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AZ CORP COMMISSION
DOCKET CONTROL

Transcript Exhibit(s)

Docket #(s): W-01445A-15-0277

Arizona Corporation Commission
DOCKETED
MAY 26 2016
DOCKETED BY

Exhibit #: WA 1-5299, WA 1-5301, WA 1-5303, WA 1-5304, WA 1-5307, WA 1-5329, WA 1-5332, WA 1-5339, WA 1-5341, WA 1-5344, WA 1-5345, WA 1-5348, WA 1-5358, WA 1-5359, WA 1-5361

Part 11 of 12

For parts 1-10, see barcodes 0000170605 through 0000170614
For part 12, see barcode 0000170616

Western Group Rate Case

Exhibit FKS-1

5299 Coolidge 9 & 10 Nitrate

ARIZONA WATER COMPANY
WORK AUTHORIZATION

W.A. NUMBER: 1-5299
P.E. NUMBER:
BUDGET ITEM NO.: 1-5299
SHEET NO.: 1 of 2

SYSTEM:	PINAL VALLEY	RETENTION REQUIRED:	☑ YES ☐ NO
DIVISION:	CASA GRANDE	WORK TO START BY:	UPON AUTHORIZATION
RESPONSIBLE PERSON:	RAY MURRIETA	WORK TO BE FINISHED BY:	WITHIN 60 DAYS
TAX CODE:	2102		

DESCRIPTION OF WORK:

Construct approximately 90 lf of 8-foot tall chain link fence at Well No. 10 and an all weather access road across easement 2454 and around Well Nos. 9, 10 and the Coolidge Nitrate Removal Facility.

FACTORS JUSTIFYING WORK:

APPROVED 2015 BUDGET ITEM ($20,000)
Company employees access Wells No. 9 and 10 daily using existing dirt roads on neighboring property to the south. Traveling the existing dirt roads during dry conditions creates excessive dust. After heavy rain the existing dirt roads are flooded. Rain saturates the soil creating muddy conditions with limited access to the site. Constructing this road provides direct all weather access to the site from Arizona Boulevard.

COST ESTIMATE		AUTHORIZATION	DATE
COST OF WORK:		PREPARED BY: James Wilson	2/23/15
MATERIAL	0		
LABOR	4,100	REVIEWED FOR ESM/ROW VERIFICATION: Charles Briggs	02-24-2015
CONTRACT PORTION	5,000		
OVERHEAD	1,100	REVIEWED BY: Mario Mendez	2/25/15
TOTAL AUTHORIZED EXPENDITURES CHARGEABLE TO THIS W.A.	$ 10,200		
FUNDS RECEIVED:		APPROVED BY ENGINEERING: Fredrick Schneider	2-25-15
CONTRIBUTIONS RECEIVED	0		
REFUNDABLE ADVANCES RECEIVED	0	APPROVED BY FINANCE: Joseph Harris	2/27/15
TOTAL CONTRIBUTIONS/ADVANCES	0		
NET COMPANY CASH REQUIRED	$ 10,200	AUTHORIZED BY PRESIDENT: William Garfield	3-2-2015

COMMENTS:

RELEASE TO DESIGN ONLY

CONSTRUCTION RELEASE:

RELEASE TO DESIGN
Authorized by:
Date: 3-2-15

2015 BUDGET

AFH

AJH
03/26/08| JTW:afh | WA XLS

ARIZONA WATER COMPANY

WORK AUTHORIZATION - DETAIL SHEET

W.A. NUMBER: 1-5299
P.E. NUMBER:
BUDGET ITEM NO. 1-5299
SHEET NO.: 2 of 2

RETIREMENT PROPERTY UNITS	PLANT PROPERTY ACCOUNT	UNIT DESCRIPTION	QUANTITY	YEAR INSTALLED AND W.A. NUMBER

PROJECT DESCRIPTION:

Construct approximately 90 lf of 8-foot tall chain link fence at Well No. 10 and an all weather access road across easement 2454 and around Well Nos. 9, 10 and the Coolidge Nitrate Removal Facility.

	DESCRIPTION	PLANT PROP ACCT	QUANTITY	UNIT COST	TOTAL
CONTRACT WORK	Geotechnical Investigation	321	1	$ 5,000.00	$ 5,000
	SERVICE CONNECTIONS COMPLETE: DOUBLE-LONG	345			
	SERVICE CONNECTIONS COMPLETE: DOUBLE-SHORT	345			
	SERVICE CONNECTIONS COMPLETE: SINGLE-LONG	345			
	SERVICE CONNECTIONS COMPLETE: SINGLE-SHORT	345			
TOTAL CONTRACT WORK					$ 5,000
MATERIALS					
	SERVICE CONNECTIONS: DOUBLE-LONG	345			
	SERVICE CONNECTIONS: DOUBLE-SHORT	345			
	SERVICE CONNECTIONS: SINGLE-LONG	345			
	SERVICE CONNECTIONS: SINGLE-SHORT	345			
	METERS	346			
TOTAL MATERIALS					$ -
LABOR	Engineering design and project management	321	20	$ 65.00	$ 1,300
	TESTING FEE				
	PERMIT FEE				
	SURVEY FEE	321	1	1,700.00	1,700
	FIELD INSPECTION	321	20	55.00	1,100
	INSTALL SERVICE CONNECTIONS: DOUBLE-LONG	345			
	INSTALL SERVICE CONNECTIONS: DOUBLE-SHORT	345			
	INSTALL SERVICE CONNECTIONS: SINGLE-LONG	345			
	INSTALL SERVICE CONNECTIONS: SINGLE-SHORT	345			
TOTAL LABOR					$ 4,100
SUBTOTAL - CONTRACT WORK, MATERIALS, AND LABOR					$ 9,100
OVERHEAD					1,100
TOTAL	REFUNDABLE PORTION ☐	NON-REFUNDABLE PORTION ☐		**COST ESTIMATE**	$ 10,200

AFH

ARIZONA WATER COMPANY

3805 N. BLACK CANYON HIGHWAY, PHOENIX, ARIZONA 85015-5351 • P.O. BOX 29006, PHOENIX, AZ 85038-9006
PHONE: (602) 240-6860 • FAX: (602) 240-6874 • TOLL FREE: (800) 533-6023 • www.azwater.com

September 17, 2014

Mr. Bruce Loose
Alta Land Survey, Inc.
5930 E. Pima Street, Suite 1300
Tucson, AZ 85712

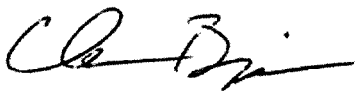
Re: Easement Boundary and Topographic Survey Coolidge, AZ.

Dear Mr. Loose:

Attached is a copy of the Task Order for the above referenced project. Please sign and return it to my attention.

If you have any questions, please call me at this office.

Very truly yours,



Charles Briggs
Real Property Specialist
engineering@azwater.com

afh
Enclosure

AGREEMENT FOR GENERAL ENGINEERING SERVICES BETWEEN ARIZONA WATER COMPANY AND ALTA LAND SURVEY, INC.

TASK ORDER AUTHORIZATION

ALTA Land Survey, Inc. Project Number 15-019

AWC Project Number Stake an Easement for APN 209-10-005 in Coolidge, AZ.

Arizona Water Company
P.O. Box 29006
Phoenix, Arizona 85038-9006

Effective Date of Authorization April 8, 2015

Upon execution of this Task Order, and effective as of the date shown above, the parties agree that ALTA Land Survey, Inc. shall perform the following services:

SCOPE OF SERVICES

As per the attached "Exhibit A". **NOTE: Authorization to commence will be given verbally by Division Manager (Ray Murrieta, or in his absence, Kevin Pakka, Ops Superintendant).**

COMPENSATION

As per the attached "Scope of Services" dated April 8, 2015.

GENERAL TERMS AND CONDITIONS

ALTA Land Survey's services shall be governed by the Master Agreement dated June 17, 2011 together with this Task Order and any Exhibits attached hereto.

The services performed within this Task Order shall commence on or about April 13, 2015, and shall be complete on or before April 15, 2015.

ALTA Land Survey's Representative in charge of the services is Bruce Loose, who may be contacted at 520-398-6651 and bloose@alta-land.com. Client's Representative in charge of the services is Charles Briggs, who may be contacted at 602-240-6860 and cbriggs@azwater.com.

ARIZONA WATER COMPANY	**ALTA LAND SURVEY, INC.**
By [signature]	By [signature]
Title REAL PROPERTY SPECIALIST	Title PROJECT MANAGER
Date APRIL 8, 2015	Date 4/13/15

ALTA
LAND SURVEY, INC.

5930 E. Pima Street #130
Tucson, AZ 85712
(520) 398-6651

April 8, 2015

Charles Briggs
Real Property Specialist
Arizona Water Company
P.O. Box 29006
Phoenix, AZ 85038-9006

RE: - Coolidge Easement

Dear Charles:

ALTA Land Survey, Inc. is pleased to provide you with the following proposal to Stake an Easement for APN 209-10-005 as shown on Arizona Water Company, "Easement Location Drawing" dated 02-19-2015.. The following is the **Scope of Services**:

1. Calc. Easement
2. Stake Easement using both whiskers and lath

The cost to perform the above referenced work is **$1,100.00.**

We appreciate the opportunity to provide you with this proposal and we look forward to hearing from you.

Sincerely,

Bruce Loose
Project Manager

CB
04-08-2015

BL
4/13/15

ALTA Land Survey, Inc. will provide the following **Deliverables**:

- 1 Adobe PDF file of the survey in its entirety at a scale not smaller than 1 inch = 20 feet.
- Upon review and acceptance of the Initial Survey - provide 1 compact disc with the following:

    1. Digital drawing file of the survey in its entirety in One AutoCAD Version 2007 or earlier DWG file. No native Civil3D files or files with xrefs will be accepted.
    2. All color digital photographs of the survey.
    3. Copies of any additional documentation used during the course of the survey above and beyond the information provided with the RFP documentaion.

The survey will begin on or before Wednesday, February 4, 2015 and provide Deliverables for review by Wednesday, February 11, 2015

The cost to perform the above referenced work is **$1,650.00.**

We appreciate the opportunity to provide you with this proposal and we look forward to hearing from you.

Sincerely,

Bruce Loose
Project Manager

CB
1-28-15

ARIZONA WATER COMPANY

3805 N. BLACK CANYON HIGHWAY, PHOENIX, ARIZONA 85015-5351 • P.O. BOX 29006, PHOENIX, AZ 85038-9006
PHONE: (602) 240-6860 • FAX: (602) 240-6874 • TOLL FREE: (800) 533-6023 • www.azwater.com

June 30, 2011

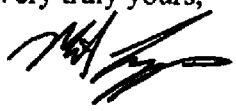
Mr. Donald J. Loose
ALTA Land Survey, Inc.
209 N. Huachuca Boulevard
Huachuca City, Arizona 85616

Dear Mr. Loose:

Enclosed is your copy of the Master Agreement for ongoing consulting, which has been accepted by Arizona Water Company (the "Company").

If you have any questions, please call me at this office.

Very truly yours,



Mike Loggins
Engineer
engineering@azwater.com

afh
Enclosure

MASTER AGREEMENT
FOR ONGOING CONSULTING AND ENGINEERING SERVICES
BETWEEN ARIZONA WATER COMPANY
AND **ALTA LAND SURVEY**

THIS AGREEMENT is made and entered into on this 17th day of June, 2011, by and between Arizona Water Company, an Arizona corporation, hereinafter referred to as "Client," and ALTA LAND SURVEY, an Arizona corporation hereinafter referred to as "Consultant."

RECITALS:

WHEREAS, Client desires that from time to time Consultant furnish Client certain consulting services;

WHEREAS, Consultant has available and offers to provide personnel and facilities necessary to perform the services desired under this Agreement;

NOW, THEREFORE, Client and Consultant agree as follows:

I. DESCRIPTION OF PROJECT

Services to be provided shall be as described in written task orders made pursuant to and referencing this Agreement; the form of such task order is attached hereto as Exhibit A.

II. SCOPE OF CONSULTANT SERVICES

Consultant agrees to perform those basic services described in separate written task order(s) signed by Client and Consultant (the "Services"). This Agreement provides the terms, obligations and conditions which shall control all work under such task orders(s). The printed terms and conditions, if any, contained on the reverse side(s) of an accepted task order shall not apply to services provided under this Agreement. Unless modified in writing by both parties, duties of Consultant shall not exceed those service specifically described in each task order. Any work authorized by Client prior to the issuance of a written task order must be authorized in writing and any services then performed by Consultant will be presumed to have been completed under the terms of this Agreement.

III. RESPONSIBILITIES OF CLIENT

In addition to payment for the Services performed under this Agreement, Client shall:

1. Assist and cooperate with Consultant in any manner necessary and within its ability to facilitate Consultant's performance under this Agreement.

2. Designate in writing a person to act as Client's representative with respect to this Agreement. Such person shall have complete authority to transmit instructions, receive information, interpret and define Client's policies, make decisions and execute documents on Client's behalf.

3. Furnish Consultant with all technical data in Client's possession including, but not limited to, maps, surveys, drawings, soils or geotechnical reports, and any other information required by or useful to, Consultant in performance of the Services under this Agreement. Consultant shall be entitled to rely upon the information supplied by Client.

4. Notify Consultant of any known or potential health or safety hazards existing at or near the project site.

5. Provide access to and/or obtain permission for Consultant to enter upon all projects whether or not owned by Client, as required to perform and complete the Services.

IV. AMERICANS WITH DISABILITIES ACT

Any other provision of this Agreement to the contrary notwithstanding, unless otherwise specified in the Scope of Services, Client's contractors shall have sole responsibility as between Client and Consultant for compliance with the Americans With Disabilities Act ("ADA") 42 U.S.C. 12101 et. Seq. and the related regulations. Consultant shall provide client with applicable ADA criteria which maybe required.

V. AUTHORIZATION AND COMPLETION

In signing this Agreement, Client grants Consultant specific authorization to proceed with work as described in Scope of Work and under the terms of this Agreement.

VI. COMPENSATION

For the Services described in each task order, Client agrees to pay, and Consultant agrees to accept the total compensation in accordance with compensation terms included in the task order. Where Consultant has provided Client with a breakdown of the total compensation into subtasks, such breakdowns are estimates only. Consultant may re-allocate compensation between tasks, provided total compensation is not exceeded without the written approval of Client. Time charges shall be in accordance with the Hourly Rate Schedule contained in Exhibit B. The rate schedule may be revised annually by mutual written Agreement. Annual revisions to the Hourly Rate Schedule shall be submitted prior to the date that they take effect. Compensation shall be billed monthly in summary form. Payment to Consultant is due upon presentation of invoice to Client.

As long as Consultant has not defaulted under this Agreement, Client shall pay Consultant within 30 days of the date of Consultant's invoices for services performed and reimbursable expenses incurred under this Agreement. Client may contest any portion of any such invoice, amounts questioned or contested shall be identified and notice given to Consultant within 15 days of the date of the invoice. Any portion of any invoice not contested shall be deemed to be accepted and approved for payment and shall be paid to Consultant within 30 days of the date of the invoice. The Consultant agrees to cooperate with Client in a mutual effort to resolve promptly any contested portions of the Consultant's invoices.

In the event any uncontested portions of any invoice are not paid within 30 days of the date of Consultant's invoice, interest on the unpaid balance shall accrue beginning with the 31st day at the maximum interest rate permitted by law, and Consultant shall have the right to suspend work per Article XV, Suspension of Work.

VII. RESPONSIBILITY OF CONSULTANT

A. Standard of Care Professional Services

Subject to the limitations inherent in the agreed scope of work as to the degree of care, amount of time and expenses to be incurred, and subject to any other limitations contained in this Agreement, Consultant shall perform its Services in accordance with generally accepted standards and practices customarily utilized by competent engineering firms in effect at the time Consultant's Services are rendered. Consultant does not expressly or impliedly warrant or guarantee its Services.

B. Reliance upon Information Provided by Others

If Consultant's performance of services hereunder requires Consultant to rely on information provided by other parties (excepting Consultant's subcontractors), Consultant shall not independently verify the validity, completeness, or accuracy of such information unless otherwise expressly engaged to do so in writing by Client.

C. Consultant's Opinion of Costs

Client acknowledges that construction cost estimates, financial analyses and feasibility projections are subject to many influences including, but not limited to, price of labor and materials, unknown or latent conditions of existing equipment or structures, and time or quality of performance by third parties. Client acknowledges that such influences may not be precisely forecasted and are beyond the control of Consultant and that actual costs incurred may vary substantially from the estimates prepared by Consultant. Consultant does not warrant or guarantee the accuracy of construction or development cost estimates.

D. Construction Phase Services

1. Consultant's Activities at Construction Site. The presence of Consultant's personnel at a construction site, whether as on-site representative, resident engineer, construction manager, or otherwise, does not make Consultant responsible for those duties that belong to Client and/or construction contractors or others, and does not relieve construction contractors or others of their obligations, duties, and responsibilities, including, but not limited to, construction methods, means, techniques, sequences, and procedures necessary for completing all portions of the construction work in accordance with the contract documents, any health or safety programs and precautions required by such construction work, and any compliance with applicable laws and regulations. Any inspection or observation of the contractor's work is solely for the purpose of determining that the work is generally proceeding in conformance with the intent of the project specifications and contract documents. Except for its own Contractors, Consultant makes no warranty or guarantee with respect to the performance of a contractor. Consultant has no authority to exercise control over any construction contractor in connection with their work or health or safety programs and

precautions. Except to protect Consultant's own personnel and except as may be expressly required elsewhere in the scope of services, Consultant has no duty to inspect, observe, correct, or report on health or safety deficiencies of the construction contractor.

2. Shop Drawing and Submittal Review. If required by Consultant's Scope of Services, Consultant shall review shop drawings or other contractor submittals for general conformance with the intent of the contract documents. Except for its own Contractors, Consultant shall not be required to verify dimensions, to engineer contractor's shop drawings or submittals, nor to coordinate shop drawings or other submittals with other shop drawings or submittals provided by contractor.

3. Record Drawings. Record drawings, if required, will be prepared, in part, on the basis of information compiled and furnished by others, and may not always represent the exact location, type of various components, or exact manner in which the Project was finally constructed. Except for its own Contractors, Consultant is not responsible for any errors or omissions in the information from others that are incorporated into the record drawings.

VIII. ASSIGNMENT OF TASKS TO AFFILIATES

If the authorized scope of work requires professional services to be performed in a jurisdiction in which Consultant renders professional services solely through a locally registered engineering affiliate for purposed of compliance with professional licensing requirements in that jurisdiction, Consultant may, in its discretion, upon notice to Client, assign its contractual rights and obligations with respect to such services to such locally registered engineering affiliate.

IX. ASBESTOS / HAZARDOUS MATERIALS

Consultant and Consultant's subcontractors shall have no responsibility for the discovery, handling, removal, or disposal of or exposure of persons to asbestos or hazardous or toxic materials that are present in any form at the Project site. Professional services related to or in any way connected with the investigation, detection, abatement, replacement, use, specification, or removal of products, materials, or processes containing asbestos or hazardous or toxic materials are beyond the scope of this Agreement. Client shall be solely responsible for notifying all appropriate governmental agencies, including the potentially effected public, of the existence of any hazardous or toxic materials located on or at the project site any any time.

In the event Consultant encounters asbestos or hazardous materials at the jobsite, Consultant may, at its option and without liability for damages, suspend the performance of services on the Project until such time as Client and Consultant mutually agree on an amendment to this Agreement to address the issue, or Client retains another specialist consultant or contractor to identify, classify, abate and/or remove the asbestos and/or hazardous materials.

X. CONSULTANT'S WORK PRODUCT

A. Scope

Consultant's work product which is prepared solely for the purposes of this Agreement, including, but not limited to, drawings, test results, recommendations and technical specifications, whether in hard copy or electronic form, shall become the property of Client when Consultant has been fully compensated as set forth herein. Consultant may keep copies of all work product(s) for its records.

Consultant and Client recognize that Consultant's work product submitted in performance of this Agreement is intended only for the project described in this Agreement. Client's alteration of Consultant's work product or its use by Client for any other purpose shall be at Client's sole risk, and Client shall hold harmless and indemnify Consultant against all losses, damages, costs and expense, including attorneys' fees, arising out of or related to any such alteration or unauthorized use.

B. Electronic Copies

If requested, solely as an aid and accommodation to Client, Consultant may provide copies of its work product documents in computer-readable media ("electronic copies," "CADD"). These documents will duplicate the documents provided as work product, but will not bear the signature and professional seals of the registered professionals responsible for the work. Client is cautioned that the accuracy of electronic copies and CADD documents may be compromised by electronic media degradation, errors in format translation, file corruption, printing errors and incompatibilities, operator inexperience and file modification. Consultant will maintain the original copy, which shall serve as the official, archived record of the electronic and CADD documents. Client agrees to hold harmless, indemnify and defend Consultant from any claims arising out of or relating to any change or alteration of electronic copies and CADD documents authorized by the Client, Client's personnel, or Client's Contractor's.

XI. INDEMNIFICATION

A. Indemnification of Client

Consultant agrees to indemnify and hold Client harmless from and against any liability to the extent arising out of the negligent errors or negligent omissions of Consultant, its agents, employees, or representatives, in the performance of Consultant's duties under this Agreement.

B. Consequential Damages.

Regardless of any other term of this Agreement, in no event shall either party be responsible or liable to the other for any incidental, consequential, or other indirect damages.

XII. CONSULTANT'S INSURANCE

Consultant shall procure and maintain the following minimum insurance:

1. Commercial general liability insurance, including personal injury liability, blanket contractual liability and broad-form property damage liability coverage. The combined single limit for bodily injury and property damage shall be not less than $1,000,000.

2. Automobile bodily injury and property damage liability insurance covering owned, non-owned, rented, and hired cars. The combined single limit for bodily injury and property damage shall be not less than $1,000,000.

3. Statutory workers' compensation and employer's liability insurance as required by state law.

4. Professional liability insurance. The policy limit shall be not less than $1,000,000.

Client shall be named as additional insured on polices 1 and 2 above. Upon execution of this Agreement, Consultant will provide a certificate of insurance to Client. Consultant will keep the certificate current at all times while this Agreement is in effect. The Consultant will provide a 30-day written notice in the event the above policies are cancelled.

XIII. CONFIDENTIALITY

Consultant agrees it will maintain the confidentiality of all material it receives from Client which Client has clearly identified as "Confidential" and will not disclose, distribute, or publish to any third party such confidential information without the prior permission of Client. Notwithstanding the foregoing, Consultant shall have no confidentiality obligation with respect to information that:

1) becomes generally available to the public other than as a result of disclosure by Consultant or its agents or employees;

2) was available to Consultant prior to its disclosure by Client;

3) becomes available to Consultant from a third party who is not, to the knowledge of Consultant, bound to retain such information in confidence.

In the event Consultant is compelled by subpoena, court order, or administrative order to disclose any confidential information, Consultant shall promptly notify Client and shall cooperate with Client prior to disclosure so that Client may take necessary actions to protect such confidential information from disclosure.

XIV. SUBCONTRACTS

Consultant shall be entitled, to the extent determined appropriate by Consultant, to subcontract any portion of the services to be performed under this Agreement.

XV. SUSPENSION OF WORK

Work under this Agreement may be suspended as follows:

1. By Client. By written notice to Consultant, Client may suspend all or a portion of the Work under this Agreement if unforeseen circumstances beyond Client's control make normal progress of the Work impracticable. Consultant shall be compensated for its reasonable expenses resulting from such suspension including mobilization and demobilization. If suspension is greater than 90 days, then Consultant shall have the right to terminate this Agreement in accordance with Article IVI, Termination of Work.

2. By Consultant. By written notice to Client, Consultant may suspend the Work if Consultant reasonably determines that working conditions at the Site (outside Consultant's control) are unsafe, or in violation of applicable laws, or in the event Client has not made timely payment in accordance with Article VI, Compensation, or for other circumstances not caused by Consultant that are interfering with the normal progress of the Work. Consultant's suspension of Work hereunder shall be without prejudice to any other remedy of Consultant at law or equity.

XVI. TERMINATION OF WORK

A. This Agreement may be terminated by Client as follows: (1) for its convenience on 15 days' notice to Consultant, or (2) for cause, if Consultant materially breaches this Agreement through no fault of Client and Consultant neither cures such material breach nor makes reasonable progress toward cure within 15 days after Client has given written notice of the alleged breach to Consultant.

B. This Agreement may be terminated by Consultant as follows: (1) for cause, if Client materially breaches this Agreement through no fault of Consultant and Client neither cures such material breach nor makes reasonable progress toward cure within 15 days after Consultant has given written notice of the alleged breach to Client, or (2) upon five days' notice if work under this Agreement has been suspended by either Client or Consultant for more than 90 days in the aggregate.

C. Payment upon Termination

In the event of termination, Consultant shall perform such additional work as is reasonably necessary for the orderly closing of the Work. Consultant shall be compensated for all work performed prior to the effective date of termination, plus work required for the orderly closing of the Work, including: (1) authorized work performed up to the termination date plus termination expenses, including all labor and expenses, at Consultant's standard billing rates, directly attributable to termination; (2) all efforts necessary to document the work completed or in progress; and (3) any termination reports requested by Client.

XVII. ASSIGNMENT

This Agreement is binding on the heirs, successors, and assigns of the parties hereto. Except as otherwise set forth under Article VIII, Assignment of Tasks to Affiliates, this Agreement may not be assigned by Client or Consultant without prior, written consent of the other.

XVIII. NO BENEFIT FOR THIRD PARTIES

The services to be performed by Consultant are intended solely for the benefit of Client, and no benefit is conferred on, nor contractual relationship established with any person or entity not a party to this Agreement. No such person or entity shall be entitled to rely on Consultant's services, opinions, recommendations, plans, or specifications without the express written consent of Consultant. No right to assert a claim against the Consultant, its officers, employees, agents, or consultants shall accrue to the construction Contractor or to any subcontractor, supplier, manufacturer, lender, insurer, surety, or any other third party as a result of this Agreement or the performance or nonperformance of the Consultant's services hereunder.

XIX. FORCE MAJEURE

Consultant shall not be responsible for delays caused by circumstances beyond their reasonable control, including, but not limited to (1) strikes, lockouts, work slowdowns or stoppages, or accidents, (2) acts of God, (3) failure of Client to furnish timely information or to approve or disapprove Consultant's instruments of service promptly, and (4) faulty performance or nonperformance by Client, Client's independent consultants or contractors, or governmental agencies. Consultant shall not be liable for damages arising out of any such delay, nor shall the Consultant or Client be deemed to be in breach of this Agreement as a result thereof.

XX. INTEGRATION

This Agreement represents the entire understanding of Client and Consultant as to those matters contained herein. No prior oral or written understanding shall be of any force or effect with respect to those matters covered herein. This Agreement may not be modified or altered except in writing signed by both parties. Any purchase order issued by Client, whether or not signed by Consultant, and any terms and conditions contained in such purchase order which are inconsistent with this Agreement shall be of no force and effect.

XXI. SEVERABILITY

If any part of this Agreement is found unenforceable under applicable laws, such part shall be inoperative, null, and void insofar as it conflicts with said laws, but the remainder of this Agreement shall be in full force and effect.

XXI. CHOICE OF LAW/JURISDICTION

This Agreement shall be administered and interpreted under the laws of the State of Arizona Jurisdiction of litigation arising from the Agreement shall be in the State of Arizona.

XXIII. ATTORNEYS' FEES

In the event either party commences legal proceedings against the other, then the prevailing party shall, in addition to any other recovery, be entitled to recover its reasonable attorneys' fees and all other costs of such proceeding.

XXIV. NOTICES

All notices required under this Agreement shall be delivered by personal delivery or first class mail and shall be addressed to the following persons:

Mr. Donald J. Loose
President
ALTA Land Survey, Inc.
209 N. Huachuca Boulevard
Huachuca City, Arizona 85616

Mr. Fred Schneider
Vice President - Engineering
Arizona Water Company
P.O. Box 29006
Phoenix, Arizona 85038

Notice shall be effective upon delivery to the above addresses. Project related instructions may be delivered by electronic mail. Either party may notify the other that a new person has been designated by it to receive notices, or that the address for the delivery of such notices has been changed, provided that, until such time as the other party receives such notice in the manner provided for herein, any notice addressed to the previously-designated person and/or delivered to the previously-designated address shall be effective.

XXV AUTHORIZATION

The persons executing this Agreement on behalf of the parties hereto represent and warrant that the parties have all legal authority and authorization necessary to enter into this Agreement, and that such persons have been duly authorized to execute this Agreement on their behalf.

IN WITNESS WHEREOF, the parties hereto have executed this Agreement as of the date first above written.

ALTA LAND SURVEY, INC.

Signature Donald J. Loose

Printed Name Donald J. Loose

Title President

Federal Tax ID number: 32-0329099

ARIZONA WATER COMPANY

Signature Fred Schneider

Printed Name Mr. Fred Schneider

Title Vice-President - Engineering

ATTACHMENT B

ALTA LAND SURVEY, INC.

Surveying ~ Drafting~Construction Staking

209 N. Huachuca Blvd., Huachuca City, AZ 85616 Ph. (520) 456-9400

Hourly Rates

August 15, 2011

2 Man Survey Crew	$150.HR.
Cad Drafting Calculations Research	$65/HR.
Licensed Surveyor Review	$95/HR.
Administrative	$40/HR.

EXHIBIT A
Scope of Services

EASEMENT BOUNDARY and TOPOGRAPHIC SURVEY/STAKING
OF
Arizona Water Company's 15-foot Ingress/Egress Easement
Across APN 209-10-005
Northwest quarter of Section 10, Township 5 South, Range 8 East
of the G.&S.R.B.&M., Coolidge, Pinal County, Arizona.

DESCRIPTION

The purpose of the survey is to: complete an Easement Boundary and Topographic survey of Arizona Water Company's 15-foot Ingress/Egress Easement located in Coolidge, Arizona and to stake the limits of the easement with lath and whisker as depicted on Exhibit B and how the existing features relate to its location within, around, above, and below the Company's Easement including, but not limited to and where applicable:

All structures, improvements, edges of pavement, unimproved or dirt roads, railroad tracks, spurs, ballast, roadbeds, trestles, rails, ties, bridges, abutments, pylons, beams, trusses, signs, switches, signals, curb, gutter, scuppers, sidewalks, driveways, fences, gates, walls, hand rails, guardrails, posts, poles, mailboxes, stoops, steps, eaves, trees, shrubs, landscape, hardscape, mounds, piles, debris, manholes, vaults, guy lines, cross-members,, overhangs, meters, meter boxes, transformers, cabinets, buildings, shelters, sheds, enclosures, pipe culverts, box culverts, storm drains, wing walls, basins, ditches, flumes, chutes, troughs, sluices, spillways, streams, washes, channels, canals, trenches, dykes, dams, diversions, all pipes, tubes, ducts, drains, hoses, conduits, wires, cables, and cords of every kind whether suspended, span, cross, are attached or affixed to any of the features described herein or not and are encountered during the course of the survey.

EXECUTION

- Locate, identify, and plot all utility blue stake markings within the bounds of the survey.
- Generate topography with 1 foot intervals. Elevation references shall be based on a known local permanent monument with the vertical datum based on NAVD88.
- Identify adjacent property owners and indicate Name, Parcel Number, and Recording Information on the survey.
- Drawing scale will not be smaller than 1 inch = 20 feet.
- Include a Basis of Bearing with a minimum of two (2) controlling monuments or reference markers.
- Include a North Arrow
- Include a Vicinity Map.
- Include the Cadastral location of the survey.
- Take color digital photographs of the survey.

EXHIBIT A
Scope of Services

DELIVERABLES

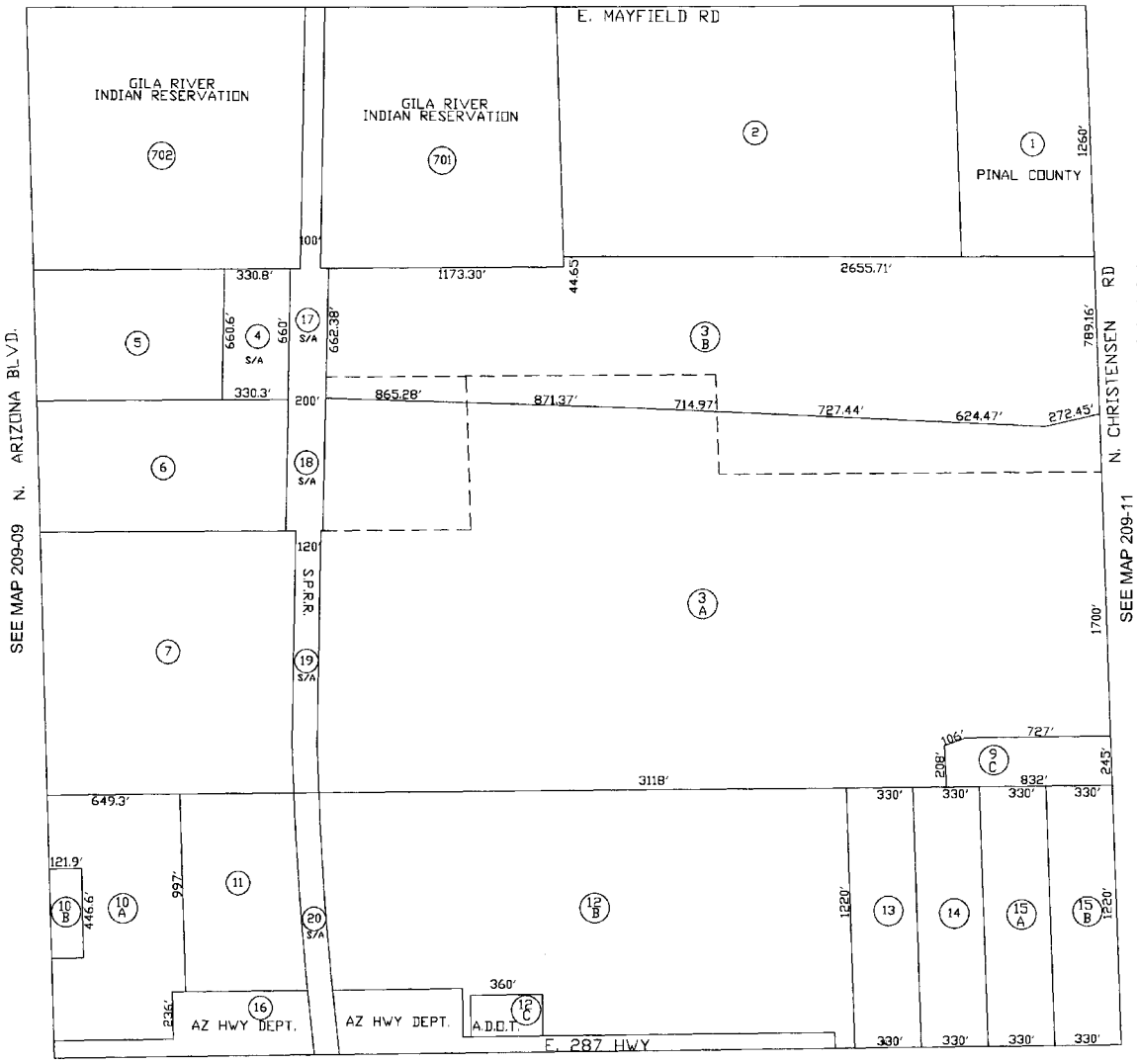
- 1 Adobe PDF file of the survey in its entirety at a scale not smaller than 1 inch = 20 feet.
- Upon review and acceptance of the Initial Survey provide 1 compact disc with the following:

  - ✓ Digital drawing file of the survey in its entirety in One AutoCAD Version 2007 or earlier DWG file. No native Civil3D files or files with xrefs will be accepted.
  - ✓ All color digital photographs of the survey
  - ✓ Copies of any additional documentation used during the course of the survey above and beyond the information provided with the RFP documentation.

SEC. 10 TN.5S RG.8E

209-10

SEE MAP 209-04

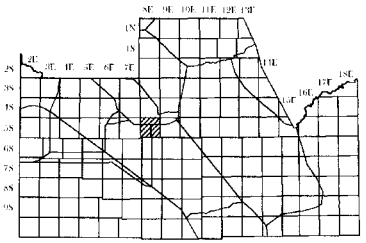


SEE MAP 209-09

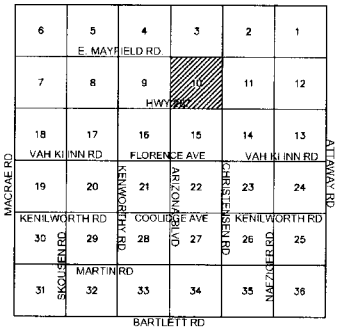
SEE MAP 209-11

SEE BOOK 203

LOCATION MAP



VICINITY MAP



NORTH

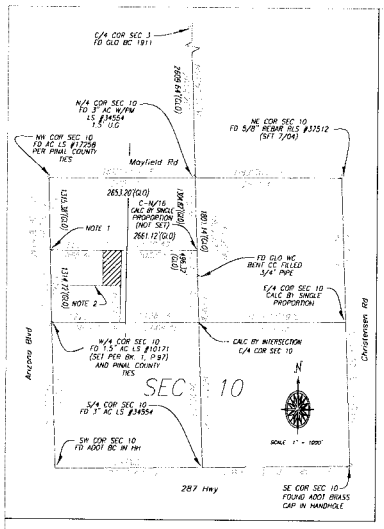
FEET

0 200 400 600

4-16-2009
UPDATED BY CC

THIS MAP IS FOR VALUATION PURPOSES ONLY. THIS OFFICE WILL NOT ASSUME LIABILITY FOR REPRESENTATION, MEASUREMENTS OR ACREAGE. SURVEYS & SUBDIVISION PLATS ARE ON FILE WITH THE PINAL COUNTY RECORDERS OFFICE.

PINAL COUNTY ASSESSORS MAP



STATE OF ARIZONA }
COUNTY OF PINAL } ss

I hereby certify that the within instrument is filed in the official records of this County on the: No.
Date:
Request of:
Witness my hand and official seal.
Dawn Deen - Title Pinal County Recorder
By: Deputy

3405.03'(R)

660.6'(R)

330.19'(R)

660.0'(R)

60'

30'

APN 201-15-004
1.60 ACRES

NOTE 1:

NOTE 2:

NOTE 3:

NOTE 4:

OWNER OF RECORD:

SURVEY CERTIFICATE:

BENCHMARK:

SITE BENCHMARK:

HANSEN
115 S. MAIN ST
COOLIDGE, AZ. 85228
(520) 723-3261 FAX (520) 723-3739
WWW.HANSENSURVEY.COM

DATE:	DRAWN BY:	DESIGN:	REVIEW:
SURVEY:	REVISED BY:	REVISION No.	

TOPOGRAPHIC SURVEY

PORTION OF THE NW/4 SEC 10,
T5S, R5E, G&SRM, PINAL COUNTY, ARIZONA

DRAWING NO

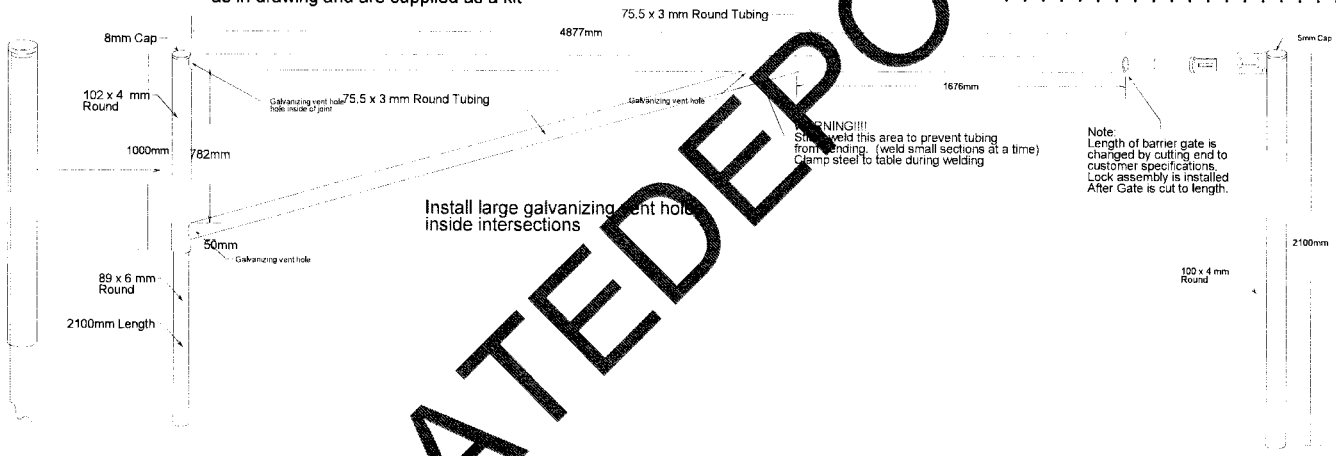
SHEET OF

Production Drawing

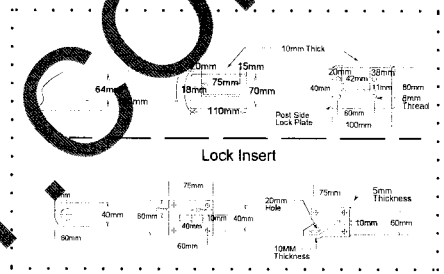
Round Barrier Gate
Variable Length 11' - 16'

Finished with Hot Dip Galvanized

Note: This gate uses round posts
as in drawing and are supplied as a kit



Lock Detail Square Gate

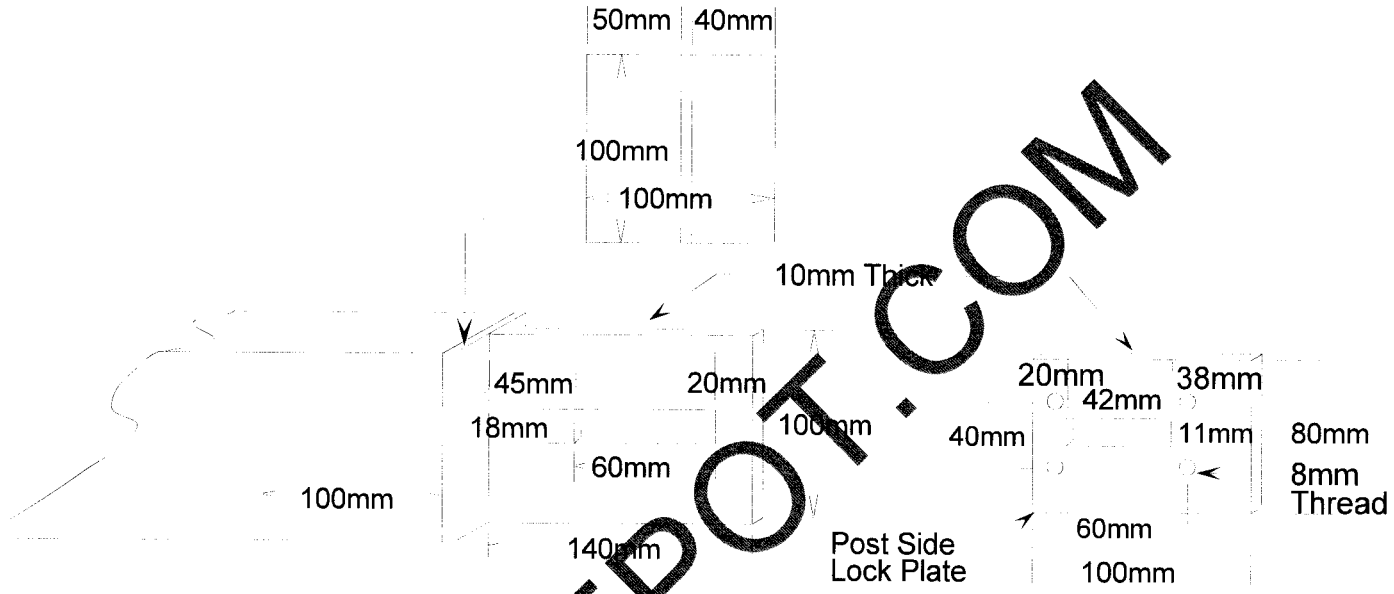


GATEDEPOT.COM

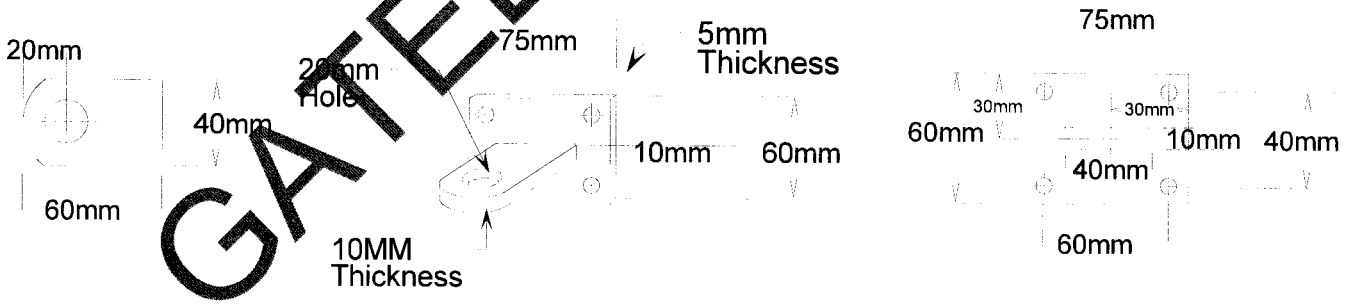
Page 1	Round Barrier Gate	Date	Rev. #
	DRAWING BY: Ken Martini		
	Date: 02-23-2013		

Production Drawing

Lock Detail Square Gate

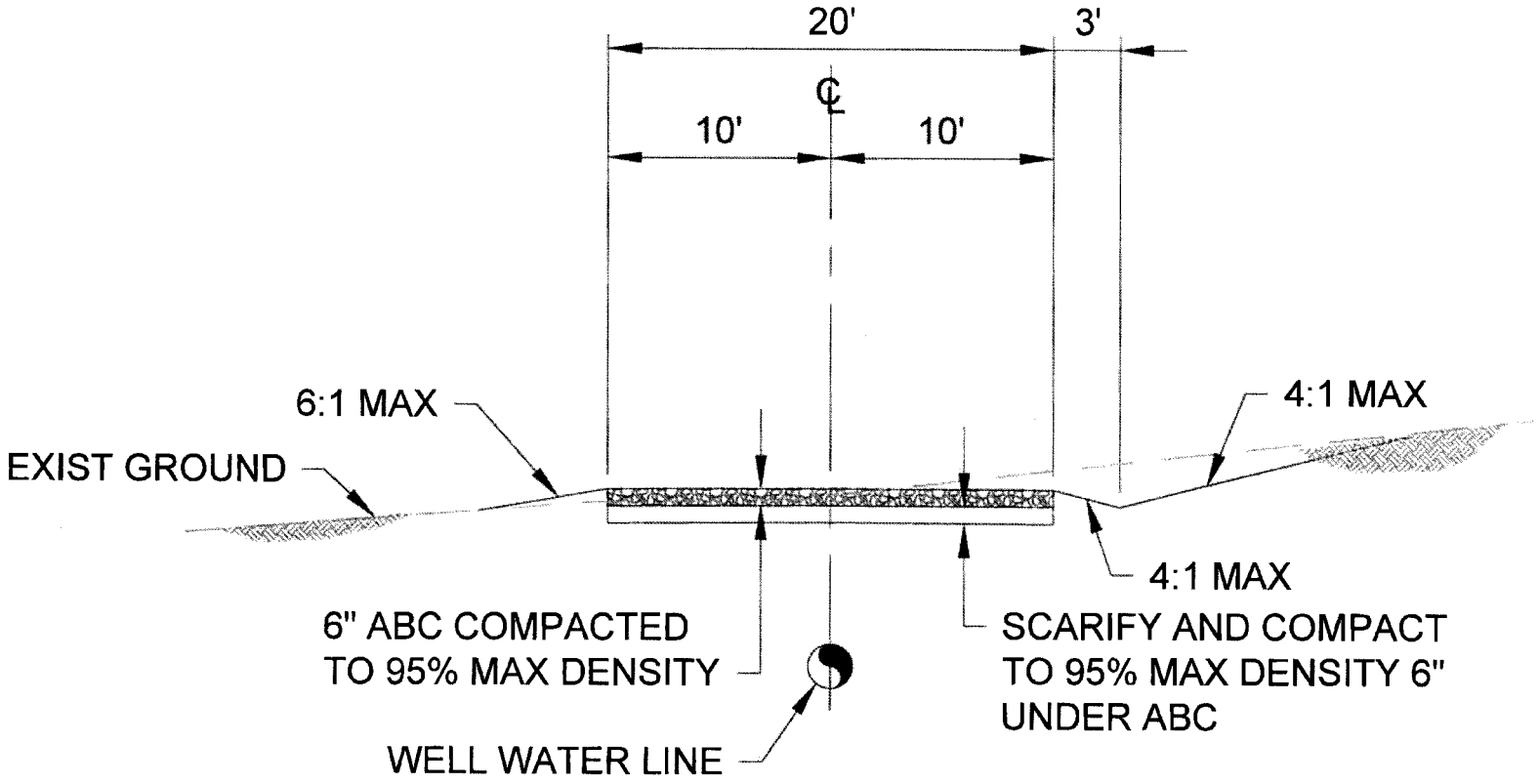


Lock Insert

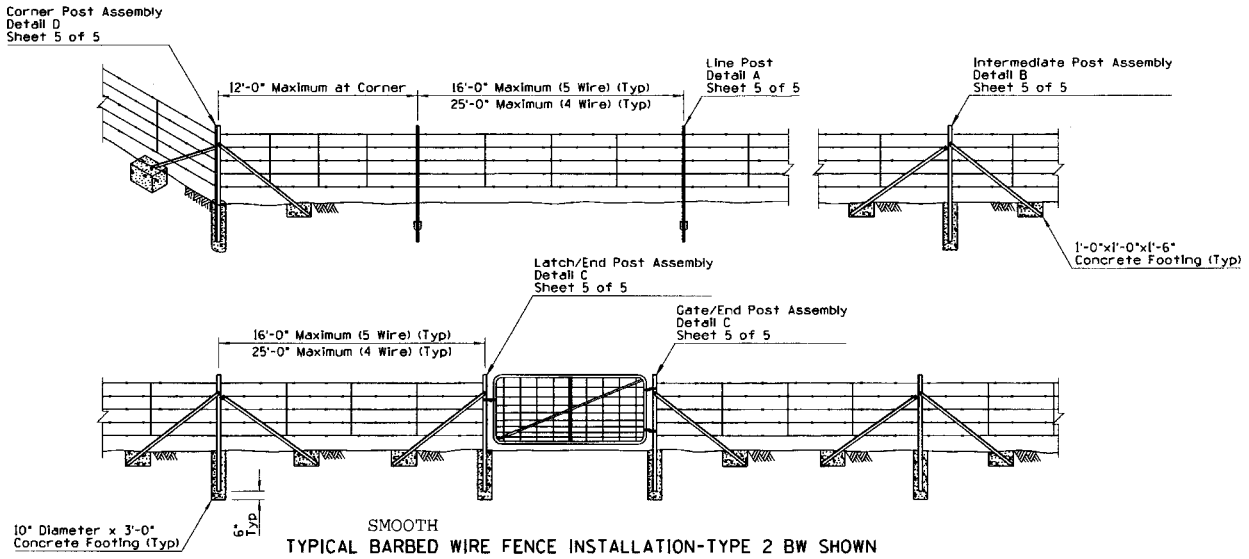


GATEDEPOT.COM

Page 1	Square Barrier Gate Lock Detail	Date	Rev. #	
DRAWING BY: Ken Martini				
Date: 02-23-2013	SCALE NA			


20'
3'
℄
10'
10'
6:1 MAX
EXIST GROUND
4:1 MAX
4:1 MAX
6" ABC COMPACTED
TO 95% MAX DENSITY
SCARIFY AND COMPACT
TO 95% MAX DENSITY 6"
UNDER ABC
WELL WATER LINE

1	REISSUE STD	PNB	7/94
2	REVISED GENERAL NOTE 1	RLF	7/05
3			
4			



SMOOTH

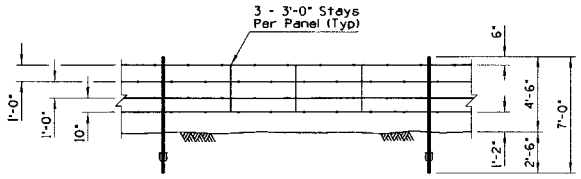
TYPICAL BARBED WIRE FENCE INSTALLATION-TYPE 2 BW SHOWN

GENERAL NOTES

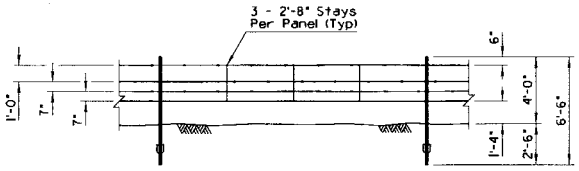
② 1. Intermediate Post Assemblies shall be located as shown and at intervals not to exceed 650', or midway between all braced posts.

2. For game fence the bottom wire shall be barbless.

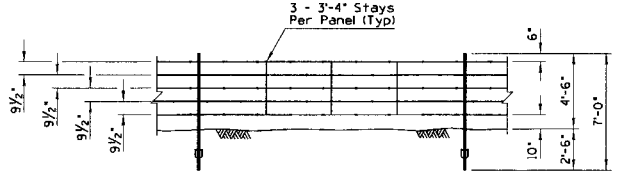
3. The stays on game fence shall have their ends turned up to prevent injuries to game.



TYPE 1 BARBED WIRE (BW) (4 WIRE)



BARBED WIRE GAME FENCE (GF)

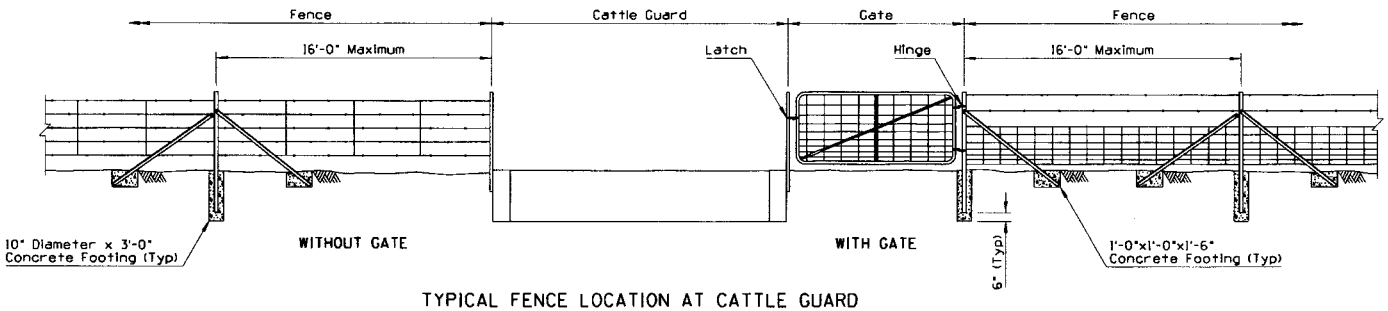


TYPE 2 BARBED WIRE (BW) (5 WIRE)

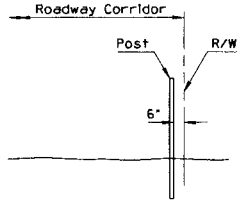
APPROVED FOR DESIGN	STATE OF ARIZONA DEPARTMENT OF TRANSPORTATION ROADWAY STANDARD DRAWINGS	REV. 7/05
APPROVED FOR DISTRIBUTION	① FENCE BARBED WIRE	DRAWING NO. C-12.10 Sheet 2 of 5

GENERAL NOTES

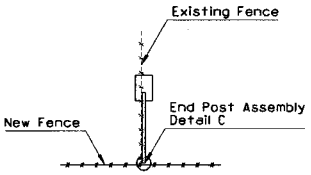
1. Post assemblies shall consist of an upright angle $2\frac{1}{2}$"x$2\frac{1}{2}$"x$\frac{1}{4}$" at 4.10 lbs/ft, and brace angles 2"x2"x$\frac{1}{4}$" at 3.19 lbs/ft.



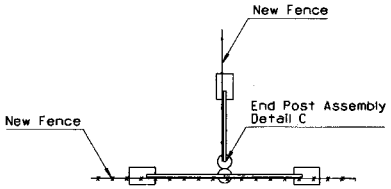
TYPICAL FENCE LOCATION AT CATTLE GUARD



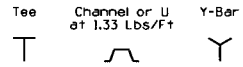
TYPICAL FENCE LOCATION



ABUTTING FENCE

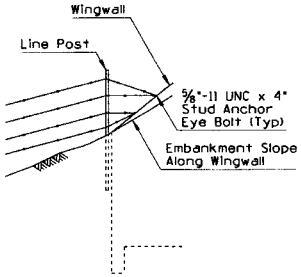


ABUTTING FENCE AT POST

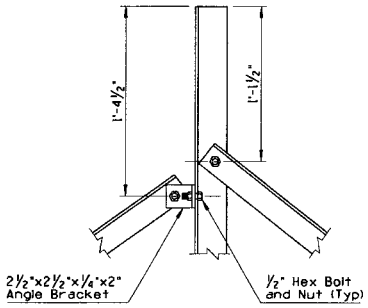


DETAIL A

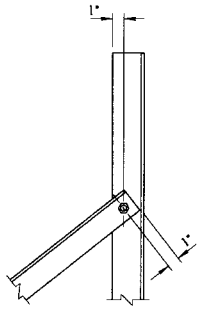
TYPICAL CROSS SECTIONS OF LINE POST SHAPES



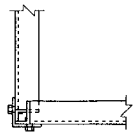
DETAIL E
FENCE CONNECTION TO WINGWALL



DETAIL B
INTERMEDIATE POST ASSEMBLY



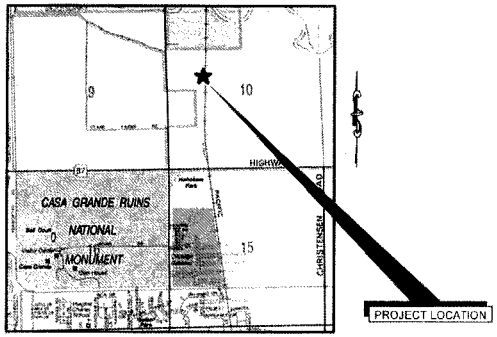
DETAIL C
END POST ASSEMBLY



DETAIL D
CORNER POST ASSEMBLY

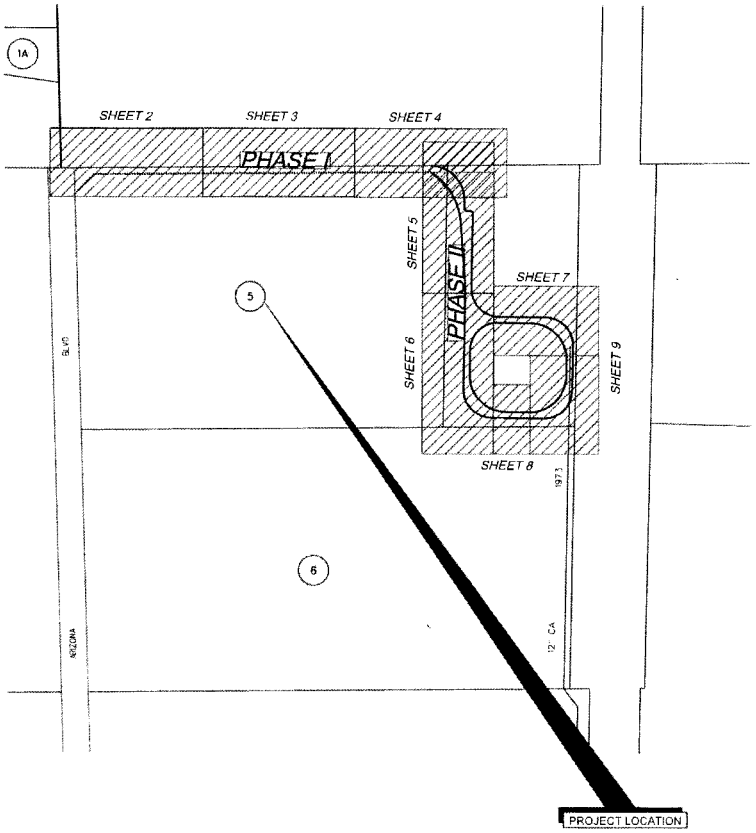
APPROVED FOR DESIGN	STATE OF ARIZONA DEPARTMENT OF TRANSPORTATION ROADWAY STANDARD DRAWINGS	REV. 7/94
APPROVED FOR DISTRIBUTION	① FENCE MISCELLANEOUS DETAILS	DRAWING NO. C-12.10 Sheet 5 of 5

CONSTRUCT ACCESS ROAD TO WELL NOS. 9, 10 AND THE COOLIDGE NITRATE PLANT LOCATED WITHIN THE SW 1/4 SEC. 10, T. 5 S., R. 8 E. OF THE G. & S. R. B. & M.



VICINITY MAP

SHEET INDEX			
SHT. No.	DWG. No.	DESCRIPTION	PREPARED BY
1	PV-0091	COVER SHEET	AWC
2-9	PV-0091	CONSTRUCTION PLAN	AWC
10	PV-0091	AWC NOTES	AWC
11	PV-0091	AWC DETAILS	AWC



	QUANTITIES LIST	QUANTITY
1	6" ABC COMPACTED TO 95%	788 CY
2	SCARIFY AND COMPACT TO 95% UNDER ABC	788 CY
3	FILL & COMPACT TO 95% PER MAG 211	57 CY
4	PLACE GEOSYNTHETIC FABRIC CLASS B PER MAG 796-22	22 SY
5	PLACE MAG 703 RIPRAP (D50=1.5") OR APPROVED EQUAL	148 SY
6	PLACE GEOSYNTHETIC FABRIC CLASS D PER MAG 796.22	148 SY
7	PLACE MAG 703 RIPRAP (D50=6") OR APPROVED EQUAL	22 SY
8	INSTALL STEEL THREE RAIL FENCE (MATCH EXISTING)	952 LF
9	DURAGATE DOT-BR STEEL BARRIER GATE ROUND TUBULAR OR APPROVED EQUAL	1 EA

CONSTRUCTION NOTES:

1. All work and materials shall conform to current County Health Department Standards and Revisions, Arizona Water Company Specifications and Details, MAG Standard Specifications and Details, and Arizona Department of Health Services Engineering Bulletin No. 10.
2. Developer shall obtain a Pinal County Right of Way Use Permit prior to any work being performed within the County right-of-way. Contact Pinal County Public Works Inspection Section at least seven (7) working days.
3. Prior to construction, the appropriate agency(ies) will be notified as required by the permits.
4. All backfill, compaction, and testing shall be per current County, City, State, ADOT and Arizona Water Company Standards and specifications.
5. All water lines 8" and less are to have a minimum cover of 36 inches & all water lines 12" and greater are to have 48 inches of minimum cover over the top of pipe to finish grade, unless otherwise specified on the construction drawings.
6. All frames, covers, valve boxes, and manhole covers shall be adjusted to finish grade prior to completion of construction. (If located outside pavement section, prefer level with finished grade but allow 6" max above finished grade.)
7. All water lines shall be pressure and leakage tested in accordance with Arizona Water Company's Specifications.
8. All water lines are to be disinfected per ADEQ Engineering Bulletin No. 8.
9. Air release valves are required at water system high points per Arizona Water Company standard details.
10. Water/sewer separation shall be per current Arizona Water Company standards ADEQ AAC R18-5-502-C.
11. It shall be the contractors responsibility to uncover all existing water lines being connected to, and to verify the location, depth and size of pipe before any construction begins.
12. Any construction performed without the knowledge of the inspector or his representative is liable for removal and replacement at the contractors expense.
13. In accordance with AAC R18-4-213, all materials added after January 1, 1993 which may come in contact with drinking water, shall conform to National Sanitation Foundation Standards 60 and 61.
14. All water services shall be set a minimum of 2 feet on the customers property and NOT in the right-of-way.
15. Unless otherwise specified on the construction drawings, all water mains are to be installed 5 feet from the property line inside the right-of-way or easement.
16. Water valves shall be spaced not more than 500 feet in commercial districts and not more than 800 feet in other districts. Variations may be required for transmission mains or special applications. Sufficient valving is required where water lines cross streams, railroads and major highways.
17. Contractor is responsible for Blue Stake marking daily as construction is in progress.
18. All residents to be notified in person 24 hours prior to driveway crossing.
19. Traffic control and barricading shall be according to the Manual on Uniform Traffic Control Devices or Pinal County requirements. Contractor to supply lighted barricade at 50' intervals with open trench signage.
20. Contractor shall submit a Traffic Control plan to Pinal County Public Works Inspection Section at least three (3) working days prior to work for review and approval.
21. Any work on arterial or collector roads shall require an off-duty Pinal County Sheriff's Officer for traffic control. Contact shall be made through PCSD representative.
22. No trench to be left open/uncovered after working hours unless properly signed and barricaded per the approved Traffic Control Plan.
23. Plan approval is valid for (12) months from the date of County approval. If approval expires, the plans must be resubmitted to Pinal County Public Works for update review and re-approval.
24. Trench excavation, back filling and compaction shall be per MAG Standard Specifications Section 601. Bedding shall be specifically per MAG Standard Specifications 601.4.2 and 601.4.6.
25. All work required to complete the construction covered by these plans shall be in accordance with Arizona Water Company Specifications and MAG Standard Specifications and Details.
26. All components must comply with the SDWA's "Lead Free" standards.

LEGEND

- MONUMENTS FOUND AS NOTED
- LIGHT/POWER POLES
- EX. WATER METER BOX
- EX. FIRE HYDRANT
- NEW WATER VALVE
- EX. WATER VALVE
- STREET CENTERLINE/MONUMENT LINE
- PROPERTY LINE
- NEW WATER LINE
- EX. WATER LINE
- 15' INGRESS/EGRESS EASEMENT
- EX. OVERHEAD ELECTRIC
- EX. UNDERGROUND ELECTRIC
- EX. FENCE
- COUNTOUR LINE (MAJOR)
- COUNTOUR LINE (MINOR)
- TOE OF SLOPE
- TOP OF SLOPE
- EX. ASPHALT AREA
- EX. CONCRETE AREA
- NEW ACCESS ROAD (6" ABC)

PINAL COUNTY ENGINEER APPROVAL

APPROVED BY: _____ DATE: _____
PINAL COUNTY ENGINEER
PINAL COUNTY DEPARTMENT OF PUBLIC WORKS

APPROVAL EXPIRES: _____ DATE

BASIS OF BEARING
BEARINGS ARE BASED ON A FOUND ALUMINUM CAPPED SURVEY MONUMENT REPRESENTING THE WEST 1/4 CORNER OF SECTION 10 (POINT "A") AND A FOUND ALUMINUM CAPPED SURVEY MONUMENT REPRESENTING THE NORTHWEST CORNER OF SECTION 10 (POINT "B"). SAID BEARING IS NORTH 01°35'26" WEST PER FEE #2009-113888, RECORDS OF PINAL COUNTY.

BENCHMARK
ELEVATIONS ARE BASED ON N.G.S. CONTROL POINT "REV 320" PID: DU0666. SAID ELEVATION IS 1413.9', NAVD88.

OWNER/ENGINEER/DEVELOPER
ARIZONA WATER COMPANY
POST OFFICE BOX 29006
PHOENIX, AZ 85038-9006
VOICE: (602) 240-6860 FAX: (602) 294-2169
CONTACT: JAMES T. WILSON

ARIZONA WATER COMPANY
3805 N BLACK CANYON HWY POST OFFICE BOX 29006
PHOENIX, ARIZONA 85038-9006
(602) 240-6860

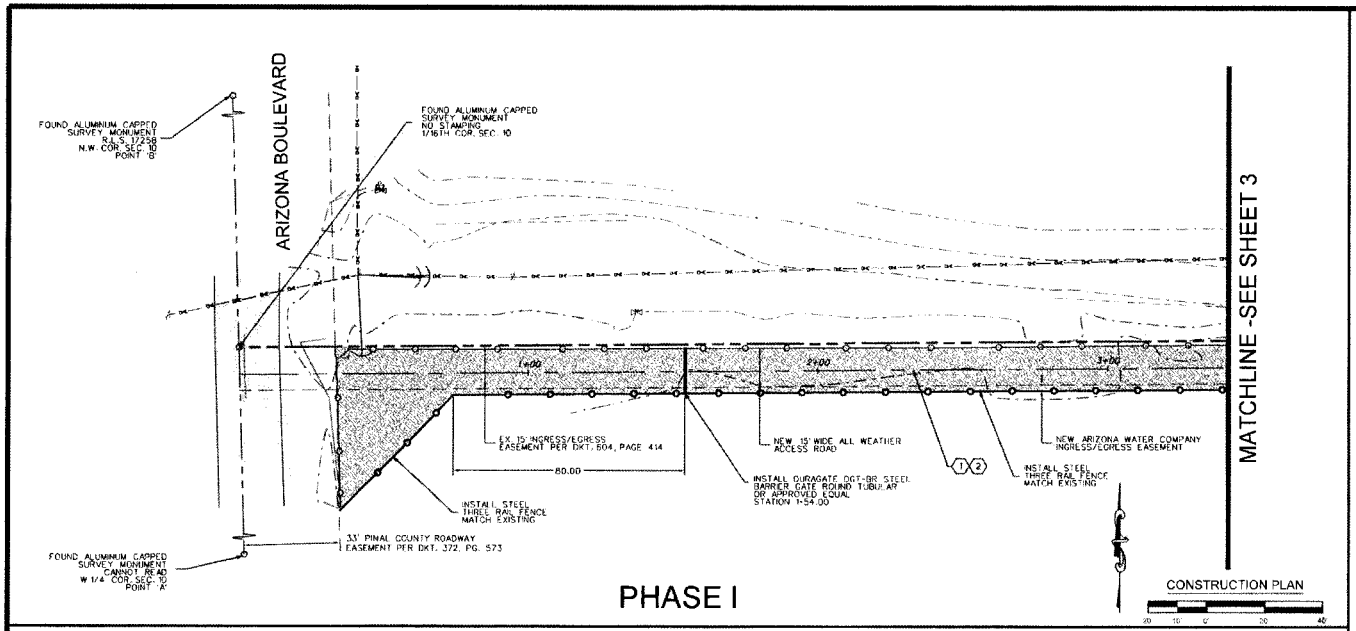
CONSTRUCT ACCESS ROAD TO WELL NOS. 9, 10 AND THE COOLIDGE NITRATE PLANT

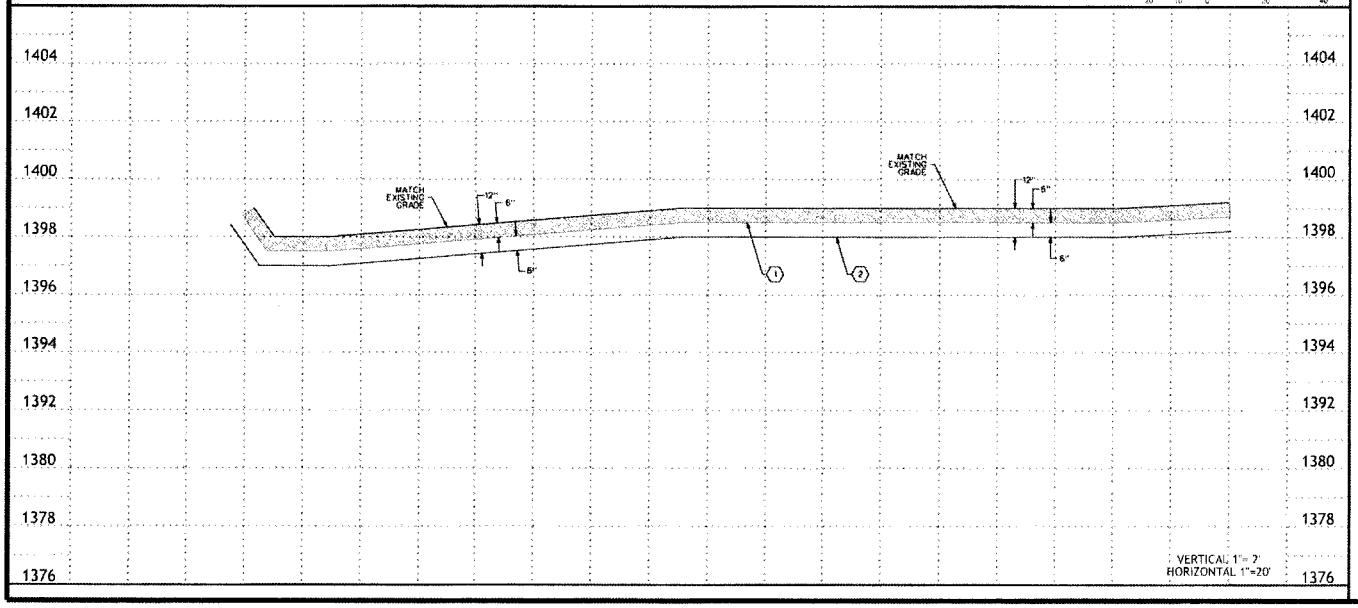
COVER SHEET

41048 JAMES T. WILSON ARIZONA U.S.A. Expires 6/30/16

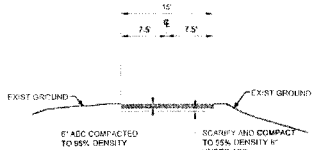
PV-0091

SHEET 1 OF 11





	WATER CONSTRUCTION
1	6" ABC COMPACTED TO 95%
2	SCARIFY AND COMPACT TO 95% UNDER ABC
3	FILL & COMPACT TO 95% PER MAG 211
4	PLACE GEOSYNTHETIC FABRIC CLASS B PER MAG 796.23
5	PLACE MAG 703 RIPRAP (D50=1.5') OR APPROVED EQUAL
6	PLACE GEOSYNTHETIC FABRIC CLASS A PER MAG 796.22
7	PLACE MAG 703 RIPRAP (D50=6') OR APPROVED EQUAL



LEGEND

- O — MONUMENTS FOUND AS NOTED
- LIGHT/POWER POLES
- EX. WATER METER BOX
- EX. FIRE HYDRANT
- NEW WATER VALVE
- EX. WATER VALVE
- STREET CENTERLINE/MONUMENT LINE
- PROPERTY LINE
- NEW WATER LINE
- EX. WATER LINE
- 15' INGRESS/EGRESS EASEMENT
- EX. OVERHEAD ELECTRIC
- EX. UNDERGROUND ELECTRIC
- EX. FENCE
- COUNTOUR LINE (MAJOR)
- COUNTOUR LINE (MINOR)
- TOE OF SLOPE
- TOP OF SLOPE
- EX. ASPHALT AREA
- EX. CONCRETE AREA
- NEW ACCESS ROAD (6" ABC)

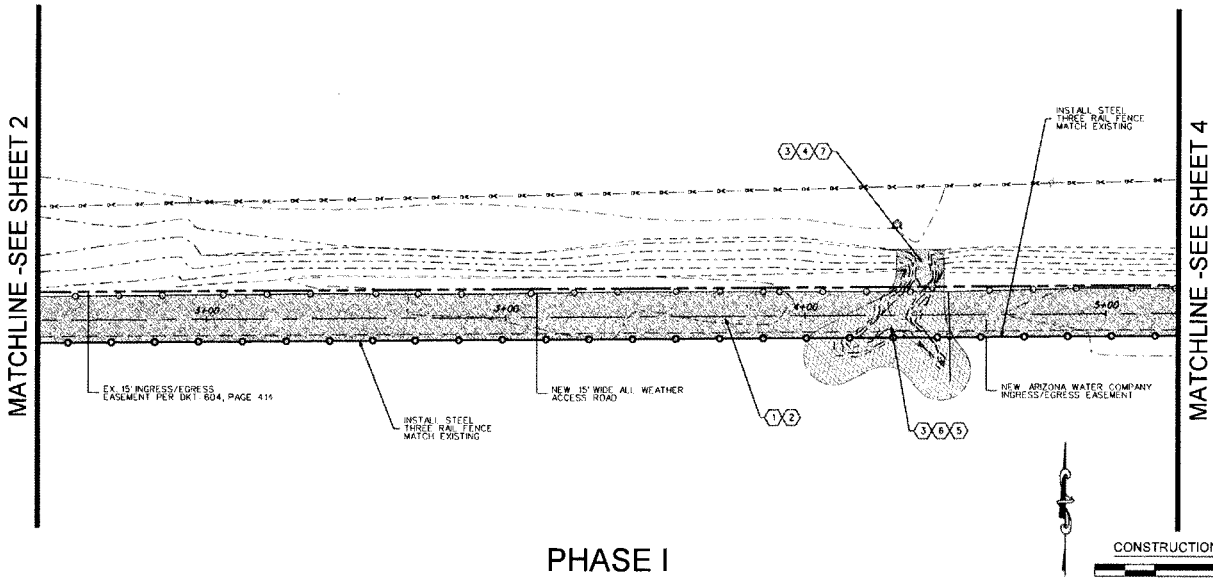
ARIZONA WATER COMPANY
3802 N BLACK CANYON HWY. - POST OFFICE BOX 29006
PHOENIX, ARIZONA 85038-9006
(602) 240-6860

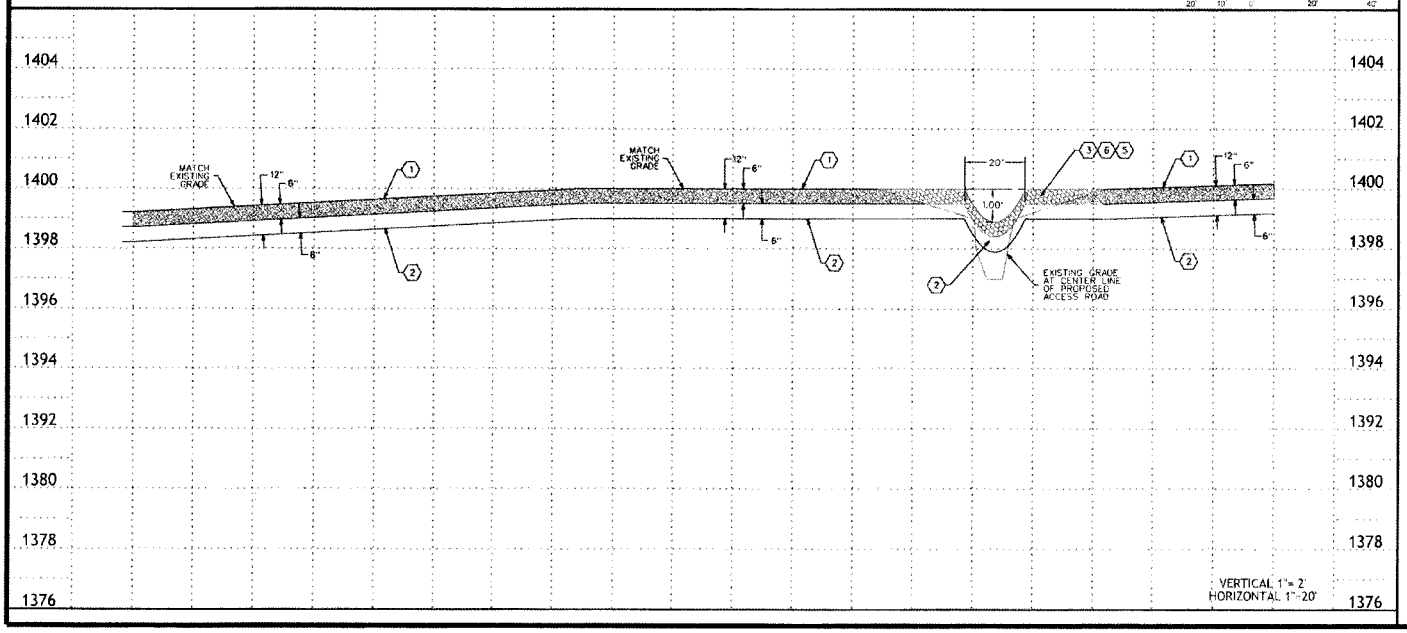
CONSTRUCT ACCESS ROAD TO WELL NOS. 9, 10 AND THE COOLIDGE NITRATE PLANT

CONSTRUCTION PLAN/PROFILE

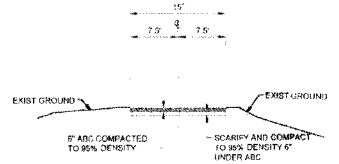
PV-0091

SHEET 2 OF 11





	WATER CONSTRUCTION
1	6" ABC COMPACTED TO 95%
2	SCARIFY AND COMPACT TO 95% UNDER ABC
3	FILL & COMPACT TO 95% PER MAG 211
4	PLACE GEOSYNTHETIC FABRIC CLASS B PER MAG 796.23
5	PLACE MAG 703 RIPRAP (D50=1.5') OR APPROVED EQUAL
6	PLACE GEOSYNTHETIC FABRIC CLASS A PER MAG 796.22
7	PLACE MAG 703 RIPRAP (D50=6") OR APPROVED EQUAL



LEGEND

- MONUMENTS FOUND AS NOTED
- LIGHT/POWER POLES
- EX. WATER METER BOX
- EX. FIRE HYDRANT
- NEW WATER VALVE
- EX. WATER VALVE
- STREET CENTERLINE/MONUMENT LINE
- PROPERTY LINE
- NEW WATER LINE
- EX. WATER LINE
- 15' INGRESS/EGRESS EASEMENT
- EX. OVERHEAD ELECTRIC
- EX. UNDERGROUND ELECTRIC
- EX. FENCE
- COUNTOUR LINE (MAJOR)
- COUNTOUR LINE (MINOR)
- TOE OF SLOPE
- TOP OF SLOPE
- EX. ASPHALT AREA
- EX. CONCRETE AREA
- NEW ACCESS ROAD (6" ABC)

ARIZONA WATER COMPANY
3805 N BLACK CANYON HWY
POST OFFICE BOX 29006
PHOENIX, ARIZONA 85038-9006
(602) 240-6860

CONSTRUCT ACCESS ROAD TO WELL NOS 9, 10 AND THE COOLIDGE NITRATE PLANT

CONSTRUCTION PLAN/PROFILE

PROJECT NO: 1-15299
SYSTEM: PINAL VALLEY (CL)
LEGAL DESC: NW 1/4 SEC 10, T 5S, R 8E
AS BUILT:
DATE: 4/24/2015
SCALE: AS SHOWN
DESIGNED BY:
DRAWN BY: MC
CHECKED BY:

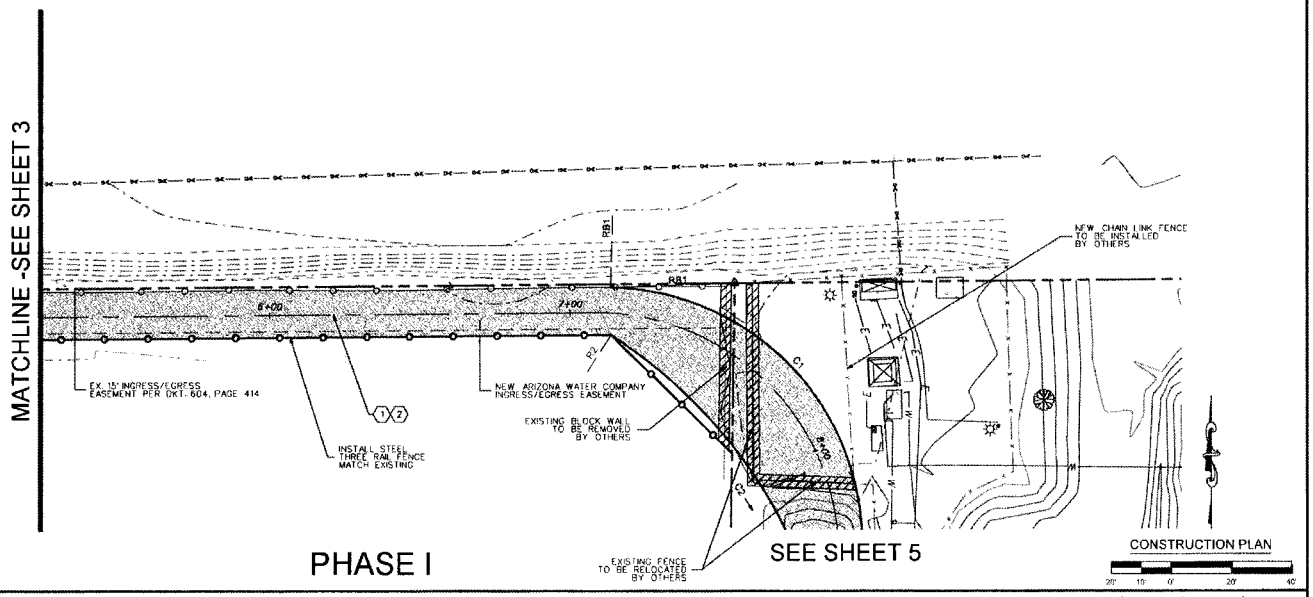
The installation shown is to be installed in accordance with the requirements of Company standard specifications and with the Arizona Department of Environmental Quality

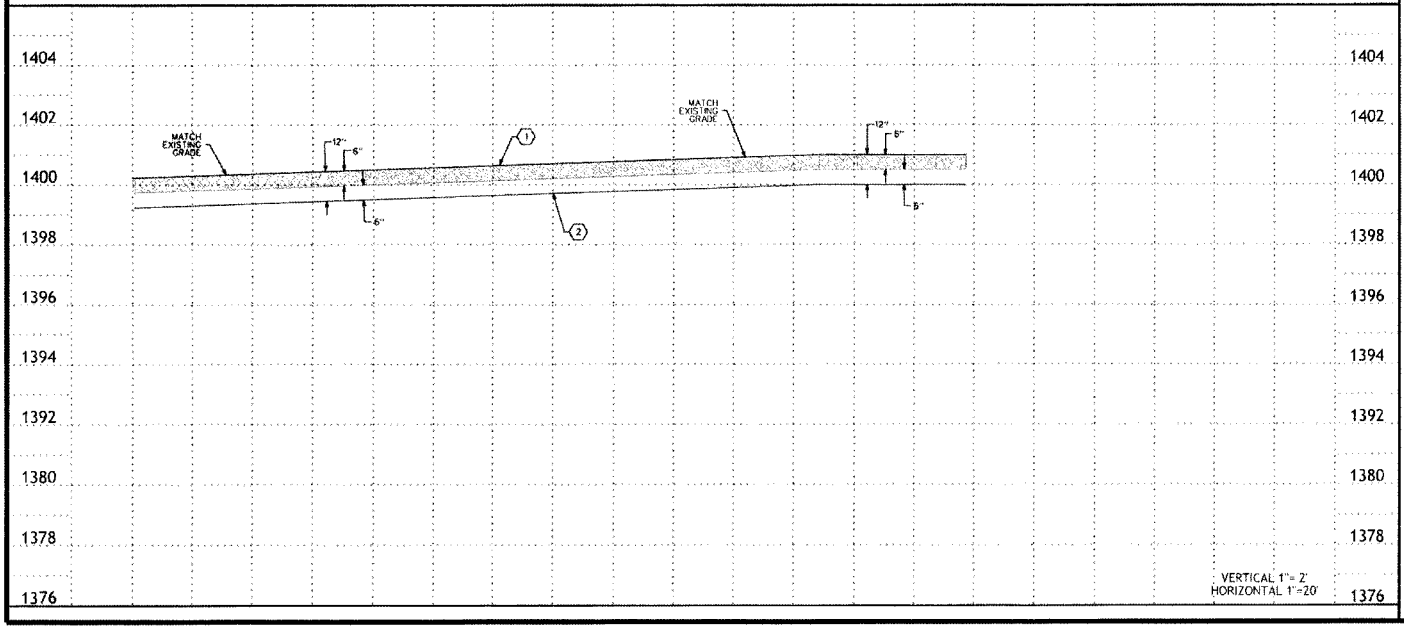
ARIZONA BLUE STAKE, INC. 263-1100 1-800-STAKE-IT

REVISIONS

41045 JAMES T WILSON REGISTERED LAND SURVEYOR ARIZONA U.S.A.
Expires 09/30/16

DRG. No: PV-0091
SHEET 3 OF 11



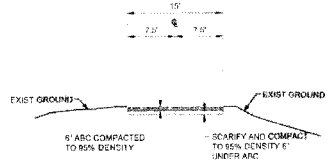


	WATER CONSTRUCTION
1	6" ABC COMPACTED TO 95%
2	SCARIFY AND COMPACT TO 95% UNDER ABC
3	FILL & COMPACT TO 95% PER MAG 211
4	PLACE GEOSYNTHETIC FABRIC CLASS B PER MAG 796.23
5	PLACE MAG 703 RIPRAP (D50=1.5") OR APPROVED EQUAL
6	PLACE GEOSYNTHETIC FABRIC CLASS A PER MAG 796.22
7	PLACE MAG 703 RIPRAP (D50=6") OR APPROVED EQUAL

CURVE	LENGTH	RADIUS	DELTA
C1	136.37'	86.07'	90°48'15"
C2	151.67'	163.87'	52°59'58"

LINE	LENGTH	BEARING
L1	41.32'	S88°14'03"W

LINE	LENGTH	BEARING
RB1	86.07'	S01°31'32"W
RB2	163.97'	S32°54'30"W



LEGEND

- MONUMENTS FOUND AS NOTED
- LIGHT/POWER POLES
- EX. WATER METER BOX
- EX. FIRE HYDRANT
- NEW WATER VALVE
- EX. WATER VALVE
- STREET CENTERLINE/MONUMENT LINE
- PROPERTY LINE
- NEW WATER LINE
- EX. WATER LINE
- 15' INGRESS/EGRESS EASEMENT
- EX. OVERHEAD ELECTRIC
- EX. UNDERGROUND ELECTRIC
- EX. FENCE
- COUNTOUR LINE (MAJOR)
- COUNTOUR LINE (MINOR)
- TOE OF SLOPE
- TOP OF SLOPE
- EX. ASPHALT AREA
- EX. CONCRETE AREA
- NEW ACCESS ROAD (6" ABC)

The installation shown is to be installed in accordance with the Arizona Department of Environmental Quality

Dial before you dig 811 or 1-800-STAKE-IT

JOB NO.	15239
DESIGNED	
DRAWN	MC
CHECKED	
QUADRANT	NW 1/4 SEC. 10, T 6S, R 1E
FACILITY ID NO.	2102
SCALE	AS SHOWN
DATE	4/24/2015

ARIZONA WATER COMPANY
3805 N. BLACK CANYON HWY. POST OFFICE BOX 29006
PHOENIX, ARIZONA 85038-9006
(602) 240-6860

CONSTRUCT ACCESS ROAD TO WELL NO. 3 & 10 AND THE COOLIDGE NITRATE PLANT

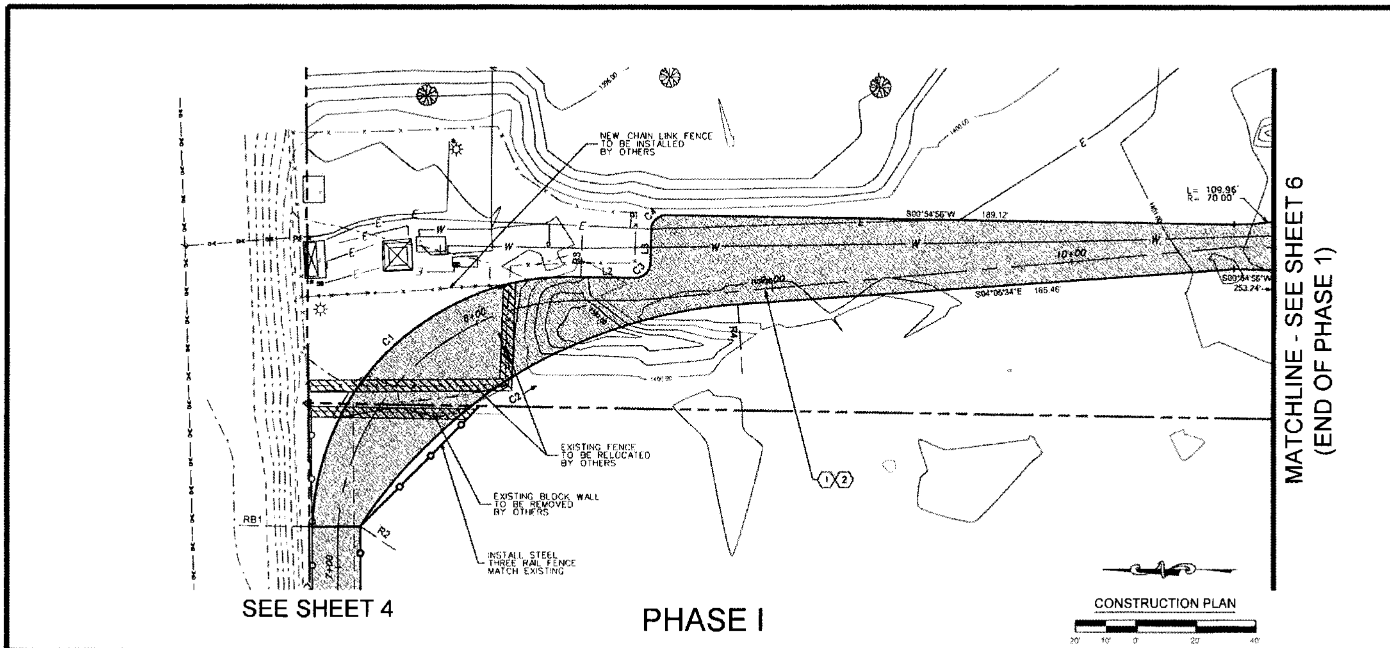
CONSTRUCTION PLAN/PROFILE

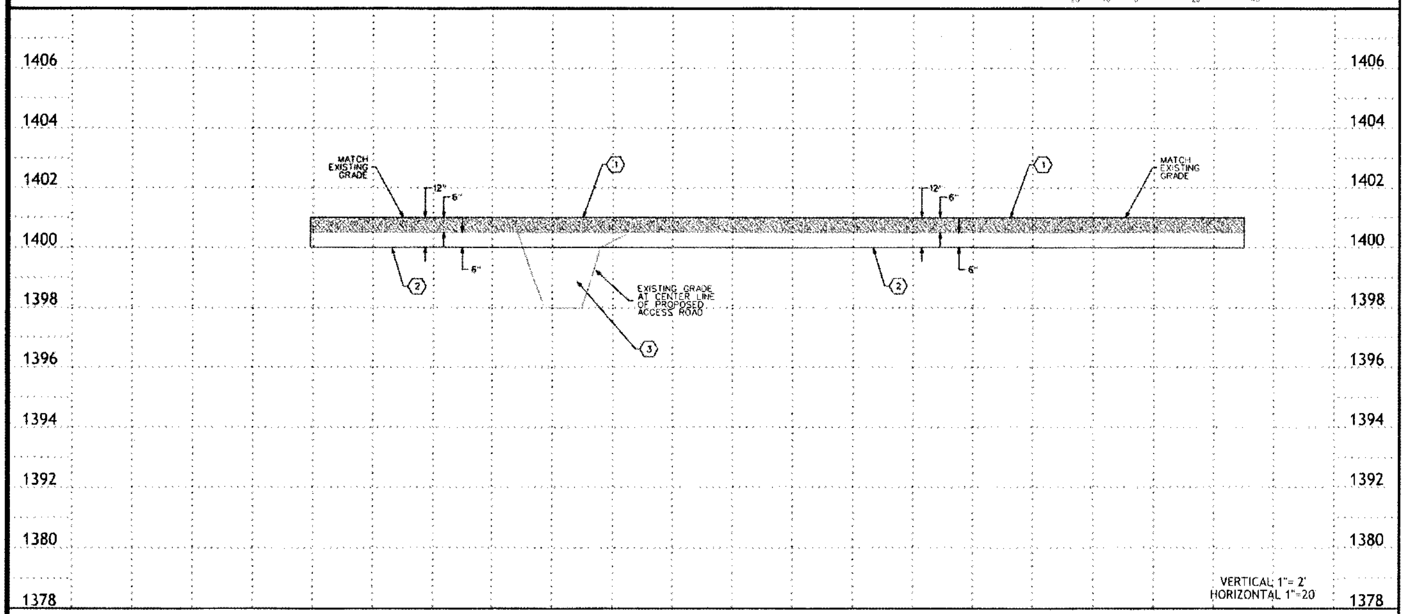
PROJECT SHEET NOS.

JAMES T. WILSON 40548 REGISTERED PROFESSIONAL ENGINEER ARIZONA, U.S.A. Expires 6/30/16

DWG. No. PV-0091

SHEET 4 OF 11



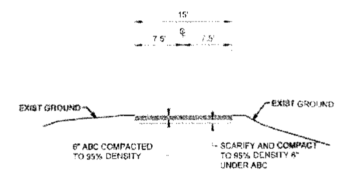


⬡	WATER CONSTRUCTION
1	6" ABC COMPACTED TO 95%
2	SCARIFY AND COMPACT TO 95% UNDER ABC
3	FILL & COMPACT TO 95% PER MAG 211
4	PLACE GEOSYNTHETIC FABRIC CLASS B PER MAG 796.23
5	PLACE MAG 703 RIPRAP (D50=1.5") OR APPROVED EQUAL
6	PLACE GEOSYNTHETIC FABRIC CLASS A PER MAG 796.22
7	PLACE MAG 703 RIPRAP (D50=6") OR APPROVED EQUAL

CURVE	LENGTH	RADIUS	DELTA
C1	136.37'	86.07'	90°48'15"
C2	151.67'	163.87'	52°59'56"
C3	7.85'	5.00'	90°00'00"
C4	7.85'	5.00'	90°00'00"

LINE	LENGTH	BEARING
L1	41.32'	S88°14'03"W
L2	18.15'	S00°54'56"W
L3	11.15'	S89°05'04"E

LINE	LENGTH	BEARING
RB1	86.07'	S01°31'32"W
RB2	163.97'	S32°54'30"W
RB3	86.07'	N87°41'42"W
RB4	163.97'	S85°54'26"W



LEGEND

- MONUMENTS FOUND AS NOTED
- LIGHT/POWER POLES
- EX. WATER METER BOX
- EX. FIRE HYDRANT
- NEW WATER VALVE
- EX. WATER VALVE
- STREET CENTERLINE/MONUMENT LINE
- PROPERTY LINE
- NEW WATER LINE
- EX. WATER LINE
- 15' INGRESS/EGRESS EASEMENT
- EX. OVERHEAD ELECTRIC
- EX. UNDERGROUND ELECTRIC
- EX. FENCE
- COUNTOUR LINE (MAJOR)
- COUNTOUR LINE (MINOR)
- TOE OF SLOPE
- TOP OF SLOPE
- EX. ASPHALT AREA
- EX. CONCRETE AREA
- NEW ACCESS ROAD (6" ABC)

The installation shown is to be installed in accordance with the Arizona Water Company standard specifications on file with the Arizona Department of Environmental Quality

CALL TWO WORKING DAYS BEFORE YOU DIG 263-1100 1-800 STAKE-IT

1-5299 | PINAL VALLEY (CL) | NW 1/4 SEC 10, T 5S, R 8E | 2102 | 4/24/2015 | AS SHOWN | MC

ARIZONA WATER COMPANY
3805 N. BLACK CANYON HWY POST OFFICE BOX 29006
PHOENIX, ARIZONA 85038-9006
(602) 240-6860

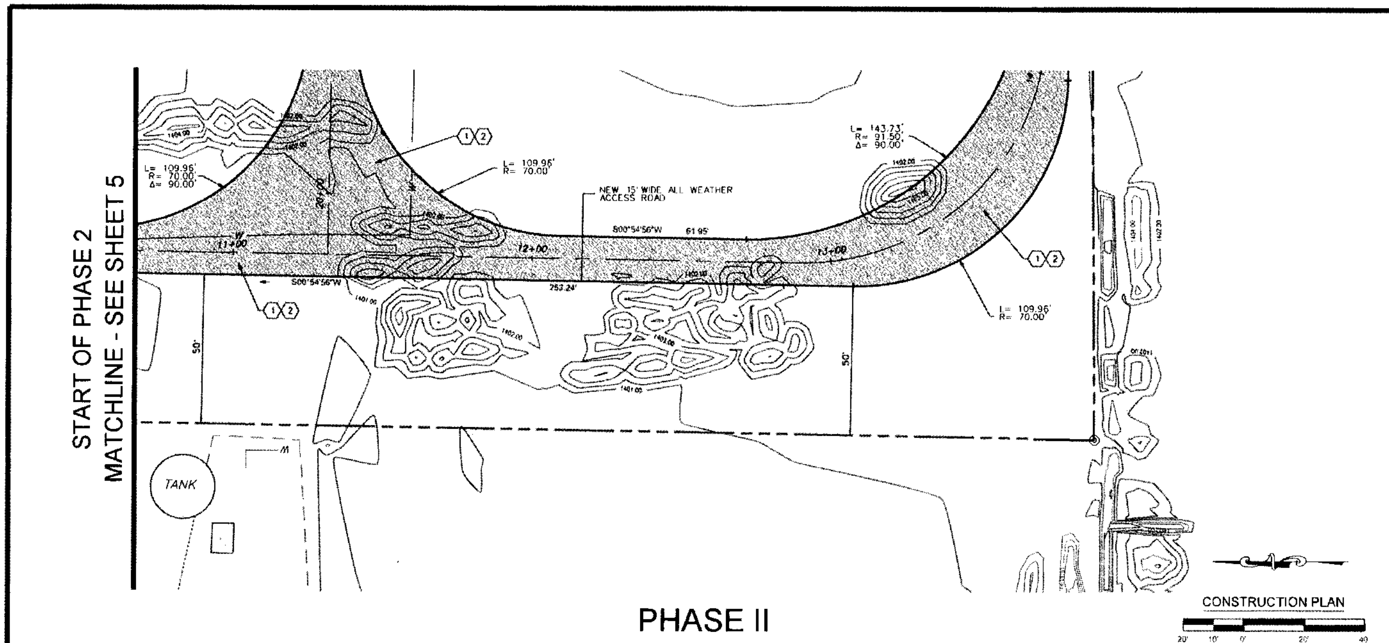
CONSTRUCT ACCESS ROAD TO WELL NOS. 9, 10 AND THE COOLIDGE NITRATE PLANT

CONSTRUCTION PLAN/PROFILE

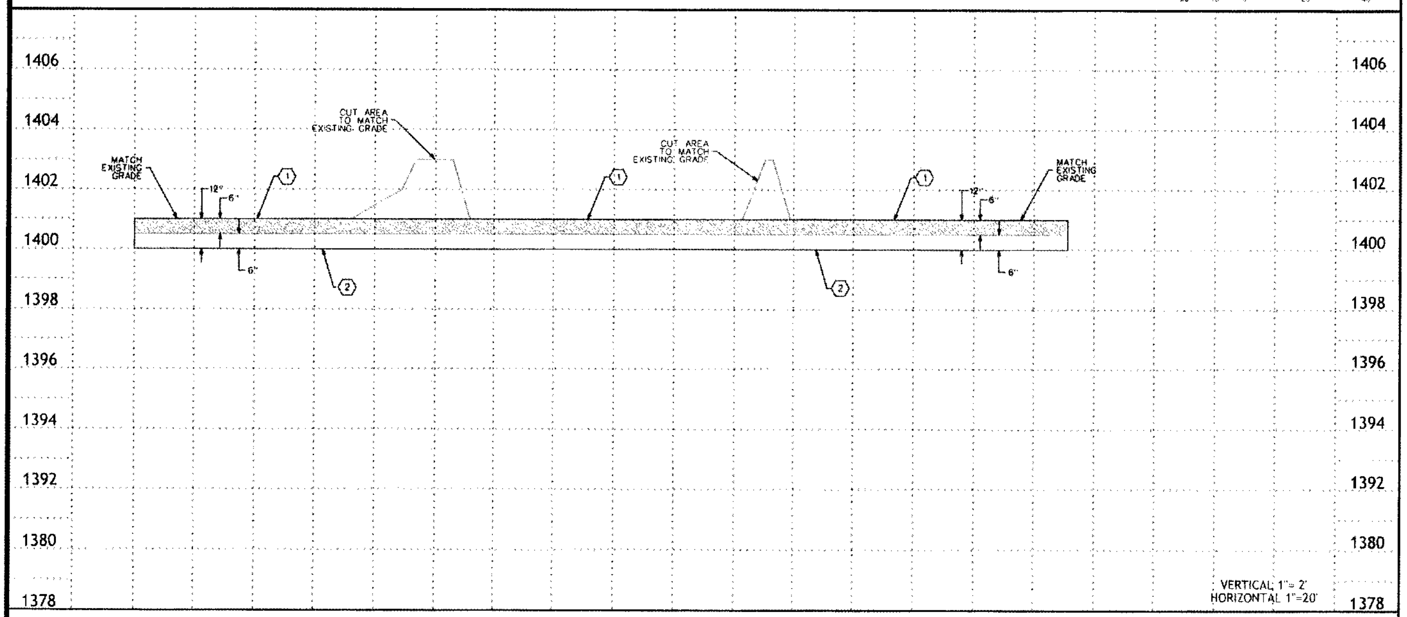
41046 JAMES T. WILSON ARIZONA, U.S.A.
Expires 6/30/16

PV-0091

SHEET 5 OF 11



PHASE II



⬡	WATER CONSTRUCTION
1	6" ABC COMPACTED TO 95%
2	SCARIFY AND COMPACT TO 95% UNDER ABC
3	FILL & COMPACT TO 95% PER MAG 211
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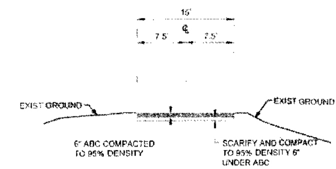
7	PLACE MAG 703 RIPRAP (D50=6") OR APPROVED EQUAL



LEGEND

- MONUMENTS FOUND AS NOTED
- LIGHT/POWER POLES
- EX. WATER METER BOX
- EX. FIRE HYDRANT
- NEW WATER VALVE
- EX. WATER VALVE
- STREET CENTERLINE/MONUMENT LINE
- PROPERTY LINE
- NEW WATER LINE
- EX. WATER LINE
- 15' INGRESS/EGRESS EASEMENT
- EX. OVERHEAD ELECTRIC
- EX. UNDERGROUND ELECTRIC
- EX. FENCE
- COUNTOUR LINE (MAJOR)
- COUNTOUR LINE (MINOR)
- TOE OF SLOPE
- TOP OF SLOPE
- EX. ASPHALT AREA
- EX. CONCRETE AREA
- NEW ACCESS ROAD (6" ABC)

The installation shown is to be installed in accordance with the Arizona Water Company standard specifications on file with the Arizona Department of Environmental Quality

CALL TWO WORKING DAYS BEFORE YOU DIG
263-1100
1-800-STAKE-IT

-5299
PINAL VALLEY (CL)
NW 1/4 SEC 10, T 5S, R 8E
2102
AS SHOWN
4/24/2015
MC

ARIZONA WATER COMPANY
3805 N BLACK CANYON HWY POST OFFICE BOX 29006
PHOENIX, ARIZONA 85038-9006
(602) 240-6860

CONSTRUCT ACCESS ROAD TO WELL NOS 9, 10 AND THE COOLIDGE NITRATE PLANT

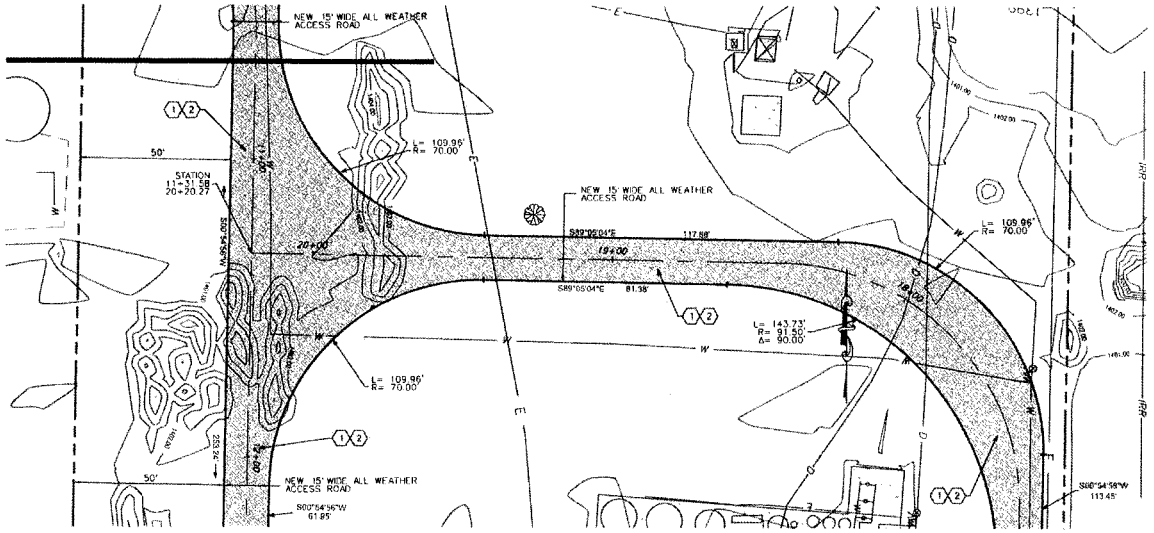
CONSTRUCTION PLAN/PROFILE

41046
JAMES T. WILSON

PV-0091

SHEET 6 OF 11

PHASE I



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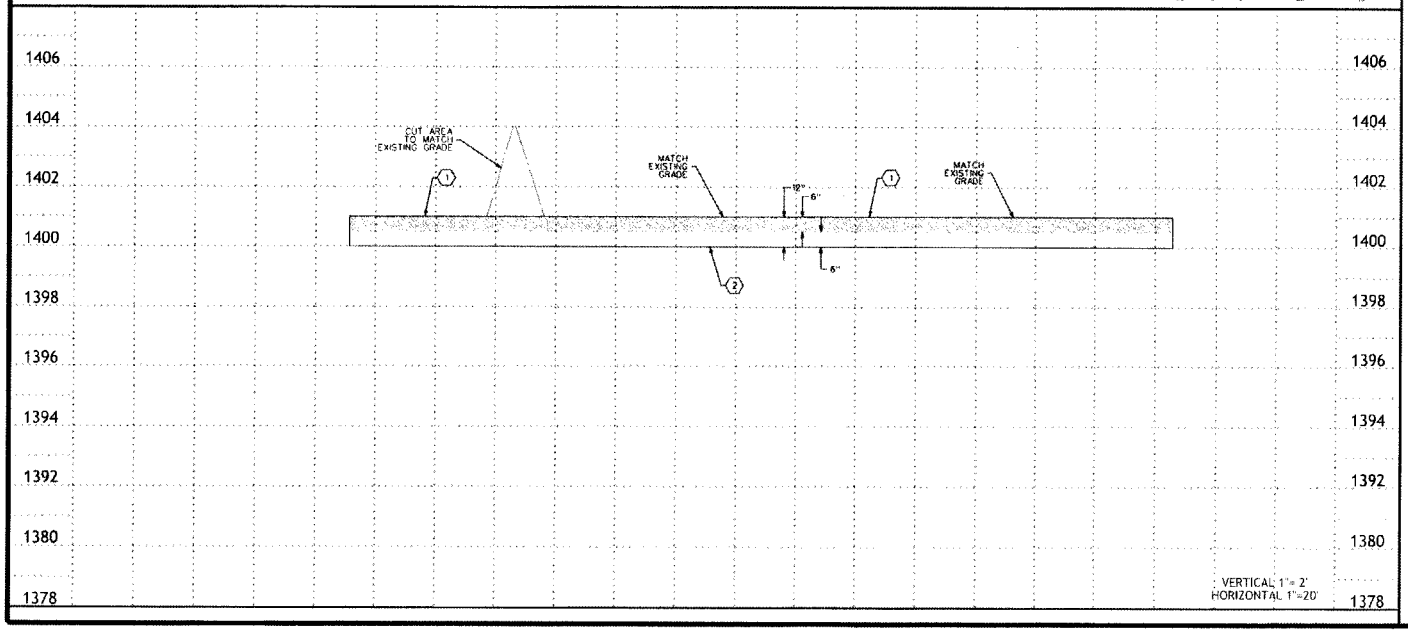

CONSTRUCTION PLAN

	WATER CONSTRUCTION
1	6" ABC COMPACTED TO 95%
2	SCARIFY AND COMPACT TO 95% UNDER ABC
3	FILL & COMPACT TO 95% PER MAG 211
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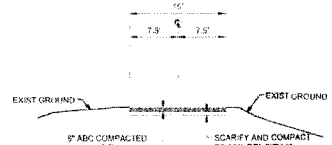
5	PLACE MAG 703 RIPRAP (D50-1.5") OR APPROVED EQUAL
6	PLACE GEOSYNTHETIC FABRIC CLASS A PER MAG 796.22
7	PLACE MAG 703 RIPRAP (D50-6") OR APPROVED EQUAL



LEGEND

- MONUMENTS FOUND AS NOTED
- LIGHT/POWER POLES
- EX. WATER METER BOX
- EX FIRE HYDRANT
- NEW WATER VALVE
- EX. WATER VALVE
- STREET CENTERLINE/MONUMENT LINE
- PROPERTY LINE
- NEW WATER LINE
- EX. WATER LINE
- 15' INGRESS/EGRESS EASEMENT
- EX. OVERHEAD ELECTRIC
- EX. UNDERGROUND ELECTRIC
- EX. FENCE
- COUNTOUR LINE (MAJOR)
- COUNTOUR LINE (MINOR)
- TOP OF SLOPE
- TOP OF SLOPE
- EX. ASPHALT AREA
- EX. CONCRETE AREA
- NEW ACCESS ROAD (6" ABC)

ARIZONA WATER COMPANY
3805 N. BLACK CANYON HWY POST OFFICE BOX 29006
PHOENIX, ARIZONA 85038-9006
(602) 240-6860

CONSTRUCT ACCESS ROAD TO WELLNOS. 9, 10 AND THE COOLIDGE NITRATE PLANT

CONSTRUCTION PLAN/PROFILE

PROJECT SHEET NO.

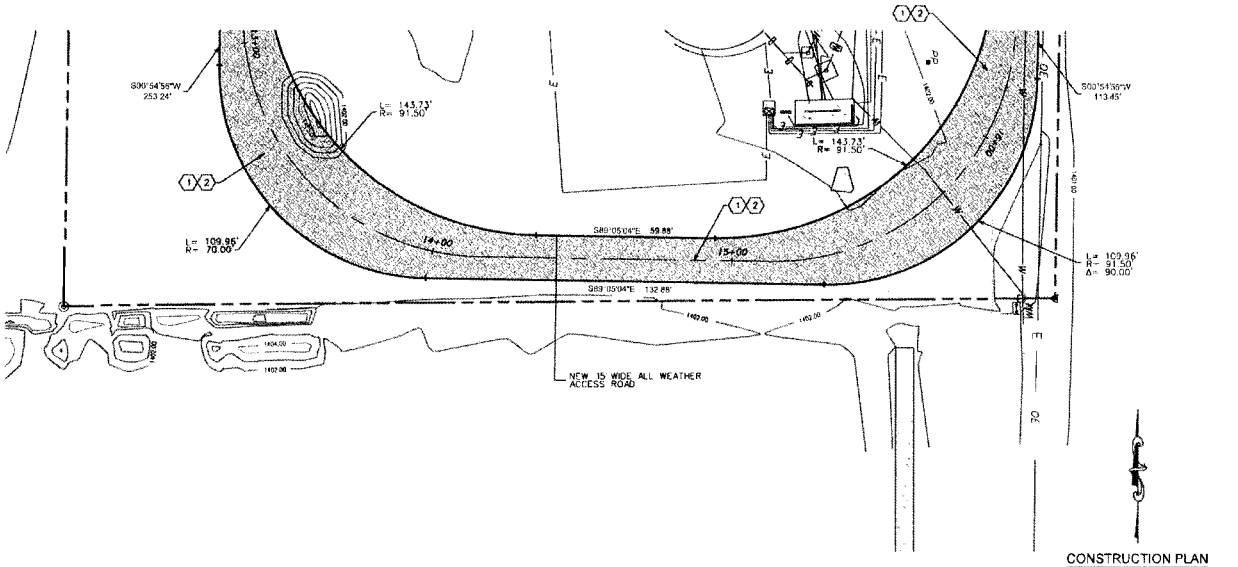
REVISIONS

This installation shall be constructed in accordance with the Arizona Water Company Standard Specifications and with the Arizona Department of Environmental Quality

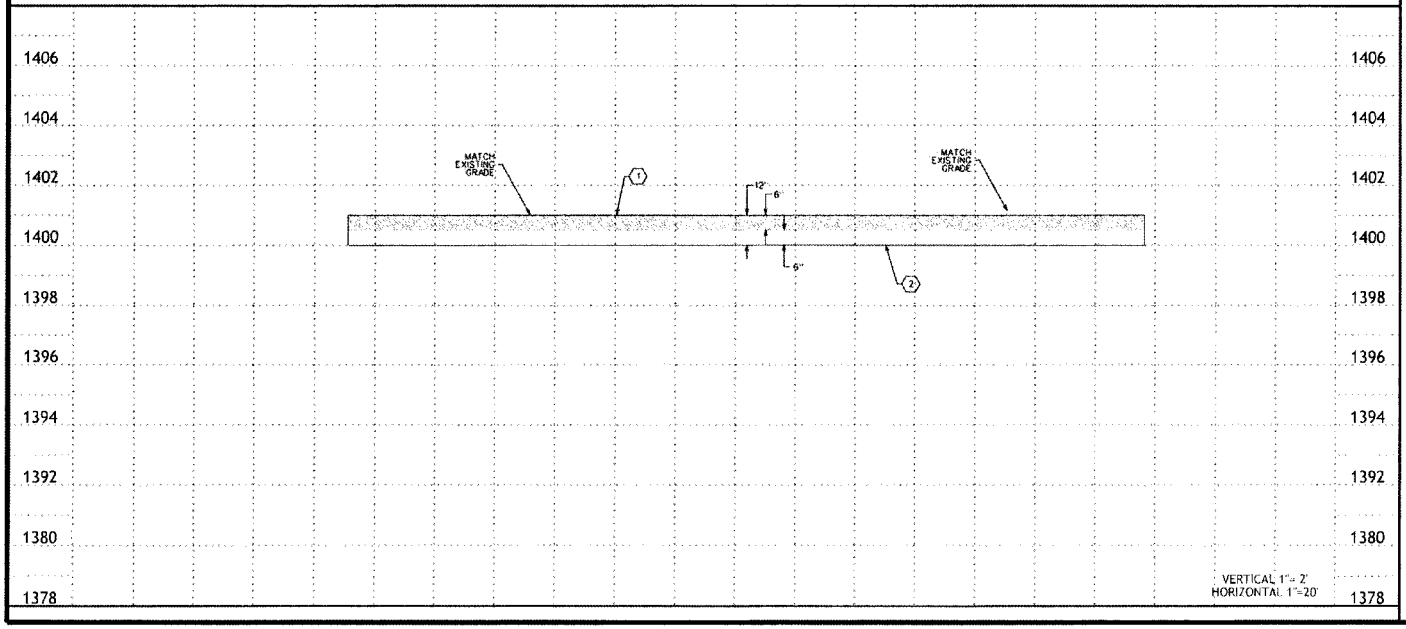
CALL BLUE STAKE, INC. 263-1100 1-800-STAKE-IT (NOT INCLUDE MUNICIPAL SYSTEMS)

J.O. NO.	1-5238	DRAWN BY	MC	DESIGNED BY	
SYSTEM	PINAL VALLEY (CU)	DATE	4/24/2015	SCALE	AS SHOWN
LOCATION	NW 1/4 SEC. 10, T. 5S., R. 8E.	SHEET NO.	2 OF 2	APPROVED BY	

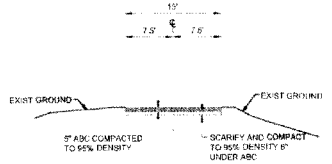
DWG. No.
PV-0091
SHEET 7 OF 11



PHASE II



	WATER CONSTRUCTION
1	6" ABC COMPACTED TO 95%
2	SCARIFY AND COMPACT TO 95% UNDER ABC
3	FILL & COMPACT TO 95% PER MAG 211
4	PLACE GEOSYNTHETIC FABRIC CLASS B PER MAG 796.23
5	PLACE MAG 703 RIPRAP (D50+1.5") OR APPROVED EQUAL
6	PLACE GEOSYNTHETIC FABRIC CLASS A PER MAG 796.22
7	PLACE MAG 703 RIPRAP (D50+6") OR APPROVED EQUAL



LEGEND

- MONUMENTS FOUND AS NOTED
- LIGHT/POWER POLES
- EX. WATER METER BOX
- EX. FIRE HYDRANT
- NEW WATER VALVE
- EX. WATER VALVE
- STREET CENTERLINE/MONUMENT LINE
- PROPERTY LINE
- NEW WATER LINE
- EX. WATER LINE
- 15' INGRESS/EGRESS EASEMENT
- EX. OVERHEAD ELECTRIC
- EX. UNDERGROUND ELECTRIC
- EX. FENCE
- COUNTOUR LINE (MAJOR)
- COUNTOUR LINE (MINOR)
- TOE OF SLOPE
- TOP OF SLOPE
- EX. ASPHALT AREA
- EX. CONCRETE AREA
- NEW ACCESS ROAD (6" ABC)

ARIZONA WATER COMPANY
3805 N BLACK CANYON HWY POST OFFICE BOX 29006
PHOENIX, ARIZONA 85038-9006
(602) 240-6860

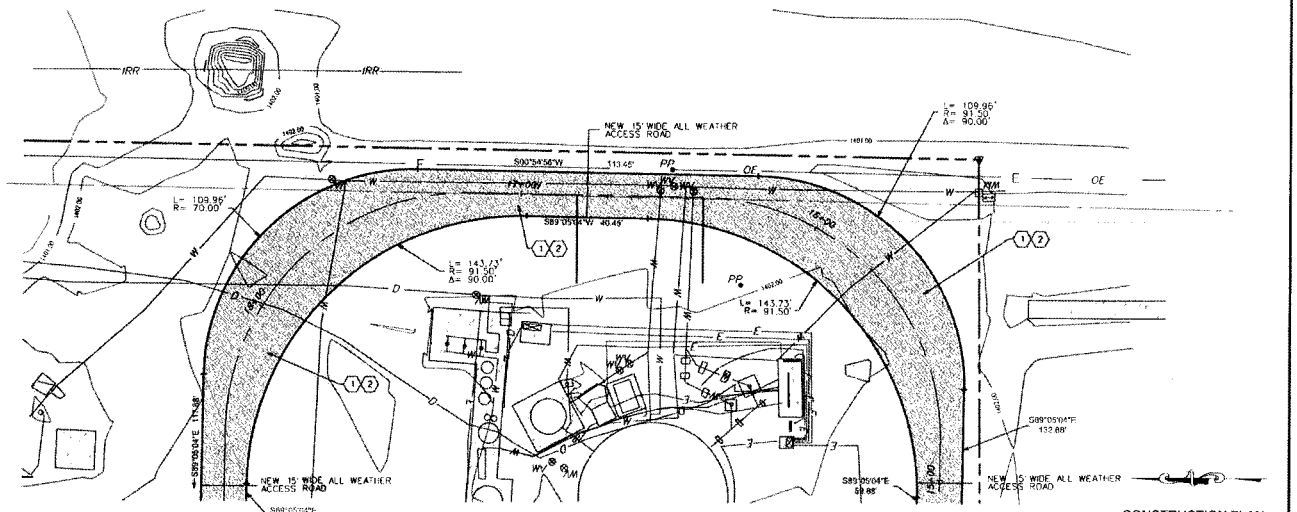
CONSTRUCT ACCESS ROAD TO WELL NOS. 9, 10 AND THE COOLIDGE NITRATE PLANT

CONSTRUCTION PLAN/PROFILE

41046
JAMES T. WILSON
ARIZONA U.S.A.
Expires 6/30/16

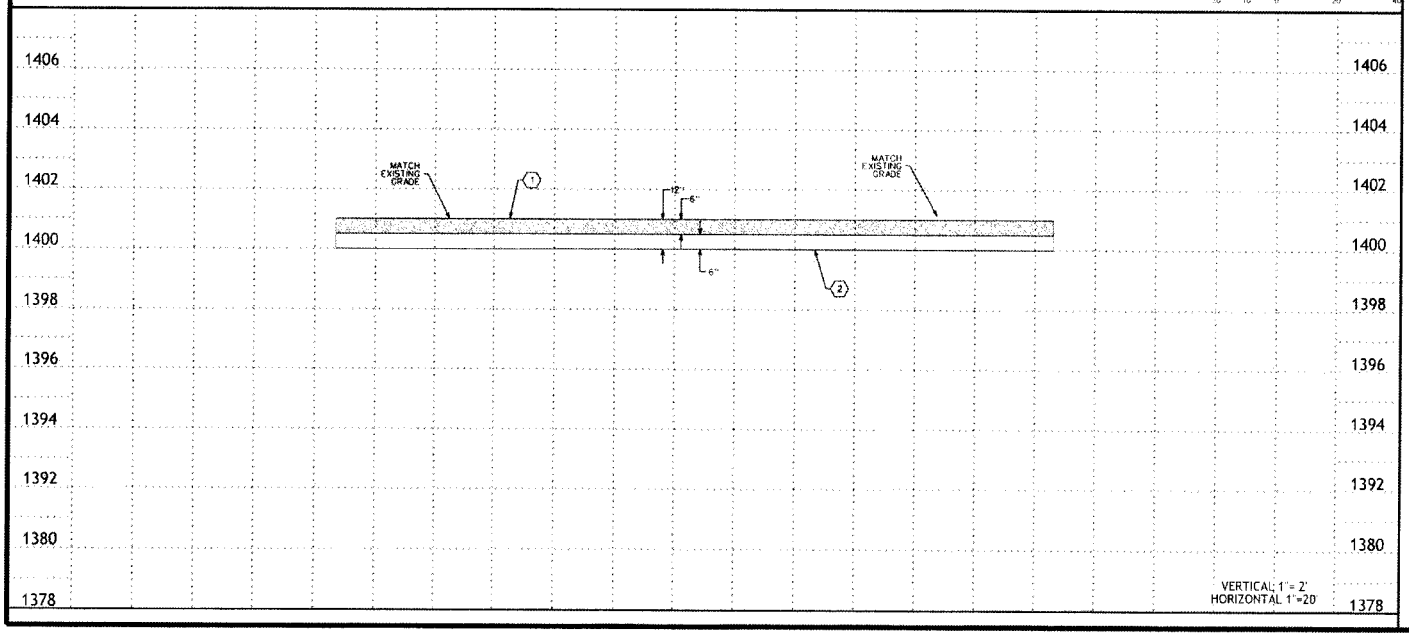
PV-0091

SHEET 8 OF 11



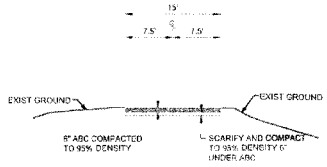
PHASE II

CONSTRUCTION PLAN



VERTICAL 1"= 2'
HORIZONTAL 1"=20'

	WATER CONSTRUCTION
1	6" ABC COMPACTED TO 95%
2	SCARIFY AND COMPACT TO 95% UNDER ABC
3	FILL & COMPACT TO 95% PER MAG 211
4	PLACE GEOSYNTHETIC FABRIC CLASS B PER MAG 796.2.3
5	PLACE MAG 703 RIPRAP (D50-1.5") OR APPROVED EQUAL
6	PLACE GEOSYNTHETIC FABRIC CLASS A PER MAG 796.22
7	PLACE MAG 703 RIPRAP (D50-6") OR APPROVED EQUAL



LEGEND

- MONUMENTS FOUND AS NOTED
- LIGHT/POWER POLES
- EX. WATER METER BOX
- EX. FIRE HYDRANT
- NEW WATER VALVE
- EX. WATER VALVE
- STREET CENTERLINE/MONUMENT LINE
- PROPERTY LINE
- NEW WATER LINE
- EX. WATER LINE
- 15' INGRESS/EGRESS EASEMENT
- EX. OVERHEAD ELECTRIC
- EX. UNDERGROUND ELECTRIC
- EX. FENCE
- COUNTOUR LINE (MAJOR)
- COUNTOUR LINE (MINOR)
- TOE OF SLOPE
- TOP OF SLOPE
- EX. ASPHALT AREA
- EX. CONCRETE AREA
- NEW ACCESS ROAD (6" ABC)

This installation shown is to be constructed in accordance with the Standard Specifications for Public Improvements of the City of Phoenix, Standard Specifications for Public Improvements of Maricopa County and with the Arizona Department of Environmental Quality

263-1100
1-800-STAKE-IT

A.R. No.	1-5389		
Scale		PINAL VALLEY (CL)	
Drawn By		NW 1/4 SEC 10, T. 3S., R. 3E	
Quad No.		21/32	
Date		4/24/2015	
Approved By		MC	

AS SHOWN

ARIZONA WATER COMPANY
3805 N. BLACK CANYON HWY. POST OFFICE BOX 29006
PHOENIX, ARIZONA 85038-9006
(602) 240-6860

CONSTRUCT ACCESS ROAD TO WELL NOS. 9, 10 AND THE DOUGLAS NITRATE PLANT

CONSTRUCTION PLAN/PROFILE

41045
JAMES T. WILSON
REGISTERED
ARIZONA U.S.A.
Expires 6-30-16

Dwg. No.
PV-0091
SHEET 9 OF 11

E-8-1
CONSTRUCTION SPECIFICATIONS
FOR THE INSTALLATION OF WATER DISTRIBUTION SYSTEMS
DUCTILE IRON

DEFINITIONS

A. Company. The words "Company" or "Arizona Water Company" mean Arizona Water Company, and where applicable, any division of Arizona Water Company, whose principal place of business is located at 3805 North Black Canyon Highway, Phoenix, Arizona 85015-5351 (Post Office Box 29006, Phoenix, Arizona 85038-9006).

B. Company's Authorized Representative. The words "Company's Authorized Representative" mean any officer of the Company, and any of the Company's Engineers, any Division Manager or Superintendent of the Company and/or such other person(s) designated in writing as the "Company's Authorized Representative" by the President or any Vice President of the Company.

C. Contractor. The word "Contractor" means either an individual or other entity employed to do the work as shown on the Construction Drawings and as specified herein.

D. Construction Drawings. The words "Construction Drawings" mean plans prepared by or on behalf of Arizona Water Company.

E. Contract. The word "Contract" means the written document titled "Proposal/Contract" when such document has been signed by an officer or other authorized representative of both the Contractor and the Company.

(1) GENERAL

All work is to be completed in a safe, workmanlike manner and in accordance with these Construction Specifications; any deviation therefrom must be approved in writing by the Company.

Installations must conform with the requirements of all governmental/regulating agencies and the cost of conforming to such regulations must be included in the unit bid prices. Examples of such regulations, without attempting to be inclusive, are:

a. Special compaction and paving for street crossing
b. Shoring when required because of the trench depth.
c. Closing a trench in those areas where no open trench is allowed overnight.
d. Barricading and traffic control as required.

(2) LOCATION MARKING

Alignment stakes as required in the opinion of the Company shall be furnished by the Company to the Contractor and shall be set by the Company at agreed upon intervals and offsets. Under normal circumstances these will reference the pipeline location five feet (5') into the right-of-way measured from property pins. Grade stakes will be provided only when the Construction Drawings show a pipeline depth other than covered in these Specifications. It is the responsibility of the Contractor to preserve all survey work.

(3) TRENCH EXCAVATION

The trench location is to be determined by the Construction Drawings.

FOR 8-INCH OR SMALLER PIPE: The depth of the trench prior to pipe laying shall be such that the finished pipeline shall have between thirty-six inches (36") and forty-two inches (42") of cover unless otherwise specified on the Construction Drawings.

FOR 12-INCH AND LARGER PIPE: The depth of the trench prior to pipe laying shall be such that the finished pipeline shall have between forty-eight inches (48") and sixty inches (60") of cover unless otherwise specified on the Construction Drawings.

The width of the trench at and below the level of the top of the pipe shall be a minimum of twelve inches (12") plus the outside diameter of the pipe barrel and a maximum of twenty-four inches (24") plus the outside diameter of the pipe barrel.

The bottom of the trench shall be accurately graded to provide a uniform bearing for each length of pipe for the full length of the pipe. If the native material on the trench bottom can be reasonably dug by hand, bell holes shall be dug for the joints so that the joints in no way support the pipe. When native materials such as rock are encountered during trenching that will not provide a uniform support for the pipe, the trench will be over-excavated an additional six inches (6") and suitable bedding material will be placed in the trench.

Bedding material will be placed by hand in four-inch (4") lifts and compacted to ensure uniform compaction and to eliminate any voids under the pipe. When the space between the pipe and trench bottom varies, this must be backfilled and compacted in four-inch (4") lifts to the mid-section of the pipe.

Whenever the trench is over-excavated for whatever reason, the trench bottom will be brought up to the correct depth at the Contractor's expense using either method (a) or (b) as follows:

a. A.B.C. material shall be used and compacted to a uniform density of not less than 80% of the maximum density as determined by AASHTO T-99 method A and T-191.

b. Native material 100% of which will pass through a one and one-half inch (1-1/2") screen and at least 20% of which will pass through a number-8 screen shall be used and compacted to a uniform density of not less than 85% of the maximum density as determined by AASHTO T-99 method A and T-191.

(4) MATERIALS TO BE PROVIDED BY CONTRACTOR

Unless otherwise specified on the Construction Drawings or in the Contract, the Contractor will supply all of the necessary materials which will become a permanent and integral part of the water distribution system, including concrete blocking, anchors, backfill material, paving material and supplies used during the prosecution of the work. All materials provided by the Contractor to construct the water distribution system must be NSF Standard 61 approved. All potable water pipes and fittings shall have NSF-PW seal. Construction materials used in the water system shall be lead free as defined at AAC R28-4-504 and R18-1-101. The Contractor will provide the following materials:

a. FIRE HYDRANTS: Mueller Super Centurion 250 Fire Hydrant, meets ANSI/AWWA C502 Standard, Model No. A 423, 5-1/4" main valve opening, three way, 6" Mechanical Joint Shoe, 1-1/2" pentagon operating nut, color - yellow, drain open, open direction - left, 4' or 4'-6" bury depending on application. For pumper and hose nozzle information see below.

(1) One - 4" Pumper Nozzle, NST and Two - 2-1/2" Hose Nozzles, NST. (These locations only: Ajo, Casa Grande, Coolidge and San Manuel.)

(2) One - 4-1/2" Pumper Nozzle, NST and Two - 2-1/2" Hose Nozzles, NST (These locations only: Apache Junction, Arizona City, Lakeside, Oracle, Overgaard, Pinewood, Rimrock, Sedona, Sierra Vista, White Tank and Winkelman.)

(3) One - 4-1/2" Pumper Nozzle, NST and Two - 2-1/2" Hose Nozzles, NPT (Bisbee only.)

(4) One - 3" Pumper Nozzle GA 6-350 (5 threads per inch, 3.50 pitch diameter) and Two - 2-1/2" Hose Nozzles, NPT (Miami only.)

(5) One - 3-1/2" Pumper Nozzle GA 6-41 (6 threads per inch, 4.0 pitch diameter) and Two - 2-1/2" Hose Nozzle, NST (Superior only.)

b. FITTINGS Manufactured by Tyler or Union: Crosses, Elbows, Tees, Cap, Reducer, Adapter, Plug, Blind Flange and Tapped Flange: Ductile Iron, Class 350 SSB, Cast Iron Cement Lined

(1) Foster Adaptors for MJ, made by Infact Corporation: Available in size 4" to 16". Part No. 4" - 4FA-BC, 6" - 6FA-BC, 8" - 8FA-BC, 10" - 10FA-BC, 12" - 12FA-BC, 16" - 16FA-BC

c. DETECTOR CHECK VALVE: Mueller/ Hersey EDC III, iron body, including 5/8" x 3/4" Trim Kit. Trim Kit Part No.: 4" - 282080, 6" - 282082, 8" - 282085, 10" - 282496.

d. GATE VALVES: Mueller Resilient Wedge Gate Valves, meets AWWA C509 specification, 250 psig, Non-rising stem, Port No. A-2360 sizes 4" through 12"; Port No. A-2361 sizes 14" through 36", low zinc stems, epoxy coated inside and outside to meet the NSF 61 rating. The bonnet and stuffing box shall have 304 stainless steel bolts/nuts.

e. TRACER WIRE and WARNING TAPE:

(1) TRACER WIRE: Shall be direct bury AWG #14 solid copper wire, Color: Blue

(2) WARNING TAPE: Reef Industries, Standard Terra Tape in 3" widths. Color: Blue and imprinted 'Arizona Water Company'.

f. AIR RELEASE VALVE: Crispin Model AR10 with 1" NPT inlet and 1/2" NPT outlet, cast iron body and top flange; with a 5/64" orifice with stainless steel valve sealing faces and BUNA-N rubber.

g. PRESSURE RELIEF VALVE: Watts 174A, Model M, 2" inlet, 2" outlet, Bronze Body, 30lb. to 150lb pressure range

h. MEGALUG: Mechanical Joint restraint made of ductile iron conforming to ASTM 536-80. 250 psi made by EBAA Iron, Inc., series 1100 or equal

i. METER BOXES:

(1) Concrete Box with a steel regular lid, Number 1: Tucson specification.

(2) Concrete Box with a steel regular lid, Number 2, 3, and 4: Phoenix specification.

j. PIPE, COPPER: Type K soft copper in 60 or 100-foot coils, per ASTM B88.

k. PIPE, DUCTILE IRON: Ductile Iron Pipe, Cement Lined, Push-on, conform to current ANSI/AWWA Specification A21.51/C151, Pressure Class 350 (sizes 4" through 12"), Pressure Class 250 (sizes 14" through 20"), or Pressure Class 200 for 24" through 36" pipe. Vendors:

(1) Pacific States Cast Iron Pipe Company
(2) Griffin Pipe
(3) United States Pipe and Foundry Company
(4) American Ductile Iron Pipe
(5) Clow Pipe (McWane, Inc.)

l. PIPE, PLASTIC: Plastic pipe, C-900 PVC per ANSI/AWWA C900, Class 150, sizes 6" through 12", NSF61 approved. Furnished in laying lengths of 20'. The barrel shall conform to the outside dimensions of steel pipe (IPS) or cast iron (CI) pipe equivalent and the wall thickness of dimension ratio (DR) 18.

m. POLYETHYLENE ENCASEMENT (Polywrap): For all pipeline and related fittings installed, EXCEPT for the Coolidge Division. Minimum 8 Mil and installed per AWWA C105/A21.5-93 and ASTM A-674-89. Manufactured by the Pacific States Cast Iron Pipe Company. The wrapping tape shall be minimum 10 mil vinyl tape. No duct tape shall be used.

n. COUPLING: Mueller, straight three part union, tested to meet ANSI/AWWA C800, H15403, conductive compression.

Mueller, H15428, straight coupling, conductive compression by male iron pipe, tested to meet ANSI/AWWA C800 specification. Size: 2".

Mueller, H15451, straight coupling, conductive compression by female iron pipe, tested to meet ANSI/AWWA C800 specification. Size: 2".

Viking Johnson brand, sold by Mueller: MaxiFit Straight (2"-24"), MaxiFitXtra Straight (4"-8") or MaxiStep Transition, tested to meet AWWA/ANSI C.219-91 specifications - certified to ISO 9001:1994 / Smith - Blair Quantum.

o. STOP, ANGLE METER, BALL: Mueller, valve, B24258, conductive compression by meter swivel nut, tested to meet ANSI/AWWA C800, size 5/8" x 3/4" x 3/4" for a 3/4" service or size 1" for a 1" service.

Mueller, valve, B24265, female pipe thread by meter swivel nut, tested to meet ANSI/AWWA C800, size 5/8" x 3/4" x 3/4" for a 3/4" service or size 1" for a 1" service.

p. STOP, CORP: Mueller, ball valve, B25008, taper thread by conductive compression, tested to meet ANSI/AWWA C800 specification, sizes: 3/4", 1" and 2".

Mueller, ball valve, B25028, iron pipe thread by conductive compression, tested to meet ANSI/AWWA C800 specification. Sizes: 3/4", 1", and 2"

Mueller, 300 Ball Curb Valve, B-25122, taper thread by conductive compression, tested to meet ANSI/AWWA C800 specifications, size: 2" (2" service)

q. STOP, CURB: Oriseal valve, H10291, iron pipe thread by iron pipe thread, quarter turn check, brass, tested to 300 psi working pressure, tested to meet ANSI/AWWA C800 specification, size: 2".

Mueller, B20283, Mueller 300 ball curb valve, female iron pipe by female iron pipe, quarter turn check, tested to meet ANSI/AWWA C800 specification. Size: 2". (Blow-off E-9-8-1).

r. TAPPING SADDLE: Smith Blair, Cast Bronze ASTM-B584 85-5-5-5, double strap, iron pipe threads, Models 321 and 323. Washers are silicon bronze, ASTM-B36. Gaskets are grade 60 Buna N, or Mueller bronze double strap service saddle, BR 2 B series, cast bronze, ASTM-B585, 85-5-5-5, or H16084, 200 psig, meets ANSI/AWWA C800

s. TAPPING SLEEVE: Mueller H304 Stainless Steel Tapping Sleeve, JCM 432 18-8 Type 304 Stainless Steel Tapping Sleeve, Romac "SST" Type 304 Stainless Steel Tapping Sleeve or CASCADE-style CST-EX stainless steel pressure rated tapping sleeve

t. TAPPING VALVE: Mueller Resilient Wedge tapping valve. Catalog Number T-2360-16, Class 125, sizes 4" through 12"; T-2361-16, Class 125, sizes 14" to 36" all with Type 304 stainless steel fasteners; bypass valves are required on 18" - 36" valves flange by mechanical joint per ANSI/AWWA C111, iron wedge, non-rising stem. Epoxy coated interior/exterior per ANSI/AWWA C550 for NSF 61 compliance 250 PSI range for valves 4" to 12". 150 PSI range for valves 14" to 36".

u. U-BRANCH: Mueller, H15364, 1" male iron pipe by 3/4" male iron pipe, tested to meet ANSI/AWWA C800 specification. Size: 1" x 3/4" x 13-1/2", straight line

v. VALVE BOXES: Valve Box with Cover, adjustable, Tyler 562-A or equal, made of cast iron.

w. VAULTS: Utility Vault Company, Chandler, AZ.

(1) 4484-WA concrete vault with a 3660 aluminum double torsion door with a recessed padlock hasp, two - 18" x 24" center knockouts.

(2) 575-WA concrete vault with a 4874 aluminum double torsion door with a recessed padlock hasp, two - 18" x 24" center knock outs and adjustable frame.

(3) 612-5K-WA concrete vault with a 4874 aluminum double torsion door with a recessed padlock hasp, two - 18" x 24" center knockouts.

x. VALVE, METER: Mueller, B24265-1, Mueller 300 ball angle meter valve, female iron pipe by meter nut, quarter turn check, lock wing, tested to meet ANSI/AWWA C800 specification. Size: 1".

Mueller, B25170, Mueller 300 ball straight valve, conductive compression by female iron pipe, quarter turn check, lock wing, tested to meet ANSI/AWWA C800 specification. Size: 1"

y. YOKES, METER: Relocator type copper meter yoke with horizontal inlet and outlet and meter thread ends, B2418, with lock wing Mueller 300 angle ball valve, full port, sizes: 1" x 12", 5/8" x 3/4" x 7", 5/8" x 3/4" x 9".

Mueller, 2" copper meter yoke with horizontal inlet and outlet and female iron pipe threads, B2423-99030, with lock wing Mueller 300 ball angle meter valves on inlet and outlet risers. Raised 1" by-pass with lock wing Mueller 300 ball valve.

The Contractor also will be required to provide the following materials, the cost of which will be included in its unit bid price:

All material and concrete for thrust blocks, other anchors, reinforcing steel; all gravel, crushed stone, A.B.C., earth, sand or screened material which may be required; all material for bracing and shoring trenches and for construction of forms; all barricades and traffic control equipment; all material for paving replacement and any water used for compaction of backfill.

(5) INSTALLATION OF MATERIALS

All materials are to be installed in accordance with manufacturers recommendations unless otherwise directed by these Specifications.

All pipe, fittings and valves shall be laid true to the lines, grades and locations established by the Specifications and the Construction Drawings.

The ends and inside of the pipe shall be thoroughly cleaned and inspected for damage. No damaged materials shall be installed in the water distribution system.

Whenever the work ceases for any reason, all open pipeline ends shall be tightly plugged by the Contractor. Plugs shall be watertight and approved by the company.

Concrete thrust blocks of the sizes required by the plans and specifications are to be provided at all valves, changes in direction or size, or at any other point where an unbalanced thrust due to water pressure would exist. Thrust blocks are to be formed to prevent any concrete from spilling over or into a joint.

Trench curves as shown on the Construction Drawings may be made without fittings when using push on joint pipe up to twelve inches (12") in diameter, if the deflection of the pipe does not exceed five degrees (5°) or nineteen inches (19") per eighteen-foot (18') length of pipe. The minimum radius of such curves will be two hundred five feet (205').

Prior to construction, the appropriate agency(ies) will be notified as required by the permit(s).

It shall be the Contractor's responsibility to uncover all existing water lines being connected to, and to verify the location, depth and size of pipe before any construction begins.

Any construction performed without the knowledge of the duly authorized representative is liable for removal and replacement at the Contractor's expense.

All fire hydrants, frames, covers and valve boxes, etc. shall be adjusted to finished grade prior to the placing of the asphalt concrete surface course by the Contractor (where applicable).

Air release valves shall be installed at water system high points per Standard Detail E-9-8-2/E-9-8-3.

All water services shall be set a minimum of two feet (2') on the customer's property, preferably within the P.U.E. and not within right-of-way.

Unless otherwise specified on the construction drawings, all water mains shall be installed five feet (5') from the property line inside the right-of-way or easement.

Water valves shall be spaced not more than five hundred feet (500') in commercial districts and not more than eight hundred feet (800') in other districts. Variations may be required for transmission mains or special applications.

Installation of water line casing shall be per Standard Specification E-9-24-1.

Tracer Wire and Warning Tape are to be installed on all mains, tees, crosses, ells and fire hydrant laterals. They will not be installed on service lines. The tracer wire will be installed on the water main 45 degrees from the vertical centerline of the pipe and shall be taped to the fittings directly and on the main every 10 feet using a minimum 10 mil vinyl tape. The tracer wire shall be placed between the valve riser and box with a minimum of 12" of wire inside. The warning tape shall be installed a minimum of two feet below the surface, being measured from final grade, directly over the center of the pipe. Any splices in the tracer wire shall be joined using waterproof connectors. Any splices in the warning tape shall be joined using minimum 10 mil vinyl tape. The tracer wire shall be tested for continuity after backfill and compaction, but before paving. Any detected damages to the wire shall be repaired before paving will be allowed.

(6) BACKFILL OF WATER MAIN TRENCHES

Backfill of any excavation shall conform to the requirements of any of the governmental agencies having jurisdiction over the location. If no governmental agency having such jurisdiction specifies backfill or compaction requirements, and no special requirements are shown on the Construction Drawings, the procedure set forth in this section will apply for water line trenches.

The bedding material above the pipe and backfill material shall be compacted to a minimum of 70% compaction within a utility easement and 80% compaction within a right-of-way as determined by AASHTO T-99 method A and T-191. If water settling is used for compaction, it is the responsibility of the Contractor to prevent the pipe from floating.

The bedding material shall be either native material, 100% of which will pass through a one and one-half inch (1-1/2") screen and at least 20% of which will pass through a number-8 screen, or imported material which conforms to M.A.G. specifications for A.B.C. or type-B select materials. Bedding material shall be used below and around the pipe and a minimum of twelve inches (12") above the pipe. Shade and bedding material to be mechanically compacted prior to remainder of trench back-fill.

The remainder of the trench shall be backfilled with native or imported material which shall be of sound earthen material free from broken concrete, wood, broken pavement, or other unsuitable substances. Except as otherwise specified, backfill may be material containing no pieces larger than six inches (6") in greatest dimension.

Where settlement occurs, additional backfill material shall be placed and compacted and the trench shall be brought to final grade.

(7) HYDROSTATIC TESTING OF COMPLETED PIPELINES

Hydrostatic testing of water pipelines will be completed before the new system is connected into the existing water system so that all testing can be done against all new materials.

The completed section of water pipeline to be tested shall be slowly filled with water with care being taken to expel all air from the pipe. If necessary, the pipe will be tapped at high points to vent air.

The Contractor shall provide all equipment and labor necessary to accomplish this testing and the price shall be included in the unit prices. The Contractor shall notify the Company in advance of the testing so that the Company can schedule a duly authorized representative to be at the site during testing. The Contractor, at its own expense, shall make any necessary repairs to the system being tested in order to cause the section being tested to meet the test limits set below. The Contractor may request authorization of the Company to connect the new pipelines to the existing system prior to completion of pressure testing when, in the Company's sole opinion and judgment, conditions warrant such connection.

The Contractor shall assume all responsibility to complete pressure testing to Company's specifications after such connection, including, but not limited to, isolation of the new pipelines from the existing system, if necessary.

Connections prior to completion of pressure testing shall not be made unless prior Company authorization has been obtained, and any extra expenses resulting from such connections shall be the sole responsibility of the Contractor.

Leakage tests will be for a period of two hours at 200 + or - 5 psi at the point of lowest elevation; leakage may not exceed 0.1 gallons per hour per one thousand feet (1,000') of pipe per inch of diameter. If dry utilities are not installed, a second pressure test is required.

(8) STERILIZATION AND FLUSHING OF COMPLETED WATER PIPELINES

Sterilization and flushing will conform to recommendations of Arizona State Department of Health Services Engineering Bulletin Number 8, latest edition, or any future Arizona Department of Environmental Quality bulletins. Contractor to follow all conditions of any discharge permit.

(9) NO OTHER UTILITIES ALLOWED IN OR NEAR WATER PIPELINE TRENCHES

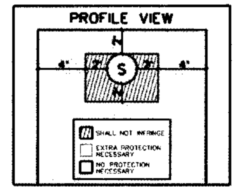
No other utility installations will be permitted in the water pipeline trench or within five feet (5') of the Company's water pipeline when running parallel to the water pipelines.

(10) PROTECTION OF WATER MAINS NEAR SEWERS

In order to protect water mains from contamination by sewers, the installation of the water mains must conform to the following requirements:

a. Horizontal - When water lines and sewers are laid parallel with each other, the horizontal distance between them shall not be less than six feet (6'). Each line shall be laid on undisturbed or bedded material in a separate trench. Where conditions prevent the minimum horizontal separation set forth above, extra protection will be required. Extra protection shall consist of constructing the sewer main with mechanical joint ductile iron pipe or with slip-joint ductile iron pipe if joint restraint is provided, or encasing both water and sewer main in concrete. See AWC Standard Detail E-9-30-1 and E-9-30-2.

The Construction Drawings shall indicate the installation requirements. The drawings showing these exceptions shall have been approved by the appropriate state and/or county health department. Refer to the diagram below for clarification.



Under no circumstances will the horizontal separation between sewer mains and water mains be less than two feet (2'). All distances are to be measured from the outside of the sewer main to the outside of the water main.

b. Vertical - When a water main is parallel with or crosses a sewer main within two feet (2') above the sewer or greater than two feet (2') below the sewer, extra protection will be required. Extra protection shall consist of constructing the sewer main with mechanical joint ductile iron pipe or with slip-joint ductile iron pipe if joint restraint is provided, or encasing both water and sewer main in concrete. See AWC Standard Detail E-9-30-1 and E-9-30-2.

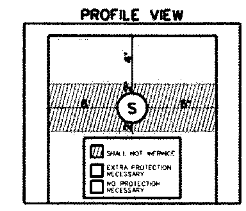
The Construction Drawings shall indicate the installation requirements. The drawings showing these exceptions shall have been approved by the appropriate state and/or county health department.

Under no circumstances will the vertical separation of a sewer main installed above a water main be less than two feet (2'). All distances are to be measured from the outside of the sewer main to the outside of the water main. Refer to the diagram above for clarification.

c. When unusual conditions such as, but not limited to, highway or bridge crossings prevent the water and sewer main separations required from being met, the appropriate state and/or county health department will review and may approve requests for authorization to use alternate construction techniques, materials and joints on a case-by-case basis.

d. No water pipe shall pass through or come into contact with any part of a sewer manhole. The minimum horizontal separation between water mains and manholes shall be six feet (6'), measured from the center of the manhole.

e. The minimum separation between force mains or pressure sewers and water mains shall be two feet (2') vertically and six feet (6') horizontally under all conditions. Where a sewer force main crosses above, or less than six feet (6') below, a water line, the sewer main shall be encased in at least six inches (6") of concrete for ten feet (10') on either side of the water main. Refer to the diagram below for clarification.



f. Sewer mains (gravity, pressure, force) shall be kept a minimum of fifty feet (50') from drinking water wells, unless the following conditions are met:

1. Water main pipe pressure tested in place to 50 psi without excessive leakage, may be used for gravity sewers at distances greater than twenty feet (20') from drinking water wells.

2. Water main pipe, pressure tested in place to 150 psi without excessive leakage, may be used for pressure sewers and force mains at distances greater than twenty feet (20') from drinking water wells.

g. No septic tank/disposal field system shall be constructed within one hundred feet (100') of a drinking water well.

h. All distances are measured perpendicularly from the outside of the sewer main to the outside of the water main. These separation requirements do not apply to building, plumbing or individual house service connections.

i. Use Mechanical Joint ductile iron pipe with Megalug thrust restraints a minimum of ten (10') feet on each side of a sewer or storm drain crossing.

(11) COMPACTION

When crossing existing water mains a minimum of 95% compaction is required to the bottom of existing mains.

Arizona Water Company requires that no slurry be permitted to contact existing cement/asbestos or ductile iron pipes, unless authorized by the company. Slurry may be poured in the bottom of the sewer trench stopping three inches (3") below the existing water main. The backfill used around the main should be AB in sufficient depth to prevent slurry from contacting existing main.

(12) WATER MAIN MATERIAL SPECIFICATIONS

Ductile iron pipe (Push-on type) minimum class 350, cement lined and conform to AWWA C151

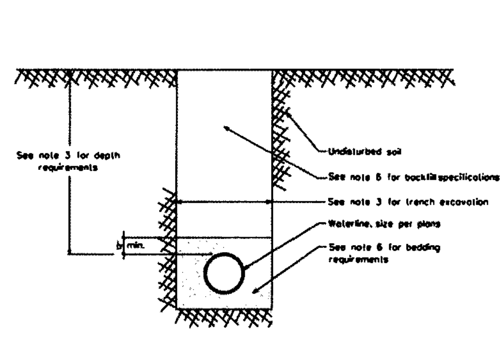
All main line valves shall conform to AWWA C500 with a minimum working pressure of 200 psi.

All cast iron fittings to be cement lined in accordance with AWWA C104 and shall conform to AWWA C110 with a minimum working pressure of 250 psi. Except for the Coolidge System - See Note 4l.

Maximum joint deflection for 6" mechanical joint ductile iron pipe is seven degrees, seven minutes (7°,7') or twenty-seven inches (27") per eighteen-foot (18') length pipe, for a maximum curve of one hundred forty-five feet (145').

Maximum joint deflection for 8" and 12" mechanical joint ductile iron pipe is five degrees, twenty-one minutes (5°,21') or twenty inches (20") per eighteen-foot (18') length pipe, for a maximum curve of one hundred ninety-five feet (195').

Maximum joint deflection for 6", 8" and 12" push-on joint ductile iron pipe is five degrees (5°) or nineteen inches (19") per eighteen-foot (18') length pipe for a maximum curve of two hundred five feet (205').



TYPICAL TRENCH DETAIL
Per MAG Detail 601, 601.4.2, 601.4.6

REVISIONS

The installation shown is to be installed in accordance with the Arizona Water Company standard specifications on file with the Arizona Department of Environmental Quality

CALL TWO WORKING DAYS BEFORE YOU DIG
263-1100
1-800-STAKE-IT
(OUTSIDE MARICOPA COUNTY)

W.O. NO.	I-5299
SYSTEM	PINAL VALLEY (CL)
LEGAL DESC.	NW 1/4 SEC 10, T 5S, R 9E
TAX DIST.	2102
DATE	4/24/2015
SCALE	AS SHOWN
DRAWN BY	MC

ARIZONA WATER COMPANY

3805 N. BLACK CANYON HWY POST OFFICE BOX 29006
PHOENIX, ARIZONA 85038-9006
(602) 240-6860

PROJECT DESC: CONSTRUCT ACCESS ROAD TO WELL NOS 9, 10 AND THE COOLIDGE NITRATE PLANT

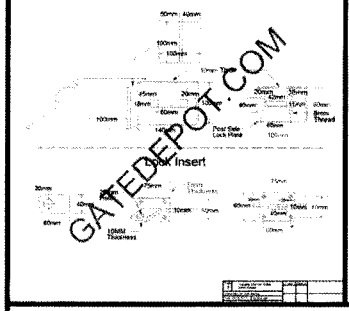
PROJECT SHEET DESC: AWC NOTES

41046
JAMES T. WILSON
ARIZONA U.S.A.
Expires 6/30/16

DWG No. PV-0091

Production Drawing

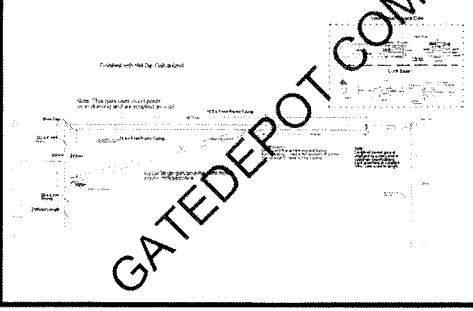
Lock Detail Square Gate



GATEDEPOT.COM

Production Drawing

Round Barrier Gate
Variable Length 11' - 16'



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ARIZONA WATER COMPANY
3805 N. BLACK CANYON HWY POST OFFICE BOX 29006
PHOENIX, ARIZONA 85038-9006
(602) 240-6860

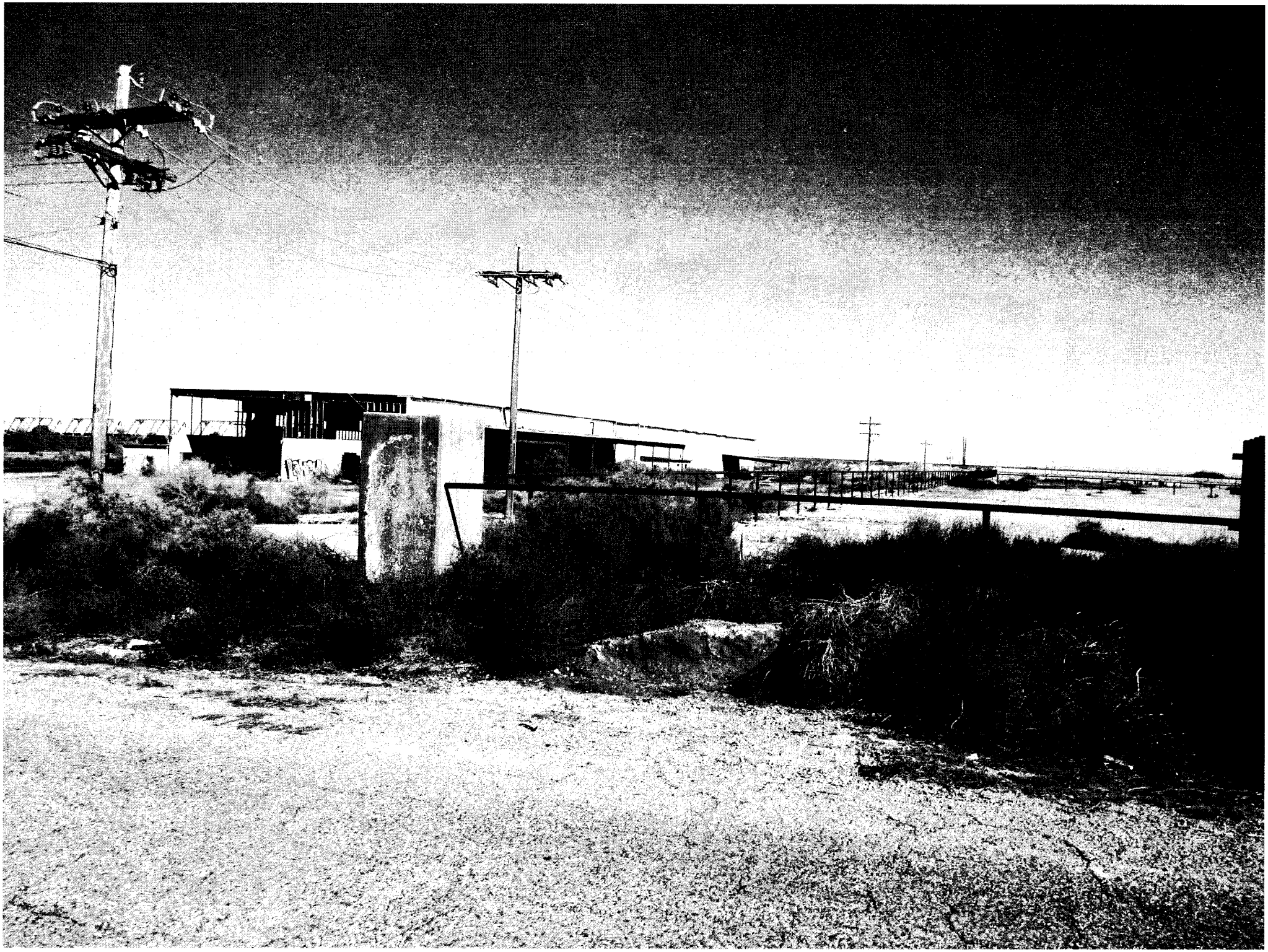
CONSTRUCT ACCESS ROAD TO WELL NOS. 9, 10 AND THE COOLIDGE NITRATE PLANT

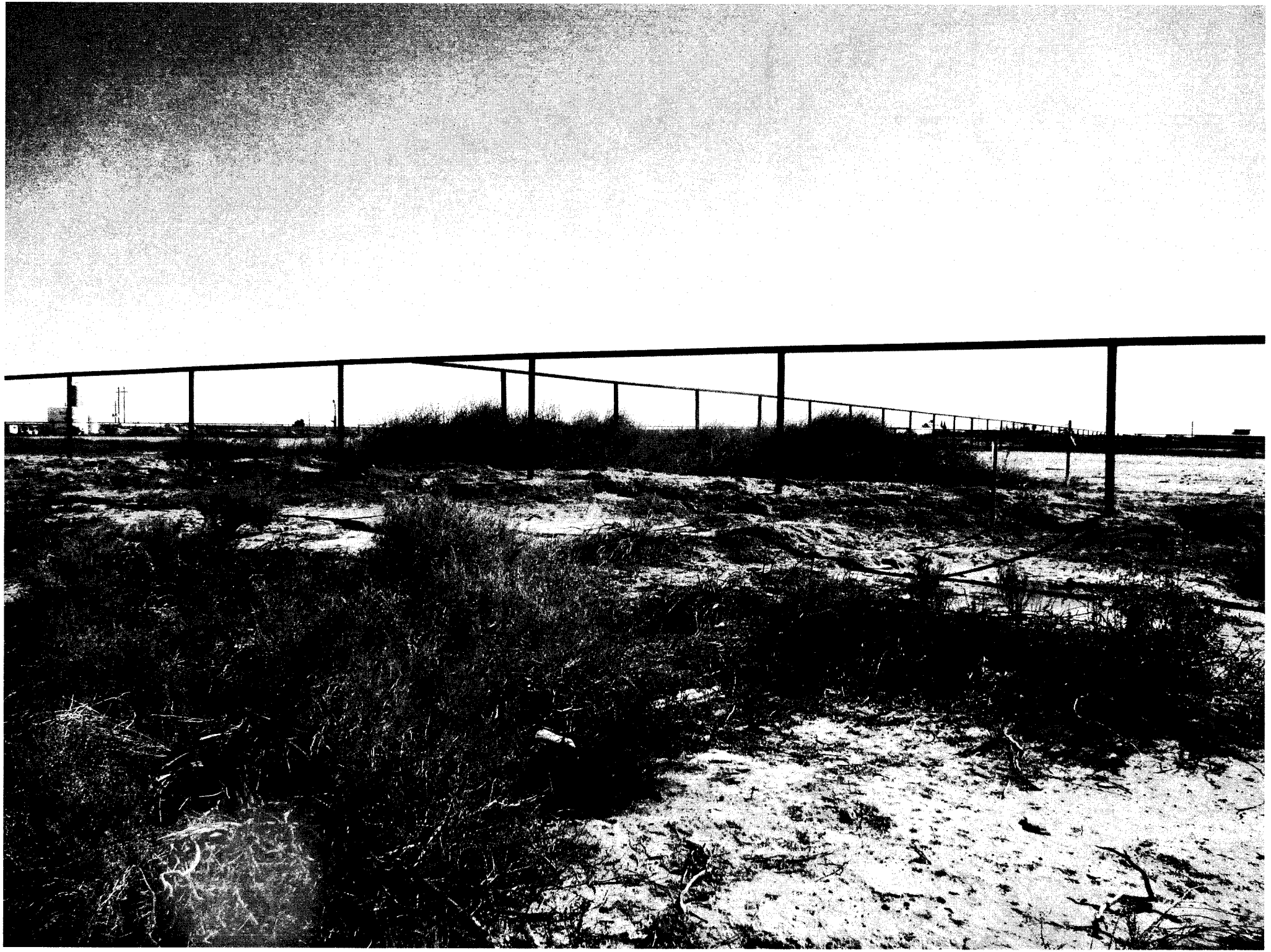
AWC DETAILS

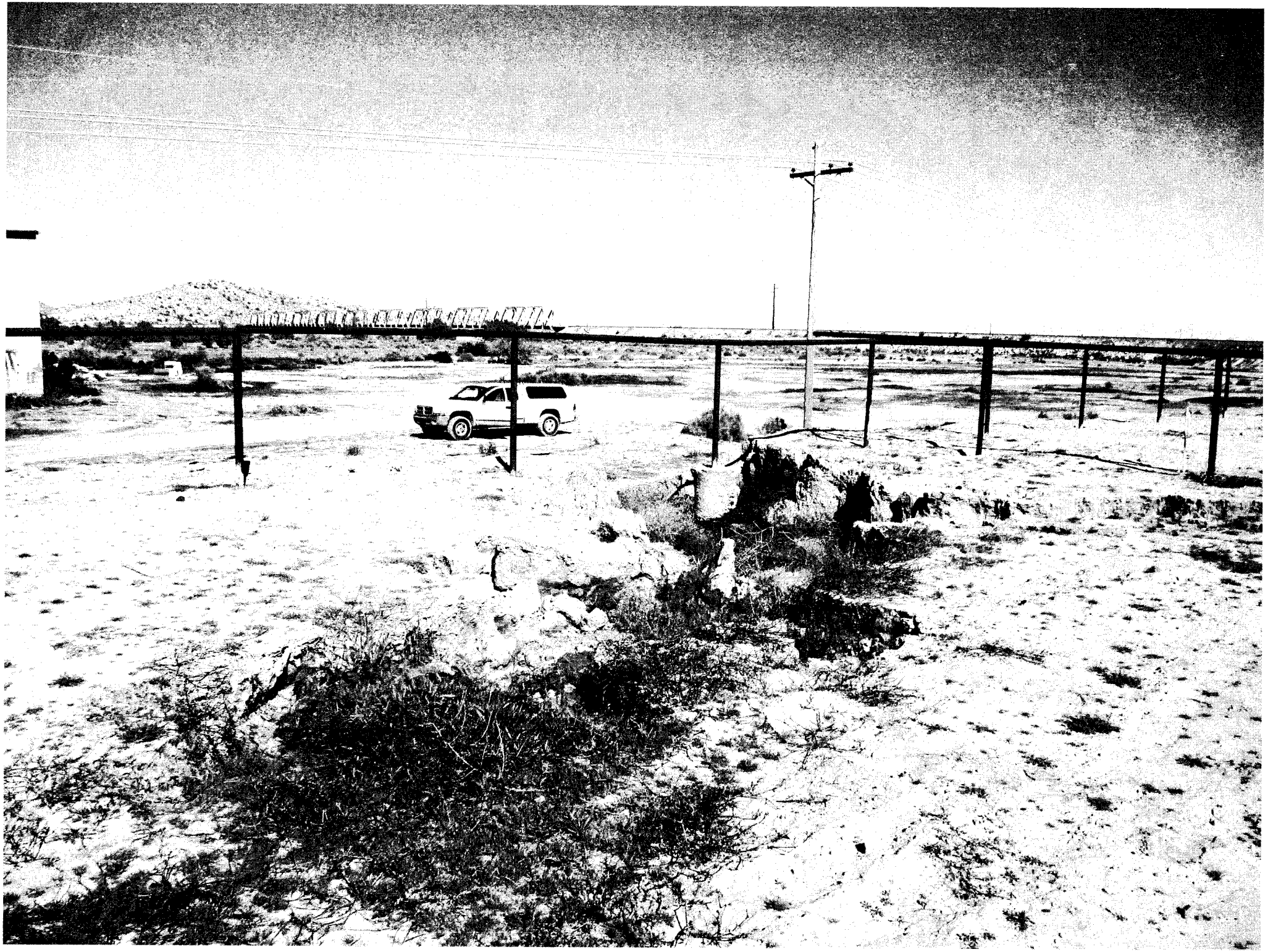
41046
JAMES T. WILSON
REGISTERED
ARIZONA, U.S.A.

PV-0091

SHEET 11 OF 11







Western Group Rate Case

Exhibit FKS-1

5301 PV 33 Flush Line

ARIZONA WATER COMPANY
WORK AUTHORIZATION

W.A. NUMBER: 1-5301
P.E. NUMBER:
BUDGET ITEM NO.: 1-5301
SHEET NO.: 1 of 2

SYSTEM:	PINAL VALLEY
DIVISION:	CASA GRANDE
RESPONSIBLE PERSON:	RAY MURRIETA
TAX CODE:	0437

RETENTION REQUIRED:	☑ YES ☐ NO
WORK TO START BY:	UPON AUTHORIZATION
WORK TO BE FINISHED BY:	WITHIN 120 DAYS

DESCRIPTION OF WORK:

Construct approximately 1,500 linear feet of 12-inch DIP flush line on Hancock Trail from Well No. 33 to Hacienda Road.

FACTORS JUSTIFYING WORK:

APPROVED 2015 BUDGET ITEM ($95,000)
Well No. 33 routinely flushes on startup and shut down to a retention basin south of the site and results in water overflowing onto the adjacent golf course. The company receives complaints from the golf course owners when the flush water discharges onto the golf course due to standing water. The golf course owners subsequently requested the company reduce discharges to the golf course. There is not sufficient space to construct an onsite retention basin to retain the flush water. Constructing the flush line to a more regional drainage system mitigates complaints from the golf course and maintains the company's ability to provide safe reliable and adequate water service.

COST ESTIMATE		AUTHORIZATION	DATE
COST OF WORK:		PREPARED BY: James Wilson JW 2/20/15	2/10/15
MATERIAL	0		
LABOR	7,400	REVIEWED FOR ESMT/ROW VERIFICATION: Charles Briggs CB 02-20-2015	02-10-2015
CONTRACT PORTION	117,403		
OVERHEAD	15,000	REVIEWED BY: Andy Haas AJH 2-20-15	2-17-15
TOTAL AUTHORIZED EXPENDITURES CHARGEABLE TO THIS W.A.	$ 139,803		
FUNDS RECEIVED:		APPROVED BY ENGINEERING: Fredrick Schneider 2-23-15	2-17-15
CONTRIBUTIONS RECEIVED	0		
REFUNDABLE ADVANCES RECEIVED	0	APPROVED BY FINANCE: Joseph Harris	2/18/15
TOTAL CONTRIBUTIONS/ADVANCES	0		
NET COMPANY CASH REQUIRED	$ 139,803	AUTHORIZED BY PRESIDENT: William M Garfield	2-19-15

COMMENTS:

Transfer additional funds required ($44,803) from 1-5170 (Cottonwood Lane BPS)

CONSTRUCTION RELEASE:

RELEASED TO CONSTRUCTION
Authorized by FRED SCHNEIDER
Date 3/24/15

2015 BUDGET

AFH

ARIZONA WATER COMPANY

WORK AUTHORIZATION - DETAIL SHEET

W.A. NUMBER: 1-5301
P.E. NUMBER:
BUDGET ITEM NO.: 1-5301
SHEET NO.: 2 of 2

RETIREMENT PROPERTY UNITS	PLANT PROPERTY ACCOUNT	UNIT DESCRIPTION	QUANTITY	YEAR INSTALLED AND W.A. NUMBER

PROJECT DESCRIPTION:

Construct approximately 1,500 linear feet of 12-inch DIP flush line on Hancock Trail from Well No. 33 to Hacienda Road.

	DESCRIPTION	PLANT PROP ACCT	QUANTITY	UNIT COST	TOTAL
CONTRACT WORK	Install 12-inch DIP with polywrap and related fittings	343	1,440	$ 68.93	$ 99,259
	Install 12-inch GVB&C	343	3	2,443.00	7,329
	Install 2-inch blow off assembly	343	2	2,485.00	4,970
	Install air release valve	343	1	1,136.00	1,136
	Contracting Tax	343	1	2,916.74	2,917
	Performance and Payment Bond	343	1	1,792.12	1,792
	SERVICE CONNECTIONS COMPLETE: DOUBLE-LONG	345			
	SERVICE CONNECTIONS COMPLETE: DOUBLE-SHORT	345			
	SERVICE CONNECTIONS COMPLETE: SINGLE-LONG	345			
	SERVICE CONNECTIONS COMPLETE: SINGLE-SHORT	345			
TOTAL CONTRACT WORK					$ 117,403
MATERIALS					
	SERVICE CONNECTIONS: DOUBLE-LONG	345			
	SERVICE CONNECTIONS: DOUBLE-SHORT	345			
	SERVICE CONNECTIONS: SINGLE-LONG	345			
	SERVICE CONNECTIONS: SINGLE-SHORT	345			
	METERS	346			
TOTAL MATERIALS					$ -
LABOR	Engineering management and Design	343	40	$ 55.00	$ 2,200
	TESTING FEE	343	1	$ 1,000.00	1,000
	PERMIT FEE	343	1	500.00	500
	SURVEY FEE	343	1	1,500.00	1,500
	FIELD INSPECTION	343	40	55.00	2,200
	INSTALL SERVICE CONNECTIONS: DOUBLE-LONG	345			
	INSTALL SERVICE CONNECTIONS: DOUBLE-SHORT	345			
	INSTALL SERVICE CONNECTIONS: SINGLE-LONG	345			
	INSTALL SERVICE CONNECTIONS: SINGLE-SHORT	345			
TOTAL LABOR					$ 7,400
SUBTOTAL - CONTRACT WORK, MATERIALS, AND LABOR					$ 124,803
OVERHEAD					15,000
TOTAL	REFUNDABLE PORTION ☐	NON-REFUNDABLE PORTION ☐		**COST ESTIMATE**	$ 139,803

AFH

ARIZONA WATER COMPANY

3805 N. BLACK CANYON HIGHWAY, PHOENIX, ARIZONA 85015-5351 • P.O. BOX 29006, PHOENIX, AZ 85038-9006
PHONE: (602) 240-6860 • FAX: (602) 240-6874 • TOLL FREE: (800) 533-6023 • www.azwater.com

February 20, 2015

Mr. Jim Morrison
Eagle Rock Excavating, LLC
4750 N. La Cholla Boulevard
Tucson, AZ 85705-4852

Re: Hancock Trail Replacement

PROJECT: Well No. 33 Flush Line	
SYSTEM: Pinal Valley	
CONTRACT NO.:	
P.E. NO.:	W.A. NO.: 1-5301

Dear Mr. Morrison:

Enclosed is your copy of the Proposal/Contract for the above-referenced project, which has been accepted by Arizona Water Company (the "Company"). The project shall be constructed in accordance with the Company's *General Conditions of Contract, the Specifications and the Drawings* which were included with the Company's previously provided Proposal/Contract, copies of which are being provided again and attached herewith.

Also enclosed are two copies of the Commencement Notice for the above-referenced project. Please sign one of the copies and return it to my attention retaining the other for your records.

As provided in paragraph 4 of the Company's Proposal/Contract executed by the Company on February 23, 2015, Eagle Rock Excavating, LLC acknowledged that one hundred percent (100%) Performance and Payment Bonds are required and must be provided to the Company prior to the commencement of work. In addition, as provided in paragraph 44 of the Company's General Conditions of Contract, the 100% Performance and Payment Bonds must be provided within ten (10) calendar days of the date of the Commencement Notice. Failure to provide an acceptable 100% Performance and Payment Bond does not limit the Company's

ability to terminate the Proposal/Contract or seek restitution for damages that the Company may have or will incur.

Prior to the start of construction, please call Ray Murrieta, Division Manager at 520-836-8785 to schedule a pre-construction meeting. In addition, please provide the required Performance and Payment Bonds to the Company promptly so that the contracted work can be completed within the contract's timeline.

If you have any questions, please call me at this office.

Very truly yours,

James T. Wilson, P. E.
Senior Engineer
jwilson@azwater.com

afh
Enclosure

ARIZONA WATER COMPANY

Pinal Valley - Casa Grande
220 E. 2nd Street
Casa Grande, AZ 85122 PH: 520-836-8785

PROPOSAL/CONTRACT

CONTRACTOR: EAGLE ROCK EXCAVATING, LLC	SYSTEM: PINAL VALLEY
ADDRESS: 4750 N. LA CHOLLA BOULEVARD	W.A. No(s): 1-5301
CITY ST ZIP: TUCSON, AZ 85705-4852	BID DUE DATE: December 23, 2014

CONTRACTOR SUBMITS this PROPOSAL/CONTRACT to ARIZONA WATER COMPANY, an Arizona corporation (the "Company"), to perform the work and complete the project described on Page 2 (the "Project"), as an independent prime contractor.

1. Contractor certifies that it has a complete copy of, and has read, understands and accepts, the Company's General Conditions of Contract, and the Company's Construction Specifications and Standard Specification Drawings, (the "Specifications"), all of which are attached hereto. Contractor has examined the specific plans and related construction drawings for the Project (the "Drawings"), copies of which are also attached hereto. The General Conditions of Contract, Specifications and Drawings are incorporated into this Proposal/Contract. Contractor affirms that all work and materials to be furnished or purchased for the Project will be in strict conformance with the General Conditions of Contract, Specifications and Drawings.

2. Contractor represents and warrants that it has satisfied and complied with the provisions of Section 6, Contractor Understands Work and Working Conditions, of the General Conditions of Contract prior to submitting this Proposal/Contract.

3. Contractor represents that this Proposal/Contract is fair and honest in all respects, is submitted in good faith and is not submitted in collusion with any other company, entity or person.

4. Contractor acknowledges that one hundred percent (100%) Performance and Payment Bonds are required and must be provided to the Company prior to the commencement of work.

5. Prior to the commencement of work, Contractor will submit to the Company a list of all materials to be used in the Project. The materials list will include the manufacturer, part number, price and quantity included in this Proposal/Contract.

6. Contractor will furnish all labor, tools, equipment and materials required to complete the Project according to the General Conditions of Contract, Specifications and Drawings. No materials purchased by Contractor to be incorporated into the Project are subject to tax at the time of purchase and Contractor will not charge the Company for any such tax. Contractor will pay the applicable transaction privilege tax (the "Contracting Tax") on the Project after Contractor receives payment of the final Project invoice from the Company. The cost of materials incorporated into the Project which are exempt by Arizona Revised State Statues ("A.R.S.") from the Contracting Tax, for example, pipes or valves having a diameter of four (4) inches or larger, including equipment, fittings and any other related part that is used in operating the pipes or valves (A.R.S. §42-5061 B.6.), will not be included in the total cost of the labor and materials upon which the Contracting Tax is computed. Contractor retains full liability and obligation to pay the Contracting Tax and will defend and indemnify the Company against any demand or obligation to pay the Contracting Tax.

7. Contractor will maintain detailed accounting records of all materials purchased and incorporated into the Project. Such records will include all supporting original vendor invoices for all materials purchased. Following completion of the Project, Contractor will submit an itemized accounting to the Company which will include all supporting original vendor invoices and satisfactory evidence of payment thereof. The Company will not pay Contractor for materials not actually incorporated into the Project, and the disposition of such materials will remain Contractor's responsibility.

8. The Estimated Total Cost of the Project, shown on Page 2, is based on estimated labor and material quantities to be furnished. It includes an estimate of the Contracting Tax and the cost of the required Performance and Payment Bonds. Contractor will not cancel, modify or withdraw this Proposal/Contract during a ninety-day (90) period commencing on the Bid Due Date. The Company may accept this Proposal/Contract by signing and mailing, or otherwise delivering, a copy hereof to Contractor during such ninety-day (90) period. If the Company does not accept this Proposal/Contract during such ninety-day (90) period, Contractor may cancel this Proposal/Contract by giving written notice of cancellation to the Company.

9. Prior to the commencement of work, Contractor will provide the Company with a detailed construction schedule, in either Gantt or CPM form, identifying all tasks to be performed from the date of the written Commencement Notice through completion of the Project, including testing, training of Company Personnel and final Project invoicing. Contractor will provide the Company with a copy of such construction schedule documenting the progress of work on the Project at least monthly.

10. Contractor will not commence work on the Project until the Company gives Contractor a written Commencement Notice. Contractor will complete the Project within 30 calendar days after the Commencement Notice is issued.

11. Following the Company's written notice of satisfactory completion of the Project, and upon receipt of the final Project invoice from Contractor, the Company shall pay Contractor the actual total cost of the Project, which will be calculated as shown on Page 2, except that actual labor and material quantities installed/constructed will be substituted for the estimated labor and materials quantities and the Contracting Tax will be recalculated based on such actual labor and materials quantities.

12. The amount of applicable liquidated damages for Contractor's failure to deliver or perform within the time limit shown in Paragraph 10 may be deducted from the Company's payment of the final Project invoice. This provision shall not limit the Company's ability to terminate this Proposal/Contract for Contractor's unsatisfactory performance or failure to perform as provided in the General Conditions of Contract, Specifications or Drawings, or in this Proposal/Contract.

SPECIAL CONDITIONS:

Pollution Insurance is not required for this project.

CONTRACTOR	PROPOSAL/CONTRACT ACCEPTED:
EAGLE ROCK EXCAVATING, LLC	ARIZONA WATER COMPANY
By:	By:
Print Name: Jim Morrison	Print Name: Fredrick K. Schneider, PE
Title: Project Manager / Estimator	Title: Vice President - Engineering
Date: 12/23/14	Date: 2-23-2015

AFH

AJH

ARIZONA WATER COMPANY

Pinal Valley - Casa Grande
220 E. 2nd Street
Casa Grande, AZ 85122 PH: 520-836-8785

PROPOSAL/CONTRACT

CONTRACTOR: EAGLE ROCK EXCAVATING, LLC	SYSTEM: PINAL VALLEY
AZ CONTRACTOR LICENSE NO: 169906 CLASSIFICATION: A	W.A. No(s): 1-5301
ADDRESS: 4750 N. LA CHOLLA BOULEVARD	BID DUE DATE: December 23, 2014
CITY ST ZIP TUCSON, AZ 85705-4852	BID BOND REQUIRED √ Yes ☐ No

DESCRIPTION OF PROJECT: Install approximately 1440 LF of 12-inch ductile iron pipe with polywrap and related fittings along Hancock Trail from Arizona Water Company well site 33 to Hacienda Road.

1-2. MATERIALS EXEMPT FROM CONTRACTING TAX (per Paragraph 6	QUANTITY	UNIT PRICE LABOR	UNIT PRICE MATERIALS	TOTAL COST LABOR	TOTAL COST MATERIALS
Install 12-inch ductile iron water main with polywrap and related fittings	1,440	41.64	27.29	59,961.26	39,302.34
Install 12-inch gate valve	3	591.29	1,851.71	1,773.88	5,555.12
Install 12-inch by 2-inch blowoff assembly	2	560.40	1,924.60	1,120.79	3,849.21
Install Air Relief Valve	1	340.35	795.65	340.35	795.65
				1	2
3. Total Labor to Install Exempt Materials (add the amounts in column 1)				3 63,201.29	
4. Total Exempt Materials (add the amounts in column 2)					4 49,502.31

5-6. NON-EXEMPT MATERIALS	QUANTITY	LABOR	MATERIALS	LABOR	MATERIALS
				5	6
7. Total Labor to Install Non-Exempt Materials (add the amounts in column 5)				7 0	
8. Total Non-Exempt Materials (add the amounts in column 6)					8 0
9. Subtotal A (add lines 3, 7 and 8)					9 63,201.29
10. Contracting Tax Base (multiply the amount on line 9 by 0.65)				10 41,080.84	
11. Applicable Contracting Tax Rate				11 7.1 %	
12. Contracting Tax (multiply the amount on line 10 by line 11)					12 2,916.74
13. Subtotal B (add lines 4, 9 and 12)					13 115,620.31
14. 100% Performance and Payment Bonds Cost					14 1,792.12
15. Estimated Total Cost (add lines 13 and 14)					15 117,412.45

NOTE: The Estimated Total Cost includes all labor and materials for backfill, pavement replacement, chip seal, and traffic control necessary for the Project.

ARIZONA WATER COMPANY

COMMENCEMENT NOTICE

CONTRACTOR:

Mr. Jim Morrison
Eagle Rock Excavating, LLC
4750 N. La Cholla Boulevard
Tucson, AZ 85705-4852

DATE: 2/24/15
DIVISION: CASA GRANDE
SYSTEM: PINAL VALLEY
W.A.: 1-5301

THIS IS YOUR NOTICE TO PROCEED WITH THE FOLLOWING PROJECT(S):

DESCRIPTION OF WORK:

Install approximately 1,440 LF of LF of 12-inch ductile iron pipe with polywrap and related fittings along Hancock Trail from Arizona Water Company well site 33 to Hacienda Road.

PERFORMANCE AND PAYMENT BONDS REQUIRED: [X] Yes [ ] No

TOTAL DAYS ALLOWED: 40

COMPLETION DATE: 4/5/15

Prior to the start of construction, please call Ray Murrieta, Division Manager at 520-836-8785 to schedule a pre-construction meeting.

ARIZONA WATER COMPANY	***EAGLE ROCK EXCAVATING, LLC***
Company	Contractor *(type name)*
By [signature]	By
Title Vice President - Engineering	Title

AFH

ARIZONA WATER COMPANY

SPECIFICATIONS

GENERAL CONDITIONS OF CONTRACT: E-4-1

CONSTRUCTION SPECIFICATIONS: E-8-1

STANDARD SPECIFICATION DRAWINGS: E-9-1

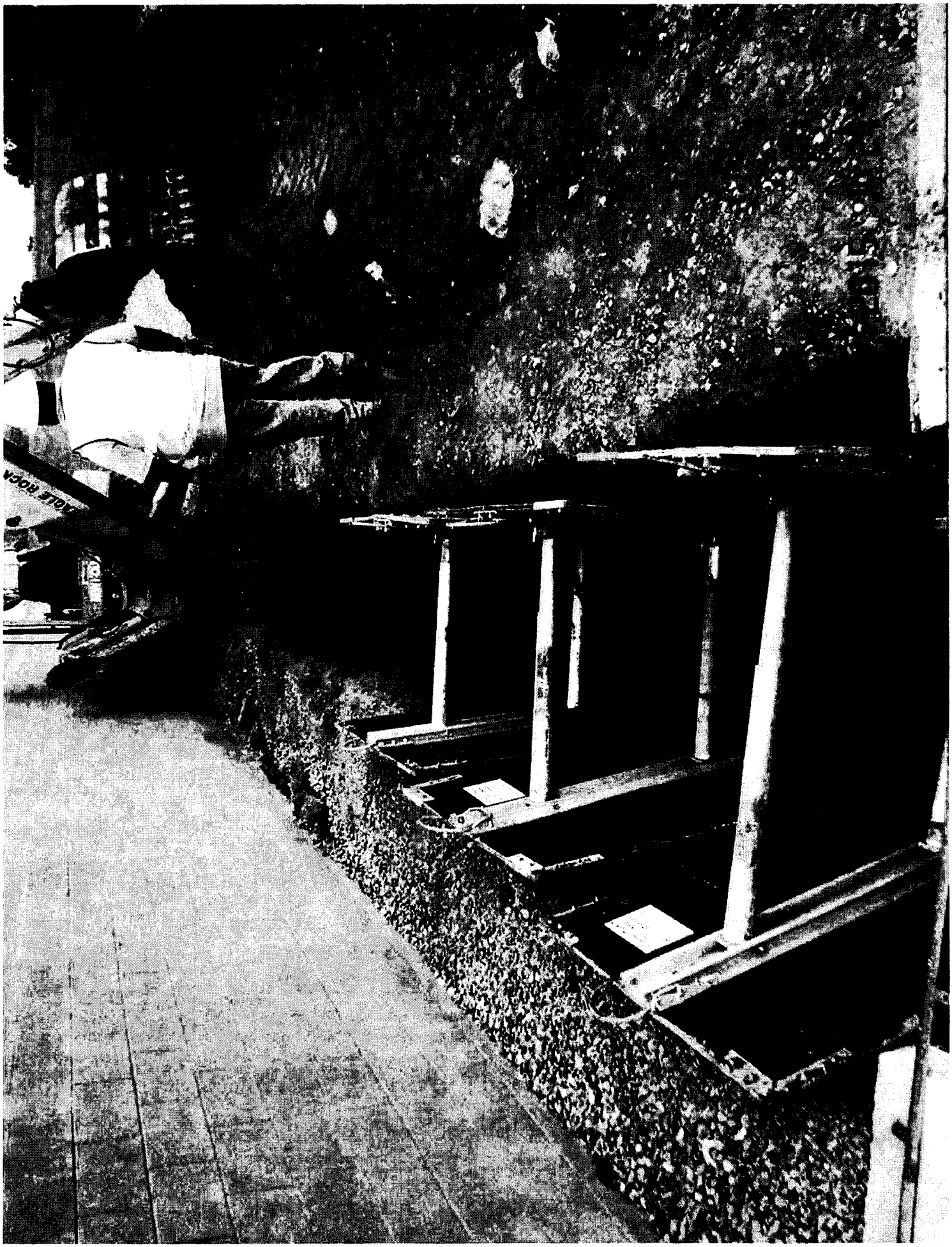
gw 2/20/15

2007 EDITION WITH **2010** REVISIONS;
2012 GENERAL CONDITIONS OF CONTRACT

A copy of this entire Spec Book was sent out with Eagle Rock Excavating proposal package for 1-5301 Hancock Trail Replacement on 2/24/15 AM

2015 3 16

EAGLE ROCK



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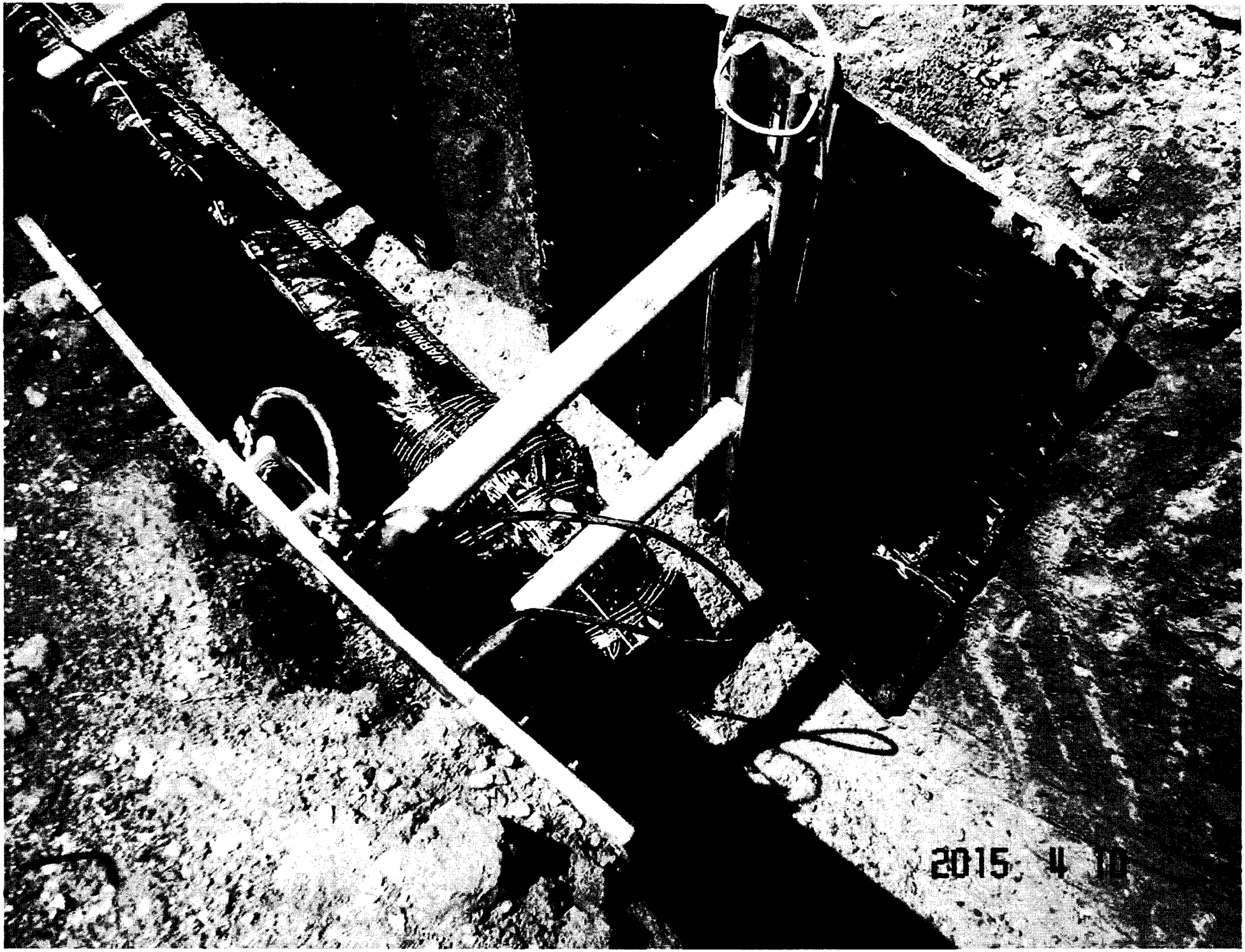
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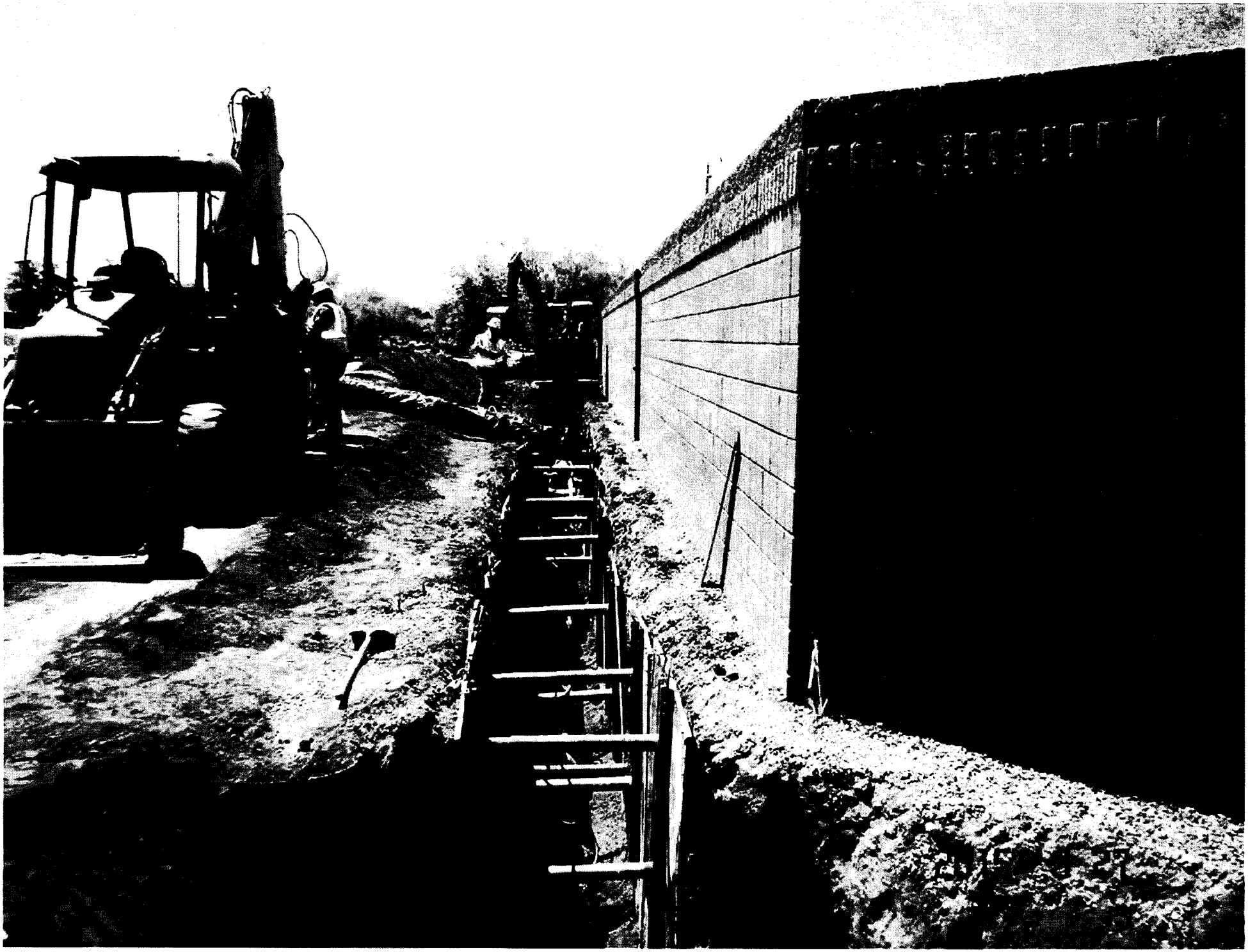

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CERTIFICATE OF APPROVAL TO CONSTRUCT WATER FACILITIES

CDP No: CDP-15-00374	I-5310 Well No 33	12-inch flush line
System Name: Pinal Valley		**PWS Number:** 11-009
Project Owner: Arizona Water Company		
Address: PO Box 29006, Phoenix AZ 850038-9006		
Project Location:	Hancock Trail from Well No. 33 to Hacienda Road	
Project Description: Construct approximately 1,461 L.F. of 12-inch D.I.P. flush line on Hancock Trail from Well No 33 to Hacienda Road in Casa Grande AZ		

Approval to construct the above-described facilities as represented in the approved documents on file with the City of Casa Grande is hereby given subject to provisions 1 through 5 continued on page 2 of 2

1. This project must be constructed in accordance with all applicable laws, including Title 49, Chapter 2, Article 9 of the Arizona Revised Statutes and Title 18, Chapter 5, Article 5 of the Arizona Administrative Code.
2. Upon completion of construction, the engineer shall fill out the Engineer's Certificate of Completion and submit it to the City of Casa Grande. If all requirements have been completed, the City will issue a Certificate of Approval of Construction. R18-5-507(B), Ariz. Admin. Code. At the project owner's request, the Department **may** conduct the final inspection required pursuant to R18-5-507(B); such a request must be made in writing in accordance with the time requirements of R18-5-507(C), Ariz. Admin. Code.
3. This certificate will be void if construction has not started within one year after the Certificate of Approval to Construct is issued, there is a halt in construction of more than one year, or construction is not completed within three years of the approval date. Upon receipt of a written request for an extension of time, the City may grant an extension of time; an extension of time must be in writing. R18-5-505(E), Ariz. Admin. Code.
4. The project owner shall be responsible to submit to the City a complete Approval of Construction application and required documentation. Operation of a newly constructed facility shall not begin until a Certificate of Approval of Construction has been issued by the City of Casa Grande. R18-5-507(A), Ariz. Admin. Code.

Approved by City Engineer: _____ Date: 3.3.

RECEIVED
MAR 11 2015
PHOENIX OFFICE
ENGINEERING

5. The City of Casa Grande's review of this application was subject to the requirements of the licensing time frames ("LTF") statute under Arizona Revised Statutes ("A.R.S.") § 41-1072 through§ 41-1079 and the LTF rules under Arizona Administrative Code ("A.A.C.") R18-1-501 through R18-1-525. This Notice is being issued within the overall time frame for your application.

City of Casa Grande hereby approves your application for Approval to Construct Drinking Water Facilities under A.R.S. § 49-351. Your copy is enclosed.

This decision is an appealable agency action under A.R.S. § 41-1092. You have a right to request a hearing and file an appeal under A.R.S. § 41-1092.03(B). You must file a written Request for Hearing or Notice of Appeal within 30 days of your receipt of this Notice. A Request for Hearing or Notice of Appeal is filed when it is received by ADEQ's Hearing Administrator as follows:

Office of Administrative Counsel
Arizona Department of Environmental Quality 1110 W. Washington Street
Phoenix, AZ 85007

The Request for Hearing or Notice of Appeal shall identify the party, the party's address, the agency and the action being appealed and shall contain a concise statement of the reasons for the appeal. Upon proper filing of a Request for Hearing or Notice of Appeal, City of Casa Grande will serve a Notice of Hearing on all parties to the appeal. If you file a timely Request for Hearing or Notice of Appeal you have a right to request an informal settlement conference with ADEQ under A.R.S. § 41-1092.06. This request must be made in writing no later than 20 days before a scheduled hearing and must be filed with the Hearing Administrator at the above address.

Please contact the City of Casa Grande Development Center at 520-421-8630 if you have questions regarding this Notice or the Certificate of Approval to Construct.

ADEQ Arizona Department of Environmental Quality

ENGINEERING REVIEW SECTION
DATA REQUIRED WITH ECC

Please complete the test data and submit this form with the Engineers Certificate of Completion. An Approval of Construction cannot be issued without the data identified below in accordance with Arizona Administrative Code (A.A.C.) R18-5-508(C). Please attach all supplemental information and calculations to this form.

WELL #33 12" FLUSH LINE

DATA

1.

PRESSURE TEST DATA				
Indicate Segment Tested	WELL #33 12" FLUSH LINE			
Pressure and Leakage Test Results (Pass/Fail)	PASS	PASS		
Date Tested	5-1-15	5-1-15		
Time Started	1:45pm	1:45pm		
Time Finished	3:45pm	3:45pm		
Pipe Diameter	12"	6"		
Footage Tested	1478 LF	5' LF		
Allowable Leakage	3.5472	0.0016		
Leakage Observed	0	0		
Pressure at Test Point	205 psi	205 psi		
Employee Observing the Test (Please Print Legibly)	SCOTT H. JOHNSON			
Signature of Employee Observing the Test	Scott H. John			

2.

DISINFECTION SAMPLING					
Initial Sampling (Minimum 50 ppm available chlorine)	Date	5-4-15	5-4-15		
	Time	11:00 AM	11:00 AM		
	ppm Cl_2	200ppm	200ppm		
After 24 Hours Detention Time (Minimum 10 ppm free chlorine)	Date	5-6-15	5-6-15		
	Time	6:45 AM	6:45 AM		
	ppm Cl_2	200ppm	200ppm		
After Sufficient Flushing (Water is clear and system Cl_2 residual is measured)	Date	5-6-15	5-6-15		
	Time	9:45 AM	9:40 AM		
	ppm Cl_2	1.3	1.0		
Bacteriological Sampling(s):	Date	5-6-15	5-6-15		
	Time	10:00 AM	10:10 AM		
	Attached (Y/N)	Y	Y		
		(Yes)/No	(Yes)/No	Yes/No	Yes/No

3.

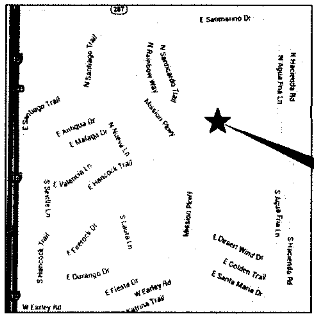
Certification

I, SCOTT H. JOHNSON, certify that I have inspected the work performed and have found it to be satisfactory and in accordance with Arizona Administrative Code, Arizona Engineering Bulletins, and the approved specifications.

Scott H Johnson — 5-13-15

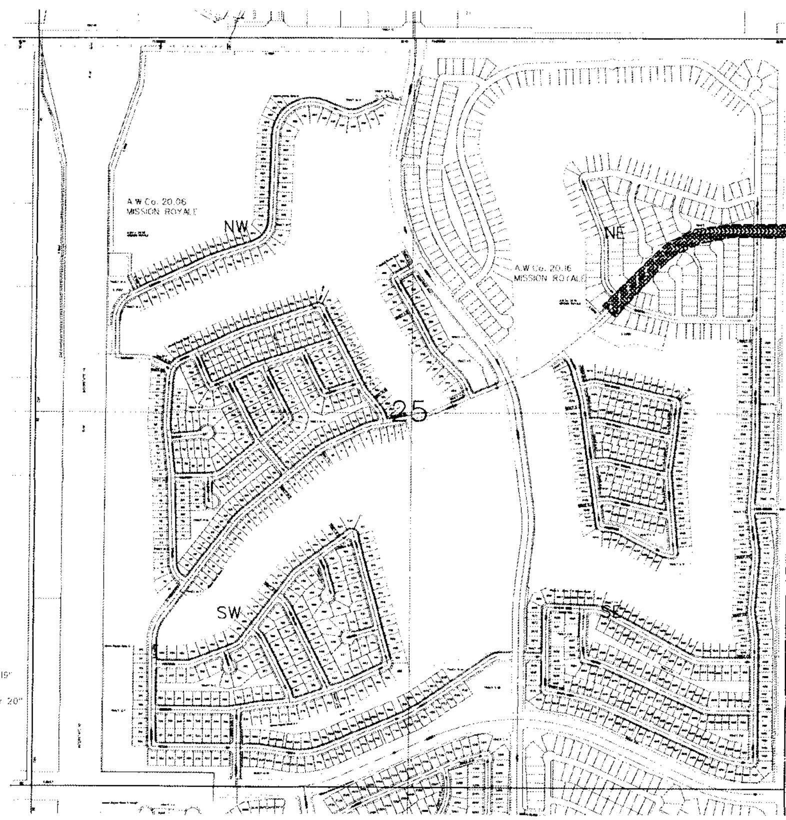
Authorized Persons Signature — Date

Professional Seal
As per A.A.C. R18-5-507(B)(1)



VICINITY MAP

CONSTRUCT APPROX. 1,478 L.F. OF 12-INCH D.I.P. FLUSH LINE ON HANCOCK TRAIL FROM WELL No. 33 TO HACIENDA ROAD IN CASA GRANDE, AZ. NE 1/4 SEC. 25, T. 6 S., R. 6 E. OF THE G. & S. R. B. & M.



PROJECT VICINITY

400' 200' 0' 400' 800'

GENERAL NOTES:

1. All work and materials shall conform to current County Health Department Standards and Revisions, Arizona Water Company Standard Specifications and Details, and Arizona Department of Health Services Engineering Bulletin No. 10.
2. Permits required will be secured from the appropriate agency, I.E. county permit in county right-of-way.
3. Prior to construction, the appropriate agency(ies) will be notified as required by the permit(s).
4. All backfill, compaction, and testing shall be per current County, City, State, ADOT, and Arizona Water Company standards and specifications.
5. All water lines 8" and less are to have a minimum cover of 36 inches & all water lines 12" and greater are to have 48" of minimum cover over the top of pipe to finished grade, unless otherwise specified on the construction drawings.
6. All frames, covers, valve boxes, etc. shall be adjusted to finished grade prior to placing of asphaltic concrete surface course by the contractor (where applicable).
7. All water lines shall be pressure and leakage tested in accordance with AWWA C-600 or MAG 610.14.
8. All water lines are to be disinfected per ADEQ Engineering Bulletin No.8 and AWWA C651-92.
9. Air release valves are required at water system high points per Arizona Water Company standard details.
10. Water/sewer separation shall be per current Arizona Water Company standards and ADEQ AAC R18-5-502-C.
11. It shall be the contractors responsibility to uncover all existing water lines being connected to, and to verify the location, depth and size of pipe before any construction begins.
12. Any construction performed without the knowledge of the inspector or his representative is liable for removal and replacement at the contractor's expense.
13. In accordance with AAC R18-4-213, all materials added after January 1, 1993 which may come in contact with drinking water, shall conform to National Sanitation Foundation Standards 60 and 61.
14. All water services shall be set a minimum of 2 Feet on the customers property and NOT within right-of-way.
15. Unless otherwise specified on the construction drawings all water mains are to be installed 5 Feet from the property line inside the right-of-way or easement.
16. Water valves shall be spaced not more than 500 Feet in commercial districts and not more than 800 Feet in other districts. Variations may be required for transmission mains or special applications. Sufficient valving is required where water lines cross streams, railroads and major highways.
17. Maximum Joint Deflection For 6" Mechanical Joint Ductile Iron Pipe Is 7° 7' Or 27" For 18 Foot Length Pipe, For A Maximum Curve Of 145 Feet.
18. Maximum Joint Deflection For 6", 8", & 12" Push-On Joint Ductile Iron Pipe Is 5° Or 19" For 18 Foot Length Pipe, For A Maximum Curve Of 205 Feet.
19. Maximum Joint Deflection For 8" & 12" Mechanical Joint Ductile Iron Pipe Is 5° 21' Or 20" For 18 Foot Length Pipe, For A Maximum Curve Of 195 Feet.
20. All components must comply with SDWA's "Lead Free" standards.

CITY OF CASA GRANDE PLAN APPROVAL RECOMMENDED

CIVIL ENGINEER: ______________________

DATE: ______________ EXPIRATION DATE: ______________

THE CITY APPROVES THESE PLANS IN CONCEPT ONLY
THE CITY ACCEPTS NO RESPONSIBILITY FOR ERRORS OR OMISSIONS

CITY OF CASA GRANDE PLAN APPROVAL

CITY ENGINEER: ______________________

DATE: ______________ EXPIRATION DATE: ______________

THE CITY APPROVES THESE PLANS IN CONCEPT ONLY.
THE CITY ACCEPTS NO RESPONSIBILITY FOR ERRORS OR OMISSIONS

AS BUILT

FOR WATER ONLY

41046 JAMES T. WILSON Expires 9/30/16

REVISED PER FIELD AS BUILTS 5/27/15 JAK

OWNER/ENGINEER/DEVELOPER

ARIZONA WATER COMPANY
POST OFFICE BOX 29006
PHOENIX, AZ 85038-9006
VOICE: (602) 240-6860 FAX: (602) 294-2369
CONTACT: JAMES T. WILSON

SHEET INDEX

SHT. No.	DWG. No.	DESCRIPTION	PREPARED BY
1	PV-0087	PROJECT VICINITY	A.W.Co.
2 - 5	PV-0087	CONSTRUCTION PLAN	A.W.Co.
6	PV-0087	GENERAL NOTES	A.W.Co.
7	PV-0087	STANDARD DETAILS AND SPECIFICATIONS	A.W.Co.

○	QUANTITIES LIST	QUANTITY
1	12" D.I.P. W/ POLYWRAP & RELATED FITTINGS	1,478 L.F.
2	12" M.J. TEE	2
3	12" M.J. GATE VALVE WITH BOX AND COVER PER A.W.C. STD. SPEC. E-9-2-1	4
4	2" BLOWOFF ASSEMBLY PER A.W.C. STD. SPEC. E-9-8-1	1
5	12" X 6" M.J. X FLG. TEE	1
6	MUELLER 5-1/4" M.J. FLUSH TYPE FIRE HYDRANT PER A.W.C. STD. SPEC. E-9-2-1	1
7	12" M.J. PLUG	1
8	6" FLG. GATE VALVE WITH BOX AND COVER PER A.W.C. STD. SPEC. E-9-2-1	1
9	6" 90° FLG. ELL	1
10	12" M.J. CAP	1
11	6" D.I.P. W/ POLYWRAP & RELATED FITTINGS	5 L.F.
12	12" 45° M.J. ELL	2
13	AIR RELEASE PER A.W.C. E-9-8-2	1

LEGEND

- ½" REBAR PROPERTY CORNER
- FIRE HYDRANT
- LIGHT/POWER POLES
- WATER VALVE
- STREET CENTERLINE/MONUMENT LINE
- PROPERTY LINE
- PROPOSED 12" WATER LINE

ADEQ APPROVAL

FILE No. ____________

DATE ____________

REVISIONS: REVISED PER FIELD AS BUILTS 5/27/15 JAK

The installation shown is to be installed in accordance with the Arizona Water Company standard specifications on file with the Arizona Department of Environmental Quality

Call two working days before you dig: 263-1100, 1-800-STAKE-IT

W.A. No.	1-5301
SYSTEM	PINAL VALLEY
LEGAL DESC.	NE 1/4 SEC. 25, T. 6 S., R. 6 E.
TAX DIST.	C437
DATE	2/6/2015
SCALE	AS SHOWN
DRAWN BY	JAK

ARIZONA WATER COMPANY

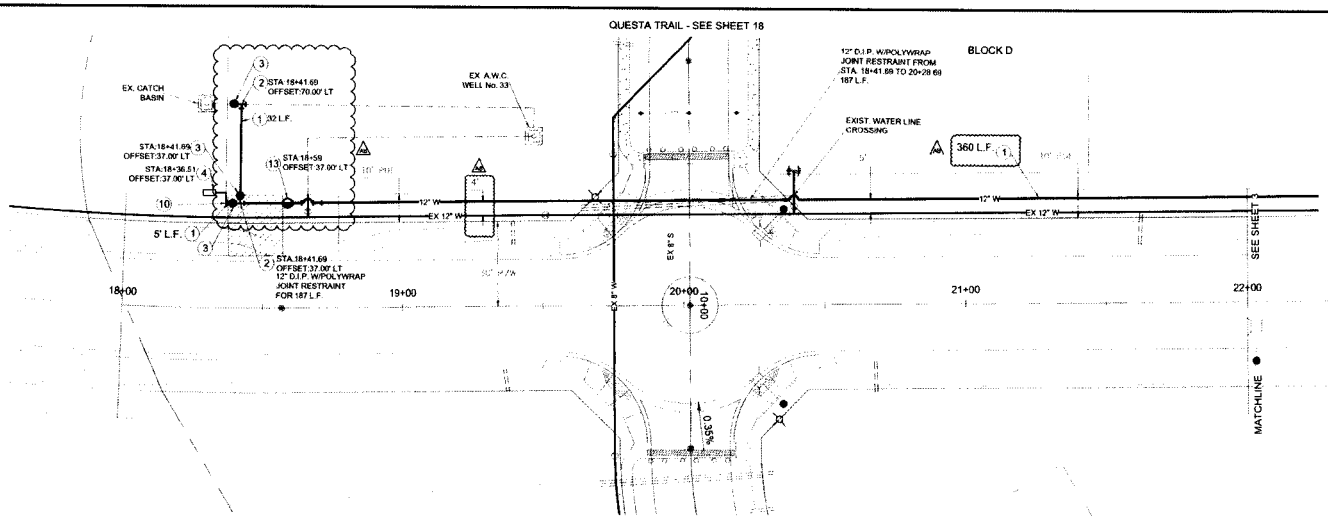
3805 N. BLACK CANYON HWY. POST OFFICE BOX 29006
PHOENIX, ARIZONA 85038-9006
(602) 240-6860

PROJECT DESC.: CONSTRUCT APPROX. 1,478 L.F. OF 12-INCH D.I.P. FLUSH LINE ON HANCOCK TRAIL FROM WELL No. 33 TO HACIENDA ROAD IN CASA GRANDE, AZ.

PROJECT SHEET DESC.: PROJECT VICINITY

DWG. No. **PV-0087**

SHEET 1 OF 7



WATER CONSTRUCTION

1. INSTALL 12" D.I.P. W/POLYWRAP PER A.W.C. SPECS. LENGTH AS SHOWN
2. INSTALL 12" M.J. TEE
3. INSTALL 12" M.J. GATE VALVE WITH BOX AND COVER PER A.W.C. STD SPEC. # 9.2-1
4. INSTALL 2" BLOWOFF ASSEMBLY PER A.W.C. STD SPEC. # 9.8-1
10. INSTALL 12" M.J. CAP
12. INSTALL 12" 45° M.J. ELL
15. INSTALL AIR RELEASE PER A.W.C. # 9.8-2

NOTE:
1. ALL MECHANICAL JOINT FITTINGS TO HAVE MEGALUGS.
2. USE TYTON ADAPTERS TO CONNECT M.J. FITTINGS TO M.J. FITTINGS.

AS BUILT

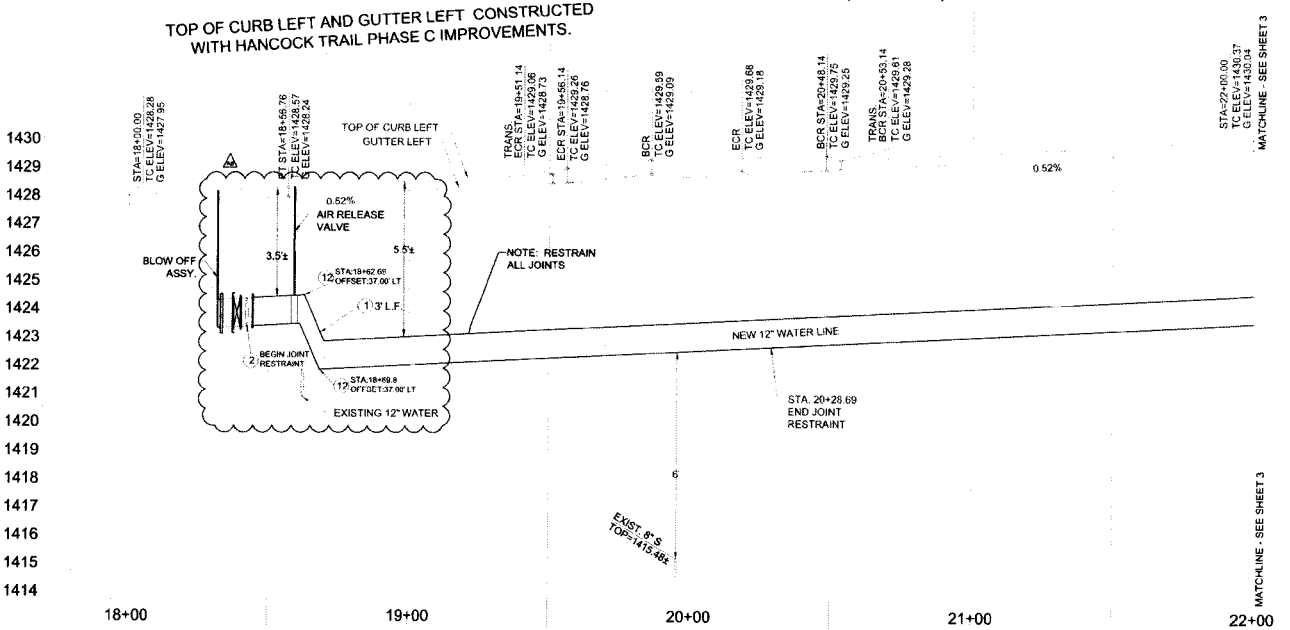
FOR WATER ONLY

41046 JAMES T WILSON REGISTERED LAND SURVEYOR U.S.A. Expires 6/30/16

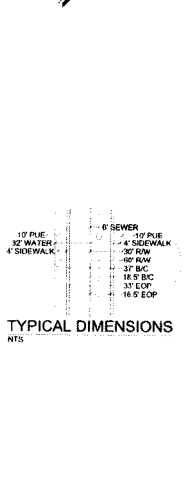
REVISED PER FIELD AS BUILTS 5/27/15 JAK

12" WATER LINE - HANCOCK TRAIL (PHASE B)

TOP OF CURB LEFT AND GUTTER LEFT CONSTRUCTED WITH HANCOCK TRAIL PHASE C IMPROVEMENTS.



Horizontal: 1"=20'
Vertical: 1"=2'



TYPICAL DIMENSIONS
NTS

The installation shown & to be installed as per plans & specifications of this Company, standard specifications on file with the Arizona Department of Environmental Quality

REVISED PER FIELD AS BUILTS 5/27/15 JAK

JOB NO.	1-5301
SYSTEM	PINAL VALLEY
SEC. TWP. RGE.	NE 1/4 SEC. 25, T. 6 S., R. 6 E.
WO. NO.	0437
DATE	2/6/2015
SCALE	AS SHOWN
DRAWN BY	JAK
CHECKED BY	
APPROVED BY	

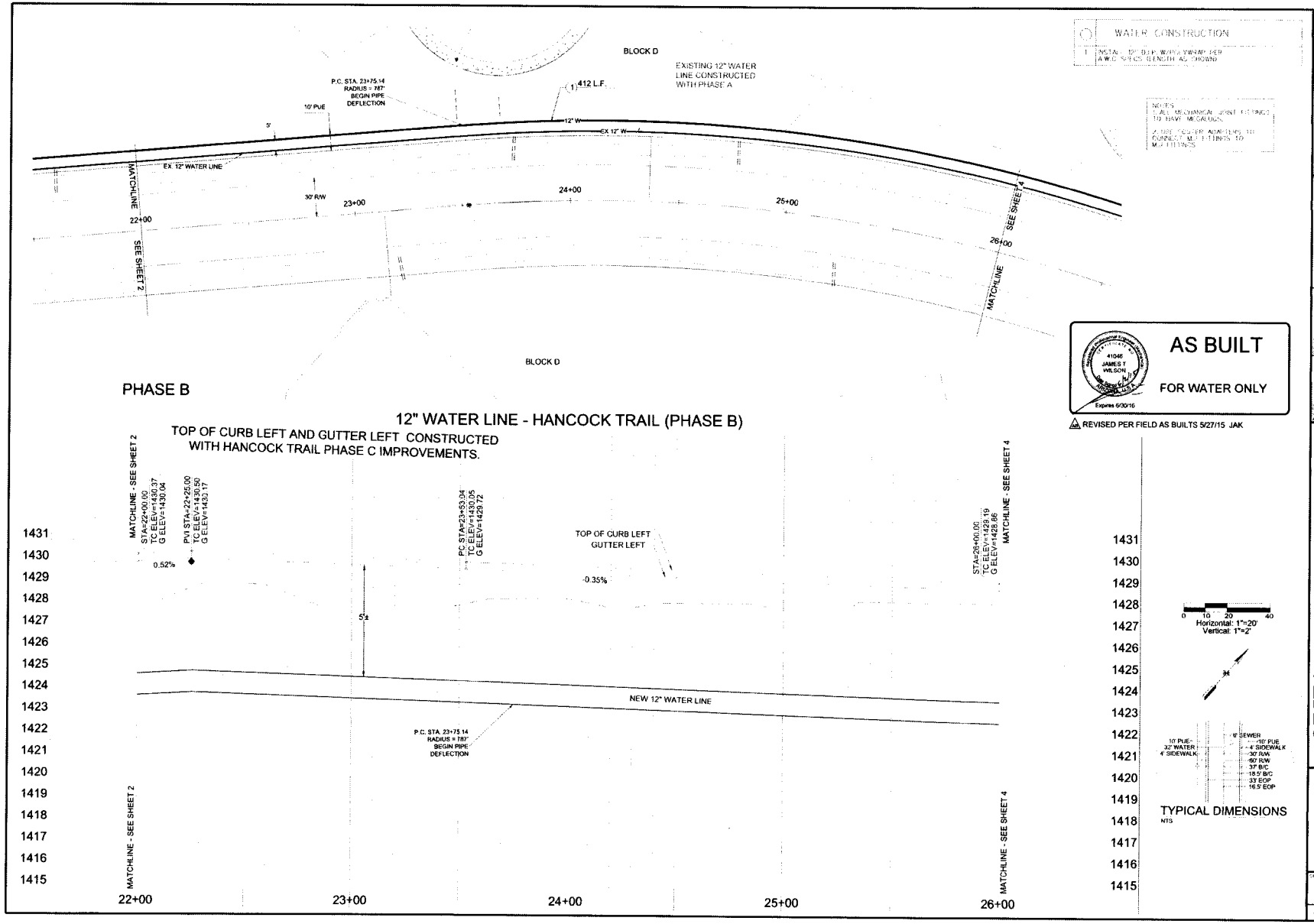
ARIZONA WATER COMPANY
3805 N. BLACK CANYON HWY. POST OFFICE BOX 29006
PHOENIX, ARIZONA 85038-9006 (602) 240-6860

PROJECT NAME: CONSTRUCT APPROX. 1,478 L.F. OF 12-INCH D.I.P. FLUSH LINE ON HANCOCK TRAIL FROM WELL NO. 33 TO HACIENDA ROAD IN CASA GRANDE, AZ.

PROJECT SHEET TITLE: CONSTRUCTION PLAN

DWG. NO. PV-0087

SHEET 2 OF 7



REVISED PER FIELD AS BUILTS 5/27/15 JAK

The installation shown is to be installed in accordance with the Arizona Water Company Standard Specifications and in accordance with the Arizona Department of Environmental Quality.

1-5301
PINAL VALLEY
NE 1/4 SEC. 25, T. 6 S., R. 6 E.
0437
2/6/2015
AS SHOWN
JAK

263-1100
1-800-STAKE-IT

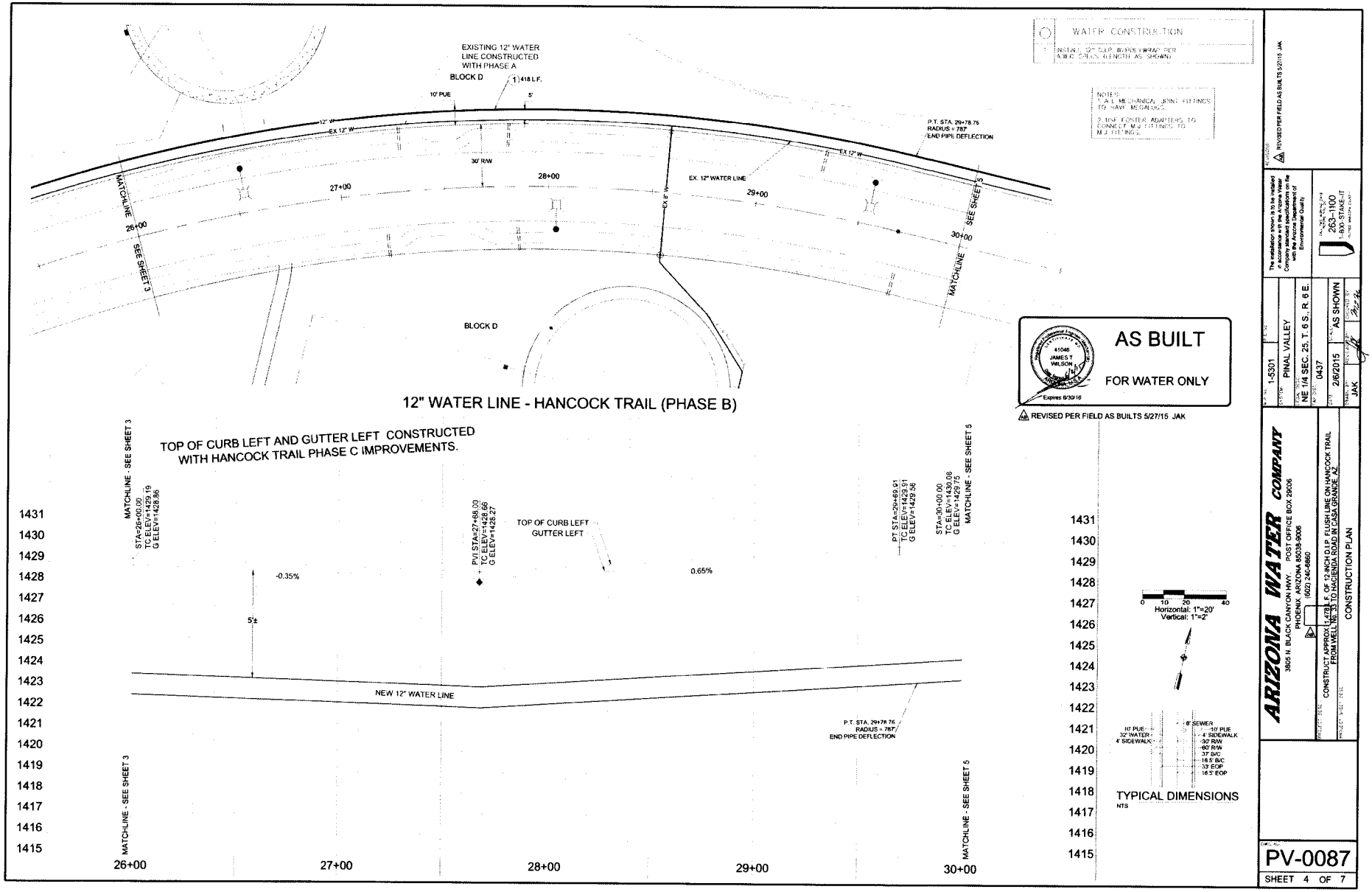
ARIZONA WATER COMPANY
3805 N. BLACK CANYON HWY. POST OFFICE BOX 29006
PHOENIX, ARIZONA 85038-9006
(602) 240-6860

CONSTRUCT APPROX. 1,478 L.F. OF 12-INCH D.I.P. FLUSH LINE ON HANCOCK TRAIL FROM WELL NO. 33 TO HACIENDA ROAD IN CASA GRANDE, AZ.

CONSTRUCTION PLAN

PV-0087

SHEET 3 OF 7



REVISED PER FIELD AS BUILTS 5/27/15 JAK

The installation shown is to be installed in accordance with the Water Company standard specifications on file with the Arizona Department of Environmental Quality.

W.O. NO.	1-5301
SYSTEM	PINAL VALLEY
SEC. TWP. RGE.	NE 1/4 SEC. 25, T. 6 S., R. 8 E.
W. SYST.	0437
DATE	2/6/2015
SCALE: H.	AS SHOWN
SCALE: V.	
DRAWN BY	JAK
CHECKED BY	

263-1100
1-800-STAKE-IT
(602) 263-1100

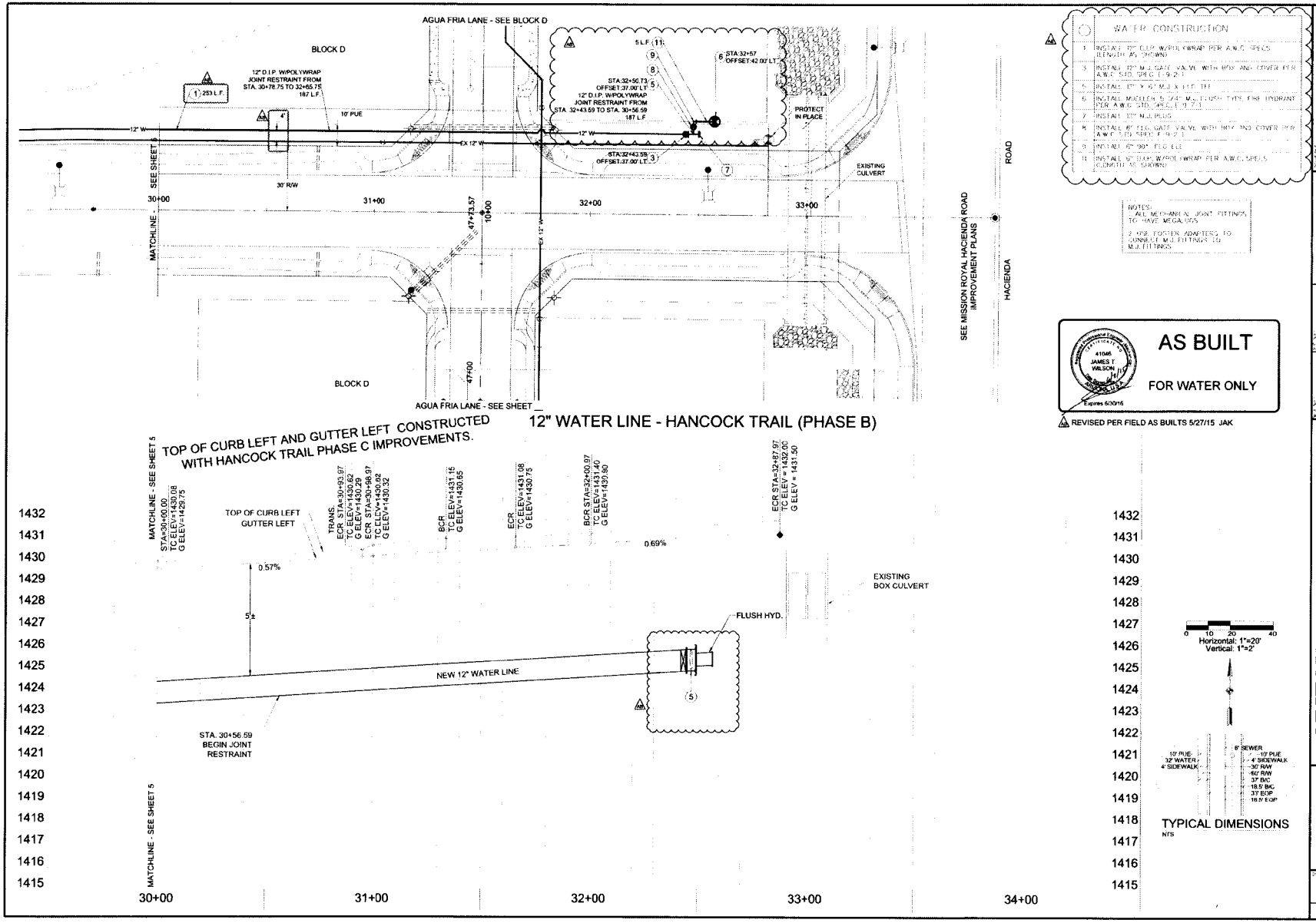
ARIZONA WATER COMPANY
3805 N. BLACK CANYON HWY. POST OFFICE BOX 29006
PHOENIX, ARIZONA 85038-9006
(602) 240-6860

PROJECT TITLE: CONSTRUCT APPROX 1,478 L.F. OF 12-INCH D.I.P. FLUSH LINE ON HANCOCK TRAIL FROM WELL NO. 33 TO HACIENDA ROAD IN CASA GRANDE, AZ

CONSTRUCTION PLAN

DWG. NO. PV-0087

SHEET 4 OF 7



WATER CONSTRUCTION	
1	INSTALL 12" D.I.P. W/POLYWRAP PER A.W.C. SPECS (LENGTH AS SHOWN)
5	INSTALL 12" M.J. GATE VALVE WITH BOX AND COVER PER A.W.C. STD. SPEC. 9-2.1
6	INSTALL MUELLER 5 1/4" M.J. FLUSH TYPE FIRE HYDRANT PER A.W.C. STD. SPEC. 9-7.1
7	INSTALL 12" M.J. PLUG
8	INSTALL 8" F.G. GATE VALVE WITH BOX AND COVER PER A.W.C. STD. SPEC. 9-2.1
9	INSTALL 8" 90° F.G. ELL
11	INSTALL 8" D.I.P. W/POLYWRAP PER A.W.C. SPECS (LENGTH AS SHOWN)

NOTES:
1. ALL MECHANICAL JOINT FITTINGS TO HAVE MEGALUGS
2. PVC FOSTER ADAPTERS TO CONNECT M.J. FITTINGS TO M.J. FITTINGS

AS BUILT

FOR WATER ONLY

41046 JAMES T. WILSON

Expires 6/30/16

REVISED PER FIELD AS BUILTS 5/27/15 JAK

Horizontal: 1"=20'
Vertical: 1"=2'

TYPICAL DIMENSIONS
NTS

REVISED PER FIELD AS BUILTS 5/27/15 JAK

The installation shown is to be installed in accordance with the Arizona Department of Environmental Quality

Call before you dig
263-1100
1-800-STAKE-IT

JOB NO.	1-5301
DESIGNED	
DRAWN	
CHECKED	
QUAD NO.	
SECTION	NE 1/4 SEC. 25, T. 6 S., R. 6 E.
COUNTY	PINAL VALLEY
FILE NO.	0437
SCALE	AS SHOWN
DATE	2/6/2015
APPROVED	
DRAWN BY	JAK

ARIZONA WATER COMPANY
3805 N. BLACK CANYON HWY. POST OFFICE BOX 29006
PHOENIX, ARIZONA 85038-9006
(602) 240-6860

PROJECT TITLE: CONSTRUCT APPROX. 1,478 L.F. OF 12-INCH D.I.P. FLUSH LINE ON HANCOCK TRAIL FROM WELL NO. 33 TO HACIENDA ROAD IN CASA GRANDE, AZ.

SHEET TITLE: CONSTRUCTION PLAN

DWG. NO. PV-0087

SHEET 5 OF 7

ARIZONA WATER COMPANY
3805 N. BLACK CANYON HWY. POST OFFICE BOX 29006
PHOENIX, ARIZONA 85038-9006
(602) 240-6860

CONSTRUCT APPROX 1,478 L.F. OF 12-INCH D.I.P. FLUSH LINE ON HANCOCK TRAIL FROM WELL NO. 33 TO HACIENDA ROAD IN CASA GRANDE, AZ.

GENERAL NOTES

PROJECT SHEET SERIES

PV-0087

SHEET 6 OF 7

DWG. NO.

REVISED PER FIELD AS BUILTS 5/27/15 JAK

AS BUILT

FOR WATER ONLY

41566
CHARLES E.
WILSON
Expires 6/30/16

DRAWN BY: JAK	DATE: 2/6/2015	SCALE: AS SHOWN	CHECKED BY:
SYSTEM: PINAL VALLEY			
LOCATION: NE 1/4 SEC. 25, T. 6 S., R. 6 E.			
APPLICATION NO.: 0437			
W-1: 1-5301			

The installation shown is to be installed in accordance with the Arizona Water Company standard specifications on file with the Arizona Department of Environmental Quality

ALL UNDERGROUND UTILITIES 263-1100 1-800-STAKE-IT (ARIZONA BLUE STAKE, INC.)

REVISIONS

FOR
CONSTRUCTION SPECIFICATIONS
FOR THE INSTALLATION OF WATER DISTRIBUTION SYSTEMS
(TRENCH WORK)

DEFINITIONS

A. Company. The word "Company" or "Arizona Water Company" mean Arizona Water Company, and when applicable, any division of Arizona Water Company, whose principal place of business is located at 3805 North Black Canyon Highway, Phoenix, Arizona 85038-9306 (Post Office Box 29006, Phoenix, Arizona 85038-9306).

B. Company's Authorized Representative. The words "Company's Authorized Representative" mean any officer of the Company, not any of the Company's Engineers, any Division Manager or Superintendent of the Company and/or such other individual designated in writing by the "Company's Authorized Representative" by the President or any Vice President of the Company.

C. Contractor. The word "Contractor" means either an individual or other entity employed to do the work as shown on the Construction Drawings and as specified herein.

D. Construction Drawings. The words "Construction Drawings" mean plans prepared by or on behalf of Arizona Water Company.

E. Contract. The word "Contract" means the written document titled "Proposal/Contract" when such document has been signed by an officer or other authorized representative of both the Contractor and the Company.

(1) GENERAL

All work is to be completed in a safe, workmanlike manner and in accordance with these Construction Specifications any deviations therefrom must be approved in writing by the Company.

Installations must conform with the requirements of all governmental/regulating agencies and the cost of conforming to such regulations must be borne by the user and not by the Company. It is the responsibility of the Contractor to determine the cost of such regulations, without attempting to be exhaustive, are:

a. Special compaction and paving for street crossing.
b. Shoring where required because of the trench depth.
c. Closing a trench in those areas where no open trench is allowed overnight.
d. Downgrading and traffic controls as required.

(2) LOCATION MARKING

Alignment stakes as required in the opinion of the Company and/or furnished by the Company to the Contractor and shall be set by the Company at agreed upon intervals and offsets under normal circumstances. Stakes will reference the pipeline location five feet (5') into the right of way measured from property pins. Grade stakes, when provided only when the Construction Drawings show a pipeline depth other than covered in these Specifications. It is the responsibility of the Contractor to preserve all survey work.

(3) TRENCH EXCAVATION

The trench location is to be determined by the Construction Drawings.

FOR 8 INCH OR SMALLER PIPE: The depth of the trench prior to pipe laying shall be such that the finished pipeline shall have between thirty-six inches (36") and forty two inches (42") of cover unless otherwise specified on the Construction Drawings.

FOR 12 INCH AND LARGER PIPE: The depth of the trench prior to pipe laying shall be such that the finished pipeline shall have between forty eight inches (48") and sixty inches (60") of cover unless otherwise specified on the Construction Drawings.

The width of the trench at and below the level of the top of the pipe shall be a minimum of twelve inches (12") greater than the outside diameter of the pipe installed a maximum of twenty four inches (24") plus the outside diameter of the pipe barrel.

The bottom of the trench shall be accurately graded to provide a uniform bearing for each length of pipe for the full length of the pipe. If the native material in the trench bottom can be reasonably dug to form, pebbles, shall be dug for the joints so that the joints in no way support the pipe. When native materials such as rock are encountered during trenching they shall be removed to provide a uniform support for the pipe. The trench shall be over-excavated an additional six inches (6") and suitable bedding material shall be placed in the trench.

Bedding material shall be placed by hand in four inch (4") lifts and compacted to ensure uniform compaction and to eliminate any voids under the pipe. When the space between the pipe and trench bottom varies, this must be backfilled and compacted in four inch (4") lifts to the intersection of the pipe.

Whenever the trench is open excavated for whatever reason, the trench bottom will be brought up to the correct depth at the Contractor's expense using either method (a) or (b) as follows:

a. Add material similar used and compacted to a uniform density of not less than 95% of the maximum density as determined by AASHTO T 99 method A and T 191.

b. Native material 3/8" or more will pass through a one and one-half inch (1-1/2") screen and at least 20% of which will pass through a number 8 screen shall be used and compacted to a uniform density of not less than 95% of the maximum density as determined by AASHTO T 99 method A and T 191.

(4) WATER IS TO BE PROVIDED BY CONTRACTOR

Unless otherwise specified on the Construction Drawings or in the Contract, the Contractor will supply all the necessary materials which will become a permanent and integral part of the water distribution system including concrete for thrust blocking, anchors, backfill material, paving material and supplies used during the construction of the work. All materials provided by the Contractor to construct the water distribution system must be NEW. Standard and approved AWWA/ANSI water pipes and fittings shall have NSF-PW Seal. Construction materials used in the water system shall be lead free as defined at ANSI/NSF-61 Section 9 and NSF-372. The Contractor will provide the following materials:

a. FIRE HYDRANTS: Mueller Super Centurion 250 Fire Hydrant, meets ANSI/AWWA C502, Standard, Model No. A-423, 5 1/4" main valve opening, three way, 6" Mechanical Joint Shoe, 1 1/2" pentagon operating nut, open - left, direct open, open direction - left, 4 or 4 1/2" duty dependent on application. For bumper and hose nozzle information see below.

(1) One - 4" Pumper Nozzle, NST and Two - 2 1/2" Hose Nozzles, NST (These locations only Apache Junction, Casa Grande, Coolidge and San Manuel.)

(2) One - 4 1/2" Pumper Nozzle, NST and Two - 2 1/2" Hose Nozzles, NST (These locations only Apache Junction, Arizona City, Superstition, Oracle, Overgaard, Rimrock, Pinetop, Sedona, Sierra Vista, White Tank and Wickenburg.)

(3) One - 4 1/2" Pumper Nozzle, NST and Two - 2-1/2" Hose Nozzles, NST (Bisbee only)

(4) One - 5" Pumper Nozzle (A & S) 5575 (6 threads per inch, 5.50 inch diameter) and Two - 2-1/2" Hose Nozzles, NST (Miami only.)

(5) One - 5 1/2" Pumper Nozzle (A & S) 4115 (4 threads per inch, 4.18 inch diameter) and Two - 2 1/2" Hose Nozzle, NST (Supplier only.)

b. FITTINGS: Manufactured by Tyler or Union Couplers, Elbows, Tees, Sleeve, Reducer, Adapter, Plug (Male Flange and Tapped Flange Duck'er Ins., Class 350, 150, Cast Iron Cement Lined.

(1) Tyler Adapters for MJ, made by Intract Corporation. Available in size 4" to 16" Part No. 4" - 4A-MJ-RC 6" - 6" MJ-RC, 8" - 8A-MJ-RC, 10" - 10A-MJ-RC, 12" - 12A-MJ-RC, 16" - 16A-MJ-RC.

c. DETECTOR CHECK VALVE: Mueller/ Hersey FDC (6, 4 iron body), including 5/8" x 3/4" Twin 45 Strap Kit Part No. 4" - 2820B0, 6" - 2820B2, 8" - 2820B5, 10" - 2820B8.

d. GATE VALVES: Mueller Resilient Wedge Gate Valves, meet, AWWA C509 specification, 250 psig, Non rising stem, Part No. A-2360, sizes 4" through 12". Part No. A-2761 sizes 14" through 36". Iron body, epoxy coated inside and outside to meet the NSF 61 rating. The bonnet and stuffing box shall have 304 stainless steel bolts/studs.

e. TRACER WIRE and WARNING TAPE:

(1) TRACER WIRE: Shall be identified by AWG #14 solid copper wire, Color: Blue

(2) WARNING TAPE: Reef Industries, Stronglon Terra Tape in 3" wide, Color: Blue and imprinted "Arizona Water Company".

f. AIR RELEASE VALVE: Crispin Model AMS with 1" NPT inlet and 1/2" NPT outlet, cast iron body and hot flange with a 5/64" orifice with stainless steel valve seating faces and BUNA N rubber.

g. PRESSURE RELIEF VALVE: Watts 174A, Model M, 2" inlet, 2" outlet, Bronze body, 300# to 150# pressure range.

h. MECHANICAL: Mechanical joint restraint made of ductile iron conforming to ASTM A536 BC, 250 psi rating by EBAA Iron, Inc., series 1100 or equal.

i. METER BOXES:

(1) Concrete Box with a steel/regular lid, Number 1 Suction specification.

(2) Concrete Box with a steel/regular lid, Numbers 2, 3, and 4 Phoenix specification.

j. PIPE, COPPER: Type K soft copper in 60' or 100' coil rolls, per ASTM B88.

k. PIPE, DUCTILE IRON: Ductile Iron Pipe, Cement Lined, Push on, conform to current ANSI/AWWA Specification A21.51/C151 Pressure Class 350 (size 4" through 12"), Pressure Class 250 (sizes 14" through 20"), or Pressure Class 200 (for 24" through 36" pipe) Vendors:

(1) Pacific States Cast Iron Pipe Company
(2) Griffin Pipe
(3) United States Pipe and Foundry Company
(4) American Ductile Iron Pipe
(5) Clow Pipe (McWane Inc.)

l. PIPE, PLASTIC: Plastic pipe, C-900 PVC per ANSI/AWWA C900 Class 150, sizes 4" through 12" NSF61 approved furnished in laying lengths of 20'. The barrel shall conform to the outside dimensions of steel pipe (DR) or cast iron (CIOD) pipe equivalent and the attributes listed in the DR/CIOD or other districts. Variations may be required for transmission mains or special applications.

m. POLYETHYLENE ENCASEMENT: Polyethylene for ductile iron and installed fittings included, EXCEPT for the Coolidge Division. Minimum 8 MIL and installed per AWWA C105/A21.5 (c) and ASTM A-674-88 Manufactured by the Pacific States Cast Iron Pipe Company. The wrapping tape shall be minimum 10 mil very tape. No duct tape shall be used.

n. COUPLING: Mueller, straight three part union, tested to meet ANSI/AWWA C800, 110-403, conductive compression.

Mueller, H15428, straight coupling, conductive compression by metal ring, manufactured to meet ANSI/AWWA C800 specification, Size 2".

Mueller, H15453, straight coupling, conductive compression by ferrule iron gaul, tested to meet ANSI/AWWA C800 specification, Size 2".

Viking Johnson brand, sold by Mueller, Model # Straight 12", 24" 3, Model #Xtra Straight (4-30") or Mueller Transition, tested to meet AWWA/ANSI C219-91 specifications - certified to P30 P0011994 / Smith - Blair Quantum.

o. STOP, ANGLE METER, BALL: Mueller, valve, B24258, conductive compression by meter swivel nut, tested to meet ANSI/AWWA C800, size 5/8" x 3/4" x 3/4" or 3/4" female outlet, 7" by 4 1/2" wings.

Mueller, valve, B24360, female spud thread by meter swivel nut, tested to meet ANSI/AWWA C800, size 5/8" x 3/4" x 3/4" or 3/4" female outlet, 7" by 4 1/2" wings or size 1" for a 5" service.

p. STOP, CORP: Mueller, ball valve, B25008, taper thread by conductive compression, tested to meet ANSI/AWWA C800 specification, sizes: 3/4", 1" and 2".

Mueller, 300 Ball Curb Valve, B 25202, taper thread by conductive compression, tested to meet ANSI/AWWA C800 specifications, sizes 2" 12" Service.

q. STOP, CORP: Ground valve, H10798, inlet pipe thread by iron pipe thread, quarter turn check, Brass, tested to 300 pounds working pressure, tested to meet ANSI/AWWA C800 specification, size 2".

Mueller, H15178 Mueller 500 ball curb valve, female iron pipe by female iron pipe, quarter turn check, tested to meet ANSI/AWWA C800 specification, Size 2". (Blue set 1 9 15 1)

r. TAPPING SADDLE SWIM: Bilok, Cast Bronze, ASTM B584 86-5-5-5, double strap iron pipe threads, Meters 321 and 325, Washers are silicon bronze, ASTM B76, Gaskets are grade 60 Buna N or Mueller bronze double strap service saddle #4, 2 #8 screws, cast bronze ASTM B584, 85-5-5-5, or H10184, 200 psig, meets ANSI/AWWA C800.

s. TAPPING SETS: Mueller H304 Stainless Steel Tapping Sleeve, JCM 432 316 in Type 304 Stainless Steel Tapping Sleeve, Romac "SST" Type 304 Stainless Steel Tapping Sleeve w/ CAROLOK style CS II SS stainless steel/grain-wire-rated tapping gasket.

t. TAPPING VALVE: Mueller Resilient Wedge Tapping Valve, Catalog Number
1. A-24416, Class 150, sizes 4" through 12" 1. A-24416, Class 125, sizes 14" to 36" with Type 304 stainless steel fasteners. Bolted valves are supplied on 18" - 36" valves flange or mechanical joint per ANSI/AWWA C111, with wedge, non-Swing stem. Epoxy coated internal exterior per ANSI/AWWA C550 for NSF 61 compliance. 250 PSI flange for valves 4" to 12" 150 PSI flange for valves 14" to 36".

u. BRANCH: Mueller, H15366, 3" male iron pipe by 3/4" male iron pipe, tested to meet ANSI/AWWA C800 specification, Size 1" x 3/4" x 1" x 1-1/2", straight line.

v. VALVE, BOXES: Valve box with cover, adjustable Tyler 6857 A or equal, made of cast iron.

w. VAULTS: Utility Vault Company, Glendale, AZ.

(1) 4484 WA concrete vault with a 1660 aluminum double torsion arch with a recessed pedrock step, two - 36" x 24" center breakouts.

(2) 4276 WA concrete vault with a 4874 aluminum double torsion door with a recessed pedrock step, two - 36" x 24" center knock outs and adjustable frame.

(3) 4572 WA concrete vault with a 4874 aluminum double torsion door with a recessed pedrock step, two - 36" x 24" center knock outs.

x. VALVE, METER: Mueller, B24276 A Meter Set, bronze meter valve, female iron pipe by meter nut, quarter turn check, lever wing, tested to meet ANSI/AWWA C800 specification, Size 1".

Mueller, H15178, Meter Set, ball curb angle valves, conductive compression by female iron pipe, quarter turn check, wing tested to meet ANSI/AWWA C800 specification, Size 1".

y. METER, WATER: Recirculator Type copper meter yoke with horn unit direct and bullet and meter thread male, B24178 with Back wing Meter, 200 meter bolt valve, flatpoint, sizes 5/8" x 3/4", 5/8" x 3/4" x 7", 5/8" x 3/4" x 9".

Mueller, 2" copper meter yoke with low profile valve and outlet and female iron pipe threads, B24275-3PB160, with back wing Meter 300 ball angle meter valves on inlet and outlet wings. Rated 1" by pair with back wing Meter 200 ball valve.

The Contractor does not be responsible for providing the materials, the cost of which will be included in his unit bid price.

Nonetheless and concrete for thrust blocks, other anchors, reinforcing steel, all gravel, crushed stone, AB (c), earth, sand, or scrapped material which may be required at meter service blocking and shoring trenches, and for construction at flumes, all barricades and traffic control equipment, all restoration paving replacement and any water used for compaction of backfill.

(5) INSTALLATION OF MATERIALS

All meters are to be installed in accordance with manufacturer's recommendations unless otherwise directed by these Specifications.

All pipe fittings and valves shall be laid true to the lines, grades and locations established by the Specifications and the Construction Drawings.

The ends and inside of the pipe shall be thoroughly cleaned and inspected for damage. No damaged materials shall be installed in the water distribution system. Whenever the work crosses, for any reason, storage pipeline ends shall be tightly plugged by the Contractor. Plugs shall be watertight and approved by the company.

Concrete thrust blocks of the sizes required by the plans and specifications are to be provided at all valves, changes in direction of size, or any other point where an unbalanced thrust due to water pressure would exist. Thrust blocks are to be formed to prevent any concrete from coming over in into a joint.

Trench curves as shown on the Construction Drawings may be made without fittings when using push on joint pipe up to twelve inches (12") in diameter, if the deflection at the pipe does not exceed five degrees (5°) or nineteen inches (19") per eighteen foot (18') length of pipe. The minimum radius of such curves will be two hundred five feet (205').

Prior to construction, the appropriate agency/ies will be notified as required by the permit(s).

It shall be the Contractor's responsibility to uncover existing water lines being connected to, and to verify the location, depth and size of pipe before any construction begins.

Any construction performed without the knowledge of the duly authorized representative is liable for removal and replacement at the Contractor's expense.

Valve hydrants, frames, covers and valve boxes, etc. shall be adjusted to finished grade prior to the placing of the asphalt concrete surface course by the contractor (where applicable).

All exposed joints shall be painted with asphalt paint per Standard Detail # 3-8-0-4, 3-8-0-5.

All other services shall be set a minimum of two feet (2') on the customer's property, preferably within the P.U.E. and not within right-of-way.

Unless otherwise specified on the construction drawings all water mains shall be installed five feet (5') from the property line inside the right of way or easement.

Water valves shall be spaced not more than five hundred feet (500') in commercial districts and not more than eight hundred feet (800') in other districts. Variations may be required for transmission mains or special applications.

Installation of water line casing shall be per Standard Specification 3-9-2-8.1

Tracer Wire and Warning Tape are to be installed on laterals, tees, crosses, ells and for the length of the transmission line as specified in the service line. The tracer wire was to be installed on the water main 45 degrees from the vertical centerline of the pipe and shall be taped to the fittings directly and on the main every 10 feet using a minimum 10 mil vinyl tape. The tracer wire shall be placed between the valve riser and box with a minimum of 12" of wire inside. The warning tape shall be installed a minimum of two feet below the surface, being measured from finish grade, directly over the center of the pipe. Any splices in the tracer wire shall be joined using waterproof connectors. Any splices in the warning tape shall be joined using minimum 3M mid-splice. The tracer wire shall be tested for continuity after backfilling completion, but before paving. Any detected damage to the wire shall be repaired before paving will be allowed.

(6) BACKFILL OF WATER MAIN TRENCHES

Backfill of any excavation shall conform to the requirements of any of the governmental agencies having jurisdiction over the location. If no governmental agency having such jurisdiction specifies backfill or compaction requirements, and no special requirements are shown on the Construction Drawings, the procedure set forth in this section will apply for water line trenches.

The backfilling material above the pipe and haunch material shall be compacted to a minimum of 70% compaction within a utility easement and 90% compaction within a right-of-way as determined by AASHTO T-99 method A and T 191 if water setting is used for compaction, it is the responsibility of the Contractor to prevent the pipe from floating.

The backfilling material shall be either native material, 100% of which will pass through a one and one-half inch (1-1/2") screen and at least 20% of which will pass through a number 8 screen, or imported material which conforms to M.A.G. specifications for A.B.C. or type B select material. Bedding material shall be used below and around the pipe and a minimum of twelve inches (12") above the pipe. Shade and bedding materials to be mechanically compacted prior to remainder of trench back fill.

The completion of the trench shall be backfilled with native or imported material which shall be of sound earthen material free from broken concrete, wood, broken pavement, or other unsuitable substances. Except as otherwise specified, backfill may be material obtained in places larger than six inches (6") in greatest dimension.

Where settlement occurs, additional backfill material shall be placed and compacted and the trench shall be brought to finish grade.

(7) HYDROSTATIC TESTING OF COMPLETED PIPELINES

Hydrostatic testing of water pipelines shall be completed before the new system is connected into the existing water system so that all testing can be done against all new materials.

The completed section of water pipeline to be tested shall be filled with water with care being taken to expel all air from the pipe if necessary, the pipe shall be tapped at high points to vent air.

The Contractor shall provide all equipment and labor necessary to accomplish the testing and the pipe shall be included in the unit prices. The Contractor shall notify the Company in advance of the testing so that the Company can schedule a duly authorized representative to be at the site during testing. The Contractor, at his own expense, shall make any necessary repairs to the system being tested in order to cause the section being tested to meet the test limits set below. The Contractor may request authorization of the Company to connect the new pipelines to the existing system prior to completion of pressure testing when, in the Company's sole opinion such authorization will not compromise such connection.

The Contractor shall assume all responsibility for corrective measures, relative to Company's specifications after such connection, including, but not limited to, isolation of the new pipelines from the existing system, if necessary.

Connections prior to completion of pressure testing and/or be made unless prior Company authorization has been obtained and any extra expenses resulting from such connections shall be the sole responsibility of the Contractor.

Leakage tests will be for a period of two hours at 200 p.s.i. or 50 p.s.i. over the point of highest elevation. Leakage may not exceed 0.1 gallons per hour per one thousand feet (1,000') of pipe per inch of diameter. If any defects are not installed a second pressure test is required.

(8) STERILIZATION AND FLUSHING OF COMPLETED WATER PIPELINES

Sterilization and flushing will conform to recommendations of Arizona State Department of Health Services Engineering Bulletin Number 8, latest edition, or any future Arizona Department of Environmental Quality bulletin. Contractor to follow all conditions of any discharge permit.

(9) NO OTHER UTILITIES ALLOWED IN OR NEAR WATER PIPELINE TRENCHES

No other utility installations will be permitted in the water pipeline trench or within five feet (5') of the Company's water pipeline when running parallel to the water pipelines.

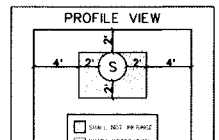
(10) PROTECTION OF WATER MAINS NEAR SEWERS

In order to protect water mains from contamination by sewers, the installation of the water mains must conform to the following requirements:

a. Horizontal: When water lines and sewers are laid parallel with each other, the horizontal distance between them shall not be less than six feet (6') Each line shall be laid on undisturbed or bedded material in a separate trench. Where conditions prevent the minimum horizontal separation set forth above, extra protection will be required. Extra protection shall consist of constructing the sewer main with mechanical joint ductile iron pipe or with slip-joint ductile iron pipe if joint restraint is provided, or ensuring both water and sewer main in concrete. See AWWA Standard Details 3-9-3-1 and 3-9-3-2.

b. Vertical: When a water main is parallel with or crosses a sewer main within ten feet (10') above the sewer or greater than ten feet (10') below the sewer, extra protection will be required. Extra protection shall consist of constructing the sewer main with mechanical joint ductile iron pipe or with slip joint ductile iron pipe if joint restraint is provided, or ensuring both water and sewer main in concrete. See AWWA Standard Details 3-9-3-1 and 3-9-3-2.

The Construction Drawings shall indicate the installation requirements. The drawings showing these exceptions shall have been approved by the appropriate state and/or county health department. Refer to the diagram below for identification.



Under no circumstances will the horizontal separation between sewer mains and water mains be less than two feet (2'). All distances are to be measured from the outside of the sewer main to the outside of the water main.

c. Sewer mains typically, pressure tested in place to 50 p.s.i. or five pounds per square inch (5 p.s.i.) above the maximum anticipated surcharge pressure. Where a sewer force main crosses above or less than six feet (6') below a water line, the sewer main shall be pressure tested to either 150 p.s.i. or twice the working pressure, whichever is greater, while the water line is at normal operating pressure. Both lines shall be pressure tested for ten minutes with no drop in pressure.

d. Water mains typically, pressure tested in place to 150 p.s.i. or five pounds per square inch (5 p.s.i.) above the maximum anticipated surcharge pressure. Where leakage may be used for pressure sewers and force mains at distances greater than twenty feet (20') from drinking water wells.

e. Water main pipe, pressure tested in place to 150 p.s.i. or five pounds per square inch (5 p.s.i.) above the maximum anticipated surcharge pressure. Where leakage may be used for pressure sewers and force mains at distances greater than twenty feet (20') from drinking water wells.

f. No septic tanks/subsurface leach systems shall be constructed within one hundred feet (100') of a drinking water well.

g. All distances are measured perpendicularly from the outside of the sewer main to the outside of the water main. Shorter separation requirements do not apply to building plumbing or individual house service connections.

h. Use Mechanical joint ductile iron pipe with Megalug thrust restraints, a distance of not less than 200 feet on each side of a sewer at storm drain crossing.

(11) CAPITAL LOSS

Water crossing existing water mains a minimum of 95% compaction is required to the bottom of existing mains.

Arizona Water Company engineers that no party be permitted to construct existing cement/asbestos or ductile iron pipes, unless authorized by the company. Slurry may be poured in the bottom of the sewer trench stopping three inches (3") below the existing water main. The backfill used around the main should be AC in surface depth to prevent slurry from contacting existing main.

(12) WATER MAIN MATERIAL SPECIFICATIONS

Ductile iron pipe (Push-on Joint) minimum class 350, cement lined and conform to AWWA C151.

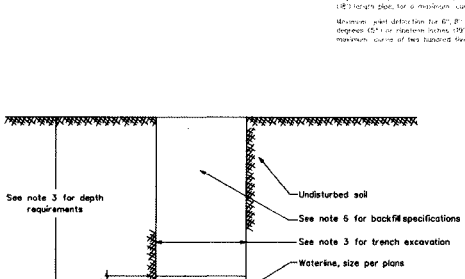
All gate line valves shall conform to AWWA C509 with a minimum working pressure of 300 psi.

All valves fittings to be cement lined in accordance with AWWA C104 and shall conform to AWWA C110 with a minimum working pressure of 250 psi. Except for the Coolidge System. See Note 4)

Maximum joint deflection for 6" mechanical joint ductile iron pipe is seven degrees, seven minutes (7°, 7') or twenty seven inches (27") per eighteen foot (18') length pipe, for a minimum curve of one thousand forty-five feet (1045').

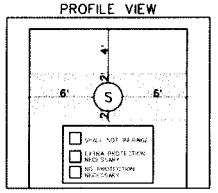
Maximum joint deflection for 8" and 12" mechanical joint ductile iron pipe is five degrees, twenty two minutes (5°, 22') or twenty inches (20") per eighteen foot (18') length pipe, for a minimum curve of one hundred ninety five feet (195').

Minimum joint deflection for 6", 8" and 12" mechanical joint ductile iron pipe is five degrees (5°) or nineteen inches (19") per eighteen foot (18') length pipe for a minimum curve of two hundred five feet (205').



TYPICAL TRENCH DETAIL
Per MAG Detail 601, 601.4.2, 601.4.6

e. The minimum separation between force mains or pressure sewers and water mains shall be two feet (2') vertically and six feet (6') horizontally under all circumstances. Where a sewer force main crosses above or less than six feet (6') below a water line, the sewer main shall be encased in pipe not less than 18" I.D. concrete for ten feet (10') on either side of the water main. Refer to the diagram below for clarification.



ARIZONA WATER COMPANY
3805 N. BLACK CANYON HWY POST OFFICE BOX 29006
PHOENIX, ARIZONA 85038-9006
(602) 240-6860

CONSTRUCT APPROX. 1,428 L.F. OF 12INCH D.I.P. FLUSH LINE ON HANCOCK TRAIL FROM WELL NO. 33 TO HACIENDA ROAD IN CASA GRANDE, AZ

STANDARD DETAILS AND SPECIFICATIONS

PV-0087
SHEET 7 OF 7

1-5301
PINAL VALLEY
NE 1/4 SEC. 25, T. 6 S., R. 6 E.
0437
2/6/2015
AS SHOWN
JAK

263-1100
1-800-STAKE-IT

This redistribution shown is to be installed in accordance with the Arizona Water Company standard specifications on file with the Arizona Department of Environmental Quality

REVISED PER FIELD AS BUILTS 5/27/15 JAK

AS BUILT
FOR WATER ONLY
Expires 6/30/16

REVISED PER FIELD AS BUILTS 5/27/15 JAK

9.20

ARIZONA WATER COMPANY
STANDARD SPECIFICATION
TYPICAL TARGET BLOCKING SCHEDULE

ARIZONA WATER COMPANY
STANDARD SPECIFICATION
TYPICAL VALVE SUBJECT TO NON-REGULAR AND IRREGULAR TRAFFIC

ARIZONA WATER COMPANY
STANDARD SPECIFICATION
TYPICAL AIR RELEASE VALVE

ARIZONA WATER COMPANY
STANDARD SPECIFICATION
TYPICAL PARALLEL FIRE HYDRANT

ARIZONA WATER COMPANY
STANDARD SPECIFICATION
TYPICAL VERTICAL GATE VALVES

ARIZONA WATER COMPANY
STANDARD SPECIFICATION
TYPICAL GATE VALVE LOCATIONS

ARIZONA WATER COMPANY
STANDARD SPECIFICATION
TARGET BLOCK (4" VERTICAL RISER)

ARIZONA WATER COMPANY
STANDARD SPECIFICATION
LOCATOR WIRE TERMINATION

ARIZONA WATER COMPANY
STANDARD SPECIFICATION
PIPE WARNING TAPE AND LOCATOR WIRE

ARIZONA WATER COMPANY
STANDARD SPECIFICATION
TYPICAL PROFILE VIEW
TYPICAL WATER TRENCH DETAIL
WIRE GENERAL NOTES

ARIZONA WATER COMPANY
STANDARD SPECIFICATION
BACKFILL PAVEMENT AND SURFACE REPLACEMENT

ARIZONA WATER COMPANY

3805 N. BLACK CANYON HIGHWAY, PHOENIX, ARIZONA 85015-5351 • P.O. BOX 29006, PHOENIX, AZ 85038-9006
PHONE: (602) 240-6860 • FAX: (602) 240-6874 • TOLL FREE: (800) 533-6023 • www.azwater.com

June 2, 2015

Ms. Linda Harris
City of Casa Grande
Development Center
510 E. Florence Boulevard
Casa Grande, AZ 85122

Re: Approval of Construction

Dear Ms. Harris:

Enclosed is the Engineer's Certificate of Completion for the above-referenced project along with a copy of the Approval to Construct, the pressure, chlorination, bacteriological test data, and As Built Drawing.

If you have any questions concerning this construction, please call or write at your convenience.

Very truly yours,

Andrew J. Haas, P. E.
Chief Engineer

afh
Enclosures

E-MAIL: mail@azwater.com

ENGINEER'S CERTIFICATE OF COMPLETION AND FINAL INSPECTION "ECC"

ARIZONA DEPARTMENT OF ENVIRONMENTAL QUALITY (ADEQ) – WATER QUALITY DIVISION 5/01

ADEQ FILE NO.: CDP-15-00374 → X DRINKING WATER DESIGN *(New separate form now used for WASTEWATER DESIGN)* If separate Drinking Water & Wastewater Approvals to Construct were issued, separate ECCs required	COUNTY: Pinal OWNER: ARIZONA WATER COMPANY

Project Name: Hancock Trail from Well No. 33 to Hacienda Road *(as shown on Approval to Construct)*

W.A. No.1-5301 SYSTEM NO.11-009

Project Description: Construct approximately 1,461 LF of 12-inch DIP flush line on Hancock Trail from Well No. 33 to Hacienda Road in Casa Grande, AZ.

The flushing hydrant was relocated from STA 32+72 to STA 32+57 due to a conflict with the existing fire hydrant.

A vertical realignment was installed at STA 18+70 due to a conflict with the existing well discharge line.

(as shown on Approval to Construct, unless completed project differed, in which case describe in detail)

I, James T. Wilson, a Professional Engineer registered in the State of Arizona, have inspected the construction of the above described project, and certify that *(check all applicable boxes, complete applicable blanks):*

ITEMS 1) THRU 4) MUST BE COMPLETED

☒ **1) The work on this project was completed on May 13, 2015 (date).**

☒ **2) On May 13, 2015 a final construction inspection was conducted by ☐ MYSELF [←check one→] ☒ under MY DIRECT SUPERVISION by Scott Johnson (print name).**

☒ **3) The materials utilized and the installation and construction of those materials and equipment are in conformance with the approved plans and specifications.**

☒ **4) All provisions listed in the ADEQ Approval to Construct for this project, a copy of which I have attached to this certificate, have been fully satisfied or exceptions are listed on the reverse side of this certificate.**

☒ **5) All construction and preoperational tests (infiltration, exfiltration, (pressure), deflection, (chlorination), (bacti), etc.) *[circle types performed]* were properly conducted, met ADEQ requirements, and are represented in attachments to this Certificate. The total number of pages of test results attached is 4.**

EITHER 6A) or 6B) MUST BE CHECKED

☒ **6A) Any deviation from the approved plans and the ADEQ Certificate of Approval to Construct have been noted on the attached "As-Built" plans (as stipulated in the Approval to Construct provisions) prepared and sealed pursuant to A.R.S.§ 32-125 on 6-2-15 (date). Of the total 7 sheets of "As-Built" plans attached, deviations from the approved plans are shown on sheets numbered 2 OF 7 AND 5 OF 7. All deviations from the approved plans comply with the ADEQ minimum design and construction standards contained in statute, rule, bulletin or referenced codes, and with the key elements of the approved plans.**

☐ **6B) The completed project did not deviate from the plans which received the Approval to Construct.**

EITHER 7A) or 7B) MUST BE CHECKED

☒ **7A) This project did not require the preparation of an Operation and Maintenance Manual.**

(the only projects which do NOT require an O&M manual are gravity-only sewage collection systems, single-family residence septic systems, and drinking water distribution projects that include no source, storage, or pressurization facilities)

☐ **7B) A FINAL Operation and Maintenance Manual has been prepared for this project and a copy is attached. This manual meets all ADEQ minimum design and construction standards contained in statute, rule, bulletin, referenced codes, the key elements of the approved plans, and, if applicable, with Attachment B of the September 10, 1994 Engineering Advisory for Individual Alternate Systems.**

EITHER 8A) or 8B) MUST BE CHECKED

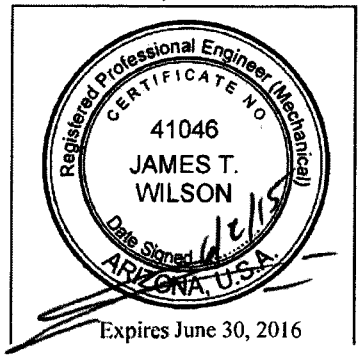
☒ **8A) Review of this project for Approval of Construction issuance does not require a fee because this project involves only drinking water, not wastewater.**

☐ **8B) In accordance with A.A.C. R18-9-103 Schedule B, a check in the amount of $_____ is attached as initial fee for review of the submitted and other information for issuance of an Approval of Construction.**

ADDITIONAL INFORMATION

☐ **9) Other, see additional information on reverse side.**

↓ **ENGINEER'S SEAL per AAC R4-30-304.B** ↓



Expires June 30, 2016

Engineer Address PO Box 29006, Phoenix, AZ 85038-9006

Phone 602-240-6860

AZ DEPARTMENT OF ENVIRONMENTAL QUALITY ACCEPTANCE

EMPLOYEE SIGNATURE **(PRINTED NAME)** **DATE**

ADEQ Arizona Department of Environmental Quality

ENGINEERING REVIEW SECTION
DATA REQUIRED WITH ECC

Please complete the test data and submit this form with the Engineers Certificate of Completion. An Approval of Construction cannot be issued without the data identified below in accordance with Arizona Administrative Code (A.A.C.) R18-5-508(C). Please attach all supplemental information and calculations to this form.

WELL #33 12" FLUSH LINE

DATA

1.

PRESSURE TEST DATA				
Indicate Segment Tested	WELL #33 12" FLUSH LINE			
Pressure and Leakage Test Results (Pass/Fail)	PASS	PASS		
Date Tested	5-1-15	5-1-15		
Time Started	1145pm	1:45pm		
Time Finished	3:45pm	3:45pm		
Pipe Diameter	12"	6"		
Footage Tested	1478 LF	5' LF		
Allowable Leakage	3.5472	0.0016		
Leakage Observed	0	0		
Pressure at Test Point	205 psi	205 psi		
Employee Observing the Test (Please Print Legibly)	SCOTT H. JOHNSON			
Signature of Employee Observing the Test	Scott H. John			

2.

DISINFECTION SAMPLING					
Initial Sampling	Date	5-4-15	5-4-15		
(Minimum 50 ppm available chlorine)	Time	11:00 AM	11:00 AM		
	ppm Cl_2	200ppm	200ppm		
After 24 Hours Detention Time	Date	5-6-15	5-6-15		
(Minimum 10 ppm free chlorine)	Time	6:45 AM	6:45 AM		
	ppm Cl_2	200ppm	200ppm		
After Sufficient Flushing	Date	5-6-15	5-6-15		
(Water is clear and system Cl_2 residual is measured)	Time	9:45 AM	9:40 AM		
	ppm Cl_2	1.3	1.0		
Bacteriological Sampling(s):	Date	5-6-15	5-6-15		
	Time	10:00 AM	10:10 AM		
	Attached (Y/N)	Y	Y		
		Yes/No	Yes/No	Yes/No	Yes/No

3.

Certification

I, SCOTT H. JOHNSON, certify that I have inspected the work performed and have found it to be satisfactory and in accordance with Arizona Administrative Code, Arizona Engineering Bulletins, and the approved specifications.

Scott H. John — 5-13-15

Authorized Persons Signature — Date

Professional Seal (As applicable Professional Engineer (Mechanical))

Registered Professional Engineer — CERTIFICATE NO. 41046 — JAMES T. WILSON — Date Signed 6/2/15 — ARIZONA U.S.A.

EXPIRES 6/30/16

LEGEND
Technical Services, Inc.
www.legend-group.com

17631 N. 25th Avenue • Phoenix, AZ 85023
P (602) 324-6100 • F (602) 324-6101

Regina Lynde
Arizona Water Company
3805 N. Black Canyon Hwy
Phoenix, AZ85015

Project: Specials
Project Number: Well #33 12 Flush Line WA-1-5301 5/6/15

Reported:
05/11/15 15:21

Analyte

Well #33 12" Flush Line #1 (Well #33 12" Flush Line #1) (5050517-01) Drinking Water (Grab) Sampled: 05/06/15 10:00
Received: 05/07/15 08:00

Analyte	Result	PQL	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Legend Technical Services of Arizona, Inc.									
Microbiology									
E. coli	Absent		P/A	1	B5E0200	05/07/15 13:30	05/07/15 13:30	SM 9223B	
Total Coliforms	Absent		P/A	1	B5E0200	05/07/15 13:30	05/07/15 13:30	SM 9223B	

Well #33 12" Flush Line #2 (Well #33 12" Flush Line #2) (5050517-02) Drinking Water (Grab) Sampled: 05/06/15 10:10
Received: 05/07/15 08:00

Analyte	Result	PQL	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Legend Technical Services of Arizona, Inc.									
Microbiology									
E. coli	Absent		P/A	1	B5E0200	05/07/15 13:30	05/07/15 13:30	SM 9223B	
Total Coliforms	Absent		P/A	1	B5E0200	05/07/15 13:30	05/07/15 13:30	SM 9223B	

Sample Condition Upon Receipt:

Temperature: 2.00 C
All samples were received in acceptable condition unless noted otherwise in the case narrative.

Case Narrative:

Holding Times: All holding times were met unless otherwise qualified.
QA/QC Criteria: All analyses met method requirements unless otherwise qualified.
Accreditations: AZ(PHX)0004, AZ(TUC)OOO4, AIHA#102982, CDC ELITE Member.
Accreditation is applicable only to the test methods specified on each scope of accreditation held by LEGEND.
Comments: There were no problems encountered during the processing of the samples, unless otherwise noted.
All samples were analyzed on a "wet" basis unless designated as "dry weight".

Chain of Custody indicates special only do not report to ADEQ- BF

Notes and Definitions

Legend Technical Services of Arizona, Inc.

Barbara Franke

Client Services Representative

The results in this report apply to the samples analyzed in accordance with the chain of custody document. This analytical report must be reproduced in its entirety.

Phone Number: (602) 324-6100

Regina Lynde
Arizona Water Company
3805 N. Black Canyon Hwy
Phoenix, AZ85015

Project: Specials
Project Number: Well #33 12 Flush Line WA-1-5301 5/6/15

Reported:
05/11/15 15:21

Laboratory Submittal ID: 505517

CHAIN OF CUSTODY RECORD

LEGEND Technical Services, Inc.
www.legend-group.com

☐ 17631 N. 25th Avenue • Phoenix, AZ 85023 • (602) 324-6100 • Fax (602) 324-6101
☐ 4585 S. Palo Verde Rd, Ste 423 • Tucson, AZ 85714 • (520) 327-1234 • Fax (520) 327-0516

Page 1 of 1

Please Print Clearly

CLIENT INFORMATION

Client Name	Address	City	State	Zip	Phone	Fax Number or Email Address
ARIZONA WATER CO.	220 E. 2ND ST	CASA GRANDE	AZ	85122	(520) 836-8785	(520) 836-2850

Project Name	Project Number	Contact	P.O. No.	Fax Results ☒	QC Report ☐	EDD ☐
WELL #33 12" FLUSH LINE	WA-1-5301	RAY MURRIETA		Email Results ☒	Special Detection Limits ☐	

SAMPLE TYPE CODES

DW=Drinking Water; WW=Wastewater; SW=Surface Water; GW=Groundwater; O=Other
S=Soil/Solid; T=Travel Blank; F=Food; G=Sludge/Biosolids

TURN AROUND TIME

Laboratory Authorization Required for Rush
☐ Standard 7-10 Day
☐ Other

REQUESTED ANALYSES

Client's Sample Identification	Date	Time	Sample Location	Composite	Grab	Sample Type	Compliance	No. of Containers	Total Coliform/E. coli		Lab No.
WELL #33 12" FLUSH LINE #1	5/6/15	10:00am	WELL #33 12" FLUSH LINE #1			DW		1	X		01
WELL #33 12" FLUSH LINE #2	5/6/15	10:10am	WELL #33 12" FLUSH LINE #2			DW		1	X		02

TO ENSURE COMPLETION OF ANALYSIS, SAMPLES MUST BE RECEIVED AT LEAST 4 HOURS PRIOR TO THE HOLD TIME EXPIRATION

Comments / Special Instructions: (SPECIAL) DO NOT REPORT TO A.D.E.Q. No. 1 - 1.3 Cl2 No. 2 - 1.0 Cl2
1281490159798759 14

SAMPLE CONDITION UPON RECEIPT (Lab Use)		
No. of Containers	2	
Temperature	2.0	°C
Custody Seal	Y	(N)
Received Cold	Y	N
Preservation	(Y)	N

RELINQUISHED BY	Date	Time	SAMPLES RECEIVED BY	Date	Time
① Sampler Signature: Scott H. Johnson / Sampler Printed Name: SCOTT H. JOHNSON	5/6/15		Signature: HWard / Printed Name: HWard UPS	5/6/15	
② Signature: UPS / Printed Name: UPS	5/7/15	730	Signature: HWard / Printed Name: HWard	5/7/15	800
③ Signature / Printed Name			Signature / Printed Name		

WHITE-LAB YELLOW-CLIENT

FORM GEN-170 (12/13)

The results in this report apply to the samples analyzed in accordance with the chain of custody document. This analytical report must be reproduced in its entirety.

City of Casa Grande, Development Center, 510 E. Florence Blvd, Casa Grande, AZ 85122 (520) 421-8630

CERTIFICATE OF APPROVAL TO CONSTRUCT WATER FACILITIES

CDP No: CDP-15-00374	**I-5310 Well No 33**	**12-inch flush line**
System Name: Pinal Valley		**PWS Number: 11-009**
Project Owner: Arizona Water Company		
Address: PO Box 29006, Phoenix AZ 850038-9006		
Project Location:	**Hancock Trail from Well No. 33 to Hacienda Road**	
Project Description: Construct approximately 1,461 L.F. of 12-inch D.I.P. flush line on Hancock Trail from Well No 33 to Hacienda Road in Casa Grande AZ		

Approval to construct the above-described facilities as represented in the approved documents on file with the City of Casa Grande is hereby given subject to provisions 1 through 5 continued on page 2 of 2

1. This project must be constructed in accordance with all applicable laws, including Title 49, Chapter 2, Article 9 of the Arizona Revised Statutes and Title 18, Chapter 5, Article 5 of the Arizona Administrative Code.
2. Upon completion of construction, the engineer shall fill out the Engineer's Certificate of Completion and submit it to the City of Casa Grande. If all requirements have been completed, the City will issue a Certificate of Approval of Construction. R18-5-507(B), Ariz. Admin. Code. At the project owner's request, the Department **may** conduct the final inspection required pursuant to R18-5-507(B); such a request must be made in writing in accordance with the time requirements of R18-5-507(C), Ariz. Admin. Code.
3. This certificate will be void if construction has not started within one year after the Certificate of Approval to Construct is issued, there is a halt in construction of more than one year, or construction is not completed within three years of the approval date. Upon receipt of a written request for an extension of time, the City may grant an extension of time; an extension of time must be in writing. R18-5-505(E), Ariz. Admin. Code.
4. The project owner shall be responsible to submit to the City a complete Approval of Construction application and required documentation. Operation of a newly constructed facility shall not begin until a Certificate of Approval of Construction has been issued by the City of Casa Grande. R18-5-507(A), Ariz. Admin. Code.

Approved by City Engineer: _____ Date: 3.3.

RECEIVED
MAR 11 2015
PHOENIX OFFICE
ENGINEERING

5. The City of Casa Grande's review of this application was subject to the requirements of the licensing time frames ("LTF") statute under Arizona Revised Statutes ("A.R.S.") § 41-1072 through§ 41-1079 and the LTF rules under Arizona Administrative Code ("A.A.C.") R18-1-501 through R18-1-525. This Notice is being issued within the overall time frame for your application.

City of Casa Grande hereby approves your application for Approval to Construct Drinking Water Facilities under A.R.S. § 49-351. Your copy is enclosed.

This decision is an appealable agency action under A.R.S. § 41-1092. You have a right to request a hearing and file an appeal under A.R.S. § 41-1092.03(B). You must file a written Request for Hearing or Notice of Appeal within 30 days of your receipt of this Notice. A Request for Hearing or Notice of Appeal is filed when it is received by ADEQ's Hearing Administrator as follows:

Office of Administrative Counsel
Arizona Department of Environmental Quality 1110 W. Washington Street
Phoenix, AZ 85007

The Request for Hearing or Notice of Appeal shall identify the party, the party's address, the agency and the action being appealed and shall contain a concise statement of the reasons for the appeal. Upon proper filing of a Request for Hearing or Notice of Appeal, City of Casa Grande will serve a Notice of Hearing on all parties to the appeal. If you file a timely Request for Hearing or Notice of Appeal you have a right to request an informal settlement conference with ADEQ under A.R.S. § 41-1092.06. This request must be made in writing no later than 20 days before a scheduled hearing and must be filed with the Hearing Administrator at the above address.

Please contact the City of Casa Grande Development Center at 520-421-8630 if you have questions regarding this Notice or the Certificate of Approval to Construct.

Western Group Rate Case

Exhibit FKS-1

5303 PV 32 & 33 Nitrate

ARIZONA WATER COMPANY
WORK AUTHORIZATION

W.A. NUMBER: 1-5303
P.E. NUMBER: 1442
BUDGET ITEM NO.: 1-5303
SHEET NO.: 1 of 2

SYSTEM:	PINAL VALLEY	RETENTION REQUIRED:	☑ YES ☐ NO
DIVISION:	CASA GRANDE	WORK TO START BY:	UPON AUTHORIZATION
RESPONSIBLE PERSON:	JOHN KNOBBE	WORK TO BE FINISHED BY:	WITHIN 100 DAYS
TAX CODE:	0437		

DESCRIPTION OF WORK:

Design and install nitrate analyzers and electrical controls at Wells No. 32 and 33 in Casa Grande, Arizona.

FACTORS JUSTIFYING WORK:

APPROVED 2015 BUDGET ITEM ($125,000)
Company Engineers were informed of the recent Wells No. 32 and 33 (Well) water quality sample results for nitrates of more than 9 mg/L, which is approaching the U.S. Environmental Protection Agency (EPA) maximum contaminant level (MCL) of 10 mg/L. EPA defines a violation of the MCL for nitrates as a Tier 1 acute violation. Water quality sample results for each Well have shown a steady increase in nitrates. Company Engineers determined it is necessary to install a nitrate analyzer at each Well discharge head to monitor nitrate levels and install controls at each Well to ensure that water pumped into the distribution system does not exceed the MCL. The nitrate analyzer and controls allow each Well to pump into the distribution system at a nitrate level up to an operator determined set point. The Company does not have a water storage tank in this area to blend with additional sources of supply to reduce nitrate concentrations. Installing a nitrate analyzer at each Well allows the Company to ~~continue to~~ provide a safe, adequate and reliable drinking water supply to the Pinal Valley water system.

COST ESTIMATE		AUTHORIZATION	DATE
COST OF WORK:		PREPARED BY: John Knobbe 2-3-15	1-27-2015
MATERIAL	52,000		
LABOR	15,430	REVIEWED FOR ESMT/ROW VERIFICATION: Charles Briggs CB 02-03-2015	01-27-2015
CONTRACT PORTION	88,218		
OVERHEAD	18,700	REVIEWED BY: ~~James Wilson~~ 2/4/15	1/27/15
TOTAL AUTHORIZED EXPENDITURES CHARGEABLE TO THIS W.A.	$ 174,348		
FUNDS RECEIVED:		APPROVED BY ENGINEERING: Fredrick Schneider 2-5-15	1-28-15
CONTRIBUTIONS RECEIVED	0		
REFUNDABLE ADVANCES RECEIVED	0	APPROVED BY FINANCE: Joseph Harris	1/30/15
TOTAL CONTRIBUTIONS/ADVANCES	0		
NET COMPANY CASH REQUIRED	$ 174,348	AUTHORIZED BY PRESIDENT: William Garfield	1-30-2015

COMMENTS:

Transfer additional funds required from
WA 1-5170 (Cottonwood BPS) $49,348.
Transfer charges from PE 1442 to this WA.

CONSTRUCTION RELEASE:

RELEASED TO CONSTRUCTION
Authorized by FRED SCHNEIDER
Date 2/3/2015

2015 BUDGET

AFH

ARIZONA WATER COMPANY

WORK AUTHORIZATION - DETAIL SHEET

W.A. NUMBER: 1-5303
P.E. NUMBER: 1442
BUDGET ITEM NO.: 1-5303
SHEET NO.: 2 of 2

RETIREMENT PROPERTY UNITS	PLANT PROPERTY ACCOUNT	UNIT DESCRIPTION	QUANTITY	YEAR INSTALLED AND W.A. NUMBER

PROJECT DESCRIPTION:

Design and install nitrate analyzers and electrical controls at Wells No. 32 and 33 in Casa Grande, Arizona.

	DESCRIPTION	PLANT PROP ACCT	QUANTITY	UNIT COST	TOTAL
CONTRACT WORK	Design and layout nitrate analyzer and electrical controls	332	1	$ 10,221.00	$ 10,221
	Install nitrate analyzer enclosures, conduits, wires, air				
	conditioner, heater, area lights and electrical controls	332	2	15,500.00	31,000
	Install HACH nitrate analyzer and controller	332	2	750.00	1,500
	Install analyzer sample feed line and related fittings	332	2	2,400.00	4,800
	Install analyzer sample waste line and related fittings	332	2	950.00	1,900
	Install 6 ft.x6 ft. concrete foundation with floor drain	332	2	1,900.00	3,800
	Install programming for nitrate analyzer system and SCADA	332	2	4,139.50	8,279
	Install Aluma-Line shade canopy	332	2	7,800.00	15,600
	Contracting Tax	332	1	5,302.30	5,302
	100% Performance and Payment Bonds Cost	332	1	816.00	816
	Construction contingency	332	1	5,000.00	5,000
	SERVICE CONNECTIONS COMPLETE: DOUBLE-LONG	345			
	SERVICE CONNECTIONS COMPLETE: DOUBLE-SHORT	345			
	SERVICE CONNECTIONS COMPLETE: SINGLE-LONG	345			
	SERVICE CONNECTIONS COMPLETE: SINGLE-SHORT	345			
TOTAL CONTRACT WORK					$ 88,218
MATERIALS	HACH NITRATAX plus sc analyzer, controller and field service	332	2	$ 26,000.00	$ 52,000
	SERVICE CONNECTIONS: DOUBLE-LONG	345			
	SERVICE CONNECTIONS: DOUBLE-SHORT	345			
	SERVICE CONNECTIONS: SINGLE-LONG	345			
	SERVICE CONNECTIONS: SINGLE-SHORT	345			
	METERS	346			
TOTAL MATERIALS					$ 52,000
LABOR	Engineering design and project management	332	140	$ 65.00	$ 9,100
	Field design review	332	16	55.00	880
	TESTING FEE	332	1	$ 500.00	500
	PERMIT FEE				
	SURVEY FEE	332	1	2,750.00	2,750
	FIELD INSPECTION	332	40	55.00	2,200
	INSTALL SERVICE CONNECTIONS: DOUBLE-LONG	345			
	INSTALL SERVICE CONNECTIONS: DOUBLE-SHORT	345			
	INSTALL SERVICE CONNECTIONS: SINGLE-LONG	345			
	INSTALL SERVICE CONNECTIONS: SINGLE-SHORT	345			
TOTAL LABOR					$ 15,430
SUBTOTAL - CONTRACT WORK, MATERIALS, AND LABOR					$ 155,648
OVERHEAD					18,700
TOTAL	REFUNDABLE PORTION ☐	NON-REFUNDABLE PORTION ☐		**COST ESTIMATE**	$ 174,348

AFH

ARIZONA WATER COMPANY

3805 N. BLACK CANYON HIGHWAY, PHOENIX, ARIZONA 85015-5351 • P.O. BOX 29006, PHOENIX, AZ 85038-9006
PHONE: (602) 240-6860 • FAX: (602) 240-6874 • TOLL FREE: (800) 533-6023 • www.azwater.com

February 3, 2015

Mr. Michael Young
Fann Environmental, LLC
6708 Corsair Avenue, Suite A
Prescott, AZ 86301

Re: WA 1-5303 Mission Royale Well Nos. 32 & 33 Nitrate Analyzers

PROJECT: Nitrate Analyzers	
SYSTEM: Pinal Valley	
CONTRACT NO.:	
P.E. NO.:	W.A. NO.: 1-5303

Dear Mr. Young:

Enclosed is your copy of the Proposal/Contract for the above-referenced project, which has been accepted by Arizona Water Company (the "Company"). The project shall be constructed in accordance with the Company's *General Conditions of Contract, the Specifications and the Drawings* which were included with the Company's previously provided Proposal/Contract, copies of which are being provided again and attached herewith.

Also enclosed are two copies of the Commencement Notice for the above-referenced project. Please sign one of the copies and return it to my attention retaining the other for your records.

As provided in paragraph 4 of the Company's Proposal/Contract executed by the Company on February 5, 2015, Fann Environmental, LLC acknowledged that one hundred percent (100%) Performance and Payment Bonds are required and must be provided to the Company prior to the commencement of work. In addition, as provided in paragraph 44 of the Company's General Conditions of Contract, the 100% Performance and Payment Bonds must be provided within ten (10) calendar days of the date of the Commencement Notice. Failure to provide an acceptable 100% Performance and Payment Bond does not limit the Company's

ability to terminate the Proposal/Contract or seek restitution for damages that the Company may have or will incur.

Prior to the start of construction, please call Ray Murrieta, Division Manager at 520-836-8785 to schedule a pre-construction meeting. In addition, please provide the required Performance and Payment Bonds to the Company promptly so that the contracted work can be completed within the contract's timeline.

If you have any questions, please call me at this office.

Very truly yours,

John P. Knobbe
Lead Designer
jknobbe@azwater.com

afh
Enclosure

ARIZONA WATER COMPANY

Pinal Valley - Casa Grande
220 E. 2nd Street

PROPOSAL/CONTRACT

CONTRACTOR: FANN ENVIRONMENTAL, LLC	SYSTEM: PINAL VALLEY
ADDRESS: 6708 CORSAIR AVENUE, SUITE A	W.A. No(s): 1-5308 1442
CITY ST ZIP: PRESCOTT, AZ 86301	BID DUE DATE: May 29, 2014

CONTRACTOR SUBMITS this PROPOSAL/CONTRACT to ARIZONA WATER COMPANY, an Arizona corporation (the "Company"), to perform the work and complete the project described on Page 2 (the "Project"), as an independent prime contractor.

1. Contractor certifies that it has a complete copy of, and has read, understands and accepts, the Company's General Conditions of Contract, and the Company's Construction Specifications and Standard Specification Drawings, (the "Specifications"), all of which are attached hereto. Contractor has examined the specific plans and related construction drawings for the Project (the "Drawings"), copies of which are also attached hereto. The General Conditions of Contract, Specifications and Drawings are incorporated into this Proposal/Contract. Contractor affirms that all work and materials to be furnished or purchased for the Project will be in strict conformance with the General Conditions of Contract, Specifications and Drawings.
2. Contractor represents and warrants that it has satisfied and complied with the provisions of Section 6, Contractor Understands Work and Working Conditions, of the General Conditions of Contract prior to submitting this Proposal/Contract.
3. Contractor represents that this Proposal/Contract is fair and honest in all respects, is submitted in good faith and is not submitted in collusion with any other company, entity or person.
4. Contractor acknowledges that one hundred percent (100%) Performance and Payment Bonds are required and must be provided to the Company prior to the commencement of work.
5. Prior to the commencement of work, Contractor will submit to the Company a list of all materials to be used in the Project. The materials list will include the manufacturer, part number, price and quantity included in this Proposal/Contract.
6. Contractor will furnish all labor, tools, equipment and materials required to complete the Project according to the General Conditions of Contract, Specifications and Drawings. No materials purchased by Contractor to be incorporated into the Project are subject to tax at the time of purchase and Contractor will not charge the Company for any such tax. Contractor will pay the applicable transaction privilege tax (the "Contracting Tax") on the Project after Contractor receives payment of the final Project invoice from the Company. The cost of materials incorporated into the Project which are exempt by Arizona Revised State Statues ("A.R.S.") from the Contracting Tax, for example, pipes or valves having a diameter of four (4) inches or larger, including equipment, fittings and any other related part that is used in operating the pipes or valves (A.R.S. §42-5061 B.6.), will not be included in the total cost of the labor and materials upon which the Contracting Tax is computed. Contractor retains full liability and obligation to pay the Contracting Tax and will defend and indemnify the Company against any demand or obligation to pay the Contracting Tax.
7. Contractor will maintain detailed accounting records of all materials purchased and incorporated into the Project. Such records will include all supporting original vendor invoices for all materials purchased. Following completion of the Project, Contractor will submit an itemized accounting to the Company which will include all supporting original vendor invoices and satisfactory evidence of payment thereof. The Company will not pay Contractor for materials not actually incorporated into the Project, and the disposition of such materials will remain Contractor's responsibility.
8. The Estimated Total Cost of the Project, shown on Page 2, is based on estimated labor and material quantities to be furnished. It includes an estimate of the Contracting Tax and the cost of the required Performance and Payment Bonds. Contractor will not cancel, modify or withdraw this Proposal/Contract during a ninety-day (90) period commencing on the Bid Due Date. The Company may accept this Proposal/Contract by signing and mailing, or otherwise delivering, a copy hereof to Contractor during such ninety-day (90) period. If the Company does not accept this Proposal/Contract during such ninety-day (90) period, Contractor may cancel this Proposal/Contract by giving written notice of cancellation to the Company.
9. Prior to the commencement of work, Contractor will provide the Company with a detailed construction schedule, in either Gantt or CPM form, identifying all tasks to be performed from the date of the written Commencement Notice through completion of the Project, including testing, training of Company Personnel and final Project invoicing. Contractor will provide the Company with a copy of such construction schedule documenting the progress of work on the Project at least monthly.
10. Contractor will not commence work on the Project until the Company gives Contractor a written Commencement Notice. Contractor will complete the Project within 90 ~~120~~ NY calendar days after the Commencement Notice is issued.
11. Following the Company's written notice of satisfactory completion of the Project, and upon receipt of the final Project invoice from Contractor, the Company shall pay Contractor the actual total cost of the Project, which will be calculated as shown on Page 2, except that actual labor and material quantities installed/constructed will be substituted for the estimated labor and materials quantities and the Contracting Tax will be recalculated based on such actual labor and materials quantities.
12. The amount of applicable liquidated damages for Contractor's failure to deliver or perform within the time limit shown in Paragraph 10 may be deducted from the Company's payment of the final Project invoice. This provision shall not limit the Company's ability to terminate this Proposal/Contract for Contractor's unsatisfactory performance or failure to perform as provided in the General Conditions of Contract, Specifications or Drawings, or in this Proposal/Contract.

SPECIAL CONDITIONS:

See attached Special Conditions dated 5-9-2014.

CONTRACTOR	PROPOSAL/CONTRACT ACCEPTED:
FANN ENVIRONMENTAL, LLC	*ARIZONA WATER COMPANY*
By:	By:
Print Name: Michael S. Young	Print Name: Fredrick K. Schneider, PE
Title: President / Member	Title: Vice President - Engineering
Date: 5/29/14	Date: 2-5-2015

AFH

ARIZONA WATER COMPANY

Pinal Valley - Casa Grande
220 E. 2nd Street
Casa Grande, AZ 85122 PH: 520-836-8785

PROPOSAL/CONTRACT

CONTRACTOR: FANN ENVIRONMENTAL, LLC	SYSTEM: PINAL VALLEY
AZ CONTRACTOR LICENSE NO: CLASSIFICATION:	W.A. No(s): 1-5303 1442
ADDRESS: 6708 CORSAIR AVENUE, SUITE A	BID DUE DATE: May 29, 2014
CITY ST ZIP PRESCOTT, AZ 86301	BID BOND REQUIRED ☑ Yes ☐ No

DESCRIPTION OF PROJECT: Design-Build nitrate analyzers and electrical controls at Mission Royale Wells No. 32 and 33 in Casa Grande, Arizona. Design-Build in accordance with the attached design plans and Arizona Water Company Specifications.

1-2. MATERIALS EXEMPT FROM CONTRACTING TAX (per Paragraph 6)	QUANTITY	UNIT PRICE LABOR	UNIT PRICE MATERIALS	TOTAL COST LABOR	TOTAL COST MATERIALS
None	0	0	0	0	0
				1	2
3. Total Labor to Install Exempt Materials (add the amounts in column 1)				3 0	
4. Total Exempt Materials (add the amounts in column 2)					4 0

5-6. NON-EXEMPT MATERIALS	QUANTITY	UNIT PRICE LABOR	UNIT PRICE MATERIALS	TOTAL COST LABOR	TOTAL COST MATERIALS
Design and layout nitrate analyzers, electrical controls, PLC's, cellular RTU's and area lights	Lot	15000.-	0	15000.-	0
Provide and install nitrate analyzer enclosures, trenching, conduits, wires, boxes, switches, timers, reset buttons, breakers, relays, terminations, grounding, air conditioners, heaters, area lights and electrical controls	Lot	18000.-	13000.-	18000.-	13000.-
Install HACH nitrate analyzer and controller and commission	2	750.-	0	1500.-	0
Provide and install nitrate analyzer sample feed lines, conduits, pressure gauges, pressure reducing valves, rotameters, tapping saddles, ball valves and freeze protection	Lot	2200.-	2600.-	2200.-	2600.-
Provide and install nitrate analyzer sample waste lines and related fittings	Lot	1150.-	750.-	1150.-	750.-
Provide and install 6 ft.x6 ft. concrete foundation with floor drain	2	1100.-	800.-	2200.-	1600.-
Provide and install Modicon M340 PLC and commission	2	3000.-	5500.-	6000.-	11,000.-
Install Sixnet cellular RTU and commission	2	850.-	0	1700.-	0
Provide and Install nitrate analyzer system and SCADA programming	Lot	11,000.-	0	11,000.-	0
Install Aluma-Line shade canopy with shade panel	2	2000.-	5800.-	4000.-	11600.-
				5	6
7. Total Labor to Install Non-Exempt Materials (add the amounts in column 5)				7 62,750.-	
8. Total Non-Exempt Materials (add the amounts in column 6)					8 40,550.-
9. Subtotal A (add lines 3, 7 and 8)					9 103,300.-
10. Contracting Tax Base (multiply the amount on line 9 by 0.65)				10 67145.-	
11. Applicable Contracting Tax Rate				11 10.70%	
12. Contracting Tax (multiply the amount on line 10 by line 11)					12 7184.51
13. Subtotal B (add lines 4, 9 and 12)					13 110484.51
14. 100% Performance and Payment Bonds Cost					14 1089.-
15. Estimated Total Cost (add lines 13 and 14)					15 111,573.51

NOTE: The Estimated Total Cost includes all labor and materials for backfill, pavement replacement, chip seal, and traffic control necessary for the Project.

ARIZONA WATER COMPANY

COMMENCEMENT NOTICE

CONTRACTOR:

Mr. Michael Young
Fann Environmental, LLC
6708 Corsair Avenue, Suite A
Prescott, AZ 86301

DATE: 2/6/15
DIVISION: CASA GRANDE
SYSTEM: PINAL VALLEY
W.A.: 1-5303

THIS IS YOUR NOTICE TO PROCEED WITH THE FOLLOWING PROJECT(S):

DESCRIPTION OF WORK:

Design-Build nitrate analyzers and electrical controls at Mission Royale Well Nos. 32 and 33 in Casa Grande, Arizona. Design-Build in accordance with the attached design plans and Arizona Water Company Specifications.

PERFORMANCE AND PAYMENT BONDS REQUIRED: [X] Yes [ ] No

TOTAL DAYS ALLOWED: 100

COMPLETION DATE: 5/17/15

Prior to the start of construction, please call Ray Murrieta, Division Manager at 520-836-8785 to schedule a pre-construction meeting.

ARIZONA WATER COMPANY	***FANN ENVIRONMENTAL, LLC***
Company	Contractor *(type name)*
By [signature]	By
Title Vice President - Engineering	Title

AFH

W:\PROJECTS\CG\PV\INSIDE\WA\ACTIVE WA\1-5303 CG WELLS 32 AND 33 NO3 ANALYZERS JPK\AGREEMENTS\CONTRACTS\E-3-16-2 FANN COMMENCEMENT NOTICE 1-5303 NITRATE ANALYZERS.DOCX 1/15/09 | FKS:afh | E

ARIZONA WATER COMPANY

CASA GRANDE WELLS NO. 32 AND 33 – CASA GRANDE, AZ
DESIGN-BUILD ELECTRICAL EQUIPMENT FOR NITRATE ANALYZER
SPECIAL CONDITIONS 5-9-2014

Existing Facility Information

Site Location: Well 32 – 278 E. Santa Ynez – Casa Grande, AZ 85194
Well 33 - 2602 E. Hancock Trail – Casa Grande, AZ 85194

Site Facilities: See attached Drawing No. PV-0079

Existing Electrical Panel: See attached Wells No. 32 and 33 existing RTU control panel diagrams and Well No. 32 existing SES, MCC and RVAR pump controller diagrams.

New Facility Information

1. New Nitrate Analyzer:
    a. Two each HACH SC200 controller
    b. Two each NITRATAX plus sc 5 mm with flow-through cell
    c. Supplied by Arizona Water Company (Company) and installed by the Contractor

2. New Modicon M340 programmable logic controller (PLC):
    a. Two each BMXCPS3500 - HI PWR AC PWR SUPPLY
    b. Two each BMXXBP0800 - 8SLOT BACKPLANE
    c. Two each BMXP341000 - CUP340-10 MODBUS
    d. Four each BMXDDI1602 - DIG 16I 24VDC SINK
    e. Two each BMXDRA0805 - DIG 8Q ISOLATED RELAYS
    f. Two each BMXAMI0410 - ANA 4 U/I IN ISOL HI SPD
    g. Two each BMXNOE0100 - 10/100 RJ45 ETHERNET
    h. Six each 990XSM00206 - MULTI MODULE MULTI MODUL
    i. Two each 990XSM00210 - ADU206/256/210 to AMI0410 QWA
    j. Two each Weidmuller ethernet switch, unmanaged, IE-SW8-ECO
    k. Supplied and installed by the Contractor

3. New cellular RTU:
    a. Two each Sixnet SN-6601-VZ-AC Cellular RTU
    b. Two each LTE/multiband stub antenna
    c. Supplied by the Company and installed by the Contractor

4. New side mount enclosure air conditioner for the new 37"Wx72"Hx24"D nitrate analyzer enclosures:
    a. Air Conditioner: Two each Pentair-Hoffman or Thermal Edge Inc.

b. General: 120V, 1Ø, 60Hz, Nema 3R
c. Temperature: Max. outside air temp. 125°F; Max. inside air temp. 90°F
d. Supplied and installed by the Contractor

5. New electric heater for the new 37"Wx72"Hx24"D nitrate analyzer enclosures:
   a. Electric Heater: Two each Pentair-Hoffman
   b. General: 120V, 1Ø, 60Hz
   c. Temperature: Min. outside air temp. 10°F; Min. inside air temp. 45°F
   d. Supplied and installed by the Contractor

6. New shade canopy area light fixture:
   a. Light fixture: Two each Lithonia, Catalog No. DMW 2 32 MVOLT GEB10IS with mounting hardware and switch
   b. Supplied and installed by the Contractor

7. New controls, timers, reset buttons with fault light, circuit breakers, relays, conduits and wires.
   a. Supplied and installed by the Contractor

8. New Programming: Program new PLC's and cellular RTU's to send SCADA data and alarms to the Casa Grande office and add SCADA control, data and alarms to the existing master SCADA computer in accordance with the control description below.
   a. Contractor shall use Delta Systems Engineering for all programming services
   b. Supplied and installed by the Contractor

General Scope of Work

1. Contractor shall design and construct all electrical equipment, including all controls, circuit breakers, relays, conduits, timers and wires necessary for operation of the new nitrate analyzers, PLC's, cellular RTU's and air conditioners. The Contractor shall install the following:
   a. New HACH nitrate analyzers in lockable Pentair-Hoffman enclosures
   b. New Modicon M340 PLC's and Ethernet switches
   c. New Sixnet cellular RTU's with stub antennas
   d. New Pentair-Hoffman or Thermal Edge Inc. side mount air conditioners
   e. New Pentair-Hoffman electric heaters
   f. New Lithonia fluorescent lighting fixtures
   g. New controls and relays to control start, stop and pump-to-waste of Wells
   h. Manual reset buttons with fault light to reset Wells if shut down occurs due to high nitrate level
   i. New control and SCADA programming

Special Conditions

1. MANDATORY PRE-BID MEETING ON ***May 19, 2014 AT 9:00 AM*** at the site.
2. Any RFI must be received no later than *May 26, 2014.*

3. Bids are due by ***May 29, 2014 AT 2:00 PM*** at the following address:
   Arizona Water Company
   Attn: John Knobbe
   3805 North Black Canyon Highway
   Phoenix, AZ 85015
4. See attached supplemental electrical specifications.
5. Company will provide electronic CAD files of Drawing No. PV-0079 and topographic survey for design purposes.
6. Contractor shall provide detailed design plans signed by a professional engineer:
   a. Contractor shall plan for, at a minimum, one (1) design review meeting prior to final construction plans.
   b. Contractor shall provide As-Built drawings and O&M manuals at the end of the project (three hard copies and one compact disk).
7. Contractor's electrical subcontractor shall provide 24 hour on-call service through the guarantee period (see Company's GCC, E-4-1, 41. Guarantee).

Control Description

1. There are three modes of operation for the well pump;
   a. Local: When the Local-Off-Remote (LOR) switch is in Local, the pump and control valves are under operator control through physical switches in the control panel. The PLC or SCADA has no control on the pump and will only monitor the status of the pump.
   b. Remote-Manual: When the LOR switch is in Remote and the pump is placed in Manual mode using the master SCADA computer (MSC) screen, the pump and control valves are under operator control through graphic switches on the MSC screen. The PLC will monitor the appropriate pump alarm and interlocks and allow the pump to run if conditions are clear but not take the decision to start or stop the pump.
   c. Remote-Automatic: When the LOR switch is in Remote and the pump is placed in Automatic mode using the MSC screen, the PLC logic takes over control of the pump and control valves. There are three possible modes of operation and the operator will choose one;
      - Burgess Peak tank based control: Start/stop set points (SP) in feet, entered by the operator will determine the run status of the well. Start SP will be less than the stop SP.
      - Time of Day: The following table will be filled by the operator (gray cells show sample data) and the well will operate on the designated day of the week, at the designated time, and for the designated time period (hr);

	Mon	Tue	Wed	Thur	Fri	Sat	Sun
Well Number	32	29	33	29	32	33	32
Start Time	8:00	13:30	7:30	14:00	9:00	16:00	6:30
Run Duration	5.5	1.0	9.5	2.0	12.0	2.5	15.0

2. At start up, the Well will pump-to-waste (PTW) for a duration determined by an existing operator adjustable PTW timer, set at the existing electric panel.
3. If the sampled nitrate level is above an operator adjustable HIGH set point of 9.5 mg/L at the MSC, then the SCADA program will override the PTW timer and the Well will continue to PTW for an operator adjustable maximum (MAX) PTW SP at the MSC computer.
4. The MAX PTW SP will be an accumulated value over a running 24 hour period. Once the MAX PTW SP is exceeded, the Well will shut down and a manual reset button with fault light at the motor starter panel will allow the Well to re-start and reset the PTW duration.
5. If the sampled nitrate level is/falls below an operator adjustable LOW SP of 9.1 mg/L at the MSC, either after exceeding the PTW timer duration or before exceeding the MAX PTW SP, then the Well will transition into the distribution system.
6. If the sampled nitrate level does not fall below the LOW SP of 9.1 mg/L after exceeding the MAX PTW SP, then the Well will shut down and the manual reset button will allow the Well to re-start and reset the MAX PTW.
7. If the Well is pumping into the distribution system and the sampled nitrate level rises above the HIGH SP of 9.5 mg/L, then the Well will transition to PTW until the sampled nitrate level falls below the LOW SP of 9.1 mg/L or the MAX PTW SP is exceeded.
8. If the PTW valve sequence fails, then the valve shall fail open and the Well shall PTW until it exceeds the MAX PTW SP.

Indications at the MSC

1. Nitrate level
2. Well status
3. PTW valve status

WIN-911 Alarms

1. High nitrate sample (> 9.5 mg/L)
2. Manual PTW timer exceeded
3. MAX PTW exceeded
4. Well fail to start/stop
5. Incomplete PTW valve sequence
6. Communication failure

ARIZONA WATER COMPANY

SPECIFICATIONS

GENERAL CONDITIONS OF CONTRACT: E-4-1

CONSTRUCTION SPECIFICATIONS: E-8-1

STANDARD SPECIFICATION DRAWINGS: E-9-1

2007 EDITION WITH **2010** REVISIONS;
2012 GENERAL CONDITIONS OF CONTRACT

2-3-15

A copy of this entire Spec Book was sent out with Fann Enviromental Proposal package for 1-5303 Mission Royale #32+33 Nitrate Analyzer on 2/6/15

ARIZONA WATER COMPANY

3805 N. BLACK CANYON HIGHWAY, PHOENIX, ARIZONA 85015-5351 • P.O. BOX 29006, PHOENIX, AZ 85038-9006
PHONE: (602) 240-6860 • FAX: (602) 240-6874 • TOLL FREE: (800) 533-6023 • www.azwater.com

May 23, 2014

Mr. Donald Loose
Alta Land Survey, Inc.
344 E. 4th Street
Benson, AZ 85602

Re: Boundary and Topographic Survey for Mission Royale Well Sites 32 and 33 in Casa Grande AZ.

Dear Mr. Loose:

Attached is a copy of the Task Order for the above referenced project. Please sign and return it to my attention.

If you have any questions, please call me at this office.

Very truly yours,

Charles Briggs
Real Property Specialist
engineering@azwater.com

afh
Enclosure

AGREEMENT FOR GENERAL ENGINEERING SERVICES BETWEEN ARIZONA WATER COMPANY AND ALTA LAND SURVEY, INC.

TASK ORDER AUTHORIZATION

ALTA Land Survey, Inc. Project Number _____

AWC Project Number Boundary and Topographic Survey for Mission Royale Well Sites 32 and 33 in Casa Grande, AZ.

Arizona Water Company
P.O. Box 29006
Phoenix, Arizona 85038-9006

Effective Date of Authorization May 15, 2014

Upon execution of this Task Order, and effective as of the date shown above, the parties agree that ALTA Land Survey, Inc. shall perform the following services:

SCOPE OF SERVICES

As per the attached "Exhibit A". **NOTE: Authorization to commence will be given verbally by Division Manager (Ray Murietta, or in his absence, Kevin Pakka, Ops Superintendant).**

COMPENSATION

As per the attached "Exhibit A" dated May 14, 2014.

GENERAL TERMS AND CONDITIONS

ALTA Land Survey's services shall be governed by the Master Agreement dated June 17, 2011 together with this Task Order and any Exhibits attached hereto.

The services performed within this Task Order shall commence on or about May 20, 2014, and shall be complete on or before May 26, 2014.

ALTA Land Survey's Representative in charge of the services is Donald Loose, who may be contacted at 520-456-9400 and dloose@alta-land.com. Client's Representative in charge of the services is Charles Briggs, who may be contacted at 602-240-6860 and cbriggs@azwater.com.

ARIZONA WATER COMPANY	**ALTA LAND SURVEY, INC.**
By _____	By _____
Title REAL PROPERTY SPECIALIST	Title _____
Date MAY 23, 2014	Date _____

W:\01-Agreements, Drafts, Ltrs & Docs\Master Agreements\ALTA Land Survey\ALTA Land Survey Task Order CG 32 & 33 Nitrate Site - Survey.docx
CB:AFB 11:13 AM 6/10/14

ALTA Land Survey, Inc.
Surveying ~ Drafting ~ Construction Staking
344 E. 4th Street, Benson, AZ 85602 520-720-6476

May 14, 2014

Charles Briggs
Real Property Specialist
Arizona Water Company
P.O. Box 29006
Phoenix, AZ 85038-9006

RE: Mission Royale Well Sites 32 and 33, Casa Grande- Boundary and Topographic Survey

Dear Charles:

ALTA Land Survey, Inc. is pleased to provide you with the following proposal to perform a boundary and topographic survey of Mission Royale Well Sites 32 and 33 in Casa Grande, AZ. We have reviewed the Scope of Services and for the site and the following is the Scope of Services:

- Generate topography with 1 foot contours. Elevations shall be based on local known permanent monument with the vertical datum based on NAVD '88.
- Locate property corners and/or set property corners, if necessary
- Record the survey at the Pinal County Recorder's Office.
- Include a basis of bearing and vicinity map on Record of Survey drawings.
- Include a cadastral location of the survey.
- Take color digital photographs of the survey.

The cost to perform the above referenced work is **$2750.00.** If awarded the contract to perform the above referenced work, the survey shall begin on or before May 20, 2014 and the deliverables will be submitted for review by May 26, 2014.

We appreciate the opportunity to provide you with this proposal and we look forward to hearing from you.

Sincerely,

CB
5-23-14

Donald J. Loose
President

MISSION ROYALE WELLS NO.32 AND 33 NITRATE ANALYZERS DESIGN BUILD

OWNER: ARIZONA WATER COMPANY
CONTRACTOR: FANN ENVIRONMENTAL
ENGINEER: WATER WORKS ENGINEERS

OWNER:

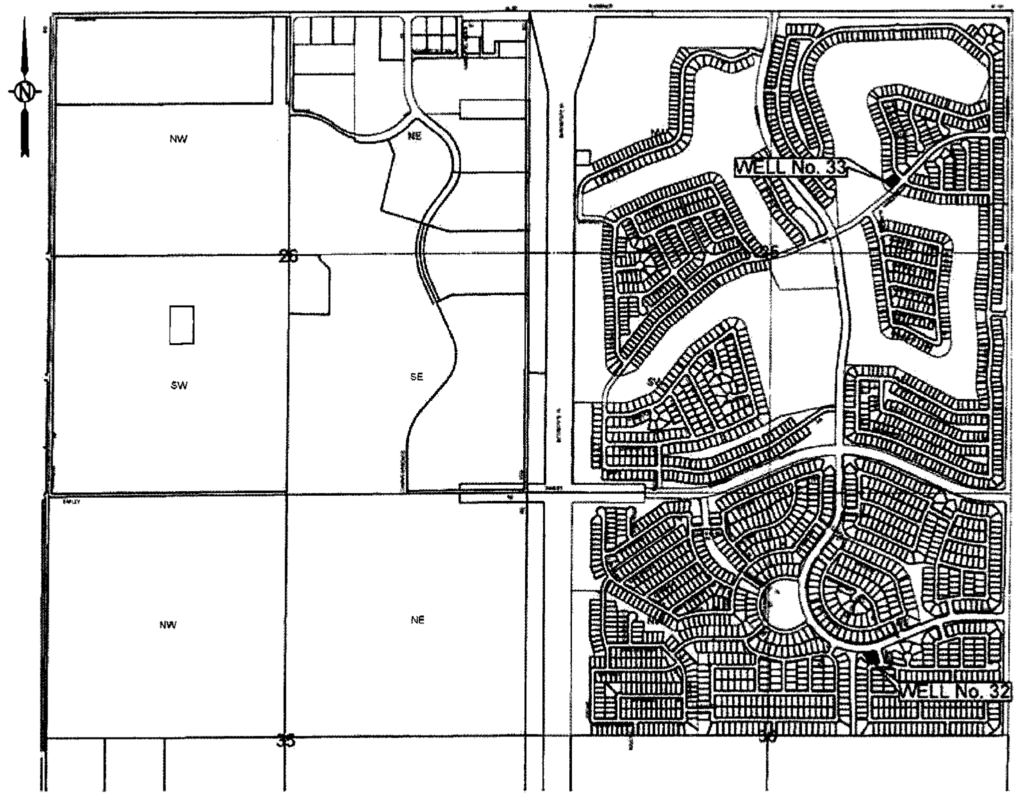
ARIZONA WATER COMPANY
POST OFFICE BOX 29006
PHOENIX, AZ 85038-9006
(602) 240-6860
CONTACT: JOHN KNOBBE

CONTRACTOR

FANN ENVIROMENTAL, LLC
6708 CORSAIR AVE
PRESCOTT, AZ 86301
(928) 778-5335
CONTACT:

ENGINEER

WATER WORKS ENGINEERS
7580 N. DOBSON RD, SUITE 200
SCOTTSDALE, AZ 85256
(480) 661-1742
CONTACT: BENJAMIN W. LEE, P.E.



VICINITY MAP
SCALE 1"=600'

DRAWING INDEX

DWG NO.	DWG TITLE
	GENERAL
G-001	COVER SHEET AND INDEX
	CIVIL
C-001	WELL NO.32 RESULTS OF SURVEY
C-002	WELL NO.33 RESULTS OF SURVEY
C-003	WELL NO.32 SITE PLAN
C-004	WELL NO.33 SITE PLAN
C-005	NITRATE ANALYZER DETAIL
	ELECTRICAL
E-01	ELECTRICAL NOTES, SYMBOLS AND LEGEND
E-02	WELL NO.32 - SITE PLAN, SCHEDULES AND DIAGRAMS
E-03	SITE PLAN - WELL NO.33
E-04	ELECTRICAL DETAILS

WATERWORKS ENGINEERS

MISSION ROYALE WELLS NO. 32 AND 33 NITRATE ANALYZER

COVER SHEET AND INDEX

PINAL VALLEY

NE 1/4 SEC. 25-T.6S.-R.6E.

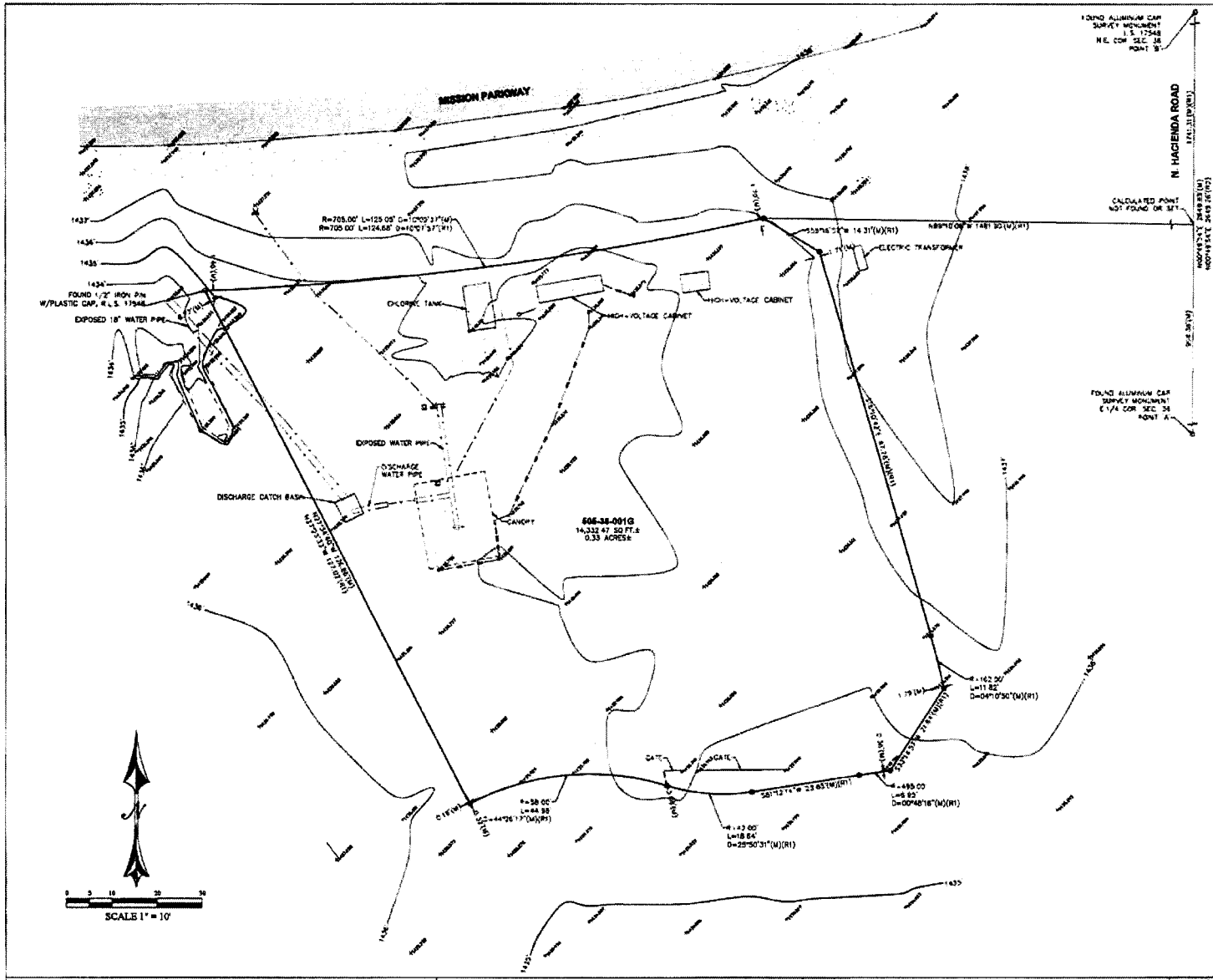
3-27-2015 | AS SHOWN | VHP | BWL

263-1100
1-800-STAKE-IT

FOR WATER ONLY

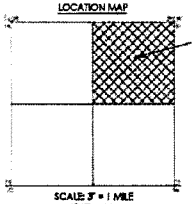
G-001

SHEET 1 OF 6



RESULTS OF SURVEY

LOCATION MAP



SCALE 3" = 1 MILE
SECTION 36

LEGEND:

- MONUMENTS FOUND AS NOTED
- SET 1/2" IRON PIN WITH PLASTIC CAP, R.L.S. 23779 UNLESS OTHERWISE NOTED.
- (N1) RECORD DATA PER FEE # 2005-175787
- (R2) RECORD DATA PER FEE # 2006-082580 - CABINET H, SLIDE 062
- (M) MEASURED DATA
- ANTENNA
- ELECTRIC CONTROL PANEL
- HOSE BIB
- LIGHT POLE
- PUMP
- WATER BOX
- WATER VALVE
- TOE
- TOP
- UNDERGROUND ELECTRIC
- WATER LINE
- ASPHALT AREA
- CONCRETE AREA

BASIS OF BEARING:

BEARINGS ARE BASED ON A FOUND ALUMINUM CAP SURVEY MONUMENT REPRESENTING THE EAST 1/4 CORNER OF SECTION 36 (POINT "A") AND A FOUND BRASS CAP SURVEY MONUMENT REPRESENTING THE NORTHEAST CORNER OF SECTION 36 (POINT "B"), SAID BEARING IS NORTH 00°48'54" EAST PER FEE # 2005-175787.

BASIS OF ELEVATION:

ELEVATIONS ARE BASED ON N.G.S. CONTROL POINT "AJ 48" (PID # CZ2074), SAID ELEVATION IS 1448.8, NAVD88.

CERTIFICATION:

I HEREBY CERTIFY THIS PLAT REPRESENTS A SURVEY MADE BY ME OR UNDER MY DIRECTION AND THAT THE PROPERTY CORNERS AND SURVEY MONUMENTS EXIST AS SHOWN HEREON

Donald J. Lee

DONALD J. LEE, R.L.S. # 23779 — DATE

EXPIRES: 09-30-2016

WELL NO 32 RESULTS OF SURVEY

C-001

SHEET 2 OF 6

ALTA LAND SURVEY, INC.
SURVEYING, CONSTRUCTION STAKING & DRAFTING
344 E. 4TH ST.
BENSON, AZ 85602
(520) 720-6478

REVISIONS			
NO.	DESCRIPTION	BY	DATE

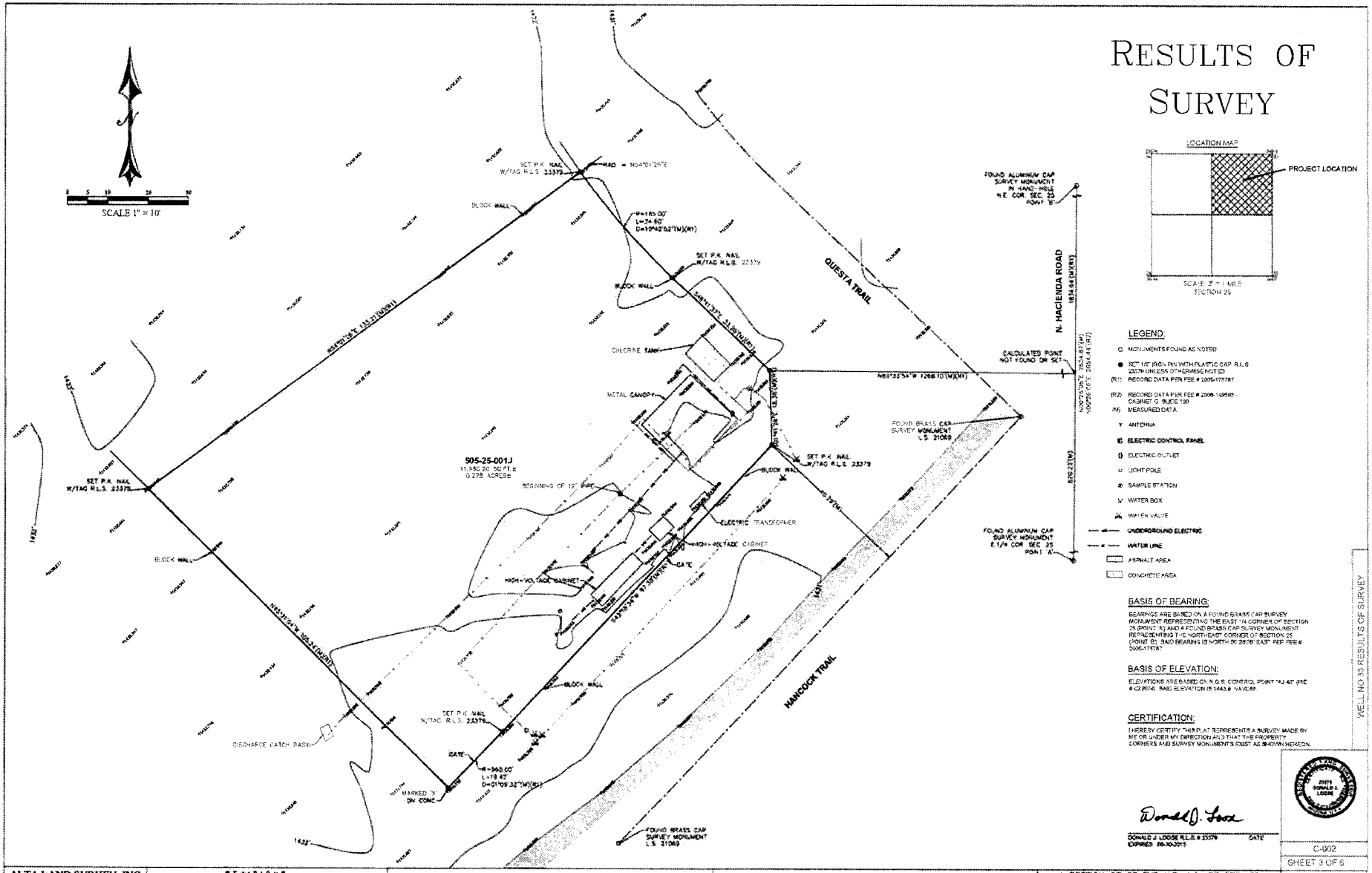
FEE#_____ BOOK____ SURVEY, PAGE____

A PORTION OF SEC. 36, T-06-S., R-06-E. GILA AND SALT RIVER MERIDIAN PINAL COUNTY, ARIZONA

A PORTION OF THE N.E. 1/4 OF SEC. 36, T-06-S., R-06-E. OF THE G.&S.R.M., PINAL COUNTY AZ

PROJECT NO. 14-003B | Drawn By: ARC | Checked By: | Date: 06/02/2014 | Sheet: 1 of 1

RESULTS OF SURVEY



BASIS OF BEARING:

BEARINGS ARE BASED ON A FOUND BRASS CAP SURVEY MONUMENT REPRESENTING THE EAST 1/4 CORNER OF SECTION 25 (POINT 'A') AND A FOUND BRASS CAP SURVEY MONUMENT REPRESENTING THE NORTHEAST CORNER OF SECTION 25 (POINT 'B'). SAID BEARING IS NORTH 00°28'06" EAST PER FEE # 2005-173787.

BASIS OF ELEVATION:

ELEVATIONS ARE BASED ON N.G.S. CONTROL POINT "AJ 46" (PID # CZ2674). SAID ELEVATION IS 1443.8' NAVD88.

CERTIFICATION:

I HEREBY CERTIFY THIS PLAT REPRESENTS A SURVEY MADE BY ME OR UNDER MY DIRECTION AND THAT THE PROPERTY CORNERS AND SURVEY MONUMENTS EXIST AS SHOWN HEREON.

Donald J. Loose

DONALD J. LOOSE R.L.S. # 23379 — DATE

EXPIRES: 09-30-2015

WELL NO.35 RESULTS OF SURVEY

C-002

SHEET 3 OF 6

ALTA LAND SURVEY, INC.
SURVEYING, CONSTRUCTION STAKING & DRAFTING
344 E. 4TH ST.
BENSON, AZ 85602
(520) 720-6676

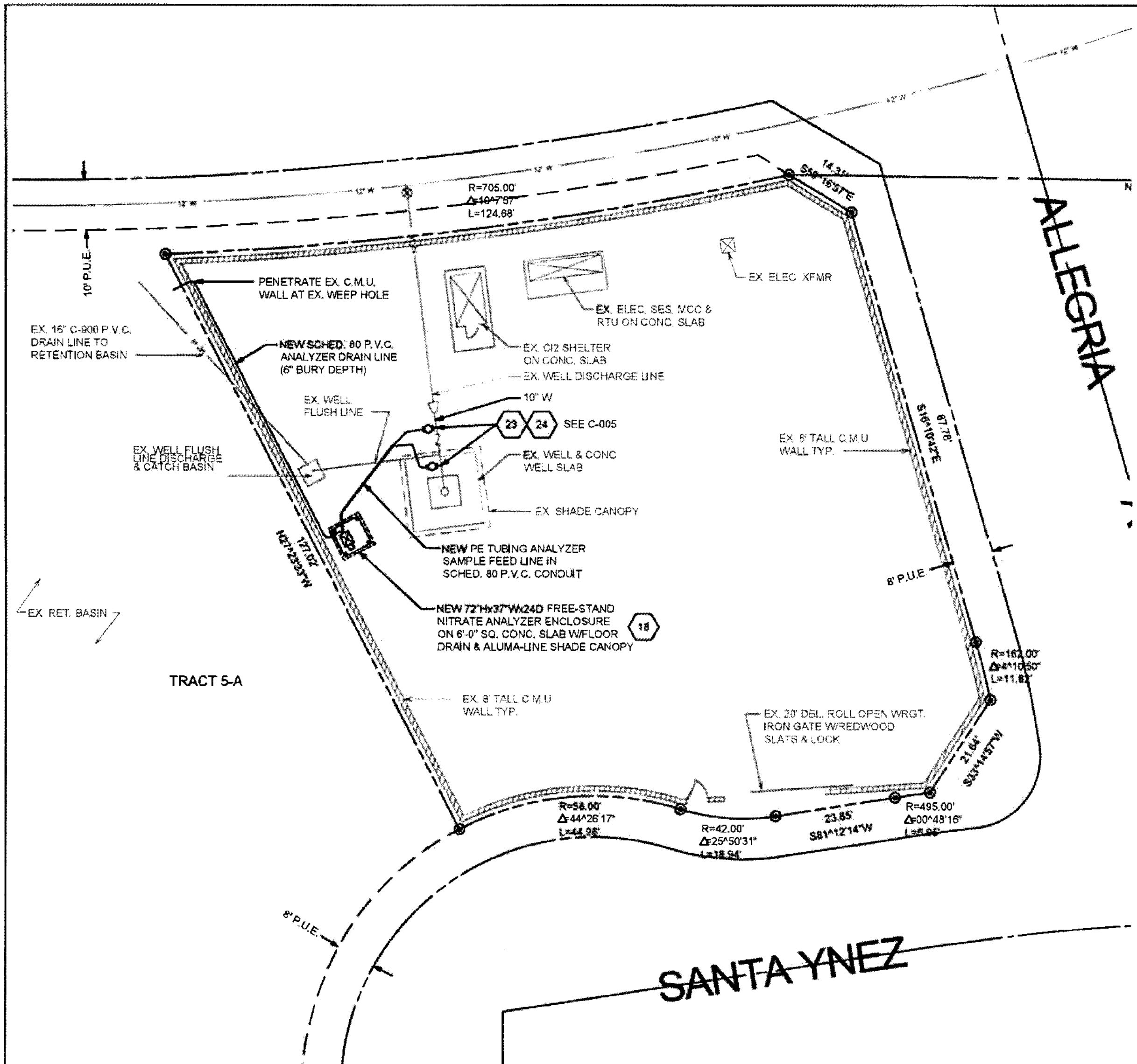
REVISIONS			
NO.	DESCRIPTION	BY	DATE

FEE#_____ BOOK____ SURVEY, PAGE____

A PORTION OF SEC. 25, T-06-S., R-06-E.
GILA AND SALT RIVER MERIDIAN
PINAL COUNTY, ARIZONA

A PORTION OF OF THE N.E. 1/4 OF SEC. 25, T-06-S., R-06-E. OF THE G.&S.R.M., PINAL COUNTY AZ

PROJECT NO. 14-083A | Drawn By: AMC | Checked By: | Date: 08/05/2014 | Sheet: 1 of 1



LEGEND

- ◎ — REBAR PROPERTY CORNER
- STREET CENTERLINE/MONUMENT LINE
- RIGHT-OF-WAY LINE
- PROPERTY LINE
- U.G. ELECTRIC LINE
- EX. WATER LINE
- EX. P.U.E.

GENERAL NOTES

1. NEW PIPING SHALL BE DISINFECTED IN ACCORDANCE WITH ADEQ ENGINEERING BULLETIN No. 8 BEFORE BEING PLACED INTO SERVICE.
2. ALL MATERIALS AND PRODUCTS USED IN WATER SYSTEM, INCLUDING SURFACE COATINGS & PAINTS, SHALL CONFORM TO NSF STANDARD 61 & CURRENT AWWA D102.
3. CONSTRUCTION MATERIALS USED IN WATER SYSTEM SHALL BE LEAD-FREE AS PER A.A.C. R18-4-504 AND R18-1-101 (43).
4. ALL EXPOSED P.V.C. PIPE & FITTINGS SHALL BE PAINTED TO PROTECT FROM UV SOLAR RADIATION.
   A. PAINT EXPOSED ANALYZER FEED LINE DARK BLUE & LABEL.
   B. PAINT EXPOSED ANALYZER WASTE LINE OLIVE GREEN & LABEL.
5. ANY EXPOSED PIPING SUBJECT TO FREEZING SHALL BE INSULATED.
6. FOUNDATION: BEAR FOOTING ON UNDISTURBED SOIL OR APPROVED ENGINEERED FILL. SOIL PRESSURE 1,500 PSF PER IBC 1804.2. CLASS 4 MATERIAL.
7. CONCRETE: A.C.I. MANUAL OF CONCRETE PRACTICE, TYPE II CEMENT, MINIMUM 28 DAY STRENGTH OF 3,000 PSI. MECHANICALLY VIBRATE WHEN PLACED, MAXIMUM SLUMP 5".
8. REINFORCING: ASTM A615, GRADE 60 DEFORMED BARS, CONCRETE COVER TO REINFORCING:
   A. CONCRETE AGAINST EARTH——3"

LAP SPLICES: 48 BAR DIAMETERS UNLESS OTHERWISE NOTED.

263-1100
1-800-STAKE-IT

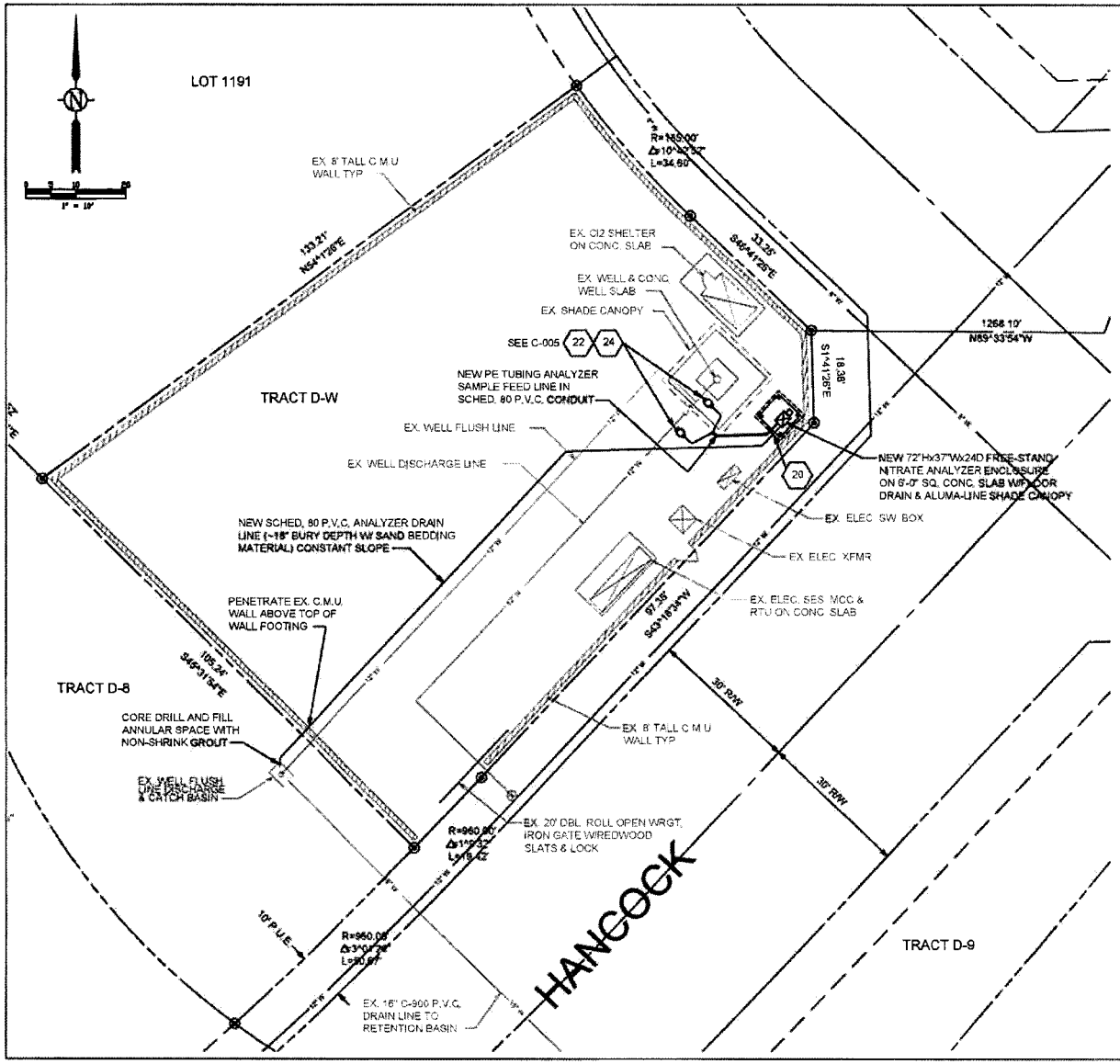
PINAL VALLEY
NE 1/4 SEC. 25, T.6 S., R.8 E.

3-27-2015 | AS SHOWN
VHP | BWI

WATERWORKS
E N G I N E E R S

MISSION ROYALE WELLS NO. 32 AND 33 NITRATE ANALYZER
WELL NO 32 SITE PLAN

FOR WATER ONLY
C-003
SHEET 4 OF 6



LEGEND

- ⊙ — " REBAR PROPERTY CORNER
- STREET CENTERLINE/MONUMENT LINE
- RIGHT-OF-WAY LINE
- PROPERTY LINE
- U.G. ELECTRIC LINE
- EX. WATER LINE
- EX. P.U.E.

GENERAL NOTES

1. NEW PIPING SHALL BE DISINFECTED IN ACCORDANCE WITH ADEQ ENGINEERING BULLETIN No. 8 BEFORE BEING PLACED INTO SERVICE.
2. ALL MATERIALS AND PRODUCTS USED IN WATER SYSTEM, INCLUDING SURFACE COATINGS & PAINTS, SHALL CONFORM TO NSF STANDARD 61 & CURRENT AWWA D102.
3. CONSTRUCTION MATERIALS USED IN WATER SYSTEM SHALL BE LEAD-FREE AS PER A.A.C. R18-4-604 AND R18-1-101 (43).
4. ALL EXPOSED P.V.C. PIPE & FITTINGS SHALL BE PAINTED TO PROTECT FROM UV SOLAR RADIATION.
   A. PAINT EXPOSED ANALYZER FEED LINE DARK BLUE & LABEL
   B. PAINT EXPOSED ANALYZER WASTE LINE OLIVE GREEN & LABEL
5. ANY EXPOSED PIPING SUBJECT TO FREEZING SHALL BE INSULATED.
6. FOUNDATION: BEAR FOOTING ON UNDISTURBED SOIL OR APPROVED ENGINEERED FILL. SOIL PRESSURE = 1,500 PSF PER IBC 1804.2, CLASS 4 MATERIAL.
7. CONCRETE: A.C.I. MANUAL OF CONCRETE PRACTICE, TYPE II CEMENT, MINIMUM 28 DAY STRENGTH OF 3,000 PSI, MECHANICALLY VIBRATE WHEN PLACED. MAXIMUM SLUMP 5".
8. REINFORCING: ASTM A615, GRADE 60 DEFORMED BARS. CONCRETE COVER TO REINFORCING:
   A. CONCRETE AGAINST EARTH——3"

LAP SPLICES 48 BAR DIAMETERS UNLESS OTHERWISE NOTED.

WATERWORKS ENGINEERS

MISSION ROYALE WELLS NO. 32 AND 33 NITRATE ANALYZER

WELL NO.33 SITE PLAN

PINAL VALLEY

NE 1/4 SEC. 20-7 E G.&S.R.B.&M.

AS SHOWN

3-27-2015

VHP

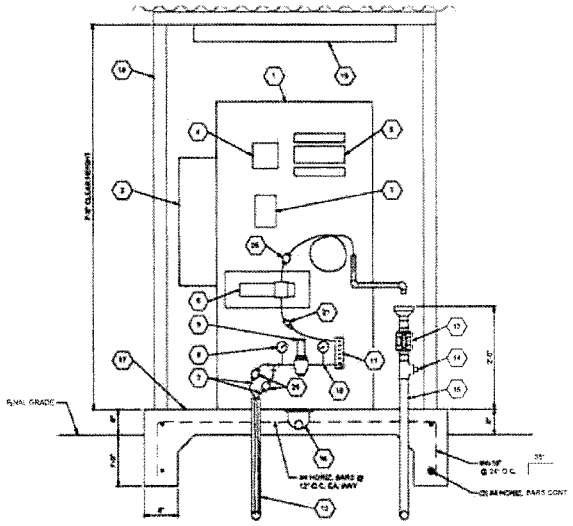
BWL

263-1100
1-800-STAKE-IT

FOR WATER ONLY

C-004

SHEET 5 OF 6



TYP. NITRATE ANALYZER DETAIL

N.T.S.

	MATERIAL SCHEDULE (1) (2)	WELL 32 QUANTITY	WELL 33 QUANTITY	SUPPLIED BY	INSTALLED BY
1.	72"Hx37"Wx24"D PENTAIR-HOFFMAN MILD STEEL TYPE 4 FREE-STAND ENCLOSURE W/3 POINT LATCH, LOCK & ALL NECESSARY MOUNTING HARDWARE AND ACCESSORIES	1	1	CONTR.	CONTR.
2.	AIR CONDITIONER - PENTAIR-HOFFMAN OR THERMAL EDGE INC., 120V, 1PH, 60Hz, NEMA 3R	1	1	CONTR.	CONTR.
3.	ELECTRIC HEATER - PENTAIR-HOFFMAN 120V, 1PH, 60Hz	1	1	CONTR.	CONTR.
4.	HACH sc200 UNIVERSAL CONTROLLER	1	1	A.W.Co.	CONTR.
5.	HACH NITRATAX plus sc 5 mm ANALYZER W/FLOW THROUGH CELL	1	1	A.W.Co.	CONTR.
6.	TERMINAL BLOCK & RACEWAYS W/FINGER SAFE ELECTRICAL COVERS	1	1	CONTR.	CONTR.
7.	3/8" O.D. POLYETHYLENE TUBING SAMPLE FEED LINE	65 L.F.	65 L.F.	CONTR.	CONTR.
8.	ASHCROFT 0-150 P.S.I. TYPE 1008SW PRESSURE GAUGE, MODEL 25 1008SW 02L 150#	1	1	CONTR.	CONTR.
9.	CLA-VAL MODEL CRD 2-7 P.S.I. PRESSURE REDUCING CONTROL VALVE W/E.S. BODY	1	1	CONTR.	CONTR.
10.	ASHCROFT 0-15 P.S.I. TYPE 1009SW PRESSURE GAUGE, MODEL 25 1009SW 02L 15#	1	1	CONTR.	CONTR.
11.	BLUE-WHITE MODEL F-55250LA PANEL MOUNT ADJUSTABLE ROTAMETER	1	1	CONTR.	CONTR.
12.	2" SCHED. 80 P.V.C. SAMPLE FEED LINE CONDUIT	30 L.F.	30 L.F.	CONTR.	CONTR.
13.	2" ASAHI/AMERICA TYPE 21 BALL VALVE	1	1	CONTR.	CONTR.
14.	GARDEN HOSE CONNECTION	1	1	CONTR.	CONTR.
15.	2" SCHED. 80 P.V.C. SAMPLE WASTE DRAIN LINE	65 L.F.	148 L.F.	CONTR.	CONTR.
16.	ZURN MODEL Z4908 SHALLOW BODY FLOOR DRAIN W/2" IP TRHD. OUTLET	1	1	CONTR.	CONTR.
17.	REINFORCED CONCRETE FOUNDATION	1	1	CONTR.	CONTR.
18.	ALUMA-LINE SHADE CANOPY W/SHADE SCREEN PANEL ON SOUTHEAST EXPOSURE	1	-	CONTR.	CONTR.
19.	LITHONIA DMW 464-INCH, 2 LAMP (32W T8) FLUORESCENT LIGHT FIXTURE W/SWITCH	1	1	CONTR.	CONTR.
20.	ALUMA-LINE SHADE CANOPY W/SHADE SCREEN PANEL ON SOUTHWEST EXPOSURE	-	1	CONTR.	CONTR.
21.	CHECK VALVE	1	1	CONTR.	CONTR.
22.	12"X4" DOUBLE STRAP SADDLE	-	2	CONTR.	CONTR.
23.	10"X1" DOUBLE STRAP SADDLE	2	-	CONTR.	CONTR.
24.	1" BALL CORP STOP	2	2	CONTR.	CONTR.
25.	3/8" SWAGELOK SST BALL VALVE	3	3	CONTR.	CONTR.

(1) SEE CONTRACT/PROPOSAL DESIGN-BUILD ELECTRICAL EQUIPMENT FOR NITRATE ANALYZER SPECIAL CONDITIONS DATED 5-8-2014 FOR ADDITIONAL FACILITY INFORMATION, GENERAL SCOPE OF WORK, SPECIAL CONDITIONS, CONTROL DESCRIPTION, SCADA INDICATIONS AND ALARMS.

The construction shown is to be installed in accordance with the latest revision of the Uniform Standard Specifications on file with the Arizona Department of Environmental Quality

"Arizona Blue Stake, Inc." 263-1100 1-800-STAKE-IT

PROJECT	PINAL VALLEY
LOCATION	NE 1/4, SEC. 25-7S-8E, G.&S.R. B.&M.
SCALE	AS SHOWN
DATE	3-27-2015
DESIGNED	VHP
DRAWN	BWL

WATERWORKS ENGINEERS

MISSION ROYALE WELLS NO. 32 AND 33 NITRATE ANALYZER

NITRATE ANALYZER DETAIL

FOR WATER ONLY

C-005

SHEET 6 OF 6

SCHEMATIC DIAGRAM SYMBOLS

Symbol	Description	Symbol	Description
(CR)	CONTROL RELAY	HAND / AUTO, XO	2 POSITION SELECTOR SWITCH POSITION LEGEND: X=CLOSED O=OPEN
(TD)	TIME DELAY RELAY	OFF, HAND / AUTO, XOO	3 POSITION SELECTOR SWITCH HAND - OFF - AUTO POSITION LEGEND: X=CLOSED O=OPEN
(AR)	ALARM RELAY		NORMALLY CLOSED PUSH BUTTON
(ETM)	ELAPSED TIME METER		LOCKOUT STOP PUSH BUTTON
(M)	MOTOR STARTER OR CONTACTOR COIL		NORMALLY OPEN PUSH BUTTON
(PC)	PHOTO CELL		EMERGENCY STOP PUSH BUTTON (MAINTAINED)
(R)	BEACON ALARM LIGHT LETTER INDICATES COLOR R=RED, A=AMBER, B=BLUE, G=GREEN	AMPS	DISCONNECT SWITCH SHOWN WITH RATING AND NUMBER OF POLES
(R)	PILOT LIGHT LETTER INDICATES COLOR R=RED, A=AMBER, B=BLUE, G=GREEN		LIMIT OR POSITION SWITCH
	OUTPUT DV/DT FILTER	PSH	PRESSURE SWITCH HIGH
	HEATING ELEMENT	PSL	PRESSURE SWITCH LOW
	TRANSFORMER		FLOW SWITCH
CT	CURRENT TRANSFORMER		LEVEL FLOAT SWITCH
	GROUND CONNECTION	T, ICTO	TIMER RELAY CONTACT INSTANTANEOUS CLOSE TIME DELAY OPEN
	GENERATOR	T, NOTC	TIMER RELAY CONTACT NORMALLY OPEN TIME DELAY CLOSE
HORN	HORN		TEMPERATURE SWITCH
5	FULL VOLTAGE NON-REVERSING (FVNR) MOTOR STARTER OR CONTACTOR NUMBER DESIGNATES NEMA SIZE		FUSE
	NORMALLY OPEN CONTACT	AMPS	FUSEHOLDER OR FUSEBLOCK
	NORMALLY CLOSED CONTACT		THERMAL OVERLOAD RELAY
DI	RTU OR PLC CONTACT		TERMINAL BLOCK
			DEVICE LOCATED AT REMOTE LOCATION
			CONDUIT SEALOFF

POWER SINGLE LINE DIAGRAM SYMBOLS

Symbol	Description	Symbol	Description
	JUNCTION BOX WITH POWER DISTRIBUTION BLOCK OR LUGS	AMPS, POLES	CIRCUIT BREAKER, SHOWN WITH TRIP RATING AND NUMBER OF POLES
	CONDUIT SEALOFF	AMPS, MCP, POLES	MOTOR CIRCUIT PROTECTOR WITH TRIP RATING AND NUMBER OF POLES
	LTC CONNECTION	AMPS, POLES	DISCONNECT SWITCH SHOWN WITH RATING AND NUMBER OF POLES
	MC CONNECTION	MMR	MOTOR MANAGEMENT RELAY
	BOND TO METALLIC WATER PIPE	SSS	SOLID STATE STARTER
(UM)	UTILITY METER	VFD	VARIABLE FREQUENCY DRIVE
(HP)	MOTOR, NUMBER DESIGNATES NEMA HORSEPOWER SIZE	HF	HARMONIC FILTER
	FUSE	EOL	ELECTRONIC OVERLOAD RELAY
AMPS	FUSEHOLDER OR FUSEBLOCK		GROUND CONNECTION

SITE PLAN SYMBOLS

Symbol	Description	Symbol	Description
	TELEPHONE OUTLET		FIELD DEVICE
$	SINGLE POLE SWITCH		GROUND ROD
$3	3 WAY SWITCH		DUPLEX RECEPTACLE
$4	4-WAY SWITCH		ANTENNA MAST
$M	MANUAL MOTOR STARTER		CONDUIT SEALOFF
	SPECIAL PURPOSE OR WELDING OUTLET		DISCONNECT SWITCH*
(S)	SMOKE DETECTOR	(M)	MOTOR
(T)	THERMOSTAT		CONDUIT TURN UP
			CONDUIT TURN DOWN

CIRCUIT SCHEDULE LEGEND

AAA-BC

- SEQUENCE NUMBER
- TYPE C=CONTROL P=POWER
- DEVICE SERVED

ELECTRICAL ABBREVIATIONS

A	AMPERE	JB	JUNCTION BOX	PMP	PUMP
AFD	ADJUSTABLE FREQUENCY DRIVE	L, LO	LOW	PNL	PANEL
AFF	ABOVE FINISHED FLOOR	LAN	LOCAL AREA NETWORK	PO	PULSE OUTPUT
AFG	ABOVE FINISHED GRADE	LC	LOOP CONTROLLER	PPB	POWER PULLBOX
AI	ANALOG INPUT	LCL	LEVEL CONTROL, LOW	PPG	POUNDS PER GALLON
AIC	AMPS INTERRUPTING CAPACITY	LCP	LOCAL CONTROL PANEL	PPH	POUNDS PER HOUR
AO	ANALOG OUTPUT	LOS	LOCK-OUT-STOP	PPM	PARTS PER MILLION
AS	AIR SUPPLY	LOR	LOCAL/OFF/REMOTE	PR	PAIR
ATS	AUTOMATIC TRANSFER SWITCH	LS	LEVEL (i.e., FLOAT) SWITCH	PRES	PRESSURE
BC	BYPASS CONTACTOR	LTC	LIQUIDTIGHT FLEXIBLE METAL CONDUIT	PS	PRESSURE SWITCH
C	CONDUIT	M	MOTOR	PSH	PRESSURE SWITCH, HIGH
CB	CIRCUIT BREAKER	MA	MANUAL/AUTO	PSI	POUNDS PER SQUARE INCH
CCW	COUNTER CLOCKWISE	mA	MILLIAMP	PV	PROCESS VARIABLE
CL2	CHLORINE	MAX	MAXIMUM	RAS	RETURN ACTIVATED SLUDGE
CON	CONTACTOR	MC	MANUFACTURER'S CABLE	RW	RAW WATER
CPB	CONTROL PULLBOX	MCB	MAIN CIRCUIT BREAKER	RF	RADIO FREQUENCY
CU	COPPER, BARE	MCC	MOTOR CONTROL CENTER	RIO	REMOTE INPUT OUTPUT
CV	CONTROL VALVE	MCP	MOTOR CIRCUIT PROTECTOR	RS	RAW SEWAGE
CW	CLOCKWISE	MFR(S)	MANUFACTURER(S)	RSP	RAW SEWAGE PUMP
DCS	DISTRIBUTED CONTROL SYSTEM	MGD	MILLION GALLONS PER DAY	RST	RESET
DI	DISCRETE INPUT	MGL	MILLIGRAMS PER LITER	RTD	RESISTANCE TEMPERATURE DETECTOR
DO	DISCRETE OUTPUT	MH	MANHOLE	RTU	REMOTE TELEMETRY UNIT
DP	DISTRIBUTION PANEL	MIN	MINIMUM	RWT	REFLECTED WAVE TRAP
DV/DT	DIFFERENTIAL VOLTAGE/TIME	MOV	MOTOR OPERATED VALVE	SCA	SHORT CIRCUIT AMPS
DWG	DRAWING	MMR	MOTOR MANAGEMENT RELAY	SEQ	SERVICE ENTRANCE EQUIPMENT
ETM	ELAPSED TIME METER	MTU	MASTER TELEMETRY UNIT	SES	SERVICE ENTRANCE SECTION
EOL	ELECTRONIC OVERLOAD	NEC	NATIONAL ELECTRICAL CODE	SLC	SINGLE LOOP CONTROLLER
EXIST	EXISTING	NECA	NATIONAL ELECTRICAL CONTRACTOR ASSOCIATION	SLOS	START-LOCK-OUT-STOP
FA	FOUL AIR			SMC	SUBMERSIBLE MANUFACTURER CABLE
FC	FAIL CLOSED	N.C.	NORMALLY CLOSED	SO2	SULFUR DIOXIDE
FE	FLOW ELEMENT	N.O.	NORMALLY OPEN	SP	SET POINT
FLA	FULL LOAD AMPS	NIC	NOT IN CONTRACT	SPC	SPARE CONDUIT
FS	FLOW SWITCH	NOTC	NORMALLY OPEN TIMED CLOSED	SPR	SPARE
FVNR	FULL VOLTAGE NON-REVERSING	NPW	NON-POTABLE WATER	SS	START/STOP
FW	FINISHED WATER	NS	NITROGEN SUPPLY	SSS	SOLID STATE STARTER (SOFT START)
GFCI	GROUND FAULT CIRCUIT INTERRUPTER	NTS	NOT TO SCALE	ST	SHUNT TRIP
GFP	GROUND FAULT PROTECTION	NTU	TURBIDITY	TC	TELEPHONE CABLE
GND	GROUND	OCA	OPEN/CLOSE/AUTO	TS	TEMPERATURE SWITCH
GPD	GALLONS PER DAY	OF	OVERFLOW	TVSS	TRANSIENT VOLTAGE SURGE SUPPRESSOR
GPH	GALLONS PER HOUR	OIT	OPERATOR INTERFACE TERMINAL		
GPM	GALLONS PER MINUTE	OL	OVERLOAD	TYP	TYPICAL
GRS	GALVANIZED RIGID STEEL	OLR	OVERLOAD RELAY	UG	UNDERGROUND
H, HI	HIGH	OO	ON/OFF (MAINTAINED)	UL	UNDERWRITERS LABORATORIES
H2S	HYDROGEN SULFIDE	OR	OFF-REMOTE	UNO	UNLESS NOTED OTHERWISE
HMI	HUMAN MACHINE INTERFACE	OSC	OPEN/STOP/CLOSE	V	VOLT
HOA	HAND-OFF-AUTO	P	PHASE	VFD	VARIABLE FREQUENCY DRIVE
HOR	HAND-OFF-REMOTE	PB	PULL BOX	W	WATT, WIRE
I	CURRENT	PCP	PROCESS CONTROL PANEL	WAS	WASTE ACTIVATED SLUDGE
IC	INSTRUMENTATION CABLE	PCV	PRESSURE CONTROL VALVE	WP	WEATHERPROOF
ICR	INTERMITTENT CYCLE REACTOR	PFR	PHASE/POWER FAILURE RELAY	XFMR	TRANSFORMER
IO	INPUT/OUTPUT	PI	PULSE INPUT	XMR	TRANSFORMER
ISC	SHORT CIRCUIT CURRENT	PLC	PROGRAMMABLE LOGIC CONTROLLER	XMTR	TRANSMITTER
		PLI	PLANT INFLUENT	ZS	POSITION (i.e., LIMIT) SWITCH

ELECTRICAL LINETYPES

- EXPOSED CONDUIT
- EXISTING EXPOSED CONDUIT
- UNDERGROUND CONDUIT
- EXISTING UNDERGROUND CONDUIT
- BARE COPPER GROUND CONDUCTOR
- EXISTING OR FUTURE
- NEW ELECTRICAL EQUIPMENT
- DEMOLITION
- DETAIL VIEW OR MATCHING
- CAPPED CONDUIT STUB OUT
- PXXX / CXXX — GROUPED CONDUIT AND CIRCUIT IDENTIFICATION TAGS. REFER TO THE POWER SINGLE-LINE, SCHEMATIC CONNECTION DIAGRAMS AND CIRCUIT SCHEDULE FOR CONDUIT SIZES AND CONTENTS.

P=POWER
C=CONTROL

GENERAL NOTES

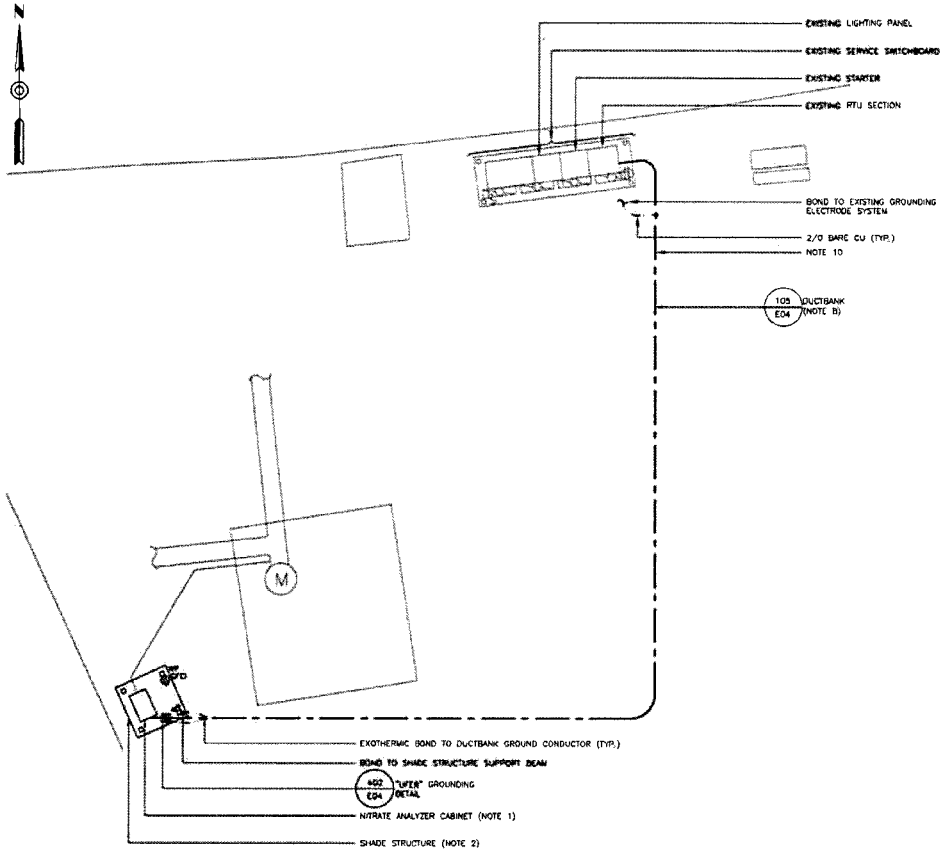
1. THE COMPLETED INSTALLATION SHALL COMPLY WITH LATEST REVISION OF APPLICABLE FEDERAL, STATE, AND LOCAL CODES, ORDINANCES, AND REGULATIONS. THE CONTRACTOR SHALL OBTAIN NECESSARY PERMITS AND INSPECTIONS REQUIRED BY THE AUTHORITIES HAVING JURISDICTION. ALL WORK SHALL BE COMPLETED IN A NEAT, WORKMANLIKE MANNER IN ACCORDANCE WITH THE LATEST NECA STANDARDS OF INSTALLATION UNDER COMPETENT SUPERVISION. INSTALL GROUNDING PER NEC.
2. VISIT THE SITE PRIOR TO BIDDING TO BECOME FAMILIAR WITH EXISTING CONDITIONS AND OTHER FACTORS, WHICH MAY AFFECT THE EXECUTION OF THE WORK. INCLUDE ALL RELATED COSTS IN THE INITIAL BID PROPOSAL.
3. THE CONTRACTOR SHALL COORDINATE WORK WITH THE UTILITIES PROVIDING SERVICES ON THIS PROJECT, AND SHALL COMPLY WITH ALL THEIR INSTALLATION REQUIREMENTS.
4. ALL MATERIALS SHALL BE NEW AND OF THE BEST QUALITY, MANUFACTURED IN ACCORDANCE WITH THE LATEST REVISION OF NEMA, ANSI, UL, OR OTHER APPLICABLE STANDARDS. THE USE OF MANUFACTURERS' NAMES, MODELS, AND NUMBERS IS INTENDED TO ESTABLISH STYLE, QUALITY, APPEARANCE, USEFULNESS, AND BID PRICE.
5. PROTECT ALL ELECTRICAL MATERIAL AND EQUIPMENT INSTALLED AGAINST DAMAGE BY OTHER TRADES, WEATHER CONDITIONS, OR ANY OTHER PREVENTABLE CAUSES. EQUIPMENT DAMAGED DURING SHIPPING OR CONSTRUCTION, PRIOR TO ACCEPTANCE BY THE ENGINEER OR THE OWNER, WILL BE REJECTED AS DEFECTIVE.
6. LEAVE THE SITE CLEAN. REMOVE ALL DEBRIS, EMPTY CARTONS, TOOLS, CONDUIT, WIRE SCRAPS AND ALL MISCELLANEOUS SPARE EQUIPMENT AND MATERIALS USED IN THE WORK DURING CONSTRUCTION. ALL COMPONENTS SHALL BE FREE OF DUST, GRIT AND FOREIGN MATERIALS, LEFT AS NEW BEFORE FINAL ACCEPTANCE OF WORK. DAMAGED PAINT AND FINISHES SHALL BE TOUCHED UP OR REPAINTED WITH MATCHING COLOR PAINT AND FINISH.
7. UNDERGROUND CONDUITS SHALL BE SCHEDULE 40 PVC. MINIMUM CONDUIT DEPTH SHALL BE 24 INCHES. MINIMUM UNDERGROUND CONDUIT SIZE SHALL BE 1 INCH.
8. CONDUITS SHALL BE MARKED AT EACH END WITH MATCHING NUMBERED BRASS TAGS. SPARE CONDUITS SHALL HAVE A PULL STRING INSTALLED, SECURED, AND CAPPED.
9. EXPOSED CONDUITS SHALL BE GALVANIZED RIGID STEEL (GRS). MINIMUM SIZE 3/4 INCH, UNLESS OTHERWISE NOTED ON THE PLANS.
10. SAFETY SWITCHES, ELECTRICAL DISTRIBUTION EQUIPMENT, CONTROL PANELS, AND OTHER ELECTRICAL DEVICES SHALL BE UL LISTED, AND RATED FOR HEAVY DUTY SERVICE.
11. WIRING DEVICES SHALL BE SPECIFICATION GRADE.
12. THE CONTRACTOR IS RESPONSIBLE FOR MANAGING, SCHEDULING, DOCUMENTING, AND PERFORMING THE WORK SO THAT A COMPLETE ELECTRICAL, INSTRUMENTATION AND CONTROL SYSTEM FOR THE FACILITY IS PROVIDED. ACCURATE SHOP AND RECORD DRAWINGS, AND O&M MANUALS SHALL BE SUBMITTED PRIOR TO FINAL ACCEPTANCE OF THE WORK.
13. TYPICAL DETAILS SHALL APPLY IN ALL CASES, WHETHER SPECIFICALLY REFERRED TO OR NOT.

263-1100

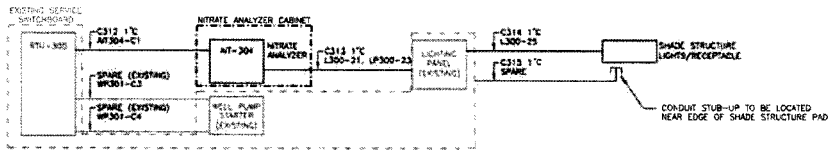
DELTA SYSTEMS ENGINEERING INC
3550 N. CENTRAL AVE., SUITE 915
PHOENIX, AZ 85012 602.266.4658

ARIZONA WATER COMPANY WELLS 32 & 33 NITRATE ANALYZER ADD. ELECTRICAL NOTES, SYMBOLS AND LEGEND

Scale	NONE
Job No.	1893.00.100
Designed	DLN
Drawn	JHA
Checked	DLN
Approved	HT
Date	APRIL 2015
Sheet	E01



A WELL # 32 SITE PLAN
N.T.S.



B CONDUIT BLOCK DIAGRAM

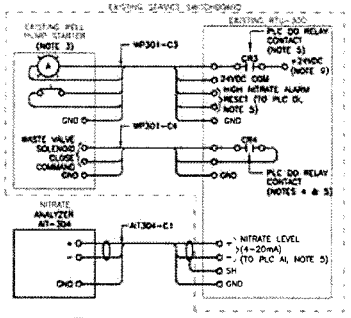
NOTES:

1. REFER TO DESIGN BY WATER WORKS ENGINEERS FOR NITRATE ANALYZER CABINET CONSTRUCTION DETAILS/REQUIREMENTS. ENSURE ALL COMPONENTS AND ASSOCIATED ELECTRICAL TERMINATIONS WITHIN NITRATE ANALYZER CABINET ASSOCIATED WITH VOLTAGES GREATER THAN 50V ARE FINGER SAFE. IF A COMPONENT OR TERMINATION ISN'T FINGER SAFE BY DESIGN, IT SHALL BE PROVIDED WITH A PROTECTIVE COVER SO AS TO PREVENT ACCIDENTAL OPERATOR CONTACT.
2. DESIGN AND CONSTRUCTION OF SHADE STRUCTURE AND ASSOCIATED CONCRETE PAD SHALL BE CONTRACTOR'S RESPONSIBILITY. CONTRACTOR SHALL UTILIZE ALUMALINE FOR SHADE STRUCTURE DESIGN. DESIGN IS TO BE REVIEWED AND APPROVED BY ARIZONA WATER COMPANY ("COMPANY") PRIOR TO CONSTRUCTION. REFER TO DESIGN BY ARIZONA WATER COMPANY FOR SHADE STRUCTURE LIGHTING FIXTURE REQUIREMENTS.
3. MOUNT RESET PUSHBUTTON AND PILOT LIGHT ON INNER DOOR OF WELL PUMP STARTER CABINET. INDICATOR LIGHT, PUSHBUTTON, AND ASSOCIATED NAMEPLATES SHALL BE CONSISTENT WITH ASSOCIATED EXISTING STARTER INDICATOR LIGHTS, PUSHBUTTONS AND NAMEPLATES.
4. RTU RELAY CONTACT "CR4" IS TO BE INCORPORATED INTO EXISTING WELL PUMP STARTER CONTROL LOGIC IN PLACE OF EXISTING NORMALLY OPEN TIME DELAY CLOSE (NOTC) "FLOW TO WASTE" TIMER RELAY CONTACT ("WVTR") THEREBY TURNING CONTROL OF WASTE VALVE OPERATION OVER SOLELY TO SITE RTU/PLC. REFER TO ORIGINAL WELL PUMP STARTER AS-BUILT DRAWINGS DATED 4/11/08 FOR INFORMATION PERTAINING TO EXISTING STARTER LOGIC.
5. UTILIZE DISCRETE OUTPUT DO-3 IN RACK 1, SLOT 5 FOR NITRATE ALARM LIGHT, DISCRETE OUTPUT DO-4 IN RACK 1, SLOT 5 FOR WASTE VALVE CLOSE COMMAND, DISCRETE INPUT DI-2 IN RACK 1, SLOT 4 FOR NITRATE ALARM DISABLE PUSHBUTTON, AND AI POINT AI-1 IN RACK 2, SLOT 7 FOR NITRATE LEVEL. REFER TO ORIGINAL RTU AS-BUILT DRAWINGS DATED 4/11/08 FOR SPECIFIC I/O CARD WIRING/TERMINATION INFORMATION.
6. INFORMATION REFLECTED IN PANEL SCHEDULE WAS TAKEN FROM KELLER ELECTRICAL DRAWINGS DATED 5/19/07.
7. WHERE AVAILABLE, EXISTING CONDUITS CAN BE UTILIZED TO ROUTE WIRING INTO EXISTING SERVICE SWITCHBOARD.
8. NEW UNDERGROUND CONDUITS SHALL BE EITHER CONCRETE ENCASED, SCHEDULE 40 PVC (IN ACCORDANCE WITH DETAIL 105) OR DIRECT BURIED, PVC-COATED GRS. IF PVC-COATED GRS CONDUITS ARE UTILIZED, ENSURE SUITABLE BACKFILL MATERIAL IS UTILIZED TO PREVENT DAMAGE TO PVC COATING. PVC-COATED GRS CONDUITS SHALL BE BURIED AT A DEPTH IN ACCORDANCE WITH NATIONAL ELECTRICAL CODE TABLE 300.5.
9. HIGH NITRATE LEVEL ALARM LIGHT IS TO BE POWERED BY EXISTING RTU 24VDC POWER SUPPLY VIA A 0.5A FUSE. FUSE TYPE/STYLE, IS TO BE CONSISTENT WITH EXISTING CABINET CONTROL FUSES.
10. **CONDUIT ROUTING SHOWN IS APPROXIMATE AND SCHEMATIC IN NATURE. ACTUAL ROUTING IS TO BE FIELD DETERMINED.**

C WELL # 32 PANEL A SCHEDULE
(NOTE 6)

CIRCUIT	CONDUCTORS
WP301-C3	4 - #14 #14 GND
WP301-C4	2 - #14 #14 GND
AT304-C1	1 - IC #14 GND

D CIRCUIT SCHEDULE



E MISC. CONNECTION DIAGRAM
CONNECTION

263-1100

Scale	NONE
Job No.	1893.00.100
Designed	DLN
Drawn	JMR
Checked	DLN
Approved	MT
Date	APRIL 2015
Sheet	E02

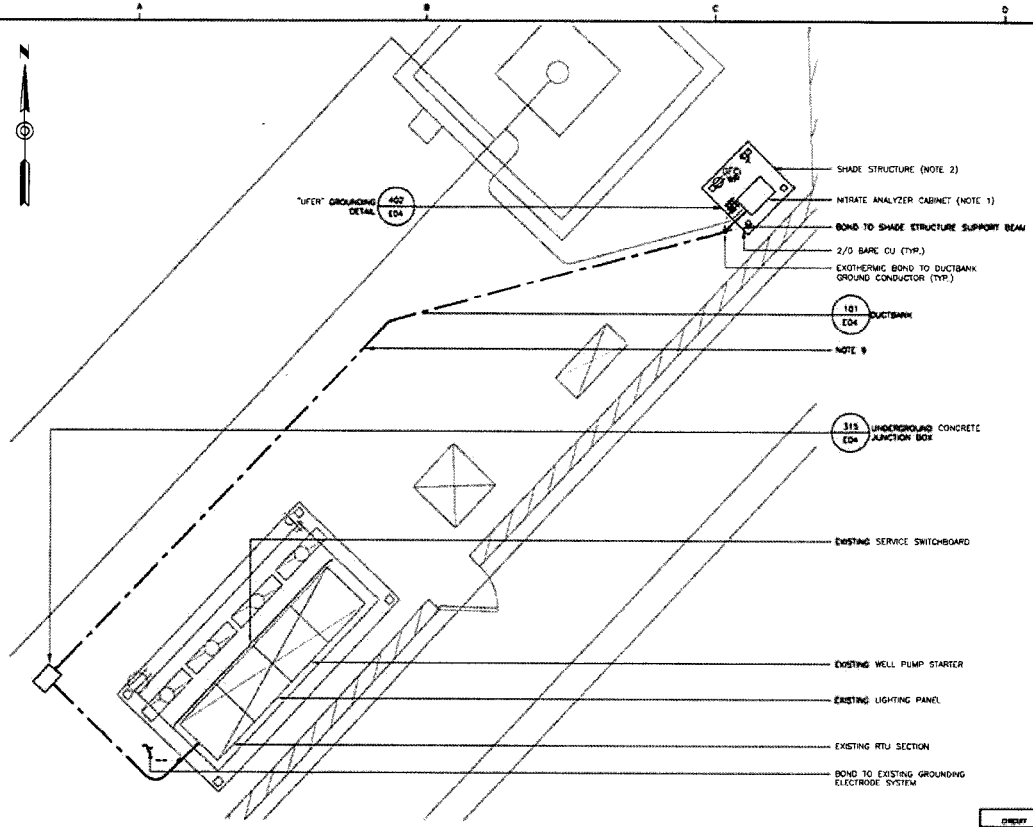
ARIZONA WATER COMPANY WELLS 32 & 33 NITRATE ANALYZER ADD.
WELL 32 – SITE PLAN, SCHEDULES AND DIAGRAMS

DELTA SYSTEMS ENGINEERING INC
3550 N. CENTRAL AVE., SUITE 915
PHOENIX, AZ 85012 602.266.4669

Description | Date | By

Expires 9/30/13

PLOTTED: April 20, 2015 BY: jjohnson DWG FILE: K:\1800's\1893.00 AWC Well 32 & 33 Nitrate Analyzer Addition\100 - Edit Design_CAD Files\1893.00.100_E02.dwg



A WELL # 33 SITE PLAN
N.T.S.

NOTES:

1. REFER TO DESIGN BY WATER WORKS ENGINEERS FOR NITRATE ANALYZER CABINET CONSTRUCTION DETAILS/REQUIREMENTS. ENSURE ALL COMPONENTS AND ASSOCIATED ELECTRICAL TERMINATIONS WITHIN NITRATE ANALYZER CABINET ASSOCIATED WITH VOLTAGES GREATER THAN 50V ARE FINGER SAFE. IF A COMPONENT OR TERMINATION ISN'T FINGER SAFE BY DESIGN, IT SHALL BE PROVIDED WITH A PROTECTIVE COVER SO AS TO PREVENT ACCIDENTAL OPERATOR CONTACT.
2. DESIGN AND CONSTRUCTION OF SHADE STRUCTURE AND ASSOCIATED CONCRETE PAD SHALL BE CONTRACTOR'S RESPONSIBILITY. CONTRACTOR SHALL UTILIZE ALUMALINE FOR SHADE STRUCTURE DESIGN. DESIGN IS TO BE REVIEWED AND APPROVED BY ARIZONA WATER COMPANY ("COMPANY") PRIOR TO CONSTRUCTION. REFER TO DESIGN BY ARIZONA WATER COMPANY FOR SHADE STRUCTURE LIGHTING FIXTURE REQUIREMENTS.
3. MOUNT RESET PUSHBUTTON AND PILOT LIGHT ON INNER DOOR OF WELL PUMP STARTER CABINET. INDICATOR LIGHT, PUSHBUTTON, AND ASSOCIATED NAMEPLATES SHALL BE CONSISTENT WITH ASSOCIATED EXISTING STARTER INDICATOR LIGHTS, PUSHBUTTONS AND NAMEPLATES.
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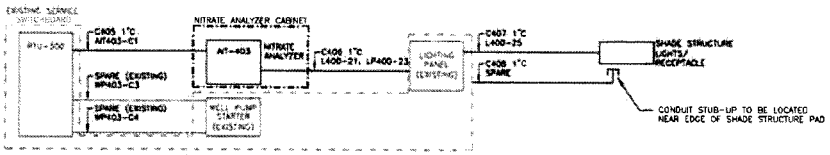
8. HIGH NITRATE LEVEL ALARM LIGHT IS TO BE POWERED BY EXISTING RTU 24VDC POWER SUPPLY VIA A 0.5A FUSE. FUSE TYPE/STYLE, IS TO BE CONSISTENT WITH EXISTING CABINET CONTROL FUSES.
9. CONDUIT ROUTING SHOWN IS APPROXIMATE AND SCHEMATIC IN NATURE. ACTUAL ROUTING IS TO BE FIELD DETERMINED.

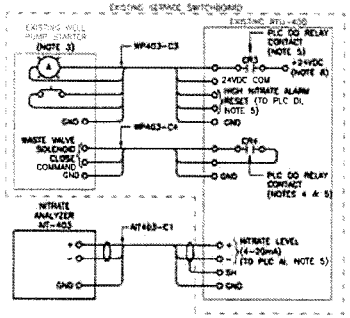
C WELL # 33 PANEL A SCHEDULE
(NOTE 6)

CIRCUIT	CONDUCTORS
WP403-C3	4 - #14, #14 GND
WP403-C4	2 - #14, #14 GND
AT403-C1	4 - #22, #14 GND

D CIRCUIT SCHEDULE



B CONDUIT BLOCK DIAGRAM



E MISC. CONNECTION DIAGRAM
CONNECTION

263-1100

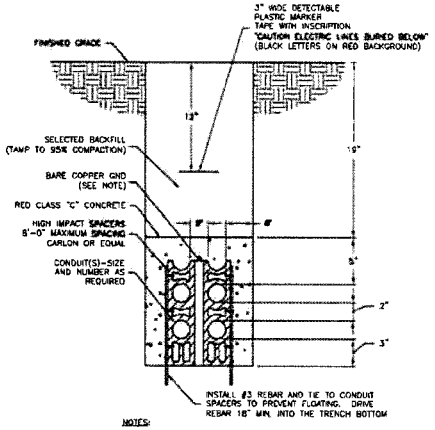
Expires 6/30/15

DELTA SYSTEMS ENGINEERING INC
3550 N. CENTRAL AVE., SUITE 915
PHOENIX, AZ 85012 602.266.4668

ARIZONA WATER COMPANY WELLS
32 & 33 NITRATE ANALYZER ADD.
SITE PLAN – WELL # 33

Scale	NONE
Job No.	1883.00.100
Designed	DLN
Drawn	JMA
Checked	DLN
Approved	MT
Date	APRIL 2015
Sheet	E03

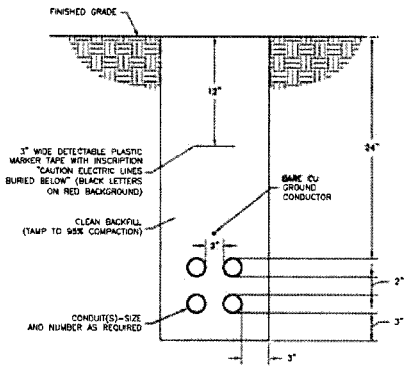
PLOTTED: April 20, 2015 By: jamesma DWG FILE: K:\1800's\1883.00 AWC Well 32 & 33 Nitrate Analyzer Addition\100 - Eng Design_CAD Files\1883.00.100_E03.dwg



NOTES:

1. GROUND CONDUCTOR SHALL RUN CONTINUOUSLY THROUGH MANHOLES AND SHALL CONTINUE FROM DUCTBANK INTO SWITCHGEAR OR BUILDING GROUNDING SYSTEM AND SHALL BE BONDED TO EACH RIGID METAL CONDUIT. SIZE TO BE #2/0 (MIN.) UNLESS OTHERWISE INDICATED ON PLANS.
2. ALL DIMENSIONS ARE MINIMUM.
3. CLASSIFICATION OF VEHICULAR AREAS TO BE CONFIRMED BY COMPANY.

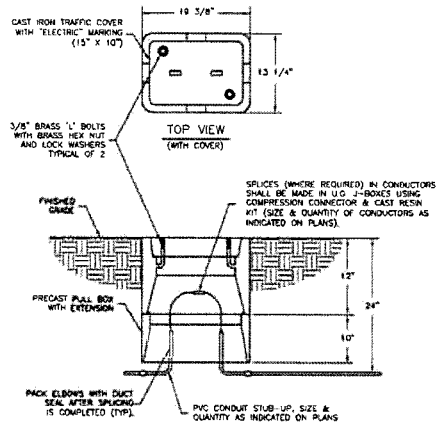
105 TYP — DUCTBANK – CONCRETE ENCASED



NOTES:

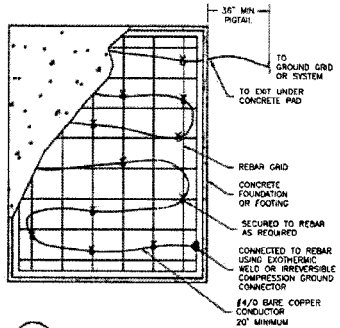
1. GROUND CONDUCTOR SHALL RUN CONTINUOUSLY THROUGH MANHOLES AND SHALL CONTINUE FROM DUCTBANK INTO SWITCHGEAR OR BUILDING GROUNDING SYSTEM AND SHALL BE BONDED TO EACH RIGID METAL CONDUIT. SIZE TO BE #2/0 (MIN.) UNLESS OTHERWISE INDICATED ON PLANS.
2. ALL DIMENSIONS ARE MINIMUM.
3. CLASSIFICATION OF NON-VEHICULAR AREAS TO BE CONFIRMED BY COMPANY.

101 TYP — DUCTBANK – DIRECT BURIED
NOT TO SCALE

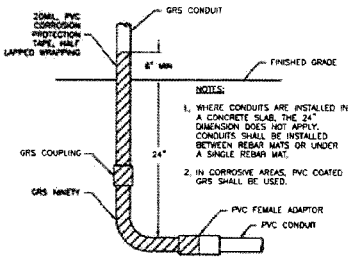


NOTE: ALL DIMENSIONS ARE MINIMUM

315 TYP — UNDERGROUND CONCRETE JUNCTION BOX
NOT TO SCALE



402 TYP — "UFER" GROUNDING DETAIL
NOT TO SCALE



NOTES:

1. WHERE CONDUITS ARE INSTALLED IN A CONCRETE SLAB, THE 24" DIMENSION DOES NOT APPLY. CONDUITS SHALL BE INSTALLED BETWEEN REBAR MATS OR UNDER A SINGLE REBAR MAT.
2. IN CORROSIVE AREAS, PVC COATED GRS SHALL BE USED.

170 TYP — GRS STUB UP DETAIL
NOT TO SCALE

Blue Stake, Inc. 263-1100

Description	Date	Issued By

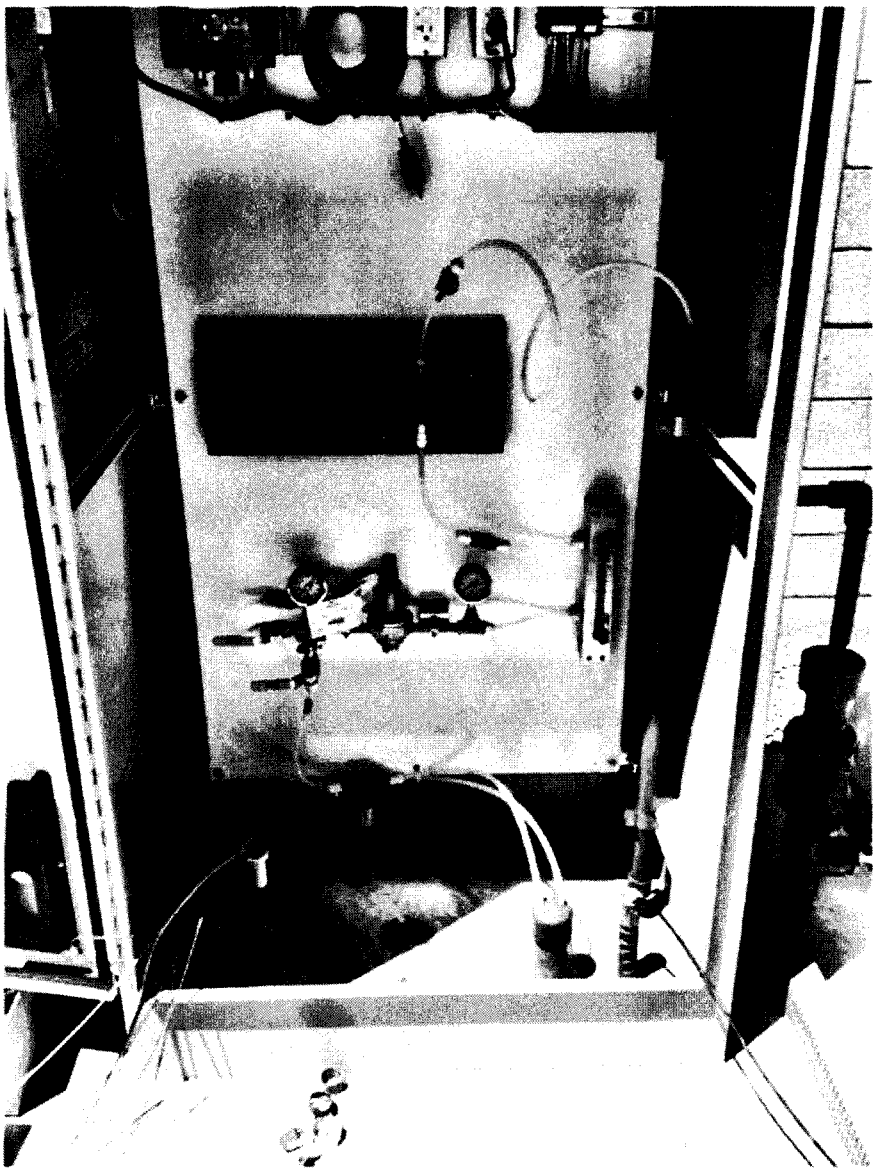
DELTA SYSTEMS ENGINEERING INC
3550 N. CENTRAL AVE., SUITE 415
PHOENIX, AZ 85012 • 602.264.4330

ARIZONA WATER COMPANY WELLS
32 & 33 NITRATE ANALYZER ADD.
ELECTRICAL DETAILS

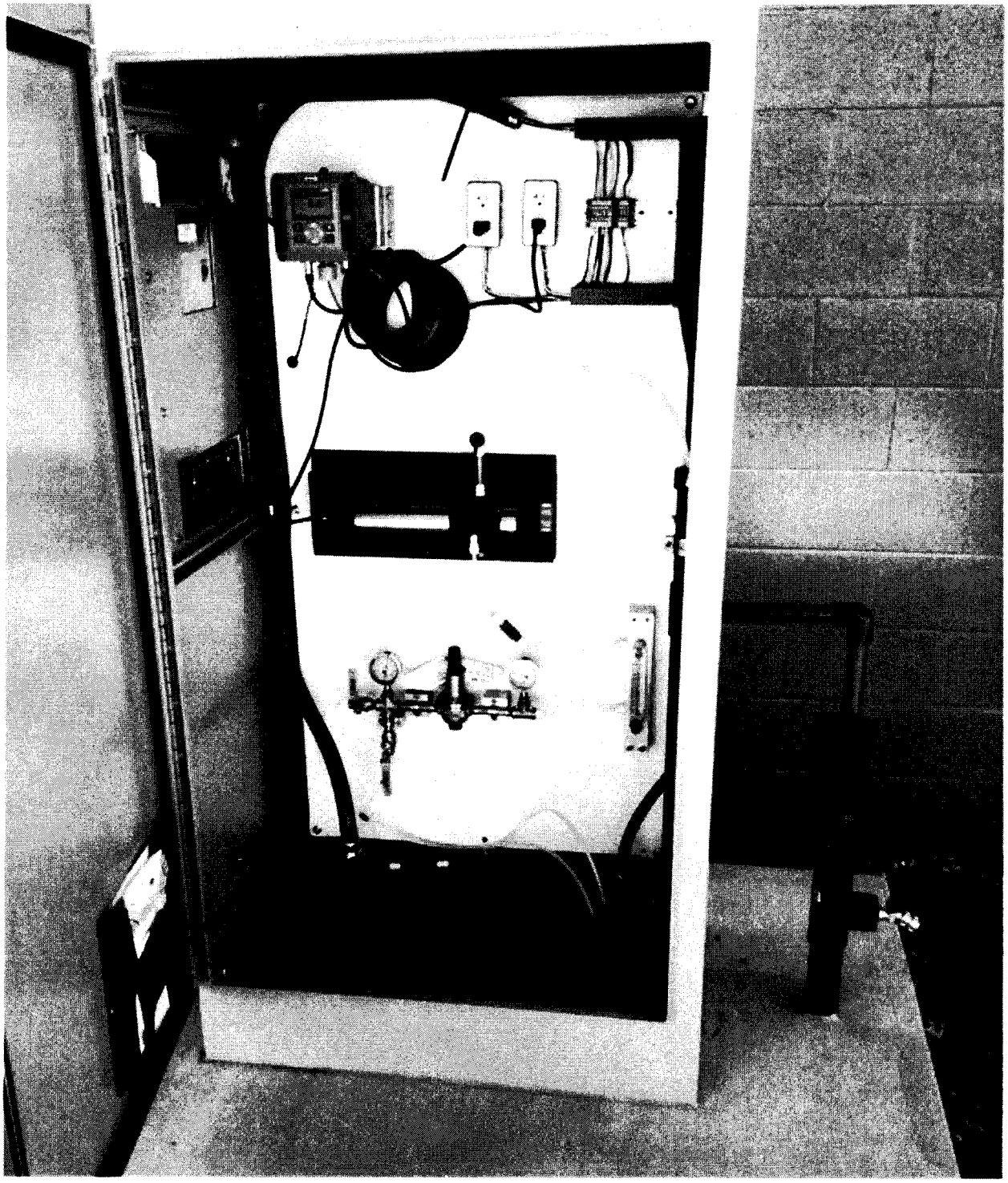
Scale	NONE
Job No.	1893.00.100
Designed	DLN
Drawn	JHA
Checked	DLN
Approved	MT
Date	APRIL 2013

E04

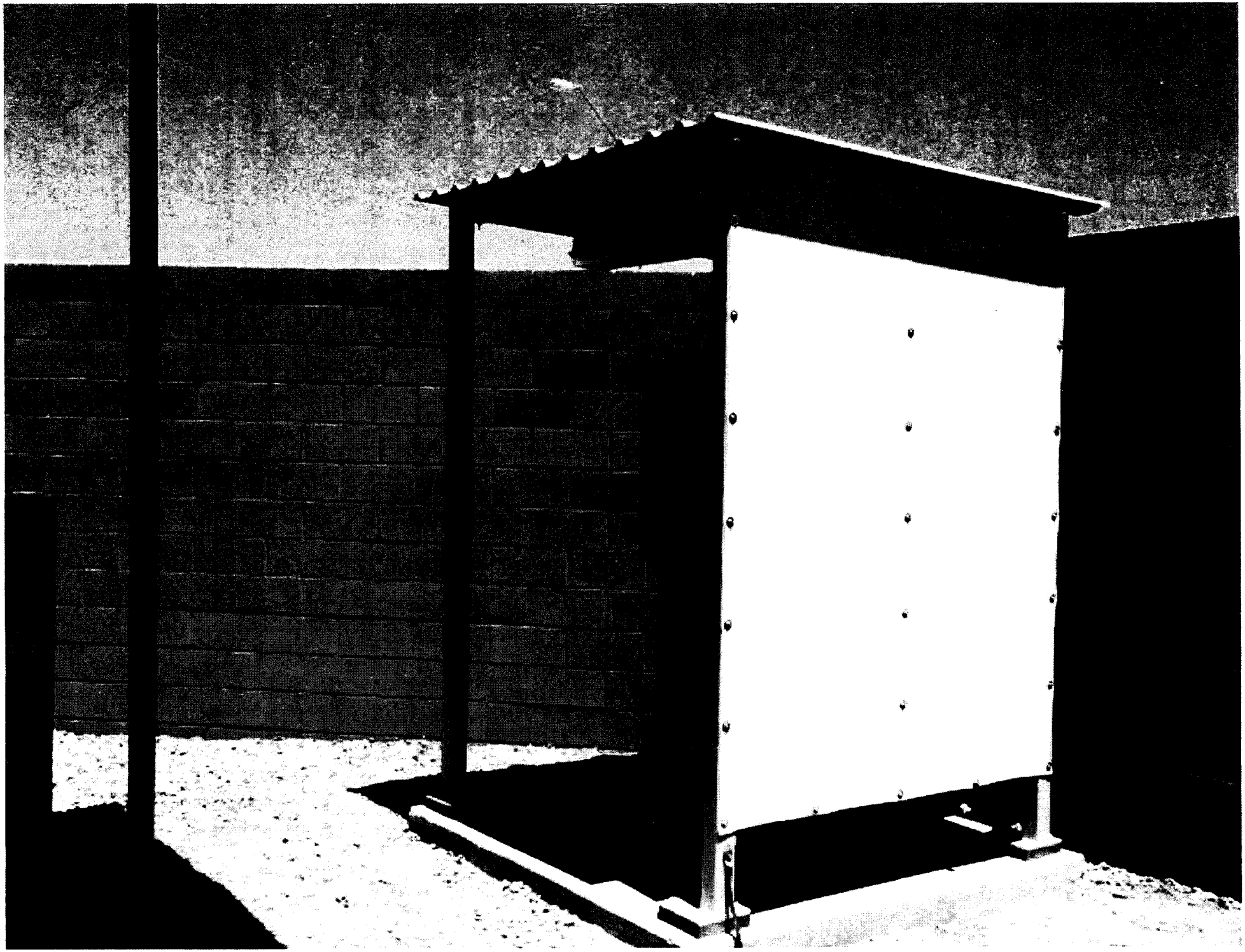
PLOTTED: April 25, 2013 BY: johnsons DWG FILE: X:\1800's\1893.00 AWC Wells 32 & 33 Nitrate Analyzer Addition\100 - Edit Design_CAD Files\1893.00.100_E04.dwg

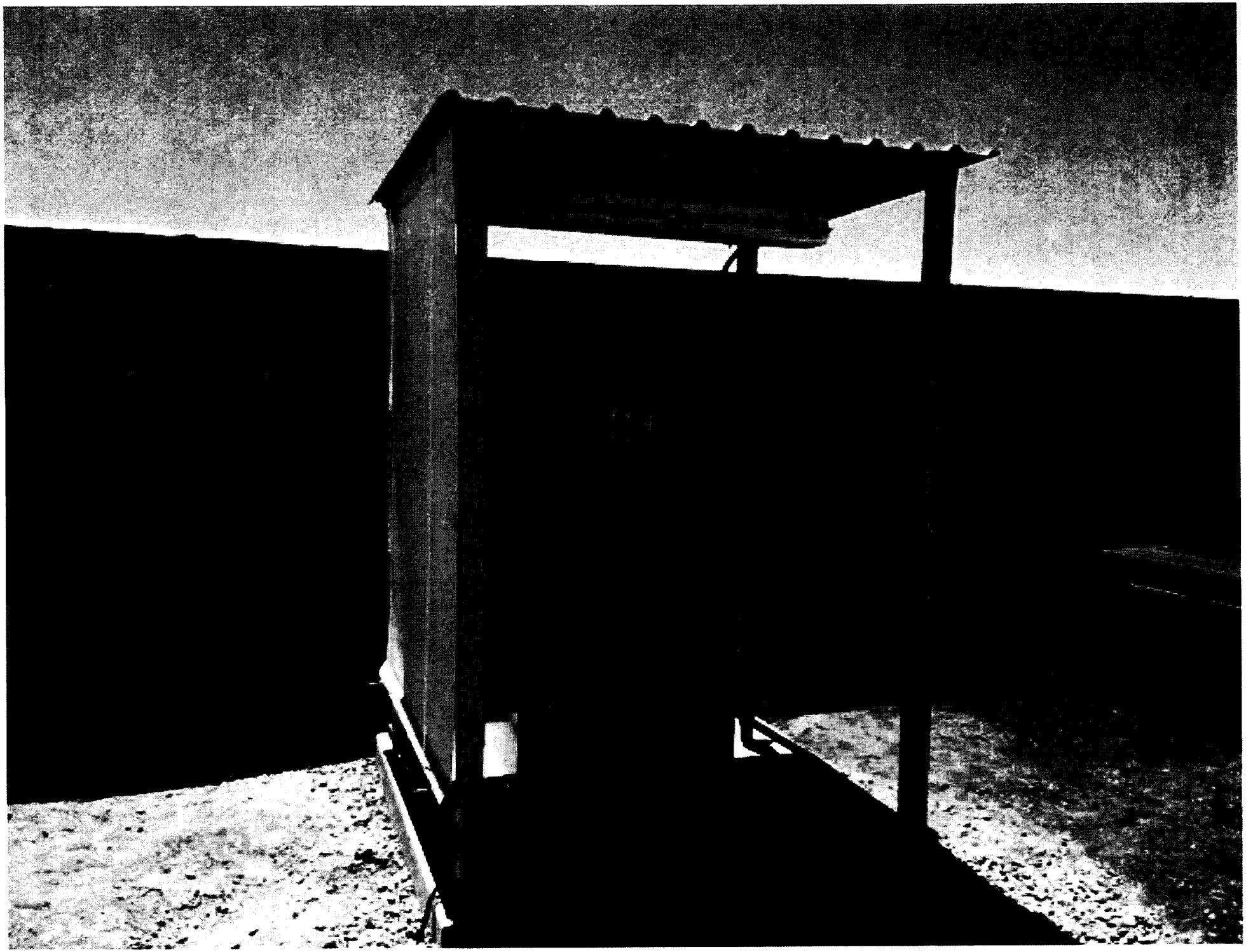


CG Well 32 5-19-15
New Nitrate Analyzer



CG Well #33 5-19-15
New Nitrate Analyzer with probe installed
And fully functional





ARIZONA WATER COMPANY

CONSTRUCTION PLACED IN SERVICE NOTICE

WORK AUTHORIZATION NO.: 1-5303

DIVISION: PV / CG

DATE PLACED IN SERVICE: 6 | 5 | 2015

CONTRACT NO:

FOR PURPOSES OF *MODIFIED ACCELERATED COST RECOVERY SYSTEM*, AN ASSET IS "PLACED IN SERVICE" WHEN IT IS IN A CONDITION OR STATE OF READINESS AND AVAILABILITY FOR A SPECIFICALLY ASSIGNED FUNCTION, WHETHER IT BE FOR USE IN A TRADE OR BUSINESS, OR FOR THE PRODUCTION OF INCOME.

I CERTIFY THAT THE ASSET(S) CONSTRUCTED PURSUANT TO THE PROVISIONS OF THE ABOVE-REFERENCED WORK AUTHORIZATION ARE READY FOR SERVICE AS OF THE DATE SHOWN ABOVE.

Division Manager or Operations Superintendent
(signature)

6-9-15
Date

SUBMIT ORIGINAL TO ACCOUNTING DEPARTMENT

A-1-3-1
FKS 11/24/11

Western Group Rate Case

Exhibit FKS-1

5304 PV Well 27

ARIZONA WATER COMPANY
WORK AUTHORIZATION

W.A. NUMBER: 1-5304
P.E. NUMBER:
BUDGET ITEM NO.: 1-5304
SHEET NO.: 1 of 2

SYSTEM:	PINAL VALLEY	RETENTION REQUIRED:	☑ YES ☐ NO
DIVISION:	CASA GRANDE	WORK TO START BY:	UPON AUTHORIZATION
RESPONSIBLE PERSON:	JAMES WILSON	WORK TO BE FINISHED BY:	WITHIN ???? DAYS
TAX CODE:			

DESCRIPTION OF WORK:

Install a second 60 HP 500 GPM booster pump, starter panel and new suction and discharge headers at the Lake In The Desert Booster Pump Station at Well No. 27.

FACTORS JUSTIFYING WORK:

Approved 2015 Budget Item ($75,000)
The BPS supplies water to the Casa Grande upper pressure zone. The upper pressure zone is supplied on the west side by the Scott Drive booster pump station and on the east side by the BPS. The BPS is necessary to supply system pressure and demand in the eastern portion of the upper pressure zone during peak demand. The BPS consists of a single 60HP 500 GPM booster pump. If the pump fails during peak demand the Company receives low pressure complaints from customers north of the BPS in the Las Montana's subdivision.

COST ESTIMATE		AUTHORIZATION	DATE
COST OF WORK:		PREPARED BY: James Wilson	
MATERIAL	0		
LABOR	0	REVIEWED FOR ESMT/ROW VERIFICATION: Charles Briggs	
CONTRACT PORTION	0		
OVERHEAD	0	REVIEWED BY: Mario Mendez	
TOTAL AUTHORIZED EXPENDITURES CHARGEABLE TO THIS W.A.	$ -		
FUNDS RECEIVED:		APPROVED BY ENGINEERING: Fredrick Schneider	
CONTRIBUTIONS RECEIVED	0		
REFUNDABLE ADVANCES RECEIVED	0	APPROVED BY FINANCE: Joseph Harris	
TOTAL CONTRIBUTIONS/ADVANCES	0		
NET COMPANY CASH REQUIRED	$ -	AUTHORIZED BY PRESIDENT: William Garfield	

COMMENTS:

CONSTRUCTION RELEASE:

AFH

ARIZONA WATER COMPANY

WORK AUTHORIZATION - DETAIL SHEET

W.A. NUMBER: 1-5304
P.E. NUMBER:
BUDGET ITEM NO.: B-1
SHEET NO.: 2 of 2

	PLANT PROPERTY ACCOUNT	UNIT DESCRIPTION	QUANTITY	YEAR INSTALLED AND W.A. NUMBER
RETIREMENT PROPERTY UNITS	343	6-inch distribution header	20	2010, 1-4620

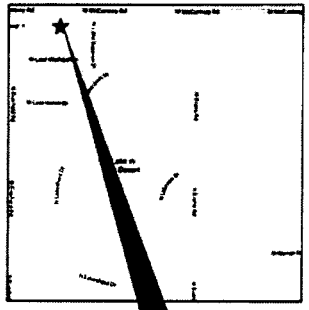
PROJECT DESCRIPTION:

Install a second 60 HP 500 GPM booster pump, starter panel and new suction and discharge headers at the Lake In The Desert Booster Pump Station at Well No. 27.

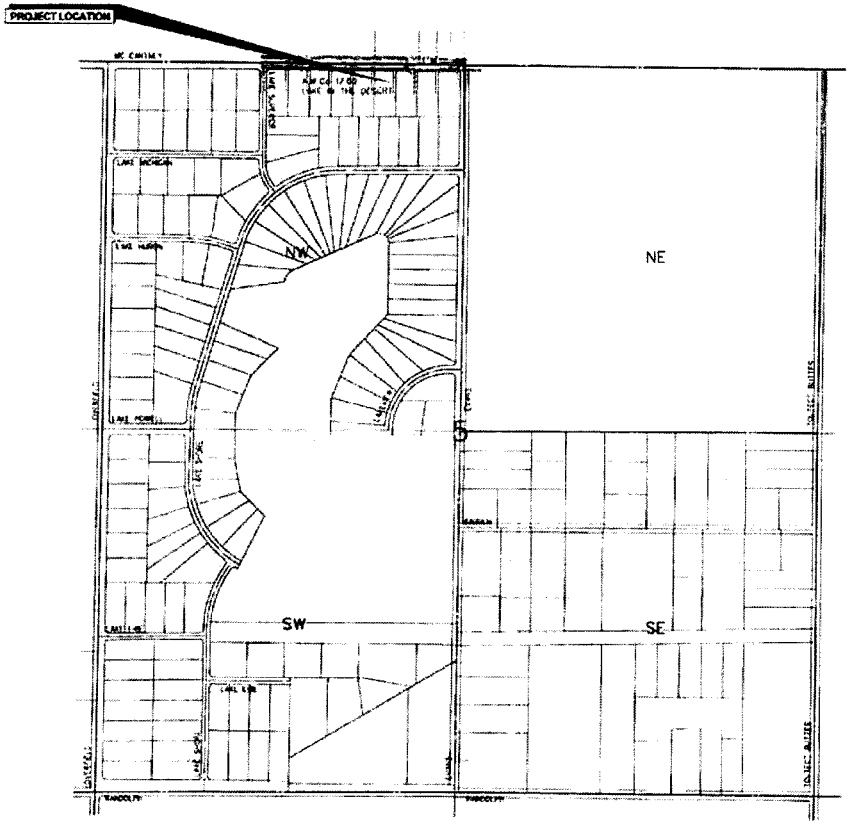
	DESCRIPTION	PLANT PROP ACCT	QUANTITY	UNIT COST	TOTAL
CONTRACT WORK					
	SERVICE CONNECTIONS COMPLETE: DOUBLE-LONG	345			
	SERVICE CONNECTIONS COMPLETE: DOUBLE-SHORT	345			
	SERVICE CONNECTIONS COMPLETE: SINGLE-LONG	345			
	SERVICE CONNECTIONS COMPLETE: SINGLE-SHORT	345			
TOTAL CONTRACT WORK					$ -
MATERIALS					
	SERVICE CONNECTIONS: DOUBLE-LONG	345			
	SERVICE CONNECTIONS: DOUBLE-SHORT	345			
	SERVICE CONNECTIONS: SINGLE-LONG	345			
	SERVICE CONNECTIONS: SINGLE-SHORT	345			
	METERS	346			
TOTAL MATERIALS					$ -
LABOR					
	TESTING FEE				
	PERMIT FEE				
	SURVEY FEE				
	FIELD INSPECTION				
	INSTALL SERVICE CONNECTIONS: DOUBLE-LONG	345			
	INSTALL SERVICE CONNECTIONS: DOUBLE-SHORT	345			
	INSTALL SERVICE CONNECTIONS: SINGLE-LONG	345			
	INSTALL SERVICE CONNECTIONS: SINGLE-SHORT	345			
TOTAL LABOR					$ -
SUBTOTAL - CONTRACT WORK, MATERIALS, AND LABOR					$ -
OVERHEAD					0
TOTAL	REFUNDABLE PORTION ☐	NON-REFUNDABLE PORTION ☐		**COST ESTIMATE**	$ -

AFH

INSTALL A 60 HP, 500 GPM BOOSTER PUMP AT LAKE IN THE DESERT WELL SITE No. 27 IN CASA GRANDE, AZ. NW1/4 SEC. 5, T. 6 S., R. 7 E. OF THE G. & S. R. B. & M.



VICINITY MAP



PROJECT VICINITY

OWNER/ENGINEER/DEVELOPER

SHEET INDEX

Sht. No.	DWG No.	DESCRIPTION	PW PAPER SIZE
1	PV-0093	PROJECT VICINITY	A 8.5 in.
2	PV-0093	SITE DIMENSIONS	A 8.5 in.
3	PV-0093	MISCELLANEOUS PUMP STATION / SITE CONSTRUCTION PLAN	A 8.5 in.
4	PV-0093	A.W.Co. NOTES	A 8.5 in.
5	PV-0093	A.W.Co. STANDARD SPECIFICATIONS AND DETAILS	A 8.5 in.

BASIS OF BEARING
THE NORTH QUARTER SECTION LINE OF SECTION 5 T.6 S., R.7 E.
BEARING N89° 38' 42" W

FOR BIDDING PURPOSES ONLY
JUL 20 2015

The installation shown is to be installed in accordance with the Arizona Water Company standard specifications and with the Arizona Department of Environmental Quality

1.5304
PINAL VALLEY
NW 1/4 SEC. 5, T. 6 S., R. 7 E.
2100
2/15/2015
AS SHOWN
JAK

ARIZONA WATER COMPANY
3805 N BLACK CANYON HWY POST OFFICE BOX 29006
PHOENIX, ARIZONA 85038-9006
(602) 240-6860

INSTALL A 60 HP, 500 GPM BOOSTER PUMP AT LAKE IN THE DESERT WELL SITE No. 27 IN CASA GRANDE, AZ

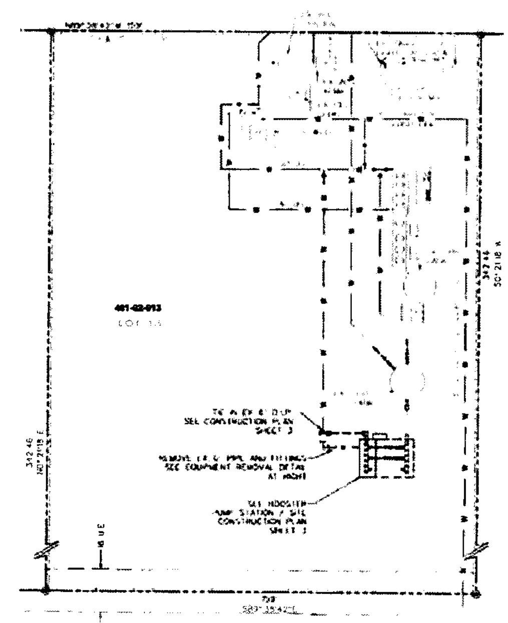
PROJECT VICINITY

PV-0093

SHEET 1 OF 5

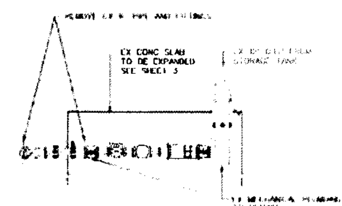
LEGEND

- 1/2" REBAR PROPERTY CORNER
- ELECTRICAL EQUIPMENT/BOXES
- LIGHT/POWER POLES
- WATER VALVE
- STREET CENTERLINE/MONUMENT LINE
- RIGHT-OF-WAY LINE
- PROPERTY LINE
- EASEMENT LINE
- EX WATER LINE
- EX WATER LINE TO BE ABANDONED
- OVERHEAD ELECTRIC
- EX CHAIN LINK FENCE
- CONTOURS



SITE OVERALL

	FITTING SCHEDULE	QUANTITY	SUPPLIED BY	INSTALLED BY
1	12" DIP W/POLYWRAP AND JOINT RESTRAINT	[illegible]	CONTR	CONTR
2	12" MJ 90° ELL	[illegible]	CONTR	CONTR
3	12" FOSTER ADAPTOR	[illegible]	CONTR	CONTR
4	12" MJ PLUG	[illegible]	CONTR	CONTR
5	12" MJ X FLG 90° ELL	[illegible]	CONTR	CONTR
6	6" FLG GATE VALVE	[illegible]	CONTR	CONTR
7	6" ROMAC RESTRAINED FLANGE COUPLING ADAPTOR	[illegible]	CONTR	CONTR
8	[illegible] DIP FLG X PE SPOOL [illegible]	[illegible]	CONTR	CONTR
9	6" X 4" FLG ECCENTRIC REDUCER	[illegible]	CONTR	CONTR
10	4" CLASS 125 COMPANION FLG [illegible]	[illegible]	CONTR	CONTR
11	4" X [illegible] SCH 40 STL PIPE [illegible] THRD EA END	[illegible]	CONTR	CONTR
12	4" CLASS 300 COMPANION FLG DIP THRD	[illegible]	CONTR	CONTR
13	GRUNDFOS [illegible] PUMP	[illegible]	A.W.C.	CONTR
14	GRUNDFOS 60HP/3PH/60HZ/460V/3550RPM MOTOR	[illegible]	A.W.C.	CONTR
15	4" CLA VAL 60G [illegible] BOOSTER PUMP CONTROL VALVE	[illegible]	CONTR	CONTR
16	12" X 6" FLG TEE	[illegible]	CONTR	CONTR
17	12" X [illegible] FLG X FLG DIP SPOOL	[illegible]	CONTR	CONTR
18	[illegible]	[illegible]	CONTR	CONTR
19	1" BALL CORP STOP MIP	[illegible]	CONTR	CONTR
20	1" CLA-VAL [illegible] AIR RELEASE VALVE	[illegible]	CONTR	CONTR
21	[illegible] 0-300 PSI PRESSURE GAUGE ([illegible] SW-021 300#)	[illegible]	CONTR	CONTR
22	1" BALL CORP STOP MIP X FIP	[illegible]	CONTR	CONTR
23	[illegible] (AWC STD DTL [illegible])	[illegible]	CONTR	CONTR
24	[illegible]	[illegible]	A.W.C.	CONTR
25	4" X [illegible] FLG X FLG DIP SPOOL	[illegible]	CONTR	CONTR
26	4" X 2'-0" [illegible] FLG DIP SPOOL [illegible]	[illegible]	CONTR	CONTR
27	[illegible] ROMAC RESTRAINED FLANGE COUPLING ADAPTOR	[illegible]	CONTR	CONTR
28	12" X 6" MJ [illegible]	[illegible]	CONTR	CONTR
29	6" BLIND FLANGE	[illegible]	CONTR	CONTR
30	3/4" [illegible] ACCESS HOSE BIBB	[illegible]	CONTR	CONTR
31	RELOCATE EX 2" X 19" O.D. REDUCING FLANGE WITH 2" BALL CORP	[illegible]	A.W.C.	CONTR
32	2" X 19" O.D. REDUCING FLANGE	[illegible]	CONTR	CONTR
33	2" BALL CORP STOP MIP X FIP	[illegible]	CONTR	CONTR
34	6" X 3'-0" DIP	[illegible]	CONTR	CONTR
35	6" X 1'-0" MJ SLEEVE	[illegible]	CONTR	CONTR
36	[illegible] FLG X FLG DIP SPOOL	[illegible]	CONTR	CONTR



EQUIPMENT REMOVAL DETAIL

NO SCALE

FOR BIDDING PURPOSES ONLY
JUL 20 2015

The installation shown is to be installed in accordance with the Arizona Water Company standard specifications on file with the Arizona Department of Environmental Quality

263-1100
1-800-STAKE-IT

1-6304 | PINAL VALLEY | NW 1/4 SEC. 5, T. 6 S., R. 7 E. | 2100 | 2/18/2015 | AS SHOWN | JAK

ARIZONA WATER COMPANY

3805 N. BLACK CANYON HWY POST OFFICE BOX 29006
PHOENIX, ARIZONA 85038-9006
(602) 240-6860

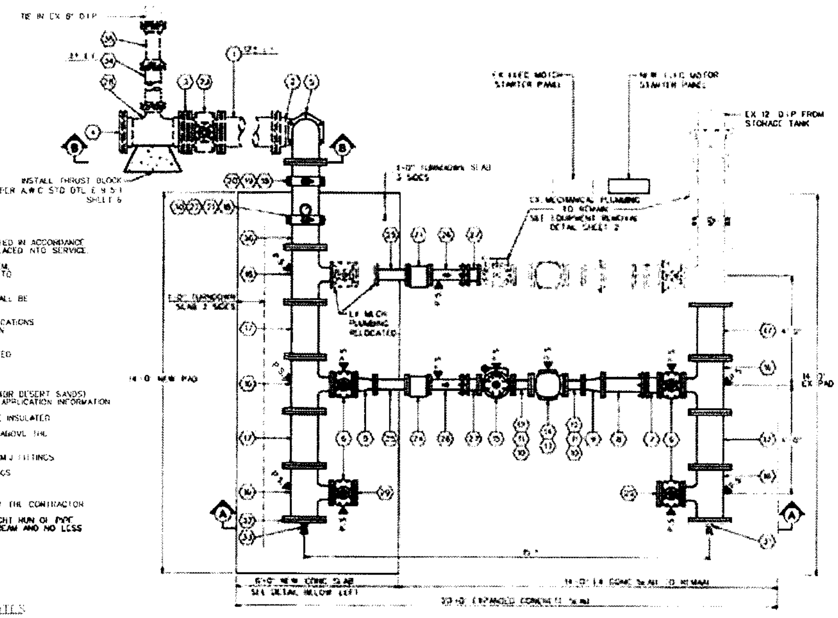
INSTALL A 60 HP, 500 GPM BOOSTER PUMP AT LAKE IN THE DESERT WELL SITE No. 27 IN CASA GRANDE, AZ

SITE OVERALL

41045 JAMES T. WILSON

PV-0093

SHEET 2 OF 5



CONSTRUCTION NOTES

1. BOOSTER PUMPS AND NEW PIPING SHALL BE DISINFECTED IN ACCORDANCE WITH ADEQ ENGINEERING BULLETIN No 8 BEFORE BEING PLACED INTO SERVICE.

2. ALL MATERIALS AND PRODUCTS USED IN WATER SYSTEM, INCLUDING SURFACE COATINGS & PAINTS, SHALL CONFORM TO NSF STANDARD 61 & CURRENT AWWA D102

3. CONSTRUCTION MATERIALS USED IN WATER SYSTEM SHALL BE LEAD-FREE AS PER A.A.C R18-4-504 AND R18-1-101 (43)

4. USE COOPER B-LINE PIPE SUPPORTS OR EQUAL AT LOCATIONS NOTED BY P.S.# ON BOOSTER PUMP STATION PIPING PLAN (SEE PIPE SUPPORT DETAIL THIS SHEET)

5. ALL ABOVE GROUND PIPING & VALVES SHALL BE PAINTED (EXCEPT METERS & CONTROL VALVES)

PIPE COATING PREPARATION SSPC SP6
PRIME COAT: TNEMEC SERIES 135 CHEMBUILD
FINISH COAT: TNEMEC SERIES 73 ENDURASHIELD (COLOR 040R DESERT SANDS)
REFER TO TNEMEC PRODUCT DATA SHEETS FOR COATING APPLICATION INFORMATION

6. ANY EXPOSED PIPING SUBJECT TO FREEZING SHALL BE INSULATED

7. ALL ELECTRICAL J-BOXES SHALL BE A MINIMUM OF 6" ABOVE THE FINISHED CONCRETE SURFACE

8. USE FOSTER ADAPTORS TO CONNECT MJ FITTINGS TO MJ FITTINGS

9. ALL MECHANICAL JOINT FITTINGS ARE TO HAVE MEGA-LUGS

10. POLYWRAP ALL DIP BELOW GRADE

11. ALL MATERIALS & PIPE REMOVED MUST BE DISPOSED BY THE CONTRACTOR

12. THE PRODUCTION METER SHALL HAVE A MINIMUM STRAIGHT RUN OF PIPE WITH NO FITTINGS OF AT LEAST 5 PIPE DIAMETERS UPSTREAM AND NO LESS THAN 2 PIPE DIAMETERS DOWNSTREAM

CONCRETE SLAB NOTES

1. FOUNDATION SLAB FOOTING ON UNDISTURBED SOIL OR APPROVED ENGINEERED FILL SOIL PRESSURE 1500 PSF PER IBC 1804.2 CLASS 4 MATERIAL

2. CONCRETE: A.C.I MANUAL OF CONCRETE PRACTICE TYPE I CEMENT MINIMUM 28 DAY STRENGTH OF 3,000 PSI MECHANICALLY VIBRATE WHEN PLACED MAXIMUM SLUMP 5

3. REINFORCING ASTM A615 GRADE 60 DEFORMED BARS

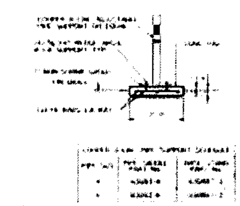
CONCRETE COVER TO REINFORCING:

A. CONCRETE AGAINST EARTH .... 3"
B. OTHER .... 1 1/2"

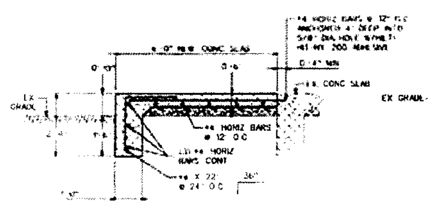
LAP SPLICES 48 BAR DIAMETERS UNLESS OTHERWISE NOTED

FITTING SCHEDULE

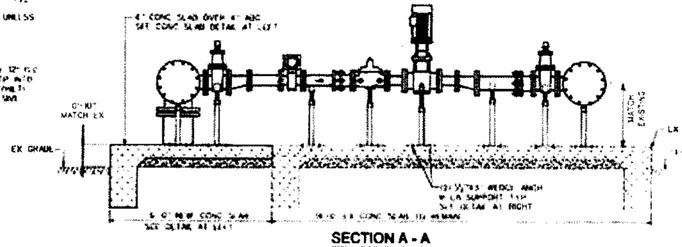
No.	FITTING SCHEDULE	QUANTITY	SUPPLIED BY	INSTALLED BY
1	12" D.I.P. W/POLYWRAP AND JOINT RESTRAINT	[illegible]	CONTR	CONTR
2	12" MJ 90° ELL	[illegible]	CONTR	CONTR
3	12" FOSTER ADAPTOR	[illegible]	CONTR	CONTR
4	12" MJ PLUG	1	CONTR	CONTR
5	6" MJ X FLG 90° ELL	[illegible]	CONTR	CONTR
6	6" FLG GATE VALVE	[illegible]	CONTR	CONTR
7	6" ROMAC RESTRAINED FLANGE COUPLING ADAPTOR	[illegible]	CONTR	CONTR
8	6" X 2'-6" DIP FLG X PE SPOOL (TRIM TO FIT)	[illegible]	CONTR	CONTR
9	6" X 4" FLG ECCENTRIC REDUCER	2	CONTR	CONTR
10	4" CLASS 125 COMPANION FLG (I.P. THRD.)	[illegible]	CONTR	CONTR
11	[illegible] SCH 40 STL PIPE [illegible]	[illegible]	CONTR	CONTR
12	4" CLASS 300 COMPANION FLG (I.P. THRD.)	[illegible]	CONTR	CONTR
13	GRUNDFOS CR 90-4 PUMP	[illegible]	A.W.C.	CONTR
14	GRUNDFOS [illegible] MOTOR	[illegible]	A.W.C.	CONTR
15	4" CLA-VAL 60G-[illegible] BOOSTER PUMP CONTROL VALVE	[illegible]	CONTR	CONTR
16	12" X 6" FLG TEE	[illegible]	CONTR	CONTR
17	12" X 2'-0" FLG X FLG DIP SPOOL	[illegible]	CONTR	CONTR
18	[illegible]	[illegible]	CONTR	CONTR
19	1" BALL CORP STOP [illegible]	[illegible]	CONTR	CONTR
20	1" CLA-VAL 34AR 1B AIR RELEASE VALVE	[illegible]	CONTR	CONTR
21	ASHCROFT 0-300 P.S.I. PRESSURE GAUGE (35-1009-SW-02L-300#)	[illegible]	CONTR	CONTR
22	[illegible] BALL CORP STOP [illegible]	[illegible]	CONTR	CONTR
23	12" MJ G.V.B.B.C. (A.W.C. STD DTL [illegible])	[illegible]	CONTR	CONTR
24	[illegible] METER	[illegible]	A.W.C.	CONTR
25	[illegible] FLG X FLG DIP SPOOL	[illegible]	CONTR	CONTR
26	[illegible] FLG X FLG DIP SPOOL (TRIM TO FIT)	[illegible]	CONTR	CONTR
27	4" ROMAC RESTRAINED FLANGE COUPLING ADAPTOR	[illegible]	CONTR	CONTR
28	12" X 4" MJ TEE	[illegible]	CONTR	CONTR
29	6" BLIND FLANGE	[illegible]	CONTR	CONTR
30	3/4" THREADLESS HOSE BIBB	[illegible]	CONTR	CONTR
31	RELOCATE [illegible] REDUCING FLANGE WITH 2" BALL CORP	[illegible]	A.W.C.	CONTR
32	2" X 19" O.D. REDUCING FLANGE	[illegible]	CONTR	CONTR
33	2" BALL CORP STOP [illegible]	[illegible]	CONTR	CONTR
34	[illegible]	[illegible]	CONTR	CONTR
35	6" X 1'-0" MJ SLEEVE	[illegible]	CONTR	CONTR
36	[illegible] X [illegible] FLG X FLG DIP SPOOL	[illegible]	CONTR	CONTR



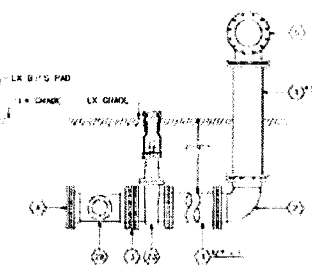
PIPE SUPPORT DETAIL



CONCRETE SLAB DETAIL



SECTION A - A
(LOOKING NORTH)



VIEW B - B
(LOOKING NORTH)

BOOSTER PUMP STATION/SITE CONSTRUCTION PLAN

JUL 20 2015

ARIZONA WATER COMPANY
3805 N BLACK CANYON HWY POST OFFICE BOX 29006
PHOENIX ARIZONA 85038-9006
(602) 240-6860

INSTALL A 80 HP, 800 GPM BOOSTER PUMP AT LAKE IN THE DESERT WELL SITE No 27 IN CASA GRANDE, AZ

BOOSTER PUMP STATION / SITE CONSTRUCTION PLAN

1-5304 | PINAL VALLEY | NW 1/4 SEC 5, T 6 S, R 7 E | 2100 | 2/15/2015 | AS SHOWN | JAK

The installation of ... to be installed in accordance with the Arizona Water Company standard specifications ... with the Arizona Department of Environmental Quality

263-1100
1-800-STAKE-IT

PV-0093
SHEET 3 OF 5

CONSTRUCTION SPECIFICATIONS FOR THE INSTALLATION OF WATER DISTRIBUTION SYSTEMS DUCTILE IRON

DEFINITIONS

1. GENERAL

2. LOCATION MARKING

3. TRENCH EXCAVATION

4. MATERIALS TO BE PROVIDED BY CONTRACTOR

5. INSTALLATION OF MATERIALS

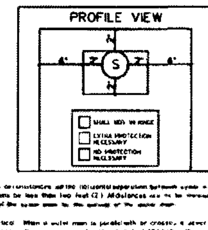
6. BACKFILL OF WATER MAIN TRENCHES

7. HYDROSTATIC TESTING OF COMPLETED PIPELINES

8. STERILIZATION AND FLUSHING OF COMPLETED PIPELINES

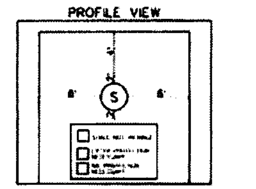
9. NO OTHER UTILITIES ALLOWED IN OR NEAR WATER PIPELINE TRENCHES

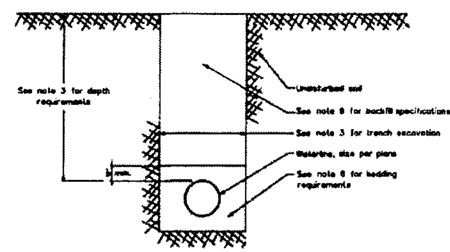
10. PROTECTION OF WATER MAINS FROM SEWERS



11. CONNECTION

12. WATER MAIN INSTALLATION SPECIFICATIONS





TYPICAL TRENCH DETAIL
Per MAC Detail 601 601.4.2 601.4.6

JUL 20 2015

ARIZONA WATER COMPANY
3805 N BLACK CANYON HWY POST OFFICE BOX 29006
PHOENIX, ARIZONA 85038-9006
(602) 240-6860

INSTALL A 60 HP, 500 GPM BOOSTER PUMP AT LAKE IN THE DESERT WELL SITE No 27 IN CASA GRANDE, AZ

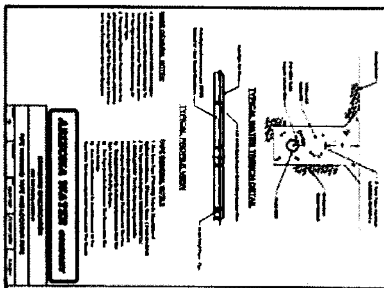
A W Co NOTES

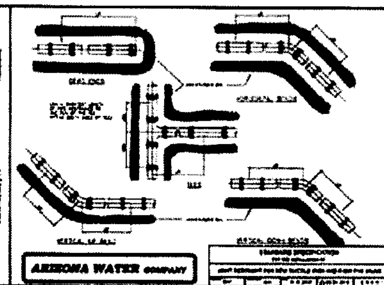
1-8304 | PINAL VALLEY | NW 1/4 SEC 5, T 6 S, R 7 E | 2100 | 2/15/2015 | AS SHOWN | JAK

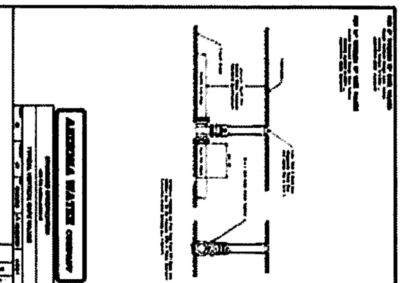
263-1100
1-800-STAKE-IT

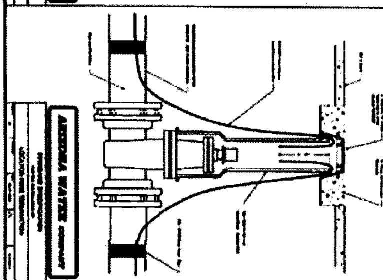
41066
JAMES T WILSON

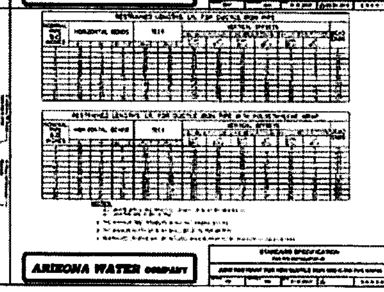
PV-0093
SHEET 4 OF 5

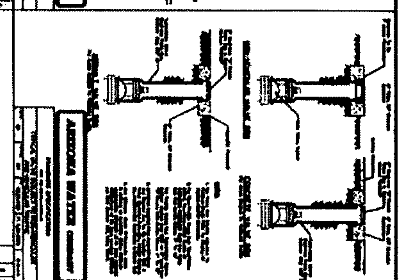


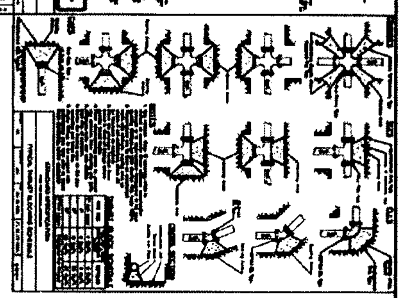


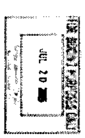












FOR BIDDING PURPOSES ONLY
JUL 20 2015

ARIZONA WATER COMPANY
3805 N. BLACK CANYON HWY POST OFFICE BOX 29006
PHOENIX ARIZONA 85038-9006
(602) 240-6860

INSTALL A 60 HP, 500 GPM BOOSTER PUMP AT LAKE IN THE DESERT WELL SITE No. 27 IN CASA GRANDE, AZ

A W Co STANDARD SPECIFICATIONS AND DETAILS

1-5304	
PINAL VALLEY	
NW 1/4 SEC. 5, T. 6 S., R 7 E	
2100	
2/16/2015	AS SHOWN
JAK	

The installation shown is to be installed in accordance with the Arizona Water Company standard specifications on file with the Arizona Department of Environmental Quality

263-1100
1-800-STAKE-IT

PV-0093
SHEET 5 OF 5

ARIZONA WATER COMPANY

3805 N. BLACK CANYON HIGHWAY, PHOENIX, ARIZONA 85015-5351 • P.O. BOX 29006, PHOENIX, AZ 85038-9006
PHONE: (602) 240-6860 • FAX: (602) 240-6874 • TOLL FREE: (800) 533-6023 • www.azwater.com

July 23, 2015

Mr. Mike Young
Fann Environmental, LLC
6708 Corsair Avenue, Suite A
Prescott, AZ 86301

Re: Request for Proposal/Contract

Dear Mr. Young:

You are hereby invited to submit a formal written bid for the Booster Pump Station expansion at the Lake in the Desert Well No. 27, in accordance with Arizona Water Company's *General Conditions of Contract, Construction Specifications* and *Standard Specification Drawings*, and with specific plans and related construction drawings for this project.

Bids must be submitted on the enclosed Proposal forms. Sealed bids will be received at the above address until August 7, 2015. Return both completed proposal forms with original signatures to the Company. There will be no formal bid opening.

A current Certificate of Insurance from the bidder must be on file with Arizona Water Company before the bidder's proposal will be considered. A **bid bond** will be required for this project.

Before a bidder is awarded a contract, the bidder may be required to demonstrate to Arizona Water Company's satisfaction that the bidder has the necessary facilities, ability, and financial resources to perform the work in a satisfactory manner within the time stipulated, and that the bidder has experience in the same or similar construction work. The bidder may also be required to furnish references concerning the bidder's qualifications.

Arizona Water Company reserves the right to reject or accept any bid.

A discussion of this project and a tour of the construction site may be scheduled by calling me at the above number.

Very truly yours,

James T. Wilson, P. E.
Senior Engineer
jwilson@azwater.com

afh
Enclosure

ARIZONA WATER COMPANY

Pinal Valley - Casa Grande
220 E. 2nd Street
Casa Grande, AZ 85130 PH: 520-836-8785

PROPOSAL/CONTRACT

CONTRACTOR: FANN ENVIRONMENTAL, LLC	SYSTEM: PINAL VALLEY
ADDRESS: 6708 CORSAIR AVENUE, SUITE A	W A No(s): 1-5304
CITY ST ZIP: PRESCOTT, AZ 86301	BID DUE DATE: August 7, 2015

CONTRACTOR SUBMITS this PROPOSAL/CONTRACT to ARIZONA WATER COMPANY, an Arizona corporation (the "Company"), to perform the work and complete the project described on Page 2 (the "Project"), as an independent prime contractor.

1. Contractor certifies that it has a complete copy of, and has read, understands and accepts, the Company's General Conditions of Contract, and the Company's Construction Specifications and Standard Specification Drawings, (the "Specifications"), all of which are attached hereto. Contractor has examined the specific plans and related construction drawings for the Project (the "Drawings"), copies of which are also attached hereto. The General Conditions of Contract, Specifications and Drawings are incorporated into this Proposal/Contract. Contractor affirms that all work and materials to be furnished or purchased for the Project will be in strict conformance with the General Conditions of Contract, Specifications and Drawings.
2. Contractor represents and warrants that it has satisfied and complied with the provisions of Section 6, Contractor Understands Work and Working Conditions, of the General Conditions of Contract prior to submitting this Proposal/Contract.
3. Contractor represents that this Proposal/Contract is fair and honest in all respects, is submitted in good faith and is not submitted in collusion with any other company, entity or person.
4. Contractor acknowledges that one hundred percent (100%) Performance and Payment Bonds are required and must be provided to the Company prior to the commencement of work.
5. Prior to the commencement of work, Contractor will submit to the Company a list of all materials to be used in the Project. The materials list will include the manufacturer, part number, price and quantity included in this Proposal/Contract.
6. Contractor will furnish all labor, tools, equipment and materials required to complete the Project according to the General Conditions of Contract, Specifications and Drawings. No materials purchased by Contractor to be incorporated into the Project are subject to tax at the time of purchase and Contractor will not charge the Company for any such tax. Contractor will pay the applicable transaction privilege tax (the "Contracting Tax") on the Project after Contractor receives payment of the final Project invoice from the Company. The cost of materials incorporated into the Project which are exempt by Arizona Revised State Statues ("A R S ") from the Contracting Tax, for example, pipes or valves having a diameter of four (4) inches or larger, including equipment, fittings and any other related part that is used in operating the pipes or valves (A.R.S. §42-5061 B.6.), will not be included in the total cost of the labor and materials upon which the Contracting Tax is computed. Contractor retains full liability and obligation to pay the Contracting Tax and will defend and indemnify the Company against any demand or obligation to pay the Contracting Tax.
7. Contractor will maintain detailed accounting records of all materials purchased and incorporated into the Project. Such records will include all supporting original vendor invoices for all materials purchased. Following completion of the Project, Contractor will submit an itemized accounting to the Company which will include all supporting original vendor invoices and satisfactory evidence of payment thereof. The Company will not pay Contractor for materials not actually incorporated into the Project, and the disposition of such materials will remain Contractor's responsibility.
8. The Estimated Total Cost of the Project, shown on Page 2, is based on estimated labor and material quantities to be furnished. It includes an estimate of the Contracting Tax and the cost of the required Performance and Payment Bonds. Contractor will not cancel, modify or withdraw this Proposal/Contract during a ninety-day (90) period commencing on the Bid Due Date. The Company may accept this Proposal/Contract by signing and mailing, or otherwise delivering, a copy hereof to Contractor during such ninety-day (90) period. If the Company does not accept this Proposal/Contract during such ninety-day (90) period, Contractor may cancel this Proposal/Contract by giving written notice of cancellation to the Company.
9. Prior to the commencement of work, Contractor will provide the Company with a detailed construction schedule, in either Gantt or CPM form, identifying all tasks to be performed from the date of the written Commencement Notice through completion of the Project, including testing, training of Company Personnel and final Project invoicing. Contractor will provide the Company with a copy of such construction schedule documenting the progress of work on the Project at least monthly.
10. Contractor will not commence work on the Project until the Company gives Contractor a written Commencement Notice. Contractor will complete the Project within _____ calendar days after the Commencement Notice is issued.
11. Following the Company's written notice of satisfactory completion of the Project, and upon receipt of the final Project invoice from Contractor, the Company shall pay Contractor the actual total cost of the Project, which will be calculated as shown on Page 2, except that actual labor and material quantities installed/constructed will be substituted for the estimated labor and materials quantities and the Contracting Tax will be recalculated based on such actual labor and materials quantities.
12. The amount of applicable liquidated damages for Contractor's failure to deliver or perform within the time limit shown in Paragraph 10 may be deducted from the Company's payment of the final Project invoice. This provision shall not limit the Company's ability to terminate this Proposal/Contract for Contractor's unsatisfactory performance or failure to perform as provided in the General Conditions of Contract, Specifications or Drawings, or in this Proposal/Contract.

SPECIAL CONDITIONS:

Contractor must attend a mandatory pre-bid meeting on July 24, 2015. Company will make two progress payments and one final payment.
A copy of the Company's EIC specifications are attached hereto and incorporated into this Proposal/Contract.

CONTRACTOR	PROPOSAL/CONTRACT ACCEPTED:
FANN ENVIRONMENTAL, LLC	*ARIZONA WATER COMPANY*
By:	By:
Print Name:	Print Name: Fredrick K. Schneider, PE
Title:	Title: Vice President - Engineering
Date:	Date:

AFH

ARIZONA WATER COMPANY

Pinal Valley - Casa Grande
220 E. 2nd Street
Casa Grande, AZ 85130 PH: 520-836-8785

PROPOSAL/CONTRACT

CONTRACTOR: FANN ENVIRONMENTAL, LLC	SYSTEM: PINAL VALLEY
AZ CONTRACTOR LICENSE NO: CLASSIFICATION:	W.A No(s): 1-5304
ADDRESS: 6708 CORSAIR AVENUE, SUITE A	BID DUE DATE: August 7, 2015
CITY ST ZIP: PRESCOTT, AZ 86301	BID BOND REQUIRED: √ Yes ☐ No

DESCRIPTION OF PROJECT: Install new suction and discharge headers and starter at the Lake in the Desert Booster Station at 7317 W. McCartney Road Casa Grande, AZ.

1-2. MATERIALS EXEMPT FROM CONTRACTING TAX (per Paragraph 6)	QUANTITY	UNIT PRICE LABOR	UNIT PRICE MATERIALS	TOTAL COST LABOR	TOTAL COST MATERIALS
Provide and install new suction and discharge headers with all related fittings	Lot				
				1	2
3. Total Labor to Install Exempt Materials (add the amounts in column 1)				3	
4. Total Exempt Materials (add the amounts in column 2)					4

5-6. NON-EXEMPT MATERIALS	QUANTITY	LABOR	MATERIALS	LABOR	MATERIALS
Demo existing 6-inch discharge pipe.	1				
Provide and install starter panel with alternator switch and all necessary conduits, wire, and controls (match existing starter panel).	1				
Provide and install concrete pad extension	1				
				5	6
7. Total Labor to Install Non-Exempt Materials (add the amounts in column 5)				7	
8. Total Non-Exempt Materials (add the amounts in column 6)					8
9. Subtotal A (add lines 3, 7 and 8)					9
10. Contracting Tax Base (multiply the amount on line 9 by 0.65)				10	
11. Applicable Contracting Tax Rate				11	
12. Contracting Tax (multiply the amount on line 10 by line 11)					12
13. Subtotal B (add lines 4, 9 and 12)					13
14. 100% Performance and Payment Bonds Cost					14
15. Estimated Total Cost (add lines 13 and 14)					15

NOTE: The Estimated Total Cost includes all labor and materials for backfill, pavement replacement, chip seal, and traffic control necessary for the Project.

ARIZONA WATER COMPANY

Pinal Valley - Casa Grande
220 E. 2nd Street
Casa Grande, AZ 85130 PH: 520-836-8785

PROPOSAL/CONTRACT

CONTRACTOR: FANN ENVIRONMENTAL, LLC	SYSTEM: PINAL VALLEY
ADDRESS: 6708 CORSAIR AVENUE, SUITE A	W A No(s): 1-5304
CITY ST ZIP: PRESCOTT, AZ 86301	BID DUE DATE: August 7, 2015

CONTRACTOR SUBMITS this PROPOSAL/CONTRACT to ARIZONA WATER COMPANY, an Arizona corporation (the "Company"), to perform the work and complete the project described on Page 2 (the "Project"), as an independent prime contractor.

1. Contractor certifies that it has a complete copy of, and has read, understands and accepts, the Company's General Conditions of Contract, and the Company's Construction Specifications and Standard Specification Drawings, (the "Specifications"), all of which are attached hereto. Contractor has examined the specific plans and related construction drawings for the Project (the "Drawings"), copies of which are also attached hereto. The General Conditions of Contract, Specifications and Drawings are incorporated into this Proposal/Contract. Contractor affirms that all work and materials to be furnished or purchased for the Project will be in strict conformance with the General Conditions of Contract, Specifications and Drawings.
2. Contractor represents and warrants that it has satisfied and complied with the provisions of Section 6, Contractor Understands Work and Working Conditions, of the General Conditions of Contract prior to submitting this Proposal/Contract
3. Contractor represents that this Proposal/Contract is fair and honest in all respects, is submitted in good faith and is not submitted in collusion with any other company, entity or person.
4. Contractor acknowledges that one hundred percent (100%) Performance and Payment Bonds are required and must be provided to the Company prior to the commencement of work.
5. Prior to the commencement of work, Contractor will submit to the Company a list of all materials to be used in the Project. The materials list will include the manufacturer, part number, price and quantity included in this Proposal/Contract.
6. Contractor will furnish all labor, tools, equipment and materials required to complete the Project according to the General Conditions of Contract, Specifications and Drawings. No materials purchased by Contractor to be incorporated into the Project are subject to tax at the time of purchase and Contractor will not charge the Company for any such tax Contractor will pay the applicable transaction privilege tax (the "Contracting Tax") on the Project after Contractor receives payment of the final Project invoice from the Company The cost of materials incorporated into the Project which are exempt by Arizona Revised State Statues ("A.R.S.") from the Contracting Tax, for example, pipes or valves having a diameter of four (4) inches or larger, including equipment, fittings and any other related part that is used in operating the pipes or valves (A.R.S §42-5061 B.6.), will not be included in the total cost of the labor and materials upon which the Contracting Tax is computed. Contractor retains full liability and obligation to pay the Contracting Tax and will defend and indemnify the Company against any demand or obligation to pay the Contracting Tax.
7. Contractor will maintain detailed accounting records of all materials purchased and incorporated into the Project. Such records will include all supporting original vendor invoices for all materials purchased. Following completion of the Project, Contractor will submit an itemized accounting to the Company which will include all supporting original vendor invoices and satisfactory evidence of payment thereof. The Company will not pay Contractor for materials not actually incorporated into the Project, and the disposition of such materials will remain Contractor's responsibility.
8. The Estimated Total Cost of the Project, shown on Page 2, is based on estimated labor and material quantities to be furnished. It includes an estimate of the Contracting Tax and the cost of the required Performance and Payment Bonds. Contractor will not cancel, modify or withdraw this Proposal/Contract during a ninety-day (90) period commencing on the Bid Due Date. The Company may accept this Proposal/Contract by signing and mailing, or otherwise delivering, a copy hereof to Contractor during such ninety-day (90) period. If the Company does not accept this Proposal/Contract during such ninety-day (90) period, Contractor may cancel this Proposal/Contract by giving written notice of cancellation to the Company.
9. Prior to the commencement of work, Contractor will provide the Company with a detailed construction schedule, in either Gantt or CPM form, identifying all tasks to be performed from the date of the written Commencement Notice through completion of the Project, including testing, training of Company Personnel and final Project invoicing. Contractor will provide the Company with a copy of such construction schedule documenting the progress of work on the Project at least monthly.
10. Contractor will not commence work on the Project until the Company gives Contractor a written Commencement Notice. Contractor will complete the Project within _____ calendar days after the Commencement Notice is issued.
11. Following the Company's written notice of satisfactory completion of the Project, and upon receipt of the final Project invoice from Contractor, the Company shall pay Contractor the actual total cost of the Project, which will be calculated as shown on Page 2, except that actual labor and material quantities installed/constructed will be substituted for the estimated labor and materials quantities and the Contracting Tax will be recalculated based on such actual labor and materials quantities
12. The amount of applicable liquidated damages for Contractor's failure to deliver or perform within the time limit shown in Paragraph 10 may be deducted from the Company's payment of the final Project Invoice. This provision shall not limit the Company's ability to terminate this Proposal/Contract for Contractor's unsatisfactory performance or failure to perform as provided in the General Conditions of Contract, Specifications or Drawings, or in this Proposal/Contract.

SPECIAL CONDITIONS:

Contractor must attend a mandatory pre-bid meeting on July 24, 2015. Company will make two progress payments and one final payment.
A copy of the Company's EIC specifications are attached hereto and incorporated into this Proposal/Contract.

CONTRACTOR	PROPOSAL/CONTRACT ACCEPTED:
FANN ENVIRONMENTAL, LLC	*ARIZONA WATER COMPANY*
By:	By:
Print Name:	Print Name: Fredrick K. Schneider, PE
Title:	Title: Vice President - Engineering
Date:	Date:

AFH

ARIZONA WATER COMPANY

Pinal Valley - Casa Grande
220 E. 2nd Street
Casa Grande, AZ 85130 PH: 520-836-8785

PROPOSAL/CONTRACT

CONTRACTOR: FANN ENVIRONMENTAL, LLC	SYSTEM: PINAL VALLEY
AZ CONTRACTOR LICENSE NO: CLASSIFICATION:	W.A. No(s): 1-5304
ADDRESS: 6708 CORSAIR AVENUE, SUITE A	BID DUE DATE: August 7, 2015
CITY ST ZIP PRESCOTT, AZ 86301	BID BOND REQUIRED √ Yes ☐ No

DESCRIPTION OF PROJECT: Install new suction and discharge headers and starter at the Lake in the Desert Booster Station at 7317 W. McCartney Road Casa Grande, AZ.

1-2. MATERIALS EXEMPT FROM CONTRACTING TAX (per Paragraph 6'	QUANTITY	UNIT PRICE LABOR	UNIT PRICE MATERIALS	TOTAL COST LABOR	TOTAL COST MATERIALS
Provide and install new suction and discharge headers with all related fittings	Lot				
				1	2
3. Total Labor to Install Exempt Materials (add the amounts in column 1)				3	
4. Total Exempt Materials (add the amounts in column 2)					4

5-6. NON-EXEMPT MATERIALS	QUANTITY	LABOR	MATERIALS	LABOR	MATERIALS
Demo existing 6-inch discharge pipe.	1				
Provide and install starter panel with alternator switch and all necessary					
conduits, wire, and controls (match existing starter panel).	1				
Provide and install concrete pad extension	1				
				5	6
7. Total Labor to Install Non-Exempt Materials (add the amounts in column 5)				7	
8. Total Non-Exempt Materials (add the amounts in column 6)					8
9. Subtotal A (add lines 3, 7 and 8)					9
10. Contracting Tax Base (multiply the amount on line 9 by 0.65)				10	
11. Applicable Contracting Tax Rate				11	
12. Contracting Tax (multiply the amount on line 10 by line 11)					12
13. Subtotal B (add lines 4, 9 and 12)					13
14. 100% Performance and Payment Bonds Cost					14
15. Estimated Total Cost (add lines 13 and 14)					15

NOTE: The Estimated Total Cost includes all labor and materials for backfill, pavement replacement, chip seal, and traffic control necessary for the Project.

ARIZONA WATER COMPANY

SPECIFICATIONS

GENERAL CONDITIONS OF CONTRACT: E-4-1

CONSTRUCTION SPECIFICATIONS: E-8-1

STANDARD SPECIFICATION DRAWINGS: E-9-1

gw 7/23/15

2007 EDITION WITH **2010** REVISIONS;
2012 GENERAL CONDITIONS OF CONTRACT

A copy of this entire Spec Book was sent out with Farm Environmental invitation to bid package for 1-5304 PV 27 Redundant Pump on 7/23/15 gs

E&C Design Guidelines Project Example Drawings
E&C Design Guidelines Standard Details
E&C Design Guidelines Technical Specification

Arizona Water Company

Farm Environmental on 7/23/15 gw

7/23/15
gs

ARIZONA DEPARTMENT OF ENVIRONMENTAL QUALITY
CERTIFICATE OF APPROVAL TO CONSTRUCT
WATER FACILITIES

ADEQ File No: 20150178 **LTF No:** 62763

System Name: Pinal Valley **System Number:** 11-009

Project Owner: Arizona Water Company

Address: P O Box 29006, Phoenix , AZ 85038

Project Location: Casa Grande **County :** Pinal

Description: AZ WATER CO.1-5304 PINAL VALLEY WELL NO. 27 REDUNDANT PUMP. INSTALL ONE 60 HP, 500 GPM BOOSTER PUMP AT THE PINAL VALLEY WELL NO.27 BOOSTER PUMP STATION IN CASA GRANDE.

Approval to construct the above-described facilities as represented in the approved documents on file with the Arizona Department of Environmental Quality is hereby given subject to provisions 1 through 5 continued on page 2 through 2

1. This project must be constructed in accordance with all applicable laws, including Title 49, Chapter 2, Article 9 of the Arizona Revised Statutes and Title 18, Chapter 5, Article 5 of the Arizona Administrative Code.

2. Upon completion of construction, the engineer shall fill out the Engineer's Certificate of Completion and forward it to the Central Regional Office located in Phoenix. If all requirements have been completed, that unit will issue a Certificate of Approval of Construction. R18-5-507(B), Ariz. Admin.Code. At the project owner's request, the Department **may** conduct the final inspection required pursuant to R18-5-507(B); such a request must be made in writing in accordance with the time requirements of R18-5-507(C), Ariz. Admin. Code.

3. This certificate will be void if construction has not started within one year after the Certificate of Approval to Construct is issued, there is a halt in construction of more than one year, or construction is not completed within three years of the approval date. Upon receipt of a written request for an extension of time, the Department may grant an extension of time; an extension of time must be in writing. R18-5-505(E), Ariz. Admin. Code.

4. Operation of a newly constructed facility shall not begin until a Certificate of Approval of Construction has been issued by the Department. R18-5-507(A), Ariz. Admin. Code.

Reviewed by: SA3

By: _____ 7/29/15
David Burchard Unit Manager Date
Water Quality Division

cc: File No : 20150178
Regional Office: Central
Owner: Arizona Water Company
County Health Department: Pinal
Engineer: Arizona Water Company
Planning and Zoning/Az Corp. Commission
Engineering Review Database - Etr021

The Arizona Department of Environmental Quality's review of this application was subject to the requirements of the licensing time frames ("LTF") statute under Arizona Revised Statutes ("A.R.S.") § 41-1072 through § 41-1079 and the LTF rules under Arizona Administrative Code ("A.A.C.") R18-1-501 through R18-1-525. This Notice is being issued within the overall time frame for your application.

ADEQ hereby approves your application for Approve to Construct Drinking Water Facilities under A.R.S. § 49-351. Your copy is enclosed.

This decision is an appealable agency action under A.R.S. § 41-1092. You have a right to request a hearing and file an appeal under A.R.S. § 41-1092.03(B). You must file a written Request for Hearing or Notice of Appeal within **30 days** of your receipt of this Notice. A Request for Hearing or Notice of Appeal is filed when it is received by ADEQ's Hearing Administrator as follows:

Office of Administrative Counsel
Arizona Department of Environmental Quality
1110 W. Washington Street
Phoenix, AZ 85007

The Request for Hearing or Notice of Appeal shall identify the party, the party's address, the agency and the action being appealed and shall contain a concise statement of the reasons for the appeal. Upon proper filing of a Request for Hearing or Notice of Appeal, ADEQ will serve a Notice of Hearing on all parties to the appeal. If you file a timely Request for Hearing or Notice of Appeal you have a right to request an informal settlement conference with ADEQ under A.R.S. § 41-1092.06. This request must be made in writing no later than **20 days** before a scheduled hearing and must be filed with the Hearing Administrator at the above address.

Please contact Sujana Attaluri at (602) 771-4391 or sa3@azdeq.gov if you have questions regarding this Notice or the Certificate of Approved to Construct

Western Group Rate Case

Exhibit FKS-1

5307 Coolidge 9 & 10 Strainer

ARIZONA WATER COMPANY
WORK AUTHORIZATION

W.A. NUMBER: 1-5307
P.E. NUMBER:
BUDGET ITEM NO.: 1-5307
SHEET NO.: 1 of 2

SYSTEM:	PINAL VALLEY
DIVISION:	CASA GRANDE
RESPONSIBLE PERSON:	RAY MURRIETA
TAX CODE:	2102

RETENTION REQUIRED:	☑ YES ☐ NO
WORK TO START BY:	UPON AUTHORIZATION
WORK TO BE FINISHED BY:	WITHIN 120 DAYS

DESCRIPTION OF WORK:

Construct a third auto strainer at Coolidge wells No. 9 and 10.

FACTORS JUSTIFYING WORK:

APPROVED 2015 BUDGET ITEM ($40,000)
Well Nos. 9 and 10 produce a large amount of sand. In 2013, the Company installed two 80-micron automatic strainers with provisions for a third strainer in the event that additional strainer capacity is needed. Company operators have determined that the amount of sand produced from Well Nos. 9 and 10 exceeds the capacity of the existing strainers resulting in plugging and damage to the strainer screens. Company operators are required to disassemble and clean the strainers approximately twice a week typically requiring overtime. The additional capacity provided by the third automatic strainer will enable company operators to schedule regular monthly cleanings during normal working hours, eliminate high differential pressure alarms outside of normal working hours and resulting damage to the strainer screens.

COST ESTIMATE		AUTHORIZATION	DATE
COST OF WORK:		PREPARED BY: James Wilson gw 4/20/15	4/13/15
MATERIAL	28,915		
LABOR	3,300	REVIEWED FOR ESMT/ROW VERIFICATION: Charles Briggs CB 04-20-2015	04-13-2015
CONTRACT PORTION	3,500		
OVERHEAD	4,300	REVIEWED BY: Mario Mendez MM 4/20/15	4/13/15
TOTAL AUTHORIZED EXPENDITURES CHARGEABLE TO THIS W.A.	$ 40,015		
FUNDS RECEIVED:		APPROVED BY ENGINEERING: Fredrick Schneider FS 4-20-15	4-14-2015
CONTRIBUTIONS RECEIVED	0		
REFUNDABLE ADVANCES RECEIVED	0	APPROVED BY FINANCE: Joseph Harris	4/14/15
TOTAL CONTRIBUTIONS/ADVANCES	0		
NET COMPANY CASH REQUIRED	$ 40,015	AUTHORIZED BY PRESIDENT: William Garfield	4-15-15

COMMENTS:

CONSTRUCTION RELEASE:

RELEASED TO CONSTRUCTION
Authorized by FRED SCHNEIDER
Date 4/2015

2015 BUDGET

AFH

ARIZONA WATER COMPANY

WORK AUTHORIZATION - DETAIL SHEET

W.A. NUMBER: 1-5307
P.E. NUMBER:
BUDGET ITEM NO.: 1-5307
SHEET NO.: 2 of 2

RETIREMENT PROPERTY UNITS	PLANT PROPERTY ACCOUNT	UNIT DESCRIPTION	QUANTITY	YEAR INSTALLED AND W.A. NUMBER

PROJECT DESCRIPTION

Construct a third auto strainer at Coolidge wells No. 9 and 10.

	DESCRIPTION	PLANT PROP ACCT	QUANTITY	UNIT COST	TOTAL
CONTRACT WORK	Tie in electrical controls and alarms	332	1	$ 3,500.00	$ 3,500
	SERVICE CONNECTIONS COMPLETE: DOUBLE-LONG	345			
	SERVICE CONNECTIONS COMPLETE: DOUBLE-SHORT	345			
	SERVICE CONNECTIONS COMPLETE: SINGLE-LONG	345			
	SERVICE CONNECTIONS COMPLETE: SINGLE-SHORT	345			
TOTAL CONTRACT WORK					$ 3,500
MATERIALS	V-1500-8 automatic strainer	332	1	$ 15,154.15	$ 15,154
	V1500-080 80 Micron Screen	332	2	1,209.45	2,419
	2-inch Flush Valve With Actuator	332	2	1,666.50	3,333
	Basic Parts Kit	332	1	508.75	509
	Onsite Training	332	1	2,500.00	2,500
	Shipping	332	1	500.00	500
	Misc. fittings and valves	332	1	4,500.00	4,500
	SERVICE CONNECTIONS: DOUBLE-LONG	345			
	SERVICE CONNECTIONS: DOUBLE-SHORT	345			
	SERVICE CONNECTIONS: SINGLE-LONG	345			
	SERVICE CONNECTIONS: SINGLE-SHORT	345			
	METERS	346			
TOTAL MATERIALS					$ 28,915
LABOR	Engineering management and Design	343	20	$ 55.00	$ 1,100
	TESTING FEE	343			
	PERMIT FEE	343			
	SURVEY FEE	343			
	FIELD INSPECTION	343	40	55.00	2,200
	INSTALL SERVICE CONNECTIONS: DOUBLE-LONG	345			
	INSTALL SERVICE CONNECTIONS: DOUBLE-SHORT	345			
	INSTALL SERVICE CONNECTIONS: SINGLE-LONG	345			
	INSTALL SERVICE CONNECTIONS: SINGLE-SHORT	345			
TOTAL LABOR					$ 3,300
SUBTOTAL - CONTRACT WORK, MATERIALS, AND LABOR					$ 35,715
OVERHEAD					4,300
TOTAL	REFUNDABLE PORTION ☐	NON-REFUNDABLE PORTION ☐		**COST ESTIMATE**	$ 40,015

AFH

ARIZONA WATER COMPANY

3805 N. BLACK CANYON HIGHWAY, PHOENIX, ARIZONA 85015-5351 • P.O. BOX 29006, PHOENIX, AZ 85038-9006
PHONE: (602) 240-6860 • FAX: (602) 240-6874 • TOLL FREE: (800) 533-6023 • www.azwater.com

June 12, 2015

Mr. Cody Eslick
Keller Electrical Industries, Inc.
1881 E. University Drive
Phoenix, AZ 85034

Re: Coolidge Well Nos 9 and 10

PROJECT: Automatic strainer valve	
SYSTEM: Pinal Valley	
CONTRACT NO.:	
P.E. NO.	W.A. NO.: 1-5307

Dear Mr. Eslick:

Enclosed is your copy of the Proposal/Contract for the above-referenced project, which has been accepted by Arizona Water Company (the "Company"). The project shall be constructed in accordance with the Company's *General Conditions of Contract, the Specifications and the Drawings* which were included with the Company's previously provided Proposal/Contract, copies of which are being provided again and attached herewith.

Also enclosed are two copies of the Commencement Notice for the above-referenced project. Please sign one of the copies and return it to my attention retaining the other for your records.

As provided in paragraph 4 of the Company's Proposal/Contract executed by the Company on June 16, 2015, Keller Electrical Industries, Inc. acknowledged that one hundred percent (100%) Performance and Payment Bonds are required and must be provided to the Company prior to the commencement of work. In addition, as provided in paragraph 44 of the Company's General Conditions of Contract, the 100% Performance and Payment Bonds must be provided within ten (10) calendar days of the date of the Commencement Notice. Failure to provide an acceptable 100% Performance and Payment Bond does not limit the Company's

ability to terminate the Proposal/Contract or seek restitution for damages that the Company may have or will incur.

Prior to the start of construction, please call Ray Murrieta, Division Manager at 520-836-8785 to schedule a pre-construction meeting. In addition, please provide the required Performance and Payment Bonds to the Company promptly so that the contracted work can be completed within the contract's timeline.

If you have any questions, please call me at this office.

Very truly yours,

James T. Wilson, P. E.
Senior Engineer
jwilson@azwater.com

afh
Enclosure

ARIZONA WATER COMPANY

Casa Grande - Pinal Valley
220 E. 2nd Street
Casa Grande, AZ 85122 PH: 520-836-8785

PROPOSAL/CONTRACT

CONTRACTOR: KELLER ELECTRICAL INDUSTRIES, INC.	SYSTEM: PINAL VALLEY
ADDRESS: 1881 E. UNIVERSITY DRIVE	W A No(s): 1-5307
CITY ST ZIP: PHOENIX, AZ 85034	BID DUE DATE: June 5, 2015

CONTRACTOR SUBMITS the PROPOSAL/CONTRACT to ARIZONA WATER COMPANY, an Arizona corporation (the "Company"), to perform the work and complete the project described on Page 2 (the "Project"), as an independent prime contractor.

1 Contractor certifies that it has a complete copy of, and has read, understands and accepts, the Company's General Conditions of Contract, and the Company's Construction Specifications and Standard Specification Drawings, (the "Specifications"), all of which are attached hereto Contractor has examined the specific plans and related construction drawings for the Project (the "Drawings"), copies of which are also attached hereto The General Conditions of Contract, Specifications and Drawings are incorporated into this Proposal/Contract Contractor affirms that all work and materials to be furnished or purchased for the Project will be in strict conformance with the General Conditions of Contract, Specifications and Drawings

2 Contractor represents and warrants that it has satisfied and complied with the provisions of Section 6, Contractor Understands Work and Working Conditions, of the General Conditions of Contract prior to submitting this Proposal/Contract

3 Contractor represents that this Proposal/Contract is fair and honest in all respects, is submitted in good faith and is not submitted in collusion with any other company, entity or person

4 Contractor acknowledges that one hundred percent (100%) Performance and Payment Bonds are required and must be provided to the Company prior to the commencement of work

5 Prior to the commencement of work, Contractor will submit to the Company a list of all materials to be used in the Project The materials list will include the manufacturer, part number price and quantity included in this Proposal/Contract

6 Contractor will furnish all labor, tools, equipment and materials required to complete the Project according to the General Conditions of Contract, Specifications and Drawings No materials purchased by Contractor to be incorporated into the Project are subject to tax at the time of purchase and Contractor will not charge the Company for any such tax Contractor will pay the applicable transaction privilege tax (the "Contracting Tax") on the Project after Contractor receives payment of the final Project invoice from the Company The cost of materials incorporated into the Project which are exempt by Arizona Revised State Statues ("A R S ") from the Contracting Tax, for example, pipes or valves having a diameter of four (4) inches or larger, including equipment, fittings and any other related part that is used in operating the pipes or valves (A.R.S §42-5061 B.6), will not be included in the total cost of the labor and materials upon which the Contracting Tax is computed Contractor retains full liability and obligation to pay the Contracting Tax and will defend and indemnify the Company against any demand or obligation to pay the Contracting Tax

7 Contractor will maintain detailed accounting records of all materials purchased and incorporated into the Project Such records will include all supporting original vendor invoices for all materials purchased Following completion of the Project, Contractor will submit an itemized accounting to the Company which will include all supporting original vendor invoices and satisfactory evidence of payment thereof The Company will not pay Contractor for materials not actually incorporated into the Project, and the disposition of such materials will remain Contractor's responsibility

8 The Estimated Total Cost of the Project, shown on Page 2, is based on estimated labor and material quantities to be furnished It includes an estimate of the Contracting Tax and the cost of the required Performance and Payment Bonds Contractor will not cancel, modify or withdraw this Proposal/Contract during a ninety-day (90) period commencing on the Bid Due Date The Company may accept this Proposal/Contract by signing and mailing, or otherwise delivering, a copy hereof to Contractor during such ninety-day (90) period If the Company does not accept this Proposal/Contract during such ninety-day (90) period, Contractor may cancel this Proposal/Contract by giving written notice of cancellation to the Company

9. Prior to the commencement of work, Contractor will provide the Company with a detailed construction schedule, in either Gantt or CPM form, identifying all tasks to be performed from the date of the written Commencement Notice through completion of the Project, including testing, training of Company Personnel and final Project invoicing Contractor will provide the Company with a copy of such construction schedule documenting the progress of work on the Project at least monthly

10 Contractor will not commence work on the Project until the Company gives Contractor a written Commencement Notice Contractor will complete the Project within 90 calendar days after the Commencement Notice is issued

11 Following the Company's written notice of satisfactory completion of the Project, and upon receipt of the final Project invoice from Contractor, the Company shall pay Contractor the actual total cost of the Project, which will be calculated as shown on Page 2, except that actual labor and material quantities installed/constructed will be substituted for the estimated labor and materials quantities and the Contracting Tax will be recalculated based on such actual labor and materials quantities

12 The amount of applicable liquidated damages for Contractor's failure to deliver or perform within the time limit shown in Paragraph 10 may be deducted from the Company's payment of the final Project invoice This provision shall not limit the Company's ability to terminate this Proposal/Contract for Contractor's unsatisfactory performance or failure to perform as provided in the General Conditions of Contract, Specifications or Drawings, or in this Proposal/Contract

SPECIAL CONDITIONS:

CONTRACTOR	PROPOSAL/CONTRACT ACCEPTED:
KELLER ELECTRICAL INDUSTRIES, INC.	ARIZONA WATER COMPANY
By: Daniel Lamm	By: Fredrick K. Schneider
Print Name: Daniel Lamm	Print Name: Fredrick K. Schneider, PE
Title: Project Manager	Title: Vice President - Engineering
Date: 6/4/2015	Date: 6-16-2015

AFH

ARIZONA WATER COMPANY

Casa Grande - Pinal Valley
220 E. 2nd Street
Casa Grande, AZ 85122 PH: 520-836-8788

PROPOSAL/CONTRACT

CONTRACTOR: KELLER ELECTRICAL INDUSTRIES, INC.	SYSTEM: PINAL VALLEY
AZ CONTRACTOR LICENSE NO: 076007 CLASSIFICATION: C-11	W A No(s): 1-5307
ADDRESS: 1881 E. UNIVERSITY DRIVE	BID DUE DATE: June 5, 2015
CITY ST ZIP PHOENIX, AZ 85034	BID BOND REQUIRED: √ Yes ☐ No

DESCRIPTION OF PROJECT: Install control wires for a new automatic strainer valve at Coolidge Well Nos. 9 and 10.

1-2. MATERIALS EXEMPT FROM CONTRACTING TAX (per Paragraph 6)	QUANTITY	UNIT PRICE LABOR	UNIT PRICE MATERIALS	TOTAL COST LABOR	TOTAL COST MATERIALS
				1	2
3. Total Labor to Install Exempt Materials (add the amounts in column 1)				3	
4. Total Exempt Materials (add the amounts in column 2)					4

5-6. NON-EXEMPT MATERIALS	QUANTITY	UNIT PRICE LABOR	UNIT PRICE MATERIALS	TOTAL COST LABOR	TOTAL COST MATERIALS
Furnish and Install ne J-box, conduit and wire for new filter valve (valve				640.00	452.31
installed by others)	1			320.00	
Wire new valve into existing controller	1				
				5	6
7 Total Labor to Install Non-Exempt Materials (add the amounts in column 5)				7 960.00	
8. Total Non-Exempt Materials (add the amounts in column 6)					8 452.31
9. Subtotal A (add lines 3, 7 and 8)				918.00	9 1412.31
10. Contracting Tax Base (multiply the amount on line 9 by 0 65)				10	
11. Applicable Contracting Tax Rate				11 .107	
12. Contracting Tax (multiply the amount on line 10 by line 11)					98.23 12
13. Subtotal B (add lines 4, 9 and 12)					13 1510.54
14. 100% Performance and Payment Bonds Cost					14 250.00
15. Estimated Total Cost (add lines 13 and 14)					15 1,760.54

NOTE: The Estimated Total Cost includes all labor and materials for backfill, pavement replacement, chip seal, and traffic control necessary for the Project.

ARIZONA WATER COMPANY

COMMENCEMENT NOTICE

CONTRACTOR:

Mr. Cody Eslick
Keller Electrical Industries, Inc.
1881 E. University Drive
Phoenix, AZ 85034

DATE: 6-16-15
DIVISION: CASA GRANDE
SYSTEM: PINAL VALLEY
W.A.: 1-5307

THIS IS YOUR NOTICE TO PROCEED WITH THE FOLLOWING PROJECT(S):

DESCRIPTION OF WORK:

Install control wires for a new automatic strainer valve at Coolidge Well Nos. 9 and 10 in Casa Grande, AZ.

PERFORMANCE AND PAYMENT BONDS REQUIRED: [X] Yes [ ] No

TOTAL DAYS ALLOWED: 100

COMPLETION DATE: 9-24-15

Prior to the start of construction, please call Ray Murrieta, Division Manager at 520-836-8785 to schedule a pre-construction meeting.

ARIZONA WATER COMPANY
Company

KELLER ELECTRICAL INDUSTRIES, INC.
Contractor *(type name)*

By [signature]
Title Vice President - Engineering

By _____
Title _____

AFH ATH
W:\PROJECTS\CG\PVWNS\DEWA\ACTIVE WA\1-5307 THIRD AUTO STRAINER AT CL WELLS 9 AND 10\AGREEMENTS\CONTRACTS\E-3-18-2 KELLER COMMENCEMENT NOTICE 1-5307 COOLIDGE 9 & 10 STRAINER VALVE.DOCX 1/15

ARIZONA WATER COMPANY

SPECIFICATIONS

GENERAL CONDITIONS OF CONTRACT: E-4-1

CONSTRUCTION SPECIFICATIONS: E-8-1

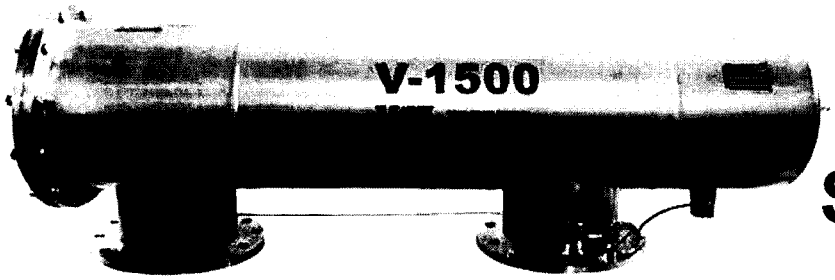
STANDARD SPECIFICATION DRAWINGS: E-9-1

gw 6/1/15

2007 EDITION WITH **2010** REVISIONS;
2012 GENERAL CONDITIONS OF CONTRACT

A copy of this entire Spec Book was sent out with Keller Electrical invitation to bid package for 1-5307 Third Auto Strainer @ Coolidge 9-10 on 6/1/15 AH

VAF FILTRATION SYSTEMS



V-1500 Automatic Screen Filter

General Information

The V-Series™ design is the most recent, state-of-the-art self-cleaning screen filtration technology available today. The complexity and cleaning efficiency of any self-cleaning screen filter is in the mechanical system that drives the cleaning process. The V-Series patented Bi-directional Hydrodynamic Drive (BHD) mechanism is the simplest and most efficient in design resulting in:

- fewer moving parts (no limit switches or pistons reversing the cleaning mechanism),
- simpler controls,
- lowest flush flow available,
- greater cleaning efficiency, and
- lower maintenance requirements.

The V-Series' 12 to 15 second flush cycle is automatically initiated when a pressure differential across the screen increases to 0.5 bar (7 psi). The filter remains on-line and the filtration process remains uninterrupted during the brief cleaning process. The flush discharge is the lowest available resulting in minimal waste.

The V-Series filters are available in ASME code and are manufactured in an ASME facility. The filters are available in a broad range of materials, pressure ratings, and temperature ratings to suit any need. VAF custom manufactures filters and skids that simplify installation and meet specific requirements.

For more information contact VAF Filtration Systems! *Wherever Water Flows...*

V-1500 Specifications

Materials	
Filter body	• 8" - 10" inlet/outlet, 316 SS
Screens	• 316L SS sintered **
Flanges	• AWWA Class D **
Seals	• nitrile, viton, silicone **
Filtration Range	• 10 to 1500 micron **
Flow Range	• 20 to 561 m^3/hr (90 to 2470 gpm) per filter *
Max Pressure	• 10.3 bar (150 psi) **
Min Pressure	• 2 bar (30 psi) **
Max Temp	• 80° C (176° F) **
Flush Cycle	• 12 to 15 seconds
Controller	• MicroFlush - up to 4 filters

* Varies depending on micron level.

** Other options are available on request.

VAF Filtration Systems
5270 Marshall Street, Arvada, CO 80002 USA
Phone +1 303 425 4242 Fax +1 303 425 0112
www.vafusa.com
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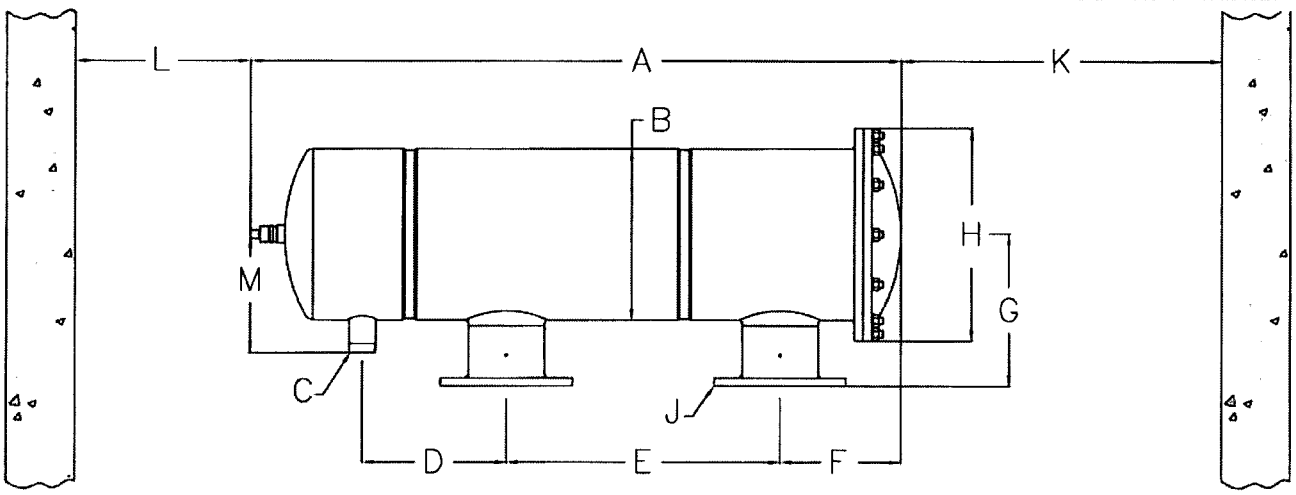
07/2013



Model	Dimensions - cm												screen area	nominal flow (m^3/hr) Micron			flush flow	# of nozzles
	A	B	C	D	E	F	G	H	J	K	L	M						
	length	body dia.	flush line						flange	clearance			cm^2	100	200	300	liters	
V-250-3	97.0	25.7	3.8	19.3	29.2	22.4	23.3	34.3	7.6	88.9	30.5	19.3	1445	63	84	92	30	2
V-250-4							23.6		10.2									
V-500-4	122.6	25.7	3.8	21.9	54.6	22.6	23.3	34.3	10.2	114.3	30.5	19.3	2890	125	168	184	57	4
V-500-6	127.7					25.1	27.8		15.2									
V-1000-6	154.0	38.5	5.1	34.6	61.0	28.8	33.2	47.8	15.2	152.4	30.5	26.9	5594	24	325	356	57	4
V-1000-8							33.5		20.3									
V-1500-8	184.7	38.5	5.1	34.6	91.4	28.8	32.0	47.8	20.3	177.8	30.5	26.9	8387	383	487	534	87	6
V-1500-10	183.9	38.8				31.7	34.0		25.4			26.7						
V-2000-X	208.6	51.7	5.1	45.7	91.4	44.3	42.9	69.9	25.4-30.5-35.6	177.8	30.5	32.9	10942	474	636	697	87	6
V-3500-X	317.2	61.0	7.6	93.3	127.0	55.0	51.1	81.3	35.6-40.6-50.8	269.2	30.5	41.7	19742	855	1147	1258	167	8

Model	Dimensions - inches												screen area	nominal flow (gpm) Micron			flush flow	# of nozzles
	A	B	C	D	E	F	G	H	J	K	L	M						
	length	body dia.	flush line						flange	clearance			in^2	100	200	300	gallons	
V-250-3	38.2	10.1	1.5" NPT	7.6	11.5	8.8	9.2	13.5	3	35.0	12.0	7.6	224	276	370	405	8	2
V-250-4							9.3		4	35.0	12.0							
V-500-4	48.3	10.1	1.5" NPT	8.6	21.5	8.9	9.2	13.5	4	45.0	12.0	7.6	448	551	739	811	15	4
V-500-6	50.3					9.9	11.0		6									
V-1000-6	60.6	15.2	2" NPT	13.6	24.0	11.3	13.1	18.8	6	60.0	12.0	10.6	867	1066	1431	1569	15	4
V-1000-8							13.2		8									
V-1500-8	72.7	15.2	2" NPT	13.6	36.0	11.3	12.6	18.8	8	70.0	12.0	10.6	1300	1599	2145	2353	23	6
V-1500-10	72.4	15.3				12.5	13.4		10			10.5						
V-2000-X	82.1	20.3	2" NPT	18.0	36.0	17.4	16.9	27.5	10-12-14	70.0	12.0	12.9	1696	2086	2798	3070	23	6
V-3500-X	124.9	24.0	3" FLG	36.7	50.0	21.7	20.1	32.0	14-16-20	106.0	12.0	16.4	3060	3764	5049	5539	44	8

Note: VAF "nominal flow" rates shown are for 100, 200 and 300 micron filtration ratings for demonstration purposes only. Larger micron ratings result in higher allowable flow rates. Smaller micron ratings result in lower allowable flow rates.

Nominal Flow rate in m^3/hr or gpm shown for each model is the maximum flow rate for that model with 100, 200 and 300 micron screens.

Flush Flow volume shown for each model is the volume of water used for that model when the pressure available to the filter is 2.4 bar (35 psi) during a 15 second flush cycle.

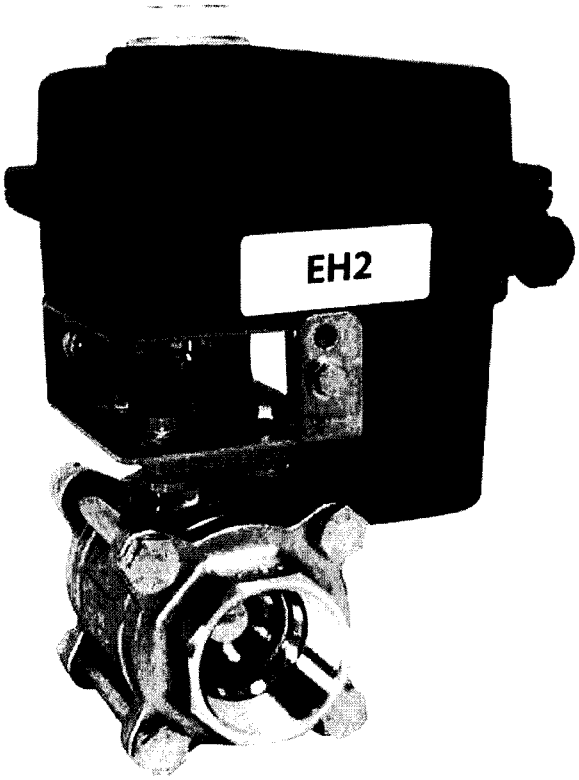
VAF Filtration Systems

5270 Marshall Street, Arvada, CO 80002 USA
Phone +1 303 425 4242 Fax +1 303 425 0112
www.vafusa.com
sales@vafusa.com

07/2013

VAF FILTRATION SYSTEMS

VAF Stainless Steel Electric Ball Valve



Ball Valve Specifications:

Valve Body	• CF8M stainless steel
Ball	• 316 stainless steel
Stem	• Virgin PTFE
Stem Packing	• PTFE and VITON

- **1/2" to 2" stainless steel 3-piece swing out style, 2-way ball valves**
- **UV modified glass-filled nylon housing** is durable, impact resistant and provides for a long life and lower maintenance cost.
- **Waterproof actuator housing is rated NEMA 6P** to protect internal components from corrosion and extend actuator life.
- **Actuator housing is igniton safe** (Rated NEMA 7D and meets the USCG Electrical Systems Standard) to support user and environment protection.
- **Electrical**

VOLT	AMPS RUN / STALL
24 VAC	0.8 / 2
24 VDC	0.8 / 2
12 VDC	1.5 / 4

General Information

The VAF Stainless Steel 3-Piece, 2-Way Ball Valves are engineered for actuation and designed to work with VAF Valve Actuators. These reliable valves are proven performers season after season.

VAF Filtration Systems

5270 Marshall Street, Arvada, CO 80002 USA
Phone +1 303 425 4242 Fax +1 303 425 0112
www.vafusa.com
sales@vafusa.com

11/2012

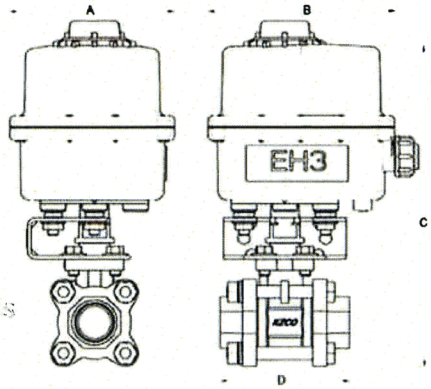
Stainless Steel Ball Valve

1/2" Stainless Steel 3-Piece, 2-Way Ball Valves

Full port, stainless steel ball, FNPT, ball valve, 12 volt DC motor. Maximum PSI: 1,000 psi at 70° F

Part #	Size	Control		Flow GPM*	A	B	C	D
KZ89DM	1/2"	On/Off	0.8 sec.	30	4.0"	5.1"	8.3"	3.0"
KZ89DPR	1/2"	Regulating	2.5 sec.	30	4.0"	5.1"	8.3"	3.0"
KZ89DQR	1/2"	Regulating	7.0 sec.	30	4.0"	5.1"	8.3"	3.0"

* GPM at 1 PSI drop, water

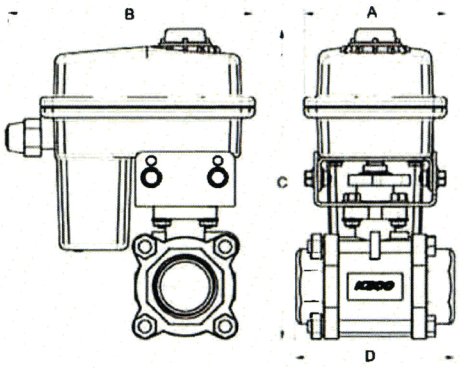


3/4", 1", 1 1/4" and 1 1/2" Stainless Steel 3-Piece, 2-Way Ball Valves

Full port, stainless steel ball, FNPT, ball valve, 12 volt DC motor. Maximum PSI: 1,000 psi at 70° F

Part #	Size	Control		Flow GPM*	A	B	C	D
KZ89EY	3/4"	On/Off	1.5 sec.	51	4.3"	7.1"	8.0"	3.2"
KZ89EWR	3/4"	Regulating	3.0 sec.	51	4.3"	7.1"	8.0"	3.2"
KZ89EUR	3/4"	Regulating	7.0 sec.	51	4.3"	7.1"	8.0"	3.2"
KZ89FY	1"	On/Off	1.5 sec.	68	4.3"	7.1"	8.4"	3.6"
KZ89FWR	1"	Regulating	7.0 sec.	68	4.3"	7.1"	8.4"	3.6"
KZ89FUR	1"	Regulating	7.0 sec.	68	4.3"	7.1"	8.4"	3.6"
KZ89GY	1 1/4"	On/Off	1.5 sec.	112	4.3"	7.1"	8.8"	4.3"
KZ89GWR	1 1/4"	Regulating	3.0 sec.	112	4.3"	7.1"	8.8"	4.3"
KZ89GUR	1 1/4"	Regulating	7.0 sec.	112	4.3"	7.1"	8.8"	4.3"
KZ89HY	1 1/2"	On/Off	1.5 sec.	170	4.3"	7.1"	9.4"	4.8"
KZ89HWR	1 1/2"	Regulating	3.0 sec.	170	4.3"	7.1"	9.4"	4.8"
KZ89HUR	1 1/2"	Regulating	7.0 sec.	170	4.3"	7.1"	9.4"	4.8"

* GPM at 1 PSI drop, water

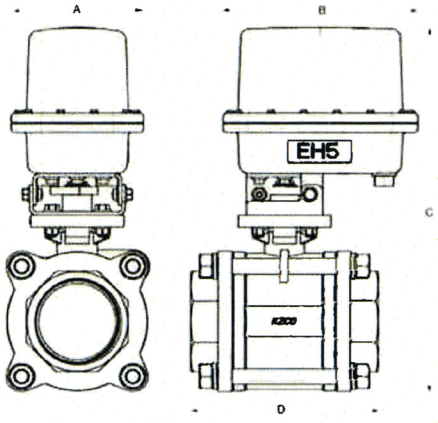


2" Stainless Steel 3-Piece, 2-Way Ball Valves

Full port, stainless steel ball, FNPT, ball valve, 12 volt DC motor. Maximum PSI: 1,000 psi at 70° F

Part #	Size	Control		Flow GPM*	A	B	C	D
KZ89I3	2"	On/Off	3.0 sec.	376	5.2"	7.7"	11.1"	4.4"
KZ89I7R	2"	Regulating	7.0 sec.	376	5.2"	7.7"	11.1"	4.4"
KZ89IAR	2"	Regulating	10.0 sec.	376	5.2"	7.7"	11.1"	4.4"

* GPM at 1 PSI drop, water



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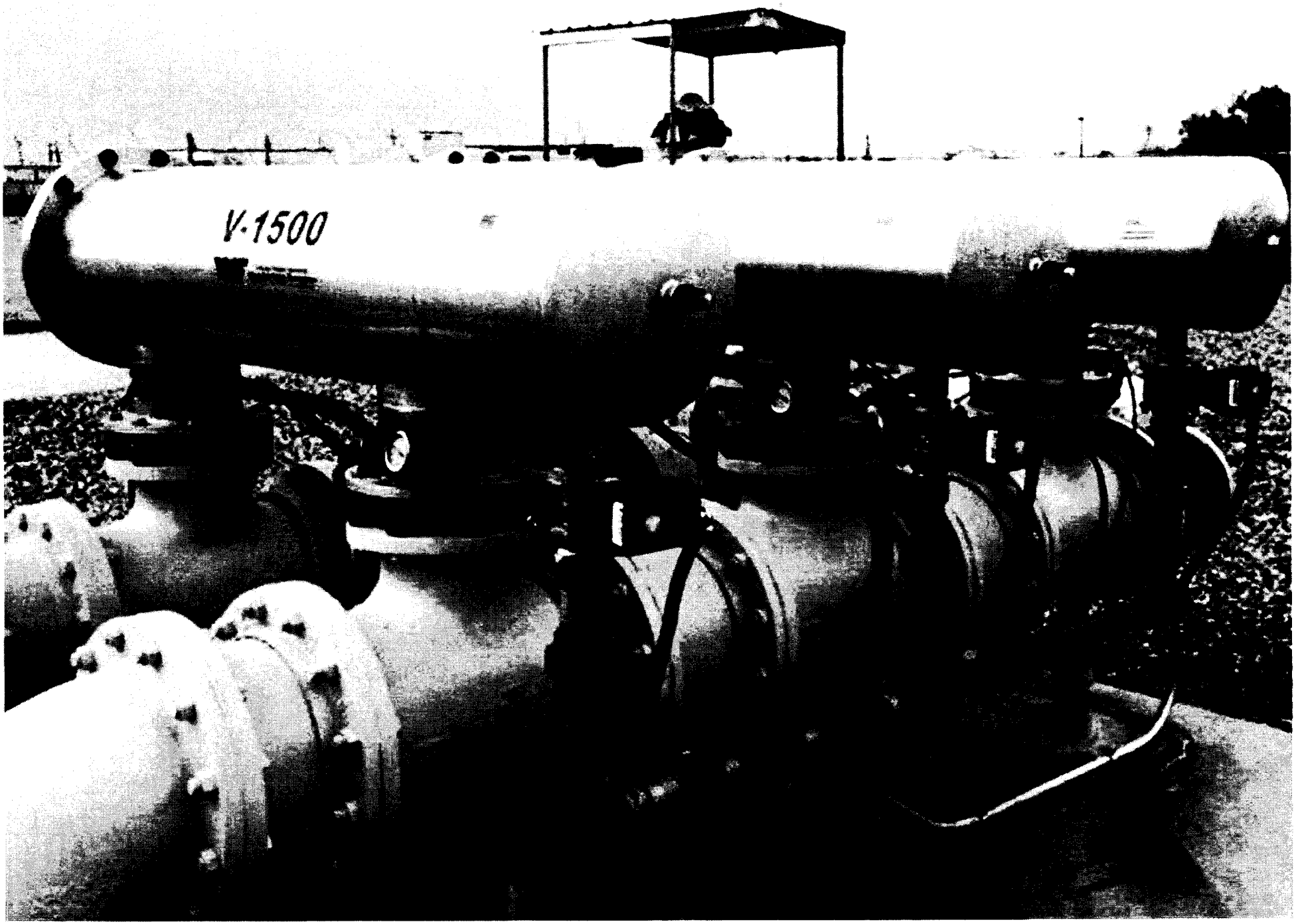
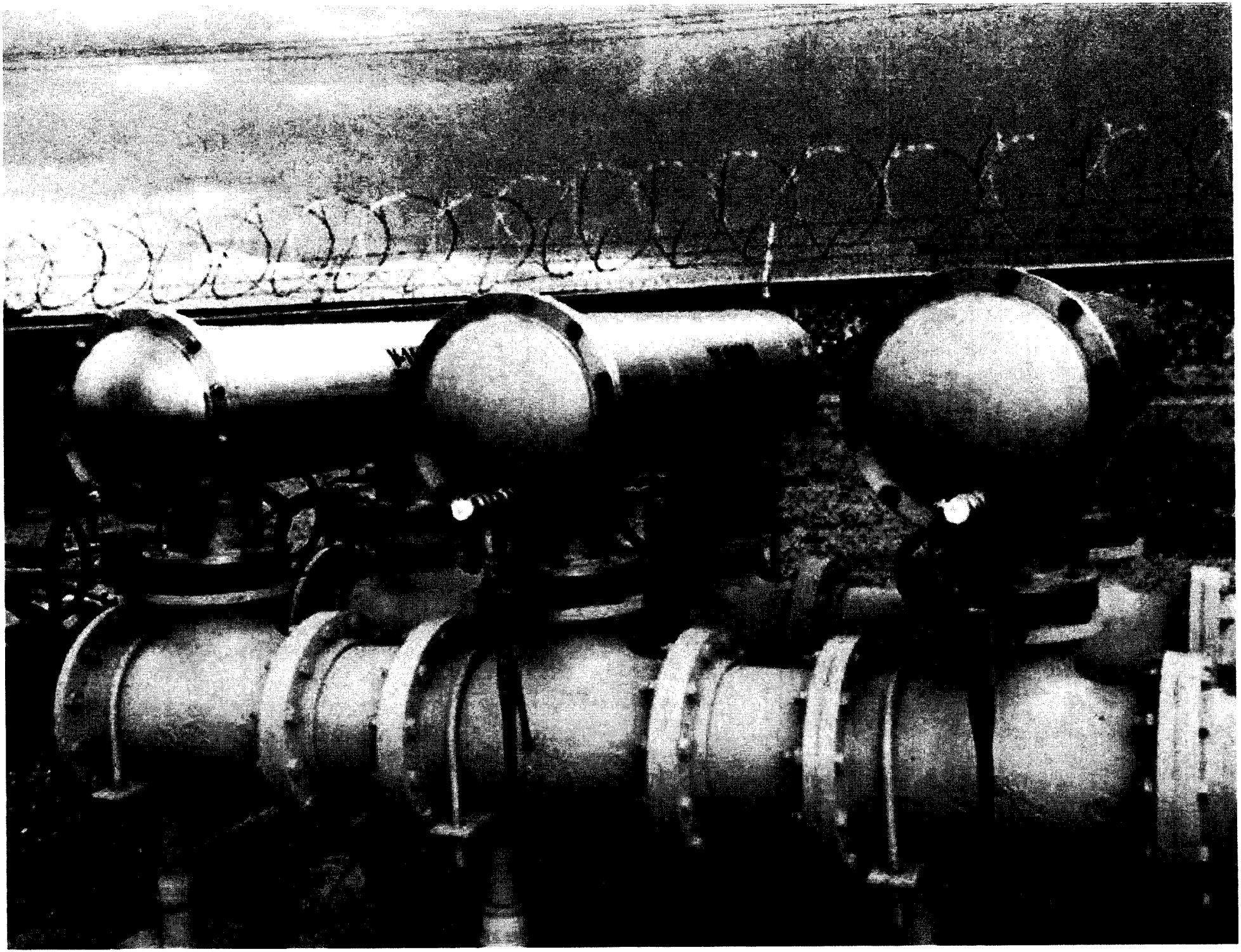

V-1500



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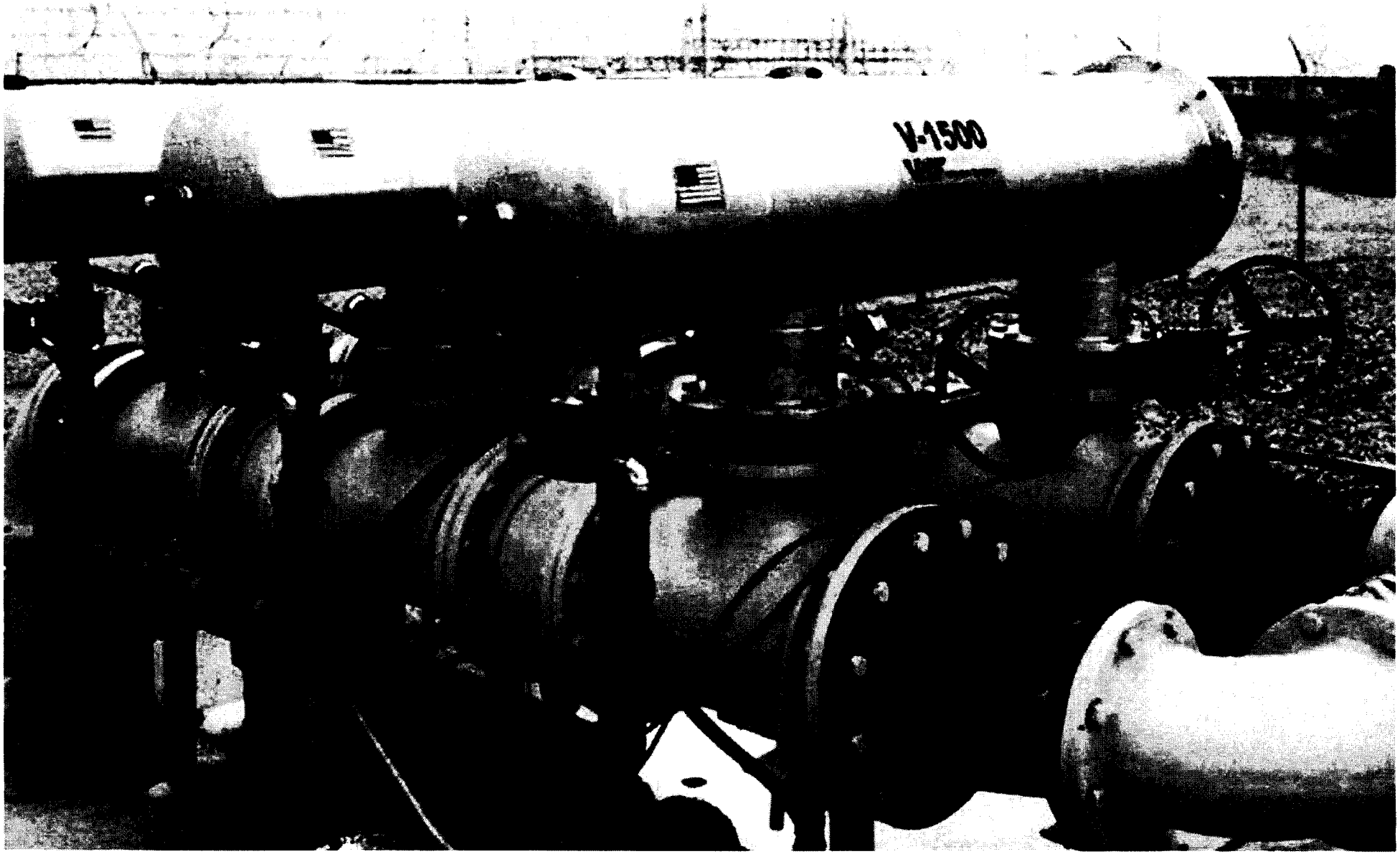

V-1500

ARIZONA WATER COMPANY

CONSTRUCTION PLACED IN SERVICE NOTICE

WORK AUTHORIZATION NO.: 1-5307

DIVISION: PV/CG

DATE PLACED IN SERVICE: 7 | 1 | 2015

CONTRACT NO:

FOR PURPOSES OF *MODIFIED ACCELERATED COST RECOVERY SYSTEM*, AN ASSET IS "PLACED IN SERVICE" WHEN IT IS IN A CONDITION OR STATE OF READINESS AND AVAILABILITY FOR A SPECIFICALLY ASSIGNED FUNCTION, WHETHER IT BE FOR USE IN A TRADE OR BUSINESS, OR FOR THE PRODUCTION OF INCOME.

I CERTIFY THAT THE ASSET(S) CONSTRUCTED PURSUANT TO THE PROVISIONS OF THE ABOVE-REFERENCED WORK AUTHORIZATION ARE READY FOR SERVICE AS OF THE DATE SHOWN ABOVE.

Division Manager or Operations Superintendent
(signature)

7-24-2015
Date

SUBMIT ORIGINAL TO ACCOUNTING DEPARTMENT

A-1-3-1
FKS 11/24/11

Western Group Rate Case

Exhibit FKS-1

5329 Cameron & Morrison

ARIZONA WATER COMPANY
WORK AUTHORIZATION

W.A. NUMBER: 1-5329
P.E. NUMBER:
BUDGET ITEM NO.: Special No. 2
SHEET NO.: 1 of 2

SYSTEM:	PINAL VALLEY	RETENTION REQUIRED:	☐ YES ☑ NO
DIVISION:	CASA GRANDE	WORK TO START BY:	UPON AUTHORIZATION
RESPONSIBLE PERSON:	RAY MURRIETA	WORK TO BE FINISHED BY:	WITHIN 30 DAYS
TAX CODE:	0402		

DESCRIPTION OF WORK:

Construct 85 LF of 4-inch DIP to replace 85 LF of 4-inch CI and replace three 4-inch gate valves, two 4-inch tees, and one 6-inch fire hydrant on 4th Street between Cameron and Morrison Ave in Casa Grande, AZ.

FACTORS JUSTIFYING WORK:

Company Servicemen responded to a water main break on a vintage 1929 4-inch CI water main in 4th Street east of Cameron Street. The leak saturated the surrounding City of Casa Grande asphalt subbase and soil, requiring emergency water main repair. The Company must repair the water main to prevent further damage. This water main is critical for providing drinking water service to this area of the Pinal Valley water system. A large section of asphalt requires saw cut, removal, and replacement in accordance with the City's right-of-way permit requirements and specifications which includes slurry backfill. Company engineers worked with the Company's General Counsel to submit an insurance claim to the Company's Insurance Carrier for the roadway damage.

COST ESTIMATE		AUTHORIZATION	DATE
COST OF WORK:		PREPARED BY: James Wilson JW 1/26/15	1/14/15
MATERIAL	5,396		
LABOR	3,140	REVIEWED FOR ESMT/ROW VERIFICATION: Charles Briggs CB 01-26-2015	01-14-2015
CONTRACT PORTION	13,084		
OVERHEAD	2,600	REVIEWED BY: Mario Mendez MM 1/28/15	1/14/15
TOTAL AUTHORIZED EXPENDITURES CHARGEABLE TO THIS W.A.	$ 24,220		
FUNDS RECEIVED:		APPROVED BY ENGINEERING: Fredrick Schneider FS 1-29-15	1-21-2015
CONTRIBUTIONS RECEIVED	0		
REFUNDABLE ADVANCES RECEIVED	0	APPROVED BY FINANCE: Joseph Harris	1/21/15
TOTAL CONTRIBUTIONS/ADVANCES	0		
NET COMPANY CASH REQUIRED	$ 24,220	SPECIAL ITEM EXCEEDING $10,000; AUTHORIZED BY PRESIDENT: William Garfield	1-22-2015
		SPECIAL ITEM EXCEEDING $10,000; AUTHORIZED BY CHAIRMAN: M. L. Whitehead APPROVED VIA FAX	1/23/2015

COMMENTS:

Transfer $24,220 from 2015 Contingency to fund this project.

CONSTRUCTION RELEASE:

RELEASED TO CONSTRUCTION
Authorized by FRED SCHNEIDER
Date 1/26/15

ARIZONA WATER COMPANY

WORK AUTHORIZATION - DETAIL SHEET

W.A. NUMBER:
P.E. NUMBER:
BUDGET ITEM NO.:
SHEET NO.:

RETIREMENT PROPERTY UNITS	PLANT PROPERTY ACCOUNT	UNIT DESCRIPTION	QUANTITY	YEAR INSTALLED AND W.A. NUMBER
	343	4-inch cast iron pipe	85	1929
	343	4-inch gate valve	3	1929
	343	4-inch tee	2	1929
	348	6-inch fire hydrant	1	1929

PROJECT DESCRIPTION:

Construct 85 LF of 4-inch DIP to replace 85 LF of 4-inch CI and replace three 4-inch gate valves, two 4-inch tees, and one 6-inch fire hydrant on 4th Street between Cameron and Morrison Ave in Casa Grande, AZ.

	DESCRIPTION	PLANT PROP ACCT	QUANTITY	UNIT COST	TOTAL
CONTRACT WORK	Remove and replace 4-inch CI with 4-inch DIP, two 4-inch gate				
	valves, two 4-inch tees	343	1	4,800.00	4,800
	Remove and replace one 6-inch fire hydrant	348	1	2,060.00	2,060
	Remove and replace asphalt	343	1	5,200.00	5,200
	Contracting Tax	343	1	839.00	839
	Performance and Payment Bond	343	1	185.00	185
	SERVICE CONNECTIONS COMPLETE: DOUBLE-LONG	345			
	SERVICE CONNECTIONS COMPLETE: DOUBLE-SHORT	345			
	SERVICE CONNECTIONS COMPLETE: SINGLE-LONG	345			
	SERVICE CONNECTIONS COMPLETE: SINGLE-SHORT	345			
TOTAL CONTRACT WORK					$ 13,084
MATERIALS	4-inch DIP	343	85	$ 21.54	$ 1,831
	4-inch MGXFL tee	343	2	140.00	280
	4-inch MJxFL gate valve	343	3	411.75	1,235
	4-inch Foster adapter	343	2	150.00	300
	4"x6" MJ reducer	343	1	150.00	150
	6-inch fire hydrant	348	1	1,600.00	1,600
	SERVICE CONNECTIONS: SINGLE-LONG	345			
	SERVICE CONNECTIONS: SINGLE-SHORT	345			
	METERS	346			
TOTAL MATERIALS					$ 5,396
LABOR	Project management	343	8	$ 55.00	$ 440
	TESTING FEE				
	PERMIT FEE	343	1	500.00	500
	SURVEY FEE				
	FIELD INSPECTION	343	40	55.00	2,200
	INSTALL SERVICE CONNECTIONS: DOUBLE-LONG	345			
	INSTALL SERVICE CONNECTIONS: DOUBLE-SHORT	345			
	INSTALL SERVICE CONNECTIONS: SINGLE-LONG	345			
	INSTALL SERVICE CONNECTIONS: SINGLE-SHORT	345			
TOTAL LABOR					$ 3,140
SUBTOTAL - CONTRACT WORK, MATERIALS, AND LABOR					$ 21,620
OVERHEAD					2,600
TOTAL	REFUNDABLE PORTION ☐	NON-REFUNDABLE PORTION ☐		COST ESTIMATE	$ 24,220

ARIZONA WATER COMPANY

3805 N. BLACK CANYON HIGHWAY, PHOENIX, ARIZONA 85015-5351 • P.O. BOX 29006, PHOENIX, AZ 85038-9006
PHONE: (602) 240-6860 • FAX: (602) 240-6874 • TOLL FREE: (800) 533-6023 • www.azwater.com

January 14, 2015

Mr. Devin Anderson
DWA Construction Company, LLC
P. O. Box 12788
Casa Grande, AZ 85130

Re: WA 1-5329 Sp. No. 2 4TH Street and Cameron Replacement

PROJECT: 4th Street and Cameron	
SYSTEM: Pinal Valley	
CONTRACT NO.:	
P.E. NO.:	W.A. NO.: 1-5329

Dear Mr. Anderson:

Enclosed is your copy of the Proposal/Contract for the above-referenced project, which has been accepted by Arizona Water Company (the "Company"). The project shall be constructed in accordance with the Company's *General Conditions of Contract, the Specifications and the Drawings* which were included with the Company's previously provided Proposal/Contract, copies of which are being provided again and attached herewith.

Also enclosed are two copies of the Commencement Notice for the above-referenced project. Please sign one of the copies and return it to my attention retaining the other for your records.

As provided in paragraph 4 of the Company's Proposal/Contract executed by the Company on January 29, 2015, DWA Construction Company, LLC acknowledged that one hundred percent (100%) Performance and Payment Bonds are required and must be provided to the Company prior to the commencement of work. In addition, as provided in paragraph 44 of the Company's General Conditions of Contract, the 100% Performance and Payment Bonds must be provided within ten (10) calendar days of the date of the Commencement Notice. Failure to provide an acceptable 100% Performance and Payment Bond does not limit the Company's

ability to terminate the Proposal/Contract or seek restitution for damages that the Company may have or will incur.

Prior to the start of construction, please call Ray Murrieta, Division Manager at 520-836-8785 to schedule a pre-construction meeting. In addition, please provide the required Performance and Payment Bonds to the Company promptly so that the contracted work can be completed within the contract's timeline.

If you have any questions, please call me at this office.

Very truly yours,

James T. Wilson, P. E.
Senior Engineer
jwilson@azwater.com

afh
Enclosure

ARIZONA WATER COMPANY

INPUT DIVISION INFORMATION
DIVISION ADDRESS
DIVISION PHONE NUMBERS

PROPOSAL/CONTRACT

CONTRACTOR: D.W.A. Construction Co. LLC	SYSTEM: Pinal Valley
ADDRESS: P.O. Box 12788	W.A. No(s): 1-5329 Spec 7
CITY ST ZIP: Casa Grande, AZ 85130-2788	BID DUE DATE: December 31, 2014

CONTRACTOR SUBMITS this PROPOSAL/CONTRACT to ARIZONA WATER COMPANY, an Arizona corporation (the "Company"), to perform the work and complete the project described on Page 2 (the "Project"), as an independent prime contractor.

1. Contractor certifies that it has a complete copy of, and has read, understands and accepts, the Company's General Conditions of Contract, and the Company's Construction Specifications and Standard Specification Drawings, (the "Specifications"), all of which are attached hereto. Contractor has examined the specific plans and related construction drawings for the Project (the "Drawings"), copies of which are also attached hereto. The General Conditions of Contract, Specifications and Drawings are incorporated into this Proposal/Contract. Contractor affirms that all work and materials to be furnished or purchased for the Project will be in strict conformance with the General Conditions of Contract, Specifications and Drawings.
2. Contractor represents and warrants that it has satisfied and complied with the provisions of Section 6, Contractor Understands Work and Working Conditions, of the General Conditions of Contract prior to submitting this Proposal/Contract.
3. Contractor represents that this Proposal/Contract is fair and honest in all respects, is submitted in good faith and is not submitted in collusion with any other company, entity or person.
4. Contractor acknowledges that one hundred percent (100%) Performance and Payment Bonds are required and must be provided to the Company prior to the commencement of work.
5. Prior to the commencement of work, Contractor will submit to the Company a list of all materials to be used in the Project. The materials list will include the manufacturer, part number, price and quantity included in this Proposal/Contract.
6. Contractor will furnish all labor, tools, equipment and materials required to complete the Project according to the General Conditions of Contract, Specifications and Drawings. No materials purchased by Contractor to be incorporated into the Project are subject to tax at the time of purchase and Contractor will not charge the Company for any such tax. Contractor will pay the applicable transaction privilege tax (the "Contracting Tax") on the Project after Contractor receives payment of the final Project invoice from the Company. The cost of materials incorporated into the Project which are exempt by Arizona Revised State Statues ("A.R.S.") from the Contracting Tax, for example, pipes or valves having a diameter of four (4) inches or larger, including equipment, fittings and any other related part that is used in operating the pipes or valves (A.R.S. §42-5061 B.6.), will not be included in the total cost of the labor and materials upon which the Contracting Tax is computed. Contractor retains full liability and obligation to pay the Contracting Tax and will defend and indemnify the Company against any demand or obligation to pay the Contracting Tax.
7. Contractor will maintain detailed accounting records of all materials purchased and incorporated into the Project. Such records will include all supporting original vendor invoices for all materials purchased. Following completion of the Project, Contractor will submit an itemized accounting to the Company which will include all supporting original vendor invoices and satisfactory evidence of payment thereof. The Company will not pay Contractor for materials not actually incorporated into the Project, and the disposition of such materials will remain Contractor's responsibility.
8. The Estimated Total Cost of the Project, shown on Page 2, is based on estimated labor and material quantities to be furnished. It includes an estimate of the Contracting Tax and the cost of the required Performance and Payment Bonds. Contractor will not cancel, modify or withdraw this Proposal/Contract during a ninety-day (90) period commencing on the Bid Due Date. The Company may accept this Proposal/Contract by signing and mailing, or otherwise delivering, a copy hereof to Contractor during such ninety-day (90) period. If the Company does not accept this Proposal/Contract during such ninety-day (90) period, Contractor may cancel this Proposal/Contract by giving written notice of cancellation to the Company.
9. Prior to the commencement of work, Contractor will provide the Company with a detailed construction schedule, in either Gantt or CPM form, identifying all tasks to be performed from the date of the written Commencement Notice through completion of the Project, including testing, training of Company Personnel and final Project invoicing. Contractor will provide the Company with a copy of such construction schedule documenting the progress of work on the Project at least monthly.
10. Contractor will not commence work on the Project until the Company gives Contractor a written Commencement Notice. Contractor will complete the Project within 90 calendar days after the Commencement Notice is issued.
11. Following the Company's written notice of satisfactory completion of the Project, and upon receipt of the final Project invoice from Contractor, the Company shall pay Contractor the actual total cost of the Project, which will be calculated as shown on Page 2, except that actual labor and material quantities installed/constructed will be substituted for the estimated labor and materials quantities and the Contracting Tax will be recalculated based on such actual labor and materials quantities.
12. The amount of applicable liquidated damages for Contractor's failure to deliver or perform within the time limit shown in Paragraph 10 may be deducted from the Company's payment of the final Project invoice. This provision shall not limit the Company's ability to terminate this Proposal/Contract for Contractor's unsatisfactory performance or failure to perform as provided in the General Conditions of Contract, Specifications or Drawings, or in this Proposal/Contract.

SPECIAL CONDITIONS:

CONTRACTOR	PROPOSAL/CONTRACT ACCEPTED:
D.W.A. Construction Co. LLC	ARIZONA WATER COMPANY
By: Dawn Anderson	By: Fredrick K. Schneider
Print Name: Dawn Anderson	Print Name: Fredrick K. Schneider, PE
Title: Manager	Title: Vice President - Engineering
Date: 12-31-14	Date: 1-29-2015

ARIZONA WATER COMPANY

INPUT DIVISION INFORMATION
DIVISION ADDRESS
DIVISION PHONE NUMBERS

PROPOSAL/CONTRACT

CONTRACTOR: D.W.A. Construction Co. LLC	SYSTEM: Pinal Valley
AZ CONTRACTOR LICENSE NO: 227278 CLASSIFICATION: A	W.A. No(s): 1-5329 Sht#2
ADDRESS: PO Box 12788	BID DUE DATE: December 31, 2014
CITY ST ZIP Casa Grande AZ 85130	BID BOND REQUIRED: √ Yes ☐ No

DESCRIPTION OF PROJECT: Replace approximately 85LF of 4" CI with 4" DIP and related fittings crossing 4th Street, in alley between Cameron and Morrison.

1-2. MATERIALS EXEMPT FROM CONTRACTING TAX (per Paragraph 6	QUANTITY	UNIT PRICE LABOR	UNIT PRICE MATERIALS	TOTAL COST LABOR	TOTAL COST MATERIALS
Remove and replace 4" CI with 4" DIP, replace two 4" GV's, replace two	1	######	XXXXXXXXX	$ 6,860	XXXXXXXXX
4" tees and 1-6" fire hydrant w/GV					
Remove, replace and haul off asphalt/concrete	1	######	XXXXXXXXX	5,200	XXXXXXXXX
				1	2
3. Total Labor to Install Exempt Materials (add the amounts in column 1)				3 12,060	
4. Total Exempt Materials (add the amounts in column 2)					4 -0-

5-6. NON-EXEMPT MATERIALS	QUANTITY	LABOR	MATERIALS	LABOR	MATERIALS
				5	6
7. Total Labor to Install Non-Exempt Materials (add the amounts in column 5)				7 -0-	
8. Total Non-Exempt Materials (add the amounts in column 6)					8 -0-
9. Subtotal A (add lines 3, 7 and 8)					9 $ 12,060
10. Contracting Tax Base (multiply the amount on line 9 by 0.65)				10 7839	
11. Applicable Contracting Tax Rate				11 10.7	
12. Contracting Tax (multiply the amount on line 10 by line 11)					12 839.00
13. Subtotal B (add lines 4, 9 and 12)					13 12,899
14. 100% Performance and Payment Bonds Cost					14 185
15. Estimated Total Cost (add lines 13 and 14)					15 13,084

NOTE: The Estimated Total Cost includes all labor and materials for backfill, pavement replacement, chip seal,

ARIZONA WATER COMPANY

COMMENCEMENT NOTICE

CONTRACTOR:

Mr. Devin Anderson
DWA Construction Company, LLC
P. O. Box 12788
Casa Grande, AZ 85130

DATE: 1/29/15
DIVISION: CASA GRANDE
SYSTEM: PINAL VALLEY
W.A.: 1-5329 Sp. No. 2

THIS IS YOUR NOTICE TO PROCEED WITH THE FOLLOWING PROJECT(S):

DESCRIPTION OF WORK:

Replace approximately 85 LF of 4-inch CI with 4-inch DIP and related fittings crossing 4th Street in alley between Cameron and Morrison.

PERFORMANCE AND PAYMENT BONDS REQUIRED: [X] Yes [ ] No

TOTAL DAYS ALLOWED: 30

COMPLETION DATE:

Prior to the start of construction, please call Ray Murrieta, Division Manager at 520-836-8785 to schedule a pre-construction meeting.

ARIZONA WATER COMPANY
Company

By [signature]
Title Vice President – Engineering

DWA CONSTRUCTION COMPANY, LLC
Contractor *(type name)*

By
Title

AFH
W:\PROJECTS\CG\PV\INSIDE\WA\2015-1-5329 SPECIAL #2 4TH ST AND CAMERON\AGREEMENTS\CONTRACTS\E-3-18-2 DWA COMMENCEMENT NOTICE LTR 1-5329 CAMERON & MORRISON.DOCX 1/15/09 | FKS:afh | E-3-18-

ARIZONA WATER COMPANY

SPECIFICATIONS

GENERAL CONDITIONS OF CONTRACT: E-4-1

CONSTRUCTION SPECIFICATIONS: E-8-1

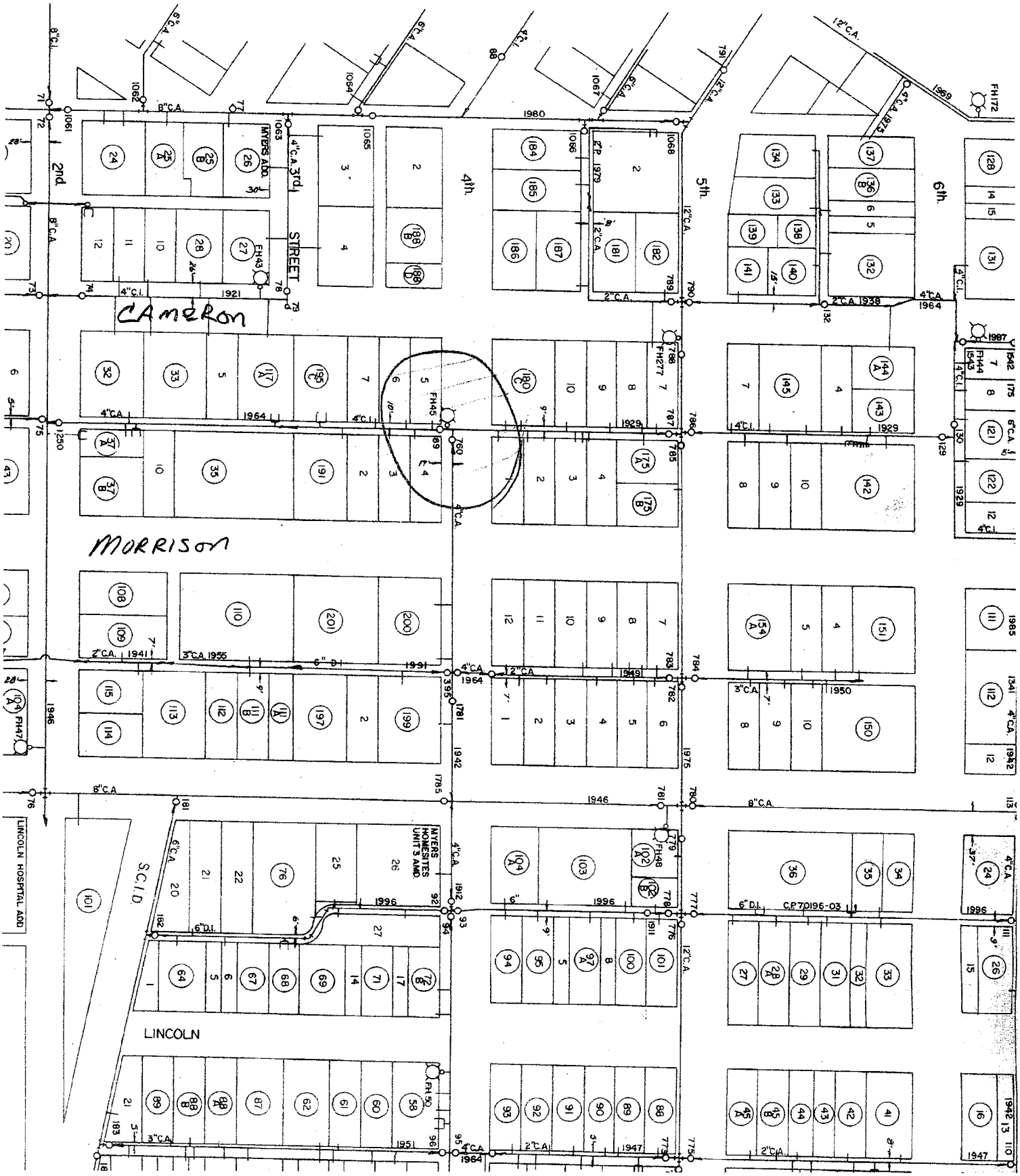
STANDARD SPECIFICATION DRAWINGS: E-9-1

SW 1/29/15

2007 EDITION WITH **2010** REVISIONS;
2012 GENERAL CONDITIONS OF CONTRACT

A copy of this entire Spec Book was sent out with DWA Construction Proposal package for 1-5330 Sp#2 Cameron & Morrison Replacement on 1/29/15

NE¼ SEC 29. T.6S. R86



NE 1/4 Sec 29 T.65., R.6E
Replace Approx 68' N/S Run
" " 18 E/W Run
Replace 4" GV # 89 E 760
Replace FH 45 W/GV & Tee
Replace 2-4" TEES
SOAK AREA
4TH
STREET
ROAD CLOSED
ROAD CLOSED
FH 45
760
89
SEWER
ALLEY CLOSED
CAMERON
MORRISON

CDP- 15-00128

CDP-15-00128

City of Casa Grande, Planning & Development Dept., 510 E. Florence Blvd, Casa Grande, AZ 85122

Aban 301 E. Ash Ave. CDP-15-00290

RIGHT OF WAY USE PERMIT APPLICATION

(Electronic Version Available at: www.casagrandeaz.gov/web/guest/devforms email applications to DCPermits@casagrandeaz.gov)

Please indicate the type of Right of Way work being permitted:

☒ Utility Repair ☒ Emergency Utility Repair Work ☐ Utility New Construction ☐ Other:_____

Utility Franchise ☒ Yes ☐ No

Road Closure required ☒ Yes Dates: 1-29-2015 ☐ No THRU 2-10-2015

1. **PROJECT LOCATION:** 4th STREET BETWEEN MORRISON & CAMERON
   (Indicate closest intersecting streets or alleys)
2. **DESCRIPTION OF WORK:** REPLACE 90' OF 4" C.I. MAIN & VALVES W/RELATED FITTINGS 4" CAST IRON IS DETERIORATING
3. **APPLICANT/CLIENT INFORMATION:**
   Name ARIZONA WATRER COMPANY
   Address 220 E 2ND STREET City CASA GRANDE State AZ Zip Code 85122
   Phone 520 836 6785. Fax 520 836 2850 Email Address RFREEMAN@AZWATER.COM
4. **CONTRACTOR PERFORMING WORK:**
   Name ARIZONA WATER CREW CONTACT PRESON: KIM BOUCHER 520 709 5868
   Address _____ City _____ State _____ Zip Code _____
   Phone _____ Fax _____ Email Address _____
   (Permit will be emailed to this address)

CITY INTAKE:
Date Accepted & Logged In: 1/23/15 Intake Staff: LM
Fee Receipt # _____ Expiration Date: 3/31/15
Assigned DC Engineer: Larry Peterson Assigned PW Inspector: _____
Engineer's Approval: Larry G Peterson Date: 1/26/15
Inspected & Accepted by: _____ Date: 03/12/2015

ADEQ Arizona Department of Environmental Quality

ENGINEERING REVIEW SECTION
DATA REQUIRED WITH ECC

INSTRUCTIONS

Please complete the test data and submit this form with the Engineers Certificate of Completion. An Approval of Construction cannot be issued without the data identified below in accordance with Arizona Administrative Code (A.A.C.) R18-5-508(C). Please attach all supplemental information and calculations to this form.

DATA

1.

PRESSURE TEST DATA				
Indicate Segment Tested	NA			
Pressure and Leakage Test Results (Pass/Fail)				
Date Tested				
Time Started				
Time Finished				
Pipe Diameter				
Footage Tested				
Allowable Leakage				
Leakage Observed				
Pressure at Test Point				
Employee Observing the Test (Please Print Legibly)				
Signature of Employee Observing the Test	NA			

2.

DISINFECTION SAMPLING					
Initial Sampling (Minimum 50 ppm available chlorine)	Date	2-12-15			
	Time	9:10AM			
	ppm Cl_2	100 ppm			
After 24 Hours Detention Time (Minimum 10 ppm free chlorine)	Date	2-12-15			
	Time	4:30PM			
	ppm Cl_2	50 ppm			
After Sufficient Flushing (Water is clear and system Cl_2 residual is measured)	Date	2-12-15			
	Time	4:50PM			
	ppm Cl_2	.8			
Bacteriological Sampling(s):	Date	2-17-15			
	Time	10:20AM			
	Attached (Y/N)	Yes			
		(Yes)/No	Yes/No	Yes/No	Yes/No

3.

Certification

I, Kim Boucher, certify that I have inspected the work performed and have found it to be satisfactory and in accordance with Arizona Administrative Code, Arizona Engineering Bulletins, and the approved specifications.

Kim Boucher — Authorized Persons Signature

3-16-2015 — Date

Professional Seal
As per A.A.C. R18-5-507(B)(1)

2015 3 9

2015 3 9

ARIZONA WATER COMPANY

CONSTRUCTION PLACED IN SERVICE NOTICE

WORK AUTHORIZATION NO.: 041-34301-5329

DIVISION: CASA GRANDE

DATE READY FOR SERVICE: 2 | 12 | 2015

FOR PURPOSES OF *MODIFIED ACCELERATED COST RECOVERY SYSTEM*, AN ASSET IS "PLACED IN SERVICE" WHEN IT IS IN A CONDITION OR STATE OF READINESS AND AVAILABILITY FOR A SPECIFICALLY ASSIGNED FUNCTION, WHETHER IT BE FOR USE IN A TRADE OR BUSINESS, OR FOR THE PRODUCTION OF INCOME.

I CERTIFY THAT THE ASSET(S) CONSTRUCTED PURSUANT TO THE PROVISIONS OF THE ABOVE-REFERENCED WORK AUTHORIZATION ARE READY FOR SERVICE AS OF THE DATE SHOWN ABOVE.

~~Division Manager~~ or Operations Superintendent *(signature)*	Date of Notice
	3-16-15

SUBMIT ORIGINAL TO ACCOUNTING DEPARTMENT

A-1-3-1

Western Group Rate Case

Exhibit FKS-1

5332 CG Mountain

ARIZONA WATER COMPANY
WORK AUTHORIZATION

W.A. NUMBER: 1-5332
P.E. NUMBER:
BUDGET ITEM NO.: Special No. 5
SHEET NO.: 1 of 2

SYSTEM:	PINAL VALLEY
DIVISION:	CASA GRANDE
RESPONSIBLE PERSON:	RAY MURRIETA
TAX CODE:	0422

RETENTION REQUIRED:	☑ YES ☐ NO
WORK TO START BY:	UPON AUTHORIZATION
WORK TO BE FINISHED BY:	WITHIN 30 DAYS

DESCRIPTION OF WORK:

Construct 60 LF of 36-inch DIP to replace 60 LF of failed 36-inch CLC transmission main on Casa Grande Mountain located south of Interstate 8 at Peart Road.

FACTORS JUSTIFYING WORK:

The Casa Grande Mountain transmission main failed and requires emergency replacement of a 60 foot section of transmission main with cracks in the exterior concrete coating and a 10-inch diameter hole. The water main was installed in 1978 and has experienced a second leak over the past nine years. The transmission main is the primary feed into and out of the the 5MG storage tank on Casa Grande Mountain which represents approximately 30% of the total storage in the Pinal Valley Water system. The transmission main is necessary to provide safe, adequate and reliable service to the Pinal Valley Water System.

COST ESTIMATE	
COST OF WORK:	
MATERIAL	0
LABOR	6,800
CONTRACT PORTION	126,669
OVERHEAD	16,000
TOTAL AUTHORIZED EXPENDITURES CHARGEABLE TO THIS W.A.	$ 149,469
FUNDS RECEIVED:	
CONTRIBUTIONS RECEIVED	0
REFUNDABLE ADVANCES RECEIVED	0
TOTAL CONTRIBUTIONS/ADVANCES	0
NET COMPANY CASH REQUIRED	$ 149,469

AUTHORIZATION	DATE
PREPARED BY: James Wilson JW 2/9/15	2/5/15
REVIEWED FOR ESMT/ROW VERIFICATION: Charles Briggs CB 02-09-2015	02-05-2015
REVIEWED BY: Andy Haas AFH 2-9-15	2-5-15
APPROVED BY ENGINEERING: Fredrick Schneider FS 2-9-15	2-5-2015
APPROVED BY PIN OFFICE: Joseph Harris	2/5/15
SPECIAL ITEM EXCEEDING $10,000; AUTHORIZED BY PRESIDENT: William Garfield	2-19-2015
SPECIAL ITEM EXCEEDING $10,000; AUTHORIZED BY CHAIRMAN: APPROVED VAI FAX M. L. Whitehead	2/9/2015

COMMENTS:

TRANSFER $149,469 FROM THE 2015 CONSTRUCTION CONTINGENCY BUDGET. AH

CONSTRUCTION RELEASE:

RELEASED TO CONSTRUCTION
Authorized by FRED SCHNEIDER
Date 2/9/15

AFH

ARIZONA WATER COMPANY

WORK AUTHORIZATION - DETAIL SHEET

W.A NUMBER: 1-5332
P.E. NUMBER:
BUDGET ITEM NO.: Special No. 5
SHEET NO.: 2 of 2

RETIREMENT PROPERTY UNITS	PLANT PROPERTY ACCOUNT	UNIT DESCRIPTION	QUANTITY	YEAR INSTALLED AND W.A. NUMBER
	343	36-inch CLC pipe	60	1978 WA 1-8010

PROJECT DESCRIPTION

Construct 60 LF of 36-inch DIP to replace 60 LF of failed 36-inch CLC transmission main on Casa Grande Mountain located south of Interstate 8 at Peart Road.

	DESCRIPTION	PLANT PROP ACCT	QUANTITY	UNIT COST	TOTAL
CONTRACT WORK	Construct 36-inch DIP with polywrap and related fittings	343	60	$ 1,836.00	$ 110,160
	Contracting Tax	343	1	9,271.00	9,271
	Performance and Payment Bond	343	1	1,206.00	1,206
	Contingency (5%)	343	1	6,031.85	6,032
	SERVICE CONNECTIONS COMPLETE: DOUBLE-LONG	345			
	SERVICE CONNECTIONS COMPLETE: DOUBLE-SHORT	345			
	SERVICE CONNECTIONS COMPLETE: SINGLE-LONG	345			
	SERVICE CONNECTIONS COMPLETE: SINGLE-SHORT	345			
TOTAL CONTRACT WORK					$ 126,669
MATERIALS					
	SERVICE CONNECTIONS: DOUBLE-LONG	345			
	SERVICE CONNECTIONS: DOUBLE-SHORT	345			
	SERVICE CONNECTIONS: SINGLE-LONG	345			
	SERVICE CONNECTIONS: SINGLE-SHORT	345			
	METERS	346			
TOTAL MATERIALS					$ -
LABOR	Project Engineering and Management	343	40	$ 65.00	$ 2,600
	TESTING FEE	343	1	$ 500.00	500
	PERMIT FEE	343			
	SURVEY FEE	343	1	1,500.00	1,500
	FIELD INSPECTION	343	40	55.00	2,200
	INSTALL SERVICE CONNECTIONS: DOUBLE-LONG	345			
	INSTALL SERVICE CONNECTIONS: DOUBLE-SHORT	345			
	INSTALL SERVICE CONNECTIONS: SINGLE-LONG	345			
	INSTALL SERVICE CONNECTIONS: SINGLE-SHORT	345			
TOTAL LABOR					$ 6,800
SUBTOTAL - CONTRACT WORK, MATERIALS, AND LABOR					$ 133,469
OVERHEAD					16,000
TOTAL	REFUNDABLE PORTION ☐	NON-REFUNDABLE PORTION ☐		**COST ESTIMATE**	$ 149,469

ARIZONA WATER COMPANY

3805 N. BLACK CANYON HIGHWAY, PHOENIX, ARIZONA 85015-5351 • P.O. BOX 29006, PHOENIX, AZ 85038-9006
PHONE: (602) 240-6860 • FAX: (602) 240-6874 • TOLL FREE: (800) 533-6023 • www.azwater.com

February 10, 2015

Mr. Nick Patterson
MGC Contractors, Inc.
4110 E. Elwood Street
Phoenix, AZ 85040

Re: Casa Grande Mountain CLC Transmission Main

PROJECT: CG Mountain Main	
SYSTEM: Pinal Valley	
CONTRACT NO.:	
P.E. NO.:	W.A. NO.: 1-5332

Dear Mr. Patterson:

Enclosed is your copy of the Proposal/Contract for the above-referenced project, which has been accepted by Arizona Water Company (the "Company"). The project shall be constructed in accordance with the Company's *General Conditions of Contract, the Specifications and the Drawings* which were included with the Company's previously provided Proposal/Contract, copies of which are being provided again and attached herewith.

Also enclosed are two copies of the Commencement Notice for the above-referenced project. Please sign one of the copies and return it to my attention retaining the other for your records.

As provided in paragraph 4 of the Company's Proposal/Contract executed by the Company on February 17, 2015 MGC Contractors, Inc. acknowledged that one hundred percent (100%) Performance and Payment Bonds are required and must be provided to the Company prior to the commencement of work. In addition, as provided in paragraph 44 of the Company's General Conditions of Contract, the 100% Performance and Payment Bonds must be provided within ten (10) calendar days of the date of the Commencement Notice. Failure to provide an acceptable 100% Performance and Payment Bond does not limit the Company's ability to

terminate the Proposal/Contract or seek restitution for damages that the Company may have or will incur.

Prior to the start of construction, please call Ray Murrieta, Division Manager at 520-836-8785 to schedule a pre-construction meeting. Prior to the pre-construction meeting, the Contractor must provide proof of insurance of no less than the minimum amounts provided in paragraph 5 of the Company's General Conditions of Contract. Failure to provide acceptable proof of insurance does not limit the Company's ability to terminate the Proposal/Contract or seek restitution for damages that the Company may have or will incur. In addition, please provide the required Performance and Payment Bonds to the Company promptly so that the contracted work can be completed within the contract's timeline.

If you have any questions, please call me at this office.

Very truly yours,

James T. Wilson, P. E.
Senior Engineer
engineering@azwater.com

afh
Enclosure

ARIZONA WATER COMPANY

Casa Grande - Pinal Valley
220 E. 2nd Street
Casa Grande, AZ 85122 PH: 520-836-8785

PROPOSAL/CONTRACT

CONTRACTOR: MGC CONTRACTORS, INC	SYSTEM: PINAL VALLEY
ADDRESS: 4110 E. ELWOOD STREET	W.A No(s): 1-5332
CITY ST ZIP: PHOENIX, AZ 85040	BID DUE DATE: February 13, 2015

CONTRACTOR SUBMITS this PROPOSAL/CONTRACT to ARIZONA WATER COMPANY, an Arizona corporation (the "Company"), to perform the work and complete the project described on Page 2 (the "Project"), as an independent prime contractor.

1. Contractor certifies that it has a complete copy of, and has read, understands and accepts, the Company's General Conditions of Contract, and the Company's Construction Specifications and Standard Specification Drawings, (the "Specifications"), all of which are attached hereto. Contractor has examined the specific plans and related construction drawings for the Project (the "Drawings"), copies of which are also attached hereto. The General Conditions of Contract, Specifications and Drawings are incorporated into this Proposal/Contract. Contractor affirms that all work and materials to be furnished or purchased for the Project will be in strict conformance with the General Conditions of Contract, Specifications and Drawings.
2. Contractor represents and warrants that it has satisfied and complied with the provisions of Section 6, Contractor Understands Work and Working Conditions, of the General Conditions of Contract prior to submitting this Proposal/Contract.
3. Contractor represents that this Proposal/Contract is fair and honest in all respects, is submitted in good faith and is not submitted in collusion with any other company, entity or person.
4. Contractor acknowledges that one hundred percent (100%) Performance and Payment Bonds are required and must be provided to the Company prior to the commencement of work.
5. Prior to the commencement of work, Contractor will submit to the Company a list of all materials to be used in the Project. The materials list will include the manufacturer, part number, price and quantity included in this Proposal/Contract.
6. Contractor will furnish all labor, tools, equipment and materials required to complete the Project according to the General Conditions of Contract, Specifications and Drawings. No materials purchased by Contractor to be incorporated into the Project are subject to tax at the time of purchase and Contractor will not charge the Company for any such tax. Contractor will pay the applicable transaction privilege tax (the "Contracting Tax") on the Project after Contractor receives payment of the final Project invoice from the Company. The cost of materials incorporated into the Project which are exempt by Arizona Revised State Statues ("A.R.S.") from the Contracting Tax, for example, pipes or valves having a diameter of four (4) inches or larger, including equipment, fittings and any other related part that is used in operating the pipes or valves (A.R.S. §42-5061 B.8.), will not be included in the total cost of the labor and materials upon which the Contracting Tax is computed. Contractor retains full liability and obligation to pay the Contracting Tax and will defend and indemnify the Company against any demand or obligation to pay the Contracting Tax.
7. Contractor will maintain detailed accounting records of all materials purchased and incorporated into the Project. Such records will include all supporting original vendor invoices for all materials purchased. Following completion of the Project, Contractor will submit an itemized accounting to the Company which will include all supporting original vendor invoices and satisfactory evidence of payment thereof. The Company will not pay Contractor for materials not actually incorporated into the Project, and the disposition of such materials will remain Contractor's responsibility.
8. The Estimated Total Cost of the Project, shown on Page 2, is based on estimated labor and material quantities to be furnished. It includes an estimate of the Contracting Tax and the cost of the required Performance and Payment Bonds. Contractor will not cancel, modify or withdraw this Proposal/Contract during a ninety-day (90) period commencing on the Bid Due Date. The Company may accept this Proposal/Contract by signing and mailing, or otherwise delivering, a copy hereof to Contractor during such ninety-day (90) period. If the Company does not accept this Proposal/Contract during such ninety-day (90) period, Contractor may cancel this Proposal/Contract by giving written notice of cancellation to the Company.
9. Prior to the commencement of work, Contractor will provide the Company with a detailed construction schedule, in either Gantt or CPM form, identifying all tasks to be performed from the date of the written Commencement Notice through completion of the Project, including testing, training of Company Personnel and final Project invoicing. Contractor will provide the Company with a copy of such construction schedule documenting the progress of work on the Project at least monthly.
10. Contractor will not commence work on the Project until the Company gives Contractor a written Commencement Notice. Contractor will complete the Project within 30 calendar days after the Commencement Notice is issued.
11. Following the Company's written notice of satisfactory completion of the Project, and upon receipt of the final Project invoice from Contractor, the Company shall pay Contractor the actual total cost of the Project, which will be calculated as shown on Page 2, except that actual labor and material quantities installed/constructed will be substituted for the estimated labor and materials quantities and the Contracting Tax will be recalculated based on such actual labor and materials quantities.
12. The amount of applicable liquidated damages for Contractor's failure to deliver or perform within the time limit shown in Paragraph 10 may be deducted from the Company's payment of the final Project invoice. This provision shall not limit the Company's ability to terminate this Proposal/Contract for Contractor's unsatisfactory performance or failure to perform as provided in the General Conditions of Contract, Specifications or Drawings, or in this Proposal/Contract.

SPECIAL CONDITIONS:

CONTRACTOR	PROPOSAL/CONTRACT ACCEPTED:
MGC CONTRACTORS, INC.	ARIZONA WATER COMPANY
By: [signature]	By: [signature]
Print Name: Nicholas Patterson	Print Name: Fredrick K. Schneider, PE
Title: Project Manager	Title: Vice President - Engineering
Date: 2/10/15	Date: 2-17-2015

AFH

ARIZONA WATER COMPANY

Casa Grande - Pinal Valley
220 E. 2nd Street
Casa Grande, AZ 85122 PH: 520-836-8785

PROPOSAL/CONTRACT

CONTRACTOR: MGC CONTRACTORS, INC.	SYSTEM: PINAL VALLEY
AZ CONTRACTOR LICENSE NO: CLASSIFICATION:	W.A. No(s): 1-5332
ADDRESS: 4110 E. ELWOOD STREET	BID DUE DATE: February 9, 2015
CITY ST ZIP PHOENIX, AZ 85040	BID BOND REQUIRED ☐ Yes ☑ No

DESCRIPTION OF PROJECT: Construct 60 LF of 36-inch DIP to replace 60 LF of failed 36-inch CLC transmission main on Casa Grande Mountain located south of Interstate 8 at Peart Road.

1-2. MATERIALS EXEMPT FROM CONTRACTING TAX (per Paragraph 6)	QUANTITY	UNIT PRICE LABOR	UNIT PRICE MATERIALS	TOTAL COST LABOR	TOTAL COST MATERIALS
Construct 36-inch DIP with polywrap and related fittings	60 LF		$34,807.00		$34,807.00
				1	2
3. Total Labor to Install Exempt Materials (add the amounts in column 1)				3	
4. Total Exempt Materials (add the amounts in column 2)					4 $34,807.00

5-6. NON-EXEMPT MATERIALS	QUANTITY	UNIT PRICE LABOR	UNIT PRICE MATERIALS	TOTAL COST LABOR	TOTAL COST MATERIALS
Transport any CLC pipe removed from service to Company yard	1	$841.00	$1,314.00	$841.00	$1,314.00
Repair tank access road	1	$1,533	$3,016.00	$1,533.00	$3,016.00
Construct 36-inch DIP with Polywrap and related fittings	1	$32,250	$37,449.00	$32,250.00	$37,449.00
				5	6
7. Total Labor to Install Non-Exempt Materials (add the amounts in column 5)				7 $34,624.00	
8. Total Non-Exempt Materials (add the amounts in column 6)					8 $41,779.00
9. Subtotal A (add lines 3, 7 and 8)					9 $76,403.00
10. Contracting Tax Base (multiply the amount on line 9 by 0.65)				10 $49,662.95	
11. Applicable Contracting Tax Rate				11 0.10700	
12. Contracting Tax (multiply the amount on line 10 by line 11)					12 $5,313.83
13. Subtotal B (add lines 4, 9 and 12)					13 $116,523.83
14. 100% Performance and Payment Bonds Cost					14 $1,177.00
15. Estimated Total Cost (add lines 13 and 14)					15 $117,700.83

NOTE: The Estimated Total Cost includes all labor and materials for backfill, pavement replacement, chip seal, and traffic control necessary for the Project.

ARIZONA WATER COMPANY

COMMENCEMENT NOTICE

CONTRACTOR:

Mr. Nick Patterson
MGC Contractors, Inc.
4110 E. Elwood Street
Phoenix, AZ 85040

DATE: 2/18/15
DIVISION: CASA GRANDE
SYSTEM: PINAL VALLEY
W.A.: 1-5332

THIS IS YOUR NOTICE TO PROCEED WITH THE FOLLOWING PROJECT(S):

DESCRIPTION OF WORK:

Construct 60 LF of 36-inch DIP to replace 60 LF of failed 36-inch CLC transmission main on Casa Grande Mountain located south of Interstate 8 at Peart Road.

PERFORMANCE AND PAYMENT BONDS REQUIRED: [X] Yes [ ] No

TOTAL DAYS ALLOWED: 40

COMPLETION DATE: 3/30/15

Prior to the start of construction, please call Ray Murrieta, Division Manager at 520-836-8785 to schedule a pre-construction meeting.

Prior to the pre-construction meeting, the Contractor must provide proof of insurance of no less than the minimum amounts provided in paragraph 5 of the Company's General Conditions of Contract. Failure to provide acceptable proof of insurance does not limit the Company's ability to terminate the Proposal/Contract or seek restitution for damages that the Company may have or will incur.

ARIZONA WATER COMPANY	**MGC CONTRACTORS, INC.**
Company	Contractor *(type name)*
By [signature]	By
Title Vice President - Engineering	Title

AFH

ARIZONA WATER COMPANY

SPECIFICATIONS

GENERAL CONDITIONS OF CONTRACT: E-4-1

CONSTRUCTION SPECIFICATIONS: E-8-1

STANDARD SPECIFICATION DRAWINGS: E-9-1

gw 2/10/15

2007 EDITION WITH **2010** REVISIONS;
2012 GENERAL CONDITIONS OF CONTRACT

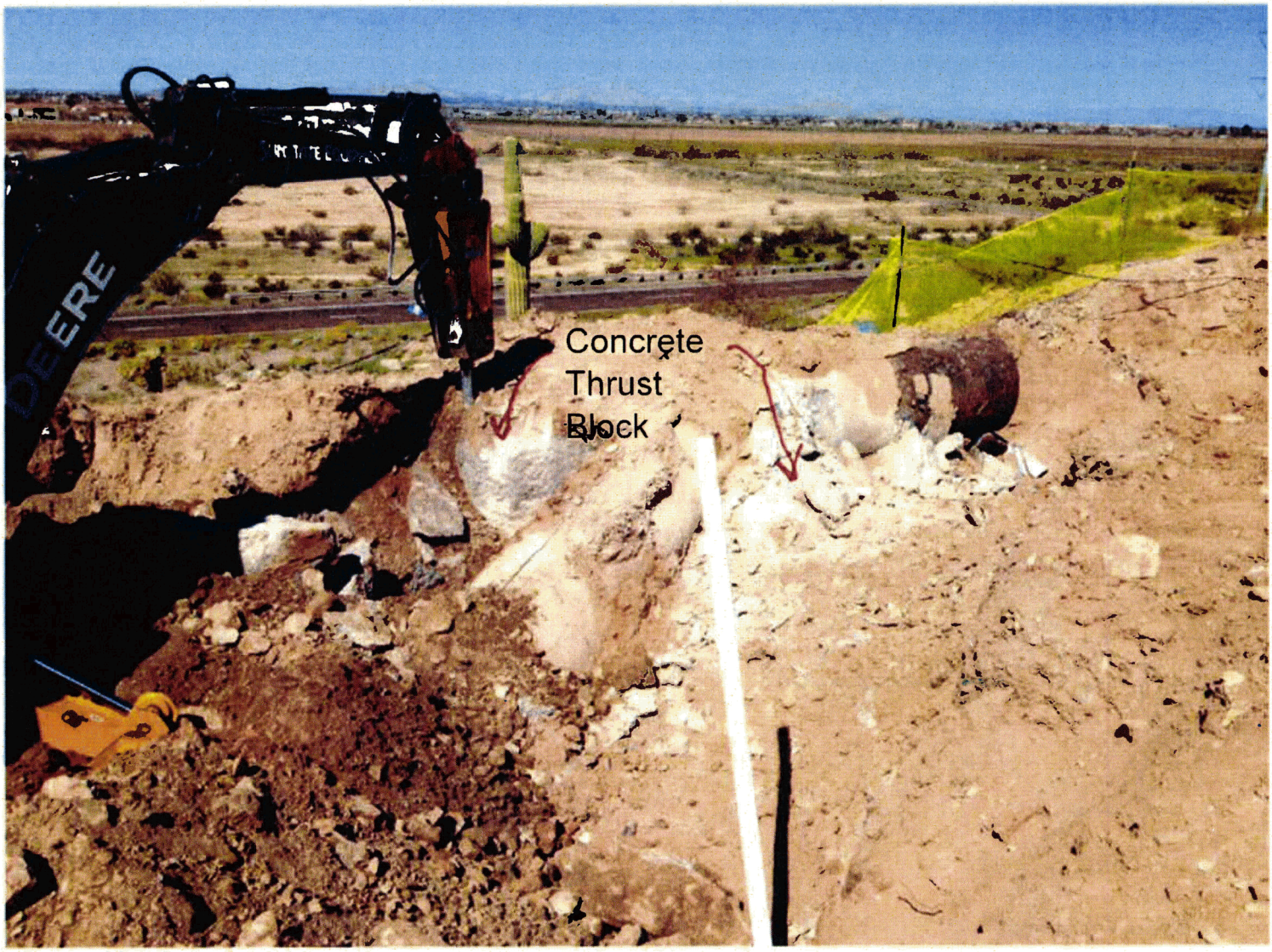
A copy of this entire Spec Book was sent out with MGC Contractors Proposal package for WA 1-5332 Casa Grande Mountain Main on 2/18/15 CCA

CG Mountain 2-23-15
Closeup of Blowout

CG Mountain 2-23-15
Blowout

CG Mountain 2-23-15
Exposed Joint with Pipe Marking

CG Mountain 2-24-15
Connection Pipe Between 36" DIP-CCP Removed



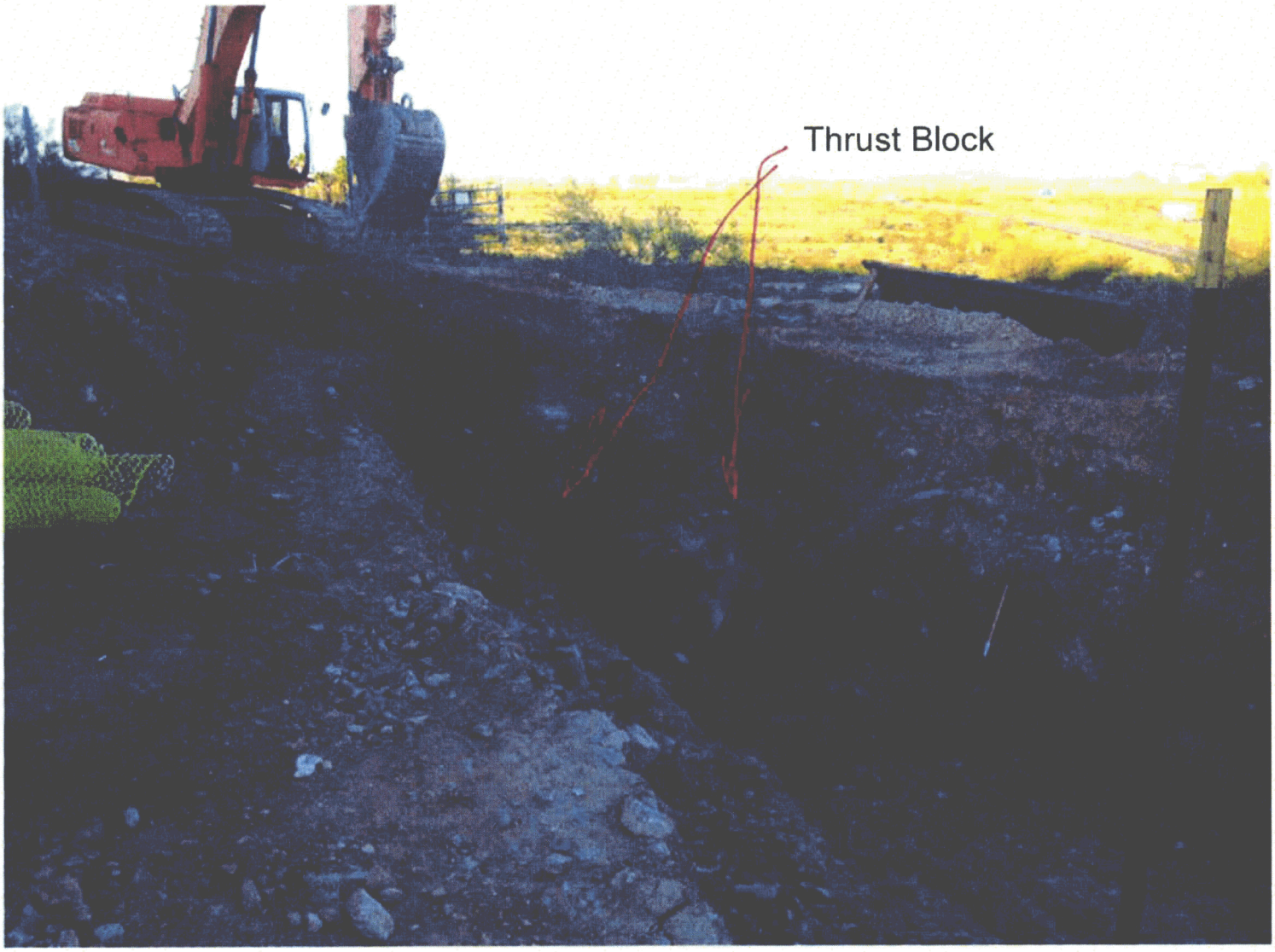
CG Mountain 3-3-15
Ameron Piece #26
With Thrust Block Being Removed

CG Mountain 3-5-15
Ameron Piece #26
(35 degree bend with 11 degree slope down)
Remnants of Thrust Block in Foreground

CG Mountain 3-5-15
Ameron Piece #26
Looking West away from Thrust Block
Hole made by contractor

CG Mountain 3-11-15
Old Ameron Pipe
Stored at Tank Site

CG Mountain 3-13-15
3/16-inch pinhole
(One of two pinholes in area)



CG Mountain 3-13-15
Ameron Piece #28

CG Mountain 3-19-15
New 36" DI Pipe (approx. 60-feet)

CG Mountain 3-19-15
Completed welded attachment to Ameron Pipe

CG Mountain 3-19-15
Welded connection at bottom of Ameron Pipe

CG Mountain 3-19-15
Welded Connection at top of Ameron Pipe

CG Mountain 3-19-15
Completed Welded Connection to Ameron Pipe

CG Mountain 3-23-15
New 36" DIP looking uphill from Ameron Pipe Connection

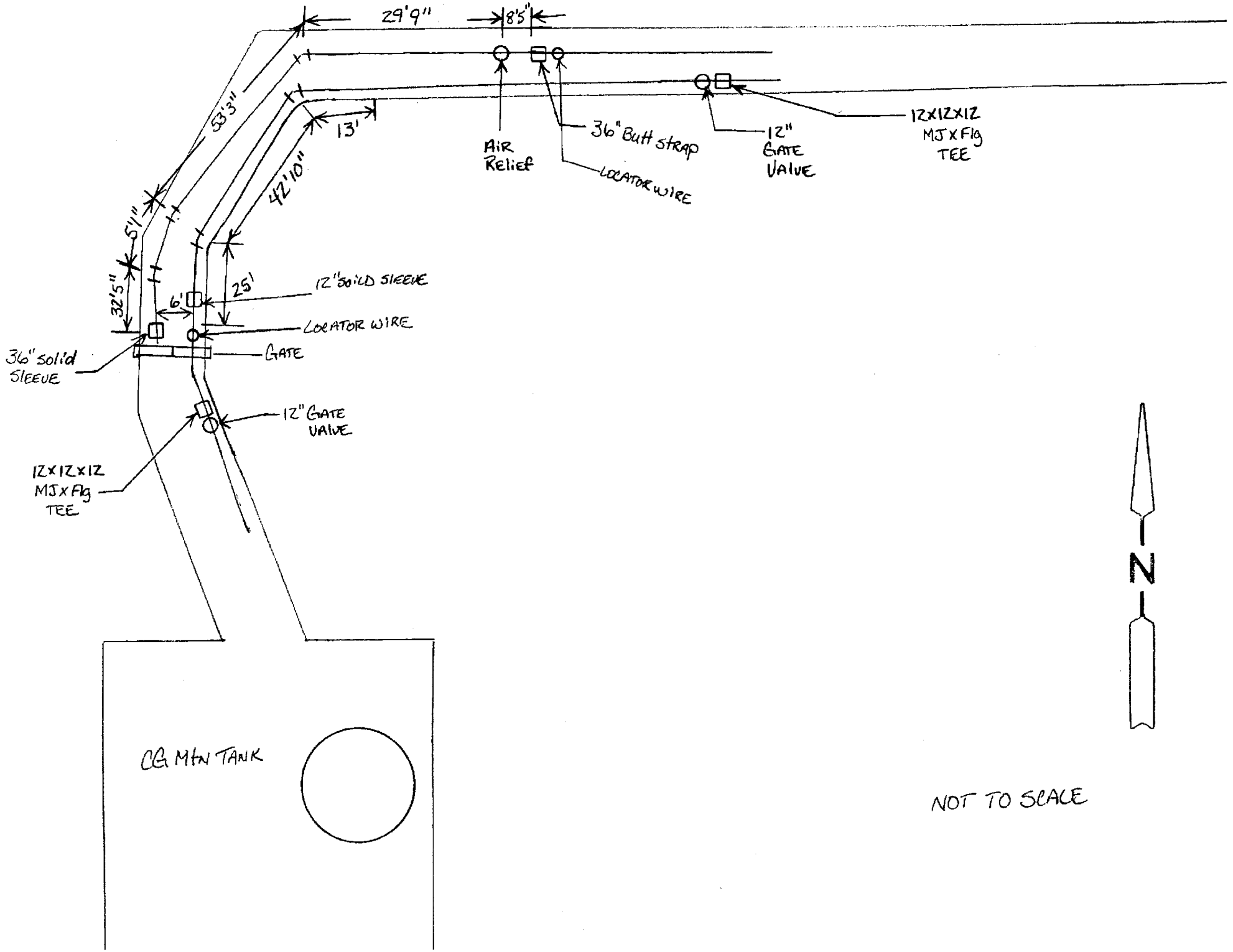
CG Mountain 3-27-15
New 36" DI Pipe
Looking uphill toward tank

CG Mountain 3-27-15
New 36" DIP partially compacted
Pipe bedding
Looking toward connection to Ameron Pipe

CG Mountain 3-27-15
Connection to Ameron Pipe
After Slurry Installed

CG Mountain 4-7-15
Re-installing 12" DI pipe
Workers making final connections

CG Mountain 4-7-15
Re-installing 12" DI Pipe
That interfered with removal of Ameron Pipe


29'9"
8'5"
53'3"
13'
42'10"
5'1"
32'5"
6'
25'
12" SOLID SLEEVE
LOCATOR WIRE
GATE
36" solid SLEEVE
12" GATE VALVE
12x12x12 MJ x Flg TEE
AIR Relief
36" Butt strap
LOCATOR WIRE
12" GATE VALVE
12x12x12 MJ x Flg TEE
CG MTN TANK
N
NOT TO SCALE

ARIZONA WATER COMPANY

CONSTRUCTION PLACED IN SERVICE NOTICE

WORK AUTHORIZATION NO.: 1-5332

DIVISION: CG/PV

DATE PLACED IN SERVICE: 5 | 5 | 15

CONTRACT NO:

FOR PURPOSES OF *MODIFIED ACCELERATED COST RECOVERY SYSTEM*, AN ASSET IS "PLACED IN SERVICE" WHEN IT IS IN A CONDITION OR STATE OF READINESS AND AVAILABILITY FOR A SPECIFICALLY ASSIGNED FUNCTION, WHETHER IT BE FOR USE IN A TRADE OR BUSINESS, OR FOR THE PRODUCTION OF INCOME.

I CERTIFY THAT THE ASSET(S) CONSTRUCTED PURSUANT TO THE PROVISIONS OF THE ABOVE-REFERENCED WORK AUTHORIZATION ARE READY FOR SERVICE AS OF THE DATE SHOWN ABOVE.

Division Manager or Operations Superintendent
(signature)

6-16-15
Date

SUBMIT ORIGINAL TO ACCOUNTING DEPARTMENT

A-1-3-1
FKS 11/24/11

Western Group Rate Case

Exhibit FKS-1

5339 SR 87 & AZ Blvd Asphalt

ARIZONA WATER COMPANY
WORK AUTHORIZATION

W.A. NUMBER: 1-5339
P.E. NUMBER:
BUDGET ITEM NO.: Special No. 9
SHEET NO.: 1 OF 2

SYSTEM:	PINAL VALLEY	RETENTION REQUIRED:	☑ YES ☐ NO
DIVISION:	CASA GRANDE	WORK TO START BY:	UPON AUTHORIZATION
RESPONSIBLE PERSON:	RAY MURIETTA	WORK TO BE FINISHED BY:	WITHIN 55 DAYS
TAX CODE: 2108			

DESCRIPTION OF WORK:

Replace leaking water service line and construct 110 ft.x11 ft. permanent asphalt patch to replace temporary asphalt patch on Arizona Boulevard (ADOT SR-87) south of Verde Lane in Coolidge, Arizona.

FACTORS JUSTIFYING WORK:

A water service line leak damaged a portion of asphalt on Arizona Boulevard (ADOT SR-87) south of Verde Lane. Company servicemen replaced the water service line and constructed a temporary asphalt patch to replace the damaged asphalt. ADOT requires the Company to replace the temporary asphalt patch with a full lane width, 2-inch deep mill and overlay for 50-feet each side of the water service line replacement in accordance with the ADOT highway encroachment permit. Company Engineers worked with the Company's General Counsel to submit an insurance claim to the Company's insurance carrier to cover the cost of the asphalt replacement.

COST ESTIMATE		AUTHORIZATION	DATE
COST OF WORK:		PREPARED BY: John Knobbe 5-1-2015	4-1-2015
MATERIAL	300		
LABOR	4,601	REVIEWED FOR ESMT/ROW VERIFICATION: Charles Briggs CB 05-01-2015	04-01-2015
CONTRACT PORTION	50,738		
OVERHEAD	6,700	REVIEWED BY: James Wilson	4/1/15
TOTAL AUTHORIZED EXPENDITURES CHARGEABLE TO THIS W.A.	$ 62,339		
FUNDS RECEIVED:		APPROVED BY ENGINEERING: Fredrick Schneider 5-1-15	4-6-2015
CONTRIBUTIONS RECEIVED	0		
REFUNDABLE ADVANCES RECEIVED	0	APPROVED BY FINANCE: Joseph Harris	4/7/15
TOTAL CONTRIBUTIONS/ADVANCES	0		
NET COMPANY CASH REQUIRED	$ 62,339	SPECIAL ITEM EXCEEDING $10,000; AUTHORIZED BY PRESIDENT: William Garfield	4-7-2015
		SPECIAL ITEM EXCEEDING $10,000; AUTHORIZED BY CHAIRMAN: Approved via Fax M. L. Whitehead	4/29/15

COMMENTS:

Transfer required funds from the 2015 Construction Contingency Budget to fund this project.

CONSTRUCTION RELEASE:

RELEASED TO CONSTRUCTION

Authorized by FRED SCHNEIDER
Date 5/1/15

AFH

ARIZONA WATER COMPANY

WORK AUTHORIZATION - DETAIL SHEET

W.A. NUMBER: 1-5339
P.E. NUMBER:
BUDGET ITEM NO.: Special No. 9
SHEET NO.: 2 of 2

RETIREMENT PROPERTY UNITS	PLANT PROPERTY ACCOUNT	UNIT DESCRIPTION	QUANTITY	YEAR INSTALLED AND W.A. NUMBER

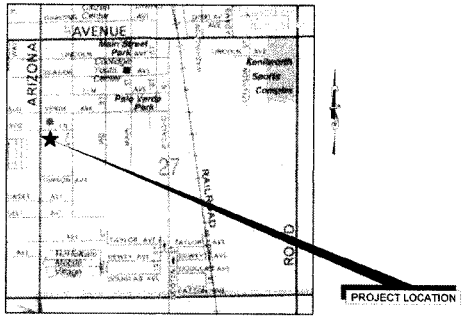
PROJECT DESCRIPTION:

Replace leaking water service line and construct 110 ft.x11 ft. permanent asphalt patch to replace temporary asphalt patch on Arizona Boulevard (ADOT SR-87) south of Verde Lane in Coolidge, Arizona.

	DESCRIPTION	PLANT PROP ACCT	QUANTITY	UNIT COST	TOTAL
CONTRACT WORK	Remove temporary asphalt patch and construct permanent				
	asphalt patch	345	1	46,550.00	46,550
	Contracting Tax	345	1	3,238.00	3,238
	100% Performance and Payment Bonds	345	1	950.00	950
	SERVICE CONNECTIONS COMPLETE: DOUBLE-LONG	345			
	SERVICE CONNECTIONS COMPLETE: DOUBLE-SHORT	345			
	SERVICE CONNECTIONS COMPLETE: SINGLE-LONG	345			
	SERVICE CONNECTIONS COMPLETE: SINGLE-SHORT	345			
TOTAL CONTRACT WORK					$ 50,738
MATERIALS	Construct temporary asphalt patch	345	1	$ 300.00	$ 300
	SERVICE CONNECTIONS: DOUBLE-LONG	345			
	SERVICE CONNECTIONS: DOUBLE-SHORT	345			
	SERVICE CONNECTIONS: SINGLE-LONG	345			
	SERVICE CONNECTIONS: SINGLE-SHORT	345			
	METERS	346			
TOTAL MATERIALS					$ 300
LABOR	Engineering design and project management	345	24	$ 65.00	$ 1,560
	Construct temporary asphalt patch	345	1	1,661.00	1,661
	TESTING FEE		1	$ 500.00	500
	PERMIT FEE				
	SURVEY FEE				
	FIELD INSPECTION	345	16	55.00	880
	INSTALL SERVICE CONNECTIONS: DOUBLE-LONG	345			
	INSTALL SERVICE CONNECTIONS: DOUBLE-SHORT	345			
	INSTALL SERVICE CONNECTIONS: SINGLE-LONG	345			
	INSTALL SERVICE CONNECTIONS: SINGLE-SHORT	345			
TOTAL LABOR					$ 4,601
SUBTOTAL - CONTRACT WORK, MATERIALS, AND LABOR					$ 55,639
OVERHEAD					6,700
TOTAL	REFUNDABLE PORTION ☐	NON-REFUNDABLE PORTION ☐		**COST ESTIMATE**	$ 62,339

AFH

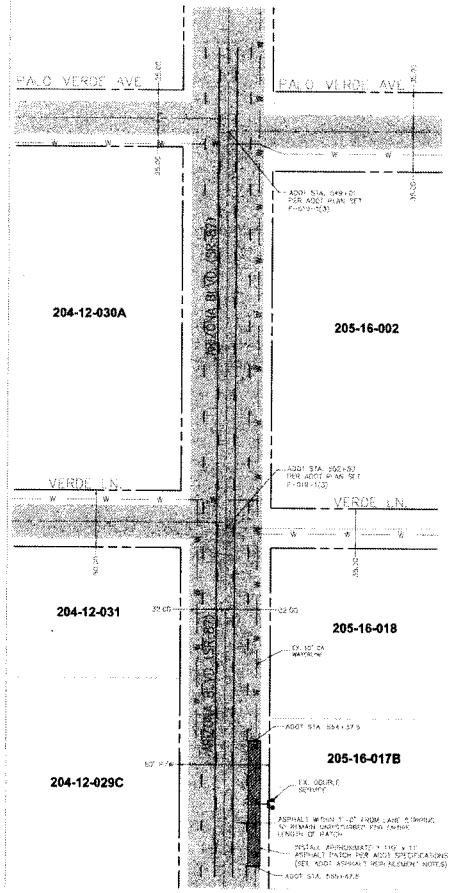
REPLACE TEMPORARY ASPHALT PATCH WITH APPROXIMATELY 110' X 11' PERMANENT ASPHALT PATCH ALONG ARIZONA BLVD.
NW 1/4 SEC. 27, T. 5 S., R. 8 E.
OF THE G. & S. R. B. & M.



VICINITY MAP

GENERAL NOTES

1. All work and materials shall conform to current County Health Department Standards and Revisions, Arizona Water Company Standard Specifications and Details, and Arizona Department of Health Services Engineering Bulletin No. 10.
2. Permits required will be secured from the appropriate agency(ies), i.e., county permit in county right-of-way.
3. Prior to construction, the appropriate agency(ies) will be notified as required by the permit(s).
4. Trenching, backfill, compaction, and testing shall be per current County, City, State, ADOT, and Arizona Water Company standards and specifications.
5. All water lines 8" and less are to have a minimum cover of 36" inches & all water lines 12" and greater are to have 48" of minimum cover over the top of pipe to finished grade, unless otherwise specified on the construction drawings.
6. All manholes, covers, valve boxes, etc. shall be adjusted to finished grade prior to placing of asphaltic concrete surface course by the contractor. Service applicable.
7. All water lines shall be pressure and leakage tested in accordance with AWWA C 600 or MAC 610.14
8. All water lines are to be disinfected per ADEQ Engineering Bulletin No.8 and AWWA C651-92.
9. Air release valves are required at water system high points per Arizona Water Company standard details.
10. Water/sewer separation shall be per current Arizona Water Company standards and ADEQ AAC R18-5-502.C.
11. It shall be the contractors responsibility to uncover all existing water lines being connected to, and to verify the location, depth and size of pipe before any construction begins.
12. Any construction performed without the knowledge of the inspector or his representative is liable for removal and replacement at the contractor's expense.
13. In accordance with AAC R18-4 213, all materials added after January 1, 1990 which may come in contact with drinking water, shall conform to National Sanitation Foundation Standards 60 and 61.
14. All water services shall be a minimum of 2 Feet on the customers property and NOT within right-of-way.
15. Unless otherwise specified on the construction drawings, all water mains are to be installed 5 Feet from the property line inside the right-of-way or easement.
16. Water valves shall be spaced not more than 500 Feet in commercial districts and not more than 800 Feet in other districts. Variations may be required for transmission mains or special appurtenances. Additional valving is required where water lines cross streams, railroads and major highways.
17. Maximum Joint Deflection For 6" Mechanical Joint Ductile Iron Pipe is 4° To 27° For 18 Foot Length Pipe, For A Maximum Curve Of 145 Feet.
18. Maximum Joint Deflection For 8", 10" & 12" Push-On Joint Ductile Iron Pipe is 5° Or 33° For 18 Foot Length Pipe, For A Maximum Curve Of 205 Feet.
19. Maximum Joint Deflection For 6" & 12" Mechanical Joint Ductile Iron Pipe is 5° 21 Or 20° For 18 Foot Length Pipe, For A Maximum Curve Of 205 Feet.



LEGEND

- STREET CENTERLINE/MONUMENT LINE
- RIGHT-OF-WAY LINE
- PROPERTY LINE
- EX. WATER LINE
- ASPHALT PATCH
- EX. ASPHALT AREA

ADOT ASPHALT REPLACEMENT NOTES:

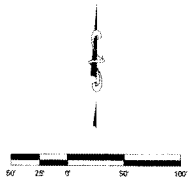
1. Existing pavement shall be saw cut full depth for the trench prior to any excavation.

2. Cement treated slurry backfill meeting ADOT Standard Specifications **501-3.02** and **501-3.04** shall be used in the trench crossing the roadway. Slurry shall be placed full depth of the trench up to the bottom of the existing asphaltic concrete (AC). Steel plates meeting traffic loading requirements shall be placed over the trench and slurry allowed setting a minimum of 24 hours without disturbance. Four feet wide cold mix AC wedges shall be used to hold steel plates in place.

3. Once the slurry is set, AC meeting the requirements of ADOT Standard Specification Section **409** shall be placed in the trench in lifts and properly compacted to the surface of the existing pavement. The thickness of replacement asphalt concrete shall match the existing thickness.

4. In the event the roadway is paved with **Rubberized Asphalt Concrete Friction Course (AR-ACFC), it shall be replaced in kind.**

5. Once the AC patch is completed, all affected travel lanes and shoulders where the patch was placed shall be milled in compliance with ADOT Standard Specification **202-3.03(C)** to a depth of two inches for a length of one hundred feet (fifty feet each side of patch). If the roadway is overlaid with AR-ACFC, the mill depth shall be two and one half (2-½) inches. The milled trench shall be properly cleaned and a Tack Coat placed on all surfaces, including the edges, which meet the requirements of ADOT Standard Specification **404-3.12**. The entire milled surface is then overlaid with two inches of AC meeting the requirements of ADOT Standard Specification Sections **409** and one half inch of AR-ACFC (if present) meeting the requirements of Standard Specification Section **414**.



FOR BIDDING PURPOSES ONLY
DEC 11 2014
Engineering Dept.
Arizona Water Co.

The installation shown is to be installed in accordance with the Arizona Water Company standard specifications on file with the Arizona Department of Environmental Quality

263-1100
1-800-STAKE-IT
(ARIZONA BLUE STAKE, INC.)

ARIZONA WATER COMPANY
3805 N. BLACK CANYON HWY. POST OFFICE BOX 29006
PHOENIX, ARIZONA 85038-9006
(602) 240-6860

PROJECT TITLE: REPLACE TEMPORARY ASPHALT PATCH WITH APPROXIMATELY 110' X 11' PERMANENT ASPHALT PATCH ALONG ARIZONA BLVD.

PROJECT SHEET TITLE: COVER SHEET

PINAL VALLEY
NW 1/4 SEC. 27, T. 5 S., R. 8 E.
2108
8/11/2014
AS SHOWN
BWP

SHEET 1 OF 1

ARIZONA WATER COMPANY

3805 N. BLACK CANYON HIGHWAY, PHOENIX, ARIZONA 85015-5351 • P.O. BOX 29006, PHOENIX, AZ 85038-9006
PHONE: (602) 240-6860 • FAX: (602) 240-6874 • TOLL FREE: (800) 533-6023 • www.azwater.com

April 30, 2015

Mr. Devin Anderson
DWA Construction Company, Inc.
P. O. Box 12788
Casa Grande, AZ 85130

Re: Arizona Boulevard Asphalt Replacement

PROJECT: AZ Blvd Asphalt Replacement	
SYSTEM: Pinal Valley	
CONTRACT NO.:	
P.E. NO.:	W.A. NO.: 1-5339

Dear Mr. Anderson:

Enclosed is your copy of the Proposal/Contract for the above-referenced project, which has been accepted by Arizona Water Company (the "Company"). The project shall be constructed in accordance with the Company's *General Conditions of Contract, the Specifications and the Drawings* which were included with the Company's previously provided Proposal/Contract, copies of which are being provided again and attached herewith.

Also enclosed are two copies of the Commencement Notice for the above-referenced project. Please sign one of the copies and return it to my attention retaining the other for your records.

As provided in paragraph 4 of the Company's Proposal/Contract executed by the Company on May 1, 2015, DWA Construction Company, LLC acknowledged that one hundred percent (100%) Performance and Payment Bonds are required and must be provided to the Company prior to the commencement of work. In addition, as provided in paragraph 44 of the Company's General Conditions of Contract, the 100% Performance and Payment Bonds must be provided within ten (10) calendar days of the date of the Commencement Notice. Failure to provide an acceptable 100% Performance and Payment Bond does not limit the Company's

ability to terminate the Proposal/Contract or seek restitution for damages that the Company may have or will incur.

Prior to the start of construction, please call Ray Murrieta, Division Manager at 520-836-8785 to schedule a pre-construction meeting. In addition, please provide the required Performance and Payment Bonds to the Company promptly so that the contracted work can be completed within the contract's timeline.

If you have any questions, please call me at this office.

Very truly yours,

John P. Knobbe
Lead Designer
jknobbe@azwater.com

afh
Enclosure

ARIZONA WATER COMPANY

Casa Grande / Pinal Valley
220 E 2nd Street Casa Grande Az 85122
O- 520-836-8785 F- 520-836-2850

PROPOSAL/CONTRACT

CONTRACTOR: DWA Construction Co LLC	SYSTEM: 041
ADDRESS: PO Box 12788	W.A. No(s): 1-53339
CITY ST ZIP: Casa Grant Az 85130	BID DUE DATE: January 16, 2015

CONTRACTOR SUBMITS this PROPOSAL/CONTRACT to ARIZONA WATER COMPANY, an Arizona corporation (the "Company"), to perform the work and complete the project described on Page 2 (the "Project"), as an independent prime contractor.

1. Contractor certifies that it has a complete copy of, and has read, understands and accepts, the Company's General Conditions of Contract, and the Company's Construction Specifications and Standard Specification Drawings, (the "Specifications"), all of which are attached hereto. Contractor has examined the specific plans and related construction drawings for the Project (the "Drawings"), copies of which are also attached hereto. The General Conditions of Contract, Specifications and Drawings are incorporated into this Proposal/Contract. Contractor affirms that all work and materials to be furnished or purchased for the Project will be in strict conformance with the General Conditions of Contract, Specifications and Drawings.
2. Contractor represents and warrants that it has satisfied and complied with the provisions of Section 6, Contractor Understands Work and Working Conditions, of the General Conditions of Contract prior to submitting this Proposal/Contract.
3. Contractor represents that this Proposal/Contract is fair and honest in all respects, is submitted in good faith and is not submitted in collusion with any other company, entity or person.
4. Contractor acknowledges that one hundred percent (100%) Performance and Payment Bonds are required and must be provided to the Company prior to the commencement of work.
5. Prior to the commencement of work, Contractor will submit to the Company a list of all materials to be used in the Project. The materials list will include the manufacturer, part number, price and quantity included in this Proposal/Contract.
6. Contractor will furnish all labor, tools, equipment and materials required to complete the Project according to the General Conditions of Contract, Specifications and Drawings. No materials purchased by Contractor to be incorporated into the Project are subject to tax at the time of purchase and Contractor will not charge the Company for any such tax. Contractor will pay the applicable transaction privilege tax (the "Contracting Tax") on the Project after Contractor receives payment of the final Project invoice from the Company. The cost of materials incorporated into the Project which are exempt by Arizona Revised State Statues ("A.R.S.") from the Contracting Tax, for example, pipes or valves having a diameter of four (4) inches or larger, including equipment, fittings and any other related part that is used in operating the pipes or valves (A.R.S. §42-5061 B.6.), will not be included in the total cost of the labor and materials upon which the Contracting Tax is computed. Contractor retains full liability and obligation to pay the Contracting Tax and will defend and indemnify the Company against any demand or obligation to pay the Contracting Tax.
7. Contractor will maintain detailed accounting records of all materials purchased and incorporated into the Project. Such records will include all supporting original vendor invoices for all materials purchased. Following completion of the Project, Contractor will submit an itemized accounting to the Company which will include all supporting original vendor invoices and satisfactory evidence of payment thereof. The Company will not pay Contractor for materials not actually incorporated into the Project, and the disposition of such materials will remain Contractor's responsibility.
8. The Estimated Total Cost of the Project, shown on Page 2, is based on estimated labor and material quantities to be furnished. It includes an estimate of the Contracting Tax and the cost of the required Performance and Payment Bonds. Contractor will not cancel, modify or withdraw this Proposal/Contract during a ninety-day (90) period commencing on the Bid Due Date. The Company may accept this Proposal/Contract by signing and mailing, or otherwise delivering, a copy hereof to Contractor during such ninety-day (90) period. If the Company does not accept this Proposal/Contract during such ninety-day (90) period, Contractor may cancel this Proposal/Contract by giving written notice of cancellation to the Company.
9. Prior to the commencement of work, Contractor will provide the Company with a detailed construction schedule, in either Gantt or CPM form, identifying all tasks to be performed from the date of the written Commencement Notice through completion of the Project, including testing, training of Company Personnel and final Project invoicing. Contractor will provide the Company with a copy of such construction schedule documenting the progress of work on the Project at least monthly.
10. Contractor will not commence work on the Project until the Company gives Contractor a written Commencement Notice. Contractor will complete the Project within 45 calendar days after the Commencement Notice is issued.
11. Following the Company's written notice of satisfactory completion of the Project, and upon receipt of the final Project invoice from Contractor, the Company shall pay Contractor the actual total cost of the Project, which will be calculated as shown on Page 2, except that actual labor and material quantities installed/constructed will be substituted for the estimated labor and materials quantities and the Contracting Tax will be recalculated based on such actual labor and materials quantities.
12. The amount of applicable liquidated damages for Contractor's failure to deliver or perform within the time limit shown in Paragraph 10 may be deducted from the Company's payment of the final Project invoice. This provision shall not limit the Company's ability to terminate this Proposal/Contract for Contractor's unsatisfactory performance or failure to perform as provided in the General Conditions of Contract, Specifications or Drawings, or in this Proposal/Contract.

SPECIAL CONDITIONS:

Pollution insurance not required per email from Fred Schneider dated 12-18-2014

CONTRACTOR	PROPOSAL/CONTRACT ACCEPTED:
DWA Construction Co LLC	ARIZONA WATER COMPANY
By: Dewin Anderson	By: Fredrick K. Schneider
Print Name: Dewin Anderson	Print Name: Fredrick K. Schneider, PE
Title: Manager	Title: Vice President - Engineering
Date: 2-18-15	Date: 5-1-2015

ARIZONA WATER COMPANY

Casa Grande / Pinal Valley
220 E 2nd Street Casa Grande Az 85122
O- 520-836-8785 F- 520-836-2850

PROPOSAL/CONTRACT

CONTRACTOR: DWA Construction LLC	SYSTEM: 041
AZ CONTRACTOR LICENSE NO: 227278 CLASSIFICATION: A	W.A. No(s): 1-5339
ADDRESS: PO Box 12788	BID DUE DATE: January 16, 2015
CITY ST ZIP Casa Grande Az 85130	BID BOND REQUIRED: √ Yes ☐ No

DESCRIPTION OF PROJECT: Replace temporary asphalt patch with approx. 110' X 11' permanent asphalt patch per ADOT and AWC specs. On Arizona Blvd in Coolidge AZ.

1-2. MATERIALS EXEMPT FROM CONTRACTING TAX (per Paragraph 6)	QUANTITY	UNIT PRICE LABOR	UNIT PRICE MATERIALS	TOTAL COST LABOR		TOTAL COST MATERIALS	
					1		2
3. Total Labor to Install Exempt Materials (add the amounts in column 1)					3		
4. Total Exempt Materials (add the amounts in column 2)							4

5-6. NON-EXEMPT MATERIALS	QUANTITY	UNIT PRICE LABOR	UNIT PRICE MATERIALS	TOTAL COST LABOR		TOTAL COST MATERIALS	
					5		6
Replace temporary asphalt patch with permanent asphalt patch	1 Lot	11,800	34,750	11,800			34,750
7. Total Labor to Install Non-Exempt Materials (add the amounts in column 5)					7	11,800	
8. Total Non-Exempt Materials (add the amounts in column 6)							8 34,750
9. Subtotal A (add lines 3, 7 and 8)							9 46,550
10. Contracting Tax Base (multiply the amount on line 9 by 0.65)					10	30,258	
11. Applicable Contracting Tax Rate					11	10.7	
12. Contracting Tax (multiply the amount on line 10 by line 11)							12 3238
13. Subtotal B (add lines 4, 9 and 12)							13 49,788
14. 100% Performance and Payment Bonds Cost							14 950
15. Estimated Total Cost (add lines 13 and 14)							15 50,738

NOTE: The Estimated Total Cost includes all labor and materials for backfill, pavement replacement, chip seal, and traffic control necessary for the Project.

ARIZONA WATER COMPANY

COMMENCEMENT NOTICE

CONTRACTOR:

Mr. Devin Anderson
DWA Construction Company, Inc.
P. O. 12788
Casa Grande, AZ 85130

DATE: 5/4/15
DIVISION: CASA GRANDE
SYSTEM: PINAL VALLEY
W.A.: 1-5339

THIS IS YOUR NOTICE TO PROCEED WITH THE FOLLOWING PROJECT(S):

DESCRIPTION OF WORK:

Replace temporary asphalt patch with approx. 110'x 11' permanent asphalt patch per ADOT and AWC specs on Arizona Boulevard in Coolidge, AZ.

PERFORMANCE AND PAYMENT BONDS REQUIRED: [X] Yes [ ] No

TOTAL DAYS ALLOWED: 55

COMPLETION DATE: 6/28/15

Prior to the start of construction, please call Ray Murrieta, Division Manager at 520-836-8785 to schedule a pre-construction meeting.

ARIZONA WATER COMPANY	***DWA CONSTRUCTION COMPANY, LLC***
Company	Contractor *(type name)*
By [signature]	By
Title Vice President - Engineering	Title

ARIZONA WATER COMPANY

SPECIFICATIONS

GENERAL CONDITIONS OF CONTRACT: E-4-1

CONSTRUCTION SPECIFICATIONS: E-8-1

STANDARD SPECIFICATION DRAWINGS: E-9-1

5-1-2015

2007 EDITION WITH **2010** REVISIONS;
2012 GENERAL CONDITIONS OF CONTRACT

A copy of this entire Spec Book was sent out with DWA Construction Proposal package for 1-5339 Arizona Blvd Asphalt Replacement on 5/4/15

Douglas A. Ducey, Governor
John S. Halikowski, Director
Dallas Hammit, State Engineer
Steve Boschen, Division Director

Ray Murietta
ARIZONA WATER COMPANY
P.O.Box29006
Phoenix, AZ 85038

Re: Permit No. 1213899

Dear Ray Murietta:

Your Permit to use State Highway Right of Way has been approved and a copy of the permit is attached for your records. Please read the specifications and standards which are part of your approved permit.

To schedule a pre-construction meeting, please contact Mr. Jason Ricketts, Permit Inspector, at (520) 850-0469 five days prior to performing any work. If Mr. Ricketts is unavailable, please contact Mr. Jim Soliz, Highway Operations Supervisor, at (520) 349-9849.

If at any time during the performance of your work, you determine it will not be possible to complete the permitted work by the expiration date on your permit, please submit a written request for a time extension. Your request should contain the reason for the delay and the additional time needed. Please submit your request to Mr. Ricketts for approval and processing.

The safety of your workers and the users of the State Highway is of great concern to us. Prior to beginning work please ensure you are in compliance with the Traffic Control requirements of your permit.

Best wishes in the execution of your work.

Sincerely,

Steve Mishler

Steve Mishler
Tucson District Development Engineer
1221 S. 2nd Avenue
Tucson, AZ 85713
(520) 429-4993

SM:aa

Enclosures

c: ADOT Maintenance Permits
Mr. Soliz and Mr. Ricketts, ADOT Maintenance

7-103902

TUCSON DISTRICT PERMITS

RECEIVED
SEP 23 2014

AP

RECEIVED PERMITS
JUL 03 2014
2140 WEST HILTON AVENUE
PHOENIX, ARIZONA 85009

ARIZONA DEPARTMENT OF TRANSPORTATION
INTERMODAL TRANSPORTATION DIVISION
Highway Encroachment Permit Application
(Application for Permission to Use State Highway Right-of-Way)

FOR ADOT USE ADOT Agreement Number: ☐ ECS ☐ JPA ☐ Other
PERMIT NUMBER: 1213899 ROUTE: SR-87 MILEPOST: 132.11
ADOT PROJECT NUMBER: F-019-1 (3) ADOT ENGINEERING STATION: 554+37 to 555+47

Name of Encroachment Owner:	Name of Authorized Agent / Applicant (*If other than the Encroachment Owner*):
Arizona Water Company	Andrew J. Haas
Mailing Address of Owner: P. O. Box 29006	Mailing Address: P. O. Box 29006
City: Phoenix	City: Phoenix
State: AZ Zip: 85038-9006	State: AZ Zip: 85038-9006
Phone: 602-240-6860	Phone: 602-240-6860
E-mail address: engineering@azwater.com	Legal Relationship to Owner: ☐ Contractor ☐ Sub Contractor ☑ Authorized Employee ☐ Engineer ☐ Attorney ☐ Other:
Name of Local Point of Contact: Ray Murietta	
Phone Number for Local Point of Contact: 520-836-8785	E-mail Address: engineering@azwater.com

City (in or near) Coolidge Side of Highway: ☐ N ☐ S ☐ E ☐ W (check one)
Highway Route # 87 Approximately 500 Feet ☑ N ☐ S ☐ E ☐ W (check one) of Milepost # 132
Encroachment Owner's Project # or Property Parcel #: 205-18-017B Project Duration :
Description of the proposed work or activity in the right-of-way: Replace temporary asphalt patch with permanent patch approximately 110' x 11.8'. 1031 S. Arizona Blvd

The Encroachment Owner will be the Permittee. By signing this application, the Encroachment Owner and the Owner's Agent acknowledge that the information given and statements made in this application are true and correct to the best of his/her knowledge. The Encroachment Owner agrees as the Permittee to accept the following General Obligations and Responsibilities as described on page 2 of the application. By accepting an approved encroachment permit, the Permittee agrees to the requirements described in the permit, to be responsible for all permit requirements, and to comply with ADOT's requirements as set out in the permit. An approved permit consists of but is not limited to this application and final supporting documentation approved by ADOT, and any requirements set by ADOT. NO WORK SHALL TAKE PLACE INSIDE THE RIGHT OF WAY WITHOUT AN APPROVED PERMIT ON SITE.

Andrew J. Haas, P. E. Andrew J. Haas 6-16-14
Encroachment Owner (*Print Name and Sign*) **Date**

Andrew J. Haas, P. E. Andrew J. Haas 6-16-14
Authorized Agent or Applicant: *If other than the Encroachment Owner (Print Name and Sign)* **Date**

FOR ADOT USE
PERMIT TO USE STATE HIGHWAY RIGHT-OF-WAY

This application is approved as a permit and a permit is issued to the Permittee. Construction is authorized only for the period indicated below.

Steve Mishler
Authorized ADOT Name and Signature
Steve Mishler, Dev. Engineer

Authorized ADOT Name and Signature

Issue Date January 8, 2015 Permit work to be completed by: April 8, 2015

№ 12-13-899

GENERAL OBLIGATIONS AND RESPONSIBLITIES

THE PERMITTEE SHALL:

1. Assume all legal liability and financial responsibility for the encroachment activity for the duration of the encroachment, including indemnify, defend, and save harmless ADOT and the State of Arizona and any of it's agents, directors, officers, employees from and against any and all claims, demands, suits, actions, proceedings, loss, costs, damages of every kind, or expenses, including court costs, reasonable attorney's fees and/or litigation expenses, and costs of claim processing and investigation, arising out of bodily injury or death of any person, or tangible or intangible property damage, caused, or alleged to be caused, in whole or in part, by the negligent or willful acts, or omissions of the Permittee, any of its directors, officers, agents, employees, or volunteers, or its contractor or subcontractors. This indemnity includes any claim or amount arising out of or recovered under the Workers' Compensation Law or arising out of the contractor's failure to conform to any federal, state or local law, statute, ordinance, rule, regulation or court decree. Permittee agrees to provide ADOT with a certificate(s) of insurance consistent with the requirements stated in the ADOT Permit Insurance Matrix. Permittee is also obligated to provide certificates for its contractor(s), if any. The required insurance shall be kept in force by the permittee and its contractors for the term of the permit and shall not expire, be cancelled or materially changed to affect coverage available to the State without thirty (30) days written notice to the State. Automobile and worker's compensation coverage requirements are dependent upon the use of employees and autos for the encroachment activity. Please refer to the Matrix to determine requirements for coverage, limits, language and other insurance related items specific to each permit. Contractor's certificates shall include all subcontractors assureds under its policies, or Contractor shall collect from each of its subcontractors a certificate that meets or exceeds the requirements for a Contractor as outlined in the Matrix. Contractor agrees to maintain and make available to ADOT all subcontractors' certificates upon demand. ADOT reserves the right to require an increase or allow a decrease in insurance limits or coverage based on the risks and financial exposure arising out of the event or activity proposed in the permit application. The Encroachment Permit is issued upon the expressed condition that ADOT and The State of Arizona does not protect or insure against loss of personal property or improvements owned by Permittee. Permittee waives the right to claim damages from ADOT and the State of Arizona for any damage resulting to said property in the event that property is damaged or destroyed by fire or any other perils that is not the direct result of negligence by ADOT or the State of Arizona.
2. Comply with Environmental Laws.
   A. Environmental Laws refers collectively to any and all federal, state, or local statute, law, ordinance, code, rule, regulation, permit, order, or decree regulating, relating to, or imposing liability or standards of conduct on a person discharging, releasing or threatening to discharge or release or causing the discharge or release of any hazardous or solid waste or any hazardous substance, pollutant, contaminant, water, wastewater or storm water, and specifically includes, but is not limited to: The Solid Waste Disposal Act, as amended by the Resource Conservation and Recovery Act; the Comprehensive Environmental Response, Compensation and Liability Act, as amended; the Toxic Substances Control Act; the Clean Water Act (CWA); the Clean Air Act; the Occupational Safety and Health Act; the Arizona Water Quality Act Revolving Fund Act, the Arizona Hazardous Waste Management Act, any applicable National Pollutant Discharge Elimination System (NPDES) or Arizona Pollution Discharge Elimination System (AZPDES) permit, any applicable CWA Section 404 permit, or any local pretreatment or environmental nuisance ordinance.
   B. Specifically agree that in the course of performing any activity for which this Permit is necessary:
      i. To comply with any and all Environmental Laws;
      ii. To ensure that no activity under this Permit shall cause ADOT to be in violation of any Environmental Laws;
      iii. That if the Permittee fails or refuses to comply with any Environmental Laws, or causes ADOT to be in violation of any Environmental Laws, ADOT may at its sole and unreviewable discretion, (1) revoke this Permit; (2) require the Permittee to undertake corrective or remedial action to address any release or threatened release or discharge of the hazardous substance, pollutant or contaminant, water, wastewater or storm water; and (3) expressly consents to entry of injunctive relief to enforce any listed remedies.
      iv. To indemnify ADOT for any losses, damages, expenses, penalties, liabilities or claims of any nature whatsoever suffered by or asserted against ADOT as a direct or indirect result of the disposal, escape, seepage, leakage, spillage, discharge, emission, or release of any hazardous waste, solid waste, hazardous substance, pollutant or contaminant, water, wastewater or storm water and losses, damages, expenses, penalties, liabilities and claims asserted or arising under the Environmental Laws, or for ADOT's costs in undertaking corrective action pursuant to an order of or settlement with a duly authorized regulatory agency or injured third party or for any penalties associated with Permittee's activities;
3. Be responsible for any repair or maintenance work and repair any aspect or condition of the encroachment that causes danger or hazard to the traveling public, for the duration of the encroachment and must perform such work under the appropriate encroachment permit authorization;
4. Comply with ADOT's traffic control standards with an ADOT approved traffic control plan;
5. Obtain written approval from the abutting property owner (and/or underlying fee owner where ADOT owns its right of way by easement) if the encroachment encroaches on abutting property owned by someone other than the permittee (and/or on underlying fee land owned by someone other than the permittee where ADOT owns its right of way by easement). In any case and at the Department's discretion; ADOT may require written approval from the abutting property owner prior to issuance of the encroachment permit.
6. ADOT reserves the right to require the permittee to perform any repairs necessary to the encroachment throughout the life of the encroachment;
7. Remove the encroachment and restore the right-of-way to its original or better condition if ADOT cancels the encroachment permit, and terminates all rights under the permit, or if the project terminates for any reason beyond ADOT's control;
8. Reimburse ADOT for costs incurred or deposit with ADOT money necessary to cover all costs incurred for activities related to the encroachment, such as inspections, restoring the right-of-way to its original or better condition, removing the encroachment, or repair encroachment to originally permitted condition and comply with ADOT's bond policy as applicable;
9. Notify a new owner to apply for an encroachment permit, as required by Arizona Administrative Rule R17-3-502(D);
10. Apply for a new encroachment permit if the use of the permitted encroachment or the use of adjoining property changes;
11. Keep a copy of the encroachment permit at the work site or site of encroachment activity;
12. Construct the encroachment according to attached Specifications, Standards and the plans approved by ADOT as part of the final permit; any changes shall be approved by ADOT prior to implementation;
13. Obtain all required permits from other government agencies or political subdivisions;
14. Remove any defective materials, or materials that fail to pass ADOT's final inspection, and replace with materials ADOT specifies.
15. Have the right to a hearing as prescribed in Arizona Administrative Code, R17-3-509 if the permit application is denied;
16. Understand that once issued, the permit is revocable and subject to modification or abrogation by ADOT at any time, without prejudice.

By accepting an approved encroachment permit, the Permittee agrees to the requirements described in the permit, to be responsible for all permit requirements, and to comply with ADOT's requirements as set out in the permit. NO WORK SHALL TAKE PLACE INSIDE THE RIGHT OF WAY WITHOUT AN APPROVED PERMIT ON SITE. I have read and understand the above requirements: Initial AH Date 6/16/14

Specifications for Permit No. 1213899

GENERAL REQUIREMENTS

GR-1 All work shall be done in accordance with current Arizona Department of Transportation Standards, Specifications, and approved plans, and administered by Mr. Barclay, Highway Operations Supervisor in Tucson.

GR-1A THE PERMITTEE SHALL NOT DEVIATE FROM THIS PERMIT OR THE APPROVED PLANS WITHOUT PRIOR WRITTEN APPROVAL FROM THE PERMITS OFFICE.

GR-2 NO WORK SHALL BEGIN PRIOR TO NOTIFICATION OF PROPER AUTHORITIES. TO SCHEDULE A PRE-CONSTRUCTION MEETING, CONTACT MR. JASON RICKETTS, PERMIT INSPECTOR AT 520-850-0469 A MIMIMUM OF 5 WORKING DAYS PRIOR TO START OF WORK AND WITHIN 3 DAYS AFTER COMPLETION FOR FINAL INSPECTION. IF MR. URBINA IS UNAVAILABLE, CONTACT MR. JIM SOLIZ, HIGHWAY OPERATIONS SUPERVISOR AT PHONE (520) 349-9849 IN TUCSON. *Failure to comply with this requirement will result in work stoppage.*

GR-3 It is the permittee's responsibility to obey all local ordinances, obtain all licenses, pay all charges, fees, and taxes and give notices necessary and incidental to the due and lawful prosecution of the work. If the permit work includes excavation, see attachment A.

GR-3a THE PERMITTEE IS RESPONSIBLE FOR COMPLIANCE WITH SECTION 404 OF THE FEDERAL CLEAN WATER ACT. OBTAINING ALL 404 PERMITS AND ANY REQUIRED STATE 401 SECTION CERTIFICATIONS IS THE RESPONSIBILITY OF THE PERMITTEE. These programs are administered by the Corps of Engineers and the Arizona Department of Environmental Quality (ADEQ) respectively. FURTHER, THE PERMITTEE IS RESPONSIBLE FOR OBTAINING AND COMPLIANCE WITH THE NECESSARY ARIZONA POLLUTION DISCHARGE ELIMINATION SYSTEM (AZPDES) PERMIT AND REQUIRED STORM WATER POLLUTION PREVENTION PLAN (SWPPP) AND APPROVALS. This program is administered by ADEQ.

Traffic shall be protected in accordance with the Manual on Uniform Traffic Control Devices (MUTCD), 2009 Edition, the Arizona Supplement to the MUTCD 2009 Edition, and the ADOT Traffic Control Design Guidelines. All signs, placement of signs and the necessity of flag persons are the responsibility of the Permittee. All flag persons shall be Arizona certified. The Arizona Supplement to the MUTCD 2009 Edition and the ADOT Traffic Control Design Guidelines are available on the Internet or from:

Arizona Department of Transportation
Engineering Records
1655 W. Jackson, Room 112F
Phoenix, Arizona 85007
Phone (602) 712-7498

GR-4a **APPROVED TCP ATTACHED HERETO AND A PART OF THIS PERMIT.**

NO WORK SHALL BEGIN UNTIL AN APPROVED TRAFFIC CONTROL PLAN STAMPED BY ADOT REGIONAL TRAFFIC ENGINEERING IS ON SITE.

GR-5 Prior to final inspection by the Highway Operations Supervisor, all surplus material shall be removed from the right-of-way, and the right-of-way left in a neat and natural state. Any existing ADOT or permitted features (i.e. fence, pipes, posts, signs, landscaping, etc.) damaged during permit work shall be repaired by the Permittee.

GR-6 The Permittee agrees to comply with state law for Underground and Overhead facilities. The Permittee shall assume full responsibility in attaining clearances from utility companies and will be responsible

for damage to any utility line. Permittee shall call BLUE STAKE AT **1-800-STAKE-IT** two (2) working days prior to any excavation. If Blue Stake is not available, the Permittee shall be responsible for contacting all utilities directly, two working days prior to any excavation. **Please provide your ADOT permit number to the blue stake operator.**

GR-7 All work shall be conducted during daylight hours unless approved by ADOT.

GR-8 The application of water to control dust shall be as deemed necessary by the inspector.

GR-9 If at any time during the performance of the work, it is determined that it will not be possible to complete the Permitted work by the expiration date, the Permittee or their representative shall submit a written request for a time extension. The request shall be submitted to the ADOT Inspector and will contain the reason for the delay and the amount of time needed.

GR-10 In case of discrepancy or conflict with documents issued with this Permit, the following are listed in the order in which they govern:

1. Permit Specifications
2. Special Provisions (when incorporated as part of the permit)
3. Project Plans
4. Standard Drawings
5. Standard Specifications

INSURANCE REQUIREMENTS

IF SUBCONTRACTORS WILL BE UTILIZED FOR WORK PERFORMED PURSUANT TO A PERMIT, IT IS THE RESPONSIBILITY OF THE ENCROACHMENT OWNER (PERMITTEE) AND THE PRIME CONTRACTOR TO VERIFY THAT EACH AND EVERY SUBCONTRACTOR WORKING PURSUANT TO THEIR PERMIT MAINTAINS VALID AND COLLECTIBLE INSURANCE CONSISTENT WITH THE REQUIREMENTS DESCRIBED IN THE CURRENT ADOT INSURANCE MATRIX ATTACHED HERETO.

MILLING ASPHALTIC CONCRETE

MA-1 Pavement milling operations shall conform to ADOT Standard Specification **202-3.03 (C).**

MA-2 Prior to placement of asphalt concrete material, the Permittee shall clean the trench of all loose material and a light coat of bituminous tack coat meeting ADOT Standard Specification **404-3.12** shall be applied to the entire milled trench including edges and vertical surfaces against which asphaltic concrete is to be placed.

PAVEMENT REPLACEMENT FOR UTILITY TRENCH

****WORK DONE UNDER THIS CATEGORY SHALL BE COORDINATED WITH THE PERMITS INSPECTOR.**

PR-1 Existing pavement shall be saw cut full depth for the trench prior to any excavation.

PR-2 Cement treated slurry backfill meeting ADOT Standard Specifications **501-3.02** and **501-3.04** shall be used in the trench crossing the roadway. Slurry shall be placed full depth of the trench up to the bottom of the existing asphaltic concrete (AC). Steel plates meeting traffic loading requirements shall be placed over the

trench and slurry allowed setting a minimum of 24 hours without disturbance. Four feet wide cold mix AC wedges shall be used to hold steel plates in place.

PR-3 Once the slurry is set, AC meeting the requirements of ADOT Standard Specification Section **409** shall be placed in the trench in lifts and properly compacted to the surface of the existing pavement. The thickness of replacement asphalt concrete shall match the existing thickness.

PR-5 Once the AC patch is completed, all affected travel lanes and shoulders where the patch was placed shall be milled in compliance with ADOT Standard Specification **202-3.03(C)** to a depth of two inches for a length of one hundred feet (fifty feet each side of patch). If the roadway is overlaid with AR-ACFC, the mill depth shall be two and one half (2-½) inches. The milled trench shall be properly cleaned and a Tack Coat placed on all surfaces, including the edges, which meet the requirements of ADOT Standard Specification **404-3.12.** The entire milled surface is then overlaid with two inches of AC meeting the requirements of ADOT Standard Specification Sections **409** and one half inch of AR-ACFC (if present) meeting the requirements of Standard Specification Section **414.**

PLAN IS NOT TO SCALE

NOTES

1. ALL SIGNS WILL BE 48" X 48" OR LARGER AND HAVE 2 FLAGS

2. ALL WORK WILL BE DONE DURING DAYLIGHT HOURS

3. JOB LOCATION IS APPROX. ¼ MILE FROM MILE POST 132 ON HWY 287

350'

VERDE LN.

100'

ARIZONA BLVD. (HWY. 287)

420' TAPER

40' SPACING BETWEEN VERTICAL PANELS

ARROW BOARD

KEEP LEFT

350'

350'

350'

RIGHT LANE CLOSED AHEAD

ROAD WORK AHEAD

RECEIVED

NOV 06 2014

TUCSON DISTRICT PERMITS

№ 1213899

ADOT
GLOBE, SAFFORD, TUCSON
REGIONAL TRAFFIC ENGINEER

APPROVED *

BY: _____

DATE: 11-05-14

*Work hours will be from 9:00am to 3:00pm.

Owner	ARIZONA WATER
Project Name	WATER LEAK
Project Number	
Prime Contractor	AZ WATER
Traffic Control Contractor	BRITE-LITE BARRICADE
Phone	(520) 836-1122
Sheet Number	1 OF 1
Date	5/18/14
Prepared By	CRAIG COLEGROVE

CERTIFICATE OF LIABILITY INSURANCE

1/1/2016

DATE (MM/DD/YYYY) 12/29/2014

THIS CERTIFICATE IS ISSUED AS A MATTER OF INFORMATION ONLY AND CONFERS NO RIGHTS UPON THE CERTIFICATE HOLDER. THIS CERTIFICATE DOES NOT AFFIRMATIVELY OR NEGATIVELY AMEND, EXTEND OR ALTER THE COVERAGE AFFORDED BY THE POLICIES BELOW. THIS CERTIFICATE OF INSURANCE DOES NOT CONSTITUTE A CONTRACT BETWEEN THE ISSUING INSURER(S), AUTHORIZED REPRESENTATIVE OR PRODUCER, AND THE CERTIFICATE HOLDER.

IMPORTANT: If the certificate holder is an ADDITIONAL INSURED, the policy(ies) must be endorsed. If SUBROGATION IS WAIVED, subject to the terms and conditions of the policy, certain policies may require an endorsement. A statement on this certificate does not confer rights to the certificate holder in lieu of such endorsement(s).

PRODUCER	Lockton Insurance Brokers, LLC 725 S. Figueroa Street, 35th Fl. CA License #0F15767 Los Angeles CA 90017 (213) 689-0065	CONTACT NAME: PHONE (A/C, No, Ext): E-MAIL ADDRESS:	FAX (A/C, No):
		INSURER(S) AFFORDING COVERAGE	NAIC #
INSURED 1348151	Arizona Water Company PO BOX 29006 Phoenix AZ 85038	INSURER A : SCF Indemnity Insurance Company	13928
		INSURER B :	
		INSURER C :	
		INSURER D :	
		INSURER E :	
		INSURER F :	

COVERAGES ARIWA01 CERTIFICATE NUMBER: 11579320 REVISION NUMBER: XXXXXXX

THIS IS TO CERTIFY THAT THE POLICIES OF INSURANCE LISTED BELOW HAVE BEEN ISSUED TO THE INSURED NAMED ABOVE FOR THE POLICY PERIOD INDICATED. NOTWITHSTANDING ANY REQUIREMENT, TERM OR CONDITION OF ANY CONTRACT OR OTHER DOCUMENT WITH RESPECT TO WHICH THIS CERTIFICATE MAY BE ISSUED OR MAY PERTAIN, THE INSURANCE AFFORDED BY THE POLICIES DESCRIBED HEREIN IS SUBJECT TO ALL THE TERMS, EXCLUSIONS AND CONDITIONS OF SUCH POLICIES. LIMITS SHOWN MAY HAVE BEEN REDUCED BY PAID CLAIMS.

INSR LTR	TYPE OF INSURANCE	ADDL INSD	SUBR WVD	POLICY NUMBER	POLICY EFF (MM/DD/YYYY)	POLICY EXP (MM/DD/YYYY)	LIMITS	
	COMMERCIAL GENERAL LIABILITY			NOT APPLICABLE			EACH OCCURRENCE	$ XXXXXXX
	CLAIMS-MADE OCCUR						DAMAGE TO RENTED PREMISES (Ea occurrence)	$ XXXXXXX
							MED EXP (Any one person)	$ XXXXXXX
							PERSONAL & ADV INJURY	$ XXXXXXX
	GEN'L AGGREGATE LIMIT APPLIES PER:						GENERAL AGGREGATE	$ XXXXXXX
	POLICY PRO-JECT LOC						PRODUCTS - COMP/OP AGG	$ XXXXXXX
	OTHER							$
	AUTOMOBILE LIABILITY			NOT APPLICABLE			COMBINED SINGLE LIMIT (Ea accident)	$ XXXXXXX
	ANY AUTO						BODILY INJURY (Per person)	$ XXXXXXX
	ALL OWNED AUTOS / SCHEDULED AUTOS						BODILY INJURY (Per accident)	$ XXXXXXX
	HIRED AUTOS / NON-OWNED AUTOS						PROPERTY DAMAGE (Per accident)	$ XXXXXXX
								$
	UMBRELLA LIAB OCCUR			NOT APPLICABLE			EACH OCCURRENCE	$ XXXXXXX
	EXCESS LIAB CLAIMS-MADE						AGGREGATE	$ XXXXXXX
	DED RETENTION $							$
A	WORKERS COMPENSATION AND EMPLOYERS' LIABILITY ANY PROPRIETOR/PARTNER/EXECUTIVE OFFICER/MEMBER EXCLUDED? (Mandatory in NH) Y/N: Y / N/A If yes, describe under DESCRIPTION OF OPERATIONS below	N/A	Y	1009629	1/1/2015	1/1/2016	X PER STATUTE / OTHER	
							E.L. EACH ACCIDENT	$ 1,000,000
							E.L. DISEASE - EA EMPLOYEE	$ 1,000,000
							E.L. DISEASE - POLICY LIMIT	$ 1,000,000

APPROVED
MAR 11 2015
ADOT - ASD
RISK MANAGEMENT

DESCRIPTION OF OPERATIONS / LOCATIONS / VEHICLES (Attach ACORD 101, Additional Remarks Schedule, may be attached if more space is required)
State of Arizona, its departments (ADOT), agencies, boards, commissions, universities and its officers, officials, agents and employees shall be named as additional insured's with respect to liability arising out of activities performed by or on behalf of the permittee or contractor, waiver of subrogation applies.

CERTIFICATE HOLDER

11579320

Arizona Department of Transportation
1221 South 2nd Ave
Tucson AZ 85713

CANCELLATION See Attachment

SHOULD ANY OF THE ABOVE DESCRIBED POLICIES BE CANCELLED BEFORE THE EXPIRATION DATE THEREOF, NOTICE WILL BE DELIVERED IN ACCORDANCE WITH THE POLICY PROVISIONS.

AUTHORIZED REPRESENTATIVE

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Client#: 4741 SANGABRI

ACORD™ CERTIFICATE OF LIABILITY INSURANCE

DATE (MM/DD/YYYY) 2/27/2015

THIS CERTIFICATE IS ISSUED AS A MATTER OF INFORMATION ONLY AND CONFERS NO RIGHTS UPON THE CERTIFICATE HOLDER. THIS CERTIFICATE DOES NOT AFFIRMATIVELY OR NEGATIVELY AMEND, EXTEND OR ALTER THE COVERAGE AFFORDED BY THE POLICIES BELOW. THIS CERTIFICATE OF INSURANCE DOES NOT CONSTITUTE A CONTRACT BETWEEN THE ISSUING INSURER(S), AUTHORIZED REPRESENTATIVE OR PRODUCER, AND THE CERTIFICATE HOLDER.

IMPORTANT: If the certificate holder is an ADDITIONAL INSURED, the policy(ies) must be endorsed. If SUBROGATION IS WAIVED, subject to the terms and conditions of the policy, certain policies may require an endorsement. A statement on this certificate does not confer rights to the certificate holder in lieu of such endorsement(s).

PRODUCER	CONTACT NAME: Liam Russell
Edgewood Partners Ins Center #0B29370 (909) 919-7880 3633 Inland Empire Blvd. #640 Ontario, CA 91764	PHONE (A/C, No, Ext): 949-417-9161 FAX (A/C, No): 949-263-0906 E-MAIL ADDRESS: liam.russell@epicbrokers.com

INSURER(S) AFFORDING COVERAGE	NAIC #
INSURER A: Arch Insurance Company	11150
INSURER B:	
INSURER C:	
INSURER D:	
INSURER E:	
INSURER F:	

INSURED
Arizona Water Company
P.O. Box 29006
Phoenix, AZ 85038-9006

COVERAGES CERTIFICATE NUMBER: REVISION NUMBER:

THIS IS TO CERTIFY THAT THE POLICIES OF INSURANCE LISTED BELOW HAVE BEEN ISSUED TO THE INSURED NAMED ABOVE FOR THE POLICY PERIOD INDICATED. NOTWITHSTANDING ANY REQUIREMENT, TERM OR CONDITION OF ANY CONTRACT OR OTHER DOCUMENT WITH RESPECT TO WHICH THIS CERTIFICATE MAY BE ISSUED OR MAY PERTAIN, THE INSURANCE AFFORDED BY THE POLICIES DESCRIBED HEREIN IS SUBJECT TO ALL THE TERMS, EXCLUSIONS AND CONDITIONS OF SUCH POLICIES. LIMITS SHOWN MAY HAVE BEEN REDUCED BY PAID CLAIMS.

INSR LTR	TYPE OF INSURANCE	ADDL INSR	SUBR WVD	POLICY NUMBER	POLICY EFF (MM/DD/YYYY)	POLICY EXP (MM/DD/YYYY)	LIMITS	
A	GENERAL LIABILITY X COMMERCIAL GENERAL LIABILITY CLAIMS-MADE X OCCUR GEN'L AGGREGATE LIMIT APPLIES PER: POLICY PRO-JECT X LOC	X	X	GWPKG0092609	03/01/2015	03/01/2016	EACH OCCURRENCE DAMAGE TO RENTED PREMISES (Ea occurrence) MED EXP (Any one person) PERSONAL & ADV INJURY GENERAL AGGREGATE PRODUCTS - COMP/OP AGG	$1,000,000 $100,000 $10,000 $3,000,000 $3,000,000 $3,000,000 $
A	AUTOMOBILE LIABILITY X ANY AUTO ALL OWNED AUTOS SCHEDULED AUTOS X HIRED AUTOS X NON-OWNED AUTOS	X	X	GWPKG0092608	03/01/2015	03/01/2016	COMBINED SINGLE LIMIT (Ea accident) BODILY INJURY (Per person) BODILY INJURY (Per accident) PROPERTY DAMAGE (Per accident)	$1,000,000 $ $ $ $
A	UMBRELLA LIAB X OCCUR X EXCESS LIAB CLAIMS-MADE DED RETENTION $			GWFXS0092604	03/01/2015	03/01/2016	EACH OCCURRENCE AGGREGATE	$10,000,000 $10,000,000 $
	WORKERS COMPENSATION AND EMPLOYERS' LIABILITY ANY PROPRIETOR/PARTNER/EXECUTIVE OFFICER/MEMBER EXCLUDED? Y/N N/A (Mandatory in NH) If yes, describe under DESCRIPTION OF OPERATIONS below						WC STATU-TORY LIMITS OTH-ER E.L. EACH ACCIDENT E.L. DISEASE - EA EMPLOYEE E.L. DISEASE - POLICY LIMIT	 $ $ $

APPROVED
MAR 04 2015
ADOT - ASD
RISK MANAGEMENT

DESCRIPTION OF OPERATIONS / LOCATIONS / VEHICLES (Attach ACORD 101, Additional Remarks Schedule, if more space is required)
State of Arizona, its departments (ADOT), agencies, boards, commissions, universities and its officers, officials, agents and employees shall be named as additional insured's with respect to liability arising out of activities performed by or on behalf of the permittee or contractor. Wavier of subrogation applies.

CERTIFICATE HOLDER
Arizona Dept. of Transportation
& The State of Arizona
2082 E. Highway 70
Safford, AZ 85546

CANCELLATION
SHOULD ANY OF THE ABOVE DESCRIBED POLICIES BE CANCELLED BEFORE THE EXPIRATION DATE THEREOF, NOTICE WILL BE DELIVERED IN ACCORDANCE WITH THE POLICY PROVISIONS.

AUTHORIZED REPRESENTATIVE

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1213899

ELLIS-4 OP ID: ME

CERTIFICATE OF LIABILITY INSURANCE

DATE (MM/DD/YYYY): 12/30/14

THIS CERTIFICATE IS ISSUED AS A MATTER OF INFORMATION ONLY AND CONFERS NO RIGHTS UPON THE CERTIFICATE HOLDER. THIS CERTIFICATE DOES NOT AFFIRMATIVELY OR NEGATIVELY AMEND, EXTEND OR ALTER THE COVERAGE AFFORDED BY THE POLICIES BELOW. THIS CERTIFICATE OF INSURANCE DOES NOT CONSTITUTE A CONTRACT BETWEEN THE ISSUING INSURER(S), AUTHORIZED REPRESENTATIVE OR PRODUCER, AND THE CERTIFICATE HOLDER.

IMPORTANT: If the certificate holder is an ADDITIONAL INSURED, the policy(ies) must be endorsed. If SUBROGATION IS WAIVED, subject to the terms and conditions of the policy, certain policies may require an endorsement. A statement on this certificate does not confer rights to the certificate holder in lieu of such endorsement(s).

PRODUCER
Hill & Usher LLC
Insurance. Bonds. Benefits.
3033 North 44th Street, #300
Phoenix, AZ 85018
Richard B. Usher
Phone: 602-956-4220
Fax: 602-956-4418

CONTACT NAME: Commercial Service Team
PHONE (A/C, No, Ext): 800-956-4220 FAX (A/C, No): 602-956-4418
E-MAIL ADDRESS: doccontrol@hillusher.com

INSURER(S) AFFORDING COVERAGE	NAIC #
INSURER A: Travelers Property Casualty Co	25674
INSURER B:	25615
INSURER C:	
INSURER D:	
INSURER E:	
INSURER F:	

INSURED
Ellison Mills Contracting, LLC
3152 North Lear #2
Casa Grande, AZ 85122-8146

COVERAGES CERTIFICATE NUMBER: REVISION NUMBER:

THIS IS TO CERTIFY THAT THE POLICIES OF INSURANCE LISTED BELOW HAVE BEEN ISSUED TO THE INSURED NAMED ABOVE FOR THE POLICY PERIOD INDICATED. NOTWITHSTANDING ANY REQUIREMENT, TERM OR CONDITION OF ANY CONTRACT OR OTHER DOCUMENT WITH RESPECT TO WHICH THIS CERTIFICATE MAY BE ISSUED OR MAY PERTAIN, THE INSURANCE AFFORDED BY THE POLICIES DESCRIBED HEREIN IS SUBJECT TO ALL THE TERMS, EXCLUSIONS AND CONDITIONS OF SUCH POLICIES. LIMITS SHOWN MAY HAVE BEEN REDUCED BY PAID CLAIMS.

INSR LTR	TYPE OF INSURANCE	ADDL INSR	SUBR WVD	POLICY NUMBER	POLICY EFF (MM/DD/YYYY)	POLICY EXP (MM/DD/YYYY)	LIMITS	
A	GENERAL LIABILITY [X] COMMERCIAL GENERAL LIABILITY [ ] CLAIMS-MADE [X] OCCUR GEN'L AGGREGATE LIMIT APPLIES PER: [ ] POLICY [X] PRO-JECT [ ] LOC	X	X	DTCO3782X324-TIL-14	12/31/14	12/31/15	EACH OCCURRENCE DAMAGE TO RENTED PREMISES (Ea occurrence) MED EXP (Any one person) PERSONAL & ADV INJURY GENERAL AGGREGATE PRODUCTS - COMP/OP AGG	$ 1,000,000 $ 300,000 $ 5,000 $ 1,000,000 $ 2,000,000 $ 2,000,000 $
A	AUTOMOBILE LIABILITY [X] ANY AUTO [ ] ALL OWNED AUTOS [ ] SCHEDULED AUTOS [X] HIRED AUTOS [X] NON-OWNED AUTOS	X	X	DT8103079X038-TIL-14	12/31/14	12/31/15	COMBINED SINGLE LIMIT (Ea accident) BODILY INJURY (Per person) BODILY INJURY (Per accident) PROPERTY DAMAGE (Per accident)	$ 1,000,000 $ $ $ $
	[ ] UMBRELLA LIAB [ ] OCCUR [ ] EXCESS LIAB [ ] CLAIMS-MADE [ ] DED [ ] RETENTION $						EACH OCCURRENCE AGGREGATE	$ $ $
A	WORKERS COMPENSATION AND EMPLOYERS' LIABILITY ANY PROPRIETOR/PARTNER/EXECUTIVE OFFICER/MEMBER EXCLUDED? Y/N [N] (Mandatory in NH) If yes, describe under DESCRIPTION OF OPERATIONS below	N/A	X	DTJUB3079X038-14	12/31/14	12/31/15	[X] WC STATU-TORY LIMITS [ ] OTH-ER E.L. EACH ACCIDENT E.L. DISEASE - EA EMPLOYEE E.L. DISEASE - POLICY LIMIT	$ 1,000,000 $ 1,000,000 $ 1,000,000
B	Equipment Floater			QT6606096X643	12/31/14	12/31/15	LSD/RNT DED	1,000,000 2,500

APPROVED
JAN 09 2015
ADOT - ASD
RISK MANAGEMENT

DESCRIPTION OF OPERATIONS / LOCATIONS / VEHICLES (Attach ACORD 101, Additional Remarks Schedule, if more space is required)
RE: PERMIT. ADDITIONAL INSURED FORMS CG D247 & CA T301. WAIVER OF SUBROGATION FORMS CG D316, CA T353 & WC 000313 ATTACHED.

CERTIFICATE HOLDER
AZDEPA1
ARIZONA DEPT OF TRANSPORTATION
1221 S 2ND AVE MAIL DROP T100
TUCSON, AZ 85713-1602

CANCELLATION
SHOULD ANY OF THE ABOVE DESCRIBED POLICIES BE CANCELLED BEFORE THE EXPIRATION DATE THEREOF, NOTICE WILL BE DELIVERED IN ACCORDANCE WITH THE POLICY PROVISIONS.

AUTHORIZED REPRESENTATIVE
Richard B. Usher

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Attachment "A"

Archaeological Clearance Notification

Cultural survey specifications and responsibilities:
In accordance with the Arizona State Historic Preservation Act, ADOT must consider the effects of its actions, including the issuance of permits, on historic properties. It is the Permittee's responsibility to obtain documents indicating that the proposed permit would not affect historic properties or, if it would affect such properties, to provide documentation attesting to the mitigation of those effects, prior to beginning excavation work within ADOT Rights of Ways. Such documentation may include concurrence on the effect from the State Historic Preservation Office or a data recovery plan approved by the Arizona State Museum (in the case of mitigative data recovery).

Archaeological Features:
The attention of the Permittee is directed to the Arizona Revised Statutes §41-841 through 846 and §41-861 through 865. Violation of A.R.S §41-841 through 845 is a Class 2 misdemeanor. Violation of A.R.S. §41-861 through 865 can be classified as either a Class 1 misdemeanor or a Class 5 felony.

Section 6(a) of the Federal Archaeological Resources Protection Act of 1979 specifies that no person may excavate, remove, damage or otherwise alter or deface any archaeological resource located on public (Federal) lands or Indian lands unless such activity is pursuant to a permit issued under Section 4 of the Act. Violations of this act are considered a felony, and are punishable by fine and imprisonment.

Although the permittee will be responsible to make every effort prior to construction to identify all cultural resources in a permit area, previously unidentified archaeological materials could be found during the construction of the permit. When historic or archaeological features are encountered or discovered during any activity related to construction of the permit, the permittee shall stop work immediately at that location, and shall take all reasonable steps to secure the preservation of those features.

The permittee shall immediately contact ADOT's Historic Preservation Team, listed below and the ADOT District Permits Office that issued the permit and make arrangements for the proper treatment of such resources. The permittee shall not resume work until he/she is so directed by the Arizona Department of Transportation.

Environmental Planning Group
Linda Davis, Historic Preservation Team Leader
1611 W. Jackson St. EM02
Phoenix, AZ 85003
Telephone 602-712-8636 (voice)
602-712-3066 (FAX)
ldavis2@azdot.gov

202-3.03 Removal of Pavement:
(A) Portland Cement Concrete Pavement:
Unless otherwise specified in the Special Provisions, concrete pavement designated on the project plans to be removed shall either be removed from the job site and disposed of at a site secured by the contractor or buried in embankment areas. If the contractor elects to bury the concrete in embankment areas, the concrete shall be broken into pieces and placed in the embankment in accordance with the requirements of Subsection 203-10.03(A). Where new construction is to join the existing concrete pavement, the pavement shall be saw cut to a true line perpendicular to the centerline of the pavement with straight vertical edges free from irregularities.

SECTION 202 REMOVAL OF STRUCTURES AND OBSTRUCTION:

(B) Bituminous Pavement:
Unless milling is specified in the Special Provisions, all bituminous pavement designated on the project plans to be removed, shall be completely removed down to the underlying base course or subgrade. The pavement material shall be removed and disposed of as specified in the Special Provisions. Where new construction is to join existing bituminous pavement, the existing pavement shall be cut to a true line perpendicular to the centerline of the pavement with straight vertical edges free from irregularities. The removal of asphaltic concrete at the approaches to structures shall be accomplished in a manner approved by the Engineer.

(C) Bituminous Pavement Removal By Milling:
When milling is specified, the existing asphaltic concrete shall be removed in accordance with the details shown on the project plans with equipment specifically designed to remove such material by means of grinding or chipping to a controlled line and grade. The equipment used shall be capable of removing the existing asphaltic concrete within 0.01 feet of the specified removal depth. The removal shall be accomplished in a manner which does not destroy the integrity of any asphaltic concrete pavement that remains and which does not result in a contamination of the milled asphaltic concrete with the underlying base material. The milled material shall be removed and disposed of as specified in the Special Provisions. Under no circumstance shall the removal of existing asphaltic concrete begin until the mix design for replacement asphaltic concrete has been approved by the Engineer. The extent of removal of existing asphaltic concrete must be in keeping with the contractor's ability to produce, haul, place and compact replacement asphaltic concrete so that at all times the length of open "trench" is at a minimum. If the contractor's production of replacement asphaltic concrete is stopped for any reason, the removal of asphaltic concrete shall either cease or shall be reduced. The Engineer will be the sole judge as to whether the removal shall cease or be reduced. The Engineer's decision will be based on the reason for the stoppage in asphaltic concrete production, the expected length of the stoppage, the type and depth of the material being removed, and the time of day. Replacement asphaltic concrete shall be placed as soon as possible after the "trench" has been opened up. The surface on which the material is to be placed shall be uniform and free of loose material. Any exposed base material shall be compacted to the extent required by the Engineer. The "trench" in which asphaltic concrete is being placed shall be filled before the end of each day's work and the lane shall be opened to

traffic. The length of open "trench" at any one time shall not exceed two miles or half the length of the work, whichever is the lesser. In the event of circumstances beyond the control of the contractor, such as equipment breakdown, or if the production of the replacement asphaltic concrete has been stopped by the Engineer and the contractor is unable to comply with the requirements in the preceding paragraph, the contractor shall provide and maintain such traffic control devices that the Engineer deems necessary under the circumstances in order to provide safe and efficient passage through the work zone. If the Engineer deems it to be warranted, the Engineer will require that the contractor provide for the surface drainage of areas where the pavement surface has temporarily been removed. Pavement, to be removed by milling, adjacent to manholes, valve boxes, small radius curbs and other fixed objects that produce confined areas shall be removed with milling equipment specifically designed to operate in restricted areas and capable of removing asphaltic concrete of the specified thickness without damage or displacement of the adjacent object. On projects with existing curb and gutter, any asphaltic concrete buildup in the gutter designated to be removed, shall be removed prior to the pavement removal operation by equipment and methods approved by the Engineer. The equipment and methods used shall be capable of removing the asphaltic concrete buildup without causing damage to the curb and gutter.

Permit #1213899

404-3.12 Tack Coat:

Tack coat shall be applied prior to placing a bituminous mixture on a primed surface, an existing bituminous surface, or an existing Port land cement concrete pavement surface. Tack coat shall also be applied between layers of bituminous mixtures.
The material to be used for bituminous tack coat will be specified by the Engineer and shall conform to the requirements of Sect ion 1005.

The type, grade or designation, and the rate of application for the specific usage will be specified by the Engineer. The following table shows the various types of material from which the Engineer may select the tack coat and the approximate application rates:

Type, Grade or Designation	**Approximate Application Rates: Gallons / Square Yard**		**Payment Factor**
	Prior to Placing ACFC, AR-ACFC, or AR-AC	**All Other Tack Coats**	
Emulsified Asphalt (Special Type)		0.12	0.7
Emulsified Asphalt (Other than Special Type)		0.08	1.0
Asphalt Cement (Grade Specified by Engineer)	0.06 to 0.08	0.06	1.0

If emulsified asphalt of any designation or type is used, it shall have broken before asphaltic concrete is placed. If emulsified asphalt of any designation or type is held over night, it shall be reheated and agitated prior to further application.

The Engineer may either reduce the rate to be applied or, except as specified below, eliminate the use of tack coat in any part of the work if, in the Engineer's judgment, the bituminous mixture to be placed will be effectively bonded to the underlying surface. For asphaltic concrete friction course, asphaltic concrete friction course (asphalt - rubber), or asphaltic concrete (asphalt - rubber), application of asphalt cement tack coat immediately prior to placing such pavements shall not be eliminated, although the Engineer may adjust the application rate within the above stated limits.

Bituminous material shall be applied only as far in advance of the placement of the bituminous mixed materials as is necessary to obtain the proper condition of tackiness. In no event shall more bituminous material be applied in one day than will be covered by bituminous mixed materials during that same day.

501-3.02 Bedding:

(A) Bedding Material:

(1) General:

Bedding material for all pipe shall conform to the following aggregate gradation:

Sieve Size	Percent Passing
1-1/2 inch	100
1 inch	90 - 100
No. 8	35 – 80
No. 200	0 - 8.0

The plasticity index of the bedding material for all pipe shall not exceed 8 when tested in accordance with the requirements of AASHTO T 90.

Bedding material for all pipe shall have a value of resistivity not less than 2,000 ohm-centimeters unless otherwise specified or approved by the Engineer. Bedding material shall have a pH value between 6.0 and 10.0, inclusive, for all metal pipe installations except aluminum. Bedding material for aluminum pipe installations shall have a pH value between 6.0 and 9.0, inclusive. Bedding material shall have a pH value between 6.0 and 12.0, inclusive, for all concrete or plastic pipe installations. Tests for pH and resistivity shall be in accordance with the requirements of Arizona Test Method 236.

(2) Standard Aggregate Bedding Material:

Standard bedding material shall conform to the aggregate requirements here-in-before specified and may be compacted, jetted or placed as an aggregate slurry as herein specified.

The maximum water content in an aggregate slurry mixture shall be 35 gallons of water per ton of bedding material. Unless otherwise approved by the Engineer, the slurry shall be compacted with internal vibrators in accordance with the requirements of Subsection 601-3.03(D). Aggregate slurry shall be thoroughly mixed in a mixer approved by the Engineer.

(3) Cement-Treated Slurry Bedding Material:

When pipe culverts or storm drains 36 inches in diameter or larger are placed in a trench, the bedding material from bottom of pipe to springline shall be a cement-treated slurry. Cement-treated slurry bedding material shall conform to the gradation specified for bedding material under Subsection 501-3.02(A)(1) and additionally shall have a cement content of one sack per cubic yard. Cement-treated slurry shall be thoroughly mixed in a mixer or at a central batch plant as approved by the Engineer and shall have a slump of eight to 11 inches.

(B) Placement of Bedding Material:

(1) General:

All trash, forms, sheeting, bracing, and loose rock or loose earth shall be removed from the area into which bedding material is to be placed. Bedding material shall be placed under and around the pipe to the elevation at the point of maximum width of the pipe (springline), as shown on the plans. At the contractor's option, bedding material may be placed above the springline of the pipe.

Bedding material shall be placed in a manner which will prevent distortion, damage to, or displacement of the pipe from its intended location. Bedding material shall also be placed so that adequate support will be provided in the haunch support areas for the pipe. Voids or loose soils which are found to occur due to improper placement or compaction of bedding materials will result in rejection of that portion of the pipe installation. Replacement of the pipe will be at no additional cost to the Department.

(2) Standard Aggregate Bedding Material:

Standard aggregate bedding material shall be placed either in uniform horizontal layers not exceeding eight inches in depth before compaction or in uniform horizontal layers not exceeding four feet in depth when placed as a slurry. Bedding material may also be placed in uniform horizontal layers not exceeding four feet in depth when compaction is done by jetting.

(3) Cement-Treated Slurry Bedding Material:

Cement-treated slurry bedding material shall be placed in a uniform manner that will prevent voids in, or segregation of, the bedding material, and will not float or shift the culvert or pipe. Cement-treated slurry bedding material shall be placed from bottom of pipe to pipe springline. No backfilling above the cement-treated slurry shall be commenced until 24 hours after the cement-treated slurry has been placed.

(C) Compaction of Bedding Material:

(1) General:

Compaction of bedding material shall be performed without damage to the pipe and surrounding in-place material. Special care shall be taken in placing, shaping and compacting all bedding material under haunches of pipe to prevent moving the pipe or raising it from its bedding.

(2) Standard Aggregate Bedding Materials:

Standard aggregate bedding material shall be compacted to at least 95 percent of the maximum density determined in accordance with the requirements of the applicable test methods of the ADOT Materials Testing Manual, as directed and approved by the Engineer.

When standard aggregate bedding material is placed as an aggregate slurry or compacted by jetting, the material placed below the springline of the pipe shall be compacted prior to placement of material above the springline of the pipe.

Jetting shall not be used for any material placed more than one foot above the top of the pipe.

Ponding will not be permitted in any case.

Jetting shall be done in such a manner that water will not be impounded. Jetting methods shall be supplemented by the use of vibratory or other compaction equipment when necessary to obtain the required compaction. Bedding material compacted by jetting shall use the least amount of water that will properly consolidate the material and move the material under the pipe to eliminate voids. A jetting probe shall be inserted into the material. It shall be of such length as to reach the material under the pipe. Water shall be provided to the jetting probe at a minimum pressure of 30 pounds per square inch. The jetting probe shall be inserted at uniformly spaced intervals on both sides of the pipe, a maximum spacing of three feet.

The contractor shall excavate holes in the compacted aggregate slurry or jetted beddingmaterial to the depths and at the locations designated by the Engineer. These holes shallbe of such size as to allow the required density testing to be performed in a safe manner. Upon completion of the tests, the contractor shall refill the excavated areas and compact the material to the required density in a manner satisfactory to the Engineer.

(3) Cement-Treated Slurry Bedding Material:

Cement-treated slurry bedding material shall not require additional compaction after placement up to pipe springline if it meets the material requirements of Subsection 501-3.02(A) and is placed as outlined in Subsection 501-3.02(B). The Engineer may require the use of vibrators with cement-treated slurry bedding if the fluidity of the mixture is not sufficient to fill all voids. No density tests will be required in the cement-treated slurry bedding material as placed up to pipe springline.

501-3.04 Backfilling and Compacting:

(A) Backfill Material:

(1) Pipe Backfill:

Pipe backfill material shall be selected from excavation or from a source selected by the contractor. It shall not contain frozen lumps, stones larger than three inches in diameter, chunks of clay or other objectionable material. Backfill material to be used for pipes, pipe-arches or arches made of metal shall have a value of resistivity not less than 2,000 ohm-centimeters or the value shown on the project plans. When resistivity is not shown on the plans, the backfill material shall have a value of resistivity not less than that of the existing in-place material or 2,000 ohm-centimeters, whichever is less. Backfill material shall have a pH value between 6.0 and 10.0, inclusive, for all metal pipe installations, except aluminum. Backfill material for aluminum pipe installations shall have a pH value between 6.0 and 9.0, inclusive. Backfill material shall have a pH value between 6.0 and 12.0, inclusive, for all concrete or plastic pipe installations. Tests for pH and resistivity shall be in accordance with the requirements of Arizona Test Method 236.

Pipe backfill material shall conform to the following gradation:

Sieve Size	Percent Passing
3 inch	100
3/4 inch	60 - 100
No. 8	35 - 80
No. 200	0 - 12.0

The plasticity index shall not exceed 12 when tested in accordance with the requirements of AASHTO T 90.

As an alternate, pipe backfill may conform to the material requirements listed for bedding material as specified in Subsection 501-3.02(A), for standard aggregate bedding material or cement-treated slurry bedding material.

(2) Trench Backfill:

Trench backfill material shall not contain organic material, rubbish, debris and other deleterious material and shall not contain solid material which exceeds eight inches in greatest dimension and shall be soil selected from excavation or from a source selected by the contractor.

As an alternate, trench backfill may conform to the material requirements listed for bedding material as specified in Subsection 501-3.02(A) for standard aggregate bedding material or cement-treated slurry bedding material.

(3) Slope Plating:

The roadway slope at the inlet ends of pipe culverts shall be plated with an impervious material. The plating material shall be a fine-grained, cohesive material with at least 50 percent of it passing the No. 40 sieve and with a plasticity index of at least 10 and shall be placed as shown on the plans. The plasticity index will be determined in accordance with the requirements of AASHTO T 90.

(B) Placement of Backfill Material:

(1) General:

All trash, forms, sheeting, bracing, and loose rock or loose earth shall be removed from the areas to be backfilled before backfill material is placed.

Backfill compacted by pneumatic or mechanical tamping devices, shall be placed in layers not more than eight inches in depth before compaction.

Pipe backfill shall be brought up evenly on both sides of the pipe for the full length to an elevation one foot above the top of the pipe.

Trench backfill shall be placed from one foot above the top of the pipe to the elevation at which base or surfacing materials are to be placed or to the top of the trench. Backfill material shall be placed around and over arches in accordance with the requirements of Section 502.

(2) Standard Aggregate Slurry:

Pipe backfill or trench backfill mixed as a standard aggregate slurry shall be placed in uniform horizontal layers not exceeding four feet in depth. The slurry shall be compacted with internal vibrators in accordance with the requirements of Subsection 601-3.03(D).

(3) Cement-Treated Slurry:

Cement-treated slurry pipe backfill placement above springline shall not commence within 24 hours of the placement of the underlying cement-treated bedding material below springline. Cement-treated pipe backfill shall be placed in a uniform manner that will prevent voids in or segregation of the backfill to an elevation one foot above the top of the pipe. No backfilling above the cement-treated slurry pipe backfill shall be commenced until 24 hours after the cement-treated slurry has been placed.

If cement-treated slurry bedding material is used for trench backfill, it shall not be disturbed or loaded in any manner within 24 hours of placement as above.

(C) Compaction of Backfill Material:

Backfill material shall be compacted to at least 95 percent of the maximum density determined in accordance with the requirements of the applicable test methods of the ADOT Materials Testing Manual, as directed and approved by the Engineer.

Jetting shall not be used to compact pipe backfill, trench backfill or any material placed more than one foot above the top of the pipe.

Ponding will not be allowed in any case.

If trench backfill or pipe backfill is placed as an aggregate slurry, the contractor shall excavate holes in the compacted slurry to the depths and at the locations designated by the Engineer. These holes shall be of such size as to allow the required density tests to be performed in a safe manner. Upon completion of the tests, the contractor shall refill the excavated areas and compact the material to the required density in a manner satisfactory to the Engineer.

Cement-treated slurry bedding material for pipe backfill shall not require additional compaction after placement up to an elevation one foot above the top of pipe if it meets the material requirements of Subsection 501-3.02(A) and is placed and compacted as outlined in Subsection 501-3.04(B) and (C). No density tests will be required in the cement-treated slurry bedding material when it is utilized for pipe backfill to an elevation one foot above the top of pipe.

Cement-treated slurry bedding material used for trench backfill shall meet the requirements listed above for pipe backfill up to the elevation which it is placed.

SECTION 409 ASPHALTIC CONCRETE (MISCELLANEOUS STRUCTURAL):

409-1 Description:

Asphaltic concrete shall consist of furnishing all materials, mixing, hauling, and placing a mixture of aggregates, mineral admixture, and bituminous material to form a pavement course or to be used for other specified purposes, in accordance with the details shown on the project plans and as directed by the Engineer.

The contractor may propose the use of a mix design that has been developed for a previous project. The contractor shall provide evidence that the asphalt cement and mineral admixture type and source of supply, and the source and methods of producing mineral aggregate, have not changed since the formulation of the previous mix design. The contractor shall also provide cur rent test results for all specified characteristics of the mineral aggregate proposed for use. The Engineer will determine if t he previously used mix design is suitable for the intended use. The Engineer will either approve or disapprove the proposed mix design. Should the Engineer disapprove the use of the previously used mix design, the contractor shall prepare and submit a new mix design proposal in accordance with the requirements of these specifications.

A previously used mix design older than two years from the date it was formulated, sealed, signed, and dated shall not be allowed for use. Any previously used mix design that is older than one year, but less than two years, shall not be allowed for use unless the contractor provides verification testing results. Such testing shall be a one-point verification at the design asphalt content utilizing the proposed mineral aggregate, asphalt cement, and mineral admixture. Once approved for use on a project, a mix design may be used for the duration of the project.

409-2 Materials:

409-2.01 Mineral Aggregate:

Mineral aggregate shall conform to the following requirements when tested in accordance with the applicable test methods.

Mineral Aggregate Characteristics	Test Method	Requirement
Combined Bulk Oven Dry Specific Gravity	Arizona Test Method 251	2.350 - 2.850
Combined Water Absorption	Arizona Test Method 251	0 - 2.5%
Abrasion	AASHTO T 96	100 Rev., Max 9% 500 Rev., Max 40%
Sand Equivalent	AASHTO T 176 (After thoroughly sieving the sample, no additional cleaning of the fines from the plus No. 4 material is required.)	Minimum 55
Fractured Coarse Aggregate Particles	Arizona Test Method 212	Minimum 70% (plus No. 4 material)

The gradation will be determined in accordance with Arizona Test Method 201, and shall conform to the requirements given below.

Mix Design Grading Limits				
	Percent Passing			
Sieve Size	Lift Thickness Less Than or Equal to Two Inches		Lift Thickness Greater Than Two Inches	
	Without Admixture	With Admixture	Without Admixture	With Admixture
1 Inch			100	100
3/4 Inch	100	100	90 - 100	90 - 100
1/2 Inch	90 – 100	90 - 100 -- -	---	---
3/8 Inch	70 – 85	70 - 85	70 - 85	70 - 85
No. 8	41 – 51	42 - 52	41 - 51	42 - 52
No. 200	2.0 - 5.0	3.0 - 6.5	2.0 - 5.0	3.0 - 6.5

409-2.02 Bituminous Material:
Asphalt cement shall be a performance grade (PG) asphalt binder conforming to the requirements of Section 1005. The type of asphalt binder shall be as shown in the Special Provisions.

The percent of asphalt cement used shall be based on the weight of total mix (asphalt cement, mineral aggregate, and mineral admixture).

The contractor shall provide the laboratory mixing and compaction temperature ranges to the mix design laboratory for each PG asphalt binder used for mix design purposes. The laboratory mixing temperature range is defined as the range

of temperatures where the un-aged asphalt binder has a rotational viscosity of 0.17 ± 0.02 Pascal ·seconds, measured in accordance with AASHTO T 316. The laboratory compaction temperature range is defined as the range of temperatures where the un-aged asphalt binder has a rotational viscosity of 0.28 ± 0.03 Pascal ·seconds, measured in accordance with AASHTO T 316. The testing required in AASHTO T 316 shall be performed at 275 degrees F and 350 degrees F, and a viscosity- temperature curve developed in accordance with ASTM D 2493. The viscosity- temperature curve shall be included in the mix design report. For PG asphalt binders that have a maximum laboratory mixing temperature exceeding 325 degrees F or a maximum laboratory compaction temperature exceeding 300 degrees F, the laboratory mixing and compaction temperature ranges shall be specified in writing by the asphalt binder supplier . The laboratory mixing and compaction temperature ranges, as well as the actual laboratory mixing and compaction temperatures used, shall be reported on the mix design. The contractor shall ensure that the asphalt binder supplier information required in this paragraph is provided to all appropriate parties in a timely manner, and that copies are included in the mix design report. The laboratory mixing and compaction temperatures are for mix design purposes only. Field mixing and compaction temperatures are specified in Subsection 409-3.

409-2.03 Mineral Admixture:

Mineral admixture shall be either Portland cement, blended hydraulic cement, or hydrated lime conforming to the following requirements:

Material	Requirement
Port land Cement, Type I or II	ASTM C 150
Blended Hydraulic Cement,	ASTM C 595

Type IP	
Hydrated Lime	ASTM C 1097

The mineral admixture content shall be 2.0 percent, by weight, of the mineral aggregate. However, a minimum of 1.0 percent mineral admixture may be used if the contractor submits test information showing a lowered percentage of mineral admixture produces mix design results for Index of Retained Strength of at least 60 percent and a Minimum Wet Strength of 150 psi when tested in accordance with Arizona Test Method 802.

A Certificate of Analysis conforming to the requirements of Subsection 106.05 of the Standard Specifications shall be submitted.

409-2.04 Mix Design:

Utilizing mineral aggregate which has been crushed, processed, separated and stockpiled, a mix design shall be formulated and submitted by the contractor to the Engineer. The mineral aggregate samples used for mix design purposes shall be representative of aggregate materials to be used during production.

The mix design shall be based on the mix design criteria and other requirements specified herein, utilizing asphalt cement and mineral admixture of the type and from the sources proposed for use in the production of asphaltic concrete.

The mix design shall be prepared under the direct supervision of a professional engineer experienced in the development of mix designs and mix design testing. The mix design shall be provided in a format that clearly indicates all the mix design requirements and shall be sealed, signed, and dated by the mix design engineer.

The mix design shall be prepared by a mix design laboratory that has met the requirements of the Department's "System for the Evaluation of Testing Laboratories". The requirements may be obtained from ADOT Materials Group, 1221 North 21st Avenue, Phoenix, Arizona 85009.

Test results used in the formulation of the mix design must be from testing performed no earlier than 45 days prior to the date the mix design is signed by

the mix design engineer. Historical abrasion values may be supplied on sources provided the testing was conducted within the past two years.

The mix design shall be submitted to the Engineer under a cover letter signed by an authorized representative of the contractor.

The mix design shall be submitted to the Engineer for review a minimum of five working days prior to the start of production.

The mix design shall meet the following criteria when tested in accordance with the requirements of the following test methods:

Criteria	Requirement	Arizona Test Method
1. Voids in Mineral Aggregate: %, Range	14.5 - 18.5	815
2. Effective Voids: %, Range	5.5 - 6.5	815
3. Absorbed Asphalt : %, Range	0-1.0	815

The Engineer reserves the right to adjust the asphalt content during production from the mix design value without additional compensation to the contractor in order to obtain desirable effective voids. The Engineer may waive the requirements for a mix design if the intended use of the material is temporary in nature.

409-2.05 Sampling and Testing:

Sampling and testing the materials or mixture for quality control purposes shall be the contractor's responsibility. The Engineer reserves the right to sample and test the materials and mixture when necessary to determine that they reasonably conform to the requirements specified herein.

409-3 Construction Requirements:

409-3.01 General:

All courses of asphaltic concrete shall be compacted as required, smooth and true to the required lines, grades, and dimensions. The following smoothness requirements shall be met:

(1) The surface of the final lift of asphaltic concrete placed under this section of the specifications shall be tested and shall not vary by more than 1/8 inch from the lower edge of a ten-foot straightedge when it is placed in the longitudinal direction (including across transverse joints), and when it is placed in the transverse direction across longitudinal joints.

(2) The surface of any lift of asphaltic concrete placed under this section of the specifications, other than the final lift, shall be tested and shall not vary by more than 1/4 inch from the lower edge of a ten-foot straightedge when it is placed in the longitudinal direction (including across transverse joints), and when it is placed in the transverse direction across longitudinal joints.

(3) All deviations exceeding the specified tolerances above shall be corrected by the contractor, to the satisfaction of the Engineer.

The asphaltic concrete hot plant shall conform to the requirements of Section 403 of the Specifications.

No fine material which has been collected in the dust collection system shall be returned to the mixture unless the collected fines are accurately and uniformly metered into the mixture.

The temperature of asphaltic concrete or mineral aggregate upon discharge from the drier shall not exceed 325 degrees F, unless a higher temperature is recommended in writing by the asphalt binder supplier and approved by the Engineer.

The moisture content of the asphaltic concrete immediately behind the paver shall not exceed 0.5 percent. The moisture content will be determined in accordance with the requirements of Arizona Test Method 406.

Asphaltic concrete shall be placed only when the temperature of the surface on which the asphaltic concrete is to be placed is at least 65 degrees F.

At any time, the Engineer may require that the work cease or that the work day be reduced in the event that weather conditions, either existing or expected, are anticipated to have an adverse effect upon the asphaltic concrete.

All wheels and tires of compactors and other equipment surfaces shall be treated when necessary with a product approved by the Engineer in order to prevent the sticking of asphaltic concrete.

Asphaltic concrete immediately behind the laydown machine shall be a minimum of 250 degrees F.

Just prior to being placed, the asphaltic concrete shall be in a thoroughly mixed condition, free of lumps and crusts and at such a temperature as to be in a free flowing, workable condition. All courses of asphaltic concrete shall be placed and finished by means of self -propelled paving machines except under certain conditions or at certain locations where the Engineer deems the use of self – propelled paving machines impractical.

Pavers shall be equipped with a screed for the full width being paved, heated if necessary, and capable of spreading and finishing all courses of asphaltic concrete.

Pavers shall be equipped with automatic screed controls with sensors for either or both sides of the paver, capable of sensing grade from an outside reference line, sensing the transverse slope of the screed, and providing the automatic signals which operate the screed to maintain the desired grade and transverse slope.

Failure of the control system to function properly shall be cause for the suspension of the placing of asphaltic concrete.

The base or subgrade upon which asphaltic concrete is to be placed shall be prepared and maintained in a firm condition until asphaltic concrete is placed. It shall not be frozen or excessively wet. Before asphaltic concrete is placed, the surface to be paved shall be cleaned of objectionable material and tacked in accordance with the requirements of Subsection 404-3.12.

Longitudinal joints of each course shall be staggered a minimum of one foot with relation to the longitudinal joint of any immediate underlying course. Longitudinal joints shall be located within one foot of the center of a lane or within one foot of the centerline between two adjacent lanes.

The contractor shall schedule its paving operations to minimize exposed longitudinal edges. Unless otherwise approved by the Engineer, the contractor shall limit the placement of asphaltic concrete courses, in advance of adjacent courses, to one shift of asphaltic concrete production. The contractor shall schedule its paving operations in such a manner to eliminate exposed longitudinal edges over weekends or holidays.

409-3.02 Compaction:

Compaction shall consist of an established sequence of coverage using specified types of compactors. A pass shall be defined as one movement of a compactor in either direction. Coverage shall be the number of passes as are necessary to cover the entire width being paved.

The rolling sequence, the type of compactor to be used and the number of coverages required shall be as follows:

Rolling Sequence	Type of Compactor		Number of Coverages	
	Option No. 1	Option No. 2	Option No. 1	Option No. 2
Initial	Static Steel	Vibrating Steel	1	1
Intermediate	Pneumatic Tired	Vibrating Steel	2 – 6*	2 – 4*

Finish	Static Steel	Static Steel	1 - 3	1 - 3
* Based on the roller pattern which exhibits the best performance.				

The Engineer shall select the option for compaction and, when pneumatic- tired compactors are used, will designate the tire pressure.

Steel wheel compactors shall not be used in the vibratory mode for courses of one inch or less in nominal thickness nor when the temperature of the asphaltic concrete falls below 180 degrees F. Steel wheel compactors shall weigh not less than eight tons.

Initial and intermediate compaction shall be completed before the temperature of the asphaltic concrete falls below 200 degrees F. All edges shall be rolled with a pneumatic tired compactor, or other methods approved by the Engineer, while the mixture is still hot.

Compaction will be deemed to be acceptable on the condition that the asphaltic concrete is compacted using the type of compactors specified, ballasted and operated as specified and with the number of coverages of the compactors as specified.

409-3.03 Acceptance:

Asphaltic concrete will be accepted complete in place, if, in the judgment of the Engineer, the asphaltic concrete reasonably conforms to the requirements specified herein. Asphaltic concrete that is not acceptable and is rejected shall be replaced to the satisfaction of the Engineer and at no expense to the Department.

SECTION 409 ASPHALTIC CONCRETE (MISCELLANEOUS STRUCTURAL):

409-1 Description:

Asphaltic concrete shall consist of furnishing all materials, mixing, hauling, and placing a mixture of aggregates, mineral admixture, and bituminous material to form a pavement course or to be used for other specified purposes, in accordance with the details shown on the project plans and as directed by the Engineer.

The contractor may propose the use of a mix design that has been developed for a previous project. The contractor shall provide evidence that the asphalt cement and mineral admixture type and source of supply, and the source and methods of producing mineral aggregate, have not changed since the formulation of the previous mix design. The contractor shall also provide cur rent test results for all specified characteristics of the mineral aggregate proposed for use. The Engineer will determine if t he previously used mix design is suitable for the intended use. The Engineer will either approve or disapprove the proposed mix design. Should the Engineer disapprove the use of the previously used mix design, the contractor shall prepare and submit a new mix design proposal in accordance with the requirements of these specifications.

A previously used mix design older than two years from the date it was formulated, sealed, signed, and dated shall not be allowed for use. Any previously used mix design that is older than one year, but less than two years, shall not be allowed for use unless the contractor provides verification testing results. Such testing shall be a one-point verification at the design asphalt content utilizing the proposed mineral aggregate, asphalt cement, and mineral admixture. Once approved for use on a project, a mix design may be used for the duration of the project.

409-2 Materials:

409-2.01 Mineral Aggregate:

Mineral aggregate shall conform to the following requirements when tested in accordance with the applicable test methods.

Mineral Aggregate Characteristics	Test Method	Requirement
Combined Bulk Oven Dry Specific Gravity	Arizona Test Method 251	2.350 - 2.850
Combined Water Absorption	Arizona Test Method 251	0 - 2.5%
Abrasion	AASHTO T 96	100 Rev., Max 9% 500 Rev., Max 40%
Sand Equivalent	AASHTO T 176 (After thoroughly sieving the sample, no additional cleaning of the fines from the plus No. 4 material is required.)	Minimum 55
Fractured Coarse Aggregate Particles	Arizona Test Method 212	Minimum 70% (plus No. 4 material)

The gradation will be determined in accordance with Arizona Test Method 201, and shall conform to the requirements given below.

Mix Design Grading Limits				
	Percent Passing			
Sieve Size	Lift Thickness Less Than or Equal to Two Inches		Lift Thickness Greater Than Two Inches	
	Without Admixture	With Admixture	Without Admixture	With Admixture
1 Inch			100	100
3/4 Inch	100	100	90 - 100	90 - 100
1/2 Inch	90 – 100	90 - 100 -- -	---	---
3/8 Inch	70 – 85	70 - 85	70 - 85	70 - 85
No. 8	41 – 51	42 - 52	41 - 51	42 - 52
No. 200	2.0 - 5.0	3.0 - 6.5	2.0 - 5.0	3.0 - 6.5

409-2.02 Bituminous Material:
Asphalt cement shall be a performance grade (PG) asphalt binder conforming to the requirements of Section 1005. The type of asphalt binder shall be as shown in the Special Provisions.

The percent of asphalt cement used shall be based on the weight of total mix (asphalt cement, mineral aggregate, and mineral admixture).

The contractor shall provide the laboratory mixing and compaction temperature ranges to the mix design laboratory for each PG asphalt binder used for mix design purposes. The laboratory mixing temperature range is defined as the range

of temperatures where the un-aged asphalt binder has a rotational viscosity of 0.17 ± 0.02 Pascal ·seconds, measured in accordance with AASHTO T 316. The laboratory compaction temperature range is defined as the range of temperatures where the un-aged asphalt binder has a rotational viscosity of 0.28 ± 0.03 Pascal ·seconds, measured in accordance with AASHTO T 316. The testing required in AASHTO T 316 shall be performed at 275 degrees F and 350 degrees F, and a viscosity- temperature curve developed in accordance with ASTM D 2493. The viscosity- temperature curve shall be included in the mix design report. For PG asphalt binders that have a maximum laboratory mixing temperature exceeding 325 degrees F or a maximum laboratory compaction temperature exceeding 300 degrees F, the laboratory mixing and compaction temperature ranges shall be specified in writing by the asphalt binder supplier . The laboratory mixing and compaction temperature ranges, as well as the actual laboratory mixing and compaction temperatures used, shall be reported on the mix design. The contractor shall ensure that the asphalt binder supplier information required in this paragraph is provided to all appropriate parties in a timely manner, and that copies are included in the mix design report. The laboratory mixing and compaction temperatures are for mix design purposes only. Field mixing and compaction temperatures are specified in Subsection 409-3.

409-2.03 Mineral Admixture:

Mineral admixture shall be either Portland cement, blended hydraulic cement, or hydrated lime conforming to the following requirements:

Material	Requirement
Port land Cement, Type I or II	ASTM C 150
Blended Hydraulic Cement,	ASTM C 595

Type IP	
Hydrated Lime	ASTM C 1097

The mineral admixture content shall be 2.0 percent, by weight, of the mineral aggregate. However, a minimum of 1.0 percent mineral admixture may be used if the contractor submits test information showing a lowered percentage of mineral admixture produces mix design results for Index of Retained Strength of at least 60 percent and a Minimum Wet Strength of 150 psi when tested in accordance with Arizona Test Method 802.

A Certificate of Analysis conforming to the requirements of Subsection 106.05 of the Standard Specifications shall be submitted.

409-2.04 Mix Design:

Utilizing mineral aggregate which has been crushed, processed, separated and stockpiled, a mix design shall be formulated and submitted by the contractor to the Engineer. The mineral aggregate samples used for mix design purposes shall be representative of aggregate materials to be used during production.

The mix design shall be based on the mix design criteria and other requirements specified herein, utilizing asphalt cement and mineral admixture of the type and from the sources proposed for use in the production of asphaltic concrete.

The mix design shall be prepared under the direct supervision of a professional engineer experienced in the development of mix designs and mix design testing. The mix design shall be provided in a format that clearly indicates all the mix design requirements and shall be sealed, signed, and dated by the mix design engineer.

The mix design shall be prepared by a mix design laboratory that has met the requirements of the Department's "System for the Evaluation of Testing Laboratories". The requirements may be obtained from ADOT Materials Group, 1221 North 21st Avenue, Phoenix, Arizona 85009.

Test results used in the formulation of the mix design must be from testing performed no earlier than 45 days prior to the date the mix design is signed by

the mix design engineer. Historical abrasion values may be supplied on sources provided the testing was conducted within the past two years.

The mix design shall be submitted to the Engineer under a cover letter signed by an authorized representative of the contractor.

The mix design shall be submitted to the Engineer for review a minimum of five working days prior to the start of production.

The mix design shall meet the following criteria when tested in accordance with the requirements of the following test methods:

Criteria	Requirement	Arizona Test Method
1. Voids in Mineral Aggregate: %, Range	14.5 - 18.5	815
2. Effective Voids: %, Range	5.5 - 6.5	815
3. Absorbed Asphalt : %, Range	0-1.0	815

The Engineer reserves the right to adjust the asphalt content during production from the mix design value without additional compensation to the contractor in order to obtain desirable effective voids. The Engineer may waive the requirements for a mix design if the intended use of the material is temporary in nature.

409-2.05 Sampling and Testing:

Sampling and testing the materials or mixture for quality control purposes shall be the contractor's responsibility. The Engineer reserves the right to sample and test the materials and mixture when necessary to determine that they reasonably conform to the requirements specified herein.

409-3 Construction Requirements:

409-3.01 General:

All courses of asphaltic concrete shall be compacted as required, smooth and true to the required lines, grades, and dimensions. The following smoothness requirements shall be met:

(1) The surface of the final lift of asphaltic concrete placed under this section of the specifications shall be tested and shall not vary by more than 1/8 inch from the lower edge of a ten-foot straightedge when it is placed in the longitudinal direction (including across transverse joints), and when it is placed in the transverse direction across longitudinal joints.

(2) The surface of any lift of asphaltic concrete placed under this section of the specifications, other than the final lift, shall be tested and shall not vary by more than 1/4 inch from the lower edge of a ten-foot straightedge when it is placed in the longitudinal direction (including across transverse joints), and when it is placed in the transverse direction across longitudinal joints.

(3) All deviations exceeding the specified tolerances above shall be corrected by the contractor, to the satisfaction of the Engineer.

The asphaltic concrete hot plant shall conform to the requirements of Section 403 of the Specifications.

No fine material which has been collected in the dust collection system shall be returned to the mixture unless the collected fines are accurately and uniformly metered into the mixture.

The temperature of asphaltic concrete or mineral aggregate upon discharge from the drier shall not exceed 325 degrees F, unless a higher temperature is recommended in writing by the asphalt binder supplier and approved by the Engineer.

The moisture content of the asphaltic concrete immediately behind the paver shall not exceed 0.5 percent. The moisture content will be determined in accordance with the requirements of Arizona Test Method 406.

Asphaltic concrete shall be placed only when the temperature of the surface on which the asphaltic concrete is to be placed is at least 65 degrees F.

At any time, the Engineer may require that the work cease or that the work day be reduced in the event that weather conditions, either existing or expected, are anticipated to have an adverse effect upon the asphaltic concrete.

All wheels and tires of compactors and other equipment surfaces shall be treated when necessary with a product approved by the Engineer in order to prevent the sticking of asphaltic concrete.

Asphaltic concrete immediately behind the laydown machine shall be a minimum of 250 degrees F.

Just prior to being placed, the asphaltic concrete shall be in a thoroughly mixed condition, free of lumps and crusts and at such a temperature as to be in a free flowing, workable condition. All courses of asphaltic concrete shall be placed and finished by means of self -propelled paving machines except under certain conditions or at certain locations where the Engineer deems the use of self – propelled paving machines impractical.

Pavers shall be equipped with a screed for the full width being paved, heated if necessary, and capable of spreading and finishing all courses of asphaltic concrete.

Pavers shall be equipped with automatic screed controls with sensors for either or both sides of the paver, capable of sensing grade from an outside reference line, sensing the transverse slope of the screed, and providing the automatic signals which operate the screed to maintain the desired grade and transverse slope.

Failure of the control system to function properly shall be cause for the suspension of the placing of asphaltic concrete.

The base or subgrade upon which asphaltic concrete is to be placed shall be prepared and maintained in a firm condition until asphaltic concrete is placed. It shall not be frozen or excessively wet. Before asphaltic concrete is placed, the surface to be paved shall be cleaned of objectionable material and tacked in accordance with the requirements of Subsection 404-3.12.

Longitudinal joints of each course shall be staggered a minimum of one foot with relation to the longitudinal joint of any immediate underlying course. Longitudinal joints shall be located within one foot of the center of a lane or within one foot of the centerline between two adjacent lanes.

The contractor shall schedule its paving operations to minimize exposed longitudinal edges. Unless otherwise approved by the Engineer, the contractor shall limit the placement of asphaltic concrete courses, in advance of adjacent courses, to one shift of asphaltic concrete production. The contractor shall schedule its paving operations in such a manner to eliminate exposed longitudinal edges over weekends or holidays.

409-3.02 Compaction:

Compaction shall consist of an established sequence of coverage using specified types of compactors. A pass shall be defined as one movement of a compactor in either direction. Coverage shall be the number of passes as are necessary to cover the entire width being paved.

The rolling sequence, the type of compactor to be used and the number of coverages required shall be as follows:

Rolling Sequence	Type of Compactor		Number of Coverages	
	Option No. 1	Option No. 2	Option No. 1	Option No. 2
Initial	Static Steel	Vibrating Steel	1	1
Intermediate	Pneumatic Tired	Vibrating Steel	2 – 6*	2 – 4*

Finish	Static Steel	Static Steel	1 - 3	1 - 3
* Based on the roller pattern which exhibits the best performance.				

The Engineer shall select the option for compaction and, when pneumatic- tired compactors are used, will designate the tire pressure.

Steel wheel compactors shall not be used in the vibratory mode for courses of one inch or less in nominal thickness nor when the temperature of the asphaltic concrete falls below 180 degrees F. Steel wheel compactors shall weigh not less than eight tons.

Initial and intermediate compaction shall be completed before the temperature of the asphaltic concrete falls below 200 degrees F. All edges shall be rolled with a pneumatic tired compactor, or other methods approved by the Engineer, while the mixture is still hot.

Compaction will be deemed to be acceptable on the condition that the asphaltic concrete is compacted using the type of compactors specified, ballasted and operated as specified and with the number of coverages of the compactors as specified.

409-3.03 Acceptance:

Asphaltic concrete will be accepted complete in place, if, in the judgment of the Engineer, the asphaltic concrete reasonably conforms to the requirements specified herein. Asphaltic concrete that is not acceptable and is rejected shall be replaced to the satisfaction of the Engineer and at no expense to the Department.

SECTION 414 ASPHALTIC CONCRETE FRICTION COURSE (ASPHALT-RUBBER):

414-1 Description:

Asphaltic Concrete Friction Course (Asphalt-Rubber), hereinafter asphaltic concrete, shall consist of furnishing all materials, mixing at a plant, hauling, and placing a mixture of aggregate materials, mineral admixture, and bituminous material (asphalt-rubber) to form a pavement course or to be used for other specified purposes, in accordance with the details shown on the project plans and the requirements of these specifications, and as directed by the Engineer. The contractor shall be responsible for all adjustments to its equipment necessary to properly accommodate the use of asphalt-rubber as a bituminous material.

414-2 Asphaltic Concrete Mix Design Criteria:

Mix designs will be performed in accordance with Arizona Test Method 814, modified as necessary for Asphaltic Concrete Friction Course (Asphalt-Rubber). The allowable range of percent absorbed asphalt-rubber shall be 0-1.0, when tested in accordance with the applicable section of Arizona Test Method 815.

414-3 Materials:

414-3.01 Mineral Aggregate Source:

There is no Department-furnished source of mineral aggregate. The contractor shall provide a source in accordance with the requirements of Section 1001 of these specifications. When the contractor selects a source or sources, it shall notify the Engineer. The contractor shall be solely responsible for assuring that the mineral aggregate meets all requirements and, when processed, is fully capable of providing asphaltic concrete which meets all the requirements of these specifications.

414-3.02 Mineral Aggregate:

Mineral aggregate shall be separated into at least two stockpiles. No individual stockpile usage shall be less than three percent of the total mineral aggregate. Coarse mineral aggregate shall consist of crushed gravel, crushed rock, or other approved inert materials with similar characteristics, or a combination thereof, conforming to the requirements of these specifications. Fine mineral aggregate or blend material shall consist of natural sand, sand prepared from rock, or other approved inert materials, or a combination thereof, conforming to the requirements of these specifications. Material aggregate furnished for mix designs shall be representative of the source(s) and sampled from the materials stockpiles to be utilized in asphaltic concrete production. Mix designs shall be performed utilizing mineral aggregate which conforms to the grading limits in Table 414-1.

TABLE 414-1
MIX DESIGN GRADING LIMITS FOR MINERAL AGGREGATE
(Without Admixture)

Sieve Size	**Percent Passing**
3/4 Inch	100
No. 4	30 - 45
No. 8	4 - 8
No. 200	0 - 2.5

Mineral aggregate shall conform to the requirements in Table 414-2 when tested in accordance with the applicable test methods. Tests on aggregates outlined in Table 414-2, other than abrasion, shall be performed on materials furnished for mix design purposes and composited to the mix design gradation. Abrasion shall be performed separately on samples from each source of mineral aggregate. All sources shall meet the requirements for abrasion.

TABLE 414-2
MINERAL AGGREGATE CHARACTERISTICS
Characteristic Test Method Requirement
Combined Bulk
Specific Gravity
Arizona Test
Method 814
2.35 - 2.85
Combined Water
Absorption
Arizona Test
Method 814 0 – 2.5%
Sand Equivalent Arizona Test
Method 242
Minimum 55
Fractured Coarse
Aggregate Particles
Arizona Test
Method 212
Minimum 85% (two
fractured faces)
Flakiness Index Arizona Test
Method 233
Maximum 25

TABLE 414-2
MINERAL AGGREGATE CHARACTERISTICS
Characteristic Test Method Requirement
Carbonates in
Aggregate
Arizona Test
Method 238
Maximum 30%
Abrasion AASHTO T 96 100 Rev., Max. 9%
500 Rev., Max. 40%

414-3.03 Mineral Admixture:
Mineral admixture will be required. The amount shall be 1.0 percent, by weight of the mineral aggregate and shall be either portland cement type II or hydrated lime, conforming to the requirements of Table 414-3.

TABLE 414-3
MINERAL ADMIXTURE
Material Requirement
Portland Cement, Type II ASTM C 150
Hydrated Lime ASTM C 1097
A Certificate of Analysis conforming to the requirements of Subsection 106.05 shall be submitted to the Engineer.

414-3.04 Bituminous Material:
Bituminous material shall be asphalt-rubber conforming to the requirements of Section 1009 of the specifications. The type of asphalt-rubber shall be as shown in the Special Provisions. The crumb rubber gradation shall be Type B conforming to the requirements of Section 1009. In no case shall the asphalt-rubber be diluted with extender oil, kerosene, or other solvents. Any asphalt-rubber so contaminated shall be rejected. Any kerosene or other solvents used in the cleaning of equipment shall be purged from the system prior to any subsequent use of that equipment.

414-4 Mix Design:
Approximately 300 pounds of produced mineral aggregate, in proportion to the anticipated percent usage, shall be obtained by the contractor and witnessed by the Engineer so that both parties are satisfied that samples are representative of the mineral aggregate to be utilized in the asphaltic concrete production. The contractor shall also furnish representative samples of the following materials: a five-pound sample of the crumb rubber proposed for use, one gallon of asphalt cement from the intended supplier, three gallons of the proposed mixture of asphalt and rubber, and a one-gallon can of the mineral admixture to be used in the asphaltic concrete.

Along with the samples furnished for mix design testing, the contractor shall submit a letter explaining in detail its methods of producing mineral aggregate including wasting, washing, blending, proportioning, etc., and any special or limiting conditions it may propose. The contractor's letter shall also state the source(s) of mineral aggregate, the source of asphalt cement and crumb rubber, the asphalt-rubber supplier, and the source and type of mineral admixture. Within 10 working days of receipt of all samples and the contractor's letter in the Central Laboratory, the Department will provide the contractor with the percentage of asphalt-rubber to be used in the mix, the percentage to be used from each of the stockpiles of mineral aggregate, the composite mineral aggregate gradation, the composite mineral aggregate and mineral admixture gradation, and any special or limiting conditions for the use of the mix. The Department will provide the contractor material to be used for calibration of nuclear asphalt content gauges. The material will be fabricated by the Department utilizing asphalt-rubber submitted by the contractor for mix design purposes.

414-5 Mix Design Revisions:
The contractor shall not change its methods of crushing, screening, washing, or stockpiling from those used during production of material used for mix design purposes without approval of the Engineer, or without requesting a new mix design.

During production of asphaltic concrete, the contractor, on the basis of field test results, may request a change to the approved mix design. The Engineer will evaluate the proposed changes and notify the contractor of the Engineer's decision within two working days of the receipt of the request. If, at any time, unapproved changes are made in the source of bituminous material, source(s) of mineral aggregate, production methods, or proportional changes in violation of approved mix design stipulations, production shall cease until a new mix design is developed, or the contractor complies with the approved mix design. At any time after the mix design has been approved, the contractor may request a new mix design. The costs associated with the testing of materials in the developing of mix designs after a mix design acceptable to the Department has been developed shall be borne by the contractor. If, during production, the Engineer on the basis of testing determines that a change in the mix design is necessary, the Engineer will issue a revised mix design. Should these changes require revisions to the contractor's operations which result in additional cost to the contractor, it will be reimbursed for these costs. However, the Engineer reserves the right to modify the asphalt-rubber content without compensation being made to the contractor involving additional operation costs.

414-6 Acceptance of Materials:
414-6.01 General:
If the production of asphaltic concrete is stopped either for failure to meet the requirements specified hereinafter under Subsection 414-6.03, or because changes are made in the mix design, samples will be taken for calculating new consecutive averages either after production resumes or after the changes in the mix design have been made. The acceptance of the mineral aggregate gradation and the bituminous material content will be determined on the basis of the tests as hereinafter specified under Subsection 414-6.03. The Engineer reserves the right to increase the frequency of sampling and testing upon the resumption of asphaltic concrete production.

414-6.02 Mineral Aggregate:
Aggregate shall be free of deleterious materials, clay balls, and adhering films or other material that prevent thorough coating of the aggregate with the bituminous material. During asphaltic concrete production, the Engineer shall obtain and test samples of mineral aggregate for the determination of the sand equivalent, fractured coarse aggregate particles, and flakiness index. The sample shall be obtained either from the cold feed prior to addition of mineral admixture, or from the stockpiles. Should such testing indicate results not meeting the requirements of Table 414-2 for sand equivalent, fractured coarse aggregate particles, and flakiness index, operations shall cease and the contractor shall have the option of requesting a new mix design or correcting deficiencies in the aggregate stockpiles.

414-6.03 Asphaltic Concrete:
(A) Mineral Aggregate Gradation:
For each approximate 500 tons of asphaltic concrete, at least one sample of mineral aggregate will be taken. Samples will be taken in accordance with the requirements of Arizona Test Method 105 on a random basis just prior to the addition of mineral admixture and bituminous material by means of a sampling device which is capable of producing samples which are representative of the mineral aggregate.

The device, which shall be approved by the Engineer, shall be furnished by the contractor. In any shift that the production of asphaltic concrete is less than 500 tons, at least one sample will be taken. Samples will be tested for conformance with the mix design gradation without mineral admixture in accordance with the requirements of Arizona Test Method 201. The gradation of the mineral aggregate will be considered to be acceptable, unless the average of any three consecutive tests or the result of any single test varies from the mix design gradation percentages as follows:

Passing Sieve Number of Tests
3 Consecutive One
No. 4 ± 4 ± 6
No. 8 ± 3 ± 4
No. 200 ± 1.0 ± 1.5
One hundred percent of the material shall pass the largest sieve size shown in Table 414-1. At any time that test results indicate that the gradation of the mineral aggregate does not fall within all of the limits indicated, the production of asphaltic concrete shall cease immediately and shall not begin again until a calibration test indicates that the gradation is within the 3-consecutive test limits indicated.

(B) Asphalt-Rubber Content:
During production of asphaltic concrete, the contractor shall maintain at the plant site a nuclear asphalt content gauge calibrated and operated in accordance with Arizona Test Method 421. The calibration shall be performed using material supplied by the Department as stated in Section 414-4. Under the observation of the Engineer, the contractor shall determine the asphalt-rubber content by means of the nuclear asphalt content gauge a minimum of four times per full shift. The contractor's technicians performing the testing, including the calibration of the nuclear gauge, shall meet the technician requirements given in the Department's System for the Evaluation of Testing Laboratories. The requirements may be obtained from ADOT Materials Group, 1221 North 21st Avenue, Phoenix, AZ 85009. Production of asphaltic concrete shall cease immediately and the plant and/or the nuclear asphalt content gauges re-calibrated if the Engineer determines the percent of asphalt-rubber has varied by an amount greater than ± 0.5 percent from the amount directed by the Engineer.

414-7 Construction Requirements:
414-7.01 Quality Control:
Quality control of mineral aggregate production and asphaltic concrete production shall be the responsibility of the contractor. The contractor shall perform sufficient testing to assure that mineral aggregate and asphaltic concrete are produced which meet all specified requirements. The Engineer reserves the right to obtain samples of any portion of any material at any point of the operations for the Engineer's own use.

414-7.02 Stockpiling:
The contractor will not be allowed to feed the hot plant from stockpiles containing less than two full days of production unless only two days production remain to be done or special conditions exist where the Engineer deems this requirement waived. Mineral aggregate shall be separated and stockpiled so that segregation is minimized. An approved divider of sufficient size to prevent intermingling of stockpiles shall be provided.

414-7.03 Proportioning:

The contractor shall provide documentation by calibration charts or other approved means that the mineral aggregate, asphalt-rubber, and mineral admixture are being proportioned in accordance with the approved mix design. Unless approved by the Engineer, no individual stockpile usage shall be less than three percent of the total mineral aggregate. Changes in stockpile/hot bin use in excess of five percent from the approved mix design will not be permitted without the approval of the Engineer. Mineral admixture shall be mechanically mixed with the mineral aggregate prior to combining the mineral aggregate and asphalt-rubber. The engineer may direct a spray of water be applied either to control the loss of the mineral admixture or to comply with any mix design requirements for wet mixing of the aggregate and admixture. If a drum mix plant is used, the mineral admixture shall be added and thoroughly mixed by means of a mechanical mixing device prior to the mixture entering the drum drier. The mineral admixture shall be weighed across a weigh belt or an approved alternative weighing system, with a weight totalizer prior to entry into the mechanical mixing device. The mechanical mixing device shall be a pugmill type mixer consisting of at least two motorized shafts with mixing paddles. The mixing device shall be designed such that the mixture of aggregate and admixture is moved in a near horizontal direction by the mixing paddles without the aid of conveyor belts for a distance of at least three feet. Mixing devices which permit the mixture of aggregate and admixture to fall through mixing blades onto a belt or chute are not acceptable. The mixing device's rated capacity in tons per hour shall not be exceeded by the rate of material feed to the mixer. The mixer shall be constructed to prevent the leakage of the contents. The mixer shall be located in the system at a location where the mixed material can be readily inspected on a belt prior to entry into the drum. The mixing device shall be capable of effective mixing in the full range of asphaltic concrete production rates. A positive signal system and a limit switch device shall be installed in the plant at the point of introduction of the admixture. The positive signal system shall be placed between the metering device and the drum drier, and utilized during production whereby the mixing shall automatically be stopped if the admixture is not being introduced into the mixture. If a batch plant is used, the mineral admixture shall be added and thoroughly mixed in the pugmill prior to adding asphalt-rubber. The contractor shall furnish daily documentation to the Engineer that the required amount of mineral admixture has been incorporated into the asphaltic concrete. No fine material which has been collected in the dust collection system shall be returned to the mixture unless the Engineer, on the basis of tests, determines that all or a portion of the collected fines can be utilized. If the Engineer so determines, the Engineer will authorize in writing the utilization of a specific proportion of the fines; however, authorization will not be granted unless the collected fines are uniformly metered into the mixture.

Mineral aggregate, mineral admixture, and asphalt-rubber shall be proportioned by volume, by weight, or by a combination of volume and weight. When mineral aggregate, mineral admixture, and asphalt-rubber are proportioned by weight, all boxes, hoppers, buckets, or similar receptacles used for weighing materials, together with scales of any kind used in batching materials, shall be insulated against the vibration or movement of the rest of the plant due to the operation of any equipment so that the error in weighing with the entire plant operating shall not exceed two percent

for any setting nor 1-1/2 percent for any batch. Bituminous material shall be weighed in a heated, insulated bucket suspended from a springless dial scale system. When mineral aggregate, mineral admixture, and asphalt-rubber are proportioned by volume, the correct portion of each mineral aggregate size introduced into the mixture shall be drawn from the storage bins by an approved type of continuous feeder which will supply the correct amount of mineral aggregate in proportion to the bituminous material and so arranged that the proportion of each mineral aggregate size can be separately adjusted. The continuous feeder for the mineral aggregate shall be mechanically or electrically actuated. The introduction of asphalt-rubber shall be controlled by an automated system fully integrated with the controls for mineral aggregate and mineral admixture.

414-7.04 Drying and Heating:
A recording pyrometer or other approved recording thermometric instrument sensitive to a rate of temperature change not less than 10 degrees F per minute shall be so placed at the discharge chute of the drier in order to record automatically the temperature of the asphaltic concrete or mineral aggregate. A copy of the recording shall be given to the Engineer at the end of each shift. The moisture content of the asphaltic concrete shall not exceed 0.5 percent. The moisture content will be determined in accordance with Arizona Test Method 406. Drying and heating shall be accomplished in such a manner as to preclude the mineral aggregate from becoming coated with fuel oil or carbon.

414-7.05 Mixing:
The production of the plant shall be governed by the rate required to obtain a thorough and uniform mixture of the materials. A positive signal system shall be provided to indicate the low level of mineral aggregate in the bins. The plant will not be permitted to operate unless this signal system is in good working condition. Each bin shall have an overflow chute or a divider to prevent material from spilling into adjacent bins.

The temperature of asphaltic concrete upon discharge from the mixer shall not exceed 350 degrees F. If the asphaltic concrete is discharged from the mixer into a hopper, the hopper shall be constructed so that segregation of the asphaltic concrete will be minimized.

414-7.06 Placing and Finishing:
(A) General Requirements:
The handling of asphaltic concrete shall at all times be such as to minimize segregation. Any asphaltic concrete which displays segregation shall be removed and replaced. Before asphaltic concrete is placed, the surface to be paved shall be cleaned of all objectionable material and tacked with asphalt cement in accordance with the requirements of Section 404 of the specifications. The cleaning of the surface, the tacking of the surface, and the amount and grade of asphalt cement used shall be as directed by and acceptable to the Engineer.
Unless otherwise specified on the project plans, asphaltic concrete shall not be placed on the two-foot widened section where guardrail is to be installed.

(1) Dates and Surface Temperature:
Asphaltic concrete shall be placed between the dates specified in the Special Provisions and only when the temperature of the surface on which the asphaltic concrete is to be placed is at least 85 °F. Despite a surface temperature of 85 °F, the Engineer at any time may require that the work cease or that the work day be reduced in the event of weather conditions either existing or expected which would have an adverse effect upon the asphaltic concrete.

(2) Delivery to Screed Unit:
Asphaltic concrete delivered to the screed unit shall be a free flowing, homogeneous mass in which there is no segregation, crusts, lumps, or migration of the asphalt-rubber. Should any one or more of such conditions be evident in the material delivered to the screed unit, and which cannot be eliminated by one or more of the following methods, the Engineer will order the work to be stopped until conditions are conducive to the delivery of the material in the condition as hereinbefore required:
(a) Covering hauling units with tarpaulins.
(b) Dumping material directly into the paver.
(c) Moving the hot plant nearer to the point of delivery.
Other measures proposed by the contractor which will deliver asphaltic concrete meeting the above requirements will be considered by the Engineer.

(B) Loading Asphaltic Concrete into the Paving Machine:
If the asphaltic concrete is dumped directly into the paving machine from the hauling trucks, care shall be taken to avoid jarring the machine or moving it out of alignment. No vertical load shall be exerted on the paving machine by the trucks. Trucks, while dumping, shall be securely attached to the paving machine. If the asphaltic concrete is dumped upon the surface being paved and subsequently loaded into the paving machine, it shall not be dumped at a distance greater than 150 feet in front of the paving machine. The loading equipment shall be self-supporting and shall not exert any vertical load on the paving machine. Substantially all of the asphaltic concrete shall be picked up and loaded into the paving machine.

(C) Placing and Finishing Asphaltic Concrete by Means of Self-Propelled Paving Machines:
All courses of asphaltic concrete shall be placed and finished by means of self-propelled paving machines except under certain conditions or at certain locations where the Engineer deems the use of self-propelled paving machines impractical. In order to achieve, as far as practical, a continuous operation, the speed of the paving machine shall be coordinated with the production of the plant. If the paving machine is stopped for more than three minutes, or there is a three-minute or longer interval between the completion of delivery by one truck and the beginning of delivery by the next truck, the paving machine shall be pulled away from the mat in order for the rollers to compact this area in accordance with the temperature limitations given hereinafter under Subsection 414-7.08(C). A transverse construction joint shall be made by a method approved by the Engineer. Self-propelled paving machines shall spread the mixture without segregation or tearing within the specified tolerances, true to the line, grade, and crown indicated on the project plans. Pavers shall be equipped with hoppers and augers which will distribute the mixture uniformly in front of adjustable screeds. Screeds shall include any strike-off device operated by tamping or vibrating action which is effective without tearing, shoving or gouging the mixture and which produces a course with a uniform texture and density for the full width being paved.

Screeds shall be adjustable as to height and crown and shall be equipped with a controlled heating device for use when required. Tapered sections not exceeding eight feet in width, or widened sections not exceeding four
feet in width may be placed and finished by other means approved by the Engineer.

(D) Automatically Actuated Control System:

Except under certain conditions or at certain locations where the Engineer deems the use of automatic controls impractical, all courses of asphaltic concrete shall be placed and finished by means of self-propelled paving machines equipped with an automatically actuated control system. The control system shall control the elevation of the screed at each end by controlling the elevation of one end directly and the other end indirectly either through controlling the transverse slope or alternately when directed, by controlling the elevation of each end independently. The control system shall be capable of working with the following devices which shall be furnished with the machine: Ski-type device at least 30 feet in length, supported throughout its entire length. Short ski. Failure of the control system to function properly shall be cause for the suspension of the asphaltic concrete operations.

414-7.07 Joints:

If the lift thickness is equal to or greater than one inch, the contractor shall schedule its paving operations to minimize exposed longitudinal edges. Unless otherwise approved by the Engineer, the contractor shall limit the placement of asphaltic concrete courses, in advance of adjacent courses, to one shift of asphaltic concrete production. The contractor shall schedule its paving operations in such a manner to eliminate exposed longitudinal edges over weekends or holidays. Longitudinal joints shall be located within one foot of the centerline between two adjacent lanes. Before a surface course is placed in contact with a cold transverse construction joint, the cold existing asphaltic concrete shall be trimmed to a vertical face by cutting the existing asphaltic concrete back for its full depth and exposing a fresh face. After placement and finishing of the new asphaltic concrete, both sides of the joint shall be dense and the joint shall be well sealed. The surface in the area of the joint shall conform to the requirements hereinafter specified for surface tolerances when tested with the straightedge placed across the joint.

414-7.08 Compaction:

(A) General Requirements:

The temperature of asphaltic concrete just prior to compaction shall be at least 275 degrees F. The wheels of compactors shall be wetted with water, or if necessary soapy water, or a product approved by the Engineer to prevent the asphaltic concrete from sticking to the steel wheels during rolling. The Engineer may change the rolling procedure if in the Engineer's judgment the change is necessary to prevent picking up of the asphaltic concrete.

(B) Equipment:

A minimum of three static steel wheel compactors shall be provided. The drums shall be of sufficient width that when staggered, two compactors can cover the entire width of the ribbon with one pass. The compactors shall weigh not less than eight tons. The compactors shall be self-propelled and shall be operated with the drive wheel in the forward position. Vibrator rollers may be used in the static mode only.

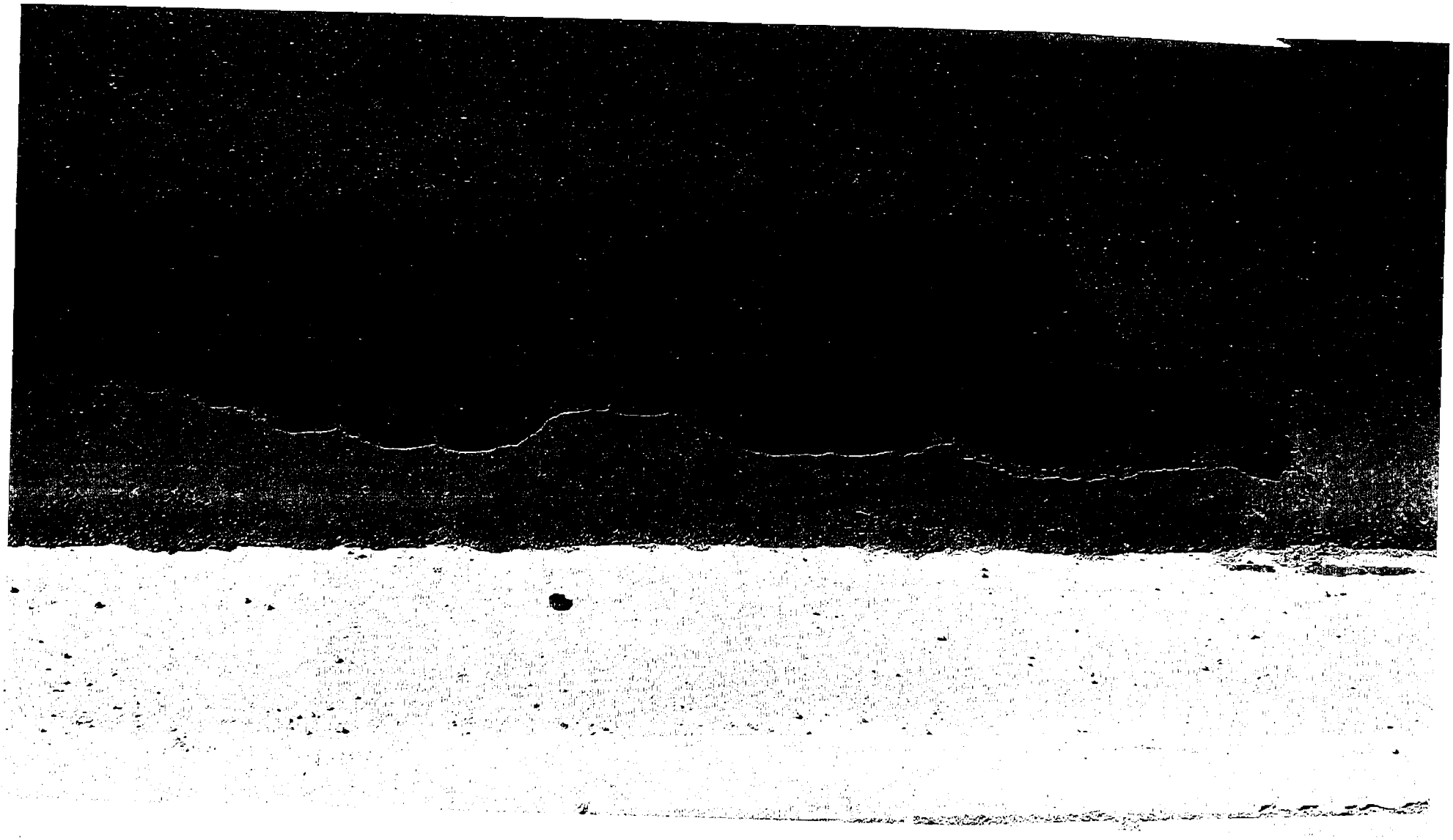
(C) Rolling Procedure:
Two compactors shall be used for initial breakdown and be maintained no more than 300 feet behind the paving machine. The roller(s) for final compaction shall follow as closely behind the initial breakdown as possible. As many passes as is possible shall be made with the compactors before the temperature of the asphaltic concrete falls below 220 $_{o}$F

414-7.09 Surface Requirements and Tolerances:
Asphaltic concrete shall be compacted as required, smooth and reasonably true to the required lines, grades, and dimensions. Asphaltic concrete shall not vary more than 1/8 inch from the lower edge of a ten-foot straightedge when the straightedge is placed parallel to the center line of the roadway, or 1/4 inch when placed in the transverse direction across longitudinal joints.

414-7.10 Acceptance:
Asphaltic concrete will be accepted complete in place, if, in the judgment of the Engineer, the asphaltic concrete reasonably conforms to the requirements specified herein. Asphaltic concrete that is not acceptable and is rejected shall be replaced to the satisfaction of the Engineer and at no expense to the Department.

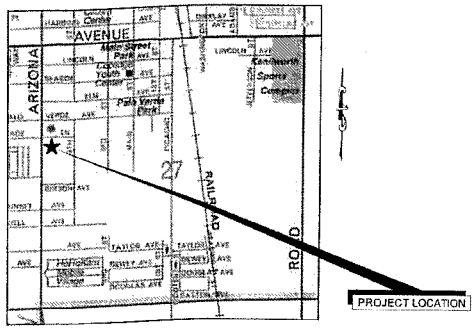
414-8 Method of Measurement:
Asphaltic concrete will be measured by the ton for the mixture actually used, which will include the weight of mineral aggregate, mineral admixture and asphalt-rubber. Measurement will include any weight used in construction of intersections, turnouts, or other miscellaneous items or surfaces. Asphalt-rubber will be measured by the ton. The weight of the asphalt-rubber material shall either be determined by weighing directly enroute from the reaction vessel to the point of delivery or be determined from the weight of the asphalt cement and the weight of the rubber minus wastage. Mineral admixture will be measured by the ton.

414-9 Basis of Payment:
The accepted quantities of asphaltic concrete, measured as provided above, will be paid for at the contract unit price per ton, which price shall be full compensation for the work, complete in place, as specified herein. Payment for the asphalt-rubber will be made by the ton, including asphalt cement and crumb rubber. The results of a nuclear asphalt content gauge shall not be used to determine the weight of asphalt-rubber material as the basis of payment. Payment for mineral admixture will be made by the ton.

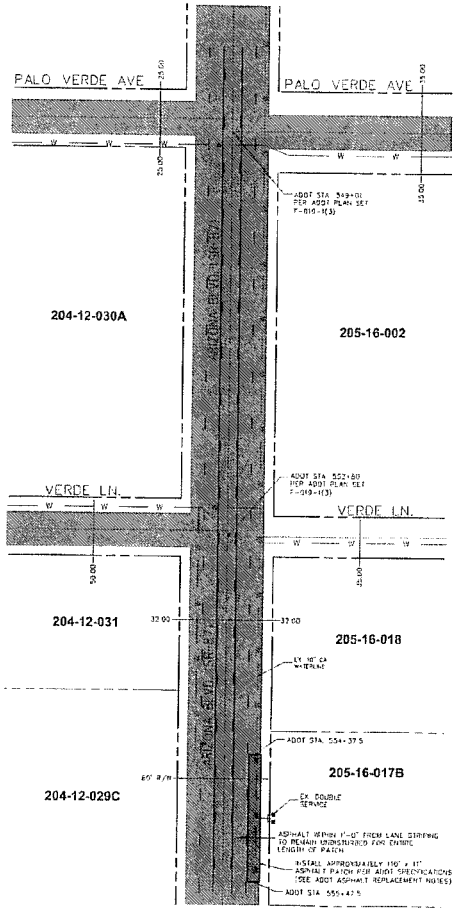


1213899

REPLACE TEMPORARY ASPHALT PATCH WITH APPROXIMATELY 110' X 11' PERMANENT ASPHALT PATCH ALONG ARIZONA BLVD.
NW 1/4 SEC. 27, T. 5 S., R. 8 E.
OF THE G. & S. R. B. & M.



VICINITY MAP



LEGEND

- STREET CENTERLINE/MONUMENT LINE
- RIGHT-OF-WAY LINE
- PROPERTY LINE
- W — W — EX. WATER LINE
- ASPHALT PATCH
- EX. ASPHALT AREA

ADOT ASPHALT REPLACEMENT NOTES:

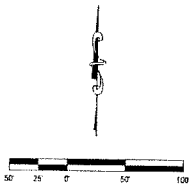
1. Existing pavement shall be saw cut full depth for the trench prior to any excavation.

2. Cement treated slurry backfill meeting ADOT Standard Specifications **501-3.02** and **501-3.04** shall be used in the trench crossing the roadway. Slurry shall be placed full depth of the trench up to the bottom of the existing asphaltic concrete (AC). Steel plates meeting traffic loading requirements shall be placed over the trench and slurry allowed setting a minimum of 24 hours without disturbance. Four feet wide cold mix AC wedges shall be used to hold steel plates in place.

3. Once the slurry is set, AC meeting the requirements of ADOT Standard Specification Section **409** shall be placed in the trench in lifts and properly compacted to the surface of the existing pavement. The thickness of replacement asphalt concrete shall match the existing thickness.

4. In the event the roadway is paved with **Rubberized Asphalt Concrete Friction Course (AR-ACFC), it shall be replaced in kind.**

5. Once the AC patch is completed, all affected travel lanes and shoulders where the patch was placed shall be milled in compliance with ADOT Standard Specification **202-3.03(C)** to a depth of two inches for a length of one hundred feet (fifty feet each side of patch). If the roadway is overlaid with AR-ACFC, the mill depth shall be two and one half (2-½) inches. The milled trench shall be properly cleaned and a Tack Coat placed on all surfaces, including the edges, which meet the requirements of ADOT Standard Specification **404-3.12.** The entire milled surface is then overlaid with two inches of AC meeting the requirements of ADOT Standard Specification Sections **409** and one half inch of AR-ACFC (if present) meeting the requirements of Standard Specification Section **414.**



GENERAL NOTES

1. All work and materials shall conform to current County Health Department Standards and Revisions, Arizona Water Company Standard Specifications and Details, and Arizona Department of Health Services Engineering Bulletin No. 10.
2. Permits required will be secured from the appropriate agency, i.e. county permit in county right-of-way.
3. Prior to construction, the appropriate agency(ies) will be notified as required by the permit(s).
4. All backfill, compaction, and testing shall be per current County, City, State, ADOT, and Arizona Water Company standards and specifications.
5. All water lines 8" and less are to have a minimum cover of 36 inches & all water lines 12" and greater are to have 48" of minimum cover over the top of pipe to finished grade, unless otherwise specified on the construction drawings.
6. All frames, covers, valve boxes, etc. shall be adjusted to finished grade prior to placing of asphaltic concrete surface course by the contractor, (where applicable)
7. All water lines shall be pressure and leakage tested in accordance with AWWA C-600 or MAG 610-14.
8. All water lines are to be disinfected per ADEQ Engineering Bulletin No 8 and AWWA C651-92.
9. Air release valves are required at water system high points per Arizona Water Company standard details.
10. Water/sewer separation shall be per current Arizona Water Company standards and ADEQ AAC R18-5-502-C.
11. It shall be the contractors responsibility to uncover all existing water lines being connected to, and to verify the location, depth and size of pipe before any construction begins.
12. Any construction performed without the knowledge of the inspector or his representative is liable for removal and replacement at the contractor's expense.
13. In accordance with AAC R18-4-213, all materials added after January 1, 1993 which may come in contact with drinking water, shall conform to National Sanitation Foundation Standards 60 and 61.
14. All water services shall be set a minimum of 2 Feet on the customers property and NOT within right-of-way.
15. Unless otherwise specified on the construction drawings, all water mains are to be installed 5 Feet from the property line inside the right-of-way or easement.
16. Water valves shall be spaced not more than 500 Feet in commercial districts and not more than 800 Feet in other districts. Variations may be required for transmission mains or special applications. Sufficient valving is required where water lines cross streams, railroads and major highways.
17. Maximum Joint Deflection For 6" Mechanical Joint Ductile Iron Pipe Is 7°-17' Or 27" For 18 Foot Length Pipe. For A Maximum Curve Of 145 Feet.
18. Maximum Joint Deflection For 6", 8", & 12" Push-On Joint Ductile Iron Pipe Is 5°-12' Or 19" For 18 Foot Length Pipe. For A Maximum Curve Of 205 Feet.
19. Maximum Joint Deflection For 8" & 12" Mechanical Joint Ductile Iron Pipe Is 5°-21' Or 20" For 18 Foot Length Pipe. For A Maximum Curve Of 195 Feet.

ARIZONA WATER COMPANY
3805 N. BLACK CANYON HWY. POST OFFICE BOX 29006
PHOENIX, ARIZONA 85038-9006
(602) 240-6860

PROJECT NAME: REPLACE TEMPORARY ASPHALT PATCH WITH APPROXIMATELY 110' X 11' PERMANENT ASPHALT PATCH ALONG ARIZONA BLVD.

PROJECT SHEET TITLE: COVER SHEET

DRAWN BY: BWP | CHECKED BY:

SCALE: AS SHOWN

DATE: 8/11/2014

JOB NO.: 2108

SYSTEM: PINAL VALLEY

LEGAL: N.W. 1/4 SEC. 27, T. 5 S., R. 8 E.

FILE NAME:

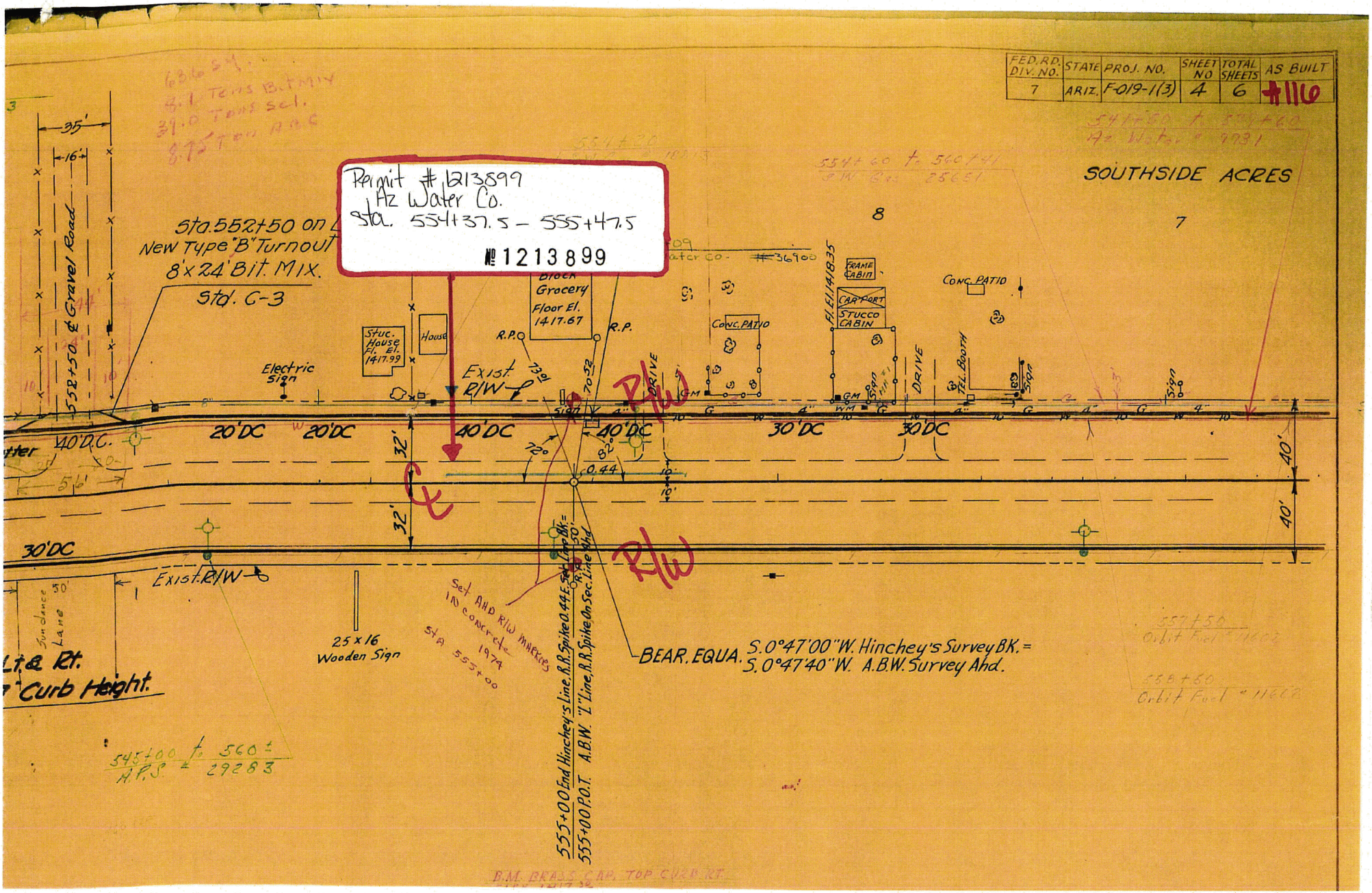
DWG NO.:

SHEET 1 OF 1

The installation shown is to be installed in accordance with the Arizona Water Company Standard Specifications and the Arizona Department of Environmental Quality.

Call Before You Dig 263-1100 1-800-STAKE-IT (Arizona Blue Stake, Inc.)

REVISIONS:


FED. RD. DIV. NO. 7
STATE ARIZ.
PROJ. NO. F-019-1(3)
SHEET NO 4
TOTAL SHEETS 6
AS BUILT #116
SOUTHSIDE ACRES
Permit # 1213899
Az Water Co.
sta. 554+37.5 – 555+47.5
№ 1213899
Sta. 552+50 on ℄
New Type "B" Turnout
8'x24' Bit. Mix.
Std. C-3
552+50 ℄ Gravel Road
35'
16'
Block Grocery
Floor El. 1417.67
Stuc. House Fl. El. 1417.99
House
Electric Sign
R.P.
Exist. R/W
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R/W
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40'DC
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30'DC
30'DC
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32'
32'
40'
40'
0.44
10'
10'
72°
82°
Frame Cabin
Carport
Stucco Cabin
Conc. Patio
Conc. Patio
Fl. El. 1418.35
Drive
Drive
Tel. Booth
Sign
Sign
Sign
GM
WM
Exist. R/W
25 x 16 Wooden Sign
Set AHD R/W markers in concrete 1974 Sta 553+00
555+00 End Hinchey's Line, R.R. Spike 0.44 S. of Line Bk. = 555+00 P.O.T. A.B.W. "L" Line, R.R. Spike On Sec. Line Ahd.
BEAR. EQUA. S. 0°47'00" W. Hinchey's Survey BK. = S. 0°47'40" W. A.B.W. Survey Ahd.
Sundance Lane 50'
Lt & Rt. Curb Height.
545+00 ± 560 ±
A.P.S. ± 29283
B.M. BRASS CAP, TOP CURB RT.

ADOT

Intermodal Transportation

Douglas A. Ducey, Governor
John S. Halikowski, Director
Dallas Hammit, State Engineer
Steve Boschen, Division Director

May 14, 2015

Ray Murietta
ARIZONA WATER COMPANY
P.O.Box29006
Phoenix, AZ 85038

Re: Permit No. 1213899
Extension No. 1

Dear Mr. Ray Murietta:

This letter will serve to advise you that the completion date of the above referenced permit has been extended for **one month** from your previous completion date.

LOCATION: **SR-87(NB) @ 132.000-132.000**

NEW COMPLETION DATE: **June 8, 2015**

Thank you in advance for ensuring that the permit work is completed within the new time frame in this extension.

Sincerely,

Richard La Pierre
Tucson District Permits Supervisor
1221 S. 2nd Avenue
Tucson, AZ 85713
(520) 388-4234

SH:aa

c: Maintenance Permits
Maintenance Supervisor

Permit #1213899

CERTIFICATE OF LIABILITY INSURANCE

1/1/2016

DATE (MM/DD/YYYY) 12/29/2014

THIS CERTIFICATE IS ISSUED AS A MATTER OF INFORMATION ONLY AND CONFERS NO RIGHTS UPON THE CERTIFICATE HOLDER. THIS CERTIFICATE DOES NOT AFFIRMATIVELY OR NEGATIVELY AMEND, EXTEND OR ALTER THE COVERAGE AFFORDED BY THE POLICIES BELOW. THIS CERTIFICATE OF INSURANCE DOES NOT CONSTITUTE A CONTRACT BETWEEN THE ISSUING INSURER(S), AUTHORIZED REPRESENTATIVE OR PRODUCER, AND THE CERTIFICATE HOLDER.

IMPORTANT: If the certificate holder is an ADDITIONAL INSURED, the policy(ies) must be endorsed. If SUBROGATION IS WAIVED, subject to the terms and conditions of the policy, certain policies may require an endorsement. A statement on this certificate does not confer rights to the certificate holder in lieu of such endorsement(s).

PRODUCER
Lockton Insurance Brokers, LLC
725 S. Figueroa Street, 35th Fl.
CA License #0F15767
Los Angeles CA 90017
(213) 689-0065

CONTACT NAME:
PHONE (A/C, No, Ext):
FAX (A/C, No):
E-MAIL ADDRESS:

INSURER(S) AFFORDING COVERAGE	NAIC #
INSURER A : SCF Indemnity Insurance Company	13928
INSURER B :	
INSURER C :	
INSURER D :	
INSURER E :	
INSURER F :	

INSURED
1348151
Arizona Water Company
PO BOX 29006
Phoenix AZ 85038

COVERAGES ARIWA01 CERTIFICATE NUMBER: 11579320 REVISION NUMBER: XXXXXXX

THIS IS TO CERTIFY THAT THE POLICIES OF INSURANCE LISTED BELOW HAVE BEEN ISSUED TO THE INSURED NAMED ABOVE FOR THE POLICY PERIOD INDICATED. NOTWITHSTANDING ANY REQUIREMENT, TERM OR CONDITION OF ANY CONTRACT OR OTHER DOCUMENT WITH RESPECT TO WHICH THIS CERTIFICATE MAY BE ISSUED OR MAY PERTAIN, THE INSURANCE AFFORDED BY THE POLICIES DESCRIBED HEREIN IS SUBJECT TO ALL THE TERMS, EXCLUSIONS AND CONDITIONS OF SUCH POLICIES. LIMITS SHOWN MAY HAVE BEEN REDUCED BY PAID CLAIMS.

INSR LTR	TYPE OF INSURANCE	ADDL INSD	SUBR WVD	POLICY NUMBER	POLICY EFF (MM/DD/YYYY)	POLICY EXP (MM/DD/YYYY)	LIMITS	
	COMMERCIAL GENERAL LIABILITY			NOT APPLICABLE			EACH OCCURRENCE	$ XXXXXXX
	CLAIMS-MADE OCCUR						DAMAGE TO RENTED PREMISES (Ea occurrence)	$ XXXXXXX
							MED EXP (Any one person)	$ XXXXXXX
	GEN'L AGGREGATE LIMIT APPLIES PER:						PERSONAL & ADV INJURY	$ XXXXXXX
	POLICY PRO-JECT LOC						GENERAL AGGREGATE	$ XXXXXXX
	OTHER						PRODUCTS - COMP/OP AGG	$ XXXXXXX
								$
	AUTOMOBILE LIABILITY			NOT APPLICABLE			COMBINED SINGLE LIMIT (Ea accident)	$ XXXXXXX
	ANY AUTO						BODILY INJURY (Per person)	$ XXXXXXX
	ALL OWNED AUTOS / SCHEDULED AUTOS						BODILY INJURY (Per accident)	$ XXXXXXX
	HIRED AUTOS / NON-OWNED AUTOS						PROPERTY DAMAGE (Per accident)	$ XXXXXXX
								$
	UMBRELLA LIAB OCCUR			NOT APPLICABLE			EACH OCCURRENCE	$ XXXXXXX
	EXCESS LIAB CLAIMS-MADE						AGGREGATE	$ XXXXXXX
	DED RETENTION $							$
A	WORKERS COMPENSATION AND EMPLOYERS' LIABILITY Y/N	N/A	Y	1009629	1/1/2015	1/1/2016	X PER STATUTE OTH-ER	
	ANY PROPRIETOR/PARTNER/EXECUTIVE OFFICER/MEMBER EXCLUDED? (Mandatory in NH) Y						E.L. EACH ACCIDENT	$ 1,000,000
	If yes, describe under DESCRIPTION OF OPERATIONS below						E.L. DISEASE - EA EMPLOYEE	$ 1,000,000
							E.L. DISEASE - POLICY LIMIT	$ 1,000,000

APPROVED
MAR 11 2015
ADOT - ASD
RISK MANAGEMENT

DESCRIPTION OF OPERATIONS / LOCATIONS / VEHICLES (Attach ACORD 101, Additional Remarks Schedule, may be attached if more space is required)
State of Arizona, its departments (ADOT), agencies, boards, commissions, universities and its officers, officials, agents and employees shall be named as additional insured's with respect to liability arising out of activities performed by or on behalf of the permittee or contractor, waiver of subrogation applies.

CERTIFICATE HOLDER

11579320

Arizona Department of Transportation
1221 South 2nd Ave
Tucson AZ 85713

CANCELLATION See Attachment

SHOULD ANY OF THE ABOVE DESCRIBED POLICIES BE CANCELLED BEFORE THE EXPIRATION DATE THEREOF, NOTICE WILL BE DELIVERED IN ACCORDANCE WITH THE POLICY PROVISIONS.

AUTHORIZED REPRESENTATIVE

ACORD 25 (2014/01)

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CERTIFICATE OF LIABILITY INSURANCE

DATE (MM/DD/YYYY) OCT 09 2014

THIS CERTIFICATE IS ISSUED AS A MATTER OF INFORMATION ONLY AND CONFERS NO RIGHTS UPON THE CERTIFICATE HOLDER. THIS CERTIFICATE DOES NOT AFFIRMATIVELY OR NEGATIVELY AMEND, EXTEND OR ALTER THE COVERAGE AFFORDED BY THE POLICIES BELOW. THIS CERTIFICATE OF INSURANCE DOES NOT CONSTITUTE A CONTRACT BETWEEN THE ISSUING INSURER(S), AUTHORIZED REPRESENTATIVE OR PRODUCER, AND THE CERTIFICATE HOLDER.

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PRODUCER	CONTACT NAME: Nancy J Carter, CISR
Phone: (480)990-1900 Fax: (480)481-9551	PHONE (A/C, No, Ext): (480)990-1900, 128 FAX (A/C, No): (480)481-9551
General Southwest Insurance Agency, Inc.	E-MAIL ADDRESS: nancyc@generalsouthwest.com
A United Valley Insurance Services Member	INSURER(S) AFFORDING COVERAGE / NAIC #
5628 East Thomas Road	INSURER A: CopperPoint Mutual Insurance Company 14216
Phoenix, Arizona 85018	INSURER B:
INSURED	INSURER C:
Tucson Asphalt Contractors Inc	INSURER D:
2425 W Curtis Rd	INSURER E:
Tucson, AZ 85705	INSURER F:

COVERAGES CERTIFICATE NUMBER: 1962 REVISION NUMBER:

THIS IS TO CERTIFY THAT THE POLICIES OF INSURANCE LISTED BELOW HAVE BEEN ISSUED TO THE INSURED NAMED ABOVE FOR THE POLICY PERIOD INDICATED. NOTWITHSTANDING ANY REQUIREMENT, TERM OR CONDITION OF ANY CONTRACT OR OTHER DOCUMENT WITH RESPECT TO WHICH THIS CERTIFICATE MAY BE ISSUED OR MAY PERTAIN, THE INSURANCE AFFORDED BY THE POLICIES DESCRIBED HEREIN IS SUBJECT TO ALL THE TERMS, EXCLUSIONS AND CONDITIONS OF SUCH POLICIES. LIMITS SHOWN MAY HAVE BEEN REDUCED BY PAID CLAIMS.

INSR LTR	TYPE OF INSURANCE	ADDL INSD	SUBR WVD	POLICY NUMBER	POLICY EFF (MM/DD/YYYY)	POLICY EXP (MM/DD/YYYY)	LIMITS
	COMMERCIAL GENERAL LIABILITY						EACH OCCURRENCE $
	CLAIMS-MADE OCCUR						DAMAGE TO RENTED PREMISES (Ea occurrence) $
							MED EXP (Any one person) $
	GEN'L AGGREGATE LIMIT APPLIES PER:						PERSONAL & ADV INJURY $
	POLICY PRO-JECT LOC						GENERAL AGGREGATE $
	OTHER:						PRODUCTS - COMP/OP AGG $
	AUTOMOBILE LIABILITY						$
	ANY AUTO						COMBINED SINGLE LIMIT (Ea accident) $
	ALL OWNED AUTOS / SCHEDULED AUTOS						BODILY INJURY (Per person) $
	HIRED AUTOS / NON-OWNED AUTOS						BODILY INJURY (Per accident) $
							PROPERTY DAMAGE (Per accident) $
	UMBRELLA LIAB OCCUR						$
	EXCESS LIAB CLAIMS-MADE						EACH OCCURRENCE $
	DED RETENTION $						AGGREGATE $
							$
A	WORKERS COMPENSATION AND EMPLOYERS' LIABILITY						✓ PER STATUTE OTH-ER
	ANY PROPRIETOR/PARTNER/EXECUTIVE OFFICER/MEMBER EXCLUDED? (Mandatory in NH) T/C	Y/N	Y	1809511	10/1/2014	10/1/2015	E.L. EACH ACCIDENT $ 1,000,000
	If yes, describe under DESCRIPTION OF OPERATIONS below						E.L. DISEASE - EA EMPLOYEE $ 1,000,000
							E.L. DISEASE - POLICY LIMIT $ 1,000,000

APPROVED
OCT 09 2014
ADOT - ASD
RISK MANAGEMENT

DESCRIPTION OF OPERATIONS / LOCATIONS / VEHICLES (ACORD 101, Additional Remarks Schedule, may be attached if more space is required)

Additional Insured: ADOT Tucson District Permits includes a Waiver of Subrogation per form WC000313 04/84.
RE: Work performed on behalf of Metropolitan Domestic Water Improvement District

CERTIFICATE HOLDER

Holder's Nature of Interest: Additional Insured

ADOT Tucson District Permits

1221 S Second Ave
Tucson, AZ 85713-1602

CANCELLATION

SHOULD ANY OF THE ABOVE DESCRIBED POLICIES BE CANCELLED BEFORE THE EXPIRATION DATE THEREOF, NOTICE WILL BE DELIVERED IN ACCORDANCE WITH THE POLICY PROVISIONS.

AUTHORIZED REPRESENTATIVE

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WORKERS COMPENSATION AND EMPLOYERS LIABILITY INSURANCE POLICY

WC 00 03 13
(Ed 4-84)

WAIVER OF OUR RIGHT TO RECOVER FROM OTHERS ENDORSEMENT

We have the right to recover our payments from anyone liable for an injury covered by this policy. We will not enforce our right against the person or organization named in the Schedule. (This agreement applies only to the extent that you perform work under a written contract that requires you to obtain this agreement from us.)

This agreement shall not operate directly or indirectly to benefit anyone not named in the Schedule.

Schedule

ANY PERSON OR ORGANIZATION TO WHOM OR WHICH YOU ARE REQUIRED BY WRITTEN CONTRACT TO OBTAIN THIS WAIVER OF OUR RIGHT TO RECOVER FROM OTHERS AGREEMENT

This endorsement changes the policy to which it is attached and is effective on the date issued unless otherwise stated.
(The information below is required only when this endorsement is issued subsequent to preparation of the policy.)

Endorsement Effective | Policy No. | Endorsement No.

Insured

Insurance Company | Countersigned by

WC 00 03 13
(Ed 4-84)

Copyright 1983 National Council on Compensation Insurance.

CERTIFICATE OF LIABILITY INSURANCE

DATE (MM/DD/YYYY): 3/27/2015

THIS CERTIFICATE IS ISSUED AS A MATTER OF INFORMATION ONLY AND CONFERS NO RIGHTS UPON THE CERTIFICATE HOLDER. THIS CERTIFICATE DOES NOT AFFIRMATIVELY OR NEGATIVELY AMEND, EXTEND OR ALTER THE COVERAGE AFFORDED BY THE POLICIES BELOW. THIS CERTIFICATE OF INSURANCE DOES NOT CONSTITUTE A CONTRACT BETWEEN THE ISSUING INSURER(S), AUTHORIZED REPRESENTATIVE OR PRODUCER, AND THE CERTIFICATE HOLDER.

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PRODUCER	CONTACT NAME: Daniel McCartin
Crest Insurance Group, LLC 5285 East Williams Circle Suite 4500 Tucson AZ 85711	PHONE (A/C, No, Ext): 520-881-5760 FAX (A/C, No): 520-325-3757 E-MAIL ADDRESS: dmccartin@crestins.com

INSURED	INSURER(S) AFFORDING COVERAGE	NAIC #
70TUCSASP Tucson Asphalt Contractors, Inc. 2425 W. Curtis Road Tucson AZ 85705-1125	INSURER A: Westfield Insurance Company	24112
	INSURER B:	
	INSURER C:	
	INSURER D:	
	INSURER E:	
	INSURER F:	

COVERAGES **CERTIFICATE NUMBER:** 356534912 **REVISION NUMBER:**

THIS IS TO CERTIFY THAT THE POLICIES OF INSURANCE LISTED BELOW HAVE BEEN ISSUED TO THE INSURED NAMED ABOVE FOR THE POLICY PERIOD INDICATED. NOTWITHSTANDING ANY REQUIREMENT, TERM OR CONDITION OF ANY CONTRACT OR OTHER DOCUMENT WITH RESPECT TO WHICH THIS CERTIFICATE MAY BE ISSUED OR MAY PERTAIN, THE INSURANCE AFFORDED BY THE POLICIES DESCRIBED HEREIN IS SUBJECT TO ALL THE TERMS, EXCLUSIONS AND CONDITIONS OF SUCH POLICIES. LIMITS SHOWN MAY HAVE BEEN REDUCED BY PAID CLAIMS.

INSR LTR	TYPE OF INSURANCE	ADDL INSD	SUBR WVD	POLICY NUMBER	POLICY EFF (MM/DD/YYYY)	POLICY EXP (MM/DD/YYYY)	LIMITS	
A	X COMMERCIAL GENERAL LIABILITY CLAIMS-MADE [X] OCCUR GEN'L AGGREGATE LIMIT APPLIES PER: POLICY [X] PRO-JECT [ ] LOC OTHER:	Y	Y	TRA0258615	2/20/2015	2/20/2016	EACH OCCURRENCE DAMAGE TO RENTED PREMISES (Ea occurrence) MED EXP (Any one person) PERSONAL & ADV INJURY GENERAL AGGREGATE PRODUCTS - COMP/OP AGG	$2,000,000 $500,000 $5,000 $2,000,000 $4,000,000 $4,000,000
A	AUTOMOBILE LIABILITY X ANY AUTO ALL OWNED AUTOS SCHEDULED AUTOS X HIRED AUTOS X NON-OWNED AUTOS	Y	Y	TRA0258615	2/20/2015	2/20/2016	COMBINED SINGLE LIMIT (Ea accident) BODILY INJURY (Per person) BODILY INJURY (Per accident) PROPERTY DAMAGE (Per accident)	$1,000,000 $ $ $
A	X UMBRELLA LIAB X OCCUR EXCESS LIAB CLAIMS-MADE DED X RETENTION $ 0			TRA0258615	2/20/2015	2/20/2016	EACH OCCURRENCE AGGREGATE	$3,000,000 $3,000,000
	WORKERS COMPENSATION AND EMPLOYERS' LIABILITY ANY PROPRIETOR/PARTNER/EXECUTIVE OFFICER/MEMBER EXCLUDED? (Mandatory in NH) Y/N If yes, describe under DESCRIPTION OF OPERATIONS below	N/A					PER STATUTE / OTH-ER E.L. EACH ACCIDENT E.L. DISEASE - EA EMPLOYEE E.L. DISEASE - POLICY LIMIT	$ $ $
A	Rented/Leased Equipment			TRA0258615	2/20/2015	2/20/2016	Limit: $100,000 Ded.: $500	

APPROVED
APR 02 2015
ADOT - ASD
RISK MANAGEMENT

DESCRIPTION OF OPERATIONS / LOCATIONS / VEHICLES (ACORD 101, Additional Remarks Schedule, may be attached if more space is required)

Certificate holder, State of Arizona and others when required in a written contract or agreement are Additional Insured (General Liability & Automobile Liability). Coverage is Primary & Non-Contributory (General Liability). Waiver of Subrogation (General Liability, Automobile Liability) applies. This form is subject to all policy forms, terms, endorsements, conditions definitions & exclusions.

CERTIFICATE HOLDER

Arizona Department of Transportation
Attn: Manager - Maintenance Permits Services
206 S. 17th Ave., Mail Drop 004R
Phoenix AZ 85007

CANCELLATION

SHOULD ANY OF THE ABOVE DESCRIBED POLICIES BE CANCELLED BEFORE THE EXPIRATION DATE THEREOF, NOTICE WILL BE DELIVERED IN ACCORDANCE WITH THE POLICY PROVISIONS.

AUTHORIZED REPRESENTATIVE
Cody Ritchil

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05/21/2015 08:06

480-963-9100
05/21/2015 08:42

CAT
05/21/2015 08:38

ROAD
SC 0800538
Wirtgen
05/21/2015 08:22

U-HAUL
05/21/2015 08:07

05/21/2015 08:06

05/21/2015 11:35

U-HAUL
05/21/2015 11:34

ARIZONA WATER COMPANY

CONSTRUCTION PLACED IN SERVICE NOTICE

WORK AUTHORIZATION NO.: 1-5339

DIVISION: CC/PV

DATE PLACED IN SERVICE: 5/21/15

CONTRACT NO:

FOR PURPOSES OF *MODIFIED ACCELERATED COST RECOVERY SYSTEM*, AN ASSET IS "PLACED IN SERVICE" WHEN IT IS IN A CONDITION OR STATE OF READINESS AND AVAILABILITY FOR A SPECIFICALLY ASSIGNED FUNCTION, WHETHER IT BE FOR USE IN A TRADE OR BUSINESS, OR FOR THE PRODUCTION OF INCOME.

I CERTIFY THAT THE ASSET(S) CONSTRUCTED PURSUANT TO THE PROVISIONS OF THE ABOVE-REFERENCED WORK AUTHORIZATION ARE READY FOR SERVICE AS OF THE DATE SHOWN ABOVE.

	6-11-15
~~Division Manager~~ or Operations Superintendent *(signature)*	Date

SUBMIT ORIGINAL TO ACCOUNTING DEPARTMENT

A-1-3-1
FKS 11/24/11

Western Group Rate Case

Exhibit FKS-1

5341 Cholla St Asphalt

ARIZONA WATER COMPANY
WORK AUTHORIZATION

W.A. NUMBER: 1-5341
P.E. NUMBER:
BUDGET ITEM NO.: Special No. 11
SHEET NO.: 1 of 2

SYSTEM: PINAL VALLEY
DIVISION: CASA GRANDE
RESPONSIBLE PERSON: RAY MURIETTA
TAX CODE: 0403

RETENTION REQUIRED: ☑ YES ☐ NO
WORK TO START BY: UPON AUTHORIZATION
WORK TO BE FINISHED BY: WITHIN 55 DAYS

DESCRIPTION OF WORK:

Replace leaking water service line and construct 100 ft.x11 ft. permanent asphalt patch and one concrete sidewalk panel to replace temporary asphalt patch on Pinal Avenue (ADOT SR-387) and Cholla Street in Casa Grande, Arizona.

FACTORS JUSTIFYING WORK:

A water service line leak caused Company servicemen to excavate and remove a portion of asphalt and one concrete sidewalk panel on Pinal Avenue (ADOT SR-387) and Cholla Street. Company servicemen replaced the water service line and constructed a temporary asphalt patch to replace the excavated asphalt and concrete sidewalk. ADOT requires the Company to replace the temporary asphalt patch with a full lane width, 2-inch deep mill and overlay for 50 feet each side of the water service line replacement and replace one concrete sidewalk panel in accordance with the ADOT highway encroachment permit. Company Engineers worked with the Company's General Counsel to submit an insurance claim to the Company's insurance carrier to cover the cost of the asphalt replacement.

COST ESTIMATE		AUTHORIZATION	DATE
COST OF WORK:		PREPARED BY: John Knobbe JK 5-7-15	4-1-2015
MATERIAL	1,719		
LABOR	7,313	REVIEWED FOR EASEMENT/ROW VERIFICATION: Charles Briggs CB 05-07-2015	04-01-2015
CONTRACT PORTION	29,383		
OVERHEAD	4,600	REVIEWED BY: James Wilson JW 5/8/15	4/1/15
TOTAL AUTHORIZED EXPENDITURES CHARGEABLE TO THIS W.A.	$ 43,015		
FUNDS RECEIVED:		APPROVED BY ENGINEERING: Fredrick Schneider 5-11-15	4-6-2015
CONTRIBUTIONS RECEIVED	0		
REFUNDABLE ADVANCES RECEIVED	0	APPROVED BY FINANCE: Joseph Harris	4/7/15
TOTAL CONTRIBUTIONS/ADVANCES	0		
NET COMPANY CASH REQUIRED	$ 43,015	SPECIAL ITEM EXCEEDING $10,000; AUTHORIZED BY PRESIDENT: William Garfield	4-7-15
		SPECIAL ITEM EXCEEDING $10,000; AUTHORIZED BY CHAIRMAN: M. L. Whitehead Approved w/ Special No. 10	

COMMENTS:

Transfer required funds from the 2015 Construction Contingency Budget to fund this project.

CONSTRUCTION RELEASE:

RELEASED TO CONSTRUCTION

Authorized by FRED SCHNEIDER
Date 5/6/15

Pkage.

AFH

ARIZONA WATER COMPANY

WORK AUTHORIZATION - DETAIL SHEET

W.A. NUMBER: 1-5341
P.E. NUMBER:
BUDGET ITEM NO.: Special No. 11
SHEET NO.: 2 of 2

RETIREMENT PROPERTY UNITS	WORK PROPERTY ACCOUNT	UNIT DESCRIPTION	QUANTITY	YEAR INSTALLED AS W.A. NUMBER

PROJECT DESCRIPTION:

Replace leaking water service line and construct 100 ft.x11 ft. permanent asphalt patch and one concrete sidewalk panel to replace temporary asphalt patch on Pinal Avenue (ADOT SR-387) and Cholla Street in Casa Grande, Arizona.

	DESCRIPTION	PLANT PROP ACCT	QUANTITY	UNIT COST	TOTAL
CONTRACT WORK	Saw-cut and remove a 6 ft. x 11 ft. temporary asphalt patch, remove				
	and replace one sidewalk panel, and mill and overlay full lane width				
	50 ft. on both sides of replacement	345	.1	27,000.00	27,000
	Contracting Tax	345	1	1,877.85	1,878
	100% Performance and Payment Bonds	345	1	505.36	505
	SERVICE CONNECTIONS COMPLETE: DOUBLE-LONG	345			
	SERVICE CONNECTIONS COMPLETE: DOUBLE-SHORT	345			
	SERVICE CONNECTIONS COMPLETE: SINGLE-LONG	345			
	SERVICE CONNECTIONS COMPLETE: SINGLE-SHORT	345			
TOTAL CONTRACT WORK					$ 29,383
MATERIALS	Construct temporary asphalt patch	345	1	$ 1,719.00	$ 1,719
	SERVICE CONNECTIONS: DOUBLE-LONG	345			
	SERVICE CONNECTIONS: DOUBLE-SHORT	345			
	SERVICE CONNECTIONS: SINGLE-LONG	345			
	SERVICE CONNECTIONS: SINGLE-SHORT	345			
	METERS	346			
TOTAL MATERIALS					$ 1,719
LABOR	Engineering design and project management	345	24	$ 65.00	$ 1,560
	Construct temporary asphalt patch	345	1	3,373.00	3,373
	TESTING FEE		1	$ 1,500.00	1,500
	PERMIT FEE				
	SURVEY FEE				
	FIELD INSPECTION	345	16	55.00	880
	INSTALL SERVICE CONNECTIONS: DOUBLE-LONG	345			
	INSTALL SERVICE CONNECTIONS: DOUBLE-SHORT	345			
	INSTALL SERVICE CONNECTIONS: SINGLE-LONG	345			
	INSTALL SERVICE CONNECTIONS: SINGLE-SHORT	345			
TOTAL LABOR					$ 7,313
SUBTOTAL - CONTRACT WORK, MATERIALS, AND LABOR					$ 38,415
OVERHEAD					4,600
TOTAL	REFUNDABLE PORTION ☐	NON-REFUNDABLE PORTION ☐		COST ESTIMATE	$ 43,015

AFN

ARIZONA WATER COMPANY

3805 N. BLACK CANYON HIGHWAY, PHOENIX, ARIZONA 85015-5351 • P.O. BOX 29006, PHOENIX, AZ 85038-9006
PHONE: (602) 240-6860 • FAX: (602) 240-6874 • TOLL FREE: (800) 533-6023 • www.azwater.com

May 6, 2015

Mr. Bruce Balls
B & F Contracting, Inc.
11011 N. 23rd Avenue
Phoenix, AZ 85029

Re: Pinal Avenue and Cholla Street Asphalt Replacement

PROJECT: Pinal Ave & Cholla St Asphalt	
SYSTEM: Pinal Valley	
CONTRACT NO.:	
P.E. NO.:	W.A. NO.: 1-5341

Dear Mr. Balls:

Enclosed is your copy of the Proposal/Contract for the above-referenced project, which has been accepted by Arizona Water Company (the "Company"). The project shall be constructed in accordance with the Company's *General Conditions of Contract, the Specifications and the Drawings* which were included with the Company's previously provided Proposal/Contract, copies of which are being provided again and attached herewith.

Also enclosed are two copies of the Commencement Notice for the above-referenced project. Please sign one of the copies and return it to my attention retaining the other for your records.

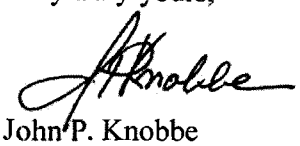
As provided in paragraph 4 of the Company's Proposal/Contract executed by the Company on May 11, 2015, B & F Contracting, Inc. acknowledged that one hundred percent (100%) Performance and Payment Bonds are required and must be provided to the Company prior to the commencement of work. In addition, as provided in paragraph 44 of the Company's General Conditions of Contract, the 100% Performance and Payment Bonds must be provided within ten (10) calendar days of the date of the Commencement Notice. Failure to provide an acceptable 100% Performance and Payment Bond does not limit the Company's

ability to terminate the Proposal/Contract or seek restitution for damages that the Company may have or will incur.

Prior to the start of construction, please call Ray Murrieta, Division Manager at 520-836-8785 to schedule a pre-construction meeting. In addition, please provide the required Performance and Payment Bonds to the Company promptly so that the contracted work can be completed within the contract's timeline.

If you have any questions, please call me at this office.

Very truly yours,



John P. Knobbe
Lead Designer
jknobbe@azwater.com

afh
Enclosure

ARIZONA WATER COMPANY

Casa Grande / Pinal Valley
220 E 2nd Street Casa Grande Az 85122
O - 520-836-8785 F- 520-836-2850

PROPOSAL/CONTRACT

CONTRACTOR: B + F Contracting, INC	SYSTEM: 041
ADDRESS: 11011 N. 23 Ave	W.A. No(s): 1-5841
CITY ST ZIP: Phoenix, Arizona 85029	BID DUE DATE: February 20 ,2015

CONTRACTOR SUBMITS this PROPOSAL/CONTRACT to ARIZONA WATER COMPANY, an Arizona corporation (the "Company"), to perform the work and complete the project described on Page 2 (the "Project"), as an independent prime contractor.

1. Contractor certifies that it has a complete copy of, and has read, understands and accepts, the Company's General Conditions of Contract, and the Company's Construction Specifications and Standard Specification Drawings, (the "Specifications"), all of which are attached hereto. Contractor has examined the specific plans and related construction drawings for the Project (the "Drawings"), copies of which are also attached hereto. The General Conditions of Contract, Specifications and Drawings are incorporated into this Proposal/Contract. Contractor affirms that all work and materials to be furnished or purchased for the Project will be in strict conformance with the General Conditions of Contract, Specifications and Drawings.
2. Contractor represents and warrants that it has satisfied and complied with the provisions of Section 6, Contractor Understands Work and Working Conditions, of the General Conditions of Contract prior to submitting this Proposal/Contract.
3. Contractor represents that this Proposal/Contract is fair and honest in all respects, is submitted in good faith and is not submitted in collusion with any other company, entity or person.
4. Contractor acknowledges that one hundred percent (100%) Performance and Payment Bonds are required and must be provided to the Company prior to the commencement of work.
5. Prior to the commencement of work, Contractor will submit to the Company a list of all materials to be used in the Project. The materials list will include the manufacturer, part number, price and quantity included in this Proposal/Contract.
6. Contractor will furnish all labor, tools, equipment and materials required to complete the Project according to the General Conditions of Contract, Specifications and Drawings. No materials purchased by Contractor to be incorporated into the Project are subject to tax at the time of purchase and Contractor will not charge the Company for any such tax. Contractor will pay the applicable transaction privilege tax (the "Contracting Tax") on the Project after Contractor receives payment of the final Project invoice from the Company. The cost of materials incorporated into the Project which are exempt by Arizona Revised State Statues ("A.R.S ") from the Contracting Tax, for example, pipes or valves having a diameter of four (4) inches or larger, including equipment, fittings and any other related part that is used in operating the pipes or valves (A.R.S. §42-5061 B.6.), will not be included in the total cost of the labor and materials upon which the Contracting Tax is computed. Contractor retains full liability and obligation to pay the Contracting Tax and will defend and indemnify the Company against any demand or obligation to pay the Contracting Tax.
7. Contractor will maintain detailed accounting records of all materials purchased and incorporated into the Project. Such records will include all supporting original vendor invoices for all materials purchased. Following completion of the Project, Contractor will submit an itemized accounting to the Company which will include all supporting original vendor invoices and satisfactory evidence of payment thereof. The Company will not pay Contractor for materials not actually incorporated into the Project, and the disposition of such materials will remain Contractor's responsibility.
8. The Estimated Total Cost of the Project, shown on Page 2, is based on estimated labor and material quantities to be furnished. It includes an estimate of the Contracting Tax and the cost of the required Performance and Payment Bonds. Contractor will not cancel, modify or withdraw this Proposal/Contract during a ninety-day (90) period commencing on the Bid Due Date. The Company may accept this Proposal/Contract by signing and mailing, or otherwise delivering, a copy hereof to Contractor during such ninety-day (90) period. If the Company does not accept this Proposal/Contract during such ninety-day (90) period, Contractor may cancel this Proposal/Contract by giving written notice of cancellation to the Company.
9. Prior to the commencement of work, Contractor will provide the Company with a detailed construction schedule, in either Gantt or CPM form, identifying all tasks to be performed from the date of the written Commencement Notice through completion of the Project, including testing, training of Company Personnel and final Project invoicing. Contractor will provide the Company with a copy of such construction schedule documenting the progress of work on the Project at least monthly.
10. Contractor will not commence work on the Project until the Company gives Contractor a written Commencement Notice. Contractor will complete the Project within 30 calendar days after the Commencement Notice is issued.
11. Following the Company's written notice of satisfactory completion of the Project, and upon receipt of the final Project invoice from Contractor, the Company shall pay Contractor the actual total cost of the Project, which will be calculated as shown on Page 2, except that actual labor and material quantities installed/constructed will be substituted for the estimated labor and materials quantities and the Contracting Tax will be recalculated based on such actual labor and materials quantities.
12. The amount of applicable liquidated damages for Contractor's failure to deliver or perform within the time limit shown in Paragraph 10 may be deducted from the Company's payment of the final Project invoice. This provision shall not limit the Company's ability to terminate this Proposal/Contract for Contractor's unsatisfactory performance or failure to perform as provided in the General Conditions of Contract, Specifications or Drawings, or in this Proposal/Contract.

SPECIAL CONDITIONS:

NO POLLUTION INSURANCE REQUIRED PER EMAIL FROM FRED SCHNEIDER DATED 2-4-2015

CONTRACTOR	PROPOSAL/CONTRACT ACCEPTED:
B + F Contracting, INC.	ARIZONA WATER COMPANY
By: Bruce Wayne Balls	By: Fredrick K. Schneider
Print Name: Bruce Wayne Balls	Print Name: Fredrick K. Schneider, PE
Title: Sec	Title: Vice President - Engineering
Date: 2/20/15	Date: 5-11-2015

ARIZONA WATER COMPANY

Casa Grande / Pinal Valley
220 E 2nd Street Casa Grande Az 85122
O - 520-836-8785 F- 520-836-2850

PROPOSAL/CONTRACT

CONTRACTOR: B + F Contracting Inc.	SYSTEM: 041
AZ CONTRACTOR LICENSE NO: ROC-089744 CLASSIFICATION: A-General	W.A. No(s): 1-5341
ADDRESS: 11011 N 23 Ave.	BID DUE DATE: February 20 ,2015
CITY ST ZIP Phoenix, Arizona 85029	BID BOND REQUIRED: √ Yes ☐ No

DESCRIPTION OF PROJECT: Saw cut and remove a 6 foot by 11 foot temporary asphalt patch , remove and replace one sidewalk panel. Mill and overlay full lane width 50 feet on both sides of replacement asphalt. At the intersection of Pinal Ave and Cholla Street in Casa Grande Az. In a portion of the NE 1/4 SEC 19 , T 6 S , R 6 E Per attached drawing , ADOT and AWC specifications.

1-2. MATERIALS EXEMPT FROM CONTRACTING TAX (per Paragraph 6	QUANTITY	UNIT PRICE LABOR	UNIT PRICE MATERIALS	TOTAL COST LABOR	TOTAL COST MATERIALS
				1	2
3. Total Labor to Install Exempt Materials (add the amounts in column 1)				3 —	
4. Total Exempt Materials (add the amounts in column 2)					4 —

5-6. NON-EXEMPT MATERIALS	QUANTITY	UNIT PRICE LABOR	UNIT PRICE MATERIALS	TOTAL COST LABOR	TOTAL COST MATERIALS
Saw cut and remove a 6 foot by 11 foot temporary asphalt patch ,					
remove and replace one sidewalk panel.					
Mill and overlay full lane width 50 feet on both sides of replacement	1 Lot			20,000 —	7,000 —
				5	6
7. Total Labor to Install Non-Exempt Materials (add the amounts in column 5)				7 20,000 —	
8. Total Non-Exempt Materials (add the amounts in column 6)					8 7,000 —
9. Subtotal A (add lines 3, 7 and 8)					9 27,000 —
10. Contracting Tax Base (multiply the amount on line 9 by 0.65)				10 17,550 —	
11. Applicable Contracting Tax Rate				11 10.79%	
12. Contracting Tax (multiply the amount on line 10 by line 11)					12 1877.85
13. Subtotal B (add lines 4, 9 and 12)					13 28,877.85
14. 100% Performance and Payment Bonds Cost					14 505.36
15. Estimated Total Cost (add lines 13 and 14)					15 29,383.21

NOTE: The Estimated Total Cost includes all labor and materials for backfill, pavement replacement, chip seal, and traffic control necessary for the Project.

ARIZONA WATER COMPANY

COMMENCEMENT NOTICE

CONTRACTOR:

Mr. Bruce Balls
B & F Contracting, inc.
11011 N. 23rd Avenue
Phoenix, AZ 85029

DATE: 5/11/15
DIVISION: CASA GRANDE
SYSTEM: PINAL VALLEY
W.A.: 1-5341

THIS IS YOUR NOTICE TO PROCEED WITH THE FOLLOWING PROJECT(S):

DESCRIPTION OF WORK:

Saw cut and remove a 6 foot by 11 foot temporary asphalt patch, remove and replace one sidewalk panel. Mill and overlay full lane width 50 feet on both sides of replacement asphalt. At the intersection of Pinal Avenue and Cholla Street in Casa Grande, AZ. In a portion of the NE 1/4 SEC 19, T 6 S, R 6 S per attached drawing, ADOT and AWC specifications.

PERFORMANCE AND PAYMENT BONDS REQUIRED: [X] Yes [ ] No

TOTAL DAYS ALLOWED: 40

COMPLETION DATE: 6/22/15

Prior to the start of construction, please call Ray Murrieta, Division Manager at 520-836-8785 to schedule a pre-construction meeting.

ARIZONA WATER COMPANY
Company

By _____
Title Vice President - Engineering

B & F CONTRACTING, INC.
Contractor *(type name)*

By _____
Title _____

ARIZONA WATER COMPANY

SPECIFICATIONS

GENERAL CONDITIONS OF CONTRACT: E-4-1

CONSTRUCTION SPECIFICATIONS: E-8-1

STANDARD SPECIFICATION DRAWINGS: E-9-1

2007 EDITION WITH **2010** REVISIONS;
2012 GENERAL CONDITIONS OF CONTRACT

5-7-2015

A copy of this entire Spec Book was sent out with B&F Contracting Proposal package for I-5341 Pinal Ave & Cholla St Asphalt Replacement on 5/11/15 DA

ARIZONA DEPARTMENT OF TRANSPORTATION
TUCSON DISTRICT
PERMIT INSPECTION REPORT

PERMIT # 121431I ROUTE 387 BEGIN M.P. 0.8 END M.P. 0.8

PERMITTEE: James T. Wilson (Arizona Water Co.)

PROPOSED WORK: Emergency Water Line and Pavement Repair.

PART A PRE-PERMIT SITE INSPECTION DATE 4-20-2015

(Permit) (Maintenance) (Construction) SUPVR:

1) Verify M.P. location 0.8 Direction: (N)(S)(E)(W)
2) Check Drainage, existing or new EXISTING
3) Fence-Existing or New NONE
4) Utilities -Existing overhead or underground
5) Is Sight distance check required NO

Inspection performed by F. Caballero
Title Permits Inspector

PART B INTERMEDIATE PERMIT (DURING WORK) INSPECTION DATE

1) Date notice to begin work received 5-19-2015 Date Permit work began 6-8-2015
2) Work being performed in accordance with permit (YES) (NO) Comments: First T.C.P. submitted was Rejected. New T.C.P. applied for 10 days later and was Approved.
3) Work progressing within permit time allocated. Spoke To Contractor and Job is Expected To last 4 days from start to finish.

Inspection performed by F. Caballero Title Permit Inspector Date 6-9-2015

Recommend 0 month extension from previous completion date based on (Verbal Request) (Permittees letter). (attach copy of letter or indicate if being sent directly to Permits Office)
Recommend Cancellation _____ Effective date _____
Reason for extension or cancellation _____
Signature of Supvr. Dennis L. Gillie Date 7/6/15

PART C FINAL INSPECTION OF PERMIT WORK DATE 6-20-2015

1) All work (WAS) (WAS NOT) completed in accordance with the permit requirements.
2) Changes made in the field: None

_____ Are marked on the attached permit plans sheets.

_____ Will be submitted to the Permit Office by the Permittee.

Additional Comments: Was on site for most of Project, Receipt for slurry Attached, Hot Mix Comming out of Tek was 350° at Test. Pictures of Project Attached.

ALL WORK WAS SATISFACTORILY COMPLETED ON THIS PERMIT ON (DATE) 6-20-2015
AND INSPECTED BY Frank Caballero TITLE Permits Inspector

rev 6/94

CEMEX

56695238

Hot Mix was 350° Right out of Tek Documented.

Plant:	Begin Loading:	To Job:	Arrive Job:	Start Unload:	Finish Unload:	Leave Job:	Return Plant:
	912	921	9:38	939	944		

Customer Code: 3029758 Customer Name: B&F CONTRACTING INC

Customer Job Number: 5180

Order Code / Date: 6601 06/10/15

Project Code: 410T9267 Project Name: PINAL AVE PAVING 15180

Project P.O. Number: AWARDED

Order P.O. Number: 17438

Ticket Date: 06/10/15 Delivery Address: PINAL AVE (SR387) & CHOLLA, CASA GRANDE

Map Page: 265 Map/Row/Column: DINNK182

Delivery Instructions: ON PINAL AVE S/OF COTTONWOOD @ CHOLLA

Dispatcher: rhvrame

Ticket Number: 4311757

Due On Job:	Slump:	Truck Number:	Driver Number:	Driver Name:	End Use:
09:15	6.00	10060463	411687	KINNEY, ERIC	SLB UNDRGRND: BED/F

LOAD QUANTITY	CUMULATIVE QUANTITY	ORDERED QUANTITY	MATERIAL CODE	PRODUCTION DESCRIPTION	UOM	UNIT PRICE	AMOUNT
6.00	6.00	6.00	1382797	PHOLSM #57 0.5# MAG SEC728 LEGACY MATERIAL NO:	YD3		
1.00			1247818	FUEL SURCHARGE ADJ			
1.00			1008749	ENVIRONMENTAL FEE			

JUN 19 AM 9:12

☐ Cash ☐ Check ☐ Charge	Check # / Auth Code:	Signature of Driver Receiving Cash:	Cash Received:	Total COD Order Amount to Collect Without Standby Charges:

Comments:

*****ADOT SPECIFICATION*****
PERCENT MOISTURE IN RUCK?
PERCENT MOISTURE IN SAND?
GALS WATER WITHHELD IN BATCH?
DID YOU RESET COUNTER?
GALS WATER ADDED AT PLANT?
MIN OF 70, MAX OF 100 REVS BEFORE
LV PLANT - PER ADOT SPEC?

WATER ADDED: 2 GAL YARDS IN DRUM: _____ WHEN ADDED.

SIGNATURE

CURB LINE CROSSED AT OWNER'S/AGENT'S REQUEST:

SIGNATURE

☐ LOAD WAS TESTED BY: _____

Notice: Our drivers will make every effort to place materials where the customer designates, but the Company assumes no responsibility for damages inside curb or property line. Customer agrees to the terms of sale and delivery and accepts concrete as is. Due to important factors which are out of our control after delivery, this Company will not accept any responsibility for the finished results. No credit for returned concrete. Buyers exceptions and claims shall be deemed waived unless made to us in writing within one business day after the receipt of materials.

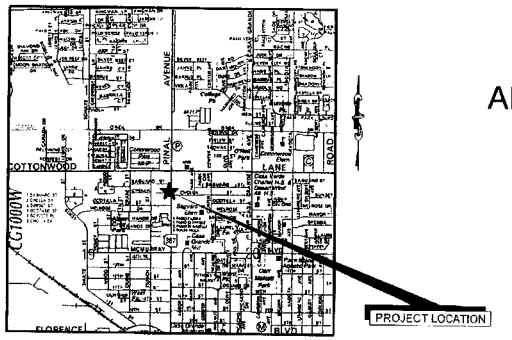
SPECIAL TERMS: Any water added is at customers own risk. If water is added on job, concrete strength is no longer guaranteed. **WARNING:** Product may cause skin and/or eye irritation. **CAUTION:** Material may be hazardous to your safety and health. Please refer to the backside of this ticket for important safety handling information, and to the material safety data sheets for additional information.

AUTHORIZED SIGNATURE:

Ⓧ

68UNIVERSAL PREV TRK? INVOICE LOAD NUM: 1

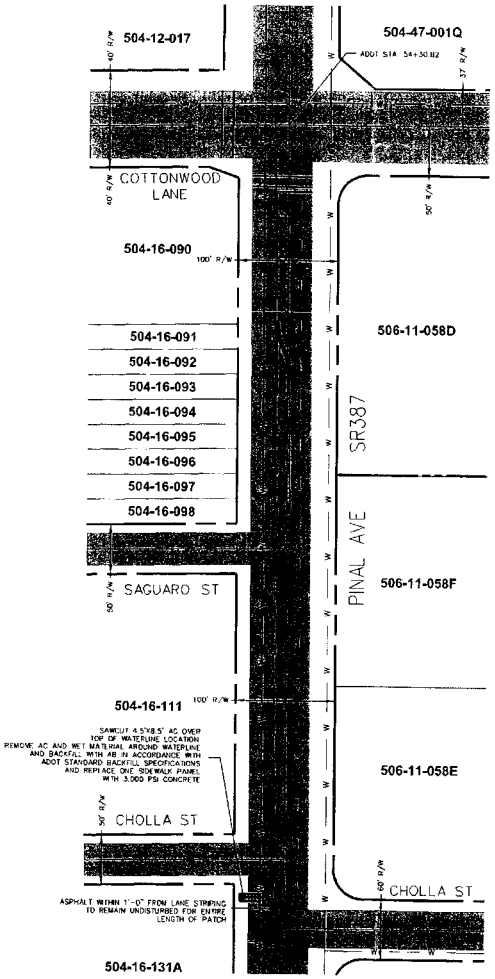
SAW CUT 4.5' x 8.5' AC OVER TOP OF WATER LINE LOCATION AND REMOVE AND REPLACE ONE SIDEWALK PANEL WITH 3,000 PSI CONCRETE ALONG CHOLLA STREET, LOCATED WITHIN THE NE 1/4 SEC. 19, T. 6 S., R. 6 E. OF THE G. & S. R. B. & M.



VICINITY MAP

GENERAL NOTES

1. All work and materials shall conform to current County Health Department Standards and Revisions, Arizona Water Company Standard Specifications and Details, and Arizona Department of Health Services Engineering Bulletin No. 10.
2. Permits required will be secured from the appropriate agency, I.E. county permit in county right-of-way.
3. Prior to construction, the appropriate agency(ies) will be notified as required by the permit(s).
4. All backfill, compaction, and testing shall be per current County, City, State, ADOT, and Arizona Water Company standards and specifications.
5. All water lines 8" and less are to have a minimum cover of 36 inches & all water lines 12" and greater are to have 48" of minimum cover over the top of pipe to finished grade, unless otherwise specified on the construction drawings.
6. All fromes, covers, valve boxes, etc. shall be adjusted to finished grade prior to placing of asphaltic concrete surface course by the contractor. (where applicable)
7. All water lines shall be pressure and leakage tested in accordance with AWWA C-600 or MAG 610-14.
8. All water lines are to be disinfected per ADEQ Engineering Bulletin No.8 and AWWA C651-92.
9. Air release valves are required at water system high points per Arizona Water Company standard details.
10. Water/sewer separation shall be per current Arizona Water Company standards and ADEQ AAC R18-5-502-C.
11. It shall be the contractors responsibility to uncover all existing water lines being connected to, and to verify the location, depth and size of pipe before any construction begins.
12. Any construction performed without the knowledge of the inspector or his representative is liable for removal and replacement at the contractor's expense.
13. In accordance with AAC R18 4-213, all materials added after January 1, 1993 which may come in contact with drinking water, shall conform to National Sanitation Foundation Standards 60 and 61.
14. All water services shall be set a minimum of 2 Feet on the customers property and NOT within right-of-way.
15. Unless otherwise specified on the construction drawings, all water mains are to be installed 5 Feet from the property line inside the right-of-way or easement.
16. Water valves shall be spaced not more than 500 Feet in commercial districts and not more than 800 Feet in other districts. Variations may be required for transmission mains or special applications. Sufficient valving is required where water lines cross streams, railroads and major highways.
17. Maximum Joint Deflection For 6" Mechanical Joint Ductile Iron Pipe Is 7°-7' Or 27" For 18 Foot Length Pipe, For A Maximum Curve Of 145 Feet.
18. Maximum Joint Deflection For 8", 8", & 12" Push-On Joint Ductile Iron Pipe Is 5° Or 19" For 18 Foot Length Pipe, For A Maximum Curve Of 205 Feet.
19. Maximum Joint Deflection For 8" & 12" Mechanical Joint Ductile Iron Pipe Is 5°-21'-0" For 18 Foot Length Pipe, For A Maximum Curve Of 195 Feet.



LEGEND

- STREET CENTERLINE/MONUMENT LINE
- RIGHT-OF-WAY LINE
- PROPERTY LINE
- EX. WATER LINE
- ASPHALT PATCH
- EX. ASPHALT AREA

ADOT ASPHALT REPLACEMENT NOTES:

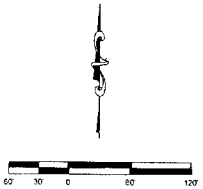
1. Existing pavement shall be saw cut full depth for the trench prior to any excavation.

2. Cement treated slurry backfill meeting ADOT Standard Specifications **501-3.02** and **501-3.04** shall be used in the trench crossing the roadway. Slurry shall be placed full depth of the trench up to the bottom of the existing asphaltic concrete (AC). Steel plates meeting traffic loading requirements shall be placed over the trench and slurry allowed setting a minimum of 24 hours without disturbance. Four feet wide cold mix AC wedges shall be used to hold steel plates in place.

3. Once the slurry is set, AC meeting the requirements of ADOT Standard Specification Section **409** shall be placed in the trench in lifts and properly compacted to the surface of the existing pavement. The thickness of replacement asphalt concrete shall match the existing thickness.

4. In the event the roadway is paved with **Rubberized Asphalt Concrete Friction Course (AR-ACFC), it shall be replaced in kind.**

5. Once the AC patch is completed, all affected travel lanes and shoulders where the patch was placed shall be milled in compliance with ADOT Standard Specification **202-3.03(C)** to a depth of two inches for a length of one hundred feet (fifty feet each side of patch). If the roadway is overlaid with AR-ACFC, the mill depth shall be two and one half (2-½) inches. The milled trench shall be properly cleaned and a Tack Coat placed on all surfaces, including the edges, which meet the requirements of ADOT Standard Specification **404-3.12**. The entire milled surface is then overlaid with two inches of AC meeting the requirements of ADOT Standard Specification Sections **409** and one half inch of AR-ACFC (if present) meeting the requirements of Standard Specification Section **414**.



REVISIONS

The installation shown is to be installed in accordance with Arizona Water Company Standards and Specifications and with the Arizona Department of Environmental Quality

263-1100
1-800-STAKE-IT

P.C. No.	
SYSTEM	PINAL VALLEY
LOCATION	NE 1/4 SEC. 19, T.6S., R.6 E.
JOB REF. NO.	0403
DATE	12/11/2014
SCALE	AS SHOWN
DRAWN BY	
CHECKED BY	MC

ARIZONA WATER COMPANY
3805 N. BLACK CANYON HWY. POST OFFICE BOX 29006
PHOENIX, ARIZONA 85038-9006
(602) 240-6860

PROJECT BRIEF: SAW CUT 4.5' x 8.5' AC OVER TOP OF WATER LINE LOCATION AND REMOVE AND REPLACE ONE SIDEWALK PANE. WITH 3,000 PSI CONCRETE ALONG CHOLLA STREET.

PROJECT SHEET DESC: COVER SHEET

DWG. No.

SHEET 1 OF 1

ADOT

Intermodal Transportation

Douglas A. Ducey, Governor
John S. Halikowski, Director
Dallas Hammit, State Engineer

April 7, 2015

James T. Wilson
ARIZONA WATER CO
P.O. Box 29006
Phoenix, AZ 85038

Re: Permit No. 1214311

Dear James T. Wilson:

Your Permit to use State Highway Right of Way has been approved and a copy of the permit is attached for your records. Please read the specifications and standards which are part of your approved permit.

To schedule a pre-construction meeting, please contact Mr. Frank Cabello, Permit Inspector, at (520) 483-6606 five days prior to performing any work. If Mr. Cabello is unavailable, please contact Mr. Dennis Lillie, Highway Operations Supervisor, at (520) 518-0519.

If at any time during the performance of your work, you determine it will not be possible to complete the permitted work by the expiration date on your permit, please submit a written request for a time extension. Your request should contain the reason for the delay and the additional time needed. Please submit your request to Mr. Cabello for approval and processing.

The safety of your workers and the users of the State Highway is of great concern to us. Prior to beginning work please ensure you are in compliance with the Traffic Control requirements of your permit.

Best wishes in the execution of your work.

Sincerely,

Steve Mishler

Steve Mishler
Tucson District Development Engineer
1221 S. 2nd Avenue
Tucson, AZ 85713
(520) 388-4227

SM:cg

Enclosures

c: ADOT Maintenance Permits
Mr. Lillie and Mr. Cabello, ADOT Maintenance

T-104023

RECEIVED

OCT 16 2014

TUCSON DISTRICT PERMITS

ARIZONA DEPARTMENT OF TRANSPORTATION
INTERMODAL TRANSPORTATION DIVISION
Highway Encroachment Permit Application
(Application for Permission to Use State Highway Right-of-Way)

FOR ADOT USE ADOT Agreement Number: _____ ☐ ECS ☐ JPA ☐ Other _____

PERMIT NUMBER: 1214311 ROUTE: SR 387 MILEPOST: 0.84 - 0.88

ADOT PROJECT NUMBER: S 267(4) ADOT ENGINEERING STATION: 46+50 - 47+33

Name of Encroachment Owner:	Name of Authorized Agent / Applicant (*If other than the Encroachment Owner*):
Arizona Water Company	James T. Wilson, P. E.
Mailing Address of Owner:	Mailing Address:
P. O. Box 29006	P. O. Box 29006
City:	City:
Phoenix	Phoenix
State: AZ Zip: 85038-9006	State: AZ Zip: 85038-9006
Phone:	Phone:
602-240-6860	602-240-6860
E-mail address:	Legal Relationship to Owner:
engineering@azwater.com	☐ Contractor ☐ Sub Contractor ☑ Authorized Employee
Name of Local Point of Contact:	☐ Engineer ☐ Attorney ☐ Other: _____
James T. Wilson, P. E.	
Phone Number for Local Point of Contact:	E-mail Address:
602-240-6860	jwilson@azwater.com

City (in or near) Casa Grande Side of Highway: ☐ N ☐ S ☐ E ☑ W (check one)

Highway Route # SR 387 Approximately 3,800 Feet ☐ N ☑ S ☐ E ☐ W (check one) of Milepost # 242

Encroachment Owner's Project # or Property Parcel #: _____ Project Duration : _____

Description of the proposed work or activity in the right-of-way: Emergency water line repair. Saw cut 4.5' x 8.5' AC over top of water line location. Remove AC and wet material around water line. Repair water line and backfill in accordance with ADOT standard backfill specifications. Remove one sidewalk panel and replace one sidewalk panel with 3,000 psi concrete. Remove wet material around water line and backfill with AB in accordance with ADOT standard backfill specifications.

The Encroachment Owner will be the Permittee. By signing this application, the Encroachment Owner and the Owner's Agent acknowledge that the information given and statements made in this application are true and correct to the best of his/her knowledge. The Encroachment Owner agrees as the Permittee to accept the following General Obligations and Responsibilities as described on page 2 of the application. By accepting an approved encroachment permit, the Permittee agrees to the requirements described in the permit, to be responsible for all permit requirements, and to comply with ADOT's requirements as set out in the permit. An approved permit consists of but is not limited to this application and final supporting documentation approved by ADOT, and any requirements set by ADOT. NO WORK SHALL TAKE PLACE INSIDE THE RIGHT OF WAY WITHOUT AN APPROVED PERMIT ON SITE.

Andrew J. Hall — 9-25-14

Encroachment Owner *(Print Name and Sign)* — **Date**

Andrew J. Hall — 9-25-14

Authorized Agent or Applicant: *If other than the Encroachment Owner (Print Name and Sign)* — **Date**

FOR ADOT USE
PERMIT TO USE STATE HIGHWAY RIGHT-OF-WAY

This application is approved as a permit and a permit is issued to the Permittee. Construction is authorized only for the period indicated below.

FOR Steve Mishler — _____

Authorized ADOT Name and Signature — Authorized ADOT Name and Signature

Jerry James/Assistant District Engineer - Operations

Issue Date 4-13-15 Permit work to be completed by: 7-12-15

№ 1214311

GENERAL OBLIGATIONS AND RESPONSIBLITIES

THE PERMITTEE SHALL:

1. Assume all legal liability and financial responsibility for the encroachment activity for the duration of the encroachment, including indemnify, defend, and save harmless ADOT and the State of Arizona and any of it's agents, directors, officers, employees from and against any and all claims, demands, suits, actions, proceedings, loss, costs, damages of every kind, or expenses, including court costs, reasonable attorney's fees and/or litigation expenses, and costs of claim processing and investigation, arising out of bodily injury or death of any person, or tangible or intangible property damage, caused, or alleged to be caused, in whole or in part, by the negligent or willful acts, or omissions of the Permittee, any of its directors, officers, agents, employees, or volunteers, or its contractor or subcontractors. This indemnity includes any claim or amount arising out of or recovered under the Workers' Compensation Law or arising out of the contractor's failure to conform to any federal, state or local law, statute, ordinance, rule, regulation or court decree. Permittee agrees to provide ADOT with a certificate(s) of insurance consistent with the requirements stated in the ADOT Permit Insurance Matrix. Permittee is also obligated to provide certificates for its contractor(s), if any. The required insurance shall be kept in force by the permittee and its contractors for the term of the permit and shall not expire, be cancelled or materially changed to affect coverage available to the State without thirty (30) days written notice to the State. Automobile and worker's compensation coverage requirements are dependent upon the use of employees and autos for the encroachment activity. Please refer to the Matrix to determine requirements for coverage, limits, language and other insurance related items specific to each permit. Contractor's certificates shall include all subcontractors assureds under its policies, or Contractor shall collect from each of its subcontractors a certificate that meets or exceeds the requirements for a Contractor as outlined in the Matrix. Contractor agrees to maintain and make available to ADOT all subcontractors' certificates upon demand. ADOT reserves the right to require an increase or allow a decrease in insurance limits or coverage based on the risks and financial exposure arising out of the event or activity proposed in the permit application. The Encroachment Permit is issued upon the expressed condition that ADOT and The State of Arizona does not protect or insure against loss of personal property or improvements owned by Permittee. Permittee waives the right to claim damages from ADOT and the State of Arizona for any damage resulting to said property in the event that property is damaged or destroyed by fire or any other perils that is not the direct result of negligence by ADOT or the State of Arizona.
2. Comply with Environmental Laws.
   A. Environmental Laws refers collectively to any and all federal, state, or local statute, law, ordinance, code, rule, regulation, permit, order, or decree regulating, relating to, or imposing liability or standards of conduct on a person discharging, releasing or threatening to discharge or release or causing the discharge or release of any hazardous or solid waste or any hazardous substance, pollutant, contaminant, water, wastewater or storm water, and specifically includes, but is not limited to: The Solid Waste Disposal Act, as amended by the Resource Conservation and Recovery Act; the Comprehensive Environmental Response, Compensation and Liability Act, as amended; the Toxic Substances Control Act; the Clean Water Act (CWA); the Clean Air Act; the Occupational Safety and Health Act; the Arizona Water Quality Act Revolving Fund Act, the Arizona Hazardous Waste Management Act, any applicable National Pollutant Discharge Elimination System (NPDES) or Arizona Pollution Discharge Elimination System (AZPDES) permit, any applicable CWA Section 404 permit, or any local pretreatment or environmental nuisance ordinance.
   B. Specifically agree that in the course of performing any activity for which this Permit is necessary:
      i. To comply with any and all Environmental Laws;
      ii. To ensure that no activity under this Permit shall cause ADOT to be in violation of any Environmental Laws;
      iii. That if the Permittee fails or refuses to comply with any Environmental Laws, or causes ADOT to be in violation of any Environmental Laws, ADOT may at its sole and unreviewable discretion, (1) revoke this Permit; (2) require the Permittee to undertake corrective or remedial action to address any release or threatened release or discharge of the hazardous substance, pollutant or contaminant, water, wastewater or storm water; and (3) expressly consents to entry of injunctive relief to enforce any listed remedies.
      iv. To indemnify ADOT for any losses, damages, expenses, penalties, liabilities or claims of any nature whatsoever suffered by or asserted against ADOT as a direct or indirect result of the disposal, escape, seepage, leakage, spillage, discharge, emission, or release of any hazardous waste, solid waste, hazardous substance, pollutant or contaminant, water, wastewater or storm water and losses, damages, expenses, penalties, liabilities and claims asserted or arising under the Environmental Laws, or for ADOT's costs in undertaking corrective action pursuant to an order of or settlement with a duly authorized regulatory agency or injured third party or for any penalties associated with Permittee's activities;
3. Be responsible for any repair or maintenance work and repair any aspect or condition of the encroachment that causes danger or hazard to the traveling public, for the duration of the encroachment and must perform such work under the appropriate encroachment permit authorization;
4. Comply with ADOT's traffic control standards with an ADOT approved traffic control plan;
5. Obtain written approval from the abutting property owner (and/or underlying fee owner where ADOT owns its right of way by easement) if the encroachment encroaches on abutting property owned by someone other than the permittee (and/or on underlying fee land owned by someone other than the permittee where ADOT owns its right of way by easement). In any case and at the Department's discretion; ADOT may require written approval from the abutting property owner prior to issuance of the encroachment permit.
6. ADOT reserves the right to require the permittee to perform any repairs necessary to the encroachment throughout the life of the encroachment;
7. Remove the encroachment and restore the right-of-way to its original or better condition if ADOT cancels the encroachment permit, and terminates all rights under the permit, or if the project terminates for any reason beyond ADOT's control;
8. Reimburse ADOT for costs incurred or deposit with ADOT money necessary to cover all costs incurred for activities related to the encroachment, such as inspections, restoring the right-of-way to its original or better condition, removing the encroachment, or repair encroachment to originally permitted condition and comply with ADOT's bond policy as applicable;
9. Notify a new owner to apply for an encroachment permit, as required by Arizona Administrative Rule R17-3-502(D);
10. Apply for a new encroachment permit if the use of the permitted encroachment or the use of adjoining property changes;
11. Keep a copy of the encroachment permit at the work site or site of encroachment activity;
12. Construct the encroachment according to attached Specifications, Standards and the plans approved by ADOT as part of the final permit; any changes shall be approved by ADOT prior to implementation;
13. Obtain all required permits from other government agencies or political subdivisions;
14. Remove any defective materials, or materials that fail to pass ADOT's final inspection, and replace with materials ADOT specifies.
15. Have the right to a hearing as prescribed in Arizona Administrative Code, R17-3-509 if the permit application is denied;
16. Understand that once issued, the permit is revocable and subject to modification or abrogation by ADOT at any time, without prejudice.

By accepting an approved encroachment permit, the Permittee agrees to the requirements described in the permit, to be responsible for all permit requirements, and to comply with ADOT's requirements as set out in the permit. NO WORK SHALL TAKE PLACE INSIDE THE RIGHT OF WAY WITHOUT AN APPROVED PERMIT ON SITE. I have read and understand the above requirements: Initial ASH Date 9-25-14

GENERAL REQUIREMENTS:

GR-1 All work shall be done in accordance with current Arizona Department of Transportation Standards, Specifications, and approved plans, and administered by Mr. Dennis Lillie, Highway Operations Supervisor in Tucson.

GR-1A THE PERMITTEE SHALL NOT DEVIATE FROM THIS PERMIT OR THE APPROVED PLANS WITHOUT PRIOR WRITTEN APPROVAL FROM THE PERMITS OFFICE.

INSURANCE REQUIREMENTS

IF SUBCONTRACTORS WILL BE UTILIZED FOR WORK PERFORMED PURSUANT TO A PERMIT, IT IS THE RESPONSIBILITY OF THE ENCROACHMENT OWNER (PERMITTEE) AND THE PRIME CONTRACTOR TO VERIFY THAT EACH AND EVERY SUBCONTRACTOR WORKING PURSUANT TO THEIR PERMIT MAINTAINS VALID AND COLLECTIBLE INSURANCE CONSISTENT WITH THE REQUIREMENTS DESCRIBED IN THE CURRENT ADOT INSURANCE MATRIX ATTACHED HERETO.

GR-2 NO WORK SHALL BEGIN PRIOR TO NOTIFICATION OF PROPER AUTHORITIES. TO SCHEDULE A PRE-CONSTRUCTION MEETING, CONTACT MR. FRANK CABELLO PERMIT INSPECTOR @ (520) 483-6606 5 DAYS PRIOR TO START OF WORK AND WITHIN 3 DAYS AFTER COMPLETION FOR FINAL INSPECTION. IF MR. CABELLO IS UNAVAILABLE, CONTACT MR. DENNIS LILLIE, HIGHWAY OPERATIONS SUPERVISOR, @ (520) 518-0519 IN TUCSON. *Failure to comply with this requirement will result in work stoppage.*

GR-3 It is the Permittee's responsibility to obey all local ordinances, obtain all licenses, pay all charges, fees, and taxes and give notices necessary and incidental to the due and lawful prosecution of the work. (If the permit work includes excavation see Attachment A.)

GR-3A THE PERMITTEE IS RESPONSIBLE FOR COMPLIANCE WITH THE SECTION 404 OF THE FEDERAL CLEAN WATER ACT. OBTAINING ALL 404 PERMITS AND ANY REQUIRED STATE 401 SECTION CERTIFICATIONS IS THE RESPONSIBILITY OF THE PERMITTEE. These programs are administered by the Corps of Engineers and the Arizona Department of Environmental Quality respectively. FURTHER, THE PERMITTEE IS RESPONSIBLE FOR OBTAINING AND COMPLIANCE WITH THE NECESSARY ARIZONA POLLUTION DISCHARGE ELIMINATION SYSTEM (AZPDES) PERMIT AND REQUIRED STORM WATER POLLUTION PREVENTION PLAN (SWPPP) AND APPROVALS. This program is administered by the Arizona Department of Environmental Quality.

GR-4 Traffic shall be protected in accordance with the Manual on Uniform Traffic Control Devices (MUTCD), 2009 Edition, the Arizona Supplement to the MUTCD 2009 Edition, and the ADOT Traffic Control Design Guidelines. All signs, placement of signs and the necessity of flag persons are the responsibility of the Permittee. All Flaggers shall be certified by A.T.S.S.A. or the National Safety Council. (Any other certification programs must be approved by the Engineer.) The Arizona Supplement to the MUTCD 2009 Edition and the ADOT Traffic Control Design Guidelines are available on the Internet or from:

Arizona Department of Transportation
Engineering Records
1655 W. Jackson, Room 112F
Phoenix, Arizona 85007
Phone (602) 712-7498

GR-4B APPROVED TRAFFIC CONTROL PLAN ATTACHED HERETO AND PART OF THE PERMIT.

NO WORK SHALL BEGIN UNLESS AN APPROVED TRAFFIC CONTROL PLAN STAMPED BY ADOT REGIONAL TRAFFIC ENGINEERING IS ON SITE.

GR-5 Prior to final inspection by the Highway Operations Supervisor, all surplus material shall be removed from the Right-of-Way, and the Right-of-Way left in a neat and natural state. Any existing Arizona Department of Transportation or permitted features (i.e. fence, pipes, posts, signs, landscaping, etc.) damaged during permit work shall be repaired by the Permittee.

GR-6 The Permittee agrees to comply with state law for Underground and Overhead facilities. The Permittee shall assume full responsibility in attaining clearances from utility companies and will be responsible for damage to any utility line. Permittee shall call BLUE STAKE AT **1-800-STAKE-IT** two (2) working days prior to any excavation. If Blue Stake is not available, the Permittee shall be responsible for contacting all utilities directly, two working days prior to any excavation. **Please provide your ADOT permit number to the blue stake operator.**

GR-7 All work shall be conducted during daylight hours unless approved by ADOT.

GR-8 The application of water to control dust shall be as deemed necessary by the inspector.

GR-9 If at any time during the performance of your work, you determine it will not be possible to complete the permitted work by the expiration date, please submit a written request for a time extension. Your request should contain the reason for the delay and the amount of time needed.

GR-10 In case of discrepancy or conflict with documents issued with this permit, the order in which they govern shall be as follows:

1. Permit Specifications
2. Project Plans
3. Standard Drawings
4. Standard Specifications

PAVEMENT REPLACEMENT FOR UTILITY TRENCH

PR-1 Existing pavement shall be saw cut full depth for the trench prior to any excavation.

PR-2 Cement treated slurry backfill meeting ADOT Standard Specifications **501-3.02** and **501-3.04** shall be used in the trench crossing the roadway. Slurry shall be placed full depth of the trench up to the bottom of the existing asphaltic concrete (AC). Steel plates meeting traffic loading requirements shall be placed over the trench and slurry allowed setting a minimum of 24 hours without disturbance. Four feet wide cold mix AC wedges shall be used to hold steel plates in place.

PR-3 Once the slurry is set, AC meeting the requirements of ADOT Standard Specification Section **409** shall be placed in the trench in lifts and properly compacted to the surface of the existing pavement. The thickness of replacement asphalt concrete shall match the existing thickness.

PR-4 In the event the roadway is paved with **Rubberized Asphalt Concrete Friction Course (AR-ACFC), it shall be replaced in kind.**

PR-5 Once the AC patch is completed, all affected travel lanes and shoulders where the patch was placed shall be milled in compliance with ADOT Standard Specification **202-3.03(C)** to a depth of two inches for a length of one hundred feet (fifty feet each side of patch). If the roadway is overlaid with AR-ACFC, the mill depth shall be two and one half (2-½) inches. The milled trench shall be properly cleaned and a Tack Coat placed on all surfaces, including the edges, which meet the requirements of ADOT Standard Specification **404-3.12**. The entire milled surface is then overlaid with two inches of AC meeting the requirements of ADOT Standard Specification Sections **409** and one half inch of AR-ACFC (if present) meeting the requirements of Standard Specification Section **414**.

STRIPING

IF ANY STRIPING IS REMOVED OR DAMAGED DURING CONSTRUCTION IT SHALL BE REPLACED IN KIND PER THE SPECIFICATIONS BELOW.

Prior to final striping, the Permittee shall notify Xavier Casillas or Gary Hack with ADOT Signing and Striping Section at (520) 838-2825. It is the responsibility of the Permittee to contact Mr. Casillas or Mr. Hack and any work performed prior to this notification **will not be accepted by ADOT.**

SS-1 The Permittee shall be responsible for the obliteration of existing striping as required using water blasting, which is the only ADOT approved method. A light application of SealMaster asphalt sealer shall be placed over the obliterated area.

SS-3 The Permittee will have all foreign material (loose gravel, mud, etc.) removed prior to the placement of any striping.

SS-4 All striping shall be accomplished by the Permittee in accordance with ADOT Standards. Temporary pavement markings shall be used until the final thermoplastic markings can be applied. The temporary pavement markings shall conform to the requirements for Permanent Pavement Markings as set forth in Section **708** of the ADOT Standard Specifications. The final striping shall be 90 millimeter Alkyd Extruded Thermoplastic Pavement Marking, which shall conform to Section **704** of ADOT Standard Specifications.

SS-5a Pavement crosswalks, arrows, and legends shall be 90 millimeter in accordance with ADOT Standard Specification **704-3.02 (G)**, attached hereto.

SS-5b Raised Pavement Markers shall be in accordance with ADOT Standard Specifications **706-2.02** and **706-3**, and ADOT Standard Drawing **M-19**.

SIDEWALK AND SIDEWALK RAMPS

SSR-1 Sidewalk and sidewalk ramps shall be constructed in accordance with Section 908 of the ADOT Standard Specifications and ADOT Standard Drawings C-5.20 and C-5.30 except that the maximum distance between expansion joints shall be 40 feet. All concrete shall be class B, with a minimum compressive strength of 2500 PSI, meeting the requirements of Section 1006 of the ADOT Standard Specifications. The sidewalk width shall match existing.

SSR-2 ADA compliant sidewalk ramps with detectable warning strips shall be placed per ADOT Standard Drawing C-5.30.

SSR-3 Existing sidewalk shall be removed from contraction joint to contraction joint and replaced with new sidewalk, including depression for sidewalk ramps per ADOT Standard Drawing C-5.30. All concrete shall be class B, 2500 PSI.

SSR-4 All soft or unsuitable material shall be removed to a depth of not less than six inches below subgrade and replaced with an approved material.

SSR-5 Prior to placing concrete, the material on which they are to be placed shall be compacted to a depth of at least six inches to a density of not less than 95 percent of the maximum density. The Permittee shall furnish proof of compaction, from a qualified laboratory within 3 working days from when the test was taken and before the concrete is placed.

SSR-6 Weather temperature limitations for the placement of concrete shall be in accordance with the requirements of ADOT Standard Specifications Section 1006.5.

SSR-8 Curbs and sidewalks shall not be painted without prior written approval from ADOT.

SSR-10 Expansion joint filler shall be 1/2 inch bituminous or non bituminous performed strips conforming to ADOT Standard Specifications 907-2.02 and 1011-6 and shall extend through the full depth of the concrete being placed. Expansion joint filler shall be placed at a maximum of 40 linear feet of sidewalk.

SSR-11 Forms shall be maintained at all times in good condition as to accuracy of shape, strength, rigidity and smoothness of surface. Forms unsatisfactory in any respect shall not be used.

SSR-12 It will be the responsibility of the permittee to maintain a minimum of 2 feet of backfill material with a 2 percent slope behind the back of sidewalk.

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Attachment "A"

Archaeological Clearance Notification

Cultural survey specifications and responsibilities:
In accordance with the Arizona State Historic Preservation Act, ADOT must consider the effects of its actions, including the issuance of permits, on historic properties. It is the Permittee's responsibility to obtain documents indicating that the proposed permit would not affect historic properties or, if it would affect such properties, to provide documentation attesting to the mitigation of those effects, prior to beginning excavation work within ADOT Rights-of-Ways. Such documentation may include concurrence on the effect from the State Historic Preservation Office or a data recovery plan approved by the Arizona State Museum (in the case of mitigative data recovery).

Archaeological Features:
The attention of the Permittee is directed to the Arizona Revised Statutes (ARS) §41-841 through 846 and §41-861 through 865. Violation of ARS §41-841 through 845 is a Class 2 misdemeanor. Violation of ARS §41-861 through 865 can be classified as either a Class 1 misdemeanor or a Class 5 felony.

Section 6(a) of the Federal Archaeological Resources Protection Act of 1979 specifies that no person may excavate, remove, damage or otherwise alter or deface any archaeological resource located on public (Federal) lands or Indian lands unless such activity is pursuant to a permit issued under Section 4 of the Act. Violations of this act are considered a felony, and are punishable by fine and imprisonment.

Although the permittee will be responsible to make every effort prior to construction to identify all cultural resources in a permit area, previously unidentified archaeological materials could be found during the construction of the permit. When historic or archaeological features are encountered or discovered during any activity related to construction of the permit, the permittee shall stop work immediately at that location, and shall take all reasonable steps to secure the preservation of those features.

The permittee shall immediately contact ADOT's Historic Preservation Team, listed below and the ADOT District Permits Office that issued the permit and make arrangements for the proper treatment of such resources. The permittee shall not resume work until he/she is so directed by the Arizona Department of Transportation.

Environmental Planning Group
Linda Davis, Historic Preservation Team Leader
Arizona Department of Transportation
1611 W. Jackson St, EM02
Phoenix, AZ 85003
(602) 712-8636 (voice)
(602) 712-3066 (fax)
ldavis2@azdot.gov

501-3 **Construction Requirements:** № 1214311

501-3.01 **Preparation of Foundations, Trenches, and Embankments:**

A trench condition is defined as a trench which has vertical slopes to a point at least one foot above the top of the pipe and its maximum width is as detailed on the plans.

Unless specified otherwise, the contractor may install pipe in either a non-trench condition or a trench condition in natural ground or in embankment.

Where rock, hardpan, or other unyielding material is encountered, such material shall be removed below the vertical limits as shown on the plans. The depth to be removed shall be at least 12 inches or as designated by the Engineer. The width to be removed shall depend on whether a trench or non-trench condition exists. If a trench condition exists, the width of the trench as shown on the plans shall be maintained throughout the additional depth. If a non-trench condition exists, the width of the removal shall be a minimum of the outside diameter of the pipe plus two feet for pipe under four feet in diameter, or a minimum of the outside diameter of the pipe plus three feet for pipe of four or more feet in diameter. The overexcavated area shall be backfilled with structure backfill material as designated in Subsection 203-5.03(B)(1) and compacted in layers not exceeding six inches in depth.

When a firm foundation is not encountered at the bottom of the vertical limits as shown on the plans due to soft, spongy, or other unstable soil, such unstable soil shall be removed for a width of at least the horizontal outside dimension of the pipe on each side of the pipe and to the depth specified by the Engineer. The unstable soil removed shall be replaced with structure backfill material as designated in Subsection 203-5.03(B)(1) and compacted in six-inch lifts.

The completed foundation shall be firm for its full length and width. When specified on the project plans, the foundation shall have a longitudinal camber of the magnitude specified.

501-3.02 **Bedding:**

(A) Bedding Material:

(1) General:

Bedding material for all pipe shall conform to the following aggregate gradation:

Sieve Size	Percent Passing
1-1/2 inch	100
1 inch	90 - 100
No. 8	35 - 80
No. 200	0 - 8.0

The plasticity index of the bedding material for all pipe shall not exceed 8 when tested in accordance with the requirements of AASHTO T 90.

Bedding material for all pipe shall have a value of resistivity not less than 2,000 ohm-centimeters unless otherwise specified or approved by the Engineer. Bedding material shall have a pH value between 6.0 and 10.0, inclusive, for all metal pipe installations except aluminum. Bedding material for aluminum pipe installations shall have a pH value between 6.0 and 9.0, inclusive. Bedding material shall have a pH value between 6.0 and 12.0, inclusive, for all concrete or plastic pipe installations. Tests for pH and resistivity shall be in accordance with the requirements of Arizona Test Method 236.

(2) Standard Aggregate Bedding Material:

Standard aggregate bedding material shall conform to the requirements specified in Subsection 501-3.02(A)(1) and may be compacted, jetted, or placed as an aggregate slurry as herein specified.

The maximum water content in an aggregate slurry mixture shall be 35 gallons of water per ton of bedding material. Unless otherwise approved by the Engineer, the slurry shall be compacted with internal vibrators in accordance with the requirements of Subsection 601-3.03(D). Aggregate slurry shall be thoroughly mixed in a mixer approved by the Engineer.

(3) Cement-Treated Slurry Bedding Material:

Aggregate for cement-treated slurry bedding material, prior to the addition of cement and water, shall conform to the requirements specified in Subsection 501-3.02(A)(1). One sack of cement shall be added to each cubic yard of aggregate. Cement-treated slurry shall be thoroughly mixed in a mixer or at a central batch plant as approved by the Engineer and shall have a slump of eight to 11 inches.

(B) Placement of Bedding Material:

(1) General:

All trash, forms, sheeting, bracing, and loose rock or loose earth shall be removed from the area into which bedding material is to be placed.

Bedding material shall be placed under and around the pipe from the bottom of the trench or bedding limits to the elevation at the point of maximum width of the pipe (springline), as shown on the plans. At the

contractor's option, bedding material may be placed above the springline of the pipe, at no additional cost to the Department.

For pipes placed in a non-trench condition, as shown on the plans, standard aggregate bedding material shall be used from six inches below the pipe to the springline.

For pipes placed in trench condition, a six-inch layer of standard aggregate bedding material shall be placed, in accordance with the plans, between the bottom of the trench and the bottom of the pipe. The remainder of the bedding, from the bottom of the pipe to the springline, shall be either standard aggregate bedding material or cement-treated slurry as tabulated below:

For pipe culverts or storm drains 36 inches or larger, cement-treated slurry shall be used as bedding material from the bottom of the pipe to springline.

For pipe culverts or storm drains less than 36 inches in diameter, cement-treated slurry may be substituted for standard aggregate bedding material from the bottom of the pipe to springline.

Bedding material shall be placed in a manner which will prevent distortion, damage to, or displacement of the pipe from its intended location. Bedding material shall also be placed so that adequate support will be provided in the haunch support areas for the pipe. Voids or loose soils which are found to occur due to improper placement or compaction of bedding materials will result in rejection of that portion of the pipe installation. Replacement of the pipe will be at no additional cost to the Department.

(2) Standard Aggregate Bedding Material:

Standard aggregate bedding material shall be placed either in uniform horizontal layers not exceeding eight inches in depth before compaction or in uniform horizontal layers not exceeding four feet in depth when placed as a slurry. Bedding material may also be placed in uniform horizontal layers not exceeding four feet in depth when compaction is done by jetting.

(3) Cement-Treated Slurry Bedding Material:

Cement-treated slurry bedding material shall be placed in a uniform manner that will prevent voids in, or segregation of, the bedding material, and will not float or shift the culvert or pipe. Cement-treated slurry bedding material shall be placed from bottom of pipe to pipe springline. No backfilling above the cement-treated slurry shall be commenced until 24 hours after the cement-treated slurry has been placed.

(C) Compaction of Bedding Material:

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(1) General:

Compaction of bedding material shall be performed without damage to the pipe and surrounding in-place material. Special care shall be taken in placing, shaping and compacting all bedding material under haunches of pipe to prevent moving the pipe or raising it from its bedding.

(2) Standard Aggregate Bedding Materials:

Standard aggregate bedding material shall be compacted to at least 95 percent of the maximum density determined in accordance with the requirements of the applicable test methods of the ADOT Materials Testing Manual, as directed and approved by the Engineer.

When standard aggregate bedding material is placed as an aggregate slurry or compacted by jetting, the material placed below the springline of the pipe shall be compacted prior to placement of material above the springline of the pipe.

Jetting shall not be used for any material placed more than one foot above the top of the pipe.

Ponding will not be permitted in any case.

Jetting shall be done in such a manner that water will not be impounded. Jetting methods shall be supplemented by the use of vibratory or other compaction equipment when necessary to obtain the required compaction. Bedding material compacted by jetting shall use the least amount of water that will properly consolidate the material and move the material under the pipe to eliminate voids. A jetting probe shall be inserted into the material. It shall be of such length as to reach the material under the pipe. Water shall be provided to the jetting probe at a minimum pressure of 30 pounds per square inch. The jetting probe shall be inserted at uniformly spaced intervals on both sides of the pipe, a maximum spacing of three feet.

The contractor shall excavate holes in the compacted aggregate slurry or jetted bedding material to the depths and at the locations designated by the Engineer. These holes shall be of such size as to allow the required density testing to be performed in a safe manner. Upon completion of the tests, the contractor shall refill the excavated areas and compact the material to the required density in a manner satisfactory to the Engineer.

(3) Cement-Treated Slurry Bedding Material:

Cement-treated slurry bedding material shall not require additional compaction after placement up to pipe springline if it meets the material requirements of Subsection 501-3.02(A) and is placed as outlined in Subsection 501-3.02(B). The Engineer may require the use of vibrators with cement-treated slurry bedding if the fluidity of the

mixture is not sufficient to fill all voids. No density tests will be required in the cement-treated slurry bedding material as placed up to pipe springline.

501-3.03 Installation:

(A) General:

Pipe shall be handled carefully. Proper facilities shall be provided for handling and lowering the sections of pipe. All pipes which show defects due to negligence or rough handling shall be removed and replaced if so ordered by the Engineer. If damaged galvanized steel pipe is not replaced it shall be repaired in accordance with the requirements of AASHTO M 36. Damage to the coating of bituminous coated pipe shall be repaired using material conforming to the requirements of AASHTO M 190.

Pipe shall be installed in reasonably close conformity with the lines, grades and dimensions shown on the project plans or specified by the Engineer.

Prior to the staking of pipe culverts a study of the normal flow of the drainage shall be made. As a result of the study, a change in length or location of pipe may be required as approved by the Engineer to attain proper placement of the pipe. Pipe profiles shall be approved by the Engineer prior to constructing or installing each structure.

Unless otherwise permitted by the Engineer, the installing of the pipe shall begin at the downstream end.

Bell or groove ends of rigid conduits and outside circumferential laps of flexible conduits shall be placed facing upstream.

Helical corrugated pipe shall be installed with the separate sections firmly joined together with the corrugations in alignment.

Where there is restricted cover, the bolts of the bands connecting flexible pipe shall be advanced so that the tops of the bolts will be in line with or below the top of the pipe.

When aluminum alloys come in contact with concrete, the contacting surfaces shall be coated either with asphalt mastic conforming to the requirements of AASHTO M 243 or with aluminum-impregnated caulking compound.

When specified on the project plans, the vertical diameter of round flexible conduit shall be increased five percent by shop elongation.

Any pipe which is not in true alignment or which shows undue settlement after laying or is damaged shall be removed. The trench shall be prepared as hereinbefore specified and the pipe shall be

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installed again. Any pipe which, in the opinion of the Engineer, is damaged so that it cannot be used shall be replaced.

Paved or partially lined flexible pipe shall be installed so that the longitudinal center line of the paved segment coincides with the flow line. Elliptical and elliptically reinforced rigid pipe shall be installed with the major axis within five degrees of a vertical plane through the longitudinal axis of the pipe.

The interior of all pipes shall be free of dirt and foreign material as the work progresses and all pipes shall be left clean at the time of final acceptance.

Connections to new or existing pipes or structures shall be made in accordance with the details shown on the project plans or as may be ordered by the Engineer in order to complete the work specified.

When using metal safety end sections, the embankment slope shall be warped to match the end section.

For a skewed pipe installation, the toe of the embankment slope shall be warped to match the toe of the skewed metal safety end section in order to provide effective drainage.

When metal safety end sections are used, the bolts in the safety bars shall be torqued at 70 foot-pounds.

(B) Full Circle Corrugated Metal Pipe:

(1) General:

Field joints for each type of corrugated metal pipe shall provide circumferential and longitudinal strength to maintain the pipe alignment, prevent separation of the pipe, prevent infiltration of side fill material, and prevent leakage of water into the surrounding soil. Coupling bands and gaskets shall conform to the requirements of Subsection 1010-2.01.

Corrugations in the coupling bands shall have the same dimensions as the corrugations in the pipes being connected. Pipe fabricated with helical corrugations shall have the ends re-rolled to circumferential corrugations to facilitate coupling. The re-rolled end shall extend a minimum of two corrugations from the end of the pipe.

When a new pipe is to be connected to the end of an existing in-place helical pipe, a coupling band with projections (dimples) may be used to make the connection.

Bands for pipe diameters to 72 inches, inclusive, and corrugation sizes of 2-2/3 by 1/2 or three by one inches shall be at least 10-1/2 inches wide. Bands for pipes 36 to 72 inches in diameter, inclusive, with corrugations five by one inches shall be at least 12 inches wide. Bands

shall have two circumferential rows of projections. The rows of projections shall be spaced to provide equal contact on each side of the pipes being joined.

When bands with projections (dimples) are used to join new pipe to existing pipe, the joints shall be sealed with a continuous sponge rubber strip. The strip shall conform to the minimum requirements of ASTM D 1056, Grade 2A1, and shall be at least 7 inches wide and 3/8 inch thick.

Where existing pipes are to be extended, the ends of the existing pipe shall be in such condition that the new pipe can be firmly joined to form an acceptable joint. All existing pipe ends that are damaged or are out of shape such that they cannot be joined in an acceptable manner shall be repaired.

Damaged galvanized coating shall be cleaned with a wire brush and the damaged area painted with at least one full coat of zinc paint, as specified in Subsection 1002-2.02. If the Engineer determines that the end of an existing pipe is damaged to the extent that it cannot be repaired sufficiently to be joined properly to the new pipe, the damaged portion shall be removed.

Where prefabricated pipe fittings are to be installed in existing pipes, a portion of the existing pipe shall be removed in order to accommodate the fitting.

(2) Watertight and Water Resistant Joints:

Watertight joints shall be provided for siphon and irrigation pipe installation and when specified in the Special Provisions, standard drawings, or shown on the project plans. Watertight joints, unless otherwise specified, will not be required for storm drains, culverts, or other drainage pipe, however, joints for these pipes shall be water resistant.

Watertight and water resistant joints shall conform to the requirements of Subsection 1010-2.01 of the specifications. When watertight joints are shown on the project plans or specified in the Special Provisions, the assembled joint shall pass a performance test, as specified herein or as approved by the Engineer, without significant leakage at the joint.

(a) A hydrostatic pressure test on a joint shall be made on an assembly of two sections of pipe, properly connected in accordance with the joint design. At the option of the contractor, suitable bulkheads shall be provided within the pipe adjacent to and on either side of the joint, or the outer ends of the two joined pipe sections shall be bulkheaded. No mortar or concrete coatings, fillings, or packings in addition to that normally required for the joint shall be placed prior to watertightness tests. After the pipe sections are fitted together with the gasket or gaskets in place, the

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assembly shall be subjected to a pressure resulting from a head of 10 feet of water above the crown of the pipe for 10 minutes. Moisture of beads of water appearing on the surface of the joint will not be considered as leakage. The tests on individual joints may be performed at the fabricator's facility or at the job site.

The joint watertightness test shall be performed on pipe sections in straight alignment and on pipe sections deflected from straight alignment. When testing pipe sections not on straight alignment, the pipe sections shall be positioned to create a gap on one side of the outside perimeter of the pipe that is 1/2 inch wider than the gap for pipe sections in straight alignment. When coupling bands are used to test pipe sections not on straight alignment and the maximum gap on one side of the outside perimeter of the pipe is less than 1/2 inch wider than that for pipe sections in straight alignment, said coupling band pipe sections shall be positioned to provide maximum gap.

(b) Joints, other than watertight joints, which employ rubber gaskets, whether flat or "O" rings, will be considered water resistant. No testing will be required to establish that condition.

The contractor shall furnish to the Engineer a Certificate of Compliance, in accordance with the provisions in Subsection 106.05 of the specifications, that the material being furnished conforms to the joint property requirements as described herein. Field tests may be required by the Engineer whenever there is a question regarding compliance with these requirements.

(C) Slotted Pipe:

Slotted pipe shall be joined with coupling bands as shown on the project plans and the joint shall be made water resistant. Prior to attaching the coupling band, sealant material shall be placed between the coupling band and the periphery of the pipe section ends.

Prior to backfilling and paving operations, the slot shall be covered to prevent infiltration of material into the pipe. Heavy tape, roofing paper, timber or other material may be used. Coverings shall be removed when the paving operations have been completed.

Slotted pipe shall be backfilled with grout in accordance with the details shown on the project plans. The grout shall conform to the requirements of Subsection 913-2.04. Grout shall not be placed when a descending air temperature falls below 40 degrees F or until an ascending air temperature exceeds 35 degrees F. Temperatures shall be taken in the shade and away from artificial heat. The grout shall be cured in accordance with the requirements of Subsection 912-3.09.

(D) Precast Concrete Pipe:

Pipe sections shall be jointed such that the inner surfaces are reasonably flush and even, and the ends are centered as required.

Unless a particular type of joint is specified on the project plans, joints shall be made with Portland cement mortar, Portland cement grout, rubber gaskets, plastic sealing compound, or any other type approved by the Engineer.

Self-centering tongue and groove mortar joints shall be finished smooth on the inside. For diapered joints, diapers shall be used to retain the poured grout. Joints shall be thoroughly wetted before mortar or grout is applied.

When Portland cement mixtures are used, the completed joints shall be protected against rapid drying by means of an approved curing method. No joint shall be grouted until the following two sections of pipe are laid.

When required, flexible watertight gasketed joints shall be installed on the pipe in accordance with the requirements of AASHTO M 198, Paragraph 5.1.

(E) Spiral Rib Corrugated Metal Pipe:

Spiral rib corrugated metal pipe shall be installed in accordance with the requirements specified in Subsection 501-3.03(B) for full circle corrugated metal pipe, except as otherwise specified herein. Special care shall be taken during placement of the pipe and backfilling to avoid damage to the pipe.

Lateral field connections between metal pipes shall be welded and any galvanizing damaged by welding shall be repaired in accordance with the requirements of Subsection 1010-2(A). Coupling bands shall be supplied in accordance with Subsection 1010-2.03(C).

The coupling bands used to connect spiral rib pipe sections shall be hugger-type bands, made from the same material as the pipe, or other approved design, and shall be fitted with gaskets or "O" rings fabricated from neoprene or butyl rubber or other durable, resilient material approved by the Engineer, and assembled in such a manner as to form a sealed joint. "O" ring gaskets required for watertight joints shall be composed of rubber as specified in ASTM C 361, Section 6.9, and shall be placed in the first corrugation of each pipe end and shall be compressed by tightening the coupling band, in accordance with the manufacturer's installation instructions.

(F) Concrete-Lined Corrugated Metal Pipe:

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Concrete-lined corrugated metal pipe shall be installed in accordance with the requirements specified in Subsection 501-3.03(B) for full circle corrugated metal pipe, except as otherwise specified herein.

Pipe shall be joined with hugger-type bands which are 0.064 inches in thickness, of the same material as the pipe, and shall be two-piece for pipe greater than 48 inches in diameter.

Coupling bands, in addition to the requirements specified in Subsection 1010-2.02(A), shall be a minimum of 10-1/2 inches wide, formed with two corrugations that are spaced to provide nesting in the second corrugation of each pipe end and shall be drawn together by a minimum of two galvanized bolts, 1/2 inch in diameter, inserted in a bar held in place by a strap welded to the pipe. Bands drawn together by other connection arrangements, such as angles, shall not be allowed. "O" ring gaskets required for watertight joints shall be composed of rubber as specified in ASTM C 361, Section 6.9, and shall be placed in the first corrugation of each pipe end and shall be compressed by tightening the coupling bands in accordance with the manufacturer's installation instructions.

(G) Corrugated High Density Polyethylene Plastic Pipe:

Corrugated high density polyethylene plastic pipe shall be assembled and installed in accordance with the manufacturer's instructions.

Watertight joints, unless otherwise specified, will not be required for storm drains, culverts, or other drainage pipes. However, joints for these pipes shall be water resistant. Watertight joints shall be provided for siphon and irrigation pipe installations.

Watertight and water resistant joints shall conform to the requirements of Subsection 1010-8 of these specifications.

A six- by eighteen-inch strip of magnetic tape shall be placed in the trench at the crown of each length of installed pipe.

Special care shall be taken in the handling and installation of corrugated high density polyethylene plastic pipe and fittings to prevent damage and to assure that proper line and pipe grade are maintained throughout the backfilling operation.

When end sections for corrugated high density polyethylene plastic pipe are called for on the plans, the contractor shall use metal safety end sections unless otherwise specified.

501-3.04 Backfilling and Compacting:

(A) Backfill Material:

(1) Pipe Backfill:

Pipe backfill material shall be selected from excavation or from a source selected by the contractor. It shall not contain frozen lumps, stones larger than three inches in diameter, chunks of clay or other objectionable material. Backfill material to be used for pipes, pipe-arches or arches made of metal shall have a value of resistivity not less than 2,000 ohm-centimeters or the value shown on the project plans. When resistivity is not shown on the plans, the backfill material shall have a value of resistivity not less than that of the existing in-place material or 2,000 ohm-centimeters, whichever is less. Backfill material shall have a pH value between 6.0 and 10.0, inclusive, for all metal pipe installations, except aluminum. Backfill material for aluminum pipe installations shall have a pH value between 6.0 and 9.0, inclusive. Backfill material shall have a pH value between 6.0 and 12.0, inclusive, for all concrete or plastic pipe installations. Tests for pH and resistivity shall be in accordance with the requirements of Arizona Test Method 236.

Pipe backfill material shall conform to the following gradation:

Sieve Size	Percent Passing
3 inch	100
3/4 inch	60 - 100
No. 8	35 - 80
No. 200	0 - 12.0

The plasticity index shall not exceed 12 when tested in accordance with the requirements of AASHTO T 90.

As an alternate, pipe backfill may conform to the material requirements listed for bedding material as specified in Subsection 501-3.02(A), for standard aggregate bedding material or cement-treated slurry bedding material.

(2) Trench Backfill:

Trench backfill material shall not contain organic material, rubbish, debris and other deleterious material and shall not contain solid material which exceeds eight inches in greatest dimension and shall be soil selected from excavation or from a source selected by the contractor.

As an alternate, trench backfill may conform to the material requirements listed for bedding material as specified in Subsection 501-3.02(A) for standard aggregate bedding material or cement-treated slurry bedding material.

(3) Slope Plating:

The roadway slope at the inlet ends of pipe culverts shall be plated with an impervious material. The plating material shall be a fine-grained, cohesive material with at least 50 percent of it passing the No. 40 sieve

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and with a plasticity index of at least 10 and shall be placed as shown on the plans. The plasticity index will be determined in accordance with the requirements of AASHTO T 90.

(B) Placement of Backfill Material:

(1) General:

All trash, forms, sheeting, bracing, and loose rock or loose earth shall be removed from the areas to be backfilled before backfill material is placed.

Backfill compacted by pneumatic or mechanical tamping devices, shall be placed in layers not more than eight inches in depth before compaction.

Pipe backfill shall be brought up evenly on both sides of the pipe for the full length to an elevation one foot above the top of the pipe.

Trench backfill shall be placed from one foot above the top of the pipe to the elevation at which base or surfacing materials are to be placed or to the top of the trench.

Backfill material shall be placed around and over arches in accordance with the requirements of Section 502.

(2) Standard Aggregate Slurry:

Pipe backfill or trench backfill mixed as a standard aggregate slurry shall be placed in uniform horizontal layers not exceeding four feet in depth. The slurry shall be compacted with internal vibrators in accordance with the requirements of Subsection 601-3.03(D).

(3) Cement-Treated Slurry:

Cement-treated slurry pipe backfill placement above springline shall not commence within 24 hours of the placement of the underlying cement-treated bedding material below springline. Cement-treated pipe backfill shall be placed in a uniform manner that will prevent voids in or segregation of the backfill to an elevation one foot above the top of the pipe. No backfilling above the cement-treated slurry pipe backfill shall be commenced until 24 hours after the cement-treated slurry has been placed.

If cement-treated slurry bedding material is used for trench backfill, it shall not be disturbed or loaded in any manner within 24 hours of placement as above.

(C) Compaction of Backfill Material:

Backfill material shall be compacted to at least 95 percent of the maximum density determined in accordance with the requirements of the applicable test methods of the ADOT Materials Testing Manual, as directed and approved by the Engineer.

Jetting shall not be used to compact pipe backfill, trench backfill or any material placed more than one foot above the top of the pipe.

Ponding will not be allowed in any case.

If trench backfill or pipe backfill is placed as an aggregate slurry, the contractor shall excavate holes in the compacted slurry to the depths and at the locations designated by the Engineer. These holes shall be of such size as to allow the required density tests to be performed in a safe manner. Upon completion of the tests, the contractor shall refill the excavated areas and compact the material to the required density in a manner satisfactory to the Engineer.

Cement-treated slurry bedding material for pipe backfill shall not require additional compaction after placement up to an elevation one foot above the top of pipe if it meets the material requirements of Subsection 501-3.02(A) and is placed and compacted as outlined in Subsection 501-3.04(B) and (C). No density tests will be required in the cement-treated slurry bedding material when it is utilized for pipe backfill to an elevation one foot above the top of pipe.

Cement-treated slurry bedding material used for trench backfill shall meet the requirements listed above for pipe backfill up to the elevation which it is placed.

501-3.05 Filter Material:

When shown on the project plans or specified in the Special Provisions, filter material shall be carefully placed around perforated pipe.

Filter material shall conform to the grading requirements for fine aggregate in Section 1006 and shall be placed in accordance with the details shown on the project plans.

501-3.06 Encasement of Pipe:

When shown on the project plans, pipe shall be encased in Class B concrete. Portland cement concrete shall conform to the requirements of Section 1006.

501-3.07 Nonreinforced, Cast-In-Place Concrete Pipe:

(A) General Requirements:

The contractor shall have previously installed cast-in-place pipe similar to the pipe specified in this contract. The Engineer may require the

contractor to submit a list of names of the contractor's key personnel with their cast-in-place pipe experience. When required, the list shall include the foreman and equipment operators.

When the project plans include cast-in-place concrete pipe as an alternate, the contractor shall review the geotechnical investigation report. The report will be available at Contracts and Specifications Section, 1651 W. Jackson, Phoenix, Arizona 85007, phone (602) 712-7221. The contractor shall be responsible to determine if the in-place soil conditions will allow the specified trench to be constructed.

The contractor shall provide a quality control administrator who shall be responsible for cast-in-place pipe quality. The administrator shall be a full-time employee of the contractor or a consultant engaged by the contractor. The contractor shall provide documentation to the Engineer which demonstrates the quality control administrator's experience in the manufacture and placement of cast-in-place pipe. The administrator shall have the authority to control all activities necessary to ensure a product of acceptable quality, including strength, alignment, thickness, and grade.

The contractor's quality control administrator shall inspect the pipe construction and complete a daily observation form, supplied by the Engineer. The form shall be completed and submitted to the Engineer no later than 9:00 a.m. on the first working day following each day work is being performed on the pipe installation.

Nonreinforced, cast-in-place concrete pipe shall be cast monolithically in a prepared trench at the locations and in accordance with the details shown on the project plans and the requirements of these specifications.

The pipe shall be constructed with equipment specifically designed for constructing cast-in-place, monolithic concrete pipe. The equipment shall be approved by the Engineer prior to use, and the contractor may be required to furnish evidence of successful operation of the equipment on similar work. If, in the opinion of the Engineer, the equipment furnished is not suitable to produce the quality of work specified, its use will not be permitted for the work.

Pipe shall be constructed in trenches which have been excavated in either native soil or compacted fill. The trench walls shall be stable so that the planned shape of the trench is maintained.

The minimum inside diameter of the pipe, measured in any direction, shall be at least 98 percent of the nominal pipe size. The minimum wall thickness will be as specified on the project plans for each pipe size.

(B) Excavation:

The trench shall be excavated to the lines and grades shown on the project plans. Laser guided alignment instruments shall be used to

control the grade and alignment of the trench. Departure from and return to the established grade for the finished trench shall not exceed one inch per ten linear feet, with a total departure not to exceed 1.5 inches. Departure from and return to specified alignment for the trench shall not exceed two inches per ten linear feet, with a total departure not to exceed four inches. The bottom of the trench shall be shaped in accordance with the details shown on the project plans and prepared to provide full, firm and uniform support over the bottom 210 degrees of the pipe to be constructed.

The length of trench permitted to remain open at any one time shall not exceed 1,600 linear feet, unless otherwise specified in the Special Provisions or as may be permitted by the Engineer.

The bottom of the trench must consist of either undisturbed native soil or compacted backfill.

When, in the opinion of the Engineer, soft, spongy or other unsuitable material is encountered in the bottom of the trench, such unsuitable material shall be removed to the depth and width directed by the Engineer. The resulting area shall be backfilled with material conforming to the requirements of Subsection 501-3.04(A)(1). The backfill shall be compacted in accordance with the requirements of Subsection 501-3.04(C). The trench shall then be excavated as specified above.

When boulders, bedrock, or rock ledges are encountered in the bottom or side walls of the trench, such material shall be removed to a distance of at least six inches from the nearest surface of the pipe, and the space then backfilled, compacted, and reshaped as required above for unsuitable material.

The trench walls, from a point one foot above the top of the pipe to the top of the trench, may be sloped as required by soil conditions to provide more stability in the trench and safer working conditions in accordance with the provisions of Subsection 107.07. The steepness of the side slopes shall be limited to the degree of stability considered necessary for safety, unless an approved shoring system is used. Side slopes shall conform to current OSHA regulations and be approved by the Engineer.

(C) Concrete Placement:

At the time of concrete placement, all surfaces in the trench which will be in contact with the pipe shall be thoroughly moistened so that moisture will not be drawn from the freshly placed concrete; however, the trench shall be free of standing water, mud and debris.

The concrete shall be placed around the full circumference of the pipe in one operation. When metal forms are used, they shall be of sufficient strength to withstand vibrating and tamping of the concrete.

The concrete shall be vibrated, rammed, tamped or worked with suitable devices until the concrete has been thoroughly consolidated and completely fills the formed space.

Laser guided alignment instruments shall be used to control the grade and alignment of the pipe. Departure from and return to the established grade for the invert of the installed pipe shall not exceed one inch per ten linear feet, with a total departure not to exceed 1.5 inches. The surface of the invert shall not vary by more than 0.10 feet when tested with a ten foot straight edge. Departures from and return to specified alignment for the pipe shall not exceed two inches per ten linear feet, with a total departure not to exceed four inches.

When placing operations stop for such a time that initial set of the concrete is likely to occur before placement resumes, a construction joint shall be made by leaving the end of the pipe rough with a slope of approximately 45 degrees and inserting 24-inch No. 4 dowels one foot into the center of the pipe wall at approximately 18-inch intervals.

Collars may be used in lieu of doweled joints. An excavation shall be made along the sides and bottom of the construction joint to permit casting of a concrete collar around the outside of the joint. The collar shall have a minimum thickness 1.25 times the pipe wall thickness and shall lap the entire joint by at least two times the wall thickness.

Immediately before resuming concrete placement, the joint shall be cleaned of all laitance, loose or defective concrete, coatings and other deleterious materials, and thoroughly wetted.

Construction joints used for connections to another pipe or at junction structures shall be made by squaring off the end of the pipe. An excavation along the sides and bottom of the pipe to permit casting of the concrete collar shall be made as previously specified.

After the removal of forms, the inside of the pipe will be inspected for rock pockets, voids, form indentation, and excessive form lap. Any necessary repairs shall be made within 24 hours and to the satisfaction of the Engineer. Cracks shall be repaired in accordance with Subsection 501-3.07(G).

(D) Finishing:

The interior surface and exterior top surface of the pipe shall be as smooth as a wood-float finish and shall be essentially free of fractures, cracks and roughness.

(E) Curing:

Within 15 minutes after the pipe is cast, the concrete forming the exposed top portion of the pipe shall be cured as follows:

The pipe shall be covered, with a polyethylene film conforming to the requirements of AASHTO M 171 except that the nominal thickness shall be 0.0015 inches. The film shall be white opaque or clear and shall be held in place with loose soil to assure continuous contact. The loose soil shall not be greater than six inches in depth at any point, and shall conform to the requirements herein before specified under pipe backfill. This curing method shall be used when the ambient temperature exceeds 100 degrees F.

For ambient air temperatures equal to or less than 100 degrees F, the pipe may be sprayed with a liquid membrane-forming compound conforming to the requirements of Subsection 1006-6(C). If the contractor elects to spray the pipe with a liquid membrane, such procedure shall be completed within 30 minutes.

During the curing period, the inside of the pipeline shall be kept in a humid condition for at least seven days following placement of the concrete. To prevent air drafts from drying the fresh concrete, openings in the pipeline shall be covered during the seven day period, except at locations where work on the pipe is required and only during the time that such work is actually in progress.

(F) Backfilling:

Backfilling shall not start until the concrete has developed a compressive strength of at least 2,500 pounds per square inch.

The type of backfill material, the placement of pipe and trench backfill material, and compaction shall conform to the requirements of Subsection 501-3.04.

(G) Pipe Repair:

The contractor shall perform all interior crack repairs only after backfilling.

Transverse cracks 0.05 inches or more in width shall be cleaned and filled with an elastomeric compound approved by the Engineer. The elastomeric compound shall penetrate into the crack at least 0.38 inches.

A longitudinal crack shall be defined as one which is generally oriented within 30 degrees of the alignment of the pipe.

Longitudinal cracks will be a cause for rejection under any of the following conditions.

(1) A crack which has caused a surface fault within the pipe with a displacement greater than 0.08 inches.

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(2) A crack width greater than that determined by the formula 0.0005 x O.D. and that can be penetrated by a standard machinist gauge leaf designated in AASHTO T 280.

(3) A crack width greater than 0.05 inches and that can be penetrated by a standard machinist gauge leaf designated in AASHTO T 280.

Longitudinally cracked pipes meeting any of the three rejection criteria above may be allowed to remain in place if approved by the Engineer. If the Engineer allows such rejectable pipe to remain, all longitudinal cracks meeting any of the three criteria above shall be repaired by full depth epoxy grouting.

Any section of pipe rejected by the Engineer shall be removed and replaced at no additional cost to the Department.

(H) Pipe Wall Thickness:

The contractor shall measure the thickness at the invert and crown by probing at 25-foot intervals during the placement of concrete. The probe shall be a 3/8-inch round bar at least two inches longer than the wall thickness to be measured. The measurements shall be reported on the daily observation form.

The wall thickness will be measured for acceptance. One hole each shall be drilled at the invert and on each side of the springline, within 200-foot intervals. The drill locations will be determined by the Engineer. The Engineer may require additional holes on curves or in areas which appear to be defective. All holes shall have a minimum diameter of 3/4 inch. If the wall thickness is less than the specified minimum thickness, a core shall be drilled adjacent to the drilled hole.

All cores shall have a minimum diameter of three inches.

The length of the core will be determined in accordance with the requirements of AASHTO T 148.

If the length of the drilled core is deficient, additional cores shall be taken at intervals not to exceed ten feet in each direction from the deficient core until one core which is not deficient is obtained in each direction. The pipe between these two acceptable cores will be rejected. The rejected pipe section shall be removed and replaced with pipe of the specified thickness at no additional cost to the Department.

At all locations where drilled holes or cores have been made, the resulting holes shall be filled with concrete in a manner satisfactory to the Engineer.

501-4 Method of Measurement:

Pipe will be measured by the linear foot parallel to the central axis of the pipeline, and shall include the length of fittings.

Tees, wyes and other branches will be measured as pipe along the central axis of the pipes to the point of intersection of said central axes. Pipe reducers will be measured as pipe of the larger diameter along the central axis.

The end of pipe in closed structures will be considered to be at the intersection of the central axis and the inside face of the wall and for masonry and concrete headwalls it will be considered to be at the intersection of the central axis and the face of the headwall.

End sections will be measured by the number of units installed.

501-5 Basis of Payment:

The accepted quantities of pipe, measured as provided above, will be paid for at the contract unit price complete in place.

Except as hereinafter specified, no separate measurement or payment will be made for excavating trenches and for furnishing, placing and compacting bedding and backfill material as described and specified herein and on the project plans, the cost thereof being considered as included in the contract unit price per foot of pipe.

Payment for the removal of rock, hard pan, other unyielding material, or soft, spongy or other unstable soil below the vertical limits as shown on the plans, and the backfilling of these over-excavated areas, as specified herein and as directed by the Engineer, will be paid for in accordance with the requirements of Subsection 104.02.

When an embankment is constructed prior to the digging of a trench and the installation of a pipe, payment for the construction of the embankment will be made under the appropriate item, such as Roadway Excavation or Borrow. Removal of rock, hard pan, other unyielding material, or soft, spongy or other unstable material from the trench within the embankment will not be considered for payment.

The repairing of the damage to existing pipe ends to which new pipe is to be joined and which cannot be seen in order to be assessed and the removal of any portion of a damaged existing pipe, as specified under Subsection 501-3.03(B) will be paid for in accordance with the provisions of Subsection 104.02.

No measurement or direct payment will be made for furnishing and placing filter material, plating material, fittings, collars, bands and the joining of new and existing pipes.

For cast-in-place pipe, no separate measurement or payment will be made for the excavation or preparation of the trench; for furnishing,

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placing and compacting backfill material; for pipe repair, when authorized by the Engineer; or for quality control activities; the cost being considered as included in the unit price per foot of pipe.

End sections, measured as provided above, will be paid for at the contract unit price complete in place.

SECTION 502 STRUCTURAL PLATE PIPE, PIPE-ARCHES, AND ARCHES:

502-1 Description:

The work under this section shall consist of furnishing and erecting structural plate pipe, pipe-arches, and arches of the sizes, thicknesses, and dimensions shown on the project plans. They shall be installed at the locations specified on the project plans or as directed by the Engineer in reasonably close conformity to the lines and grades shown on the project plans or as established by the Engineer and the requirements of these specifications.

502-2 Materials:

Materials shall conform to the requirements of Section 1010, unless otherwise specified.

Plates shall be fabricated in accordance with the requirements of either AASHTO M 167, AASHTO M 219 or Federal Specification WW-P-405.

Concrete shall conform to the requirements of Section 1006 for the class and strength shown on the project plans.

Reinforcing steel shall conform to the requirements of Section 1003.

502-3 Construction Requirements:

Excavating bedding and backfilling for the structural plate pipe, pipe-arches, and arches shall be performed as specified under Section 501 and as specified herein and on the project plans. Excavating and backfilling for the concrete footings shall be performed as specified under Subsection 203-5. Placement of reinforcing steel and structural concrete shall conform to the requirements of Sections 605 and 601, respectively.

When backfill material is placed around and over arches before headwalls are in place, the material shall first be placed midway between the ends of the arch, forming as narrow a ramp as possible, until the top of the arch is reached. The ramp shall be constructed evenly from both sides and the material shall be compacted as it is placed. After the two ramps have been constructed to the top of the arch, the remainder of the material shall be placed from the top of the

A separate roller(s) shall be used for final compaction. The roller(s) used for final compaction shall follow as closely behind the initial breakdown rollers as possible.

Compaction will be deemed to be acceptable on the condition that the asphaltic concrete is compacted using the type of compactors specified, ballasted and operated in accordance with the manufacturer's recommendations and with the number of coverages of the compactors as specified.

407-7.07 Compacting Miscellaneous Items and Surfaces:

Asphaltic concrete used in the construction of miscellaneous items and surfaces shall be compacted using compactors, hot-hand tampers, smoothing irons, mechanical vibrating hand tampers or with other devices to the extent considered necessary by the Engineer.

407-7.08 Smoothness and Surface Tolerances:

Asphaltic concrete shall be compacted as required, smooth and true to the required lines, grades, and dimensions.

The Special Provisions may require the smoothness of the final pavement surface to be tested in accordance with Subsection 109.13.

Regardless of whether testing in accordance with Subsection 109.13 is specified or not, the following requirements shall be met:

(1) The finished asphaltic concrete surface shall be tested and shall not vary by more than 1/8 inch from the lower edge of a ten-foot straightedge when it is placed in the longitudinal direction (including across transverse joints), and when it is placed in the transverse direction across longitudinal joints.

(2) All deviations exceeding the specified tolerances above shall be corrected by the contractor, to the satisfaction of the Engineer.

407-7.09 Acceptance:

Asphaltic concrete will be accepted complete in place if, in the judgment of the Engineer, the asphaltic concrete reasonably conforms to the requirements specified herein. Asphaltic concrete that is not acceptable and is rejected shall be replaced to the satisfaction of the Engineer and at no additional cost to the Department.

407-8 Method of Measurement:

Asphaltic concrete will be measured by the ton for the mixture actually used, which will include the weight of mineral aggregate, bituminous material, and mineral admixture. Measurement will include any weight

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used in construction of intersections, turnouts, miscellaneous items, or other surfaces.

Asphalt cement will be measured by the ton.

Mineral admixture will be measured by the ton.

407-9 Basis of Payment:

The accepted quantities of asphaltic concrete, measured as provided above, will be paid for at the contract unit price per ton, which price shall be full compensation for the work, complete in place, as specified herein.

Payment for asphalt cement will be made by the ton. The results of a nuclear asphalt content gauge shall not be used to determine the weight of asphalt cement as the basis of payment. Adjustments in payment shall be made in accordance with the requirements of Subsection 1005-3.01.

Mineral admixture will be paid for at the predetermined price established in the Bidding Schedule.

When required in the Special Provisions, payment for smoothness shall be made in accordance with the requirements of Subsection 109.13.

When lime water is used, no separate payment will be made for the lime water or its application, the cost being considered as included in this contract item.

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SECTION 409 ASPHALTIC CONCRETE (MISCELLANEOUS STRUCTURAL):

409-1 Description:

Asphaltic concrete shall consist of furnishing all materials, mixing, hauling, and placing a mixture of aggregates, mineral admixture, and bituminous material to form a pavement course or to be used for other specified purposes, in accordance with the details shown on the project plans and as directed by the Engineer.

The contractor may propose the use of a mix design that has been developed for a previous project. The contractor shall provide evidence that the asphalt cement and mineral admixture type and source of supply, and the source and methods of producing mineral aggregate, have not changed since the formulation of the previous mix design. The contractor shall also provide current test results for all specified

characteristics of the mineral aggregate proposed for use. The Engineer will determine if the previously used mix design is suitable for the intended use. The Engineer will either approve or disapprove the proposed mix design. Should the Engineer disapprove the use of the previously used mix design, the contractor shall prepare and submit a new mix design proposal in accordance with the requirements of these specifications.

A previously used mix design older than two years from the date it was formulated, sealed, signed, and dated shall not be allowed for use. Any previously used mix design that is older than one year, but less than two years, shall not be allowed for use unless the contractor provides verification testing results. Such testing shall be a one-point verification at the design asphalt content utilizing the proposed mineral aggregate, asphalt cement, and mineral admixture. Once approved for use on a project, a mix design may be used for the duration of the project.

409-2 Materials:

409-2.01 Mineral Aggregate:

Mineral aggregate shall conform to the following requirements when tested in accordance with the applicable test methods.

Mineral Aggregate Characteristics	Test Method	Requirement
Combined Bulk Oven Dry Specific Gravity	Arizona Test Method 251	2.350 - 2.850
Combined Water Absorption	Arizona Test Method 251	0 - 2.5%
Abrasion	AASHTO T 96	100 Rev., Max 9% 500 Rev., Max 40%
Sand Equivalent	AASHTO T 176 (After thoroughly sieving the sample, no additional cleaning of the fines from the plus No. 4 material is required.)	Minimum 55
Fractured Coarse Aggregate Particles	Arizona Test Method 212	Minimum 70% (plus No. 4 material)

The gradation will be determined in accordance with Arizona Test Method 201, and shall conform to the requirements given below.

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Mix Design Grading Limits				
Sieve Size	Percent Passing			
	Lift Thickness Less Than or Equal to Two Inches		Lift Thickness Greater Than Two Inches	
	Without Admixture	With Admixture	Without Admixture	With Admixture
1 Inch			100	100
3/4 Inch	100	100	90 - 100	90 - 100
1/2 Inch	90 – 100	90 - 100	---	---
3/8 Inch	70 – 85	70 - 85	70 - 85	70 - 85
No. 8	41 – 51	42 - 52	41 - 51	42 - 52
No. 200	2.0 --5.0	3.0 - 6.5	2.0 - 5.0	3.0 - 6.5

409-2.02 Bituminous Material:

Asphalt cement shall be a performance grade (PG) asphalt binder conforming to the requirements of Section 1005. The type of asphalt binder shall be as shown in the Special Provisions.

The percent of asphalt cement used shall be based on the weight of total mix (asphalt cement, mineral aggregate, and mineral admixture).

The contractor shall provide the laboratory mixing and compaction temperature ranges to the mix design laboratory for each PG asphalt binder used for mix design purposes. The laboratory mixing temperature range is defined as the range of temperatures where the un-aged asphalt binder has a rotational viscosity of 0.17 ± 0.02 Pascal-seconds, measured in accordance with AASHTO T 316. The laboratory compaction temperature range is defined as the range of temperatures where the un-aged asphalt binder has a rotational viscosity of 0.28 ± 0.03 Pascal-seconds, measured in accordance with AASHTO T 316. The testing required in AASHTO T 316 shall be performed at 275 °F and 350 °F, and a viscosity-temperature curve developed in accordance with ASTM D 2493. The viscosity-temperature curve shall be included in the mix design report. For PG asphalt binders that have a maximum laboratory mixing temperature exceeding 325 °F or a maximum laboratory compaction temperature exceeding 300 °F, the laboratory mixing and compaction temperature ranges shall be specified in writing by the asphalt binder supplier. The laboratory mixing and compaction temperature ranges, as well as the actual laboratory mixing and compaction temperatures used, shall be reported on the mix design. The contractor shall ensure that the asphalt binder supplier information required in this paragraph is provided to all appropriate parties in a timely manner, and that copies are included in the mix design report. The laboratory mixing and compaction temperatures are for mix design purposes only. Field mixing and compaction temperatures are specified in Subsection 409-3.

409-2.03 Mineral Admixture:

Mineral admixture shall be either Portland cement, blended hydraulic cement, or hydrated lime conforming to the following requirements:

Material	Requirement
Portland Cement, Type I or II	ASTM C 150
Blended Hydraulic Cement, Type IP	ASTM C 595
Hydrated Lime	ASTM C 1097

The mineral admixture content shall be 2.0 percent, by weight, of the mineral aggregate. However, a minimum of 1.0 percent mineral admixture may be used if the contractor submits test information showing a lowered percentage of mineral admixture produces mix design results for Index of Retained Strength of at least 60 percent and a Minimum Wet Strength of 150 psi when tested in accordance with Arizona Test Method 802.

A Certificate of Analysis conforming to the requirements of Subsection 106.05 of the Standard Specifications shall be submitted.

409-2.04 Mix Design:

Utilizing mineral aggregate which has been crushed, processed, separated and stockpiled, a mix design shall be formulated and submitted by the contractor to the Engineer. The mineral aggregate samples used for mix design purposes shall be representative of aggregate materials to be used during production.

The mix design shall be based on the mix design criteria and other requirements specified herein, utilizing asphalt cement and mineral admixture of the type and from the sources proposed for use in the production of asphaltic concrete.

The mix design shall be prepared under the direct supervision of a professional engineer experienced in the development of mix designs and mix design testing. The mix design shall be provided in a format that clearly indicates all the mix design requirements and shall be sealed, signed, and dated by the mix design engineer.

The mix design shall be prepared by a mix design laboratory that has met the requirements of the Department's "System for the Evaluation of Testing Laboratories". The requirements may be obtained from ADOT Materials Group, 1221 North 21st Avenue, Phoenix, Arizona 85009.

Test results used in the formulation of the mix design must be from testing performed no earlier than 45 days prior to the date the mix design is signed by the mix design engineer. Historical abrasion values may be supplied on sources provided the testing was conducted within the past two years.

The mix design shall be submitted to the Engineer under a cover letter signed by an authorized representative of the contractor.

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The mix design shall be submitted to the Engineer for review a minimum of five working days prior to the start of production.

The mix design shall meet the following criteria when tested in accordance with the requirements of the following test methods:

Criteria	Requirement	Arizona Test Method
1. Voids in Mineral Aggregate: %, Range	14.5 - 18.5	815
2. Effective Voids: %, Range	5.5 - 6.5	815
3. Absorbed Asphalt: %, Range	0-1.0	815

The Engineer reserves the right to adjust the asphalt content during production from the mix design value without additional compensation to the contractor in order to obtain desirable effective voids. The Engineer may waive the requirements for a mix design if the intended use of the material is temporary in nature.

409-2.05 Sampling and Testing:

Sampling and testing the materials or mixture for quality control purposes shall be the contractor's responsibility. The Engineer reserves the right to sample and test the materials and mixture when necessary to determine that they reasonably conform to the requirements specified herein.

409-3 Construction Requirements:

409-3.01 General:

All courses of asphaltic concrete shall be compacted as required, smooth and true to the required lines, grades, and dimensions.

The following smoothness requirements shall be met:

(1) The surface of the final lift of asphaltic concrete placed under this section of the specifications shall be tested and shall not vary by more than 1/8 inch from the lower edge of a ten-foot straightedge when it is placed in the longitudinal direction (including across transverse joints), and when it is placed in the transverse direction across longitudinal joints.

(2) The surface of any lift of asphaltic concrete placed under this section of the specifications, other than the final lift, shall be tested and shall not vary by more than 1/4 inch from the lower edge of a ten-foot straightedge when it is placed in the longitudinal direction (including across transverse joints), and when it is placed in the transverse direction across longitudinal joints.

(3) All deviations exceeding the specified tolerances above shall be corrected by the contractor, to the satisfaction of the Engineer.

The asphaltic concrete hot plant shall conform to the requirements of Section 403 of the Specifications.

No fine material which has been collected in the dust collection system shall be returned to the mixture unless the collected fines are accurately and uniformly metered into the mixture.

The temperature of asphaltic concrete or mineral aggregate upon discharge from the drier shall not exceed 325 degrees F, unless a higher temperature is recommended in writing by the asphalt binder supplier and approved by the Engineer.

The moisture content of the asphaltic concrete immediately behind the paver shall not exceed 0.5 percent. The moisture content will be determined in accordance with the requirements of Arizona Test Method 406.

Asphaltic concrete shall be placed only when the temperature of the surface on which the asphaltic concrete is to be placed is at least 65 degrees F.

At any time, the Engineer may require that the work cease or that the work day be reduced in the event that weather conditions, either existing or expected, are anticipated to have an adverse effect upon the asphaltic concrete.

All wheels and tires of compactors and other equipment surfaces shall be treated when necessary with a product approved by the Engineer in order to prevent the sticking of asphaltic concrete.

Asphaltic concrete immediately behind the laydown machine shall be a minimum of 250 degrees F.

Just prior to being placed, the asphaltic concrete shall be in a thoroughly mixed condition, free of lumps and crusts and at such a temperature as to be in a free flowing, workable condition.

All courses of asphaltic concrete shall be placed and finished by means of self-propelled paving machines except under certain conditions or at certain locations where the Engineer deems the use of self-propelled paving machines impractical.

Pavers shall be equipped with a screed for the full width being paved, heated if necessary, and capable of spreading and finishing all courses of asphaltic concrete.

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Pavers shall be equipped with automatic screed controls with sensors for either or both sides of the paver, capable of sensing grade from an outside reference line, sensing the transverse slope of the screed, and providing the automatic signals which operate the screed to maintain the desired grade and transverse slope.

Failure of the control system to function properly shall be cause for the suspension of the placing of asphaltic concrete.

The base or subgrade upon which asphaltic concrete is to be placed shall be prepared and maintained in a firm condition until asphaltic concrete is placed. It shall not be frozen or excessively wet.

Before asphaltic concrete is placed, the surface to be paved shall be cleaned of objectionable material and tacked in accordance with the requirements of Subsection 404-3.12.

Longitudinal joints of each course shall be staggered a minimum of one foot with relation to the longitudinal joint of any immediate underlying course. Longitudinal joints shall be located within one foot of the center of a lane or within one foot of the centerline between two adjacent lanes.

The contractor shall schedule its paving operations to minimize exposed longitudinal edges. Unless otherwise approved by the Engineer, the contractor shall limit the placement of asphaltic concrete courses, in advance of adjacent courses, to one shift of asphaltic concrete production. The contractor shall schedule its paving operations in such a manner to eliminate exposed longitudinal edges over weekends or holidays.

409-3.02 Compaction:

Compaction shall consist of an established sequence of coverage using specified types of compactors. A pass shall be defined as one movement of a compactor in either direction. Coverage shall be the number of passes as are necessary to cover the entire width being paved.

The rolling sequence, the type of compactor to be used and the number of coverages required shall be as follows:

Rolling Sequence	Type of Compactor		Number of Coverages	
	Option No. 1	Option No. 2	Option No. 1	Option No. 2
Initial	Static Steel	Vibrating Steel	1	1
Intermediate	Pneumatic Tired	Vibrating Steel	2 – 6*	2 - 4*
Finish	Static Steel	Static Steel	1 - 3	1 - 3

* Based on the roller pattern which exhibits the best performance.

The Engineer shall select the option for compaction and, when pneumatic-tired compactors are used, will designate the tire pressures.

Steel wheel compactors shall not be used in the vibratory mode for courses of one inch or less in nominal thickness nor when the temperature of the asphaltic concrete falls below 180 degrees F. Steel wheel compactors shall weigh not less than eight tons.

Initial and intermediate compaction shall be completed before the temperature of the asphaltic concrete falls below 200 degrees F. All edges shall be rolled with a pneumatic tired compactor, or other methods approved by the Engineer, while the mixture is still hot.

Compaction will be deemed to be acceptable on the condition that the asphaltic concrete is compacted using the type of compactors specified, ballasted and operated as specified and with the number of coverages of the compactors as specified.

409-3.03 Acceptance:

Asphaltic concrete will be accepted complete in place, if, in the judgment of the Engineer, the asphaltic concrete reasonably conforms to the requirements specified herein. Asphaltic concrete that is not acceptable and is rejected shall be replaced to the satisfaction of the Engineer and at no expense to the Department.

409-4 Method of Measurement:

Asphaltic concrete will be measured by the ton for the mixture actually used, which will include the weight of mineral aggregate, bituminous material, and mineral admixture. Measurement will include any weight used in construction of intersections, turnouts, curbs, spillways and spillway inlets, ditches, catch basin entrances, median strips, sidewalks or other miscellaneous items or surfaces.

409-5 Basis of Payment:

409-5.01 General:

The accepted quantities of asphaltic concrete, measured as provided above, will be paid for at the contract unit price per ton for the bituminous mixture complete in place.

No direct payment will be made for the bituminous material and mineral admixture in the asphaltic concrete, or the bituminous material for tack coat and application of tack coat, the price being considered as included in the price paid for asphaltic concrete.

Asphaltic concrete may be measured, by volume, upon the execution of a supplemental agreement which will specify the manner in which the volume is determined. The volume will include the volume of mineral

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aggregate, bituminous material, mineral admixture and any necessary blending material.

409-5.02 Reduction for Noncompliance:

A reduction in payment to the contractor for asphaltic concrete will be made for quantities of asphalt cement that do not meet the requirements of Section 1005 as determined by corresponding test results. Adjustments in payment will be made in accordance with the requirements of Table 1005-1 and the following formula:

$$R = (100 - P) \times \left[\frac{(\$200) \times (T)}{100}\right]$$

Where:

R = Amount of Reduction in Payment (dollars)
T = Quantity of asphalt cement in failure (tons, rounded to nearest tenth)
P = Percent of Contract Unit Price allowed (Table 1005-1)

SECTION 410 ASPHALT-RUBBER STRESS-ABSORBING MEMBRANE:

410-1 Description:

The work under this section shall consist of furnishing all materials including asphalt-rubber, tack coat and cover material and applying the materials in accordance with the details shown on the project plans and the requirements of these specifications.

410-2 Materials:

410-2.01 Tack Coat:

The existing roadway surface upon which the Asphalt Rubber Membrane is to be placed, shall be first cleaned of potentially detrimental material and tacked with a light coat of bituminous material, conforming to the requirements of Subsection 404-3.12 of the specifications. The cleaning of the surface, the tacking of the surface and the type and amount of bituminous material used shall be as directed by the Engineer.

410-2.02 Asphalt-Rubber:

Asphalt-Rubber shall conform to the requirements of Section 1009. The type of asphalt-rubber shall be as shown in the Special Provisions. The crumb rubber gradation shall be Type A conforming to the requirements of Section 1009.

410-2.03 Cover Material:

No. 121431.1

TABLE 1005-6
OTHER REQUIREMENTS

Grade of Asphalt Specification Designation	Range of Temperatures for Application by Spraying, °F (Not applicable for Plant Mixing)	Range of Aggregate Temperatures for Plant Mixing, °F	Basis of Conversion, Average Gallons Per Ton at 60 °F
Paving Asphalt	275 - 400	------	
PG 76-XX			232
PG 70-XX			233
PG 64-XX			235
PG 58-XX			236
PG 52-XX			238
PG 76-22 TR+			229
Liquid Asphalt			
MC-70	105 - 175	90 - 155	253
MC-250	140 - 225	125 - 200	249
MC-800	175 - 225	160 - 225	245
MC-3000	215 - 290	200 - 260	241
Emulsified Asphalt		-----	240
RS-1	70 - 140		
CRS-1	125 - 185		
RS-2	125 - 185		
CRS-2	125 - 185		
CRS-2P	125 - 185 (1)		
SS-1	70 - 160		
CSS-1	70 - 160		
HFE-150P	-----		
HFE-300P	-----		
Emulsified Asphalt (Special Type)	70 - 160	-----	240
Recycling Agent (RA-1, RA-5, RA-25, RA-75)	-----	-----	240
Emulsified Recycling Agent (ERA-1, ERA-5, ERA-25, ERA-75)	70 - 160	-----	240

(1) Or as directed by the Engineer.

SECTION 1006 PORTLAND CEMENT CONCRETE:

1006-1 General Requirements:

Portland cement concrete shall consist of a mixture of hydraul cement, fine aggregate, coarse aggregate, and water. It may als contain air-entraining admixtures, chemical admixtures, and supplementary cementitious material.

The contractor shall determine the mix proportions and shall furni concrete which conforms to the requirements of these specification All concrete shall be sufficiently workable, at the slump proposed l the contractor within the specified range, to allow proper placement the concrete without harmful segregation, bleeding, or incomple consolidation. It shall be the responsibility of the contractor proportion, mix, place, finish, and cure the concrete properly accordance with the requirements of these specifications.

1006-2 Materials:

1006-2.01 Hydraulic Cement:

Hydraulic cement shall consist of either Portland cement Portland-pozzolan cement.

Portland cement shall conform to the requirements of ASTM C 150 t Type II, III, or V. However, at the option of the manufactur processing additions may be used in the manufacture of the ceme provided such processing additions have been shown to meet t requirements of ASTM C 465, and the total amount of such mater used does not exceed one percent of the weight of the Portland ceme clinker.

Portland-pozzolan cement shall conform to the requirements of AS C 595 for Type IP (MS).

Hydraulic cement shall not contain more than 0.60 percent total alk The word alkali as used in these specifications shall be taken as sum of sodium oxide and potassium oxide calculated as sodium oxide

Certificates of Analysis conforming to the requirements of Subsect 106.05 shall be submitted.

Cement of different types or brands shall not be intermingled or usec the same batch. The contractor shall provide suitable means storing and protecting the cement against dampness. Cement which any reason has become partially set or which contains caked lur shall not be used.

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The use of either sacked cement or bulk cement is permissible. The use of fractional bags of sacked cement will not be permitted unless the contractor elects to weigh the cement into each batch.

1006-2.02 Water:

The water used shall be free from injurious amounts of oil, acid, alkali, clay, vegetable matter, silt or other harmful matter. Water shall contain not more than 1,000 parts per million of chlorides as Cl and not more than 1,000 parts per million of sulfates as SO_4.

Water shall be sampled and tested in accordance with the requirements of AASHTO T 26. Potable water obtained from public utility distribution lines will be acceptable.

1006-2.03 Aggregates:

(A) General Requirements:

When concrete is to be placed at elevations above 4,500 feet, the fine and coarse aggregate shall be subject to five cycles of the sodium sulfate soundness test in accordance with the requirements of AASHTO T 104. The total loss shall not exceed 10 percent by weight of the aggregate as a result of the test. Tests for soundness may be waived when aggregates from the same source have been approved and the approved test results apply to the current production from that source.

When aggregates show potential for alkali silica reaction (ASR), as indicated by expansions of 0.10% or greater at 16 days after casting when tested in accordance with ASTM C 1260, sufficient mitigation for the expansion shall be determined in accordance with ASTM C 1567.

Mill tailings or material from mine dumps shall not be used in the production of fine or coarse aggregate.

The handling and storage of concrete aggregate shall be such as to minimize segregation or the intermixing and contamination with foreign materials. The Engineer may require that aggregates be stored separately. Different sizes of aggregate shall be separated by bulkheads or stored in separate stockpiles sufficiently removed from each other to prevent the material from becoming intermixed.

When aggregates are stored on the ground, the sites for the stockpiles shall be clear of all vegetation and level. The bottom one-foot layer of aggregate shall not be disturbed or used.

The handling and storage of concrete aggregate for Class P concrete at the job site shall be such as to minimize segregation. Stockpiles shall be neat and regular in form and shall occupy as small an area as possible. Stockpiles shall be constructed by first distributing the aggregate over the entire base and then building upward in successive

layers not more than five feet in depth. Aggregate shall not be dump or spilled over the side of the pile. When a conveyor is used stockpile aggregate, it shall be equipped with an adequate rock tren or rock ladder to reduce segregation and it shall be moved continuou across the stockpile. The distance the material drops from the tren shall not exceed 10 feet. Aggregate shall be distributed over t stockpile so that the formation of conical piles higher than 10 feet prevented.

Contamination of concrete aggregate for Class P concrete by cont with the ground at the job site shall be positively prevented. T contractor shall take the necessary measures to prevent su contamination. Such preventive measures shall include, but n necessarily be limited to, placing aggregate on hardened surfac consisting of Portland cement concrete, asphaltic concrete, or cem treated material.

The contractor shall maintain at least two full days worth of product of fine and coarse aggregate stockpiled at the batch plant for Class concrete prior to starting and throughout the duration of Portl cement concrete paving operations. This requirement is waived for last two days of production.

The following test methods will be used to evaluate the quality aggregates for concrete:

Sampling	Arizona Test Method 105
Reducing field samples to testing size	AASHTO T 248
Potential for Alkali Silica Reaction (ASR)	ASTM C 1260 & C 1567
Clay lumps and friable particles	AASHTO T 112
Lightweight particles	AASHTO T 113 (See Not
Organic impurities	AASHTO T 21
Aggregate gradation	Arizona Test Method 201
Soundness (Sodium Sulfate)	AASHTO T 104
Mortar Strength	AASHTO T 71(See Note)
Sand equivalent	AASHTO T 176
L.A. abrasion	AASHTO T 96
Fractured Coarse Aggregate Particles	Arizona Test Method 212

Note: AASHTO T 113 and T 71 are modified as specified in Subsections 1006-2.03 (B) and (C).

(B) Fine Aggregate:

Fine aggregate shall be a natural sand, or other approved inert mate with similar characteristics, composed of clean, hard, strong, durat uncoated particles. The aggregate shall be washed and shall conf to the requirements of AASHTO M 6, with the following exceptions:

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The amount of deleterious substances in the washed fine aggregate shall not exceed the following limits by dry weight, when tested in accordance with the following test methods:

Clay lumps and friable particles	AASHTO T 112	0.5%
Lightweight particles	AASHTO T 113 (Except that the percent of lightweight particles shall be reported to the nearest 0.01%)	1.25% (0.25% Max. Coal and Lignite*)

* Only material that is brownish-black, or black, shall be considered coal or lignite.

The total amount of all deleterious substances listed in the table above shall not exceed 1.25 percent by dry weight.

Fine Aggregate shall meet the following gradation requirements when tested in accordance with Arizona Test Method 201.

Sieve Size	Percent Passing
3/8 in.	100
No. 4	95 - 100
No. 16	45 - 80
No. 50	0 - 30
No. 100	0 - 10
No. 200	0 - 4.0

Fine aggregate shall have a sand equivalent value of not less than 75.

Fine aggregates shall be subjected to testing under AASHTO T 21 for organic impurities. Aggregates producing a color darker than the standard color shall be rejected unless the material passes the mortar strength specified in the following paragraph:

Fine aggregate shall be made into mortar and subjected to testing under AASHTO T 71, except that the mortar shall develop a compressive strength at seven and 28 days of not less than 90 percent of that developed by a mortar prepared in the same manner with the same Type II cement and graded Ottawa sand having a fineness modulus of 2.40 ± 0.10.

(C) Coarse Aggregate:

Coarse aggregate shall consist of crushed stone, gravel, crushed gravel, or other approved inert material of similar characteristics, including cinders when specified, having hard, strong and durable pieces free of clay and other deleterious substances. The aggregate shall be washed. The aggregate gradation, when tested in accordance with Arizona Test Method 201, shall conform to the appropriate size designation of AASHTO M 43, except as shown below.

The amount of deleterious substances in the washed coarse aggreg shall not exceed the following limits by dry weight, when tested accordance with the following test methods, except as noted:

Clay lumps and friable particles	AASHTO T 112	0.3%
Lightweight particles	AASHTO T 113 (Except that the percent of lightweight particles shall be reported to the nearest 0.01%.)	1.25% (0.25% Max. Co and Lignite
Material passing No. 200 sieve	Arizona Test Method 201	1.0%

* Only material that is brownish-black, or black, shall be consider coal or lignite.

The total amount of all deleterious substances listed in the table ab shall not exceed 1.25 percent by dry weight.

The percent of wear of coarse aggregate at 500 revolutions, w tested in accordance with the requirements of AASHTO T 96, shall exceed 40.

1006-2.04 Admixtures:

(A) General Requirements:

The contractor shall furnish Certificates of Compliance conformin the requirements of Subsection 106.05 for each type of admix furnished.

Calcium chloride as a separate admixture shall not be acceptable.

All concrete admixtures shall be stored in suitable container accordance with the manufacturer's recommendations. All li admixtures shall be protected from freezing. Liquid admixtures have frozen shall not be used.

Admixtures shall be uniform in properties throughout their use ir work.

If more than one admixture is used, the admixtures shall be compa with each other so that the desired effects of all admixtures used be realized.

(B) Air-Entraining Admixtures:

Air-entraining admixtures shall conform to the requirement ASTM C 260.

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Only those air-entraining admixtures shown on the Department's Approved Products List (APL) shall be used. Copies of the most current version of the APL are available on the Internet from the Arizona Transportation Research Center (ATRC), through its PRIDE program.

Air-entraining admixtures having a chloride concentration of 10,000 parts per million (one percent by mass of the admixture) or less, as determined in accordance with Arizona Test Method 738, are acceptable unless otherwise specified.

(C) Chemical Admixtures:

Chemical admixtures shall conform to the requirements of ASTM C 494.

Only those chemical admixtures shown on the Department's Approved Products List (APL) shall be used. Copies of the most current version of the APL are available on the Internet from the Arizona Transportation Research Center (ATRC), through its PRIDE program.

Chemical admixtures having a chloride concentration of 10,000 parts per million (one percent by mass of the admixture) or less, as determined in accordance with Arizona Test Method 738, are acceptable unless otherwise specified.

(D) Supplementary Cementitious Material (Fly Ash, Natural Pozzolan, and Silica Fume):

Supplementary cementitious materials shall be approved prior to their use in accordance with Materials Policy and Procedure Directive "Certification and Acceptance of Hydraulic Cement, Fly Ash, Natural Pozzolan, and Silica Fume".

Fly ash and natural pozzolan shall conform to the requirements of ASTM C 618 for Class C, F, or N mineral admixture, except that the loss on ignition shall not exceed 3.0 percent.

Silica fume shall conform to the requirements of ASTM C 1240.

When a supplementary cementitious material with a calcium oxide content greater than 15 percent is used, or when the Special Provisions specify sulfate resistant concrete, the cement intended to be used shall be tested for sulfate expansion in accordance with ASTM C 1157 and ASTM C 1012. For moderate sulfate resistance, the maximum expansion shall be 0.10 percent at six months. For high sulfate resistance, the maximum expansion shall be 0.05 percent at six months and 0.10 percent at one year.

When Class C fly ash is used, the cement intended to be used shall be tested for sulfate expansion in accordance with ASTM C 1157 and

ASTM C 1012 and shall have a maximum expansion of 0.05 percen six months and 0.10 percent at one year.

1006-2.05 Concrete Curing Materials:

Liquid membrane forming compound shall conform to the requireme of AASHTO M 148. Type 2 compound with either a Class A or Clas vehicle shall be used for concrete pavement, bridge decks, approach slabs. Type 1-D compound with either a Class A or Clas vehicle shall be used for other concrete items.

Certificates of Compliance conforming to the requirements Subsection 106.05 shall be submitted.

1006-3 Design of Mixtures:

1006-3.01 Design Criteria:

Portland cement concrete shall conform to the requirements spec in Table 1006-A for each of the classes listed therein.

TABLE 1006-A

Class of Concrete	Minimum 28-Day Compressive Strength Required: psi (See Note 1)	Hydraulic Cement Content: Lbs per Cu Yd Minimum-Maximum (See Notes 2, 3, & 4)	Maximum Water/Cement Ratio	Slu Ran Inch
B	2,500	470 – 658	None	
S or E	2,500	520 – 752	0.55	(S Not
	3,000 (See Note 5)			
	3,500			
	4,000			
	4,500 and greater	564 – 752	0.50	
P	4,000	564 – 658	None	0 –
H	High performance concrete as specified in project spe provisions.			

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TABLE 1006-A (continued)

Note 1: Testing for compressive strength of cylinders for all classes of concrete shall be in accordance with the requirements of Arizona Test Method 314.

Note 2: A supplementary cementitious material (fly ash, natural pozzolan, or silica fume) conforming to the requirements of Subsection 1006-2.04(D) may be used at the option of the contractor only when Portland cement is used. The use of a supplementary cementitious material is not allowed for replacement of cement when Portland-pozzolan cement [Type IP (MS)] is used. A maximum of 25 percent of the required weight of Portland cement may be replaced with fly ash or natural pozzolan. A maximum of 10 percent of the required weight of Portland cement may be replaced with silica fume, or a maximum of 10 percent silica fume may be added to the required weight of Portland cement. When supplementary cementitious material is used as a replacement for Portland cement, the replacement shall be made on a 1.0 pound to 1.0 pound basis. If performance enhancement of the concrete, such as the mitigation of an alkali silica reaction or for increased sulfate resistance is necessary, additional quantities of fly ash or natural pozzolan may be incorporated into the concrete without a corresponding Portland cement replacement, if approved by the Engineer.

Note 3: The hydraulic cement content shall be as shown unless otherwise specified.

Note 4: Concrete to be placed under water, tremie concrete, shall conform to the requirements for the class and strength required except the minimum hydraulic cement content shall be increased by 50 pounds per cubic yard of concrete.

Note 5: Unless otherwise shown on the plans.

Note 6: The proposed slump shall be chosen by the contractor. Concrete at the proposed slump shall be sufficiently workable to allow proper placement without harmful segregation, bleeding, or incomplete consolidation.

Air-entraining admixtures will be required for all classes of concrete placed at an elevation of 3,000 feet or above. The amount of entrained air in the concrete mixture shall not be less than four percent nor more than seven percent by volume. However, no air-entrainment will be required for minor precast structures, precast pipe, and precast, prestressed structural members supporting a concrete deck slab or impervious overlay. Also, no air-entrainment will be required for any precast items constructed using the dry pack or no-slump method.

For elevations below 3,000 feet, air-entraining admixtures may be use at the option of the contractor. If air-entraining admixtures are used the amount of entrained air in the concrete shall not exceed seve percent by volume.

Concrete that fails to conform to the entrained air content requirement listed above for the respective elevation as determined by th Engineer, shall be rejected prior to placement.

Unless specifically required, water-reducing admixtures may be used a the option of the contractor.

The coarse aggregate size designation for Class S, Class B, an Class E concrete shall be chosen by the contractor and approved by th Engineer and shall conform to the size designation and gradin requirements of AASHTO M 43. In choosing the size designation, th maximum size of coarse aggregate shall not be larger than one fifth the narrowest dimension between sides of adjacent forms, or two-thirc of the minimum clear spacing between reinforcing bars, or one third th depth of the slab, whichever is least. If two or more stockpiles ar utilized to manufacture an AASHTO M 43 size designation, at the tim of proportioning for mixing, the aggregate from each stockpile shall b measured by weight and proportioned so that the resulting mixture coarse aggregate meets the requirements for the chosen siz designation. The percent of fractured coarse aggregate particles sha be at least 30 when tested in accordance with the requirements Arizona Test Method 212.

Coarse aggregate for Class P concrete used to construct Portlar cement concrete pavement without load transfer dowels shall b separated into two stockpiles. At the time of proportioning for mixin the aggregate from each stockpile shall be measured by weight ar proportioned so that the resulting mixture of coarse aggregate mee the requirements for size designation No. 467, as specified in AASHT M 43. The percent of fractured coarse aggregate particles for th coarse aggregate composite shall be at least 30 when tested accordance with the requirements of Arizona Test Method 212.

Coarse aggregate for Class P concrete used to construct Portlai cement concrete pavement with load transfer dowels and adjace shoulders shall meet the requirements for size designation No. 57, specified in AASHTO M 43. The percent of fractured coarse aggrega particles shall be at least 30 when tested in accordance with t requirements of Arizona Test Method 212.

Coarse aggregate for Class P concrete placed in pavement ramp tape not exceeding a width of 10 feet and in pavement gore areas may size designation No. 57, as specified in AASHTO M-43. The use of si designation No. 57 coarse aggregate may be used in concrete placed other inaccessible pavement areas when approved in writing by t Engineer.

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1006-3.02 Design Procedures:

At least two weeks prior to the appropriate concreting operation, the contractor shall furnish a mix design for each class of concrete and each strength of Class S and Class E concrete for review and approval. More than one mix design for each class of concrete and each strength of Class S and Class E concrete may be submitted for approval provided specific items and locations of intended uses accompany the mix design. The contractor shall substantiate each mix design by furnishing test data and providing all details of the mixtures proposed for use. The mix design shall be prepared under the direct supervision of, and signed by, a registered professional engineer, a NICET Level III or higher certified technician in the concrete subfield, or an ACI certified Concrete Laboratory Testing Technician Grade II. Individuals preparing and submitting mix designs shall have experience in the development of mix designs and mix design testing.

The complete solid volume mix designs submitted for approval shall include all weights and volumes of all ingredients. The brand, type, and source of hydraulic cement and admixtures, the coarse aggregate size number designation, source of aggregates, the specific gravities of all ingredients, the proposed slump, the water/cement ratio, a product code to identify the mix design, and the intended use of each mix design shall be an integral part of each mix design.

The use of new and previously used mix designs, and the requirements for trial batches, will be as required by the Materials Policy and Procedure Directive "Submittal and Approval of Portland Cement Concrete Mix Designs".

Changes in approved mix designs may be made by the contractor with the approval of the Engineer.

In no case shall the approval of a mix design relieve the contractor of the responsibility for the results obtained by the use of such approved mix design.

A new mix design shall be submitted for approval any time the test results of an approved mix design indicate that the concrete does not meet the required compressive strength.

When approved by the Engineer, concrete from trial batches may be used in the work at locations where concrete of a lower strength is required and such concrete will meet the requirements of the class of concrete at that location. The basis of payment for such concrete shall be that which applies to the concrete required at that location.

1006-4 Concrete Production:

1006-4.01 General Requirements:

The contractor may obtain concrete for each class of concrete and for each strength of Class S and Class E concrete from a source approved by the Engineer in lieu of establishing a batch plant at the project site.

For each class of concrete and each strength of Class S and Class E concrete, except for Class P concrete produced in a batch plant at the site and used exclusively for Class P work, the contractor shall furnish a delivery ticket for each batch of concrete. The minimum information to be shown on each delivery ticket shall be the date, time batched, truck identification number, name or identification of batch plant, name of contractor, name and location of project, the quantity of concrete, the batch weights or mix design product code, the amount of permissible additional water to meet the design water/cement ratio, and the number of revolutions that the concrete has been mixed at mixing speed in a truck mixer. An authorized representative of the contractor shall be responsible for each delivery ticket and shall sign each delivery ticket accepting the contractor's responsibility for the concrete. The representative shall immediately furnish the delivery ticket to the Engineer.

1006-4.02 Proportioning:

(A) Hydraulic Cement:

A separate scale shall be used to weigh the hydraulic cement. A load-indicating device, positioned so as to be easily visible to the Engineer and accurate to ± 0.2 percent of scale capacity, shall be provided to weigh all hydraulic cement. The batching accuracy shall be within ± 1.0 percent of the required weight. Load-indicating devices for the scale, or a load cell providing a digital printed readout will be required when weighing all hydraulic cement.

The cement shall be conveyed by means of an enclosed conveying system and the weighing hopper shall be equipped with one or more vibrators as required to ensure the complete discharge of all cement from the hopper after each batch is weighed.

(B) Water:

Water shall be measured by volume or by weight. Measurement by volume will be by metering.

Scales shall be accurate within ± 0.2 percent of scale capacity. Volumetric measuring devices shall have an accuracy of ± 1.5 percent. The batching devices shall be capable of routinely batching water within ± 1.5 percent.

(C) Aggregates:

All aggregates shall be proportioned by weight.

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Suitable scales shall be provided by the contractor to weigh each size of aggregate. Load indicating devices for the scales shall be positioned so as to be easily visible to the Engineer and accurate to ± 0.2 percent of scale capacity. The batching accuracy shall be within ± two percent of the target weight. The weighing equipment shall be arranged so as to permit the convenient removal of excess material from the weighing hopper and the equipment shall be arranged to enable the operator to have convenient access to all controls. The scales and load indicating devices shall be so graduated and equipped that the weights of materials can be accurately determined. Necessary efforts shall be made to obtain and preserve uniform moisture content in the coarse and fine aggregates. The moisture content shall not vary more than three percent during any day's concrete production. The estimated percent of free moisture in each of the coarse and fine aggregates shall be determined by the contractor using acceptable test methods.

The moisture content of the aggregate shall be such that no free drainage of water from the aggregate will be visible during transportation from the stockpile to the point of mixing. Aggregate containing excess moisture shall be stockpiled prior to use until it is sufficiently dry to meet the above requirement.

In the event that either the coarse or fine aggregate has a moisture absorption rate of more than 1.5 percent, the materials shall be thoroughly prewetted and allowed to drain in advance of use until the moisture content is stable.

(D) Admixtures:

The equipment and the procedures used to measure admixtures and dispense them into the concrete batch shall be approved by the Engineer prior to use.

Dry admixtures shall be measured by weight with a separate scale. A load indicating device for the scale shall be positioned so as to be easily visible to the Engineer and accurate to within ± 1.0 percent of the amount being weighed. Paste or liquid admixtures shall be measured either by weight or by volume. Only mechanical dispensing equipment shall be used for adding admixtures. Dosage rates shall conform to the manufacturer's recommendations or approved rates, or as determined from field trial batches.

Dispensers for admixtures shall have sufficient capacity to measure at one time the full quantity required for each batch. Admixtures shall be added in accordance with the manufacturer's recommendations and in a manner such that the admixture is incorporated uniformly in the concrete mixture. The amount of liquid admixtures shall not vary from the required amount by more than ± 3.0 percent.

Equipment for measurement shall be designed for convenient confirmation of measurement accuracy. If more than one liquid

admixture is used, each admixture shall be dispensed by separat equipment unless otherwise permitted in writing by the Engineer.

When a supplementary cementitious material (such as fly ash, natur pozzolan, or silica fume) is specified in the mix design, it may b weighed cumulatively with the hydraulic cement on the same scale. the same scale is used, the hydraulic cement shall be weighed firs then the supplementary cementitious material. If the same scale is n used, a separate scale with a load-indicating device, positioned so a to be easily visible to the Engineer and accurate to ± 0.2 percent scale capacity, shall be provided to weigh the supplementa cementitious material.

When the quantity of hydraulic cement exceeds 30 percent of the f capacity of the scale, the batching accuracy of mixtures containir supplementary cementitious material shall be such that the quantity the hydraulic cement, and the cumulative quantity of the hydrau cement plus the supplementary cementitious material, is within ± 1. percent of the sum of their designated batch weights.

Supplementary cementitious material shall be conveyed by means of enclosed conveying system, and the weighing hopper shall be equipp with one or more vibrators as required to ensure the comple discharge of the supplementary cementitious material from the hopp after each batch is weighed.

1006-4.03 Mixing:

(A) General Requirements:

The concrete may be mixed in a stationary mixer, either at a centi mixing plant or at the site, or it may be mixed in a truck mixer, either a central mixing plant or at the site. Concrete may be mixed in mobile mixer at the site for Class S, Class B, and Class E concre provided written permission of the Engineer is granted.

Each mixer shall meet the specified requirements for type and size a shall have attached in a prominent place a manufacturer's pl showing the gross volume of the mixer and the recommended speeds the mixer for mixing and for agitating.

Each batch plant shall be equipped to control the time when the wa enters the mixer during the mixing cycle. Batch and mixing time sh be from the time hydraulic cement is combined with water.

Mixers shall be cleaned at suitable intervals. Water used for clean the mixer shall be discharged prior to further batching.

Equipment having components made of aluminum or magnesium allc which would have contact with plastic concrete during mixing transporting, shall not be used.

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All concrete shall be homogeneous and thoroughly mixed, and there shall be no lumps or evidence of un-dispersed cement.

(B) Mixing in a Stationary Mixer:

The volume of concrete mixed per batch shall not exceed the capacity of the mixer as shown on the manufacturer's plate. No spillage of concrete will be allowed during the process of mixing.

While mixing, the mixer shall be operated at the speed shown on the manufacturer's plate as the mixing speed.

The mixing time shall not be less than 60 seconds per batch on Class P concrete and the mixing time shall be increased if directed by the Engineer. The mixing time shall be not less than 60 seconds for one cubic yard and shall be increased 15 seconds for each additional cubic yard or fraction thereof for Class S, Class B, and Class E concrete.

The mixers shall have an automatic timing device which locks the discharge equipment until the required mixing time has been completed. The mixer shall be operating at mixing speed at the time that all ingredients enter the mixer to ensure the immediate beginning of the mixing cycle. Mixing time shall end when the discharge chute opens. The contents of the mixer shall be completely discharged before the succeeding batch is placed in the mixer.

Any concrete discharged before the mixing time is completed shall be disposed of by the contractor at no additional cost to the Department.

Stationary mixers shall be equipped with automatic batch meters for counting the batches for Class P concrete. The contractor shall furnish the batch count daily to the Engineer.

Mixed concrete shall be transported in truck mixers, truck agitators or in non-agitating trucks having special bodies.

When truck mixers or truck agitators are used, the concrete shall be continuously agitated from the time of loading until the time of discharge. Agitation shall be by rotation of the drum at the speed shown on the manufacturer's plate as agitating speed.

The truck mixer or truck agitator shall be loaded and operated within a capacity not to exceed 80 percent of the gross volume of the drum. The rate of discharge shall be controlled by the speed of rotation of the drum in the discharge direction with the discharge gate fully opened.

Discharge from the truck mixer or truck agitator shall be completed within 90 minutes from the time batched, unless otherwise noted in the mix design and approved by the Engineer.

Bodies of non-agitating trucks shall be smooth, mortar-tight, me containers and shall be capable of discharging the concrete at satisfactory controlled rate without segregation. If discharge concrete is accomplished by tilting the body, the surface of the lo shall be retarded by a suitable baffle. Covers shall be provided wh needed for protection.

Discharge from non-agitating trucks shall be completed wit 45 minutes from the time concrete is batched.

Concrete hauled in open-top vehicles shall be protected against ra When the ambient temperature exceeds 85 degrees F, the concr shall be covered if it will be exposed to the sun for more th 30 minutes.

(C) Mixing in Truck Mixers:

Truck-mixed concrete shall be mixed entirely in the truck mixer a shall be mixed at the batch plant or at the site.

Truck mixers shall be operated within a capacity not to exce 63 percent of the gross volume of the drum and at speeds shown on t manufacturer's plate as mixing and agitating speeds.

Each batch of concrete shall be mixed for not less than 70 nor mo than 100 revolutions of the drum at mixing speed after all materi have been loaded into the drum, except that when approved by t Engineer, the maximum of 100 revolutions may be increased. A revolving of the drum beyond the maximum number of revolutions sh be at the agitating speed. Mixing shall begin within 10 minutes af the cement has been combined with either the aggregate or water.

The truck mixer shall be equipped with an electrically or mechanica activated revolution counter by which the number of drum revolutio may be verified. The counter shall accurately register the number revolutions. It shall be mounted on the truck mixer or just inside t truck cab, so that it may be safely and conveniently read from besi the truck. The revolution counter shall be reset to zero after materials have been loaded into the drum.

Discharge from the truck mixer shall be completed within 90 minut from the time batched, unless otherwise noted in the mix design a approved by the Engineer.

If additional mixing water is required to maintain the mix desi water/cement ratio, the concrete shall be mixed by a minimum 30 revolutions of the drum at mixing speed after the water has be added, prior to discharge of any concrete for placement. Any additio mixing water and required mixing revolutions shall be recorded on t delivery ticket specified in Subsection 1006-4.01. This additio mixing may be in excess of the maximum revolutions previou specified.

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(D) **Mixing in Mobile Mixers:**

Concrete mixing in mobile mixers for Class S, Class B, and Class E concrete shall be performed in accordance with the requirements of AASHTO M 241.

1006-4.04 Consistency:

The contractor shall furnish Class P Concrete having a slump within the range specified in Table 1006-A.

The contractor shall furnish Class S, Class B, and Class E concrete having the slump shown on the approved mix designs with a permissible variation of ± one inch; however, the permissible variation will be ± two inches when an approved high range water reducing chemical admixture (ASTM C 494, Type F or Type G) conforming to the requirements of Subsection 1006-2.04 is used.

Concrete that fails to conform to the consistency requirements will be rejected.

When concrete is pumped, samples for consistency will be taken both as the concrete leaves the mixer and at the pump hose discharge. If the Engineer determines that there is a good correlation between the results of consistency tests on samples obtained from the mixer and from the pump hose, the Engineer may discontinue sampling from one of the sources; however, the Engineer may take periodic samples from both sources to verify the correlation of test results.

1006-5 Weather Limitations:

1006-5.01 General Requirements:

Under rainy conditions, placing of concrete shall be stopped before the quantity of surface water is sufficient to cause a flow or wash of the concrete surface or have a detrimental effect on the finished concrete and acceptance parameters.

Placing of concrete shall immediately cease if the hauling vehicles or any equipment or pedestrian traffic tracks mud on the prepared base or changes the allowable subgrade dimensional tolerances for Class P concrete and slabs placed on subgrade for Class S, Class B, and Class E concrete.

1006-5.02 Hot Weather Concreting:

The temperature of the concrete mixture immediately before placement shall not exceed 90 degrees F.

Forms, subgrade and reinforcing steel, shall be sprinkled with cool water just prior to placement of concrete.

Mix water may be cooled by refrigeration, liquid nitrogen, or well-crushed ice of a size that will melt completely during the mixing operation. Crushed ice may be substituted for part of the mix water on a pound for pound basis.

1006-5.03 Cold Weather Concreting:

The temperature of the mixed concrete immediately before placing shall not be less than 50 degrees F.

Concrete shall not be placed on or against ice-coated forms, reinforcing steel, structural steel, conduits or construction joints, nor on or against snow, ice, or frozen earth materials.

Concrete operations shall be discontinued when a descending air temperature in the shade and away from artificial heat falls below 40 degrees F nor shall concrete operations be resumed until an ascending air temperature in the shade and away from artificial heat reaches 35 degrees F unless otherwise approved by the Engineer.

Mixing and placing concrete shall continue no later in any day than that time which will allow sufficient time to place and protect the concrete already poured before the air temperature drops to 35 degrees F.

Concrete operations may be allowed although the air temperature at any time during the cure period in the shade and away from artificial heat is below the limit permitted above. Where concrete operations are thus allowed, the contractor shall use equipment to heat the aggregates or water, or both, prior to mixing. If aggregates are heated, the minimum temperature shall be 60 degrees F and the aggregates shall have no chunks of ice or frozen aggregate present. Equipment used to heat the aggregates shall be such that consistent temperatures are obtained throughout the aggregate within each batch and from one batch to another. Water shall not be heated in excess of 150 degrees F unless the water is mixed with the aggregate prior to the addition of cement to the batch.

When concreting operations are allowed when the air temperature falls below the limits permitted in the shade and away from artificial heat the contractor shall provide adequate insulation or heat, or both, to protect the concrete after placement. This protection shall be to the extent required to maintain a concrete surface temperature of not less than 50 degrees F for a period of 72 hours after placement and at not less than 40 degrees F for an additional 96 hours. When artificial heating is required, the heating units shall not locally heat or dry the surface of the concrete. A written outline of the proposed protection method shall be submitted to the Engineer for approval.

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The placing of concrete will not be permitted until the Engineer is satisfied that all the necessary protection equipment and materials are on hand at the site and in satisfactory working condition.

Concrete requiring cold weather protection shall have such protection removed at the end of the required period in a manner that will permit a gradual drop in the concrete temperature.

1006-6 Curing Concrete:

1006-6.01 Curing Cast-in-Place Concrete:

(A) General Requirements:

All cast-in-place concrete shall be cured by one or by a combination of more than one of the methods specified herein and curing shall begin immediately after completion of machine or hand finishing of the fresh concrete.

Curing shall be continued for a period of at least seven days after placing if either Type II Portland cement or Portland pozzolan cement has been used, or for at least three days if Type III Portland cement has been used.

Surfaces requiring a Class II finish shall not be cured by the Liquid-Membrane Forming Compound Method until after the finishing operations are completed.

No traffic, hauling, storing of material or other work shall be allowed on any concrete surface during the required curing periods.

(B) Water Curing Method:

All surfaces not covered by reasonably waterproof forms shall be kept damp by applying water with a nozzle that so atomizes the flow of the water that a fog mist and not a spray is formed until the surface of the concrete is covered with a curing medium or sprinkling of the surface is permitted. The moisture from the nozzle shall not be applied under pressure directly upon the concrete and shall not be allowed to accumulate on the concrete in a quantity sufficient to cause a flow or wash the surface.

If a curing medium is used, the concrete shall be kept continuously wet by sprinkling with water for the entire curing period. Burlap, rugs, carpets, or earth or sand blankets may be used as a curing medium to retain the moisture during the curing period. Application of the curing medium shall not begin until such time that placement can be made without marring the surfaces of the concrete.

If a curing medium is not used, the entire surface of the concrete shall be kept damp by the application of water with an atomizing nozzle as

specified above until the concrete has set, after which the entire surface of the concrete shall be sprinkled continuously with water for the entire curing period.

In no case shall curing be interrupted by more than one hour during the curing period.

(C) Liquid-Membrane Forming Compound Method:

All surfaces not covered by reasonably waterproof forms shall be cured by the liquid-membrane forming compound method. The curing compound shall be applied to the concrete immediately following the surface finishing operation in one or more applications totaling a rate of not less than one gallon per 100 square feet.

The curing compound shall form a continuous unbroken surface.

If the membrane film is broken during the curing period, the broken area shall be given a new application of compound at a rate sufficient to assure uniform coverage.

In no case shall curing be interrupted by more than one hour during the curing period.

(D) Forms in Place Method:

Formed surfaces of concrete may be cured by retaining the forms in place. The forms shall remain in place for the entire curing period.

All joints in the forms and the joints between the end of forms and concrete shall be kept moisture-tight during the curing period.

Cracks in the forms and cracks between the forms and the concrete shall be resealed by methods approved by the Engineer.

(E) Curing Bridge Decks, Approach Slabs, and Anchor Slabs:

The top surface of bridge decks, approach slabs, and anchor slabs shall be cured by the liquid-membrane forming compound method and by the water curing method. The curing compound shall be applied progressively immediately following the surface finishing operation. Liquid-membrane forming compound shall be applied at a rate of one gallon per 100 square feet. The curing compound shall form a continuous unbroken surface.

Water curing shall be applied not later than four hours after the completion of the surface finishing operations and shall be applied as specified herein.

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The top surface of bridge decks, approach slabs, and anchor slabs that will be covered with a special riding surface or waterproofing membrane shall be cured by the water curing method only. Water curing shall be applied progressively immediately following the surface finishing operation as specified herein.

1006-6.02 Curing Precast Concrete:

(A) General Requirements:

The contractor may cure precast concrete in accordance with the requirements specified above for curing cast-in-place concrete or if it elects, the curing of precast concrete may be performed by external heating. This may be accomplished by the use of low-pressure steam or radiant heat with moisture.

If curing of the concrete is accomplished by low-pressure steam or radiant heat with moisture, curing will be considered completed after termination of steam or radiant heat curing. Rapid temperature changes in the concrete shall be avoided during the cooling period.

If curing of the concrete is accomplished by the water curing method, the liquid-membrane forming compound method, or the forms-in-place method, such curing shall be continued for a period of at least seven days after placement of the concrete. The curing time may be reduced to a minimum of three days when a Type III Portland cement has been used.

(B) Low-Pressure Steam Curing:

After placement of the concrete, precast items shall be held for a minimum two-hour presteaming period. If the ambient air temperature is below 50 degrees F, steam shall be applied during the presteaming period to hold the air surrounding the precast item at a temperature between 50 and 90 degrees F.

To prevent moisture loss on exposed surfaces during the presteaming period, precast items shall be covered as soon as possible after casting or the exposed surfaces shall be kept wet by fog spray or wet blankets.

Enclosures for steam curing shall allow free circulation of steam about the member and shall be constructed to contain the live steam with a minimum moisture loss. The use of tarpaulins or similar flexible covers will be permitted, provided they are kept in good repair and secured in such a manner to prevent the loss of steam and moisture.

Steam at the jets shall be low pressure and in a saturated condition. Steam jets shall not impinge directly on the concrete, test cylinders or forms. During application of the steam, the ambient air temperature rise within the enclosure shall not exceed 40 degrees F per hour. The average curing temperature throughout the enclosure shall not exceed

160 degrees F and shall be maintained at a constant level for sufficient length of time so as to ensure the development of th required compressive strength by the age of 28 days in concrete item which are not be prestressed. For items which are to be prestresse the constant temperature shall be maintained for sufficient tim necessary to develop the concrete compressive strength required f prestressing. The ambient curing temperature shall not exce 175 degrees F at any point. Control cylinders shall be covered prevent moisture loss and shall be placed in a location whe temperature is representative of the average temperature of th enclosure.

Temperature recording devices that will provide an accurate continuo permanent record of the ambient curing temperature shall be provide A minimum of two temperature recording devices or one for eve 200 feet of continuous bed length will be required for checki temperature.

In the event the side forms are removed before the precast unit h attained the required release compressive strength, the curing meth shall be continuous in maintaining the temperature and moisture le as described above, within the enclosure, as nearly as practical. The shall not be a delay in re-covering the girder or prestress member.

(C) Radiant Heat With Moisture:

Radiant heat shall be applied by means of pipes circulating steam, h oil or hot water, or by heating elements or electric blankets on t forms. Pipes, blankets or elements shall not be in contact with t concrete surfaces.

Moisture shall be applied in such a manner as to keep the top surfa of the precast unit continuously moist during the curing period fogging or spraying. Moisture shall be maintained by a cover of bur or cotton matting and further covered by a waterproof tarpaulin with insulating cover.

Temperature limits and the use of recording thermometers shall be same as curing with low-pressure steam. Application of the heat cy may be accelerated to meet climatic conditions upon the approval of Engineer. A temperature sensing device shall be placed ± 1/2 inches from the heated form.

1006-7 Acceptance Sampling and Testing

1006-7.01 General:

Rejection of concrete will occur due to improper temperature, slu and/or air content for the concrete mixture delivered to the site. Engineer may allow failed concrete mixture already placed to remai place subject to acceptance by compressive-strength or may require removal.

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Rejection of concrete will also occur due to insufficient compressive strength. Concrete compressive strength requirements consists of the specified strength which the concrete shall attain before various loads or stresses are applied and a minimum strength at 28 days.

Acceptance and penalties for placed concrete which meets the above mixture requirements or is allowed to remain in place shall be determined by the results of the 28-day compressive strength, and additionally in the case of Class P concrete, on the measured thickness of concrete pavement in place according to Section 401. Sampling and testing for compressive strength will be performed on all classes of concrete furnished, including each strength specified on the project plans for Class S or Class E concrete.

1006-7.02 Sampling and Testing of Concrete:

A sample of concrete for determination of temperature, slump, and air content (when required) as well as for fabrication of test cylinders for compressive strength determination at 28 days will be taken at random at the specified sampling frequency for each type of concrete.

Samples of concrete shall be of sufficient size to perform all the required tests and fabricate the necessary test cylinders. The samples shall be taken in accordance with the requirements of AASHTO T 141, except as follows:

(1) Concrete for Class S, Class B, or Class E shall be sampled only once during discharge in the middle portion of the batch. At the discretion of the Engineer, a sample may be obtained at the beginning of the discharge if, in the Engineer's opinion, the properties of the concrete do not appear to be within the specification limits for slump or temperature.

(2) Concrete for Class P shall be sampled immediately before going into the paver or forms, or as otherwise directed by the Engineer.

If concrete is pumped to facilitate placement, at the discretion of the Engineer, samples may be taken from the truck and pump hose discharge to determine that the compressive strength specifications are met in the structure, and to correlate temperature, slump and air content results. If the correlation is satisfactory and meets with the approval of the Engineer, sampling may continue from the most convenient location with occasional re-testing for correlation. Rejection of concrete due to improper temperature or slump may occur at either the truck or pump hose discharge; however, rejection of concrete due to improper air content will only occur due to a failing test for a sample obtained at the final point of discharge.

Temperature of the concrete mixture will be determined in accordan with ASTM C 1064. Slump of the concrete mixture will be determined accordance with AASHTO T 119. Air content of the concrete mixtu will be determined in accordance with AASHTO T 152. All compressi strength test cylinders will be made, cured, handled, protected, a transported in accordance with the requirements of AASHTO T 2 Testing for compressive strength of cylinders shall be in accordan with the requirements of Arizona Test Method 314.

For Class S concrete with a compressive strength requirement le than 4000 psi, or Class B concrete, a strength test will consist of t average strength of two test cylinders. However, if the compressi strengths of the two test cylinders differ by more than 10 percent fr the average of the two, the strength test result shall be the cylinc with the highest compressive strength.

For Class S concrete with a compressive strength requirement equal or greater than 4000 psi, or Class P concrete, the compressive stren of each sample shall be determined by averaging the results of three test cylinders fabricated as specified in Subsection 1006-7. However, if the compressive strength of any one of the three t cylinders differs by more than 10 percent from the average of the thr its result shall be discarded and the compressive strength shall be average of the remaining two cylinders. Should the individ compressive strength of any two of the three test cylinders differ more than 10 percent from the average of the three, the results of b will be discarded and the compressive strength shall be the strengtl the remaining cylinder.

1006-7.03 Sampling Frequency for Cast-in-place Concrete:

(A) Class S and Class B Concrete:

For Class S concrete with a compressive strength requirement l than 4000 psi, or Class B concrete, a sample of concrete for required tests; as specified in Subsection 1006-7.02, will be taken daily basis for each 100 cubic yards, or fraction thereof, continuously placed concrete from each batch plant. For Class concrete with a compressive strength requirement equal to or gre than 4000 psi, a sample of concrete for the required tests, as speci in Subsection 1006-7.02, will be taken on a daily basis for eacl cubic yards, or fraction thereof, of continuously placed concrete each batch plant. For Class S or Class B concrete placed at elevat of 3,000 feet or above, air content testing shall be performed for 50 cubic yards placed, regardless of the compressive stre requirement. An additional sample or samples for any of the requ tests may be taken at an interval of less than the sampling frequ specified above, at the discretion of the Engineer, on any batch or of concrete. A sample for the required tests on daily placement 10 cubic yards or less may be taken at the discretion of the Enginee

(B) Class E Concrete:

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Class E concrete shall be sampled and tested for compressive strength by the sub-lot. A sub-lot will be 30 cubic yards or an accumulation of quantities of a specified strength of concrete to total 30 cubic yards. A sample will be obtained for each portion of concrete between 10 and 30 cubic yards, inclusive, for each specified strength of concrete. For each specified concrete strength; the quantity of concrete represented by four samples will be defined as a lot. However, for a continuous pour of greater than 120 cubic yards of a specified strength of concrete, the total amount of concrete in that pour will be considered to be a lot, and four samples will be taken at randomly selected locations as directed by the Engineer. The Engineer may exclude certain locations from random sampling should the Engineer determine that the location of the work precludes normal construction operations. Three test cylinders shall be fabricated from each sample and tested for 28-day compressive strength in accordance with Subsection 1006-7.02.

Class E concrete shall be sampled and tested for temperature and slump for each 30 cubic yards. For concrete placed at an elevation of 3,000 feet or above, a sample will be taken for each 30 cubic yards for testing of air content. For quantities of concrete less than 30 cubic yards, the sampling and testing frequency for temperature, slump, and air content may be reduced with the concurrence of the Engineer. Additional samples for any of the required tests may be taken at the discretion of the Engineer.

(C) Class P Concrete:

Class P concrete shall be sampled and tested for compressive strength by the lot. A lot shall be considered to be one shift's production; however, a new lot shall begin when the mix design is changed. For partial shifts due to weather or other reasons, more than one day's production may be included in a lot. When such partial shifts occur, the contractor and the Engineer will jointly determine the lot limits. Five samples shall be obtained from each lot at random locations as directed by the Engineer. The Engineer may exclude certain locations from random sampling should the Engineer determine that the location of the work precludes normal construction operations. Three test cylinders shall be fabricated from each sample and tested for 28-day compressive strength in accordance with Subsection 1006-7.02.

Class P concrete shall be sampled and tested for temperature, slump, and air content (if applicable) a minimum of five times per lot. The frequency may be reduced for partial shifts with the concurrence of the Engineer. Additional samples for any of the required tests may be taken at the discretion of the Engineer.

1006-7.04 Sampling Frequency for Precast Concrete:

A sample of concrete for the required tests as specified in Subsection 1006-7.02 will be taken for either each precast concrete

member or for each day's production at the discretion of the Enginee when the method of measurement is by the unit.

An additional sample or samples for any of the required tests may l taken at the discretion of the Engineer. The Engineer will determi the quantity of concrete represented by each sample of concrete f any test performed.

When a sample of concrete for the required compressive strength te is taken to represent a single day's production and not each prece member, the degree of acceptance for all precast concrete members that day's production will be established by the results of su compressive strength test.

1006-7.05 Testing for Minor Precast Concrete Structures:

A strength test on each precast unit produced will consist of t average rebound number as determined from readings taken on t precast unit with a rebound hammer. The average rebound number w be determined in accordance with the requirements of ASTM C 805.

The compressive strength of the concrete will be determined from t average rebound number and the calibration chart established for t specific rebound hammer being used. The calibration chart will established from rebound readings taken on concrete test cylind fabricated at the precast plant and the actual compressive strength the cylinders. The test cylinders will be fabricated in accordance w the requirements of AASHTO T 23. Testing for compressive strength cylinders shall be in accordance with the requirements of Arizona T Method 314.

1006-7.06 Acceptance for Compressive Strength:

(A) Class P Concrete:

Class P concrete will be accepted for compressive strength accordance with the provisions of Section 401. All concrete failing meet the compressive strength requirement or otherwise rejected accordance with Section 401 or Subsection 1006-7.01, shall replaced with concrete meeting the requirements of the specifications.

If the contractor chooses to contest the compressive strength results any sample for purposes of acceptability or improving a negative f factor, the contractor may elect to rely on the results of compress strengths of cores. Three cores shall be obtained at no additional c to the Department, at the approximate location where the contested t cylinders were obtained. Such cores shall be obtained and tested accordance with Arizona Test Method 317. Cores must be obtain under the observation of an ADOT representative and delivered to t Engineer in time to allow complete testing within 48 days of placeme The contractor may elect to have a representative present duri

testing. Compressive strength shall be the average of the results of the three cores. However, if the compressive strength of any one of the three cores differs by more than 10 percent from the average of the three, its result shall be discarded and the compressive strength shall be the average of the remaining two cores. Should the individual compressive strength of any two of the three cores differ by more than 10 percent from the average of the three, the results of both shall be discarded and the compressive strength shall be the result of the remaining core. Results of the core testing will be binding on both the contractor and the Department, and will replace the results of the test cylinders for that sample.

(B) Class S and Class B Concrete:

Class S and Class B concrete will be accepted for compressive strength and paid for in accordance with the following table. Concrete will be paid for by the linear foot or by the cubic yard, complete in place, except that an adjustment in the contract unit price, to the nearest cent, will be made for the quantity of concrete represented by 28-day compressive strength test results less than the specified requirement.

Adjustment in Contract Unit Price For Compressive Strength of Class S and Class B Concrete

3000 psi and Below		3500 psi		4000 psi and Above	
Percent of Specified 28-Day Compressive Strength Attained, to the Nearest One Percent	Percent Reduction in Contract Unit Price (See Note 1)	Percent of Specified 28-Day Compressive Strength Attained, to the Nearest One Percent	Percent Reduction in Contract Unit Price (See Note 1)	Percent of Specified 28-Day Compressive Strength Attained, to the Nearest One Percent	Percent Reduction in Contract Unit Price (See Note 1)
100 or More	0	100 or More	0	100 or More	0
97 – 99	3	98 – 99	2	99	1
94 – 96	6	96 – 97	4	98	2
91 – 93	9	94 – 95	6	97	3
88 – 90	12	92 – 93	8	96	4
85 – 87	15	90 – 91	10	95	5
Less than 85	30 (See Note 2)	Less than 90	30 (See Note 2)	Less than 95	30 (See Note 2)

Note 1: For items measured and paid for by the cubic yard, the reduction shall not exceed $150.00 per cubic yard.

Note 2: If allowed to remain in place.

Concrete failing to meet at least 85 percent of the 28-day compressive strength for specified strengths of 3,000 pounds per square inch and below, 90 percent for a specified strength of 3,500 pounds per square

inch, or 95 percent for specified strengths of 4,000 pounds per square inch and above, or any concrete failing to meet the other requirements of Subsection 1006-7.01, will be rejected and removed in accordance with the provisions of Subsection 106.11 at no additional cost to the Department, unless the contractor can submit evidence that will indicate to the Engineer that the strength and quality of the concrete is such that the concrete should be considered acceptable and be allowed to remain in place.

If such evidence consists of cores, the contractor shall obtain three cores from the concrete represented by the failing cylinder strength test. The cores shall be obtained at no additional cost to the Department, under the observation of an ADOT representative, and delivered to the Engineer in time to allow complete testing of such cores within 48 days after the placement of the concrete. All cores shall be obtained and tested in accordance with the requirements of Arizona Test Method 317. The contractor may elect to have a representative present during testing. The concrete represented by the cores will be considered for acceptance, in accordance with the requirements of the table above. If the average compressive strength does not meet the specified requirement, all concrete so represented shall be removed at no additional cost to the Department unless permitted to remain in place by the Engineer. Results of the core testing will be binding on both the contractor and the Department, and will replace the results of the test cylinders for that sample.

(C) Class E Concrete:

Class E concrete will be accepted for compressive strength in accordance with the provisions of Section 611. All concrete failing to meet the compressive strength requirement or otherwise rejected in accordance with Section 611 or Subsection 1006-7.01, shall be replaced with concrete meeting the requirements of these specifications.

If the contractor chooses to contest the compressive strength results of any sample for purposes of acceptability or improving a deficiency in compressive strength, the contractor may elect to rely on the results of compressive strengths of cores. Three cores shall be obtained at no additional cost to the Department, at the approximate location where the contested test cylinders were obtained. Such cores shall be obtained and tested in accordance with Arizona Test Method 317. Cores must be obtained under the observation of an ADOT representative and delivered to the Engineer in time to allow complete testing within 48 days of placement. The contractor may elect to have a representative present during testing. Compressive strength shall be the average of the results of the three cores. However, if the compressive strength of any one of the three cores differs by more than 10 percent from the average of the three, its result shall be discarded and the compressive strength shall be the average of the remaining two cores. Should the individual compressive strength of any two of the three cores differ by more than 10 percent from the average of the

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three, the results of both shall be discarded and the compressive strength shall be the result of the remaining core. Results of the core testing will be binding on both the contractor and the Department, and will replace the results of the test cylinders for that sample.

1006-8 Method of Measurement and Basis of Payment:

The method of measurement and basis of payment will be made as specified herein and under the provisions specified in the various sections of the specifications covering construction requiring the use of concrete.

SECTION 1007 RETROREFLECTIVE SHEETING:

1007-1 General Requirements:

Retroreflective sheeting shall consist of a retroreflective system having a smooth outer surface. The sheeting shall have a pre-coated adhesive on the back side protected by an easily removable liner, except for self-supporting products having a Class V backing, such as roll-up signs and some types of traffic cone collars. Sheeting shall conform to the criteria listed in ASTM D 4956-04 for the applicable type and class unless otherwise specified. All references herein to ASTM D 4956 shall refer to ASTM D 4956-04.

Only those retroreflective sheeting, inks, and film products that are currently shown in the Department's Approved Products List (APL) shall be used. Copies of the APL are available on the Internet from the Arizona Transportation Research Center (ATRC), through its PRIDE program.

A Certificate of Compliance, conforming to the requirements of Subsection 106.05, shall be submitted. The Certificate of Compliance shall identify the retroreflective sheeting type, backing class, make of sheeting, inks, and film intended for use in all manufactured devices, including signs, channeling devices, mileposts, object markers, guard rail markers, delineators and reference markers. The Engineer may accept all materials based on the certification or may require the contractor to furnish additional information or laboratory test results. Additionally, the Engineer may perform measurements on materials to determine their compliance with these specifications. Signs and other devices that have sheeting, inks or films that do not meet these requirements shall be rejected and shall be replaced at no additional cost to the Department.

1007-2 Material Types:

The type of sheeting to be used in any given application will be called out on the project plans. Type VI is a flexible sheeting material suitable for use with roll-up signs. For applications where more than

one sheeting type is allowed, the contractor may use a higher grade of sheeting than specified at no additional cost to the Department.

Materials used for a particular application shall be of the same ASTM type, manufacturer, and product for all signs of the same type in the project.

Opaque films used with sheeting shall be acrylic type films.

Direct-applied and demountable black characters shall be non-reflective.

1007-3 Visual Appearance, Luminance and Color Requirements:

Except as specified herein, the color of the sheeting, ink or film shall conform to the ADOT Manual of Approved Signs, the Manual on Uniform Traffic Control Devices (MUTCD), and the plans.

All warning signs with yellow backgrounds shall use fluorescent yellow sheeting.

All work zone signs with orange backgrounds shall use fluorescent retroreflective orange sheeting, except that non-reflective sign materials may be used for temporary work zone signs where the signs will be clearly visible under available natural light.

All sheeting, inks and film used shall be uniformly colored so there is no visual variation in their appearance on the same sign or from sign to sign of the same colors.

Standard colors specified for sheeting, processing inks, and films shall, as applicable, match visually and be within the color tolerance limits required by Highway Tolerance Charts issued by the Federal Highway Administration. Additionally, for the retroreflective sheeting, unless otherwise noted, the Luminance Factor (Daytime Luminance) and Color Specification Limits (Daytime) shall conform to the applicable requirements of ASTM D 4956.

In addition to the luminance and color requirements, fluorescent orange sheeting shall have the capacity to effectively fluoresce outdoors under low light conditions. For all applications requiring fluorescent orange sheeting, the contractor shall provide a letter to the Engineer from the manufacturer certifying that the sheeting to be used is fluorescent.

1007-4 Coefficient of Retroreflection:

The coefficient of retroreflection shall meet the minimum requirements of ASTM D 4956 for the type of retroreflective sheeting specified.

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Two-ply membrane waterproofing for the protection of footing construction joints or other designated areas shall consist of two layers of bituminized cotton fabric and three mop coats, placed alternately over the concrete surface previously treated with one coat of primer.

Three-ply membrane waterproofing for the protection of decks and sides of structures or other designated areas shall consist of three layers of bituminized cotton fabric and four mop coats, placed alternately over the concrete surface previously treated with one coat of primer.

The layers of the treated cotton fabric shall be laid so that all edges will lap at least two inches. The line of lap shall in every case be broken with that of the preceding layer of membrane. Each strip shall be laid in a fresh hot mop coat and when the specified number of layers has been laid, the entire surface shall be mopped. If practicable, the laying of the fabric shall begin at the lowest part of the surface to be waterproofed. The surface shall be completely covered with a heavy mop coat before the strip of fabric is put down. The mopping shall be so done that there will be no air bubbles, pockets or spots where the surface shows through. As soon as a strip of fabric has been laid, it shall be pressed into the coat to eliminate air bubbles. Creases in the fabric shall be smoothed out carefully by pulling the fabric. The top mopping shall be of such thickness and be so applied as to seal and cover the fabric completely.

Waterproofing shall be free from punctures, pockets or folds.

Special care shall be taken so that the fabric is completely sealed down at the laps. The waterproofing membrane shall be continuous and unbroken.

At joints in the membrane, the laps shall be at least 12 inches. The fabric for making the lap shall be left unmopped until the joint is completed.

On horizontal surfaces, not less than four gallons in each mop coat shall be used for each 100 square feet of surface, and on vertical surfaces, not less than five gallons in each mop coat shall be used for each 100 square feet of surface.

Expansion and contraction joints shall be covered with membrane waterproofing as required by the plans.

Sections waterproofed shall be protected against mechanical injury, high temperature and chemical action, as soon as possible after application and until final acceptance of the work.

907-4 Method of Measurement:

The project plans will show the estimated quantity of surface area to be dampproofed and/or waterproofed and the contractor shall assure itself

that this estimated quantity is substantially correct.

907-5 Basis of Payment:

No direct payment will be made for Dampproofing and Waterproofing Concrete Surfaces. The cost of furnishing and applying all materials shall be considered as included in the contract price paid for concrete of the class treated.

SECTION 908 CONCRETE CURBS, GUTTERS, SIDEWALKS AND DRIVEWAYS:

908-1 Description:

The work under this section shall consist of furnishing all materials and constructing Portland cement concrete curb, curb and gutter, ramp curb, sidewalk, sidewalk ramps, driveways, and valley gutters at the locations shown on the project plans in accordance with the details shown on the plans and the requirements of these specifications.

908-2 Materials:

908-2.01 Concrete:

Concrete shall be Class B concrete conforming to the requirements of Section 1006.

908-2.02 Expansion Joint Filler:

Expansion joint filler shall be 1/2-inch bituminous or nonbituminous preformed strips conforming to the requirements of Subsection 1011-6.

908-2.03 Concrete Curing Compound:

Curing compound shall be liquid membrane-forming compound conforming to the requirements of AASHTO M 148, Type I, Class A.

908-2.04 Detectable Warning Strip:

Detectable warning strips shall consist of a pre-fabricated mat with truncated domes aligned in a square grid matrix on a flat substrate, or other pre-fabricated materials meeting the requirements of the Standard Drawings. Detectable warning strips shall contrast visually with the sidewalk ramp, and shall conform to the current requirements of the Americans with Disabilities Act Accessibility Guidelines (ADAAG). Detectable warning strips shall be pre-fabricated from durable material approved by the Department. All detectable warning strips installed within the project limits shall be the same type, unless shown otherwise on plans or approved by the Engineer.

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Only those pre-fabricated detectable warning strips shown on the Department's Approved Products List (APL) shall be used. Copies of the most current version of the APL are available on the internet from the Arizona Transportation Research Center (ATRC), through its PRIDE program.

908-3 Construction Requirements:

The subgrade shall be constructed in reasonably close conformity to the lines and grades established or shown on the project plans.

Prior to placing concrete curb, curb and gutter, driveway, valley gutter, sidewalk ramp, or sidewalk, the material on which they are to be placed shall be compacted to a depth of at least six inches to a density of not less than 95 percent of the maximum density determined in accordance with the requirements of the applicable test methods of the ADOT Materials Testing Manual as directed and approved by the Engineer.

All soft or unsuitable material shall be removed to a depth of not less than six inches below subgrade and replaced with material approved by the Engineer.

Single curb, curb and gutter, and sidewalk shall be constructed either by the use of conventional fixed forms or by slip-form curb and sidewalk placing machines.

Weather and temperature limitations for the placement of concrete shall be in accordance with the requirements of Subsection 1006-5.

Forms shall be maintained at all times in good condition as to accuracy of shape, strength, rigidity and smoothness of surface. The depth of face forms for concrete curbs shall be equal to the full face height of the curb.

All other forms shall be set to form the full depth of all edges not formed by adjacent concrete. Forms unsatisfactory in any respect shall not be used.

Forms shall be set in reasonably close conformity to the dimensions, lines and grades shown on the project plans or established by the Engineer and be securely staked in position. Clamps, spreaders, and braces shall be used where required to insure rigid forms.

When the roadway section slopes away from the gutter, the slope of the gutter shall be formed to match the roadway cross slope.

The subgrade and forms shall be watered immediately in advance of placing concrete. Concrete shall be placed in the forms and thoroughly consolidated. The concrete shall be consolidated by means of approved mechanical vibrators or by tamping or spading by hand. The fresh concrete shall be struck off so the surface will be at the proper elevation when the concrete is consolidated. Concrete shall be

thoroughly worked so that the coarse aggregate is below the surface. The surface shall then be finished to grade and cross-section with a float, troweled smooth and then given a final fine brush finish.

The exposed edges shall be tooled to a 1/4-inch radius unless a larger radius is indicated on the plans. When concrete placed in curb has set sufficiently so that it will not slump, the front face form shall be removed. The gutter, front face, and top of curb shall be troweled smooth and then given a final fine brush finish with brush strokes parallel to the lines of curb and gutter. The exposed edges shall be tooled to a 1/4-inch radius.

Expansion joints shall be constructed at tangent points of curb returns, at structures, and at a maximum of 60-foot intervals. Expansion joints shall be constructed between sidewalks and driveways, between sidewalks and abutting structures, around poles, posts, boxes, and other fixtures that protrude through the sidewalk. Expansion joints shall match as nearly as possible the joints in the adjacent pavement or existing concrete curb and sidewalk. Joint filler shall be placed vertically and extend full depth beginning 3/16 inch below the surface of the concrete being placed. During the placing and tamping of concrete, the filler shall be restrained in its proper position.

Edges of the concrete at expansion joints shall be tooled to a 1/4 inch radius.

Contraction joints (weakened-plane joints) shall be constructed at a maximum of 15-foot intervals in curb and gutter and sidewalks and shall coincide with contraction joints in adjacent pavement or existing concrete curb and sidewalk. A contraction joint shall be constructed along the center of driveway entrances 20 feet in width or greater.

Longitudinal contraction joints shall be constructed in the center of sidewalk having a width greater than seven feet. Contraction joints shall either be formed or sawed. Formed contraction joints shall be constructed by parting the large aggregates in the fresh concrete with a straightedge to a depth of two inches. The final joint finishing shall be accomplished with a jointer tool having a radius of 1/4 inch leaving a finished joint depth of a minimum of 3/4 inch. Sawed joints shall be sawed to a depth of two inches or one-third the thickness of the concrete, whichever is greater.

Scoring lines, where required, shall have a minimum depth of 1/4 inch and a radius of 1/8 inch. Where longitudinal scoring lines are required, they shall be parallel to, or concentric with, the lines of the work.

Forms shall be thoroughly cleaned each time they are used and shall be coated with a light oil as required to prevent the concrete from adhering to them.

If slip-form equipment is used to construct curb and gutter and sidewalk, such equipment shall be designed specifically for the work.

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The results shall be equal to or better than that produced by the use of fixed forms. If the results are not satisfactory to the Engineer, the use of the equipment shall be discontinued. All applicable requirements of construction by use of fixed forms shall apply to the use of slip-form equipment.

The slip-form equipment shall be controlled as to line and grade by means of automatic sensing and control devices such that the machine automatically senses and follows either a taut guide line or other reference, performing any necessary corrective maneuvers in order to establish the correct grade and alignment. The contractor shall set the guide line from survey marks provided by the Engineer.

Immediately following the required finishing operations, one or more applications of curing compound shall be applied to all exposed surfaces.

The curing compound shall be applied at the rate of not less than one gallon per 150 square feet of surface area, and in such manner as to entirely cover and seal all exposed surfaces of concrete with a uniform film.

The surface of concrete sidewalk shall be tested with a 10-foot straightedge. Any deviation in excess of 1/4 inch shall be corrected at no additional expense to the Department.

The face, top, back, and flow line of the curb and gutter shall be tested with a 10-foot straightedge or curve template, longitudinally along the surface.

Any deviation in excess of 1/4 inch shall be corrected at no additional expense to the Department.

No vehicular traffic will be allowed on driveways until the concrete has reached at least 60 percent of the required 28-day strength.

Before acceptance of the work, all curb and gutter and sidewalk shall be cleaned of all discolorations resulting from the contractor's operations, including, but not limited to, dirt, stains, bitumens, and equipment tire marks. Cleaning may be by abrasive blast methods or by other methods approved by the Engineer.

The top surface of detectable warning strips, exclusive of the truncated domes, shall be within ± 1/16 inch of the sidewalk ramp surface in accordance with the requirements of the ADAAG. Detectable warning strips shall be installed in accordance with manufacturer's instructions and current industry practice. In case of discrepancy the manufacturer's instructions shall govern.

908-4 Method of Measurement:

Concrete single curb and curb and gutter will be measured by the linear

foot along the flow line. Lengths of depressed curb and depressed curb and gutter at driveway and sidewalk ramp locations will be included in the measurement. Lengths occupied by catch basins will be excluded from the measurement. No measurement will be made for ramp curb.

Concrete sidewalks, driveways, and valley gutter will be measured by the square foot of area constructed. Areas occupied by catch basins will be excluded from the measurement.

Concrete sidewalk ramps, of the type shown on the plans, will be measured as a unit for each sidewalk ramp constructed, including detectable warning strip. The limits of measurement for the various sidewalk ramp types will be shown on the plans.

908-5 Basis of Payment:

The accepted quantities of concrete single curb, curb and gutter, valley gutter, sidewalk, and driveway, measured as provided above, will be paid for at the contract unit price per linear foot or square foot, which price shall be full compensation for the work, complete in place, including furnishing and placing embankment material, excavating, removing unstable material, backfilling and compacting.

The accepted quantities of sidewalk ramps, measured as provided above, will be paid for at the contract unit price each, which price shall be full compensation for the work, complete in place, including furnishing and placing embankment material, excavating, removing unsuitable material, backfilling and compacting, surface finishing, and furnishing and installing the detectable warning strip. No separate measurement or payment will be made for the ramp curb along the back edge or side of sidewalk ramps, nor for the detectable warning strip, the costs being considered as included in the price of contract items. No separate payment will be made for the curb along the back edge of sidewalk connecting sidewalk ramps at an intersection, the cost being considered as included in the price of contract items.

SECTION 909 SURVEY MONUMENTS:

909-1 Description:

The work under this section shall consist of furnishing all materials and installing concrete monuments, including cast iron frames and covers; furnishing cast iron frames and covers; or removing and resetting existing frames and covers at the locations shown on the project plans and in accordance with the details shown on the plans and the requirements of these specifications.

909-2 Materials:

909-2.01 Concrete:

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Wooden shims shall conform to the requirements shown on the plans.

906-3 Construction Requirements:

Excavation and backfill shall be in accordance with the requirements of Subsection 203-5.

Completed cattle guards shall be well drained.

Cattle guards shall be cast-in-place or, at the option of the contractor, may be precast units. A list of approved precast units may be found on the Department's Approved Products List (APL), available on the internet from the Arizona Transportation Research Center (ATRC) through its PRIDE program. The use of precast cattle guards shall be limited to roadway locations with maximum longitudinal grades of six percent. Precast units shall be installed to match the roadway centerline profile grade and the roadway cross-slope.

Cattle guards shall be constructed in accordance with the details shown on the plans in reasonably close conformity to the lines and grades established or shown on the project plans. All fence and steel gates required shall be constructed as specified under Section 902 or 903, as applicable.

Painting of structural steel shall be in accordance with the requirements of Section 610. Structural steel shall be painted with one coat of primer (Paint No. 1) in accordance with Section 1002. Painting of fence posts and gates shall be in accordance with the requirements of Section 902 or 903, as applicable.

Existing cattle guards designated on the project plans for reconstruction shall be dismantled to the extent required and in such a manner as to preserve all materials or portions of the existing structure that are acceptable for use in the reconstructed structure. All removed concrete shall be disposed of in accordance with the requirements of Subsection 202-3.03(A).

Cattle guards to be reconstructed shall be constructed as specified herein, except that the materials required shall be salvaged to the extent possible from the existing cattle guards designated on the plans to be reconstructed or removed.

Steel angles providing a bearing surface for each grille unit of a roadway cattle guard and wooden shims under railroad cattle guards shall be set to the required elevations with sufficient accuracy that no rocking under load of a grille unit or tread assembly can be observed and that no gap greater than 1/32 inch exists between any pair of bearing surfaces when the unit or assembly is not under load and is not spiked, welded or otherwise held in place.

The fabrication and connections of grille units, angle units, and other

steel elements shall conform to the requirements of Section 604. Either H-10 or H-20 loading will be designated on the project plans.

906-4 Method of Measurement:

Cattle guard, and reconstruct cattle guard will be measured as a unit for each structure.

Cattle guards consisting of a different number of grille units, different "H" loadings, different widths, or being new instead of reconstructed will be measured separately.

906-5 Basis of Payment:

The accepted quantities of cattle guards and reconstruct cattle guards, measured as provided above, will be paid for at the contract unit price each, complete in place, including excavation, structure backfill, structural steel, reinforcing steel, grilles, concrete, painting, wood shims and concrete slabs where required.

Payment for fence or gates will be made as specified under Section 902 or 903, except that posts and braces attached to the cattle guard shall be considered as included in the cost of the cattle guard.

SECTION 907 DAMPPROOFING AND WATERPROOFING CONCRETE SURFACES:

907-1 Description:

The work under this section shall consist of furnishing all materials and dampproofing concrete surfaces or waterproofing concrete structures and joints at the locations shown on the project plans and in accordance with the requirements of the plans and these specifications.

907-2 Materials:

907-2.01 General Requirements:

The materials furnished by the contractor to dampproof or waterproof concrete structures as shown on the plans shall conform to the requirements of this section unless otherwise specified on the project plans or in the Special Provisions. Certificates of Compliance conforming to the requirements of Subsection 106.05 shall be submitted.

All materials shall be delivered in the original packages bearing the manufacturer's brand and label. The manufacturer's label and/or the Certificate of Compliance shall state that the fabric has been saturated with asphalt. Fabrics saturated with coal-tar pitch are not acceptable. Materials shall be delivered on the work site a sufficient time before

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they are to be used to permit testing and analyzing, if required by the Engineer. The fabric shall be stored in a dry place, and the rolls shall not be stored on end.

907-2.02 Prime Coats:

An asphalt primer conforming to the requirements of ASTM D 41 shall be used.

907-2.03 Mop Coats:

An asphalt which conforms to the requirements of ASTM D 449 Type III, shall be used for the mop coats.

907-2.04 Fabric:

The fabric shall be bituminized cotton fabric conforming to the requirements of ASTM D 173. The fabric shall be saturated with asphalt.

907-3 Construction Requirements:

907-3.01 General:

Bituminous coats shall not be applied in wet weather nor when the ambient temperature is below 50 degrees F. Concrete shall be dry and clean before the prime coat is applied. If bituminous material is used for curing, it may also serve as a priming coat, except that additional primer may be necessary before application of the mop coat. The material for mop coats shall be heated as necessary to aid application, but not above 350 degrees F.

The bitumen shall be heated in kettles equipped with armored thermometers, and stirred frequently.

Primer shall be allowed to cure properly before applying the mop coat. The primer shall be applied without heating at the approximate rate of one gallon per 100 square feet of surface with a three- or four-knot roofing brush. If asphalt primer is too thick to allow easy brushing, the material may be thinned by the addition of a small quantity of gasoline or naphtha.

Work shall be so regulated that at the end of the day all fabric that has been applied will have received a mop coat.

Concrete surfaces not to be dampproofed or waterproofed shall be protected from the spilling or otherwise marring of the surface with the bituminous materials.

907-3.02 Dampproofing:

Concrete surfaces to be dampproofed shall be given an asphalt primer and an asphalt mop coat.

Each coat shall be applied uniformly, fully covering the surface, and shall be thoroughly worked into the surface.

After the primer has cured, the mop coat shall be applied at the rate of approximately 50 pounds per 100 square feet of surface to obtain a thickness of approximately 5/64 inch for the dampproof coating.

Within the areas to be treated, all expansion or construction joints that are not protected with metal seals and which will be covered with earth in the completed structure shall be protected with a single layer or strip of bituminized cotton fabric not less than 12 inches wide. The fabric shall be laid evenly over the joints and in a fresh mopping of asphalt. The fabric shall be pressed into place and shall be smooth and free of creases. Joints in the fabric shall lap 12 inches. After placing, the fabric shall be sealed with a mop coat.

Sections dampproofed shall be protected against mechanical injury and high temperature as soon as possible after application and until final acceptance of the work.

907-3.03 Membrane Waterproofing:

(A) Surface Preparation:

Waterproofing may be used in conjunction with slab protection, sheet metal seals or other protective devices.

Surfaces of concrete to be waterproofed shall be smooth and free from projections which might injure the waterproofing membrane. The surfaces shall be cleaned of dust, dirt, grease and loose particles or any foreign substances and shall be dry prior to placing waterproofing.

The use of compressed air may be required in order to remove dust and loose dirt from corners and joints. Damp surfaces may be dried by covering with a layer of hot sand. The sand shall remain in place one or two hours, after which it shall be removed from enough surface to allow the work to proceed.

After the surfaces of concrete to be waterproofed have been thoroughly cleaned and prior to the first hot mop coat, one coat of primer shall be applied. The primer shall be thoroughly worked into the concrete to give a uniform coating.

(B) Application of Membrane:

Two- or three-ply membrane waterproofing, as specified on the project plans, shall be applied after the primer has cured.

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TABLE NO. 1
PHYSICAL PROPERTIES FOR PREFORMED ELASTOMER STRIP SEALS

Property	Require -ment	ASTM Test Method
Tensile strength, minimum psi	2000	D 412
Elongation at break, min. %	250	D 412
Hardness, Type A durometer, points	60 ± 5	D 2240 (Modified) (1, 3)
Oven aging, 70 hr at 212 °F		D 573
Tensile strength, loss, max. %	20	
Elongation, loss, max. %	20	
Hardness, Type A durometer, points change	0 to + 10	D 2240 (Modified) (1, 3)
Oil swell, ASTM Oil No. 3, 70 hr at 212 °F, weight change, max. %	45	D 471
Ozone resistance, 20 % strain, 300 pphm in air, 70 hr at 104 °F	No Cracks	D 1149 (Modified) (2)
Low temperature stiffening 7 days at 14 °F; Hardness, Type A durometer, points change	0 to +15	D 2240 (Modified) (1, 3)
Compression set, 70 hr at 212 °F, maximum %	40	D 395 Method B (Modified) (1)

(1) The term "modified" in the table relates to the specimen preparation. The use of the strip seal as the specimen source requires that more plies than specified in either of the modified test procedures be used. Such specimen modification shall be agreed upon by the purchaser and producer or supplier prior to testing.
(2) Test in accordance with procedure A of ASTM D 518 and ozone concentration is expressed in pphm.
(3) The hardness test shall be made with the durometer in a durometer stand as recommended in ASTM D 2240.

1011-6 Preformed Expansion Joint Filler:

Preformed expansion joint filler for concrete structures, pavements and incidental items shall conform to the requirements on the plans. When not specified, one of the following joint fillers may be used.

Certificates of Compliance conforming to the requirements of Subsection 106.05 shall be submitted.

1011-6.01 Bituminous Joint Filler:

Bituminous joint filler shall conform to the requirements of AASHTO M 213.

1011-6.02 Nonbituminous Joint Filler:

Nonbituminous joint filler shall conform to the requirements of AASHTO M 153, Type II, with the following modifications. The joint filler may be formed as a premolded strip from suitable fibers. The compression test specimen of the premolded fiber joint filler shall recover to at least 65 percent of its thickness before testing.

1011-7 Cellular Plastic Joint Filler:

Cellular plastic joint filler shall conform to the requirements of ASTM D 3204. The lubricant-adhesive shall be furnished by the manufacturer and used according to its recommendations.

Certificates of Compliance conforming to the requirements of Subsection 106.05 shall be submitted.

1011-8 Silicone Joint Sealant:

1011-8.01 General Requirements:

Silicone joint sealant shall be a low modulus silicone that is specifically formulated to seal Portland cement concrete pavement joints. Silicone sealant shall be furnished in a one part formulation which is non acid-curing, and shall conform to the requirements of ASTM D 5893, except as specified herein.

1011-8.02 Packaging and Marking:

The sealant shall be delivered in the manufacturer's original sealed container. Each container shall have attached, intact, the original manufacturer's label. The label shall be tamper-proof, non-removable and shall be legibly marked with the manufacturer's name, the trade name of the sealant, the manufacturer's batch or production lot number, and the expiration date of the manufacturer's shelf life warranty. Sealant that has exceeded the shelf life warranty expiration date shall not be used unless it has been retested and recertified for bond test method in conformance with ASTM D5893. The sealant may be recertified for a period not exceeding six months from the date of retesting. Retesting or replacement of the sealant will be at the contractor's option. Retesting will be at no additional cost to the Department. Failure to meet specification requirements shall not be cause for claim or extension of the contract. The contractor shall be held liable for all costs incurred in procuring and testing of materials that are found to be outside specification requirements.

1011-8.03 Field Performance:

The manufacturer of the joint sealant shall demonstrate satisfactor field performance in Arizona of less than one percent total failur

other reasons, the Engineer determines that conditions are not conducive to obtaining the best results, brooming shall be discontinued until the Engineer has considered all conditions and has determined the best time for the removal of the cover material. The cover material shall be removed by means of a power broom which shall be in good condition and of a design suitable for the work. The action of the broom shall be such that particles which are stuck to the bituminous material will not be dislodged.

404-3.09 Application of Blotter Material:

The approximate amount of blotter material, when required as a part of a bituminous treatment, will be specified in the Special Provisions; however, the Engineer will specify the exact rate to be applied based on the characteristics of the bituminous treated surface.

Blotter material, at the time of spreading, shall be wet but free from running water.

Blotter material shall be uniformly spread. Any oversize aggregate or foreign material picked up during stockpiling or loading operations shall be eliminated before entering the spreader. Supplemental spreading or smoothing shall be done by hand methods where necessary.

Prior to final acceptance and when ordered by the Engineer, the contractor shall remove and dispose of any excess blotter material. The method of removal and the disposal of any excess blotter material shall be the contractor's responsibility.

404-3.10 Joints:

Transverse joints with the preceding work, at intersections, and at all existing pavements and structures shall be made by a method approved by the Engineer prior to the start of the work.

Longitudinal joints shall be butt joints.

Joints shall be cleaned as deemed necessary by the Engineer prior to the application of bituminous material in the adjacent strip.

Regardless of the width of the roadway to be sealed, the number of longitudinal joints shall be kept to a minimum and shall be located to the greatest degree possible so that they will coincide with painted lines between traffic lanes.

404-3.11 Prime Coat:

The type of bituminous material and the approximate application rate shall be as specified in the Special Provisions.

When it is deemed necessary, areas having excess bituminous material shall be blotted with material as directed.

When so directed, the surface of the completed prime coat shall be rolled with a pneumatic-tired roller.

The integrity of the prime coat shall be maintained at all times until the next course is placed or until final acceptance. In the event traffic has caused holes or breaks in the surface, such holes or breaks shall be satisfactorily repaired by the contractor.

404-3.12 Tack Coat:

Tack coat shall be applied prior to placing a bituminous mixture on a primed surface, an existing bituminous surface, or an existing Portland cement concrete pavement surface. Tack coat shall also be applied between layers of bituminous mixtures.

The material to be used for bituminous tack coat will be specified by the Engineer and shall conform to the requirements of Section 1005.

The type, grade or designation, and the rate of application for the specific usage will be specified by the Engineer. The following table shows the various types of material from which the Engineer may select the tack coat and the approximate application rates:

Type, Grade or Designation	Approximate Application Rates: Gallons / Square Yard		Payment Factor
	Prior to Placing ACFC, AR-ACFC, or AR-AC	All Other Tack Coats	
Emulsified Asphalt (Special Type)		0.12	0.7
Emulsified Asphalt (Other than Special Type)		0.08	1.0
Asphalt Cement (Grade Specified by Engineer)	0.06 to 0.08	0.06	1.0

If emulsified asphalt of any designation or type is used, it shall have broken before asphaltic concrete is placed.

If emulsified asphalt of any designation or type is held over night, it shall be reheated and agitated prior to further application.

The Engineer may either reduce the rate to be applied or, except as specified below, eliminate the use of tack coat in any part of the work if, in the Engineer's judgment, the bituminous mixture to be placed will be effectively bonded to the underlying surface. For asphaltic concrete friction course, asphaltic concrete friction course (asphalt-rubber), or

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asphaltic concrete (asphalt-rubber), application of asphalt cement tack coat immediately prior to placing such pavements shall not be eliminated, although the Engineer may adjust the application rate within the above stated limits.

Bituminous material shall be applied only as far in advance of the placement of the bituminous mixed materials as is necessary to obtain the proper condition of tackiness. In no event shall more bituminous material be applied in one day than will be covered by bituminous mixed materials during that same day.

404-3.13 Fog Coat:

The type of bituminous material and the approximate application rate shall be as specified in the Special Provisions. The material shall be diluted with one part water to one part bituminous material.

Blotter material shall be applied to the treated surface in one or more applications for a total application as specified in the Special Provisions at a time specified by the Engineer and before opening to traffic.

404-3.14 Chip Seal Coat:

The design quantities of cover material and bituminous material for chip seal coat shall be determined in accordance with Arizona Test Method 819.

The type of bituminous material shall be CRS-2. The approximate application rate shall be as specified in the Special Provisions.

Cover material shall be applied at the rate of approximately 0.01 cubic yards per square yard; however, the Engineer will specify the exact rate to be applied based on the characteristics of the aggregate material and the surface to be treated.

The contractor shall submit a minimum 75-pound sample of cover material to the Engineer at least 10 calendar days prior to beginning application of the cover material for testing.

Chip seal coat shall be placed between the dates shown below for the average elevation of the project.

Average Elevation of Project, Feet	Beginning and Ending Dates
0 – 3499	March 15 – May 31
0 – 3499	September 1 – October 31
3500 – 4999	May 1 – September 30
5000 and over	June 1 – August 31

The minimum traffic-free period for a newly applied chip seal coat shall be three hours; however, the contractor's hauling equipment may use the new seal coat during the traffic free period at a speed not to exceed 15 miles per hour. After the traffic free period, but prior to removing the loose cover material, all traffic allowed by the Engineer shall be limited to a speed not to exceed 25 miles per hour.

404-4 Method of Measurement:

Bituminous materials will be measured by the ton.

Bituminous material that is required to be diluted prior to application will be measured by the ton of diluted material.

Cover material, when specified, will be measured by the cubic yard. Cover material will be weighed, and the amount in tons of dry material will be converted to cubic yards. The weight of all moisture contained in the cover material will be deducted prior to the conversion of the weight in tons to the volume in cubic yards. The dry weight per cubic yard will be determined in accordance with the requirements of AASHTO T 19.

The contractor shall be responsible to determine the amount of cover material that will be required to complete the work from the source or sources from which the cover material is obtained.

Blotter material, when required, will be measured by the ton.

Measurement for payment will be made only for the quantity of bituminous material and for the quantity of aggregate material used in accordance with the requirements of these specifications.

Time to apply tack coat is defined as the hours within a work shift that an approved distributor truck containing the specified bituminous material is required by the Engineer to be at the work site.

The time which is required to apply tack coat will be measured to the nearest hour for the actual number of hours required in any one work shift; however, when the time required is less than four hours in any workday, the time will be measured as four hours.

404-5 Basis of Payment:

The accepted quantities of bituminous treatments, complete in place, measured as provided above, will be paid for at the contract unit price, except the contract unit price for bituminous material will be adjusted for quantities of material represented by the corresponding test results. Adjustments will be made in accordance with Table 1005.

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703-5 Basis of Payment:

The accepted quantities of delineators and markers, measured as provided above, will be paid for at the contract price each for the type of delineator or marker designated in the bidding schedule, which price shall be full compensation for the work complete in place.

SECTION 704 THERMOPLASTIC PAVEMENT MARKINGS:

704-1 Description:

The work under this section shall consist of cleaning and preparing pavement surfaces and furnishing and applying either white or yellow thermoplastic reflectorized pavement markings using extrusion, ribbon or spray dispensing devices of the required shape and thickness to the prepared pavement surface at the locations and in accordance with the details shown on the project plans, the manufacturer's specifications, and the requirements of these specifications.

704-2 Materials:

704-2.01 General Requirements:

The thermoplastic reflectorized material shall consist of a solid mixture of heat-stable resins, white or yellow pigment, inter-mixed glass beads, filler, and other materials in granular or block form specifically compounded for reflectorized pavement markings to be applied to the pavement in a molten state. The characteristics of the liquefied material shall be such that complete and even coverage of specified areas to the required thicknesses is provided by the required application method and rate. Upon cooling to normal pavement temperature, this material shall produce an adherent reflectorized marking capable of resisting deformation and wear in the roadway.

Only thermoplastic materials currently shown on the Department's Approved Products List (APL) shall be used. Copies of the most recent version of the APL are available on the internet from the Arizona Transportation Research Center (ATRC), through its PRIDE program.

Certificates of Compliance conforming to the requirements of Subsection 106.05 shall be submitted.

704-2.02 Composition:

The thermoplastic composition shall conform to the following requirements:

	Percent by Weight	
	White	Yellow
Binder (hydrocarbon or alkyd)	18 - 26	18 - 26
Titanium dioxide	10 - 15	-----
Basic lead chromate	-----	2 - 10
Reflective glass inter-mix beads	30 - 40	30 - 40
Calcium carbonate or equivalent filler	20 - 40	25 - 45

The ingredients of the thermoplastic composition shall be thoroughly mixed and in a solid or sectionalized block, or free-flowing granular form. When heated in a melting apparatus, the material shall readily liquefy into a uniform solution. This solution shall be free from all skins, dirt, foreign objects or any other ingredient which would cause bleeding, staining, blotting, or discoloration when applied to the bituminous or concrete pavement surfaces.

The thermoplastic shall be one of the following two types based on the binder composition:

Hydrocarbon: Shall consist mainly of synthetic petroleum hydrocarbon resins with appropriate fillers and pigments.

Alkyd: Shall consist of a mixture of synthetic resins, at least one of which is solid at room temperature, and of high-boiling-point plasticizers. At least one third of the binder composition and no less than eight percent by weight of the entire material formulation shall be solid maleic-modified glycerol ester resin. The alkyd binder shall not contain any petroleum-based hydrocarbon resins.

An alkyd thermoplastic formulation shall be used for all symbols, legends, and transverse lines, including stop bars and crosswalks. Either an alkyd or hydrocarbon thermoplastic formulation may be used for longitudinal lines, including lane lines and edge lines, unless otherwise shown on the project plans or specified herein. Extrusion or spray formulations shall be used in accordance with requirements of the application equipment used to install the markings.

(A) Reflective Glass Beads:

In addition to incorporating glass beads in the thermoplastic mix, glass beads shall be evenly applied to the surface of the molten material, immediately after application, at a minimum rate of 10 pounds of glass beads per 100 square feet of line (300 linear feet of four-inch stripe).

(B) Filler:

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The filler shall be a white calcium carbonate or equivalent filler with a compressive strength of at least 5,000 pounds per square inch.

(C) Titanium Dioxide:

Titanium Dioxide shall conform to the requirements of ASTM D 476 for Type II (92 percent).

(D) Lead Chromate Pigment:

The lead chromate pigment shall be silica double encapsulated heat resistant lead chromate pigment.

704-2.03 Physical Characteristics of the Composition:

(A) General Requirements:

The thermoplastic material shall not exude fumes which are toxic, injurious, or require specialized breathing apparatus when heated to the temperature range specified by the manufacturer for application. The material shall remain stable when held for four hours at this temperature, or when subjected to four reheatings, not exceeding a total of four hours, after cooling to ambient temperature. The temperature viscosity characteristics of the plastic material shall remain constant throughout the reheatings and shall show like characteristics from batch to batch. There shall be no obvious change in color of the thermoplastic material as a result of reheating, and the color of the material shall not vary from batch to batch.

(B) Color:

The thermoplastic material, after heating for four hours ± five minutes at 425 ± three degrees F and cooled to 77 ± three degrees F, shall meet the following:

White: Daylight reflectance at 45 degrees - 0 degrees shall be 70 percent minimum.

Color shall match Federal Test Standard Number 595 color chip no. 17925.

Yellow: Daylight reflectance at 45 degrees - 0 degrees shall be 43 percent minimum.

Color shall match Federal Test Standard Number 595 color chip no. 13538.

(C) Retroreflectance:

The white and yellow thermoplastic materials shall have the following minimum retroreflectance values at 86.5 degrees illumination angle and 1.5 degrees observation angle as measured by a Mirolux 12 portable retroreflectometer or similar approved device within 30 days after application to the roadway surface:

Product	Retroreflectance (millicandelas)
White	200
Yellow	125

(D) Softening Point:

After heating the thermoplastic material for four hours ± five minutes at 425 ± three degrees F and testing in accordance with ASTM D 36, the thermoplastic materials shall have a softening point of 215 ± 15 degrees F.

(E) Water Absorption and Specific Gravity:

The thermoplastic material shall not exceed 0.5 percent by weight of retained water when tested in accordance with the requirements of ASTM D 570.

The specific gravity of the material, as determined by Section 11 of AASHTO T 250, shall be between 1.85 and 2.3.

(F) Impact Resistance:

After heating the thermoplastic material for four hours ± five minutes at 425 ± three degrees F and forming test specimens, the impact resistance shall be not less than 10 inch-pounds when tested in accordance with Section 9 of AASHTO T 250.

(G) Bond Strength:

After heating the thermoplastic material for four hours ± five minutes at 425 ± three degrees F, the bond strength to Portland cement concrete shall be not less than 180 pounds per square inch. The bond strength shall be determined in accordance with the procedures specified in Section 7 of AASHTO T 250.

(H) Abrasion Resistance:

The abrasion resistance of the thermoplastic material shall be determined by forming a representative lot of the material at a thickness of 0.125 inches on a four-inch square monel panel (thickness 0.050 ± 0.001 inches), on which a suitable primer has been previously applied, and subjecting it to 200 revolutions on a Taber Abraser at 25 °C, using H-22 calibrated wheels weighted to 250 grams. The wearing surface shall be kept wet with distilled water throughout the test.

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The maximum loss of thermoplastic material shall be 0.5 grams.

(I) Cracking Resistance at Low Temperature:

After heating the thermoplastic material for four hours ± five minutes at 425 ± three degrees F, applying to concrete blocks, and cooling to 15 ± three degrees , the material shall show no cracks when observed from a distance exceeding 12 inches. Testing for low temperature crack resistance shall be in accordance with the procedures specified in Section 8 of AASHTO T 250.

(J) Flowability:

After heating the thermoplastic material for four hours ± five minutes at 425 ± three degrees F, and testing for flowability in accordance with Section 6 of AASHTO T 250, the white thermoplastic shall have a maximum percent residue of 18, and the yellow thermoplastic shall have maximum percent residue of 21.

(K) Yellowness Index:

The white thermoplastic material shall not exceed a yellowness index of 0.12 when tested in accordance with Section 4 of AASHTO T 250.

(L) Flowability (Extended Heating):

After heating the thermoplastic material for eight ± 1/2 hours at 425 ± three degrees , with stirring the last six hours, and testing for flowability in accordance with Section 12 of AASHTO T 250, the thermoplastic shall have a maximum percent residue of 28.

(M) Flash Point:

The thermoplastic material shall have a flash point not less than 475 degrees F when tested in accordance with the requirements of ASTM D 92.

(N) Storage Life:

The materials shall meet the requirements of this specification for a period of one year from the date of manufacture. The month and year of manufacture shall be clearly marked on all packages of thermoplastic material. The thermoplastic material must also melt uniformly with no evidence of skins or unmelted particles for this one year period. Any material which does not meet the above requirements, or which is no longer within this one year period at the time of application, shall not be used. The contractor shall replace any outdated material with material meeting the above performance and time requirements at no additional cost to the Department.

(O) Primer-Sealer:

Primer-sealers shall be used on Portland cement concrete, or exis hot mix asphaltic concrete surfaces prior to application of thermoplastic material, and shall be applied as recommended by thermoplastic material manufacturer. The primer-sealer shall compounded specifically for use with the specified thermopl material.

Application of primer-sealer will not be required on newly pl hot-mix asphaltic concrete surfaces prior to application of thermoplastic material.

704-2.04 Physical Requirements for Glass Beads:

Inter-mix and drop-on reflective glass beads shall conform to requirements of Subsection 708-2.02, except as noted herein.

The inter-mix beads shall conform to AASHTO M 247-81 (1986), ty and may be coated or uncoated as recommended by the manufact If uncoated beads are used, the thermoplastic formulation shal configured to minimize settling of the intermix beads when the mat is heated and applied.

If recommended by the manufacturer, the drop-on beads shall hav adherence coating.

704-3 Construction Requirements:

704-3.01 Equipment:

The equipment used to install hot applied thermoplastic material s be constructed to provide continuous uniform heating to temperat exceeding 400 degrees F while mixing and agitating the material. heating mechanism of the kettle shall be equipped with a heat trar medium consisting of oil or air. The burner flame shall not dir contact the material vessel surface. The mixing and agita mechanism shall be capable of thoroughly mixing the material at a which ensures constant uniform temperature distribution. The k shall be equipped with two temperature gauges: one to indicate temperature of the oil or air heat transfer medium, and the othe indicate the temperature of the thermoplastic material. The kettle also be equipped with an automatic thermostatic control device allows for positive temperature control to prevent overheating underheating of the material.

The conveying portion of the equipment, between the kettle and the dispensing device shall be configured to prevent accumulation clogging, and shall maintain the material at the specified applic temperature. The dispensing device shall be capable of applying required shapes and thicknesses. All parts of the equipment which

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come in contact with the material shall be constructed for easy accessibility for cleaning and maintenance.

All melting and application equipment shall have functioning and calibrated temperature sensing devices to verify that temperature requirements are being met. The contractor shall provide proof that the temperature sensing devices and verification thermometers are fully functional.

The application equipment to be used on roadway long-line installations shall consist of either truck-mounted units or motorized ride-on equipment. The truck-mounted or motorized ride-on units used for center lines, lane lines, gore lines, and edge lines shall consist of a mobile self-contained unit carrying its own material capable of operating at a minimum speed of five miles per hour while applying striping, and shall be sufficiently maneuverable to install curved and straight lines, both longitudinally and transversely.

The truck shall be equipped with high pressure air spray jets in front of the pavement marking material applicators to remove loose matter from the pavement surface where the marking material is to be applied.

Hand applicator equipment, to be used for all other roadway installations, shall be either self-contained melter application units or reservoir application units that are filled from a separate melter unit. Both types of units shall be equipped to maintain and measure the required application temperatures. The hand applicator equipment shall be sufficiently maneuverable to install symbols and legends, and curved and straight lines, both longitudinally and transversely.

The application equipment shall be so constructed as to assure continuous uniformity in the dimensions of the pavement marking. The applicator shall provide a means for cleanly cutting off square pavement markings edges and provide a method of applying "skip" and solid lane lines. The equipment shall be constructed to provide varying widths and thicknesses of pavement markings. The application equipment shall be mobile and maneuverable to the extent that straight lines can be followed and normal curves can be made in a true arc. The equipment operator shall be located in such a position as to enable full visibility of the striping apparatus.

A glass bead top dressing shall be applied to the completed thermoplastic stripe by an automatic glass bead dispenser attached to the striping machine in such a manner that the beads are applied to the molten thermoplastic material immediately after it has been applied to the pavement. The bead dispenser shall use pressure-type spray guns for truck-mounted or motorized ride-on units; and a drop-on bead dispenser for hand applicators. The bead dispenser shall be capable of evenly distributing glass beads at the required application rate immediately after the application of the thermoplastic. The bead dispenser shall dispense the beads in such a matter that they shall be embedded in the surface of the molten thermoplastic to an anchoring

depth of from 55 to 60 percent of the bead diameter. The be dispenser shall be equipped with an automatic cut-off which synchronized with the cut-off of the thermoplastic material.

The heating kettle and application equipment shall meet requirements of the National Fire Underwriters, the National F Protection Association, and other applicable federal, state and lo authorities. Thermoplastic melting units, trucks or trailers, shall equipped with foam-type fire extinguishers suitable for application thermoplastic material that is at the flash point.

704-3.02 Application:

(A) Placement Locations:

Pavement markings shall be positioned as defined on the plans an the specifications. When it becomes necessary for proper installat the Engineer may revise individual marking locations as necessar accommodate the following requirements:

Marking lines shall not be placed on parallel construction or expan joints. Longitudinal lines shall be offset to provide two to four inc of clearance from parallel construction and expansion joints un directed otherwise by the Engineer.

Placement of symbols and legends on construction joints, expan joints or uneven pavement surfaces shall be avoided. Where location of construction joints, expansion joints or otherwise unsuit surfaces conflicts with specified locations for symbols or legends, Engineer will designate the symbol or legend location. The contra shall identify such location conflicts for the Engineer's determinatio

(B) Materials Selection and Compatibility:

All thermoplastic material, drop-on glass beads, and primer-seale be inspected and approved by the Engineer prior to their applica The contractor shall also provide samples of said materials if requ by the Engineer.

All materials shall be properly packaged and stored. Each contair be used on the project shall be clearly labeled to indicate the foll information:

- Nature, type, and formulation of the material, incl whether it is an alkyd or hydrocarbon;
- Manufacturer, batch number, and date of manufacti
- Application requirements and constraints; and
- Compatibility requirements and constraints, partic those pertaining to equipment, storage, and materials to be used.

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Preparation and application equipment shall be in accordance with the plans and specifications, and shall conform to the recommendations of the materials manufacturer.

Incompatible materials shall not be used together. The contractor shall not combine alkyd and hydrocarbon materials in preparation or application equipment. The contractor shall completely clean preparation and application equipment when materials are changed.

The contractor shall dispose of excess materials, cleaning fluids, and all empty material containers at a site approved by the Engineer.

(C) Equipment Inspections and Deficiencies:

The contractor shall make daily maintenance and operation inspections of all application equipment to ensure that it is operable within the requirements of the specifications. The contractor shall inform the Engineer of any equipment breakdowns, intermittent malfunctions, or other conditions that may impact the proper application of specified markings. Any equipment judged to be unsuitable by the Engineer shall be repaired or replaced.

(D) Pavement Surface:

The contractor shall remove all dirt, dust, grease, oil, loose surfacing materials, poorly adhered existing markings, or other detrimental material from the road surface prior to application of the thermoplastic material.

The method of cleaning the surface is subject to approval by the Engineer and shall include sweeping and the use of high-pressure air spray. The method of surface preparation shall also be in accordance with the recommendations of the thermoplastic material manufacturer. Loose material including all grindings and obliterated markings shall be removed from the pavement surface and disposed of properly.

When thermoplastic markings are to be applied to new Portland cement concrete pavement, any curing compound present shall be removed by means of a high-pressure water jet or sandblasting, followed by sweeping and high-pressure air spray. The curing compound shall be removed at least two inches beyond the entire perimeter of each marking to be installed.

At the time of application of primer-sealer and thermoplastics, the road surface shall be absolutely dry with no detectable or measurable surface or near-surface dampness. If precipitation or other surface wetting is imminent, all marking operations shall be stopped. If any surface dampness is detected during marking activities, marking operations shall be stopped until the pavement dries. If the hot-applied thermoplastic marking blisters upon application, marking operations shall be stopped until the cause, potentially including subsurface moisture, is determined and corrected.

(E) Primer Application:

On both old and new Portland cement concrete pavement primer-sealer shall be used if recommended by the thermopla manufacturer. The primer-sealer shall be applied at the manufactu recommended application rates prior to placing the thermopla material. The primer-sealer shall be allowed to set up for manufacturer's specified cure or evaporation time, and shall be fre solvent and water when the thermoplastic is applied.

The thermoplastic material shall be applied to primed pave surfaces within the working time specified by the primer-sealer thermoplastic materials manufacturers. If the primed surfaces are marked within these time limits, the contractor shall re-prime surfaces as required by the manufacturer at no additional cost to Department. If an epoxy primer is used, the thermoplastic applic shall be completed before the epoxy has cured.

Improper primer-sealer application may result in bond failure bet the thermoplastic and the pavement surface and may cause thermoplastic surface to pinhole or blister. Should these condi occur, all application operations shall stop until the caus determined and corrected. All such defective markings shal removed and replaced at no additional cost to the Department.

(F) Pavement Temperatures:

Ribbon-gun application procedures shall not be used if the wind factor is below 65 degrees F.

For other application procedures, the road surface temperature a time of application shall be a minimum of 55 degrees F and rising.

If at any time during marking operations the air or pav temperature falls below these requirements, all marking oper shall stop.

The contractor shall measure pavement surface temperatures on hour prior to the start of the striping installation activities a deemed necessary by the Engineer until the end of the appli period. For elevation changes greater than 1,000 feet, tempe readings at the highest elevation shall govern unless otherwise di by the Engineer. The lowest temperature so measured shall g unless otherwise directed by the Engineer. The tempe measurements shall be recorded in a log book and provided Engineer when required. The pavement surface temperature sh measured with a standard surface temperature thermometer non-contact infrared thermometer.

(G) Thermoplastic Application:

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The thermoplastic pavement marking material shall be extruded or sprayed on to the pavement surface at a material temperature between 400 and 440 degrees, depending on manufacturer's recommendations, ambient air and pavement temperatures, and the nature of the pavement surface. The contractor shall verify temperature requirements with a non-contact infrared thermometer as directed by the Engineer.

The alkyd and hydrocarbon thermoplastic material temperatures shall not exceed 450 degrees F. Material temperatures exceeding 440 degrees F shall be allowed for short periods of time; however, in no case shall the material be held for more than four hours at temperatures above 440 degrees F. Total heating time for any batch of material shall not exceed six hours. The contractor shall note in the temperature log the time when each batch of thermoplastic material is first heated. The start of heating time shall also be marked on the side of the kettle to which it applies.

Specified temperature requirements shall be maintained at all times during application. The contractor shall monitor material temperature at thirty minute intervals, unless otherwise directed by the Engineer, and maintain a log of temperature readings taken. Readings shall be taken at the melting kettle or the application outlet point, as determined by the Engineer.

The contractor shall minimize the thermoplastic material remaining in the kettle at the end of the work day and shall blend a minimum of 80 percent fresh material the start of each day. During project delays, the contractor may transfer heated thermoplastic material into approved containers for later re-use, subject to specified limits on total acceptable heating time for each batch.

Drop-on glass beads shall be mechanically deposited, at the specified rate, into the thermoplastic material immediately after the thermoplastic marking is applied. The bead dispenser shall evenly distribute the beads such that they embed in the surface of the thermoplastic to a depth of between 50 and 60 percent of the bead diameter. If the glass beads do not adhere to the thermoplastic marking, operations shall be stopped until the problem has been corrected. All markings which do not meet the requirements of Subsection 704-2.03(C), as determined by the Engineer, shall be removed by the contractor and replaced at no additional cost to the Department.

Unless otherwise specified, thermoplastic pavement markings for legends and symbols, and for crosswalks, stop bars and other transverse elements, shall be extruded, and shall be 0.090 ± 0.002 inches thick. Longitudinal markings, such as edge lines, lane lines, gore lines, and other markings parallel to traffic, shall be sprayed thermoplastic, and shall be 0.060 ± 0.002 inches thick. Longitudinal markings of approximately 200 feet or less may be extruded, and shall be a minimum of 0.060 ± 0.002 inches thick. The thermoplastic

thickness shall be uniform and consistent throughout the total length o the marking project.

The contractor shall perform periodic spot checks of thermoplasti material to verify that the required thickness has been attained Random spot checks of the thermoplastic thickness will be made by th Engineer to ensure conformance with the required criteria. Suggeste spot check procedures include the following:

Wet: Thickness can be field tested immediately after th thermoplastic marking is applied by inserting a thir graduated machinist rule or similar instrument into th molten thermoplastic to the depth of the pavemer surface. The thickness is then determined visually b noting on the scale the depth of the penetration c coating of the instrument.

Dried: Thickness can be field tested by placing a small fla sheet of metal with a known thickness immediatel ahead of the striping apparatus. After striping, remov the sample and use a suitable measuring device, suc as a caliper or micrometer, to determine the thickness of the dried marking.

The finished thermoplastic line shall have well defined edges and b free from waviness. Lateral deviation of the thermoplastic line shall nc exceed one inch in 100. The longitudinal deviation of a painte segment and gap shall not vary more than six inches in a 40-foot cycle The actual width of line shall be within the limits specified in th following table, according to the width of line called for on the plans:

Plan Width	Actual Width
4 inches	4 to 4-1/2 inches
8 inches	8 to 9 inches
Over 8 inches	± 1 inch

After application and sufficient drying time, the thermoplastic markin shall show no appreciable deformation or discoloration under loca traffic conditions with air and road temperatures ranging from -10 t 180 degrees F. The drying time shall be defined as the minimun elapsed time, after application, when the thermoplastic pavemen markings shall have and retain the characteristics required herein, and after which normal traffic will leave no impression or imprint on the newly applied marking. When applied within a temperature range of 412.5 ± 12.5 degrees F and thickness range of 0.060 to 0.090 inches, the material shall set to bear traffic in not more than two minutes when the air and pavement surface temperatures are approximately 50 ± three degrees F and not more than 10 minutes when the air and road surface temperatures are approximately 90 ± three degrees. The Engineer may conduct field tests in accordance with ASTM D 711 to verify actual drying times.

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704-4 Method of Measurement:

Thermoplastic pavement longitudinal and transverse markings, such as edge lines, lane lines, gore lines, cross-walks and stop bars, will be measured by the linear foot along the center line of the pavement marking line and will be based on a four-inch-wide line. Measurement for striping with a plan width greater or less than the basic four inches, as shown on the plans or directed by the Engineer will be made by the same method and then adjusted by the following factor:

$$\frac{\text{Plan Width of Striping (inches)} \times \text{Linear Feet}}{4 \text{ (inches)}}$$

No measurement will be made of the number of linear feet of gaps in dashed lines.

Double marking lines, consisting of two four-inch-wide stripes, will be measured as two individual marking lines. Crosswalk lines, stop bars, stop lines, gore lines, cross hatch lines, chevron lines and railroad marking transverse lines will be measured for centerline length and adjusted for widths other than four inches, as defined above.

Thermoplastic pavement marking symbols, such as diamonds, or single, double, or triple arrows, will be measured by each unit applied. Each pavement symbol, as shown on the plans, will be considered a unit.

Thermoplastic pavement marking legends, defined as a complete letter grouping such as "SCHOOL," "XING," "STOP," "RR," or "ONLY.", will be measured by each unit applied. Each pavement legend, as shown on the plans, will be considered a unit.

No separate measurement or payment will be made for cleaning and preparing the pavement surface, including abrasive sweeping and high-pressure air spray, and for disposal of excess materials, cleaning fluids, and empty material containers, the cost being considered as included in contract items.

Removal of curing compound from new Portland cement concrete pavement and the application of primer-sealer, which is to be applied to both old and new Portland cement concrete pavement prior to application of thermoplastic marking, shall be measured by the linear foot for striping lines regardless of width, or unit each for symbols and legends, and in accordance with the items of work established in the bid schedule.

704-5 Basis of Payment:

The accepted quantities of thermoplastic pavement markings of the type specified in the bidding schedule, measured as provided above, will be

paid for at the contract unit price, complete in place, including pavement surface preparation and glass beads.

The accepted quantities for removal of curing compound from new Portland cement concrete pavement and the application of primer-sealer, measured as provided above, will be paid for at the respective contract unit prices, under the items of work established in the bid schedule.

SECTION 705 PREFORMED PLASTIC PAVEMENT MARKING:

705-1 Description:

The work under this section shall consist of furnishing all materials, preparing the pavement surface and applying preformed reflectorized pavement marking tape, arrows and legends to the pavement in accordance with the details shown on the project plans and the requirements of these specifications.

Preformed pavement marking tape, arrows and legends shall be limited to the following applications unless otherwise specified in the contract documents:

(A) Preformed Pavement Markings - Type I (Permanent):

Type I shall be a general purpose high durability retroreflective pliant polymer film for preformed striping and markings to be used for finished permanent markings. Type I shall be capable of performing as specified herein when subjected to high traffic volumes and severe wear conditions such as repeated shear action from crossover or encroachment on edge and channelization lines, starting, stopping, and turning movements.

(B) Preformed Pavement Markings - Type II (Temporary - Removable):

Type II shall be a removable preformed retroreflective pavement marking capable of performing for the duration of a normal construction season. It shall be a nonmetallic mixture of high quality materials and shall be capable of being removed intact or in large pieces either manually or with a recommended roll up device. Type II shall be used on finished pavement surfaces where traffic control or channelization through the construction zone is temporary requiring removal prior to final pavement markings.

(C) Preformed Pavement Markings - Type III (Temporary - Nonremovable):

Type III shall be a nonremovable preformed retroreflective film on a conformable metallic backing capable of performing for the duration of

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705-5 Basis of Payment:

The accepted quantities of preformed pavement markings, measured as provided above, will be paid for at the contract unit price for the type specified in the bidding schedule, which price shall be full compensation for the item, complete in place, including necessary pavement cleaning, removal of Type II temporary markings, and maintaining Types II and III temporary markings in construction work zones.

When Type II or III temporary preformed pavement markings are required for maintaining traffic through a construction work zone, but are not listed as pay items in the bidding schedule, they will be considered as included in the lump sum paid for Maintenance and Protection of Traffic in accordance with Subsection 701-5.

Additional payment will be made for replacement of temporary markings when the contractor is required by the Engineer to install marking materials on distressed pavements or during adverse weather conditions and subsequent failure occurs. Distressed pavement conditions are defined as alligator cracking, bleeding, or spalling of bituminous pavements and spalling of PCC pavements. Adverse weather conditions are defined as any occurrence where application is required at pavement temperatures less than 60 degrees F or when precipitation occurs within 24 hours before or after application. The Department will pay for the replacement, where failures occur, at the contract unit price for the initial occurrence.

In the event a second failure occurs when markings have been reapplied on distressed pavements or under weather conditions described above, the Engineer shall determine if conditions require primer, alternate methods of marking, or reapplication of preformed markings. Preformed markings will be paid for at the contract unit price. Primers or other methods of markings deemed necessary by the Engineer will be paid for in accordance with the provisions of Subsection 109.04.

SECTION 706 RAISED PAVEMENT MARKERS:

706-1 Description:

The work under this section shall consist of cleaning and preparing the pavement surface; furnishing all materials, equipment, tools and labor and placing raised pavement markers of the type specified at the locations and in accordance with the details shown on the plans and the requirements of these specifications.

706-2 Materials:

706-2.01 General:

Certificates of Compliance, for raised pavement markers and adhesi conforming to the requirements of Subsection 106.05 shall be submitt to the Engineer at least 10 days prior to use. A minimum of one samp per lot per type of marker shall be taken by the Engineer.

The pavement marker samples shall be tested to determi conformance to the applicable standard drawings and the specifications.

The base of the pavement markers shall be free from glass glaze from substances which may reduce its bond to the adhesive. The ba shall be flat and it's deviation from a flat surface shall not exceed 0 inches.

706-2.02 Reflective Pavement Markers:

Reflective pavement markers shall be of the following type:

Type C	Clear, red
Type D	Yellow, two-way
Type E	Clear, yellow
Type G	Clear, one-way
Type H	Yellow, one-way

Reflective pavement markers shall be of the prismatic reflector t consisting of a molded methyl methacrylate or suitably compoun acrylonitrile butadiene styrene (ABS) shell filled with a mixture of inert thermosetting compound and filler material. The exterior surf of the shell shall be smooth and shall contain one or two prism reflector faces of the color specified.

When illuminated by an automobile headlight, the color of the reflect shall be an approved clear, yellow, or red as designated. Reflect not meeting the required color may be rejected.

Permanent reflective pavement markers will be tested for compres strength, abrasion resistance and specific intensity. Perma reflective pavement markers shall have thin untempered glass or o abrasion resistant material bonded to the prismatic reflector face provide an extremely hard and durable, abrasive resistant refle surface.

The glass, or other abrasion resistant surface, is not required on red faces of two-way (Clear/Red) permanent reflective markers. area covered by the glass, or other abrasion resistant surface, shall be less than three square inches.

Temporary reflective pavement markers will be tested for compres strength and specific intensity. Temporary reflective paver markers, or permanent reflective pavement markers used as tempo will not be tested for abrasion resistance.

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The strength by compressive loading shall be at least 2,000 pounds for both permanent and temporary reflective pavement markers.

The original specific intensity of each reflecting surface for both temporary and permanent reflective markers shall not be less than the following:

Reflectance:	Specific Intensity: candelas/foot-candle		
degrees incidence	Clear	Yellow	Red
0	3.0	1.8	0.75
20	1.2	0.72	0.30

Permanent reflective pavement markers shall be subject to an abrasion resistance test as follows:

Steel Wool Abrasion Procedure: Form a one-inch diameter flat pad using No. 3 coarse steel wool per Federal Specification FF-W1825. Place the steel wool pad on the reflector lens face. Apply a force of 50 pounds and rub the entire lens surface 100 times. After the lens surface has been abraded, the specific intensity of each clear and yellow reflective surface shall be not less than that required above for the original specific intensity.

706-2.03 Non-Reflective Pavement Markers and Reflectorized Dagmars:

Non-reflective pavement markers shall be of the following types:

Type	Color
A	white
AY	yellow

Reflectorized Dagmars shall be of the following types:

Type J white
Type JY yellow

Non-reflective pavement markers and reflectorized dagmars shall consist of a heat-fired, vitreous ceramic base and a heat-fired, opaque glazed surface which will produce the required properties. Markers shall be produced from any suitable combination of intimately mixed clays, shales, flints, feldspars, or other inorganic material which will meet the properties herein required. Markers shall be thoroughly and evenly matured and free from defects which will affect appearance or serviceability.

The top surface of the marker shall be in reasonably close conformity with the configuration shown on the plans. Markers shall be convex and the radius of curvature shall be between 3-1/2 and six inches, except that the radius of the 1/2 inch nearest the edge may be less. All

edges shall be rounded and any change in curvature shall be gradual. The top and sides shall be smooth and free of mold marks, pits, indentations, air bubbles, or other objectionable marks or discolorations.

Non-reflective pavement markers and dagmars shall meet the following requirements:

Glaze Thickness: inches	0.005 Minimum
Moh Hardness:	6 Minimum
Directional Reflectance: (White Only)	
Glazed Surface	75 Minimum
Body of Marker	70 Minimum
Yellowness Index: (White Only)	
Glazed Surface	0.07 Maximum
Body of Marker	0.12 Maximum
Color (Yellow Only):	
Purity: percent, range	75 - 96
Dominant Wave Length: mu, range	579 - 585
Total Luminous Reflectance (Y valve)	0.41 Minimum
Compressive Strength: pounds	1,500 Minimum
Water Absorption: percent	2.0 Maximum
Autoclave	Glaze shall not spall, craze or peel

Reflectorized dagmars shall have encapsulated lens reflectors conforming to standard manufacturing practices.

706-2.04 Jiggle Bars:

(A) General:

Types K and KY jiggle bars shall be concrete or ceramic, at the option of the contractor, and shall be shaped to conform to the details shown on the plans. The same type of jiggle bar shall be used throughout any one project.

Jiggle bars shall be painted either white or yellow and shall be reflectorized, as shown on the plans. The color shall be uniform.

The bottom surface of the jiggle bars shall be of a roughness comparable to at least that of fine grade sandpaper. The bottom surface shall not be grooved such that air will be trapped in the grooves when it is pressed into the adhesive.

(B) Concrete:

Concrete jiggle bars shall be made of Class B concrete conforming to the requirements of Section 1006.

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(C) Ceramic:

Ceramic jiggle bars shall be made of a heat-fired vitreous base. The glazed surface shall not craze, spall or peel when tested in accordance with the requirements of ASTM C 424 for one cycle at 250 pounds per square inch.

The jiggle bar tiles shall have a compressive strength as follows when tested in accordance with the requirements of ASTM C 773:

Minimum average of five units	6,000 psi
Individual minimum, one unit	5,000 psi

706-2.05 Bituminous Adhesive:

The bituminous adhesive for pavement markers shall be a hot-melt adhesive manufactured by an approved manufacturer. A list of approved manufacturers of bituminous adhesive is shown on the Department's Approved Products List (APL). Copies of the most current version of the APL are available on the internet from the Arizona Transportation Research Center (ATRC), through its PRIDE program.

706-3 Construction Requirements:

The portion of the highway to which the markers are to be attached shall be free of dirt, existing painted lines, curing compound, grease, oil, moisture, loose or unsound layers and any other material which could adversely affect the bond of the adhesive. The method of cleaning the pavement surface and removal of detrimental material is subject to approval by the Engineer and shall include sweeping and the use of high-pressure air spray. On Portland cement concrete pavement and old asphaltic concrete pavements, cleaning shall be accomplished by sandblasting, followed by sweeping and/or air blowing. Newly placed asphaltic concrete pavement need not be sandblasted unless, in the opinion of the Engineer, the surface is contaminated with materials that would adversely affect the bond of the adhesive.

The adhesive shall be placed uniformly on the cleaned pavement surface in an amount sufficient to result in complete coverage of the area of contact of the markers, with no voids present and with a slight excess after the markers have been placed. The markers shall be placed in position and pressure applied until firm contact is made with the pavement. The markers shall be protected against impact until the adhesive has set to the degree acceptable to the Engineer.

Excess adhesive on the pavement and on the exposed surfaces of the markers shall be immediately removed. Thinners or solvents which may be detrimental to either the markers or the bond provided by the adhesive shall not be used in removing excess adhesive.

Markers shall not be installed when the temperature of the pavement surface or the atmosphere is less than 40 degrees F, when the relative humidity is 80 percent or higher or when the pavement surface is not dry.

All markers shall be installed to the line approved by the Engineer and in such manner that the reflective face of the markers is perpendicular to a line parallel to the roadway centerline. No pavement markers shall be installed over longitudinal or transverse joints of the pavement surface.

706-4 Method of Measurement:

Pavement markers will be measured as a unit for each marker furnished and placed.

706-5 Basis of Payment:

The accepted quantities of pavement markers, measured as provided above, will be paid for at the contract unit price for the type designated in the bidding schedule, complete in place, including adhesive and surface preparation.

SECTION 707 TUBULAR MARKER (Flexible):

707-1 Description:

The work under this section shall consist of furnishing and installing flexible tubular markers in accordance with the details shown on the project plans and the requirements of these specifications. The work shall also include the removal and salvage of the markers when ordered by the Engineer.

707-2 Materials:

The post shall be of a flexible material which is resistant to impact, ultra violet light, ozone, hydrocarbons and stiffening with age. The base shall prevent post removal by impact or vandals. The post and base shall exhibit good workmanship and shall be free of burns, discoloration, contamination, and other objectionable marks or defects which affect appearance or serviceability.

The post shall be designed to resist overturning, twisting and displacement from wind and impact forces. A 50-mile per hour wind load shall not deflect the post more than two inches from the at-rest position. Measurement shall be made at the point of maximum deflection and normal to the movement.

The post shall have minimum tensile strength of 1,100 pounds per square. The tensile stress shall be determined in accordance with the

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"Standard Method of Test for Tensile Properties of Plastic," ASTM D 638 (Test Specimen Type 1). The rate of jaw separation shall be 2 inches per minute.

The post shall be conditioned for a minimum of two hours in an oven at 140 ± three degrees F. The conditioned post shall be capable of straightening itself within 30 seconds when bent 180 degrees at the midpoint for each of four bends. The stress test on each post shall be completed within two minutes of removal from oven.

The post shall be sufficiently rigid to resist wilting after conditioning a minimum of two hours at 180 ± three degrees F.

The post shall be conditioned a minimum of two hours at -5 ± three degrees F in an environmentally controlled test chamber. Testing shall be performed in the environmental chamber. The post shall be sufficiently flexible to permit four 180-degree bends at the midpoint without cracking, each time straightening itself within 60 seconds.

The post shall be manufactured from an impact resistant material so that an installed post is capable of self-erecting and withstanding 10 vehicle impacts at 55 miles per hour at temperatures of 40 degrees F or above without breakage or loss of serviceability. Little or no damage shall be caused to the impacting vehicle. The vehicle shall be a typical sedan with a weight of 4,000 ± 1,000 pounds.

The post shall also be capable of sustaining a wheel hit during testing at 55 miles per hour without loss of serviceability.

The reflective sheeting shall be a high reflectivity flexible sheeting conforming to the requirements of Section 1007. The sheeting must retain 75 percent of its reflectivity after 10 vehicle impacts at 55 miles per hour. Color shall be silver-white, yellow, or green in accordance with the appropriate Federal Highway Administration color tolerance chart.

The base shall prevent post removal by impact or vandals. The base shall not protrude more than four inches above the pavement surface.

707-3 Construction:

The base shall be installed with an epoxy adhesive or acceptable alternate, in accordance with the manufacturer's specifications.

When used in a construction work zone, it shall be the contractor's responsibility to keep the tubular markers bright and clean for maximum target value.

When replacement, repair or resetting of markers is necessary during traffic control in a construction work zone, such work shall be done immediately by the contractor.

707-4 Method of Measurement:

Tubular markers will be measured by the unit for each marker furnished and installed.

707-5 Basis of Payment:

The accepted quantities of tubular markers, measured as provided above, will be paid for at the contract unit price each, which price shall be full compensation for the work, complete in place, as specified herein and as shown on the plans.

It shall be the contractor's responsibility to reset those markers that become detached from the pavement at no additional cost to the Department.

Where the Engineer determines markers are in need of repair, such repairs shall be made by the contractor and will be paid for in accordance with the provisions of Subsection 109.04.

Where the Engineer determines markers need to be replaced, such replacement shall be made by the contractor and additional payment will be made at the contract unit price.

No measurement or direct payment will be made for removing, hauling and stockpiling salvaged markers, the cost being considered as included in the cost of the contract item.

SECTION 708 PERMANENT PAVEMENT MARKINGS:

708-1 Description:

The work under this section shall consist of cleaning and preparing the pavement surface, furnishing all materials and applying white or yellow, water-borne, lead-free, rapid-dry traffic paint and reflective glass beads at the locations and in accordance with the details shown on the plans, MUTCD, and associated ADOT Supplement, the requirements of these specifications, or as directed by the Engineer.

708-2 Materials:

708-2.01 Pavement Marking Paint:

(A) General:

All material used in the formulation of the pavement marking paint shall meet the requirements herein specified. Any materials not specifically covered shall meet the approval of the Engineer.

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Certificates of Compliance conforming to the requirements of Subsection 106.05 shall be submitted for each lot or batch of paint prior to its use.

(B) Composition Requirements:

The pavement marking paint shall be a ready-mixed, one component, water-borne lead-free traffic line paint, of the correct color, to be applied to either asphaltic or Portland cement concrete pavement. The composition of the paint shall be determined by the manufacturer. It will be the manufacturer's responsibility to produce a pigmented, water-borne paint containing all the necessary co-solvents, dispersant, wetting agents, preservatives and all other additives, so that the paint shall retain its viscosity, stability and all of the properties as specified herein. The manufacturer shall certify that the product does not contain mercury, lead, hexavalent chromium, toluene, chlorinated solvents, hydrolyzable chlorine derivatives, ethylene-based glycol ethers and their acetates, and not any carcinogen, as defined in 29 CFR 1910.1200. Lead content shall not exceed 0.06 percent of weight of the dry film, and the test for chromium content shall be negative.

No glass beads will be allowed in the pavement marking paint. Glass beads will be applied after the paint has been applied.

(C) Manufacturing Formulations:

The manufacturer shall formulate the pavement marking paint in a consistent manner and notify the Engineer of any change of formulation. The formulation of the paint shall be determined by the manufacturer. It will be the manufacturer's responsibility to formulate paint which will meet the quantitative and qualitative requirements of this specification. Any change in the formulation of the paint must be approved by the Engineer.

(D) Quantitative Requirements of Mixed Paints:

	White	Yellow
Pigment: Percent by weight, ASTM D 3723, allowable variation from qualifying sample	± 2.0	± 2.0
Non-Volatile Content: Percent by weight, ASTM D 2369, allowable variation from qualifying sample	± 2.0	± 2.0
Viscosity: Krebs Units at 77 ± 1 °F, ASTM D 562	70 - 85	70 - 85
Weight per Gallon: pounds per gallon 77 ± 1 °F, ASTM D 1475P, allowable variation from qualifying sample	± 0.3	± 0.3
Vehicle Composition: Vehicle Infrared Spectra, ASTM D 2621, allowable variation from qualifying sample	None	None
PH: ASTM E 70, allowable variation from qualifying sample	± 1.0	± 1.0
Fineness of Dispersion: HEGMAN, minimum, ASTM D 1210	3.0	3.0
Volatile Organic Compounds: pounds per gallon of paint, maximum, ASTM D 3960 according to 7.1.2.	2.1	2.1
Flash Point: Degrees F., minimum, ASTM D 93, Method A	100	100
Dry Time to No Pick Up: with no beads: minutes, maximum, ASTM D 711	10	10
Dry Through Time: Minutes, ASTM D 1640 except no thumb pressure is used when thumb is rotated 90° on paint film	20	20
Flexibility: TT-P-1952D	Pass	Pass

(E) Qualitative Requirements:

(1) Color of Yellow Paint:

The color of the yellow paint shall closely match Federal Standard 595b, Color No. 33538. The color shall be checked visually, and will be checked against Tristimulus Values for the color according to Federal Test Method Standard No. 141.

(2) Dry Opacity:

Dry opacity for the paint will be determined using a black-white Leneta chart, Form 2C Opacity and a Photovolt 577 Reflectance Meter or equal. Using a 10-mil gap doctor blade, a film of paint is drawn down, covering both black and white portions of the chart. The film shall be allowed to dry 24 hours. After calibrating the Reflectance Meter according to the manufacturer's instructions, measure the reflectance over the white and black portions with the green Tristimulus filter. Dry Opacity is calculated as follows:

$$\text{Dry Opacity} = \frac{\text{Reflectance over black}}{\text{Reflectance over white}}$$

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Dry Opacity for both white and yellow paint shall be a minimum 0.90.

(3) Yellowness Index:

Yellowness Index for white paint will be determined as described for dry opacity, only use a 15-mil gap doctor blade to draw down the paint. After 24 hours for drying, measure the reflectance of the paint film using the green, blue, and amber Tristimulus filters. Calculate the Yellowness Index as follows:

$$\text{Yellowness Index} = \frac{\text{Amber} - \text{Blue}}{\text{Green}} \times 100.$$

Yellowness Index for the white paint shall be a maximum of 10.

(4) Reflectance:

Reflectance for both white and yellow paint will be determined using the same 15-mil draw-down film as for the Yellowness Index. For white paint the same sample may be utilized for both the Yellowness Index and Reflectance. Measure the reflectance of the paint film using the green Tristimulus filter. Reflectance for the white paint shall be a minimum of 85. Reflectance for the yellow paint may range from 42 to 59, inclusive.

(5) UV Color Durability:

UV Color Durability shall be determined using a QUV Weatherometer with Ultra Violet Light and Condensate Exposure according to ASTM G 53, for 300 hours total. The repeating cycle shall be four hours UV exposure at 60 °C followed by four hours condensate exposure at 40 °C. After 300 hours of exposure, the Yellowness Index for white paint shall not exceed 12, and yellow paint must still match Federal Standard 595b, Color No. 33538.

(6) Static Heat Stability:

To determine static heat stability for the paint, place one pint of paint in a sealed can and heat in an air circulation oven at 120 ± one degrees F for a period of one week. Remove the paint from the oven and check the viscosity in Krebs Units at 77 ± one degrees F according to ASTM D 562. The viscosity measured must be in the range from 68 to 90, inclusive. Also, check for any signs of instability.

(7) Heat-Shear Stability:

To determine heat-shear stability for the paint, one pint of the paint is sheared in a Waring Blender at high speed to 150 degrees F. The blender should have a tight fitting lid taped onto it to minimize volatile loss. When the paint reaches 150 degrees F, stop the blender, immediately pour the paint into a sample can, and apply a cover to seal

the can. Let the paint cool overnight and examine for jelling or other signs of instability. Measure viscosity in Krebs Units at 77 ± one degrees F according to ASTM D 562. The viscosity measured must be in the range from 68 to 95 inclusive. If not within the upper limit, run total solids on the sheared paint and adjust solids, if necessary, by adding water to reach the original solids content. If the solids content required adjustment, again check the viscosity of the paint. The viscosity must be in the range from 68 to 95 inclusive.

(8) Scrub Resistance:

Scrub Resistance will be determined according to ASTM D 2486. Use an appropriate doctor blade to provide a dry film thickness of three to four mils. Allow the paint to cure for 24 hours. Perform the scrub resistance test at 77 ± one degrees F and 50 ± five percent humidity. Record the number of cycles to remove the paint film. The number of cycles recorded must be a minimum of 800.

(9) Spraying Properties:

The paint shall be applied at a 15 mils wet film thickness in the field. The paint shall show the following properties at ambient temperatures of 50 to 100 degrees F with a paint spray temperature of 150 degrees F, maximum, and six to eight pounds of post-applied glass beads per gallon of paint. Beads shall conform to subsection 708-2.02 of these specifications.

(a) Dry to a no-track condition in five minutes or less when the line is crossed over in a passing maneuver with a standard-sized automobile.

(b) Produce a clean-cut, smooth line with no overspray or puddling.

(c) Paint immediately after application shall accept glass beads so that the spheres shall be embedded into the paint film to a depth of 50 percent of their diameter.

(d) Paint when heated to the temperature necessary to obtain the specified dry time, shall show no evidence of instability such as viscosity increase, jelling, or poor spray application.

(10) Freeze-Thaw Properties:

The paint viscosity or consistency shall not change significantly when the paint is tested for resistance to five cycles of freeze-thaw according to ASTM D 2243.

(11) Road Service Rating:

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Test stripes of the paint shall be applied transversely across the road four inches in width and approximately 12 feet long at a location approved by the Engineer.

Wet film thickness of the test stripes shall be approximately 15 mils as determined according to ASTM D 4414 and ASTM D 713 prior to test stripe application. To aid in obtaining the correct film thickness a length of roofing paper placed by the side of the road can be used. Place a rigid metal test panel on the roofing paper in the path of a test line. Immediately after the test line is applied by the striper, measure the wet film thickness. If not satisfactory, adjust the spray pressure and repeat until the target wet film thickness is attained. It is important that no glass beads be present that would give a false wet film thickness. When the wet film thickness is correct, apply a test line across a tared metal test panel. After this, apply another test line across a different tared metal test panel, this time also adding the beads. These samples are necessary to determine the initial bead retention.

Glass beads conforming to the requirements of Subsection 708-2.02 of these specifications (moisture proof type) will be applied after the paint has been applied, but during the same striping operation at a rate such that the initial bead retention on the test line is a minimum of six pounds of beads per gallon of wet paint. The initial bead retention will be determined analytically by the ADOT Materials Group concurrently with the determination of the dry paint thickness utilizing tared metal test panels. The paint shall accept the glass beads so that the spheres are embedded into the paint film to a depth of 50 percent of their diameter. Test stripes will be observed for a period of 180 days from date of application. Paints will be evaluated for wear according to ASTM D 913.

After 180 days of service, on a visual rating scale of 0 to 100 percent, paints must have a rating of 92 percent or better to be acceptable. All ratings will be taken in the wheel track area. Glass beads shall show no more than a 30 percent loss after 180 days of test. This will be determined by taking close-up photographs of the paint film and by count determining the average bead loss.

The road service test may be waived at the option of the Engineer or evaluated for a period of time less than 180 days.

(12) Workmanship:

Paint shall be free from foreign materials, such as dirt, sand, fibers from bags, or other material capable of clogging screens, valves, pumps, and other equipment used in a paint striping apparatus.

The paint pigment shall be well ground and properly dispersed in the vehicle. The pigment shall not cake or thicken in the container, and shall not become granular or curdled. Any settlement of pigment in the

paint shall result in a thoroughly wetted, soft mass permitting the complete and easy vertical penetration of a paddle. Settled pigment shall be easily redispersed, with minimum resistance to the sidewise manual motion of a paddle across the bottom of the container, to form a smooth uniform product of the proper consistency. If the paint cannot be easily redispersed, due to excessive pigment settlement as described above or due to any other cause, the paint shall be considered unfit for use.

The paint shall retain all specified properties under normal storage conditions for 12 months after acceptance and delivery. The contractor shall be responsible for all costs and transportation charges incurred in replacing paint that is unfit for use. The properties of any replacement paint, as specified herein, shall remain satisfactory for eight months from the date of acceptance and delivery.

(F) Manufacturing Requirements:

(1) Inspection:

The manufacturer of the paint shall advise the Engineer when paint is to be manufactured, shall furnish the Engineer free access to all parts of the plant involved in the paint manufacture, and shall furnish every reasonable facility for sampling both the paint and the raw materials during the process of manufacturing.

All materials used in formulation shall meet the requirements herein specified. Any materials not specifically covered shall meet the approval of the Engineer.

All manufactured paint shall be prepared at the factory ready for application.

When paint is shipped to a distributor or paint applicator who will store the paint prior to its use, the distributor or paint applicator shall furnish the Engineer free access to all parts of the facility where paint is stored and shall furnish every reasonable facility for sampling the paint.

Paint shall normally be sampled at the place of storage either at a warehouse or on the site prior to application of the paint. Application of the paint will not be permitted until the paint has been approved by the Engineer. It is the contractor's responsibility to notify the Engineer a minimum of 14 working days prior to any traffic painting operation and to allow access at that time for paint sampling at the storage location.

A minimum of one paint sample shall be obtained from each lot of paint.

Check-samples of finished paint while being applied will be taken at intervals as determined by the Engineer.

(2) Testing:

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All tests will be conducted in accordance with the latest test methods of the American Society for Testing and Materials, Federal Test Method Standard No. 141, and methods in use by the Materials Group, Highways Division, and the Arizona Department of Transportation as specified herein.

Evidence of adulteration or improper formulation shall be cause for rejection.

(3) Packaging:

All shipping containers for paint must comply with the Department of Transportation Code of Federal Regulations, Hazardous Materials and Regulation Board, Reference 49 CFR. The container and lids must be lined with a suitable coating so as to prevent attack by the paint or by agents in the air space above the paint. The lining must not come off the container or lid as skins.

Containers shall be colored white, including lids, and containers shall have an identifying band of the appropriate color around and within the top one third of the container.

All containers shall be properly sealed with suitable gaskets, shall show no evidence of leakage, and shall remain in satisfactory condition for a period of 12 months after delivery to a distributor or paint applicator. The contractor shall be responsible for all costs and transportation charges incurred in replacing paint and containers.

(4) Marking:

All containers of paint shall be labeled showing the manufacturer's name, date of manufacture, paint color, product code, manufacturer's batch number, and quantity or weight of paint on both the side of the container and also the lid. Containers shall be clearly marked or labeled Rapid or Fast Dry lead-free Water-Borne Traffic Paints.

All containers of paint shall be labeled to indicate that the contents fully comply with all rules and regulations concerning air pollution control in the State of Arizona, Maricopa County.

The manufacturer of the paint shall be responsible for proper shipping labels with reference to whether the contents are toxic, corrosive, flammable, etc., as outlined in the U.S. Department of Transportation Hazardous Materials Regulations, Reference 49 CFR.

(5) Unused Paint:

Disposal of unused quantities of traffic paint shall be the responsibility of the contractor and must meet all applicable Federal regulations for waste disposal. Paint which is saved to be used later shall be

packaged as specified previously and shipped to a storage location. Unused paint must be identified on the container. Unused paint may be utilized on a future project provided the paint still conforms to all specifications contained herein.

708-2.02 Reflective Glass Beads (Spheres):

(A) General:

The term "glass bead" shall be synonymous with the term "glass sphere" as used herein.

The beads shall be manufactured from glass of a composition designated to be highly resistant to traffic wear and to the effects of weathering.

The glass beads shall be moisture-proof; contain less than 0.25 percent moisture by weight; and be free of trash, dirt, or other deleterious materials.

Beads shall be essentially free of sharp angular particles showing milkiness or surface scoring or scratching. Beads shall be water white in color.

Certificates of Compliance conforming to the requirements of Subsection 106.05 shall be submitted.

(B) Physical Requirements:

(1) Gradation:

When tested by the method provided in ASTM D 1214, the grade sizes of the beads shall be as follows:

Size of Sieve	Percent Passing
No. 30	100
No. 50	15 - 35
No. 70	0 - 15
No. 100	0 - 5

(2) Roundness:

When tested by the method provided in ASTM D 1155 (Procedure B), beads retained on any screen specified in the gradation requirements shall contain a minimum of 75 percent true spheres.

(3) Index of Refraction:

When tested by a liquid immersion method at a temperature of 25 °C, the beads shall have an index of refraction of 1.50 to 1.57.

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(4) Specific Gravity:

The specific gravity of the beads shall be in the range 2.40-2.60 when tested in accordance with the following procedures:

Place 100 grams in an oven at 110 °C for one hour.

Remove beads and place in a desiccator until the sample is cool.

Remove approximately 60 grams of beads from the desiccator and weigh the sample accurately.

Pour the beads slowly into a clean 100-milliliter graduated cylinder containing 50 milliliters of isopropyl alcohol. Make certain that air is not entrapped among the beads.

The total volume, minus 50, will give the volume of the beads.

Calculate the specific gravity as follows:

$$\text{Specific Gravity} = \frac{\text{Weight of the sample}}{\text{Volume of the sample}}$$

(5) Chemical Stability:

Beads which show any tendency toward decomposition, including surface etching, when exposed to atmospheric conditions, moisture, dilute acids, or alkalis or paint film constituents, may be required to demonstrate satisfactory reflectance behavior, prior to acceptance, under such tests as may be prescribed.

(C) Moisture Proofing:

All glass beads shall have a moisture-proof overlay consisting of water repellent material applied during the process of bead manufacture. The beads so treated shall not absorb moisture in storage and shall remain free of clusters and lumps and shall flow freely from dispensing and testing equipment.

The beads shall pass the test for water repellency and free flow using the following equipment:

(1) Test bag:

The bag used is approximately 10-1/2 by 17-1/2 inches after sewing. The material used in the construction of the bag is unbleached cotton sheeting with a thread count of 48 by 48. The material before sewing is approximately 18 by 22 inches. The cloth is folded in half lengthwise and stitched in the shape of an "L" with the short side left open at the

top. The material can be obtained from selected manufacturers of cloth and paper packaging. The finished bag may also be obtained from the manufacturer of the glass beads.

Newly fabricated bags must be thoroughly washed with hot water and detergent and rinsed before use to remove the sizing which may be present in the cloth. Subsequent to the initial washing, the bags need only be rinsed clean of beads from previous tests and dried thoroughly before use.

(2) Funnel:

The funnel used is a standard laboratory funnel with a top opening diameter of 125 millimeters and a 150-millimeter stem length. The inside diameter of the stem is between nine and 10 millimeters. This funnel is available from most laboratory glassware supply houses, Corning No. 6100 or equal.

(3) Ring Stand and Clamp.

(4) Balance accurate to 0.1 grams.

(5) Distilled water.

MOISTURE TESTING PROCEDURE:

Glass beads shall be tested for compliance with specification requirements. Testing shall be conducted at standard conditions of temperature (25 ± one degrees Celsius) and humidity (50 ± five percent Relative Humidity) and shall consist of the following procedure or an approved alternate:

Weigh 900.0 grams of glass beads into a clean, dry, flat-bottomed pan.

Dry beads at 150 °C for two hours.

Cool beads to room temperature (25 ± one degrees Celsius) in a desiccator.

Using the clean, pre-washed bag described under apparatus section, turn the bag inside-out so that the sewn seam and seam-allowance are on the outside.

Quantitatively transfer the beads into the inverted cotton bag.

Grasp the gathered top of the bag with one hand and lower the bag into a container of distilled water until the beads are approximately one inch below the water level. The container shall be of such dimensions that the bag does not contact the bottom or sides during immersion. Each bag shall be immersed

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Individually. Do not allow one bag to contact another if multiple tests are run.

Remove the bag after 30 seconds of immersion time.

Cradle the bottom of the bag uniformly in the palm of one hand and twist the top neck of the bag until the twisted bag is compressed firmly against the beads. Twist until excess water no longer drips from the bag.

After the excess water has been squeezed from the bag, allow the bag to unwind.

Gather the top of the bag and clamp. Suspend the bag on a ring stand or other support such that the bottom or sides of bag do not contact the support.

After a standing time of two hours at room temperature (25 ± one degrees Celsius), remove bag from support. Mix sample thoroughly by holding the bottom seam allowance in one hand and gathered neck of the bag in the other, invert bag and shake up and down five times. Transfer the sample into a clean, dry funnel of the type described under apparatus. If consecutive tests are run, be sure the funnel is clean, dry and free of beads from prior tests.

The entire sample shall flow through the funnel without stoppage.

At the start of the test only, it is permissible to lightly tap the stem of the funnel to initiate flow.

Small quantities of beads which have adhered to the side of the funnel or stem shall not be cause for failure.

708-3 Construction Requirements:

708-3.01 Equipment:

The traffic paint and beads shall be placed on the pavement by a spray-type, self-propelled pavement marking machine except that temporary striping during construction may be placed with other equipment designed for application of paint and beads.

The application equipment to be used on roadway installation shall have, as a minimum, the following characteristic and/or apparatus:

The machine shall be capable of applying clear-cut lines of the width specified on the project plans.

The machines shall be equipped with a mechanical device capable of placing a broken reflectorized line with a 10-foot painted segment and a 30-foot gap.

The machine shall be equipped with an air-operated glass bead drop-in dispenser controlled by the spray gun mechanism.

A glass bead dispenser which is capable of placing the glass beads into the paint line as the paint is applied to the pavement shall be utilized. This dispenser shall provide satisfactory marking and delineation.

708-3.02 Application:

Pavement markings shall be applied when the pavement surface is dry and the weather is not foggy, rainy, or otherwise adverse to the application of markings. The surface shall be free from excess asphalt or other deleterious substances before traffic paint, beads or primer are applied. The contractor shall remove dirt, debris, grease, oil, rocks or chips from the pavement surface before applying markings. The method of cleaning the pavement surface and removal of detrimental material is subject to approval by the Engineer and shall include sweeping and the use of high-pressure air spray. The placing of traffic markings shall be done only by personnel who are experienced in this work.

Painting shall not be performed when the atmospheric temperature is below 50 degrees F when using water-borne paint, nor when it can be anticipated that the atmospheric temperature will drop below said 50 degrees F temperature during the drying period. Water-borne paints shall not be applied if rain is expected within one hour of its application, unless otherwise approved by the Engineer. Water-borne paint shall not be heated to a temperature greater than 150 degrees F to accelerate drying.

The volume of paint in place shall be determined by measuring the paint tank with a calibrated rod. At the option of the Engineer, if the striping machine is equipped with air-atomized spray units (not airless) and paint gauges, the volume of paint may be determined by utilizing said gauges.

The quantity of glass reflectorizing beads in place shall be determined by measuring the glass reflectorizing bead tank with a calibrated rod.

The contractor shall provide the necessary personnel and equipment to divert traffic from the installation area where the work is in progress and during drying time when, in the opinion of the Engineer, such diversion of traffic is necessary.

Tolerances for Placing Paint, Beads, and Primer:

The length of painted segment and gap shall not vary more than six inches in a 40-foot cycle.

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The finished line shall be smooth, aesthetically acceptable and free from undue waviness.

Painted lines shall be four, eight, or 12 inches wide as shown on the plans with a tolerance of ± 1/8 inch and shall be placed at a minimum rate of 16 gallons per mile for a solid four-inch line and four gallons per mile for a broken four-inch line, based on a 10-foot stripe and a 30-foot gap (40-foot cycle aggregate).

Glass reflectorizing beads shall be applied on the wet paint at a minimum rate of six pounds per gallon of paint.

Wet thickness shall not be less than 15 mils.

708-4 Method of Measurement:

Pavement marking paint will be measured by the linear foot along the centerline of the pavement stripe. Skips in dashed lines will not be included in the measurement. Length of pavement markings will be based on four-inch wide stripe. Measurement for striping with a plan width greater or less than the basic four inches as shown on the plans or directed by the Engineer will be made by the following method:

$$\frac{\text{Plan Width of Striping (inches)} \times \text{Linear Feet}}{4 \text{ (inches)}}$$

Symbols and legends will be measured by each unit applied. Each legend, regardless of the number of letters, will be considered as a single unit.

708-5 Basis of Payment:

Pavement striping of the type specified, measured as provided above, will be paid for at the contract price per linear foot for the total length of painted line applied to the nearest foot, which price shall be full compensation for the work complete, including glass beads, as described and specified herein and on the project plans.

Pavement symbols and legends measured as provided above, will be paid for at the contract price for each painted symbol or legend, which price shall be full compensation for the work complete, including glass beads, as described and specified herein and on the project plans.

SECTION 709 DUAL COMPONENT PAVEMENT MARKINGS:

709-1 Description:

The work under this section shall consist of cleaning and preparing pavement surfaces and furnishing and applying either white or yellow

reflectorized dual component pavement markings to the prepared pavement at the locations and in accordance with the manufacturer's specifications, the details shown on the project plans and the requirements of these specifications. The type of dual component marking system, marking configuration and thickness shall be in accordance with the project plans and these specifications.

709-2 Materials:

709-2.01 General Requirements:

The dual component pavement marking material shall be a liquid or 100 percent solids epoxy or other dual component UV-stabilized system, formulated and designed to provide a simple volumetric mixing ratio of the two components (resin and catalyst). The characteristics of the material shall be such that complete and even coverage of specified areas to the required thickness is provided by the required application method and rate. Upon drying the dual component material shall produce an adherent durable reflectorized marking capable of resisting deformation and wear in the roadway. The material shall be suitable for application to old and new asphaltic concrete and Portland cement concrete pavement surfaces.

A list of approved manufacturers of dual component pavement marking material is shown on the Department's Approved Products List (APL). The most current version is available on the Internet from the Arizona Transportation Research Center (ATRC), through its PRIDE program.

709-2.02 Epoxy Composition Requirements:

Epoxy pavement marking material shall conform to the following requirements:

(A) Composition:

The epoxy resin material shall be within the following compositional requirements:

Component	Percent by Weight	
	White	Yellow
White Pigment (Titanium Dioxide)	18 min.	---
Yellow Pigment	---	23 - 30
Epoxy Resin	75 - 82	70 - 77

(B) Epoxide Number:

The epoxide number of the epoxy shall be determined in accordance with ASTM D 1652 for both white and yellow resin material on a pigment free basis. The epoxide number shall be within ± 50 of the published manufacturer's standard for the approved product.

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Blasting or other operations necessary for the removal of an existing structure or obstruction, which may damage new construction, shall be completed prior to commencing the new work.

Items designated to be salvaged shall be carefully stockpiled or stored by the contractor at locations designated in the Special Provisions or as directed by the Engineer.

Items which are to be salvaged or reused in the new construction and are damaged or destroyed as a result of the contractor's operations shall be repaired or replaced by the contractor at no additional cost to the Department.

Holes, cavities, trenches and depressions resulting from the removal of structures or obstructions, except in areas to be excavated, shall be backfilled with suitable material which shall be compacted to a density of not less than 95 percent of the maximum density as determined in accordance with the requirements of the applicable test methods of the ADOT Materials Testing Manual, as directed and approved by the Engineer.

202-3.02 Removal of Pipe:

All removed pipe which is to be salvaged or relaid shall be cleaned of all earth and other material inside and outside prior to being stockpiled or reused. Pipe to be reused shall be stored when necessary to avoid damage or loss before relaying.

Existing pipe to be partially removed shall be cut with straight and smooth edges on a plane perpendicular to the center line of the pipe.

202-3.03 Removal of Pavement:

(A) Portland Cement Concrete Pavement:

Unless otherwise specified in the Special Provisions, concrete pavement designated on the project plans to be removed shall either be removed from the job site and disposed of at a site secured by the contractor or buried in embankment areas. If the contractor elects to bury the concrete in embankment areas, the concrete shall be broken into pieces and placed in the embankment in accordance with the requirements of Subsection 203-10.03(A).

Where new construction is to join the existing concrete pavement, the pavement shall be saw cut to a true line perpendicular to the centerline of the pavement with straight vertical edges free from irregularities.

(B) Bituminous Pavement:

Unless milling is specified in the Special Provisions, all bituminous pavement designated on the project plans to be removed, shall be

completely removed down to the underlying base course or subgrade. The pavement material shall be removed and disposed of as specified in the Special Provisions.

Where new construction is to join existing bituminous pavement, the existing pavement shall be cut to a true line perpendicular to the centerline of the pavement with straight vertical edges free from irregularities. The removal of asphaltic concrete at the approaches to structures shall be accomplished in a manner approved by the Engineer.

(C) Bituminous Pavement Removal By Milling:

When milling is specified, the existing asphaltic concrete shall be removed in accordance with the details shown on the project plans with equipment specifically designed to remove such material by means of grinding or chipping to a controlled line and grade. The equipment used shall be capable of removing the existing asphaltic concrete within 0.01 feet of the specified removal depth. The removal shall be accomplished in a manner which does not destroy the integrity of any asphaltic concrete pavement that remains and which does not result in a contamination of the milled asphaltic concrete with the underlying base material. The milled material shall be removed and disposed of as specified in the Special Provisions.

Under no circumstance shall the removal of existing asphaltic concrete begin until the mix design for replacement asphaltic concrete has been approved by the Engineer.

The extent of removal of existing asphaltic concrete must be in keeping with the contractor's ability to produce, haul, place and compact replacement asphaltic concrete so that at all times the length of open "trench" is at a minimum. If the contractor's production of replacement asphaltic concrete is stopped for any reason, the removal of asphaltic concrete shall either cease or shall be reduced. The Engineer will be the sole judge as to whether the removal shall cease or be reduced. The Engineer's decision will be based on the reason for the stoppage in asphaltic concrete production, the expected length of the stoppage, the type and depth of the material being removed, and the time of day.

Replacement asphaltic concrete shall be placed as soon as possible after the "trench" has been opened up. The surface on which the material is to be placed shall be uniform and free of loose material. Any exposed base material shall be compacted to the extent required by the Engineer.

The "trench" in which asphaltic concrete is being placed shall be filled before the end of each day's work and the lane shall be opened to traffic. The length of open "trench" at any one time shall not exceed two miles or half the length of the work, whichever is the lesser.

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In the event of circumstances beyond the control of the contractor, such as equipment breakdown, or if the production of the replacement asphaltic concrete has been stopped by the Engineer and the contractor is unable to comply with the requirements in the preceding paragraph, the contractor shall provide and maintain such traffic control devices that the Engineer deems necessary under the circumstances in order to provide safe and efficient passage through the work zone.

If the Engineer deems it to be warranted, the Engineer will require that the contractor provide for the surface drainage of areas where the pavement surface has temporarily been removed.

Pavement, to be removed by milling, adjacent to manholes, valve boxes, small radius curbs and other fixed objects that produce confined areas shall be removed with milling equipment specifically designed to operate in restricted areas and capable of removing asphaltic concrete of the specified thickness without damage or displacement of the adjacent object.

On projects with existing curb and gutter, any asphaltic concrete buildup in the gutter designated to be removed, shall be removed prior to the pavement removal operation by equipment and methods approved by the Engineer. The equipment and methods used shall be capable of removing the asphaltic concrete buildup without causing damage to the curb and gutter.

202-3.04 Removal of Miscellaneous Concrete:

Miscellaneous concrete shall be defined as all or portions of mortared rubble masonry, curbs, gutters, sidewalks, driveways, aprons, slope paving, island paving, retaining walls, spillways, drainage structures, concrete box culverts, foundations, footings and all other Portland cement concrete or masonry construction, except bridges and pavement. All existing miscellaneous concrete shall be removed to a depth of at least five feet below finished subgrade elevation unless otherwise specified in the Special Provisions or on the project plans.

Where new concrete is to join existing concrete, the existing concrete shall be saw cut to a true line with straight vertical edges free from irregularities.

Concrete removal operations shall be performed without damage to any portion that is to remain in place. All damage to the existing concrete which is to remain in place, shall be repaired to a condition equal to that existing prior to the beginning of removal operations. The repairing of existing concrete damaged by the contractor's operations shall be at no additional cost to the Department.

Existing reinforcement that is to be incorporated in new work shall be protected from damage and shall be thoroughly cleaned of all adhering material before being embedded in new concrete.

Concrete shall be disposed of as provided in Subsection 202-3.03(A).

The floors of concrete basements, pits and structures, that are not required to be removed and which are located within the roadway shall be broken in a manner that will prevent the entrapment of water.

202-3.05 Removal of Bridges:

The removal of existing bridges, either wholly or in part, shall be as shown on the project plans or as described in the Special Provisions. Bridge removal operations shall be conducted in such a manner as to cause the least interference to public traffic.

At least ten days before beginning bridge removal over or adjacent to public traffic or railroad property, the contractor shall submit to the Engineer details of the removal operations showing the methods and sequence of removal and equipment to be used.

When total bridge removal is specified, all materials designated for salvage, such as structural steel, structural steel members, timber and other reusable materials shall be carefully dismantled, removed and salvaged in accordance with the requirements of Subsection 202-3.01. Steel members shall be match marked as directed by the Engineer.

Piling, piers, abutments, footings and pedestals shall be removed to at least one foot below ground line or five feet below finished subgrade elevation unless specified otherwise in the Special Provisions or on the project plans.

When partial bridge removal is specified or alteration of an existing bridge requires removal of portions of the existing structure, such removal shall be performed with sufficient care as to leave the remaining portion of the structure undamaged.

In case of damage to the existing bridge structure, the contractor shall make all necessary repairs at no additional cost to the Department. Reinforcing steel extending from the remaining portion of the structure shall be protected, cleaned and incorporated in the new portion of the structure in accordance with the details shown on the project plans or as directed by the Engineer.

Flame cutting and saw cutting may be used for removing, widening, or modifying bridges provided the contractor complies with all protection, safety and damage requirements.

Explosives shall not be used in bridge removal operations unless approved by the Engineer.

Before beginning concrete removal operations involving the removal of a portion of a monolithic concrete element, a saw cut approximately one

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All courses of asphaltic concrete shall be compacted as required, smooth and true to the required lines, grades, and dimensions.

The Special Provisions may require the smoothness of the final pavement surface to be tested in accordance with Subsection 109.13.

Regardless of whether testing in accordance with Subsection 109.13 is specified or not, the following requirements shall be met:

(1) The surface of the final lift of asphaltic concrete placed under this section of the specifications shall be tested and shall not vary by more than 1/8 inch from the lower edge of a ten-foot straightedge when it is placed in the longitudinal direction (including across transverse joints), and when it is placed in the transverse direction across longitudinal joints.

(2) The surface of any lift of asphaltic concrete placed under this section of the specifications, other than the final lift, shall be tested and shall not vary by more than 1/4 inch from the lower edge of a ten-foot straightedge when it is placed in the longitudinal direction (including across transverse joints), and when it is placed in the transverse direction across longitudinal joints.

(3) All deviations exceeding the specified tolerances above shall be corrected by the contractor, to the satisfaction of the Engineer.

413-7.09 Acceptance:

Asphaltic concrete will be accepted complete in place, if, in the judgment of the Engineer, the asphaltic concrete reasonably conforms to the requirements specified herein. Asphaltic concrete that is not acceptable and is rejected shall be replaced to the satisfaction of the Engineer and at no additional cost to the Department.

413-8 Method of Measurement:

Asphaltic concrete will be measured by the ton for the mixture actually used, which will include the weight of mineral aggregate, mineral admixture, and asphalt-rubber. Measurement will include any weight used in construction of intersections, turnouts, or other miscellaneous items or surfaces.

Asphalt-rubber material will be measured by the ton.

The weight of the asphalt-rubber material shall either be determined by weighing directly enroute from the reaction vessel to the point of delivery or be determined from the weight of the asphalt cement and the weight of the rubber minus wastage.

Mineral admixture will be measured by the ton.

413-9 Basis of Payment:

The accepted quantities of asphaltic concrete, measured as provided above, will be paid for at the contract unit price per ton, which price shall be full compensation for the work, complete in place, as specified herein.

Payment for the asphalt-rubber will be made by the ton, including asphalt cement and crumb rubber. The results of a nuclear asphalt content gauge shall not be used to determine the weight of asphalt-rubber material as the basis of payment. Adjustments in payment shall be made in accordance with the requirements of Subsection 1009-2.03.

Mineral admixture will be paid for at the predetermined price established in the Bidding Schedule.

When required in the Special Provisions, payment for smoothness shall be made in accordance with the requirements of Subsection 109.13.

When lime water is used, no separate payment will be made for the lime water or its application, the cost being considered as included in this contract item.

SECTION 414 ASPHALTIC CONCRETE FRICTION COURSE (ASPHALT-RUBBER):

414-1 Description:

Asphaltic Concrete Friction Course (Asphalt-Rubber), hereinafter asphaltic concrete, shall consist of furnishing all materials, mixing at a plant, hauling, and placing a mixture of aggregate materials, mineral admixture, and bituminous material (asphalt-rubber) to form a pavement course or to be used for other specified purposes, in accordance with the details shown on the project plans and the requirements of these specifications, and as directed by the Engineer.

The contractor shall be responsible for all adjustments to its equipment necessary to properly accommodate the use of asphalt-rubber as a bituminous material.

414-2 Asphaltic Concrete Mix Design Criteria:

Mix designs will be performed in accordance with Arizona Test Method 814, modified as necessary for Asphaltic Concrete Friction Course (Asphalt-Rubber). The allowable range of percent absorbed asphalt-rubber shall be 0-1.0, when tested in accordance with Arizona Test Method 806.

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414-3 Materials:

414-3.01 Mineral Aggregate:

There is no Department-furnished source of mineral aggregate. The contractor shall provide a source in accordance with the requirements of Section 1001 of the specifications.

When the contractor selects a source or sources, it shall notify the Engineer. The contractor shall be solely responsible for assuring that the mineral aggregate meets all requirements and, when processed, is fully capable of providing asphaltic concrete which meets all the requirements of these specifications.

Mineral aggregate shall be separated into at least two stockpiles. No individual stockpile or hot bin usage shall be less than three percent of the total mineral aggregate.

Coarse mineral aggregate shall consist of crushed gravel, crushed rock, or other approved inert materials with similar characteristics, or a combination thereof, conforming to the requirements of these specifications.

Fine mineral aggregate or blend material shall consist of natural sand, sand prepared from rock, or other approved inert materials, or a combination thereof, conforming to the requirements of these specifications.

Mineral aggregate furnished for mix designs shall be representative of the source(s) and sampled from the material stockpiles to be utilized in asphaltic concrete production. Mix designs shall conform to the grading limits in Table 414-1, when tested in accordance with Arizona Test Method 201.

TABLE 414-1
MIX DESIGN GRADING LIMITS

Sieve Size	Percent Passing	
	Without Admixture	With Admixture
3/8 Inch	100	100
No. 4	30-45	31-46
No. 8	4-8	5-9
No. 200	0-2.0	0-3.0

Mineral aggregate shall conform to the requirements in Table 414-2 when tested in accordance with the applicable test methods.

Tests on aggregates outlined in Table 414-2, other than abrasion, shall be performed on materials furnished for mix design purposes and composited to the mix design gradation. Abrasion shall be performed

separately on samples from each source of mineral aggregate. All sources shall meet the requirements for abrasion.

TABLE 414-2
MINERAL AGGREGATE CHARACTERISTICS

Characteristic	Test Method	Requirement
Combined Bulk Oven Dry Specific Gravity	Arizona Test Method 251	2.350 - 2.850
Combined Water Absorption	Arizona Test Method 251	0 – 2.5%
Sand Equivalent	Arizona Test Method 242 (After thoroughly sieving the sample, no additional cleaning of the fines from the plus No. 8 material is required.)	Minimum 55
Fractured Coarse Aggregate Particles	Arizona Test Method 212	Minimum 85% (at least two fractured faces) and minimum 92% (at lest one fractured face)
Flakiness Index	Arizona Test Method 233	Maximum 25%
Carbonates	Arizona Test Method 238	Maximum 20%
Abrasion	AASHTO T 96	100 Rev., Max. 9% 500 Rev., Max. 40%

414-3.02 Mineral Admixture:

Mineral admixture will be required. The amount shall be 1.0 percent, by weight of the mineral aggregate. Mineral admixture shall be either Portland cement, blended hydraulic cement, or hydrated lime conforming to the requirements of Table 414-3.

TABLE 414-3
MINERAL ADMIXTURE

Material	Requirement
Portland Cement, Type I or II	ASTM C 150
Blended Hydraulic Cement, Type IP	ASTM C 595
Hydrated Lime	ASTM C 1097

A Certificate of Analysis conforming to the requirements of Subsection 106.05 shall be submitted to the Engineer.

414-3.03 Bituminous Material:

Bituminous material shall be asphalt-rubber conforming to the requirements of Section 1009 of the specifications. The type of asphalt-rubber shall be as shown in the Special Provisions. The crumb

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rubber gradation shall be Type B conforming to the requirements of Section 1009.

The percent of asphalt-rubber used shall be based on the weight of total mix (asphalt-rubber, mineral aggregate, and mineral admixture).

The percent of asphalt-rubber to be used will be specified by the Engineer.

In no case shall the asphalt-rubber be diluted with extender oil, kerosene, or other solvents. Any asphalt-rubber so contaminated will be rejected.

Any kerosene or other solvents used in the cleaning of equipment shall be purged from the system prior to any subsequent use of that equipment.

414-4 Mix Design:

Approximately 300 pounds of produced mineral aggregate, in proportion to the anticipated percent usage, shall be obtained by the contractor and witnessed by the Engineer so that both parties are satisfied that samples are representative of the mineral aggregate to be utilized in the asphaltic concrete production.

In addition to the mineral aggregate samples, the contractor shall also furnish the Engineer with representative samples of the following materials: a five-pound sample of the crumb rubber proposed for use, one gallon of asphalt cement from the intended supplier, three gallons of the proposed mixture of asphalt and rubber, and a one-gallon can of the proposed mineral admixture. These materials must be representative of the material which will subsequently be used in the production of asphaltic concrete.

If the mineral aggregate does not meet the requirements of Subsection 414-3.01, no mix design will be prepared. The contractor shall take the necessary steps to provide material meeting the specified requirements.

Along with the samples furnished for mix design testing, the contractor shall submit a letter explaining in detail its methods of producing mineral aggregate including wasting, washing, blending, proportioning, etc., and any special or limiting conditions it may propose. The contractor's letter shall also state the source(s) of mineral aggregate, the source and type of asphalt cement, the source and type of crumb rubber, and the source and type of mineral admixture.

Within 10 working days of receipt of all samples and the contractor's letter in the Central Laboratory, the Department will provide the contractor with a mix design containing the type and percentage of asphalt-rubber; the type and source of asphalt cement; the type and source of crumb rubber; the type, source, and percentage of mineral

admixture; the source(s) of mineral aggregate and the percentage from each of the stockpile; the composite mineral aggregate gradation; the combined mineral aggregate and mineral admixture gradation; and any special or limiting conditions.

The contract time established for the completion of the work includes 10 working days for the required testing and the developing of the approved mix design.

Asphaltic concrete friction course production shall not begin until there is an approved mix design.

414-5 Mix Design Revisions:

At any time after production of asphaltic concrete has been started using the approved mix design, changes may be proposed by the contractor or directed by the Engineer.

The contractor shall not change its methods of crushing, screening, washing, or stockpiling from those used during production of material used for mix design purposes without approval of the Engineer, or without requesting a new mix design.

If changes are made in the source or type of bituminous material or the source(s) of mineral aggregate, or changes are made in the proportions of mineral aggregate equal to or greater than five percentage points, additional testing to the extent deemed necessary by the Engineer will be performed in order that the Engineer may be satisfied that the mix design criteria will be met.

During production of asphaltic concrete, the contractor, on the basis of field test results, may request a change to the approved mix design. The Engineer will evaluate the proposed changes and notify the contractor of the Engineer's decision within two working days of the receipt of the request.

If, at any time, unapproved changes are made by the contractor in the source of bituminous material, source(s) of mineral aggregate, production methods, or proportional changes in violation of approved mix design stipulations, production shall cease until a new mix design is developed at no additional cost to the Department, or the contractor complies with the approved mix design.

At any time after the mix design has been approved, the contractor may request a new mix design. The costs associated with the testing of materials in the developing of mix designs requested by the contractor after a mix design acceptable to the Department has been developed shall be borne by the contractor.

If the Engineer determines that a new mix design is necessary due to changes in mineral aggregate characteristics or gradation, costs

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associated with the development of the new mix design shall be borne by the contractor.

A new mix design can be developed by the Engineer at any time the Engineer deems necessary. Should such a new mix design require revisions to the contractor's operations which result in additional cost to the contractor, it will be reimbursed for these costs. However, the Engineer reserves the right to modify the asphalt-rubber content without compensation being made to the contractor involving additional operation costs.

414-6 Acceptance of Materials:

414-6.01 General:

The contractor's attention is directed to the requirements of Subsection 105.13, Removal of Unacceptable and Unauthorized Work.

If the production of asphaltic concrete is stopped either for failure to meet the requirements specified in Subsection 414-6.03 or because changes are made in the mix design, samples will be taken for calculating new consecutive averages either after production resumes or after the changes in the mix design have been made. The acceptance of the mineral aggregate gradation and the bituminous material content will be determined on the basis of the tests specified in Subsection 414-6.03. The Engineer reserves the right to increase the frequency of sampling and testing upon the resumption of asphaltic concrete production.

414-6.02 Mineral Aggregate:

Aggregate shall be free of deleterious materials, clay balls, and adhering films or other material that prevent thorough coating of the aggregate with the bituminous material.

Prior to and during asphaltic concrete production, the Engineer shall obtain and test samples of mineral aggregate for the determination of the sand equivalent, fractured coarse aggregate particles, and flakiness index. Samples shall be obtained either from the cold feed belt prior to the addition of mineral admixture, or from the stockpiles when sampling from the cold feed belt is not possible. Should such testing indicate results not meeting the requirements of Table 414-2 for sand equivalent, fractured coarse aggregate particles, and flakiness index, operations shall cease and the contractor shall have the option of requesting a new mix design or correcting deficiencies in the aggregate stockpiles.

414-6.03 Asphaltic Concrete:

(A) Mineral Aggregate Gradation:

Prior to the initial startup of asphaltic concrete production, and prior to startup after any subsequent mix design revisions affecting gradation, a sample of the combined mineral aggregate shall be tested. The mineral aggregate shall meet the gradation requirements for the 3-consecutive test limits indicated below. If the mineral aggregate does not meet these requirements, production shall not begin until the mineral aggregate is in compliance with this requirement.

For each approximate 500 tons of asphaltic concrete produced, at least one sample of mineral aggregate will be taken. Samples will be taken in accordance with the requirements of Arizona Test Method 105 on a random basis. For batch plants, the sample shall be taken from the hot bins. For other than batch plants, the sample shall be taken from the cold feed belt. Samples will be taken by means of a sampling device which is capable of obtaining representative samples. The device, which shall be approved by the Engineer, shall be furnished by the contractor. In any shift that the production of asphaltic concrete is less than 500 tons, at least one sample will be taken.

Samples will be tested for conformance to the mix design gradation, with or without mineral admixture as appropriate, in accordance with the requirements of Arizona Test Method 201.

The gradation will be considered to be acceptable unless the average of any three consecutive tests or the result of any single test varies from the mix design gradation percentages as follows:

Passing Sieve	Number of Tests	
	3 Consecutive	One
No. 4	± 4	± 6
No. 8	± 3	± 4
No. 200	± 1.0	± 1.5

One hundred percent of the material shall pass the 3/8-inch sieve.

At any time that test results indicate that the gradation does not fall within all of the limits indicated, the production of asphaltic concrete shall cease immediately and shall not begin again until a calibration test indicates that the gradation is within the 3-consecutive test limits indicated.

(B) Asphalt-Rubber Content:

During production of asphaltic concrete, the contractor shall maintain at the plant site a nuclear asphalt content gauge calibrated and operated in accordance with Arizona Test Method 421. At the discretion of the Engineer, the Department may choose to prepare the calibration samples for use by the contractor. Under the observation of the Engineer, the contractor shall determine the asphalt-rubber content by means of the nuclear asphalt content gauge a minimum of four times per full shift. The Engineer shall determine the times that the samples

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are taken. The contractor's technicians performing the testing, including the calibration of the nuclear gauge, shall meet the technician requirements given in the Department's System for the Evaluation of Testing Laboratories. The requirements may be obtained from ADOT Materials Group, 1221 North 21st Avenue, Phoenix, AZ 85009.

Production of asphaltic concrete shall cease immediately and the plant and/or the nuclear asphalt content gauges re-calibrated if any single test result varies by an amount greater than ± 0.60, or the average of three consecutive test results varies by an amount greater than ± 0.40, from the amount directed by the Engineer. Material that has already been produced may be used on the project if the single test value representative of that material varies by an amount from ± 0.61 to ± 0.75, inclusive, from the amount directed by the Engineer. Material that has already been produced may not be used on the project if the single test value representative of that material varies by an amount greater than ± 0.75 from the amount directed by the Engineer unless, by retesting, the material is found to be acceptable.

414-7 Construction Requirements:

414-7.01 Quality Control:

Quality control of mineral aggregate production and asphaltic concrete production shall be the responsibility of the contractor. The contractor shall perform sufficient testing to assure that mineral aggregate and asphaltic concrete are produced which meet all specified requirements. The Engineer reserves the right to obtain samples of any portion of any material at any point of the operations for the Engineer's own use.

414-7.02 Stockpiling:

The contractor will not be allowed to feed the hot plant from stockpiles containing less than two full days of production unless only two days production remain to be done or special conditions exist where the Engineer deems this requirement waived.

Mineral aggregate shall be separated and stockpiled so that segregation is minimized. An approved divider of sufficient size to prevent intermingling of stockpiles shall be provided.

414-7.03 Proportioning, Drying, Heating, and Mixing:

The asphaltic concrete hot plant shall conform to the requirements of Section 403 of the Specifications.

Unless approved by the Engineer, no individual mineral aggregate stockpile or hot bin usage shall be less than three percent of the total mineral aggregate.

Changes in stockpile or hot bin use in excess of five percent from the approved mix design will not be permitted without the approval of the Engineer.

No fine material which has been collected in the dust collection system shall be returned to the mixture unless the collected fines are uniformly metered into the mixture.

The moisture content of the asphaltic concrete shall not exceed 0.5 percent. The moisture content will be determined in accordance with Arizona Test Method 406.

The temperature of asphaltic concrete or mineral aggregate upon discharge from the dryer shall not exceed 350 degrees F.

414-7.04 Placing and Finishing:

(A) General Requirements:

The handling of asphaltic concrete shall at all times be such as to minimize segregation. Any asphaltic concrete which displays segregation shall be removed and replaced.

All equipment surfaces shall be treated when necessary with a product approved by the Engineer in order to prevent the sticking of asphaltic concrete.

Before asphaltic concrete is placed, the surface to be paved shall be cleaned of all objectionable material and tacked with asphalt cement in accordance with the requirements of Section 404 of the specifications. The cleaning of the surface, the tacking of the surface, and the amount and grade of asphalt cement used shall be as directed by and acceptable to the Engineer.

Unless otherwise specified on the project plans, asphaltic concrete shall not be placed on the two-foot widened section where guardrail is to be installed.

(1) Placement Dates and Weather Requirements:

Asphaltic concrete shall be placed between the dates shown below for the average elevation of the project, and only when the temperature of the surface on which the asphaltic concrete is to be placed is at least 85 degrees F and the ambient temperature at the beginning of placement is at least 70 degrees F and rising. The placement shall be stopped when the ambient temperature is 75 degrees F or less and falling.

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Average Elevation of Project, Feet	Beginning and Ending Dates
0 – 3499	March 15 – May 31
0 – 3499	September 1 – October 31
3500 – 4999	April 15 – October 15
5000 and over	June 1 – September 15

At any time, the Engineer may require that the work cease or that the work day be reduced in the event of weather conditions, either existing or expected, which would have an adverse effect upon the asphaltic concrete.

Prior to opening to any traffic, the Engineer may require up to three applications of lime water (a minimum of 50 pounds of lime per 2,000 gallons of water). Lime water shall be applied in a manner that uniformly covers the entire surface of the paving pass. No separate payment will be made for lime water or its application, the cost being considered as included in this contract item.

(2) Delivery to Screed Unit:

Asphaltic concrete delivered to the screed unit shall be a free flowing, homogeneous mass in which there is no segregation, crusts, lumps, or migration of the asphalt-rubber.

Should any one or more of such conditions be evident in the material delivered to the screed unit, and which cannot be eliminated by one or more of the following methods, the Engineer will order the work to be stopped until conditions are conducive to the delivery of the material in the condition as hereinbefore required:

(a) Covering hailing units with tarpaulins.

(b) Dumping material directly into the paver.

(c) Moving the hot plant nearer to the point of delivery.

Other measures proposed by the contractor which will deliver asphaltic concrete meeting the above requirements will be considered by the Engineer.

(B) Loading Asphaltic Concrete into the Paving Machine:

If the asphaltic concrete is dumped directly into the paving machine from the hauling trucks, care shall be taken to avoid jarring the machine or moving it out of alignment. No vertical load shall be exerted on the paving machine by the trucks. Trucks, while dumping, shall be securely attached to the paving machine.

If the asphaltic concrete is dumped upon the surface being paved and subsequently loaded into the paving machine, it shall not be dumped at a distance greater than 150 feet in front of the paving machine. The loading equipment shall be self-supporting and shall not exert any vertical load on the paving machine. Substantially all of the asphaltic concrete shall be picked up and loaded into the paving machine.

(C) Placing and Finishing Asphaltic Concrete by Means of Self-Propelled Paving Machines:

All courses of asphaltic concrete shall be placed and finished by means of self-propelled paving machines except under certain conditions or at certain locations where the Engineer deems the use of self-propelled paving machines impractical.

In order to achieve, as far as practical, a continuous operation, the speed of the paving machine shall be coordinated with the production of the plant.

Self-propelled paving machines shall spread the mixture without segregation or tearing within the specified tolerances, true to the line, grade, and crown indicated on the project plans. Pavers shall be equipped with hoppers and augers which will distribute the mixture uniformly in front of adjustable screeds.

Screeds shall include any strike-off device operated by tamping or vibrating action which is effective without tearing, shoving or gouging the mixture and which produces a course with a uniform texture and density for the full width being paved. Screeds shall be adjustable as to height and crown and shall be equipped with a controlled heating device for use when required.

Tapered sections not exceeding eight feet in width, or widened sections not exceeding four feet in width may be placed and finished by other means approved by the Engineer.

(D) Automatically Actuated Control System:

Except under certain conditions or at certain locations where the Engineer deems the use of automatic controls impractical, asphaltic concrete shall be placed and finished by means of self-propelled paving machines equipped with an automatically actuated control system.

The control system shall control the elevation of the screed at each end by controlling the elevation of one end directly and the other end indirectly, either through controlling the transverse slope or, alternately when directed, by controlling the elevation of each end independently.

The control system shall be capable of working with the following devices which shall be furnished with the machine:

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Ski-type device at least 30 feet in length, supported throughout its entire length.

Short ski.

Failure of the control system to function properly shall be cause for the suspension of the asphaltic concrete operations.

414-7.05 Joints:

Longitudinal joints shall be staggered a minimum of one foot with relation to the longitudinal joint of the immediate underlying course.

The contractor shall schedule its paving operations to minimize exposed longitudinal edges. Unless otherwise approved by the Engineer, the contractor shall limit the placement of asphaltic concrete courses, in advance of adjacent courses, to one shift of asphaltic concrete production. The contractor shall schedule its paving operations in such a manner to eliminate exposed longitudinal edges over weekends or holidays.

Longitudinal joints shall be located within one foot of the centerline between two adjacent lanes.

414-7.06 Compaction:

(A) General Requirements:

The temperature of asphaltic concrete just prior to compaction shall be at least 275 degrees F.

The wheels of compactors shall be wetted with water, or if necessary soapy water, or a product approved by the Engineer to prevent the asphaltic concrete from sticking to the steel wheels during rolling. The Engineer may change the rolling procedure if in the Engineer's judgment the change is necessary to prevent picking up of the asphaltic conorete.

(B) Equipment:

Compacting and smoothing shall be accomplished by the use of static steel wheel compactors. Vibrator compactors may be used in the static mode only. The compactors shall be self-propelled and shall be operated with the drive wheel in the forward position. A minimum of three compactors shall be provided; however, sufficient compactors shall be provided so that the drums of the compactors when staggered will cover the entire width of the paving machine during initial breakdown.

Compactors shall be operated in accordance with the manufacturer's recommendations. Compactors shall be designed and properly

maintained so that they are capable of accomplishing the required compaction.

The compactors shall weigh not less than eight tons.

(C) Rolling Procedure:

A pass shall be defined as one movement of a compactor in either direction. Coverage shall be the number of passes as are necessary to cover the entire width being paved.

Compaction shall consist of the following rolling sequence:

Rolling Sequence	Number of Coverages
Initial	1
Finish	1 - 2

A sufficient number of compactors shall be used for initial breakdown so that when the compactors are staggered the entire width of the mat being laid is compacted with one forward pass of the compactors. The distance between the paving machine and the initial rolling shall not exceed 300 feet.

A separate roller(s) shall be used for final compaction. The roller(s) used for final compaction shall follow as closely behind the initial breakdown rollers as possible.

Compaction will be deemed to be acceptable on the condition that the asphaltic concrete is compacted using the type of compactors specified, ballasted and operated in accordance with the manufacturer's recommendations, and with the number of coverages of the compactors as specified.

414-7.07 Compacting Miscellaneous Items and Surfaces:

Asphaltic concrete used in the construction of miscellaneous items and surfaces shall be compacted using compactors, hot-hand tampers, smoothing irons, mechanical vibrating hand tampers, or with other devices to the extent considered necessary by the Engineer.

414-7.08 Smoothness and Surface Tolerances:

Asphaltic concrete shall be compacted as required, smooth and true to the required lines, grades, and dimensions.

The Special Provisions may require the smoothness of the final pavement surface to be tested in accordance of Subsection 109.13.

Regardless of whether testing in accordance with Subsection 109.13 is specified or not, the following requirements shall be met:

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(1) The finished asphaltic concrete surface shall be tested and shall not vary by more than 1/8 inch from the lower edge of a ten-foot straightedge when it is placed in the longitudinal direction (including across transverse joints), and when it is placed in the transverse direction across longitudinal joints.

(2) All deviations exceeding the specified tolerances above shall be corrected by the contractor, to the satisfaction of the Engineer.

414-7.09 Acceptance:

Asphaltic concrete will be accepted complete in place, if, in the judgment of the Engineer, the asphaltic concrete reasonably conforms to the requirements specified herein. Asphaltic concrete that is not acceptable and is rejected shall be replaced to the satisfaction of the Engineer and at no additional cost to the Department.

414-8 Method of Measurement:

Asphaltic concrete will be measured by the ton for the mixture actually used, which will include the weight of mineral aggregate, mineral admixture and asphalt-rubber. Measurement will include any weight used in construction of intersections, turnouts, or other miscellaneous items or surfaces.

Asphalt-rubber will be measured by the ton.

The weight of the asphalt-rubber material shall either be determined by weighing directly enroute from the reaction vessel to the point of delivery or be determined from the weight of the asphalt cement and the weight of the rubber minus wastage.

Mineral admixture will be measured by the ton.

414-9 Basis of Payment:

The accepted quantities of asphaltic concrete, measured as provided above, will be paid for at the contract unit price per ton, which price shall be full compensation for the work, complete in place, as specified herein.

Payment for the asphalt-rubber will be made by the ton, including asphalt cement and crumb rubber. The results of a nuclear asphalt content gauge shall not be used to determine the weight of asphalt-rubber material as the basis of payment. Adjustments in payment shall be made in accordance with the requirements of Subsection 1009-2.03.

Mineral admixture will be paid for at the predetermined price established in the Bidding Schedule.

When required in the Special Provisions, payment for smoothness shall be made in accordance with the requirements of Subsection 109.13.

When lime water is used, no separate payment will be made for the lime water or its application, the cost being considered as included in this contract item.

SECTION 415 ASPHALTIC CONCRETE (ASPHALT-RUBBER) - END PRODUCT:

415-1 Description:

The work under this section shall consist of constructing Asphaltic Concrete (Asphalt-Rubber), hereinafter asphaltic concrete, by providing a mix design meeting the design criteria specified herein, furnishing all materials, mixing at a plant, hauling, and placing a mixture of aggregate materials, mineral admixture, and bituminous material (asphalt-rubber) to form a pavement course or to be used for other specified purposes, in accordance with the details shown on the project plans and the requirements of these specifications.

The contractor shall be responsible for all adjustments to its equipment necessary to properly accommodate the use of asphalt-rubber as a bituminous material.

415-2 Asphaltic Concrete Mix Design Criteria:

Mix designs shall be developed by the contractor. Each mix design shall meet the criteria in Table 415-1.

NO.	DESCRIPTION OF REVISIONS	MADE BY	DATE
1	RE-ISSUE	L. LOPEZ	2/02
2	CHANGED WEB ADDRESS IN NOTE #8.	L. LOPEZ	12/08
3	ADDED TYPE E & TYPE BB PAVEMENT MARKER. EDIT NOTES.	L. LOPEZ	6/08
4			

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RAISED PAVEMENT MARKER TYPES:

TYPE A WHITE, LANE MARKER (NON-REFLECTIVE)

TYPE AY YELLOW, LANE MARKER (NON-REFLECTIVE)

TYPE AB DARK RUMBLE STRIP MARKER (NON-REFLECTIVE)

TYPE B WHITE, SMALL CHANNEL MARKER (NON-REFLECTIVE)

TYPE BB BLUE, TWO-SIDED MARKER (REFLECTIVE)

TYPE BY YELLOW, SMALL CHANNEL MARKER (NON-REFLECTIVE)

TYPE C CLEAR/RED, TWO-SIDED MARKER (REFLECTIVE)

TYPE D YELLOW, TWO-SIDED MARKER (REFLECTIVE)

TYPE E YELLOW/RED, TWO-SIDED MARKER (REFLECTIVE)

TYPE G CLEAR, ONE-SIDED MARKER (REFLECTIVE)

TYPE H YELLOW, ONE-SIDED MARKER (REFLECTIVE)

TYPE J WHITE, LARGE CHANNEL MARKER (REFLECTIVE)

TYPE JY YELLOW, LARGE CHANNEL MARKER (REFLECTIVE)

TYPE K WHITE, JIGGLE BAR (ONE-WAY) (REFLECTIVE)

TYPE KY YELLOW, JIGGLE BAR (ONE-WAY) (REFLECTIVE)

TYPE L WHITE, JIGGLE BAR (TWO-WAY) (REFLECTIVE)

TYPE LY YELLOW, JIGGLE BAR (TWO-WAY) (REFLECTIVE)

TYPE M WHITE LARGE CHANNEL MARKER (NON-REFLECTIVE)

TYPE MY YELLOW, LARGE CHANNEL MARKER (NON-REFLECTIVE)

TYPE N WHITE, JIGGLE BAR (ONE-SIDED) (NON-REFLECTIVE)

TYPE NY YELLOW, JIGGLE BAR (ONE-SIDED) (NON-REFLECTIVE)

TYPE O WHITE, JIGGLE BAR (TWO-SIDED) (NON-REFLECTIVE)

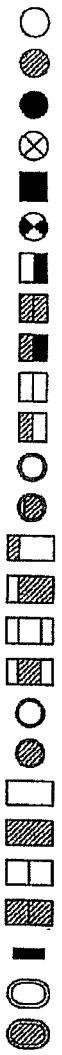
TYPE OY YELLOW, JIGGLE BAR (TWO-SIDED) (NON-REFLECTIVE)

TYPE P WHITE OR YELLOW, TRAFFIC BAR (SEE NOTE #4)

TYPE Q WHITE, OVAL (NON-REFLECTIVE)

TYPE OY YELLOW, OVAL (NON-REFLECTIVE)

LEGEND:



DEPARTMENT DESIGNATION	COLORS OF REFLECTIVE FACES	ASTM D 4280 TYPE	ASTM D 4280 COLOR DESIGNATION	ASTM D 4280 ABRASION RESISTANCE DESIGNATION	ASTM D 4280 FLEXURAL STRENGTH DESIGNATION
TYPE C	CLEAR OR WHITE, RED	TYPE E	WR	H COATED ONLY	F
TYPE D	YELLOW, TWO-WAY	TYPE A	YY	H COATED ONLY	F
TYPE E	YELLOW, RED	TYPE E	YR	H COATED ONLY	F
TYPE G	WHITE	TYPE B	W	H COATED ONLY	F
TYPE H	YELLOW	TYPE B	Y	H COATED ONLY	F
TYPE BB	BLUE, TWO WAY	TYPE E	BB	H COATED OR GLASS FACE ON BOTH SIDES	F

ABRASION RESISTANT COATING ON RED RETROREFLECTIVE SIDE IS OPTIONAL.
TWO SIDED RRPM'S SHALL HAVE AN ABRASION RESISTANT TREATMENT ON BOTH SIDES.

NOTES:

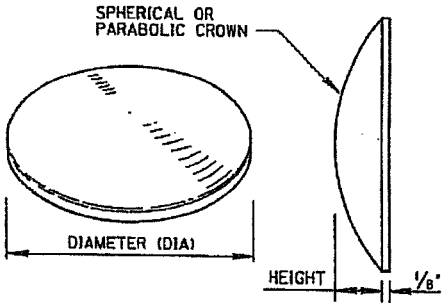
1. SEE THE SPECIFICATIONS FOR ADDITIONAL REQUIREMENTS.
2. LARGE CHANNEL MARKERS OR TRAFFIC BARS SHOULD NORMALLY NOT TO BE USED ON ROADWAYS WITH A SPEED LIMIT EQUAL TO OR GREATER THAN 45 MPH. THE HEIGHT OF RAISED PAVEMENT MARKERS PLACED ADJACENT TO TRAVEL LANES SHOULD NOT EXCEED ¾".
3. STANDARD ABBREVIATIONS:
   "RPM" = RAISED PAVEMENT MARKER; CAN BE USED TO DEFINE ANY NON-REFLECTIVE RAISED PAVEMENT MARKER.
   "RRPM" = RETROREFLECTIVE RAISED PAVEMENT MARKER; CAN BE USED TO DEFINE ANY MARKER THAT HAS A REFLECTIVE ELEMENT, WHETHER IT IS SURFACE MOUNTED OR RECESSED.
4. TRAFFIC BARS CAN BE REFLECTIVE OR NON-REFLECTIVE PER REQUIREMENTS OF THE PROJECT PLANS.
5. THE APPLICATION OF CHANNEL MARKERS, JIGGLE BARS, OVALS AND TRAFFIC BARS SHALL BE SPECIFIED ON THE PROJECT PLANS AND/OR SPECIAL PROVISIONS.
6. SURFACE MOUNTED MARKERS GENERALLY SHOULD NOT BE INSTALLED IN AREAS OF POTENTIAL SNOW REMOVAL ACTIVITIES. PERMANENT MARKERS IN THESE AREAS SHOULD BE RECESSED IN GROOVES.
7. THE 2 INCH TO 3 INCH WIDE BY 4 INCH TO 5 INCH WIDE (+/-) VERSIONS OF TYPE C, D, E, G, & H RRPM'S SHALL BE USED FOR RECESSED APPLICATIONS.
8. A LIST OF RPM AND AND RRPM PRODUCTS THAT HAVE BEEN TESTED AND APPROVED FOR USE IS AVAILABLE IN THE APPROVED PRODUCT LIST (APL), ARIZONA TRANSPORTATION RESEARCH CENTER 2739 EAST WASHINGTON STREET MAIL DROP 075R PHOENIX, AZ 85034-1422 OR WWW.AZDOT.GOV/TPD/ATRC/PRIDE/INDEX.ASP

SHEET 1 OF 10
NOT TO SCALE

DESIGN APPROVED: SIGNATURE ON FILE	ARIZONA DEPARTMENT OF TRANSPORTATION INTERMODAL TRANSPORTATION DIVISION STANDARD DRAWINGS	REV. 6/08
APPROVED: DIRECTOR, INTERMODAL TRANSPORTATION DIVISION	RAISED PAVEMENT MARKER PLAN LEGEND	DRAWING NO. M-19

№ 1214311

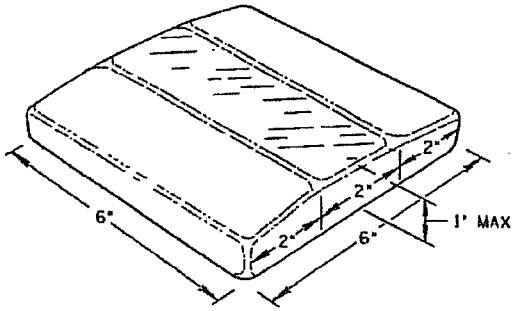
NO	DESCRIPTION OF REVISION	MADE BY	DATE
1	RE-ISSUE	L. LOPEZ	2/02
2	CHANGED TOTAL SHEET NUMBER	L. LOPEZ	6/08
3			
4			



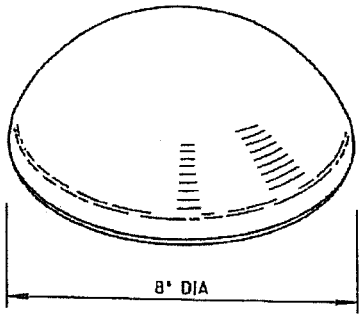
TYPES A, AY AND AB

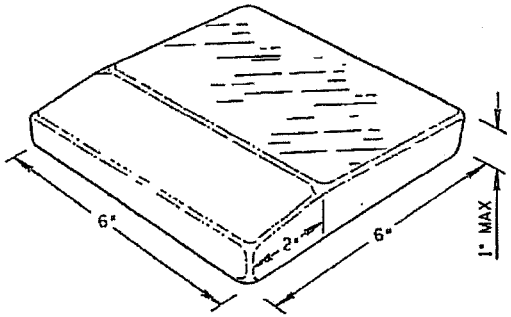
TYPES B AND BY (NOT SHOWN)

MARKER TYPE	DIA	HEIGHT
A, AY & AB	4"	3/4" MAX
B & BY	6"	1 3/4" MAX

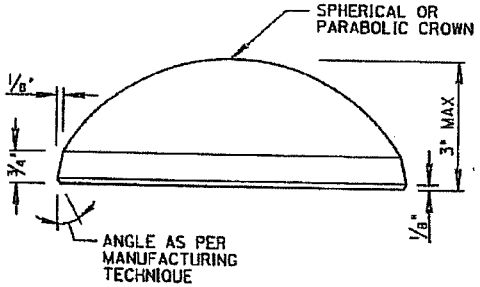


TYPES O AND OY JIGGLE BAR

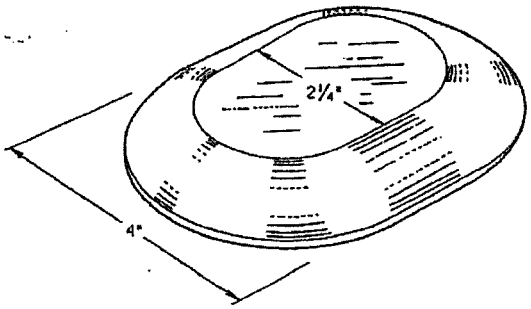




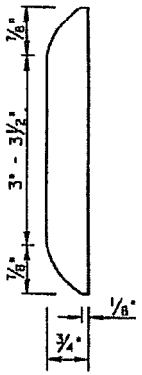
TYPES N AND NY JIGGLE BAR



TYPES M AND MY,
LARGE CHANNEL MARKER



TYPES Q AND QY OVAL



NOTES:

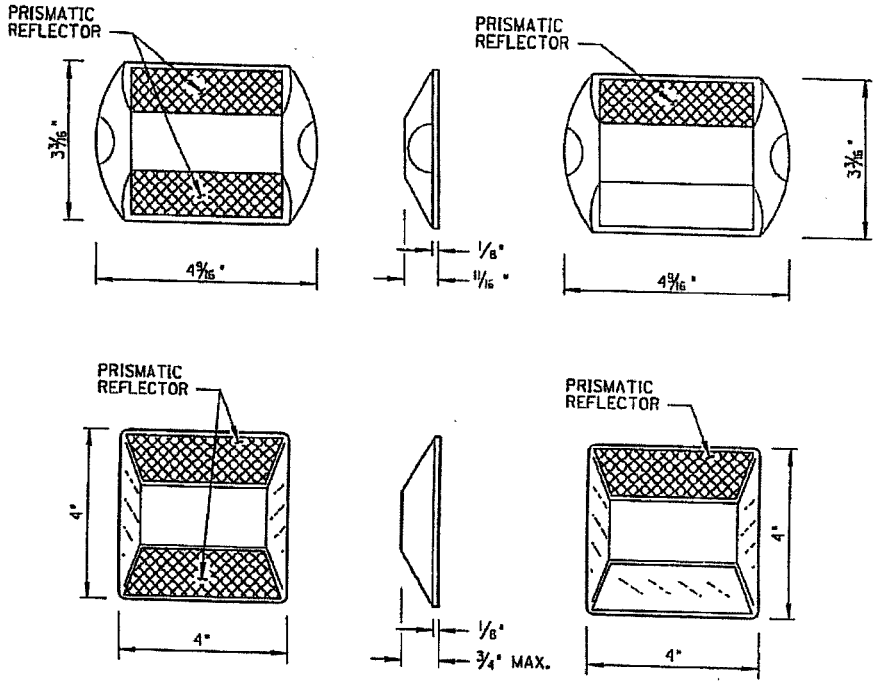
1. SEE THE SPECIFICATIONS FOR ADDITIONAL REQUIREMENTS.
2. ALL DIMENSIONS ARE NOMINAL, EXCEPT AS OTHERWISE NOTED.
3. THE HEIGHT OF JIGGLE BARS CAN BE REDUCED TO 3/4 INCH IF CALLED FOR ON THE PLANS.

SHEET 2 OF 10
NOT TO SCALE

DESIGN APPROVED: SIGNATURE ON FILE	ARIZONA DEPARTMENT OF TRANSPORTATION INTERMODAL TRANSPORTATION DIVISION STANDARD DRAWINGS	REV. 6/08
APPROVED: SIGNATURE ON FILE	NON-REFLECTIVE RAISED PAVEMENT MARKER DETAILS	DRAWING NO. M-19

№ 1214311

NO	DESCRIPTION OF REVISIONS	MADE BY	DATE
1	RE-ISSUE	L. LOPEZ	2/02
2	RE-ISSUED ADDED TYPE BB & TYPE E PAVEMENT MARKER	L. LOPEZ	6/08
3			
4			



TYPES BB, C, D AND E

TYPES G AND H

NOTES:

1. SEE THE SPECIFICATIONS FOR ADDITIONAL REQUIREMENTS.
2. ALL DIMENSIONS ARE NOMINAL, EXCEPT AS OTHERWISE NOTED.
3. THE ACTUAL SHAPES OF THE RRPM'S CAN VARY FROM WHAT IS SHOWN, IF APPROVED.

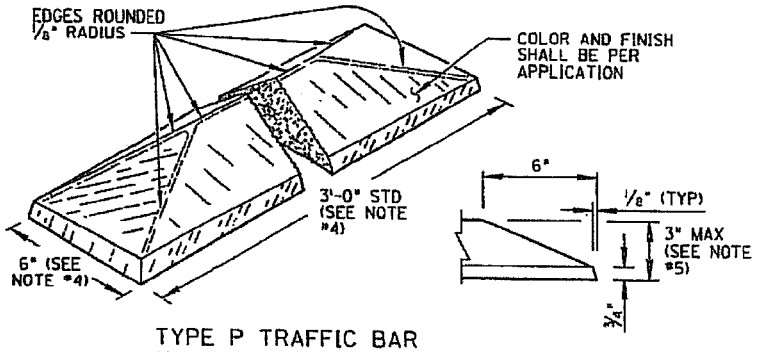
RETROREFLECTIVE RAISED PAVEMENT MARKERS

SHEET 3 OF 10
NOT TO SCALE

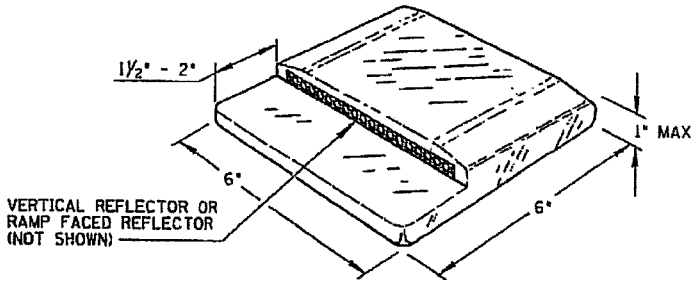
DESIGN APPROVED	ARIZONA DEPARTMENT OF TRANSPORTATION INTERMODAL TRANSPORTATION DIVISION STANDARD DRAWINGS	REV. 6/08
SIGNATURE ON FILE	RETROREFLECTIVE RAISED PAVEMENT MARKER DETAILS	M-19

№ 1214311

NO	DESCRIPTION OF REVISIONS	MADE BY	DATE
1	RE-ISSUED, MOVED FROM ANOTHER DRAWING	L. LOPEZ	6/08
2			
3			
4			



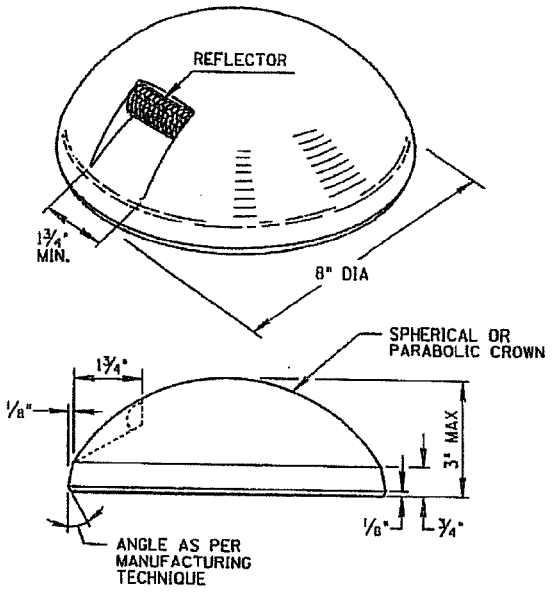
TYPE P TRAFFIC BAR



TYPES K AND KY JIGGLE BAR
(ONE-WAY)
TYPES L AND LY JIGGLE BAR
(TWO-WAY) (NOT PICTURED)

NOTE:

THIS MARKER IS THE SAME AS THE TYPE K AND KY EXCEPT IT SHALL HAVE A REFLECTOR ON BOTH SIDES OF THE MARKER PER THE REQUIRED CONFIGURATIONS OF THE TYPE K AND KY MARKER.



TYPES J AND JY
LARGE CHANNEL MARKER

NOTES:

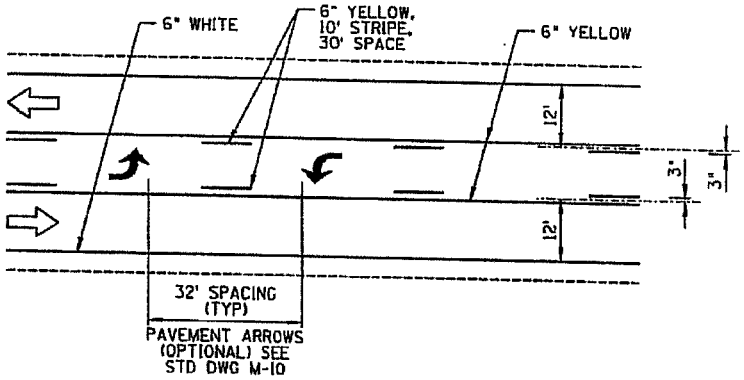
1. SEE THE SPECIFICATIONS FOR ADDITIONAL REQUIREMENTS.
2. ALL DIMENSIONS ARE NOMINAL, EXCEPT AS OTHERWISE NOTED.
3. THE ACTUAL SHAPES OF REFLECTIVE MARKERS AND JIGGLE BARS CAN VARY FROM WHAT IS SHOWN, IF APPROVED.
4. LENGTHS AND WIDTHS MAY VARY. SEE PROJECT PLANS.
5. THE MAXIMUM HEIGHT IF USED ON A ROADWAY AREA IS 3 INCHES. THE HEIGHT MAY BE LESS IF SPECIFIED.

SHEET 4 OF 10
NOT TO SCALE

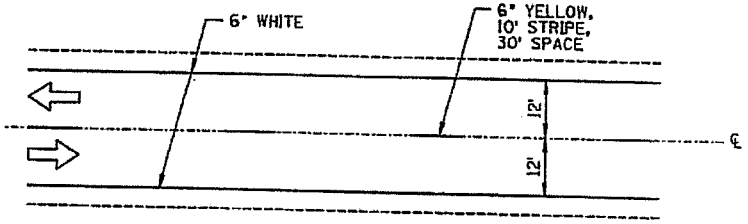
DESIGN APPROVED: SIGNATURE ON FILE	ARIZONA DEPARTMENT OF TRANSPORTATION INTERMODAL TRANSPORTATION DIVISION STANDARD DRAWINGS	REV. 6/08
APPROVED FOR DISTRIBUTION: SIGNATURE ON FILE	RETROREFLECTIVE RAISED PAVEMENT MARKER DETAILS	DRAWING NO. M-19

№ 1214311

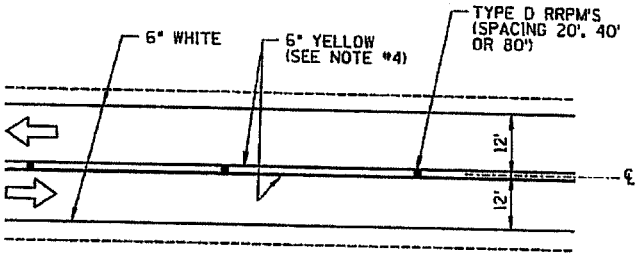
NO	DESCRIPTION OF REVISIONS	MADE BY	DATE
1	RE-ISSUE	L. LOPEZ	2/02
2	TEXT EDIT	L. LOPEZ	6/08
3			
4			



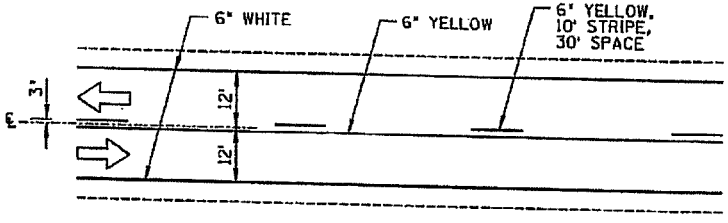
TWO-WAY LEFT-TURN LANE



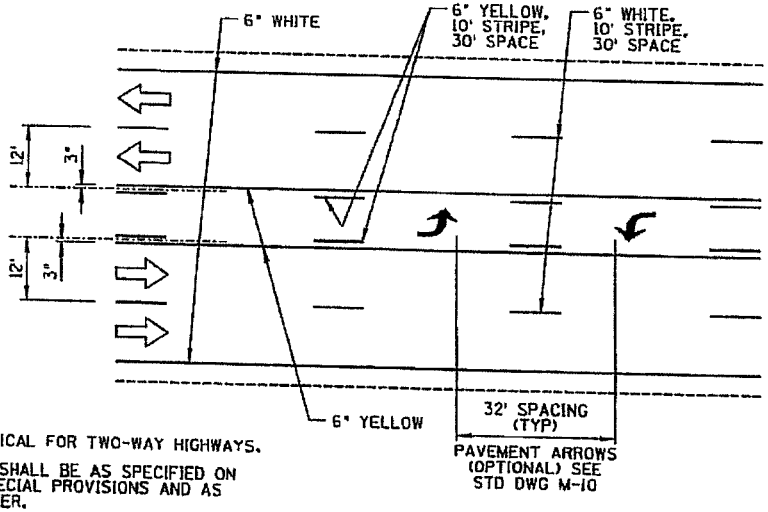
SINGLE CENTER LINES
PASSING ALLOWED - BOTH DIRECTIONS



DOUBLE CENTER LINES
NO PASSING - BOTH DIRECTIONS



DOUBLE CENTER LINES
NO PASSING - ONE DIRECTION



MULTI-LANE HIGHWAY WITH TWO-WAY LEFT-TURN LANE

NOTES:

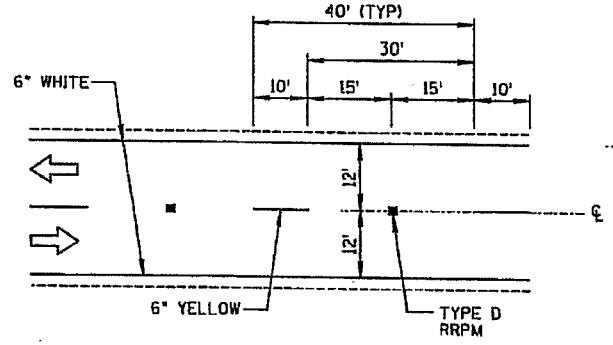
1. DETAILS SHOWN ARE TYPICAL FOR TWO-WAY HIGHWAYS.
2. APPLICATION OF DETAIL SHALL BE AS SPECIFIED ON THE PROJECT PLANS, SPECIAL PROVISIONS AND AS DIRECTED BY THE ENGINEER.
3. TYPICALLY EDGE LINES SHOULD NOT BE USED IF THE OUTSIDE SHOULDERS ARE CURBED, EXCEPT ON RAMPS.
4. CROSS-SECTION PLACEMENT DETAILS ARE SHOWN ON SHEET 10 OF 10 OF THIS STANDARD DRAWING.

SHEET 5 OF 10
NOT TO SCALE

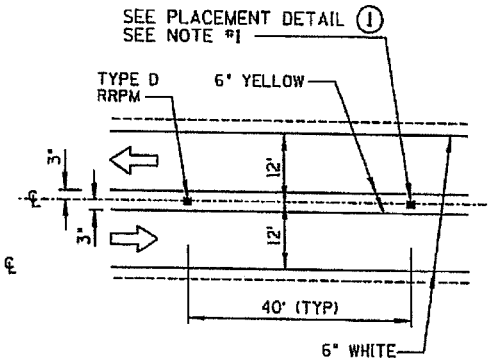
DESIGN APPROVED	ARIZONA DEPARTMENT OF TRANSPORTATION INTERMODAL TRANSPORTATION DIVISION STANDARD DRAWINGS	REV. 6/08
SIGNATURE ON FILE	PAVEMENT MARKING DETAILS FOR UNDIVIDED HIGHWAYS	DRAWING NO. M-19

№ 1214311

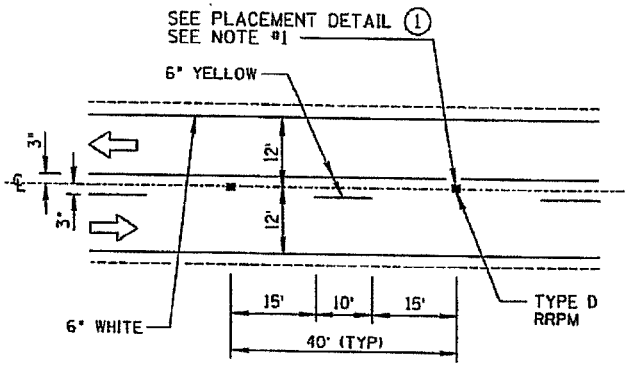
NO	DESCRIPTION OF REVISIONS	MADE BY	DATE
1	RE-ISSUE	L. LOPEZ	2/03
2	CHANGED SHEET NUMBER, EDIT NOTES.	L. LOPEZ	6/08
3			
4			



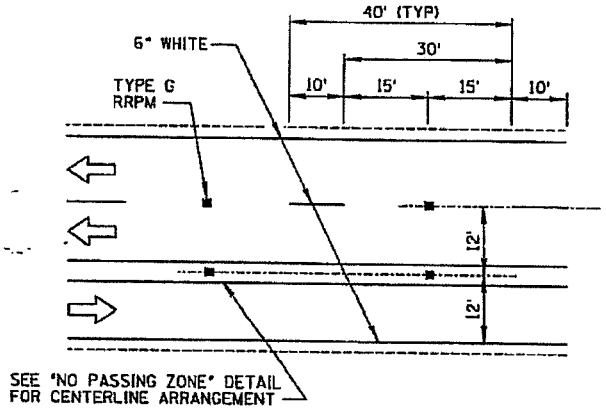
TWO-WAY PASSING ZONE



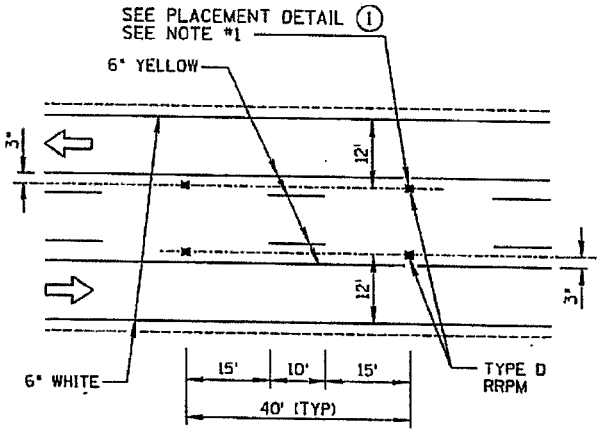
NO PASSING ZONE



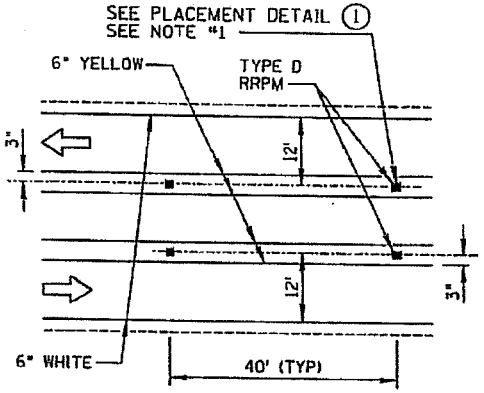
PASSING ONE-SIDE



PASSING/CLIMBING LANE



TWO-WAY LEFT-TURN LANE



STRIPED MEDIAN

NOTES:

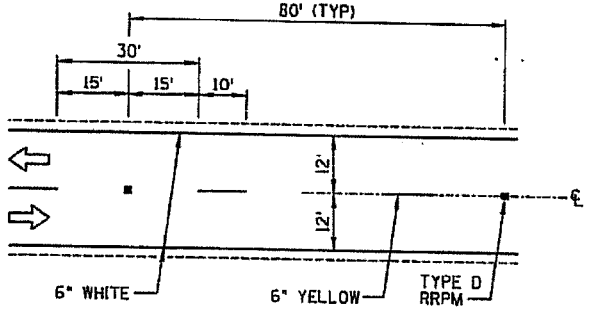
1. PLACEMENT DETAIL (1) IS SHOWN ON SHEET 10 OF 10 OF THIS STANDARD DRAWING.

SHEET 6 OF 10
NOT TO SCALE

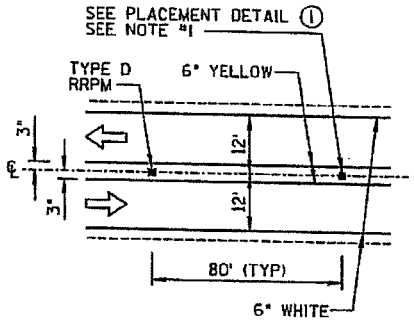
SIGNATURE ON FILE	ARIZONA DEPARTMENT OF TRANSPORTATION INTERMODAL TRANSPORTATION DIVISION STANDARD DRAWINGS	REV. 6/08
	SERIES 40 RETROREFLECTIVE RAISED PAVEMENT MARKERS (RRPM) FOR UNDIVIDED HIGHWAYS	DRAWING NO. M-19

№ 1214311

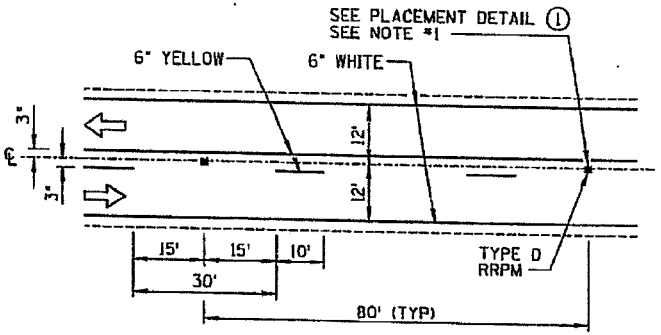
NO	DESCRIPTION OF REVISIONS	MADE BY	DATE
1	RE-ISSUE	L. LOPEZ	3/02
2	CHANGED SHEET NUMBER. EDIT NOTES.	L. LOPEZ	6/08
3			
4			



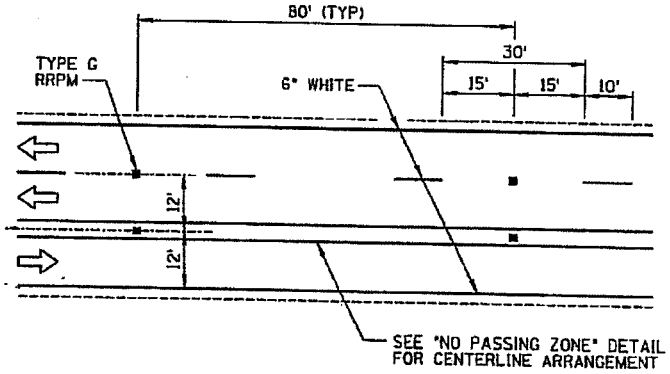
TWO-WAY PASSING ZONE



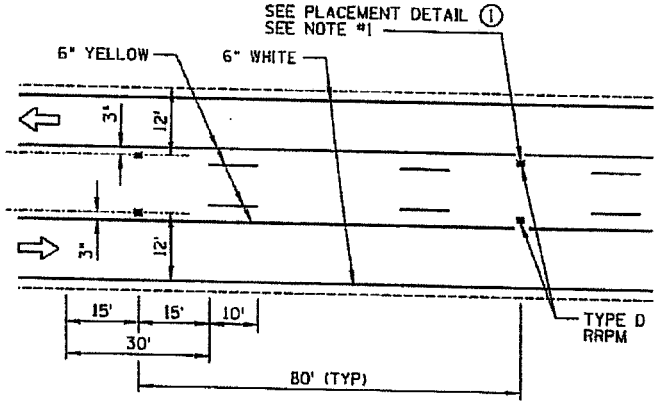
NO PASSING ZONE



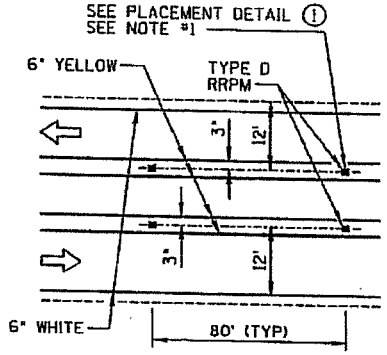
PASSING ONE-SIDE



PASSING/CLIMBING LANE



TWO-WAY LEFT-TURN LANE



STRIPED MEDIAN

NOTES:

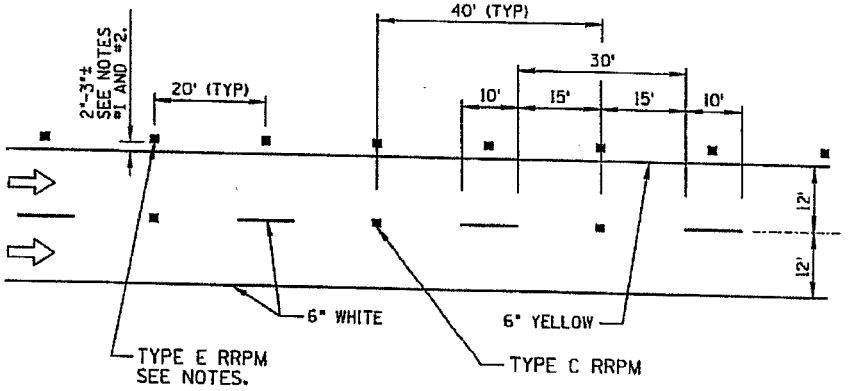
1. PLACEMENT DETAIL ① IS SHOWN ON SHEET 10 OF 10 OF THIS STANDARD DRAWING.
2. SERIES 80 SPACING OF PAVEMENT MARKERS SHOULD ONLY BE CONSIDERED ON RURAL HIGHWAYS THAT ARE RELATIVELY STRAIGHT AND FLAT.

SHEET 7 OF 10
NOT TO SCALE

DESIGN APPROVED SIGNATURE ON FILE	ARIZONA DEPARTMENT OF TRANSPORTATION INTERMODAL TRANSPORTATION DIVISION STANDARD DRAWINGS	REV. 6/08
APPROVED SIGNATURE ON FILE	SERIES 80 RETROREFLECTIVE RAISED PAVEMENT MARKERS (RRPM) FOR UNDIVIDED HIGHWAYS	DRAWING NO. M-19

№ 1214311

NO	DESCRIPTION OF REVISIONS	MADE BY	DATE
1	NEW ISSUE; ADDED LEFT EDGE MARKS TO FREEWAY LANE STRIPING	L. LOPEZ	6/08
2			
3			
4			



FREEWAY EDGELINE AND LANE STRIPING

NOTES:

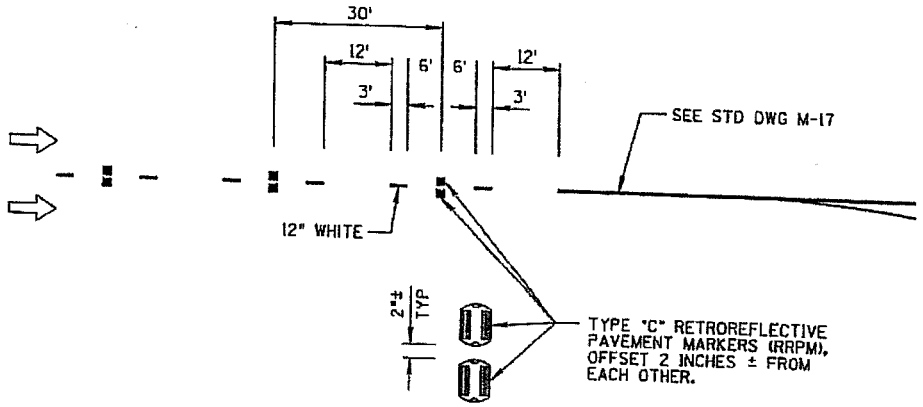
1. PLACEMENT OF TYPE E (EDGE LINE) RETROREFLECTIVE PAVEMENT MARKERS SHALL BE UNIFORM AND PARALLEL TO THE EDGE STRIPE BETWEEN THE LIP OF PAVEMENT AND RUMBLE STRIP. SEE PLACEMENT DETAIL (2) SHEET 10 OF 10. PAVEMENT MARKERS CAN BE INSTALLED IN THE RUMBLE STRIP IF NECESSARY.
2. THE LANE LINE APPLICATION SHALL BE SPECIFIED ON THE PROJECT PLANS.
3. SEE STANDARD DRAWING M-18 FOR RECESSED APPLICATIONS.

SHEET 8 OF 10
NOT TO SCALE

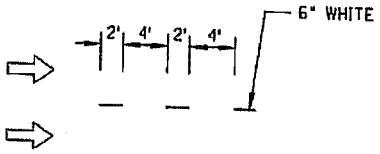
DESIGN APPROVED	ARIZONA DEPARTMENT OF TRANSPORTATION INTERMODAL TRANSPORTATION DIVISION STANDARD DRAWINGS	REV. 6/08
SIGNATURE ON FILE	TYPICAL MARKING DETAILS FOR EDGELINE RETROREFLECTIVE PAVEMENT MARKERS (ALL FREEWAYS)	DRAWING NO. M-19

№ 1214311

NO	DESCRIPTION OF REVISIONS	MADE BY	DATE
1	RE-ISSUE	L. LOPEZ	7/02
2	TEXT EDITS. ADDED DURABLE TAPE NOTE	L. LOPEZ	6/03
3	MOVED DRAWINGS TO NEW SHEET NUMBER. EDIT NOTES.	L. LOPEZ	6/08
4			



LANE DROP MARKINGS



RAMP OR INTERSECTION GUIDE STRIPING

(LINE MAY BE USED ACROSS FREEWAY OFF RAMPS AND TO GUIDE VEHICLE IN INTERSECTIONS; USE OF THIS LINE IS THE TRAFFIC ENGINEER'S OPTION)

SHEET 9 OF 10
NOT TO SCALE

DESIGN APPROVED
SIGNATURE ON FILE
ASSISTANT STATE ENGINEER

ARIZONA DEPARTMENT OF TRANSPORTATION
INTERMODAL TRANSPORTATION DIVISION
STANDARD DRAWINGS

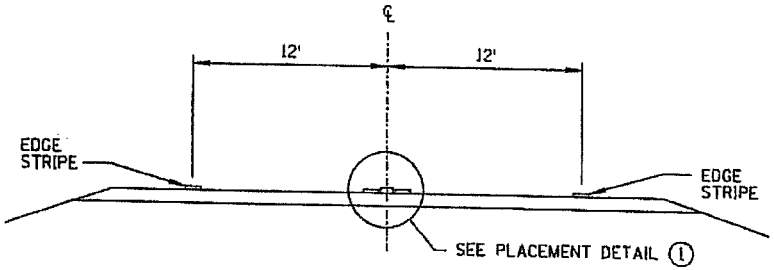
REV. 6/08

TYPICAL MARKING DETAILS FOR LANE DROP AND RAMP OR INTERSECTION GUIDE STRIPING

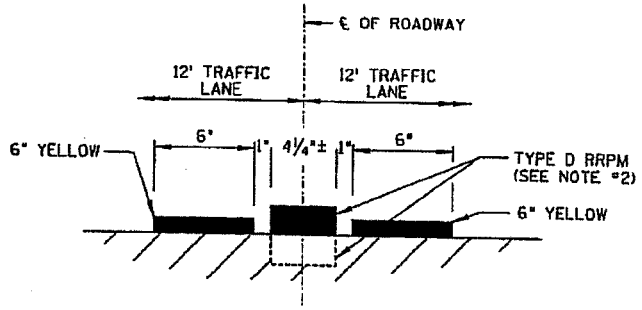
DETAIL NO. M-19

№ 1214311

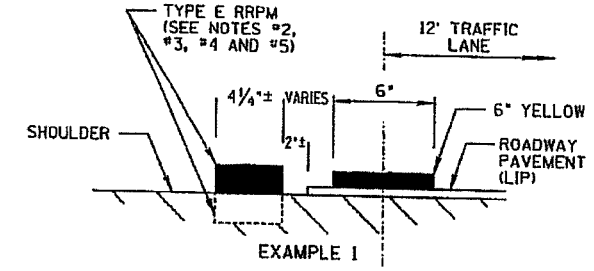
NO.	DESCRIPTION OF REVISIONS	MADE BY	DATE
1	RE-ISSUE	L. LOPEZ	2/02
2	ADDED PLACEMENT DETAIL 3	L. LOPEZ	6/08
3			
4			



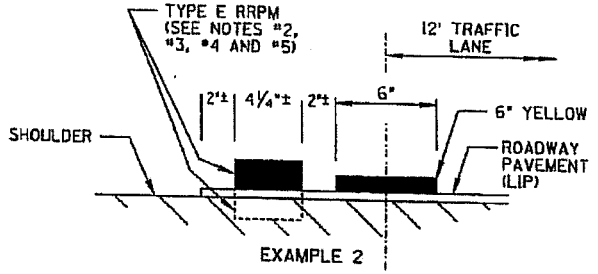
TYPICAL CROSS-SECTION



PLACEMENT DETAIL (1)



EXAMPLE 1



EXAMPLE 2

PLACEMENT DETAIL (2)

ONE WAY
FREEWAY TRAFFIC ONLY
SEE NOTES

NOTES:

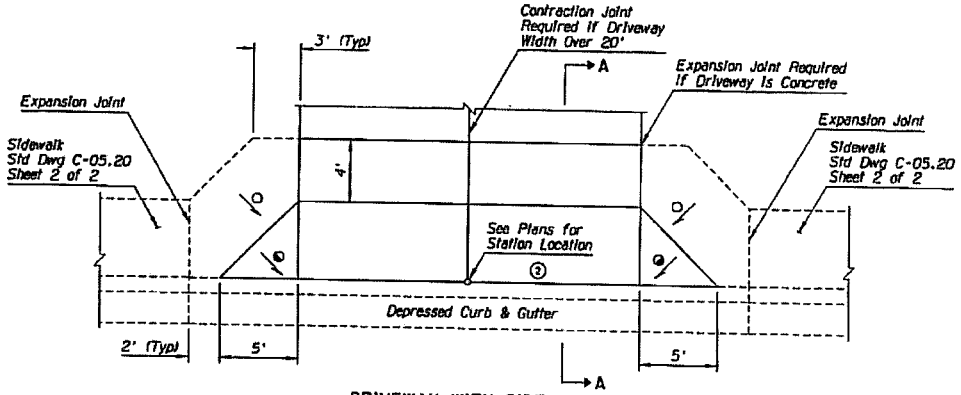
1. ALL ROADWAYS SHOWN ARE 2-WAY UNLESS OTHERWISE NOTED.
2. APPLICABLE TO BOTH RAISED AND RECESSED PAVEMENT MARKERS.
3. PLACEMENT OF TYPE E (EDGELINE) RETROREFLECTIVE PAVEMENT MARKERS SHALL BE UNIFORM AND PARALLEL TO THE EDGE STRIPE BETWEEN THE LIP OF PAVEMENT AND RUMBLE STRIP. SEE PLACEMENT DETAIL (2) ON THIS SHEET. PAVEMENT MARKERS CAN BE INSTALLED IN THE RUMBLE STRIP IF NECESSARY.
4. SEE STANDARD DRAWING M-18 FOR RECESSED APPLICATIONS.
5. TYPE E PAVEMENT MARKERS ARE TO BE PLACED A MINIMUM OF TWO INCHES CLEAR FROM THE LIP OF THE PAVEMENT ON EITHER SIDE.

SHEET 10 OF 10
NOT TO SCALE

DESIGN APPROVED	ARIZONA DEPARTMENT OF TRANSPORTATION INTERMODAL TRANSPORTATION DIVISION STANDARD DRAWINGS	REV. 6/08
SIGNATURE ON FILE	PAVEMENT MARKING CROSS-SECTION DETAILS FOR HIGHWAYS AND FREEWAYS	DRAWING NO. M-19

№ 1214311

NO	DESCRIPTION OF REVISIONS	MADE BY	DATE
1	REISSUED STANDARD DRAWING	RLF	9/04
2	REVISED NOTATION	RLF	7/05
3	ADDED GENERAL NOTE FOR AB REQUIREMENT	RLF	5/07
4			



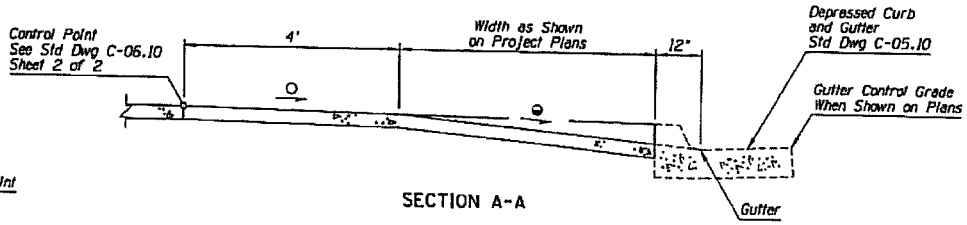
DRIVEWAY WITH SIDEWALK ADJACENT TO CURB

GENERAL NOTES

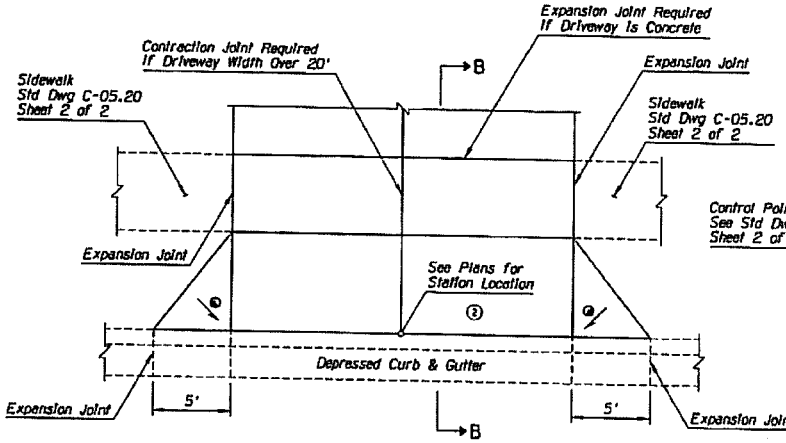
1. Unless otherwise specified, driveways shall be 6" thick.
2. Two-inch deep transverse contraction joints shall be placed in driveways if the driveway width is over 20'. If the driveway thickness is greater than 6", then the contraction joint depth shall be T/3, where T is the thickness of the driveway. Joints shall be either formed or sawn. Formed joints shall be finished with a tool having a 1/4" radius. See Sheet 2 of 2 for the Contraction Joint Detail.
3. Expansion joints shall be located between driveways and sidewalks and all abutting structures. The 1/2" joint filler shall extend the full depth of the concrete. See Sheet 2 of 2 for the Expansion Joint Detail.
4. Concrete shall be finished by means of a float, then steel trowelled and then broomed with a fine brush in a transverse direction.
3. 5. Place AB under driveways when shown on plans.

LEGEND

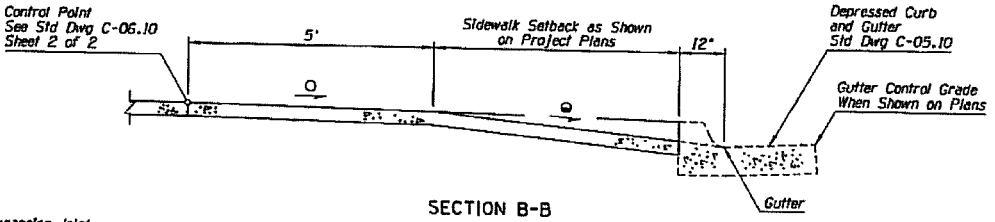
- Minimum slope = 0.01 ft/ft
- Maximum slope = 0.02 ft/ft
- Straight grade with downward slope



SECTION A-A



DRIVEWAY WITH SIDEWALK SETBACK

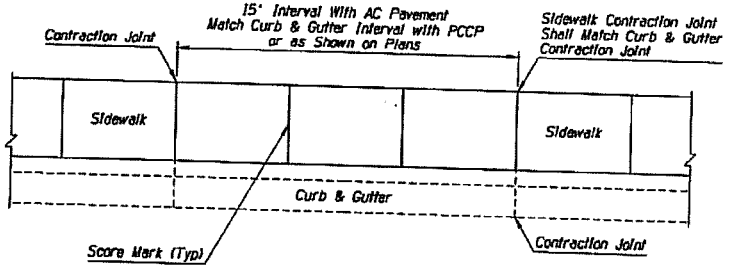


SECTION B-B

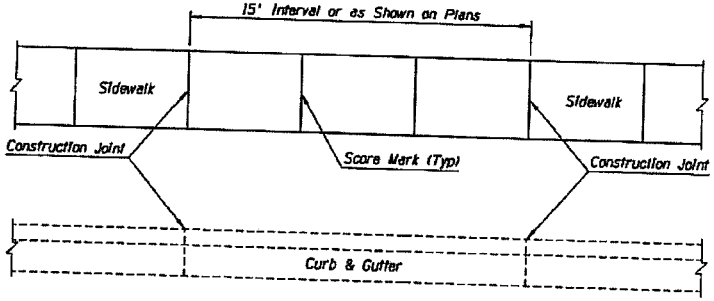
APPROVED FOR DESIGN	STATE OF ARIZONA DEPARTMENT OF TRANSPORTATION ROADWAY STANDARD DRAWINGS	REV. 5/12
APPROVED FOR DISTRIBUTION	CONCRETE DRIVEWAYS & SIDEWALKS DRIVEWAYS	DRAWING NO. 1 C-05.20 Sheet 1 of 2

№ 1214311

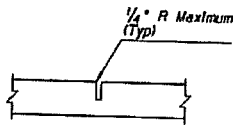
NO	DESCRIPTION OF REVISIONS	MADE BY	DATE
1	NEW GENERAL NOTE 5, REARRANGED 3, 4 & 5	RLF	9/04
2	ADDED SLOPE SPECIFICATIONS & REVISED SECTION VIEWS	RLF	7/05
3	ADDED GENERAL NOTE FOR AB REQUIREMENT	RLF	5/07
4			



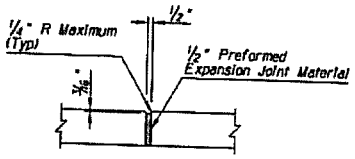
SIDEWALK ADJACENT TO CURB



SIDEWALK SETBACK FROM CURB



CONTRACTION JOINT DETAIL



EXPANSION JOINT DETAIL

① GENERAL NOTES

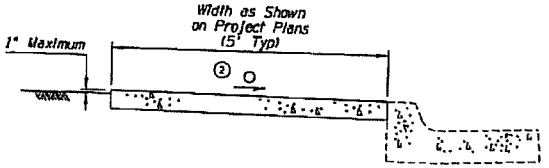
1. Unless otherwise specified, sidewalks shall be 4" thick.
2. One-inch deep transverse contraction joints shall be placed in sidewalks at intervals of approximately 15' or at a spacing that matches adjacent curb and gutter. If the sidewalk is over 7' in width, a 2" deep longitudinal contraction joint shall be placed in the center of the sidewalk. The maximum area of sidewalk without contraction joints or scoring lines shall be approximately 36 square feet. Joints shall be either formed or sawn. Formed joints shall be finished with a tool having a 1/4" radius.
3. Score marks shall be 1/4" in depth. They shall be placed at 5' spacing when the contraction joint interval is 15' and at 6' spacing when the contraction joint interval is 12'.
4. Expansion joints shall be located between sidewalks and driveways and all abutting structures. Expansion joints shall match the joints in the adjacent concrete pavement or existing concrete curb and sidewalk. Maximum length of sidewalk without an expansion joint shall be 60 transverse feet. The 1/2" joint filler shall extend the full depth of the concrete.
5. Concrete shall be finished by means of a float, then steel trowelled and then broomed with a fine brush in a transverse direction.

③ 6. Place AB under sidewalks when shown on plans.

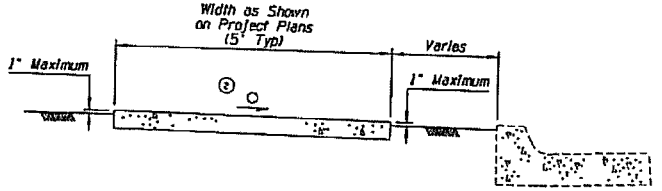
② LEGEND

Minimum slope = 0.01 ft/ft

Maximum slope = 0.02 ft/ft



CONCRETE SIDEWALK ADJACENT TO CURB



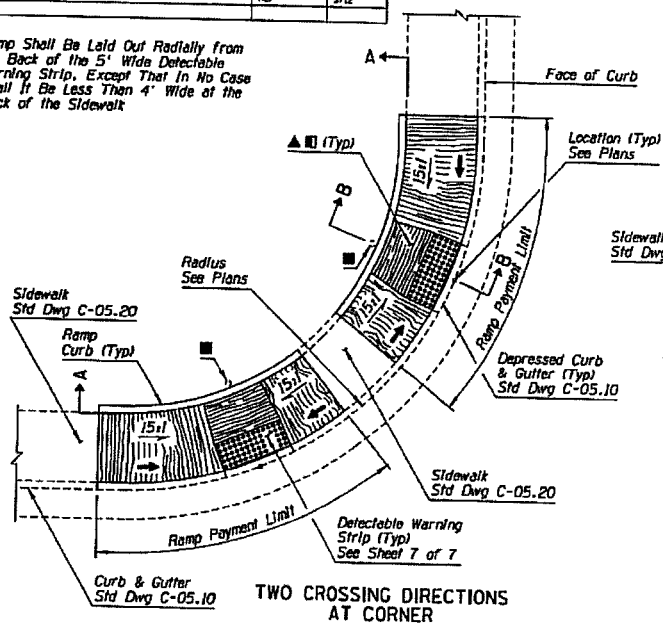
CONCRETE SIDEWALK SETBACK FROM CURB

APPROVED FOR DESIGN	STATE OF ARIZONA DEPARTMENT OF TRANSPORTATION ROADWAY STANDARD DRAWINGS	REV. 5/12
APPROVED FOR DISTRIBUTION	CONCRETE DRIVEWAYS & SIDEWALKS SIDEWALKS	DRAWING NO. C-05.20 Sheet 2 of 2

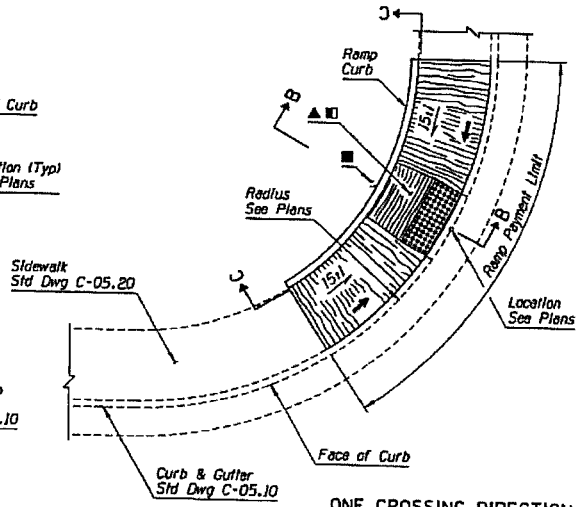
NO 1214311

NO	DESCRIPTION OF REVISIONS	MADE BY	DATE
1	REISSUED STD DWG	RLF	5/07
2	ADDED NOTE & REVISED VIEW	RLF	5/12
3	REVISED DIMENSION LOCATION	RLF	5/12
4			

■ Ramp Shall Be Laid Out Radially from the Back of the 5' Wide Detectable Warning Strip, Except That In No Case Shall It Be Less Than 4' Wide at the Back of the Sidewalk



TWO CROSSING DIRECTIONS AT CORNER



ONE CROSSING DIRECTION AT CORNER

GENERAL NOTES

1. Ramp centerline shall be radial from the face of the curb at the Sidewalk Ramp Control Point.
2. For ramps 15-ft long or less, the 15:1 slope governs. If a 15:1 slope results in a ramp length longer than 15-ft, the 15:1 slope may be waived and the ramp length held at 15-ft, regardless of the slope.
3. Drainage inlets should not be located within the marked crosswalks, or if crosswalks aren't marked, within the area a standard marked crosswalk would enclose.
4. Concrete shall receive a rough broom finish as shown.
5. See Std Dwgs C-05.10 and C-05.20 for joint details.

● See Note 2

◑ 10" Maximum to Face of Pedestrian Push Button

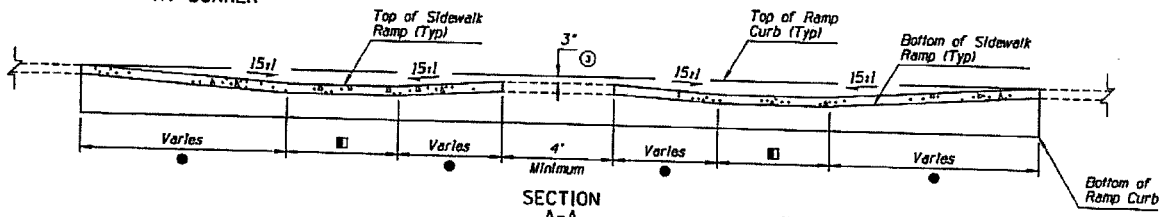
■ Pedestrian Push Button Pole When Shown on Traffic Plans. See Traffic Signal Plans for Additional Information

LEGEND

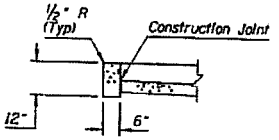
▲ Minimum Slope = 100:1 (0.01 ft/ft)

Maximum Slope = 50:1 (0.02 ft/ft)

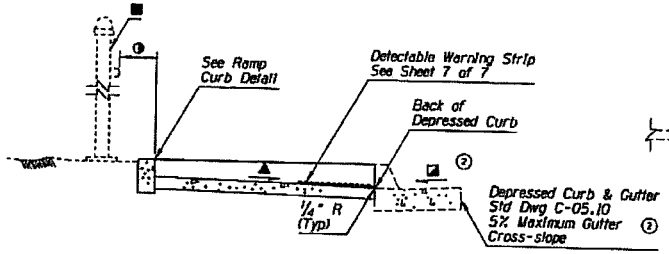
② ◪ Maximum Slope = 20:1 (0.05 ft/ft)



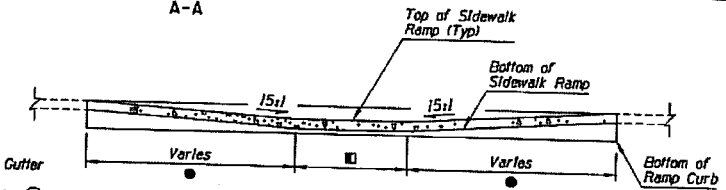
SECTION A-A



RAMP CURB DETAIL



SECTION B-B



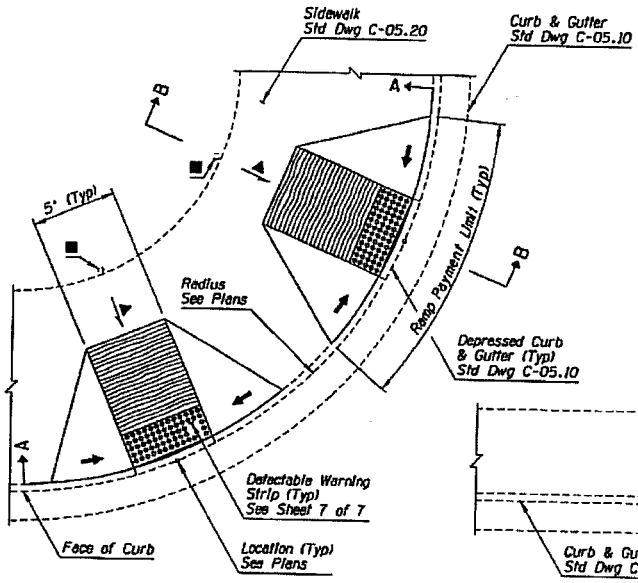
SECTION C-C

PARALLEL SIDEWALK RAMP

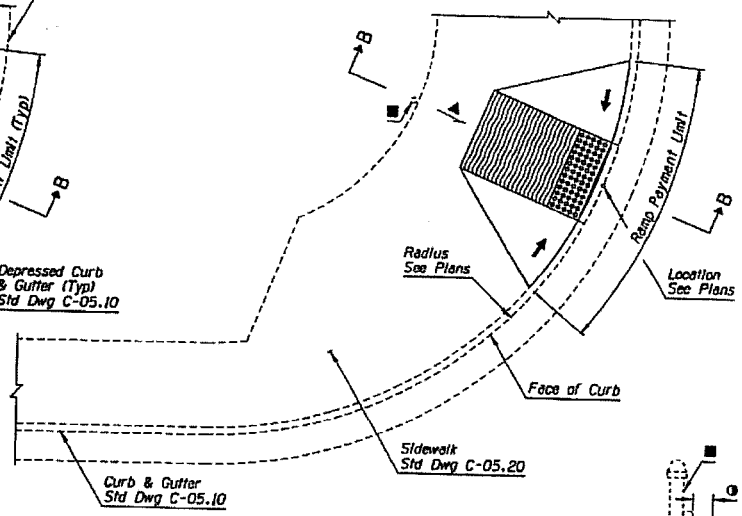
APPROVED FOR DESIGN	STATE OF ARIZONA DEPARTMENT OF TRANSPORTATION ROADWAY STANDARD DRAWINGS	REV. ① 5/12
APPROVED FOR DISTRIBUTION	SIDEWALK RAMP TYPE A	DRAWING NO. C-05.30 Sheet 1 of 7

№ 1214311

NO	DESCRIPTION OF REVISIONS	MADE BY	DATE
1	ADDED NOTE, REVISED VIEW & REISSUED STANDARD DRAWING	MLF	5/12
2			
3			
4			



TWO CROSSING DIRECTIONS
AT CORNER



ONE CROSSING DIRECTION
AT CORNER

GENERAL NOTES

1. Ramp centerline shall be radial from the face of the curb at the sidewalk ramp control point.
2. For ramps 15-ft long or less, the 15:1 slope governs. If a 15:1 slope results in a ramp length longer than 15-ft, the 15:1 slope may be waived and the ramp length held at 15-ft, regardless of the slope.
3. Drainage inlets should not be located within the marked crosswalks, or if crosswalks aren't marked, within the area a standard marked crosswalk would enclose.
4. Concrete shall receive a rough broom finish as shown. The side slope wings do not receive a broom finish.
5. The Engineer may approve replacing the side slope wing with a curb at a location where access to the side of a ramp run is blocked by a pole, utility box, other obstruction, or by a non-accessible surface such as a dirt planter strip.
6. See Std Dwgs C-05.10 and C-05.20 for joint details.

■ Pedestrian Push Button Pole When Shown on Traffic Plans. See Traffic Signal Plans for Additional Information

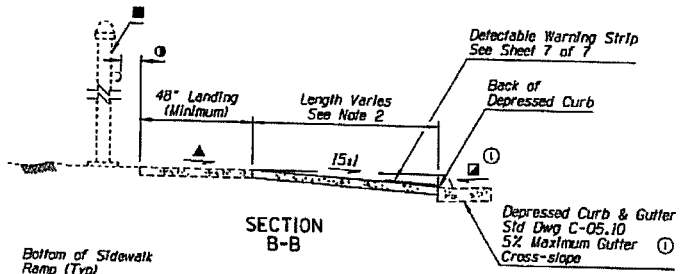
◑ 10" Maximum to Face of Pedestrian Push Button

LEGEND

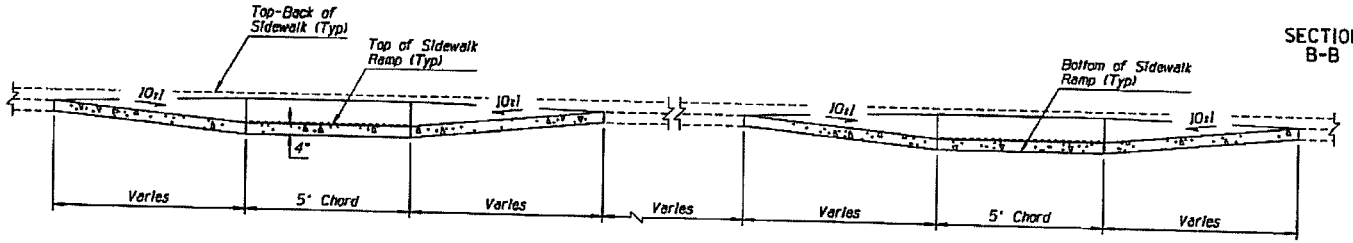
Minimum Slope = 100:1 (0.01 ft/ft)

Maximum Slope = 50:1 (0.02 ft/ft)

① Maximum Slope = 20:1 (0.05 ft/ft)



SECTION
B-B



SECTION
A-A

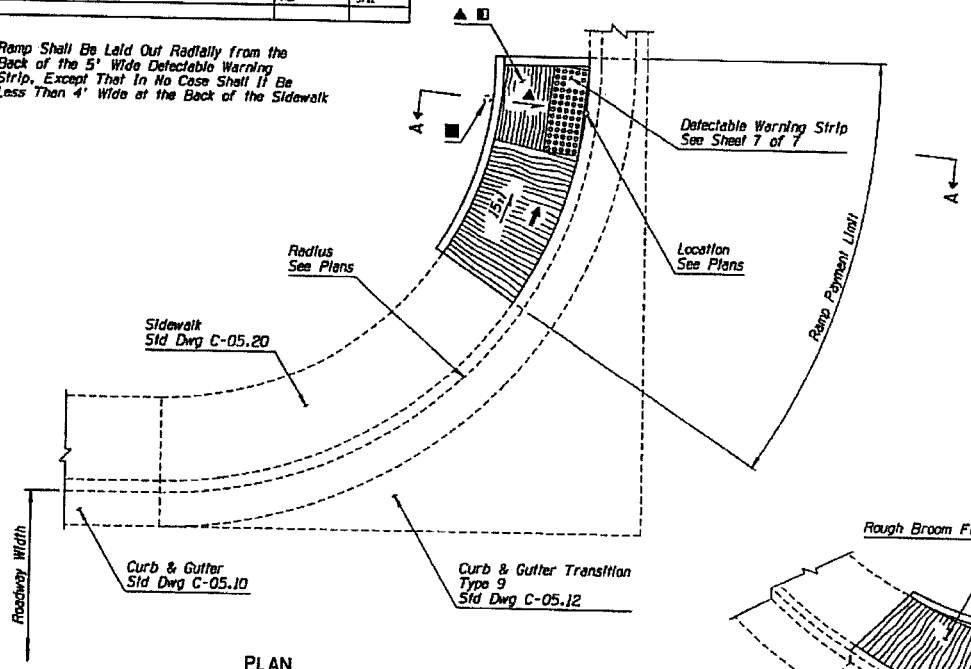
PERPENDICULAR CURB RAMP

APPROVED FOR DESIGN	STATE OF ARIZONA DEPARTMENT OF TRANSPORTATION ROADWAY STANDARD DRAWINGS	REV. 5/12
APPROVED FOR DISTRIBUTION	SIDEWALK RAMP TYPE B	DRAWING NO. C-05.30 Sheet 2 of 7

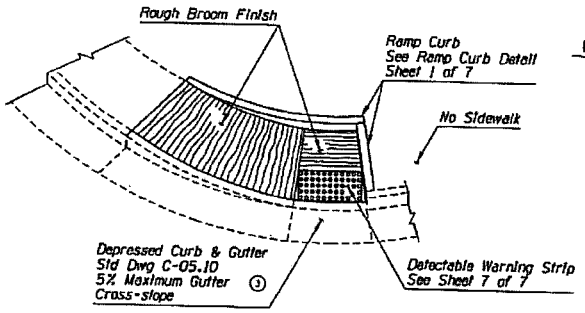
№ 1214311

NO	DESCRIPTION OF REVISIONS	MADE BY	DATE
1	REVISED GENERAL NOTE 3: SLOPES & LENGTHS	RLF	11/06
2	DELETED GENERAL NOTE 8	RLF	5/07
3	ADDED NOTE 6 & REVISED VIEW	RLF	5/12
4			

■ Ramp Shall Be Laid Out Radially from the Back of the 5' Wide Detectable Warning Strip, Except That In No Case Shall It Be Less Than 4' Wide at the Back of the Sidewalk



PLAN



PERSPECTIVE

GENERAL NOTES

1. For use where sidewalk is not continuous.
2. Ramp centerline shall be radial from the face of the curb at the Sidewalk Ramp Control Point.
① 3. For ramps 15-ft long or less, the 15:1 slope governs. If a 15:1 slope results in a ramp length longer than 15-ft, the 15:1 slope may be waived and the ramp length held at 15-ft, regardless of the slope.
4. The top of the Ramp Curb along the back of the Sidewalk Ramp shall match the elevation of the adjacent back of sidewalk and run parallel to the Sidewalk Ramp. The Ramp Curb along the side of the Sidewalk Ramp shall match the elevation at the back of the Curb & Gutter and the back of Ramp Curb.
5. Drainage Inlets should not be located within the marked crosswalks, or if crosswalks aren't marked, within the area a standard marked crosswalk would enclose.
6. Concrete shall receive a rough broom finish as shown.
7. See Std Dwgs C-05.10 and C-05.20 for joint details.

② ■ Pedestrian Push Button Pole When Shown on Traffic Plans. See Traffic Signal Plans for Additional Information

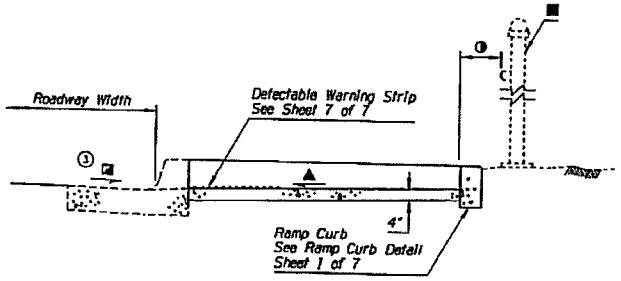
◑ 10" Maximum to Face of Pedestrian Push Button

LEGEND

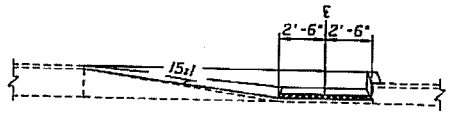
▲ Minimum Slope = 100:1 (0.01 ft/ft)

Maximum Slope = 50:1 (0.02 ft/ft)

◪ Maximum Slope = 20:1 (0.05 ft/ft) ③



SECTION A-A



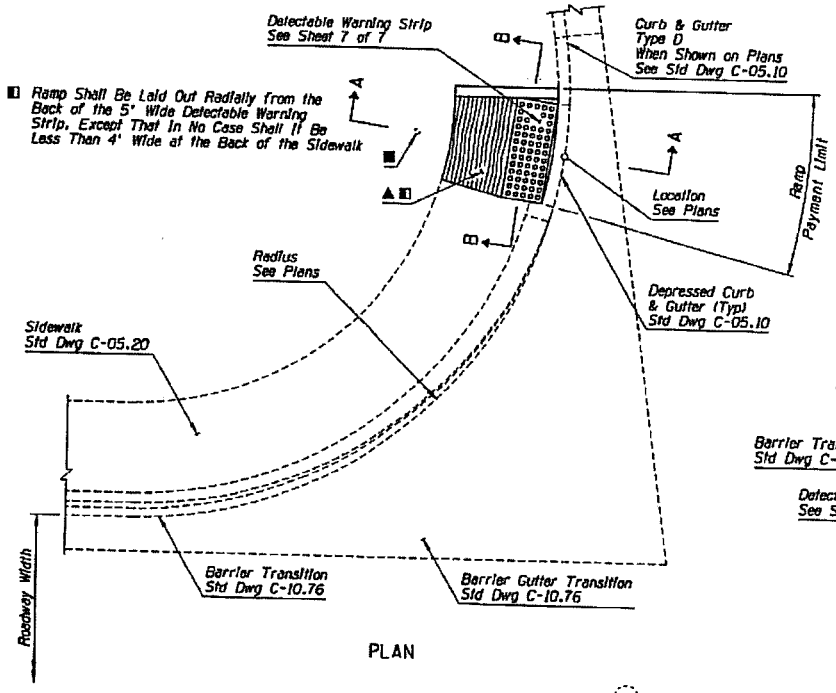
ELEVATION
DEPRESSED CURB AT SIDEWALK RAMP

SIDEWALK RAMP AT SIDEWALK TERMINUS

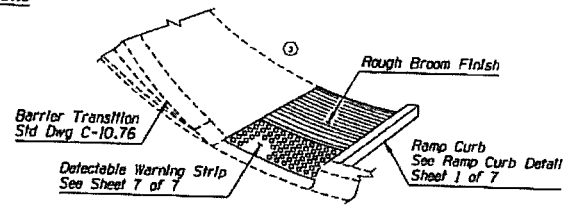
APPROVED FOR DESIGN	STATE OF ARIZONA DEPARTMENT OF TRANSPORTATION ROADWAY STANDARD DRAWINGS	REV. 5/12
APPROVED FOR DISTRIBUTION	SIDEWALK RAMP TYPE C	DRAWING NO. C-05.30 Sheet 3 of 7

№ 1214311

NO	DESCRIPTION OF REVISIONS	MADE BY	DATE
1	REISSUED STANDARD DRAWING	RLF	4/06
2	DELETED GENERAL NOTE 7	RLF	5/07
3	REVISED VIEW: REMOVED CURB	RLF	5/07
4	ADDED NOTE & REVISED VIEW	RLF	5/12



PLAN



PERSPECTIVE

GENERAL NOTES

1. For use where sidewalk is not continuous.
2. Ramp centerline shall be radial from the face of the curb at the Sidewalk Ramp Control Point.
3. The top of the Ramp Curb along the back of the Sidewalk Ramp shall match the elevation of the adjacent back of sidewalk and run parallel to the Sidewalk Ramp. The Ramp Curb along the side of the Sidewalk Ramp shall match the elevation at the back of the Curb & Gutter and the back of Ramp Curb.
4. Drainage inlets should not be located within marked crosswalks, or if crosswalks aren't marked, within the area a standard marked crosswalk would enclose.
5. Concrete shall receive a rough broom finish as shown.
6. See Std Dwgs C-05.10 and C-05.20 for joint details.

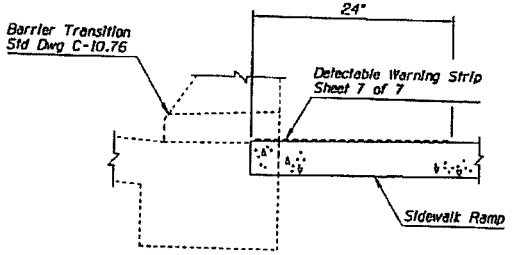
■ Pedestrian Push Button Post When Shown on Traffic Plans. See Traffic Signal Plans for Additional Information ②

● 10" Maximum to Face of Pedestrian Push Button

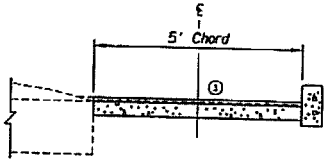
LEGEND

▲ Minimum Slope = 100:1 (0.01 '/ft)
Maximum Slope = 50:1 (0.02 '/ft)

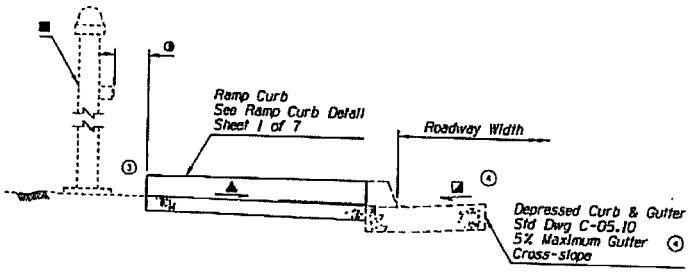
◪ Maximum Slope = 20:1 (0.05 '/ft) ④



DETAIL



SECTION B-B



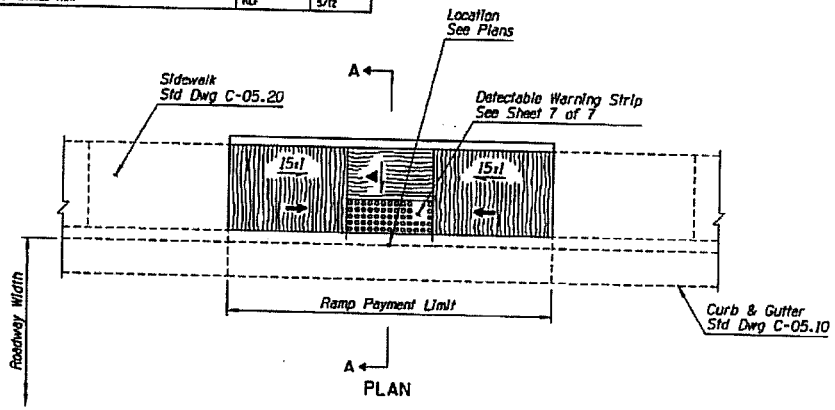
SECTION A-A

SIDEWALK RAMP AT SIDEWALK TERMINUS
SIDEWALK BEHIND BARRIER

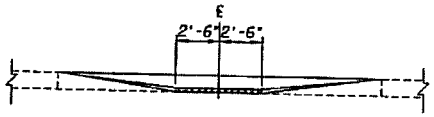
APPROVED FOR DESIGN	STATE OF ARIZONA DEPARTMENT OF TRANSPORTATION ROADWAY STANDARD DRAWINGS	REV. 5/12
APPROVED FOR DISTRIBUTION	SIDEWALK RAMP TYPE D	DRAWING NO. ① C-05.30 Sheet 4 of 7

№ 1214311

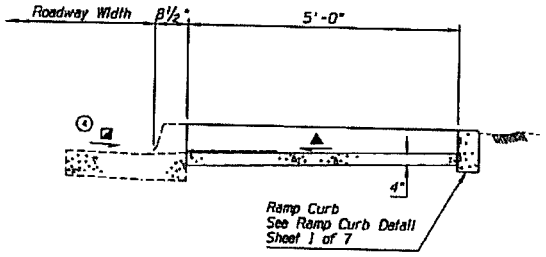
NO	DESCRIPTION OF REVISIONS	MADE BY	DATE
1	REISSUED STD DWG	RLF	4/06
2	REVISED GENERAL NOTE	RLF	4/06
3	DELETED GENERAL NOTE 9	RLF	5/07
4	ADDED NOTE 8 REVISED VIEW	RLF	5/12



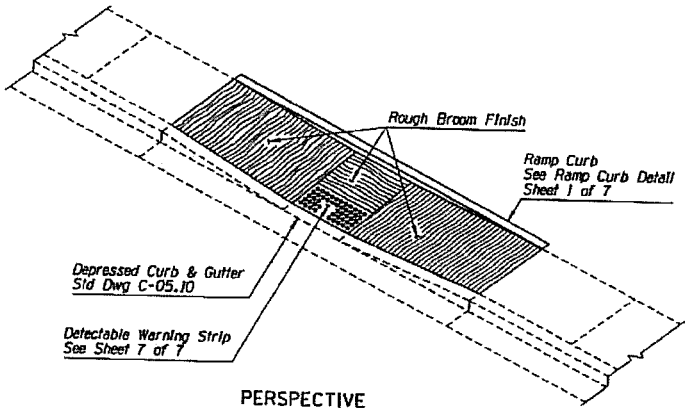
PLAN



ELEVATION
DEPRESSED CURB AT SIDEWALK RAMP



SECTION A-A



PERSPECTIVE

GENERAL NOTES

1. For use at mid-block locations.
2. Ramp centerline shall be perpendicular to the face of the curb at the Sidewalk Ramp Control Point.
3. For ramps 15-ft long or less, the 15:1 slope governs. If a 15:1 slope results in a ramp length longer than 15-ft, the 15:1 slope may be waived and the ramp length held at 15-ft, regardless of the slope.
4. For sidewalk widths greater than shown on C-05.20, the overall Sidewalk Ramp depth shall match the sidewalk width.
5. Ramp curb height to match elevation at back of adjacent sidewalk.
6. Drainage inlets should not be located within the marked crosswalks, or if crosswalks aren't marked, within the area a standard marked crosswalk would enclose.
7. Concrete shall receive a rough broom finish as shown.
8. See Std Dwgs C-05.10 and C-05.20 for joint details.

LEGEND

Minimum slope = 100:1 (0.01 ft/ft)

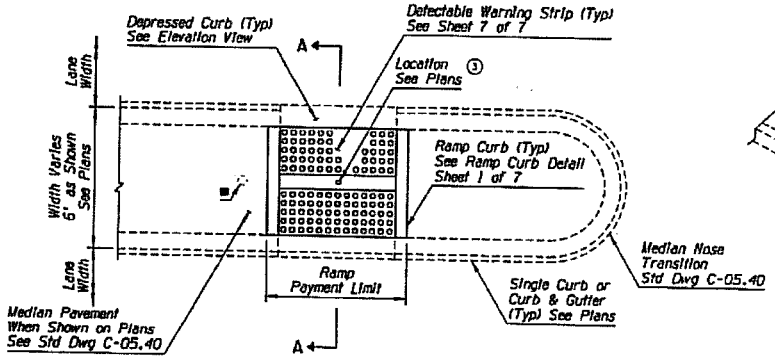
Maximum slope = 50:1 (0.02 ft/ft)

Maximum Slope = 20:1 (0.05 ft/ft)

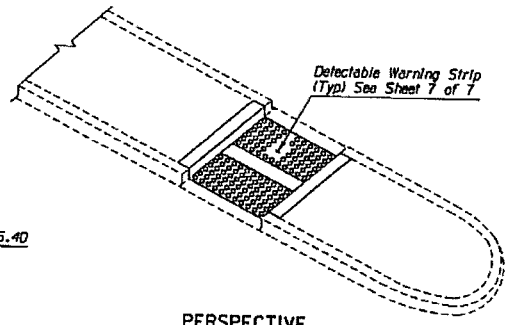
APPROVED FOR DESIGN	STATE OF ARIZONA DEPARTMENT OF TRANSPORTATION ROADWAY STANDARD DRAWINGS	REV. 5/12
APPROVED FOR DISTRIBUTION	SIDEWALK RAMP TYPE E	DRAWING NO. 1 C-05.30 Sheet 5 of 7

№ 1214311

NO	DESCRIPTION OF REVISIONS	MADE BY	DATE
1	REISSUED STANDARD AS SHEET 6 OF 7	RLF	9/04
2	ADDED GENERAL NOTE 4	RLF	7/05
3	REVISED NOTE	RLF	7/05
4	DELETED GENERAL NOTE 4	RLF	5/07



PLAN



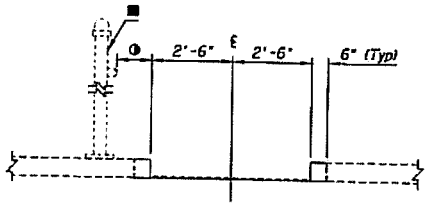
PERSPECTIVE
(For Median Widths Greater Than 5'-5")

GENERAL NOTES

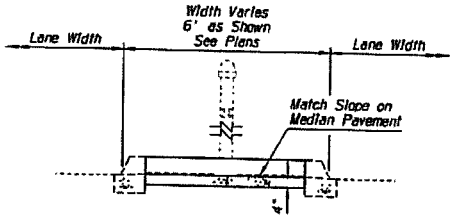
1. For median widths 5'-5" and less, the Detectable Warning Strip shall be continuous from back-of-curb to back-of-curb. The Detectable Warning Strip shall not extend beyond the back of curb. Modular units such as bricks or tiles shall be used to construct the Detectable Warning Strip. Partial domes at the edge of the Strip shall be ground flush with the brick or tile surface.
2. Use Type A1 curb if median is to be landscaped.
3. Single curb shown; see plans for Curb & Gutter application.

② ■ Pedestrian Push Button Pole When Shown on Plans.
④ See Traffic Signal Plans for Additional Information

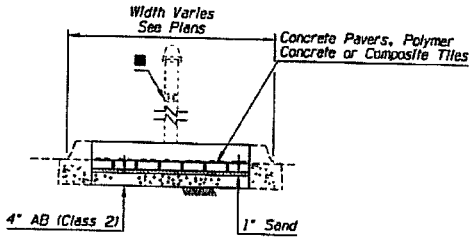
◑ 10" Maximum to Face of Pedestrian Push Button



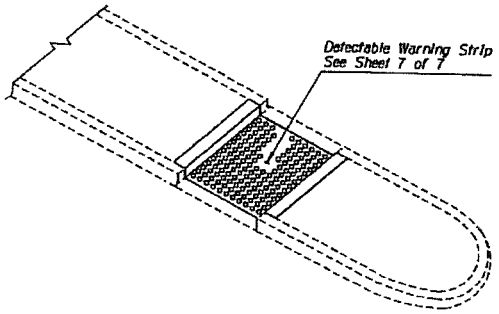
ELEVATION
DEPRESSED CURB AT SIDEWALK RAMP



SECTION A-A
(For Median Widths Greater Than 5'-5")



SECTION A-A
(For Median Widths Less Than 5'-5")



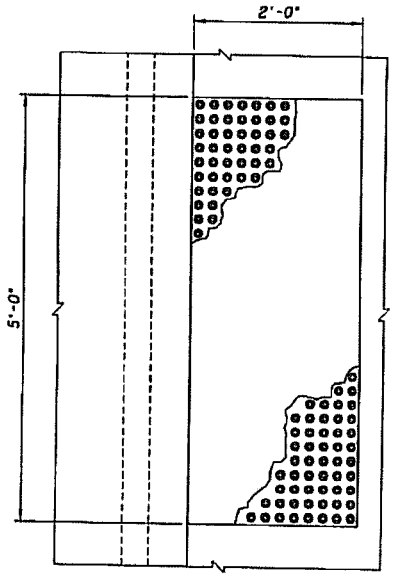
PERSPECTIVE
(For Median Widths 5'-5" And Less)
See Note 1

SIDEWALK RAMP AT MEDIAN ISLAND CROSSING

APPROVED FOR DESIGN	STATE OF ARIZONA DEPARTMENT OF TRANSPORTATION ROADWAY STANDARD DRAWINGS	REV. 5/12
APPROVED FOR DISTRIBUTION	SIDEWALK RAMP TYPE F	DRAWING NO. ① C-05.30 Sheet 6 of 7

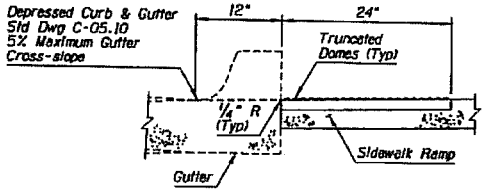
№ 1214311

NO	DESCRIPTION OF REVISIONS	MADE BY	DATE
1	REVISED VIEW & REISSUED STANDARD DRAWING	RLF	5/12
2			
3			
4			

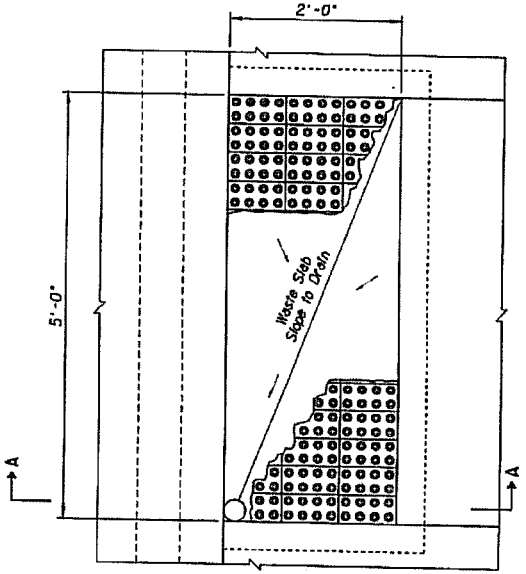


DETECTABLE WARNING STRIP

PLAN

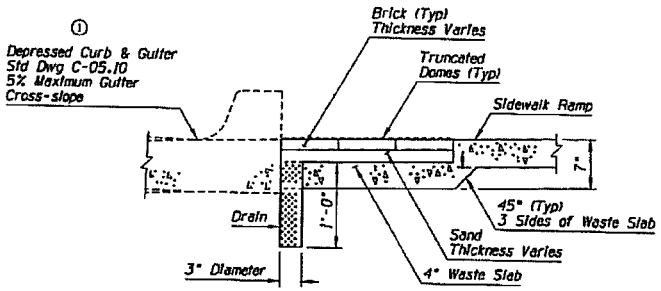


SECTION



DETECTABLE WARNING STRIP
BRICK OPTION

PLAN



DETECTABLE WARNING STRIP
BRICK OPTION

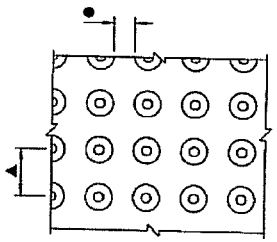
SECTION A-A

GENERAL NOTES

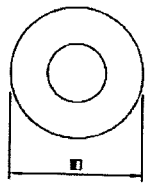
1. Drain shall be placed in low corner and filled with coarse aggregate (AASHTO N43 Size 7) securely tied in a long-life geotextile sack.

LEGEND

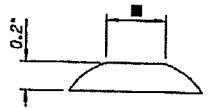
- ● 5/16" Minimum (Typ) (0.65 in. Minimum ADA Actual)
- ▲ 1 5/8" to 2 3/8" (Typ) (1.6 in. to 2.4 in. ADA Actual)
- ◧ 7/8" to 1 3/8" (Typ) (0.9 in. to 1.4 in. ADA Actual)
- ■ 50% to 65% of ◧



TEXTURE PATTERN DETAIL



TRUNCATED DOME
DETAIL



TRUNCATED DOME
ELEVATION

DETECTABLE WARNING STRIP DETAIL

APPROVED FOR DESIGN	STATE OF ARIZONA DEPARTMENT OF TRANSPORTATION ROADWAY STANDARD DRAWINGS	REV. 5/12
APPROVED FOR DISTRIBUTION	SIDEWALK RAMP DETECTABLE WARNING STRIP	DRAWING NO. ① C-05.30 Sheet 7 of 7

№ 1214311

Corrine Garey

From: Sardar Chalabe
Sent: Monday, April 06, 2015 8:18 AM
To: John Knobbe; Corrine Garey
Cc: Isaac A. Canez
Subject: RE: Asphalt Mix Design for ADOT SR387 (Pinal Ave.) and Cholla St.
Attachments: 20150406081129086.pdf

Good Morning Corrine,
Attached mix design is approved for use. Thanks

From: John Knobbe [mailto:jknobbe@azwater.com]
Sent: Monday, April 06, 2015 7:40 AM
To: Sardar Chalabe
Cc: Corrine Garey; Isaac A. Canez
Subject: RE: Asphalt Mix Design for ADOT SR387 (Pinal Ave.) and Cholla St.

Hi Sardar,

Please see the mix design from Calportland. The Contractor that will be doing the work sent me this mix design after I provided the initial mix design and would prefer to use Calportland.

Thanks,

John Knobbe
Lead Designer
Arizona Water Company
3805 N. Black Canyon Hwy.
Phoenix, AZ 85015
PO Box 29006
Phoenix, Az 85038-9006
Phone: 602.240.6860
Fax: 602.294.2169

From: Sardar Chalabe [mailto:SChalabe@azdot.gov]
Sent: Monday, April 06, 2015 7:25 AM
To: John Knobbe
Cc: Corrine Garey; Isaac A. Canez
Subject: RE: Asphalt Mix Design for ADOT SR387 (Pinal Ave.) and Cholla St.

Please send me the full design package . Who is the supplier and what is the pit # CM# that they mine the aggregate. If you have any questions let me know. Thanks

From: Corrine Garey
Sent: Thursday, April 02, 2015 10:02 AM
To: Sardar Chalabe
Subject: FW: Asphalt Mix Design for ADOT SR387 (Pinal Ave.) and Cholla St.

№ 1214311

Hi Sardar,

We finally got the mix design for this project. Will you please review and let me know if this is OK?

Thanks

Corrine E. Garey
TR Engineering Permit Tech III
1221 S. 2nd Ave
Tucson AZ 85713
520.388.4225
cgarey@azdot.gov

ADOT

From: John Knobbe [mailto:jknobbe@azwater.com]
Sent: Wednesday, April 01, 2015 2:44 PM
To: Corrine Garey; Travis Kuhnert
Subject: RE: Asphalt Mix Design for ADOT SR387 (Pinal Ave.) and Cholla St.

Hi Corrine,

Finally got the mix design. Please see attached.

Thanks,

John Knobbe

Lead Designer

Arizona Water Company

3805 N. Black Canyon Hwy.

Phoenix, AZ 85015

PO Box 29006

№ 1214311

Phoenix, Az 85038-9006

Phone: 602.240.6860

Fax: 602.294.2169

From: Corrine Garey [mailto:CGarey@azdot.gov]
Sent: Friday, March 20, 2015 4:47 PM
To: Travis Kuhnert
Cc: John Knobbe
Subject: FW: Asphalt Mix Design for ADOT SR387 (Pinal Ave.) and Cholla St.

Hi Travis,

I will be leaving this permit on your desk. It is already signed, all we are waiting on is the submittal of the mix design. Sardar will need to approve it. Once it is approved, please include a copy in the permit and pdf the permit to John who is copied on this e-mail.

Thanks a bunch!

Corrine E. Garey
TR Engineering Permit Tech III
1221 S. 2nd Ave
Tucson AZ 85713
520.388.4225
cgarey@azdot.gov

ADOT

From: Corrine Garey
Sent: Friday, March 20, 2015 2:51 PM
To: 'John Knobbe'
Cc: Sardar Chalabe; Travis Kuhnert
Subject: RE: Asphalt Mix Design for ADOT SR387 (Pinal Ave.) and Cholla St.

Hi John,

Unfortunately ADOT cannot provide the mix design. Please have the supplier send us their proposed mix design and we will review it.

Thank you,

№ 1214311

Corrine E. Garey
TR Engineering Permit Tech III
1221 S. 2nd Ave
Tucson AZ 85713
520.388.4225
cgarey@azdot.gov

ADOT

From: John Knobbe [mailto:jknobbe@azwater.com]
Sent: Friday, March 20, 2015 2:33 PM
To: Corrine Garey
Subject: FW: Asphalt Mix Design for ADOT SR387 (Pinal Ave.) and Cholla St.

Corrine,

Do you have the mix design spec.?

Thanks,

John Knobbe

Lead Designer

Arizona Water Company

3805 N. Black Canyon Hwy.

Phoenix, AZ 85015

PO Box 29006

Phoenix, Az 85038-9006

Phone: 602.240.6860

Fax: 602.294.2169

№ 1214311

From: Jerman, Jerry [mailto:jermanj@vmcmail.com]
Sent: Friday, March 20, 2015 2:28 PM
To: John Knobbe
Subject: Re: Asphalt Mix Design for ADOT SR387 (Pinal Ave.) and Cholla St.

Please send the mix design specs, I do not think we have a current mix design with a 76-16 but we may have one for the Cemex plants we just took over. We better start with the mix design to see where we stand. Thanks JJ

Jerry Jerman

Senior Sales Rep

Vulcan Materials

602-284-4911

Jermanj@vmcmail.com

On Fri, Mar 20, 2015 at 1:57 PM, John Knobbe <jknobbe@azwater.com> wrote:

Hi Jerry,

Thanks for returning my call. For the 409 AC mix design ADOT requires PG 76-16 for this project.

Also, the quantity for the 11ft.x2in.x100ft. mill and overlay is approx. 6.5 cubic yards.

AWC's contractor is B&F Contracting.

If you require additional information to provide the asphalt mix design please feel free to contact me.

Thanks,

John Knobbe

Lead Designer

Arizona Water Company

3805 N. Black Canyon Hwy.

Phoenix, AZ 85015

PO Box 29006

Phoenix, Az 85038-9006

Phone: 602.240.6860

Fax: 602.294.2169

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№ 1214311

Asphalt Design Summary

(75 Blow Marshall Method)

Western Technologies Inc.

WTI Project No.:	214431.010	Date:	11-03-14
WTI Lab No.:	H010-23A	Mix Type:	3/4" ADOT 409 Miscellaneous Structural
Project Name:	Various	Client:	CalPortland
Project Nos.:	Various	Asphalt Source:	Western Refining
TRACS Nos.:	Various		Tucson, AZ Asphalt Terminal
Project Loc.:	Various	Asphalt Grade:	PG 70-10
Source of Aggregate:	CalPortland Orange Grove & APC Pits	Type of Admix:	CalPortland Type II Cement (Wet Mixed)

Composite Aggregate Gradation

Aggregate	Lab No.	Percentage
M.A. Fines	H010-23A	39.0
Washed Sand	H010-23B	15.0
3/8" M.A.	H010-23C	16.0
5/8" M.A.	H010-23D	20.0
1" M.A.	H010-23E	10.0
Type II Cement	Cement	1.0

Sieve (US/mm)	Composite w/Admix	Spec. > 2" w/Admix	Composite w/Admix	Spec. > 2" w/Admix
2" / 50	100		100	
1.35" / 31.5	100		100	
1" / 25	100	(100)	100	(100)
3/4" / 19	97	(90-100)	97	(90-100)
1/2" / 12.5	88		88	
3/8" / 9.5	77	(70-85)	77	(70-85)
1/4" / 6.3	65		66	
#4 / 4.75	60		61	
#8 / 2.36	44	(41-51)	44	(42-52)
#10 / 2.00	40		40	
#16 / 1.18	28		29	
#30 / .600	17		18	
#40 / .425	13		14	
#50 / .300	10		11	
#100 / .150	6		7	
#200 / .075	4.4	(2.0-5.0)	5.3	(3.0-6.5)

Immersion Compression - ARIZ 802:

6.10 % Total Binder

1.0 Type II Cement

		Specification
Dry Strength (psi)	477.1	
Wet Strength (psi)	324.8	150 Min
Index of Retained Strength (%)	68.0	60 Min

Recommended % Asphalt: 6.1

Mix Type: 3/4" ADOT 409 Miscellaneous Structural

Asphalt Source: Western Refining, Tucson Asphalt Terminal

Asphalt Grade: PG 70-10

Admix Source: CalPortland, Rillito, AZ

Lab Mixing Temperature: 315°F - 326°F (Actual 320°F)

Lab Compaction Temperature: 295°F - 303°F (Actual 300°F)

Design Data:				Design	Spec.
% Total Binder	5.5	6.0	6.5	6.1	
Bulk Sp. Gravity	2.223	2.223	2.230	2.226	
Bulk Density (pcf)	138.6	138.6	139.3	138.7	
Stability (lbf)	3880	4290	4080	4244	
Flow (0.01 inch)	13	13	13	13	
Effective Voids (%)	6.6	6.0	4.7	5.7	5.3-5.7
VMA (%)	16.8	17.2	17.2	17.2	14.5-18.5
Effective Asph. (%)	4.56	5.07	5.57	5.17	
Dust/Bitumen Ratio	1.16	0.86	0.70	1.0	
Absorbed Asphalt (%)	0.00				0-1.0
Max. Theo. Specific Gravity	2.381	2.364	2.361	2.361	
Max. Theo. Density (pcf)	148.3	147.3	147.1	147.1	

	Aggregate / Admix Properties / Sp. Gr.				
Property	Coarse	Fine	Combined	Spec. w/Admix	Combined w/Admix
Bulk (Dry) Sp. Gravity:	2.589	2.475	2.519	2.350-2.850	2.524
"SSD" Sp. Gravity:	2.617	2.529	2.563		2.568
Apparent Sp. Gravity:	2.664	2.617	2.635		2.640
Water Absorption(%):	1.10	2.19	1.57	0-2.5	1.57
Admixture Sp. Gravity:	3.140	Asphalt Sp. Gravity @ 77°F:			1.0002
Effective Sp. Gravity:	2.589				

Sand Equivalent value (AASHTO T176):	65	55 Min
AZ 212 One or More Fractured Faces, (No. 4 (%):	99	70 Min
AZ 212 Two or More Fractured Faces, (No. 4 (%):	99	---
(AZ 247) Uncompacted Voids (%):	45.7	---
(ARIZ 238) Carbonates (%):	19	20 Max
(AASHTO T96) L.A. Abrasion @ 100 Rev. (%):	*6 / **6	9 Max
(AASHTO T96) L.A. Abrasion @ 500 Rev. (%):	*22 / **24	40 Max

*Historical Orange Grove **Historical APC Quarry

Registered Professional Engineer (Civil) CERTIFICATE NO. 39527 RAPHAEL TIXIER Date Signed 11-3-14 ARIZONA, U.S.A.

Page 3

Approval of this mix design shall not relieve the contractor of full responsibility for the results obtained.

Project Use Permit

By: Sahib Chalal

ADOT Tucson Regional Materials Engineer

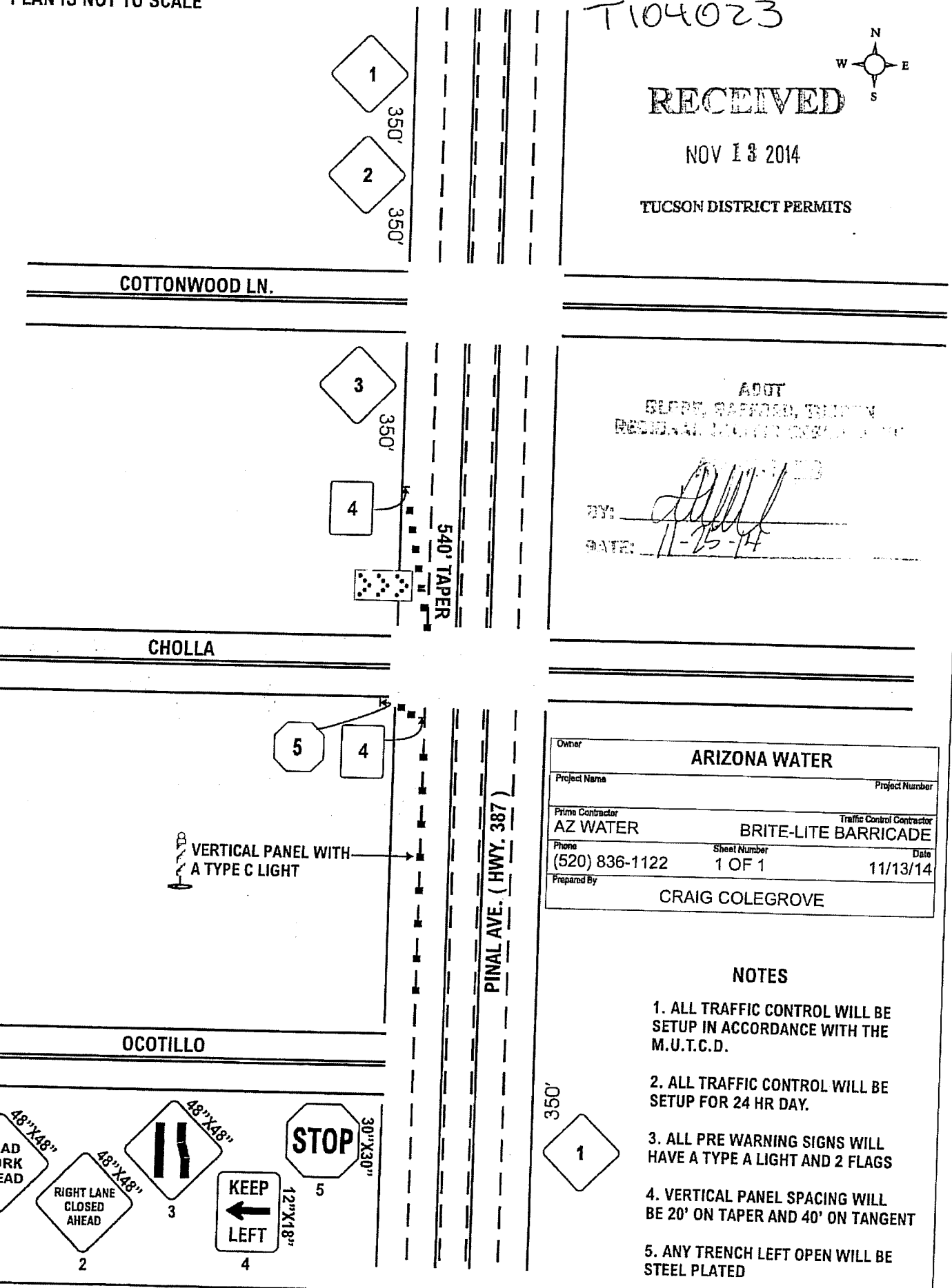
Date: 4/6/15

№ 1214311

CG-

PLAN IS NOT TO SCALE

T104023



RECEIVED

NOV 13 2014

TUCSON DISTRICT PERMITS

ADOT

BY:

DATE: 11-25-14

Owner	ARIZONA WATER	
Project Name		Project Number
Prime Contractor		Traffic Control Contractor
AZ WATER		BRITE-LITE BARRICADE
Phone	Sheet Number	Date
(520) 836-1122	1 OF 1	11/13/14
Prepared By	CRAIG COLEGROVE	

NOTES

1. ALL TRAFFIC CONTROL WILL BE SETUP IN ACCORDANCE WITH THE M.U.T.C.D.
2. ALL TRAFFIC CONTROL WILL BE SETUP FOR 24 HR DAY.
3. ALL PRE WARNING SIGNS WILL HAVE A TYPE A LIGHT AND 2 FLAGS
4. VERTICAL PANEL SPACING WILL BE 20' ON TAPER AND 40' ON TANGENT
5. ANY TRENCH LEFT OPEN WILL BE STEEL PLATED

№ 1214311

Client#: 4741 SANGABRI

ACORD™ CERTIFICATE OF LIABILITY INSURANCE

DATE (MM/DD/YYYY): 2/27/2015

THIS CERTIFICATE IS ISSUED AS A MATTER OF INFORMATION ONLY AND CONFERS NO RIGHTS UPON THE CERTIFICATE HOLDER. THIS CERTIFICATE DOES NOT AFFIRMATIVELY OR NEGATIVELY AMEND, EXTEND OR ALTER THE COVERAGE AFFORDED BY THE POLICIES BELOW. THIS CERTIFICATE OF INSURANCE DOES NOT CONSTITUTE A CONTRACT BETWEEN THE ISSUING INSURER(S), AUTHORIZED REPRESENTATIVE OR PRODUCER, AND THE CERTIFICATE HOLDER.

IMPORTANT: If the certificate holder is an ADDITIONAL INSURED, the policy(ies) must be endorsed. If SUBROGATION IS WAIVED, subject to the terms and conditions of the policy, certain policies may require an endorsement. A statement on this certificate does not confer rights to the certificate holder in lieu of such endorsement(s).

PRODUCER Edgewood Partners Ins Center #0B29370 (909) 919-7880 3633 Inland Empire Blvd. #640 Ontario, CA 91764	CONTACT NAME: Liam Russell PHONE (A/C, No, Ext): 949-417-9161 FAX (A/C, No): 949-263-0906 E-MAIL ADDRESS: liam.russell@epicbrokers.com
INSURED Arizona Water Company P.O. Box 29006 Phoenix, AZ 85038-9006	INSURER(S) AFFORDING COVERAGE — NAIC # INSURER A: Arch Insurance Company — 11150 INSURER B: INSURER C: INSURER D: INSURER E: INSURER F:

COVERAGES CERTIFICATE NUMBER: REVISION NUMBER:

THIS IS TO CERTIFY THAT THE POLICIES OF INSURANCE LISTED BELOW HAVE BEEN ISSUED TO THE INSURED NAMED ABOVE FOR THE POLICY PERIOD INDICATED. NOTWITHSTANDING ANY REQUIREMENT, TERM OR CONDITION OF ANY CONTRACT OR OTHER DOCUMENT WITH RESPECT TO WHICH THIS CERTIFICATE MAY BE ISSUED OR MAY PERTAIN, THE INSURANCE AFFORDED BY THE POLICIES DESCRIBED HEREIN IS SUBJECT TO ALL THE TERMS, EXCLUSIONS AND CONDITIONS OF SUCH POLICIES. LIMITS SHOWN MAY HAVE BEEN REDUCED BY PAID CLAIMS.

INSR LTR	TYPE OF INSURANCE	ADDL INSR	SUBR WVD	POLICY NUMBER	POLICY EFF (MM/DD/YYYY)	POLICY EXP (MM/DD/YYYY)	LIMITS	
A	GENERAL LIABILITY [X] COMMERCIAL GENERAL LIABILITY [ ] CLAIMS-MADE [X] OCCUR GEN'L AGGREGATE LIMIT APPLIES PER: [ ] POLICY [ ] PRO-JECT [X] LOC	X	X	GWPKG0092608	03/01/2015	03/01/2016	EACH OCCURRENCE DAMAGE TO RENTED PREMISES (Ea occurrence) MED EXP (Any one person) PERSONAL & ADV INJURY GENERAL AGGREGATE PRODUCTS - COMP/OP AGG	$1,000,000 $100,000 $10,000 $3,000,000 $3,000,000 $3,000,000
A	AUTOMOBILE LIABILITY [X] ANY AUTO [ ] ALL OWNED AUTOS [ ] SCHEDULED AUTOS [X] HIRED AUTOS [X] NON-OWNED AUTOS	X	X	GWPKG0092608	03/01/2015	03/01/2016	COMBINED SINGLE LIMIT (Ea accident) BODILY INJURY (Per person) BODILY INJURY (Per accident) PROPERTY DAMAGE (Per accident)	$1,000,000 $ $ $
A	[ ] UMBRELLA LIAB [X] OCCUR [X] EXCESS LIAB [ ] CLAIMS-MADE [ ] DED [ ] RETENTION $			GWFXS0092604	03/01/2015	03/01/2016	EACH OCCURRENCE AGGREGATE	$10,000,000 $10,000,000
	WORKERS COMPENSATION AND EMPLOYERS' LIABILITY ANY PROPRIETOR/PARTNER/EXECUTIVE OFFICER/MEMBER EXCLUDED? Y/N [ ] (Mandatory in NH) If yes, describe under DESCRIPTION OF OPERATIONS below	N/A					WC STATU-TORY LIMITS / OTH-ER E.L. EACH ACCIDENT E.L. DISEASE - EA EMPLOYEE E.L. DISEASE - POLICY LIMIT	$ $ $

APPROVED
MAR 17 2015
ADOT - ASD
RISK MANAGEMENT

DESCRIPTION OF OPERATIONS / LOCATIONS / VEHICLES (Attach ACORD 101, Additional Remarks Schedule, if more space is required)

The State of Arizona, ADOT and it's Departments, Agencies, Boards, Commissions, Universities, Officers, Officials, Agents & Employees shall be named as additional insureds with respect to liability arising out of activities performed by or on behalf of the permittee or contractor, waiver of subrogation applies.

CERTIFICATE HOLDER

Arizona Dept of Transportation
& the State of Arizona
1221 S. 2nd Ave.
Tucson, AZ 85713

CANCELLATION

SHOULD ANY OF THE ABOVE DESCRIBED POLICIES BE CANCELLED BEFORE THE EXPIRATION DATE THEREOF, NOTICE WILL BE DELIVERED IN ACCORDANCE WITH THE POLICY PROVISIONS.

AUTHORIZED REPRESENTATIVE

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№ 1214311

CERTIFICATE OF LIABILITY INSURANCE

1/1/2016

DATE (MM/DD/YYYY) 12/29/2014

THIS CERTIFICATE IS ISSUED AS A MATTER OF INFORMATION ONLY AND CONFERS NO RIGHTS UPON THE CERTIFICATE HOLDER. THIS CERTIFICATE DOES NOT AFFIRMATIVELY OR NEGATIVELY AMEND, EXTEND OR ALTER THE COVERAGE AFFORDED BY THE POLICIES BELOW. THIS CERTIFICATE OF INSURANCE DOES NOT CONSTITUTE A CONTRACT BETWEEN THE ISSUING INSURER(S), AUTHORIZED REPRESENTATIVE OR PRODUCER, AND THE CERTIFICATE HOLDER.

IMPORTANT: If the certificate holder is an ADDITIONAL INSURED, the policy(ies) must be endorsed. If SUBROGATION IS WAIVED, subject to the terms and conditions of the policy, certain policies may require an endorsement. A statement on this certificate does not confer rights to the certificate holder in lieu of such endorsement(s).

PRODUCER	Lockton Insurance Brokers, LLC 725 S. Figueroa Street, 35th Fl. CA License #0F15767 Los Angeles CA 90017 (213) 689-0065
CONTACT NAME:	
PHONE (A/C, No, Ext):	FAX (A/C, No):
E-MAIL ADDRESS:	
INSURED	1348151 Arizona Water Company PO BOX 29006 Phoenix AZ 85038

INSURER(S) AFFORDING COVERAGE	NAIC #
INSURER A : SCF Indemnity Insurance Company	13928
INSURER B :	
INSURER C :	
INSURER D :	
INSURER E :	
INSURER F :	

COVERAGES ARIWA01 CERTIFICATE NUMBER: 11579320 REVISION NUMBER: XXXXXXX

THIS IS TO CERTIFY THAT THE POLICIES OF INSURANCE LISTED BELOW HAVE BEEN ISSUED TO THE INSURED NAMED ABOVE FOR THE POLICY PERIOD INDICATED. NOTWITHSTANDING ANY REQUIREMENT, TERM OR CONDITION OF ANY CONTRACT OR OTHER DOCUMENT WITH RESPECT TO WHICH THIS CERTIFICATE MAY BE ISSUED OR MAY PERTAIN, THE INSURANCE AFFORDED BY THE POLICIES DESCRIBED HEREIN IS SUBJECT TO ALL THE TERMS, EXCLUSIONS AND CONDITIONS OF SUCH POLICIES. LIMITS SHOWN MAY HAVE BEEN REDUCED BY PAID CLAIMS.

INSR LTR	TYPE OF INSURANCE	ADDL INSD	SUBR WVD	POLICY NUMBER	POLICY EFF (MM/DD/YYYY)	POLICY EXP (MM/DD/YYYY)	LIMITS	
	COMMERCIAL GENERAL LIABILITY			NOT APPLICABLE			EACH OCCURRENCE	$ XXXXXXX
	CLAIMS-MADE OCCUR						DAMAGE TO RENTED PREMISES (Ea occurrence)	$ XXXXXXX
							MED EXP (Any one person)	$ XXXXXXX
							PERSONAL & ADV INJURY	$ XXXXXXX
	GEN'L AGGREGATE LIMIT APPLIES PER:						GENERAL AGGREGATE	$ XXXXXXX
	POLICY PRO-JECT LOC						PRODUCTS - COMP/OP AGG	$ XXXXXXX
	OTHER							$
	AUTOMOBILE LIABILITY			NOT APPLICABLE			COMBINED SINGLE LIMIT (Ea accident)	$ XXXXXXX
	ANY AUTO						BODILY INJURY (Per person)	$ XXXXXXX
	ALL OWNED AUTOS / SCHEDULED AUTOS						BODILY INJURY (Per accident)	$ XXXXXXX
	HIRED AUTOS / NON-OWNED AUTOS						PROPERTY DAMAGE (Per accident)	$ XXXXXXX
								$
	UMBRELLA LIAB OCCUR			NOT APPLICABLE			EACH OCCURRENCE	$ XXXXXXX
	EXCESS LIAB CLAIMS-MADE						AGGREGATE	$ XXXXXXX
	DED RETENTION $							$
A	WORKERS COMPENSATION AND EMPLOYERS' LIABILITY Y/N		Y	1009629	1/1/2015	1/1/2016	X PER STATUTE OTH-ER	
	ANY PROPRIETOR/PARTNER/EXECUTIVE OFFICER/MEMBER EXCLUDED? (Mandatory in NH) Y	N/A					E.L. EACH ACCIDENT	$ 1,000,000
	If yes, describe under DESCRIPTION OF OPERATIONS below						E.L. DISEASE - EA EMPLOYEE	$ 1,000,000
							E.L. DISEASE - POLICY LIMIT	$ 1,000,000

APPROVED
MAR 17 2015
ADOT - ASD
RISK MANAGEMENT

DESCRIPTION OF OPERATIONS / LOCATIONS / VEHICLES (Attach ACORD 101, Additional Remarks Schedule, may be attached if more space is required)
State of Arizona, its departments (ADOT), agencies, boards, commissions, universities and its officers, officials, agents and employees shall be named as additional insured's with respect to liability arising out of activities performed by or on behalf of the permittee or contractor, waiver of subrogation applies.

CERTIFICATE HOLDER

11579320

Arizona Department of Transportation
1221 South 2nd Ave
Tucson AZ 85713

CANCELLATION See Attachment

SHOULD ANY OF THE ABOVE DESCRIBED POLICIES BE CANCELLED BEFORE THE EXPIRATION DATE THEREOF, NOTICE WILL BE DELIVERED IN ACCORDANCE WITH THE POLICY PROVISIONS.

AUTHORIZED REPRESENTATIVE

Timothy G. Jones

ACORD 25 (2014/01)

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№ 1214311

SCF Arizona
and its subsidiary companies

CARRIER CODE SCF Indemnity - 93107
POLICY ENDORSEMENT
Please attach this endorsement to your policy
This endorsement changes the policy to which it is attached and is effective on the date issued unless otherwise stated.
If you have any questions, please contact your local SCF Arizona office.

Effective 12:01 AM	MO	DAY	YEAR	AMENDING POLICY NUMBER	MO	DAY	YEAR
1/1/2015				1009629			

Arizona Water Company
3805 N. Black Canyon Hwy
Phoenix, AZ 85038

Waiver of Our Right to Recover From Others Endorsement

We have the right to recover our payments from anyone liable for an injury covered by this policy. We will not enforce our right against the person or organization named in the Schedule. (This agreement applies only to the extent that you perform work under a written contract that requires you to obtain this agreement from us.)

This agreement shall not operate directly or indirectly to benefit anyone not named in the Schedule.

__ Schedule Job Name & Contract Number:

X Blanket Any and all Arizona jobs. This agreement applies only to the extent that you perform work under a written contract that requires you to obtain this agreement from us.

This endorsement changes the policy to which it is attached and is effective on the date issued unless otherwise stated.

Premium Charge: $0.00

61-1046 POLEND WC 00 03 13 © 1983 National Council on Compensation Insurance WC 00 03 13

Attachment Code : D470770
Certificate ID : 11579320

№ 1214311

CERTIFICATE OF LIABILITY INSURANCE

DATE (MM/DD/YYYY): 3/13/2015

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IMPORTANT: If the certificate holder is an ADDITIONAL INSURED, the policy(ies) must be endorsed. If SUBROGATION IS WAIVED, subject to the terms and conditions of the policy, certain policies may require an endorsement. A statement on this certificate does not confer rights to the certificate holder in lieu of such endorsement(s).

PRODUCER
Lovitt & Touche' Inc - Phoenix
P. O. Box 64985
Phoenix AZ 85082

CONTACT NAME: Janet Hardin
PHONE (A/C, No, Ext): 602-956-2250 FAX (A/C, No): 602-956-2258
E-MAIL ADDRESS: jhardin@lovitt-touche.com

INSURER(S) AFFORDING COVERAGE	NAIC #
INSURER A : Amerisure Insurance Company	19488
INSURER B : Amerisure Mutual Insurance	23396
INSURER C : Amerisure Partners Insurance Compan	
INSURER D :	
INSURER E :	
INSURER F :	

INSURED
B & F Contracting, Inc.
11011 N. 23rd Ave
Phoenix AZ 85029

BFCON-1

COVERAGES **CERTIFICATE NUMBER:** 818442496 **REVISION NUMBER:**

THIS IS TO CERTIFY THAT THE POLICIES OF INSURANCE LISTED BELOW HAVE BEEN ISSUED TO THE INSURED NAMED ABOVE FOR THE POLICY PERIOD INDICATED. NOTWITHSTANDING ANY REQUIREMENT, TERM OR CONDITION OF ANY CONTRACT OR OTHER DOCUMENT WITH RESPECT TO WHICH THIS CERTIFICATE MAY BE ISSUED OR MAY PERTAIN, THE INSURANCE AFFORDED BY THE POLICIES DESCRIBED HEREIN IS SUBJECT TO ALL THE TERMS, EXCLUSIONS AND CONDITIONS OF SUCH POLICIES. LIMITS SHOWN MAY HAVE BEEN REDUCED BY PAID CLAIMS.

INSR LTR	TYPE OF INSURANCE	ADDL INSD	SUBR WVD	POLICY NUMBER	POLICY EFF (MM/DD/YYYY)	POLICY EXP (MM/DD/YYYY)	LIMITS	
A	X COMMERCIAL GENERAL LIABILITY CLAIMS-MADE [X] OCCUR GEN'L AGGREGATE LIMIT APPLIES PER: POLICY [X] PRO-JECT [ ] LOC OTHER:	Y	Y	CPP2072909	11/1/2014	11/1/2015	EACH OCCURRENCE DAMAGE TO RENTED PREMISES (Ea occurrence) MED EXP (Any one person) PERSONAL & ADV INJURY GENERAL AGGREGATE PRODUCTS - COMP/OP AGG $	$1,000,000 $1,000,000 $10,000 $1,000,000 $2,000,000 $2,000,000 $
A	AUTOMOBILE LIABILITY X ANY AUTO ALL OWNED AUTOS SCHEDULED AUTOS X HIRED AUTOS X NON-OWNED AUTOS	Y	Y	CA20729080401	11/1/2014	11/1/2015	COMBINED SINGLE LIMIT (Ea accident) BODILY INJURY (Per person) BODILY INJURY (Per accident) PROPERTY DAMAGE (Per accident) $	$1,000,000 $ $ $ $
B	X UMBRELLA LIAB X OCCUR EXCESS LIAB CLAIMS-MADE DED X RETENTION $0	Y	Y	CU2089945	11/1/2014	11/1/2015	EACH OCCURRENCE AGGREGATE $	$8,000,000 $8,000,000 $
C	WORKERS COMPENSATION AND EMPLOYERS' LIABILITY ANY PROPRIETOR/PARTNER/EXECUTIVE OFFICER/MEMBER EXCLUDED? (Mandatory in NH) Y/N [ ] N/A If yes, describe under DESCRIPTION OF OPERATIONS below		Y	WC2095039(AZ)	1/1/2015	1/1/2016	X PER STATUTE OTH-ER E.L. EACH ACCIDENT E.L. DISEASE - EA EMPLOYEE E.L. DISEASE - POLICY LIMIT	 $1,000,000 $1,000,000 $1,000,000
A	Work Comp & Empl Liab(NV)	N	Y	WC2095040 (NV)	1/1/2015	1/1/2016	EL Each Accident EL Disease Ea Emp EL Disease Pol Limit	$1,000,000 $1,000,000 $1,000,000

APPROVED
MAR 17 2015
ADOT - ASD
RISK MANAGEMENT

DESCRIPTION OF OPERATIONS / LOCATIONS / VEHICLES (ACORD 101, Additional Remarks Schedule, may be attached if more space is required)

Certificate Holder and owner (if applicable) are additional insureds as respects general liability, automobile liability and excess liability if required in a written contract per the attached forms. Waiver of Subrogation applies to the general liability and auto liability and workers compensation if required in a written contract per the attached form. The general liability insurance is primary and certificate holder's insurance is non-contributory if required by written contract per the attached form.
State of Arizona, its departments (ADOT), agencies, boards, commissions, universities and its officers, officials, agents and employees; Arizona Water Company are additional insureds if required by written contract.

CERTIFICATE HOLDER

Arizona Department of Transporation
PO Box 2100
Phoenix AZ 85001-2100

CANCELLATION

SHOULD ANY OF THE ABOVE DESCRIBED POLICIES BE CANCELLED BEFORE THE EXPIRATION DATE THEREOF, NOTICE WILL BE DELIVERED IN ACCORDANCE WITH THE POLICY PROVISIONS.

AUTHORIZED REPRESENTATIVE
Dennis M. Tsosie

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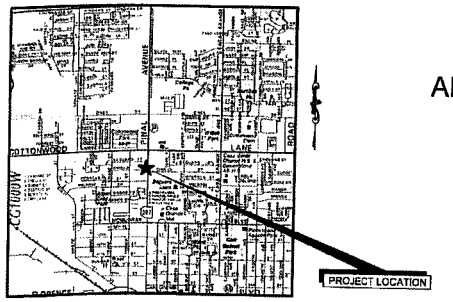
The ACORD name and logo are registered marks of ACORD

№ 1214311

SAW CUT 6'x 11' AC OVER TOP OF WATER LINE LOCATION AND REMOVE AND REPLACE ONE SIDEWALK PANEL WITH 3,000 PSI CONCRETE ALONG CHOLLA STREET, LOCATED WITHIN THE NE 1/4 SEC. 19, T. 6 S., R. 6 E. OF THE G. & S. R. B. & M.



VICINITY MAP

GENERAL NOTES

1. All work and materials shall conform to current County Health Department Standards and Revisions, Arizona Water Company Standard Specifications and Details, and Arizona Department of Health Services Engineering Bulletin No. 10.
2. Permits required will be secured from the appropriate agency, i.E. county permit in county right-of-way.
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9. Air releases valves are required at water system high points per Arizona Water Company standard details.
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13. In accordance with AAC R18-4-215, all materials added after January 1, 1993 which may come in contact with drinking water, shall conform to National Sanitation Foundation Standards 60 and 61.
14. All water services shall be set a minimum of 2 Feet on the customers property and NOT within right-of-way.
15. Unless otherwise specified on the construction drawings, all water mains are to be installed 5 Feet from the property line inside the right-of-way or easement.
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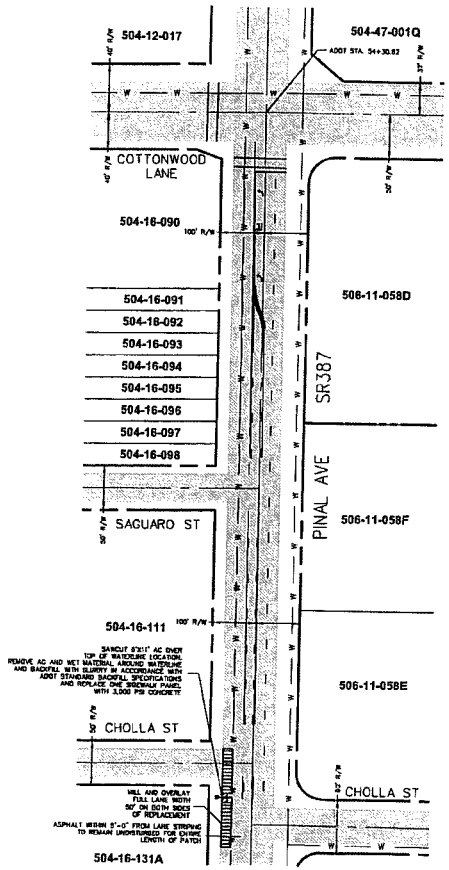
17. Maximum Joint Deflection For 6" Mechanical Joint Ductile Iron Pipe is 7°-7' Or 27" For 18 Foot Length Pipe, For A Maximum Curve Of 145 Feet.
18. Maximum Joint Deflection For 6", 8", & 12" Push-On Joint Ductile Iron Pipe is 5°Or 19" For 18 Foot Length Pipe, For A Maximum Curve Of 205 Feet.
19. Maximum Joint Deflection For 8" & 12" Mechanical Joint Ductile Iron Pipe is 5°-21' Or 20' For 18 Foot Length Pipe, For A Maximum Curve Of 195 Feet.



LEGEND

- STREET CENTERLINE/MONUMENT LINE
- RIGHT-OF-WAY LINE
- PROPERTY LINE
- EX. WATER LINE
- ASPHALT PATCH
- MILL AND OVERLAY AREA (50' BOTH SIDES)
- EX. ASPHALT AREA

ADOT ASPHALT REPLACEMENT NOTES:

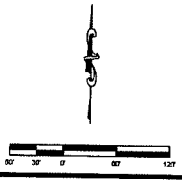
1. Existing pavement shall be saw cut full depth for the trench prior to any excavation.

2. Cement treated slurry backfill meeting ADOT Standard Specifications **501-3.02** and **501-3.04** shall be used in the trench crossing the roadway. Slurry shall be placed full depth of the trench up to the bottom of the existing asphaltic concrete (AC). Steel plates meeting traffic loading requirements shall be placed over the trench and slurry allowed setting a minimum of 24 hours without disturbance. Four feet wide cold mix AC wedges shall be used to hold steel plates in place.

3. Once the slurry is set, AC meeting the requirements of ADOT Standard Specification Section 409 shall be placed in the trench in lifts and properly compacted to the surface of the existing pavement. The thickness of replacement asphalt concrete shall match the existing thickness.

4. In the event the roadway is paved with **Rubberized Asphalt Concrete Friction Course (AR-ACFC), it shall be replaced in kind.**

5. Once the AC patch is completed, all affected travel lanes and shoulders where the patch was placed shall be milled in compliance with ADOT Standard Specification **202-3.03(C)** to a depth of two inches for a length of one hundred feet (fifty feet each side of patch). If the roadway is overlaid with AR-ACFC, the mill depth shall be two and one half (2-½) inches. The milled trench shall be properly cleaned and a Tack Coat placed on all surfaces, including the edges, which meet the requirements of ADOT Standard Specification **404-3.12**. The entire milled surface is then overlaid with two inches of AC meeting the requirements of ADOT Standard Specification Sections 409 and one half inch of AR-ACFC (if present) meeting the requirements of Standard Specification Section 414.



ARIZONA WATER COMPANY
3805 N. BLACK CANYON HWY. POST OFFICE BOX 29006
PHOENIX, ARIZONA 85038-9006
(602) 240-6860

PROJECT DESC: SAW CUT 6'x 11' AC OVER TOP OF WATER LINE LOCATION AND REMOVE AND REPLACE ONE SIDEWALK PANEL WITH 3,000 PSI CONCRETE ALONG CHOLLA STREET.

PROJECT SHEET TITLE: COVER SHEET

DRAWN BY: MC | CHECKED BY:

DATE: 12/11/2014 | SCALE: AS SHOWN

DWG NO: D403

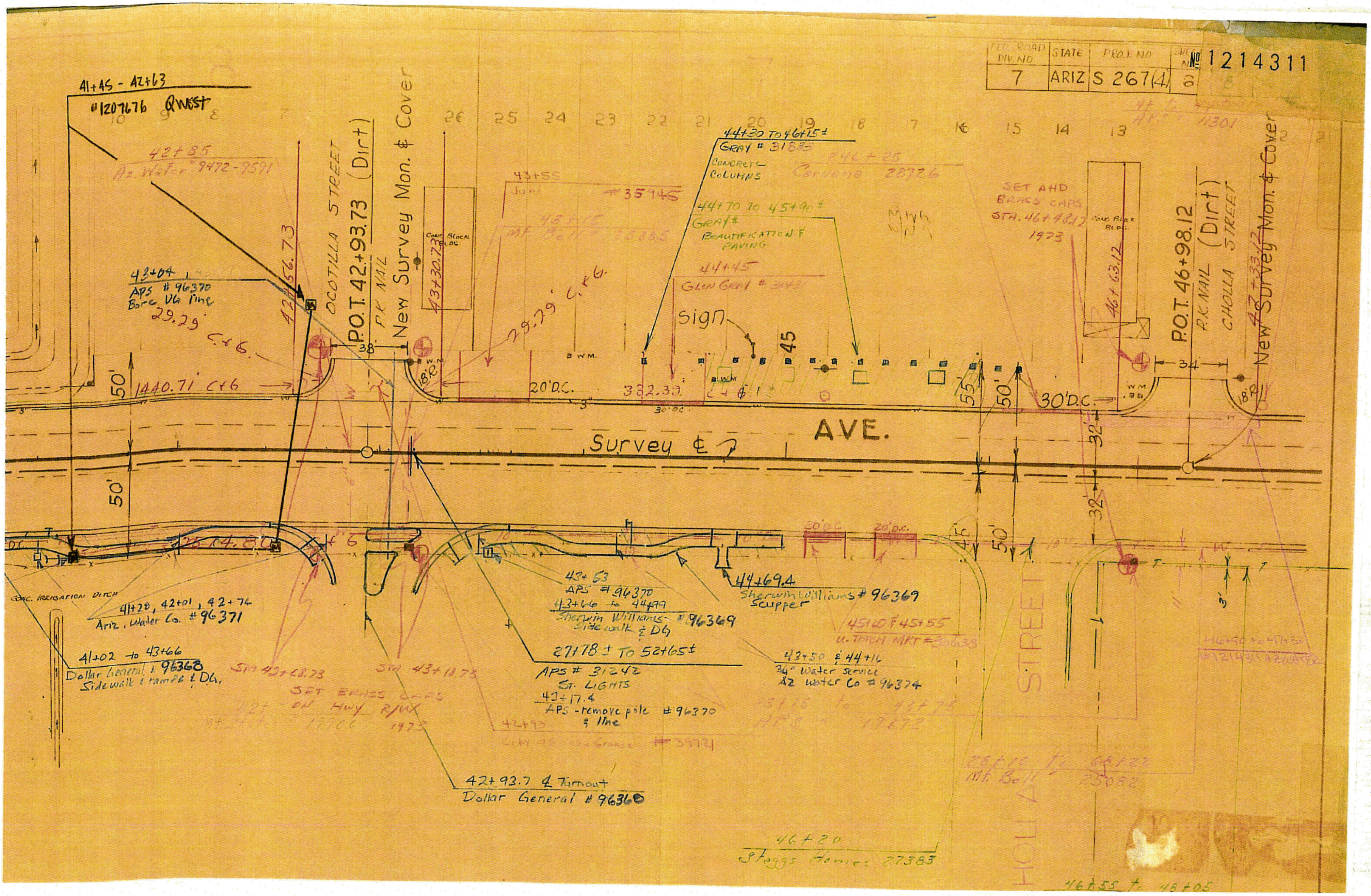
CITY/TOWN: PINAL VALLEY

DESC: NE 1/4 SEC. 19, T. 6 S., R. 6 E.

AT&T: 263-1100 | 1-800-STAKE-IT

The installation shown is to be installed in accordance with the Arizona Water Company Standard Specifications and in accordance with the Arizona Department of Environmental Quality

SHEET 1 OF 1



FED. ROAD DIV. NO. 7
STATE ARIZ
PROJ. NO S 267(4)
№ 1214311
41+45 - 42+63
#1207676 QWEST
42+85
Az. Water #9472-9591
43+04
APS # 96370
Bore UG line
29.29'
C&G.
42+56.73
OCOTILLA STREET
P.O.T. 42+93.73 (Dirt)
P.K. NAIL
New Survey Mon. & Cover
43+30.73
Conc. Block Bldg.
43+55
29.79' C&G.
44+20 TO 46+15±
GRAY # 31835
CONCRETE COLUMNS
44+70 TO 45+90±
GRAY #
BEAUTIFICATION & PAVING
44+45
GLEN GRAY # 3143
Sign
45
SET AHD BRASS CAPS
STA. 46+48.12
1973
46+63.12
P.O.T. 46+98.12
P.K. NAIL (Dirt)
CHOLLA STREET
47+33.12
New Survey Mon. & Cover
50'
1440.71' C&G
20' D.C.
332.39
30' D.C.
18'R
34
32
AVE.
Survey ℄
Conc. Irrigation Ditch
41+28, 42+01, 42+74
Ariz. Water Co. #96371
41+02 to 43+66
Dollar General #96368
Sidewalk & ramps & DG.
STA 42+28.73
STA 43+18.73
SET BRASS CAPS
ON HWY R/W
1973
42+93.7 ℄ Turnout
Dollar General #96368
43+63
APS #96370
43+66 to 44+99
Sherwin Williams #96369
Sidewalk & DG
27+78± To 52+65±
APS # 31242
St. Lights
43+17.4
APS - remove pole #96370 & line
44+69.4
Sherwin Williams #96369
Scupper
45+20 & 45+55
U-Totem MKT
43+50 & 44+16
3/4" Water service
AZ Water Co #96374
46+20
Staggs Homes 27383
CHOLLA STREET
46+55 to 48+05

Asphalt Design Summary (75 Blow Marshall Method) Western Technologies Inc.

WTI Project No.:	2144JL010	Date:	11-03-14
WTI Lab No.:	H010-23A	Mix Type:	3/4" ADOT 409 Miscellaneous Structural
Project Name:	Various	Client:	CalPortland
Project Nos.:	Various	Asphalt Source:	Western Refining
TRACS Nos.:	Various		Tucson, AZ Asphalt Terminal
Project Loc.:	Various	Asphalt Grade:	PG 70-10
Source of Aggregate:	CalPortland Orange Grove & APC Pits	Type of Admix.:	CalPortland Type II Cement (Wet Mixed)

Composite Aggregate Gradation

Aggregate	Lab No.	Percentage
M.A. Fines	H010-23A	39.0
Washed Sand	H010-23B	15.0
3/8" M.A.	H010-23C	16.0
5/8" M.A.	H010-23D	20.0
1" M.A.	H010-23E	10.0
Type II Cement	Cement	1.0

Sieve (US/mm)	Composite wo/ Admix	Spec. > 2" wo/ Admix	Composite w/ Admix	Spec. > 2" w/ Admix
2" / 50	100		100	
1.25" / 31.5	100		100	
1" / 25	100	(100)	100	(100)
3/4" / 19	97	(90-100)	97	(90-100)
1/2" / 12.5	88		88	
3/8" / 9.5	77	(70-85)	77	(70-85)
1/4" / 6.3	65		66	
#4 / 4.75	60		61	
#8 / 2.36	44	(41-51)	44	(42-52)
#10 / 2.00	40		40	
#16 / 1.18	28		29	
#30 / .600	17		18	
#40 / .425	13		14	
#50 / .300	10		11	
#100 / .150	6		7	
#200 / .075	4.4	(2.0-5.0)	5.3	(3.0-6.5)

Immersion Compression - ARIZ 802:

6.10 % Total Binder 1.0 Type II Cement		Specification
Dry Strength (psi)	477.1	
Wet Strength (psi)	324.6	150 Min
Index of Retained Strength (%)	68.0	60 Min

Registered Professional Engineer (Civil) CERTIFICATE NO. 39527 RAPHAEL TIXIER Date Signed 11.3.14 ARIZONA, U.S.A.

Recommended % Asphalt: 6.1

Mix Type: 3/4" ADOT 409 Miscellaneous Structural
Asphalt Source: Western Refining, Tucson Asphalt Terminal
Asphalt Grade: PG 70-10
Admix Source: CalPortland, Rillito, AZ
Lab Mixing Temperature: 315°F - 326°F (Actual 320°F)
Lab Compaction Temperature: 295°F - 303°F (Actual 300°F)

Design Data:				Design	Spec.
% Total Binder	5.5	6.0	6.5	6.1	
Bulk Sp. Gravity	2.223	2.223	2.236	2.226	
Bulk Density (pcf)	138.5	138.6	139.3	138.7	
Stability (lbf)	3880	4290	4060	4244	
Flow (0.01 inch)	13	13	13	13	
Effective Voids (%)	6.6	6.0	4.7	5.7	5.3-5.7
VMA (%)	16.8	17.2	17.2	17.2	14.5-18.5
Effective Asph. (%)	4.56	5.07	5.57	5.17	
Dust/Bitumen Ratio	1.16	0.86	0.78	1.0	
Absorbed Asphalt (%)	0.99				0-1.0
Max. Theo. Specific Gravity	2.381	2.364	2.361	2.361	
Max. Theo. Density (pcf)	148.3	147.3	147.1	147.1	

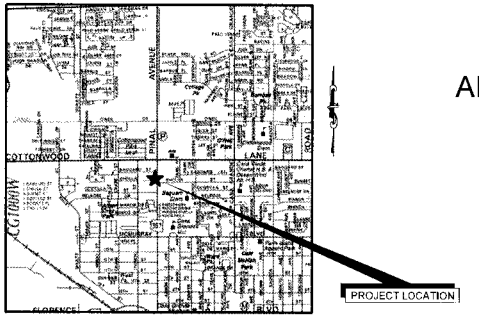
	Aggregate / Admix Properties / Sp. Gr.				
Property	Coarse	Fine	Combined	Spec. wo/Admix	Combined w/Admix
Bulk (Dry) Sp. Gravity:	2.589	2.475	2.519	2.350-2.850	2.524
"SSD" Sp. Gravity:	2.617	2.529	2.563		2.568
Apparent Sp. Gravity:	2.664	2.617	2.635		2.640
Water Absorption(%):	1.10	2.19	1.57	0-2.5	1.57
Admixture Sp. Gravity:	3.140		Asphalt Sp. Gravity @ 77°F:		1.0002
Effective Sp. Gravity:	2.589				

Sand Equivalent value (AASHTO T176):	65	55 Min
AZ 212 One or More Fractured Faces, +No. 4 (%):	99	70 Min
AZ 212 Two or More Fractured Faces, +No. 4 (%):	99	---
(AZ 247) Uncompacted Voids (%):	45.7	---
(ARIZ 238) Carbonates (%):	19	20 Max
(AASHTO T96) L.A. Abrasion @ 100 Rev. (%):	*6 / **6	9 Max
(AASHTO T96) L.A. Abrasion @ 500 Rev. (%):	*22 / **24	40 Max

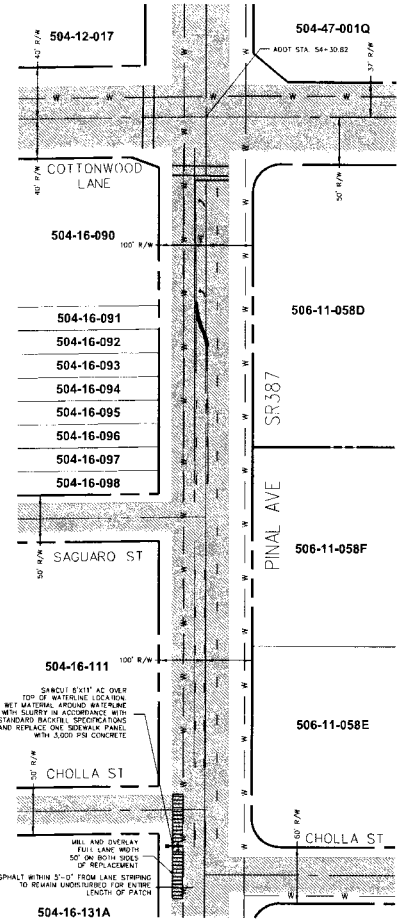
*Historical Orange Grove **Historical APC Quarry

Approval of this mix design shall not relieve the contractor of full responsibility for the results obtained.
Project No. Permit
By: Sarah Chalal
ADOT Tucson Regional Materials Engineer
Date: 4/6/15

SAW CUT 6'x 11' AC OVER TOP OF WATER LINE LOCATION AND REMOVE AND REPLACE ONE SIDEWALK PANEL WITH 3,000 PSI CONCRETE ALONG CHOLLA STREET, LOCATED WITHIN THE NE 1/4 SEC. 19, T. 6 S., R. 6 E. OF THE G. & S. R. B. & M.



VICINITY MAP



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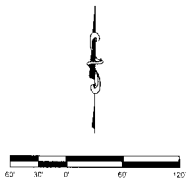

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263-1100
1-800-STAKE-IT

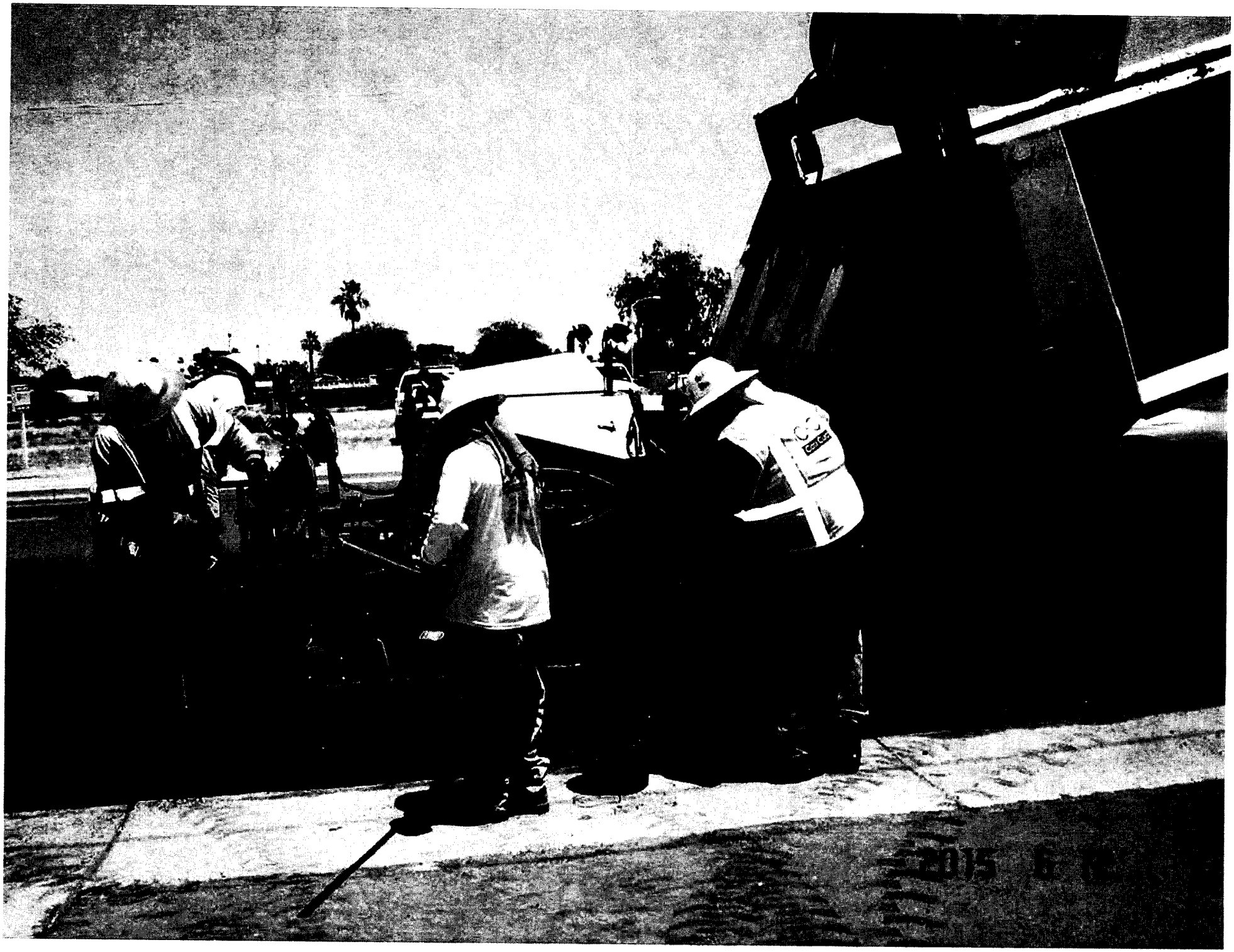
A.P.N.	
DISTRICT	PINAL VALLEY
LOCATION	NE 1/4 SEC. 19, T. 6 S., R. 6 E.
FILE NO.	0403
SCALE	AS SHOWN
DATE	12/11/2014
DRAWN BY	MC
CHECKED BY	

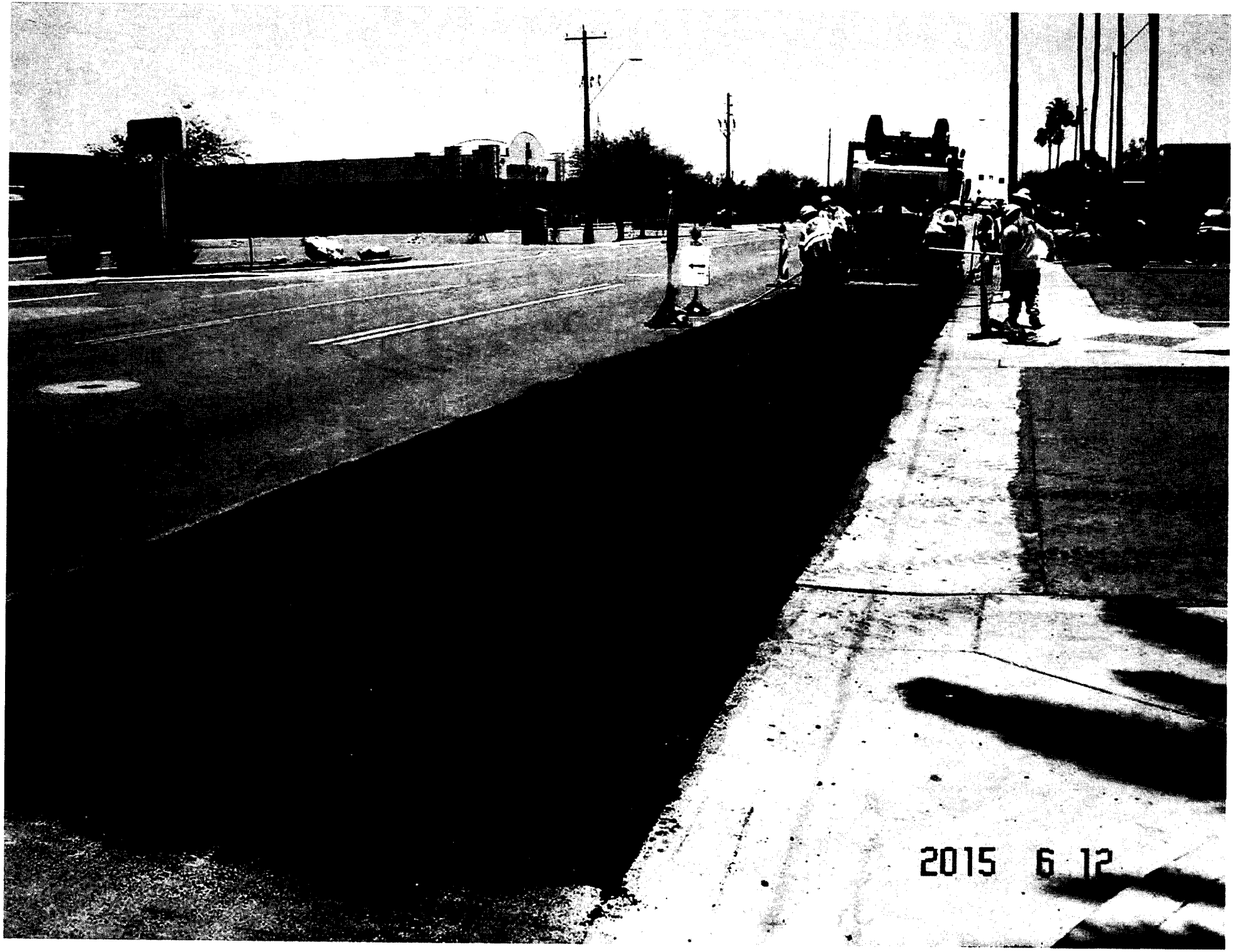
ARIZONA WATER COMPANY
3805 N. BLACK CANYON HWY. POST OFFICE BOX 29006
PHOENIX, ARIZONA 85038-9006
(602) 240-6860

PROJECT DESC: SAW CUT 6'X 11' AC OVER TOP OF WATER LINE LOCATION AND REMOVE AND REPLACE ONE SIDEWALK PANEL WITH 3,000 PSI CONCRETE ALONG CHOLLA STREET.

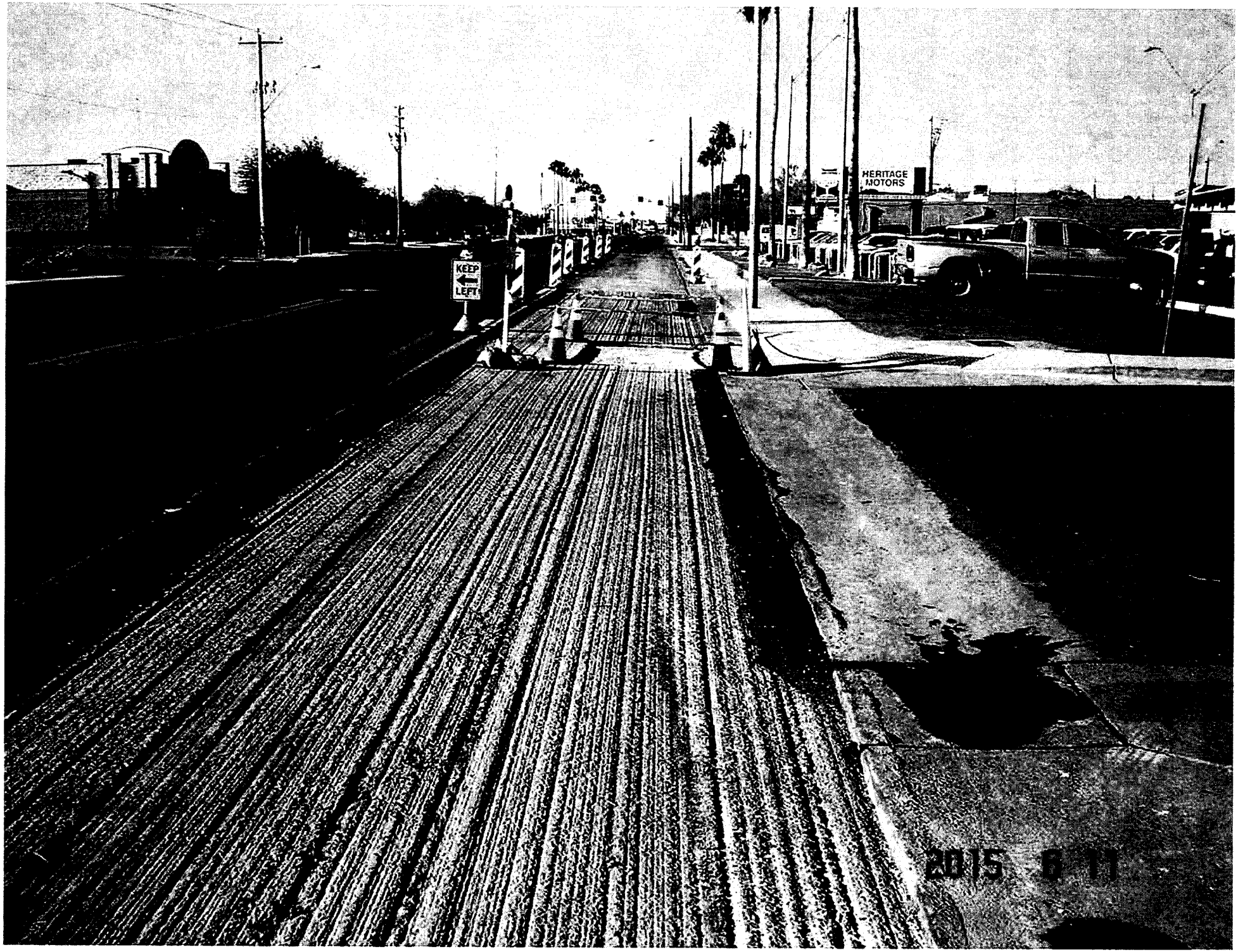
PROJECT SHEET DESC: COVER SHEET

SHEET 1 OF 1




2015 6 12

CAT
CB-534D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LEFT
HERITAGE
MOTORS
2015 6 11

KEEP
LEFT
CAUTION
CAUTION
CAUTION
CAUTION
CAUTION
CAUTION
2015 6

ARIZONA WATER COMPANY

CONSTRUCTION PLACED IN SERVICE NOTICE

WORK AUTHORIZATION NO.: 1-53411

DIVISION: CG/PV

DATE PLACED IN SERVICE: 6 | 20 | 15

CONTRACT NO:

FOR PURPOSES OF *MODIFIED ACCELERATED COST RECOVERY SYSTEM*, AN ASSET IS "PLACED IN SERVICE" WHEN IT IS IN A CONDITION OR STATE OF READINESS AND AVAILABILITY FOR A SPECIFICALLY ASSIGNED FUNCTION, WHETHER IT BE FOR USE IN A TRADE OR BUSINESS, OR FOR THE PRODUCTION OF INCOME.

I CERTIFY THAT THE ASSET(S) CONSTRUCTED PURSUANT TO THE PROVISIONS OF THE ABOVE-REFERENCED WORK AUTHORIZATION ARE READY FOR SERVICE AS OF THE DATE SHOWN ABOVE.

~~Division Manager~~ or Operations Superintendent
(signature)

7-14-15
Date

A-1-3-1
FKS 11/24/11

Western Group Rate Case

Exhibit FKS-1

5344 2nd St & Morrison

ARIZONA WATER COMPANY
WORK AUTHORIZATION

W.A. NUMBER: 1-5344
P.E. NUMBER:
BUDGET ITEM NO.: Special No. 15
SHEET NO.: 1 of 2

SYSTEM:	PINAL VALLEY	RETENTION REQUIRED:	☐ YES ☑ NO
DIVISION:	CASA GRANDE	WORK TO START BY:	UPON AUTHORIZATION
RESPONSIBLE PERSON:	RAY MURRIETA	WORK TO BE FINISHED BY:	WITHIN 60 DAYS
TAX CODE:	0402		

DESCRIPTION OF WORK:

Construct approximately 25 lf of 8-inch DIP water main, one 4-inch gate valve, and one 6-inch gate valve to replace 25 lf of 8-inch CI water main, one 4-inch gate valve and one 6-inch gate valve at 2nd Street and the alley west of Morrison Avenue.

FACTORS JUSTIFYING WORK:

While isolating a portion of the Pinal Valley distribution system company operators found two gate valves broken in the closed position. In the closed position the valves reduce available flow and pressure in this portion of the distribution system. The valves are over 50 years old and repair parts are not available. Replacing the valves is necessary to provide safe, reliable and adequate operation of the distribution system.

COST ESTIMATE		AUTHORIZATION	DATE
COST OF WORK:		PREPARED BY: James Wilson JW 4/30/15	4/14/15
MATERIAL	0	REVIEWED FOR ESMT/ROW VERIFICATION: Charles Briggs CB 04-30-2015	04-14-2015
LABOR	5,300		
CONTRACT PORTION	18,665	REVIEWED BY: Mario Mendez MM 4/30/15	4/14/15
OVERHEAD	2,900		
TOTAL AUTHORIZED EXPENDITURES CHARGEABLE TO THIS W.A.	$ 26,865	APPROVED BY ENGINEERING: Fredrick Schneider FS 5-2-15	4-15-15
FUNDS RECEIVED:		APPROVED BY FINANCE: Joseph Harris	4/20/15
CONTRIBUTIONS RECEIVED	0		
REFUNDABLE ADVANCES RECEIVED	0		
TOTAL CONTRIBUTIONS/ADVANCES	0		
NET COMPANY CASH REQUIRED	$ 26,865	SPECIAL ITEM EXCEEDING $10,000; AUTHORIZED BY PRESIDENT: William Garfield	4-20-2015
		SPECIAL ITEM EXCEEDING $10,000; AUTHORIZED BY CHAIRMAN: Approved via Fax M. L. Whitehead	4/24/15

COMMENTS:

Transfer $26,865 from 2015 Construction Contingency to fund this project.

CONSTRUCTION RELEASE:

RELEASED TO CONSTRUCTION
Authorized by FRED SCHNEIDER
Date _____

AFH

AJH

03/26/08| JTW:afh | WA XLS

ARIZONA WATER COMPANY

WORK AUTHORIZATION - DETAIL SHEET

W.A. NUMBER: 1-5344
P.E. NUMBER:
BUDGET ITEM NO.: Special No. 15
SHEET NO.:

	PLANT PROPERTY ACCOUNT	UNIT DESCRIPTION	QUANTITY	YEAR INSTALLED AND W.A. NUMBER
RETIREMENT PROPERTY UNITS	343	4-inch gate valve	1	1964
	343	6-inch gate valve	1	1954
	343	8-inch CI	25	1948

PROJECT DESCRIPTION:

Construct approximately 25 lf of 8-inch DIP water main, one 4-inch gate valve, and one 6-inch gate valve to replace 25 lf of 8-inch CI water main, one 4-inch gate valve and one 6-inch gate valve at 2nd Street and the alley west of Morrison Avenue.

	DESCRIPTION	PLANT PROP ACCT	QUANTITY	UNIT COST	TOTAL
CONTRACT WORK	Construct 8-inch DIP w/polywrap and related fittings	343	25	$ 162.00	$ 4,050
	Construct 6-inch gate valve	343	1	3,620.00	3,620
	Construct 4-inch gate valve	343	1	3,020.00	3,020
	Tie new DIP into existing pipe with related fittings	343	1	3,205.00	3,205
	Replace asphalt per City of Casa Grande specifications	343	1	3,910.00	3,910
	Contracting Tax	343	1	554.00	554
	Performance and Payment Bond	343	1	306.00	306
	SERVICE CONNECTIONS COMPLETE: DOUBLE-LONG	345			
	SERVICE CONNECTIONS COMPLETE: DOUBLE-SHORT	345			
	SERVICE CONNECTIONS COMPLETE: SINGLE-LONG	345			
	SERVICE CONNECTIONS COMPLETE: SINGLE-SHORT	345			
TOTAL CONTRACT WORK					$ 18,665
MATERIALS					
	SERVICE CONNECTIONS: DOUBLE-LONG	345			
	SERVICE CONNECTIONS: DOUBLE-SHORT	345			
	SERVICE CONNECTIONS: SINGLE-LONG	345			
	SERVICE CONNECTIONS: SINGLE-SHORT	345			
	METERS	346			
TOTAL MATERIALS					$ -
LABOR	Project engineering and management	343	20	$ 55.00	$ 1,100
	TESTING FEE	343	1	$ 1,500.00	1,500
	PERMIT FEE	353	1	500.00	500
	SURVEY FEE	343			
	FIELD INSPECTION	343	40	55.00	2,200
	INSTALL SERVICE CONNECTIONS: DOUBLE-LONG	345			
	INSTALL SERVICE CONNECTIONS: DOUBLE-SHORT	345			
	INSTALL SERVICE CONNECTIONS: SINGLE-LONG	345			
	INSTALL SERVICE CONNECTIONS: SINGLE-SHORT	345			
TOTAL LABOR					$ 5,300
SUBTOTAL - CONTRACT WORK, MATERIALS, AND LABOR					$ 23,965
OVERHEAD					2,900
TOTAL	REFUNDABLE PORTION ☐	NON-REFUNDABLE PORTION ☐		COST ESTIMATE	$ 26,865

AFH

ARIZONA WATER COMPANY

3805 N. BLACK CANYON HIGHWAY, PHOENIX, ARIZONA 85015-5351 • P.O. BOX 29006, PHOENIX, AZ 85038-9006
PHONE: (602) 240-6860 • FAX: (602) 240-6874 • TOLL FREE: (800) 533-6023 • www.azwater.com

April 28, 2015

Mr. Devin Anderson
DWA Construction Company, LLC
P. O. Box 12788
Casa Grande, AZ 85130

Re: 2nd Street and Morrison Replacement

PROJECT: 2nd St & Morrison Replacement	
SYSTEM: Pinal Valley	
CONTRACT NO.:	
P.E. NO.:	W.A. NO.: 1-5344

Dear Mr. Anderson:

Enclosed is your copy of the Proposal/Contract for the above-referenced project, which has been accepted by Arizona Water Company (the "Company"). The project shall be constructed in accordance with the Company's *General Conditions of Contract, the Specifications and the Drawings* which were included with the Company's previously provided Proposal/Contract, copies of which are being provided again and attached herewith.

Also enclosed are two copies of the Commencement Notice for the above-referenced project. Please sign one of the copies and return it to my attention retaining the other for your records.

As provided in paragraph 4 of the Company's Proposal/Contract executed by the Company on MAY 4, 2015, DWA Construction Company, LLC acknowledged that one hundred percent (100%) Performance and Payment Bonds are required and must be provided to the Company prior to the commencement of work. In addition, as provided in paragraph 44 of the Company's General Conditions of Contract, the 100% Performance and Payment Bonds must be provided within ten (10) calendar days of the date of the Commencement Notice. Failure to provide an acceptable 100% Performance and Payment Bond does not limit the Company's

ability to terminate the Proposal/Contract or seek restitution for damages that the Company may have or will incur.

Prior to the start of construction, please call Ray Murrieta, Division Manager at 520-836-8785 to schedule a pre-construction meeting. In addition, please provide the required Performance and Payment Bonds to the Company promptly so that the contracted work can be completed within the contract's timeline.

If you have any questions, please call me at this office.

Very truly yours,

James T. Wilson, P. E.
Senior Engineer
jwilson@azwater.com

afh
Enclosure

ARIZONA WATER COMPANY

Casa Grande / Pinal Valley
220 E 2nd Street Casa Grande AZ 85122
O - 520-836-8785 F- 520-836-2850

PROPOSAL/CONTRACT

CONTRACTOR: DWA Construction Co LLC	SYSTEM: 041
ADDRESS: PO Box 12788	W.A. No(s): 1-5344
CITY ST ZIP: Casa Grande AZ 85130	BID DUE DATE: March 10 ,2015

CONTRACTOR SUBMITS this PROPOSAL/CONTRACT to ARIZONA WATER COMPANY, an Arizona corporation (the "Company"), to perform the work and complete the project described on Page 2 (the "Project"), as an independent prime contractor.

1. Contractor certifies that it has a complete copy of, and has read, understands and accepts, the Company's General Conditions of Contract, and the Company's Construction Specifications and Standard Specification Drawings, (the "Specifications"), all of which are attached hereto. Contractor has examined the specific plans and related construction drawings for the Project (the "Drawings"), copies of which are also attached hereto. The General Conditions of Contract, Specifications and Drawings are incorporated into this Proposal/Contract. Contractor affirms that all work and materials to be furnished or purchased for the Project will be in strict conformance with the General Conditions of Contract, Specifications and Drawings.
2. Contractor represents and warrants that it has satisfied and complied with the provisions of Section 6, Contractor Understands Work and Working Conditions, of the General Conditions of Contract prior to submitting this Proposal/Contract.
3. Contractor represents that this Proposal/Contract is fair and honest in all respects, is submitted in good faith and is not submitted in collusion with any other company, entity or person.
4. Contractor acknowledges that one hundred percent (100%) Performance and Payment Bonds are required and must be provided to the Company prior to the commencement of work.
5. Prior to the commencement of work, Contractor will submit to the Company a list of all materials to be used in the Project. The materials list will include the manufacturer, part number, price and quantity included in this Proposal/Contract.
6. Contractor will furnish all labor, tools, equipment and materials required to complete the Project according to the General Conditions of Contract, Specifications and Drawings. No materials purchased by Contractor to be incorporated into the Project are subject to tax at the time of purchase and Contractor will not charge the Company for any such tax. Contractor will pay the applicable transaction privilege tax (the "Contracting Tax") on the Project after Contractor receives payment of the final Project invoice from the Company. The cost of materials incorporated into the Project which are exempt by Arizona Revised State Statues ("A.R.S.") from the Contracting Tax, for example, pipes or valves having a diameter of four (4) inches or larger, including equipment, fittings and any other related part that is used in operating the pipes or valves (A.R.S. §42-5061 B.6.), will not be included in the total cost of the labor and materials upon which the Contracting Tax is computed. Contractor retains full liability and obligation to pay the Contracting Tax and will defend and indemnify the Company against any demand or obligation to pay the Contracting Tax.
7. Contractor will maintain detailed accounting records of all materials purchased and incorporated into the Project. Such records will include all supporting original vendor invoices for all materials purchased. Following completion of the Project, Contractor will submit an itemized accounting to the Company which will include all supporting original vendor invoices and satisfactory evidence of payment thereof. The Company will not pay Contractor for materials not actually incorporated into the Project, and the disposition of such materials will remain Contractor's responsibility.
8. The Estimated Total Cost of the Project, shown on Page 2, is based on estimated labor and material quantities to be furnished. It includes an estimate of the Contracting Tax and the cost of the required Performance and Payment Bonds. Contractor will not cancel, modify or withdraw this Proposal/Contract during a ninety-day (90) period commencing on the Bid Due Date. The Company may accept this Proposal/Contract by signing and mailing, or otherwise delivering, a copy hereof to Contractor during such ninety-day (90) period. If the Company does not accept this Proposal/Contract during such ninety-day (90) period, Contractor may cancel this Proposal/Contract by giving written notice of cancellation to the Company.
9. Prior to the commencement of work, Contractor will provide the Company with a detailed construction schedule, in either Gantt or CPM form, identifying all tasks to be performed from the date of the written Commencement Notice through completion of the Project, including testing, training of Company Personnel and final Project invoicing. Contractor will provide the Company with a copy of such construction schedule documenting the progress of work on the Project at least monthly.
10. Contractor will not commence work on the Project until the Company gives Contractor a written Commencement Notice. Contractor will complete the Project within 45 calendar days after the Commencement Notice is issued.
11. Following the Company's written notice of satisfactory completion of the Project, and upon receipt of the final Project invoice from Contractor, the Company shall pay Contractor the actual total cost of the Project, which will be calculated as shown on Page 2, except that actual labor and material quantities installed/constructed will be substituted for the estimated labor and materials quantities and the Contracting Tax will be recalculated based on such actual labor and materials quantities.
12. The amount of applicable liquidated damages for Contractor's failure to deliver or perform within the time limit shown in Paragraph 10 may be deducted from the Company's payment of the final Project invoice. This provision shall not limit the Company's ability to terminate this Proposal/Contract for Contractor's unsatisfactory performance or failure to perform as provided in the General Conditions of Contract, Specifications or Drawings, or in this Proposal/Contract.

SPECIAL CONDITIONS:

Pollution insurance not required for this project per email from Fred Schneider dated 3-3-15

CONTRACTOR	PROPOSAL/CONTRACT ACCEPTED:
DWA Construction Co LLC	ARIZONA WATER COMPANY
By: Dewin Anderson	By:
Print Name: Dewin Anderson	Print Name: Fredrick K. Schneider, PE
Title: Manager	Title: Vice President - Engineering
Date: 3-5-15	Date: 5-4-2015

ARIZONA WATER COMPANY

Casa Grande / Pinal Valley
220 E 2nd Street Casa Grande AZ 85122
O - 520-836-8785 F- 520-836-2850

PROPOSAL/CONTRACT

CONTRACTOR: DWA Construction Co LLC	SYSTEM: 041
AZ CONTRACTOR LICENSE NO: 327278 CLASSIFICATION: A	W.A. No(s): 1-5344
ADDRESS: PO Box 12788	BID DUE DATE: March 10 ,2015
CITY ST ZIP Casa Grande Az 85130	BID BOND REQUIRED ☑ Yes ☐ No

DESCRIPTION OF PROJECT: Remove approx. 25 LF of 8 inch CA and 2 valves. Replace with approx 25 LF of 8 inch DIP and new valves. At Second Street and the alley West of Morrison in Casa Grande Az

1-2. MATERIALS EXEMPT FROM CONTRACTING TAX (per Paragraph 6	QUANTITY	UNIT PRICE LABOR	UNIT PRICE MATERIALS	TOTAL COST LABOR	TOTAL COST MATERIALS
Install 8 inch DIP w/ poly wrap and related fittings	25 LF	50.00	112.00	1250	2,800
Install 6 inch gate valve	1	800	2,820	800	2,820
Install 4 inch gate valve	1	800	2,220	800	2,220
Tie new DIP into existing pipe w/ related fittings	1	1,200	2,005	1,200	2,005
				1	2
3. Total Labor to Install Exempt Materials (add the amounts in column 1)				3 4,050	
4. Total Exempt Materials (add the amounts in column 2)					4 9,845

5-6. NON-EXEMPT MATERIALS	QUANTITY	UNIT PRICE LABOR	UNIT PRICE MATERIALS	TOTAL COST LABOR	TOTAL COST MATERIALS
Replace asphalt to meet City of CG specs.	1	500	3,410	500	3,410
				5	6
7. Total Labor to Install Non-Exempt Materials (add the amounts in column 5)				7 500	
8. Total Non-Exempt Materials (add the amounts in column 6)					8 3,410
9. Subtotal A (add lines 3, 7 and 8)					9 7,960
10. Contracting Tax Base (multiply the amount on line 9 by 0.65)				10 5,174	
11. Applicable Contracting Tax Rate				11 10.7	
12. Contracting Tax (multiply the amount on line 10 by line 11)					12 554
13. Subtotal B (add lines 4, 9 and 12)					13 18,359
14. 100% Performance and Payment Bonds Cost					14 306
15. Estimated Total Cost (add lines 13 and 14)					15 18,665

NOTE: The Estimated Total Cost includes all labor and materials for backfill, pavement replacement, chip seal, and traffic control necessary for the Project.

ARIZONA WATER COMPANY

COMMENCEMENT NOTICE

CONTRACTOR:

Mr. Devin Anderson
DWA Construction Company, LLC
P. O. Box 12788
Casa Grande, AZ 85130

DATE: 5/7/15
DIVISION: CASA GRANDE
SYSTEM: PINAL VALLEY
W.A.: 1-5344

THIS IS YOUR NOTICE TO PROCEED WITH THE FOLLOWING PROJECT(S):

DESCRIPTION OF WORK:

Remove approximately 25 LF of 6-inch CA and 2 valves. Replace with approximately 25 LF of 8-inch DIP and new valves. At Second Street and the alley West of Morrison in Casa Grande, AZ.

PERFORMANCE AND PAYMENT BONDS REQUIRED: [X] Yes [ ] No

TOTAL DAYS ALLOWED: 55

COMPLETION DATE: 7/1/15

Prior to the start of construction, please call Ray Murrieta, Division Manager at 520-836-8785 to schedule a pre-construction meeting.

ARIZONA WATER COMPANY
Company

DWA CONSTRUCTION COMPANY, LLC
Contractor *(type name)*

By _____
Title Vice President - Engineering

By _____
Title _____

AFH

ARIZONA WATER COMPANY

SPECIFICATIONS

GENERAL CONDITIONS OF CONTRACT: E-4-1

CONSTRUCTION SPECIFICATIONS: E-8-1

STANDARD SPECIFICATION DRAWINGS: E-9-1

gw
4/30/15

2007 EDITION WITH **2010** REVISIONS;
2012 GENERAL CONDITIONS OF CONTRACT

A copy of this entire Spec Book was sent out with DWA Construction Proposal package for 2nd St + Morrison Replacement on 5/7/15

CDP- 15-01064

City of Casa Grande, Planning & Development Dept., 510 E. Florence Blvd, Casa Grande, AZ 85122

RIGHT OF WAY USE-REPAIR/MAINTENANCE PERMIT APPLICATION

(Permit Authorizing Private Utilities To Be Repaired/Maintained Within Public Right Of Way)
(Electronic Version Available at: http://casagrandeaz.us/dept/planning/building-division/engineering-permits/
email applications to DCPermits@casagrandeaz.gov)

Please indicate the type of Right of Way work being permitted:

☒ Scheduled Utility Repair ☐ Other _____
☐ Emergency Utility Repair Work

Utility Franchise ■ Yes ☐ No

1. **PROJECT LOCATION:** 806 E. 2ND STREET BETWEEN MORRISON & CAMERON
(Indicate closest intersecting streets or alleys)

2. **DESCRIPTION OF WORK:** REPLACE TWO BROKEN VALVES UNDER ASPHALT VALVES 1250 & 75 RESTRICTED WATER FLOW TO CUSTOMER'S & THE FIRE HYDRANT #45

3. **STREET CLOSURE REQUIRED** (Not including alleys) ☐ **Yes Dates**_____ ☐ **No**

4. **APPLICANT INFORMATION:**
Name Arizona Water Company
Address 220 E. 2ND Street City CASA GRANDE State AZ Zip Code 85122
Phone 520-836-8785 Fax 5208362850 Email Address kboucher@azwater.com

5. **CONTRACTOR PERFORMING WORK:** D.W.A. CONSTRUCTION DEVIN 1-520-251-1036
Name ARIZONA WATER CREW CONTACT PERSON KIM BOUCHER 1-6024480262
Address _____ City _____ State ____ Zip Code _____
Phone _____ Fax _____ Email Address _____

Applicants may receive clarification regarding the specific steps included in processing this application as well as information regarding any code, regulation or policy relevant to the processing of this application by contacting one of the following review Engineers:

Larry Petersen – lpetersen@casagrandeaz.gov, 520-421-8630, Ext. 3320
Cesar Adamos – cadamos@casagrandeaz.gov, 520-421-8630, Ext. 3019

RECEIVED
MAY 29 2015
CITY OF CASA GRANDE
DEVELOPMENT SERVICES

CITY INTAKE:
Date Accepted & Logged In: _____
Assigned DC Engineer: CA 6/2/15
Inspected and Accepted by: _____ Date: 06/29/2015
1-Year Warranty Inspection due on: _____

CDP-15-01064

CITY OF CASA GRANDE, ARIZONA
DEVELOPMENT SERVICES
510 East Florence Blvd. 85122
Office (520-421-8630) **Inspection Line (520-421-8684)**

[redacted]

E14A - ROW Use Repair Maintenance **Issued Date:** 6/5/2015

Telephone PIN: 173034 **Expires:** 8/2/2015

Parcel

Address: 806 E 2nd St
Casa Grande, AZ 85122
Legal: MYERS 1ST ADD CG LOTS 1 & 2 BLK 5
MYERS 1ST ADDITION
Parcel Number: 507-06-032-0 **Zoning:** R-1

Owners/Parties

Primary
Name: Kim Boucher
Address: ,
Phone:

Contractors

Primary
Type: UTILITY COMPANY (CC)
Name: Arizona Water Company **Phone:** (602) 240-6860
Address: PO Box 29006
Phoenix, AZ 85038

Sub-Contractors

Project Description

Description of Work: 806 E. 2nd Street (Between Morrison & Cameron), Replace two broken valves under asphalt valve's 1250 & 75 restricted water flow to customers & thru Fire Hydrant # 45.

ROW Work Type No **Utility** No
Engineering Inspector Assigned: Lupe Vidal (520) 450-2627 **Road closure necessary?** No

Cesar P. Adams, PE, CFM

Review Comments/Conditions

- Public Works Inspector must be notified within 72 hours prior to start of work. Contact Public Works Inspector Lupe Vidal at (520) 450-2627 or GVidal@casagrandeaz.gov
- For work in the alley, coordinate with the Sanitation Department, (520) 421-8625.
- The Contractor is responsible for ensuring that the safety of the work site and the public is maintained. OSHA safety and Arizona Blue Stake Laws shall apply to all construction activities.
- All improvements shall be constructed to MAG Specifications and Details, unless modified by the special conditions of this permit.
- All approved trench work inside public Right-of-Way and Easements shall be either 1 sack concrete slurry or shall have compaction testing. Final asphalt course shall match the existing pavement section, unless specified by the City Engineer.
- Compaction and materials testing, as directed by the City Engineer or his authorized representative, shall be conducted at the Contractor¿s expense. Results shall be submitted to the City Engineering Inspector.
- All work shall conform to approved plans.
- This permit, along with approved construction, traffic control & safety plans, shall be kept on site at all times. Additional traffic control for vehicular or pedestrian traffic may be required by the Public Works Inspector.
- The City of Casa Grande reserves the right to suspend and/or modify the conditions of this permit should field conditions warrant. This shall include improper or inadequate construction techniques or a safety hazard on the work site, or to the public. The Contractor agrees to hold the City harmless for any delays in construction.
- The Contractor shall call the Engineering Division 421-8625 prior to any backfill, and also for a final inspection and acceptance of the work at the completion of the permitted work. The permit number should be used with this call. The Contractor shall warrant all improvements for one year after the acceptance date. Failure to get a final inspection and acceptance of the work will extend the warranty period indefinitely.
- If any of the conditions of this permit are not met the permit is void.

CDP- _____

City of Casa Grande, Planning & Development Dept., 510 E. Florence Blvd, Casa Grande, AZ 85122

Submittal Requirements:

1. **Site Plan illustrating the following:**
   a. The area of the right of way to be affected
   b. The location of any existing right of way improvements *(i.e. sidewalk, curb, pavement)*
2. **Traffic Control Plan** *(if applicable)*
3. **Road Closure Plan which shall address the following notification requirements:**
   a. Contact the Development Center with specific Road Closure dates at (520) 421-8630 or by email at DCPermits@casagrandeaz.gov
   b. The following must be notified at least 5 days prior to start of work:
      i. Sanitation: Greg Garcia – Ggarcia@casagrandeaz.gov
      ii. Police: Michael Brashier – MikeB@casagrandeaz.gov
      iii. GIS: Jeff Little – Jlittle@casagrandeaz.gov
      iv. Road closure must be advertised in the Casa Grande Dispatch Newspaper for 5 days prior to start of work.
4. **Application Review Fees**
   a. Review Fees: $30.00
   b. Technology Recovery Fee: 5% of Total Permit Fees

CDP- _____

City of Casa Grande, Planning & Development Dept., 510 E. Florence Blvd, Casa Grande, AZ 85122

Over-All Review Time-Frames for Engineering Permits [1,7,8]

Permit Classification	Administrative Completeness Review (CR) of Initial Submittal[2]	Review of Initial Submittal and Staff Decision to Approve or Issue a Review Letter[4,8]	CR Review of Re-Submittal	Review of Resumbittal[5,7,8] and Staff Decision to Approve/Deny	Over-All Review Timeframe[6,7,8]
ROW Use-Repair and maintenance (E-14A)	2	10	2	10	24

[1]All times are maximum timeframes in business days (Mon-Fri.; excluding City Holidays). Shorter review times will be accomplished where possible.

[2]Completeness Review timeframes are calculated from date of application submittal to date of acceptance or rejection of the application as administratively complete.

[3]Substantive Review timeframes are calculated from date of acceptance of application for Substantive Review, or upon receipt of re-submittal of revised plans/reports, to the date of issuance of a comprehensive review letter, or final administrative decision.

[4] Review of initial submittal limited to determination of compliance with ordinances, codes, regulations or policy relevant to the specific permit or project application. The review comments on the initial submittal may be amended to address code/policy requirements that City staff failed to include in the 1st comprehensive review document.

[5] Review of resubmittal shall be limited to:
a) Addressing 1st review comments that the applicant failed to adequately address in their resubmittal; or
b) Addressing new review issues arising from modifications the applicant has made to the design and/or technical reports. In this case the City may issue an additional review letter addressing the new design.

[6]Over-All Review timeframe is the sum of the Completeness, Initial & Resubmittal Substantive Review timeframes.

[7] If an applicant requests significant changes, alterations, additions or amendments to an application that are not in response to the request for corrections, the City may make **one additional comprehensive written request for corrections (i.e., review of 2nd resubmittal)**. Said additional request for correction shall not exceed 50% of the Substantive Review time frame for the specific type of permit.

[8]The Substantive Review timeframe and the Overall Review timeframe may be extended by mutual consent of the applicant and the City. Said extension shall not exceed 50% of the Over-All timeframe.

[9]Indicates that the Project will require a public hearing and Board/Commission and/or City Council approval. For these Projects the Substantive Review period ends when staff schedules the application for the public hearing and Board/Commission/City Council action.

In accordance with the Regulatory Bill of Rights (ARS 9-835) the City of Casa Grande will typically make an administrative decision on each permit application after one (1) comprehensive staff review. However, from time to time a 2nd review is necessary to resolve code/policy compliance issues associated with a permit. In accordance with ARS 9-835.I., by mutual agreement, the applicant and the City may engage in a 2nd review of an application as long as said 2nd review does not exceed the over-all time frame by 50%. The specific 1st and 2nd and over-all review timeframes for this application are provided above. Applicants may sign below, consenting to a 2nd review if necessary, within the stated prescribed timeframe. Your consent is not required at time of application submittal. Applicants who do not sign below will be contacted by City staff if a 2nd review is determined to be necessary prior to making an administrative decision on this application. Applications denied after the completion of the review cycle are eligible for re-application to address the code/policy deficiencies which were the basis for the application denial with the payment of a fee equal to 25% of original application fee amount. Said re-application shall occur within 90 days of the application denial.

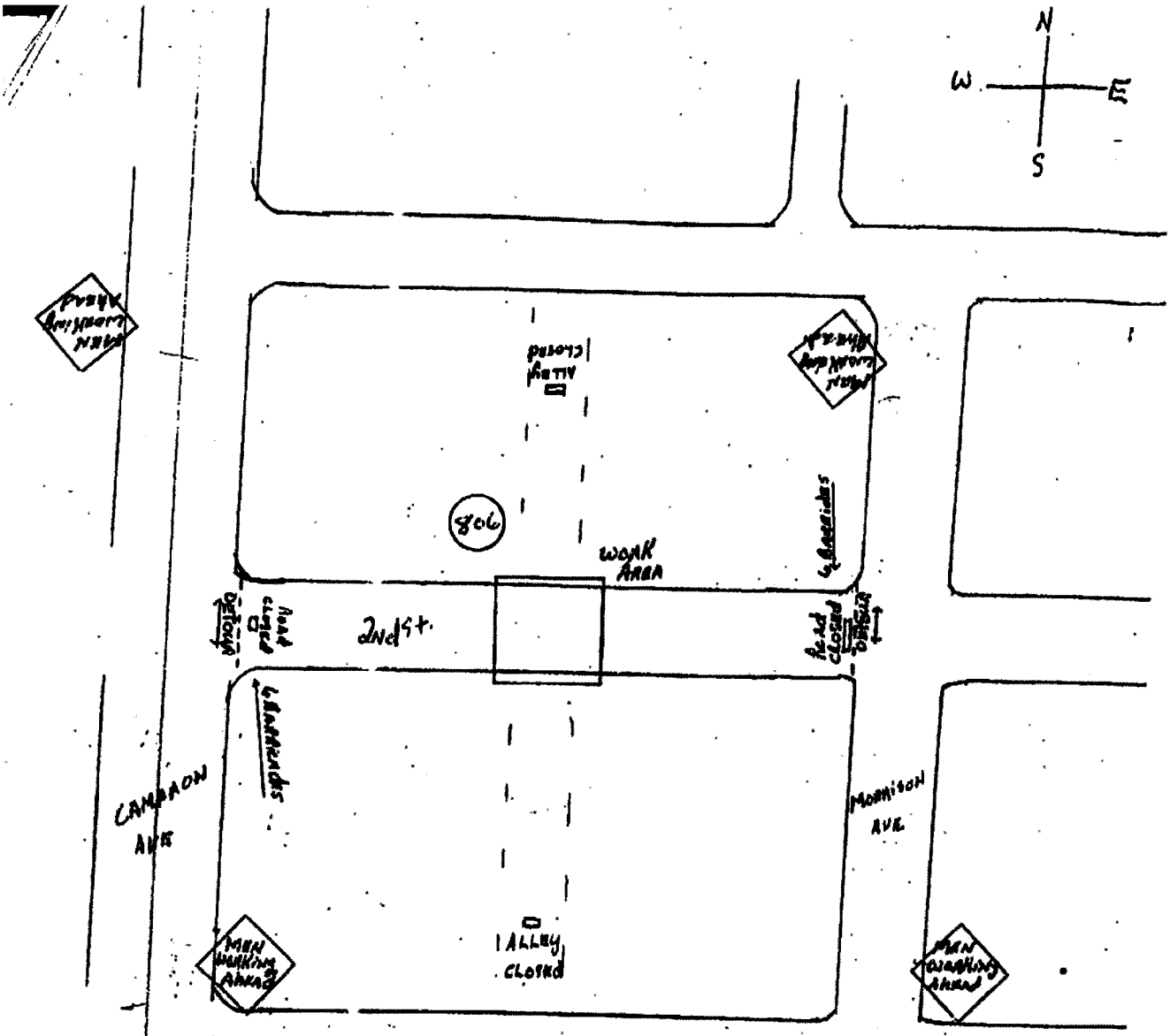
I hereby consent to an extension of the stated Substantive Review timeframe for a maximum of _____ additional days.

_____ Applicant

_____ Agreed to by City

APPLICATION COMPLETENESS REVIEW CHECKLIST

		DC Engineer
1)	**Site Plan:**	☐
2)	**Traffic Control Plan:** *(if applicable)*	☐
3)	**Road Closure Plan:**	☒
4)	**Application Review Fees**	☐
	a. **Review Fees: $30.00**	
	b. **Technology Recovery Fee: 5% of Total Permit Fees**	

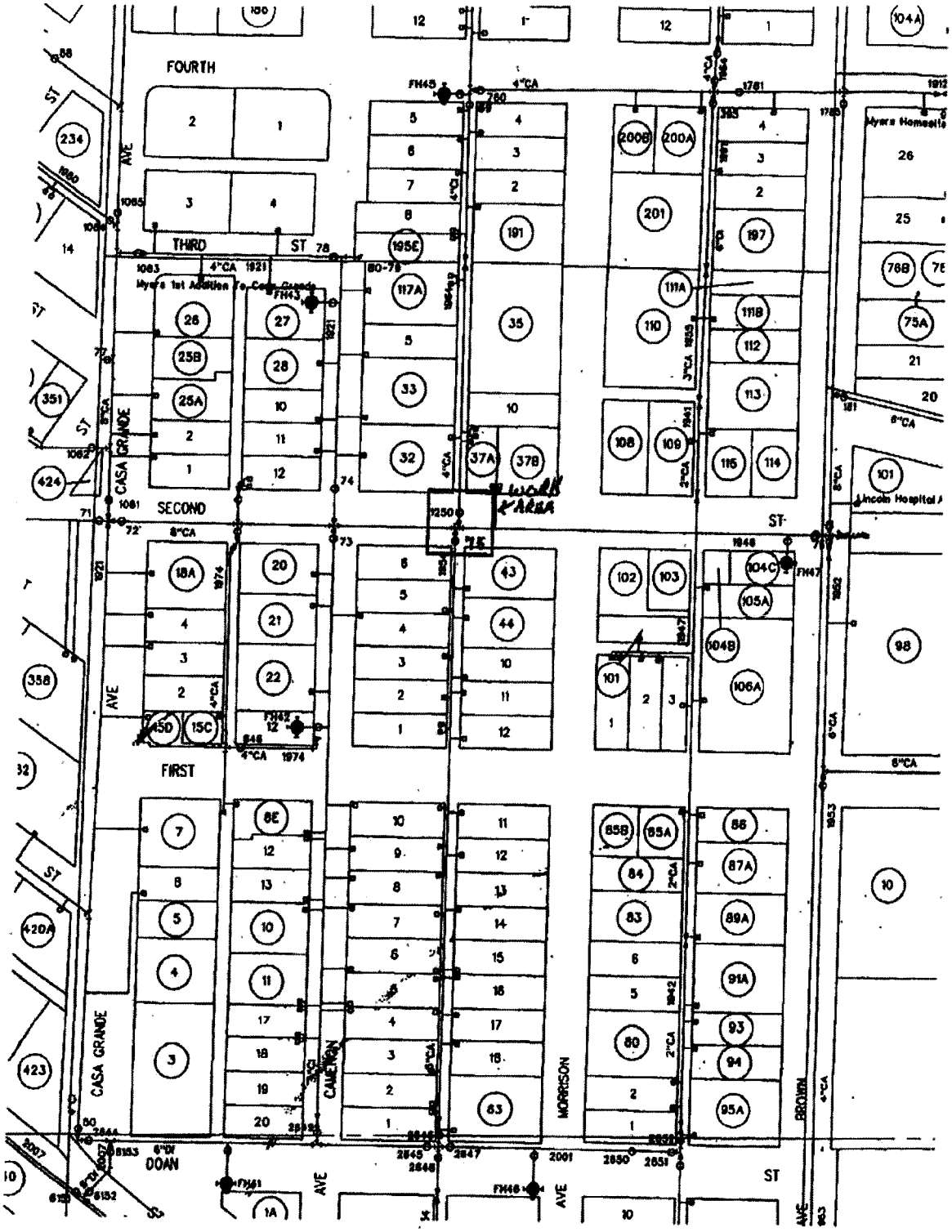


Brite Light
Barricade Co.
Set 12-18-14

Emergency Valve Replacement
Main

City of Casa Grande
PLAN APPROVAL
Civil Engineer MCPA
Date 6/2/15 Date 8/2/15
THE CITY APPROVES THIS PLAN IN CONCEPT ONLY. THE CITY ASSUMES NO RESPONSIBILITY FOR ERRORS OR OMISSIONS

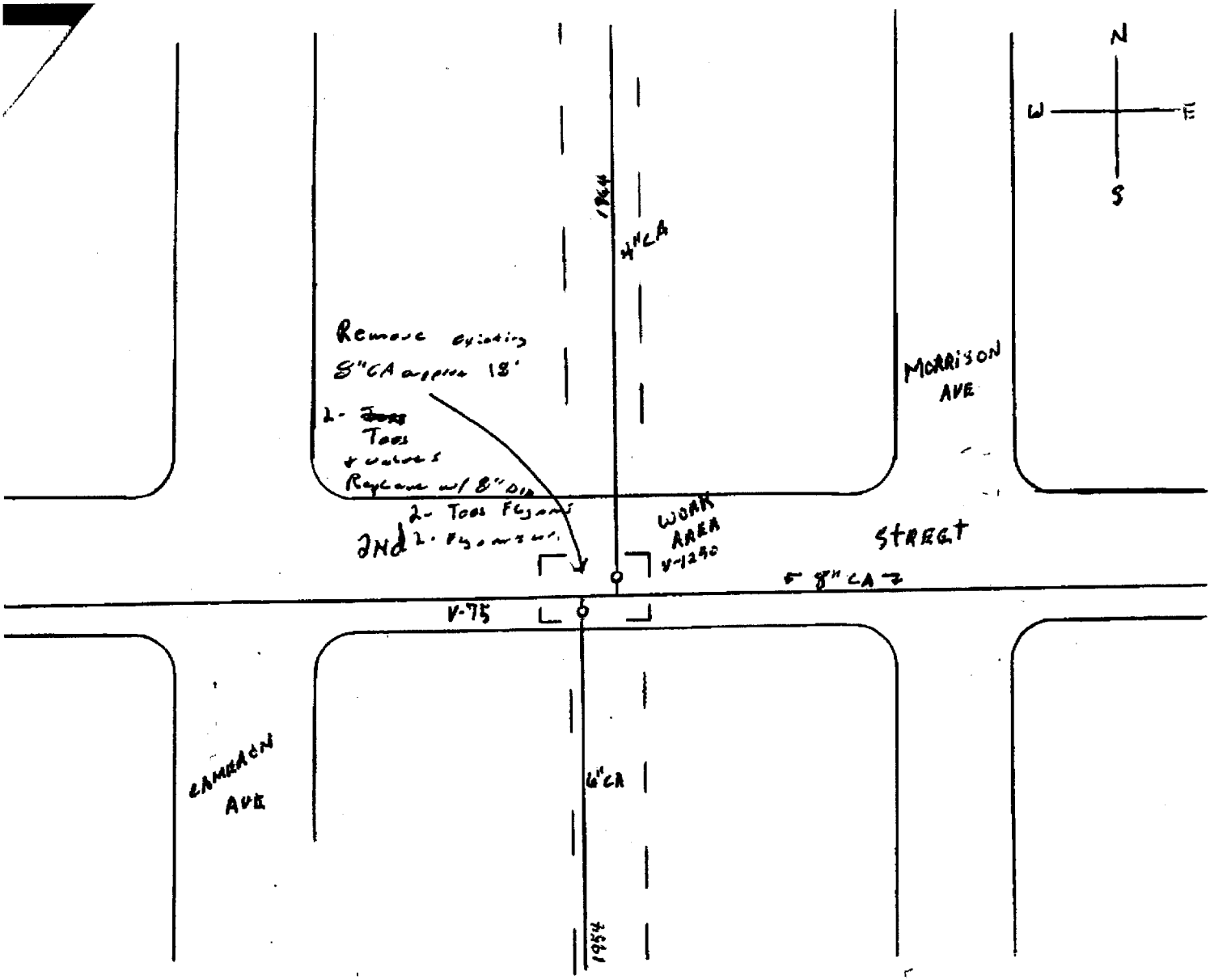
Owner	AZ WATER
Project Name	Project Number
Prime Contractor: AZ WATER	Traffic Control Contractor: BRITE-LITE BARRICADE
Phone: (520) 836-1122	Sheet Number: 1 OF 1
Prepared By	Date: 10/2/12



Valve Shut Down.

CASA

NE¼ Sec. 29-T.6S.R6E



NE¼ Sec 29-T. 6 S., R6E

2-18-2015.

V-75 & V-1250 ARE 12'6" APART East to West. V-75 Shows to be ON A 6"CA MAIN & Should BE A 6" VALVE. V-1250 Shows to be ON A 4"CA MAIN & Should BE A 4" VALVE. TOTAL DISTANCE to cut out 8"CA is 18' Long & two 8" DRESSERS. W/D.I.P. 1=8" TEE MJ X FL to 4" VALVE 4"FLXMJ 1=8" TEE MJX FL to 6" VALVE 6"FLXMJ 4" & 6" D.I.P. Stubs & 1=6" DRESSER & 1=4" DRESSER. TWO A-FRAMES, VALVE RISERS, SLURRY & ASPHALT REPLACE OUR VALVE CANS DO NOT SEEM TO BE.

STOP

Western Group Rate Case

Exhibit FKS-1

5345 Casa Grande Asphalt

ARIZONA WATER COMPANY
WORK AUTHORIZATION

W.A. NUMBER: 1-5345
P.E. NUMBER:
BUDGET ITEM NO.: Special No. 16
SHEET NO.: 1 of 2

SYSTEM:	PINAL VALLEY	RETENTION REQUIRED:	☑ YES ☐ NO
DIVISION:	CASA GRANDE	WORK TO START BY:	UPON AUTHORIZATION
RESPONSIBLE PERSON:	RAY MURRIETA	WORK TO BE FINISHED BY:	WITHIN 40 DAYS
TAX CODE:	0403		

DESCRIPTION OF WORK:

Construct 13 L.F. of 8-inch ductile iron water main to replace 13 L.F. of leaking 8-inch cement asbestos water main, replace a 44 ft.x4 in.x78 ft. (WxHxL) section of damaged asphalt roadway and replace 28 L.F. of damaged concrete sidewalk, curb and gutter at 1955 N. Casa Grande Avenue in Casa Grande, Arizona.

FACTORS JUSTIFYING WORK:

A leaking 8-inch cement asbestos water main damaged a portion of asphalt roadway and concrete sidewalk, curb and gutter at 1955 N. Casa Grande Avenue. Company servicemen replaced the leaking section of 8-inch water main and placed traffic barricades to prevent public access to the damaged portion of the roadway and sidewalk. The City of Casa Grande (City) requires the Company to replace the damaged asphalt with a 44 ft.x4 in.x78 ft. (WxHxL) permanent asphalt patch and replace 28 L.F. of concrete sidewalk, curb and gutter in accordance with City specifications.

COST ESTIMATE		AUTHORIZATION	DATE
COST OF WORK:		PREPARED BY: AH for Ray Murrieta 5-1-15 Ray Murrieta	4/15/15
MATERIAL	2,056		
LABOR	6,806	REVIEWED FOR ESMT/ROW VERIFICATION: Charles Briggs CB 05-01-2015	04-15-2015
CONTRACT PORTION	46,847		
OVERHEAD	6,700	REVIEWED BY: Ted Millspaugh	04-15-2015
TOTAL AUTHORIZED EXPENDITURES CHARGEABLE TO THIS W.A.	$ 62,409		
FUNDS RECEIVED:		APPROVED BY ENGINEERING: Fredrick Schneider for 5-1-15	4-21-2015
CONTRIBUTIONS RECEIVED	0		
REFUNDABLE ADVANCES RECEIVED	0	APPROVED BY FINANCE: Joseph Harris	4/23/15
TOTAL CONTRIBUTIONS/ADVANCES	0		
NET COMPANY CASH REQUIRED	$ 62,409	SPECIAL ITEM EXCEEDING $10,000; AUTHORIZED BY PRESIDENT: William Garfield	4-24-2015
		SPECIAL ITEM EXCEEDING $10,000; AUTHORIZED BY CHAIRMAN: Approved via Fax M. L. Whitehead	4-29-15

COMMENTS:

TRANSFER FUNDS REQUIRED ($62,409) FROM 1-5700 (CASA GRANDE OFFICE)

CONSTRUCTION RELEASE:

RELEASED TO CONSTRUCTION
Authorized by FRED SCHNEIDER
Date 5/1/15

AFH

AJH

ARIZONA WATER COMPANY

WORK AUTHORIZATION - DETAIL SHEET

W.A. NUMBER: 1-5345
P.E. NUMBER:
BUDGET ITEM NO.: Special No. 16
SHEET NO.: 2 of 2

	PLANT PROPERTY ACCOUNT	UNIT DESCRIPTION	QUANTITY	YEAR INSTALLED AND W.A. NUMBER
RETIREMENT PROPERTY UNITS	343	8-inch cement asbestos pipe	13 L.F.	1985

PROJECT DESCRIPTION

Construct 13 L.F. of 8-inch ductile iron water main to replace 13 L.F. of leaking 8-inch cement asbestos water main, replace a 44 ft.x4 in.x78 ft. (WxHxL) section of damaged asphalt roadway and replace 28 L.F. of damaged concrete sidewalk, curb and gutter at 1955 N. Casa Grande Avenue in Casa Grande, Arizona.

	DESCRIPTION	PLANT PROP ACCT	QUANTITY	UNIT COST	TOTAL
CONTRACT WORK	Replace 44 ft.x4 in.x78 ft. (WxHxL) of asphalt roadway	343	1	$ 26,327.00	$ 26,327
	Replace thermal striping	343	1	3,424.00	3,424
	Replace concrete sidewalk, curb and gutter	343	1	2,741.00	2,741
	Contracting Tax	343	1	2,259.82	2,260
	100% Performance and Payment Bonds Cost	343	1	695.04	695
	Traffic barricade rental per day	343	120	95.00	11,400
	SERVICE CONNECTIONS COMPLETE: DOUBLE-LONG	345			
	SERVICE CONNECTIONS COMPLETE: DOUBLE-SHORT	345			
	SERVICE CONNECTIONS COMPLETE: SINGLE-LONG	345			
	SERVICE CONNECTIONS COMPLETE: SINGLE-SHORT	345			
TOTAL CONTRACT WORK					$ 46,847
MATERIALS	8-inch ductile iron pipe, related fittings and appurtenances	343	1	$ 2,056.24	$ 2,056
	SERVICE CONNECTIONS: DOUBLE-LONG	345			
	SERVICE CONNECTIONS: DOUBLE-SHORT	345			
	SERVICE CONNECTIONS: SINGLE-LONG	345			
	SERVICE CONNECTIONS: SINGLE-SHORT	345			
	METERS	346			
TOTAL MATERIALS					$ 2,056
LABOR	Engineering and project management	343	24	$ 65.00	$ 1,560
	Replace 8-inch water main	343	1	3,426.25	3,426
	TESTING FEE	343	1	$ 500.00	500
	PERMIT FEE				
	SURVEY FEE				
	FIELD INSPECTION	343	24	55.00	1,320
	INSTALL SERVICE CONNECTIONS: DOUBLE-LONG	345			
	INSTALL SERVICE CONNECTIONS: DOUBLE-SHORT	345			
	INSTALL SERVICE CONNECTIONS: SINGLE-LONG	345			
	INSTALL SERVICE CONNECTIONS: SINGLE-SHORT	345			
TOTAL LABOR					$ 6,806
SUBTOTAL - CONTRACT WORK, MATERIALS, AND LABOR					$ 55,709
OVERHEAD					6,700
TOTAL	REFUNDABLE PORTION ☐	NON-REFUNDABLE PORTION ☐		COST ESTIMATE	$ 62,409

AFH

ARIZONA WATER COMPANY

DAMAGE AND INJURY REPORT

(NOT FOR WORKERS COMPENSATION CLAIMS OR AUTOMOBILE CLAIMS)

1. What Happened?

Date of Occurrence:	2-24-, 2015 Time: 12:00 a.m. (p.m) (circle one)
Location of Occurrence:	Address/location: 1955 N. CASA GRANDE AVE City: CASA GRANDE State: AZ Zip Code: 85122
Description of Occurrence:	TETRA TECH DIRECTIONAL DRILLING. DRILLED INTO OUR 8" WATER MAIN. NO FRESH MARKS, BUT WHEN JASON WAS SHOWN OLD BLUE MARKS ON THE SIDEWALK. HE TRYED TO SCUFF OFF THE BLUE STAKE MARKS WITH HIS SHOE. THIS LOCATED AT THE POINT OF DAMAGE. IF CONTRACTOR WOULD HAVE LOOKED OVER THE JOB, HE SHOULD HAVE NOTICED OUR WATER SERVICES ACROSS THE STREET & NO POT HOLING TO VERIFY UTILITY'S *IF THIS WAS AN AUTOMOBILE ACCIDENT PLEASE FILL OUT THE DRIVER'S REPORT OF ACCIDENT*
Who was involved?	Arizona Water employees: 1. RICHARD SCHAAR JESUS MANRIQUEZ 2. JOSH GARCIA ARRON ORTIZ 3. RYAN SALINAS DON COLLINS 4. HEATH ROBISON KIM BOUCHER Other individuals (and their employers if applicable): 1. TETRA TECH JASON 1-320-292-2340: FOREMAN 2. SUPERVISION SETH 1-480-773-5133 3. _____ Other companies: 1. _____ 2. _____

2. Was Anyone Hurt?

Were any Arizona Water Company employees injured (check one)?	Yes ___ *If yes, please complete an Injury/Accident Report for each employee and submit with this report.* (No) ___
Were any other persons injured?	Yes ___ (No) ___
If yes, please identify.	1. N/A 2. N/A 3. N/A

DAMAGE AND INJURY REPORT

(NOT FOR WORKERS COMPENSATION CLAIMS OR AUTOMOBILE CLAIMS)

3. Was Any Property Damaged?

Was any Arizona Water Company property damaged?	(Yes) ___ No ___
If yes, please identify.	8" C.A. WATER MAIN that FEEDS HOME OF HOPE. & TEEN CHALLENGE CENTER
Estimate(s) of value:	8 EMPLOYEES @ about 10 HR EACH. EQUIPMENT B.H. DUMP TRAILER, SERVICE TRUCKS, TRAFFICADE, SLURRY, AB. two Smith & BLAIR DRESSERS, & 13' of 6" D.I. PIPE
Are you aware of any other person's property receiving damage?	(Yes) ___ 1971 N. CASA GRANDE AVE JEHOVAH WITNESSES No ___ PARKING LOT & LANDSCAPING FLOODED & debris
If yes, please identify those persons and provide a brief description of the property.	1. Person/Entity: City OF CASA GRANDE Property: SIDEWALK, CURB, GUTTER, ASPHALT 2. Person/Entity: ___ Property: ___ 3. Person/Entity: ___ Property: ___

Name: KIM BOUCHER Title: SENIOR SERVICEMAN

Signature: Kim Boucher Date: 2-24-15

Division: CASA GRANDE

Seq 00020 Routine Notice for AZWTCG00 - Ticket Number: 2015021801209

mail@Arizona811.com [mail@Arizona811.com]

Sent: Wednesday, February 18, 2015 3:31 PM

To: Casa Grande CSR

```
Start of Ticket
Arizona Blue Stake           Destination: AZWTCG00 Seq. No:0020
Ticket No:  2015021801209.000     ROUTINE

Send To: AZWTCG09              Map Ref:

Original Due Date:   /  /       Time:    :
Transmission Date: 02/18/2015   Time:   3:31 PM    Op: WEB-TRACIE.WARREN
Work Start Date:   02/23/2015   Time:   8:00 AM

Due Date: 02/20/2015   Time:   5:00 PM
Location of Work: STREET ADDRESS: 1955 N CASA GRANDE AVE, CROSS STREET: E
: KORSTEN RD
: LOC 40FT WD PATH USING WHITE LINE AS C/L OF PATH STARTING FRM N/W/CRN OF
: BLDG GOING N/100FT, E/405FT THEN S/205FT TO EXISTING COX PED
Type of Work: CATV INSTALL TRENCH & BORING
Hundred Block:                    Explosives: N    Permit#: N
               ACCESS IS OPEN     ADDRESS IS POSTED      SITE WHITE LINED
Overhead: N    Job#: N            Offsets: Y


Remarks: ***Boring = YES
: ***Subcontractor = STEVE MIRACLE / MODERN TECHNICAL SERVICES OSP / Cell:
(623)221-3197
: ***Subcontractor = LUPE GONZALEZ / GPE CONSTRUCTIOIN / Cell:
(602)400-6229
: ***Subcontractor = JIM AYRES / ELITE UNDERGROUND / Cell: (602)318-5008
: ***Subcontractor = SHANE OLERICH / DIVERSIFIED SOLUTIONS / Cell:
(602)821-8911
: ***Subcontractor = ADAM / BLINE DIRECTIONAL DRILLING / Cell:
(602)574-3706
: ***Subcontractor = STEVE / WOLVERINE LLC / Cell: (623)221-3197
: ***Subcontractor = AUGUSTINE / ANDALE / Cell: (623)262-4204
: ***Subcontractor = ELLIOT / CABLE ONE / Cell: (602)413-0260
: ***Subcontractor = MEMO / GONZALEZ CONSTRUCTION / Cell: (602)803-7004

Company: TETRA TECH CONSTRUCTION              Best Time: 6:30 - 3:30
Contact Name: TRACIE WARREN                   Phone: (480)271-1330
                                         Fax Phone:
Alt. Contact                                  Phone:


State: AZ          County: PINAL                    City: CASA GRANDE
Address:  1955     Street: N CASA GRANDE AVE
Twp: 6S     Rng: 6E     Sect-Qtr:  08-SW,17-NE-NW

Lat/Lon:  32.9089230  -111.7525360    32.9089230  -111.7483150
          32.9048600  -111.7483150    32.9048600  -111.7525360
APSCG09    AZWTCG09   CASAALL0   COXALL09   EDTWO09    QLNAZ109
SWGCL09

End of Ticket
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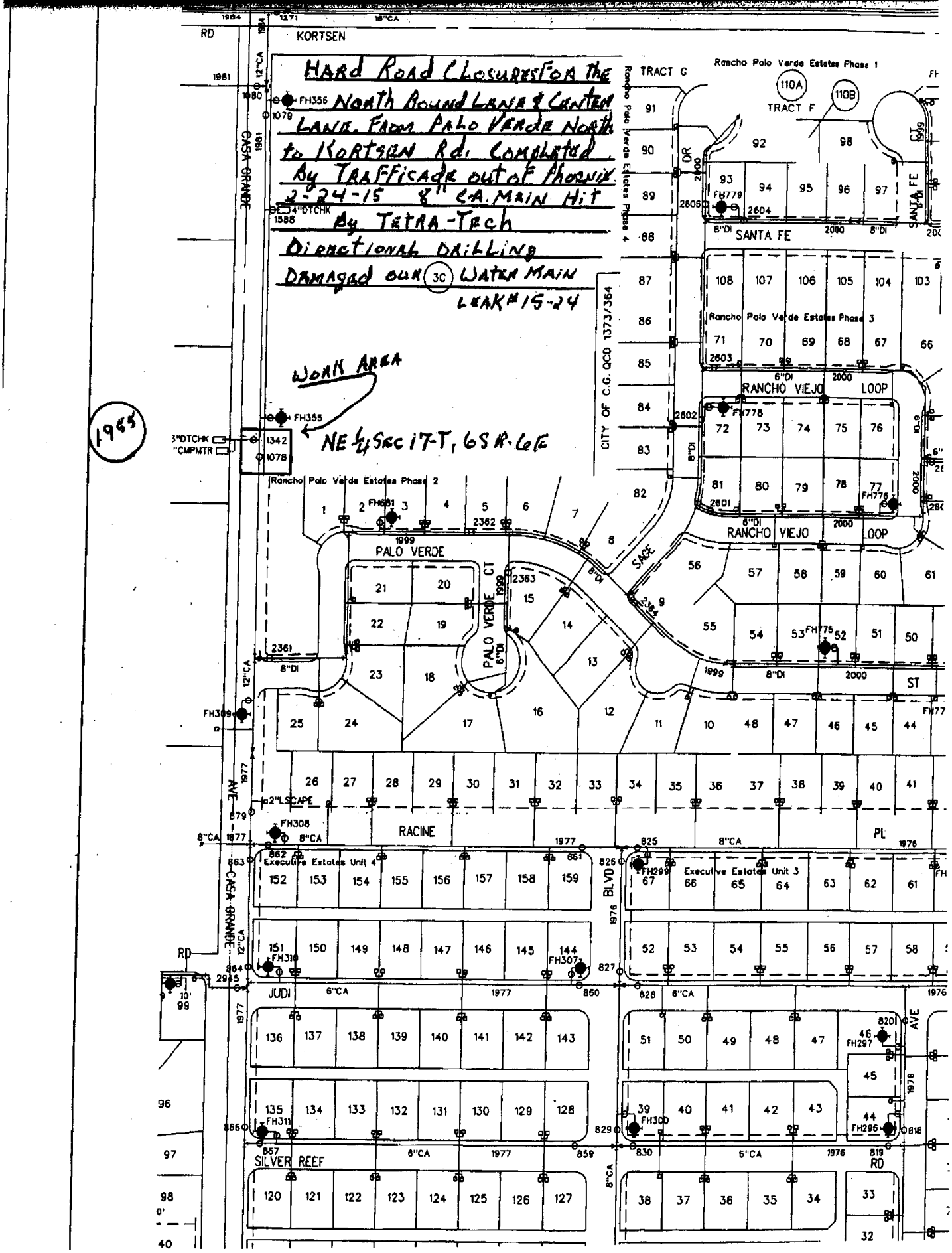
A 2-18-15


HARD ROAD CLOSURES FOR THE NORTH BOUND LANE & CENTER LANE FROM PALO VERDE NORTH to KORTSEN Rd. COMPLETED BY TRAFFICADE OUT OF PHOENIX 2-24-15
8" CA. MAIN HIT BY TETRA-TECH DIRECTIONAL DRILLING
DAMAGED OUR 30 WATER MAIN
LEAK #15-24
WORK AREA
NE 1/4 SEC 17-T, 6S R. 6E
1955
KORTSEN RD
CASA GRANDE AVE
PALO VERDE
PALO VERDE CT
SAGE
RANCHO VIEJO LOOP
SANTA FE
SANTA FE DR
SANTA FE CT
RACINE
PL
JUDI
SILVER REEF
RD
BLVD
AVE
CITY OF C.G. QCD 1373/364
Rancho Palo Verde Estates Phase 1
Rancho Palo Verde Estates Phase 2
Rancho Palo Verde Estates Phase 3
Rancho Palo Verde Estates Phase 4
TRACT F
TRACT G
110A
110B
Executive Estates Unit 3
Executive Estates Unit 4
FH355
FH356
FH779
FH778
FH776
FH775
FH309
FH308
FH299
FH310
FH307
FH311
FH300
FH297
FH296
12"CA
8"CA
8"DI
6"DI
12"LSCAPE
3"DTCHK
4"DTCHK
"CMPMTR

ARIZONA WATER COMPANY

WATER LOSS CONTROL FORM

DATE: 2-24-15 SYSTEM: 041 PWSID AND NAME: 11-009 LEAK #: 15-24

TYPE OF LEAK: SERVICE ☐ MAIN ☒ FITTING ☐

800 GPM X 1440 minutes per day X 120 MIN Days = Total Volume 96000 Gallons Total Duration (In Months) 2HRS

LOCATION OF LEAK: LEGAL DESCRIPTION: ¼ SEC. NE SEC. 17 T. 6S R. 6E

ADDRESS #: 1955 STREET NAME: CASA GRANDE AVE

LOT#: SUBDIVISION NAME: (e.g., PINEWOOD UNIT 1)

LOCATION: (e.g. MAJOR CROSS STREETS, INTERSECTION) 650' South of KORTSEN

SERVICE/MAIN/FITTING CONDITION:

YEAR: 1981 MATERIAL: CA SIZE: 8" LENGTH: 13' FITTING TYPE: (e.g. Meter/Valve) RTXRT DEPTH OF COVER: (Inches) 44"

EXTERIOR CONDITION: (CIRCLE ONE) BAD POOR FAIR GOOD (EXCELLENT)

EXTERIOR CONDITION DESCRIPTION: (e.g. CORROSION, PITS, CRACKS)

VERY Good

POLY-WRAPPED: YES ☐ NO ☒

INTERIOR CONDITION: (CIRCLE ONE) BAD POOR FAIR GOOD (EXCELLENT)

INTERIOR CONDITION DESCRIPTION: (e.g. CORROSION, PITS, TUBERCULATION, SCOURING, SLIME GROWTH)

NEW CONDITION

DESCRIPTION OF LEAK: (e.g. PINHOLE, RADIAL CRACK, AXIAL CRACK, COUPLING/JOINT, COLLAPSE)

DESTROYED TOP ½ OF MAIN FOR 4' LONG

CAUSE OF LEAK: (e.g. CORROSION, FREEZING, BEDDING/BACKFILL, EARTH SETTLING, SURGE, ADJ. CONST. ACTIVITIES)

DIRECTIONAL BORING MACHINE TETRA-TECH

DESCRIPTION OF REPAIRS MADE: REPLACED 13' OF CA PIPE WITH 13' OF 8" D.I.P. & TWO SMITH & BLAIR ORINGERS 4610854098 5000

PLACE DIGITAL PHOTOS IN THE LEAK DETECTION DIRECTORY UNDER THE APPROPRIATE DIVISION/SYSTEM ON THE COMPANY'S SHARED DRIVE

REV: 10/2013
thh

ARIZONA WATER COMPANY

LOCATION REQUEST RECORD
CALL BEFORE YOU DIG!

REQUEST NO: EMERGENCY B/S 20150224000946	DIVISION: CASA GRANDE
DATE: 2-24-2015	TIME: 1:30PM
CALLER'S NAME: KIM BOUCHER	TYPE OF PROJECT: REPAIR 8" MAIN
CITY OR TOWN: CASA GRANDE	PERMIT NO: FILED
EXPLOSIVES? YES _____ NO X	PROJECT LOCATION OR ADDRESS: TEEN CHALLENGE. 1955 N. CASA GRANDE AVE 300' RADIUS R.TO R.OFWAY
PRIVATE PROPERTY? YES _____ NO X ACCESS OPEN? YES X NO _____ LOT IDENTIFIED? YES X NO _____ EASEMENT _____ PUBLIC RIGHT OF WAY X	
DATE MARKINGS SCHEDULED TO BE COMPLETED: 2-24-2015	TIME:
UTILITIES NOTIFIED: AWC APS City C.G SEWER COX SWG CLN	

TWO WORKING DAYS ARE REQUIRED ON ALL LOCATION REQUESTS
Calling hours 6:00 a.m. to 4:30 p.m. Monday through Friday, excluding these holidays:
New Year's Day, President's Day, Memorial Day, Independence Day, Labor Day, Veterans' Day, Thanksgiving Day, Christmas Day

CDP-15-00429

CITY OF CASA GRANDE, ARIZONA

DEVELOPMENT SERVICES
510 East Florence Blvd. 85122
Office (520-421-8630) **Inspection Line (520-421-8684)**

E14A - ROW Use Repair Maintenance

Issued Date: 5/18/2015

Telephone PIN: 172345

Expires: 7/18/2015

Parcel

Address: 1955 N Casa Grande Ave
Casa Grande, AZ 85122

Legal: N-262' OF S-802' OF E-435.60' OF NE NW SEC 17-6S-6E EXC E-40' THEREOF DEEDED TO CITY OF CG 2.38 AC

Parcel Number: 504-09-022-0 **Zoning:** PAD

Owners/Parties

Primary

Name: Arizona Water Company
Address: 220 E 2nd St
Casa Grande, AZ 85122
Phone: (520) 836-8785

Contractors

Primary
Sub-Contractors

Project Description

Description of Work: EMERGENCY REPAIR Leak #15-24 Emergency Water Line Repair 8" Main

ROW Work Type No
Utility No
Engineering Inspector Assigned: Lupe Vidal (520) 450-2627
ROW Location Description: 1955 N Casa Grande Ave
Road closure necessary? No

CESAR P. ADAMOS, PE, CFM

ARIZONA WATER COMPANY

3805 N. BLACK CANYON HIGHWAY, PHOENIX, ARIZONA 85015-5351 • P.O. BOX 29006, PHOENIX, AZ 85038-9006
PHONE: (602) 240-6860 • FAX: (602) 240-6874 • TOLL FREE: (800) 533-6023 • www.azwater.com

April 30, 2015

Mr. Bruce Balls
B & F Contracting, Inc.
11011 N. 23rd Avenue
Phoenix, AZ 85029

Re: Casa Grande Avenue Asphalt Replacement

PROJECT: Curb, Gutter &Asphalt Replacement	
SYSTEM: Pinal Valley	
CONTRACT NO.:	
P.E. NO.:	W.A. NO.: 1-5345

Dear Mr. Balls:

Enclosed is your copy of the Proposal/Contract for the above-referenced project, which has been accepted by Arizona Water Company (the "Company"). The project shall be constructed in accordance with the Company's *General Conditions of Contract, the Specifications and the Drawings* which were included with the Company's previously provided Proposal/Contract, copies of which are being provided again and attached herewith.

Also enclosed are two copies of the Commencement Notice for the above-referenced project. Please sign one of the copies and return it to my attention retaining the other for your records.

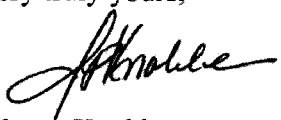
As provided in paragraph 4 of the Company's Proposal/Contract executed by the Company on MAY 1 2015, B & F Contracting, Inc. acknowledged that one hundred percent (100%) Performance and Payment Bonds are required and must be provided to the Company prior to the commencement of work. In addition, as provided in paragraph 44 of the Company's General Conditions of Contract, the 100% Performance and Payment Bonds must be provided within ten (10) calendar days of the date of the Commencement Notice. Failure to provide an acceptable 100% Performance and Payment Bond does not limit the Company's

ability to terminate the Proposal/Contract or seek restitution for damages that the Company may have or will incur.

Prior to the start of construction, please call Ray Murrieta, Division Manager at 520-836-8785 to schedule a pre-construction meeting. In addition, please provide the required Performance and Payment Bonds to the Company promptly so that the contracted work can be completed within the contract's timeline.

If you have any questions, please call me at this office.

Very truly yours,



John P. Knobbe
Lead Designer
jknobbe@azwater.com

afh
Enclosure

ARIZONA WATER COMPANY

Pinal Valley - Casa Grande
220 E 2nd Street Casa Grande Az. 85122
520-836-8785

PROPOSAL/CONTRACT

CONTRACTOR: B&F Contracting, Inc.	SYSTEM: 041
ADDRESS: 11011 N. 23rd Ave	W.A. No(s): 1-5345
CITY ST ZIP: Phoenix, Az 85029	BID DUE DATE: March 31, 2015

CONTRACTOR SUBMITS this PROPOSAL/CONTRACT to ARIZONA WATER COMPANY, an Arizona corporation (the "Company"), to perform the work and complete the project described on Page 2 (the "Project"), as an independent prime contractor.

1. Contractor certifies that it has a complete copy of, and has read, understands and accepts, the Company's General Conditions of Contract, and the Company's Construction Specifications and Standard Specification Drawings, (the "Specifications"), all of which are attached hereto. Contractor has examined the specific plans and related construction drawings for the Project (the "Drawings"), copies of which are also attached hereto. The General Conditions of Contract, Specifications and Drawings are incorporated into this Proposal/Contract. Contractor affirms that all work and materials to be furnished or purchased for the Project will be in strict conformance with the General Conditions of Contract, Specifications and Drawings.
2. Contractor represents and warrants that it has satisfied and complied with the provisions of Section 6, Contractor Understands Work and Working Conditions, of the General Conditions of Contract prior to submitting this Proposal/Contract.
3. Contractor represents that this Proposal/Contract is fair and honest in all respects, is submitted in good faith and is not submitted in collusion with any other company, entity or person.
4. Contractor acknowledges that one hundred percent (100%) Performance and Payment Bonds are required and must be provided to the Company prior to the commencement of work.
5. Prior to the commencement of work, Contractor will submit to the Company a list of all materials to be used in the Project. The materials list will include the manufacturer, part number, price and quantity included in this Proposal/Contract.
6. Contractor will furnish all labor, tools, equipment and materials required to complete the Project according to the General Conditions of Contract, Specifications and Drawings. No materials purchased by Contractor to be incorporated into the Project are subject to tax at the time of purchase and Contractor will not charge the Company for any such tax. Contractor will pay the applicable transaction privilege tax (the "Contracting Tax") on the Project after Contractor receives payment of the final Project invoice from the Company. The cost of materials incorporated into the Project which are exempt by Arizona Revised State Statues ("A.R.S.") from the Contracting Tax, for example, pipes or valves having a diameter of four (4) inches or larger, including equipment, fittings and any other related part that is used in operating the pipes or valves (A.R.S. §42-5061 B.6.), will not be included in the total cost of the labor and materials upon which the Contracting Tax is computed. Contractor retains full liability and obligation to pay the Contracting Tax and will defend and indemnify the Company against any demand or obligation to pay the Contracting Tax.
7. Contractor will maintain detailed accounting records of all materials purchased and incorporated into the Project. Such records will include all supporting original vendor invoices for all materials purchased. Following completion of the Project, Contractor will submit an itemized accounting to the Company which will include all supporting original vendor invoices and satisfactory evidence of payment thereof. The Company will not pay Contractor for materials not actually incorporated into the Project, and the disposition of such materials will remain Contractor's responsibility.
8. The Estimated Total Cost of the Project, shown on Page 2, is based on estimated labor and material quantities to be furnished. It includes an estimate of the Contracting Tax and the cost of the required Performance and Payment Bonds. Contractor will not cancel, modify or withdraw this Proposal/Contract during a ninety-day (90) period commencing on the Bid Due Date. The Company may accept this Proposal/Contract by signing and mailing, or otherwise delivering, a copy hereof to Contractor during such ninety-day (90) period. If the Company does not accept this Proposal/Contract during such ninety-day (90) period, Contractor may cancel this Proposal/Contract by giving written notice of cancellation to the Company.
9. Prior to the commencement of work, Contractor will provide the Company with a detailed construction schedule, in either Gantt or CPM form, identifying all tasks to be performed from the date of the written Commencement Notice through completion of the Project, including testing, training of Company Personnel and final Project invoicing. Contractor will provide the Company with a copy of such construction schedule documenting the progress of work on the Project at least monthly.
10. Contractor will not commence work on the Project until the Company gives Contractor a written Commencement Notice. Contractor will complete the Project within 30 calendar days after the Commencement Notice is issued.
11. Following the Company's written notice of satisfactory completion of the Project, and upon receipt of the final Project invoice from Contractor, the Company shall pay Contractor the actual total cost of the Project, which will be calculated as shown on Page 2, except that actual labor and material quantities installed/constructed will be substituted for the estimated labor and materials quantities and the Contracting Tax will be recalculated based on such actual labor and materials quantities.
12. The amount of applicable liquidated damages for Contractor's failure to deliver or perform within the time limit shown in Paragraph 10 may be deducted from the Company's payment of the final Project invoice. This provision shall not limit the Company's ability to terminate this Proposal/Contract for Contractor's unsatisfactory performance or failure to perform as provided in the General Conditions of Contract, Specifications or Drawings, or in this Proposal/Contract.

SPECIAL CONDITIONS:

Pollution insurance not required per email from Fred Schneider dated 3-11-15

CONTRACTOR	PROPOSAL/CONTRACT ACCEPTED:
B&F Contracting Inc.	ARIZONA WATER COMPANY
By: Bruce Wayne Balls	By: Fredrick K. Schneider
Print Name: Bruce Wayne Balls	Print Name: Fredrick K. Schneider, PE
Title: Secretary	Title: Vice President - Engineering
Date: 3/31/2015	Date: 5-1-2015

ARIZONA WATER COMPANY

Pinal Valley - Casa Grande
220 E 2nd Street Casa Grande Az. 85122
520-836-8785

PROPOSAL/CONTRACT

CONTRACTOR: B & F Contracting, Inc.	SYSTEM: 041
AZ CONTRACTOR LICENSE NO: ROC-089744 CLASSIFICATION: A-General	W.A. No(s): 1-5345
ADDRESS: 11011 N. 23rd Ave	BID DUE DATE: March 31, 2015
CITY ST ZIP Phoenix, Az 85029	BID BOND REQUIRED ☑ Yes ☐ No

DESCRIPTION OF PROJECT: Remove and replace damaged asphalt, sidewalk, curb and gutter at 1955 North Casa Grande AVE. in Casa Grande Az. Per AWC specs and City of Casa Grande specs.

1-2. MATERIALS EXEMPT FROM CONTRACTING TAX (per Paragraph 6	QUANTITY	UNIT PRICE LABOR	UNIT PRICE MATERIALS	TOTAL COST LABOR	TOTAL COST MATERIALS
				1	2
3. Total Labor to Install Exempt Materials (add the amounts in column 1)				3	
4. Total Exempt Materials (add the amounts in column 2)					4

5-6. NON-EXEMPT MATERIALS	QUANTITY	UNIT PRICE LABOR	UNIT PRICE MATERIALS	TOTAL COST LABOR	TOTAL COST MATERIALS
Remove and replace asphalt per MAG detail 220A					
4 inches thick 1/2" 19 MM High volume . Area of 78 feet by 44 feet	1 LOT	19,202	7125	19202	7125
Replace thermal striping	1 LOT	2,924	500	2924	500
Replace curb, gutter and sidewalk	28 LF	2241	500	2241	500
				5	6
7. Total Labor to Install Non-Exempt Materials (add the amounts in column 5)				7 24,367	
8. Total Non-Exempt Materials (add the amounts in column 6)					8 8125
9. Subtotal A (add lines 3, 7 and 8)					9 32,492
10. Contracting Tax Base (multiply the amount on line 9 by 0.65)				10 21,119.80	
11. Applicable Contracting Tax Rate				11 10.7%	
12. Contracting Tax (multiply the amount on line 10 by line 11)					12 2259.82
13. Subtotal B (add lines 4, 9 and 12)					13 34,751.82
14. 100% Performance and Payment Bonds Cost					14 695.04
15. Estimated Total Cost (add lines 13 and 14)					15 35,446.86

NOTE: The Estimated Total Cost includes all labor and materials for backfill, pavement replacement, chip seal, and traffic control necessary for the Project.

ARIZONA WATER COMPANY

COMMENCEMENT NOTICE

CONTRACTOR:

Mr. Bruce Balls
B & F Contracting, Inc.
11011 N. 23rd Avenue
Phoenix, AZ 85029

DATE: 5/4/15
DIVISION: CASA GRANDE
SYSTEM: PINAL VALLEY
W.A.: 1-5345

THIS IS YOUR NOTICE TO PROCEED WITH THE FOLLOWING PROJECT(S):

DESCRIPTION OF WORK:

Remove and replace damaged asphalt, sidewalk, curb and gutter at 1955 N. Casa Grande Avenue in Casa Grande, AZ per AWC specs and City of Casa Grande specs.

PERFORMANCE AND PAYMENT BONDS REQUIRED: [X] Yes [ ] No

TOTAL DAYS ALLOWED: 40

COMPLETION DATE: 6/13/15

Prior to the start of construction, please call Ray Murrieta, Division Manager at 520-836-8785 to schedule a pre-construction meeting.

ARIZONA WATER COMPANY
Company

By [signature]
Title Vice President - Engineering

B & F CONTRACTING, INC.
Contractor *(type name)*

By _____
Title _____

ARIZONA WATER COMPANY

SPECIFICATIONS

GENERAL CONDITIONS OF CONTRACT: E-4-1

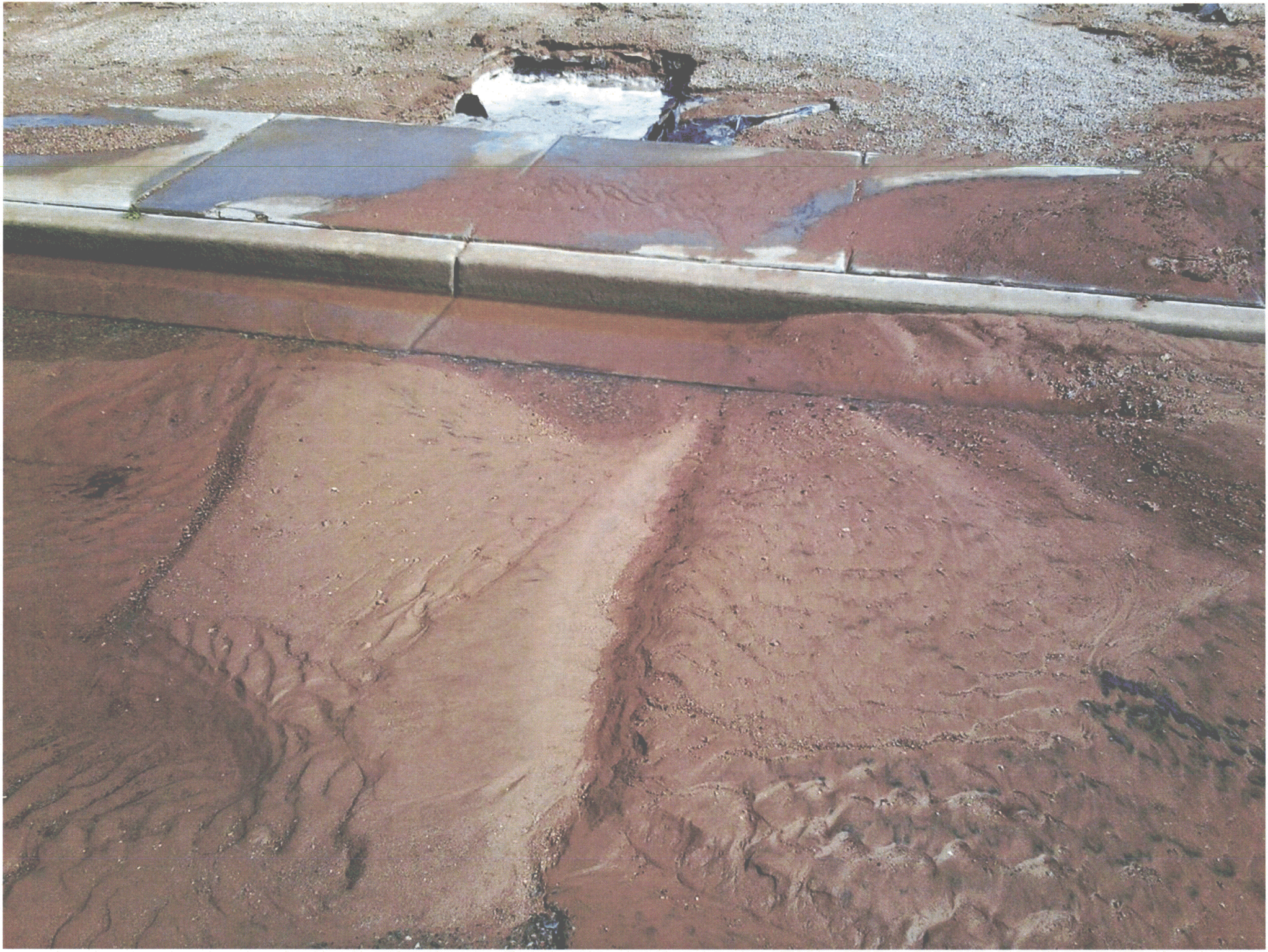
CONSTRUCTION SPECIFICATIONS: E-8-1

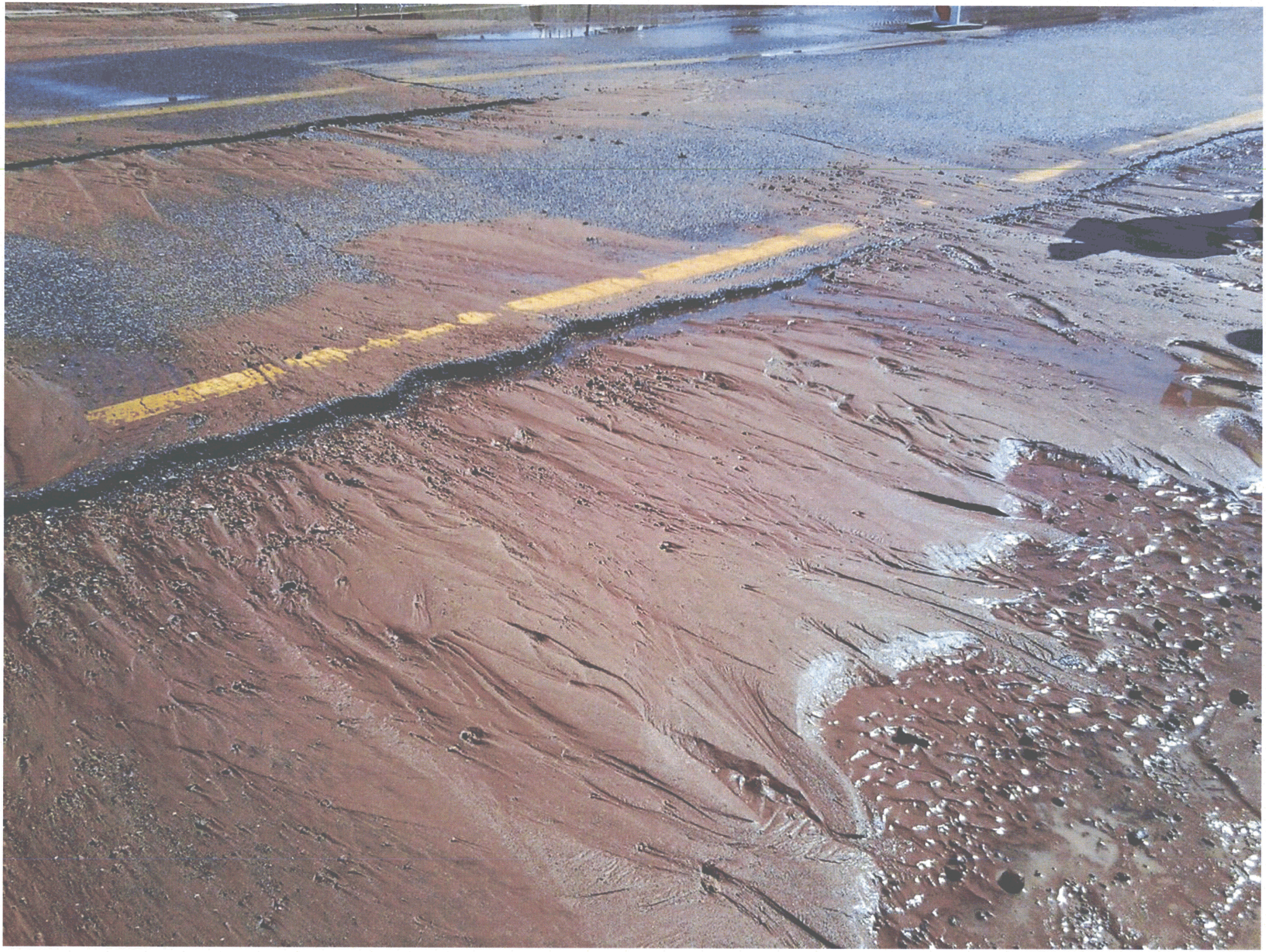
STANDARD SPECIFICATION DRAWINGS: E-9-1

5-1-15

2007 EDITION WITH **2010** REVISIONS;
2012 GENERAL CONDITIONS OF CONTRACT

A copy of this entire Spec Book was sent out with B&F Contracting Proposal package for 1-5345 CL Curb + Gutter on 5/4/15 @ 4





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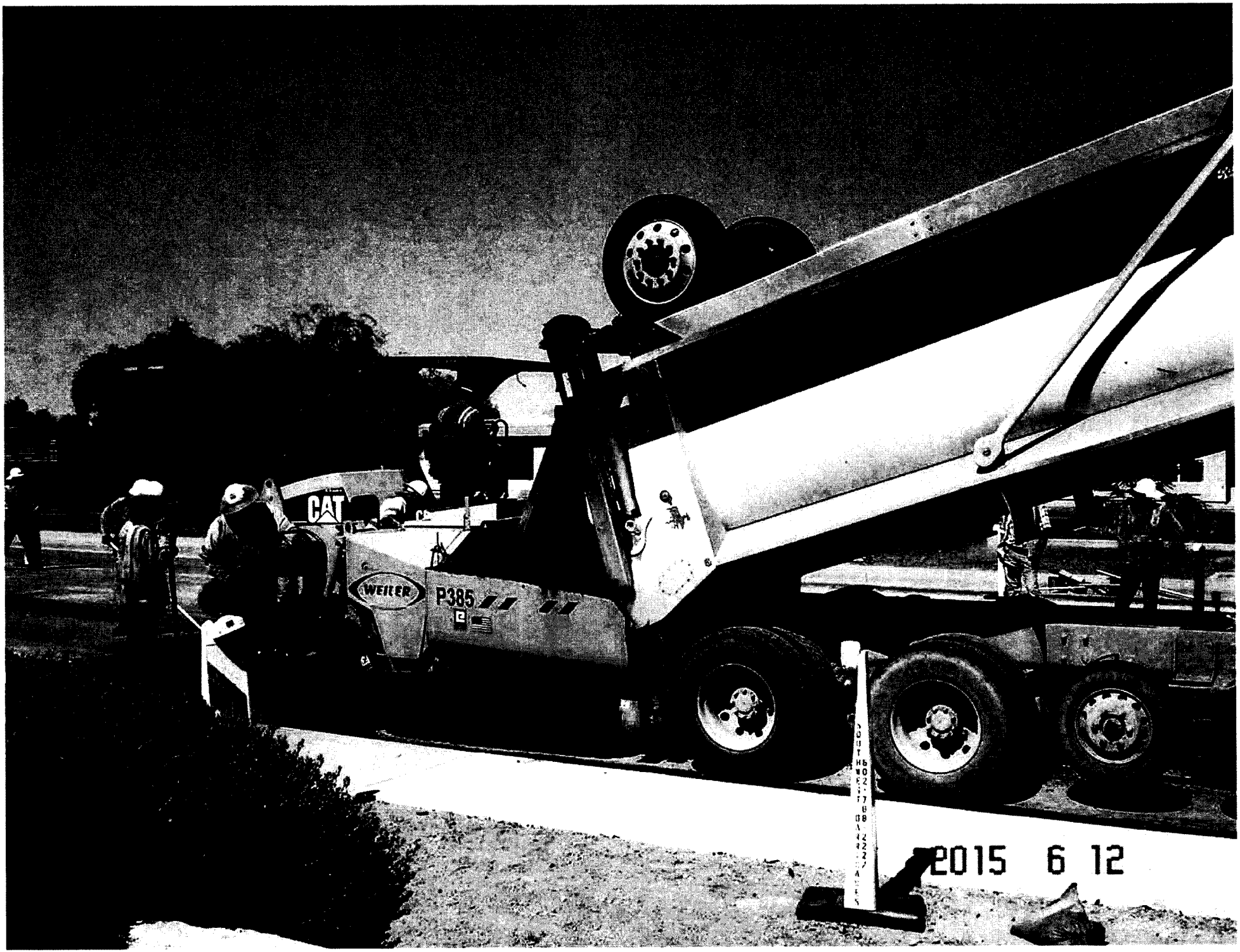
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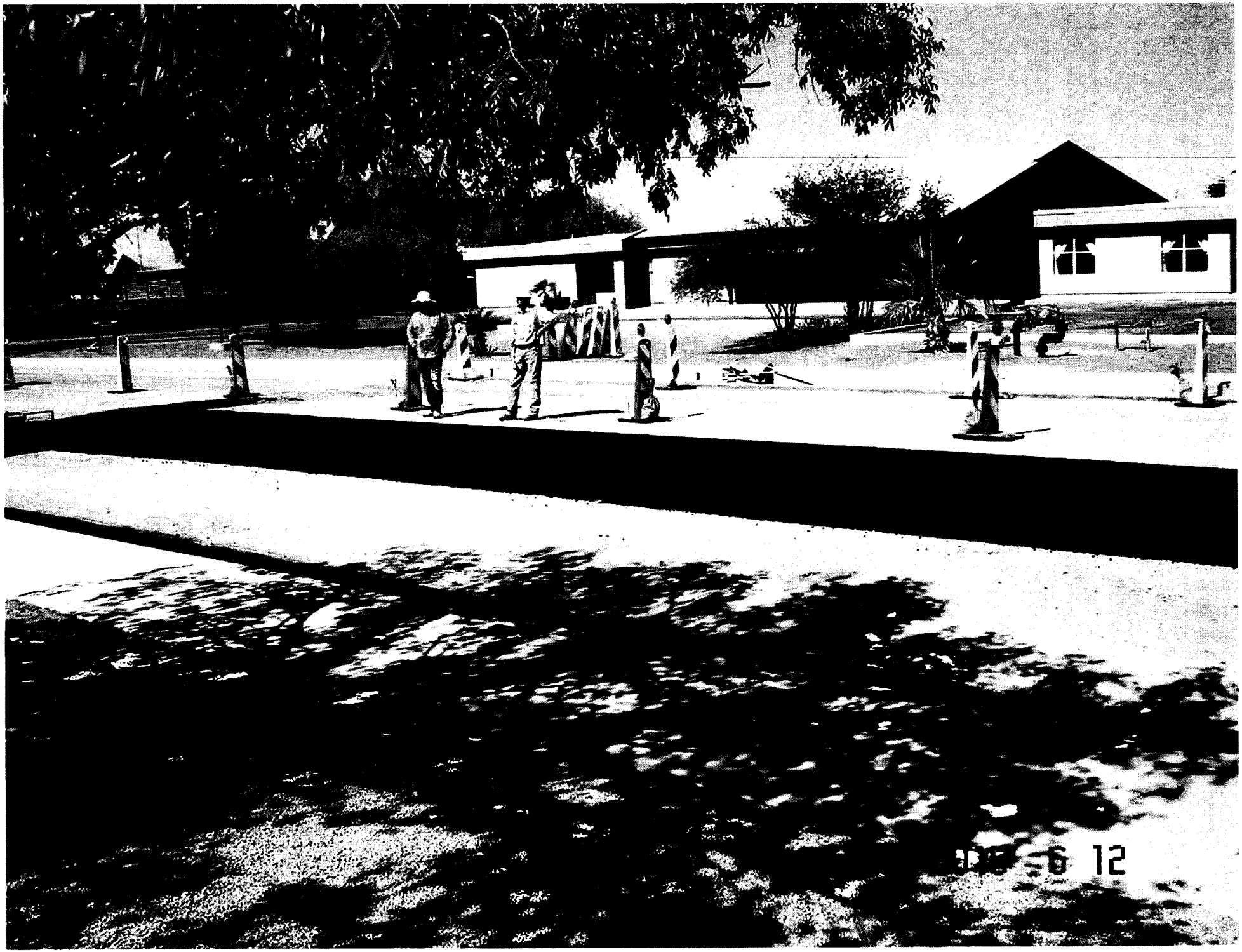

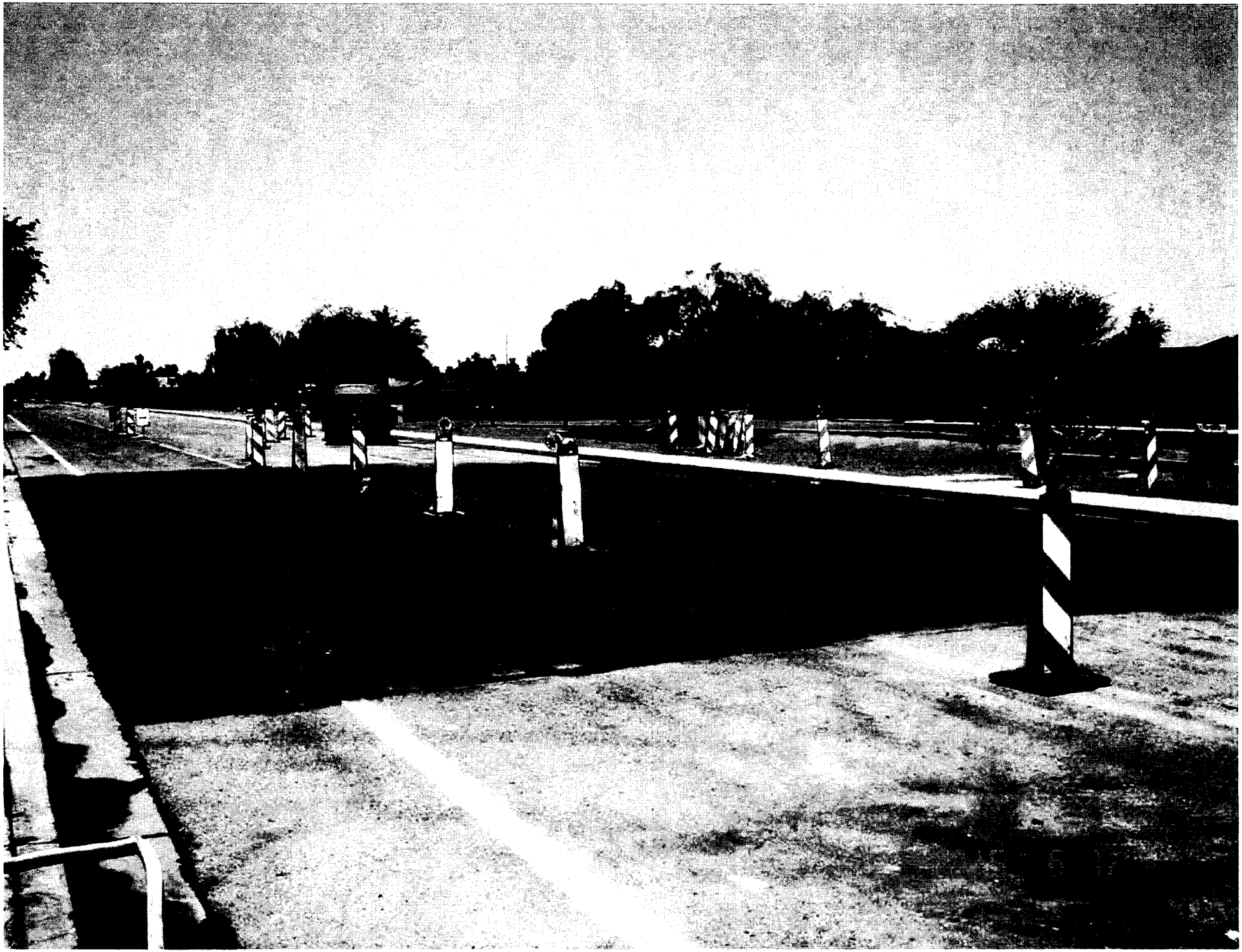

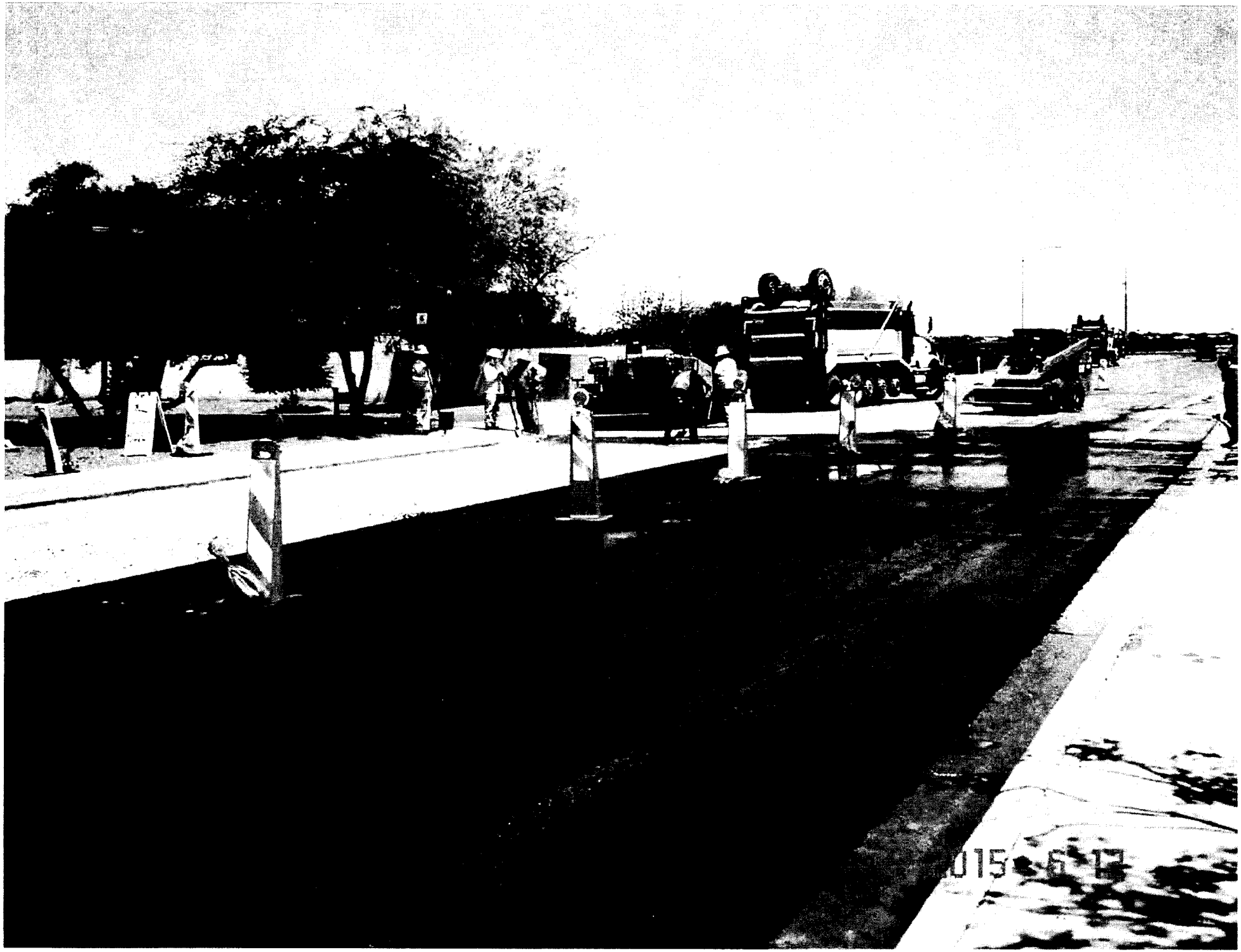

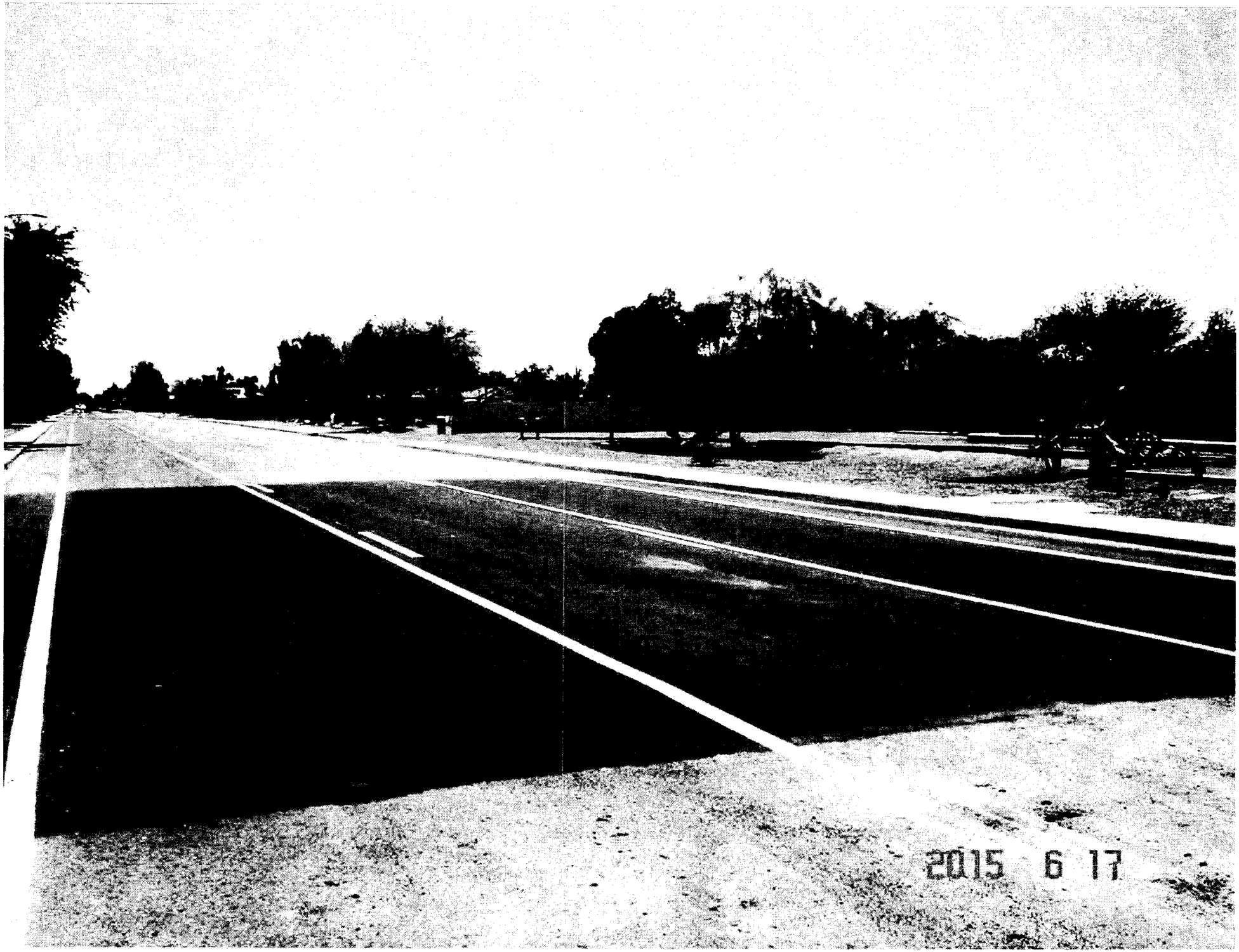
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Western Group Rate Case

Exhibit FKS-1

5348 Burgess Peak Radio

ARIZONA WATER COMPANY
WORK AUTHORIZATION

W.A NUMBER: 1-5348
P.E NUMBER:
BUDGET ITEM NO.: Special No. 18
SHEET NO.: 1 of 2

SYSTEM:	PINAL VALLEY	RETENTION REQUIRED:	☑ YES ☐ NO
DIVISION:	CASA GRANDE	WORK TO START BY:	UPON AUTHORIZATION
RESPONSIBLE PERSON:	RAY MURRIETA	WORK TO BE FINISHED BY:	WITHIN 90 DAYS
TAX CODE:	0403		

DESCRIPTION OF WORK:

Install a redundant radio system, solar shields, fan and filter kit, and surge arrestor at the Burgess Peak SCADA radio repeater.

FACTORS JUSTIFYING WORK:

The Burgess Peak SCADA radio repeater (Radio) has failed 2 times in the past 5 years. All communication between the Casa Grande SCADA master computer and 17 well, tank, treatment, and booster pump station sites are transmitted through the Radio. When the Radio fails company operators remove and replace the failed Radio with a spare Radio kept in the Pinal Valley office. Radio replacement takes approximately 6 hours to complete during which time company operators are unable to receive alarms from the 17 sites listed above. Installation of an automatic, redundant radio system will eliminate loss of alarms during a Radio failure. Installation of a surge arrestor will reduce the number of Radio failures and installation of the solar shield and fan kit will increase equipment life.

COST ESTIMATE		AUTHORIZATION	DATE
COST OF WORK:		PREPARED BY: James Wilson JW 5/29/15	5/8/15
MATERIAL	0	REVIEWED FOR ESMT/ROW VERIFICATION: Charles Briggs CB 06-01-2015	05-07-2015
LABOR	2,200	REVIEWED BY: Andy Haas AFH 6-1-15 for	5-11-2015
CONTRACT PORTION	22,131	APPROVED BY ENGINEERING: Fredrick Schneider FS 6-1-15	5-11-2015
OVERHEAD	2,900	APPROVED BY FINANCE: Joseph Harris	5/12/15
TOTAL AUTHORIZED EXPENDITURES CHARGEABLE TO THIS W.A.	$ 27,231	SPECIAL ITEM EXCEEDING $10,000; AUTHORIZED BY PRESIDENT: William Garfield	5-15-15
FUNDS RECEIVED:		SPECIAL ITEM EXCEEDING $10,000; AUTHORIZED BY CHAIRMAN: Approved via Fax M. L. Whitehead	5/19/2015
CONTRIBUTIONS RECEIVED	0		
REFUNDABLE ADVANCES RECEIVED	0		
TOTAL CONTRIBUTIONS/ADVANCES	0		
NET COMPANY CASH REQUIRED	$ 27,231		

COMMENTS:

Transfer funds required ($27,231) from WA 1-5166 (Coolidge Airport ARF)

CONSTRUCTION RELEASE:

RELEASED TO CONSTRUCTION
Authorized by FRED SCHNEIDER
Date 5/29/2015

AFH

ARIZONA WATER COMPANY

WORK AUTHORIZATION - DETAIL SHEET

W A NUMBER: 1-5348
P E NUMBER:
BUDGET ITEM NO.: Special No. 18
SHEET NO.: 2 of 2

RETIREMENT PROPERTY UNITS	PLANT PROPERTY ACCOUNT	UNIT DESCRIPTION	QUANTITY	YEAR INSTALLED AND W.A. NUMBER

PROJECT DESCRIPTION

Install a redundant radio system, solar shields, fan and filter kit, and surge arrestor at the Burgess Peak SCADA radio repeater.

	DESCRIPTION	PLANT PROP ACCT	QUANTITY	UNIT COST	TOTAL
CONTRACT WORK	Furnish and install new iNETII900 access point dual gateway	397.2	1	$ 12,982.00	$ 12,982
	redundant radio system, Delta LA303 surge arrestor, connect to				
	existing level transmitter and antenna, loop check and functional test				
	Furnish and install solar shields on existing radio cabinet	397.2	1	3,350.00	3,350
	Furnish and install fan and filter kit	397.2	1	2,930.00	2,930
	Furnish and install Falcon 1500VA UPS	397.2	1	2,869.00	2,869
	SERVICE CONNECTIONS COMPLETE: DOUBLE-LONG	345			
	SERVICE CONNECTIONS COMPLETE: DOUBLE-SHORT	345			
	SERVICE CONNECTIONS COMPLETE: SINGLE-LONG	345			
	SERVICE CONNECTIONS COMPLETE: SINGLE-SHORT	345			
TOTAL CONTRACT WORK					$ 22,131
MATERIALS					
	SERVICE CONNECTIONS: DOUBLE-LONG	345			
	SERVICE CONNECTIONS: DOUBLE-SHORT	345			
	SERVICE CONNECTIONS: SINGLE-LONG	345			
	SERVICE CONNECTIONS: SINGLE-SHORT	345			
	METERS	346			
TOTAL MATERIALS					$ -
LABOR	Engineering Design and Project Management	397.2	20	$ 55.00	$ 1,100
	TESTING FEE				
	PERMIT FEE				
	SURVEY FEE				
	FIELD INSPECTION	397.2	20	55.00	1,100
	INSTALL SERVICE CONNECTIONS: DOUBLE-LONG	345			
	INSTALL SERVICE CONNECTIONS: DOUBLE-SHORT	345			
	INSTALL SERVICE CONNECTIONS: SINGLE-LONG	345			
	INSTALL SERVICE CONNECTIONS: SINGLE-SHORT	345			
TOTAL LABOR					$ 2,200
SUBTOTAL - CONTRACT WORK, MATERIALS, AND LABOR					$ 24,331
OVERHEAD					2,900
TOTAL	REFUNDABLE PORTION ☐	NON-REFUNDABLE PORTION ☐		**COST ESTIMATE**	$ 27,231

AFH

ARIZONA WATER COMPANY

3805 N. BLACK CANYON HIGHWAY, PHOENIX, ARIZONA 85015-5351 • P.O. BOX 29006, PHOENIX, AZ 85038-9006
PHONE: (602) 240-6860 • FAX: (602) 240-6874 • TOLL FREE: (800) 533-6023 • www.azwater.com

May 29, 2015

Mr. Cody Eslick
Keller Electrical Industries, Inc.
1881 E. University Drive
Phoenix, AZ 85034

Re: Burgess Peak SCADA Radio Repeater

PROJECT: Burgess Peak Radio Repeater	
SYSTEM: Pinal Valley	
CONTRACT NO.:	
P.E. NO.:	W.A. NO.: 1-5348

Dear Mr. Eslick:

Enclosed is your copy of the Proposal/Contract for the above-referenced project, which has been accepted by Arizona Water Company (the "Company"). The project shall be constructed in accordance with the Company's *General Conditions of Contract, the Specifications and the Drawings* which were included with the Company's previously provided Proposal/Contract, copies of which are being provided again and attached herewith.

Also enclosed are two copies of the Commencement Notice for the above-referenced project. Please sign one of the copies and return it to my attention retaining the other for your records.

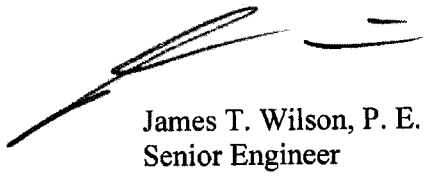
As provided in paragraph 4 of the Company's Proposal/Contract executed by the Company on June 1, 2015, Keller Electrical Industries, Inc. acknowledged that one hundred percent (100%) Performance and Payment Bonds are required and must be provided to the Company prior to the commencement of work. In addition, as provided in paragraph 44 of the Company's General Conditions of Contract, the 100% Performance and Payment Bonds must be provided within ten (10) calendar days of the date of the Commencement Notice. Failure to provide an acceptable 100% Performance and Payment Bond does not limit the Company's

ability to terminate the Proposal/Contract or seek restitution for damages that the Company may have or will incur.

Prior to the start of construction, please call Ray Murrieta, Division Manager at 520-836-8785 to schedule a pre-construction meeting. In addition, please provide the required Performance and Payment Bonds to the Company promptly so that the contracted work can be completed within the contract's timeline.

If you have any questions, please call me at this office.

Very truly yours,



James T. Wilson, P. E.
Senior Engineer
jwilson@azwater.com

afh
Enclosure

ARIZONA WATER COMPANY

CASA GRANDE DIVISION
220 E 2ND STREET
520-836-8785

PROPOSAL/CONTRACT

CONTRACTOR: Keller Electrical Industries, Inc	SYSTEM: Casa Grande
ADDRESS: 1881 E University Dr	W.A. No(s): 1-5348
CITY ST ZIP: Phoenix, AZ 85034	BID DUE DATE: May 18, 2015

CONTRACTOR SUBMITS this PROPOSAL/CONTRACT to ARIZONA WATER COMPANY, an Arizona corporation (the "Company"), to perform the work and complete the project described on Page 2 (the "Project"), as an independent prime contractor

1. Contractor certifies that it has a complete copy of, and has read, understands and accepts, the Company's General Conditions of Contract, and the Company's Construction Specifications and Standard Specification Drawings, (the "Specifications"), all of which are attached hereto. Contractor has examined the specific plans and related construction drawings for the Project (the "Drawings"), copies of which are also attached hereto. The General Conditions of Contract, Specifications and Drawings are incorporated into this Proposal/Contract. Contractor affirms that all work and materials to be furnished or purchased for the Project will be in strict conformance with the General Conditions of Contract, Specifications and Drawings.
2. Contractor represents and warrants that it has satisfied and complied with the provisions of Section 6, Contractor Understands Work and Working Conditions, of the General Conditions of Contract prior to submitting this Proposal/Contract.
3. Contractor represents that this Proposal/Contract is fair and honest in all respects, is submitted in good faith and is not submitted in collusion with any other company, entity or person.
4. Contractor acknowledges that one hundred percent (100%) Performance and Payment Bonds are required and must be provided to the Company prior to the commencement of work.
5. Prior to the commencement of work, Contractor will submit to the Company a list of all materials to be used in the Project. The materials list will include the manufacturer, part number, price and quantity included in this Proposal/Contract.
6. Contractor will furnish all labor, tools, equipment and materials required to complete the Project according to the General Conditions of Contract, Specifications and Drawings. No materials purchased by Contractor to be incorporated into the Project are subject to tax at the time of purchase and Contractor will not charge the Company for any such tax. Contractor will pay the applicable transaction privilege tax (the "Contracting Tax") on the Project after Contractor receives payment of the final Project invoice from the Company The cost of materials incorporated into the Project which are exempt by Arizona Revised State Statues ("A.R.S.") from the Contracting Tax, for example, pipes or valves having a diameter of four (4) inches or larger, including equipment, fittings and any other related part that is used in operating the pipes or valves (A.R.S. §42-5061 B.6.), will not be included in the total cost of the labor and materials upon which the Contracting Tax is computed. Contractor retains full liability and obligation to pay the Contracting Tax and will defend and indemnify the Company against any demand or obligation to pay the Contracting Tax.
7. Contractor will maintain detailed accounting records of all materials purchased and incorporated into the Project. Such records will include all supporting original vendor invoices for all materials purchased. Following completion of the Project, Contractor will submit an itemized accounting to the Company which will include all supporting original vendor invoices and satisfactory evidence of payment thereof. The Company will not pay Contractor for materials not actually incorporated into the Project, and the disposition of such materials will remain Contractor's responsibility.
8. The Estimated Total Cost of the Project, shown on Page 2, is based on estimated labor and material quantities to be furnished. It includes an estimate of the Contracting Tax and the cost of the required Performance and Payment Bonds. Contractor will not cancel, modify or withdraw this Proposal/Contract during a ninety-day (90) period commencing on the Bid Due Date. The Company may accept this Proposal/Contract by signing and mailing, or otherwise delivering, a copy hereof to Contractor during such ninety-day (90) period. If the Company does not accept this Proposal/Contract during such ninety-day (90) period, Contractor may cancel this Proposal/Contract by giving written notice of cancellation to the Company
9. Prior to the commencement of work, Contractor will provide the Company with a detailed construction schedule, in either Gantt or CPM form, identifying all tasks to be performed from the date of the written Commencement Notice through completion of the Project, including testing, training of Company Personnel and final Project invoicing. Contractor will provide the Company with a copy of such construction schedule documenting the progress of work on the Project at least monthly.
10. Contractor will not commence work on the Project until the Company gives Contractor a written Commencement Notice. Contractor will complete the Project within 60 calendar days after the Commencement Notice is issued.
11. Following the Company's written notice of satisfactory completion of the Project, and upon receipt of the final Project invoice from Contractor, the Company shall pay Contractor the actual total cost of the Project, which will be calculated as shown on Page 2, except that actual labor and material quantities installed/constructed will be substituted for the estimated labor and materials quantities and the Contracting Tax will be recalculated based on such actual labor and materials quantities.
12. The amount of applicable liquidated damages for Contractor's failure to deliver or perform within the time limit shown in Paragraph 10 may be deducted from the Company's payment of the final Project invoice. This provision shall not limit the Company's ability to terminate this Proposal/Contract for Contractor's unsatisfactory performance or failure to perform as provided in the General Conditions of Contract, Specifications or Drawings, or in this Proposal/Contract.

SPECIAL CONDITIONS:

CONTRACTOR	PROPOSAL/CONTRACT ACCEPTED: ARIZONA WATER COMPANY
By: C.R. Eslick	By: Fredrick K. Schneider
Print Name: Cody R. Eslick	Print Name: Fredrick K. Schneider, PE
Title: Vice President of Operations	Title: Vice President - Engineering
Date: 5/27/15	Date: 6-1-2015

AJH

ARIZONA WATER COMPANY
CASA GRANDE DIVISION
220 E 2ND STREET
520-836-8785

PROPOSAL/CONTRACT

CONTRACTOR: Keller Electrical Industries, Inc	SYSTEM: Casa Grande
AZ CONTRACTOR LICENSE NO: CLASSIFICATION:	W.A. No(s): 1-5348
ADDRESS: 1881 E University Dr	BID DUE DATE: May 18, 2015
CITY ST ZIP Phoenix, AZ 85034	BID BOND REQUIRED: √ Yes ☐ No

DESCRIPTION OF PROJECT: Burgess Peak Radio and Cabinet Upgrades

1-2. MATERIALS EXEMPT FROM CONTRACTING TAX (per Paragraph 6)	QUANTITY	UNIT PRICE LABOR	UNIT PRICE MATERIALS	TOTAL COST LABOR	TOTAL COST MATERIALS
				1	2
3. Total Labor to Install Exempt Materials (add the amounts in column 1)				3 0	
4. Total Exempt Materials (add the amounts in column 2)					4 0

5-6. NON-EXEMPT MATERIALS	QUANTITY	UNIT PRICE LABOR	UNIT PRICE MATERIALS	TOTAL COST LABOR	TOTAL COST MATERIALS
Create new drawings for redundant radio system and connections.	1			$ 1,620.00	
Supply Arizona Water drawings and cut sheets for new equipment	1			$ 600.00	
Furnish and install new iNETII 900 Access Point/Dual Gateway Redundant					
Radio system with redundant power supplies	1			$ 2,470.00	$ 7,250.00
Connect to existing level transmitter and existing antenna cable	1			$ 327.00	
Furnish technician to assist with loop check out and functional test to equip	1			$ 655.00	
Furnish Solar shields and install on front, top and two sided of existing				5	6
30"x30" radio cabinet. shields to be 12ga. Painted steel, white. Installed					
with approx. 1" separation between cabinet and shield.	1			$ 820.00	$ 450.00
Furnish and Install Delta LA303 single phase surge arrestor	1			$ 520.00	$ 280.00
Option to install 4" cabinet fan for circulation	1			$ 520.00	$ 400.00
Option to install Falcon 1500VA UPS if needed	1			$ -	$ 1,920.00
7. Total Labor to Install Non-Exempt Materials (add the amounts in column 5)				7 $ 7,532.00	X
8. Total Non-Exempt Materials (add the amounts in column 6)					8.0 $ 10,300.00
9. Subtotal A (add lines 3, 7 and 8)					9.0 $ 17,832.00
10. Contracting Tax Base (multiply the amount on line 9 by 0.65)				10 $ 11,590.80	
11. Applicable Contracting Tax Rate				11 10.70%	
12. Contracting Tax (multiply the amount on line 10 by line 11)					12 $ 1,240.22
13. Subtotal B (add lines 4, 9 and 12)					13 $ 19,072.22
14. 100% Performance and Payment Bonds Cost					14 $ 381.44
15. Estimated Total Cost (add lines 13 and 14)					15 $ 19,453.66

NOTE

ARIZONA WATER COMPANY

COMMENCEMENT NOTICE

CONTRACTOR:

Mr. Cody Eslick
Keller Electrical Industries, Inc.
1881 E. University Drive
Phoenix, AZ 85034

DATE: 6/2/14
DIVISION: CASA GRANDE
SYSTEM: PINAL VALLEY
W.A.: 1-5348

THIS IS YOUR NOTICE TO PROCEED WITH THE FOLLOWING PROJECT(S):

DESCRIPTION OF WORK:

Burgess Peak Radio and Cabinet Upgrades.

PERFORMANCE AND PAYMENT BONDS REQUIRED: [X] Yes [ ] No

TOTAL DAYS ALLOWED: 70

COMPLETION DATE: 8/11/15

Prior to the start of construction, please call Ray Murrieta, Division Manager at 520-836-8785 to schedule a pre-construction meeting.

ARIZONA WATER COMPANY
Company

By [signature]
Title Vice President - Engineering

KELLER ELECTRICAL INDUSTRIES, INC.
Contractor *(type name)*

By _____
Title _____

AFH
W:\PROJECTS\CG\PVINS\DEWA\ACTIVE WA\1-5348 SPECIAL NO. 18 BURGESS PEAK REDUNDANT RADIO\AGREEMENTS\CONTRACTS\E-3-18-1 KELLER COMMENCEMENT NOTICE 1-5348 BURGESS PEAK RADIO.DOCX 1/15/09

ARIZONA WATER COMPANY

SPECIFICATIONS

GENERAL CONDITIONS OF CONTRACT: E-4-1

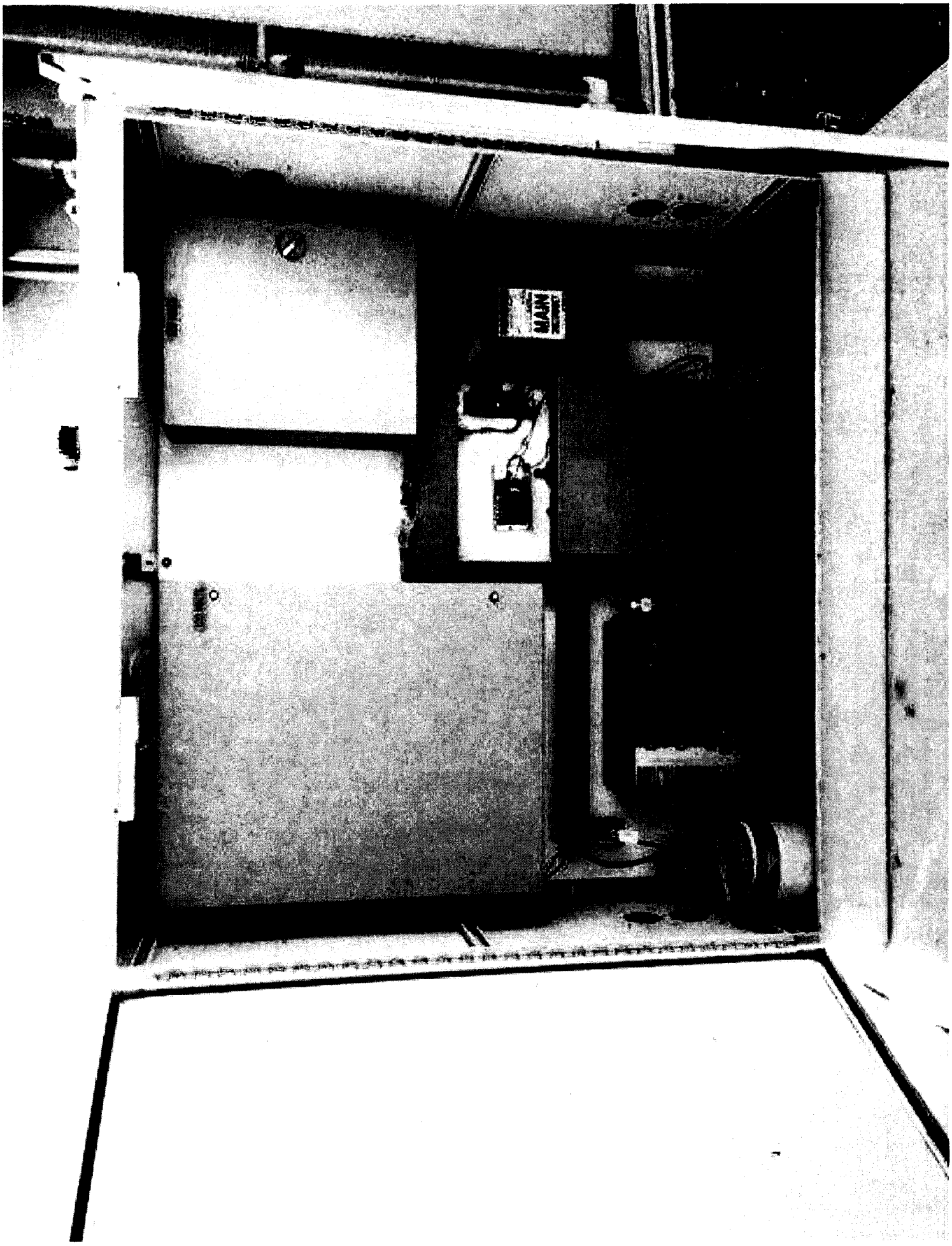
CONSTRUCTION SPECIFICATIONS: E-8-1

STANDARD SPECIFICATION DRAWINGS: E-9-1

gw 5/29/15

2007 EDITION WITH **2010** REVISIONS;
2012 GENERAL CONDITIONS OF CONTRACT

A copy of this entire Spec Book was sent out with Keller Electrical Proposal package for 1-5248 Burgess Peak Radio on 6/2/15 GH


MAIN

72" Top to Bottom
Mounting Holes

24" front
to back
72" top to bottom

14"
30" side to side
30" Top to bottom
16.75"

Western Group Rate Case

Exhibit FKS-1

5358 PV Well No. 26

ARIZONA WATER COMPANY
WORK AUTHORIZATION

W.A. NUMBER: 1-5358
P.E. NUMBER:
BUDGET ITEM NO.: Special No. 24
SHEET NO.: 1 of 2

SYSTEM:	CASA GRANDE
DIVISION:	PINAL VALLEY
RESPONSIBLE PERSON:	JAMES WILSON
TAX CODE:	0408

RETENTION REQUIRED:	☑ YES ☐ NO
WORK TO START BY:	UPON AUTHORIZATION
WORK TO BE FINISHED BY:	WITHIN 60 DAYS

DESCRIPTION OF WORK:

Pull the pump, video inspect the well, and replace the pump, 560 LF of 10-inch column pipe, 3-inch oil tube, 1-15/16-inch lineshaft, 1/4-inch air line, and 3/4-inch PVC sounding line at Well No. 26 in the Pinal Valley water system. Company engineers anticipate brushing and bailing the well prior to retuning the well to service.

FACTORS JUSTIFYING WORK:

Well No. 26 recently lost all production, dropping from approximately 1300 gpm to 0 gpm. The pumping equipment in this well has been in service for over 18 years. Company engineers have determined the pumping equipment has reached the end of its useful life and replacement is necessary. Well No. 26 is critical to meeting peak water demands and necessary to continue to provide a safe, adequate and reliable drinking water supply to the Pinal Valley water system.

COST ESTIMATE	
COST OF WORK:	
MATERIAL	0
LABOR	4,900
CONTRACT PORTION	95,437
OVERHEAD	12,000
TOTAL AUTHORIZED EXPENDITURES CHARGEABLE TO THIS W.A.	$ 112,337
FUNDS RECEIVED:	
CONTRIBUTIONS RECEIVED	0
REFUNDABLE ADVANCES RECEIVED	0
TOTAL CONTRIBUTIONS/ADVANCES	0
NET COMPANY CASH REQUIRED	$ 112,337

AUTHORIZATION	DATE
PREPARED BY: James Wilson JW 7/7/15	6/25/15
REVIEWED FOR ESMT/ROW VERIFICATION: Charles Briggs CB 07-07-2015	06-25-2015
REVIEWED BY: Mario Mendez MM 7/7/15	6/25/15
APPROVED BY ENGINEERING: Fredrick Schneider FS 7-7-15	6-29-15
APPROVED BY FINANCE: Joseph Harris	6/29/15
SPECIAL ITEM EXCEEDING $10,000; AUTHORIZED BY PRESIDENT: William Garfield	6-30-2015
SPECIAL ITEM EXCEEDING $10,000; AUTHORIZED BY CHAIRMAN: APPROVED VIA FAX M. L. Whitehead	07/06/2015

COMMENTS:

Transfer $112,337 from WA 1-4806 (Coolidge Well No. 13 ARF) to fund this project.

CONSTRUCTION RELEASE:

RELEASED TO CONSTRUCTION
Authorized by FRED SCHNEIDER
Date 6/29/2015

AFH

AFH

ARIZONA WATER COMPANY

WORK AUTHORIZATION - DETAIL SHEET

W.A. NUMBER: 1-5358
P.E. NUMBER:
BUDGET ITEM NO. Special No. 24
SHEET NO. 2 of 2

RETIREMENT PROPERTY UNITS	PLANT PROPERTY ACCOUNT	UNIT DESCRIPTION	QUANTITY	YEAR INSTALLED AND W.A. NUMBER
	325	Fairbanks 12M 9-Stage pump	1	1997, 1-2608
	325	10-inch column pipe	560	1997, 1-2608
	325	3x1-15/16 oil tube and shaft	560	1997, 1-2608
	325	1/4-inch air line	560	1997, 1-2608
	325	3/4-inch air line	560	1997, 1-2608

PROJECT DESCRIPTION:

Pull the pump, video inspect the well, and replace the pump, 560 LF of 10-inch column pipe, 3-inch oil tube, 1-15/16-inch lineshaft, 1/4-inch air line, and 3/4-inch PVC sounding line at Well No. 26 in the Pinal Valley water system. Company engineers anticipate brushing and bailing the well prior to retuning the well to service.

	DESCRIPTION	PLANT PROP ACCT	QUANTITY	UNIT COST	TOTAL
CONTRACT WORK	Labor to pull and replace pump assembly	325	1	$ 7,650.00	$ 7,650
	Provide and install Goulds 12CHC 9-stage bowl assembly complete	325	1	10,597.00	10,597
	Provide and install 10" x 20' taper thread seamless column pipe	325	28	1,240.00	34,720
	Provide and install 3/4" solvent weld PVC line	325	560	0.50	280
	Provide and install 1/4" stainless steel airline with gauge & valve	325	560	2.50	1,400
	Video well with downward and side scan, log and provide 2 DVDs	325	2	850.00	1,700
	Provide and install all misc materials (buckles, bandits, tape etc)	325	1	1,035.00	1,035
	Provide and install 3"x1-15/16" x 20' oil tube and shaft	325	28	773.00	21,644
	Brush and Bail Well Casing	325	40	225.00	9,000
	Mobilize and De-Mobilize Cable Tool Rig	325	1	2,500.00	2,500
	Contracting Tax	325	1	3,123.93	3,124
	Performance and Payment Bond	325	1	1,786.68	1,787
	SERVICE CONNECTIONS COMPLETE: DOUBLE-LONG	345			
	SERVICE CONNECTIONS COMPLETE: DOUBLE-SHORT	345			
	SERVICE CONNECTIONS COMPLETE: SINGLE-LONG	345			
	SERVICE CONNECTIONS COMPLETE: SINGLE-SHORT	345			
TOTAL CONTRACT WORK					$ 95,437
MATERIALS					
	SERVICE CONNECTIONS: DOUBLE-LONG	345			
	SERVICE CONNECTIONS: DOUBLE-SHORT	345			
	SERVICE CONNECTIONS: SINGLE-LONG	345			
	SERVICE CONNECTIONS: SINGLE-SHORT	345			
	METERS	346			
TOTAL MATERIALS					$ -
LABOR	Engineering Design and Project Management	325	40	$ 55.00	$ 2,200
	TESTING FEE	325	1	$ 500.00	500
	PERMIT FEE				
	SURVEY FEE				
	FIELD INSPECTION	325	40	55.00	2,200
	INSTALL SERVICE CONNECTIONS: DOUBLE-LONG	345			
	INSTALL SERVICE CONNECTIONS: DOUBLE-SHORT	345			
	INSTALL SERVICE CONNECTIONS: SINGLE-LONG	345			
	INSTALL SERVICE CONNECTIONS: SINGLE-SHORT	345			
TOTAL LABOR					$ 4,900
SUBTOTAL - CONTRACT WORK, MATERIALS, AND LABOR					$ 100,337
OVERHEAD					12,000
TOTAL	REFUNDABLE PORTION ☐	NON-REFUNDABLE PORTION ☐		**COST ESTIMATE**	$ 112,337

AFH

ARIZONA WATER COMPANY

3805 N. BLACK CANYON HIGHWAY, PHOENIX, ARIZONA 85015-5351 • P.O. BOX 29006, PHOENIX, AZ 85038-9006
PHONE: (602) 240-6860 • FAX: (602) 240-6874 • TOLL FREE: (800) 533-6023 • www.azwater.com

June 25, 2015

Mr. Mike Richardson
Southwest Waterworks Contractors
P. O. Box 6339
Phoenix, Arizona 85005

Re: Pinal Valley Well No. 26

PROJECT: Replace Pump & Column Pipe	
SYSTEM: Pinal Valley	
CONTRACT NO.:	
P.E. NO.:	W.A. NO.: 1-53XX

Dear Mr. Richardson:

Enclosed is your copy of the Proposal/Contract for the above-referenced project, which has been accepted by Arizona Water Company (the "Company"). The project shall be constructed in accordance with the Company's *General Conditions of Contract, the Specifications and the Drawings* which were included with the Company's previously provided Proposal/Contract, copies of which are being provided again and attached herewith.

Also enclosed are two copies of the Commencement Notice for the above-referenced project. Please sign one of the copies and return it to my attention retaining the other for your records.

As provided in paragraph 4 of the Company's Proposal/Contract executed by the Company on June 25, 2015, Southwest Waterworks Contractors acknowledged that one hundred percent (100%) Performance and Payment Bonds are required and must be provided to the Company prior to the commencement of work. In addition, as provided in paragraph 44 of the Company's General Conditions of Contract, the 100% Performance and Payment Bonds must be provided within ten (10) calendar days of the date of the Commencement Notice. Failure to provide an acceptable 100% Performance and Payment Bond does not limit the Company's

ability to terminate the Proposal/Contract or seek restitution for damages that the Company may have or will incur.

Prior to the start of construction, please call Ray Murrieta, Division Manager at 520-836-8785 to schedule a pre-construction meeting. In addition, please provide the required Performance and Payment Bonds to the Company promptly so that the contracted work can be completed within the contract's timeline.

If you have any questions, please call me at this office.

Very truly yours,

James T. Wilson, P. E.
Senior Engineer
jwilson@azwater.com

afh
Enclosure

ARIZONA WATER COMPANY

Pinal Valley - Casa Grande
220 E. 2nd Street

PROPOSAL/CONTRACT

CONTRACTOR: SOUTHWEST WATERWORKS CONTRACTORS	SYSTEM: PINAL VALLEY
ADDRESS: P. O. BOX 6339	W A No(s): 1-53XX
CITY ST ZIP: PHOENIX, AZ 85005	BID DUE DATE: May 29, 2015

CONTRACTOR SUBMITS this PROPOSAL/CONTRACT to ARIZONA WATER COMPANY, an Arizona corporation (the "Company"), to perform the work and complete the project described on Page 2 (the "Project"), as an independent prime contractor.

1. Contractor certifies that it has a complete copy of, and has read, understands and accepts, the Company's General Conditions of Contract, and the Company's Construction Specifications and Standard Specification Drawings, (the "Specifications"), all of which are attached hereto. Contractor has examined the specific plans and related construction drawings for the Project (the "Drawings"), copies of which are also attached hereto. The General Conditions of Contract, Specifications and Drawings are incorporated into this Proposal/Contract. Contractor affirms that all work and materials to be furnished or purchased for the Project will be in strict conformance with the General Conditions of Contract, Specifications and Drawings.
2. Contractor represents and warrants that it has satisfied and complied with the provisions of Section 6, Contractor Understands Work and Working Conditions, of the General Conditions of Contract prior to submitting this Proposal/Contract.
3. Contractor represents that this Proposal/Contract is fair and honest in all respects, is submitted in good faith and is not submitted in collusion with any other company, entity or person
4. Contractor acknowledges that one hundred percent (100%) Performance and Payment Bonds are required and must be provided to the Company prior to the commencement of work
5. Prior to the commencement of work, Contractor will submit to the Company a list of all materials to be used in the Project. The materials list will include the manufacturer, part number, price and quantity included in this Proposal/Contract.
6. Contractor will furnish all labor, tools, equipment and materials required to complete the Project according to the General Conditions of Contract, Specifications and Drawings. No materials purchased by Contractor to be incorporated into the Project are subject to tax at the time of purchase and Contractor will not charge the Company for any such tax. Contractor will pay the applicable transaction privilege tax (the "Contracting Tax") on the Project after Contractor receives payment of the final Project invoice from the Company. The cost of materials incorporated into the Project which are exempt by Arizona Revised State Statues ("A.R.S.") from the Contracting Tax, for example, pipes or valves having a diameter of four (4) inches or larger, including equipment, fittings and any other related part that is used in operating the pipes or valves (A.R.S. §42-5061 B.6.), will not be included in the total cost of the labor and materials upon which the Contracting Tax is computed. Contractor retains full liability and obligation to pay the Contracting Tax and will defend and indemnify the Company against any demand or obligation to pay the Contracting Tax.
7. Contractor will maintain detailed accounting records of all materials purchased and incorporated into the Project. Such records will include all supporting original vendor invoices for all materials purchased. Following completion of the Project, Contractor will submit an itemized accounting to the Company which will include all supporting original vendor invoices and satisfactory evidence of payment thereof. The Company will not pay Contractor for materials not actually incorporated into the Project, and the disposition of such materials will remain Contractor's responsibility.
8. The Estimated Total Cost of the Project, shown on Page 2, is based on estimated labor and material quantities to be furnished. It includes an estimate of the Contracting Tax and the cost of the required Performance and Payment Bonds. Contractor will not cancel, modify or withdraw this Proposal/Contract during a ninety-day (90) period commencing on the Bid Due Date. The Company may accept this Proposal/Contract by signing and mailing, or otherwise delivering, a copy hereof to Contractor during such ninety-day (90) period. If the Company does not accept this Proposal/Contract during such ninety-day (90) period, Contractor may cancel this Proposal/Contract by giving written notice of cancellation to the Company.
9. Prior to the commencement of work, Contractor will provide the Company with a detailed construction schedule, in either Gantt or CPM form, identifying all tasks to be performed from the date of the written Commencement Notice through completion of the Project, including testing, training of Company Personnel and final Project invoicing. Contractor will provide the Company with a copy of such construction schedule documenting the progress of work on the Project at least monthly.
10. Contractor will not commence work on the Project until the Company gives Contractor a written Commencement Notice. Contractor will complete the Project within 45 calendar days after the Commencement Notice is issued.
11. Following the Company's written notice of satisfactory completion of the Project, and upon receipt of the final Project invoice from Contractor, the Company shall pay Contractor the actual total cost of the Project, which will be calculated as shown on Page 2, except that actual labor and material quantities installed/constructed will be substituted for the estimated labor and materials quantities and the Contracting Tax will be recalculated based on such actual labor and materials quantities.
12. The amount of applicable liquidated damages for Contractor's failure to deliver or perform within the time limit shown in Paragraph 10 may be deducted from the Company's payment of the final Project invoice. This provision shall not limit the Company's ability to terminate this Proposal/Contract for Contractor's unsatisfactory performance or failure to perform as provided in the General Conditions of Contract, Specifications or Drawings, or in this Proposal/Contract.

SPECIAL CONDITIONS:

Contractor is allowed one progress payment.
See attached Equipment Specifications dated May 15, 2015.

CONTRACTOR	PROPOSAL/CONTRACT ACCEPTED:
SOUTHWEST WATERWORKS CONTRACTORS	ARIZONA WATER COMPANY
By:	By:
Print Name: Mike Richardson	Print Name: Fredrick K. Schneider, PE
Title: Vice - President	Title: Vice President - Engineering
Date: 5-29-15	Date: 6-25-2015

AFH

ARIZONA WATER COMPANY

Pinal Valley - Casa Grande
220 E. 2nd Street
Casa Grande, AZ 85122 PH: 520-836-8785

PROPOSAL/CONTRACT

CONTRACTOR: SOUTHWEST WATERWORKS CONTRACTORS, INC.	SYSTEM: PINAL VALLEY
AZ CONTRACTOR LICENSE NO: CLASSIFICATION:	W.A. No(s): 1-53XX
ADDRESS: P. O BOX 6339	BID DUE DATE: May 29, 2015
CITY ST ZIP PHOENIX, AZ 85005	BID BOND REQUIRED: ☑ Yes ☐ No

DESCRIPTION OF PROJECT: Pull and replace the pump and column pipe at Pinal Valley Well No. 26.

1-2. MATERIALS EXEMPT FROM CONTRACTING TAX (per Paragraph 6)	QUANTITY	UNIT PRICE LABOR	UNIT PRICE MATERIALS	TOTAL COST LABOR	TOTAL COST MATERIALS
Alternate Bowl National K12HC-1 stage Coated 1-2 weeks	1		10,204	1	2

3. Total Labor to Install Exempt Materials (add the amounts in column 1) 3
4. Total Exempt Materials (add the amounts in column 2) 4

5-6. NON-EXEMPT MATERIALS		QUANTITY	LABOR	MATERIALS	LABOR	MATERIALS
Labor to pull and replace pump assembly		1	7650		7650	
Provide and install Goulds 12CHC 9-stage bowl assembly complete		1		10,597		10,597
Provide and install 10" x 20' taper thread seamless column pipe		28	20	1220	560	34160
Provide and install 3/4" solvent weld PVC line		560 ft		.50		280
Provide and install 1/4" stainless steel air line with gauge and valve		560 ft		2.50		1400
Video well with downward and side scan; log and provide 2 DVD copies		1	850		850	
Provide and install all miscellaneous materials (buckles, bandits, tape, etc.)		Lot		1035	5	6 1035
Provide and install 3" x 1-15/16" x 20' tube and shaft	Price Only	1	20	753		
Brush and bail well using cable tool rig	Price Only	40 hr.	225			
Acid wash with corrosion inhibitor and hydrogen peroxide, swab well, passivate the well casing and neutralize discharge	Price Only	Lot	*	*		
Mob/Demob Cable Tool Rig		1	2500			

7. Total Labor to Install Non-Exempt Materials (add the amounts in column 5) 7 9060
8. Total Non-Exempt Materials (add the amounts in column 6) 8 41472
9. Subtotal A (add lines 3, 7 and 8) 9 50,532
10. Contracting Tax Base (multiply the amount on line 9 by 0.65) 10 36,745.80
11. Applicable Contracting Tax Rate 11 8.5
12. Contracting Tax (multiply the amount on line 10 by line 11) 12 3123.93
13. Subtotal B (add lines 4, 9 and 12) 13 59655.93
14. 100% Performance and Payment Bonds Cost 14 1786.68
15. Estimated Total Cost (add lines 13 and 14) 15 61,342.61

*Not enough information given

ARIZONA WATER COMPANY

COMMENCEMENT NOTICE

CONTRACTOR:

Mr. Mike Richardson
Southwest Waterworks Contractors
P. O. Box 6339
Phoenix, AZ 85005

DATE: 6/25/15
DIVISION: PINAL VALLEY
SYSTEM: CASA GRANDE
W.A.: 1-53XX

THIS IS YOUR NOTICE TO PROCEED WITH THE FOLLOWING PROJECT(S):

DESCRIPTION OF WORK:

Pull and replace the pump and column pipe at Pinal Valley Well No. 26 in Casa Grande, AZ.

PERFORMANCE AND PAYMENT BONDS REQUIRED: [X] Yes [ ] No

TOTAL DAYS ALLOWED: 55

COMPLETION DATE: 8/19/15

Prior to the start of construction, please call Ray Murrieta, Division Manager at 520-836-8785 to schedule a pre-construction meeting.

ARIZONA WATER COMPANY
Company

By _____
Title Vice President - Engineering

SOUTHWEST WATERWORKS CONTRACTORS
Contractor *(type name)*

By _____
Title _____

AFH

AJH

W:\PROJECTS\CG\PV\INSIDE\WA\ACTIVE WA\1-53XX SPECIAL NO. XX CASA GRANDE WELL 26 PUMP REPLACEMENT\AGREEMENTS\E-3-18-2 SW WATERWORKS COMMENCEMENT NOTICE 1-53XX PINAL VALLEY WELL NO. 26.DOCX

1/15/09 | FKS:afh | E-3-18-2

ARIZONA WATER COMPANY

CASA GRANDE WELL NO. 26 – CASA GRANDE, AZ
EQUIPMENT SPECIFICATIONS
5/15/2015

Existing Well Information

Location:	1660 N. E. Cottonwood Lane, Casa Grande, Arizona
Drilled by:	Layne-Western - 1997
Casing:	Mild Steel, 18 in. from 0 ft. to 1240 ft., perforated from 600 ft. to 800 ft and from 840 ft. to 1240 ft.
Pump:	Fairbanks 12M 9-stage, Pump Setting @ 560 ft.
Column:	10 in.
Oil Tube:	3 in.
Shaft:	1-15/16 in.
Airline:	1/4 in.
Motor:	US Motors 300 HP

Special Conditions

- All waste materials removed from the well shall be removed and disposed of by the contractor.

Design Conditions

- 1,300 GPM @ 610 ft. TDH
- Pump Setting @ 560 ft.

Equipment to be Furnished and Installed by Pump Company

- One Goulds 12CHC 9-stage (8.5625-inch full trim impellers) 1770 RPM bowl assembly or alternate with Arizona Water Company Engineering approval. Please provide alternative bowl assembly as a separate bid in addition to the specified bowl assembly. Please include pump curve and supporting information for alternative bowl assembly.
- Provide and install 560 ft. of 10 in x 20 ft. ASTM A53 Grade B Schedule 40 steel seamless tapered thread column pipe and additional, if required. Use 8-round thread for settings greater than 800 ft.
- Provide and install 560 ft. of 3 in. x 1-15/16 in. tube and shaft (if required).
- Provide and install 560 ft. of 3/4 in. Schedule 40 PVC line.
- Provide and install 560 ft. of 1/4 in. Stainless Steel air line.
- Video well with downward and side scan, log, and provide 2 DVD copies.
- Brush and bail well using cable tool rig, if required.
- Acid wash with corrosion inhibitor and hydrogen peroxide, swab well, passivate well casing, flush and neutralize discharge if required.
- All miscellaneous bandits, buckles, tape, etc.
- All material subject to Arizona Water Company Standard Specifications (enclosed) except as noted.

Bowl Assembly Construction Materials

- Contractor's proposal shall include pump manufacturer's recommendations for quantity of bowls requiring alternative material for high pressure. Pump bowl materials shall be selected based on maximum operating pressure of pump at any point on performance curve.
- No invoice will be accepted for payment unless accompanied by a "complete" installed pump equipment data sheet (see attached copy)
- Alternate bowl assemblies may be considered subject to final approval by Arizona Water Company's Engineering department

Included with Each Bid should be a List Including:

- Maximum Bhp
- Operating Bhp
- Overall efficiency at design conditions
- Total down thrust at design conditions
- Maximum down thrust throughout total pump range
- Differential stretch at design condition
- Maximum differential stretch
- Allowable lateral for bowl assembly

Pump Data Sheet - National Pump Company

Company: Southwest Waterworks Contracto
Name: Michael Richardson
Date: 5/21/2015

NATIONAL PUMP COMPANY
A GORMAN-RUPP COMPANY

Pump:

Size: K12HC (10 stage)

Type: VERT.TURB.ENCLOSED
Synch speed: 1800 rpm

Speed: 1770 rpm
Dia: 9.12 in

Curve: CVK12HC4P6CY

Impeller: K12HC (1/16)

Specific Speeds:

Ns: 2900
Nss: 8700

Dimensions:

Suction: —
Discharge: —

Vertical Turbine:

Bowl size: 11.6 in
Max lateral: 0.88 in
Thrust K factor: 10.5 lb/ft

Pump Limits:

Temperature: 180 °F
Pressure: 340 psi g
Sphere size: 0.25 in

Power: 417 hp
Eye area: 21.5 in²

Search Criteria:

Flow: 1300 US gpm

Head: 610 ft

Fluid:

Water
SG: 1
Viscosity: 1.105 cP

Temperature: 60 °F
Vapor pressure: 0.2563 psi a
Atm pressure: 14.07 psi a

NPSHa: —

Motor:

Standard: NEMA
Enclosure: WP-I

Size: 300 hp
Speed: 1800
Frame: 447

Sizing criteria: Max Power on Design Curve

Pump Selection Warnings:

Pump shutoff dP exceeds limit for the pump.

— Data Point —

Flow:	1300 US gpm
Head:	614 ft
Eff:	83.9%
Power:	240 hp
NPSHr:	14.1 ft

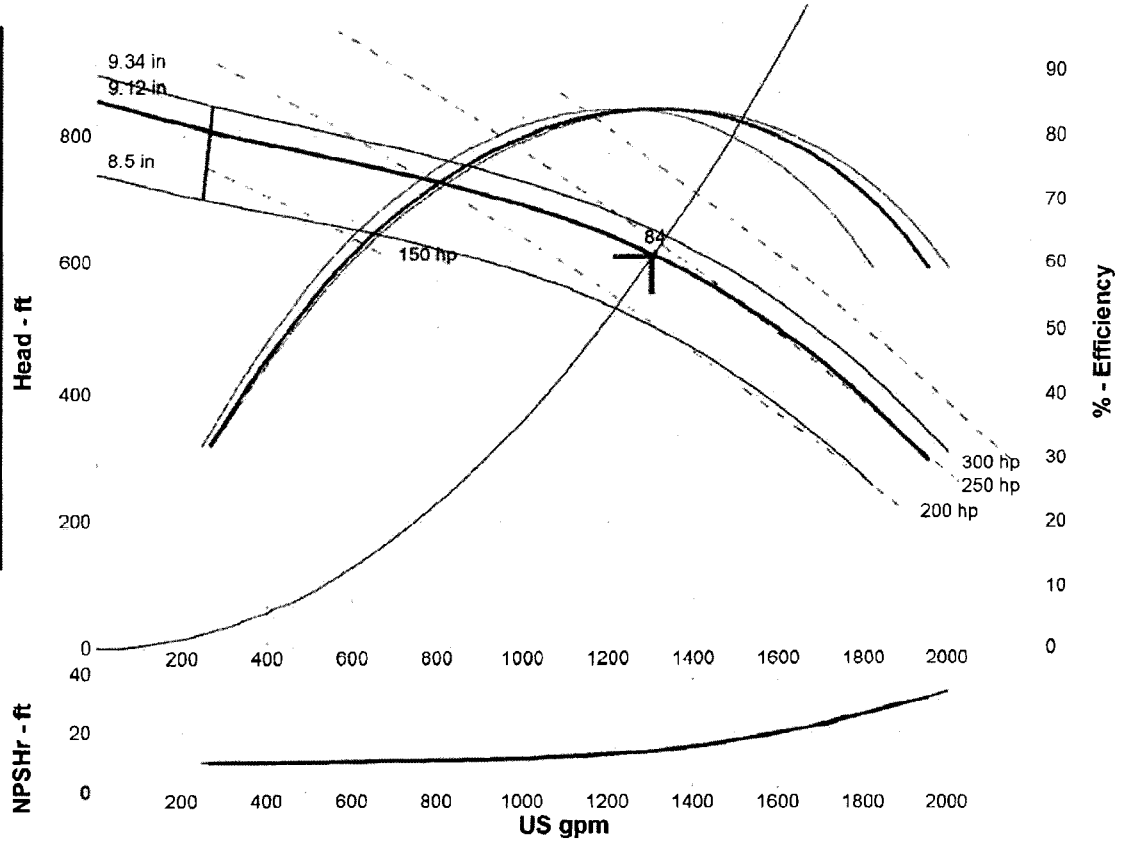
— Design Curve —

Shutoff head:	854 ft
Shutoff dP:	370 psi
Min flow:	262 US gpm
BEP:	84% @ 1308 US gpm

NOL power:
253 hp @ 1738 US gpm

— Max Curve —

Max power:
272 hp @ 1780 US gpm

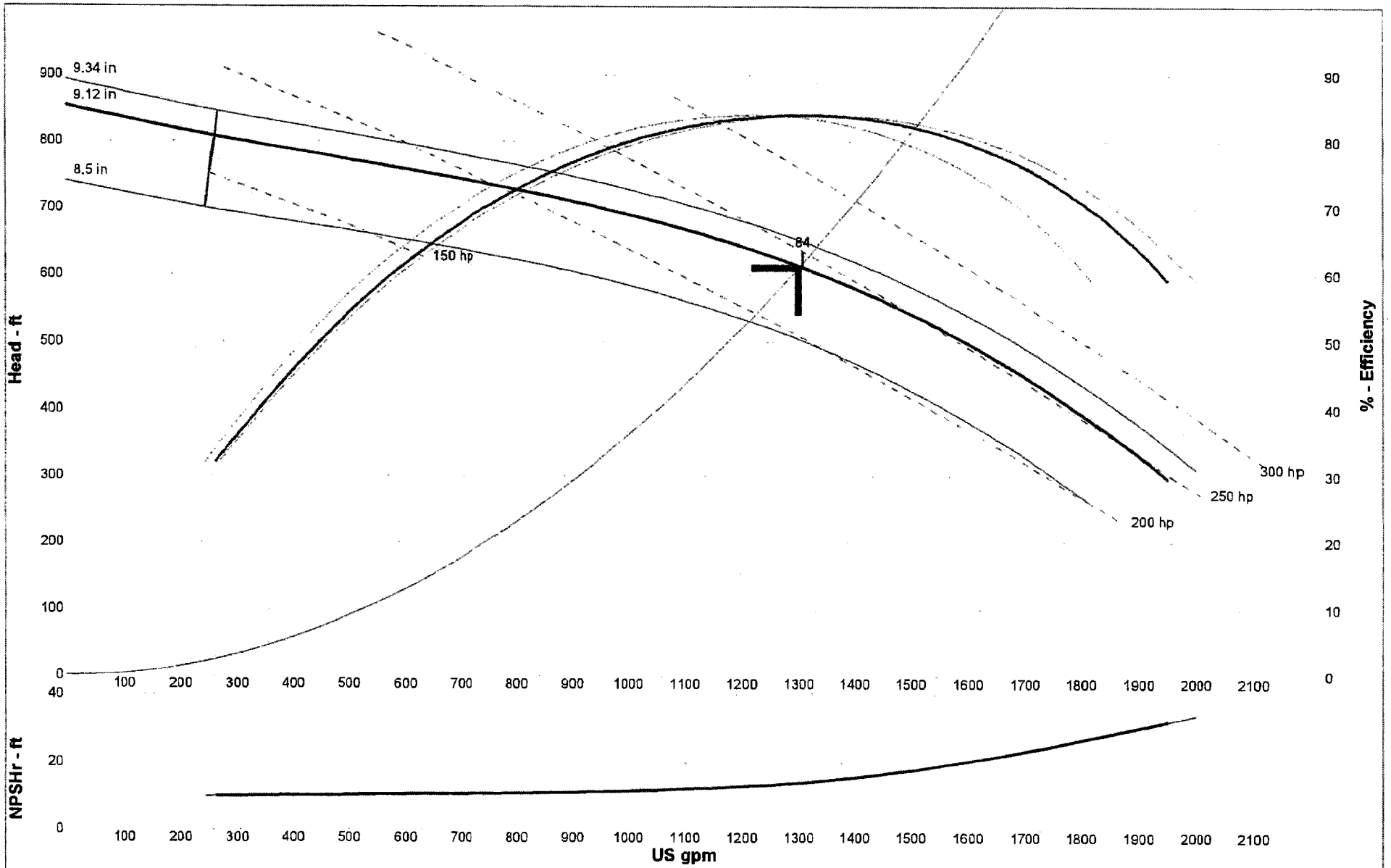


UNLESS OTHERWISE SPECIFIED: [1] PUMP LIMITS AND PERFORMANCE BASED ON STANDARD MATERIALS. [2] PERFORMANCE MEETS HI 14.6-2011 GRADE 1B TOLERANCES AT THE RATED CONDITION WITHIN THE SELECTION WINDOW. [3] NPSHR AT 1ST STAGE IMPELLER CENTERLINE.

Performance Evaluation:

Flow US gpm	Speed rpm	Head ft	Efficiency %	Power hp	NPSHr ft
1560	1770	516	80.8	251	19.5
1300	1770	614	83.9	240	14.1
1040	1770	682	80.6	221	11.9
780	1770	731	71.1	201	10.9
520	1770	771	55.4	181	10.4

Selected from catalog: national pump company.60 Vers: 6c15022



UNLESS OTHERWISE SPECIFIED: [1] PUMP LIMITS AND PERFORMANCE BASED ON STANDARD MATERIALS. [2] PERFORMANCE MEETS HI 14.6-2011 GRADE 1B TOLERANCES AT THE RATED CONDITION WITHIN THE SELECTION WINDOW. [3] NPSHR AT 1ST STAGE IMPELLER CENTERLINE.

Company: Southwest Waterworks Contracto
Name: Michael Richardson
5/21/2015

National Pump Company
Catalog: national pump company.60, Vers 6c150223
VERT.TURB.ENCLOSED - 1800
Design Point: 1300 US gpm, 610 ft

Size: K12HC 10 stage
Speed: 1770 rpm
Dia: 9.12 in
Curve: CVK12HC4P6CY
Impeller: K12HC (1/16)

NATIONAL PUMP COMPANY
A GORMAN-RUPP COMPANY

ARIZONA WATER COMPANY

SPECIFICATIONS

GENERAL CONDITIONS OF CONTRACT: E-4-1

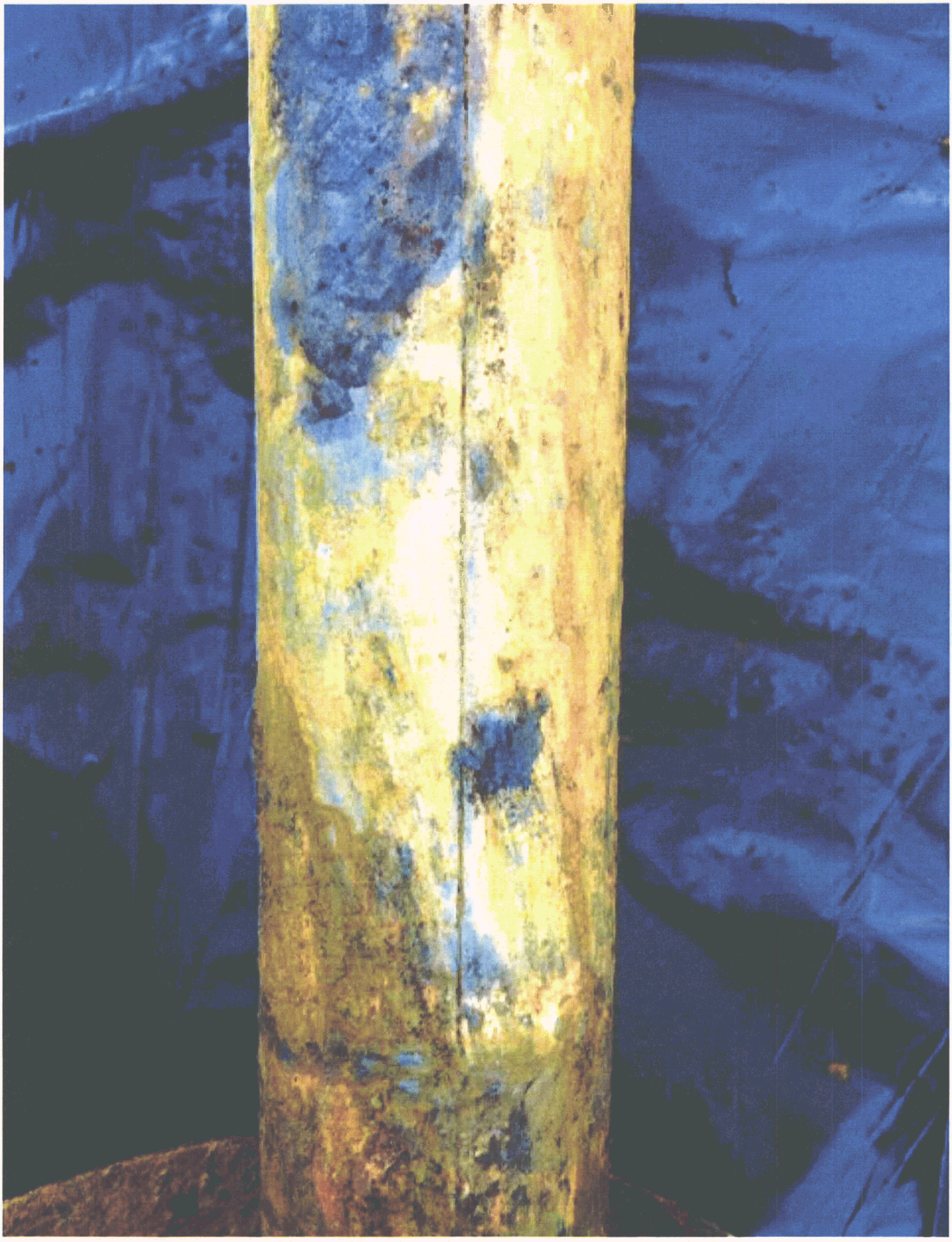
CONSTRUCTION SPECIFICATIONS: E-8-1

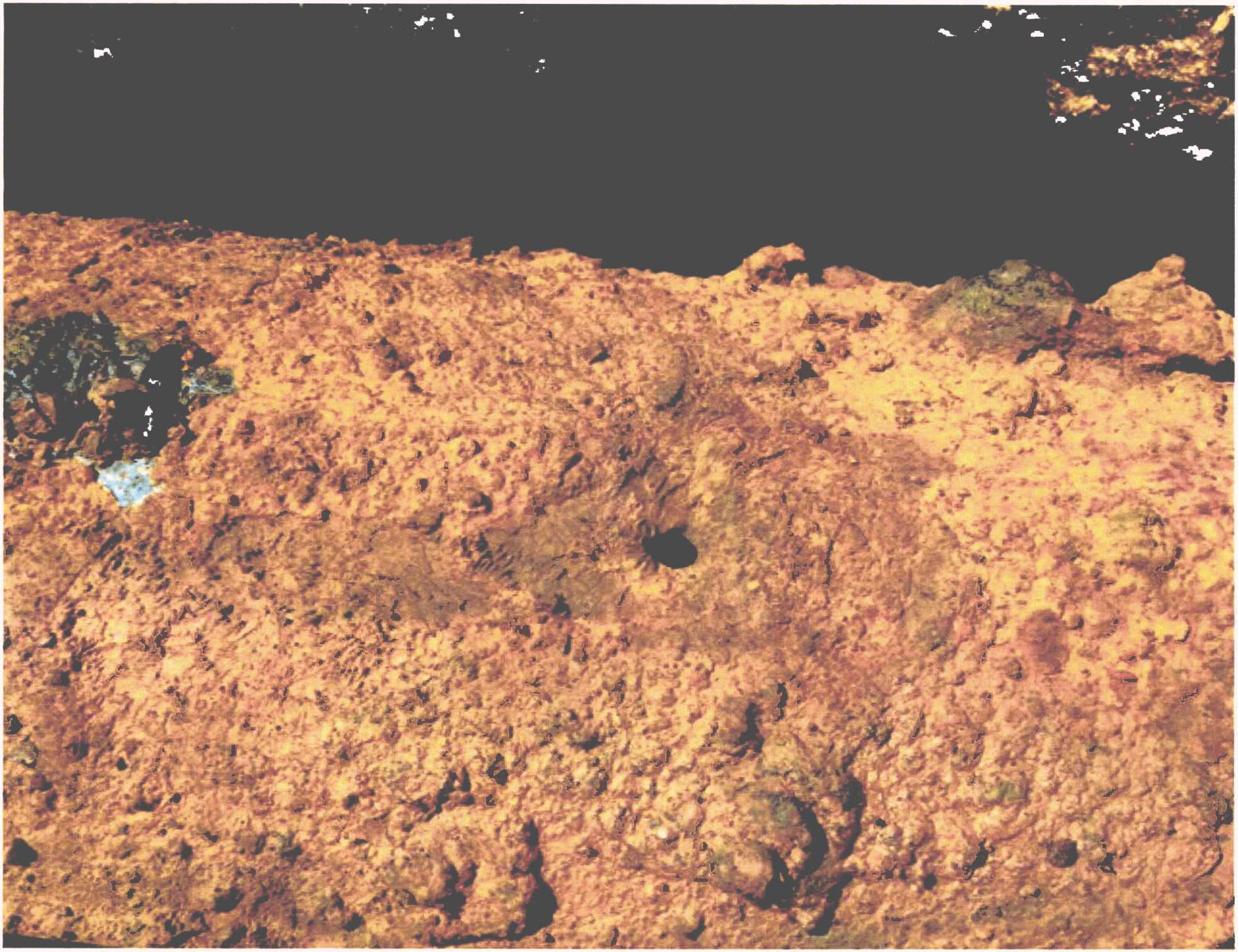
STANDARD SPECIFICATION DRAWINGS: E-9-1

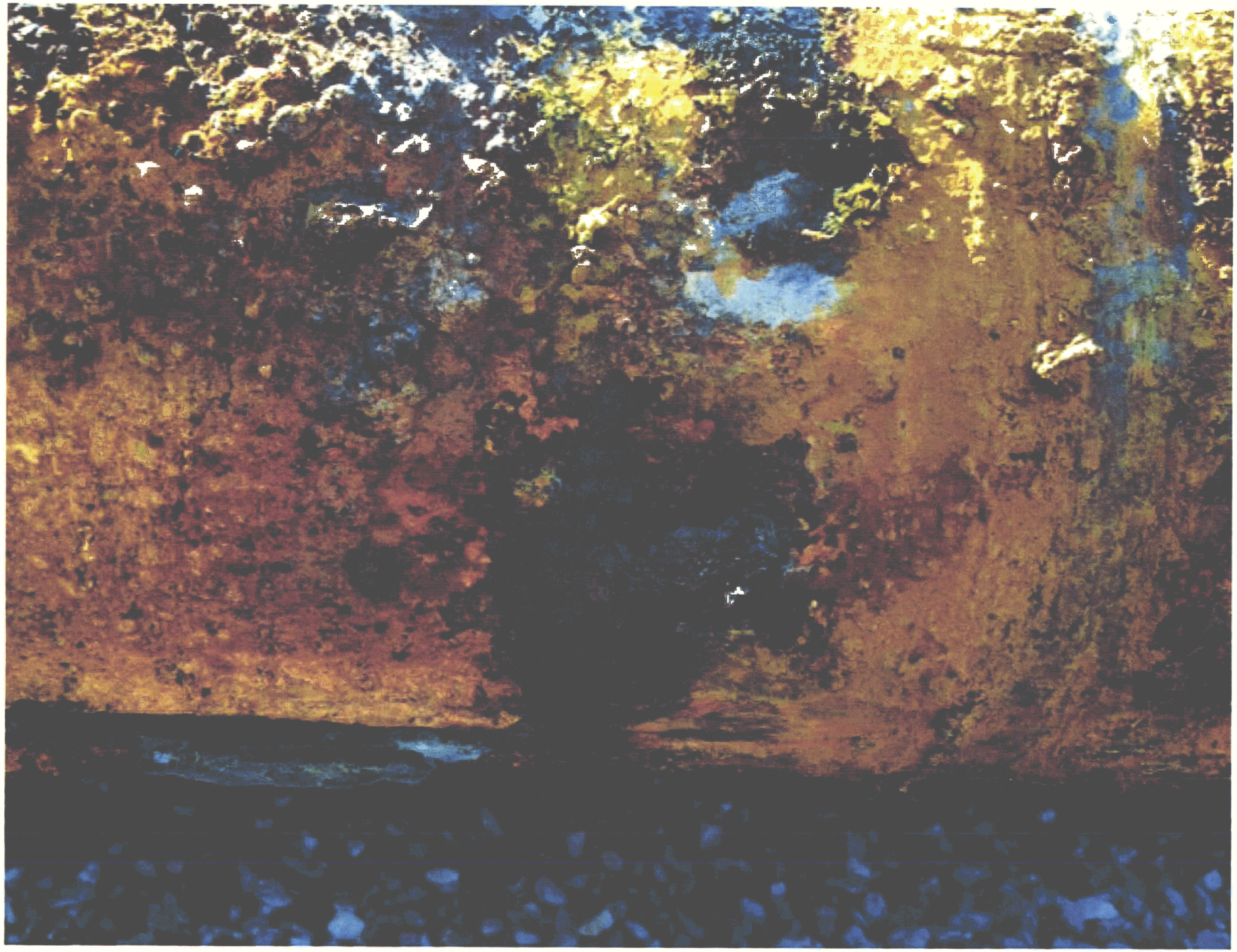
GW 6/25/15

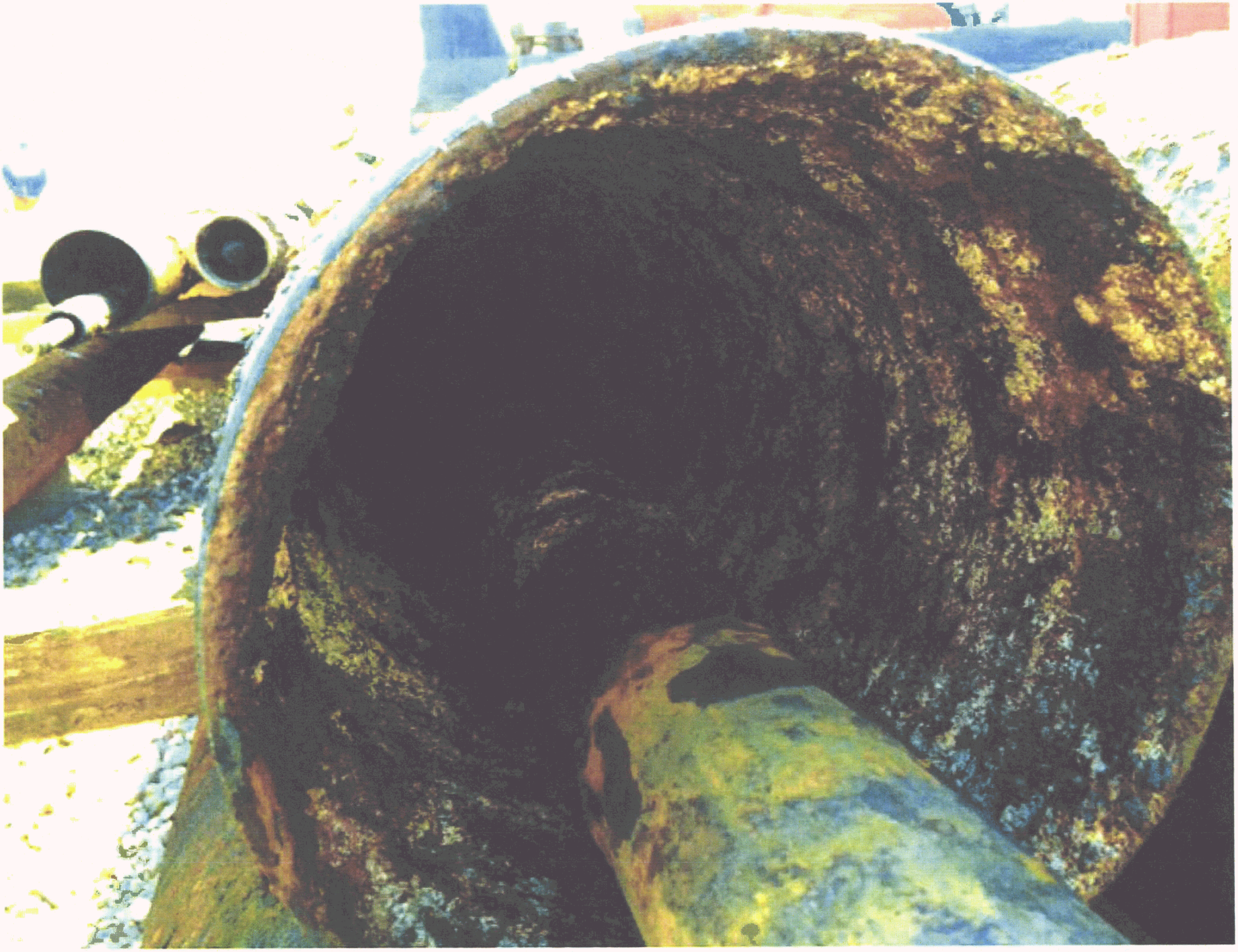
2007 EDITION WITH **2010** REVISIONS;
2012 GENERAL CONDITIONS OF CONTRACT

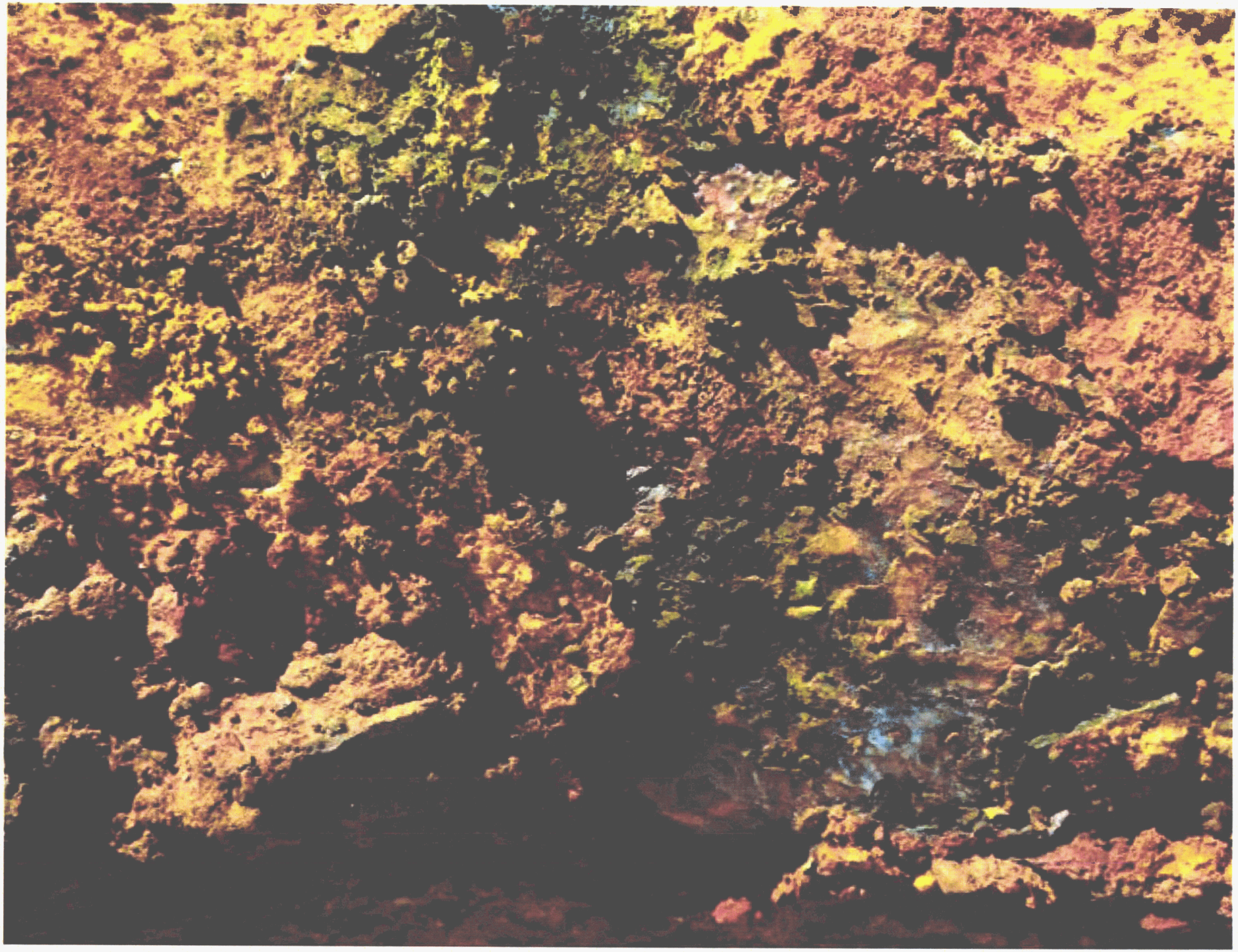
A copy of this entire Spec Book was sent out with Southwest Waterworks proposal package for Pinal Valley Well #26 pump & column pipe on 6/25











Western Group Rate Case

Exhibit FKS-1

5359 PV Well No. 27

ARIZONA WATER COMPANY
WORK AUTHORIZATION

W.A. NUMBER: 1-5359.
P.E. NUMBER:
BUDGET ITEM NO.: Special No. 25
SHEET NO.: 1 of 2

SYSTEM:	PINAL VALLEY	RETENTION REQUIRED:	☑ YES ☐ NO
DIVISION:	CASA GRANDE	WORK TO START BY:	UPON AUTHORIZATION
RESPONSIBLE PERSON:	JAMES WILSON	WORK TO BE FINISHED BY:	WITHIN 60 DAYS
TAX CODE:	2100		

DESCRIPTION OF WORK:

Pull the pump, video inspect the well, and replace the pump, 1/4-inch stainless steel air line, 1-inch PVC sounding line, and 3/4-inch air line at Well No. 27 in the Pinal Valley water system. Prior to reinstalling the new pump, company engineers will inspect the existing oil tube and line shaft, replace failed components, perform spinner log testing and collect zonal samples. Company engineers also anticipate brushing and bailing the well and installing a packer prior to retuning the well to service.

FACTORS JUSTIFYING WORK:

Production from Well No. 27 recently decreased from approximately 450 gpm to 170 gpm. The pump and equipment in this well have been in service for approximately five years and have reached the end of their useful life. Additionally, the nitrate concentration in Well No. 27 is more than 9 mg/L and approaching the U.S. Environmental Protection Agency (EPA) maximum contaminant level (MCL) of 10 mg/L. Company Engineers recommend performing a spinner log and collecting zonal samples from the well to determine if modifications to the well construction will mitigate the increasing nitrate concentration to continue to provide safe, adequate and reliable drinking water supply to the Pinal Valley water system.

COST ESTIMATE		AUTHORIZATION	DATE
COST OF WORK:		PREPARED BY: James Wilson	6/29/15
MATERIAL	0		
LABOR	6,550	REVIEWED FOR ESMT/ROW VERIFICATION: Charles Briggs CB 07-07-2015	06-29-2015
CONTRACT PORTION	171,644		
OVERHEAD	21,400	REVIEWED BY: Andy Haas AH 7-7-15	6-29-15
TOTAL AUTHORIZED EXPENDITURES CHARGEABLE TO THIS W.A.	$ 199,594		
FUNDS RECEIVED:		APPROVED BY ENGINEERING: Fredrick Schneider 7-9-15	6-30-~~15~~
CONTRIBUTIONS RECEIVED	0		
REFUNDABLE ADVANCES RECEIVED	0	APPROVED BY FINANCE: Joseph Harris	6/30/15
TOTAL CONTRIBUTIONS/ADVANCES	0		
NET COMPANY CASH REQUIRED	$ 199,594	AUTHORIZED BY PRESIDENT: William M Garfield	7-1-2015
		SPECIAL ITEM EXCEEDING $10,000; AUTHORIZED BY CHAIRMAN: APPROVED VIA FAX M. L. Whitehead	7/6/2015

COMMENTS:

Transfer required funds ($199,594.) from WA 1-4806 (Coolidge Well No. 13 ARF)

CONSTRUCTION RELEASE:

RELEASED TO CONSTRUCTION
Authorized by FRED SCHNEIDER
Date 7/6/15

AFH

ARIZONA WATER COMPANY

WORK AUTHORIZATION - DETAIL SHEET

W A NUMBER: 1-5359
P E NUMBER:
BUDGET ITEM NO : Special No. 25
SHEET NO : 2 of 2

	PLANT PROPERTY ACCOUNT	UNIT DESCRIPTION	QUANTITY	YEAR INSTALLED AND W A NUMBER
RETIREMENT PROPERTY UNITS	325	Simflow SC12C 8-stage pump assembly	1	2010, 1-4763
	325	8-inch column pipe	680	2010, 1-4763
	325	1/4-inch stainless steel air line	680	2010, 1-4763
	325	1-inch PVC sounding line	680	2010, 1-4763
	325	3/4-inch PVC air line	680	2010, 1-4763

PROJECT DESCRIPTION

Pull the pump, video inspect the well, and replace the pump, 1/4-inch stainless steel air line, 1-inch PVC sounding line, and 3/4-inch air line at Well No. 27 in the Pinal Valley water system. Prior to reinstalling the new pump, company engineers will inspect the existing oil tube and line shaft, replace failed components, perform spinner log testing and collect zonal samples. Company engineers also anticipate brushing and bailing the well and installing a packer prior to retuning the well to service.

	DESCRIPTION	PLANT PROP ACCT	QUANTITY	UNIT COST	TOTAL
CONTRACT WORK	Labor to pull and replace pump	325	1	$ 9,000.00	$ 9,000
	Provide and install Goulds 9WAHC 12-stage pump	325	1	15,000.00	15,000
	Provide and install 6"x20' seamless taper thread column pipe	325	34	1,220.00	41,480
	Provide and install 3"x1-15/16" tube and shaft	325	10	831.40	8,314
	Provide and install 3/4" PVC line	325	1	250.00	250
	Provide and install 1/4" stainless steel air line with gauge and valve	325	1	1,700.00	1,700
	Video Well	325	2	850.00	1,700
	Miscellaneous materials	325	1	500.00	500
	Brush and bail well	325	40	205.00	8,200
	Performance and payment bond	325	1	1,500.00	1,500
	Contacting Tax	325	1	1,000.00	1,000
	Spinner Log and zonal samples	325	1	25,000.00	25,000
	Spinner log and zonal sample analysis	325	1	13,000.00	13,000
	Install casing packer	325	1	45,000	45,000
	SERVICE CONNECTIONS COMPLETE: SINGLE-LONG	345			
	SERVICE CONNECTIONS COMPLETE: SINGLE-SHORT	345			
TOTAL CONTRACT WORK					$ 171,644
MATERIALS					
	SERVICE CONNECTIONS: DOUBLE-LONG	345			
	SERVICE CONNECTIONS: DOUBLE-SHORT	345			
	SERVICE CONNECTIONS: SINGLE-LONG	345			
	SERVICE CONNECTIONS: SINGLE-SHORT	345			
	METERS	346			
TOTAL MATERIALS					$ -
LABOR	Project Management and Engineering Design	325	55	$ 55.00	$ 3,025
	TESTING FEE	325	1	$ 500.00	500
	PERMIT FEE				
	SURVEY FEE				
	FIELD INSPECTION	325	55	55.00	3,025
	INSTALL SERVICE CONNECTIONS: DOUBLE-LONG	345			
	INSTALL SERVICE CONNECTIONS: DOUBLE-SHORT	345			
	INSTALL SERVICE CONNECTIONS: SINGLE-LONG	345			
	INSTALL SERVICE CONNECTIONS: SINGLE-SHORT	345			
TOTAL LABOR					$ 6,550
SUBTOTAL - CONTRACT WORK, MATERIALS, AND LABOR					$ 178,194
OVERHEAD					21,400
TOTAL	REFUNDABLE PORTION ☐	NON-REFUNDABLE PORTION ☐		COST ESTIMATE	$ 199,594

AFH

ARIZONA WATER COMPANY

3805 N. BLACK CANYON HIGHWAY, PHOENIX, ARIZONA 85015-5351 • P.O. BOX 29006, PHOENIX, AZ 85038-9006
PHONE: (602) 240-6860 • FAX: (602) 240-6874 • TOLL FREE: (800) 533-6023 • www.azwater.com

July 7, 2015

Mr. Dion Waddell
Navajo Pump & Supply Company
P. O. Box 798
Tolleson, AZ 85353

Re: Casa Grande Well No. 27

PROJECT: Pump	
SYSTEM: Pinal Valley	
CONTRACT NO.:	
P.E. NO.:	W.A. NO.: 1-5359

Dear Mr. Waddell:

Enclosed is your copy of the Proposal/Contract for the above-referenced project, which has been accepted by Arizona Water Company (the "Company"). The project shall be constructed in accordance with the Company's *General Conditions of Contract, the Specifications and the Drawings* which were included with the Company's previously provided Proposal/Contract, copies of which are being provided again and attached herewith.

Also enclosed are two copies of the Commencement Notice for the above-referenced project. Please sign one of the copies and return it to my attention retaining the other for your records.

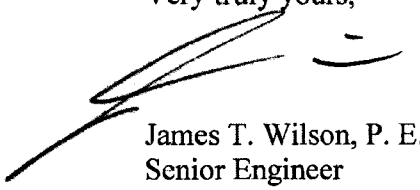
As provided in paragraph 4 of the Company's Proposal/Contract executed by the Company on July 7, 2015, Navajo Pump & Supply Company acknowledged that one hundred percent (100%) Performance and Payment Bonds are required and must be provided to the Company prior to the commencement of work. In addition, as provided in paragraph 44 of the Company's General Conditions of Contract, the 100% Performance and Payment Bonds must be provided within ten (10) calendar days of the date of the Commencement Notice. Failure to provide an acceptable 100% Performance and Payment Bond does not limit the Company's

ability to terminate the Proposal/Contract or seek restitution for damages that the Company may have or will incur.

Prior to the start of construction, please call Ray Murrieta, Division Manager at 520-836-8785 to schedule a pre-construction meeting. In addition, please provide the required Performance and Payment Bonds to the Company promptly so that the contracted work can be completed within the contract's timeline.

If you have any questions, please call me at this office.

Very truly yours,



James T. Wilson, P. E.
Senior Engineer
jwilson@azwater.com

afh
Enclosure

ARIZONA WATER COMPANY

Pinal Valley - Casa Grande
220 E. 2nd Street
Casa Grande, AZ 85122 PH: 520-836-8785

PROPOSAL/CONTRACT

CONTRACTOR: NAVAJO PUMP & SUPPLY COMPANY	SYSTEM: PINAL VALLEY
ADDRESS: P. O. BOX 798	W.A. No(s): 1-5359
CITY ST ZIP: TOLLESON, AZ 85353	BID DUE DATE: July 1, 2015

CONTRACTOR SUBMITS this PROPOSAL/CONTRACT to ARIZONA WATER COMPANY, an Arizona corporation (the "Company"), to perform the work and complete the project described on Page 2 (the "Project"), as an independent prime contractor.

1. Contractor certifies that it has a complete copy of, and has read, understands and accepts, the Company's General Conditions of Contract, and the Company's Construction Specifications and Standard Specification Drawings, (the "Specifications"), all of which are attached hereto. Contractor has examined the specific plans and related construction drawings for the Project (the "Drawings"), copies of which are also attached hereto. The General Conditions of Contract, Specifications and Drawings are incorporated into this Proposal/Contract. Contractor affirms that all work and materials to be furnished or purchased for the Project will be in strict conformance with the General Conditions of Contract, Specifications and Drawings.
2. Contractor represents and warrants that it has satisfied and complied with the provisions of Section 6, Contractor Understands Work and Working Conditions, of the General Conditions of Contract prior to submitting this Proposal/Contract.
3. Contractor represents that this Proposal/Contract is fair and honest in all respects, is submitted in good faith and is not submitted in collusion with any other company, entity or person.
4. Contractor acknowledges that one hundred percent (100%) Performance and Payment Bonds are required and must be provided to the Company prior to the commencement of work.
5. Prior to the commencement of work, Contractor will submit to the Company a list of all materials to be used in the Project. The materials list will include the manufacturer, part number, price and quantity included in this Proposal/Contract.
6. Contractor will furnish all labor, tools, equipment and materials required to complete the Project according to the General Conditions of Contract, Specifications and Drawings. No materials purchased by Contractor to be incorporated into the Project are subject to tax at the time of purchase and Contractor will not charge the Company for any such tax. Contractor will pay the applicable transaction privilege tax (the "Contracting Tax") on the Project after Contractor receives payment of the final Project invoice from the Company. The cost of materials incorporated into the Project which are exempt by Arizona Revised State Statues ("A.R.S.") from the Contracting Tax, for example, pipes or valves having a diameter of four (4) inches or larger, including equipment, fittings and any other related part that is used in operating the pipes or valves (A.R.S. §42-5061 B.6.), will not be included in the total cost of the labor and materials upon which the Contracting Tax is computed. Contractor retains full liability and obligation to pay the Contracting Tax and will defend and indemnify the Company against any demand or obligation to pay the Contracting Tax.
7. Contractor will maintain detailed accounting records of all materials purchased and incorporated into the Project. Such records will include all supporting original vendor invoices for all materials purchased. Following completion of the Project, Contractor will submit an itemized accounting to the Company which will include all supporting original vendor invoices and satisfactory evidence of payment thereof. The Company will not pay Contractor for materials not actually incorporated into the Project, and the disposition of such materials will remain Contractor's responsibility.
8. The Estimated Total Cost of the Project, shown on Page 2, is based on estimated labor and material quantities to be furnished. It includes an estimate of the Contracting Tax and the cost of the required Performance and Payment Bonds. Contractor will not cancel, modify or withdraw this Proposal/Contract during a ninety-day (90) period commencing on the Bid Due Date. The Company may accept this Proposal/Contract by signing and mailing, or otherwise delivering, a copy hereof to Contractor during such ninety-day (90) period. If the Company does not accept this Proposal/Contract during such ninety-day (90) period, Contractor may cancel this Proposal/Contract by giving written notice of cancellation to the Company.
9. Prior to the commencement of work, Contractor will provide the Company with a detailed construction schedule, in either Gantt or CPM form, identifying all tasks to be performed from the date of the written Commencement Notice through completion of the Project, including testing, training of Company Personnel and final Project invoicing. Contractor will provide the Company with a copy of such construction schedule documenting the progress of work on the Project at least monthly.
10. Contractor will not commence work on the Project until the Company gives Contractor a written Commencement Notice. Contractor will complete the Project within 60 calendar days after the Commencement Notice is issued.
11. Following the Company's written notice of satisfactory completion of the Project, and upon receipt of the final Project invoice from Contractor, the Company shall pay Contractor the actual total cost of the Project, which will be calculated as shown on Page 2, except that actual labor and material quantities installed/constructed will be substituted for the estimated labor and materials quantities and the Contracting Tax will be recalculated based on such actual labor and materials quantities.
12. The amount of applicable liquidated damages for Contractor's failure to deliver or perform within the time limit shown in Paragraph 10 may be deducted from the Company's payment of the final Project invoice. This provision shall not limit the Company's ability to terminate this Proposal/Contract for Contractor's unsatisfactory performance or failure to perform as provided in the General Conditions of Contract, Specifications or Drawings, or in this Proposal/Contract.

SPECIAL CONDITIONS:

CONTRACTOR	PROPOSAL/CONTRACT ACCEPTED:
NAVAJO PUMP & SUPPLY COMPANY	ARIZONA WATER COMPANY
By:	By:
Print Name: DION WADDELL	Print Name: Fredrick K. Schneider, PE
Title: MANAGER	Title: Vice President - Engineering
Date: 07/01/15	Date: 7-7-2015

AFH

ARIZONA WATER COMPANY

Pinal Valley - Casa Grande
220 E. 2nd Street
Casa Grande, AZ 85122 PH: 520-836-8785

PROPOSAL/CONTRACT

CONTRACTOR: Navajo Pump	SYSTEM: PINAL VALLEY
AZ CONTRACTOR LICENSE NO: CLASSIFICATION:	W.A. No(s): 1-5359
ADDRESS: P.O. Box 798	BID DUE DATE: July 1, 2015
CITY ST ZIP Tolleson, Az 85353	BID BOND REQUIRED ☑ Yes ☐ No

DESCRIPTION OF PROJECT: Pull and replace the pump at Casa Grande Well No. 27.

1-2. MATERIALS EXEMPT FROM CONTRACTING TAX (per Paragraph 6)	QUANTITY	UNIT PRICE LABOR	UNIT PRICE MATERIALS	TOTAL COST LABOR	TOTAL COST MATERIALS
				1	2
3. Total Labor to Install Exempt Materials (add the amounts in column 1)				3	
4. Total Exempt Materials (add the amounts in column 2)					4

5-6. NON-EXEMPT MATERIALS	QUANTITY	UNIT PRICE LABOR	UNIT PRICE MATERIALS	TOTAL COST LABOR	TOTAL COST MATERIALS
Labor to pull and replace pump assembly	1	11210		11210	
Provide and install Goulds 9WAHC 12-stage bowl assembly complete	1		9075		9075
Provide and install 6 " x 20' Seamless taper thread column pipe	34		20555		20555
Provide and install 3" x 1-15/16" x 20' tube and shaft (price only)	1		799		
Provide and install 1" solvent weld PVC line	680 ft		327		327
Provide and install 3/4" solvent weld PVC line	680 ft		221		221
Provide and install 1/4" stainless steel air line with gauge and valve	680 ft		1340		1340
Video well with downward and side scan; log and provide 2 DVD copies	1	800		800	
Provide and install all miscellaneous materials (buckles, bandits, tape, etc.)	lot		680	5	6 680
Provide and install test pumping equipment (constant rate)	lot	6500			
Provide and install test pumping equipment (variable rate)	lot	6500			
Test pump well	8 hr.	1200			
Brush and bail well using cable tool rig (price only)	40 hr.	10000			
FLOWSERVE 10ELL 10 STAGE BOWL ASSEMBLY			9195		
7. Total Labor to Install Non-Exempt Materials (add the amounts in column 5)				7 12010	
8. Total Non-Exempt Materials (add the amounts in column 6)					8 32198
9. Subtotal A (add lines 3, 7 and 8)					9 44208
10. Contracting Tax Base (multiply the amount on line 9 by 0.65)				10 28735.20	
11. Applicable Contracting Tax Rate				11 6.7%	
12. Contracting Tax (multiply the amount on line 10 by line 11)					12 1925.25
13. Subtotal B (add lines 4, 9 and 12)					13 46133.25
14. 100% Performance and Payment Bonds Cost					14 1150.00
15. Estimated Total Cost (add lines 13 and 14)					15 47283.25

NOTE: The Estimated Total Cost includes all labor and materials for backfill, pavement replacement, chip seal, and traffic control necessary for the Project.

ARIZONA WATER COMPANY

COMMENCEMENT NOTICE

CONTRACTOR:

Mr. Dion Waddell
Navajo Pump & Suppy Company
P. O. Box 798
Tolleson, AZ 85353

DATE: 07/10/15
DIVISION: CASA GRANDE
SYSTEM: PINAL VALLEY
W.A.: 1-5359

THIS IS YOUR NOTICE TO PROCEED WITH THE FOLLOWING PROJECT(S):

DESCRIPTION OF WORK:

Pull and replace the pump at Casa Grande Well No. 27.

PERFORMANCE AND PAYMENT BONDS REQUIRED: [X] Yes [ ] No

TOTAL DAYS ALLOWED: 70

COMPLETION DATE: 9/18/15

Prior to the start of construction, please call Ray Murrieta, Division Manager at 520-836-8785 to schedule a pre-construction meeting.

ARIZONA WATER COMPANY
Company

By
Title Vice President - Engineering

NAVAJO PUMP & SUPPLY COMPANY
Contractor *(type name)*

By
Title

AFH

AJH

W:\PROJECTS\CG\PV\INSIDE\WA\ACTIVE WA\1-5359 SPECIAL NO. 25 CG WELL NO. 27 PUMP REPLACEMENT\AGREEMENTS\CONTRACTS\E-3-18-1 NAVAJO COMMENCEMENT NOTICE 1-5359 CG WELL #27.DOCX 1/15/09 | FKS:a

ARIZONA WATER COMPANY

CASA GRANDE #27 – CASA GRANDE, AZ
EQUIPMENT SPECIFICATIONS
JUNE 18, 2015

Existing Well Information

Location:	Southwest of McCartney Rd. & Evans Rd.
Drilled by:	Zim Industries – 1998
Casing:	18" x .312 Roscoe Moss Copper Bearing Casing from 0'-1110'(bottom) with .070 Slot Ful-Flo perforations from 550'-670', 710'-790', and 830'-1090'
Pump:	Simflow SC12C 8-Stage 1800 RPM bowl assembly
Motor:	U.S. Electrical Motor 200 HP VHS 480V 3-phase motor 445TPA Frame
Column:	8-inch, taper thread
Tube:	3-inch
Shaft:	1-15/16-inch

Special Conditions

- Contractor will remove from site and dispose of all scrap materials, including those removed from the well.

Design Conditions

250 GPM @ 490 ft. TDH.
Pump setting 680 ft.

Equipment Furnished and Installed by Pump Company

- One Goulds 9WAHC 12-stage 1800 RPM bowl assembly (6.563-inch impeller, 0.56-inch minimum lateral required, pump curve attached) or alternate with Arizona Water Company Engineering approval. Please provide alternative bowl assembly as a separate alternative in addition to the specified bowl assembly. Please include pump curve and required supporting information listed below for all alternative bowl assemblies.
- Provide and install 680 ft. of 6 in x 20 ft. seamless tapered thread column pipe and additional, if required.
- Provide and install 3-inch. x 1-15/16-inch. tube and shaft if required.
- Provide and install 680 ft. of 1-inch. Schedule 40 PVC line.
- Provide and install 680 ft. of ¾-inch. Schedule 40 PVC line.
- Provide and install 680 ft. of ¼-inch. Stainless Steel air line.
- Video Well with downward and side scan video. Provide well video log and two (2) DVD copies.
- Brush and Bail well using cable tool rig if required.
- Acid wash (with corrosion inhibitor) and swab well, if required.
- All miscellaneous bandits, buckles, straps, etc.
- All material subject to Arizona Water Company Standard Specifications (enclosed) except as noted.

Services Furnished by Pump Company

- Perform static spinner log testing with a minimum of two up and two down runs under non-pumping conditions. Log shall include but is not limited to; line speed, spinner counts per second, flow velocity, water temperature, fluid resistivity, and tool information.

- Perform a constant rate, 250 gpm, dynamic spinner log with pump intake set at 550' BLS with a minimum of three down runs under pumping conditions. Log shall include but is not limited to; line speed, spinner counts per second, flow velocity, water temperature, fluid resistivity, net flow, and tool information.
    - Collect six zonal water quality samples. Sample depths will be determined by Company during spinner log testing. Laboratory water quality analysis performed by Company.

Bowl Assembly Construction Materials

1. No left hand to right hand adaptations will be allowed for the oil tube assembly
2. No invoice will be accepted for payment unless accompanied by a "complete" installed pump equipment data sheet
3. Alternate bowl assemblies will be considered subject to final approval by Arizona Water Company's Engineering department

Included with Each Bid Should be a List Including:

Maximum Bhp
Operating Bhp
Overall efficiency at design conditions
Total down thrust at design conditions
Maximum down thrust throughout total pump range
Differential stretch at design condition
Maximum differential stretch
Allowable lateral for bowl assembly

Pump Data Sheet - Turbine 60 Hz

Company: AWC
Name: James Wilson
Date: 6/18/2015

Customer:
Order No:

GOULDS WATER TECHNOLOGY
a xylem brand

Pump:

Size: 9WAHC (12 stage)

Type: Lineshaft
Synch speed: 1800 rpm

Speed: 1770 rpm
Dia: 6.5625 in

Curve: E6409WAPCO

Impeller:

Specific Speeds:

Ns: 1600
Nss: ---

Dimensions:

Suction: ---
Discharge: ---

Vertical Turbine:

Bowl size: 9.25 in
Max lateral: 0.56 in
Thrust K factor: 3.75 lb/ft

Pump Limits:

Temperature: ---
Pressure: ---
Sphere size: 0.47 in

Power: ---
Eye area: ---

Search Criteria:

Flow: 250 US gpm

Head: 487 ft

Fluid:

Water
SG: 1
Viscosity: 1.105 cP

Temperature: 60 °F
Vapor pressure: 0.2563 psi a
Atm pressure: 14.7 psi a

NPSHa: ---

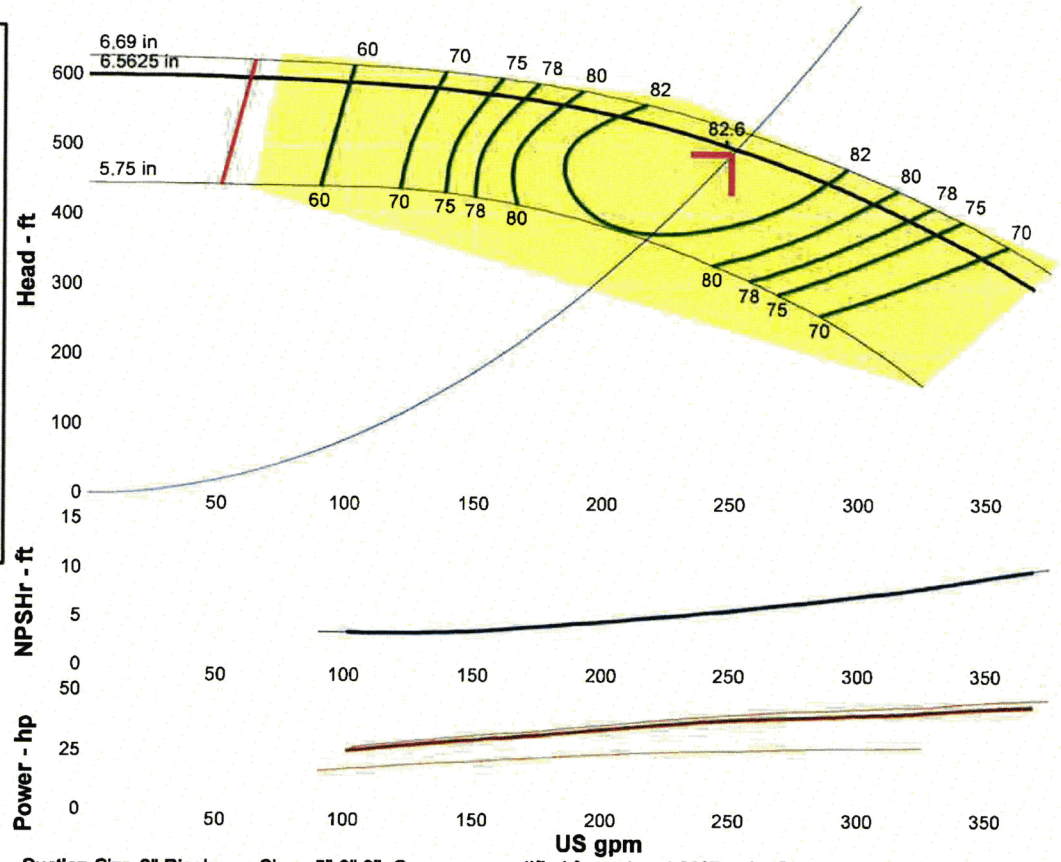
Motor:

Standard: NEMA
Enclosure: WPI

Size: 50 hp
Speed: 1800
Frame: 326

Sizing criteria: Max Power on Design Curve

---- Data Point ----	
Flow:	250 US gpm
Head:	496 ft
Eff:	82.6%
Power:	37.9 hp
NPSHr:	5.68 ft
---- Design Curve ----	
Shutoff head:	599 ft
Shutoff dP:	260 psi
Min flow:	62 US gpm
BEP:	82.6% @ 248 US gpm
NOL power:	43.6 hp @ 369 US gpm
-- Max Curve --	
Max power:	46.6 hp @ 375 US gpm



Suction Size-6" Discharge Sizes-5",6",8". Curves are certified for water at 60°F only. Consult factory for performance with any other fluid. Note: Contains unofficial Goulds Water Technology catalog content, not to be used for production.

Performance Evaluation:

Flow US gpm	Speed rpm	Head ft	Efficiency %	Power hp	NPSHr ft
300	1770	425	80.6	40	7.17
250	1770	496	82.6	37.9	5.68
200	1770	546	81.5	33.8	4.5
150	1770	575	73.6	29.5	3.52
100	1770	589	59.8	24.9	3.38

Selected from catalog: goulds lineshaft.60 Vers: 3.61

ARIZONA WATER COMPANY

SPECIFICATIONS

GENERAL CONDITIONS OF CONTRACT: E-4-1

CONSTRUCTION SPECIFICATIONS: E-8-1

STANDARD SPECIFICATION DRAWINGS: E-9-1

gw 7/7/15

2007 EDITION WITH **2010** REVISIONS;
2012 GENERAL CONDITIONS OF CONTRACT

A copy of this entire Spec Book was sent out with Navajo Pump ~~invitation~~ proposal to bid package for 1-53559 Pinal Valley Well #27 pump on 7/10/15 gs

Western Group Rate Case

Exhibit FKS-1

5361 Coolidge Tank

ARIZONA WATER COMPANY
WORK AUTHORIZATION

W.A. NUMBER: 1-5361
P.E. NUMBER:
BUDGET ITEM NO.: Special No. 28
SHEET NO.: 1 of 2

SYSTEM:	PINAL VALLEY	RETENTION REQUIRED:	☐ YES ☑ NO
DIVISION:	CASA GRANDE	WORK TO START BY:	UPON AUTHORIZATION
RESPONSIBLE PERSON:	TED MILLSPAUGH	WORK TO BE FINISHED BY:	WITHIN 30 DAYS
TAX CODE:			

DESCRIPTION OF WORK:

Construct a 16-inch overflow to replace an 8-inch overflow line, replace the cathodic protection system, one 8-inch gate valve on the tank inlet line and one 4-inch gate valve on the tank drain line at the Coolidge Warehouse elevated water storage tank in the Pinal Valley water system.

FACTORS JUSTIFYING WORK:

The existing overflow line is undersized for current system operations. The cathodic wiring broke and fell to the bottom of the tank when the tank was drained, rendering the cathodic protection system unusable. The 8-inch and 4-inch valves do not close completely, allow water to leak through and require replacement. The Coolidge Warehouse elevated water storage tank provides system pressure and is critical to provide reliable water supply to the Coolidge portion of the Pinal Valley water system.

COST ESTIMATE		AUTHORIZATION	DATE
COST OF WORK:		PREPARED BY: Mario Mendez	
MATERIAL	1,500		
LABOR	3,180	REVIEWED FOR ESMT/ROW VERIFICATION: Charles Briggs	
CONTRACT PORTION	66,360		
OVERHEAD	8,500	REVIEWED BY: Ted Millspaugh	
TOTAL AUTHORIZED EXPENDITURES CHARGEABLE TO THIS W.A.	$ 79,540		
FUNDS RECEIVED:		APPROVED BY ENGINEERING: Fredrick Schneider	
CONTRIBUTIONS RECEIVED	0		
REFUNDABLE ADVANCES RECEIVED	0	APPROVED BY FINANCE: Joseph Harris	
TOTAL CONTRIBUTIONS/ADVANCES	0		
NET COMPANY CASH REQUIRED	$ 79,540	SPECIAL ITEM EXCEEDING $10,000; AUTHORIZED BY PRESIDENT: William Garfield	
		SPECIAL ITEM EXCEEDING $10,000; AUTHORIZED BY CHAIRMAN: M. L. Whitehead	

COMMENTS:

Transfer $79,540 from WA 1-5166, Coolidge Airport ARF to fund this project

CONSTRUCTION RELEASE:

AFH

ARIZONA WATER COMPANY

WORK AUTHORIZATION - DETAIL SHEET

W.A. NUMBER: 1-5361
P.E. NUMBER:
BUDGET ITEM NO.: Special No. 28
SHEET NO.: 2 of 2

RETIREMENT PROPERTY UNITS	PLANT PROPERTY ACCOUNT	UNIT DESCRIPTION	QUANTITY	YEAR INSTALLED AND W.A. NUMBER
	342	Cathodic protection system	1	
	342	8-inch overflow	1	
	342	8-inch gate valve	1	
	342	4-inch gate valve	1	

PROJECT DESCRIPTION:

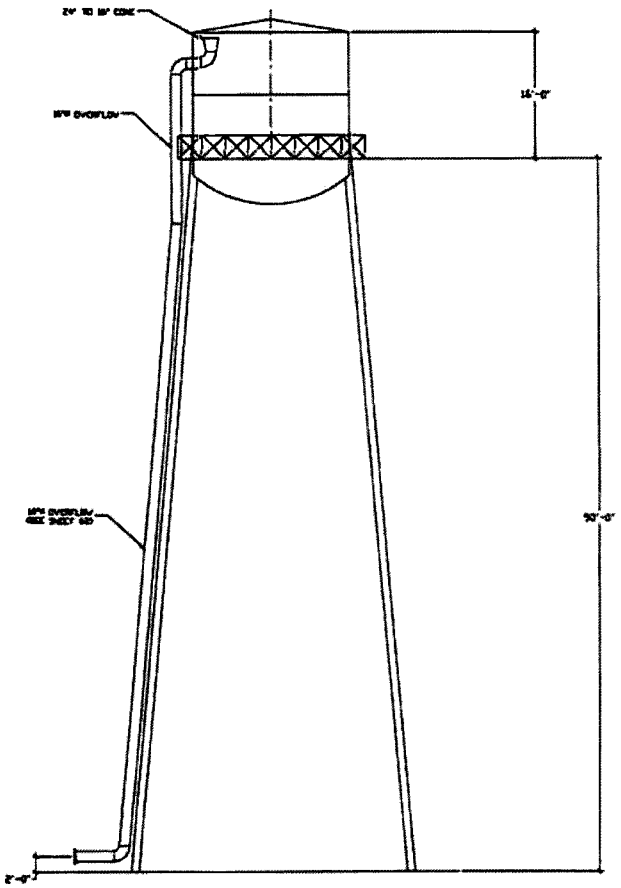
Construct a 16-inch overflow to replace an 8-inch overflow line, replace the cathodic protection system, one 8-inch gate valve on the tank inlet line and one 4-inch gate valve on the tank drain line at the Coolidge Warehouse elevated water storage tank in the Pinal Valley water system.

	DESCRIPTION	PLANT PROP ACCT	QUANTITY	UNIT COST	TOTAL
CONTRACT WORK	Replace cathodic protection system	342	1	$ 17,250.00	$ 17,250
	Install new 16-inch overflow	342	1	44,050.00	44,050
	Scaffolding required to install overflow	342	1	660.00	660
	Labor to replace 8-inch and 4-inch gate valves	342	1	4,400.00	4,400
	SERVICE CONNECTIONS COMPLETE: DOUBLE-LONG	345			
	SERVICE CONNECTIONS COMPLETE: DOUBLE-SHORT	345			
	SERVICE CONNECTIONS COMPLETE: SINGLE-LONG	345			
	SERVICE CONNECTIONS COMPLETE: SINGLE-SHORT	345			
TOTAL CONTRACT WORK					$ 66,360
MATERIALS	Provide 8-inch gate valve	342	1	$ 1,000.00	$ 1,000
	Provide 4-inch gate valve	342	1	500.00	500
	SERVICE CONNECTIONS: DOUBLE-LONG	345			
	SERVICE CONNECTIONS: DOUBLE-SHORT	345			
	SERVICE CONNECTIONS: SINGLE-LONG	345			
	SERVICE CONNECTIONS: SINGLE-SHORT	345			
	METERS	346			
TOTAL MATERIALS					$ 1,500
LABOR	Engineering and Project Management	342	24	$ 55.00	$ 1,320
	TESTING FEE	342	1	$ 100.00	100
	PERMIT FEE				
	SURVEY FEE				
	FIELD INSPECTION	342	32	55.00	1,760
	INSTALL SERVICE CONNECTIONS: DOUBLE-LONG	345			
	INSTALL SERVICE CONNECTIONS: DOUBLE-SHORT	345			
	INSTALL SERVICE CONNECTIONS: SINGLE-LONG	345			
	INSTALL SERVICE CONNECTIONS: SINGLE-SHORT	345			
TOTAL LABOR					$ 3,180
SUBTOTAL - CONTRACT WORK, MATERIALS, AND LABOR					$ 71,040
OVERHEAD					8,500
TOTAL	REFUNDABLE PORTION ☐	NON-REFUNDABLE PORTION ☐		**COST ESTIMATE**	$ 79,540

AFH

DRAWING LIST

PAGE #	PAGE CONTENTS	PAGE #	PAGE CONTENTS
1	NOTES & ELEVATIONS	2	16'Ø OVERFLOW



MMI TANK & INDUSTRIAL SERVICES
3240 SOUTH 37th AVE.
PHOENIX, AZ 85009
OFFICE: (602) 272-6000
FAX: (602) 272-6700

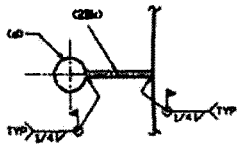
DRAWN BY: JRC	CHECKED BY: BRG	SCALE: NONE

CITY OF COOLIDGE
ELEVATED TANK MODIFICATIONS
COOLIDGE, AZ
ELEVATED WATER TANK

NO.	REVISION	DATE	MADE BY	CHK'D BY

NOTES AND ELEVATION	SHEET NO.	JOB NO.	REV.
	1	14-0486	A

NOTES:
UNLESS NOTED OTHERWISE (U.N.O.)
1. WELD SIZES SHALL BE EQUAL THICKNESS OF THINNER MEMBER JOINED
2. SEE SHEET #1 FOR GENERAL NOTES.
3. SEE SHEET #1 FOR COATING
4. INSTALL 1/4"ø NPT. DEBURR BACKSIDE FOR TESTING.



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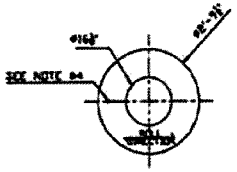
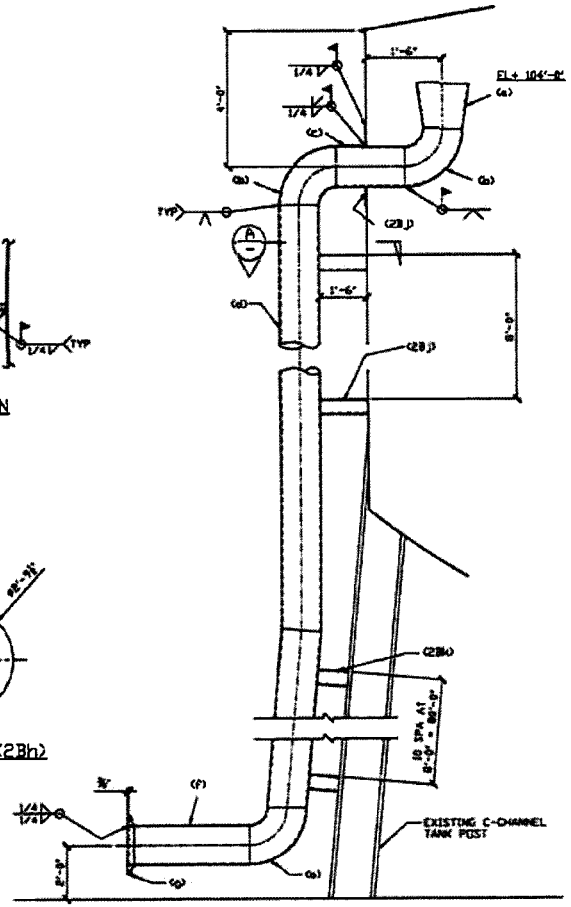


PART MARK-(2Bh)



2A 16"ø OVERFLOW

BILL OF MATERIAL

# TO SHIP	SHOP MARK	# OF PIECES	ASSY MARK	DESCRIPTION	REMARKS	MATL'S	WT. (LBS)
ONE	2A			16"ø OVERFLOW			
		1	a	24" X 16" CONCENTRIC REDUCER		A105	
		1	b	ELBOW 16"ø 90° - SR		A105	
	2B			16"ø OVERFLOW			
		1	b	ELBOW 16"ø 90° - SR		A105	
		1	c	PIPE 16"ø XS X 1'-9 1/4"		A106B	
		1	d	PIPE 16"ø SCH 10 X 18'-7 1/2"		A53B	
		1	e	PIPE 16"ø SCH 10 X 80LF		A53B	
		1	f	PIPE 16"ø SCH 10 X 4'-11"		A53B	
		1	g	16"ø RFSO 150#		A105	
1	2Bh			PL 1/4 X 33 1/1" O.D. X 16 1/8" I.D.	SK/ROLL	A36	
2	2Bj			C4 X 5.4 X 1'-6"		A36	
11	2Bk			C4 X 5.4 X 6'		A36	

ROLL: ROLL TO TANK O.S. RADIUS

MKI TANK & INDUSTRIAL SERVICES
3240 SOUTH 37th AVE.
PHOENIX, AZ 85009
OFFICE: (602) 272-6000
FAX: (602) 272-6700

DRAWN BY JRC	CHECKED BY BAG	SCALE: NONE

CITY OF COOLIDGE
ELEVATED TANK MODIFICATIONS
COOLIDGE, AZ
ELEVATED WATER TANK

NO.	REVISION	DATE	MADE BY	CHK'D BY

16"ø OVERFLOW

SHEET NO.	JOB NO.	REV.
2	14-0486	A

ARIZONA WATER COMPANY

Pinal Valley
220 E. 2nd Street
Casa Grande, AZ 85122 PH: 520-836-8785

PROPOSAL/CONTRACT

CONTRACTOR: MMI TANK AND INDUSTRIAL SERVICES	SYSTEM: PINAL VALLEY
ADDRESS: 3240 S. 37TH AVENUE	W.A. No(s):
CITY ST ZIP: PHOENIX, AZ 85009	BID DUE DATE: October 22, 2013

CONTRACTOR SUBMITS this PROPOSAL/CONTRACT to ARIZONA WATER COMPANY, an Arizona corporation (the "Company"), to perform the work and complete the project described on Page 2 (the "Project"), as an independent prime contractor.

1. Contractor certifies that it has a complete copy of, and has read, understands and accepts, the Company's General Conditions of Contract, and the Company's Construction Specifications and Standard Specification Drawings, (the "Specifications"), all of which are attached hereto. Contractor has examined the specific plans and related construction drawings for the Project (the "Drawings"), copies of which are also attached hereto. The General Conditions of Contract, Specifications and Drawings are incorporated into this Proposal/Contract. Contractor affirms that all work and materials to be furnished or purchased for the Project will be in strict conformance with the General Conditions of Contract, Specifications and Drawings.

2. Contractor represents and warrants that it has satisfied and complied with the provisions of Section 6, Contractor Understands Work and Working Conditions, of the General Conditions of Contract prior to submitting this Proposal/Contract.

3. Contractor represents that this Proposal/Contract is fair and honest in all respects, is submitted in good faith and is not submitted in collusion with any other company, entity or person.

4. Contractor acknowledges that one hundred percent (100%) Performance and Payment Bonds are required and must be provided to the Company prior to the commencement of work.

5. Prior to the commencement of work, Contractor will submit to the Company a list of all materials to be used in the Project. The materials list will include the manufacturer, part number, price and quantity included in this Proposal/Contract.

6. Contractor will furnish all labor, tools, equipment and materials required to complete the Project according to the General Conditions of Contract, Specifications and Drawings. No materials purchased by Contractor to be incorporated into the Project are subject to tax at the time of purchase and Contractor will not charge the Company for any such tax. Contractor will pay the applicable transaction privilege tax (the "Contracting Tax") on the Project after Contractor receives payment of the final Project invoice from the Company. The cost of materials incorporated into the Project which are exempt by Arizona Revised State Statues ("A.R.S.") from the Contracting Tax, for example, pipes or valves having a diameter of four (4) inches or larger, including equipment, fittings and any other related part that is used in operating the pipes or valves (A.R.S. §42-5061 B.6.), will not be included in the total cost of the labor and materials upon which the Contracting Tax is computed. Contractor retains full liability and obligation to pay the Contracting Tax and will defend and indemnify the Company against any demand or obligation to pay the Contracting Tax.

7. Contractor will maintain detailed accounting records of all materials purchased and incorporated into the Project. Such records will include all supporting original vendor invoices for all materials purchased. Following completion of the Project, Contractor will submit an itemized accounting to the Company which will include all supporting original vendor invoices and satisfactory evidence of payment thereof. The Company will not pay Contractor for materials not actually incorporated into the Project, and the disposition of such materials will remain Contractor's responsibility.

8. The Estimated Total Cost of the Project, shown on Page 2, is based on estimated labor and material quantities to be furnished. It includes an estimate of the Contracting Tax and the cost of the required Performance and Payment Bonds. Contractor will not cancel, modify or withdraw this Proposal/Contract during a ninety-day (90) period commencing on the Bid Due Date. The Company may accept this Proposal/Contract by signing and mailing, or otherwise delivering, a copy hereof to Contractor during such ninety-day (90) period. If the Company does not accept this Proposal/Contract during such ninety-day (90) period, Contractor may cancel this Proposal/Contract by giving written notice of cancellation to the Company.

9. Prior to the commencement of work, Contractor will provide the Company with a detailed construction schedule, in either Gantt or CPM form, identifying all tasks to be performed from the date of the written Commencement Notice through completion of the Project, including testing, training of Company Personnel and final Project invoicing. Contractor will provide the Company with a copy of such construction schedule documenting the progress of work on the Project at least monthly.

10. Contractor will not commence work on the Project until the Company gives Contractor a written Commencement Notice. Contractor will complete the Project within 90 calendar days after the Commencement Notice is issued.

11. Following the Company's written notice of satisfactory completion of the Project, and upon receipt of the final Project invoice from Contractor, the Company shall pay Contractor the actual total cost of the Project, which will be calculated as shown on Page 2, except that actual labor and material quantities installed/constructed will be substituted for the estimated labor and materials quantities and the Contracting Tax will be recalculated based on such actual labor and materials quantities.

12. The amount of applicable liquidated damages for Contractor's failure to deliver or perform within the time limit shown in Paragraph 10 may be deducted from the Company's payment of the final Project invoice. This provision shall not limit the Company's ability to terminate this Proposal/Contract for Contractor's unsatisfactory performance or failure to perform as provided in the General Conditions of Contract, Specifications or Drawings, or in this Proposal/Contract.

SPECIAL CONDITIONS:

CONTRACTOR	PROPOSAL/CONTRACT ACCEPTED:
MMI TANK AND ~~INSPECTION~~ INDUSTRIAL SERVICES	ARIZONA WATER COMPANY
By: Don Marmon	By: Fredrick K. Schneider
Print Name: Don Marmon	Print Name: Fredrick K. Schneider, PE
Title: Coatings Manager	Title: Vice President - Engineering
Date: 10/22/13	Date: 11-4-2013

AFH

AFH

ARIZONA WATER COMPANY

Pinal Valley
220 E. 2nd Street
Casa Grande, AZ 85122 PH: 520-836-8785

PROPOSAL/CONTRACT

CONTRACTOR: MMI TANK AND INDUSTRIAL SERVICES	SYSTEM: PINAL VALLEY
AZ CONTRACTOR LICENSE NO: CLASSIFICATION:	W.A. No(s):
ADDRESS: 3240 S. 37TH AVENUE	BID DUE DATE: October 22, 2013
CITY ST ZIP PHOENIX, AZ 85009	BID BOND REQUIRED ☑ Yes ☐ No

DESCRIPTION OF PROJECT: Interior and exterior coating of multiple water storage tanks in the Pinal Valley water system.

1-2. MATERIALS EXEMPT FROM CONTRACTING TAX (per Paragraph 6)	QUANTITY	UNIT PRICE LABOR	UNIT PRICE MATERIALS	TOTAL COST LABOR	TOTAL COST MATERIALS
Coat interior of the Coolidge Elevated 100,000 gallon water storage tank (26' D X 25' H) in the Pinal Valley water system; near white abrasive blast cleaning; per attached specifications.	1			17,520	25,989
Make spot repairs to approximately 50 square feet of the exterior coating of the Coolidge Elevated 100,000 gallon water storage tank (26' D X 25' H) in the Pinal Valley water system; prime coat: Carbomastic 15; finish coat: Series 73, Desert Sand.	1			2,966	4,336
Coat interior of the Coolidge Well #7 1,000,000 gallon water storage tank (69' D X 36' H) in the Pinal Valley water system; near white abrasive blast cleaning; per attached specifications.	1			44,345	50,734
Coat exterior of the Coolidge Well #7 1,000,000 gallon water storage tank (69' D X 36' H) in the Pinal Valley water system; per attached Level 1 surface preparation specifications.	1			13,164	10,992
Coat interior of the Stanfield 20,000 gallon water storage tank (10.5' D X 24' H) in the Pinal Valley water system; near white abrasive blast cleaning; per attached specifications.	1			7,492	7,888
Coat exterior of the Stanfield 20,000 gallon water storage tank (10.5' D X 24' H) in the Pinal Valley water system; per attached Level 1 surface preparation specifications.	1			3,616	4,414
PRICE ONLY					
Coat exterior of the Coolidge Well #7 1,000,000 gallon water storage tank (69' D X 36' H) per attached Level 2 surface preparation specifications.	1	27,245	34,694		
Coat exterior of the Stanfield 20,000 gallon water storage tank (10.5' D X 24' H) per attached Level 2 surface preparation specifications.	1	8,262	7,205		
Apply Chlor*Rid Surface Treatment on the interior of the Coolidge Elevated 100,000 gallon water storage tank (26' D X 25' H).	1	14,464	15,187		
Apply Chlor*Rid Surface Treatment on the interior of the Coolidge Well #7 1,000,000 gallon water storage tank (69' D X 36' H).	1	53,390	67,902		
Apply Chlor*Rid Surface Treatment on the interior of the Stanfield 20,000 gallon water storage tank (10.5' D X 24' H).	1	2,825	9,809		
3. Total Labor to Install Exempt Materials (add the amounts in column 1)				89,103	
4. Total Exempt Materials (add the amounts in column 2)					104,353

5-6. NON-EXEMPT MATERIALS	QUANTITY	LABOR	MATERIALS	LABOR	MATERIALS

7. Total Labor to Install Non-Exempt Materials (add the amounts in column 5)	7	N/A	
8. Total Non-Exempt Materials (add the amounts in column 6)			8 N/A
9. Subtotal A (add lines 3, 7 and 8)			9 89,103
10. Contracting Tax Base (multiply the amount on line 9 by 0.65)	10	57,917	
11. Applicable Contracting Tax Rate	11	6.7%	
12. Contracting Tax (multiply the amount on line 10 by line 11)			12 3880
13. Subtotal B (add lines 4, 9 and 12)			13 197336
14. 100% Performance and Payment Bonds Cost			14 3947
15. Estimated Total Cost (add lines 13 and 14)			15 201,283

NOTE: The Estimated Total Cost includes all labor and materials for backfill, pavement replacement, chip seal, and traffic control necessary for the Project.

ARIZONA WATER COMPANY

CONTRACT CHANGE ORDER

CONTRACTOR: MMI Tank and Industrial Services	DATE: April 21, 2015	CONTRACT DATE: October 22, 2013
	W.A. NO.: Routine	CHANGE ORDER NO.: 1

DESCRIPTION OF WORK:

1. Install New 16" Overflow Piping w/ Weir Cone & Brackets on storage tank.
2. Reinstall Cathodic Protection System in storage tank.
3. Replace one 4" and one 8" gate valve labor only
4. Install (2) patch plates 5. Scaffold for installing overflow piping Extend completion day to May 1, 2015

APPLICABLE C. O. COST: $ 69,360.00

ORIGINAL CONTRACT AMOUNT: $ 50,811.00

SUM OF ALL CHANGE ORDERS TO DATE: $ 69,360.00

REASON FOR ADDITIONAL WORK:

Current overflow piping is not sized correctly for system operating changes. Cathodic Wiring fell to bottom of tank when tank was drained. The 4" and 8" valves are not closing completely allowing water to leak through. Two patches covering holes in tank. Scaffold for installing overflow. Extended days are required to complete the necessary additions and repairs to Elevated Storage Tank.

APPROVAL LEVEL REQ'D: (CIRCLE ALL THAT APPLY) (BASED ON $DM)

(Mgr & Eng Up to $10,000 or 10% whichever is less) (VP Eng Up to $100,000 or 20% whichever is less) (VP Tres & Pres greater than $100,000 or 20%)

BASIS OF PAYMENT:

- [ ] In accordance with rates contained in Contractor's Proposal/Contract dated:
- [ ] In accordance with material prices, labor and equipment rates shown on Proposal dated:
- [X] Lump Sum Price (including taxes) of: (Include supporting documentation) $ 69,360.00
- [X] Other: Attached quotes

Contractor is hereby authorized to proceed with the work as described above. The Company will pay for the above-described work as indicated above.

Contractor agrees, as an independent contractor, to perform the above-described work in accordance with the Company's *General Conditions of Contract, and the Company's Construction Specifications* and *Standard Specification Drawings* ("General Conditions of Contract") and related construction drawings which, were provided with the original Proposal/Contract and supplemented herein, and agrees that all provisions of said General Conditions of Contract dated as of April 2004, including any subsequent amendments thereto, and related construction drawings, apply to work covered under this Contract Change Order.

Work Authorization Approval for additional funds required YES NO (circle one) If yes, attach applicable form & proof of payment for outside funded work.

Ray Munter
Division Superintendent/Manager

Project Engineer/Project Manager

AWC Vice President – Engineering

CHANGE ORDER AUTHORIZATION OVER $100,000 OR 20% OF THE CONTRACT NOT VALID WITHOUT SIGNATURES BELOW

AWC Vice President and Treasurer

AWC President

MMI Tank and Industrial Services
Contractor: (Name)

By: Contractor Signed Attached Contract
Contractor's Representative Signature

Name: Change order Ann Letourneau 4/27/15
(Printed)

It's: _____
(Title or Position)

Date Work Started

Date Work Completed

CONTRACTOR'S INVOICE APPROVED BY:

Company's Representative Overseeing the Work (signature)

DISTRIBUTION:
Original to Person Authorizing Work and, when completed, to Accounting Dept. with approved invoice for the work with supporting documentation. Copy to Contractor. Copy to Project Engineer.

Labor and Material Releases Required: ☐ Yes ☐ No
Releases Received and Approved By:

Company's Authorized Signature

Ted Millspaugh

From: Ron Bethsold [Ron@mmitank.com]
Sent: Tuesday, April 21, 2015 2:42 PM
To: Ted Millspaugh
Cc: Sandy Foisy; Dave Cooper; Stacy Pinckard; Mike Despres
Subject: MMI Job #14-0486 Coolidge Elevated Tank -- Change Order Request

Ted –

Per our conversation today please proceed change order request in the following amount:

(1) New Overflow: $44,050

(2) Patch Plates: $3,000

(1) New Cathodic Protection System: $17,250

Labor Only to Replace (2) Valves: $4,400

Scaffold Rental: $660

TOTAL CHANGE ORDER AMOUNT: $69,360

Thanks,

Ron Bethsold

Estimator

ron@mmitank.com

PH 480-553-6115

FX 602 272-6700

ARIZONA WATER COMPANY

Storage Tank Record

THIS SECTION TO BE COMPLETED BY AWC

STORAGE TANK DATA

System:	Map Reference (e.g. Site Name):		Tank No.:
W.A. #	Location (e.g. SE ¼ SEC 25 T1N R7E):		Tank Status (e.g. In Service, Not In Service, Abandoned, etc):
Tank Capacity (gal):	Shell Dia. (feet):		Shell Height (feet):
Inlet/Outlet Dia. (inch):	Inlet Dia. (inch):	Outlet Dia. (inch):	Tank Material:
Tank Foundation:		Floor Elevation (feet):	
Built By:	Year Built:	Cathodic Protection (yes/no):	Cathodic Date:
Remarks:			

THIS SECTION TO BE COMPLETED BY AWC

STORAGE TANK PAINT DATA

Original Interior Paint System:
Original Exterior Paint System:
Original Exterior Color:
Painted By:
Remarks:

ARIZONA WATER COMPANY

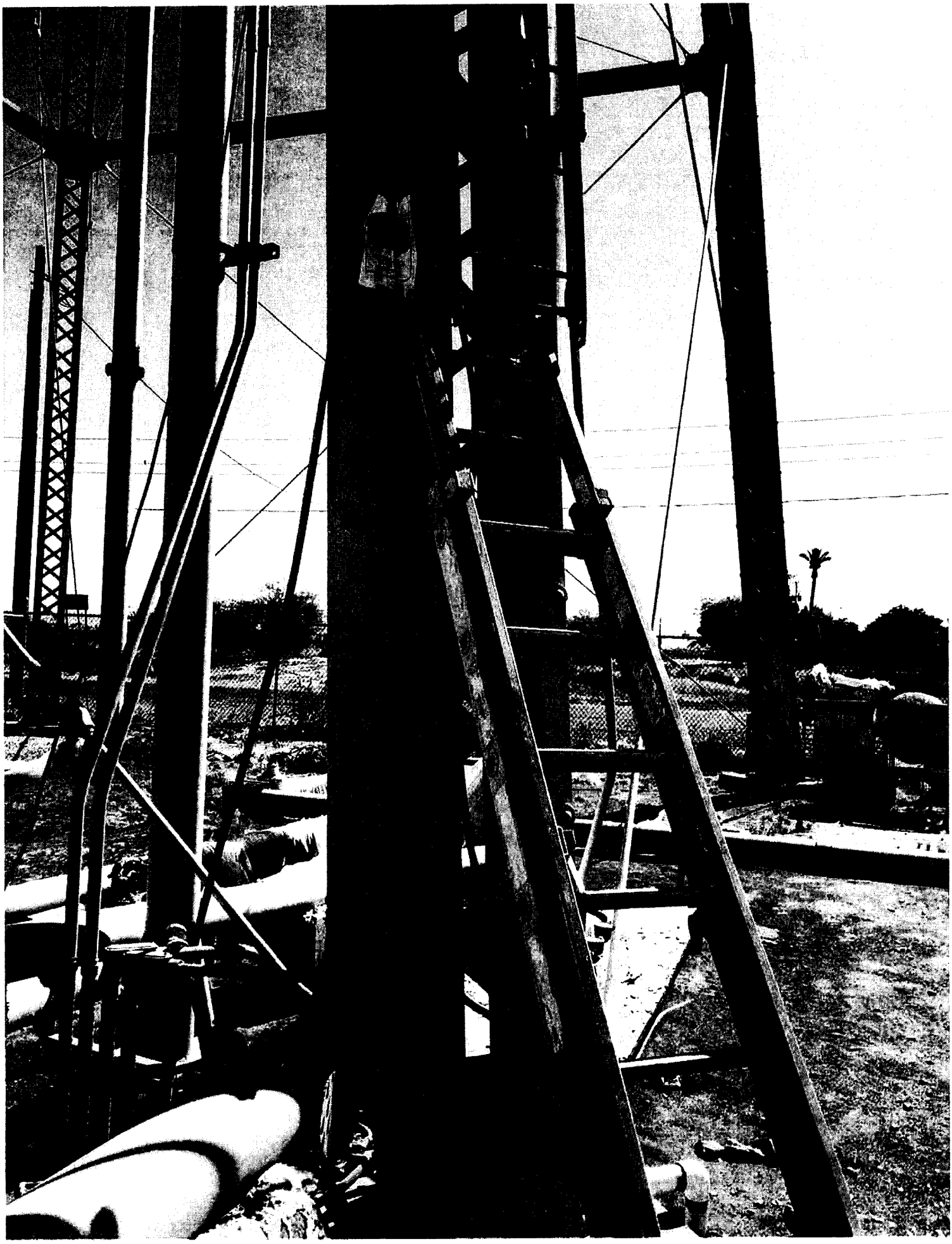
Storage Tank Record

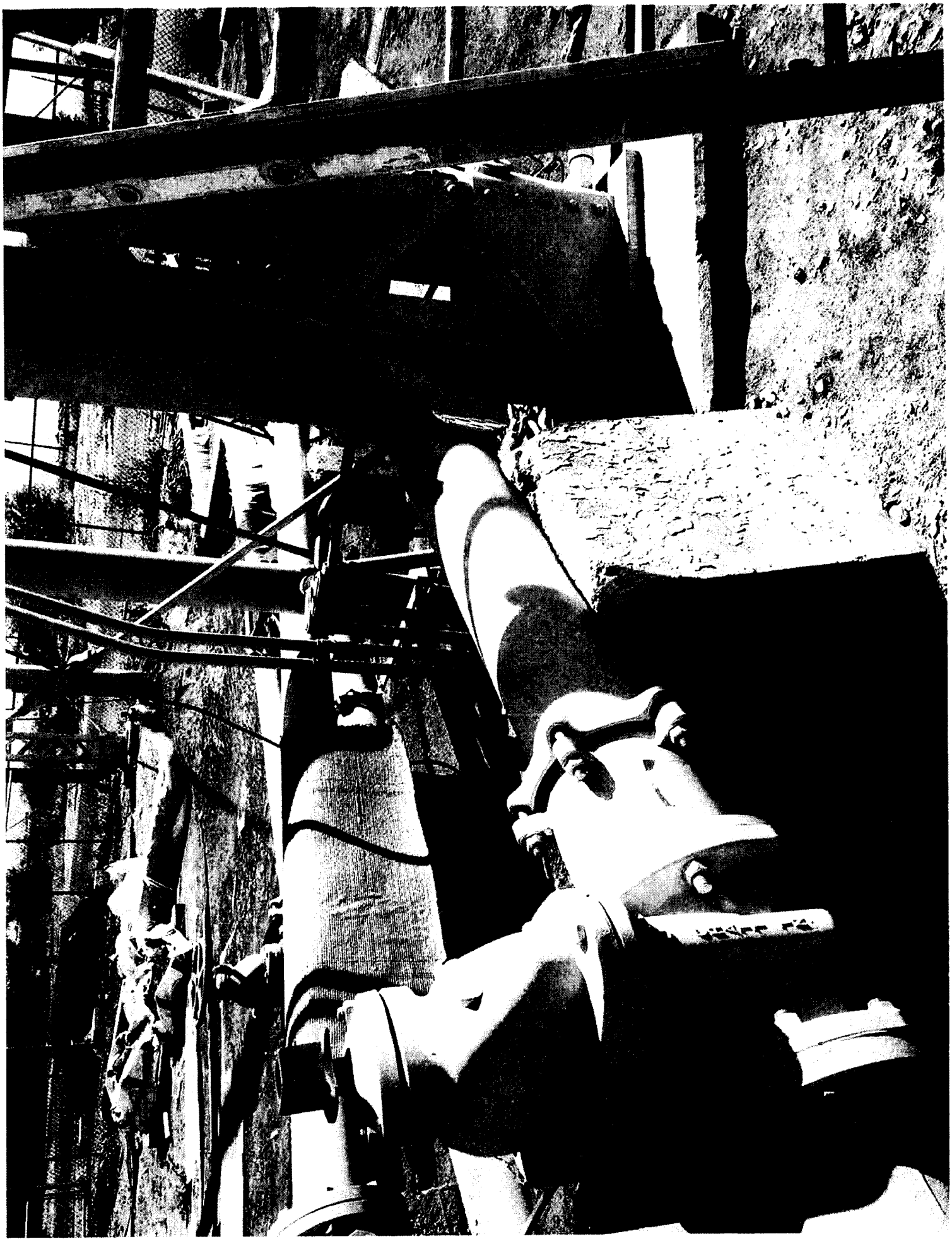
System:	Map Reference (e.g. Site Name):	Tank No.

PHOTOGRAPHS ARE TO BE TAKEN BY AWC

STORAGE TANK PHOTOGRAPHS

insert photos





INDUSTRIAL INSPECTION AND CONSULTING, LLC
CERTIFIED NACE AND SSPC INSPECTION AND CONSULTING SERVICES

ARIZONA WATER COMPANY

Elevated Water Storage Tank

Rehabilitation

COOLIDGE, ARIZONA

SURFACE PREPERATION & COATING INSPECTION REPORT

PREPARED FOR ARIZONA WATER

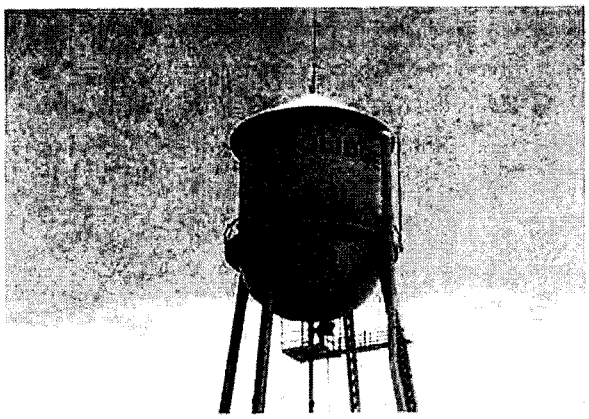
PO BOX 51026 PHOENIX, ARIZONA 85076-1026
GREGSPRINKLE@HOTMAIL.COM
PHONE 480-993-8999

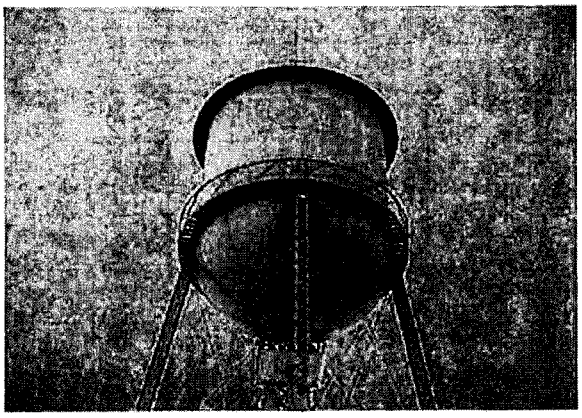
INDUSTRIAL INSPECTION AND CONSULTING, LLC

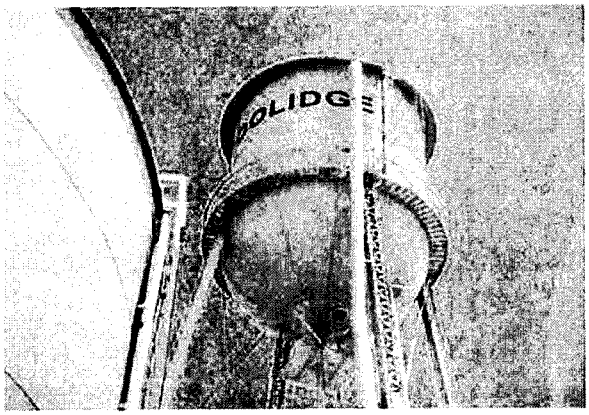
CERTIFIED NACE INSPECTORS

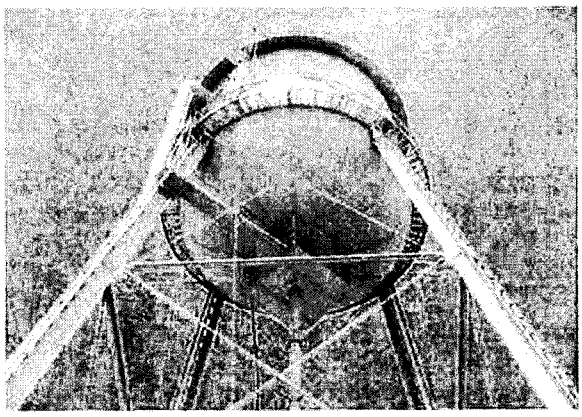
Paint Inspection Photo Documentation

New Exterior Coating System (Carboline Carboguard 133 HB)









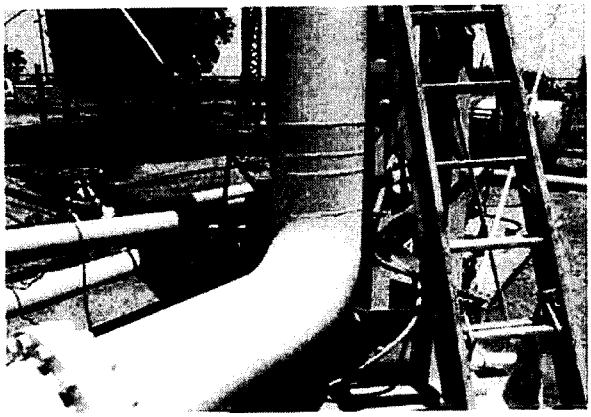
Company:	MMI Industrial Services	**Report No.**	4	**Page**	2
Project:	Coolidge Elevated Water Storage Tank	**Job No.**	Coolidge Elevated Water Tank		
Location:	Coolidge, Arizona	**Date:**	6/24/2015		

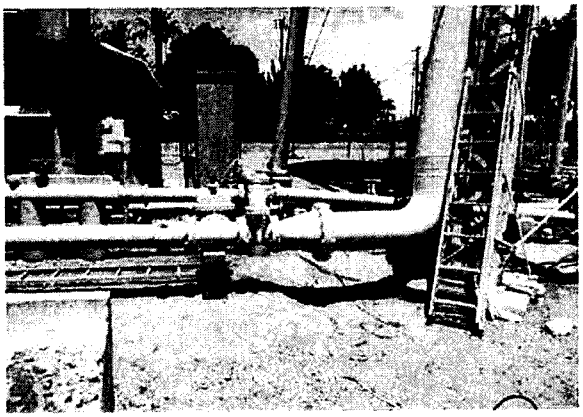
INDUSTRIAL INSPECTION AND CONSULTING, LLC

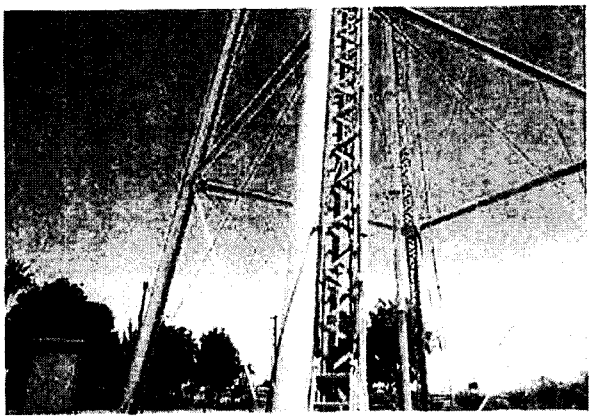
CERTIFIED NACE INSPECTORS

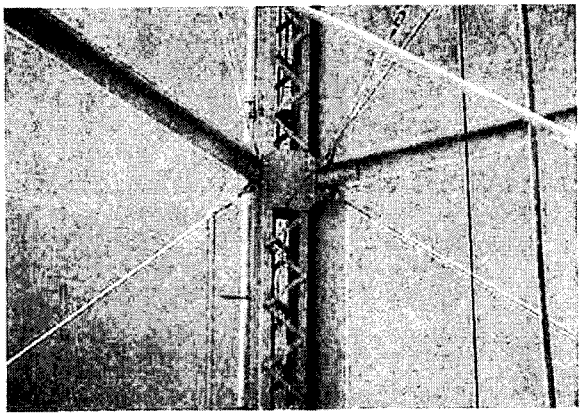
Paint Inspection Photo Documentation

New Exterior Coating System On Exterior Pipes (Carboline Carboguard 133 HB)









Company:	MMI Industrial Services	**Report No.**	4	**Page**	3
Project:	Coolidge Elevated Water Storage Tank	**Job No.**	Coolidge Elevated Water Tank		
Location:	Coolidge, Arizona	**Date:**	6/24/2015		

LEGEND
Technical Services, Inc.
www.legend-group.com

17631 N. 25th Avenue • Phoenix, AZ 85023
P (602) 324-6100 • F (602) 324-6101

Ray Murrieta
Arizona Water Company - Pinal Valley 11-009
220 E. 2nd Street
Casa Grande, AZ85222

Project: Drinking Water Analysis
Project Number: 11-009

Reported:
06/26/15 15:00

Analyte

DRAFT: Elevated Tank (Elevated Tank) (5062248-01) Drinking Water (Grab) Sampled: 06/25/15 11:30 Received: 06/25/15 13:25

Legend Technical Services of Arizona, Inc.

DRAFT: Volatile Organic Compounds

Analyte	Result	PQL	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
1,1,1-Trichloroethane	<0.0005	0.0005	mg/L	1	B5F0785	06/26/15 10:00	06/26/15 11:54	EPA 524.2	
1,1,2-Trichloroethane	<0.0005	0.0005	mg/L	1	B5F0785	06/26/15 10:00	06/26/15 11:54	EPA 524.2	
1,1-Dichloroethene	<0.0005	0.0005	mg/L	1	B5F0785	06/26/15 10:00	06/26/15 11:54	EPA 524.2	
1,2,4-Trichlorobenzene	<0.0005	0.0005	mg/L	1	B5F0785	06/26/15 10:00	06/26/15 11:54	EPA 524.2	
1,2-Dichlorobenzene	<0.0005	0.0005	mg/L	1	B5F0785	06/26/15 10:00	06/26/15 11:54	EPA 524.2	
1,2-Dichloroethane	<0.0005	0.0005	mg/L	1	B5F0785	06/26/15 10:00	06/26/15 11:54	EPA 524.2	
1,2-Dichloropropane	<0.0005	0.0005	mg/L	1	B5F0785	06/26/15 10:00	06/26/15 11:54	EPA 524.2	
1,4-Dichlorobenzene	<0.0005	0.0005	mg/L	1	B5F0785	06/26/15 10:00	06/26/15 11:54	EPA 524.2	
Benzene	<0.0005	0.0005	mg/L	1	B5F0785	06/26/15 10:00	06/26/15 11:54	EPA 524.2	
Bromodichloromethane	**0.0005**	0.0005	mg/L	1	B5F0785	06/26/15 10:00	06/26/15 11:54	EPA 524.2	
Bromoform	**0.0039**	0.0005	mg/L	1	B5F0785	06/26/15 10:00	06/26/15 11:54	EPA 524.2	
Carbon tetrachloride	<0.0005	0.0005	mg/L	1	B5F0785	06/26/15 10:00	06/26/15 11:54	EPA 524.2	
Chlorobenzene	<0.0005	0.0005	mg/L	1	B5F0785	06/26/15 10:00	06/26/15 11:54	EPA 524.2	
Chloroform	**0.0020**	0.0005	mg/L	1	B5F0785	06/26/15 10:00	06/26/15 11:54	EPA 524.2	
cis-1,2-Dichloroethylene	<0.0005	0.0005	mg/L	1	B5F0785	06/26/15 10:00	06/26/15 11:54	EPA 524.2	
Dibromochloromethane	**0.0016**	0.0005	mg/L	1	B5F0785	06/26/15 10:00	06/26/15 11:54	EPA 524.2	
Dichloromethane	<0.0005	0.0005	mg/L	1	B5F0785	06/26/15 10:00	06/26/15 11:54	EPA 524.2	
Ethylbenzene	<0.0005	0.0005	mg/L	1	B5F0785	06/26/15 10:00	06/26/15 11:54	EPA 524.2	
m,p-Xylene	<0.0005	0.0005	mg/L	1	B5F0785	06/26/15 10:00	06/26/15 11:54	EPA 524.2	
o-Xylene	<0.0005	0.0005	mg/L	1	B5F0785	06/26/15 10:00	06/26/15 11:54	EPA 524.2	
Styrene	<0.0005	0.0005	mg/L	1	B5F0785	06/26/15 10:00	06/26/15 11:54	EPA 524.2	
Tetrachloroethene	<0.0005	0.0005	mg/L	1	B5F0785	06/26/15 10:00	06/26/15 11:54	EPA 524.2	
Toluene	<0.0005	0.0005	mg/L	1	B5F0785	06/26/15 10:00	06/26/15 11:54	EPA 524.2	
Total THMs	**0.0080**	0.0005	mg/L	1	B5F0785	06/26/15 10:00	06/26/15 11:54	EPA 524.2	
trans-1,2-Dichloroethene	<0.0005	0.0005	mg/L	1	B5F0785	06/26/15 10:00	06/26/15 11:54	EPA 524.2	
Trichloroethene	<0.0005	0.0005	mg/L	1	B5F0785	06/26/15 10:00	06/26/15 11:54	EPA 524.2	
Vinyl chloride	<0.0005	0.0005	mg/L	1	B5F0785	06/26/15 10:00	06/26/15 11:54	EPA 524.2	
Xylenes (total)	<0.0005	0.0005	mg/L	1	B5F0785	06/26/15 10:00	06/26/15 11:54	EPA 524.2	
Surrogate: 1,2-Dichlorobenzene-d4		*102 %*	*70-130*		*B5F0785*	*06/26/15 10:00*	*06/26/15 11:54*	*EPA 524.2*	
Surrogate: 1,2-Dichloroethane-d4		*94 %*	*70-130*		*B5F0785*	*06/26/15 10:00*	*06/26/15 11:54*	*EPA 524.2*	
Surrogate: 4-Bromofluorobenzene		*94 %*	*70-130*		*B5F0785*	*06/26/15 10:00*	*06/26/15 11:54*	*EPA 524.2*	
Surrogate: Pentafluorobenzene		*102 %*	*70-130*		*B5F0785*	*06/26/15 10:00*	*06/26/15 11:54*	*EPA 524.2*	

DRAFT REPORT

The results in this report apply to the samples analyzed in accordance with the chain of custody document. This analytical report must be reproduced in its entirety.

DATA SUBJECT TO CHANGE

Phone Number: (602) 324-6100

Ray Murrieta	Project: Drinking Water Analysis
Arizona Water Company - Pinal Valley 11-009	Project Number: 11-009
220 E. 2nd Street	**Reported:**
Casa Grande, AZ85222	06/26/15 15:00

Sample Condition Upon Receipt:

Temperature: 5.40 C

All samples were received in acceptable condition unless noted otherwise in the case narrative.

Case Narrative:

Holding Times: All holding times were met unless otherwise qualified.

QA/QC Criteria: All analyses met method requirements unless otherwise qualified.

Accreditations: AZ(PHX)0004, AZ(TUC)OOO4, AIHA#102982, CDC ELITE Member.

Accreditation is applicable only to the test methods specified on each scope of accreditation held by LEGEND.

Comments: There were no problems encountered during the processing of the samples, unless otherwise noted.
All samples were analyzed on a "wet" basis unless designated as "dry weight".

Notified Regina of the absent Total Coliform results on 06/26/15. BF
Emailed prelim results for Method 524 on 06/26/15. BF

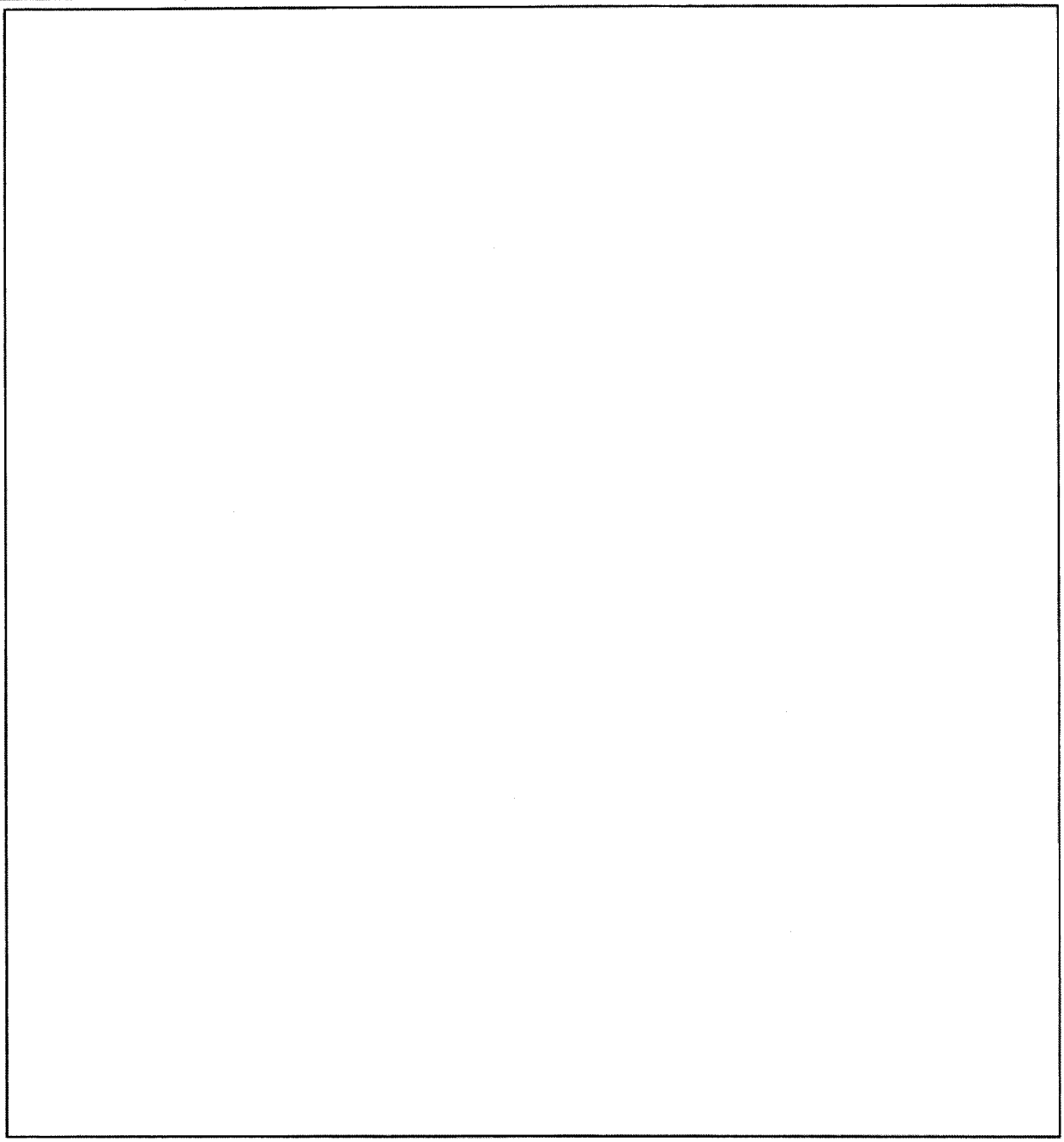
Notes and Definitions

The results in this report apply to the samples analyzed in accordance with the chain of custody document. This analytical report must be reproduced in its entirety.

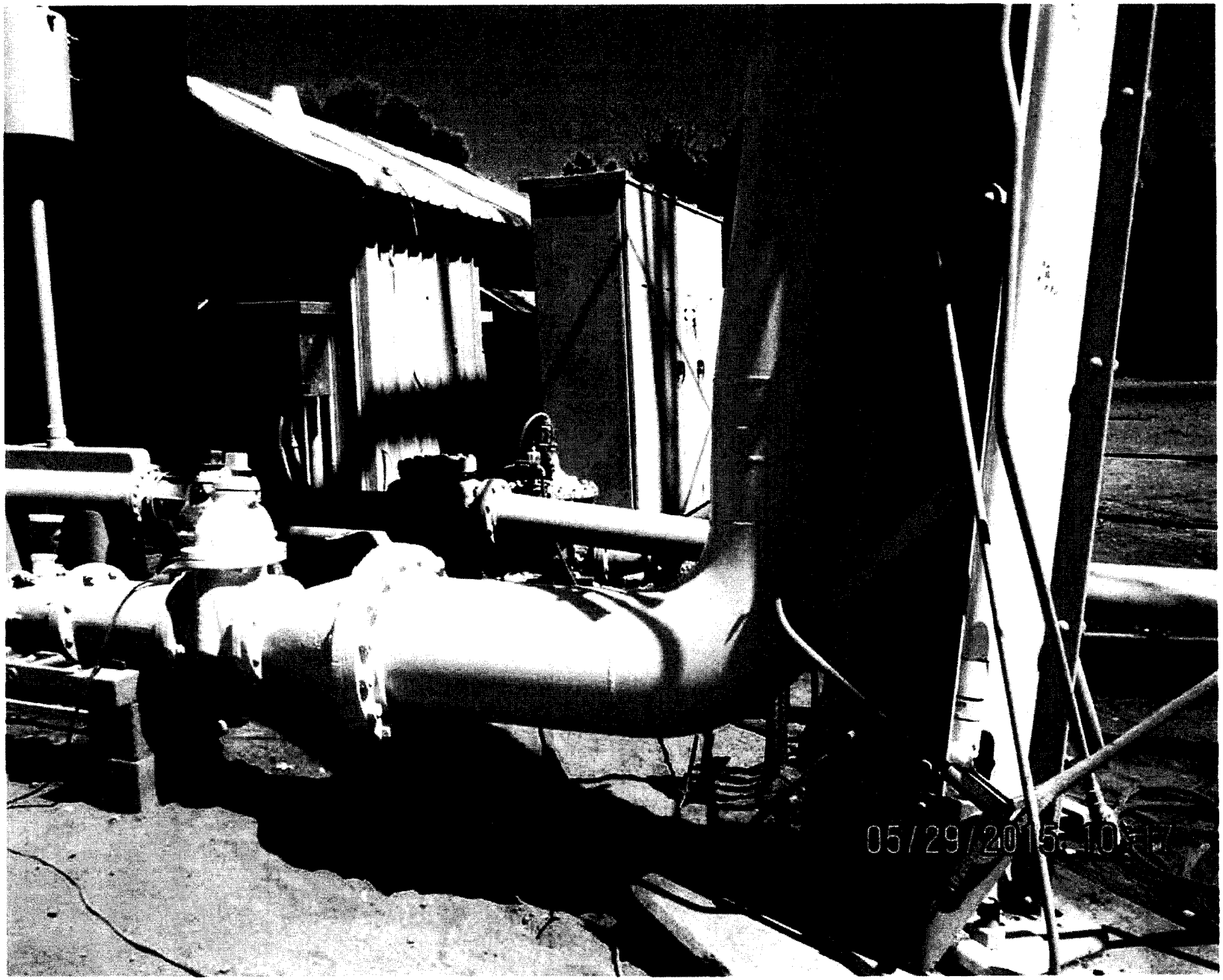
Ray Murrieta
Arizona Water Company - Pinal Valley 11-009
220 E. 2nd Street
Casa Grande, AZ85222

Project: Drinking Water Analysis
Project Number: 11-009

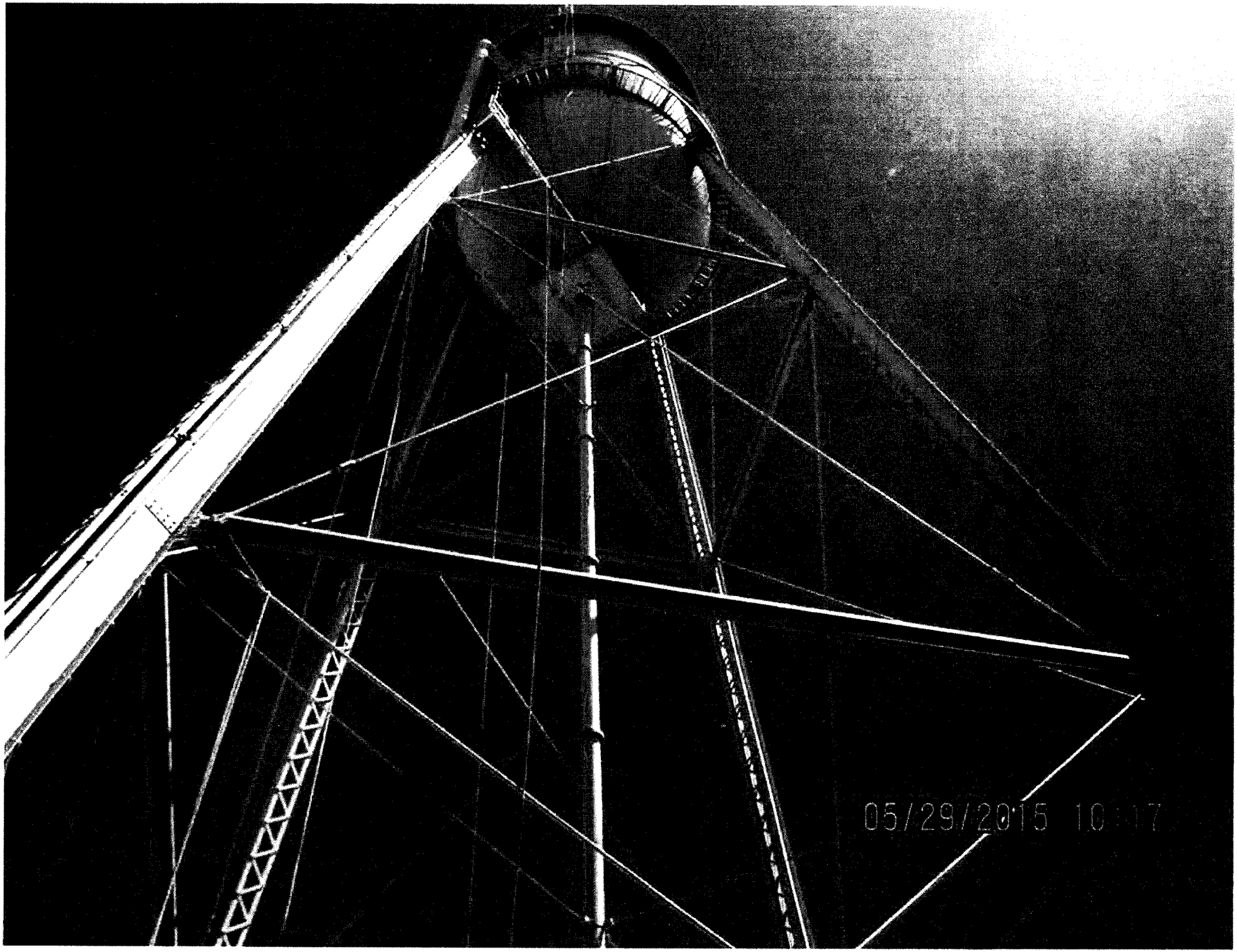
Reported:
06/26/15 15:00



The results in this report apply to the samples analyzed in accordance with the chain of custody document. This analytical report must be reproduced in its entirety.


05/29/2015

05/29/2015 10:17


05/29/2015 10:17

ARIZONA WATER COMPANY

CONSTRUCTION PLACED IN SERVICE NOTICE

WORK AUTHORIZATION NO.: 1-5361

DIVISION: PV/CG

DATE PLACED IN SERVICE: 7 | 8 | 2015

CONTRACT NO:

FOR PURPOSES OF *MODIFIED ACCELERATED COST RECOVERY SYSTEM*, AN ASSET IS "PLACED IN SERVICE" WHEN IT IS IN A CONDITION OR STATE OF READINESS AND AVAILABILITY FOR A SPECIFICALLY ASSIGNED FUNCTION, WHETHER IT BE FOR USE IN A TRADE OR BUSINESS, OR FOR THE PRODUCTION OF INCOME.

I CERTIFY THAT THE ASSET(S) CONSTRUCTED PURSUANT TO THE PROVISIONS OF THE ABOVE-REFERENCED WORK AUTHORIZATION ARE READY FOR SERVICE AS OF THE DATE SHOWN ABOVE.

Division Manager or Operations Superintendent
(signature)

7-24-2015
Date

SUBMIT ORIGINAL TO ACCOUNTING DEPARTMENT

A-1-3-1
FKS 11/24/11