BUCKHORN MESA WPP
SPOOK HILL FRS
ROAD RAMP ALTERNATIVES
MC KELLIPS ROAD
MC DOWELL ROAD

A303.912

file 11.8.14

UNITED STATES DEPARTMENT OF AGRICULTURE

SOIL CONSERVATION SERVICE Room 6029 Federal Bldg., Phoenix, AZ 85025

SUBJECT: ENG - Design PL566 Buckhorn-Mesa WPP
Arizona - Spook Hill FRS

DATE: February 11, 1976

TO: Ralph M. Arrington
State Conservation Engineer

In response to a request from Mr. Herb Donald, Chief Engineer and General Manager of the Flood Control District of Maricopa County, in his letter to Mr. Rockenbaugh dated January 8, 1976 (attached) the relocation of the ramps at McKellips and McDowell Roads has been studied. The study shows that a total cost increase of $110,276.00 will result from the relocations.

The relocation was introduced in a meeting with the Flood Control District, Bureau of Reclamation and SCS on January 7, 1976. A copy of the memo to Ralph Arrington from Paul Monville dated January 9, 1976 describing the meeting is attached. Adopted for study was the alternative described by the Bureau of Reclamation which would move the ramp into the reservoir area and reduce the height of fill over the Salt-Gila Aqueduct. Details of this alternative are included in the attached copy of the letter to Mr. Rockenbaugh from Mr. Pugh, Projects Manager, Bureau of Reclamation, Arizona Projects Office, dated January 13, 1976. The Bureau's details were modified to permit passage of the freeboard hydrograph without increasing the backwater. Extensive hydraulic calculations were not made at this time. Instead, the area between the top of the dam and the C/L of the roadway was maintained in the revision. In order to maintain equality, excavation in the reservoir area was necessary.

Attached is the following information:

1. Cost comparison

2. Cost estimate McKellips Road Ramp original alinement C/L dam, Sta. 193+00 to Station 223+00.

3. Cost estimate McKellips Road Ramp, new alinement C/L Dam, Sta. 193+00 to Sta. 223+00.

4. Profile McKellips Road Ramp.

5. Plan McKellips Road Ramp.

6. Cost estimate McDowell Road Ramp, original alinement C/L dam, Sta. 260+00 to Sta. 280+00.

W.S. control Bk.
Bridge Deck Control Bk.
300 - Plans for bridge Const.
SCS - Flood
to copy Co.

7. Cost estimate McDowell Road Ramp, new alinement, C/L dam, Sta. 260+00 to Sta. 280+00.

8. Profile McDowell Road Ramp.

9. Plan McDowell Road Ramp.

Paul J. Monville
Design Engineer

Attachments

Paul's copy

UNITED STATES DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE Room 6029 Federal Bldg., Phoenix, AZ 85025

SUBJECT: ENG - Design - PL 566
Buckhorn-Mesa WPP, Arizona
Spook Hill FRS

DATE: January 9, 1976

TO:

Ralph M. Arrington
State Conservation Engineer

A meeting was held in the Federal Building on January 7, 1976 between members of the Flood Control District, Bureau of Reclamation, and the SCS. The list of persons in attendance is attached.

The purpose of the meeting was to discuss alternative design approaches to the McKellips and McDowell Road Ramps.that would relieve rights-of-way problems. With the current design, costly severences of property west of the dam and adjacent to the roadways are expected.

The Flood Control District presented two (2) proposals which were as follows:

1. Do not disturb the existing roadways. Extend the dam adjacent to the roadways and connect the separated pools with conduit.

2. Move the ramps upstream as far as possible and use steeper side slopes by applying gunnite concrete or other stabilizing materials.

The SCS pointed out the following:

1. Alternative No. 1 would treate separate dams that would require separate emergency spillways.

2. Alternative No. 2 would require an excavated ramp across the road to convey waters to the spillways. Additional removal and replacement of pavement would be required.

The Bureau of Reclamation offered another alternative. The ramp would be moved upstream by moving that portion of the dam crossing the roadways upstream. They claimed that the benefit due to this change would be to decrease the bridge costs from about $800,000 each to about $400,000 each. This type of treatment is in effect in the Granite Reef Aqueduct, Reach 11.

The Flood Control District was requested to submit their proposals in writing to Mr. Rockenbaugh and the analysis would be given top priority.

Paul Monville
Design Engineer

cc- John Peterson

Attachment

PJM:ks

Meeting at SCS Office Jan 7 1976

Attendance

Paul Morwells	SCS
John Peterson	SCS
SID BRASE	F.C.
JACK LEAVITT	F.C.D.
BILL JOLLY	F.C.D.
Lowell Heaton	U.S.B.R.
E. H. DIERMANN	U.S.B.R.
M. C. Thomas	USBR
H. F. Hobbs	USBR
John Sullivan	SCS
Bob Bond	USBR

FLOOD CONTROL DISTRICT of Maricopa County

3325 West Durango Street • Phoenix, Arizona 85009 • Telephone (602) 262-3630/262-3639

January 8, 1976

United States Department of Agriculture
Soil Conservation Service
Room 6029, Federal Building
Phoenix, Arizona 85025

ATTENTION: Mr. Thomas G. Rockenbaugh,
State Conservationist

RE: McDowell Road and McKellips Road Ramps - Spook Hill Retarding Structure

Dear Mr. Rockenbaugh:

As per our discussion with members of your staff at your office on January 7, 1976, we are herewith requesting that a study be made to consider relocation and redesign of the roadway ramps crossing the Spook Hill Retarding Structure at McKellips Road and McDowell Road. It is intended to relocate the ramps east of the present location consequently reducing the height of the ramps and the roadway crossing the Central Arizona Project aqueduct at existing grade.

We feel the aforesaid can be accomplished and will minimize a traffic hazard at the intersection of Bush Highway and McDowell Road. In addition there will be a substantial savings in construction costs for bridge structures over the C.A.P. aqueduct and ramp construction.

Should you require additional information please contact Sid Brase of my staff.

Sincerely,

Herbert P. Donald, P. E.
Chief Engineer and General Manager

/SHB/det

cc: Mr. C. A. Pugh, Projects Manager
Bureau of Reclamation

Arrington
Rob
Paul

United States Department of the Interior

cyc to R+P

BUREAU OF RECLAMATION

ARIZONA PROJECTS OFFICE
SUITE 2200 VALLEY CENTER
201 NORTH CENTRAL AVENUE
PHOENIX, ARIZONA 85073

IN REPLY REFER TO: 330-212
520.

JAN 13 1976

Department of Agriculture
Soil Conservation Service
Room 6029, Federal Building
Phoenix, Arizona 85025

Attention: Mr. Thomas Rockenbaugh, State Conservationist

Gentlemen:

We have reviewed the preliminary drawings and design information of the Spook Hill Floodwater Retarding Structure and Floodway and offer the following recommendations for consideration:

1. The earth dam at McKellips, McDowell and Brown Roads should parallel both sides of and cross the above roads approximately 600 feet upstream of the proposed Salt-Gila Aqueduct to permit construction of the proposed bridges at existing grade as shown on the enclosed sketches.

2. Allow sufficient space between the dam spurs paralleling McKellips, McDowell and Brown Roads for possible future expansion of the existing road to four lanes.

3. Earth plugs, 300 feet wide, should be left in the canal prism at the above bridge sites to provide crossings of the aqueduct during the period following excavation of the prism and prior to construction of the bridges.

4. Alinement of the dam should be sinuous rather than straight to provide a more pleasing and aesthetically acceptable appearance. The existing vegetation in the pocket areas, between the toe of the dam and the left maintenance road, created by the sinuous alinement should be preserved.

AMERICAN REVOLUTION BICENTENNIAL 1776-1976

5. Topsoil should be stripped, stockpiled and replaced on the slopes of the dam in a roughened form to facilitate natural revegetation.

6. Vegetative growth located in wash or drainage areas within the borrow area should be preserved to create green belt areas and to further promote growth of native vegetation.

7. Landscaping of the downstream slopes of the dam should consist of native trees and shrubs compatible to the area and capable of panoramic blending within a brief time span.

8. Ramp grades at points of dam crossings on McKellips, McDowell and Brown Roads should not exceed 6 percent.

9. An area from the outside toe of the dam to the beginning of the borrow area should be left undisturbed to provide stability to the dam and enhance the environmental aspect of the feature.

10. Excavation of the canal prism should be limited to within six inches of final excavation lines as shown on the enclosed typical canal section.

The bridge at Brown Road was requested by Maricopa County Highway Department officials in lieu of a bridge at Usery Pass Road.

We appreciate the opportunity of reviewing and commenting on the subject plans.

Should you have questions or require additional information regarding the above, please contact Mr. E. H. Diekmann at 261-3757.

Sincerely,

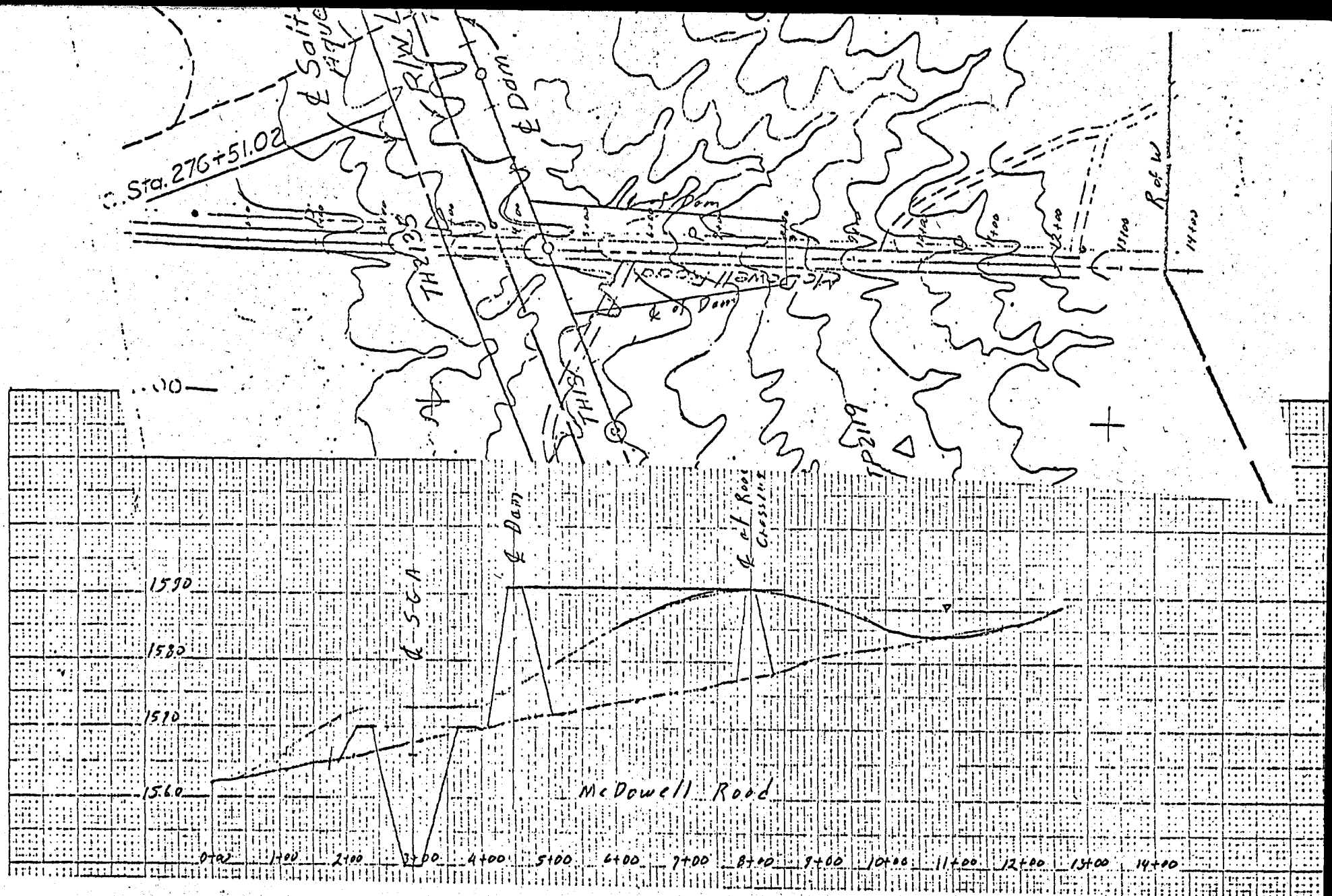
C. A. Pugh
Projects Manager

In duplicate

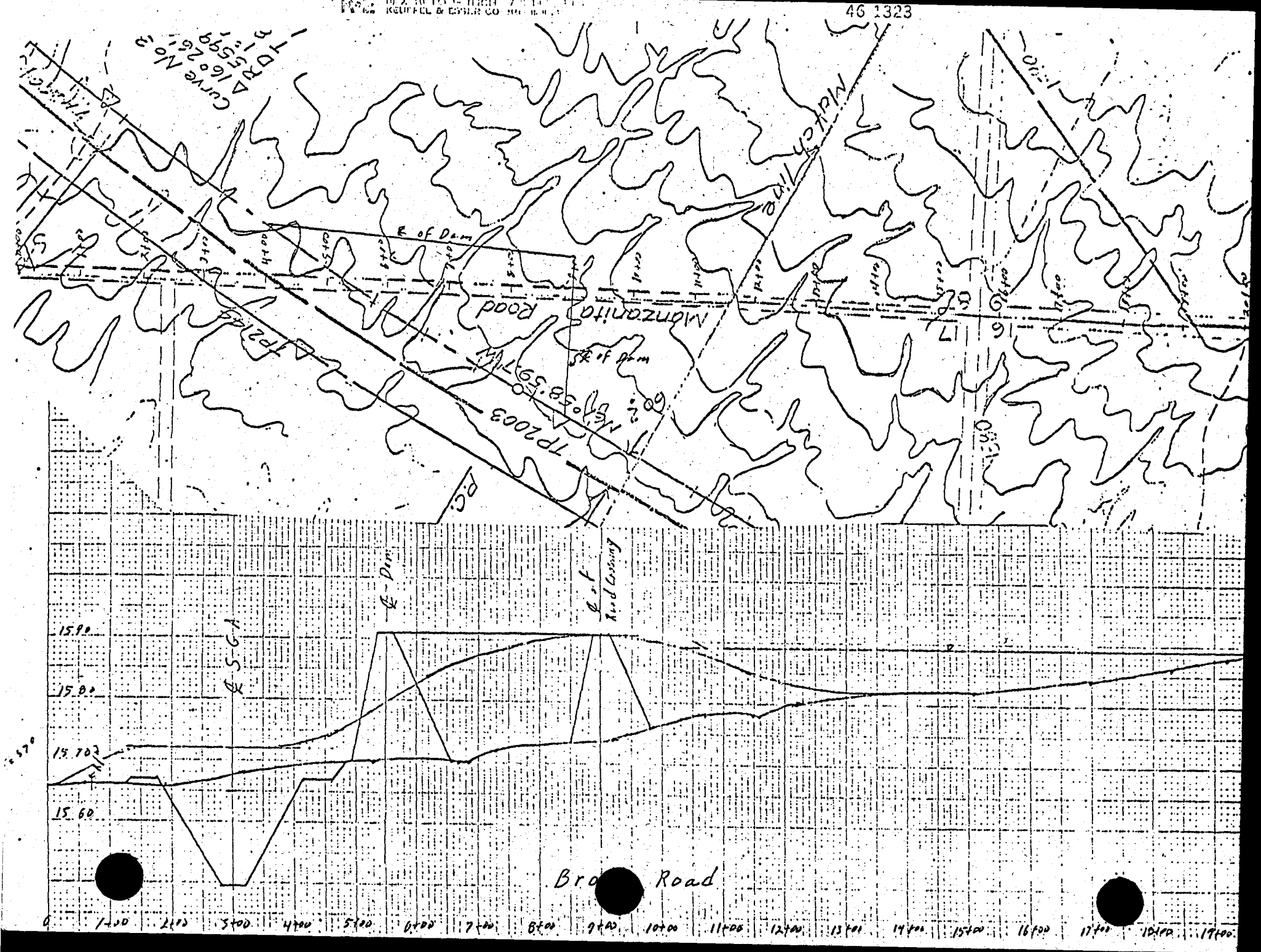
Enclosures (4)

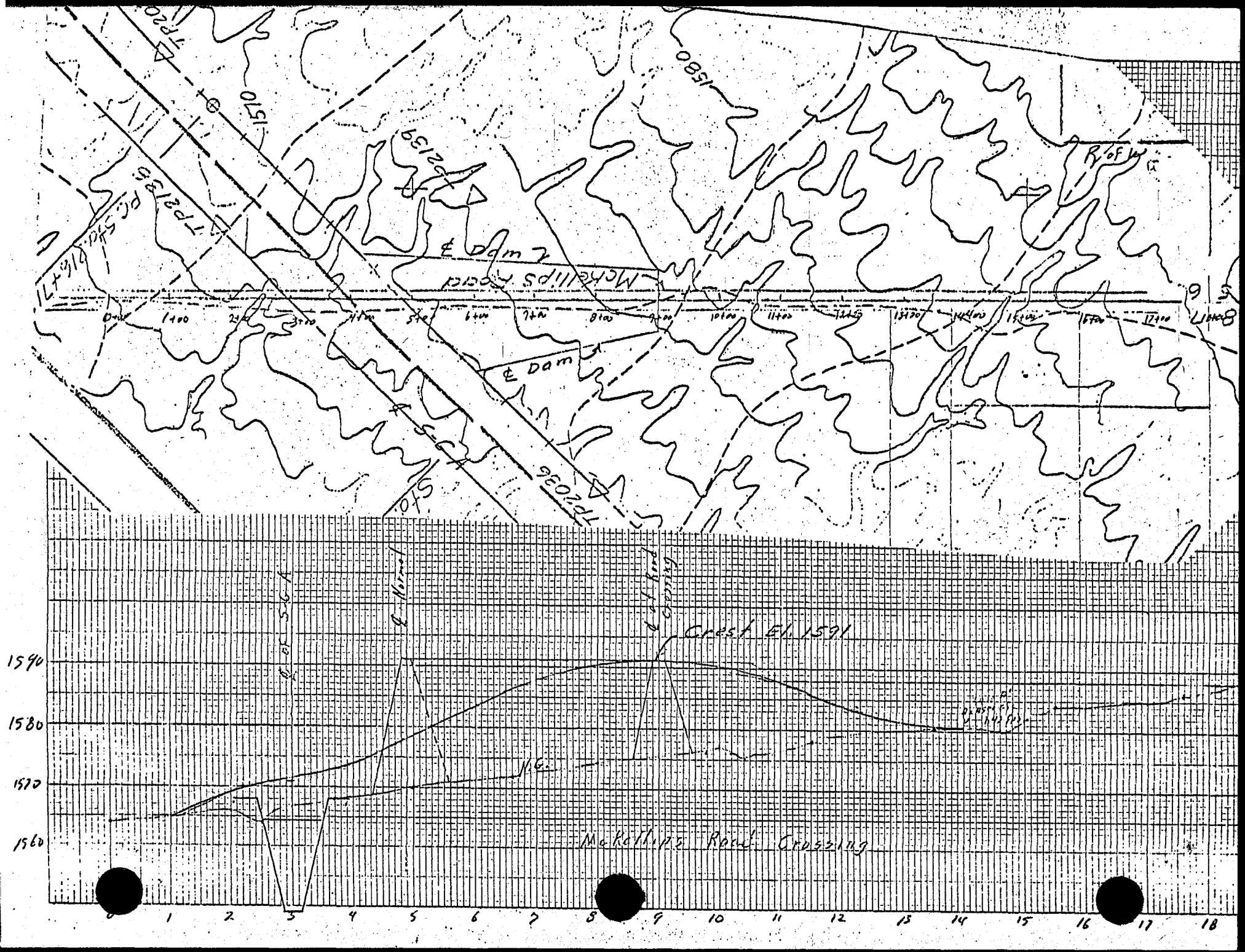
(cc's on following page)

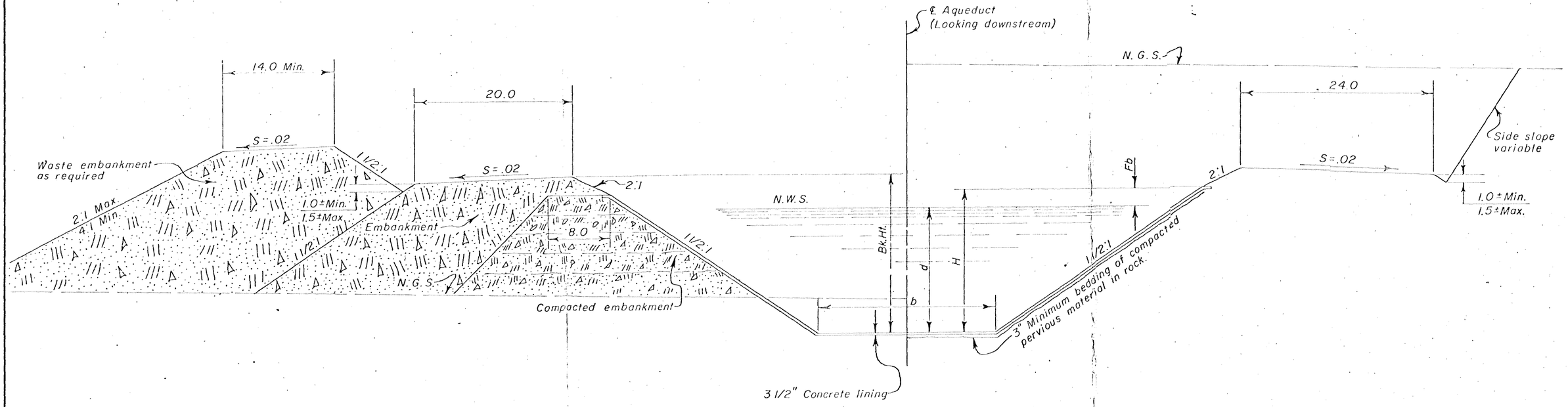
cc:
Maricopa County Highway Department, 3325 W. Durango Street, Phoenix, Arizona 85009
Maricopa County Flood Control District, 3325 W. Durango Street, Phoenix, Arizona 85009
(w/enclosures to each)


Sta. 276+51.02
℄ Dam
℄ of Dam
℄ SGA
℄ at Road Crossing
McDowell Road
1590
1580
1570
1560
0+00
1+00
2+00
3+00
4+00
5+00
6+00
7+00
8+00
9+00
10+00
11+00
12+00
13+00
14+00

10 X 10 TO 1/2 INCH
KEUFFEL & ESSER CO.




McKellips Road
℄ Dam 3
℄ Dam
℄ Sec. 5
TP2036
TP2139
TP2139 Pc 5+01.67
1510
1580
R/of W
Crest El. 1591
Q Normal
Q at Crossing
Q Sec. 5 G.
N.G.
1590
1580
1570
1560
McKellips Road Crossing
0
1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
16
17
18



TYPICAL SECTION

CANAL PROPERTIES

Q	b	d	A	V	n	r	s	Fb	H	Bk. Ht.	b/d
2500	22.0	15.35	691.45	3.62	.016	8.94	.00008	2.25	17.6	19.8	1.43
3000	24.0	16.43	799.24	3.75	.016	9.60	.00008	2.17	18.6	20.8	1.46
3700	26.0	17.66	927.08	3.97	.016	10.34	.00008	2.34	20.0	22.3	1.47 *

*Tenative hydraulic properties of combined Salt-Gila and Florence-Casa Grande canals.

THIS DRAWING SUPERSEDES DRAWING NO. 344-330-T-225

THIS DRAWING SUPERSEDES DRAWING NO. 344-314-872

UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF RECLAMATION
CENTRAL ARIZONA PROJECT—ARIZONA

GRANITE REEF AND SALT-GILA AQUEDUCTS

TYPICAL SECTION

DESIGNED ____ SUBMITTED ____
DRAWN H.D.S. ____ RECOMMENDED ____
CHECKED ____ APPROVED ____

PHOENIX, ARIZONA DECEMBER 15, 1975 344-330-T-458

United States Department of the Interior

BUREAU OF RECLAMATION

ARIZONA PROJECTS OFFICE
SUITE 2200 VALLEY CENTER
201 NORTH CENTRAL AVENUE
PHOENIX, ARIZONA 85073

IN REPLY
REFER TO: 330-212
520.

FEB 2 1976

Department of Agriculture
Soil Conservation Service
Room 6029, Federal Building
Phoenix, Arizona 85025

Attention: Mr. Paul Monville

Gentlemen:

In response to Mr. Monville's verbal request, we are enclosing copies of our comparative cost summaries for the McKellips and McDowell Road bridges crossing Reach 1 of the Salt-Gila Aqueduct. The comparative costs, providing bridges at existing grade versus earth ramp crossings, have been developed for both a 32-foot wide bridge to accommodate the existing roadway widths and an 80-foot wide bridge to allow for future expansion of the existing roads to four lanes.

The 80-foot bridge width is an obligation of the Bureau of Reclamation to Maricopa County under the Water Resource Development Act of 1974 requiring the use of current standards. Therefore, in the best interest of all agencies concerned, we request that your plans for the Spook Hill Floodway Retarding Structure allow sufficient space for possible future expansion of the existing McKellips, McDowell and Brown Roads to four lanes.

Sincerely,

C. A. Pugh
Projects Manager

In duplicate

Enclosures

AMERICA'S REVOLUTION BICENTENNIAL 1776-1976

7-1654 (7-73)
Bureau of Reclamation

COMPUTATION SHEET

BY	DATE	PROJECT	SHEET ___ OF ___
FES	1/22/75	CAP	
CHKD BY	DATE	FEATURE	
		Salt-Gila Aqueduct Reach 1 - Bridges	

DETAILS Summary of Comparative Costs - SCS Ramps vs Exist. Grade

	Mc Kellips Rd.		Mc Dowell Rd.	
	w/ Ramps	w/o Ramps	w/ Ramps	w/o Ramps
Mc Kellips Rd. Compacted Embankment:				
Ramps - 44,000 yds³ @ $.50/yd³	$22,000			
w/o Ramps - 94,172 yds³ @ $.50/yd³		$47,086		
Bridge:				
Ramps - L = 275' @ $985.00/l.f.	$270,875			
w/o Ramps - L = 130' @ $985/l.f.		$128,050		
Mc Dowell Rd. Compacted Embankment:				
with Ramps - 32,918 yds³ @ $.50			$16,459	
w/o Ramps - 42,756 yds³ @ $.50				$21,378
Bridge:				
w/Ramp L = 275' @ $985/l.f.			$270,875	
w/o Ramp. L = 130' @ $985/l.f.				$128,050
Totals	$292,875	$175,136	$287,334	$149,428

Note: Costs based on 32 ft. bridge width to conform with existing pavement widths of 28 ft. at above locations.

COMPUTATION SHEET
SCS-522 REV 5-58

U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

GPO 1958 O—470868

STATE	PROJECT			
Arizona	Buckhorn Mesa WPP Spookhill Dam			
BY: D Riddle	DATE: 2-5-76	CHECKED BY	DATE	JOB NO. 2005

SUBJECT: Cost Analysis of Ramps Summary

SHEET 1 OF 1

Item	SCS Cost	FCDMC Cost	CAP Cost	Total Cost
McKellips Road				
Existing Design	173,204.00	~~432,587.00~~ 446248	432,424.00	~~1,038,215.00~~ 1051816.00
Proposed Change	~~366,615.00~~ 275185.00	~~422,985.00~~ 362750.00	285,250.00 303,107.00	~~1,074,850.00~~ 941032.00
Change in Cost	(+) ~~193,411.00~~ (+) 101981.00	(-) ~~9,602.00~~ (-) 83498.00	(-) ~~147,174.00~~ (-) 129317.00	(+) ~~36,635.00~~ (-) 110,784
McDowell Road				
Existing Design	153,315.00	~~374,461.00~~ 397,231.00	403,717.00	~~931,493.00~~ 954,263.00
Proposed Change	363,252.00	~~410,547.00~~ 369,685.00	~~231,335.00~~ 249,105.00	~~1,005,134.00~~ 983,042.00
Change in Cost	(+) 209,937.00	(+) ~~36,086.00~~ (-) 27,546.00	(-) ~~172,382.00~~ (-) 154,612.00	(+) ~~73,641.00~~ (+) 28779.00
Total Change in Cost	(+) ~~403,348.00~~ (+) 311,918.00	(+) 26,484.00 (-) 110,044.00	(-) ~~319,556.00~~ (-) 283929.00	+110,276 (-) 82060.00

COMPUTATION SHEET
SCS-ENG-523 Rev. 8-69

U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

STATE	PROJECT			
Arizona	Buckhorn Mesa WPP Spookhill Dam			
BY D Riddle	DATE 1-19-76	CHECKED BY JLS	DATE 2-10-76	JOB NO. 2005
SUBJECT Total Cost Est. Mikollipe Rd (Oriz Alternate)				SHEET 1 OF 3

Item No	Item	SCS Cost	FCD Cost	CAP Cost	Total Cost
1	Clearing	$4,140.00	$540.00		$4,680.00
3	Foundation Exc.	$22,035.00	$3,389.00		$25,424.00
4	Channel Excav	$9,000.00			$9,000.00
5	Str. Excav.		$2,640.00		$2,640.00
6	Zone I Fill	$51,528.00	$29,800.00		$81,328.00
7	Zone II Fill	$51,860.00			$51,860.00
8	Str. Backfill		$6,670.00		$6,670.00
13	108" dia C.P.M.		$51,694.00		$51,694.00
14	Pav. Removal & Patching		$59,072.00		$59,072.00
15	Loose Rock Riprap		$4,560.00		$4,560.00
—	CAP Bridge			292,875.00	292,875.00
—	Total Const. Cost	$138,563.00	$158,365.00	$292,875.00	$589,803.00
—	R/W Cost	—	~~$213,300.00~~ $225,720.00	$60,300.00	~~$273,600~~ $286,020
Total Cost (Const. + R/W)		$138,563.00	~~$371,665.00~~ 384,085	353,175.00	~~863,403.00~~ 875823
10% Admin. Service (const. + R/W)		$13,856.30	~~$37,167.30~~ 38408	$35,318.00	~~$86,346.00~~ 87582
15% Engineering (const.)		$20,785.00	$23,755.00	$43,931.00	$88,471
	Total	$173,204.00	~~$432,587.00~~ 446248	$432,424.00	$1,038,215 1051876

117,500

from Sta 193+00 to Sta 223+00

COMPUTATION SHEET
SCS-ENG-523 Rev. 8-69

U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

STATE	PROJECT			
Arizona	Burkhorn Mesa WPP Spookhill Dam			
BY D Riddle	DATE 1-19-75	CHECKED BY J.L.S	DATE 2-6-76	JOB NO. 2005
SUBJECT Cost of McKallips Rd Ramp orig alinmt				SHEET 2 OF 3

Sta 1.93+00 to Sta 223+00

Item #1 Clearing

Dam Gov Cost

(300)(3,000) ÷ 43,560 = 20.7 Ac

(20.7 Ac) $200.00 Per Ac = $4,140.00

Span Cost Ramp

[(89)(620) + (89)(680)] ÷ 43,560 = 2.7 Ac

(2.7)($200.00 Per Ac = $540.00

Total Cost $4,680.00

Item #3 Foundation Excavation

Dam Gov Cost

44,070 cu. yd @ $0.50 = $22,035.00

Ramp

(61)(1,500)(2.0) ÷ 27 = 6,778 cu. yd

6,778 cu. yd @ $0.50 per yd = $3,389.00

Total = $25,424.00

Item #4 Channel Excavation

(3,000)(6)(27) ÷ 27 = 18,000 cu. yd

(18,000 cu. yd)($0.50) = $9,000.00

All Gov. Cost

COMPUTATION SHEET
SCS-ENG-523 Rev. 8-69

U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

STATE		PROJECT		
Arizona		Buckhorn Mesa WPP Spook Hill Dam		
BY D. Riddle	DATE 1-19-76	CHECKED BY JLS	DATE 2-6-76	JOB NO. 2005
SUBJECT Cost of Dam & Mckellaps Rd sta 195+00 to 220+00				SHEET 3 OF 3

Item #5

Structure Excavation

Pipe 660 cu. yd @ $4.00 = $2,640.00

All Sponsers Cost

Item #6

Embankment Fill Zone I

Dam (100,475)(0.58768) @ $0.50 = $29,493.00 + $22,035.00 Core

$51,528.00 Dam Total

Ramp Spon. Cost

59,600 cu. yd @ $0.50 = $29,800.00

Total Cost = $81,328.00

81,528

Item #7

Embankment Fill zone II

Dam = 41,488 cu yd @ $1.25 = $51,860.00

All Gov. Cost

Item #8

Structure Backfill

Ramp = 667 cu. yd @ $10.00 = $6,670.00

Item #13

108" dia C. M. Pipe

301' @ $171.74 = $51,694.00

Item #14

Pavement Removal & Replacement

5,680 S.Y. @ $10.40 = $59,072.00

Item #15

Loose Rock Riprap

456 cu. yd. @ $10.00 = $4,560.00

COMPUTATION SHEET
SCS-ENG-523 Rev. 8-69

U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

STATE	PROJECT			
Arizona	Buckhorn Mesa WPP Spookhill Dam			
BY D Ridella	DATE 1-20-76	CHECKED BY JLS	DATE 2-10-76	JOB NO. 2005

SUBJECT Cost Est. Mokellips Rd Area (New Alignment) SHEET 1 OF 4

Item No	Item	S.C.S Cost	F.C.D. Cost	C.A.P. Cost	Total Cost
1	Clearing	$9,420.00	$460.00		$9,880.00
3	Foundation Excav.	$24,172.00	$4,444.00		$28,616.00
4 ?	Channel Excav.	~~$146,284.00~~ 73,142			~~$146,284~~ 73,142
5	Str. Excav		$3,512.00		$3,512.00
6	Zone I Fill	$56,526.00	~~$17,913.00~~ 16,669.00	1244.00	$74,439.00
7	Zone II Fill	$56,890.00			$56,890.00
8	Str Backfill		$5,200.00		$5,200.00
13	108" dia C.M.P.		$26,104.00		$26,104.00
14	Pav. Remov. & Replace		~~$73,611.00~~ 36,484.00	13062.00	~~$73,611.00~~ 49546
15	Rock Riprap		$3,600.00		$3,600.00
—	C.A.P. Bridge			$175,136.00	$175,136.00
—	Total Const. Cost	~~$293,292.00~~ 220,148	~~$134,844.00~~ 96,473	~~$175,136.00~~ 189422	~~$603,272~~ 506,043
—	R/W Cost	—	~~$231,300.00~~ 233300.00	$60,300.00	~~$291,600.00~~ 293600.00
Total Const + R/W Cost		~~$293,292.00~~ 220,148	~~$366,144.00~~ 329773	~~$235,436.00~~ 249722.00	~~$894,872.00~~ 785857
10% Admin. Service (Const + R/W)		~~$29,329.00~~ 22015	~~$36,614.00~~ 32977	~~23,544.00~~ 24972.00	~~89,487.00~~ 79964
15% Engineering (const)		~~$43,994.00~~ 33,022.00	~~20,227.00~~ 14470	26,270.00 28413	~~90,491.00~~ 75905
Total		~~$366,615.00~~ 275,185	~~$422,985.00~~ 362750	285,250.00 303,101.00	~~1,074,850.00~~ 941,042.00

+ 9 Ac. @ $4500.00 per Ac.

from Sta 193+00 to Sta 223+00

COMPUTATION SHEET
SCS-ENG-523 Rev. 8-69

U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

STATE	PROJECT			
Arizona	Buckhorn Mesa WPP-Spookhill Dam			
BY D Riddle	DATE 1-20-76	CHECKED BY JLS	DATE 2-6-76	JOB NO. 2005
SUBJECT Cost Est Mckellips Rd Area New Alignment				SHEET 2 OF 4

Sta 193+00 to Sta 223+00

Item #1 Dam Gov Cost

193+00	300		
		1,000	6.9 Ac
203+00	300		
		200	1.5 Ac
205+00	350		
		400	4.8 Ac
209+00	700		
		1,400	16.1 Ac
223+00	300		

? $\left(\frac{1,100 + 1875}{2}\right)(520) \div 43,560 =$ 17.8 Ac

42.1 Ac

47.1 Ac @ $200. = $9,420.00 Gov Cost

Ramp $\left[(740)(124) + (75)(120)\right] / 43560 =$ 2.3 Ac

2.3 Ac @ $200.00 = $460.00

Total Cost = $9,880.00

Item #3

Foundation Excavation

$\frac{3290}{3000} = 1.097 \times 44,070 =$ 48,344 cu. yd Dam

48,344 cu. yd @ $0.50 = $24,172.00 Gov. Cost.

Ramp

7+00	(48)(2)	1,200 CY	19+90	(152)(2)	2,667 CY
300			360		
10+00	(60)(2)	1,926 CY	23+50	(48)(2)	
400					
14+00	(70)(2)	3,096 CY			
440					
18+40	120(2)				

Total = 8,888 cu. y

@ $0.50 = $4,444.00

Total of $28,616.00

COMPUTATION SHEET
SCS-ENG-523 Rev. 8-69

U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

STATE		PROJECT		
Arizona		Buckhorn Mesa WPP Spookhill Dam		
BY D Riddle	DATE 1-20-76	CHECKED BY J.L.S.	DATE 2-6-76	JOB NO. 2005
SUBJECT Cost Est Mckallips Rd Area New Alinment				SHEET 3 OF 4

Item #4
Channel Excavation

$[(1,100)(4)+(750)(2.0)]540 \div 27 = 118,000$ cu. yd

$[(1,150)(27)(6.0)+(\frac{13+6}{2})(35.75)(1,700)] \div 27 = 28,284$ cu. yd

Total = 146,284 cu. yd. @ \$1.00 = \$146,284

@ 0.50 = 73,142

Item #5
Structure Excavation

$(12)(13)(152)/27 = 878$ cu. yd @ \$4.00 = \$3,512.00

Item #6 Zone I Fill

Dam Gov. Cost $(100,475)(1.097)(0.58708) = 64,709$

$64,709 + 48,344 = 113,053$ @ \$0.50 = \$56,526 cu. yd

Span Cost Ramp

35,826 cu. yd @ \$0.50 = \$17,913.00 16669.00

33339

Total of = \$74,439.00

73195.00

Item #7 Zone II Fill

$(100,475)(1.097)(0.41292) = 45,512$ cu. yd

45,512 cy @ \$1.25 = \$56,890.00

Item #8
Structure Backfill

$878 - (152)\pi(4.5)^2/27 = 520$ cu. yd

520 cu. yd @ \$10.00 = \$5,200.00

COMPUTATION SHEET
SCS-ENG-523 Rev. 8-69

U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

STATE Arizona		PROJECT Buckhorn Mesa WPP Spook hill Dam		
BY D Ridolla	DATE 1-20-75	CHECKED BY JLS	DATE 2-6-76	JOB NO. 2005
SUBJECT Cost Est. McKellips Rd Area New Alignment				SHEET 4 OF 4

Item #13

108" dia C.M.P.

152 ft. @ $171.74 = $26,104.00

Item #14

Pavement Removal & Replacement

(2,275 Lin. ft)(28) ÷ 9 = 7,078 S.Y.

(7,078)($10.40) = $73,611.00

5212 (7.00) 36,484.00

Item #15

Loose Rock Riprap

360 cu. yd @ $10.00 = $3,600.00

4.0 Ac Required upstream of R/W

4.0 Ac @ $2,000.00 = $8,000.00 Spon. Cost

5,000.00

? 20,000.00

COMPUTATION SHEET
SCS-ENG-523 Rev. 8-69

U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

STATE	PROJECT			
Arizona	Buckhorn Mesa WPP Spoot hill Dam			
BY: D R Ridolla	DATE: 1-14-76	CHECKED BY: JLS	DATE: 2-10-76	JOB NO. 2005
SUBJECT: Total Cost Est. McDowell Rd Ramp (Orig. Loc.)				SHEET 1 OF 3

Item No	Item	S.C.S. Cost	FCD. Cost	CAP Cost	Item Total Cost
1	Clearing & Grub.	$2,760.00	$460		$3,220.00
3	Foundation Excav.	$18,905.00	5,120.00		$24,025.00
4	Channel Excav.	$12,000.00			$12,000.00
5	Structure Excav		$1,828.00		$1,828.00
6	Zone I Fill	$44,312.00	23,983.00		$68,295.00
7	Zone II Fill	$44,675.00			$44,675.00
8	Structure Backfill		$4,000.00		$4,000.00
13	108" dia C.M. Pipe		$38,642.00		$38,642.00
14	Pav. Rem. & Replace		$42,380.00		$42,380.00
15	Rock Riprap		$4,560.00		$4,560.00
—	C.A.P. Bridge			$287,334.00	$287,334.00
—	Total Const. Cost	$122,652	120,973.00	$287,334.00	$530,959.00
—	R/W Cost	—	~~202,950.00~~ 223,650.00	$40,500.00	~~243,450.00~~ 264,150
Total Cost (const + R/W)		$122,652.00	~~323,923.00~~ 344,623	$327,834.00	~~774,409.00~~ 795,109
10% Admin. Service (const + R/W)		$12,265.00	~~32,392.00~~ 34462	32,783.00	~~77,440.00~~ 79510
15% Engineering (const.)		$18,398.00	18,146.00	43,100.00	79,644.00
Total		$153,315.00	~~374,461.00~~ 397,231	403,717.00	~~931,493.00~~ 954,263

from Sta 260+00 to Sta 280+00

COMPUTATION SHEET
SCS-ENG-523 Rev. 8-69

U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

STATE	PROJECT			
Arizona	Buckhorn-Mesa WPP Spillhill Dam			
BY D. Riddle	DATE 1-14-75	CHECKED BY J.L.J	DATE 2-6-76	JOB NO. 2005
SUBJECT Total Cost Eval McDowell Rd Ramp (ovig)				SHEET 2 OF 3

(1) Clearing & Grubbing (Gov. Cost)

Dam

Sta 260+00 to 280+00

70' D.S & 230 up.S. = 300'

2,000 × 300 ÷ 4356 = 13.8 AC

13.8 ac @ 200.00 per Ac. = $2,760.00

Ramp (Sponsrs. Cost)

$\left[\frac{135+80}{2}(750) + 70 \times 250\right] \div 4356 = 2.3$ ac

2.3 ac @ $200.00 = $460

Total Cost = $3,220.00

---

3 Foundation Excavation Sta 260+00 to 280+00

Dam Gov Cost

$[(3.58)(112.58) + (4.58)(23.45)]2,000 \div 27 = 37,810$ cu yd

Gov Cost = 37,810 cy @ $0.50 = $18,905.00

Spon Cost Ramp 10,240 cu yd @ .504 = $5,120.00

Total Cost = $24,025.00

---

4 Channel Excavation Sta 260+00 to 280+00

$(6)(27)(2,000) \div 27 = 12,000$ cu. yd

12,000 cu yd @ 1.00 = $12,000.00

all Gov Cost

COMPUTATION SHEET
SCS-ENG-523 Rev. 8-69

U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

STATE		PROJECT		
Arizona		Buckhorn Mesa WPP Spook Hill Dam		
BY D Riddle	DATE 1-14-75	CHECKED BY J.L.S	DATE 2-6-76	JOB NO. 2005
SUBJECT Total Cost Est McDowell Rd Ramp (Ons. Alin)				SHEET 3 OF 3

5 Structure Excavation

Pipe 457 cu. yd @ 4.00 = $1,828.00

(All Spon. Cost)

---

6 Embankment Fill Zone I

Dam (14)(49)(2,000) ÷ 27 = 50,815 cu. y

Core = 37,810 cu. yd.

Total Dam = 88,625 cu. yd

Gov Cost = 88,625 @ $0.50 = $44,312

Spon Cost Ramp = 47,967 cu. yd = $23,983 22,828

Total cost = $68,295 67,140

---

7 Embankment Fill Zone II

[(19)(61.5) - (14)(49)] 2,000 ÷ 27 = 35,740 cu. yd

Gov Cost = 35,740 @ 1.25 = $44,675.00

---

8 Structure Backfill

Spon Cost Ramp = 400 cu. yd @ $10.00 = $4,000.00

---

13 108" dia C.M. Pipe

225 Lin ft @ $171.74 per ft. = $38,642.00
Spon Cost 150 33,750

---

15 Loose Rock Riprap

456 cu. yd @ $10.00 = $4,560.00

---

14 Pavement Removal & Replacement

4,075 S.Y. @ $10.40 per S.Y. = $42,380.00
2209 @ 7 = 15463

COMPUTATION SHEET
SCS-ENG-523 Rev. 8-69

U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

STATE		PROJECT		
Arizona		Buckhorn Mesa WPP Spookhill Dam		
BY D Ridelle	DATE 1-15-76	CHECKED BY J.L.S.	DATE 2-6-76	JOB NO. 2005
SUBJECT Cost to Remove Asphalt @ McDowell Rd				SHEET 1 OF 5

1,310 Lin. ft. of Pavement Removal

min of 350 cu yd to be hauled off

13 mi one way haul to Nerest Land Fill

350 ÷ 12 cu yd per Load = 30 Loads

@ 1 hr per Load 3 Trucks 10 hr

	Blade 10 hr @ $26.31 =		$263.10
2hrs. O.T	operator 10 hr @ $13.86 =		$152.46
	Loader 10 hr @ 26.31 =		$263.10
2hrs. O.T.	operator 10 hr @ 13.86 =		$152.46
	3 Dump Trucks 30 hr @ $27.94 =		$838.20
	3 Drivers 30 hr @ $10.63 =		$350.79
2hrs. O.T.	Forman 10 hr @ $14.36 =		$157.96
	Pickup 10 hr @ $4.00 =		$40.00

Total Cost $2,218.07

Cost to Dump Loads 30 Lods @ 5.00 = $150.00

Total Cost = $2,368.07

Admin. & Profit 15% = $355.21

$2,723.28

4,076 SY ∴ $0.67 per S.Y.

COMPUTATION SHEET
SCS-ENG-523 Rev. 8-69

U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

STATE	PROJECT			
Arizona	Buckhorn Mesa WPP Spook Hill Dam			
BY	DATE	CHECKED BY	DATE	JOB NO.
O R. della	1-15-76	J.L.S	2-6-76	2005
SUBJECT				SHEET 2 OF 5
Cost of ABC @ McDowell Road Ramp				

ABC -10" Thick (Material only)

one S.Y. = 7.497 s.f @ 10" Thick

(7.497)(150#) ÷ 2,000 = 0.56 Ton/S.Y.

($2.76 Per Ton)(0.56) = $1.55 S.Y. (FOB) delivered

Placement of A.B.C.

(1,310)(28)(0.833) ÷ 27 = 1,132 cu. Yd.

@ 12 cu Yd per Load = 95 Loads

1 hr per Load 95 hr to Accomp

4 Trucks delivered in 3 days @ 8 hr per day

Blade 24 hr @ $26.31	= $631.44
operator 24 hr @ $13.86	= $332.64
Water Truck 24 hr @ $55.50	= $1,332.00
operator 24 hr @ 13.86	= 332.64
Roller 24 hr @ $26.31	= $631.44
operator 24 hr @ $12.15	= $291.60
Foreman 24 hr @ $14.36	= $344.64
Pickup 24 hr @ $4.00	= $96.00
Const Cost Total	= $3,992.40
Water cost $33.33 per Day	= 100.00
Total Cost	$4,092.40
Admin & Profit 15%	$613.86
Total	$4,706.26

@ 4,076 S.Y. = $1.15 Su.Yd.

COMPUTATION SHEET
SCS-ENG-523 Rev. 8-69

U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

STATE Arizona		PROJECT Buckhorn Mesa WPP Spook Hill Dam		
BY D Riddle	DATE 1-16-75	CHECKED BY J.L.S	DATE 2-6-76	JOB NO. 2005
SUBJECT Cost of Placing 6" of Bituminous				SHEET 3 OF 5

6" Bituminous (Material)

(9)(0.5)(154.5)(÷2,000 = 0.347625 Ton/S.Y.

($11.00 Per Ton)(0.347625) = $3.82 S.Y. (F.O.B.) delivered

Placing 6" Bituminous

[(1,310)(0.5)(28)]÷27 = 680 cu. Yd

@ 12 c.y. loads = 57 loads

1 hr Per Load = 57 hr Hauling

4 Trucks 2 days work

Paver 16 hr @ $50.00	=	$800.00
operator 16 hr @ $13.86	=	$221.76
3 Laborers 48 hr @ $10.64		$510.72
Roller 16 hr @ $19.81	=	$317.00
operator 16 hr @ $12.15	=	$194.40
Foreman 16 hr @ $14.36	=	$229.76
Pickup 16 hr @ $4.00	=	$64.00
Total Cost		$2,337.64
Admin. & Profit 15%	=	$350.65
		$2,688.29
@ 4,076 S.Y.	=	$0.66 per S.Y.

COMPUTATION SHEET
SCS-ENG-523 Rev. 8-69

U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

STATE		PROJECT		
Arizona		Buckhorn Mesa WPP Spook Hill Dam		
BY D Riddle	DATE 1-16-75	CHECKED BY J.L.S.	DATE 2-6-76	JOB NO. 2005
SUBJECT Cost of Pavemen @ Mc Dowell Road Ramp				SHEET 4 OF 5

Pavement 2" (Material)
Pavement

(9)(0.17)(142.80) ÷ 2,000 = 0.11 Ton/S.Y.

(12.00)(0.11 = $1.32

Tack coat $0.50 S.Y.

Total = $1.82 S.Y

Placing 2" Pavement

(1,310)(0.17)(28) ÷ 27 = 231 cu.yd

@ 12 cu.y. Per Load = 20 Loads

1 hr Per Load 20 hr hauling

=6.67 hr

Use 1

3 trucks 1 days

Broom 8 hr @ $17.56	=	$140.48
operator 8 hr @ $12.15	=	$97.20
Water Truck 8 hr @ $43.05	=	$344.40
Driver 8 hr @ $13.86		$110.88
Tack Truck 8 hr @ $35.00	=	$280.00
Driver 8 hr @ $13.86	=	$110.88
Paver 8 hr @ $50.00	=	$400.00
operator 8 hr @ $13.86	=	$110.88
3 Laborers 24 hr @ $10.64	=	$255.36
Roller 8 hr @ $19.81	=	$158.50
operator 8 hr @ $12.15	=	$97.20
Forman 8 hr @ $14.36	=	$114.88
Pickup 8 hr @ 4.00	=	$32.00
Toto Cost		$2,247.66
Admin & Profet		$337.15
total =		$2,584.81

4,076 S.Y = $0.63 S.Y.

COMPUTATION SHEET
SCS-ENG-523 Rev. 8-69

U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

STATE		PROJECT		
Arizona		Buckhorn Mesa WPP Spook Hill Dam		
BY D Riddle	DATE 1-16-76	CHECKED BY JLS	DATE 2-10-76	JOB NO. 2005
SUBJECT Cost on McDowell Road Ramp Pavement				SHEET 5 OF 5

Sanding for finishing

Sand

2 loads of Sand @ $20.00 . $40.00

Broom 8 hr @ 17.56 = 140.48
operator 8 hr @ 12.15 = 97.20

Total Cost = $277.20

Admin & Profit 15% = 41.58

Total = 318.78

4,076 SY = $0.08 S.Y.

Total Job = $10.38 S.Y.

Rounded to $10.40

COMPUTATION SHEET
SCS-522 REV 5-58

U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

GPO 1958 O—470868

STATE	PROJECT			
Arizona	Buckhorn Mesa WPP Spookhill Dam			
BY D R. Dale	DATE 2-10-76	CHECKED BY	DATE	JOB NO. 2005

SUBJECT Check Average Cost against Estim — SHEET 5A OF 5

2-2-76

Item #19 Pavement Replacement

Wickenburg Quan 1,125 S.Y.

Jackson $7.00

Sunt $11.00

Hunter $7.00

Tiffany $15.00

New Pueblo $9.00

Dullon $15.00

Anderson $20.00

P.K.S. $7.00

$11.375 Average

COMPUTATION SHEET
SCS-ENG-523 Rev. 8-69

U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

STATE		PROJECT		
Arizona		Buckhorn Mesa WPP-Spook Hill Dam		
BY D Ridolle	DATE 1-14-76	CHECKED BY J.L.S	DATE 2-6-76	JOB NO. 2005
SUBJECT Design C.M. Pipe @ McDowell Rd 8 ft of Fill				SHEET ___ OF ___

See HandBook of Steel Drainage & Hwy Const. Products Page 47 through 52

Dead Load = (100#/ft)(8ft) = 800#

Live Load = 100#/ft (Highway H-20 Loading)

Ring Compression

$C = (P)\left(\frac{S}{2}\right) = (900^{\#})\frac{9}{2} = 4{,}050\ \#/ft$

FS_R = Factor of Safety = 4

Seam Strength Required = 4,050 × 4 = 16,200 #/ft

12 Ga 3/8" Single Rivets = 23,400 #/ft OK

Buckling of Wall

Ultimate buckling stress fb = 33,000 PSI

$FS_B = 2$ ∴ Allowable fc = 16,500 PSI

$f_c = \frac{C}{12 \times A} = \frac{4{,}050}{12 \times 0.13} = 2{,}596\ PSI < 16{,}500\ PSI$ OK

Deflection

W_c = Load on Pipe $= \frac{(P)(S)}{12} = \frac{(900)(9)}{12} = 675\ \#/in$

$\Delta_x = \frac{D_1 \times K \times W_c \times R^3}{(E \times I) + 0.061 \times E' \times R^3}$

Could Use D_1 of 1.25 Backfill will be compacted to 95% or better

$\Delta_x = \frac{1.5 \times 0.10 \times 675 \times 54^3}{(30 \times 10^6 \times 0.0604) + (0.061 \times 700 \times 54^3)}$

$\Delta_x \frac{15{,}943{,}230}{1{,}812{,}000 + 1{,}763{,}596.8 + 6{,}723{,}712.8} = 1.87\ in$

Allowable = 108" × 0.05 = 5.40 in > 1.87 OK

Answer

NO 12 gage Meets all requirements

COMPUTATION SHEET
SCS-ENG-523 Rev. 8-69

U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

STATE		PROJECT		
Arizona		Buckhorn Mesa WPP Sioux & Hill Dam		
BY	DATE	CHECKED BY	DATE	JOB NO.
D. Riddle	1-15-25	JLS	2-6-76	2005
SUBJECT				SHEET ___ OF ___
Cost of C.M.P. for Ramps				

1-15-76

Called Armco Steel Corp for Cost (278-6234)
on 108" dia C.M. Pipe 12 Gage, Anular
Rings & O ring-Gaskets
$104.09 pipe $10.40 coating 25% discount
to Contractors $85.87 Cost

1-15-76

Called Ariz Culvert & MFG. Co (839-3485)
Said he would Drop of information
in PM Today $85.87 same

1-15-76
Called Unruled Metro for Prices
ABC $2.76 per ton F.O.B.
Bituminous 11.00 per ton F.O.B
Paving 12.00 per ton F.O.B
Tack 0.50 per sq yd

COMPUTATION SHEET
SCS-ENG-523 Rev. 8-69

U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

STATE	PROJECT			
Arizona	Buckhorn Mesa WPP Spook Hill Dam			
BY D Riddle	DATE 1-19-76	CHECKED BY JLS	DATE 2-10-76	JOB NO. 2605
SUBJECT Cost Est McDowell Rd New Allinment				SHEET 1 OF 3

Item No	Item	S.C.S. Cost	F.C.R. Cost	C.A.R. Cost	Total Cost
1	Clearing & Grubbing	$8,280.00	$300.00		$8,580.00
3	Found. Excav.	28,358.00	3,478.00		$31,836.00
4	Channel Excav.	$120,483.00			$120,483.00
5	Str. Excav		$4,228.00		$4,228.00
6	Zone I Fill	$66,469.00	$16,456.00 15,301 =	1155 =	$82,925.00
7	Zone II Fill	$67,012.00			$67,012.00
8	Str. Backfill		$6,710.00		$6,710.00
13	108" dia C.M.P.		$28,~~159~~ 165.00		$28,~~159~~ 165.00
14	Pav. Rem. & Rep		$65,520.00 31,038 =	13,062 =	$65,520.00 44,100 =
15	Rock Riprap		$3,600.00		$3,600.00
—	CAP Bridge			$149,428.00	$149,428.00
—	Total Const Cost	$290,602.00	$128,457.00 92,820 =	$149,428.00 163,645	$568,487.00 547,067
—	R/W Cost	—	$227,250.00 230,600 =	$40,500.00	$267,750.00 271,100
Total Cost (Const + R/W)		$290,602.00	$355,707 323,420 =	$189,928.00 204,145 =	$836,237.00 818,167
10% Admin Service (Const + R/W		$29,060.00	$35,571.00 32,342 =	18,993.00 20414 =	$83,624.00 81,816
15% Engineering (Const.)		$43,590.00	$19,269.00 18,923 =	22,414.00 25,541 =	$85,273.00 83,059
Total		$363,252.00	$410,547.00 369,685 =	$231,335.00 249,105 =	$1,005,134.00 983,042 =

+ 5.4 Ac. @ $4500 per Ac.

COMPUTATION SHEET
SCS-ENG-523 Rev. 8-69

U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

STATE	PROJECT			
Arizona	Buckhorn Mesa WPP Spookhill Dam			
BY D. Riddle	DATE 1-19-75	CHECKED BY JLS	DATE 2-6-76	JOB NO. 2005
SUBJECT Cost Est McDowell Rd New Alignment				SHEET 2 OF 3

Item #1

Clearing & Grubbing

260+00 to Sta 280+00

260+00 - 300'				
		570	9.8 Ac	
265+70	1,200			41.4
		680	18.7 Ac	
272+50	1,200			
		750	12.9	
280+00	300			

41.4 Ac @ $200 = $8,280.00 Gov Cost

Spon. Cost. (810)(80) ÷ 43560 = 1.5 Ac @ $200.00 = $300.00

Total = $8,580.00

Item #3

Foundation Excav

Note: Length was increased 50%

(37,810)(1.5) = 56,715 cu. yd in Dam

(56,715 cu. yd)($0.50) = $28,358.00 Gov Cost

[(1,070)(82)(2) + 140(44)2] / 27 = 6,956 cu. yd.

(6,956 cu. yd)(0.50) = $3,478.00 spon. Cost.

Total = $31,836.00

Item #4

Channel Excavation

[(700)(700)(4) + (650)(700)8] / 27 = 207,400 cu. yd.
(1325)

((14.5 + 6.0)/2)(2,350)(37.625) / 27 = 33,566 cu. yd
(10.25)

240,966 cu. yd.

240,966 cu. yd @ $0.50 = $120,483

COMPUTATION SHEET
SCS-ENG-523 Rev. 8-69

U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

STATE	PROJECT			
Arizona	Buckhorn Mesa WPP-Spoonhill Dam			
BY D Riddle	DATE 1-19-76	CHECKED BY JLS	DATE 2-6-76	JOB NO. 2005
SUBJECT Cost Est McDowell Rd. New Alignment				SHEET 3 OF 3

Item #5
Structure Excav.

$(12)(14.5)(164)/27 = 1,057$ cu. yd

1,057 cu. yd @ \$4.00 = \$4,228 cu. yd.

Sponsors Cost.

Item #6
Embankment Fill Zone I

Earthfill was increase 50% by the increase in distance

$(88,625 \text{ cu. yd})1\frac{1}{2} = 132,938$ cu. yd

132,938 cu. yd @ \$0.50 = \$66,469.00 Gov Cost

Spon Cost Ramp 32,912 cu. yd @ \$0.50 = \$16,456.00

30,602 @ " = 15,301

* Total = \$82,925.00 ✓ 82,925

Item #7
Embankment Fill zone II

$(35,740)(1.5) = 53,610$ cu. yd

53,610 cu. yd @ \$1.25 = \$67,012.00 Gov Cost

Item #8
Structure Backfill

? $1,057 - \left[164\pi(4.5)^2/27\right] = 671$ cu. yd

671 cu. yd @ \$10.00 = \$6,710.00 Spon. Cost.

Item #13
108" dia. C.M.P. 164' @ \$171.74 = \$28,~~159.00~~ 165.00

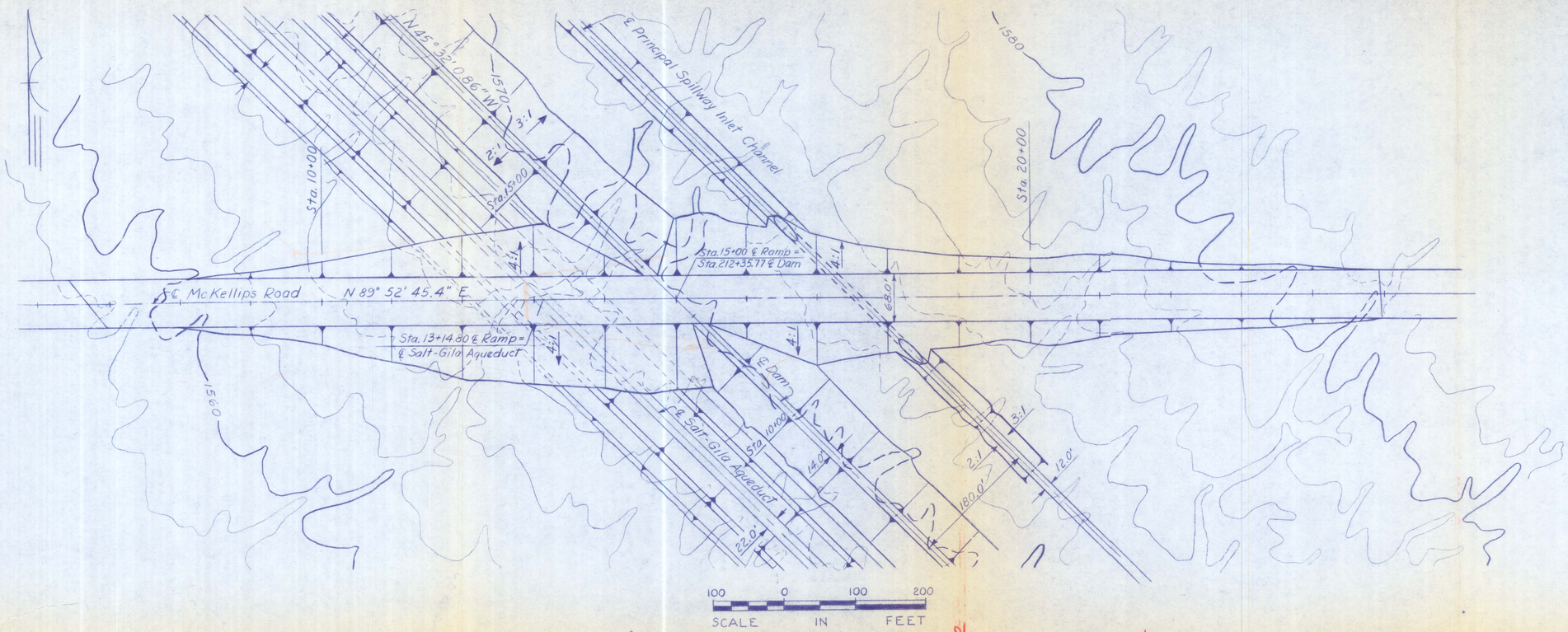
Item #14
Pavement Removal & Replacement

$[(2,025)(28) \div 9]$ \$10.40 = \$65,520.00 Spon Cost

4434 4025 = 31,038

Item #15
Loose Rock Riprap

360 cu. yd at \$10.00 = \$3,600.00 Spon Cost



VERTICAL CURVE DATA

CURVE NO. 1 L = 300.0'

Station	Elevation
7+00	1558.4
7+50	1559.4
8+00	1560.8
8+50	1562.6
9+00	1564.7
9+50	1567.2
10+00	1570.0

CURVE NO. 2 L = 300.0'

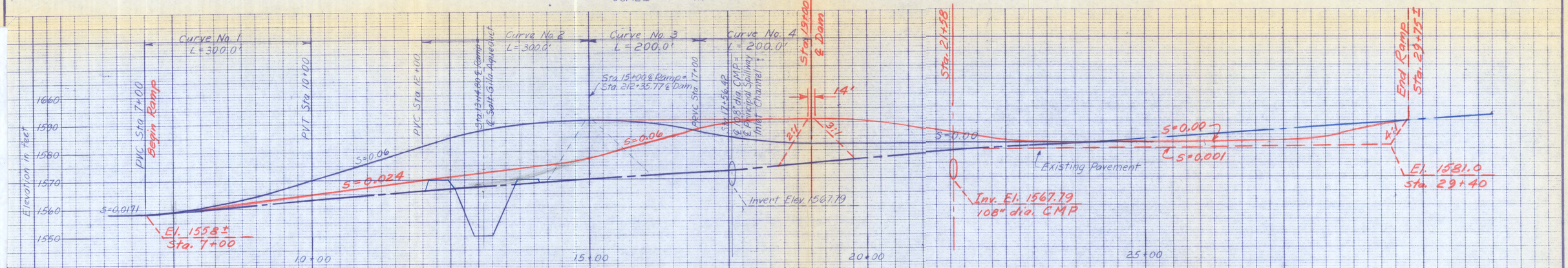
Station	Elevation
12+00	1582.0
12+50	1584.8
13+00	1587.0
13+50	1588.8
14+00	1590.0
14+50	1590.8
15+00	1591.0

CURVE NO. 3 L = 200.0'

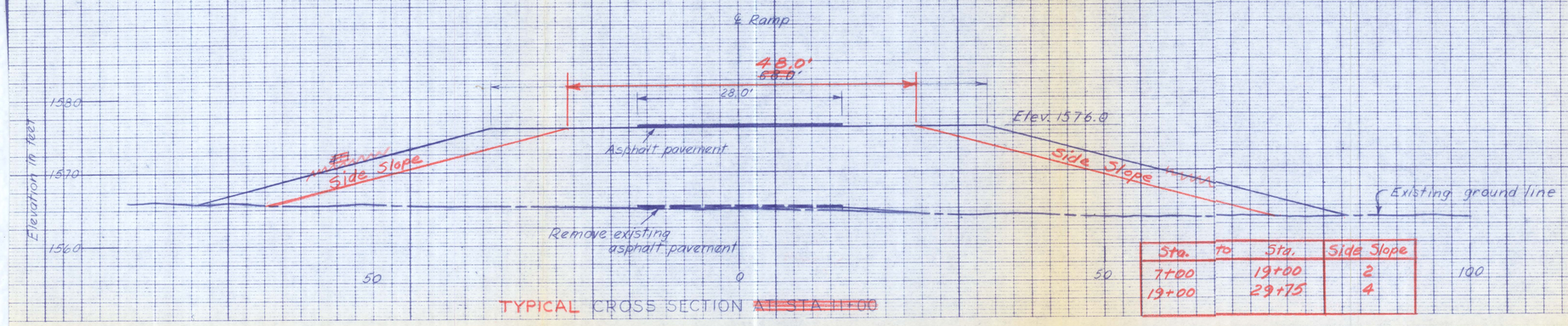
Station	Elevation
15+00	1591.0
15+50	1590.7
16+00	1589.9
16+50	1588.5
17+00	1586.6

CURVE NO. 4 L = 200.0'

Station	Elevation
17+00	1586.6
17+50	1584.6
18+00	1583.2
18+50	1582.4
19+00	1582.1



PROFILE ON ℄ RAMP



Sta.	to	Sta.	Side Slope
7+00		19+00	2
19+00		29+75	4

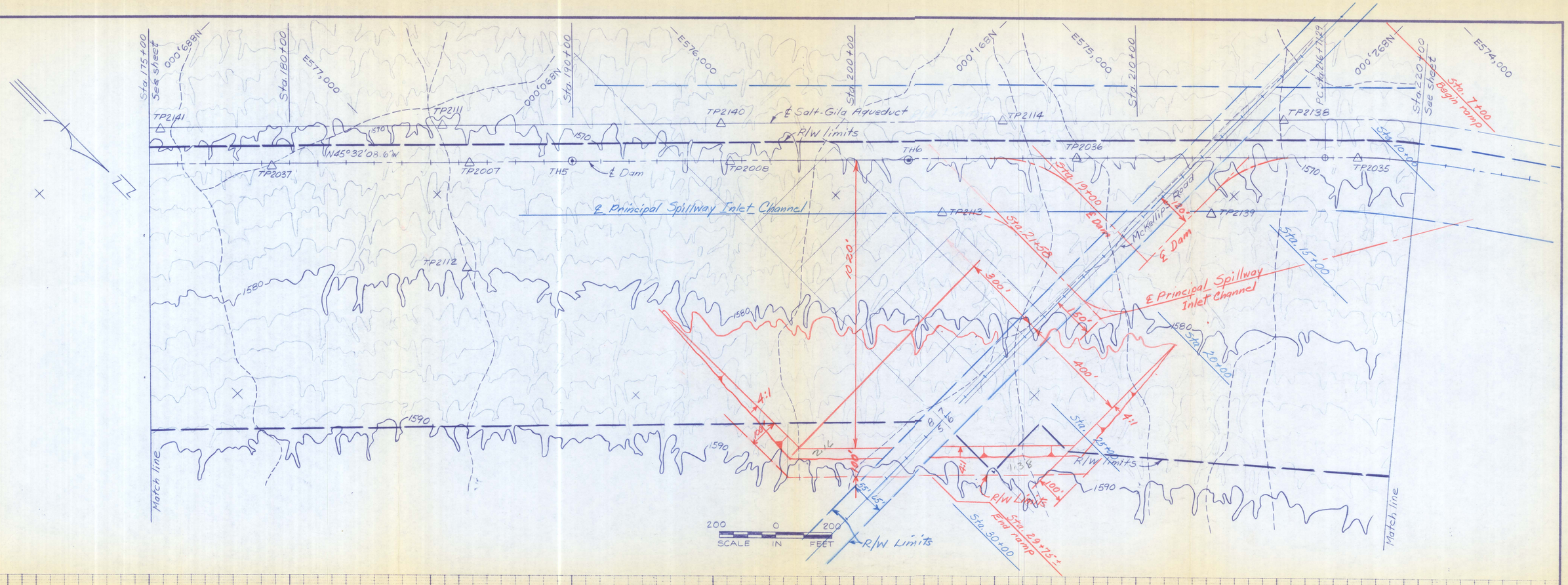
TYPICAL CROSS SECTION ~~AT STA 11+00~~

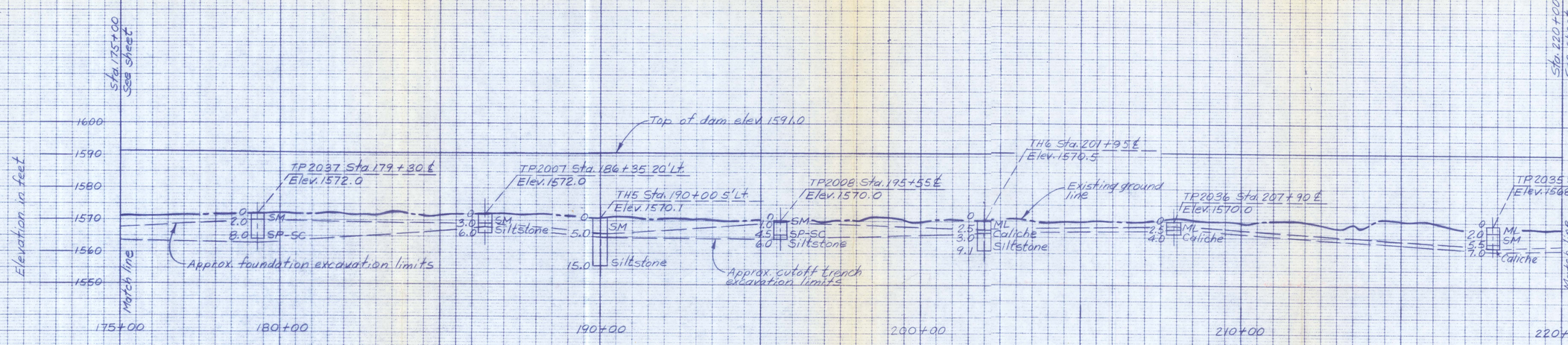
PLAN & PROFILE - MC KELLIPS ROAD RAMP
SPOOK HILL F.R.S.
BUCKHORN-MESA W.P.P.
MARICOPA & PINAL COUNTIES, ARIZONA

U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

		Date	
Designed	JLS	7-75	Approved by
Drawn	DKT	8-75	Title
Traced	ES	10-75	Title
Checked	PJM	10-75	Sheet No 13 of; Drawing No.

FORM SCS - 317 (NOV. 1966)



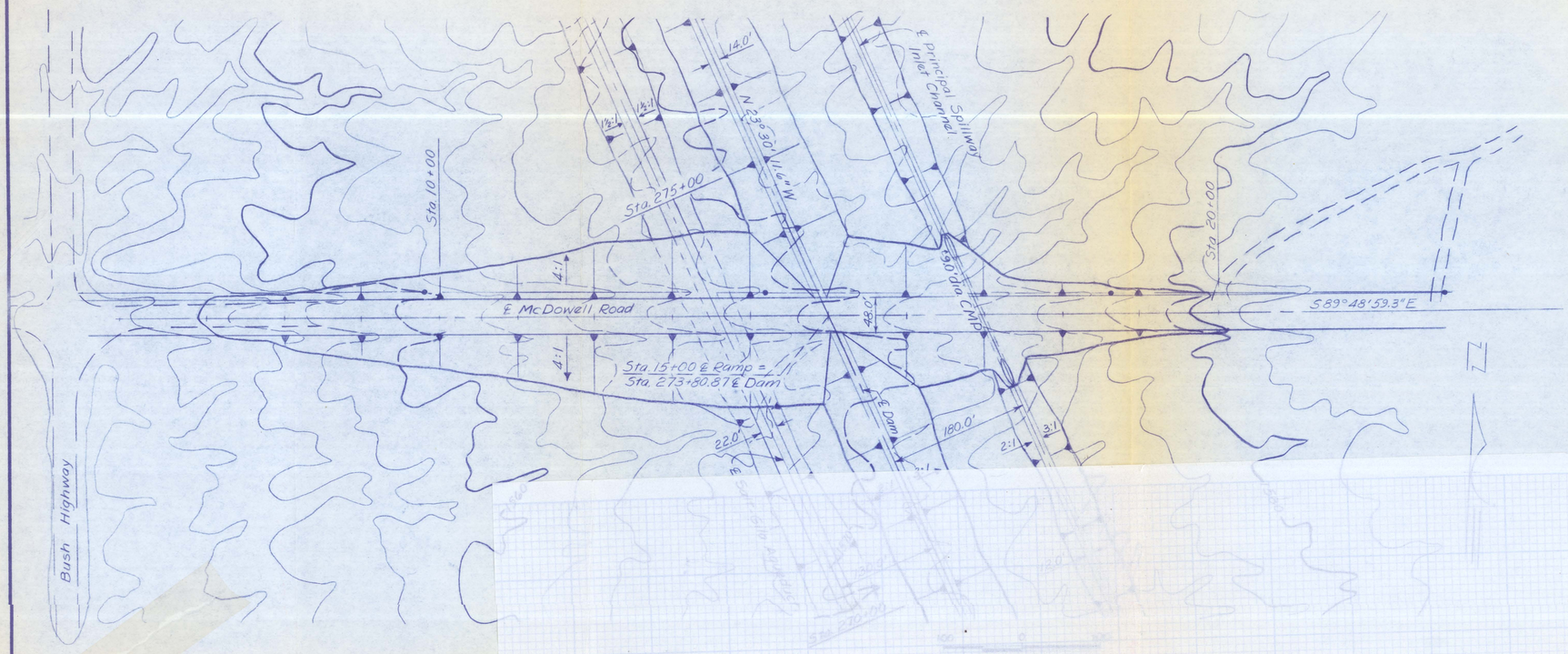


PLAN & PROFILE - ℄ DAM
STA 175+00 TO STA 220+00
SPOOK HILL F.R.S.
BUCKHORN MESA W.P.P.
MARICOPA & PINAL COS. ARIZONA

U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

		Date		
Designed LLB, PJM		4-75	Approved by	
Drawn MR		4-75	Title	
Traced			Title	
Checked			Sheet No. 5 of	Drawing No.

FORM SCS - 317 (NOV. 1966)



VERTICAL CURVE DATA

CURVE NO.1 L=140.0'

Station	Elevation
6+90	1554.9
7+25	1555.8
7+60	1557.0
7+95	1558.6
8+30	1560.5

CURVE NO.2 L=250.0'

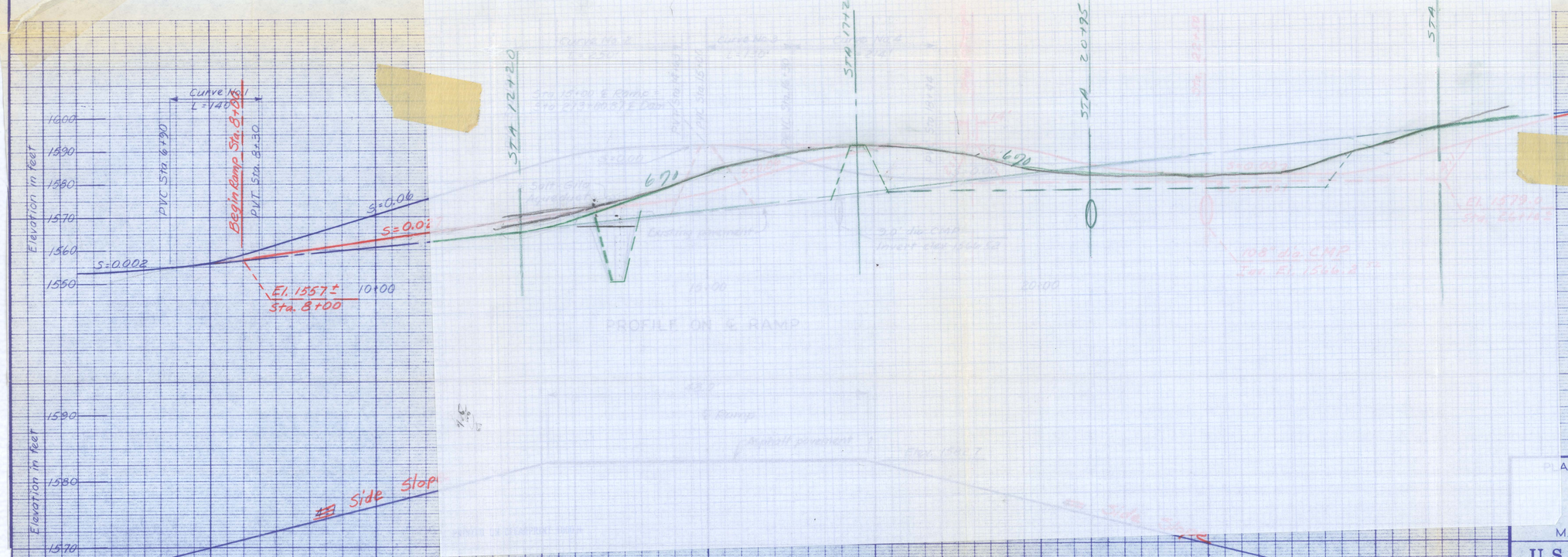
Station	Elevation
12+13	1583.5
12+50	1585.5
13+00	1587.8
13+38	1589.1
13+50	1589.5
14+00	1590.5
14+50	1591.0
14+63	1591.0

CURVE NO.3 L=130.0'

Station	Elevation
15+00	1591.0
15+65	1590.0
16+00	1588.7
16+30	1587.1

CURVE NO.4 L=214.0'

Station	Elevation
[illegible]	1587.1
16+50	1586.0
17+00	1583.6
17+37	1582.3
17+50	1581.9
18+00	1581.0
18+25	1580.8
18+44	1580.7



TYPICAL CROSS SECTION ~~AT STA. 12+00~~

Sta.	to	Sta.	Side Slope
8+00		19+00	2:1
19+00		26+60	4:1
26+60		28+25	2:1

PLAN & PROFILE - MC DOWELL ROAD RAMP

SPOOK HILL F.R.S.

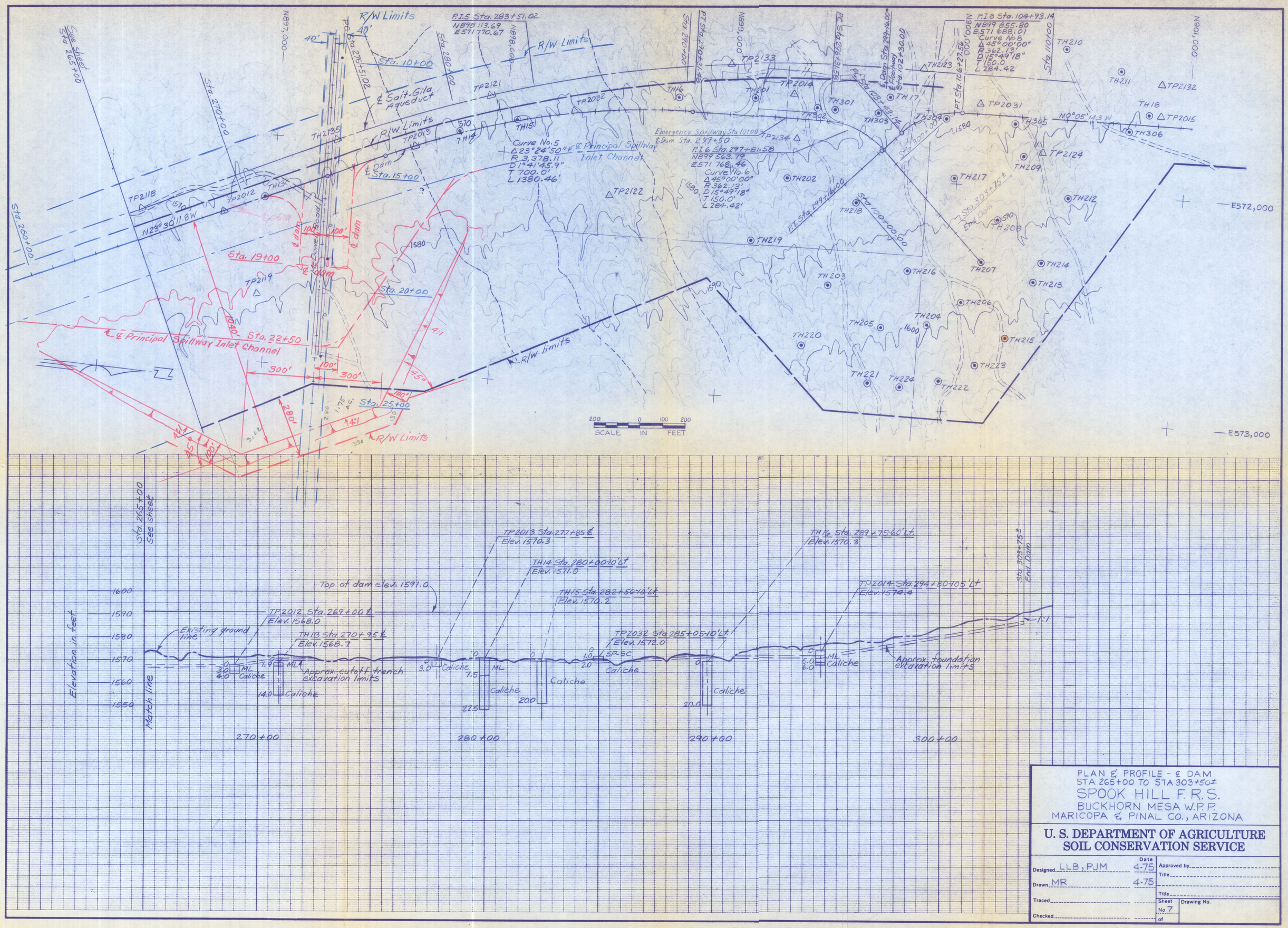
BUCKHORN-MESA W.P.P.

MARICOPA & PINAL COUNTIES, ARIZONA

U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

		Date	
Designed	JLS	7-75	Approved by
Drawn	DKT	9-75	Title
Traced			Title
Checked			Sheet No. 14 of; Drawing No.

FORM SCS-317 (NOV. 1966)



PLAN & PROFILE - ℄ DAM
STA 265+00 TO STA 303+50±
SPOOK HILL F.R.S.
BUCKHORN MESA W.P.P.
MARICOPA & PINAL CO., ARIZONA

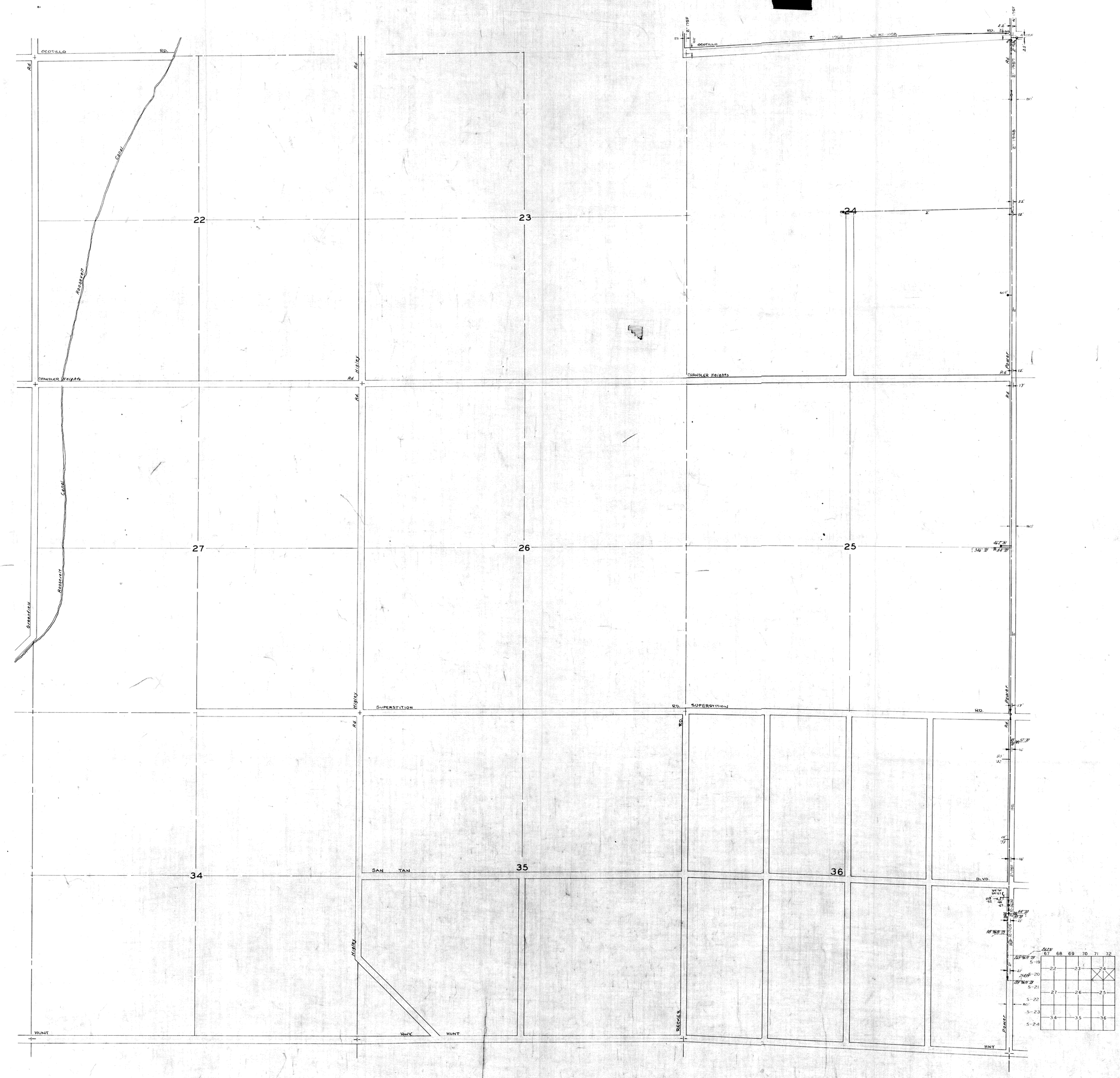
U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

Designed LLB, PJM	Date 4-75	Approved by	
Drawn MR	4-75	Title	
Traced		Title	
Checked		Sheet No 7 of	Drawing No.

FORM SCS – 317 (NOV. 1966)

NW 1/4 SE 1/4 T.2S., R.6E.

NE 1/4 SE 1/4 T.2S., R.6E.



2437

SE 1/4 T.2S., R.6E.

GAS DISTRIBUTION

ARIZONA PUBLIC SERVICE CO.

PHOENIX, ARIZONA

SCALE 1"=600' APRIL 8, 1952

H.W.B.

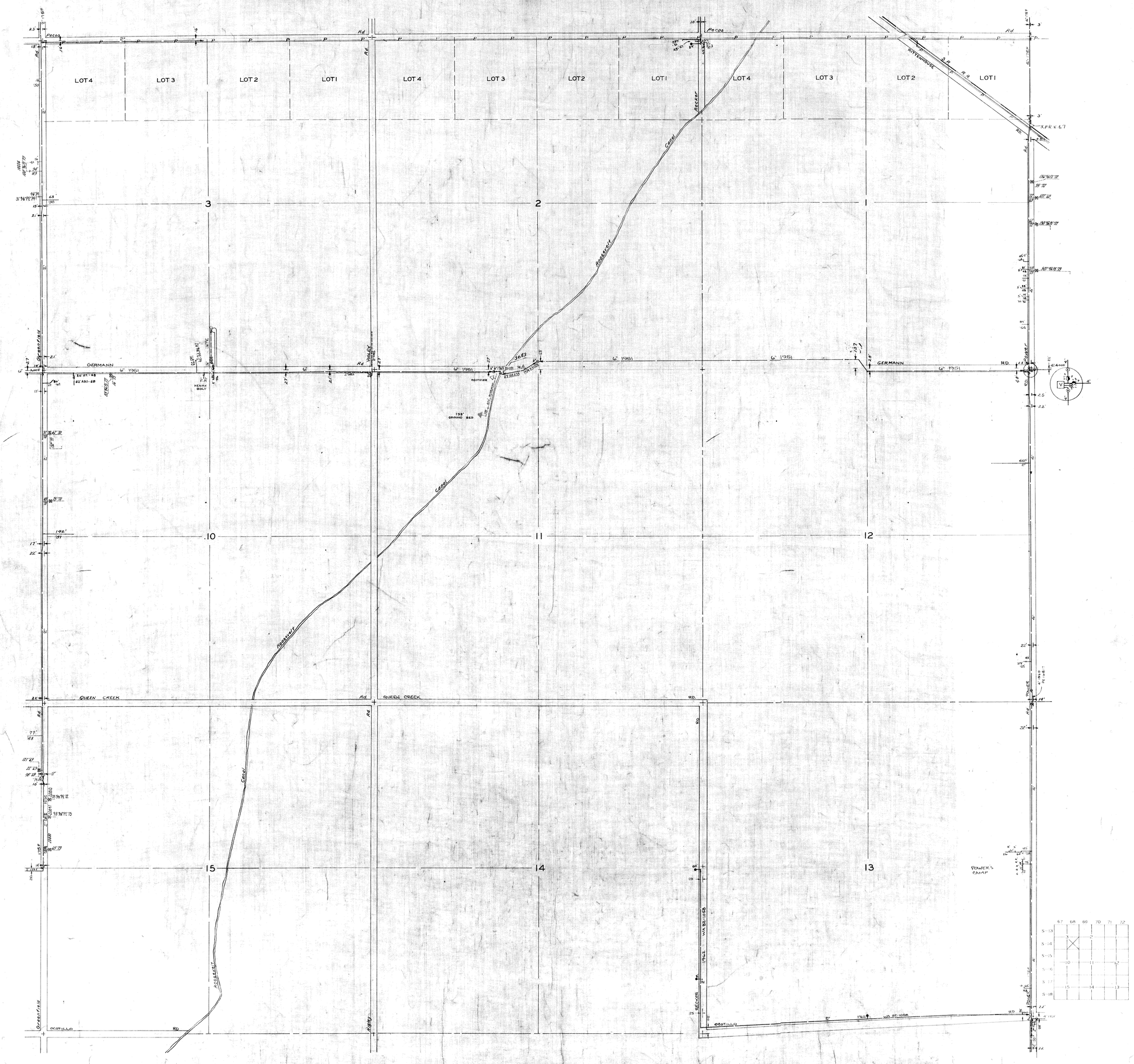
SW 1/4 SE 1/4 T.2S., R.6E

SE 1/4 SE 1/4 T.2S., R.6E

NW 1/4 NE 1/4 T.2 S., R.6E

NE 1/4 NE 1/4 T.2 S., R.6E.

[redacted]



NOTE:

—P—P—P— INDICATES APPROX. LOCATION OF SOUTHERN PACIFIC CO. 6" PETROLEUM PIPE LINE.

2437

NE 1/4 T.2S., R.6E.

GAS DISTRIBUTION

ARIZONA PUBLIC SERVICE CO.

PHOENIX, ARIZONA

SCALE 1"=600' APRIL 2, 1952

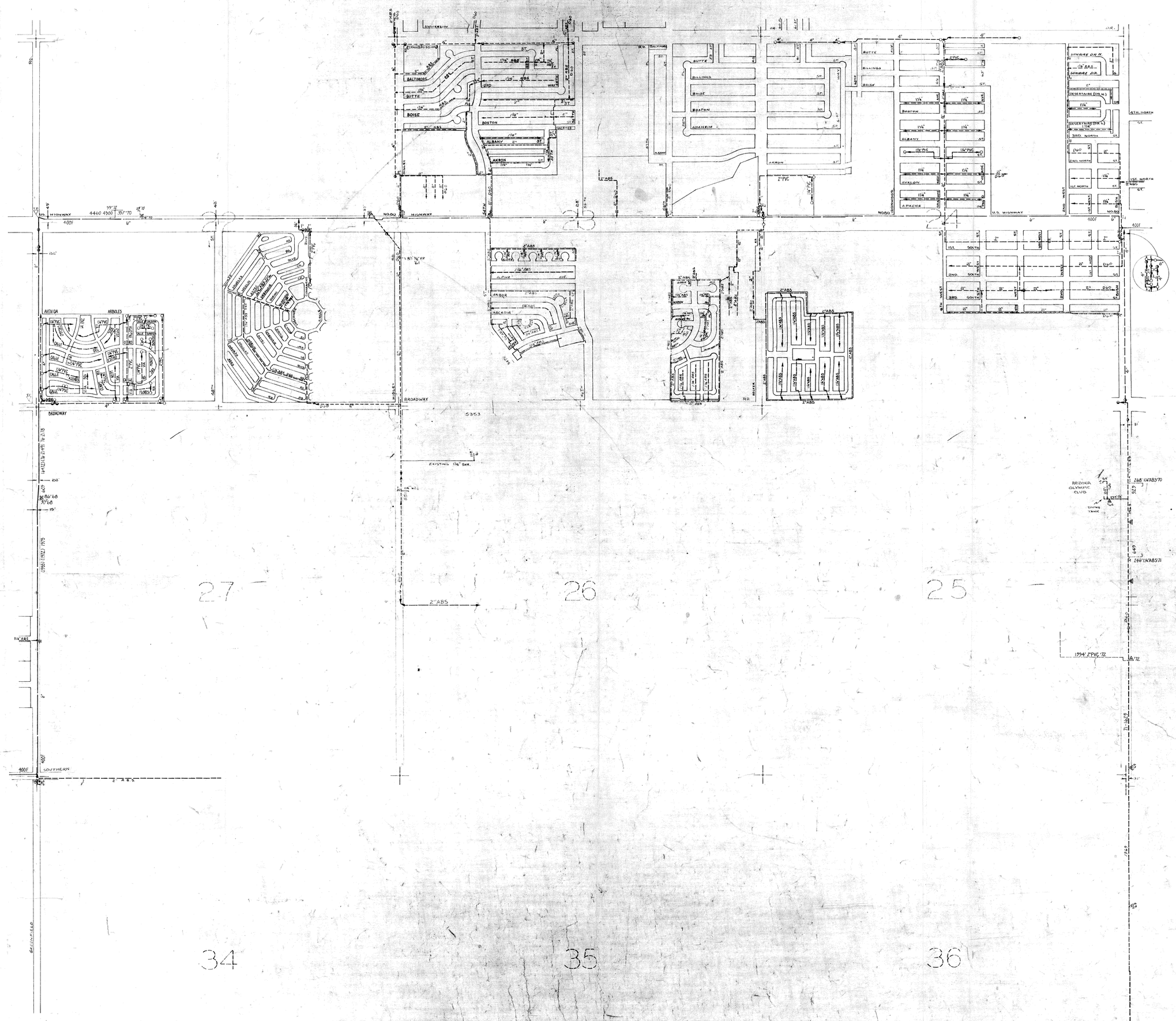
[redacted]

SW 1/4 NE 1/4 T.2 S., R.6E

SE 1/4 NE 1/4 T.2 S., R.6E

NW ¼ SE ¼ T.1N., R.6E

NE ¼ SE ¼ T.1N., R.6E



	67	68	69	70	71	72
6						
5	22		23		24	
4						
3	27		26		25	
2						
1	34		35		36	

NOTE: FOR ADDITIONAL INFORMATION INDICATED ¼ SEC. ATLASES ARE AVAILABLE.

SE ¼ T. 1 N., R. 6 E.

GAS DISTRIBUTION

ARIZONA PUBLIC SERVICE COMPANY

PHOENIX, ARIZONA

SCALE: 1" = 600' DATE: MAY 23, 1968

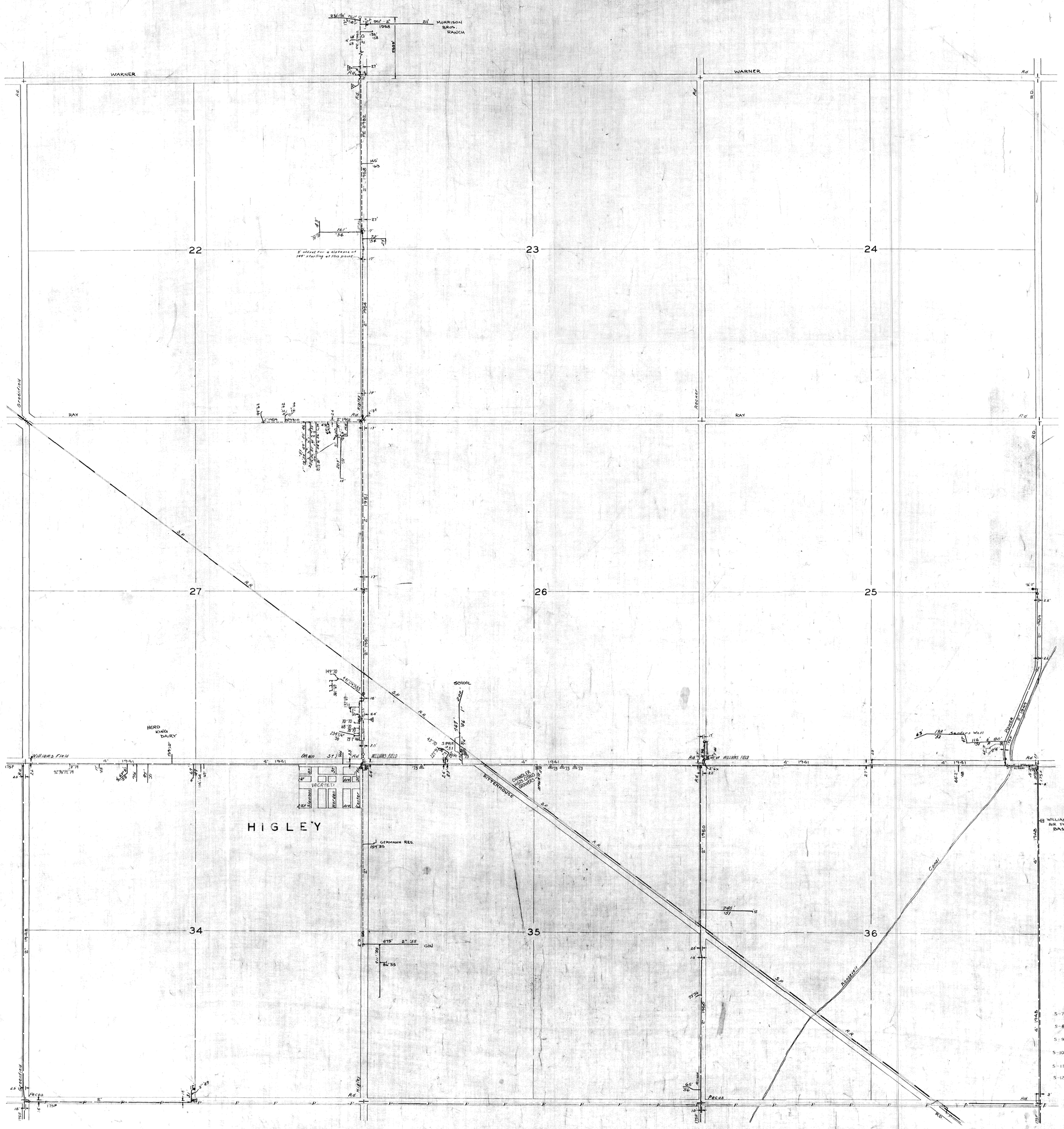
SW ¼ SE ¼ T.1N., R.6E

SE ¼ SE ¼ T.1N., R.6E

APS

NW 1/4 SE 1/4 T.1S., R.6E

NE 1/4 SE 1/4 T.1S., R.6E



NOTE:

—P—P—P— INDICATES APPROX. LOCATION OF SOUTHERN PACIFIC CO. 6" PETROLEUM PIPE LINE.

[redacted]

2537

[redacted]

SE 1/4 T.1S., R.6E.

GAS DISTRIBUTION

ARIZONA PUBLIC SERVICE CO.

PHOENIX, ARIZONA

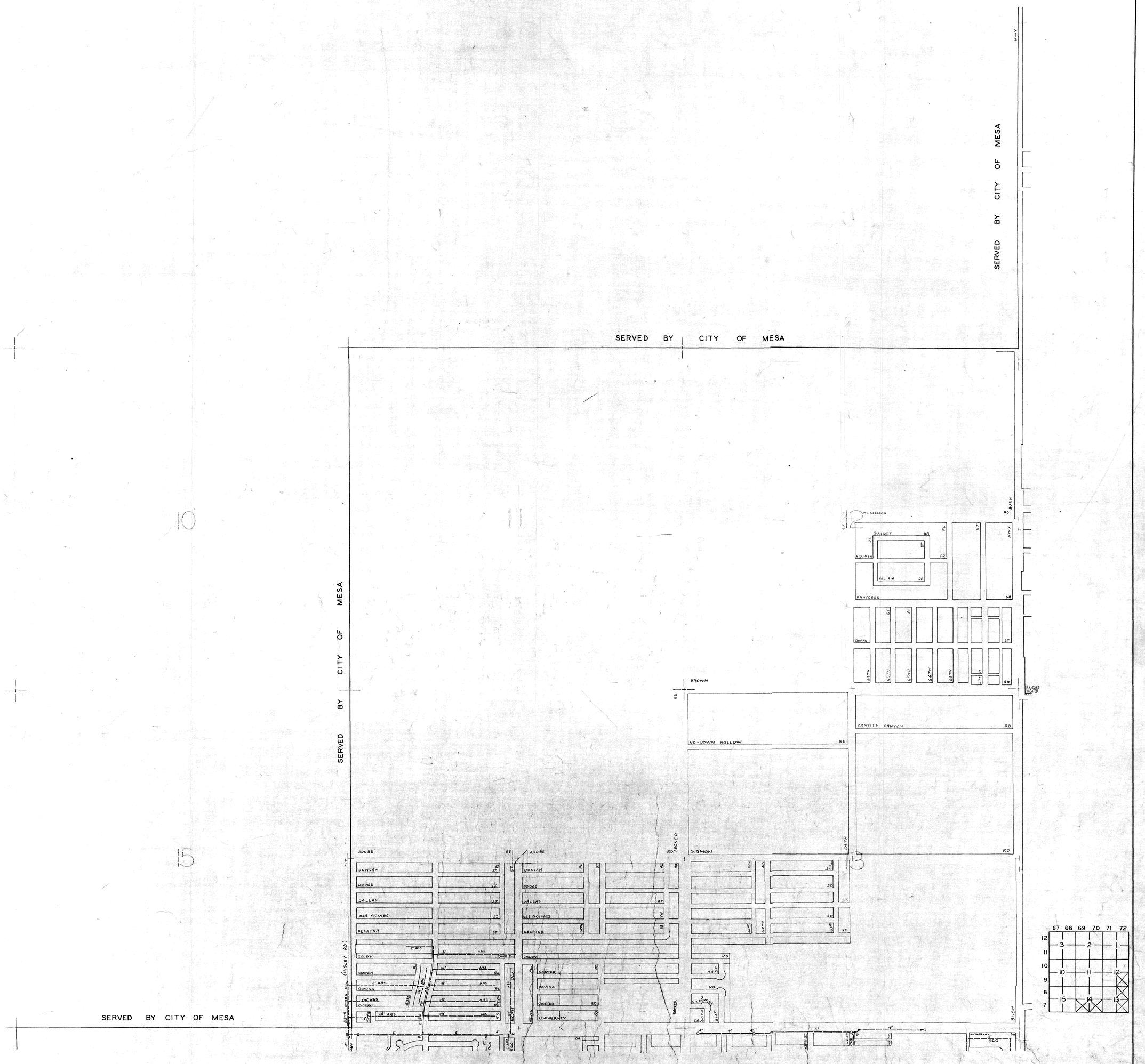
SCALE 1"=600' MAR. 24, 1952

SW 1/4 SE 1/4 T.1S., R.6E

SE 1/4 SE 1/4 T.1S., R.6E.

NW ¼ NE ¼ T.1N., R.6E.

NE ¼ NE ¼ T.1N., R.6E.



2637

NE ¼ T. 1 N.. R. 6 E.

GAS DISTRIBUTION

ARIZONA PUBLIC SERVICE COMPANY

PHOENIX, ARIZONA

SCALE: 1" = 60' DATE: APRIL 5, 1962

RLG.

SW ¼ NE ¼ T.1N., R.6E

SE ¼ NE ¼ T.1N., R.6E

POST 125 IMPERIAL TRACING CLOTH