
Magnesium	Remainder

PREPACKAGED IN

75% GYPSUM
20% BENTONITE
5% SODIUM SULFATE

NO EXCEPTION TAKEN ☑ MAKE CORRECTIONS NOTED ☐
REJECTED ☐ REVISE AND RESUBMIT ☐

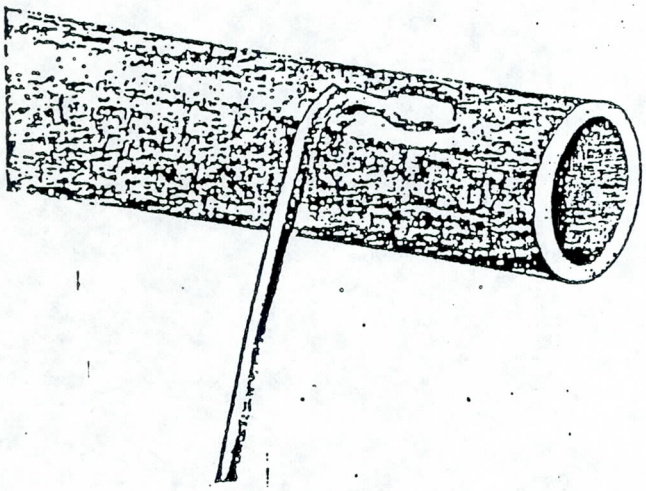
CHECKING IS ONLY FOR GENERAL CONFORMANCE WITH THE DESIGN CONCEPT OF THE PROJECT AND GENERAL COMPLIANCE WITH THE INFORMATION GIVEN IN THE CONTRACT DOCUMENTS. ANY ACTION SHOWN IS SUBJECT TO THE REQUIREMENTS OF THE PLANS AND SPECIFICATIONS. CONTRACTOR IS RESPONSIBLE FOR: DIMENSIONS WHICH SHALL BE CONFIRMED AND CORRELATED AT THE JOB SITE; MATERIAL QUANTITIES; FABRICATION PROCESSES AND TECHNIQUES OF CONSTRUCTION; COORDINATION OF HIS WORK WITH THAT OF ALL OTHER TRADES AND THE SATISFACTORY PERFORMANCE OF HIS WORK.

JOHANNESSEN & GIRAND
Consulting Engineers, Inc.

Date 5/14/82 By

CADWELD® CATHODIC PROTECTION CONNECTIONS

TYPE CONNECTION

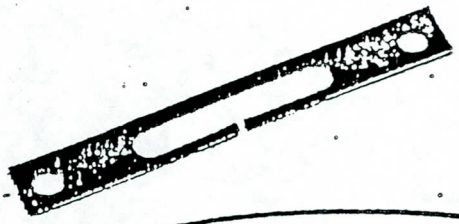


Tap conductor to top of horizontal STEEL pipe or flat surface

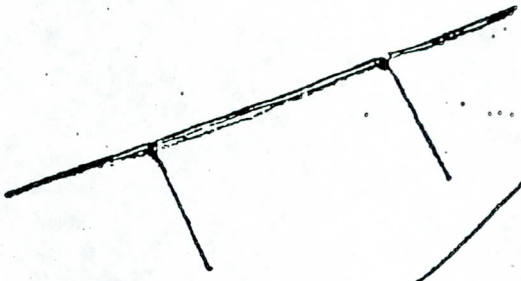
Conductor Size	Surface	Welder Part No.†	Welder Price	Weld Metal
#14 to #10 Solid In sleeve CAB-133-1H / #8 Solid or Stranded, #6 Solid	Flat (4" & larger pipe)	CAHAA-1G	CAA	CA15
	3/4" to 3-1/2" pipe	CAHAA-1GA	CAA	CA15
6 Stranded	Flat (4" & larger pipe)	CAHAA-1H	CAA	CA15
	3/4" to 3-1/2" pipe	CAHAA-1HA	CAA	CA15
4 Solid	Flat (6" & larger pipe)	CAHAA-1K	CAA	CA15
	3/4" to 3-1/2" pipe	CAHAA-1KA	CAA	CA15
	4" to 5" pipe	CAHAA-1KB	CAA	CA15
4 Stranded	Flat (6" & larger pipe)	CAHAA-1L	CAA	CA15
	3/4" to 3-1/2" pipe	CAHAA-1LA	CAA	CA15
	4" to 5" pipe	CAHAA-1LB	CAA	CA15
2 Solid	Flat (10" & larger pipe)	CAHAA-1T	CAA	CA15
	1" to 3-1/2" pipe	CAHAA-1TA	CAA	CA25
	4" to 8" pipe	CAHAA-1TB	CAA	CA25
2 Stranded	Flat (16" & larger pipe)	CAHAA-1V	CAA	CA32
	1" to 3-1/2" pipe	CAHAA-1VA	CAA	CA32
	4" to 8" pipe	CAHAA-1VB	CAA	CA32
	10" to 14" pipe	CAHAA-1VC	CAA	CA32
1 Stranded	Flat (16" & larger pipe)	CAHAA-1Y	CAA	CA45
	1-1/2" to 3-1/2" pipe	CAHAA-1YA	CAA	CA45
	4" to 8" pipe	CAHAA-1YB	CAA	CA45
	10" to 14" pipe	CAHAA-1YC	CAA	CA45
1/0 Stranded	Flat (20" & larger pipe)	CAHAA-2C	CAA	CA65
	2-1/2" to 3-1/2" pipe	CAHAA-2CA	CAA	CA65
	4" to 8" pipe	CAHAA-2CB	CAA	CA65
	10" to 18" pipe	CAHAA-2CC	CAA	CA65
2/0 Stranded	Flat (20" & larger pipe)	CAHAA-2G	CAA	CA65
	2-1/2" to 3-1/2" pipe	CAHAA-2GA	CAA	CA65
	4" to 8" pipe	CAHAA-2GB	CAA	CA65
	10" to 18" pipe	CAHAA-2GC	CAA	CA65

†Welder Part No. Includes mold frame. If mold only (less frame) is required, order—Welder Part No.—"M".

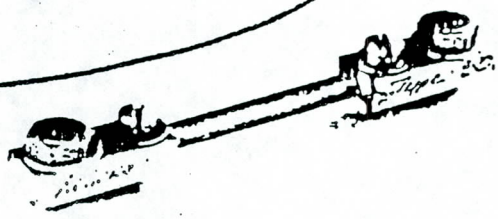
SHUNTS



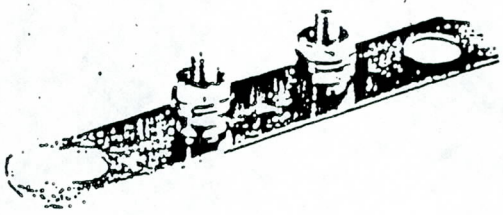
Agra J. B.
This is a 0.01 ohm 8 ampere capacity manganin strip shunt designed for use in junction boxes. Size ½ x 3¾ in. Holes are for #10 (3/16") screws. Holes for ¼" screws are $.10 additional per shunt. Hole spacing is 3¼".



Holloway Type RS
This is a 0.01 ohm manganin wire shunt with a 6 ampere capacity.



Holloway Type SO
This is a 0.001 ohm manganin wire shunt rated at 50 amperes 50 millivolts. Potential screws are #10. Bolt is ¼". Bolt spacing is 3¾".

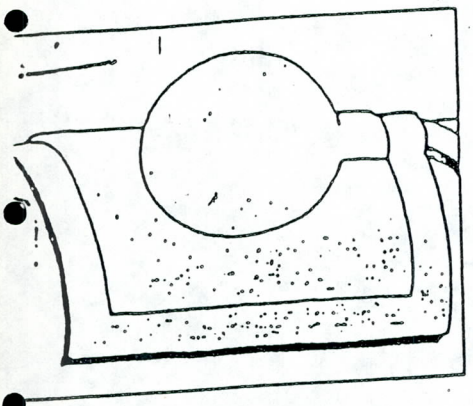


Holloway Type SS
This is a 0.001 ohm constantan shunt with a 25 ampere capacity. Studs are #10. Holes are for 3/16" bolt. Bolt spacing is 3".

Agra Engineering Company — 551 South Quaker Avenue — Tulsa, Oklahoma 74120

DISTRIBUTED BY

FARWEST CORROSION CONTROL CO.
17311 SOUTH MAIN STREET
GARDENA, CALIFORNIA 90248
213-532-9524 213-770-6425
TWX 910-346-6345 800-421-2622 (EXCEPT CAL.)



The Royston Handy-Cap

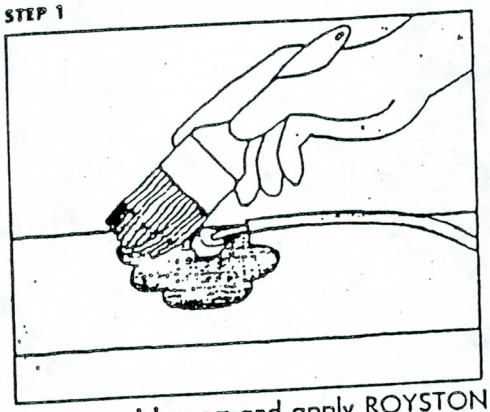
Protects and Insulates
The Royston Handy-Cap is designed to protect and insulate underground anode lead wire welds, as well as test wire welds, to pipes and tanks in cathodically protected installations.

Prefabricated
The Handy-Cap is made of a plastic dome and tunnel lined with an elastomeric sheet of 125 mils ROYSTON TAC TAPE. The dome is pre-filled with an elastomeric compound firm enough to resist flow during application yet soft enough to mold around the irregular shape of a thermite weld.

Applied simply and quickly
The Handy-Cap can be applied as quickly as laying the cap over the weld area previously primed with Roybond 747 and pressing by hand. There's no mixing or pouring, and no curing or waiting.

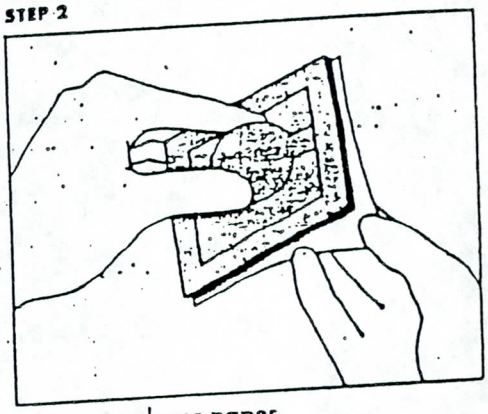
Handy-Caps are especially useful for covering thermite welds on mill coated pipe. In instances where extensive damage to the coating occurs, the exposed metal surface should be protected with ROYSTON GREENLINE tape or ROYSTON ROSKOTE mastic.

STEP 1



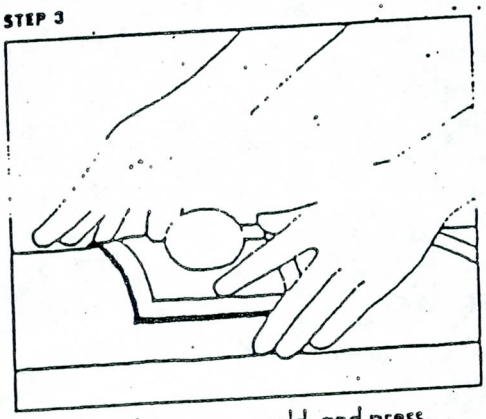
Clean weld area and apply ROYSTON ROYBOND 747 primer.

STEP 2



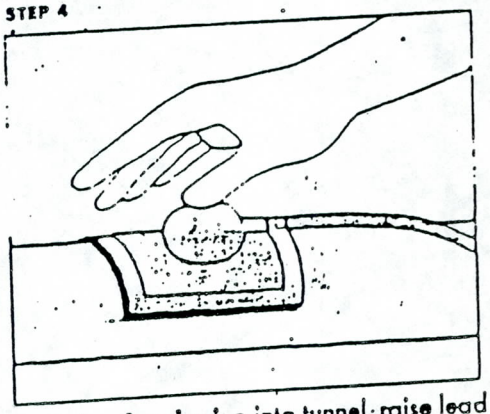
Remove release paper.

STEP 3



Position dome over weld, and press.

STEP 4



Position lead wire into tunnel; raise lead wire approximately 45° and pinch elastomer around wire. Then simply press firmly to pipe for last, permanent protection.

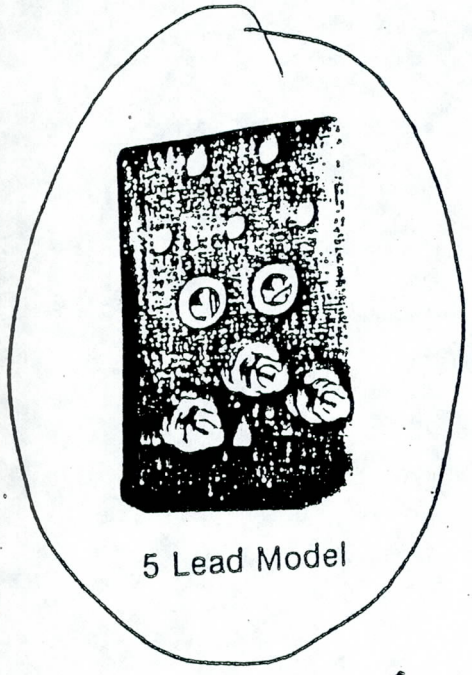
TYPICAL PROPERTIES:

Construction:	Molded plastic cap filled with corrosion resistant compound on a base of thick elastomeric sheet.
Dimensions:	
Over-all:	4 by 4 inches.
Plastic Sheet:	2¾ by 2¾ inches.
Sheet Thickness:	15 mils.
Plastic Dome:	Diameter: 1⅝ inches; Height: 0.8 inch.
Tape Thickness:	125 mils.
Weight:	2.1 ±.2 oz.
Application Temperature:	—20° to 120°F.
Service Temperature:	—40° to 185°F.
Shelf Life:	At least one year.

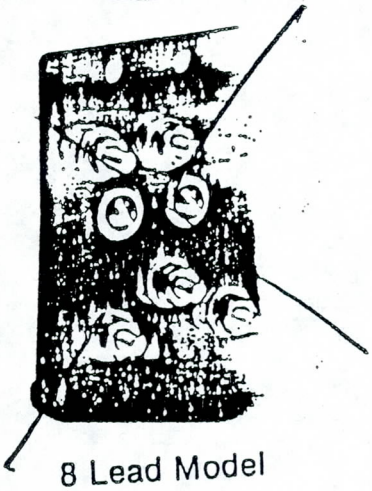
Materials

Test Station: Glass filled polycarbonate-urethane coated
Hardware: Machine screws, washers, hex nuts - cadmium or zinc plated (Brass, brass nickel plated and stainless steel hardware available as options.)

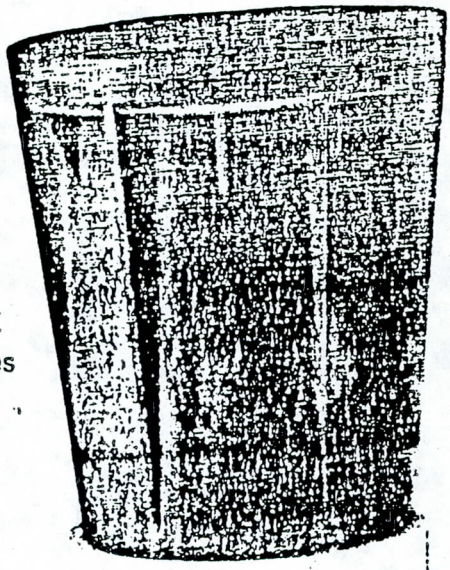
Each test station consists of a housing, bell, terminal board and complete hardware. Conduit, wiring and other accessories are available on request.



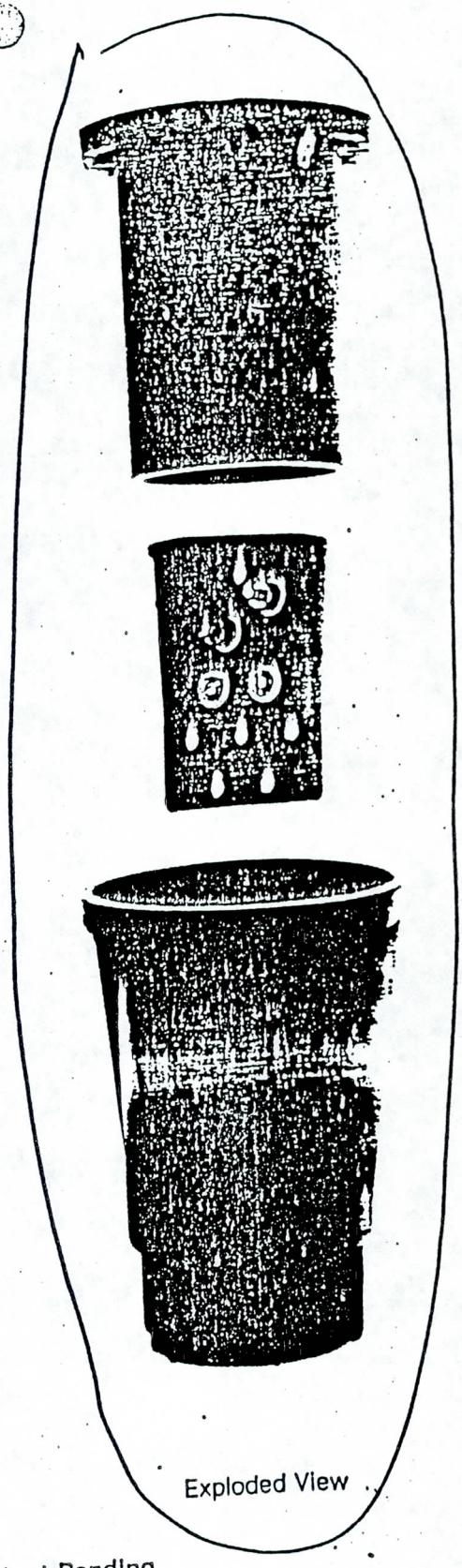
5 Lead Model



8 Lead Model



Flush Fink© with conduit



Exploded View

Patent Pending

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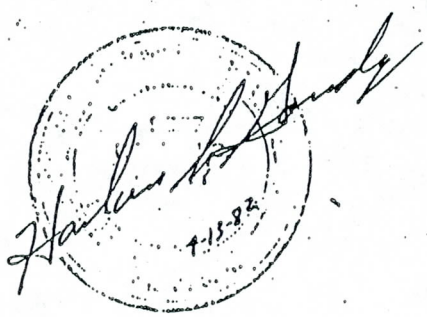
CATHODIC PROTECTION
PIPELINE PORTION
CITY OF AVONDALE

WATER SYSTEM IMPROVEMENTS
FmHA PROJECT NO. 02-39-866000233

April 1982

CORROSION SPECIALIST NO. 2385



goudy engineering, inc.
7840 EAST BROADWAY • SUITE 201 • TUCSON, ARIZONA 85710 • (602) 298-1104

1. GENERAL

The Avondale water distribution system consists of Asbestos Cement and Ductile Iron pipe. The portion investigated consisted of the Ductile Iron pipe that was in close proximity to an existing steel line pipe currently under Cathodic Protection. The joints on the Ductile Iron pipe are bonded with jumper bonds. The water system is of new construction and the Ductile Iron pipe is encased with a polyetheylne wrap.

The Cathodic Protection System investigated consisted of 17 pound magnesium anodes. The anodes were connected to a header cable. Contact with the pipe was made through a test station by connecting the header cable to the pipe lead. This Cathodic Protection System was designed by the Engineers. The contractor to install the system per specifications.

This investigation was conducted in compliance with Section 16D, paragraph 10, Test and Measurements, of FmHA No. 02-39-866000233 of the specifications. The engineering services required are as follows:

a. Obtain static pipe-to-soil measurements, here in after referred to as "Natural" potentials.

b. Investigate continuity of test station leads in relation to the pipe line.

c. Investigate continuity of jumper bonds at the pipe joints.

d. Determine group anode output on the header cable.

e. Investigate for any possibility of stray current interference.

f. Investigate for interference on other structures by the installed Cathodic Protection System.

g. Obtain pip-to-soil potential of the completed Cathodic Protection System.

h. Recommendations for maintenance testing and frequency of testing.

2. TEST PROCEDURE

2.1 Pipe-to-soil

The pipe-to-soil potential is a measurement commonly used to determine the degree of corrosivity present on an underground metallic structure. The pipe-to-soil potential is basically the measure of the emf or voltage of the underground structure with reference to a copper-copper sulfate half cell.

These measurements were also used to determine electrical continuity of the test station lead wires in relation to the pipe. All readings listed as "Natural" were taken on the pipeline system at the stations indicated and are the voltage or potential before any current was impressed. Readings listed as "With Anodes" were taken after the anode header cable was connected to the pipeline in the test station. These measurements are shown in Tables No. 1 and No. 2 of the appendix.

2.2 Test Station Continuity

Pipe-to-soil potentials were used to establish existing continuity between the underground pipe and the test lead wires extending above ground to the test stations. When a continuity existes both wire readings will reflect the same potential. If a discontinuity exists there will be no measurable potential reading. The "Natural" pipe-to-soil measurements were used for this test. No discontinuities were detected on the test leads.

2.3 Anode Output

The group output of the anodes was measured by reading the amperes between the anode header cable and the test lead from the pipe. The number of anodes installed divided into the amperes measured yields the average output of each anode.

Individual anode output was not taken. This reading would indicate the total output capability of the individual anode, not actual working output. The individual anode would be seeing a much larger mass of steel than it would be required to protect if all the anodes were connected. Results of this test are shown in Table No. 1 of the appendix.

2.4 Stray Current Interference

During all pipe-to-soil potential testing and current requirement testing careful attention was made in instrument readings for detection of any stray currents in the area. During all tests no stray currents were detected.

2.5 Interference to Foriegn Lines

Interference tests are conducted to determine any adverse effects of a Cathodic Protection System on neighboring metallic lines. This was accomplished by inserting an electronic interrupter between the anode header cable and the pipeline test lead. Pipe-to-soil potentials were taken on the foriegn pipeline as the Cathodic Protection System was switched "off" and "on". If the system surpresses the foriegn line the potentials will become less negative. Results of these tests are shown in Tables No. 1 and No. 2 under "Anodes off" and "Anodes on" in the appendix.

2.6 Pipeline Continuity

Natural pipe-to-soil measurements are taken at both ends of the pipeline under investigation. Current is applied to the section of pipe. If the potential becomes more negative all jumper bonds are connected and operating correctly. If the potential becomes less negative a discontinuity exists between the point where the current was induced and where the pipe-to-soil becomes less negative. Results may be found in Table No. 1 of the appendix.

3. TEST RESULTS

All Tests indicated the Cathodic Protection System was installed in accordance with the plans and specifications. Test leads were in continuity with the pipeline. All joint bonds were installed and the pipeline was continous. No stray currents were detected. All anodes were operating within the output criteria as set forth in the specifications. The Cathodic Protection System is not interfering with Southern Pacific or El Paso lines. Southern Pacific and El Paso lines are not interfering with the newly installed system.

The Cathodic Protection System is functioning properly and meets the criteria set forth in the specifications at both river crossings. The Cathodic Protection System does not meet any of the criteria, as set forth in the specifications, at the borings at Second Street and at El Mirage Road. This is because there are insufficient anodes to obtain the criteria.

4. RECOMMENDATIONS

It is recommended that at the Agua Fria river crossings, at Thomas Road and at Van Buren Street, the anode header cable be connected to the ductile iron pipe with no resistance wire installed. The anode header cable is connected directly to the pipe lead now. All anodes are within the output criteria of the specifications and the pipeline is under Cathodic Protection with no interference to or from foriegn lines.

Readings of both the pipe-to-soil and group anode output should be taken every six months. Records in tabular form should be kept and any abnormalties noted and corrected. All potentials should be taken in reference to a copper-copper sulfate cell.

4. RECOMMENDATIONS (continued)

The casing crossings on Highway 85 at Second Street and at El Mirage will not come up to potentials necassary for Cathodic Protection. There are insufficient anodes to accomplish this. It is recommended that the anodes not be connected in the test boxes at these crossings. To make a structure some what more negative does not assure that more damage then good is not done to that structure. To install enough anodes to assure that cathodic protection is achieved would entail bonding of any pipe joints previously laid under Highway 85 at Second Street, if they are not already bonded, and the entire line placed under cathodic protection. If full protection were to be put unto the pipelines there is a good chance that interference will occure with the casing itself. This would necessitate resistance bonding and more drain from the anodes. These options are left up to the Engineer per specifications.

5. CONCLUSIONS

The Contractor has installed the Cathodic Protection System in accordance with the plans and specifications and has taken care to achieve what was set forth. The major portion of the Ductile Iron pipe is under Cathodic Protection. The small amount that is not currently under Cathodic Protection should present little, if any, problems in the future. If the Engineer elects to bring all the Ductile Iron pipe up to the criteria for Cathodic Protection the contract should be modified per Section 16D, paragraph 11, page 16D of the specifications.

APPENDIX

TABLE 1

PIPE-TO-SOIL POTENTIALS

THOMAS ROAD RIVER CROSSING - 53 each 17lb Magnesium Anodes
2.2 Amps Flowing, Average of 41.5ma per Anode

Location	(-mv) Natural	(-mv) With Anodes	S.P. Gasline (-mv) Anodes(off)	Anodes(on)
262+00, Test Sta.	463	1532		
S.P. Test Sta.			1212	1222
266+00	454	1533		
270+00	461	1534		
274+00	455	1533		
277+00	447	1497		

VAN BUREN STREET RIVER CROSSING - 48 each 17lb Magnesium Anodes
1.7 Amps Flowing, Average of 35.4ma per Anode

Location	(-mv) Natural	(-mv) With Anodes	S.P. Gasline (-mv) Anodes(off)	Anodes(on)
45+00, Test Sta.	484	1441		
46+80, S.P.Gas Riser			958	960
49+00	479	1440		
53+00	480	1441		
57+00	478	1439		
59+80, Test Sta.	471	1440		

TABLE 2

Casing at Hwy 85 and Second Street

Wire Code	(-mv) Natural	(-mv) With Anodes
Red	683	750
White	683	750
Black	683	750
Black (casing)	780	760

Casing at Hwy 85 and El Mirage Road (RR)

Wire Code	(-mv) Natural	(-mv) With Anodes	ElPaso GasLine(-mv) Anodes(off)	ElPaso GasLine(-mv) Anodes(on)
Pipe (D.I.)	433	520		
Casing	552	480		
El Paso J			322	322

CONTRACT FCD 86-6

THIS AGREEMENT, made and entered into this_____ day of_____, 19___, by and between _____

_____

of the City of_____, County of_____, State of_____, party of the first part, hereinafter designated the CONTRACTOR, and the FLOOD CONTROL DISTRICT OF MARICOPA COUNTY, acting by and through its BOARD OF DIRECTORS, a political subdivision of the State of Arizona, a body politic with corporate power, party of the second part, hereinafter designated OWNER.

WITNESSETH: That the said CONTRACTOR, for and in consideration of the sum to be paid him by the said OWNER, in the manner and at the time hereinafter provided, and of the other covenants and agreements hereincontained, and under the penalties expressed in the bonds provided, hereby agrees, for himself, his heirs, executors, administrators, successors, and assigns to as follows:

ARTICLE I-SCOPE OF WORK: The CONTRACTOR shall furnish any and all labor, materials, equipment, transportation, utilities, services and facilities required to perform all work for the construction of Project No._____

and to complete and totally construct the same and install the material therein for the OWNER, in a good and workmanlike and substantial manner and to the satisfaction of the OWNER through its Engineers and under the direction and supervision of the Engineer, or his properly authorized agents and strictly pursuant to and in conformity with the Plans and Specifications prepared by the Engineers for the OWNER, and with such modifications of the same and other documents that may be made by the OWNER through the Engineer or his properly authorized agents, as provided herein.

ARTICLE II-CONTRACT DOCUMENTS: The Invitation for Bids, Plans, Standard Specifications and Details, Special Provisions, Addenda, if any, and Proposal, as accepted by the BOARD OF DIRECTORS, Performance Bond, Payment Bond, Certificates of Insurance, and Change Orders, if any, are by this reference made a part of this Contract to the same extent as if set forth herein in full.

ARTICLE III-TIME OF COMPLETION: The CONTRACTOR further covenants and agrees at his own proper cost and expense, to do all work as aforesaid for the construction of said improvements and to completely construct the same and install the material therein, as called for by this agreement free and clear of all claims, liens, and charges whatsoever, in the manner and under the conditions specified within the time, or times, stated in the proposal pamphlet.

ARTICLE IV-PAYMENTS: For and in consideration of the faithful performance of the work herein embraced as set forth in the Contract Documents, which are a part hereof and in accordance with the directions of the OWNER, through its Engineer and to his satisfaction, the OWNER agrees to pay the said CONTRACTOR the amount earned, computed from actual quantities of work performed and accepted or materials furnished at the unit bid price on the Proposal made a part hereof, and to make such payment within forty (40) days after final inspection and acceptance of the work.

IN WITNESS WHEREOF: Four (4) identical counterparts of this Contract each of which shall for all purposes be deemed an original thereof, have been duly executed by the parties hereinabove named, on the date and year first above written.

The CONTRACTOR agrees that this Contract, as awarded, is for the stated work, and understands that payment for the total work will be made on the basis of the indicated amount(s), as bid in the Proposal.

PARTY OF THE FIRST PART

_____

FLOOD CONTROL DISTRICT OF MARICOPA COUNTY
PARTY OF THE SECOND PART

By: _____
Chairman, Board of Directors

Date: _____

RECOMMENDED BY:

_____
Chief Engineer and General Manager
Flood Control District
of Maricopa County

Date: _____

ATTEST:

_____
Clerk of the Board

LEGAL REVIEW

Approved as to form and within the powers and authority granted under the laws of the State of Arizona to the Flood Control District of Maricopa County.

By: _____

Date: _____

CONTRACT NO. FCD 86-6

STATUTORY PAYMENT BOND PURSUANT TO TITLE 34
CHAPTER 2, ARTICLE 2, OF THE ARIZONA REVISED STATUTES
(Penalty of this bond must be 100% of the Contract amount)

KNOW ALL MEN BY THESE PRESENTS:

That, _____
(hereinafter called the Principal), as Principal, and

_____
a corporation organized and existing under the laws of the State of _____, with its principal office in the City of _____, (hereinafter called the Surety), as Surety, are held and firmly bound unto the Flood Control District of Maricopa County, State of Arizona (hereinafter called the Obligee) in the amount of _____ dollars ($_____), for the payment whereof, the said Principal and Surety bind themselves, and their heirs, administrators, executors, successors and assigns, jointly and severally, firmly by these presents.

WHEREAS, the Principal has entered into a certain written contract with the Obligee, dated the _____ day of _____, 19___, for _____

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

NOW, THEREFORE, THE CONDITION OF THIS OBLIGATION IS SUCH, that if the said Principal shall promptly pay all moneys due to all persons supplying labor or materials to him or his subcontractors in the prosecution of the work provided for in said contract, then this obligation shall be void, otherwise to remain in full force and effect.

PROVIDED, HOWEVER, that this bond is executed pursuant to the provisions of Title 34, Chapter 2, Article 2, of the Arizona Revised Statutes, and all liabilities on this bond shall be determined in accordance with the provisions, of said Title, Chapter, and Article, to the extent as if it were copied at length herein.

The prevailing party or any party which recovers judgment on this bond shall be entitled to such reasonable attorney's fees as may be fixed by the court or a judge thereof.

Witness our hands this _____ day of _____, 19___.

_____
PRINCIPAL SEAL

_____ BY: _____
AGENCY OF RECORD

_____
SURETY SEAL

_____
AGENCY ADDRESS BY: _____

_____
POWER OF ATTORNEY SEAL

CONTRACT NO. FCD 86-6 BY: _____
PAYMENT BOND

STATUTORY PERFORMANCE BOND PURSUANT TO TITLE 34
CHAPTER 2, ARTICLE 2, OF THE ARIZONA REVISED STATUTES
(Penalty of this bond must be 100% of the Contract amount)

KNOW ALL MEN BY THESE PRESENTS:

That, _____
(hereinafter called the Principal), as Principal, and

_____
a corporation organized and existing under the laws of the State of _____, with its principal office in the City of _____ (hereinafter called the Surety), as Surety, are held and firmly bound unto the Flood Control District of Maricopa County, in the County of Maricopa, State of Arizona, in the amount of _____dollars ($_____), for the payment whereof, the said Principal and Surety bind themselves, and their heirs, administrators, executors, successors and assigns, jointly and severally, firmly by these presents.

WHEREAS, the Principal has entered into a certain written contract with the Flood Control District of Maricopa County, dated the _____day of_____, 19___, for _____

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

NOW, THEREFORE, THE CONDITION OF THIS OBLIGATION IS SUCH, that if the said Principal shall faithfully perform and fulfill all the undertakings, covenants, terms, conditions and agreements of said contract during the original term of said contract and any extension thereof, with or without notice to the Surety, and during the life of any guaranty required under the contract, and shall also perform and fulfill all the undertakings, covenants, terms, conditions, and agreements of any and all duly authorized modifications of said contract that may hereafter be made, notice of which modifications to the Surety being hereby waived; then the above obligation shall be void, otherwise to remain in full force and effect;

PROVIDED, HOWEVER, that this bond is executed pursuant to the provisions of Title 34, Chapter 2, Article 2, of the Arizona Revised Statutes, and all liabilities on this bond shall be determined in accordance with the provisions of said Title, Chapter, and Article, to the extent as if it were copied at length herein.

The prevailing party in a suit on this bond shall be entitled to such reasonable attorney's fees as may be fixed by a judge of the court.

Witness our hands this _____ day of _____, 19___.

_____
PRINCIPAL SEAL

_____
AGENCY OF RECORD

BY: _____

_____
AGENCY ADDRESS

_____
SURETY SEAL

BY: _____

_____
POWER OF ATTORNEY SEAL

BY: _____

CONTRACT NO. FCD 86-6
PERFORMANCE BOND

FLOOD CONTROL DISTRICT OF MARICOPA COUNTY

CERTIFICATE OF INSURANCE

CONTRACT FCD 86-6 PROJECT TITLE _____

NAME AND ADDRESS OF INSURANCE AGENCY	INSURANCE COMPANIES AFFORDING COVERAGES
	Company Letter A
	Company Letter B
	Company Letter C
NAME AND ADDRESS OF INSURED	Company Letter D
	Company Letter E
	Company Letter F
	Company Letter G

THIS IS TO CERTIFY THAT POLICIES OF INSURANCE LISTED BELOW HAVE BEEN ISSUED TO THE INSURED NAMED ABOVE AND ARE IN FORCE AT THIS TIME.

COMPANY LETTER	TYPE OF INSURANCE	POLICY NUMBER	EXPIRATION DATE	LIMITS OF LIABILITY IN $1,000 MINIMUM	each occurrence
	[X] COMPREHENSIVE GENERAL LIABILITY FORM			BODILY INJURY per person	$1,000
	[X] PREMISES OPERATIONS			each occurrence	$5,000
	[X] CONTRACTUAL			PROPERTY DAMAGE	$1,000
	[X] BROAD FORM PROPERTY DAMAGE			OR	
	[X] EXPLOSION & COLLAPSE			BODILY INJURY AND PROPERTY DAMAGE Combined	$5,000
	[X] PRODUCTS/COMPLETED OPERATIONS HAZARD				
	[X] UNDERGROUND HAZARD				
	[X] INDEPENDENT CONTRACTORS				
	[X] PERSONAL INJURY				
	[X] COMPREHENSIVE AUTO LIABILITY & NON-OWNED			SAME AS ABOVE	
	[ ] EXCESS LIABILITY			NECESSARY IF UNDERLYING NOT ABOVE MINIMUM	
	[X] WORKERS' COMPENSATION and EMPLOYERS' LIABILITY			STATUTORY	
				each accident	$100
	[ ] OTHER				

The Flood Control District of Maricopa County is added as an additional insured as respects work done for the District by the named insured as required by statute, contract, purchase order or otherwise requested. It is agreed that any insurance available to the named insured shall be primary of other sources that may be available. It is further agreed that no policy shall expire, be cancelled or materially changed to effect the coverage available to the District without fifteen days written notice to the District. THIS CERTIFICATE IS NOT VALID UNLESS COUNTERSIGNED BY AN AUTHORIZED REPRESENTATIVE OF THE INSURANCE COMPANY.

NAME AND ADDRESS OF CERTIFICATE HOLDER
FLOOD CONTROL DISTRICT OF MARICOPA COUNTY
3335 West Durango Street
Phoenix, Arizona 85009

DATE ISSUED _____

_____
AUTHORIZED REPRESENTATIVE

It is further agreed that:

The Contractor hereby agrees to indemnify and save harmless the FLOOD CONTROL DISTRICT OF MARICOPA COUNTY, or any of its departments, agencies, officers or employees, from and against all loss, expense, damage or claim of any nature whatsoever which is caused by any activity, condition or event arising out of the performance or nonperformance of any of the provisions of this Agreement. The Flood Control District of Maricopa County shall in all instances be indemnified against all liability, losses and damages of any nature for or on account of any injuries to or death of persons or damages to or destruction of property arising out of or in any way connected with the performance or nonperformance of this Agreement, except such injury or damage as shall have been occasioned by the sole negligence of the Flood Control District of Maricopa County. The above cost of damages incurred by the Flood Control District of Maricopa County or any of its departments, agencies, officers or employees shall include in the event of an action, court costs, expenses for litigation and reasonable attorney's fees.

Date _____ _____

Contractor

CERTIFICATE OF INSURANCE
CONTRACT FCD 86-6