FLOOD CONTROL DISTRICT OF MARICOPA COUNTY 1959

FLOOD CONTROL DISTRICT

OF

MARICOPA COUNTY

2801 WEST DURANGO STREET PHOENIX, ARIZONA 85009

BUCKEYE AREA

FLOOD DELINEATION STUDY

HYDROLOGY REPORT

FCD CONTRACT NO. 90-69

Registered Professional Engineer (Civil) CERTIFICATE NO. 23969 FRANK EDWARD BROWN Date Signed 7-1-92 ARIZONA, U.S.A.

Registered Professional Engineer (Civil) CERTIFICATE NO. 17928 GEORGE V. SABOL Date Signed 7-1-92 ARIZONA, U.S.A.

MAY, 1992

REVISED JULY, 1992

PREPARED BY:

McLAUGHLIN KMETTY ENGINEERS, LTD.

3501 N. 16TH STREET

PHOENIX, ARIZONA 85016

(602) 248-7702

IN ASSOCIATION WITH:

GEORGE V. SABOL CONSULTING ENGINEERS, INC.

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INITIAL STUDY		RESTUDY ✓		LOMR		OTHER	

SECTION 1: GENERAL INFORMATION

1A	COMMUNITY	Maricopa County, Arizona
1B	COMMUNITY NUMBER	040037 and 040039
1C	COUNTY	Maricopa
1D	STATE	Arizona
1E	DATE STUDY ACCEPTED	June 17, 1994
1F	STUDY CONTRACTOR	McLaughlin Kmetty Engineers, Ltd.
	CONTACTS	Mr. Geza E. Kmetty, P.E. Mr. Frank Edward Brown, P.E.
	ADDRESS	3501 North 16th Street Phoenix, Arizona 85016-6419
	PHONE	(602) 248-7702
	SUBCONSULTANTS	George V. Sabol Consulting Engineers Project Engineering Consultants Kenney Aerial Mapping
1G	TECH. REVIEWER (FEMA)	Michael Baker, Jr., Inc. Alexandria, Virginia
	PHONE	(703) 960-8800
1H	FEMA REGIONAL REVIEWER	Michael K. Buckley, P.E.,Chief Hazard Identification Branch
	PHONE	Mitigation Directorate (202) 646-3932
1I	STATE REVIEWER	Mr. David E. Creighton, Jr., P.E. Arizona Department of Water Resources
	PHONE	(602) 542-1541
1J	LOCAL REVIEWER	Mr. Timothy M. Murphy Flood Control District of Maricopa County (FCDMC)
	PHONE	(602) 506-1501

STUDY DOCUMENTATION ABSTRACT

1K	RIVER OR STREAM NAME	Buckeye Area, along Roosevelt Canal, Southern Pacific Railroad, and Buckeye Canal
1L	REACH DESCRIPTION	a. Roosevelt Canal, ponding against embankment, from Johnson Rd to Dean Rd (approx 12.0 mi) FIRM Panels 2015, 2025, 2040, 2050
		b. Southern Pacific Railroad, ponding against embankment, from Johnson Rd to Dean Rd (approx 12.3 mi) FIRM Panels 2040, 2050, 2480, 2485
		c. Buckeye Canal, ponding against embankment, from Johnson Rd to Dean Rd (approx 13.1 mi) FIRM Panels 2040, 2050, 2480, 2485, 2505
1M	STUDY TYPE	Detailed Study of Ponding Areas

BUCKEYE AREA
FLOOD DELINEATION STUDY
HYDROLOGY REPORT

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B RAINFALL WORKSHEETS AND FIGURES

C RAINFALL LOSS CALCULATION SPREADSHEETS FOR EACH SUBBASIN

D MAP UNIT XKSAT TABLES FROM THE FLOOD CONTROL DISTRICT

E ROUTING SECTION DISCHARGE RATING CURVES

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O HEC-1 OUTPUT FOR THE 100-YR, 24-HR MODEL

APPENDICES, (SEPARATE VOLUME)

AA TECHNICAL MEMORANDUM ON UNIT HYDROGRAPHS FOR AGRICULTURAL FIELDS AND NEW LAG RELATION FOR UNIT HYDROGRAPHS

BB TECHNICAL MEMORANDUM FOR A SIMPLIFIED PROCEDURE FOR ROUTING THROUGH AGRICULTURAL FIELDS

Statement to be attached to FEMA Form 2,

Certification by Registered Professional Land Surveyor

Signed by Larry Maldonado, P.E., L.S.

The data that was compiled and used in the preparation of the Survey Horizontal and Vertical Mapping Control and ERM Elevations, Buckeye Floodplain Delineation Study, are the most practical data that are available and are accurate to the best of the certifier's knowledge. The survey control was performed in accordance with sound Land Surveying practices, as applicable to Maricopa County, Arizona.

REGISTERED LAND SURVEYOR
CERTIFICATE NO.
16863
LARRY M.
MALDONADO
ARIZONA, U. S. A.

(MS) FEMA

BUCKEYE AREA
FLOOD DELINEATION STUDY
HYDROLOGY REPORT

ADDENDA

Addendum No.	Title
1	COORDINATION OF HYDROLOGIC ANALYSIS WITH HYDRAULIC ANALYSIS

STUDY DOCUMENTATION ABSTRACT

SECTION 2: MAPPING INFORMATION

2A	U.S.G.S. QUAD SHEETS	a. Buckeye, Buckeye NW, Valencia and Hassayampa: 1971 Photo Revised, 1955 Photo Date, 20′ Contour Interval, 10′ Supplementary Contour Interval, 7.5 minute series
2B	MAPPING FOR HYDROLOGIC STUDY TYPE/SOURCE	USGS 7.5 Minutes Quadrangle Maps
	SCALE	1" = 2,000′
	DATE	1958 Photo Revised 1971
2C	MAPPING FOR HYDRAULIC STUDY TYPE/SOURCE	Outside Town of Buckeye: 7.5 Minute Quadrangle Maps, supplemented by Ground Survey Data
	SCALE	1" = 2,000′
	DATE	1971 Photo Revised
2C	MAPPING FOR HYDRAULIC STUDY TYPE/SOURCE	Inside Town of Buckeye: Aerial Mapping by Project Engineering Consultants, Inc.
	SCALE	1" = 200′ with 2′ CI
	DATE	January 14, 1992

STUDY DOCUMENTATION ABSTRACT

SECTION 4: HYDRAULICS

4A	MODEL OR METHOD USED (including vendor and version description)	Broad-crested weir formula for embankment overtopping, orifice equation for railroad trestle flow.
4B	REGIME	Ponded against embankments, limited areas of Subcritical Flow.
4C	FREQUENCIES FOR WHICH PROFILES WERE COMPUTED	100-Year
4D	METHOD OF FLOODWAY CALCULATION	Floodways not determined
4E	UNIQUE CONDITIONS AND PROBLEMS	Some runoff crosses subbasin boundary along certain sectionline roads. See Discussion in Hydraulic Report "Coordination of Hydrologic Analysis with Hydraulic Analysis"

STUDY DOCUMENTATION ABSTRACT

SECTION 3: HYDROLOGY

3A	MODEL OR METHOD USED (including vendor and version description)	U.S. Army Corps of Engineers' HEC-1 Model, Version 4.0, dated September 1, 1990
3B	STORM DURATION	6-Hour and 24-Hour Storms
3C	HYETOGRAPH TYPE	6-Hour Storm: FCDMC Distributions 24-Hour Storm: SCS Type II Distribution
3D	FREQUENCIES DETERMINED	100-Year
3E	LIST OF GAGES USED IN FREQUENCY ANALYSIS OR CALIBRATION (Location, Years of Record, Gage Ownership)	No stream gages within study area.
3F	RAINFALL AMOUNTS AND REFERENCE	3.30 inches for a 6-Hour Storm 4.10 inches for a 24-Hour Storm Hydrologic Design Manual for Maricopa County, Arizona by FCDMC
3G	UNIQUE CONDITIONS AND PROBLEMS	Some runoff crosses subbasin boundary along certain sectionline roads. See discussion in Addendum No. 1 to Hydrology Report "Coordination of Hydrologic Analysis with Hydraulic Analysis"
3H	COORDINATION OF Q'S (Agency, date, comments)	

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FORM 2

CERTIFICATION BY REGISTERED PROFESSIONAL ENGINEER AND/OR LAND SURVEYOR

1. This certification is in accordance with 44 CFR Ch. I, Section 65.2.

2. I am licensed with an expertise in hydrology and hydraulics [example: water resources (hydrology, hydraulics, sediment transport, interior drainage)* structural, geotechnical, land surveying.]

3. I have 23 years experience in the expertise listed above.

4. I have [X] prepared [ ] reviewed the attached supporting data and analyses related to my expertise.

5. I [X] have [ ] have not visited and physically viewed the project.

6. In my opinion, the following analyses and/or design, were performed in accordance with sound engineering practices:
flood hydrology

7. Based upon the following review, the modifications in place have been constructed in general accordance with plans and specifications.

Basis for above statement: (check all that apply)

a. [ ] Viewed all phases of actual construction.
b. [ ] Compared plans and specifications with as-built survey information.
c. [ ] Examined plans and specifications and compared with completed projects.
d. [X] Other N/A

8. All information submitted in support of this request is correct to the best of my knowledge. I understand that any false statement may be punishable by fine or imprisonment under Title 18 of the United States Code, Section 1001.

Name: George V. Sabol
(please print or type)

Title: President
(please print or type)

Registration No. 17928 Expiration Date: 30 June 1994

State Arizona

Type of License Civil

Signature

23 February 1993
Date

Seal (Optional)

*Specify Subdiscipline

Note: Insert not applicable (N/A) when statement does not apply.

Statement to be attached to FEMA Form 2,

Certification by Registered Professional Engineer

Signed by George V. Sabol, P.E.

The data that were compiled and used in the preparation of the Hydrology Report, Buckeye Floodplain Delineation Study, are the most practical data that are available and are accurate to the best of the certifier's knowledge. The hydrologic analyses were performed in accordance with sound engineering practices, as applicable to Maricopa County, Arizona. The Hydrology Report presents the flood hydrology for this study that is representative of existing hydrologic conditions, and portrays, to the standard of the profession, the flood potential for the study area.

Professional Engineer (Civil)
CERTIFICATE
17929
GEORGE V.
SABOL
Date Signed 26 Feb 93
ARIZONA, U.S.A.

FEMA USE ONLY

FORM 2

CERTIFICATION BY REGISTERED PROFESSIONAL ENGINEER AND/OR LAND SURVEYOR

1. This certification is in accordance with 44 CFR Ch. I, Section 65.2.

2. I am licensed with an expertise in Land Surveying
[example: water resources (hydrology, hydraulics, sediment transport, interior drainage)* structural, geotechnical, land surveying.]

3. I have 18 years experience in the expertise listed above.

4. I have ☐ prepared ☒ reviewed the attached supporting data and analyses related to my expertise.

5. I ☒ have ☐ have not visited and physically viewed the project.

6. In my opinion, the following analyses and/or design, were performed in accordance with sound engineering practices:
Survey Horizontal and Vertical Mapping Control and ERM Elev.

7. Based upon the following review, the modifications in place have been constructed in general accordance with plans and specifications.

Basis for above statement: (check all that apply)

a. ☐ Viewed all phases of actual construction.
b. ☐ Compared plans and specifications with as-built survey information.
c. ☐ Examined plans and specifications and compared with completed projects.
d. ☒ Other N/A

8. All information submitted in support of this request is correct to the best of my knowledge. I understand that any false statement may be punishable by fine or imprisonment under Title 18 of the United States Code, Section 1001.

Name: Larry Maldonado
(please print or type)

Title: President
(please print or type)

Registration No. 16863 Expiration Date: Current

State Arizona

Type of License Land Surveyor

Larry Maldonado
Signature

4-6-93
Date

REGISTERED LAND SURVEYOR CERTIFICATE NO. 16863 LARRY M. MALDONADO Date Signed 4-7-93 ARIZONA, U.S.A.

Seal
(Optional)

*Specify Subdiscipline

Note: Insert not applicable (N/A) when statement does not apply.

SECTION I

INTRODUCTION

GENERAL

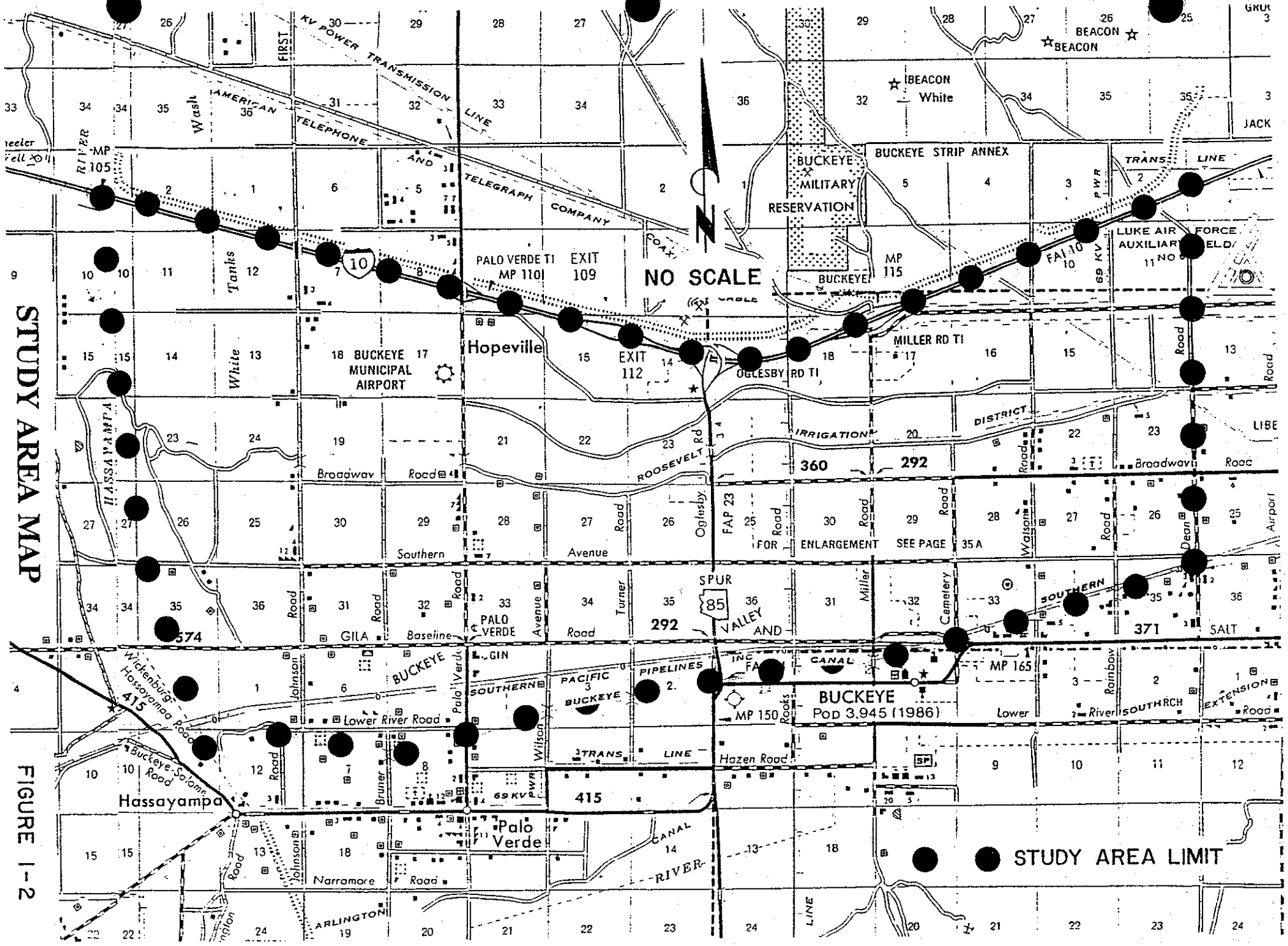
A Flood Delineation Study of the Buckeye area was performed by McLaughlin Kmetty Engineers, Ltd. for the Flood Control District of Maricopa County (Flood Control District) under contract FCD 90-69. The project consists of floodplain delineation and topographic mapping of a portion of the project area. An hydrologic analysis was performed to determine the 100-yr flood discharges for the purpose of floodplain delineation. That hydrologic analysis was performed by George V. Sabol Consulting Engineers, Inc. as a subcontractor to McLaughlin Kmetty Engineers, Ltd. This report presents the hydrologic analyses and results for the project.

SCOPE-OF-WORK

The project is conducted in two phases. Phase I is the hydrologic analysis and some of the topographic mapping. Phase II is the hydraulic analysis and floodplain delineation, with additional spot elevation mapping. Phase I has two objectives. Objective 1 is the hydrologic analysis of the watershed using presently available techniques and procedures. Objective 2 is the investigation and development of improved procedures for hydrologic modeling of agricultural areas. The results of Phase I, Objective 2 are presented in Appendices AA and BB (Separate Volume) and those results were not incorporated into the Buckeye Area Flood Delineation Study hydrologic modeling. This report addresses only Phase I, Objective 1.

PROJECT AREA

The project area consists of 61.5 square miles containing, and generally north of, the Town of Buckeye in central Maricopa County, Arizona, about 32 miles west of Phoenix. The project area location shown in Figure 1-1, and the study area is shown in Figure 1-2.



STUDY AREA MAP

FIGURE 1-2

SOURCES OF DATA

Topographic information for the project area is obtained from USGS 7.5 minute topographic maps (Reference 5) and maps that were developed for this project (Reference 6). Aerial photographs of 1990 (Reference 7) were used to identify land-use and to assist in model development. Soils information was obtained from a detailed soil survey by the SCS (Reference 8). Rainfall statistics were obtained from the NOAA Atlas for Arizona (Reference 9). Other specific data and information sources are provided in the report as reference is made to that information.

Note: Figure 2-3 is in the Rear Folder

ROAD PROFILES

FIGURE 2-3

SECTION II

WATERSHED DESCRIPTION

GENERAL

The project study area is a 61.5 square mile drainage area that lies to the south of the White Tank Mountains, north of the Gila River, just east of the Hassayampa River, and west of Dean Road, as shown in Figure 1-2. The drainage area is the southern (lower) end of a larger watershed that heads in the White Tank Mountains, and the study area is hydrologically separated from the northern (upper) part of the watershed by the Buckeye Flood Retarding Structures (Buckeye FRS).

The study area is of rectangular shape. The north boundary is the Buckeye FRS, the south boundary is a portion of the Buckeye Irrigation District canal, the east boundary is Dean Road, and the west boundary is the floodplain terrace of the Hassayampa River. The drainage area and boundaries are shown in Plate 1.

The study area contains the majority of the Town of Buckeye; however, the study area is almost exclusively agricultural fields and desert with about 60 percent of the study area being irrigated agriculture. Agricultural production is mainly cotton and alfalfa with some landscape nursery-stock production. About 70 percent of the agricultural land is in production at any time with the remaining 30 percent fallow. The agricultural fields are terraced and laser-leveled to improve irrigation efficiency. The irrigation system consists of laterals, ditches, turnouts, and irrigation return ditches. The terracing and leveling of the land, and the superposition of the surface irrigation system affects storm runoff.

Irrigation of the agricultural crops appears to be exclusively border and furrow flood irrigation. The area is subject to irrigation about 11 months per year due to double cropping. The one month of non-irrigation generally occurs in the winter and is practiced for agricultural insect pest control. The agricultural soils are fairly fast draining and irrigation applications are made to a field every 1 to 2 weeks depending on crop and weather conditions. Therefore, during the occurrence of a

major storm, most of the agricultural land would be at a condition of very high soil moisture and this would result in higher runoff rates as compared to non-irrigated areas of the same soil type.

Five major man-made structures exist in the study area that significantly impact stormwater drainage and flood hazard. These structures are oriented in a generally east-west direction and are generally perpendicular to the flow direction. These structures are (see Plate 1):

1. Buckeye FRS (northern boundary of the study area),
2. Interstate Highway 10 (I-10),
3. Southern Pacific Railroad (SPRR),
4. Roosevelt Irrigation District Canal (RC), and
5. Buckeye Irrigation District Canal (BC) (southern boundary of the study area).

The Buckeye FRS (Reference 10) were constructed by the SCS as a small watershed protection facility, and these consist of three earthen embankment dams that intercept storm runoff from north of the study area. The structures contain gated outlets that are normally closed. The operating procedure for these structures is to retain storm runoff and to release the retained runoff through the gated outlets at a controlled rate after the storm. For storms of 100-yr magnitude and less, there should be no release of runoff from the outlets during the storm. Therefore, these structures define the upper boundary of the drainage area.

I-10 crosses the drainage area just south of the Buckeye FRS, and for the most part, there is very little intervening drainage area between the Buckeye FRS and I-10. Runoff and peak discharge would be very small for that drainage area. The I-10 cross-drainage structures are designed for the 50-yr flood event (Reference 11).

The SPRR passes through the drainage area near the southern border, and is generally parallel to the BC. The track is built on elevated ballast to maintain a nearly uniform road grade. Cross-drainage through the railroad is provided by 24 drainage structures. Field measurements of those structures were made so as to determine a discharge rating curve for each structure. Documentation of these structures is contained in Appendix A. The railroad attempts to provide cross drainage capacity to satisfy the 50-yr flood peak discharge (Reference 12), however, railroad

drainage structure capacities were typically determined by the railroad designers by relatively simple empirical relations which may not agree with current hydrologic practices.

The RC supplies irrigation water to the agricultural fields to the north of the RC and to much of the fields to the south that are between the RC and the BC. The RC is built along a terrace with an unpaved access road along each bank. The canal is concrete lined with about 1 foot of earthen freeboard. A typical cross-section of the RC is shown in Figure 2-1. Turnouts and irrigation pump stations occur along its length. An irrigation storage regulation pond exists in T 1N, R 4W, Section 20 (model subbasin 16 of Plate 1). Irrigation return flow and storm runoff is directed to the RC through rundown structures along the north bank of the canal at numerous locations that are usually adjacent to the north-south roads. A wasteway exists at the western terminus of the canal just west of Johnson Road. The gate is closed during normal operation. The gate can be opened to drain the canal for maintenance of the canal, or presumably, if excess runoff into the canal is threatening to cause canal overtopping.

The BC supplies irrigation water to the agricultural fields south of the BC (outside of the study area) and some of the fields to the north that are between the BC and the RC. The construction of the BC is similar to the RC, and a typical canal section is shown in Figure 2-1. An irrigation storage regulation pond exists in T 1S, R 4W, Section 8 (model subbasin 60 of Plate 1). A wasteway to the Hassayampa River is located at the western terminus of the BC. The canal can be drained to the river by operation of the wasteway. Irrigation return flow rundown structures do not occur in the BC as they do in the RC.

The study area contains a portion of the Town of Buckeye which has moderate density single-family residences, some commercial development, and a railway siding. Outside of the Town of Buckeye, some relatively low density residential development occurs in T 1N, R 3W, Sections 14 and 15 (model subbasins 24 and 26 of Plate 1), and a trailer park exists in T 1N, R 3W, Section 17 (model subbasin 10 of Plate 1). The Buckeye Municipal Airport is in T 1N, R 4W, Sections 17 and 20 (model subbasin 16 of Plate 1).

The project area is undeveloped desert from south of the Buckeye FRS to the irrigated fields, and between the Hassayampa River on the western boundary to Johnson Road. The vegetation is

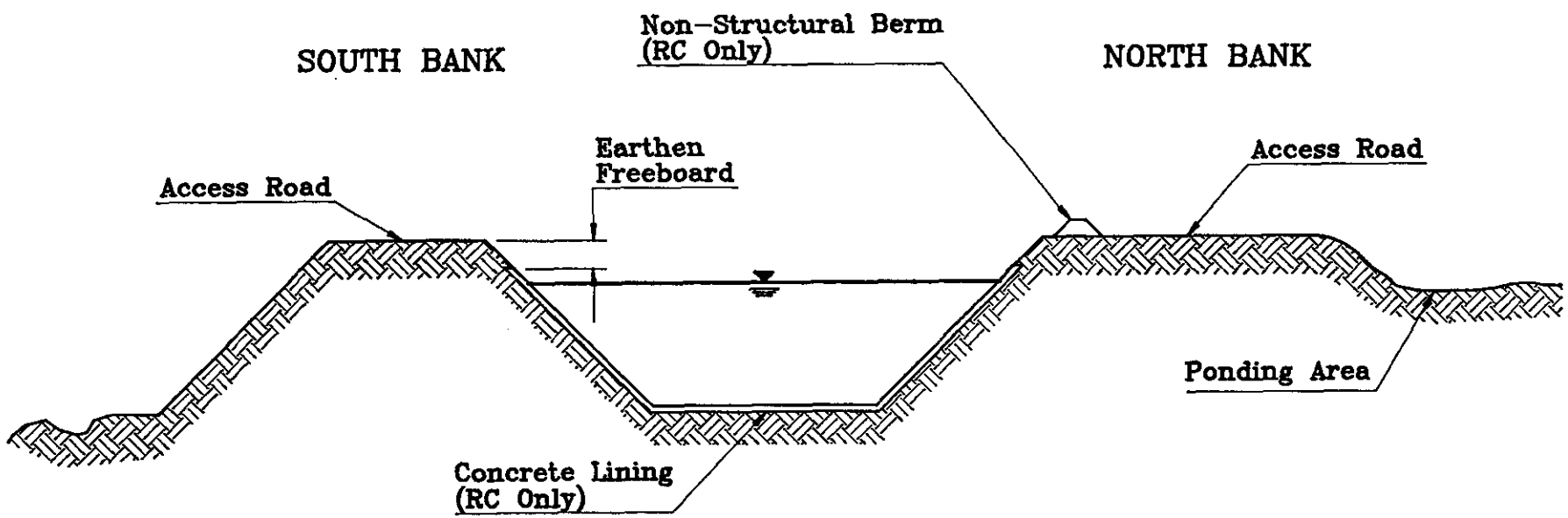


FIGURE 2-1

Typical RC and BC Cross Sections

typical desert brush, grasses, and cacti, with a vegetation cover density of about 15 percent.

The only other feature in the study area that has significant impact on storm runoff are the paved sectionline roads that, generally, intersect the area at one mile intervals in both the north-south and east-west directions. Those roads are slightly crowned and often have roadside drainage ditches and adjacent irrigation return flow ditches. Sketches of typical road sections are shown in Figure 2-2. Broadway Road, Southern Avenue, and Baseline Road were field surveyed to determine the elevation profiles of those roads. These profiles are shown in Figure 2-3. These profiles were used to help delineate drainage flow paths.

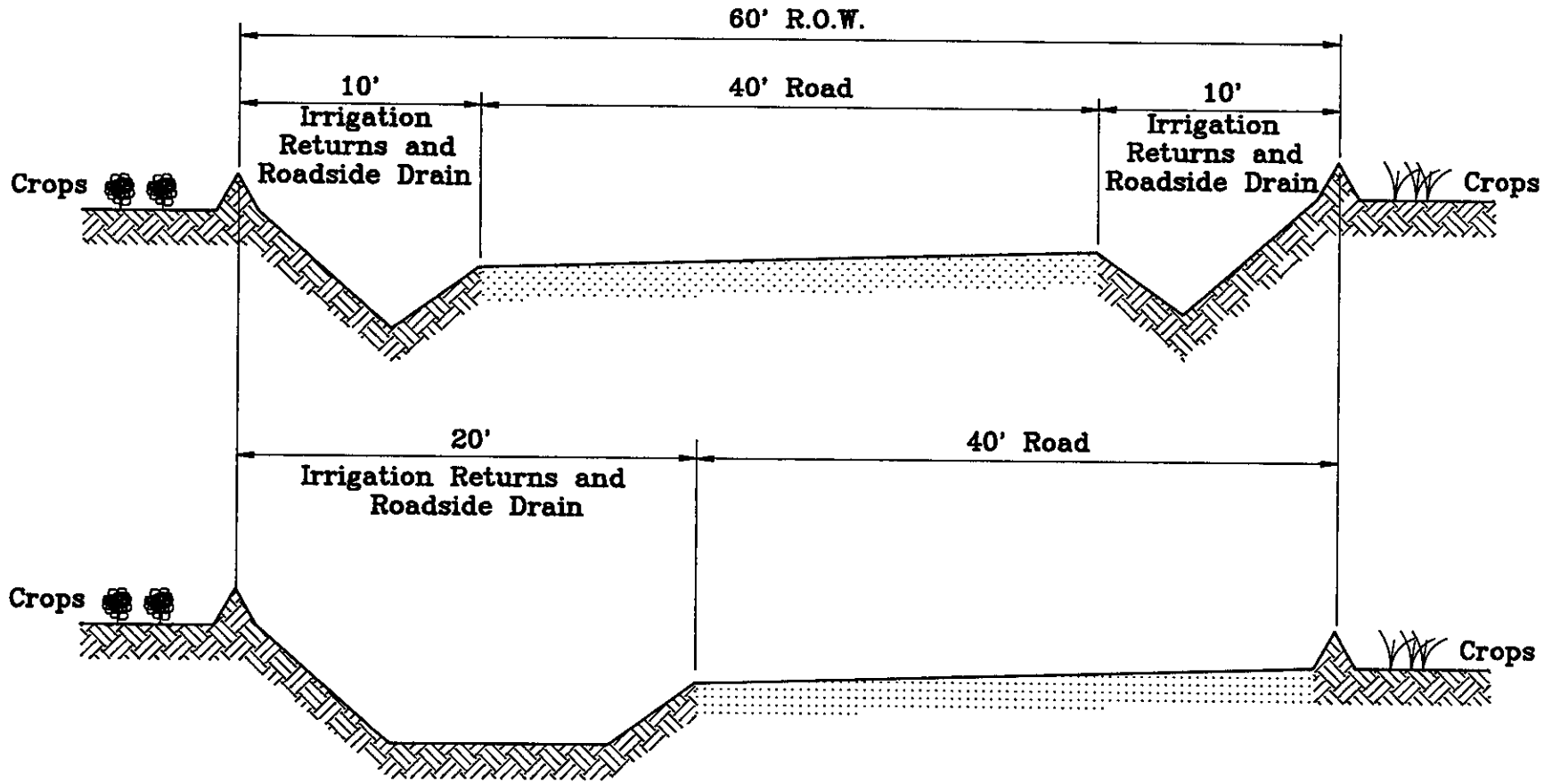


FIGURE 2–2

Typical Road Sections

(Not to Scale)

TABLE 3-3

Rainfall Loss Parameters for Each Subbasin

SUBBASIN	AREA sq.mi.	IA inches	DTHETA	PSIF inches	XKSAT[a] in/hr	RTIMP %
1	1.672	0.350	0.350	3.98	0.359	0.00
2	1.239	0.350	0.350	4.24	0.412	0.00
3	1.309	0.429	0.206	4.24	0.535	0.00
4	0.567	0.350	0.350	4.24	0.411	0.28
5	1.638	0.350	0.350	3.82	0.327	0.00
6	0.323	0.350	0.370	4.74	0.222	4.88
7	0.413	0.350	0.350	4.14	0.391	0.00
8	0.383	0.350	0.350	4.19	0.401	0.00
9	0.706	0.350	0.350	4.24	0.412	0.00
10	1.316	0.321	0.338	4.14	0.383	1.73
11	1.267	0.350	0.350	3.71	0.306	0.00
12	0.977	0.350	0.350	3.50	0.264	0.00
13	0.447	0.350	0.350	4.08	0.380	0.00
14	0.788	0.500	0.350	4.19	0.401	0.00
15	1.331	0.444	0.178	4.03	0.501	0.00
16	0.920	0.328	0.312	4.19	0.380	0.00
17	0.880	0.449	0.169	4.24	0.567	0.00
18	0.905	0.437	0.191	4.14	0.520	0.00
19	0.594	0.500	0.075	4.30	0.664	0.00
20	0.666	0.500	0.075	4.24	0.647	0.00
21	0.552	0.500	0.075	4.24	0.647	0.00
22	0.577	0.500	0.075	4.24	0.647	0.00
23	0.527	0.500	0.075	4.30	0.664	0.00
24	0.486	0.200	0.250	3.66	0.280	7.50
25	0.270	0.500	0.075	4.14	0.614	0.00
26	0.519	0.200	0.250	4.24	0.390	7.50
27	0.231	0.500	0.074	4.24	0.649	0.00
28	0.325	0.500	0.075	4.14	0.615	0.00

[a] - adjusted for vegetation cover

TABLE 3-3 (Continued)

Rainfall Loss Parameters for Each Subbasin

SUBBASIN	AREA sq.mi.	IA inches	DTHETA	PSIF inches	XKSAT[a] in/hr	RTIMP %
29	1.000	0.500	0.075	4.24	0.647	0.00
30	1.000	0.500	0.075	4.24	0.647	0.00
31	1.063	0.500	0.075	4.24	0.647	0.00
32	0.881	0.500	0.075	4.24	0.648	0.00
33	0.978	0.500	0.075	4.30	0.664	0.00
34	0.625	0.500	0.075	4.24	0.647	0.00
35	1.502	0.500	0.075	4.24	0.648	0.00
36	0.683	0.500	0.075	4.30	0.664	0.00
37	1.441	0.500	0.075	4.19	0.631	0.00
38	0.525	0.500	0.075	4.30	0.664	0.00
39	0.714	0.500	0.075	3.98	0.564	0.00
40	0.952	0.500	0.075	4.03	0.581	0.00
41	1.208	0.500	0.075	4.30	0.664	0.00
42	0.775	0.500	0.075	4.03	0.581	0.00
43	1.000	0.500	0.075	4.30	0.664	0.00
44	1.000	0.500	0.075	4.19	0.631	0.00
45	1.147	0.500	0.075	4.24	0.648	0.00
46	1.375	0.500	0.075	4.14	0.614	0.00
47	0.620	0.500	0.075	3.77	0.498	0.00
48	0.486	0.500	0.075	3.92	0.548	0.00
49	1.000	0.500	0.075	4.30	0.664	0.00
50	1.000	0.500	0.075	4.08	0.598	0.00
51	0.998	0.500	0.075	3.87	0.531	0.00
52	0.816	0.500	0.075	4.24	0.647	0.00
53	0.341	0.500	0.075	4.24	0.648	0.00
54	0.380	0.500	0.075	4.24	0.647	0.00
55	0.266	0.365	0.075	4.19	0.631	0.00
56	0.736	0.500	0.075	4.24	0.648	0.00

[a] - adjusted for vegetation cover

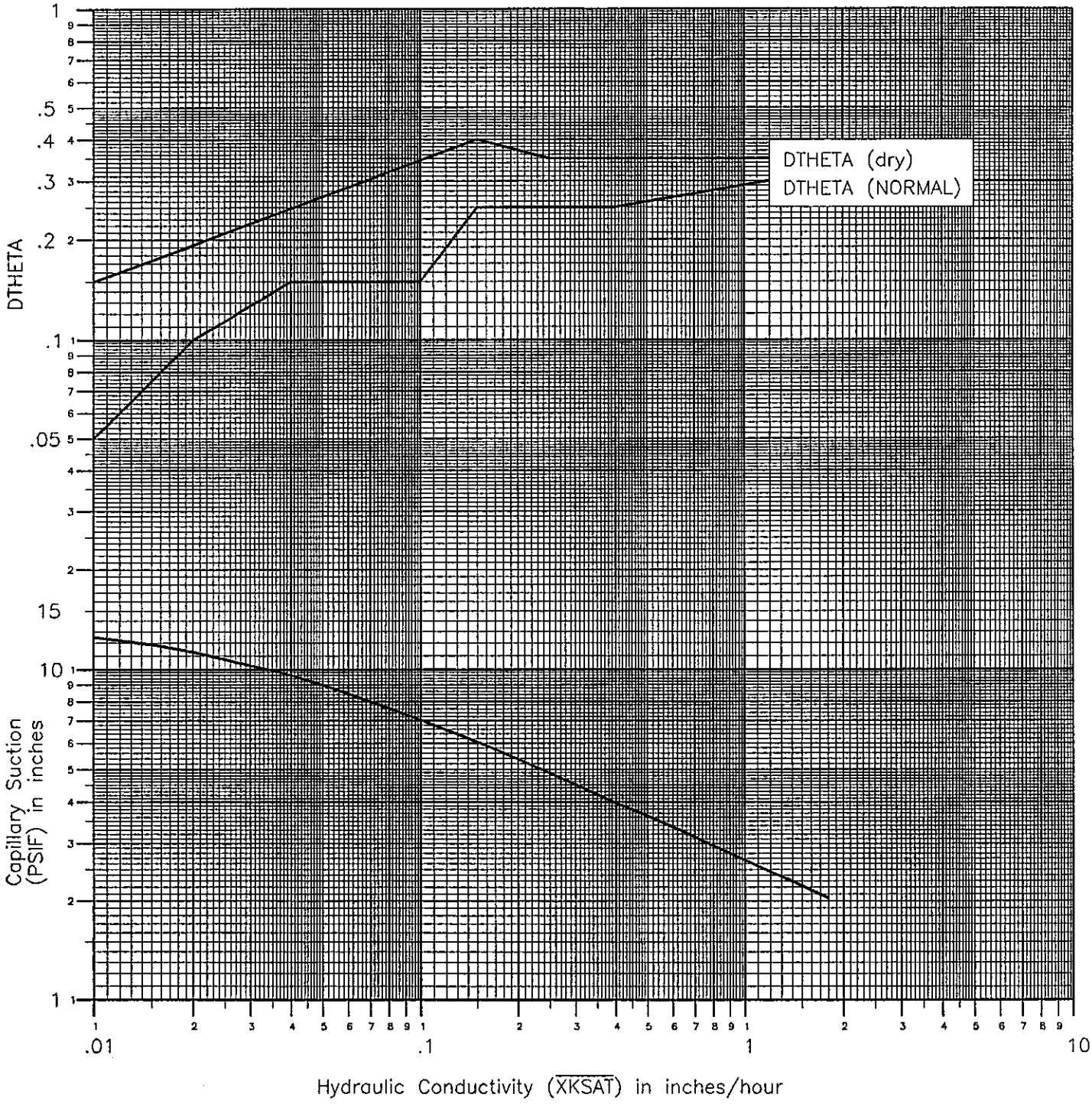
Drainage Area	Depth-Area Reduction Factors	
square miles	24-hr general storm	6-hr local storm
0.01	1.0	1.0
0.5	-	.99
2.8	-	.98
6.0	.95	-
16.0	-	.92
25.0	.91	-
61.5	.87	.85

Worksheets and copies of figures used to calculate the rainfall depths and depth-area reduction factors are shown in Appendix B.

RAINFALL LOSSES

Rainfall losses for the watershed model are estimated by the Green and Ampt infiltration equation with a surface retention loss. The rainfall loss parameters are determined based on guidance in the Hydrologic Design Manual (Reference 14). The Green and Ampt infiltration equation parameters are based on logarithmic area-averaging of the map unit hydraulic conductivities (XKSAT) for the mapped soils in each subbasin, and the selection of capillary suction (PSIF) and soil moisture deficit (DTHETA) based on the calculated subbasin value of XKSAT. The graphs used to select PSIF and DTHETA from XKSAT are shown in Figure 3-1. The bare ground XKSAT values for each subbasin, determined as described above, are adjusted for vegetation cover. The calculation of these subbasin parameters is facilitated by a spreadsheet that was provided by the District (Reference 16). The spreadsheet calculation sheets for each subbasin are presented in Appendix C.

A detailed soil survey for central Maricopa County is available (Reference 8) that provides a description of the 44 soils that are identified for the study area. The SCS soils map is reproduced in Plate 2. The Flood Control District has calculated the map unit XKSAT values for each of those soils based on soil texture descriptions of each soil in the map unit and the soil texture XKSAT values from the Hydrologic Design Manual (Reference 14). The map unit XKSAT tables from the Flood Control District are provided in Appendix D. A listing of the 44 soils in the study area along with the corresponding map unit XKSAT values from Appendix D is shown in Table 3-1.



Composit values of PSIF and DTHETA as a function of $\overline{XKSAT}$.
To be used for area weighted averaging of Green and Ampt parameters.

FIGURE 3-1

TABLE 3-3 (Continued)

Rainfall Loss Parameters for Each Subbasin

SUBBASIN	AREA sq.mi.	IA inches	DTHETA	PSIF inches	XKSAT[a] in/hr	RTIMP %
57	0.508	0.500	0.075	4.03	0.580	0.00
58	0.211	0.500	0.076	3.98	0.563	0.00
59	0.236	0.500	0.075	4.24	0.648	0.00
60	1.147	0.500	0.075	4.19	0.631	0.00
61	0.347	0.500	0.075	4.30	0.663	0.00
62	0.580	0.500	0.075	4.19	0.631	0.00
63	0.513	0.500	0.075	4.08	0.598	0.00
64	0.427	0.500	0.075	3.87	0.531	0.00
65	0.405	0.500	0.075	3.61	0.448	0.00
66	0.286	0.500	0.075	3.92	0.548	0.00
67	0.489	0.200	0.250	3.92	0.330	22.50
68	0.278	0.500	0.074	3.98	0.565	0.00
69	0.138	0.200	0.250	3.71	0.290	22.50
70	0.166	0.500	0.075	3.92	0.547	0.00
71	0.139	0.500	0.076	3.50	0.414	0.00
72	0.067	0.500	0.076	3.71	0.481	0.00
73	2.061	0.350	0.350	3.77	0.317	0.00
74	2.691	0.350	0.350	3.87	0.338	0.00
75	0.541	0.350	0.350	3.55	0.274	0.00
76	0.061	0.350	0.350	3.61	0.285	0.00
77	0.230	0.350	0.350	4.08	0.380	0.00
78	0.414	0.350	0.350	3.61	0.285	0.00
79	0.783	0.350	0.350	3.61	0.285	0.00
80	0.644	0.382	0.292	4.03	0.414	0.00
81	0.633	0.396	0.265	4.08	0.447	0.00
82	0.258	0.350	0.350	4.14	0.390	0.00
83	0.870	0.350	0.380	5.05	0.211	0.00

[a] - adjusted for vegetation cover

UNIT HYDROGRAPHS

The Phoenix Valley S-graph is used to generate unit hydrographs for all subbasins in the watershed model. The U.S. Army Corps of Engineers version of the Lag equation (Reference 14) is used to estimate Lag time. That Lag equation is:

$$Lag = 24\ K_n \left(\frac{L \times L_{ca}}{S^{0.5}} \right)^{0.38}$$

where Lag is in hours,
- L is length of the longest flow path, in miles,
- L_{ca} is length along L to a point opposite the centroid, in miles,
- S is the flow path slope, in ft/mile, and
- K_n is a resistance coefficient.

The flow path length (L) and slope (S) are measured on the USGS 7.5 minute topographic maps (Reference 5). The assumed flow paths (L) for each of the subbasins are shown in Plate 3. The slope (S) is calculated by dividing the difference in elevation between the end points of the flow path by the length of the flow path. For the subbasins that are desert areas, L_{ca} is measured by the traditional method, and the centroid of each subbasin is shown in Plate 3. Most of the subbasins that are agricultural fields are square or rectangular in shape, and for those subbasins the dimension of L_{ca} could have two different values. An analysis was performed to determine a reasonable method to estimate L_{ca} for the agricultural subbasins. That analysis resulted in the following observations:

1. The fields all drain in a generally north to south direction.
2. Use of the shorter dimension for L_{ca} would result in very small Lag times (L_{ca} could even be 0.0 for certain subbasins and the calculated Lag would be 0.0 in such cases). Such short Lags are not considered reasonable.
3. Use of the longer dimension for L_{ca} implies a significant overland flow component that is in the east-west direction. This seems contradictory to the empirical basis of the Lag equation for this application.
4. From a theoretical consideration, L_{ca} is a shape factor. For symmetric watersheds, L_{ca} is equal to 0.5L. The agricultural subbasins are usually symmetrical in shape.

Therefore, based on these observations, it was decided for consistency of results and in accord with

the underlying assumptions of the Lag equation that a $L_{ca} = 0.5L$ was appropriate and reasonable for use with agricultural fields.

The resistance coefficient (K_n) was selected based on guidance in the Hydrologic Design Manual (Reference 14). The agricultural fields have comparatively uniform slopes and surface characteristics such that channelization is not present, and no drainage improvements exist. The ground cover is generally dense vegetation. The K_n for agricultural areas is generally taken as 0.20. The desert has no well defined drainage network and the surface runoff is in broad, shallow watercourses and as overland flow. The desert vegetation would result in significant resistance to flow. The K_n for desert areas is generally taken as 0.05.

The subbasin unit hydrograph parameters and the calculated Lags are shown in Table 3-4. The Lag ranges from 14 minutes as a minimum for Subbasin 76, to 223 minutes as a maximum for Subbasin 37.

TABLE 3-4
Unit Hydrograph Parameters and Lag for Each Subbasin

SUBBASIN	K_n	L miles	L_{ca} miles	S ft/mi	Lag hours	Lag min
1	0.05	2.51	1.34	24	1.04	62
2	0.05	1.77	0.90	37	0.72	43
3	0.05	1.84	1.44	36	0.88	53
4	0.05	1.26	0.68	41	0.57	34
5	0.05	1.67	1.17	44	0.75	45
6	0.05	0.73	0.23	62	0.28	17
7	0.05	0.76	0.33	64	0.32	19
8	0.05	1.29	0.49	22	0.56	34
9	0.05	1.01	0.36	54	0.38	23
10	0.05	1.58	1.06	47	0.70	42
11	0.05	1.63	0.78	63	0.60	36
12	0.05	1.37	0.76	77	0.53	32
13	0.05	1.57	0.86	73	0.60	36
14	0.05	1.52	0.40	72	0.44	26
15	0.2	2.12	1.06	30	3.42	205
16	0.2	1.56	0.78	31	2.69	162
17	0.2	1.58	0.79	36	2.64	159
18	0.2	1.40	0.70	44	2.32	139
19	0.2	1.45	0.73	19	2.80	168
20	0.2	1.04	0.52	27	2.03	122
21	0.2	1.42	0.71	20	2.73	164
22	0.2	1.46	0.73	20	2.78	167
23	0.2	1.57	0.79	16	3.07	184
24	0.2	0.95	0.48	15	2.12	127
25	0.2	1.29	0.65	22	2.49	149
26	0.2	1.63	0.82	25	2.90	174
27	0.2	0.67	0.34	15	1.63	98
28	0.2	0.95	0.48	14	2.15	129
29	0.2	1.50	0.75	24	2.74	165
30	0.2	1.51	0.76	25	2.74	164
31	0.2	1.91	0.96	29	3.18	191
32	0.2	1.80	0.90	32	2.99	179
33	0.2	1.72	0.86	31	2.90	174
34	0.2	1.17	0.59	19	2.38	143
35	0.2	1.95	0.98	26	3.30	198
36	0.2	1.85	0.93	36	2.98	179
37	0.2	2.37	1.19	30	3.72	223
38	0.2	1.33	0.67	22	2.55	153
39	0.2	1.52	0.76	25	2.75	165
40	0.2	1.77	0.88	31	2.96	178
41	0.2	1.52	0.76	24	2.77	166
42	0.2	1.50	0.75	26	2.70	162
43	0.2	2.00	1.00	23	3.44	207
44	0.2	2.00	1.00	28	3.32	199

TABLE 3-4 (Continued)
Unit Hydrograph Parameters and Lag for Each Subbasin

SUBBASIN	K_n	L miles	L_{ca} miles	S ft/mi	Lag hours	Lag min
45	0.2	1.53	0.77	28	2.71	162
46	0.2	1.70	0.85	30	2.89	174
47	0.2	1.39	0.70	27	2.53	152
48	0.2	0.98	0.49	22	2.02	121
49	0.2	1.98	0.98	27	3.30	198
50	0.2	1.98	0.98	31	3.22	193
51	0.2	1.98	0.98	28	3.28	197
52	0.2	1.52	0.76	21	2.84	171
53	0.2	0.61	0.31	25	1.37	82
54	0.2	1.17	0.59	11	2.64	158
55	0.2	0.92	0.46	8	2.33	140
56	0.2	1.60	0.80	21	2.96	177
57	0.2	1.27	0.64	22	2.46	148
58	0.2	0.93	0.47	13	2.14	129
59	0.2	0.57	0.28	46	1.15	69
60	0.2	1.42	0.71	13	2.96	177
61	0.2	0.81	0.41	25	1.71	102
62	0.2	0.98	0.49	22	2.02	121
63	0.2	0.94	0.47	26	1.90	114
64	0.2	0.80	0.40	26	1.68	101
65	0.2	0.78	0.39	21	1.71	103
66	0.2	0.73	0.37	12	1.81	109
67	0.2	0.85	0.43	25	1.77	106
68	0.2	0.87	0.44	46	1.60	96
69	0.2	0.87	0.44	5	2.44	147
70	0.2	0.85	0.43	5	2.40	144
71	0.2	0.61	0.31	5	1.87	112
72	0.2	0.59	0.30	5	1.82	109
73	0.05	2.75	1.67	33	1.09	66
74	0.05	3.12	1.55	30	1.15	69
75	0.05	1.89	0.92	29	0.78	47
76	0.05	0.38	0.23	50	0.23	14
77	0.05	1.14	0.38	25	0.47	28
78	0.05	1.02	0.59	59	0.46	27
79	0.05	1.63	1.11	42	0.74	44
80	0.05	1.42	0.73	31	0.63	38
81	0.05	1.04	0.62	31	0.53	32
82	0.05	1.06	0.80	32	0.58	35
83	0.05	1.61	0.76	75	0.57	34

ROUTING

General

Probably the most difficult factor in developing a watershed model for the study area is the runoff routing. This is because of two factors. First, defined drainage watercourses, in general, do not exist in the area. The surface runoff will be, for the most part, shallow overland flow and concentrated overland flow in and alongside the roads and in broad, shallow watercourses through the fields and desert. Such routing is very difficult to define and model, but a channel routing scheme is deemed appropriate for this. Second, runoff will be retained behind the structures that traverse the width of the study area from east to west. These structures, identified in Plate 1 and previously discussed, are I-10, the RC, the SPRR, and the BC. A storage routing scheme is used for the RC, the SPRR, and the BC.

A watershed model routing diagram is shown in Figure 3-2, and an illustration of the assumed routing flow paths and combining of subbasin runoff at concentration points is shown in Plate 4.

The two types of routing that are used in the watershed model are described in the following sections.

Channel Routing of Overland Flow

Channel routing is used to model concentrated runoff as it travels from one concentration point to the next downstream concentration point. The Muskingum-Cunge routing method was used and this required the selection of a representative channel section, Manning's roughness coefficient, channel length, and bed slope for each routing reach.

Four different channel sections were determined to be representative of the various routing reaches in the study area. Sketches of the four routing sections are shown in Figure 3-3. Section A of Figure 3-3 is used to represent the very broad, shallow routing reaches that pass through agricultural fields, desert, and urbanized and open areas. The Manning's roughness coefficient (n) was selected based on the flow resistance that is expected through each type of flow path. For agricultural areas n was selected as 0.10, for desert areas n was selected as 0.035, and for urbanized and open areas n was selected as 0.025. Section A geometry was selected for use in the very flat routing reaches based on the fact that there is very little topographic relief in those areas. The concentrated runoff through those areas would spread to several hundred feet and the maximum flow depths would be quite shallow.

TABLE 3-1

Map Units and Corresponding XKSAT Values for Soils in the Study Area

Symbol	Map Unit Name	Map Unit XKSAT, in/hr
Aa	Agualt loam	0.26
AbA	Antho sandy loam, 0-1 % slope	0.38
AdA	Antho gravelly sandy loam, 0-1% slope	0.40
Ae	Antho-Brios sandy loam	0.39
AGB	Antho-Carrizo Complex, 0-3% slope	0.40
AL	Antho Association	0.40
AM	Antho-Valencia Association	0.39
Ao	Avondale clay loam	0.04
Br	Brios loamy sand	1.05
Bs	Brios sandy loam	0.39
Cb	Carrizo gravelly sandy loam	0.40
CF	Carrizo and Brios soils	0.50
Cn	Cashion clay	0.01
CO	Cherioni-Rock outcrop complex	0.29
Cp	Coolidge sandy loam	0.40
CrB	Coolidge gravelly sandy loam, 1-3% slope	0.40
CV	Coolidge-Laveen association	0.39
Ge	Gilman fine sandy loam	0.26
GgA	Gilman loam, 0-1% slope	0.25
GM	Gilman-Antho association	0.29
GWD	Gunsight-Pinal Complex, 1-10% slope	0.35
GYD	Gunsight-Rillito Complex, 1-10% slope	0.26
HLC	Harqua-Gunsight Complex, 0-5% slope	0.14
Lb	Laveen sandy loam	0.40
LcA	Laveen loam, 0-1% slope	0.25
Ma	Maripo sandy loam	0.40
Mo	Mohall sandy loam	0.39
Mr	Mohall clay loam	0.05
Pa	Perryville sandy loam	0.40
PeA	Perryville gravelly loam, 0-1% slope	0.37
PeB	Perryville gravelly loam, 1-3% slope	0.38
PRB	Perryville-Rillito Complex, 0-3% slope	0.28
PT	Pinal gravelly loam	0.40
PYD	Pinamt-Tremant Complex, 1-10% slope	0.20

TABLE 3-1 (Continued)

Map Units and Corresponding XKSAT Values for Soils in the Study Area

Symbol	Map Unit Name	Map Unit XKSAT, in/hr
RaA	Rillito sandy loam, 0-1% slope	0.39
RbA	Rillito loam, 0-1% slope	0.26
RpE	Rillito-Perryville complex, 5-20% slope	0.29
RS	Rock outcrop-Cherioni complex	0.40
TB	Torrifluvents	0.40
TSC	Tremant-Rillito complex, 0-5% slope	0.14
Tu	Tucson loam	0.25
Va	Valencia sandy loam	0.39
Vh	Vint fine sandy loam	0.27
Wg	Wintersburg Complex	0.03

Five land-uses are identified in the study area; desert, agricultural, very light density residential, moderate density residential, and open area. The majority of the study area is either agricultural or desert. Agricultural land is assumed to be either in production or fallow, and that 70 percent of the agricultural land is in production at any time and the remaining 30 percent is fallow. Land-use classification is used in the selection of surface retention loss (IA), DTHETA (wet, normal, or dry), effective impervious area (RTIMP), and percent vegetation cover. The values that are used for those parameters for the five land-uses are shown in Table 3-2.

TABLE 3-2

Land-use and Related Characteristics for Calculating Rainfall Losses

Land-use	Surface Retention (IA) inches	DTHETA Classification	Effective Impervious Area (RTIMP) %	Vegetation Cover %
desert	.35	Dry	0	15
agricultural				
production	.50	Wet	0	100
fallow	.50	Normal	0	0
very light density residential	.10-.20	Normal	7.5-15	0
moderate density residential	.20	Normal	22.5	0
open	.30	Dry	0	0

A portion of Subbasins 10, 24, and 26 are designated as very low density residential land-use based on existing conditions using recent aerial photographs and zoning maps. This land-use is categorized by the Flood Control District as being 15 percent total impervious (Reference 16). For subbasins 24 and 26, the effective impervious area is assumed to be 7.5 percent (50 percent of the 15 percent total impervious area). For subbasin 10, the effective impervious area is assumed to be equal to the total impervious area (15 percent) for the trailer park in that subbasin. The moderate density residential land-use associated with subbasins 67 and 69 represent the Town of Buckeye

itself with a total impervious area of 45 percent based on aerial photographs and zoning maps. The effective impervious area in those subbasins is assumed to be 22.5 percent (50 percent of the 45 percent total impervious area). Subbasins 4 and 6 contain the only soils with rock outcrop. These are the Cherioni-rock outcrop complex soils with map symbols CO and RS, and percentage rock outcrop of 20 percent and 65 percent, respectively. It is assumed that 100 percent of the rock outcrop is effective impervious area. The resulting range in effective impervious area for these subbasins is from 0 to 22.5 percent.

The majority of the land in the study area is agricultural. A distinction in the soil moisture deficit (DTHETA) and vegetative cover adjustment to the hydraulic conductivities (XKSAT) for the agricultural fields is based on information gathered from conversations with personnel of the SCS Buckeye office (Reference 17) and field reconnaissance. At any time, an average of approximately 30 percent of the Roosevelt Irrigation District is fallow. For the fallow lands, it is assumed that DTHETA is "normal" and vegetation cover is 0 percent. For the remaining 70 percent of the agricultural area, it is assumed that the soil is saturated or near saturated from irrigation applications (DTHETA is "wet") and has 100 percent vegetation cover. For the desert areas, a vegetation cover of 15 percent is assumed based on field reconnaissance.

A distinction in the percent vegetation cover is made for subbasins 10, 24 and 26 based on field reconnaissance. For subbasin 10 and 26, the vegetation has been removed in the very low density residential land-use area, and those areas of the subbasins are assumed to have 0 percent vegetation cover. Subbasin 24 has native vegetation landscaping and the vegetation cover is assumed to be the same as the surrounding desert at 15 percent.

The airplane landing strip in subbasin 16 is represented as open area land-use with no vegetation cover. This area also has a slightly lower surface retention than the surrounding desert.

The area averaged rainfall loss parameters (from the spreadsheets in Appendix C) for each of the subbasins are listed in Table 3-3. These Green and Ampt infiltration equation parameters (XKSAT adjusted for vegetation cover, PSIF, and DTHETA), surface retention loss (IA), and percent effective impervious area (RTIMP) are used as input to the HEC-1 models to represent rainfall losses for the study area.

SECTION III

HYDROLOGIC ANALYSIS

METHODOLOGY

Streamgage data are not available for this study area and, therefore, a hydrologic rainfall-runoff model is used to estimate storm runoff resulting from 100-yr rainfall depths of 6-hr and 24-hr durations. The HEC-1 program (Reference 13) is used to model the watershed with input to the program developed from guidance in the Hydrologic Design Manual for Maricopa County (Reference 14). The following describes the development of the watershed model input to that program.

SUBBASIN DELINEATION

The 61.5 square mile study area is divided into 83 subbasins, as illustrated in Plate 1. The subbasins range in size from 0.06 to 2.69 square miles. The land topography, anticipated flow paths, and numerous man-made improvements were used to delineate the subbasins. Subbasin boundaries are established along the crest of the Buckeye FRS, along the length of both the RC and the BC, along the alignment of the SPRR, and along the I-10 alignment for two subbasins that have significant drainage area between the Buckeye FRS and I-10. Those are all east-west trending boundary lines. Other east-west boundaries were established to separate the desert areas from the agricultural fields. Portions of Broadway and Baseline Road, and all of Southern Avenue constitute other east-west subbasin boundaries. The land surface gradient is generally from north to south and it is assumed that storm runoff will be mainly overland sheetflow with some concentrated flow in poorly defined watercourses and along the roads. The sectionline roads are generally paved with slightly elevated crowns, and most of the north-south roads have roadside drainage ditches and/or adjacent irrigation return flow ditches. Therefore, many of the north-south oriented boundaries of subbasins are the sectionline roads, based on the assumption that runoff will generally not cross those roads. In some cases, the north-south oriented boundaries were established by land surface contours. The subbasin boundaries were established based on USGS 7.5 minute topographic maps (Reference 5),

1990 aerial photos (Reference 7), and field reconnaissance of the study area.

The flow concentration points, shown in Plate 1, were selected to represent a general location where runoff from a subbasin is assumed to exit one subbasin and to enter an adjacent, southern subbasin. The locations of those concentration points were selected based on the best available information for the lowest elevation point along the boundary between adjacent subbasins. That information was obtained from USGS 7.5 minute topographic maps (Reference 5) and field surveys along the east-west sectionline roads (Figure 2-3).

Runoff from Subbasin 83 exits the study area in a southeasterly direction. That runoff is calculated but it does not contribute to flooding in the study area. Along the western side of the study area, the Hassayampa River floodplain terrace drains directly to the river and that area is excluded from detailed analysis since it does not contribute to flooding in the study area.

RAINFALL

Because of the size of the drainage area (61.5 square miles) it cannot be determined, beforehand, whether a longer duration, lower intensity general storm, or a shorter duration, higher intensity local storm will constitute the more severe flood hazard. Therefore, both a general storm and a local storm were input into models of the watershed. The general storm is modeled using the SCS Type II distribution with the 100-yr, 24-hr rainfall depth; and the local storm is modeled using the 6-hr distribution from the Hydrologic Design Manual with the 100-yr, 6-hr rainfall depth.

The 100-yr rainfall depths from the NOAA Atlas (Reference 9) are 4.10 inches for a duration of 24 hours, and 3.30 inches for a duration of 6 hours. These point rainfall depths are reduced, depending upon the size of the contributing drainage area, based on depth-area reduction factors in NOAA Technical Memorandum HYDRO-40 (Reference 15) for the 24-hr general storm, and the Hydrologic Design Manual (Reference 14) for the 6-hr local storm. The JD record option in HEC-1 is used to estimate storm runoff for various sized drainage areas. The depth-area reduction factors that are used for the two storms are as follows:

ROUTING DIAGRAM

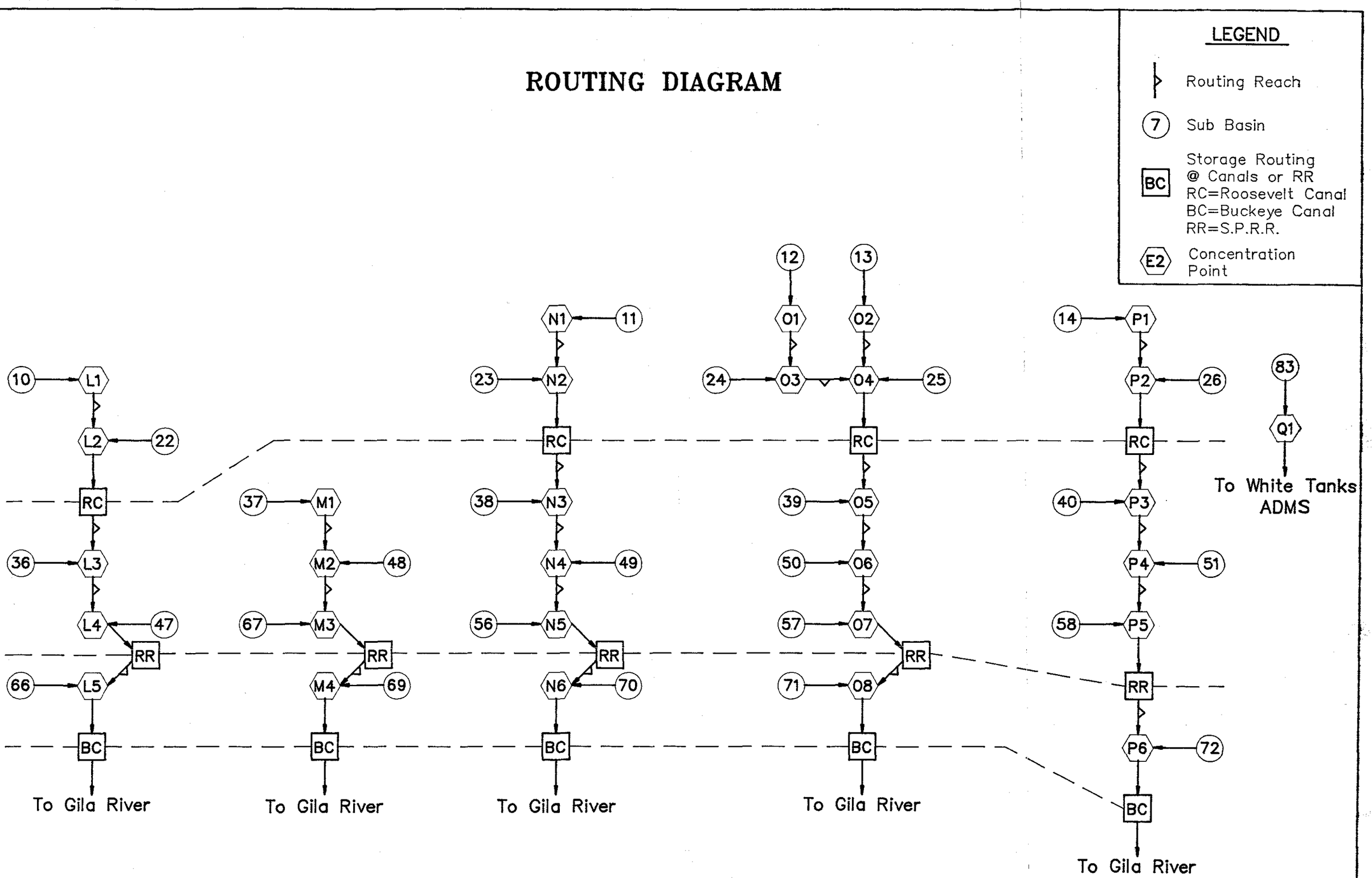


FIGURE 3–2 (Cont'd.)

ROUTING DIAGRAM

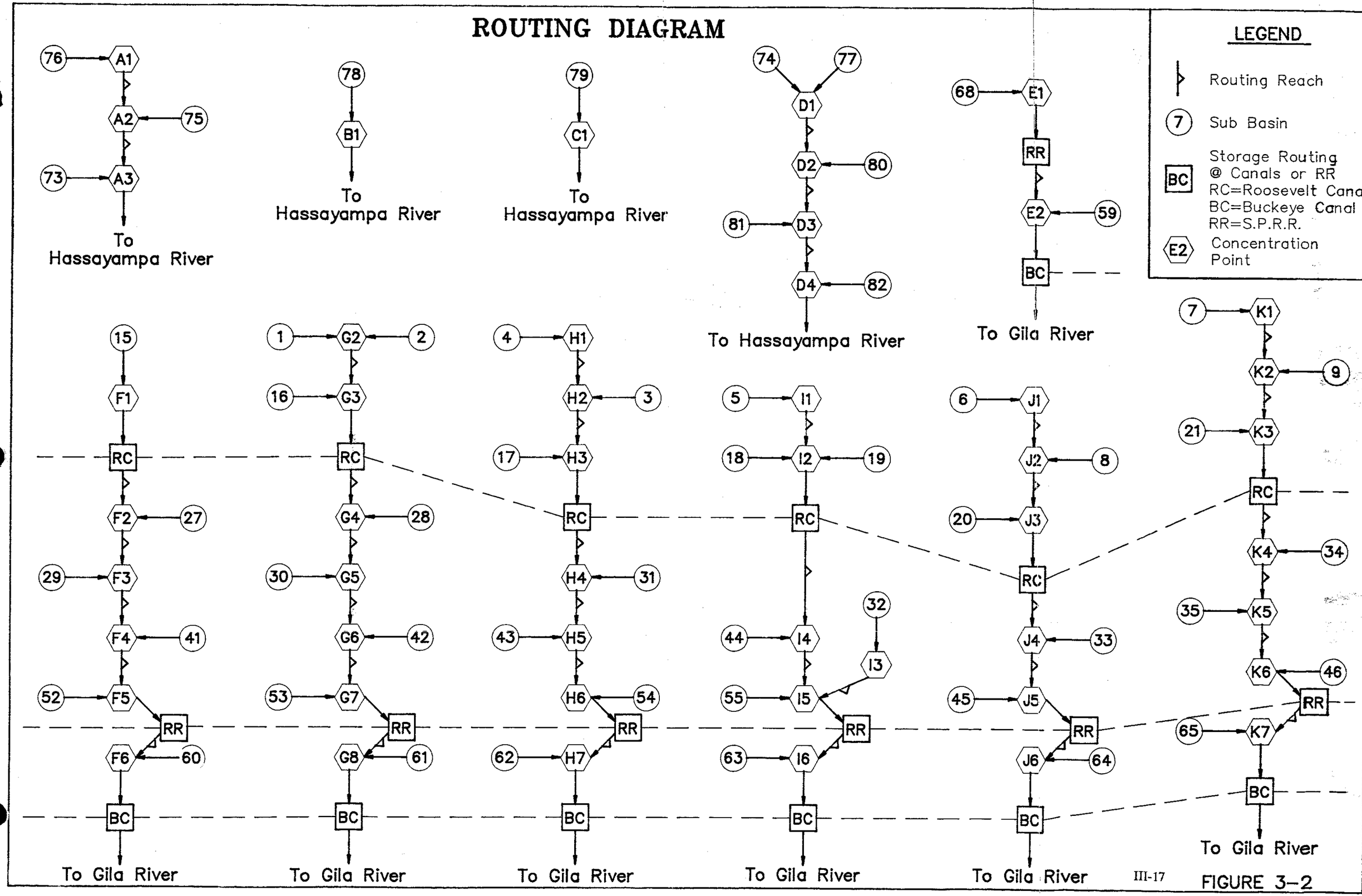


FIGURE 3–2

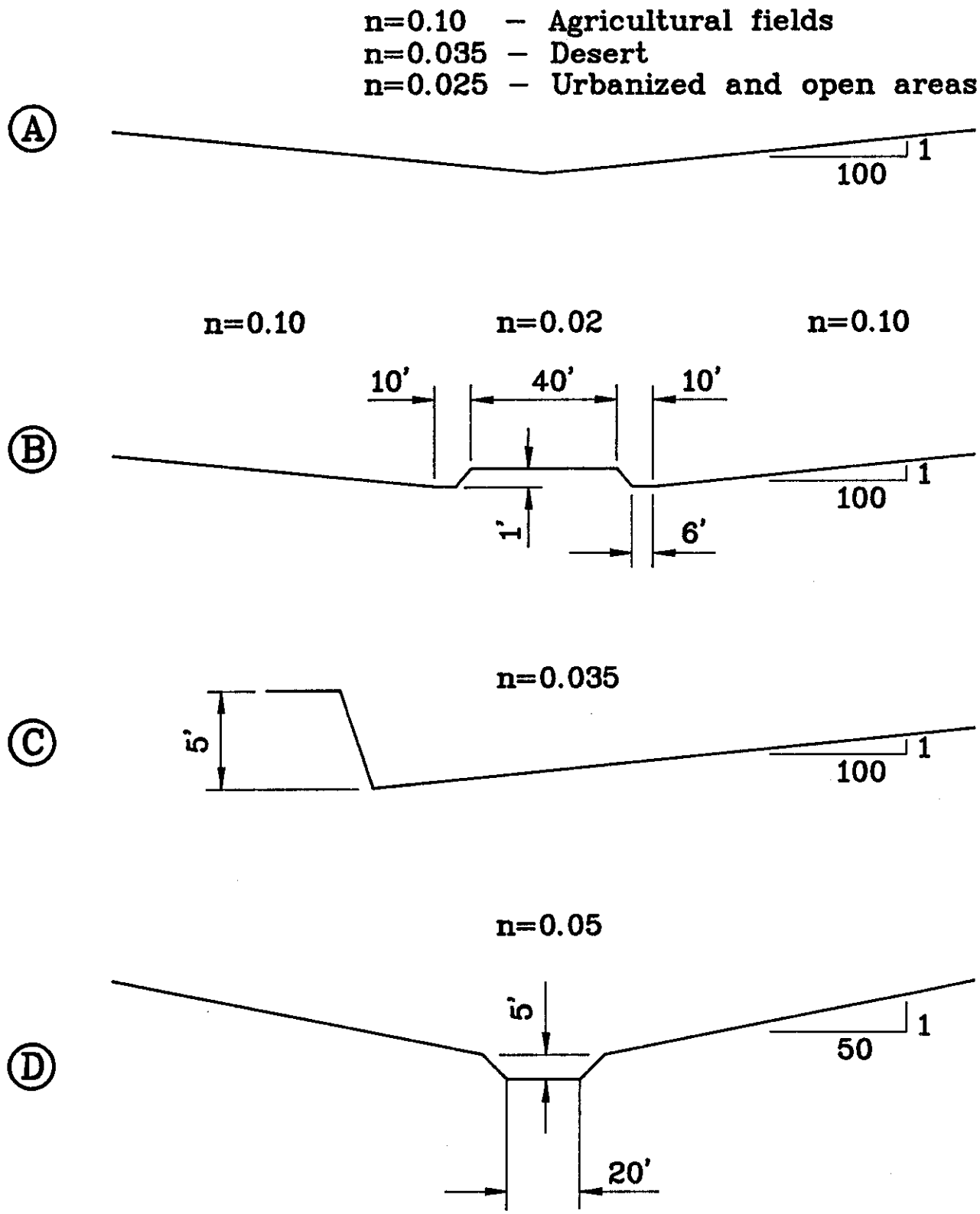


FIGURE 3–3

SKETCHES OF CHANNEL SECTIONS USED FOR THE VARIOUS ROUTING REACHES

Section B of Figure 3-3 is used to represent routing reaches along the sectionline roads. This section geometry is a representation of the sectionline roads in Figure 2-2. Section C of Figure 3-3 is used to represent a few routing reaches that are along the RC wasteway channel and along a flood protection berm. Section D of Figure 3-3 is a representation of the natural watercourse through subwatershed D. That watercourse is a well defined channel with sloping overbank floodplains.

The discharge rating curves for each of the four channel routing sections are presented in Appendix E, and the HEC-1 input for each routing reach is shown in Table 3-5. That table provides the routing reach lengths and slopes that were measured from the watershed map, and identifies the channel section from Figure 3-3 that was used along with the Manning's roughness coefficients for the channel and overbanks.

TABLE 3-5

Muskingum-Cunge Routing Input for Each Routing Reach

Reach	Length (ft)	Slope (ft/ft)	Channel Section (See Figure 3-3)	Manning's n Channel	Manning's n Overbank
A1-A2	2500	.004	C	.035	---
A2-A3	4500	.004	C	.035	---
D1-D2	7200	.006	D	.050	---
D2-D3	5300	.008	D	.050	---
D3-D4	5200	.005	D	.050	---
E1-E2	1200	.002	A	.100	---
F1-F2	2600	.004	A	.100	---
F2-F3	5280	.006	A	.100	---
F3-F4	5280	.006	A	.100	---
F4-F5	3200	.005	A	.100	---
F5-F6	3500	.006	A	.100	---
G2-G3	3400	.005	A	.100	---
G3-G4	1500	.009	A	.100	---
G4-G5	5400	.007	A	.100	---
G5-G6	5300	.006	A	.100	---
G6-G7	2200	.005	A	.100	---
G7-G8	3500	.005	A	.100	---
H1-H2	5500	.004	C	.035	---
H2-H3	2600	.008	B	.020	.10
H3-H4	6500	.007	B	.020	.10
H4-H5	5280	.006	B	.020	.10
H5-H6	2200	.006	B	.020	.10
H6-H7	2800	.006	A	.100	---
I1-I2	2100	.007	B	.020	.10
I2-I4	9600	.009	B	.020	.10
I3-I5	10400	.005	B	.020	.10
I4-I5	2000	.003	A	.100	---
I5-I6	3000	.007	A	.100	---
J1-J2	4000	.005	A	.035	---
J2-J3	2900	.009	B	.020	.10
J3-J4	6000	.009	B	.020	.10

TABLE 3-5 (Continued)

Muskingum-Cunge Routing Input for Each Routing Reach

Reach	Length (ft)	Slope (ft/ft)	Channel Section (See Figure 3-3)	Manning's n Channel	Manning's n Overbank
J4-J5	7600	.006	A	.100	---
J5-J6	2000	.008	A	.100	---
K1-K2	4000	.008	A	.035	---
K2-K3	4200	.007	A	.100	---
K3-K4	2200	.011	B	.020	.10
K4-K5	5280	.008	B	.020	.10
K5-K6	5600	.006	B	.020	.10
K6-K7	2600	.007	A	.100	---
L1-L2	2640	.009	B	.020	.10
L2-L3	7600	.009	B	.020	.10
L3-L4	6000	.006	B	.020	.10
L4-L5	1500	.005	A	.100	---
M1-M2	2600	.009	A	.100	---
M2-M3	3500	.007	A	.025	---
M3-M4	400	.001	A	.025	---
N1-N2	2300	.007	B	.020	.10
N2-N3	3500	.008	B	.020	.10
N3-N4	5280	.009	B	.020	.10
N4-N5	4500	.008	B	.020	.10
N5-N6	700	.001	A	.100	---
O1-O3	2600	.008	A	.025	---
O2-O4	3400	.007	B	.020	.10
O3-O4	4200	.005	A	.100	---
O4-O5	4300	.009	B	.020	.10
O5-O6	5280	.011	B	.020	.10
O6-O7	3500	.003	B	.020	.10
O7-O8	1600	.001	A	.100	---
P1-P2	4600	.005	A	.025	---
P2-P3	5900	.009	B	.020	.10
P3-P4	5280	.009	B	.020	.10
P4-P5	2500	.004	A	.100	---
P5-P6	700	.001	A	.100	---

Storage Routing through Structures

The man-made structures (RC, SPRR and BC) that traverse the study area are (1) generally perpendicular to the flow direction, and (2) elevated above the natural ground surface. Therefore, these structures will result in the ponding of surface runoff behind the structures with flow either passing through the structures in drainage facilities, or flow passing over the structures if the storage capacity of the ponding area is exceeded by runoff. Level-pool storage routing (RS record) is used for the ponding areas, and this requires stage-discharge-storage input to the model (SE, SQ and SA records). This type of modeling is performed for the RC, the SPRR and the BC. Storage routing is not performed for the two concentration points (Plate 1, J1 and K1) where I-10 is used as a subbasin boundary. This is because the highway cross-drainage structures are designed to pass the 50-yr flood and there would probably be little reduction of peak discharge for those two locations.

A description of the RC, SPRR and BC are contained in the Watershed Description in Section II of this report. This section, Storage Routing through Structures, contains a discussion of the assumptions and data that are used to analyze the storage routing through and over those structures.

In performing storage routing for the RC, the SPRR and the BC, field survey data were obtained and these data were used to define stage-storage and stage-discharge relations for those structures. The field survey consisted of three-point cross-section measurements along the north side of the RC, the SPRR and the BC. These measurements consist of elevation of the top of the canal bank on the north side for the RC and the BC, elevation of the top of ballast for the SPRR, the visually determined low point in the field immediately adjacent to either the canal road or the SPRR, and a point in the field to the north of either the canal or the SPRR that was about one foot above the canal bank or the railroad ballast. Definition sketches of the three-point cross-section field survey data are shown in Figure 3-4. Along the RC, there is a low (less than 1 foot high) earthen berm that runs along the canal north bank. This is considered a non-structural berm and elevations were not taken at the top of that small berm.

The three-point survey data were used to calculate the stage-storage relations (conic method with SE and SA records) for the ponding areas behind the RC, the SPRR and the BC. The three-point

survey data and data analyses are presented in Appendix F.

For overflow over both the RC and the BC, it is assumed that the canals are conveying irrigation water and/or storm runoff at canal bankfull (no freeboard available). Inflow at a rundown or canal overflow section is assumed to enter the canal and to exit the canal over the south bank at the same location without any loss of runoff volume or attenuation of the peak. It is also assumed that overtopping of the canals does not result in breach of the canal or diversion of any of the discharge that is being conveyed by the canal. These assumptions, in essence, treat the canals as if they do not exist except for the elevated berms that cause ponding to the north of the canals.

For both the RC and the BC, there are no cross-drainage facilities (siphons, flumes, etc.) - with one exception: At Concentration Point F1, there is a 36-inch siphon under the Roosevelt Canal. This siphon is assumed to be debris-plugged and inoperational during a 100-year storm. Therefore, storm runoff from drainage areas upslope of either of those canal structures will pond against the north canal banks until the depth of ponding is sufficient to cause overtopping of the north canal bank. Overtopping flow crosses the canal and enters the adjacent (to the south) modeling subbasin. For both of these canals, stage-discharge-storage relations were defined for each subbasin adjacent to and on the north side of those two canals. The three-point cross-sectional field survey data for those two canals were used to define the stage-storage relations for each of the subbasin ponding areas. A description of the stage-storage analysis and results are contained in Appendix F. A summary of the stage-storage relations that were derived from the three-point cross-sectional data for both the RC and the BC are shown in Tables 3-6 and 3-7, respectively.

For overtopping discharges of the RC and the BC, stage-discharge relations were developed assuming weir flow over the canals. The profile of the north canal bank was obtained by field survey. The overtopping flow stage-discharge relation (within the boundaries of each subbasin) was calculated using an uneven weir relation and a broadcrested weir coefficient of 2.63. The canal bank station-elevation data for each subbasin and the results of the overtopping flow stage-discharge relations are provided in Appendix G for the RC and in Appendix H for the BC.

The SPRR has 24 cross-drainage structures with timber trestles within the study area (photographs and field survey data in Appendix A). However, it is possible that the discharge capacities of those

structures are not adequate to pass all incoming runoff without overtopping the railroad. Therefore, railroad overtopping stage-discharge relations were developed by using the uneven weir method as used for the RC and the BC. The railroad (to the top of rail which is 8-inches higher than the surveyed top of ballast) station-elevation data and overtopping flow stage-discharge relations for each subbasin are provided in Appendix I. A summary of the stage-storage relation that was derived from the three-point cross-sectional data for the SPRR is shown in Table 3-8. Stage-discharge rating curves for each structure were developed based on an orifice equation and calculations are presented in Appendix J.

For the SPRR, the final stage-discharge relation is a compilation of the stage-discharge relation(s) for the cross-drainage structure(s) plus the stage-discharge relation for overtopping flow for each modeling length of the SPRR. For both the RC and the BC, the stage-discharge relation was simply that due to overtopping. For all three structures (RC, SPRR and BC), the stage-storage relations (storage in terms of ponding surface area) and the stage-discharge relations were graphed. These relations are shown in Appendices K, L and M for the RC, BC and SPRR, respectively. From those graphs, SE, SQ and SA input to the HEC-1 model were determined.

Ponding area equals width times length of canal (L) between adjacent survey locations

A1 = W1xL = 0.0
A2 = W2xL
A3 = W3xL

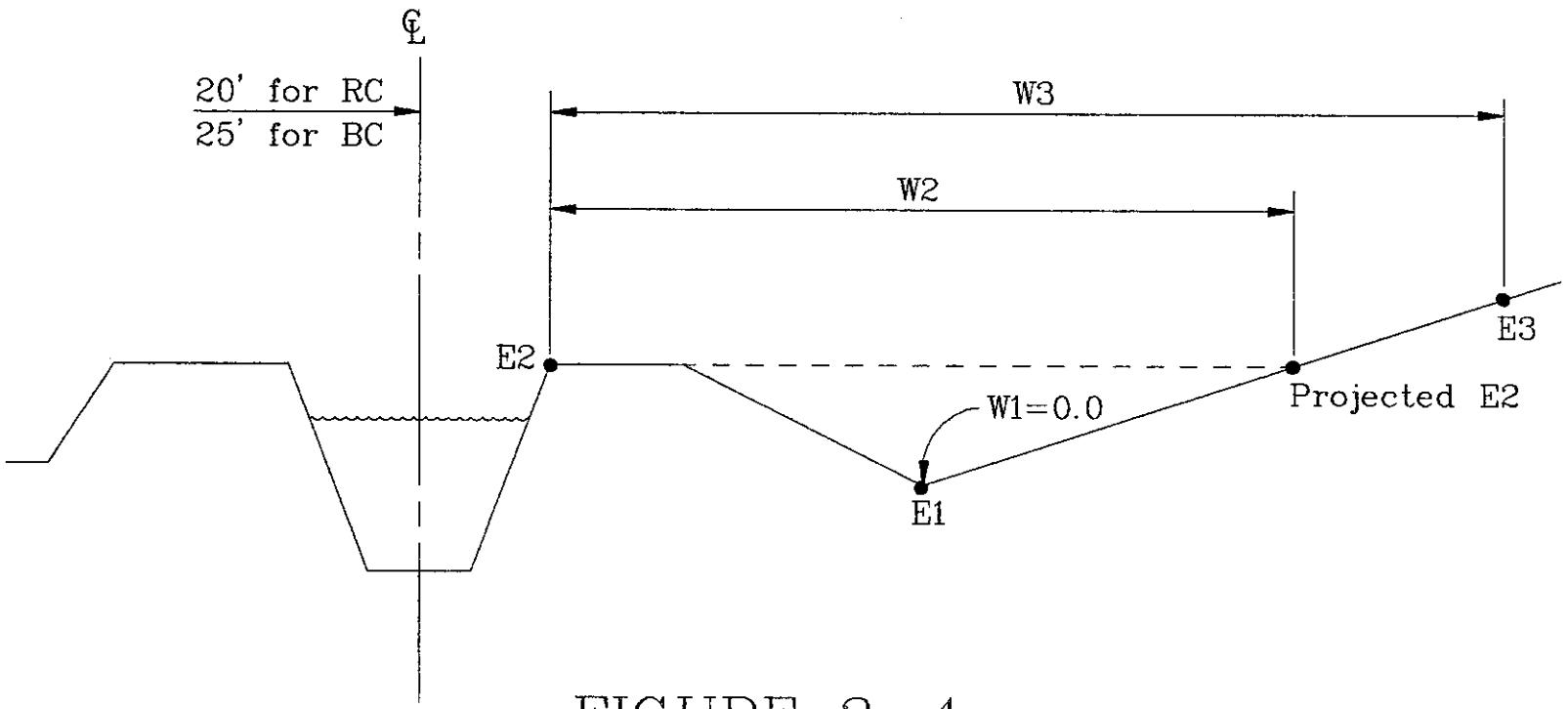


FIGURE 3-4a

DEFINITION SKETCH OF THREE POINT CROSS-SECTIONAL FIELD SURVEY DATA ALONG THE RC AND THE BC.

(Not to Scale)

Ponding area equals width times length of canal (L) between adjacent survey locations

A1 = W1xL = 0.0
A2 = W2xL
A3 = W3xL

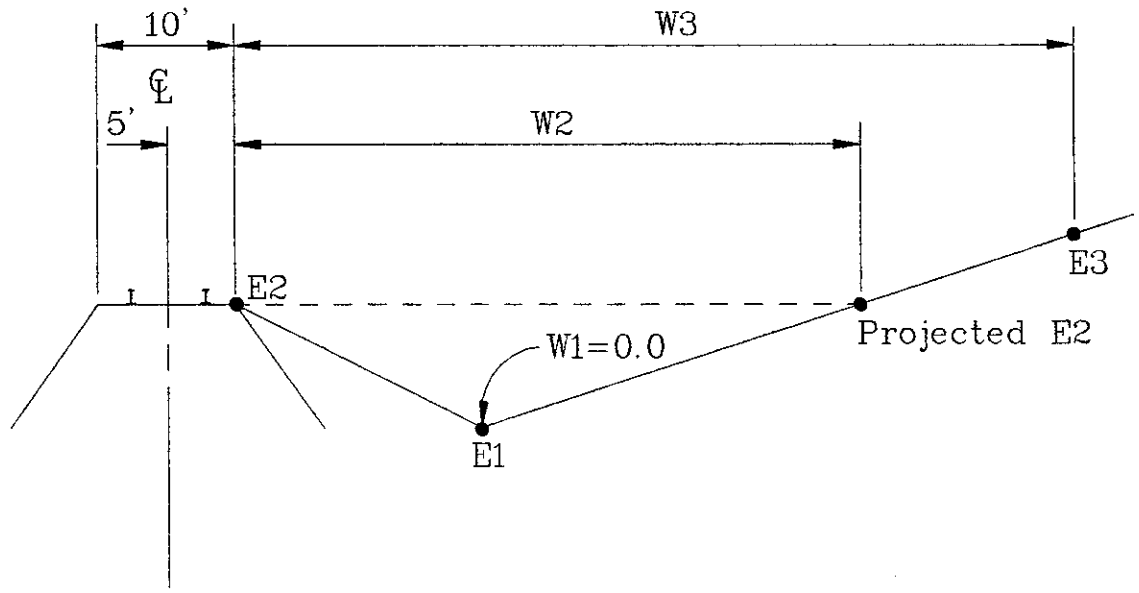


FIGURE 3-4b

DEFINITION SKETCH OF THREE POINT CROSS-SECTIONAL FIELD SURVEY DATA ALONG THE SPRR

(Not to Scale)

TABLE 3-6

Stage-Area Relations for Ponding Areas Behind the
Roosevelt Irrigation District Canal

(See Figure 3-4a for definition of dimensions.)

Ponding Location	Elevation, in feet			Ponding area, in acres, Corresponding to Elevation[a]	
	E1	E2	E3	A2	A3
Dean Rd to Rainbow Rd	998.19	999.12	1000.12	12.2	30.7
Rainbow Rd to Watson Rd	995.25	996.79	998.26	17.9	29.4
Watson Rd to Cemetery Rd	995.68	996.49	997.48	19.2	38.6
Cemetery Rd to Miller Rd	994.91	995.14	996.13	3.4	34.9
Miller Rd to Rooks Rd	992.43	994.01	995.00	17.7	39.9
Rooks Rd to Oglesby Rd	991.22	991.44	992.39	10.0	48.5
Oglesby Rd to Turner Rd	988.35	989.60	990.70	29.0	51.5
Turner Rd to Wilson Rd	986.58	988.31	989.32	33.7	57.4
Wilson Rd to Palo Verde Rd	985.66	987.39	988.40	47.7	81.8
Palo Verde Rd to Bruner Rd	983.14	986.04	987.03	94.2	118.2
Bruner Rd to Johnson Rd	982.04	984.23	985.50	127.3	145.3
Johnson Rd to end of Canal	980.41	981.09	982.10	23.3	36.1

[a] - A1 is 0.0 acres

TABLE 3-7

Stage-Area Relations for Ponding Areas Behind the
Buckeye Irrigation District Canal

(See Figure 3-4a for definition of dimensions.)

Ponding Location	Elevation, in feet			Ponding area, in acres, Corresponding to Elevation[a]	
	E1	E2	E3	A2	A3
Dean Rd to Rainbow Rd	887.73	889.35	889.72	36.8	43.9
Rainbow Rd to Watson Rd	885.62	888.24	890.18	79.0	87.4
Watson Rd to Cemetery Rd	883.23	886.33	886.55	73.4	84.4
Cemetery Rd to Miller Rd	879.00	883.90	886.00	70.0	108.0
Miller Rd to Rooks Rd	878.35	882.05	883.05	95.0	119.5
Rooks Rd to Oglesby Rd	877.46	880.43	881.52	76.0	100.9
Oglesby Rd to Turner Rd	876.47	828.29	879.60	60.7	91.4
Turner Rd to Wilson Rd	874.67	877.40	878.39	62.1	100.5
Wilson Rd to Palo Verde Rd	872.35	875.90	876.90	84.6	119.7
Palo Verde Rd to Bruner Rd	872.29	875.46	876.56	94.3	140.6
Bruner Rd to Johnson Rd	870.66	873.08	874.34	80.6	136.7
Johnson Rd to end of canal	866.70	867.65	868.81	15.1	44.7

[a] - A1 is 0.0 acres

TABLE 3-8

Stage-Area Relations for Ponding Areas Behind the Southern Pacific Railroad

(See Figure 3-4b for definition of dimensions.)

Ponding Location	Elevation, in feet			Ponding area, in acres, Corresponding to Elevation[a]	
	E1	E2	E3	A2	A3
Dean Rd to Rainbow Rd	892.47	893.69	894.70	31.6	60.8
Rainbow Rd to Watson Rd	891.30	892.87	893.83	21.4	41.0
Watson Rd to Cemetery Rd	886.78	890.08	891.07	37.3	48.8
Cemetery Rd to Miller Rd	887.06	888.11	889.96	24.7	79.8
Miller Rd to Rooks Rd	888.94	890.79	891.45	34.4	54.2
Rooks Rd to Oglesby Rd	891.58	892.82	893.75	46.5	76.3
Oglesby Rd to Turner Rd	891.55	893.92	895.20	41.3	66.0
Turner Rd to Wilson Ave	893.11	894.49	895.30	32.1	63.7
Wilson Rd to Palo Verde Rd	891.43	893.22	894.24	51.7	76.9
Palo Verde Rd to Bruner Rd	891.04	893.04	894.17	39.3	61.1
Bruner Rd to Johnson Rd	892.31	894.07	895.57	27.5	62.0
Johnson Rd to End of Canal	875.00	880.00	890.00	33.8	72.7

[a] - A1 is 0.0 acres

CHANNEL TRANSMISSION LOSSES

Channel transmission losses are not estimated with the watershed model. This is because of the following:

1. There are no defined watercourses containing coarse alluvium in the study area.
2. Concentrated overland flow is physically contained over and along roads and through broad, shallow watercourses in the agricultural fields. The percolation rates for the paved roads and through these relatively tight soils (in comparison to typical alluvial bed material) would be quite low.
3. The percolation rates through the agricultural fields would be lower than would occur under natural (nonagricultural) conditions because antecedent irrigation applications are assumed which would lower the percolation rate to the steady-state infiltration rate which would be less than 1 in/hr.

Therefore, incorporation of channel transmission losses would add complexity to the model without any reasonable data to substantiate assumptions, and would probably not result in significant reduction of runoff discharges.

SECTION IV

RESULTS OF HYDROLOGIC ANALYSIS

GENERAL

The hydrologic analyses using the watershed models, as described, yield estimates of flood peak discharges and runoff volumes for the 6-hr local storm and the 24-hr general storm for the study area. The watershed is modeled with subbasins that are generally about 1 mile wide. Runoff is generally from north to south with runoff from an upstream subbasin flowing into a southern, adjacent subbasin. Therefore, the watershed consists of sets of north-south connected subbasins that are essentially parallel to each other. Under the assumption that runoff does not exit a subbasin except at a designated concentration point, these sets of "stacked" subbasins are essentially independent subwatersheds within the larger project watershed. There are 13 of these subwatersheds, each about 1 mile wide, and these are designated according to the letter in the concentration point number of the stacked subbasins (D through P). These subwatersheds are identified in Plate 4.

The assumption that there is no lateral (east-west) flow between adjacent subwatersheds is valid if there is no hydraulic gradient between subbasins in the east-west direction. This assumption could be questioned particularly in the ponding areas on the north side of the RC, SPRR, and the BC. Although there is a slight gradient of the land surface from east to west along those structures (0.7 ft/mile for the RC, 0.2 ft/mile for the SPRR, and 1.5 ft/mile for the BC) it is likely that sufficient roadway elevation occurs at the roads separating the subwatersheds and this would restrict lateral flow behind those structures. Also, runoff behind those structures would probably occur at about the same time and to comparable depths so that the ponded water surface elevation (hydraulic gradient) would be very small behind those structures thereby further limiting or restricting lateral flow along those structures. Therefore, the hydrologic results, as presented, are based on this assumption of independence of flow in each of the subwatersheds (D through P) and this assumption appears to be justified.

Listings of the HEC-1 input and output files for the 100-yr, 6-hr model and the 100-yr, 24-hr model are shown in Appendices N and O, respectively.

MODEL RESULTS

Plate 5 and Table 4-1 show the 100-yr flood peak discharges that are developed from each subbasin for both the 6-hr and the 24-hr storms. Table 4-1 also shows the land-use and the unit peak discharges for each subbasin. For the 6-hr storm, the average unit peak discharges are 1,262 cfs/square mile and 424 cfs/square mile for the desert and agricultural areas, respectively. For the 24-hr storm, the average unit peak discharges are 903 cfs/square mile and 304 cfs/square mile for the desert and agricultural areas, respectively. Notice that larger flood peaks for the subbasins are generated for the 6-hr storm. Also, the desert subbasins produce larger unit peak discharges than do the agricultural fields. This is due to the shorter Lag times for the desert subbasins than those for agricultural fields. The agricultural fields have higher flow resistance (K_n) than do the desert. The volume of runoff per unit area is greater for the agricultural fields than the desert because of the higher antecedent soil moisture (reflected in DTHETA) in the irrigated agricultural areas.

Also shown in Plate 5 are the peak discharges from combined runoff at each concentration point. Again, the 6-hr storm usually produces the greater peak discharges throughout the study area although the 24-hr storm produces the greater peak discharge at many of the concentration points. Tracing of the peak discharges for a subwatershed (D through P) from north to south shows that the peak discharge usually increases somewhat as the runoff moves to the south, however, the peak discharges from the upper desert subbasins are the dominant driving force for the runoff as it is routed through the subwatersheds.

The discharges at the RC, SPRR, and the BC for each modeling subwatershed are shown in Table 4-2. A primary result, shown in Table 4-2 and Plate 5, indicates that runoff will overtop the RC and the BC at each subwatershed interval along each of these canals. The implication of this is that the storage capacities behind these two structures are exceeded and the maximum ponding area (with a relatively small vertical increment of water surface to provide overtopping head) defines the flooded zone for those two structures.

TABLE 4-1

100-year Peak Discharges (also shown in Plate 5) and Unit Peak Discharges for each Subbasin.

Subbasin No.	Land-Use A - agriculture D - Desert	Area (sq. mi.)	6-hr Storm Peak Discharge (cfs)	6-hr Storm Unit Peak Discharge (cfs/sq.mi.)	24-hr Storm Peak Discharge (cfs)	24-hr Storm Unit Peak Discharge (cfs/sq.mi.)
1	D	1.672	1109	663	982	587
2	D	1.239	1112	897	897	724
3	D	1.309	989	756	764	584
4	D	0.567	702	1238	482	850
5	D	1.638	1468	896	1275	778
6	D	0.323	653	2022	468	1449
7	D	0.413	795	1925	478	1157
8	D	0.383	493	1287	331	864
9	D	0.706	1150	1629	699	990
10	D	1.316	1283	975	1025	779
11	D	1.267	1491	1177	1150	908
12	D	0.977	1238	1267	1041	1066
13	D	0.447	591	1322	374	837
14	D	0.788	1096	1391	763	968
15	A	1.331	341	256	283	213
16	A	0.920	319	347	244	265
17	A	0.880	280	318	223	253
18	A	0.905	344	380	265	293
19	A	0.594	213	359	148	249
20	A	0.666	316	474	224	336
21	A	0.552	207	375	142	257
22	A	0.577	210	364	145	251
23	A	0.527	177	336	121	230
24	A	0.486	277	570	201	414
25	A	0.270	116	430	78	289
26	A	0.519	206	397	148	285
27	A	0.231	136	589	93	403
28	A	0.325	153	471	107	329
29	A	1.000	338	338	252	252
30	A	1.000	338	338	255	255
31	A	1.063	301	283	241	227
32	A	0.881	281	319	209	237
33	A	0.978	305	312	240	245
34	A	0.625	248	397	184	294
35	A	1.502	400	266	322	214
36	A	0.683	225	329	161	236
37	A	1.441	343	238	287	199
38	A	0.525	210	400	143	272
39	A	0.714	274	384	192	269
40	A	0.952	317	333	240	252
41	A	1.208	387	320	300	248
42	A	0.775	290	374	212	274
43	A	1.000	264	264	210	210
44	A	1.000	289	289	218	218

TABLE 4-1 (Continued)

100-year Peak Discharges (also shown in Plate 5) and Unit Peak Discharges for each Subbasin.

Subbasin No.	Land-Use A - agriculture D - Desert	Area (sq. mi.)	6-hr Storm Peak Discharge (cfs)	6-hr Storm Unit Peak Discharge (cfs/sq.mi.)	24-hr Storm Peak Discharge (cfs)	24-hr Storm Unit Peak Discharge (cfs/sq.mi.)
45	A	1.147	379	330	298	260
46	A	1.375	420	305	347	252
47	A	0.620	271	437	188	303
48	A	0.486	263	541	176	362
49	A	1.000	285	285	214	214
50	A	1.000	300	300	232	232
51	A	0.998	317	318	234	234
52	A	0.816	274	336	204	250
53	A	0.341	233	683	158	463
54	A	0.380	145	382	103	271
55	A	0.266	121	455	83	312
56	A	0.736	241	327	178	242
57	A	0.508	222	437	150	295
58	A	0.211	103	488	72	341
59	A	0.236	193	818	124	525
60	A	1.147	354	309	281	245
61	A	0.347	201	579	132	380
62	A	0.580	289	498	199	343
63	A	0.513	274	534	188	366
64	A	0.427	270	632	177	415
65	A	0.405	269	664	178	440
66	A	0.286	164	573	115	402
67	A	0.489	348	712	242	495
68	A	0.278	171	615	122	439
69	A	0.138	76	551	54	391
70	A	0.166	73	440	53	319
71	A	0.139	83	597	60	432
72	A	0.067	40	597	28	418
73	D	2.061	1375	667	1193	579
74	D	2.691	1603	596	1435	500
75	D	0.541	594	1098	441	815
76	D	0.061	134	2197	92	1508
77	D	0.230	353	1535	236	1026
78	D	0.414	732	1768	478	1155
79	D	0.783	891	1138	657	839
80	D	0.644	792	1230	512	795
81	D	0.633	757	1196	583	921
82	D	0.258	351	1360	231	895
83	D	0.870	1142	1313	870	1000

TABLE 4-2

Peak Discharges at the RC, SPRR, and the BC for Each Modeling Subwatershed

(Values for the RC and the BC are the peak discharges that overtop the canal structures at the concentration points. For the SPRR, both overtopping discharges and discharges through cross-drainage structures are shown.)

Subwatershed	RC		SPRR			BC	
	Concentration Point	Discharge (cfs)	Concentration Point	Discharge (cfs)		Concentration Point	Discharge (cfs)
				Overtopping	Structures		
D	D1	1603	a	a	a	a	a
E	b	b	E1	0	171	E2	255
F	F1	294	F5	0	541	F6	666*
G	G3	1144	G7	0	1457 *	G8	976*
H	H3	1218	H6	0	951 *	H7	889*
I	I2	1399	I5	870	204	I6	1008*
J	J3	832	J5	573	255	J6	780*
K	K3	1078	K6	0	1173 *	K7	1103*
L	L2	1139 *	L4	893 *	287 *	L5	439
M	b	b	M3	317	205	M4	287
N	N2	1419	N5	115	661	N6	770
O	O4	1373	O7	1095	155	O8	851
P	P2	840	P5	0	973 *	P6	710

a - Subwatershed D does not cross the SPRR or the BC
b - Subwatershed E and M do not cross the RC
* - Indicates that the larger peak discharge is produced by the 24-hr storm.

Since the results indicate that both the RC and the BC are overtopped in each of the modeling subwatersheds, this means that the ponding areas behind each of those canals fill with stormwater runoff under the set of modeling assumptions that were made and the model input that was developed. Therefore, the use of more conservative assumptions for model input (greater rainfall depth, less rainfall losses, shorter unit hydrograph Lag times, or hydraulically more efficient routing) would not result in measurably more severe flooding behind the RC or the BC. The use of more conservative assumptions that would produce greater runoff peaks or volumes would only result in greater discharges overtopping those structures (or longer overtopping durations) without significantly affecting the volume of ponding (and therefore ponded area). Therefore, the model input and results, as presented, represent the most reasonably severe condition of flood inundation behind the RC and the BC.

The peak discharges and maximum flow depths for each routing reach are shown in Table 4-3. The maximum flow depths were obtained from discharge rating curves for the four routing sections (Figure 3-3), and these rating curves are shown in Appendix E. The maximum flow depths for the routing reaches through the agricultural fields and deserts (Section A of Figure 3-3), and along the sectionline roads (Section B of Figure 3-3) are generally greater than 1 ft and less than 3 ft. There are only seven routing reaches through agricultural fields where the maximum flow depths exceed 3 ft (3.7 ft maximum). The maximum flow depths, as shown in Table 4-3, are reasonable for the discharges and hydraulic conditions that exist in the Buckeye area. These routing results are presented as a demonstration of the validity of the assumptions that were made in selecting the routing section channel geometrics and Manning's roughness coefficients.

In some cases, the peak discharges for the subwatersheds decrease from one concentration point to a next downstream concentration point (see Plate 5). This occurs because of a combination of factors in the models. Routing, particularly through the very broad, shallow agricultural routing reaches, results in a reduction of the routed hydrograph peak discharges. Hydrographs from contributing subbasins may (and probably do) peak sooner than the routed hydrographs and the addition of these two hydrographs occasionally results in a reduction of peak discharge from the upper concentration point. Another factor that has some impact on these results is the use of the JD option. The peak discharges for smaller drainage areas are based on greater rainfall depths, and for the 6-hr storm, greater rainfall intensities. Therefore, there is a tendency for flood peak discharges to decrease as drainage area increases due to the diminishing rainfall input through use of the JD option.

TABLE 4-3

100-year Peak Discharges and Maximum Flow Depths for Each Routing Reach

Routing Reach	Channel Routing Section (See Figure 3-3)	6-hr Storm Peak Discharge (cfs)	6-hr Storm Maximum Flow Depth (feet)	24-hr Storm Peak Discharge (cfs)	24-hr Storm Maximum Flow Depth (feet)
A1-A2	C	102	1.6	74	0.9
A2-A3	C	644	2.1	451	1.9
D1-D2	D	1513	6.4	1431	6.2
D2-D3	D	1483	6.0	1436	5.9
D3-D4	D	1441	6.4	1420	6.4
E1-E2	A	155	1.7	109	1.4
F1-F2	A	285	1.8	223	1.6
F2-F3	A	274	1.6	220	1.5
F3-F4	A	338	1.8	299	1.7
74-F5	A	462	2.1	439	2.0
F5-F6	A	533	2.1	529	2.1
G2-G3	A	1638	3.4	1576	3.3
G3-G4	A	1126	2.6	1091	2.6
G4-G5	A	1191	2.8	1164	2.8
G5-G6	A	1341	3.0	1382	3.0
G6-G7	A	1358	3.1	1458	3.2
G7-G8	A	1279	3.0	1386	3.1
H1-H2	C	599	2.1	461	1.9
H2-H3	B	1209	2.4	1091	2.3
H3-H4	B	1578	2.7	1465	2.6
H4-H5	B	1389	2.6	1615	2.8
H5-H6	B	1274	2.5	1763	2.9
H6-H7	A	937	2.6	959	2.7
I1-I2	B	1430	2.6	1217	2.4
I2-I4	B	1668	2.6	1174	2.3
I4-I5	A	1154	3.2	1008	3.1
I3-I5	B	248	1.4	193	1.3
I5-I6	A	1017	2.6	1032	2.6
J1-J2	A	647	1.6	482	1.4
J2-J3	B	867	2.0	679	1.8
J3-J4	B	815	2.0	854	2.0
J4-J5	A	875	2.6	843	2.5
J5-J6	A	934	2.5	898	2.4
K1-K2	A	737	1.5	408	1.2
K2-K3	A	1101	2.7	838	2.4
K3-K4	B	1040	2.1	849	1.9
K4-K5	B	967	2.2	872	2.1
K5-K6	B	846	2.2	977	2.3
K6-K7	A	1046	2.6	1171	2.8
L1-L2	B	1180	2.3	1104	2.2
L2-L3	B	1199	2.3	1233	2.3
L3-L4	B	1145	2.7	1305	2.8
L4-L5	A	983	2.8	1088	2.8
M1-M2	A	337	1.6	282	1.5

TABLE 4-3 (Continued)

100-year Peak Discharges and Maximum Flow Depths for Each Routing Reach

Routing Reach	Channel Routing Section (See Figure 3-3)	6-hr Storm Peak Discharge (cfs)	6-hr Storm Maximum Flow Depth (feet)	24-hr Storm Peak Discharge (cfs)	24-hr Storm Maximum Flow Depth (feet)
M2-M3	A	345	1.0	295	1.0
M3-M4	A	517	1.8	435	1.6
N1-N2	B	1400	2.6	1087	2.3
N2-N3	B	1310	2.4	1085	2.3
N3-N4	B	1159	2.3	1168	2.3
N4-N5	B	955	2.2	841	2.1
N5-N6	A	760	3.4	723	3.3
O1-O3	A	1222	1.6	910	1.4
O3-O4	A	1103	2.9	996	2.8
O2-O4	B	530	1.8	351	1.5
O4-O5	B	1325	2.4	1244	2.3
O5-O6	B	1388	2.3	1142	2.2
O6-O7	B	1282	2.9	1185	2.8
O7-O8	A	976	3.7	892	3.6
P1-P2	A	1012	1.7	723	1.3
P2-P3	B	826	2.0	909	2.1
P3-P4	B	866	2.0	811	2.0
P4-P5	A	866	2.7	940	2.8
P5-P6	A	711	3.3	689	3.2

COMPARISON WITH REGIONAL DATA

No gaged watershed data are available for the study area or for an hydrologically similar watershed, therefore only indirect methods of evaluating the model results can be used. Two data sets are available for this evaluation. First, a comparison of unit peak discharges (cfs/square mile) from the model for selected subbasins and subwatersheds to an analysis of regional gaged watershed data; and second, a comparison of the same model results as above to results from other flood insurance studies in Maricopa County.

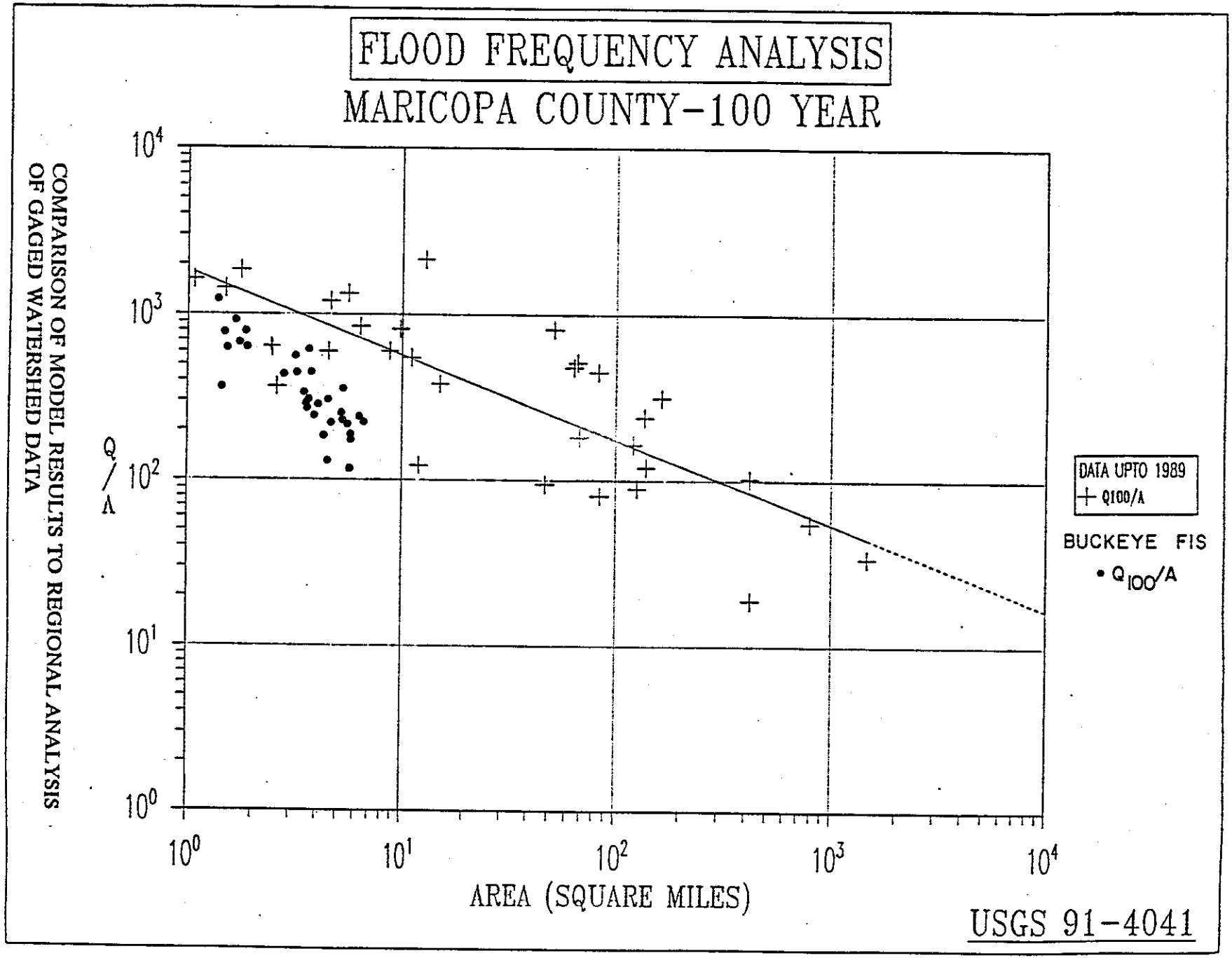
Table 4-4 shows the discharges that were used for the comparisons. Figure 4-1 is a graph that shows unit peak discharges from this hydrologic analysis to a line that was established as a reasonable linear fit of unit peak discharges for gaged watersheds in Maricopa County (Reference 4). There are no gaged watershed data for agricultural watersheds in the data base that is used to define the line in Figure 4-1. The data base for that line is representative of urban, and undeveloped desert and hillslope watersheds. Therefore, the unit peak discharges for the study area, being mainly agricultural fields, are expected to be considerably below the line.

Figure 4-2 is a graph that shows the results of other flood insurance studies for Maricopa County and an upper envelope line for those results (Reference 19). The results from the Buckeye FIS for selected subbasins and subwatersheds are also shown in Figure 4-2. The model results generally fit the trend from other Maricopa County flood insurance studies.

TABLE 4-4

Discharges from the Buckeye FIS Model Used for Comparison with Regional Data

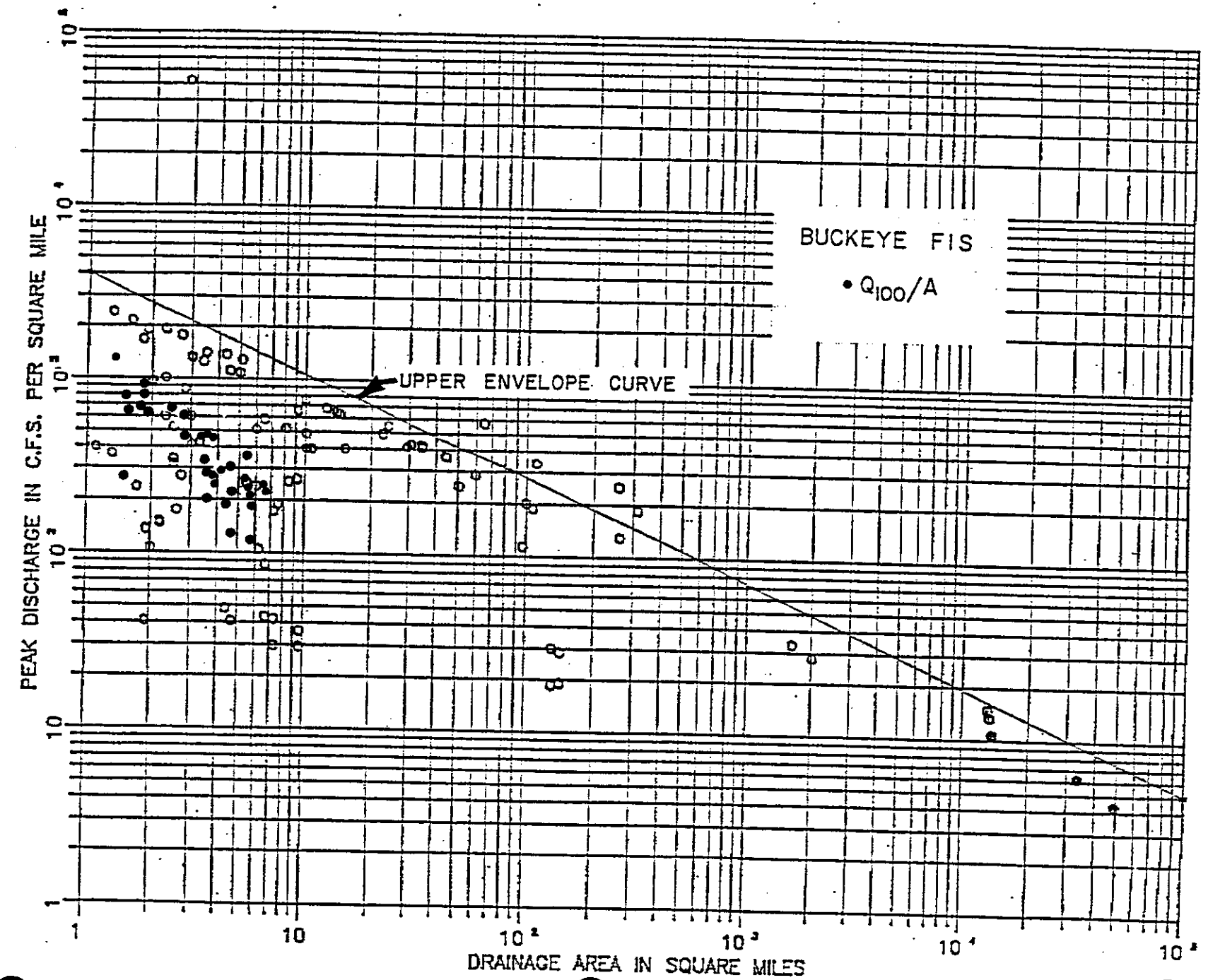
Concentration Point	Drainage Area sq.mi.	Peak Discharge cfs	Unit Peak Discharge cfs/sq.mi.
D1	2.69	1603	600
F1	1.33	341	260
F5	4.59	542	120
F6	5.73	646	110
G3	3.83	1679	440
G7	6.27	1458 *	230
G8	6.62	1384 *	210
H3	2.76	1219	440
H6	5.20	1827 *	350
H7	5.78	970 *	170
I1	1.64	1468	900
I2	3.14	1430	460
I5	5.28	1156	220
I6	5.80	1061 *	180
J3	1.37	833	610
J5	3.50	996 *	280
J6	3.92	902 *	230
K3	1.67	1101	660
K6	5.17	1287 *	250
K7	5.58	1189 *	210
L2	1.89	1180	620
L4	3.20	1432 *	450
L5	3.48	1101 *	320
N1	1.27	1491	1,170
N2	1.79	1400	780
N5	4.06	1140	280
N6	4.22	773	180
O4	2.18	1393	640
O7	4.40	1331	300
O8	4.54	973	210
P2	1.31	1012	770
P5	3.47	970 *	280
P6	3.54	711	200



COMPARISON OF MODEL RESULTS TO REGIONAL ANALYSIS OF GAGED WATERSHED DATA

FIGURE 4-1

MARICOPA COUNTY 100-YEAR FIS FLOWS ENVELOP CURVE
ADWR MAY 1990



COMPARISON OF MODEL RESULTS TO RESULTS FROM OTHER FLOOD INSURANCE STUDIES FOR MARICOPA COUNTY

FIGURE 4-2

REFERENCES

1 U.S. Department of Agriculture, Soil Conservation Service, Watershed Workplan, Buckeye Watershed, Maricopa County, Arizona, October 1963.

2 Federal Emergency Management Agency, Flood Insurance Study, Town of Buckeye, Arizona, 15 February 1980, and revised 29 September 1989.

3 Flood Control District of Maricopa County, Internal Correspondence with Mr. Francis Donnely on the Flood Damages as a Result of the 15 August 1991 Storm Event.

4 U.S. Department of Interior, U.S. Geological Survey, Water Resources Investigations Report 91-4041, Basin Characteristics and Streamflow Statistics in Arizona as of 1989, July 1991.

5 U.S. Department of Interior, U.S. Geological Survey, 7.5 Minute Series Topographic Maps, Scale 1:24,000,: Buckeye, Buckeye NW, Valencia, and Hassayampa Quadrangles.

6 Kenney Aerial Mapping, Inc., Topographic Maps of the Buckeye, Arizona Area, Scale 1"=200', Contour Interval = 2 feet; October 1991.

7 Landiscor Aerial Photo, Inc., Outside Phoenix Aerial Photographs, Scale: 1" = 1200', February, 1990.

8 U.S. Department of Agriculture, Soil Conservation Service, Soil Survey of Maricopa County Central Part, September 1977.

9 U.S. Department of Commerce, National Oceanic and Atmospheric Administration, NWS, Precipitation-Frequency Atlas of the Western United States, Volume VIII, Arizona, 1973.

10 Flood Control District of Maricopa County, Buckeye Flood Retarding Structures, As-Builts, 1974.

11 Arizona Department of Transportation, Interstate 10 As-Builts, Project Numbers: I-10-2(31,61) 1974, I-10-2(16) 1975, and I-10-2(28) 1977.

12 Personal Communication, Southern Pacific Railroad, Tucson, Arizona, Mr. Wynton Hall, 6 December 1991.

13 U.S. Army Corps of Engineers, HEC-1 Flood Hydrograph Package, Version 4.0, September 1990.

14 Flood Control District of Maricopa County, Hydrologic Design Manual, Phoenix, Arizona, September 1990.

15 U.S. Department of Commerce, National Oceanic and Atmospheric Administration, NWS, Depth-Area Ratios in the Semi-Arid Southwest United States, HYDRO-40, August 1984.

REFERENCES (Continued)

16 Flood Control District of Maricopa County, Land Use Categorization and Subbasin Loss Parameter Spreadsheet, September 1991.

17 Personal Communication, U.S.D.A., S.C.S., Buckeye Field Office, Mr. Steve Smarik, 15 October 1991.

18 Thomsen, B.W., and Hjalmarson, H.W., Manning's Roughness Coefficients for Stream Channels and Flood Plains in Maricopa County, Arizona, Prepared by the United States Geologic Survey for the Flood Control District of Maricopa County, April 1991.

19 Arizona Department of Water Resources, Maricopa County 100-year Flood Insurance Study Flows Envelop Curve, May 1990.

89-407.002

FLOOD INSURANCE STUDY
for
THE BUCKEYE AREA
FCD CONTRACT NO. 90-69

SUMMARY REPORT FOR
PHASE I, TASK 1 DATA COLLECTION

As part of the Scope of Work for the Flood Insurance Study for the Buckeye Area, data collection was performed. Appropriate reference sources were consulted in order to obtain the results of previous studies and other data to supplement study area understanding. The following is a brief summary of that information.

Summary of Data Collection

1. Soil Conservation Service:

   a. Watershed Work Plan, Buckeye Watershed, Maricopa County, Arizona, October 1963, with Supplemental Watershed Work Plan Agreement No. l, 1972. This SCS watershed workplan report for the Buckeye watershed contained some useful historic information. It indicated that damages from stormwater runoff, to some degree, occurred approximately once every three years. The effect of a 1951 storm was discussed. The objective of the report was to provide the preliminary justification and analysis for construction of the Buckeye Flood Retarding Structures.

   b. Buckeye Watershed, Study of Emergency Spillway Adequacy As Related to Dam Safety Examination (Site 1), December 1979. A complete copy of the text and calculations was obtained. The cover sheet of the TR-20 computer output was photocopied. The main results of this report were incorporated into the FCDMC Buckeye FRS Dam Break Study (Items 11A and 11B)

   c. Other SCS Documents: The FRS Record Drawings were obtained from FCDMC. The complete SCS file was reviewed. For the most part, no other documentation was photocopied as it generally dealt with runoff coming into the FRS. Some portions of these files were copied: A map showing Structures I, II and III; a letter referencing 1970 aerial photographs; and a watershed boundary map.

The available final hydrology report and Record Drawings ("As Builts") for the Buckeye Flood Retarding Structures prepared by the SCS indicate that the structures will contain runoff from the 100-year event, and direct this runoff to the Hassayampa River and not to the Study Area.

2. Arizona Department of Transportation:

   a. Record Drawings (As-Builts) for Interstate 10 from the Hassayampa River to Dean Road. These drawings show culvert locations, Design flow rate (Q_{50}) at each culvert and the design headwater.

   b. The Hydrology Reports for I-10 were not obtained due to the flow rate information contained in the Record Drawings.

3. FCDMC Hydrology Study for the White Tanks ADMS, prepared by WLB Group, will be reviewed at the offices of the District.

4. & 5. Design and Operations Information on the Roosevelt Canal. A map of the Roosevelt Canal shows storm sewer entering the canal, stormwater siphons under the canal and stormwater inlet points. Mr. Gary Colvin, Manger, was contacted.

Design and Operations Information on the Buckeye Canal. A map of the Buckeye Canal shows storm sewer entering the canal, stormwater siphons under the canal and stormwater inlet points. Mr. Stan Ashby, Manager, was contacted.

The design and operation of the Roosevelt Canal and the Buckeye Canal was obtained from these maps and conversations with the Irrigation District managers. The Roosevelt Irrigation District (RID) and Buckeye Irrigations (BID) cover approximately 38,000 and 18,000 acres, respectively. The major crops are cotton and alfalfa. The Buckeye Canal conveys 350 cfs under normal operations. At any one time approximately 85% of the total acreage is under irrigation. The RID is entirely supplied by groundwater and the BID gets some from the Gila River and groundwater.

6. A meeting is planned for sometime in October, 1991, with Mr. Fred Carpenter, Town of Buckeye Manager, and Mr. Greg Schuelke, Town of Buckeye Engineer.

7. Bond copies of the USGS topographic maps, at 1:24,000 scale. These maps are presently not available in GIS format.

8. Aerial Photographs, from Landiscor, at 1:14,400 scale. Photographs taken March 31, 1991 (current publication) were reviewed. For hydrologic purposes, little change has occurred in the study area, thus photos taken February 22, 1990 (last year's publication) will be utilized for the hydrology.

9. SCS Soil Survey of Maricopa County Central Part, September 1977. The 1:20,000 maps were reduced to 1:24,000 for overlay use with the watershed map. There are approximately 30 different soil symbols in the study area.

10. FCDMC Flooding Reports. The Flood Control District has gathered newspaper articles and photos of past flooding events throughout the County. A review of this valuable information includes articles from the Buckeye town paper discussing flooding that occurred along the Gila River. The most significant flooding event in the study area happened on August 15, 1990. Information gathered by the FCDMC indicates that most of the damage from this event took place along Dean Road at the RID Canal. Flood waters were restricted by improvements to Dean Road and resulted in the overtopping of the RID Canal. A number of claims for damages were filed against the MCHD by local residents.

11. a. Phase I Report Hydrologic Analysis, Buckeye Floodwater Retarding Structures #1, #2, and #3 for Flood Control District of Maricopa County, FCD Project 88-63, prepared by Dames & Moore, January 23, 1990. This report states that each Flood Retarding Structure (FRS) is capable of fully detaining the 100-year runoff. Information concerning the Probable Maximum Precipitation (PMP) and resulting Probable Maximum Flood (PMF) are presented.

    b. Phase II Report, Volume I, Dam-Break Analysis, Buckeye Floodwater Retarding Structure #1, #2 and #3, for the Flood Control District of Maricopa County, FCD Project 86-63, prepared by Dames & Moore, June 28, 1990.

    Discussions of seepage-induced breaches of the FRS embankments during a PMP event conclude there are probably no embankment sections more susceptible to

a breach than another. A similar conclusion is reached for PMF overtopping failure. There is every indication that the Buckeye FRS would operate as designed during the 100-year event. The information on PMF inundation downstream of the FRS does not apply to this Buckeye Area Flood Insurance Study.

12. A separate hydrology report for the Hassayampa River was apparently not prepared as that information is contained in the Maricopa County Flood Insurance Study. An attempt will be made to obtain the following reference to verify this: Cella Barr Associates, 1975, FEMA Flood Insurance Re-Study of Maricopa County, Hassayampa River, Phoenix, Arizona.

13. Flood Insurance Study, Flood Boundary and Floodway Maps, and Flood Insurance Rate Maps for Maricopa County, Unincorporated and Incorporated Areas, Revised September 4, 1991.

    The most recent FEMA publication of an FIS for Maricopa County is dated September 4, 1991. An approximate study using TR-55 designated several Zone A areas along the north sides of the Roosevelt and Buckeye Canals. The following FIRM panels cover the study area: 2000, 2015, 2025, 2040, 2050, 2485, 2480, and 2505.

14. Mr. Harry Millsaps, Hydraulic Engineer, Soil Conservation Service. Mr. Millsaps was made aware on September 11, 1991, that MKE is performing a Buckeye Area FIS. He provided access to SCS's file on the Buckeye FRS.

15. Mr. Dave Creighton, Project Engineer, Flood Management, Arizona Department of Water Resources. A meeting was held with Mr. Creighton on September 26, 1991. Separately published meeting minute notes were sent to FCDMC.

ADDENDUM NO. 1 - COORDINATION OF HYDROLOGIC ANALYSIS WITH HYDRAULIC ANALYSIS

During the course of the hydraulic analysis for floodplain mapping, it became apparent that the flowrates obtained from the hydrologic analysis had to be modified in limited areas to account for flow diversions across sectionline roads. The affected Concentration Points are G7, G8, H6, H7, I5, I6, L4, L5, M3, M4, N5, N6, O7 and O8. The subbasins affected by this modification are Subbasins 53, 54, 55, 61, 62 and 63 in the Palo Verde Road - Wilson Avenue - Turner Road area, and Subbasins 47, 67, 56, 57, 66, 69, 70 and 71 in the Miller Road - Apache Road - Watson Road area. This latter area (Miller Road to Watson Road) is discussed in the "Problem Areas" of the Hydraulic Report (Section 3.4) and a general overview presented here. The above referenced concentration points and subbasins are along the Southern Pacific Railroad and the Buckeye Canal. The floodplain upstream from the Roosevelt Canal is not affected by this modification. Figures A1-1 and A1-2 graphically depict the subbasins and flow diversions.

The general scenario for these diversions is as follows: runoff travels south within the subbasin and encounters the raised embankment of the Southern Pacific Railroad. Some of the runoff flows through an existing railroad trestle, and the remainder ponds until it reaches an elevation high enough to overtop the sectionline road on the east or west side of the subbasin. Flow is thus diverted to the adjoining subbasin. In the next subbasin, this sequence may occur one more time until the runoff flows to a subbasin which has a sectionline road high enough to force all of the runoff over the Railroad embankment and/or through the trestles. The runoff then continues southward to the Buckeye Canal embankment. Here, ponding occurs until the water surface elevation exceeds the adjacent sectionline road elevation, and some runoff is diverted into the adjoining subbasin as well as over the canal road.

To obtain the flowrate for floodplain mapping purposes, the runoff rates found in Plate 5, or Appendices N and O were added (or subtracted) directly to reflect the flow diversion. The hydrologic effects of additional storage volume attenuation, channel routing or time translation of the hydrograph peak were not considered, nor was a hydrologic split flow analysis performed. The hydrologic model's accuracy would not be significantly improved and such modifications would have made the model cumbersome and complex without significant benefit to the mapped floodplain. The worst case increase in floodplain elevation is 1.2 feet in Subbasin 53, which is

based upon an additional 705 cfs flowing entirely through railroad trestles with no embankment overtopping. Where the additional flow overtops an embankment, the floodplain increase is relatively minor. For example, there is a 0.1 foot floodplain increase in Subbasin 69 which is based upon 1,576 cfs additional flow to the subbasin. Performing a more detailed hydrologic routing and split flow analysis using HEC-1 will not provide significant improvement in accuracy. By adding (or subtracting) the flowrates directly and using that number for water surface elevation calculations, the resulting mapped floodplains present the most reasonably severe condition for these areas at the Southern Pacific Railroad and the Buckeye Canal.

The current County criteria for crossroad culverts states that culverts for collector and arterial streets, (which would be the case for these sectionline roads), should be designed for the 50-year peak discharge. Thus if the roads that are currently overtopped by these flow diversions are to be improved in the future, the hydrology would have to be reworked. Smaller subbasins would probably be required, and a hydrology model developed specifically for the roadway crossing. Such refinements are beyond the scope of this study.

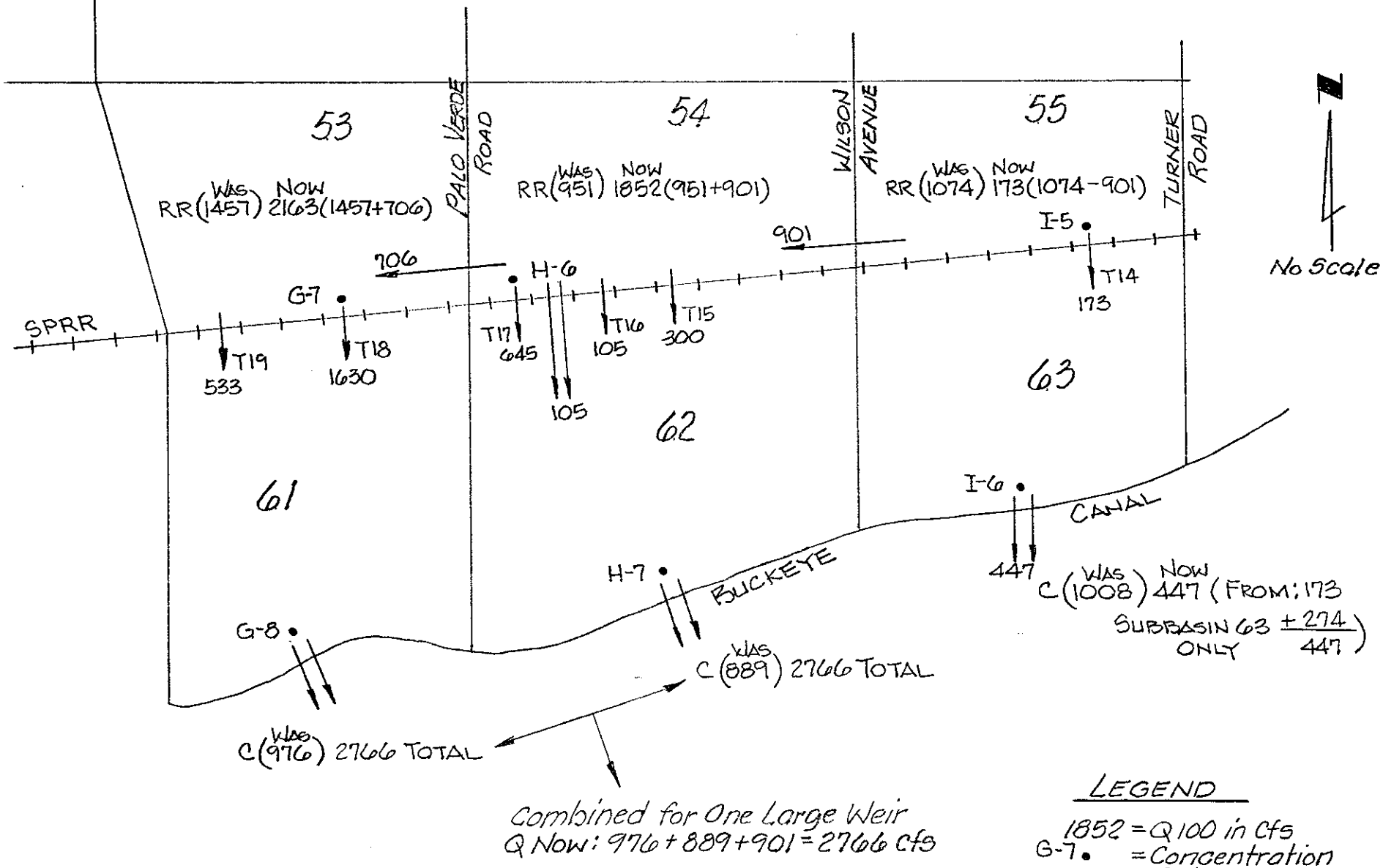
SUMMARY:

The 100-year flowrates for Concentration Points G7, G8, H6, H7, I5, I6, L4, L5, M3, M4, N5, N6, 07 and 08 have been modified to account for flow diversions across sectionline roads. In these areas the existing roads are lower than the railroad or canal embankment, thus allow flow diversions. The flowrates used for floodplain mapping are derived by adding and subtracting diverted flows. These diversions have a relatively minor effect on the final water surface elevation of the floodplain. Revising the HEC-1 model to account for the flow diversions would not add to the accuracy of the floodplains and the model would become too unwieldy and complex to satisfy the intent of obtaining flowrates for floodplain mapping purposes. The final floodplain maps present the most reasonably severe condition at the areas affected by flow diversions. Figures A1-1 and A1-2 present the flow diversions.

Registered Professional Engineer (Civil) CERTIFICATE NO. 23969 FRANK EDWARD BROWN Date Signed 12-16-92 ARIZONA, U.S.A.

Registered Professional Engineer (Civil) CERTIFICATE 17928 GEORGE V. SABOL Date Signed 12-21-92 ARIZONA, U.S.A.

SUMMARY OF FLOW TRANSFERS FOR FLOODPLAIN MAPPING



LEGEND

1852 = Q 100 in Cfs

G-7 • = Concentration Point G-7

787 = FLOWRATE OVERTOPPING CANAL OR RR IS 787 CFS

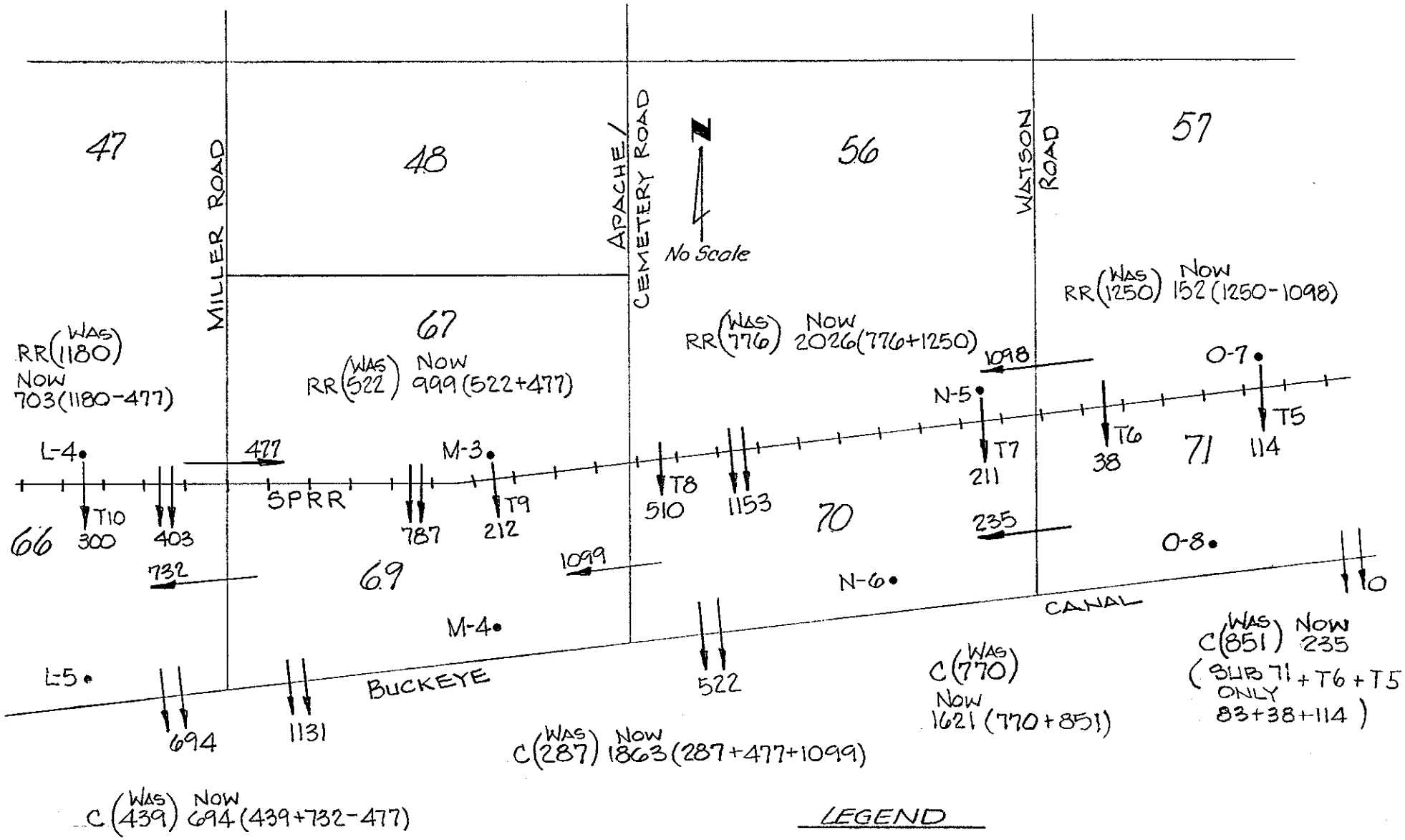
T9 212 = FLOWRATE THROUGH RR TRESTLE #9 IS 212 CFS

Use this Map when Viewing Pages 3, 4 & 5 of 12 of Appendix-2 and for Pages 4B & 5 of 6 of Appendix-3

See Floodplain Map Sheets 10 & 11 of 23 for SPRR and Sheets 18 & 19 of 23 for BC

FIGURE A1-1

SUMMARY OF FLOW TRANSFERS FOR FLOODPLAIN MAPPING



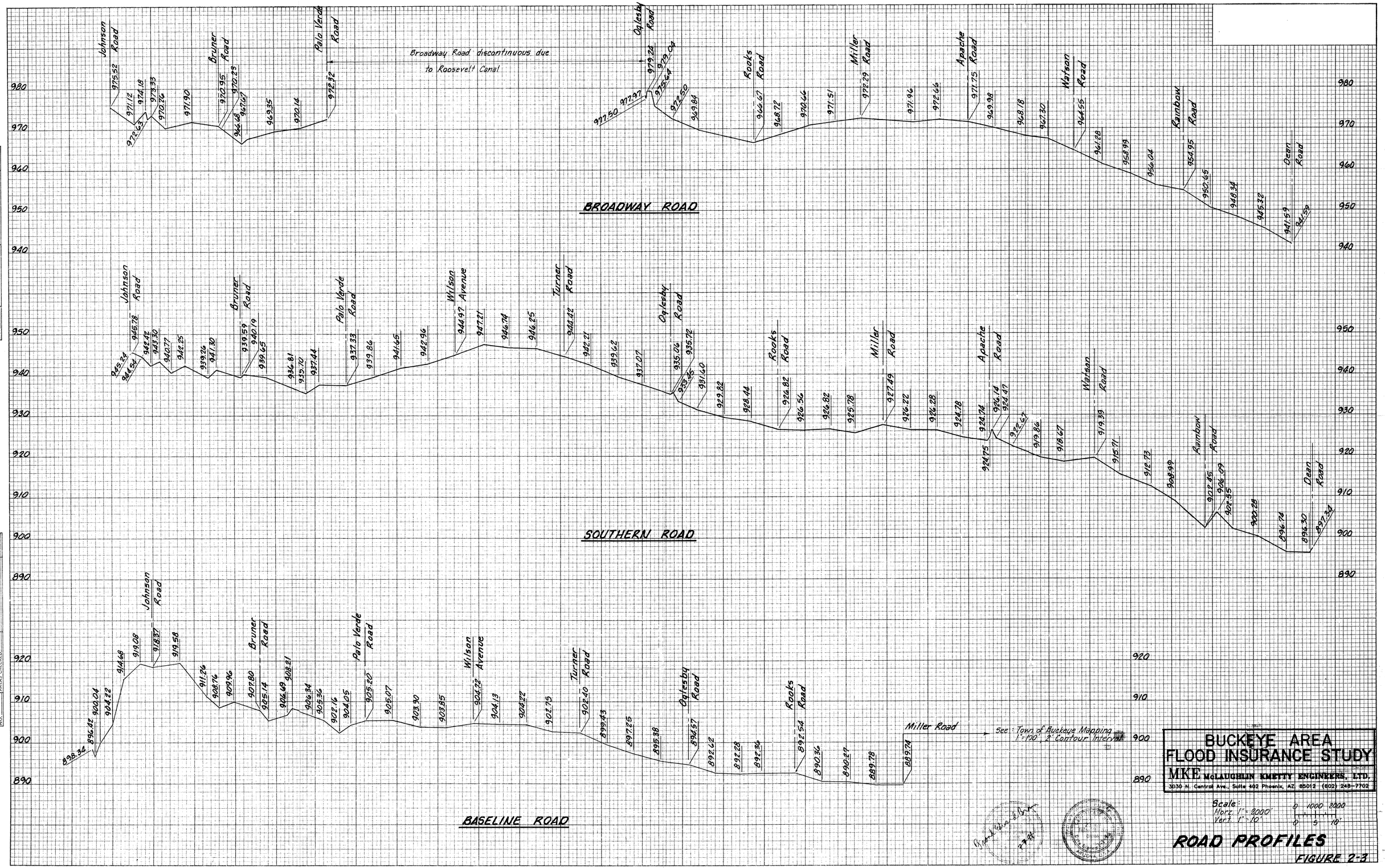
Use this Map when Viewing Pages 8 & 9 of 12 of Appendix-2 Pages 1 thru 7 of Appendix-4 and for Pages 2 & 3 of 6 of Appendix-3

See Floodplain Map Sheets 12, 13 & 14 of 23 for SPRR and Sheets 20, 21 & 22 of 23 for BC

LEGEND

999	=	Q100 in cfs
• M-3	=	CONCENTRATION POINT M3
↓↓ 787	=	FLOWRATE OVERTOPPING CANAL OR RR IS 787 cfs
↓ T9 212	=	FLOWRATE THROUGH RR TRESTLE #9 IS 212 cfs

FIGURE A1-2



Printed in U.S.A. On IMPERIAL Tracing Cloth
PLATE 3 CROSS SECTION B P R STANDARD
ENGINE DIETZGEN CO., CHICAGO - NEW YORK
Printed in U.S.A. On IMPERIAL Tracing Cloth

SCALE: 1" = 2000'

Study Area Limits

LANDING FIELD (CLOSED)

LEGEND - SUBBASINS

- Subbasin Boundary
- 34 Subbasin Number
- •J5 Subbasin Concentration Point & Label
- ■ Approximate Railroad Trestle Location

WATERSHED MAP

FLOOD CONTROL DISTRICT OF MARICOPA COUNTY

DRAWN BY: G.A. & R.K.
DESIGN BY: G.V.S.
CHECK BY: G.V.S./S.B.
Date: JULY, 1992
Project No. 89-407.02

BUCKEYE AREA FLOOD INSURANCE STUDY

MKE McLAUGHLIN KMETTY ENGINEERS, LTD.
3501 N. 16th Street Phoenix, Arizona 85016-6419 (602) 248-7702

PLT. 1 2 3 4 5

LEGEND - SUBBASINS

- Subbasin Boundary
- 34 Subbasin Number
- • J5 Subbasin Concentration Point & Labels
- ■ Approximate Railroad Trestle Location
- Soil Boundary
- PT Soil Symbol

SOILS MAP

WATERSHED MAP

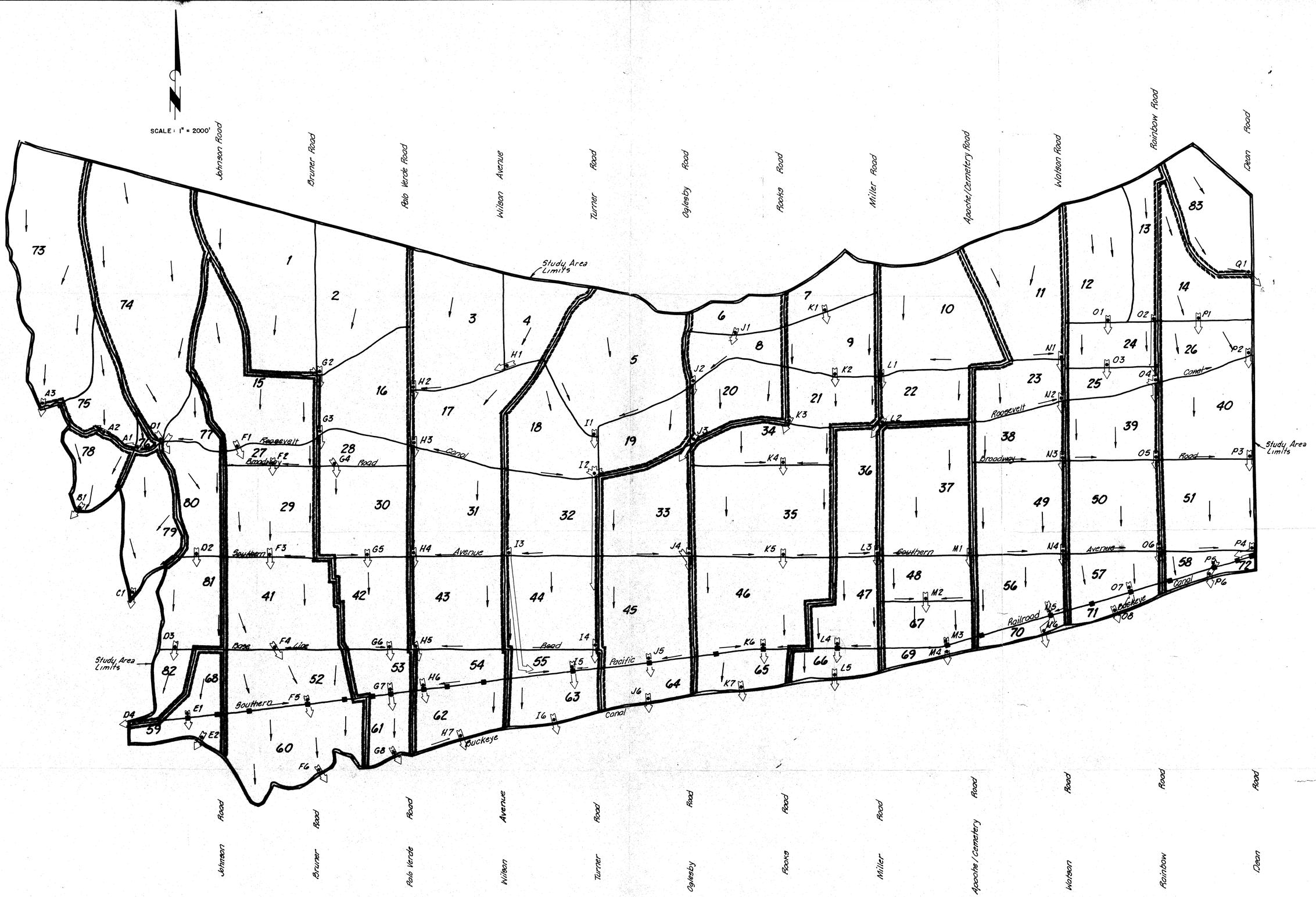
FLOOD CONTROL DISTRICT OF MARICOPA COUNTY

DRAWN BY G.A. & R.K.
DESIGN BY G.V.S.
CHECK BY G.V.S./S.B.
Date: JULY, 1992
Project No. 89-407.02

BUCKEYE AREA FLOOD INSURANCE STUDY

MKE McLAUGHLIN KMETTY ENGINEERS, LTD.
3501 N. 16th Street Phoenix, Arizona 85016-5419 (602) 248-7702

PLT. 2 3 4 5



LEGEND - SUBBASINS

- Subbasin Boundary
- 34 Subbasin Number
- •J5 Subbasin Concentration Point & Labels
- ■ Approximate Railroad Trestle Location
- Routing Path
- Flow Line
- Connected Subbasin Boundaries

ROUTING SCHEMATIC

WATERSHED MAP

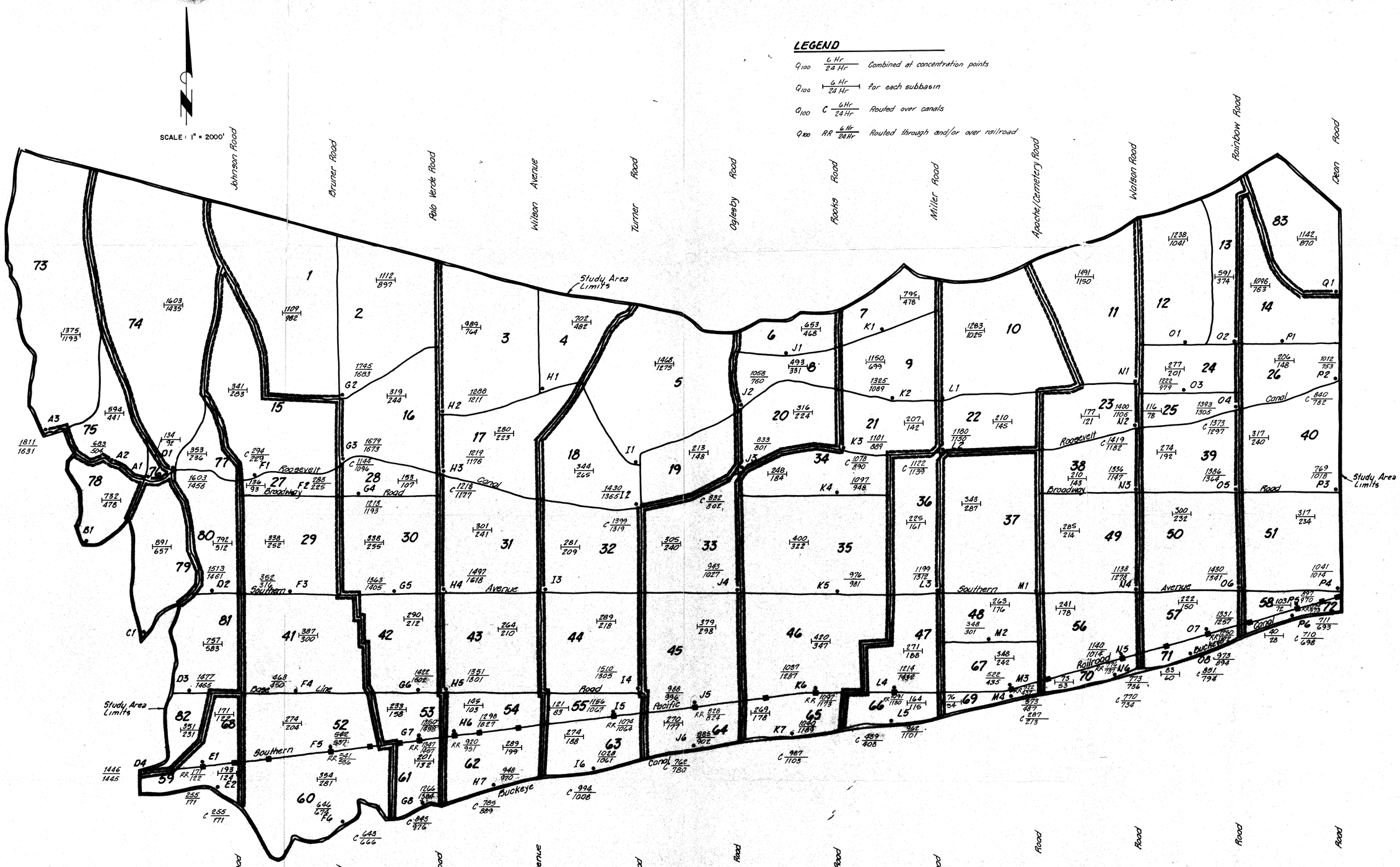
FLOOD CONTROL DISTRICT OF MARICOPA COUNTY

DRAWN BY: G.A.F.R.K
DESIGN BY: G.V.S.
CHECK BY: G.V.S./S.B.
Date: JULY, 1992
Project No. 89-407.02

BUCKEYE AREA FLOOD INSURANCE STUDY

MKE McLAUGHLIN KMETTY ENGINEERS, LTD.
3501 N. 46th Street Phoenix, Arizona 85016-6419 (602) 248-7702

PLT. 1 2 3 4 5



LEGEND - SUBBASINS

- Subbasin Boundary
- 34 Subbasin Number
- •J5 Subbasin Concentration Point & Labels
- ■ Approximate Railroad Trestle Location
- Connected Subbasin Boundaries

MODEL RESULTS

WATERSHED MAP

FLOOD CONTROL DISTRICT OF MARICOPA COUNTY

DRAWN BY: G.A. & F.R.K.
DESIGN BY: G.V.S. / D.T.P.
CHECK BY: G.V.S. / S.B.
Date: JULY, 1992
Project No. 89-407.02

BUCKEYE AREA FLOOD INSURANCE STUDY

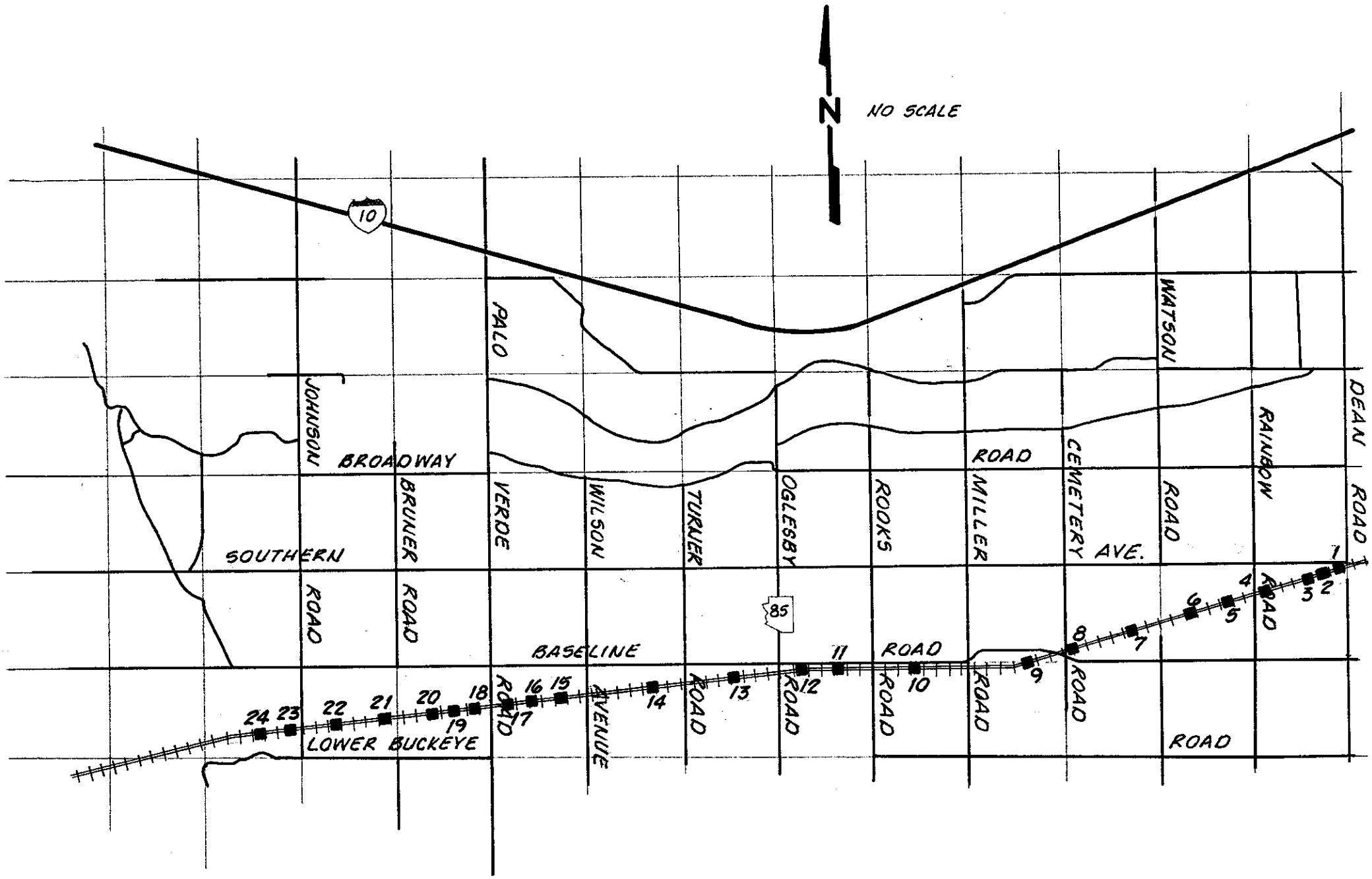
MKE McLAUGHLIN KMETTY ENGINEERS, LTD.
3501 N. 16th Street, Phoenix, Arizona 85016-6419 (602) 248-7702

PLT. 1 2 3 4 5

APPENDIX A

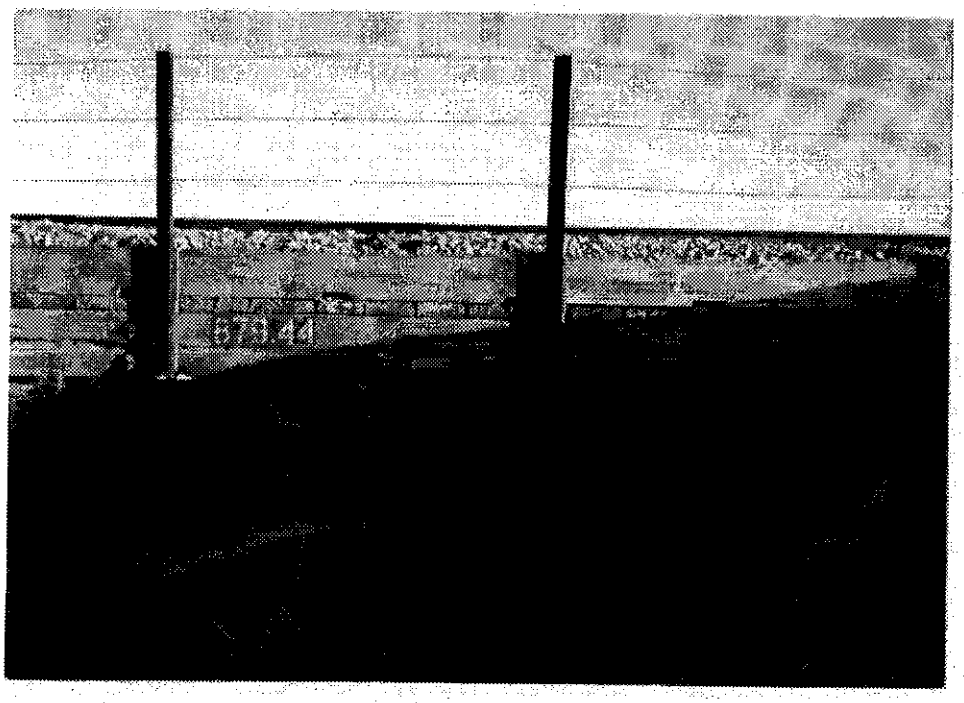
SURVEY DATA AND PHOTOGRAPHS

OF RAILROAD STRUCTURES



TRESTLE KEY MAP

TRESTLE #1



TRESTLE #1

MKE McLaughlin Kmetty Engineers, Ltd.

Project Title: BUCKEYE FLOOD INS. STUDY Project No. 89-407.02 Date 10-2-91

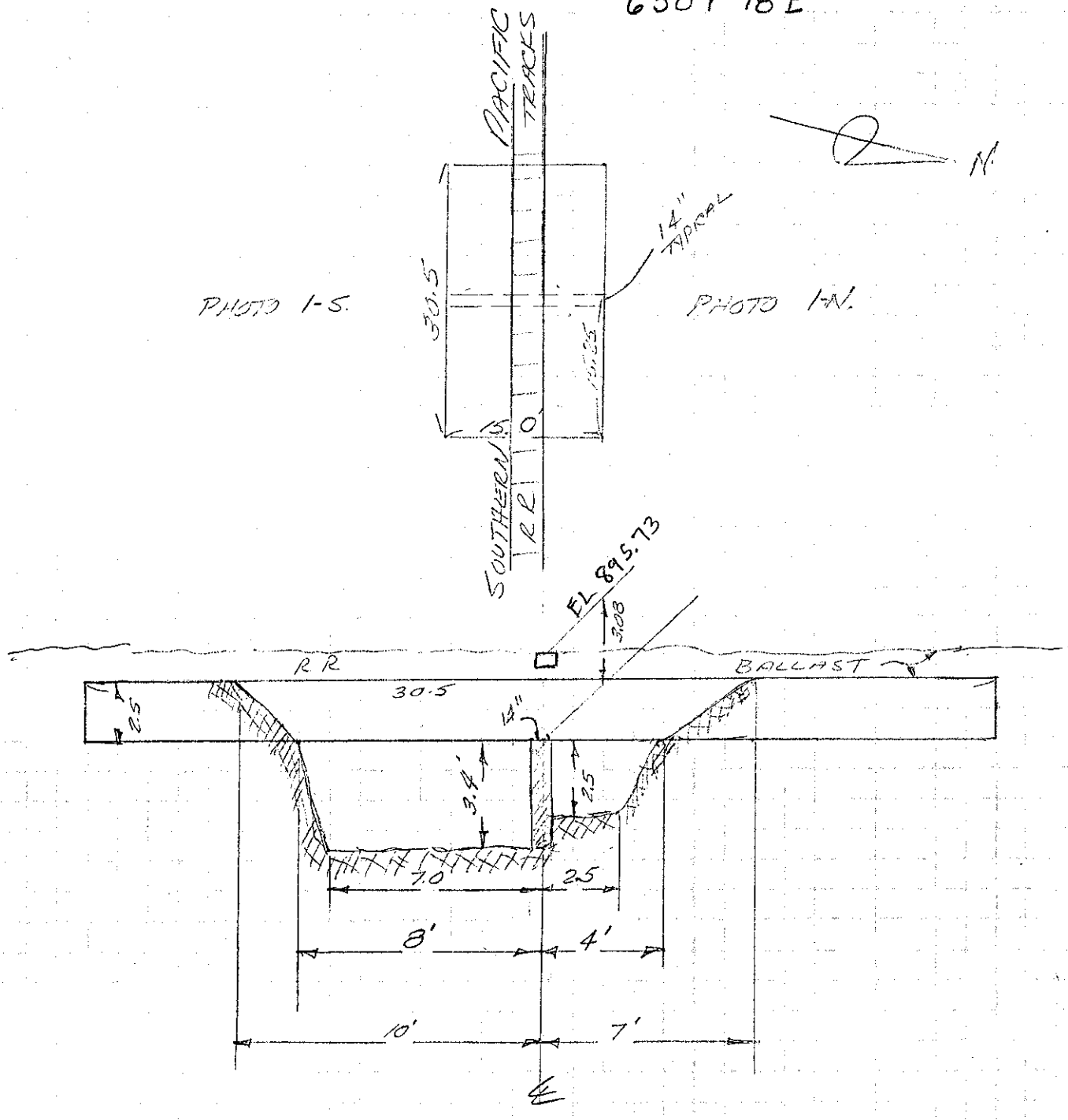
Subject: SOUTHERN PACIFIC R.R. CROSSINGS Designed _____ Page 1 of 37

DEAN ROAD (STA 0+00) TO RAINBOW RD (STA 54+43)

#1

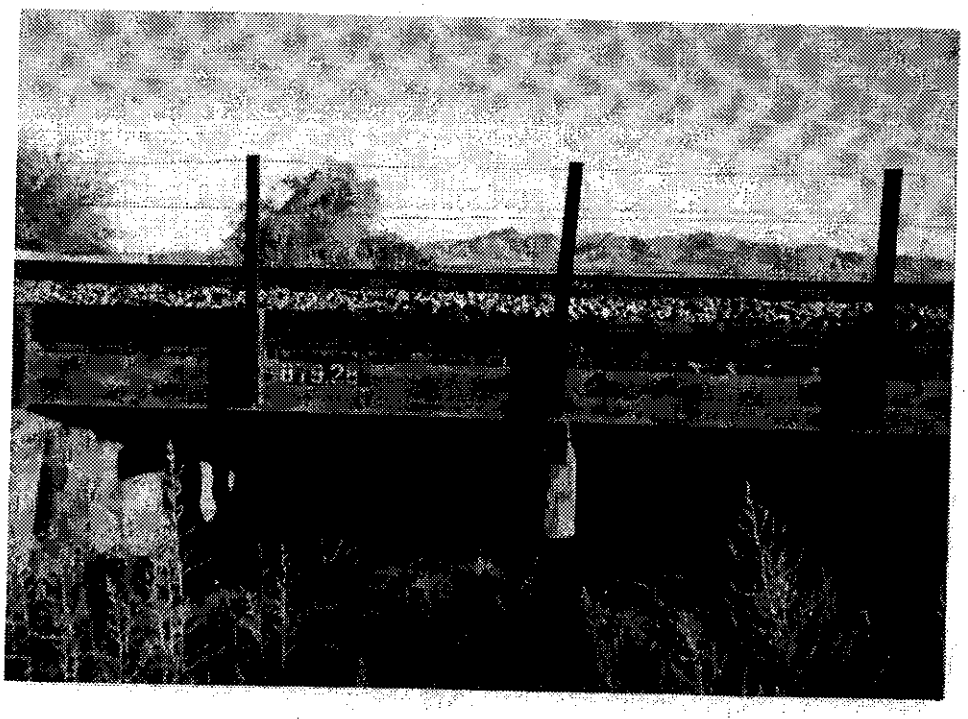
30.5' x 15.5' WOOD TRESTLE - 1+87 W

650+78 E



UPSTREAM SIDE
(NORTH)

TRESTLE #2



TRESTLE #2

MKE McLaughlin Kmetty Engineers, Ltd.

Project Title _____ Project No. _____ Date _____

Subject _____ Designed _____ Page 2 of 37

DEAN RD TO RAINBOW RD (CONT)

#2

30.5' x 15.5' WOOD TRESTLE – 10+56 W (RR MP 879.28)

642+09 E

Railroad Milepost

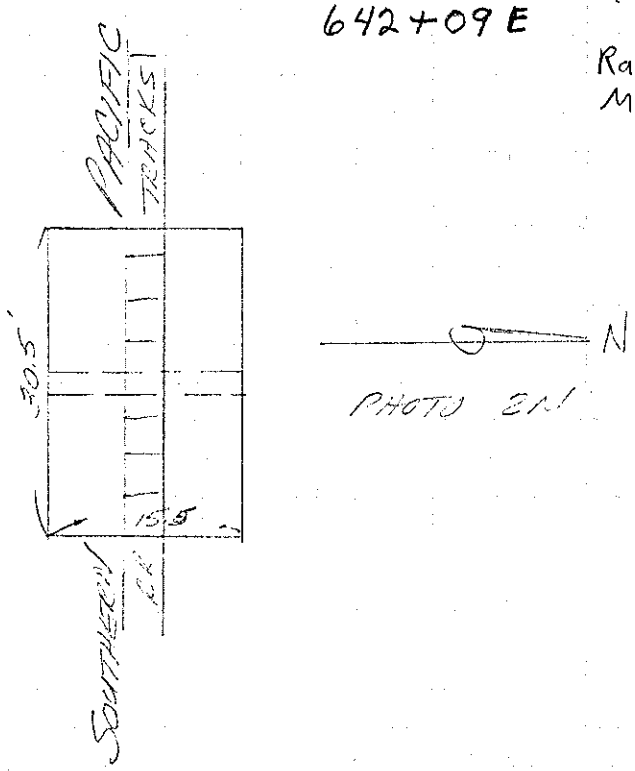
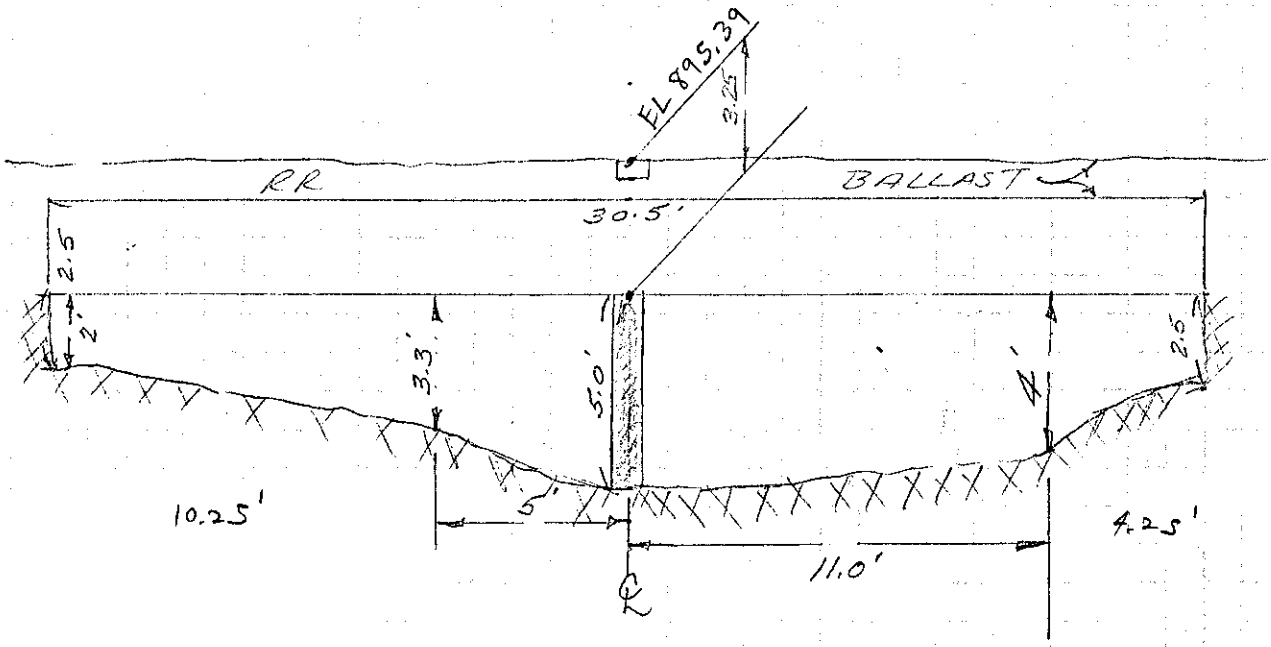


PHOTO 25

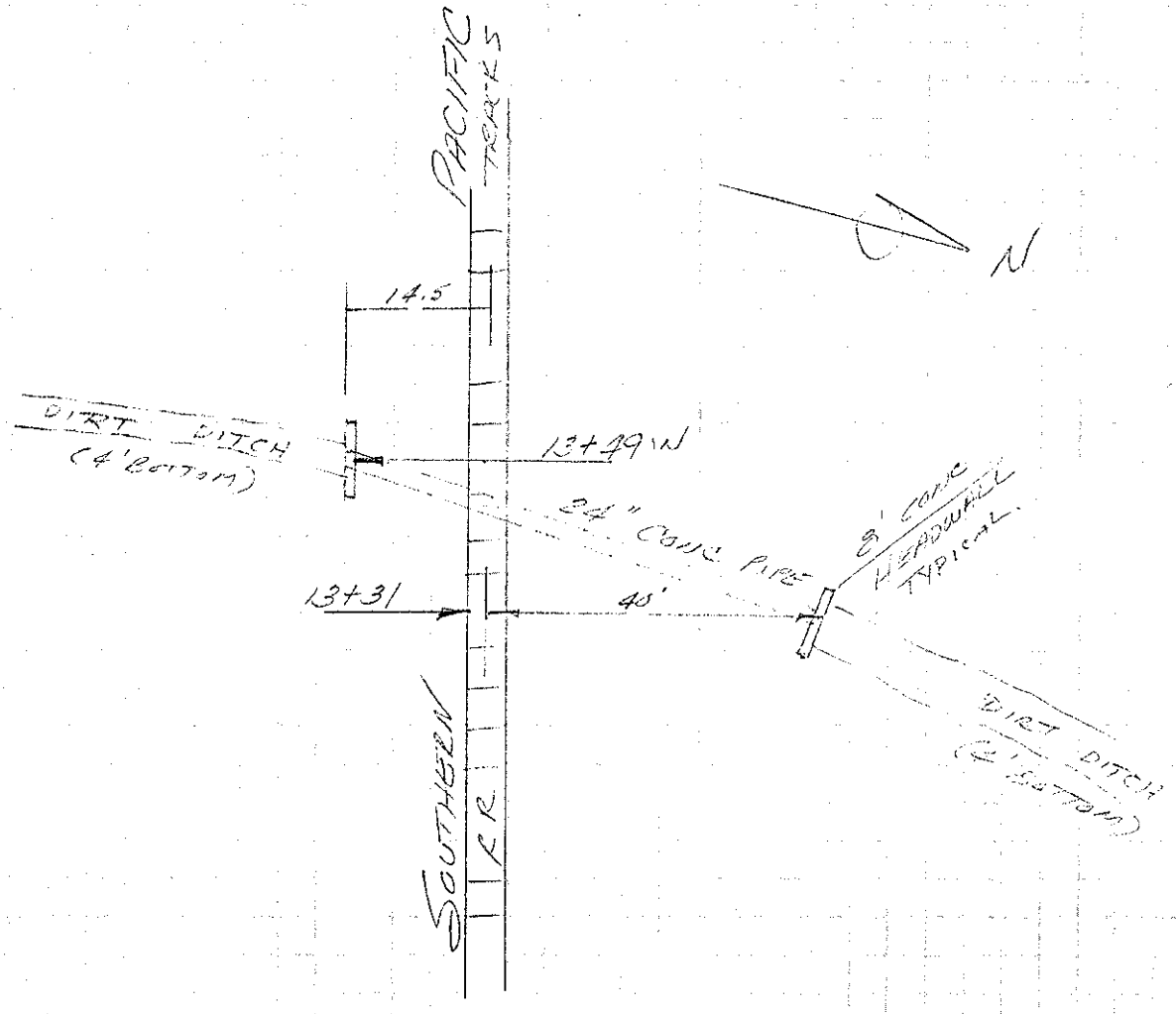
PHOTO 24



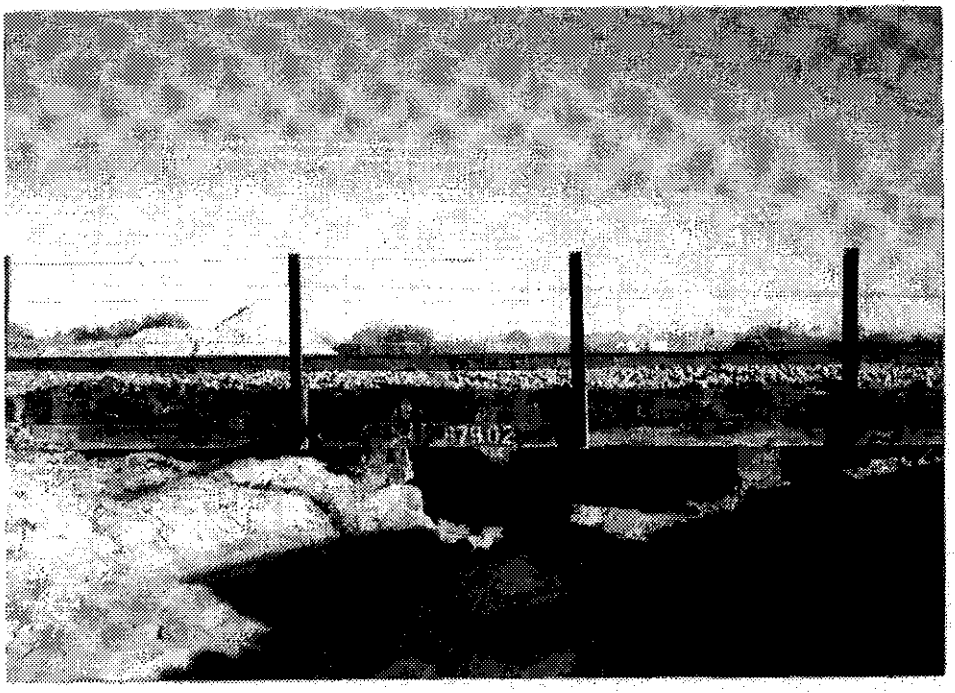
UPSTREAM SIDE (NORTH)

DEAN RD TO RAINBOW RD (CON'T)

24" CONC PIPE – 13+42W



TRESTLE #3



TRESTLE #3

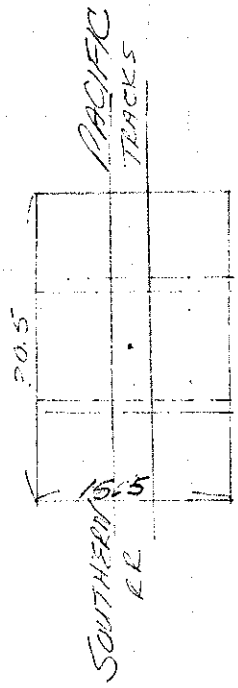
MKE McLaughlin Kmetty Engineers, Ltd.

Project Title _____ Project No. _____ Date 10-02-91

Subject _____ Designed _____ Page 4 of 37

DEAN RD TO RAINBOW (CONT)

30.5' x 15.5 WOOD TRESTLE #3 — 24+23 W (RR MP 579.02)
628+42E



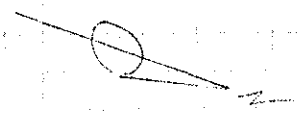
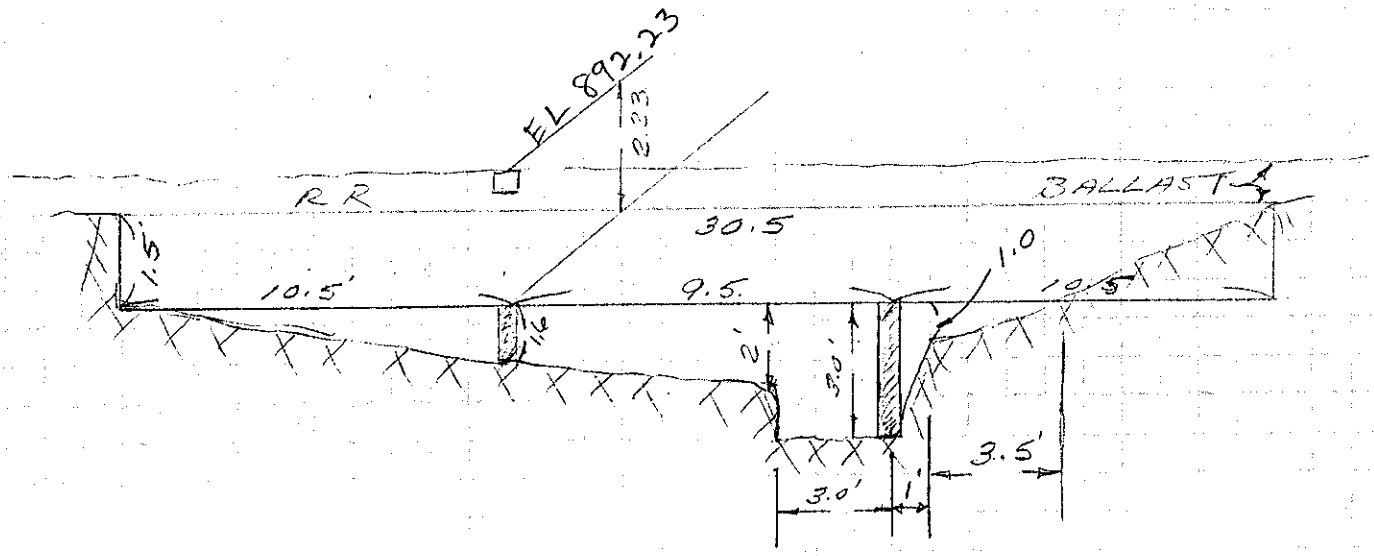


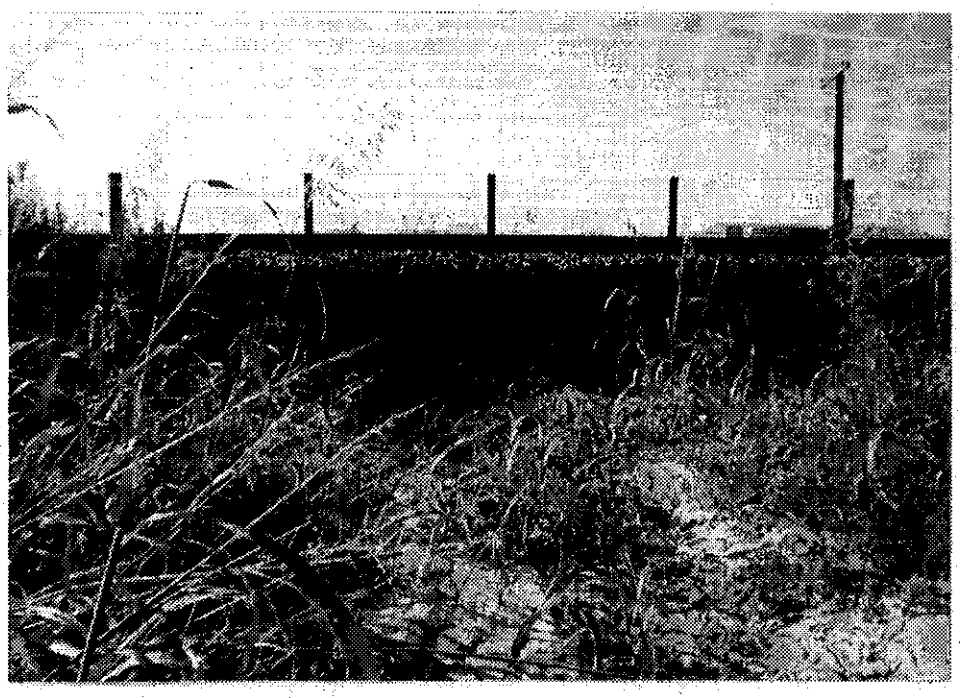
PHOTO 35.

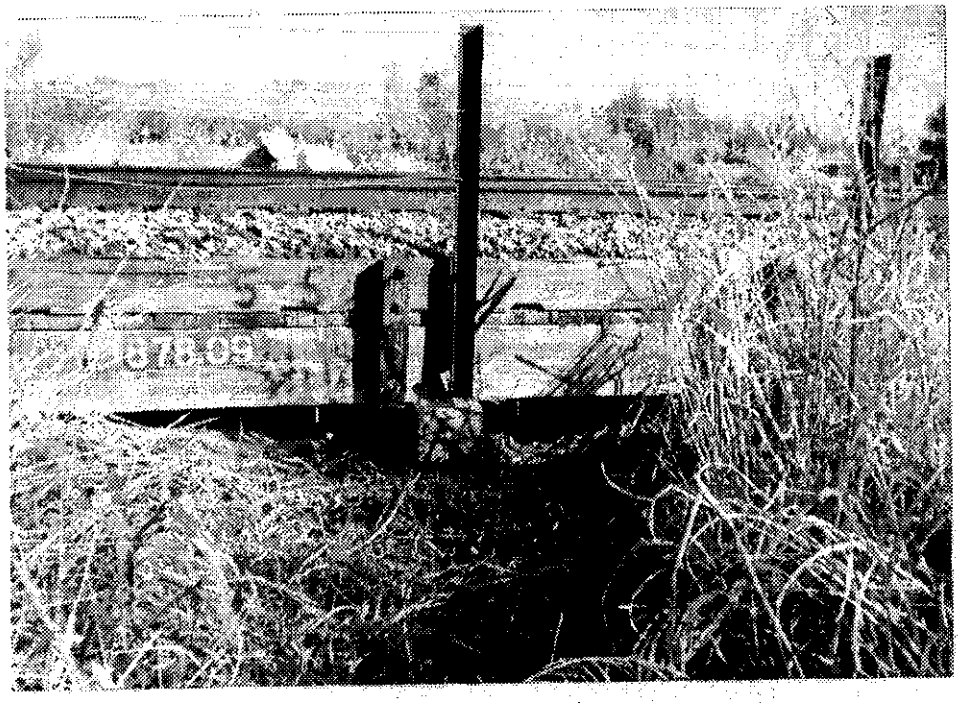
PHOTO 34.



UPSTREAM SIDE
(NORTH)

TRESTLE #5





TRESTLE #5

MKE McLaughlin Kmetty Engineers, Ltd.

Project Title BUCKEYE FLOOD INS. STUDY Project No. 89-407.02 Date 10-2-91

Subject SOUTHERN PACIFIC R.R. CROSSING Designed _____ Page 6 OF 37

RAINBOW RD (OTOW) TO WATSON RD (55+38 W)

30.5' x 15.5' WOOD TRESTLE #5 — 18+88 W. (RR MP 878.09)
579+34 E

PHOTO 55.

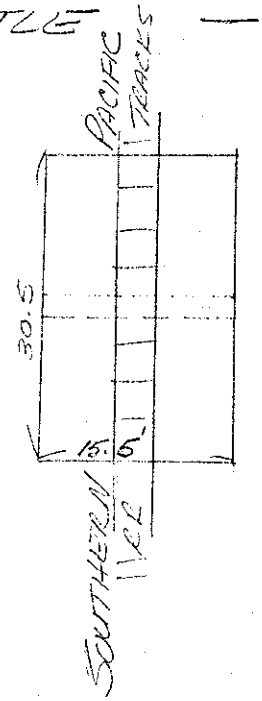
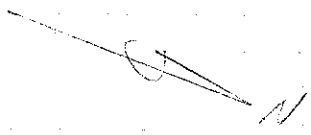
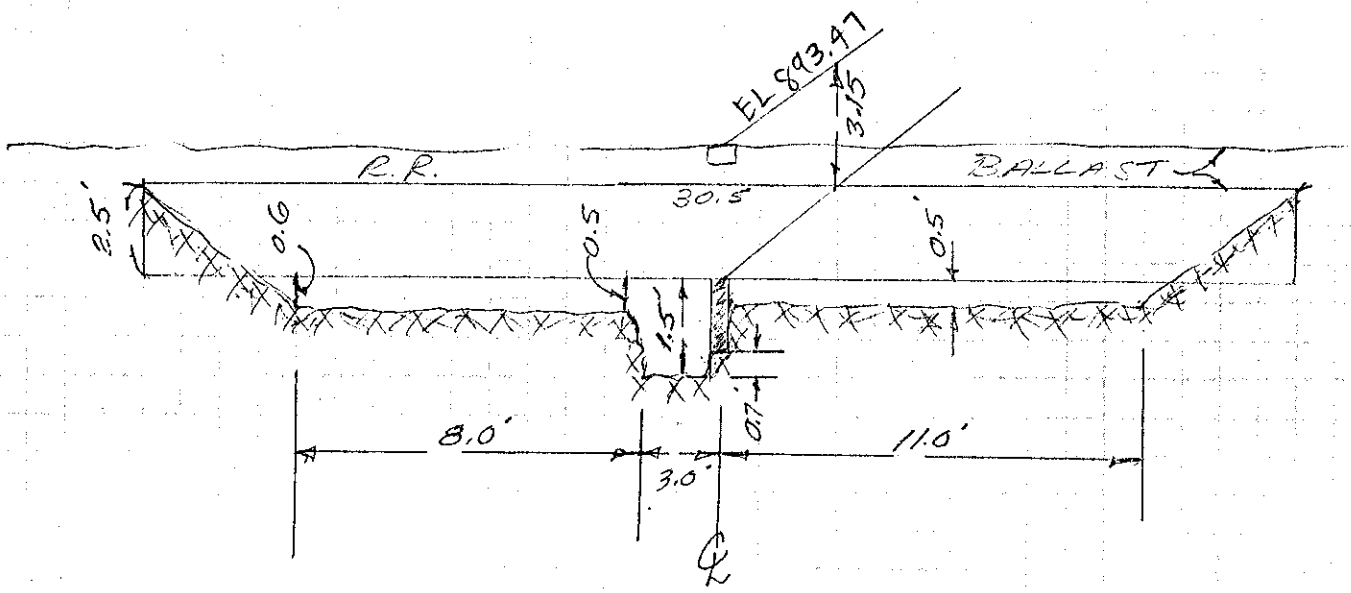


PHOTO 54

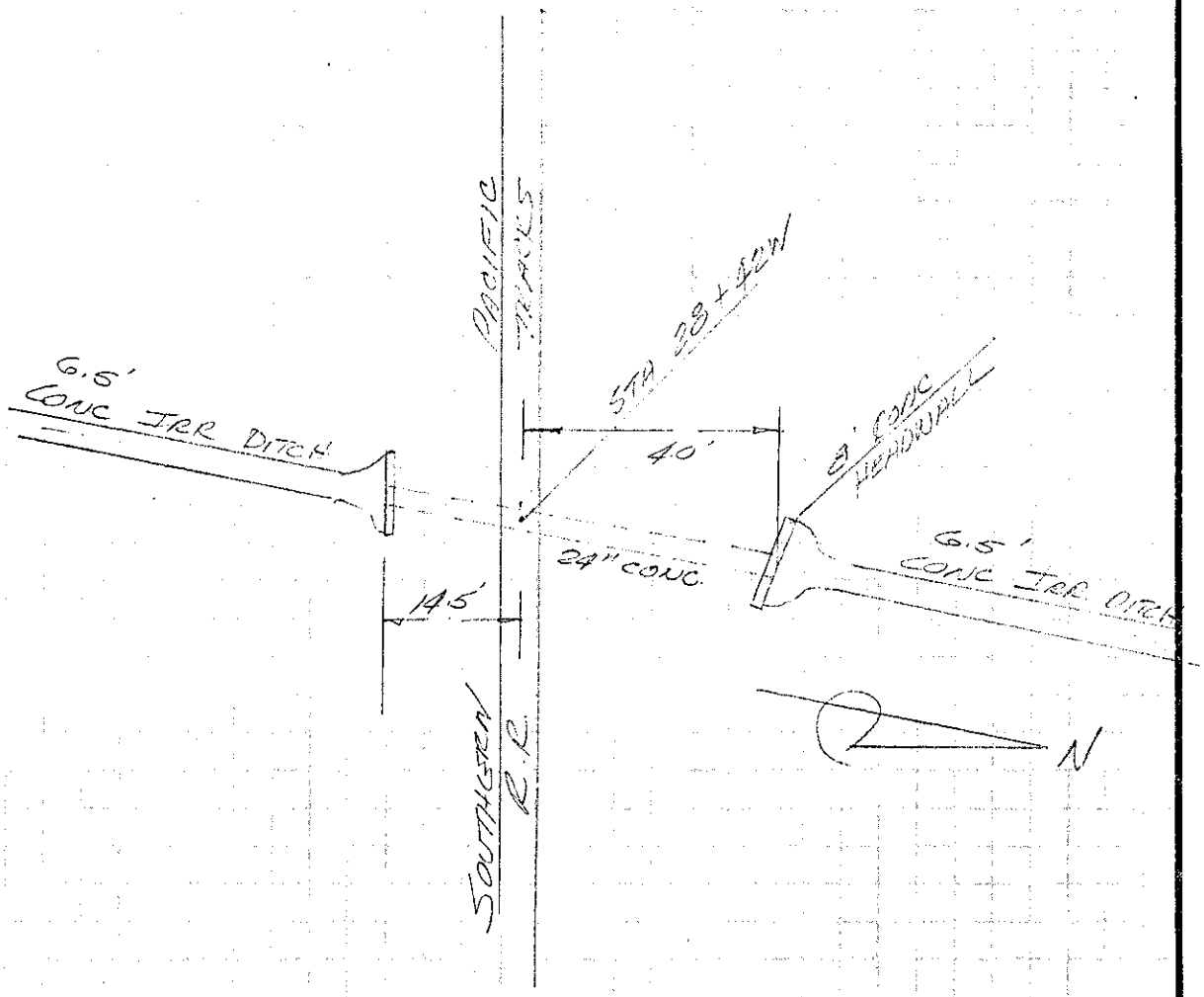




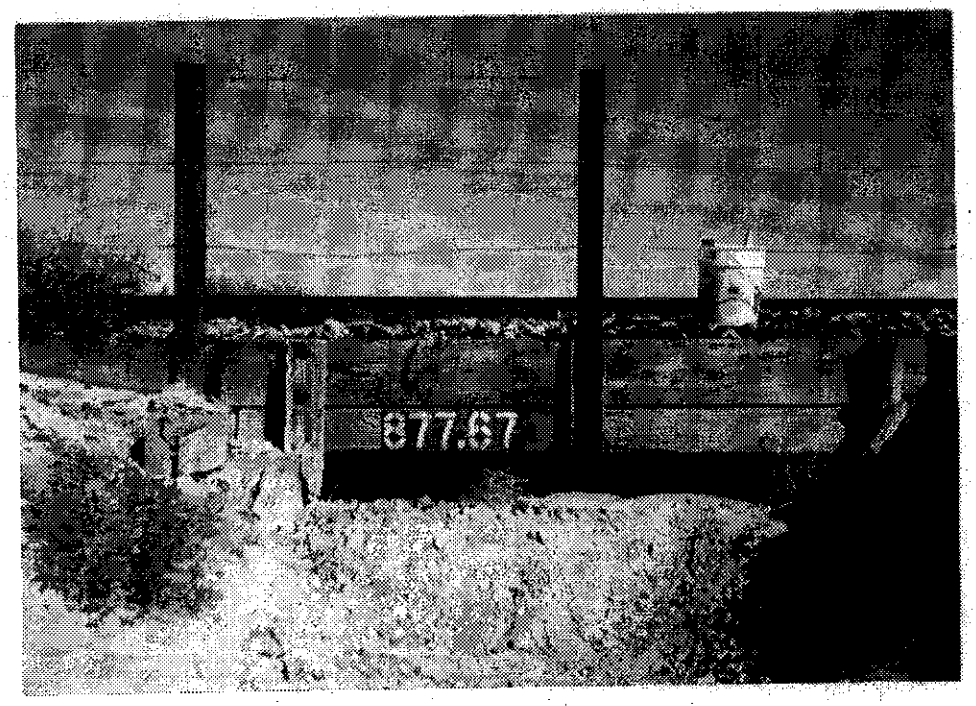
UPSTREAM SIDE
(NORTH)

RAINBOW RD TO WATSON RD (CONT)

24" CONC PIPE – 28+42 W
569+80 E



TRESTLE #6



TRESTLE #6

MKE McLaughlin Kmetty Engineers, Ltd.

Project Title _____ Project No. _____ Date _____

Subject _____ Designed _____ Page 8 of 37

RAINBOW RD TO WATSON RD (COUT)

#6

10.5'x16.0' WOOD TRESTLE — 41+18 W (RR MP 377.67)

597+04 E

PHOTO 6 S.

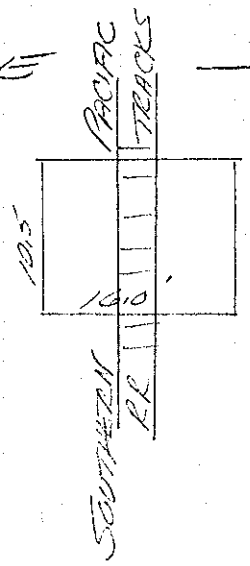
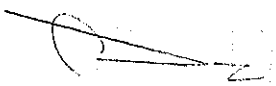
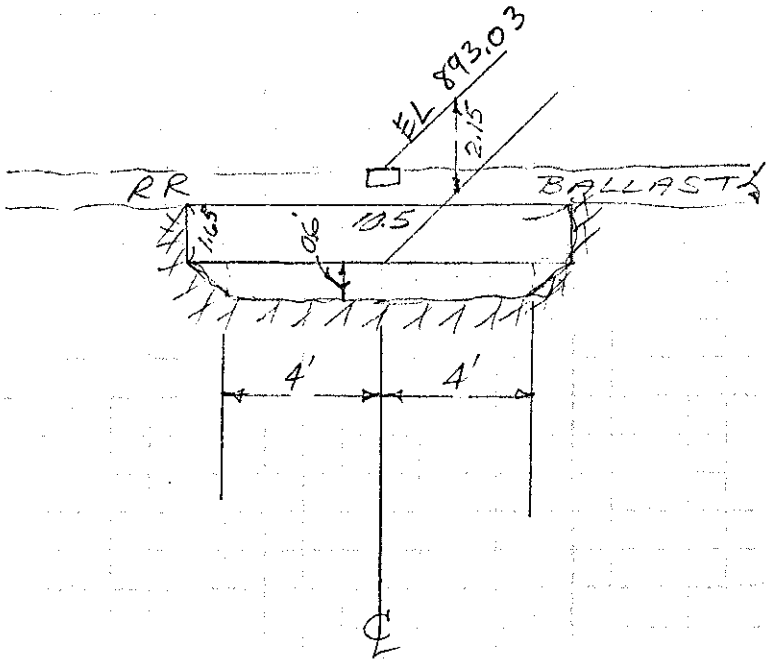
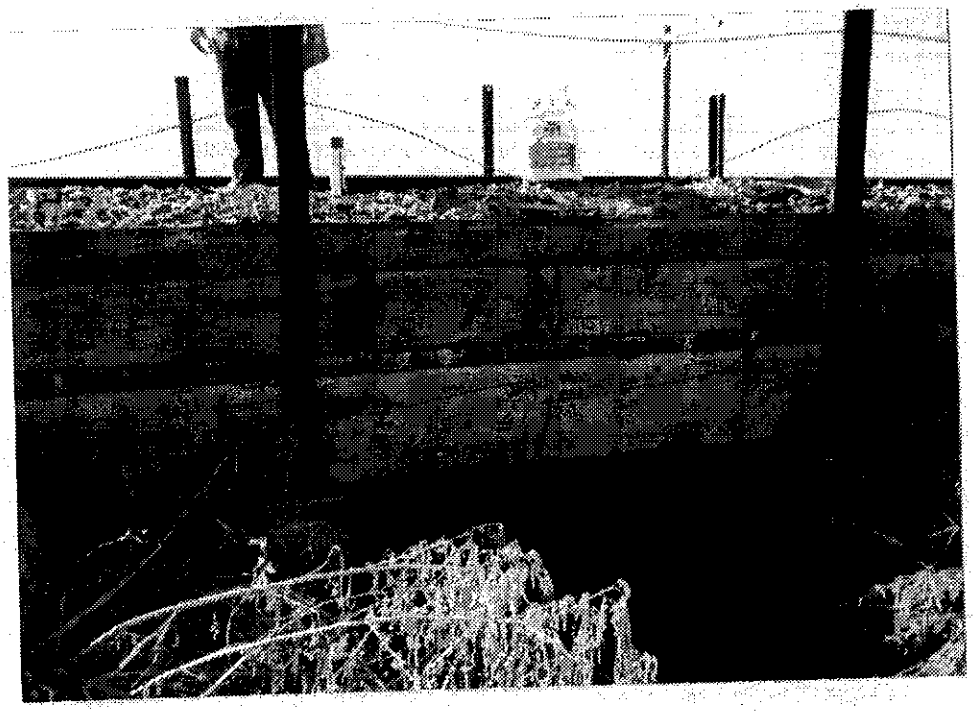


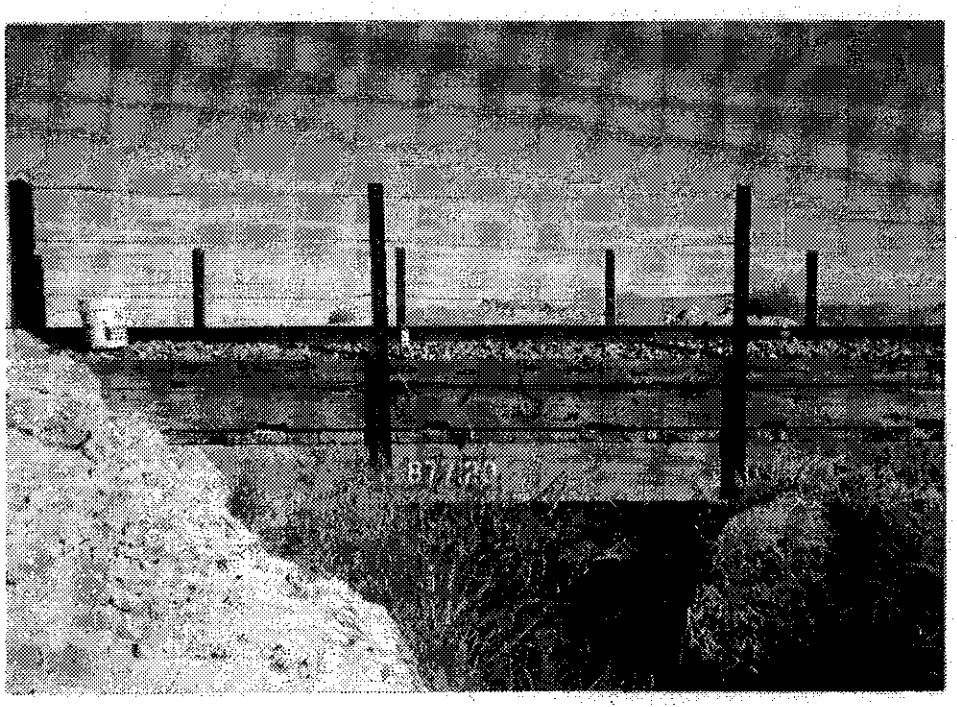
PHOTO 6 N





TRESTLE #7





TRESTLE #7

MKE McLaughlin Kmetty Engineers, Ltd.

Project Title: BUCKEYE FLOOD INS. STUDY Project No. 89-407.02 Date 10-2-91

Subject: SOUTHERN PACIFIC R.R. CROSSINGS Designed _____ Page 9 of 37

WATSON RD (OTOW) TO APACHE RD (55+03 W)

#7

30.5' x 15.5' WOOD TRESTLE - 10+13 W (877.20)

Railroad Milemarker = RR MP

532+71 E

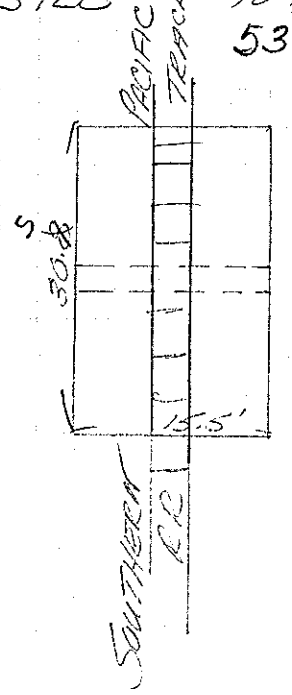
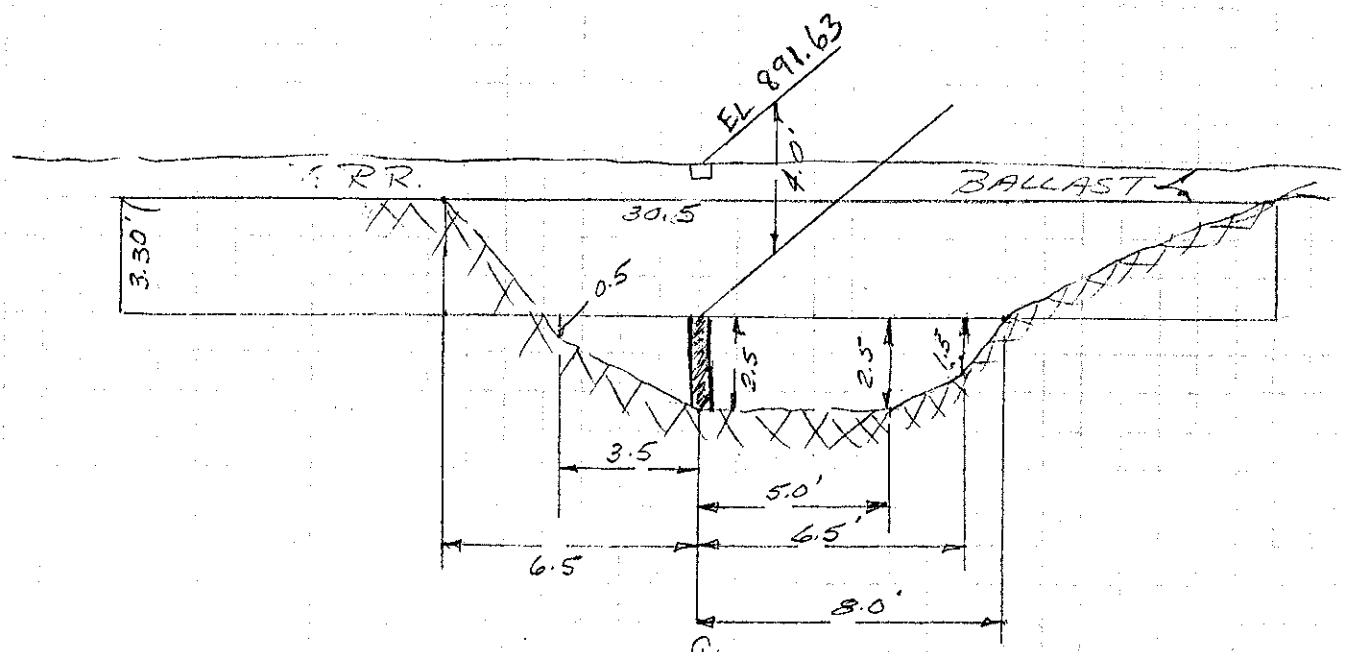


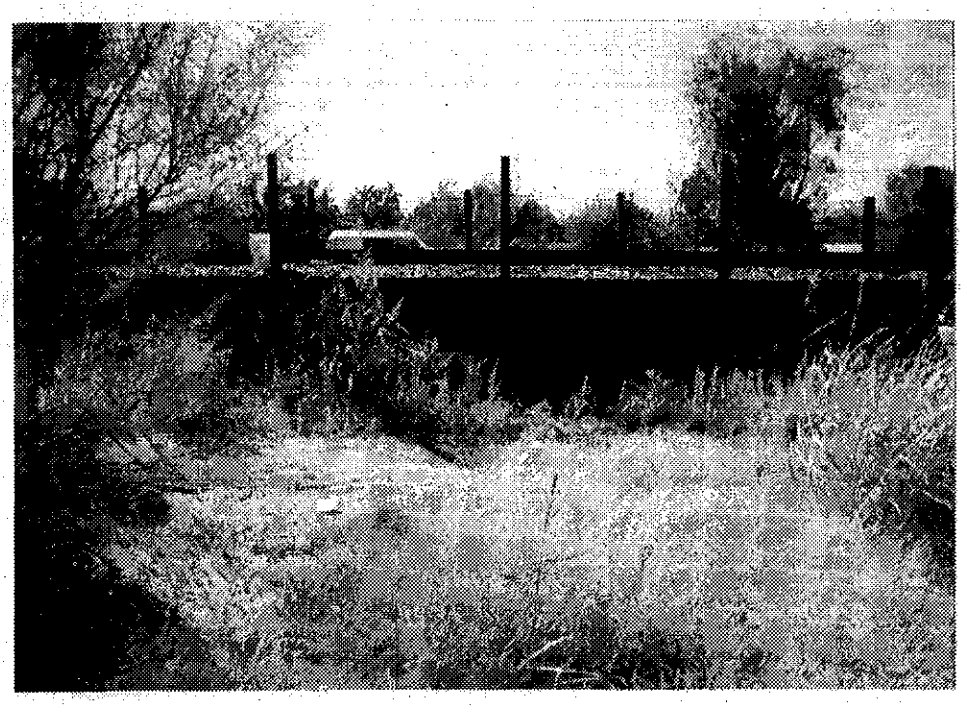
PHOTO - 7-S

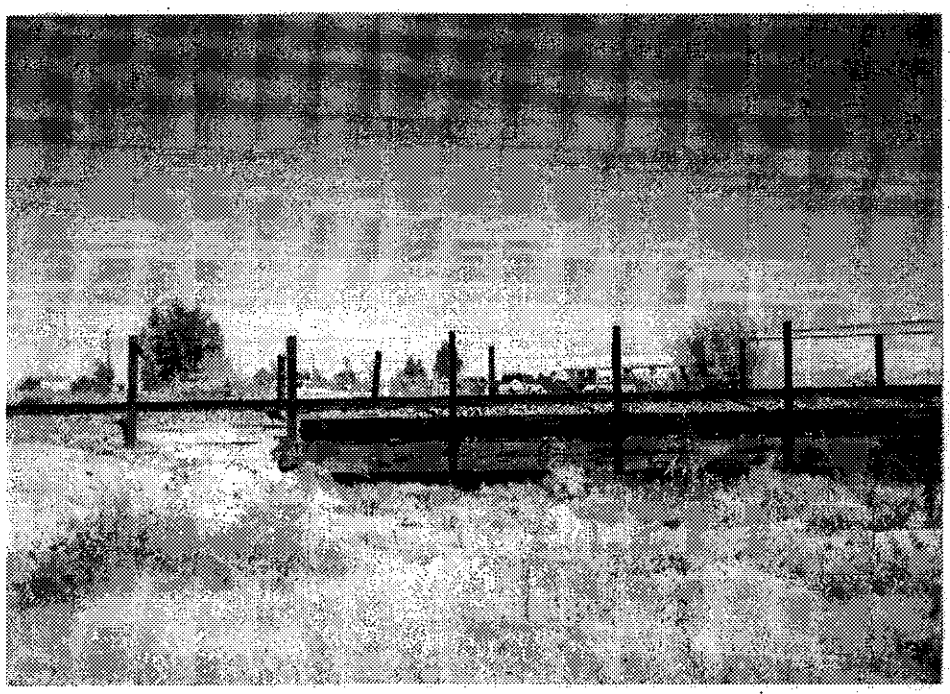
PHOTO 7-N



UPSTREAM SIDE (NORTH)

TRESTLE #8





TRESTLE #8

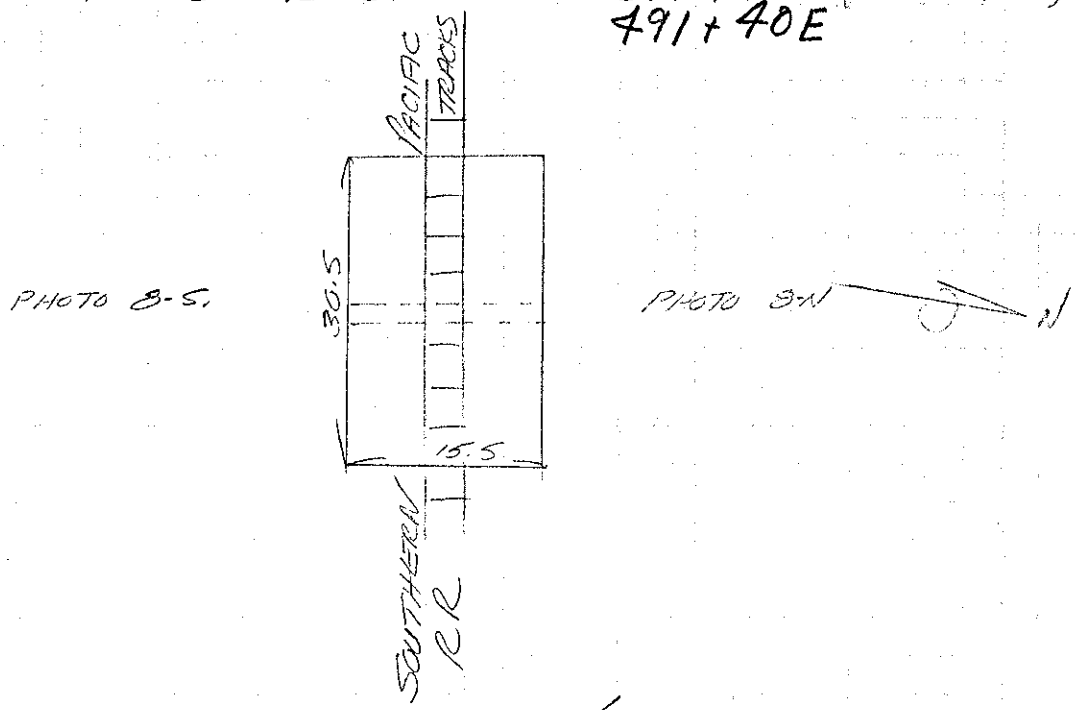
MKE McLaughlin Kmetty Engineers, Ltd.

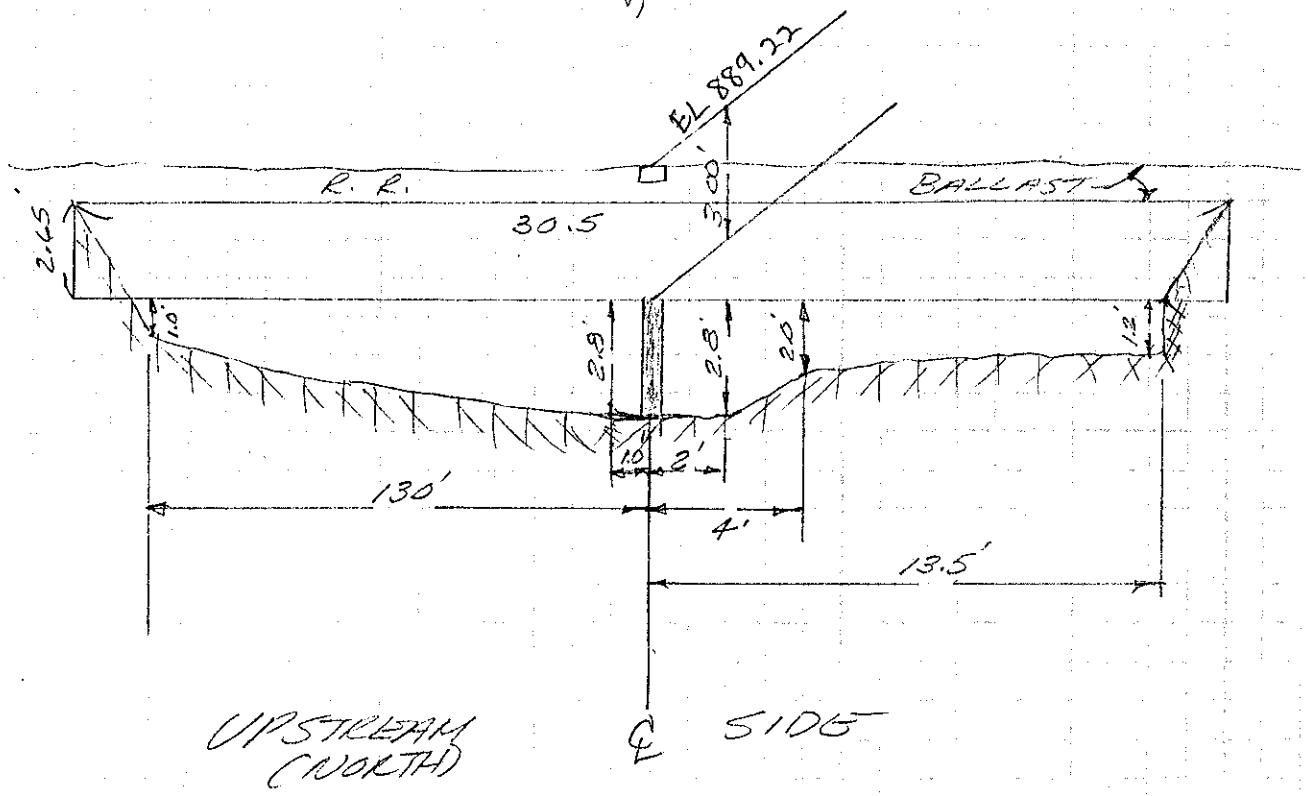
Project Title _____ Project No. _____ Date _____

Subject _____ Designed _____ Page 10 of 37

WATSON RD TO APACHE RD (CONT)

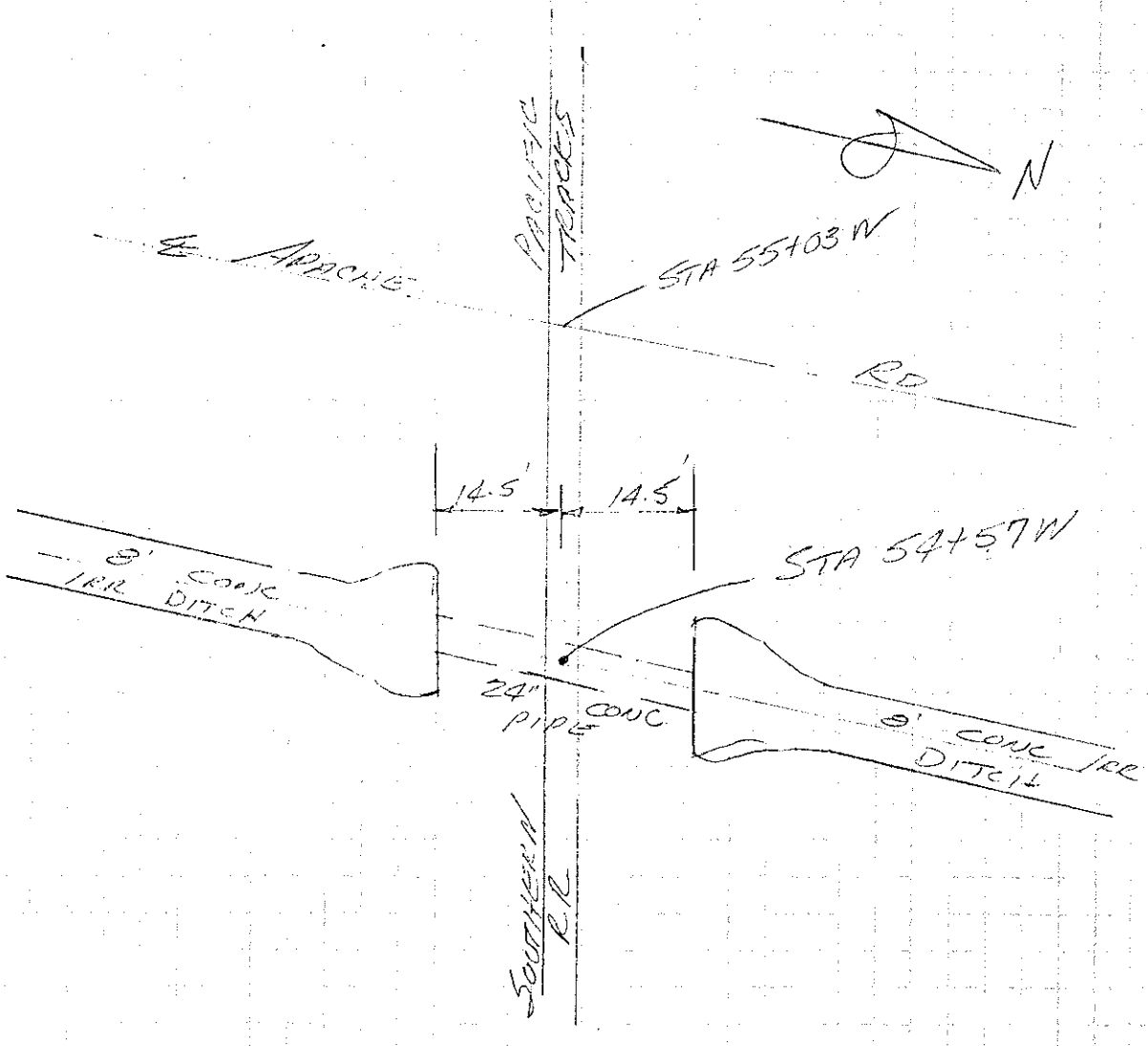
30.5' x 15.5' WOOD TRESTLE #8 – 514+44W (876.42) RR MP
491+40E



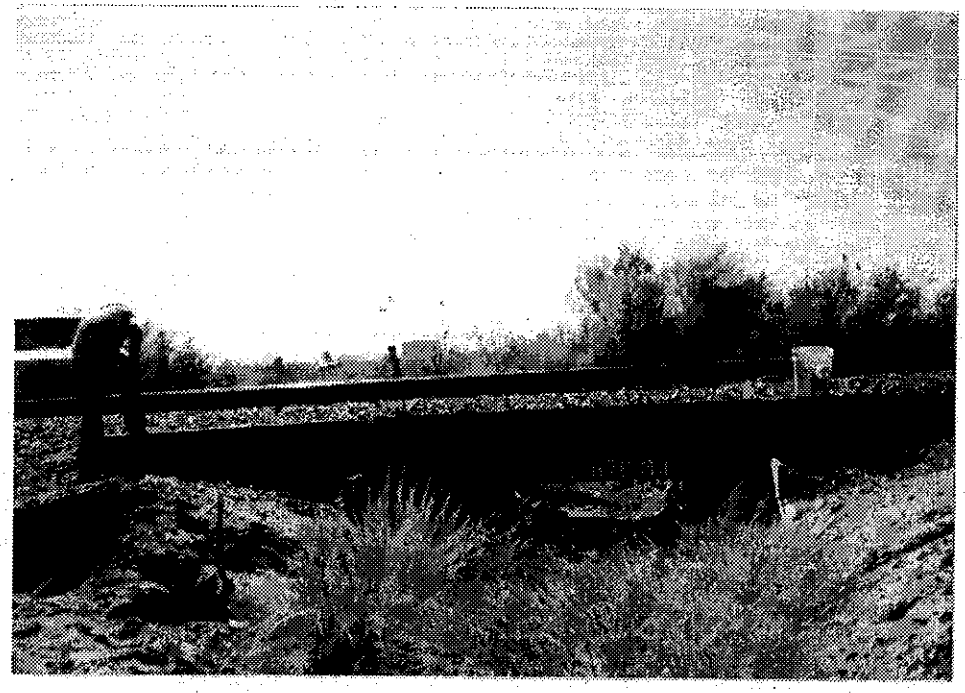


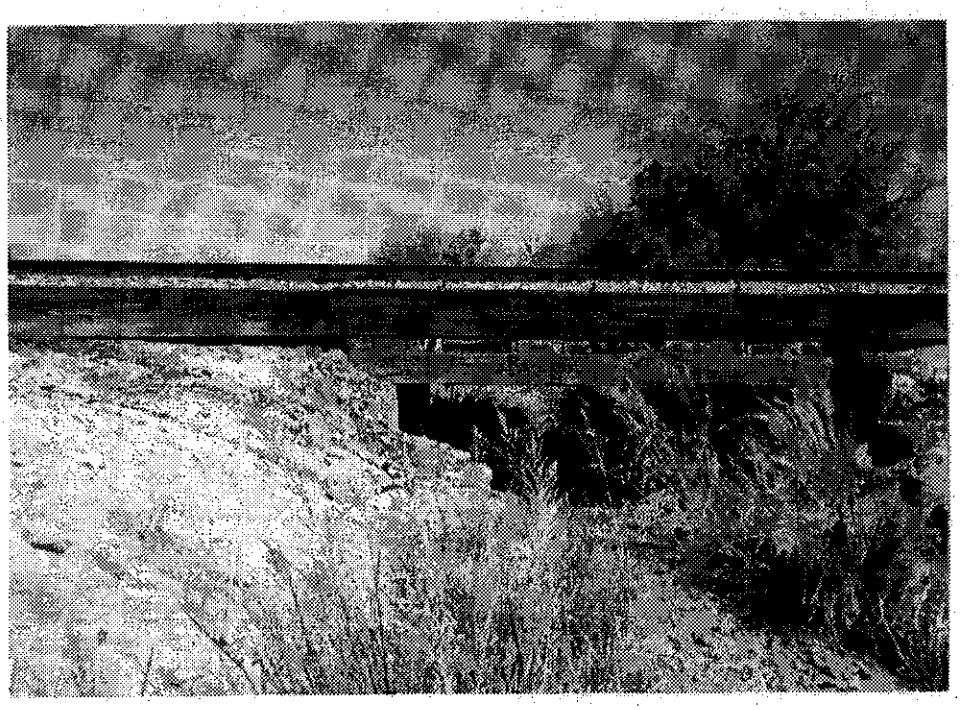
WATSON RD TO APACHE RD (CON'T)

24" CONC PIPE - 54+57 W



TRESTLE #9





TRESTLE #9

MKE McLaughlin Kmetty Engineers, Ltd.

Project Title BUCKEYE FLOOD INS. STUDY Project No. 89-407.02 Date 10-2-91

Subject SOUTHERN PACIFIC R.R. CROSSINGS Designed _____ Page 12 of 37

APACHE RD (0+0W) TO MILLER RD (53+56 W)
P.I. RR - 20+81W.

#9
10.5' x 16.0' WOOD TRESTLE — 16+59W (876.04) RR MP
471+22E

PHOTO - 9-5

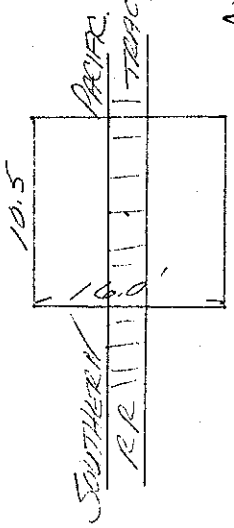
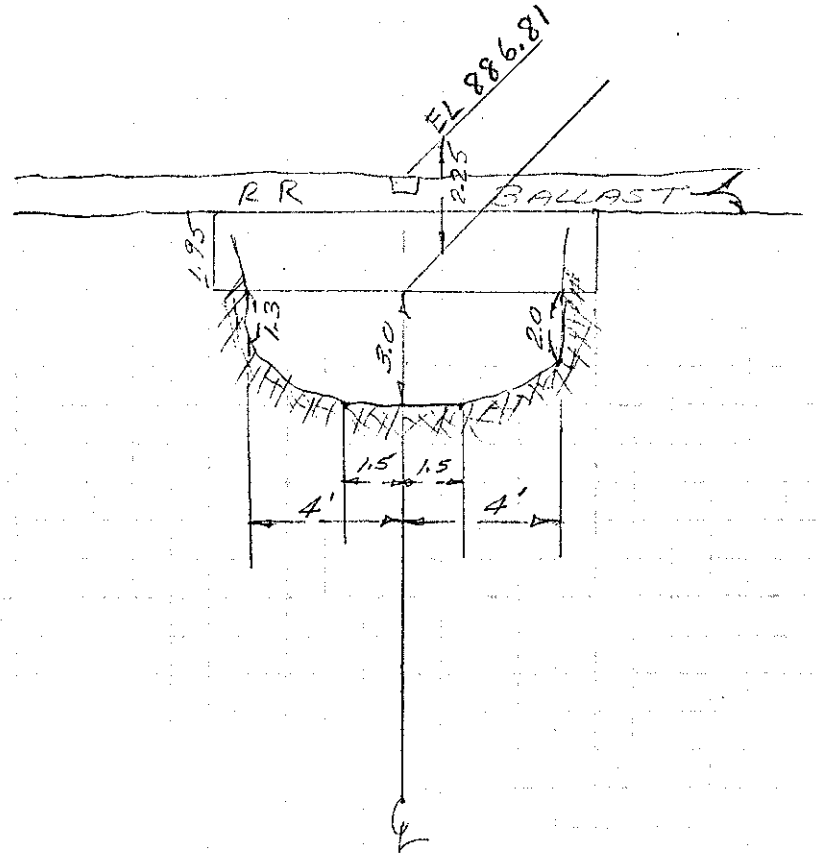
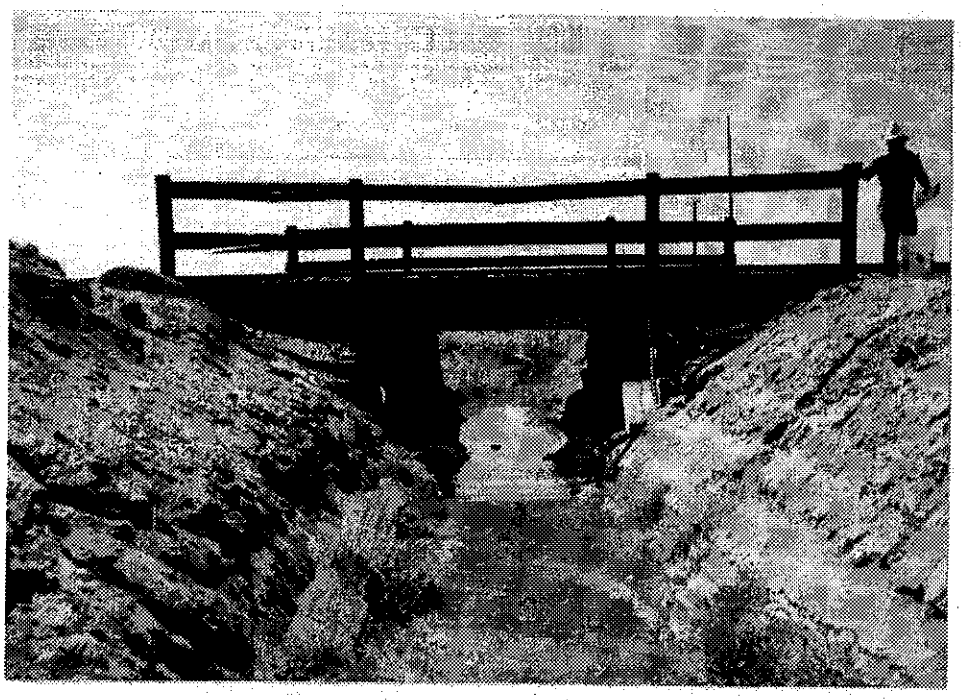


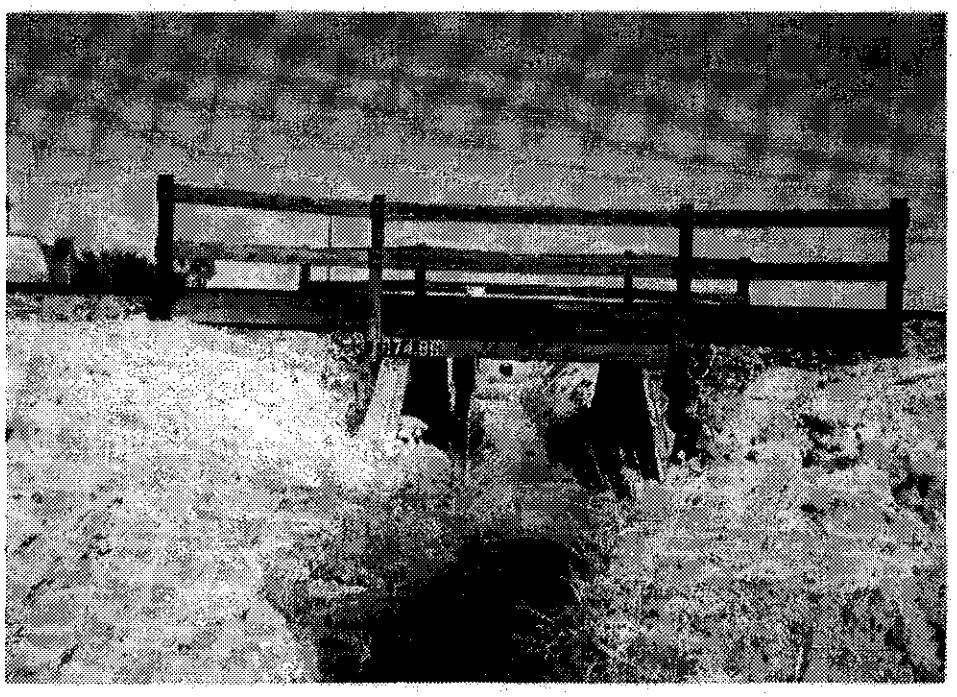
PHOTO 9-4



UPSTREAM SIDE
(NORTH)

TRESTLE #10





TRESTLE #10

MKE McLaughlin Kmetty Engineers, Ltd.

Project Title: BUCKEYE FLOOD INS. STUDY Project No. 89-407.02 Date 10-2-91

Subject: SOUTHERN PACIFIC R.R. CROSSINGS Designed _____ Page 13 of 37

MILLER RD (6+0W) TO ROOKS RD (52+77W)

10.5' x 16.0' WOOD TRESTLE #10 — 25+40W (RR MP 374.86) 409+21E

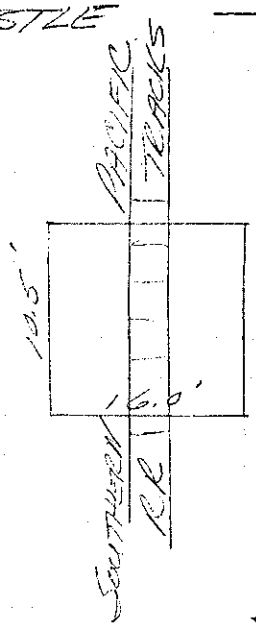
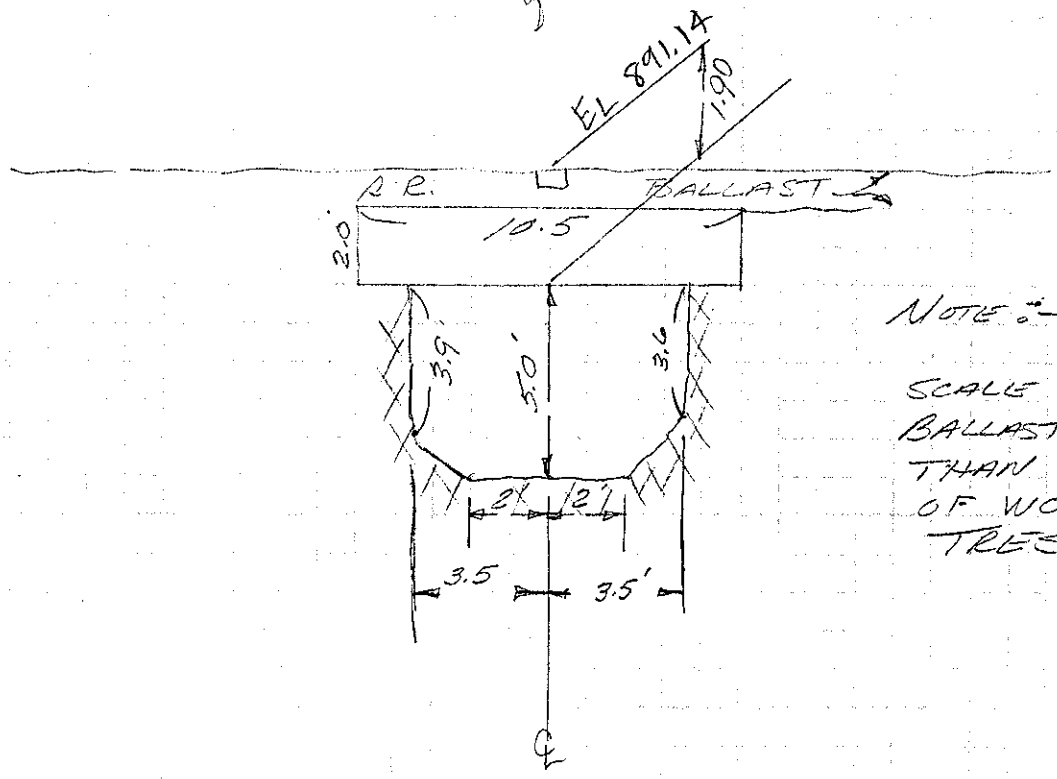


PHOTO 10 S.

PHOTO - 10 N

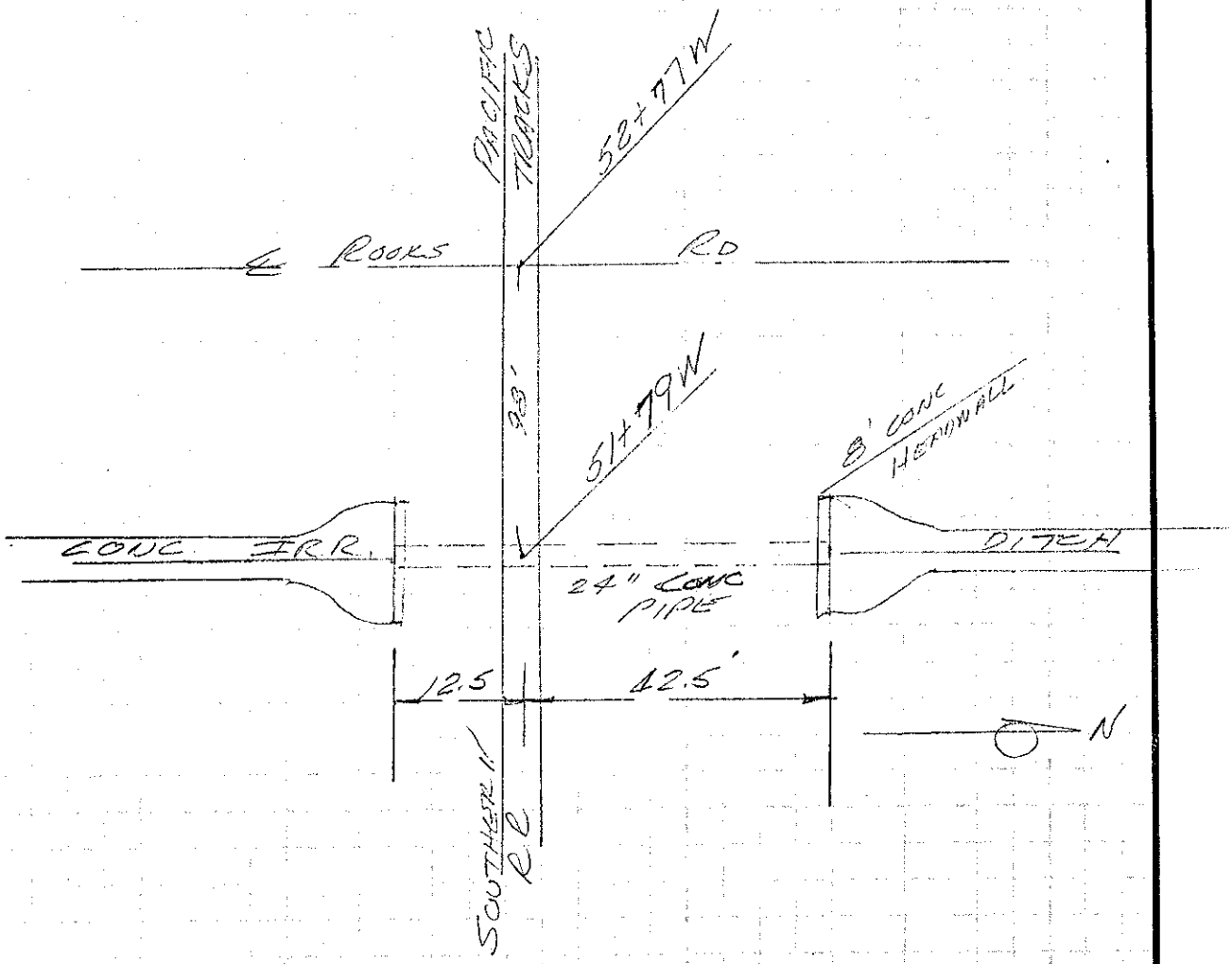


NOTE:- NOT TO SCALE R.R. BALLAST LOWER THAN TOP OF WOOD TRESTLE

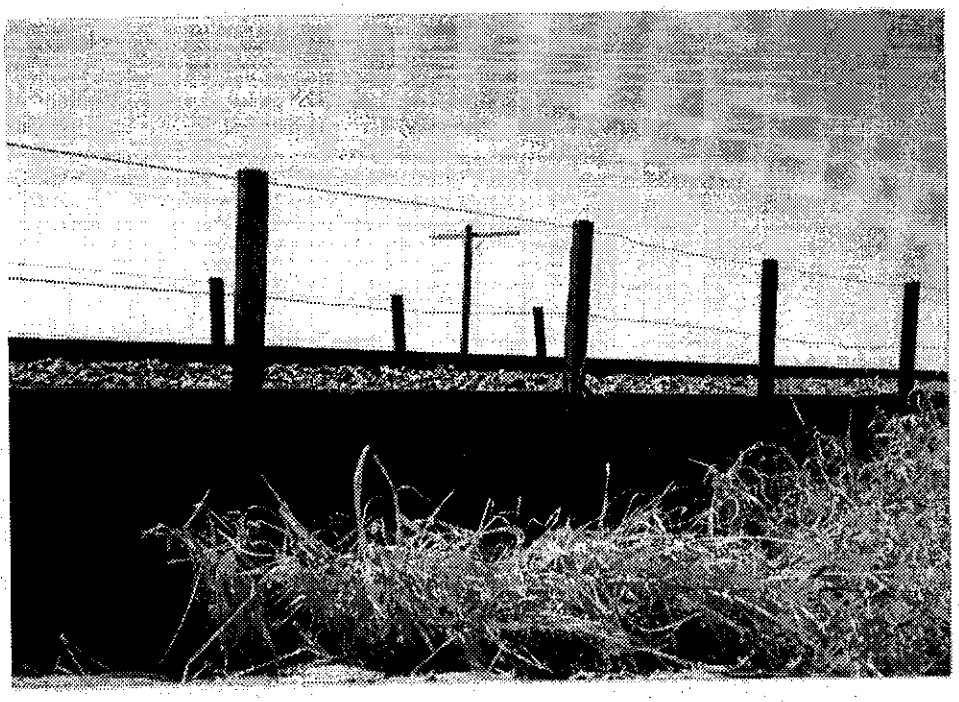
UPSTREAM SIDE (NORTH)

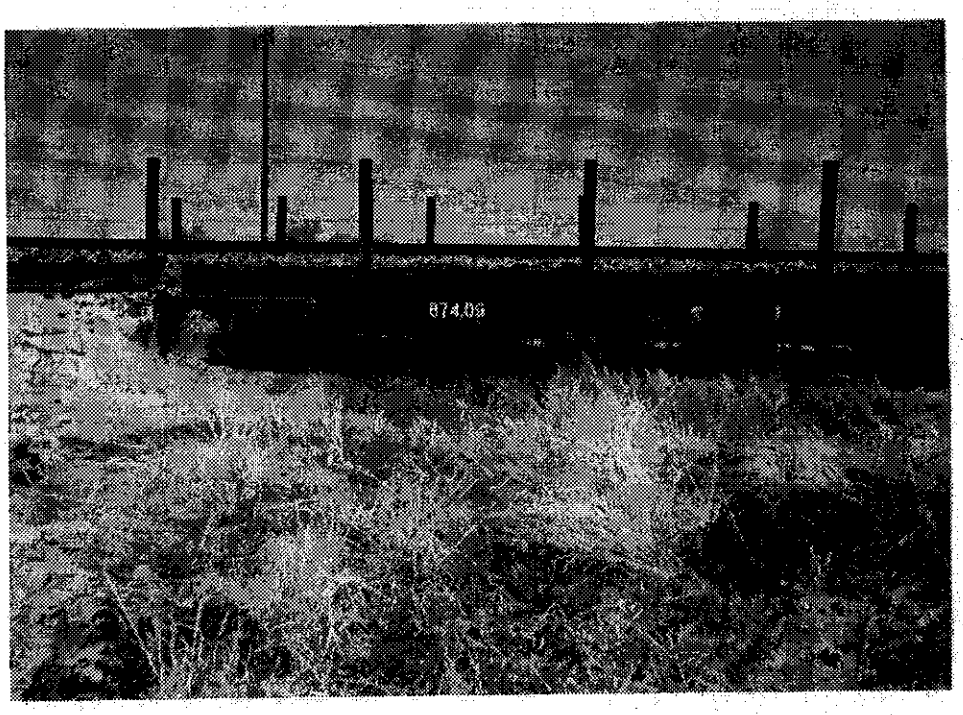
MILLER RD TO ROOK RD (CONT)

24" CONC. PIPE - 51+77 W.



TRESTLE #11





TRESTLE #11

MKE McLaughlin Kmetty Engineers, Ltd.

Project Title: BUCKEYE FLOOD MIS. STUDY Project No. 89-407.02 Date 10-2-91

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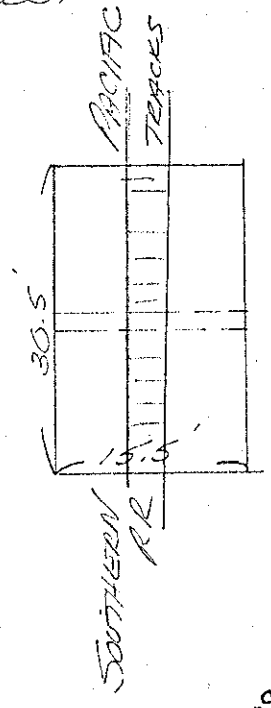
ROOKS RD (0+00W) – P.I.-R.R. (15+78W) – OBLESBY RD (51+77W)

30.5' x 15.5' WOOD TRESTLE #11 – 13+02 (874.09) RR MP
468+46E



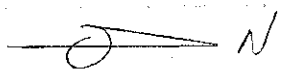
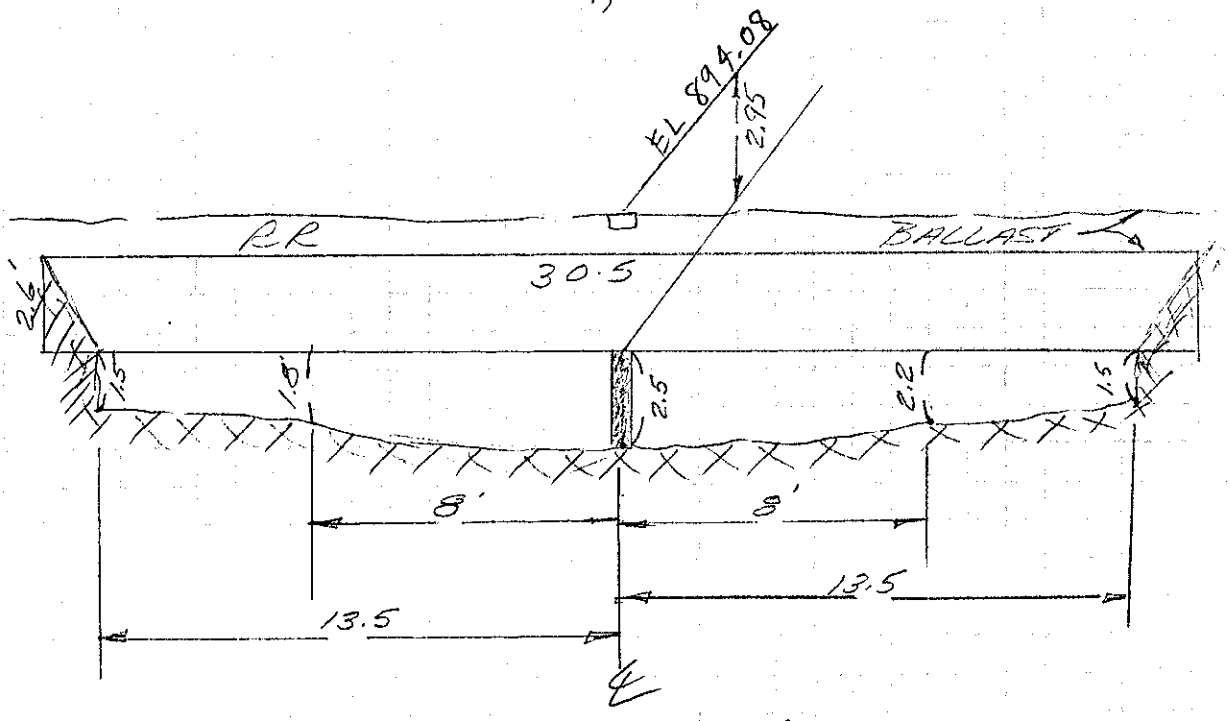


PHOTO - 11-S.

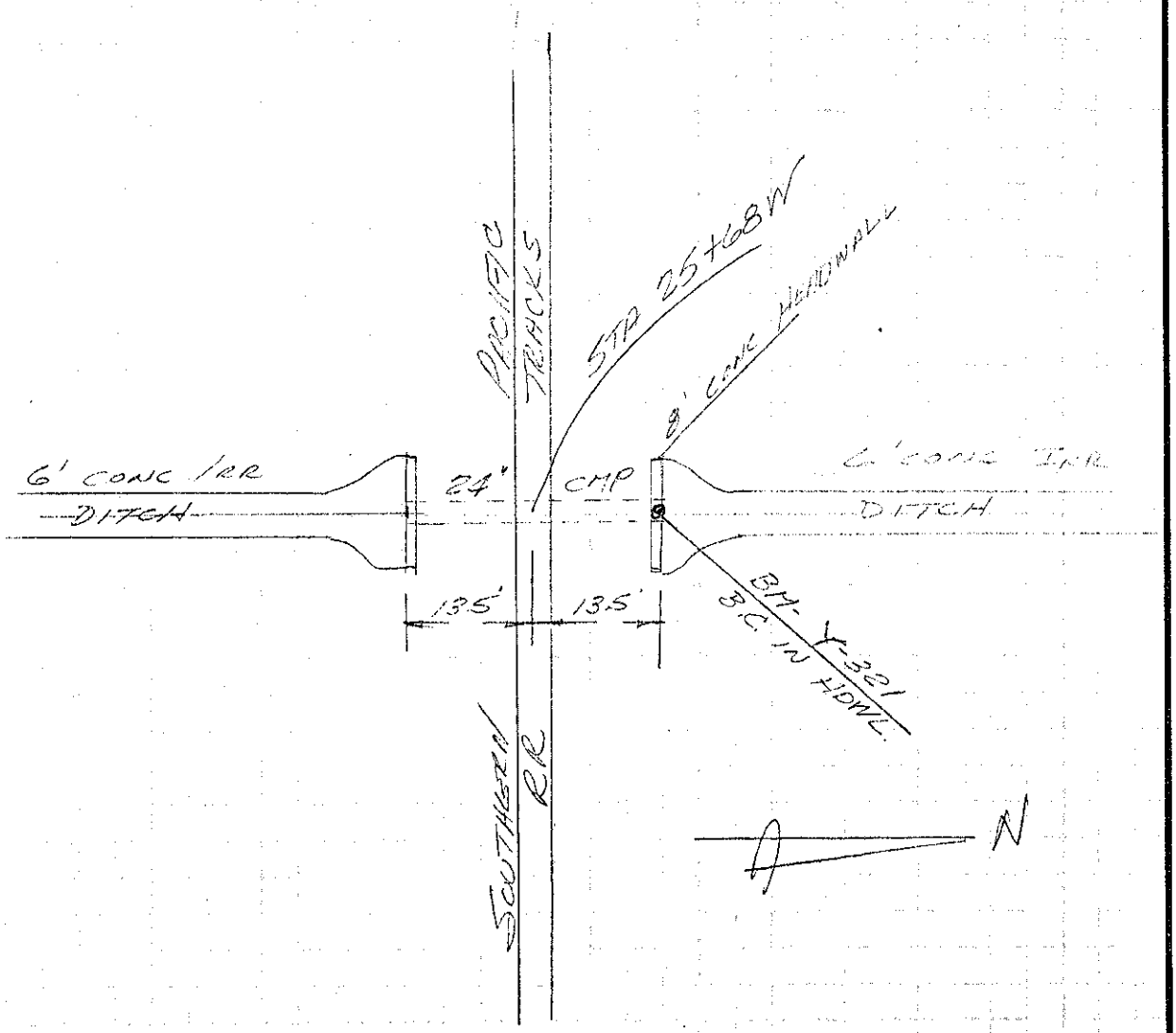
PHOTO - 11 N



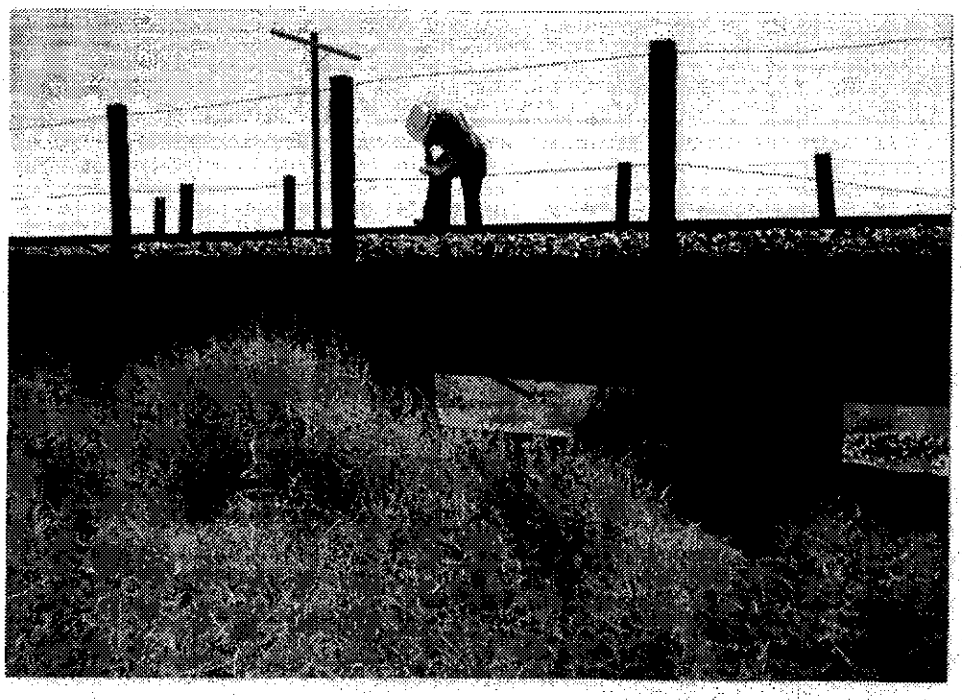
UP STREAM SIDE
(NORTH)

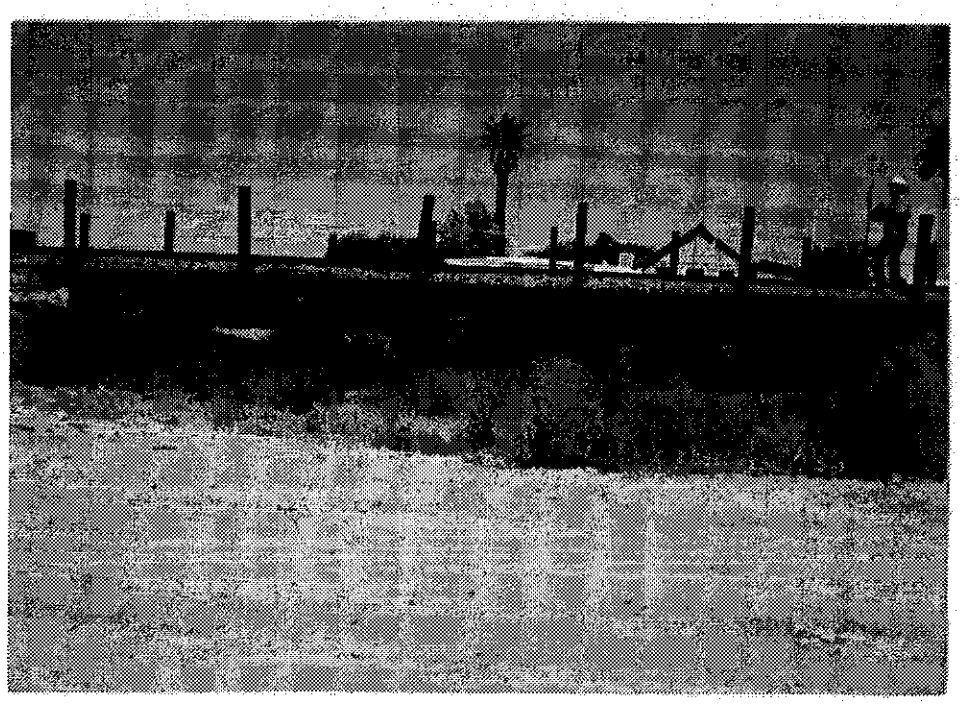
ROOKS RD TO OGLESBY RD (CONT)

24" CMP - 25+68 W
355+80 E



TRESTLE #12





TRESTLE #12

MKE McLaughlin Kmetty Engineers, Ltd.

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ROOKS RD TO OGLESBY RD (CONT)

45.0' X 15.5' WOOD TRESTLE #12 — 40+12 W. (RR MP 873.59) 341+46E

PHOTO - 12.5.

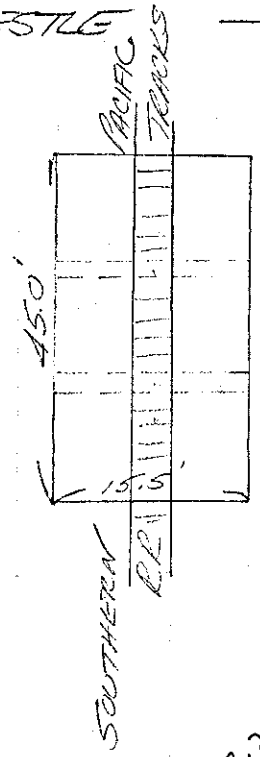
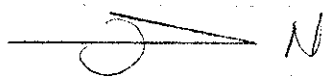
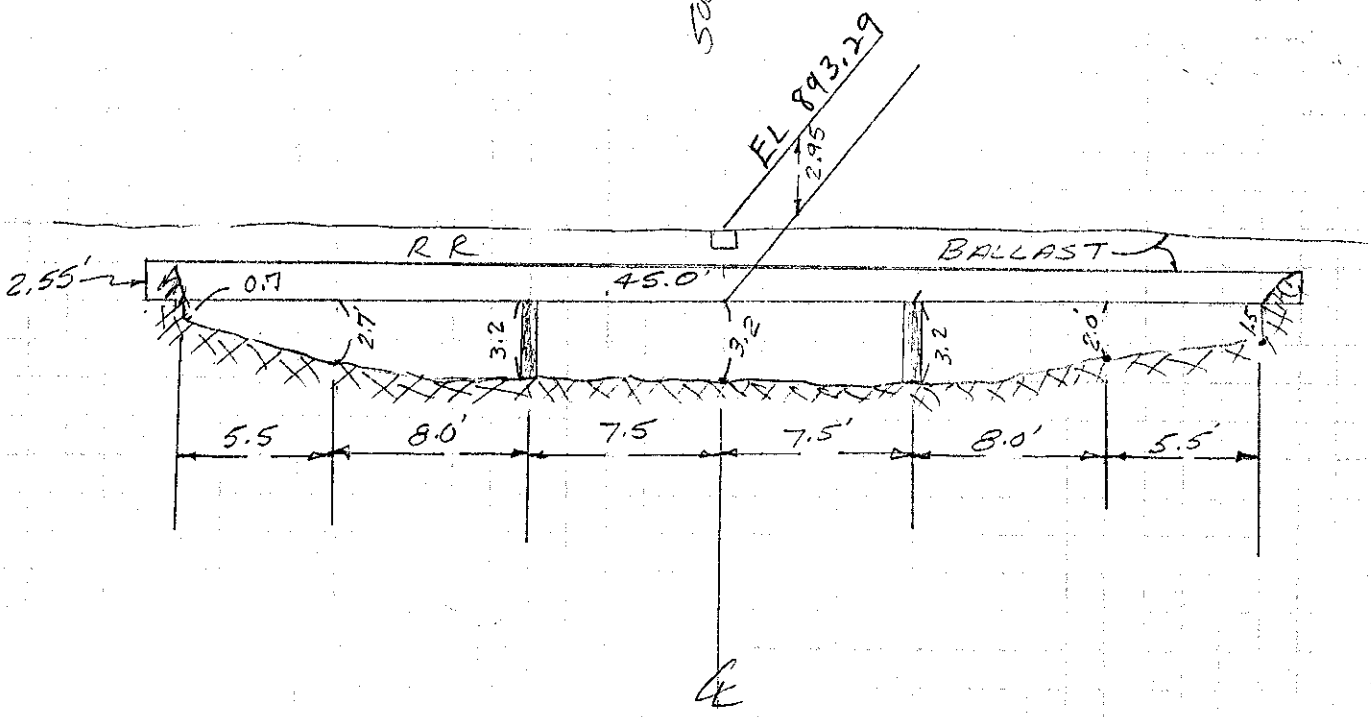


PHOTO - 12N (2 SHOTS)

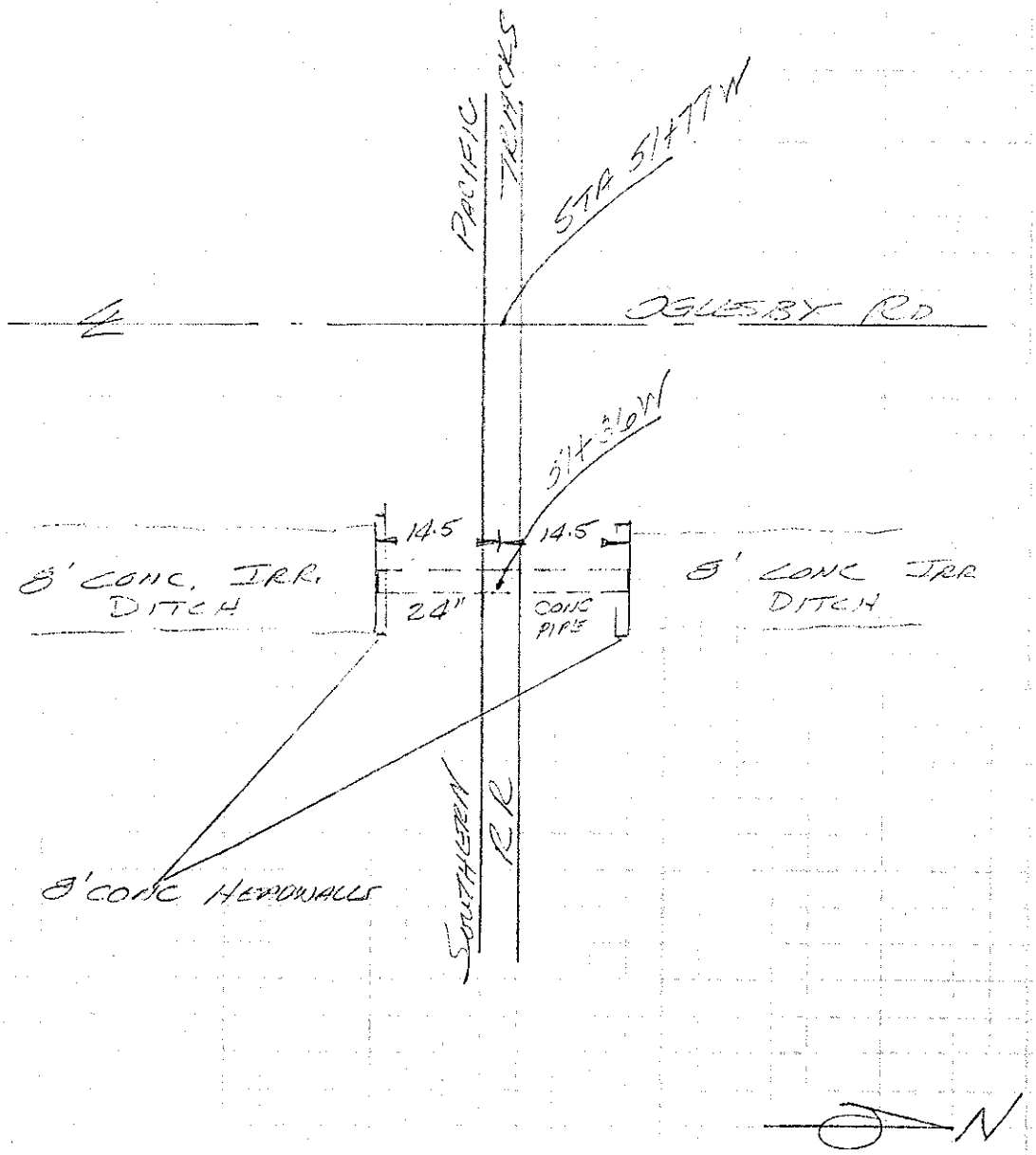




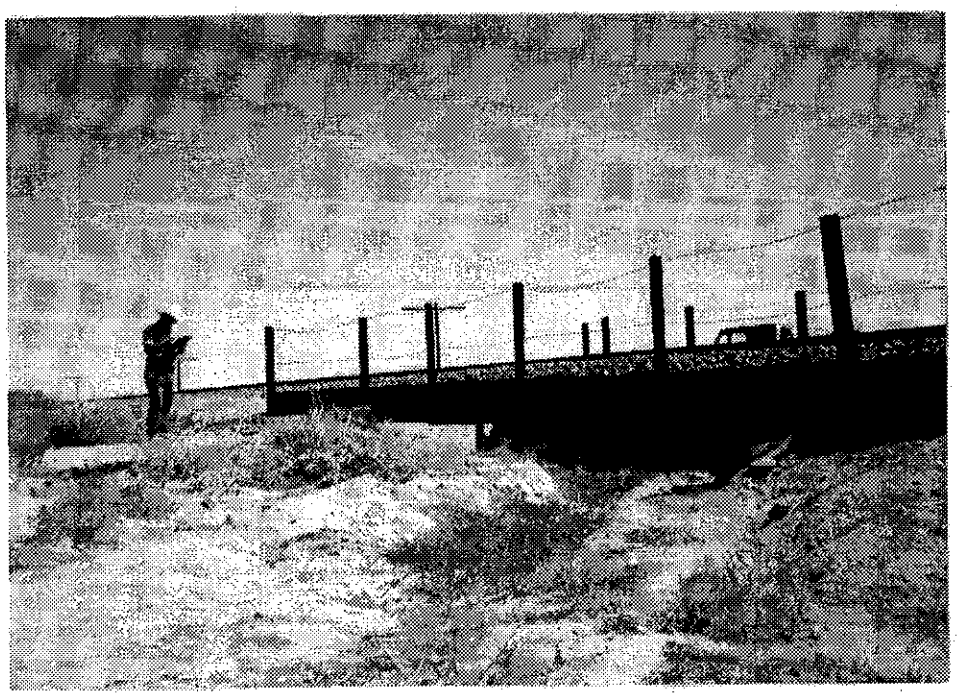
UPSTREAM SIDE (NORTH)

ROOKS RD TO OGLESBY RD (CON'T)

24" CONC. PIPE - 51+36 W



TRESTLE #13



TRESTLE #13

MKE McLaughlin Kmetty Engineers, Ltd.

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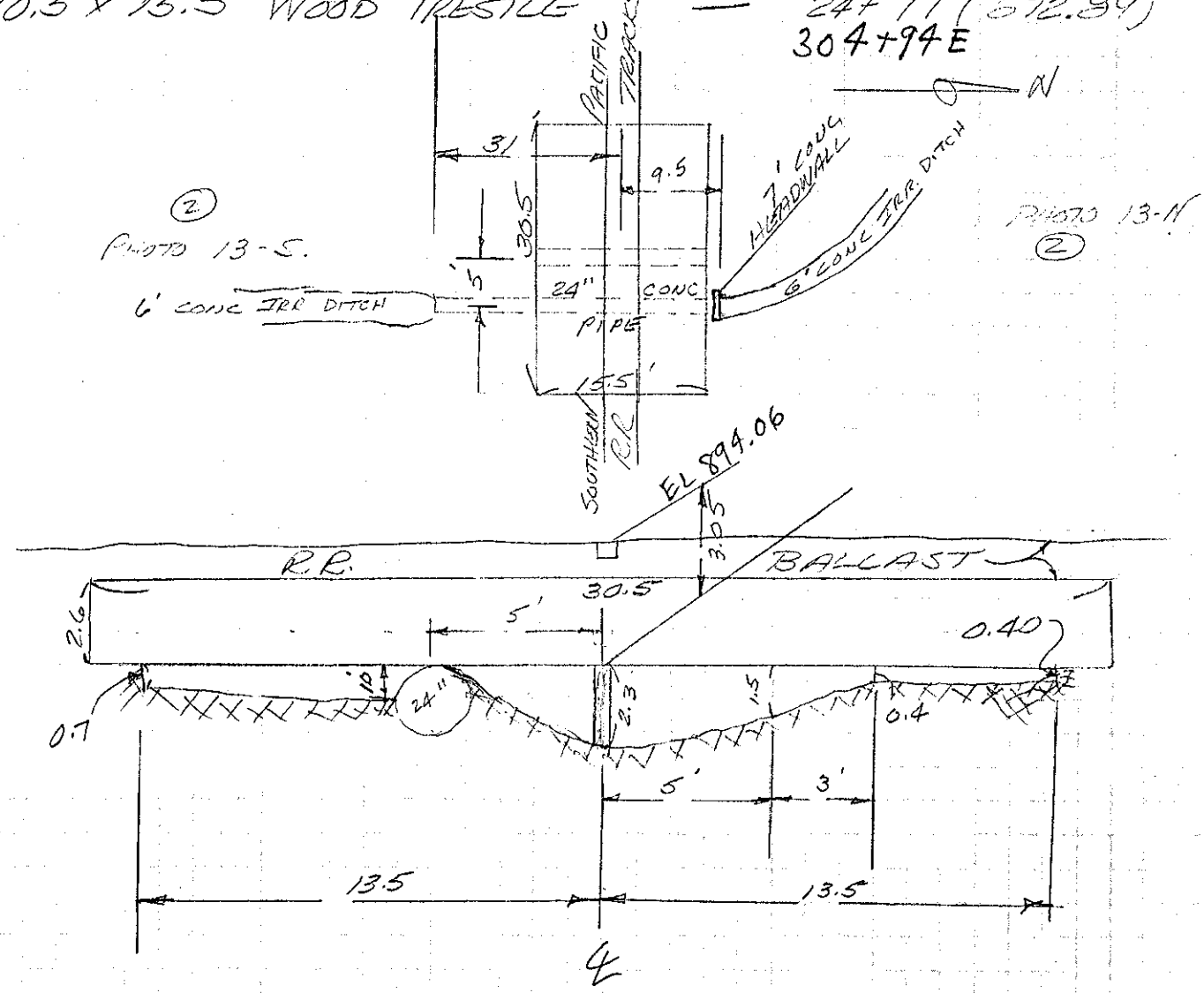
OGLESBY ROAD (0+00W) TO TURNER RD (53+07W)

30.5' x 15.5' WOOD TRESTLE #13 — 24+77 (572.89) RR MP

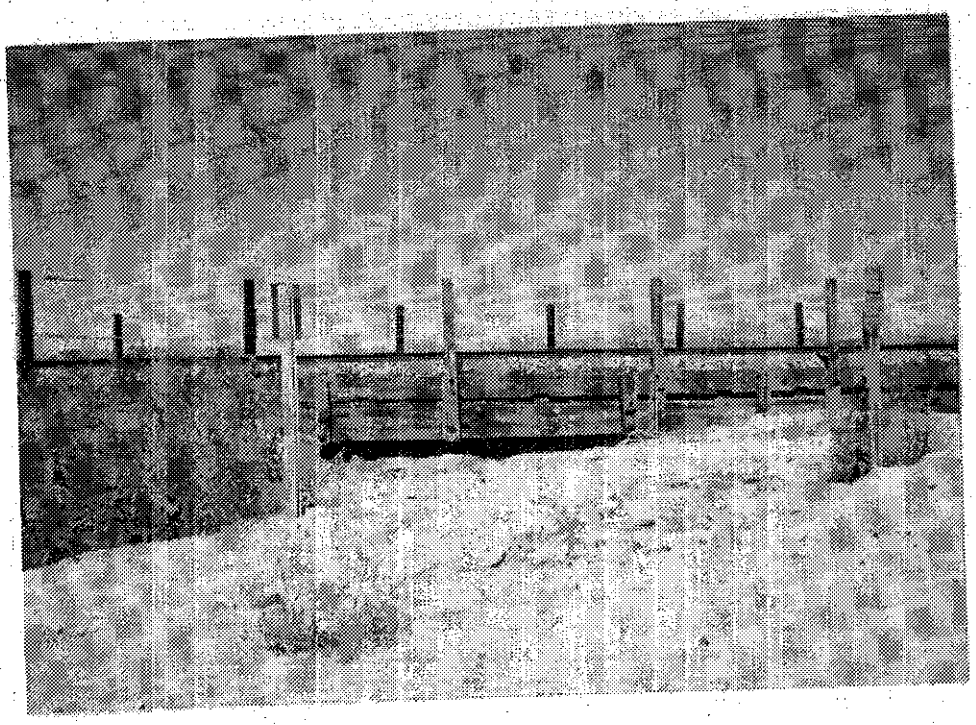
304+94E

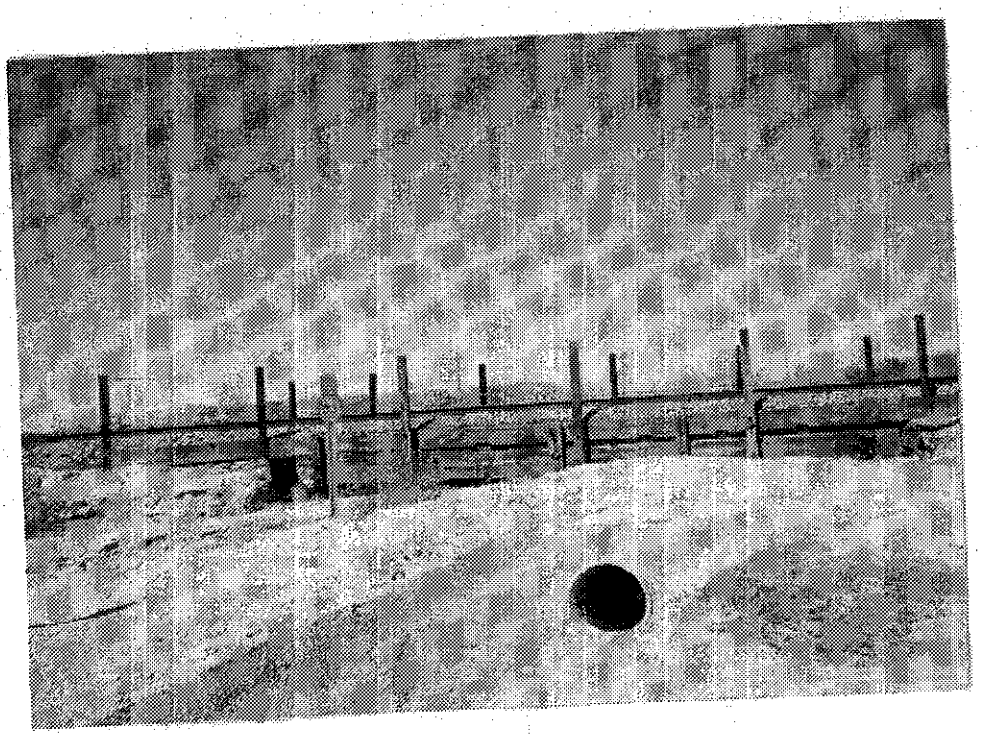


UPSTREAM SIDE

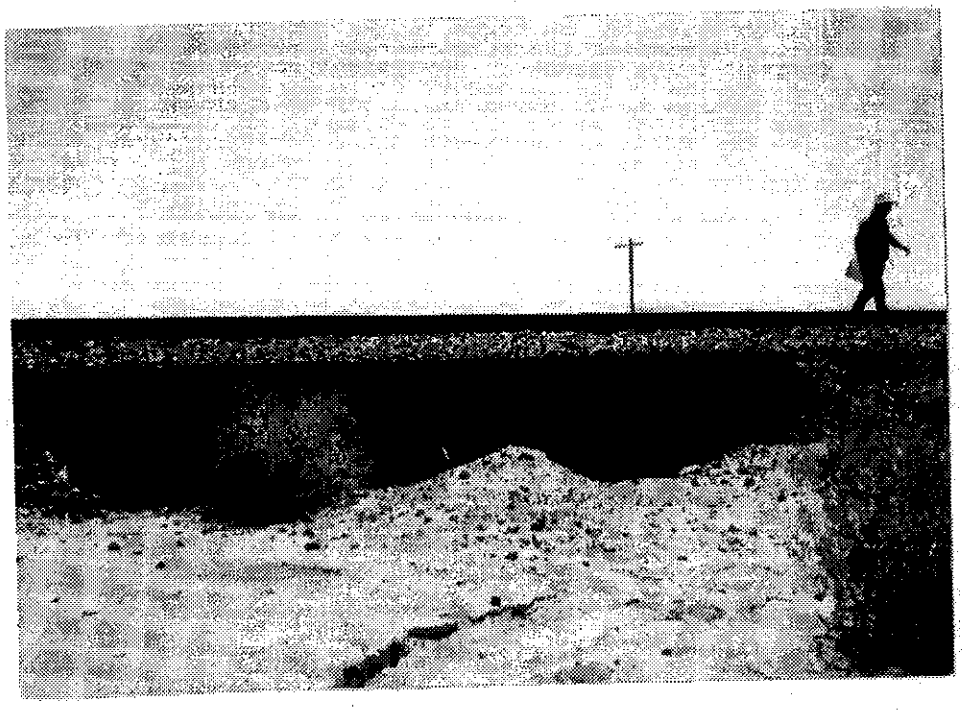
(NORTH)

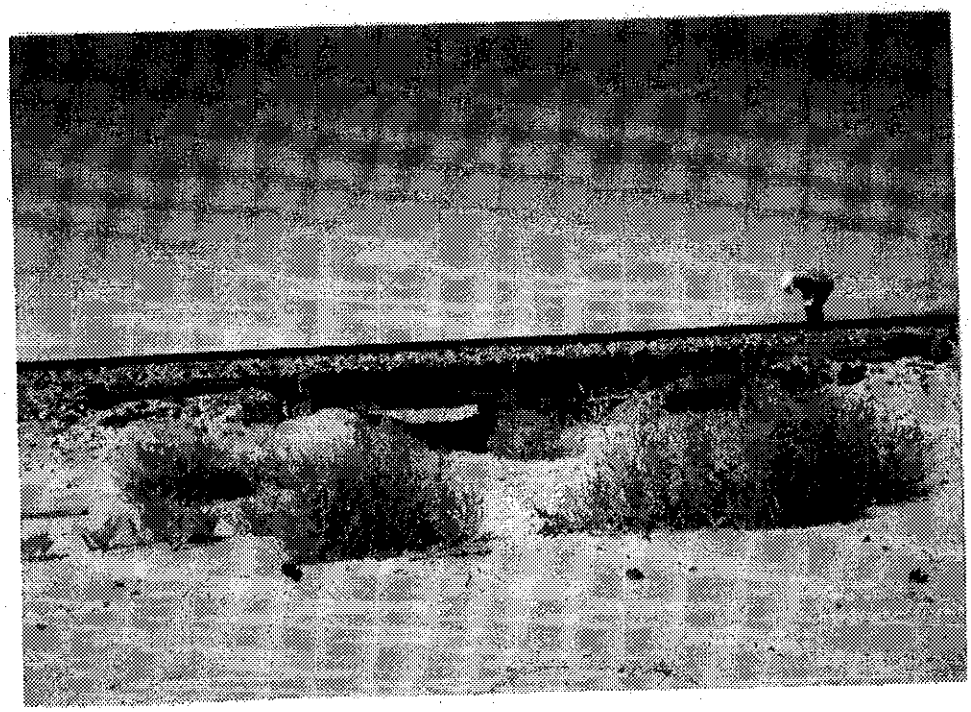
TRESTLE #13



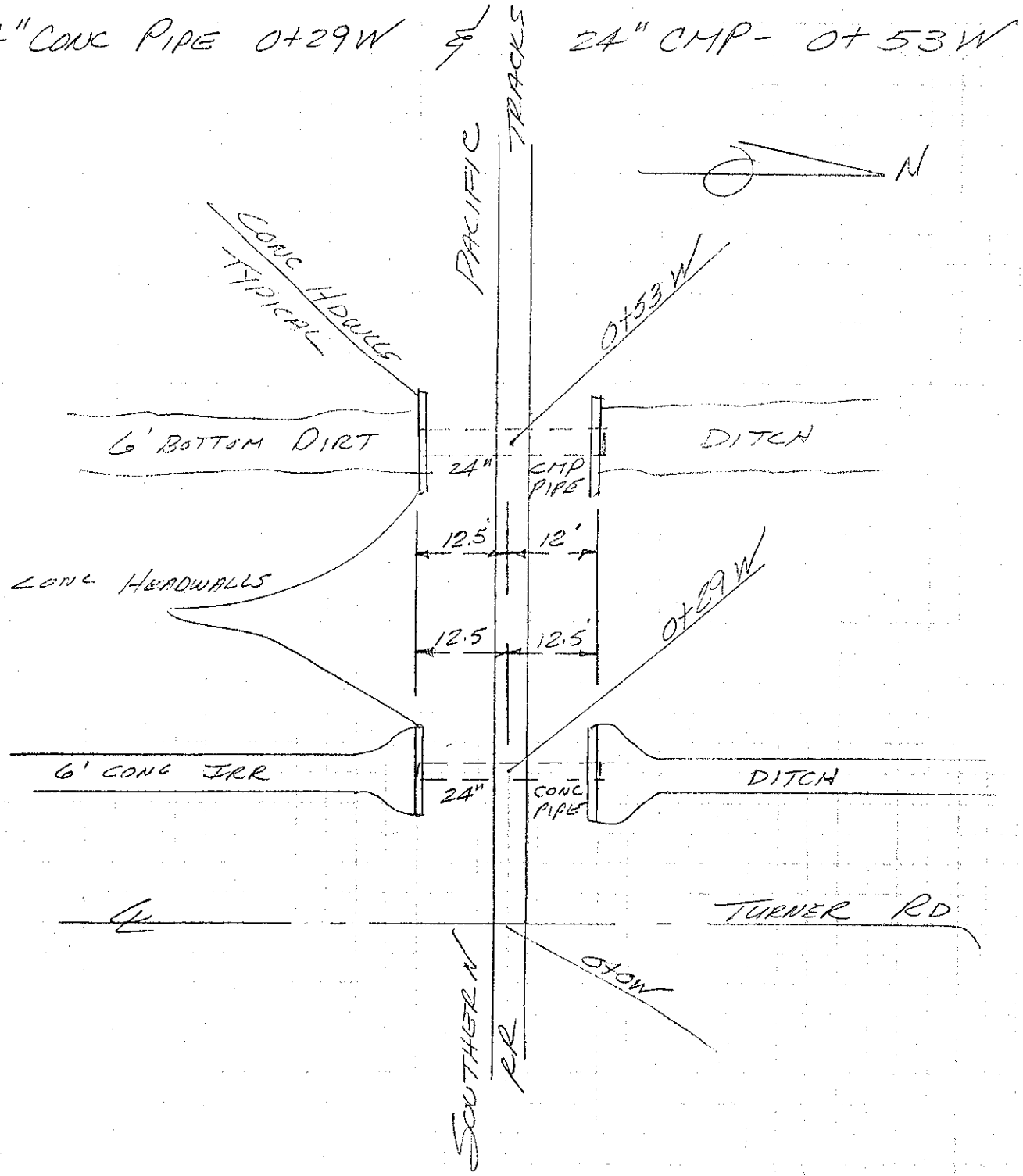


TRESTLE #14





TURNER RD (0+00W) TO WILSON AVE (53+22W)



TRESTLE #14

MKE McLaughlin Kmetty Engineers, Ltd.

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TURNER RD TO WILSON AVE (CON'T)

19.5' x 15.5' WOOD TRESTLE #14 — 16+15 W (872.05) RR MP
260+49E

PHOTO 14 S

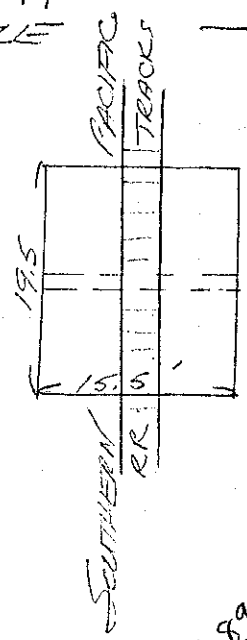
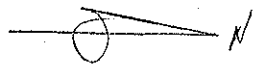
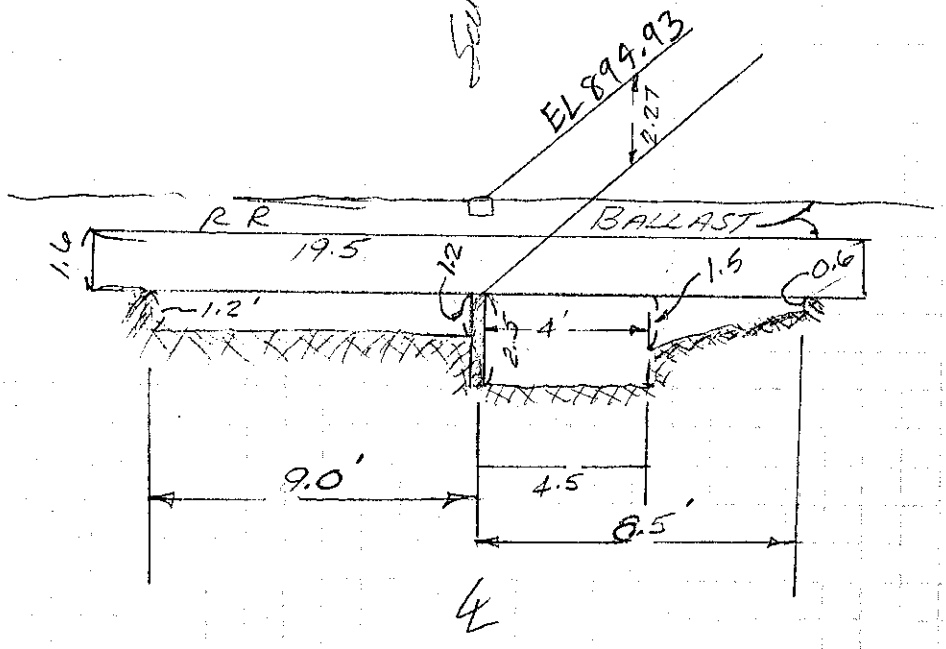


PHOTO 14 N

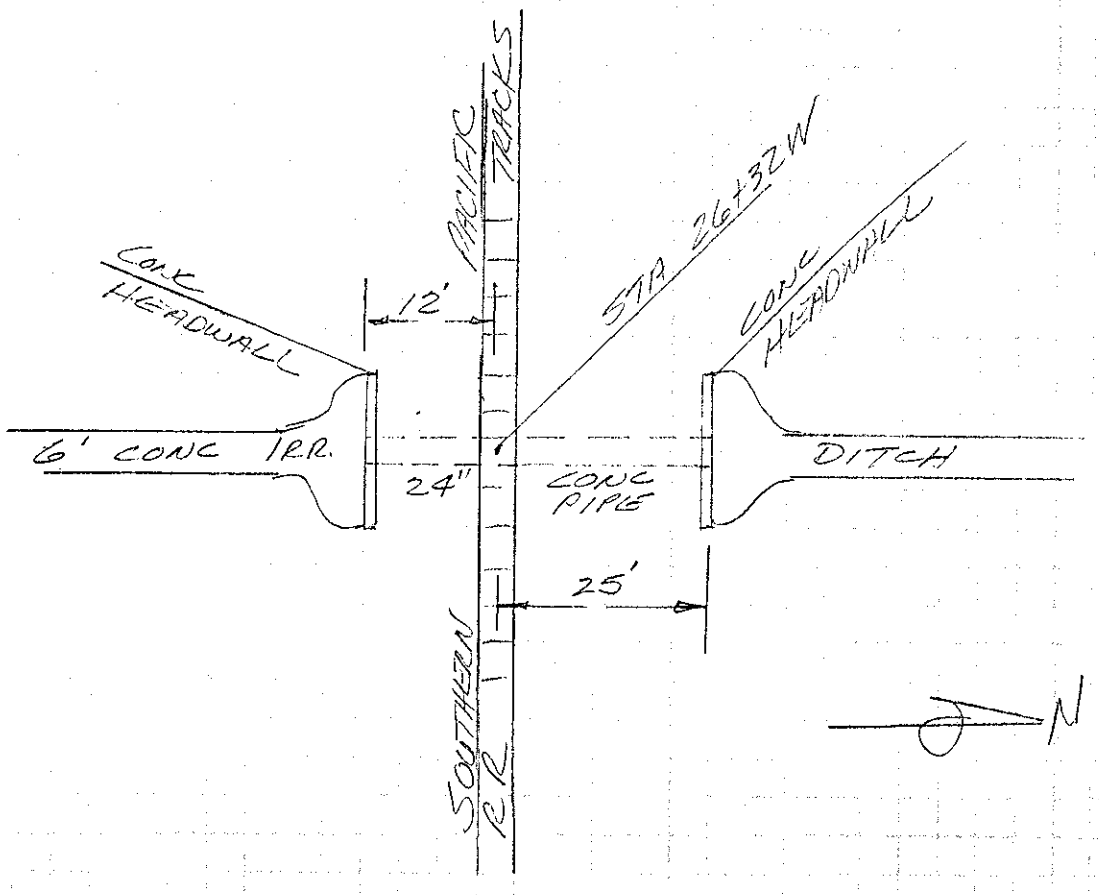




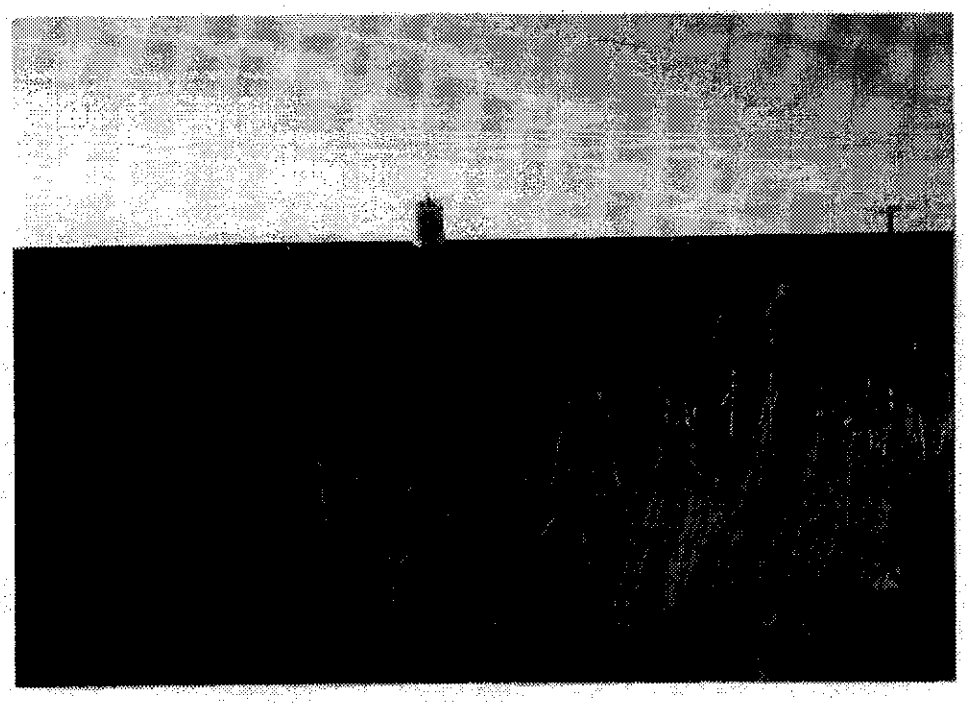
UPSTREAM SIDE
(NORTH)

TURNER RD TO WILSON AVE (CON'T)

24" CONC PIPE - 26+32 W
250+32 E

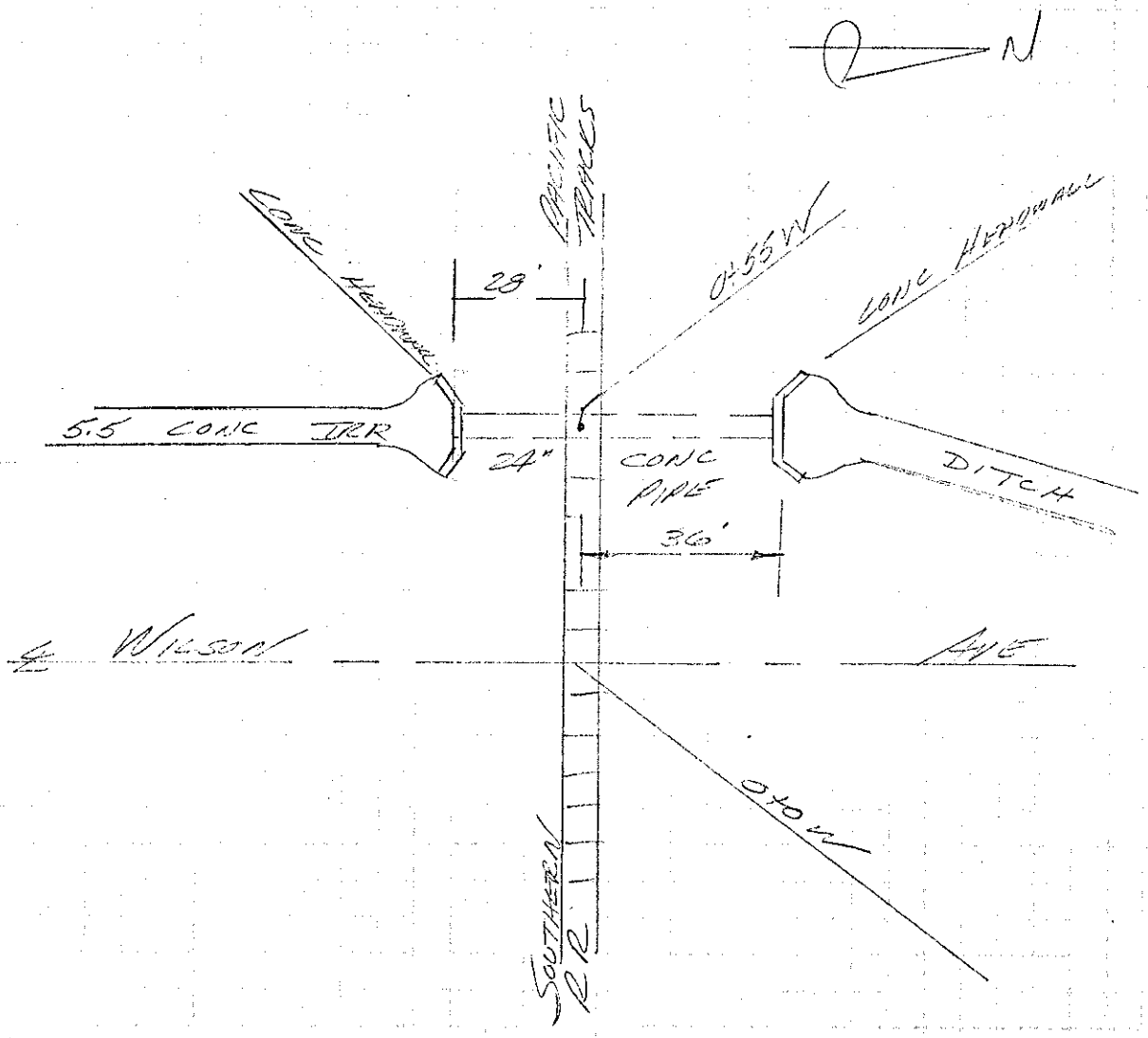


TRESTLE #15



WILSON AVE (0+00W) TO PALO VERDE RD (53+64W)

24" CONC PIPE 0+55 W



TRESTLE #15

MKE McLaughlin Kmetty Engineers, Ltd.

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WILSON RD TO PALO VERDE RD (CONT)

15.5 x 15.5 WOOD TRESTLE #15 - 13+20W 210+22E (RR MP 871.10)

PHOTO 15 S.

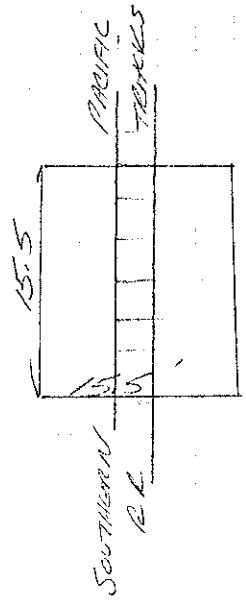
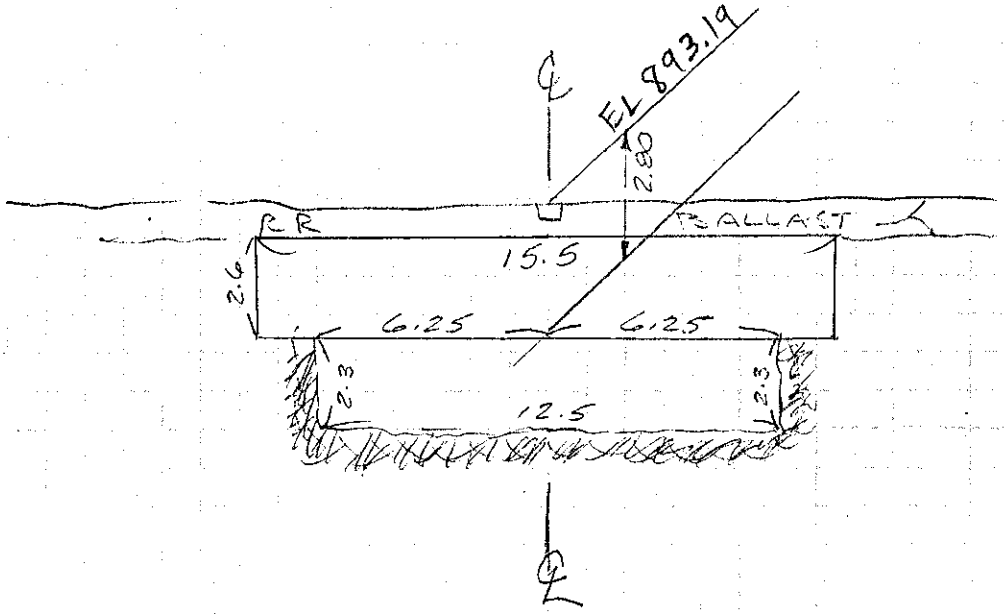
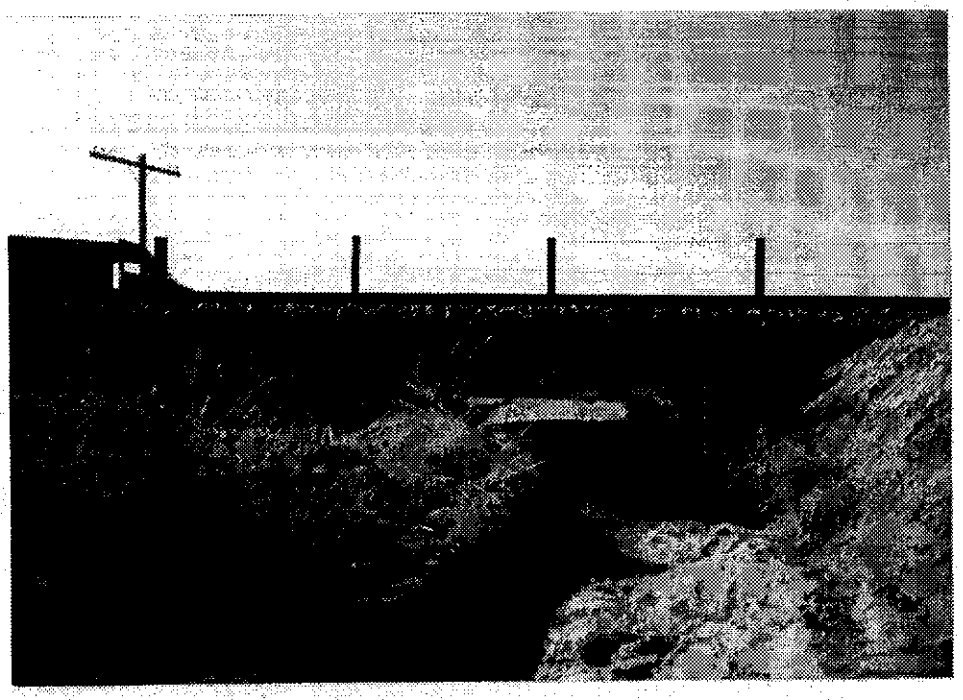


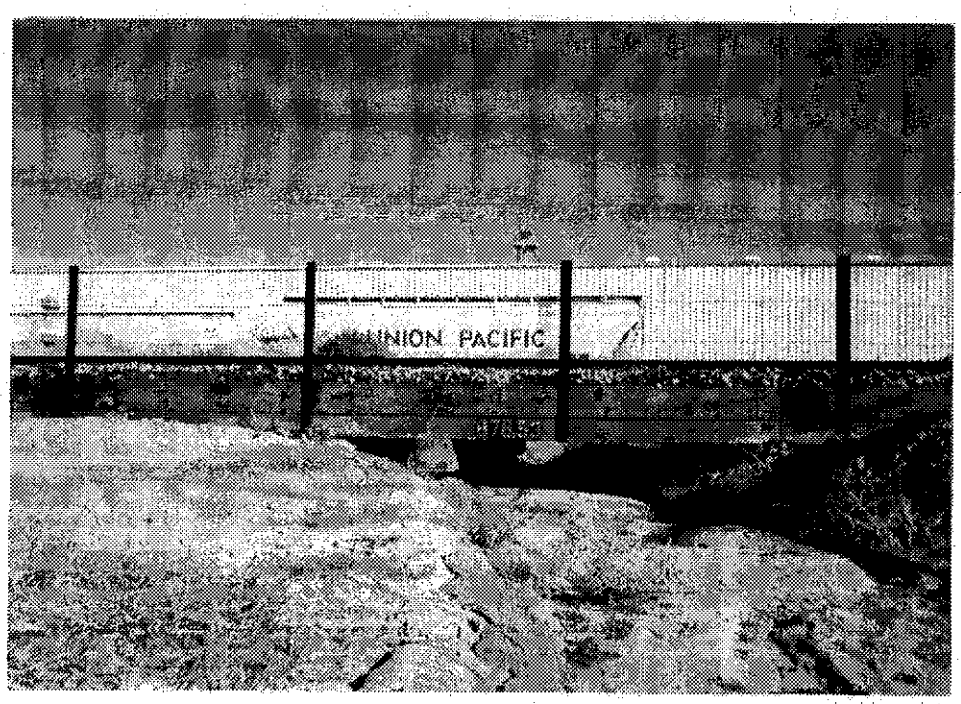
PHOTO 15 N



UPSTREAM SIDE (NORTH)

TRESTLE #4





TRESTLE #4

MKE McLaughlin Kmetty Engineers, Ltd.

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DEAN RD TO RAINBOW RD

#4

40.0' x 16.0' WOOD TRESTLE – 49+68W (RR MP 878.53)

602+97E

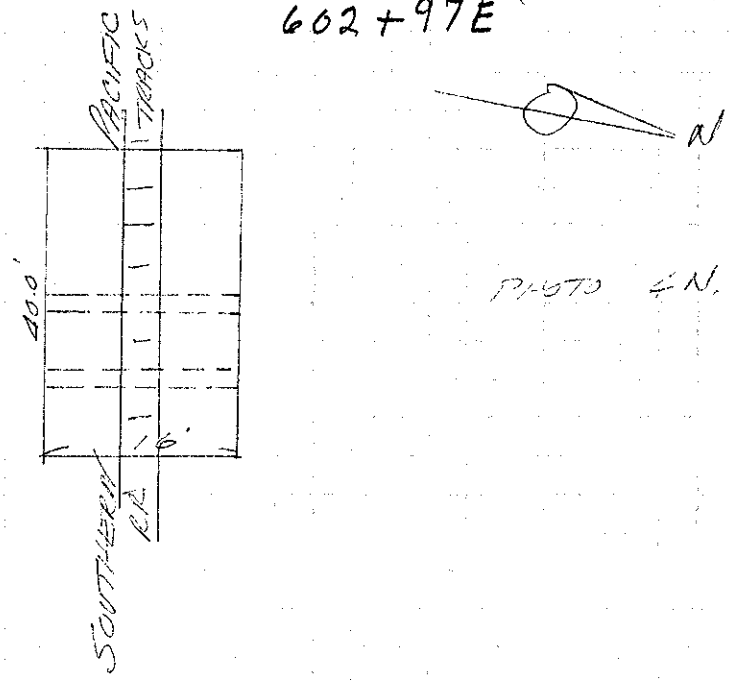
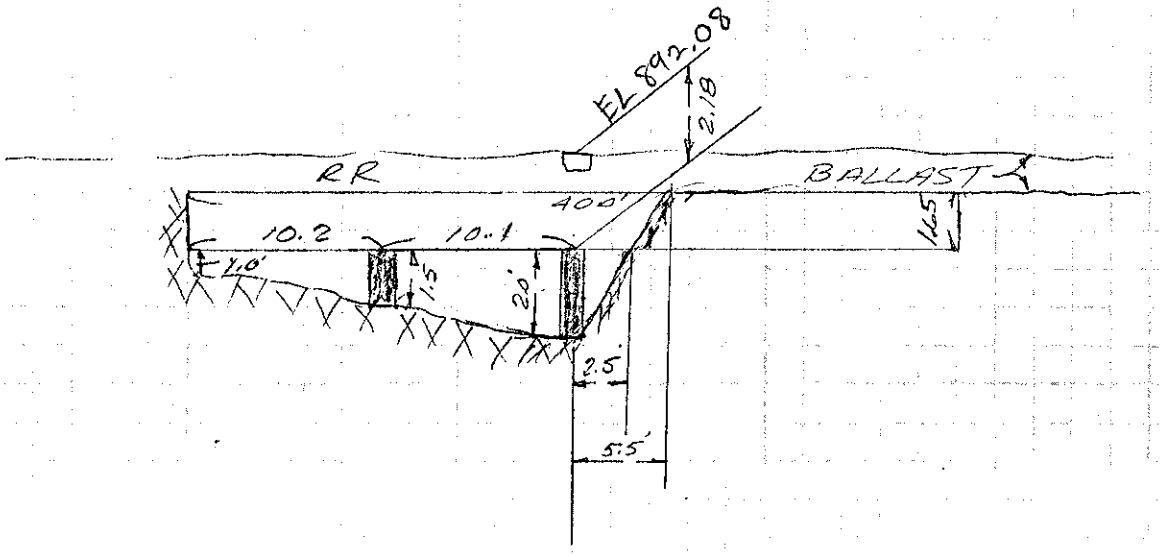


PHOTO 4S.

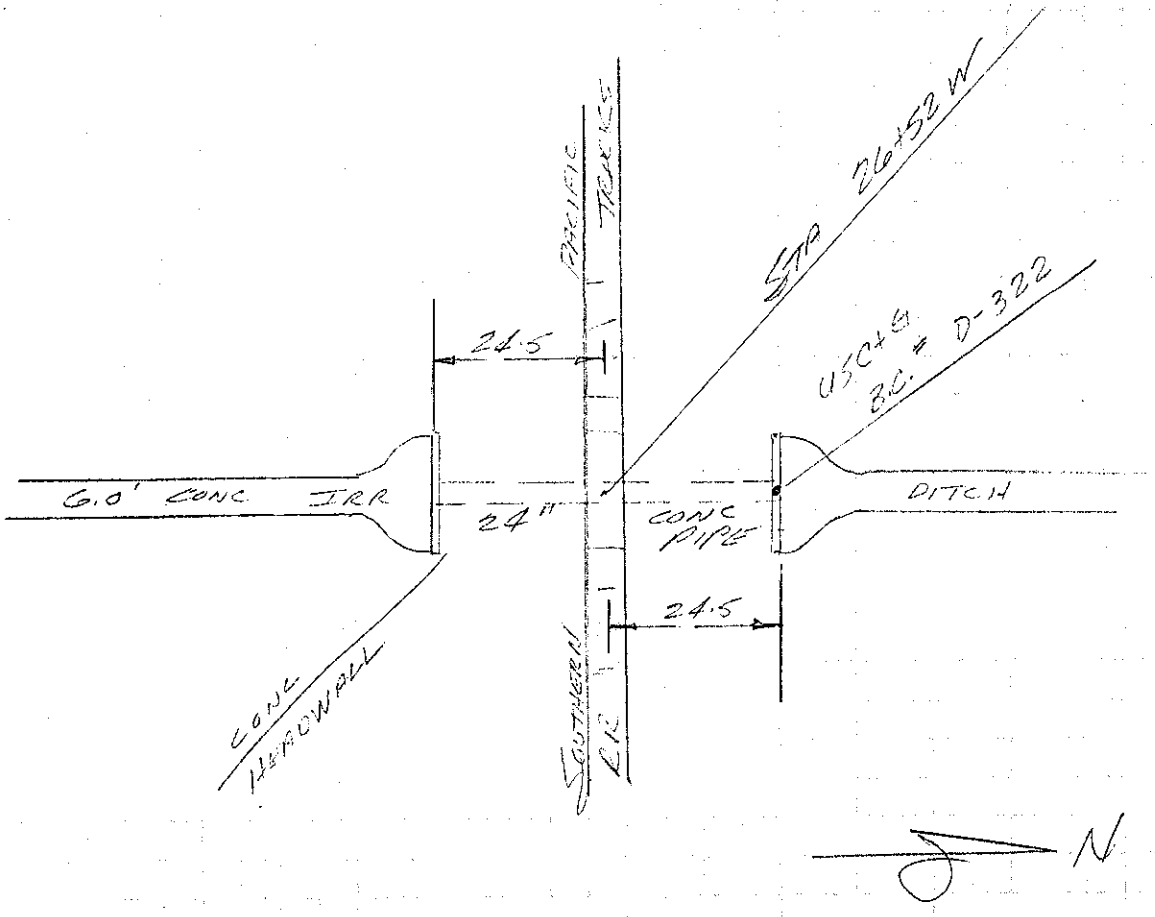
PHOTO 4N.



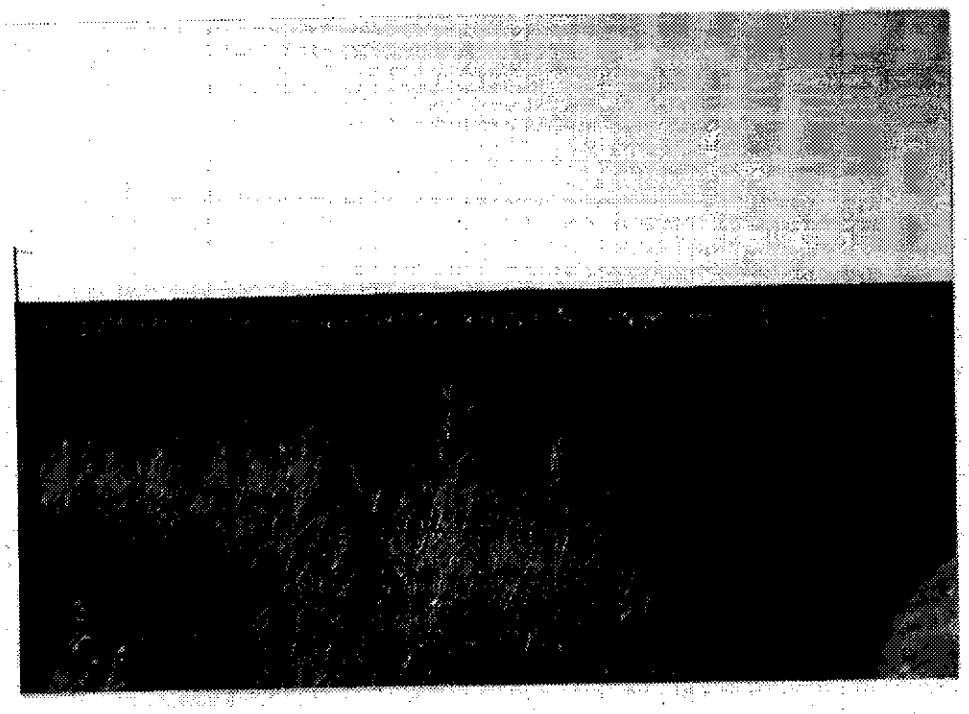
UPSTREAM SIDE
(NORTH)

WILSON AVE TO PALO VERDE (CONT)

24" CONC PIPE – 26+52 W
196+90 E



TRESTLE #16



WILSON AVE TO PALO VERDE (CON'T)

19.5' x 16.0' WOOD TRESTLE #16 – 34+42W (RR MP 870.70)
189+90E

PHOTO 16 S.

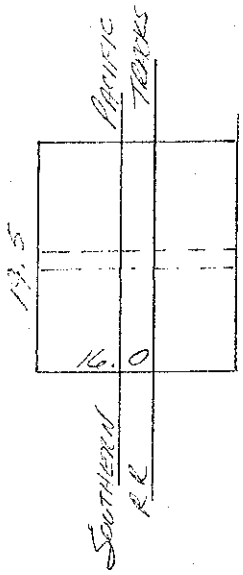
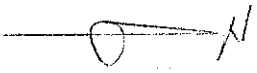
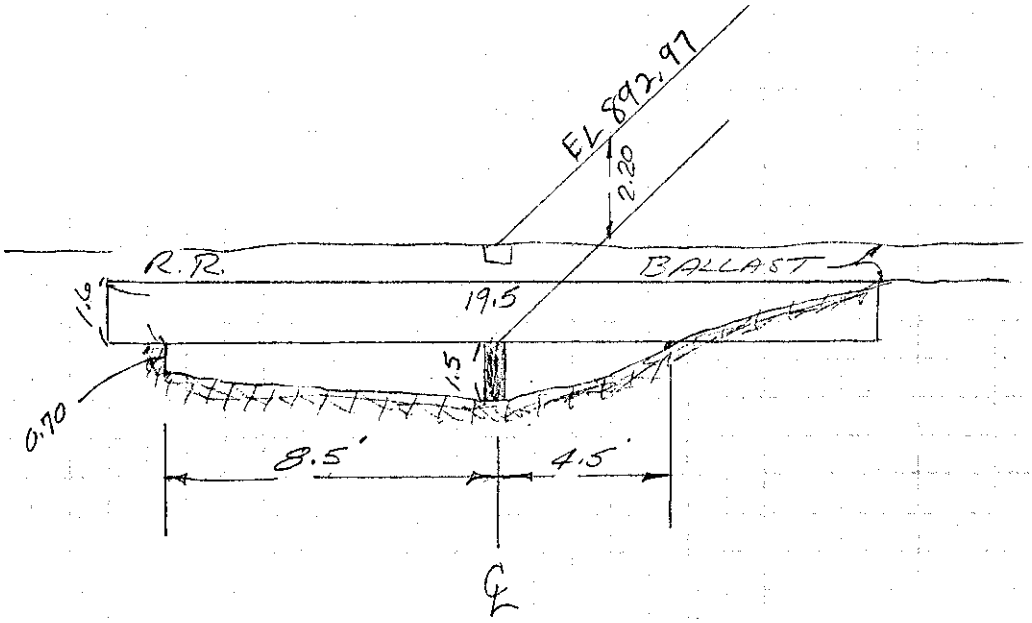


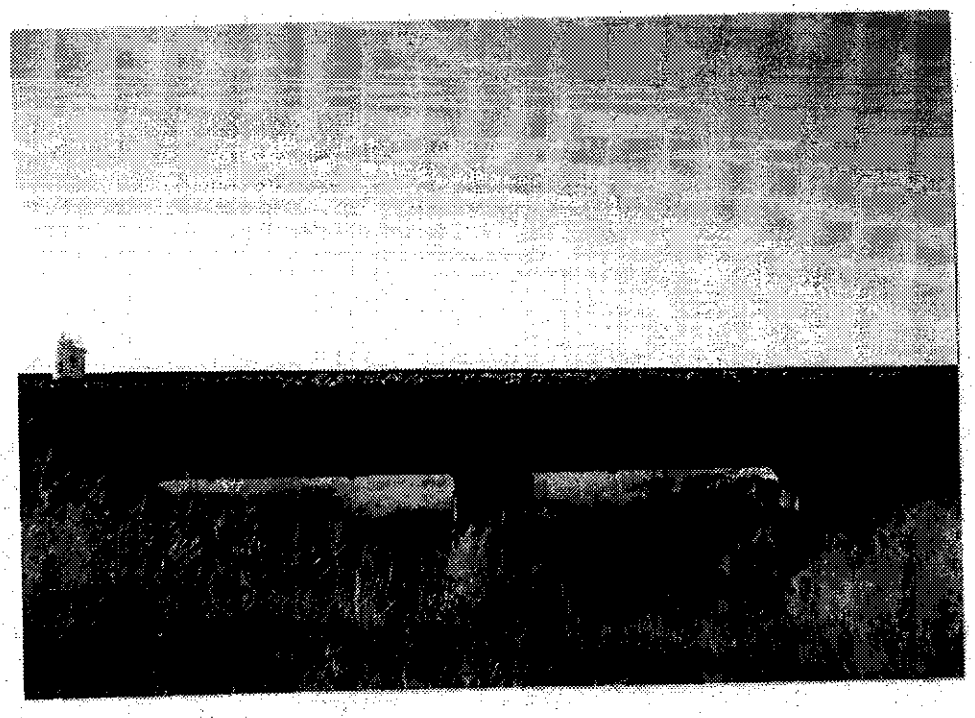
PHOTO 16 N





UPSTREAM SIDE
(NORTH)

TRESTLE #17



TRESTLE #17

MKE McLaughlin Kmetty Engineers, Ltd.

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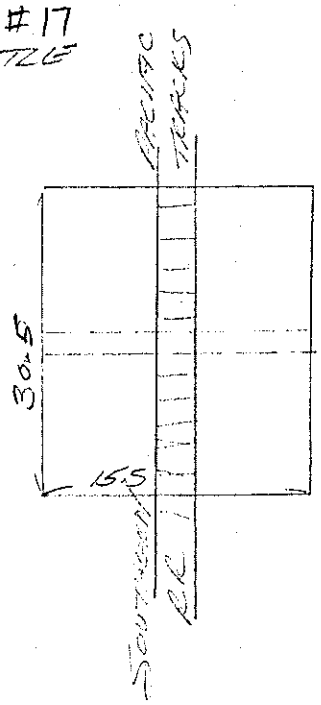
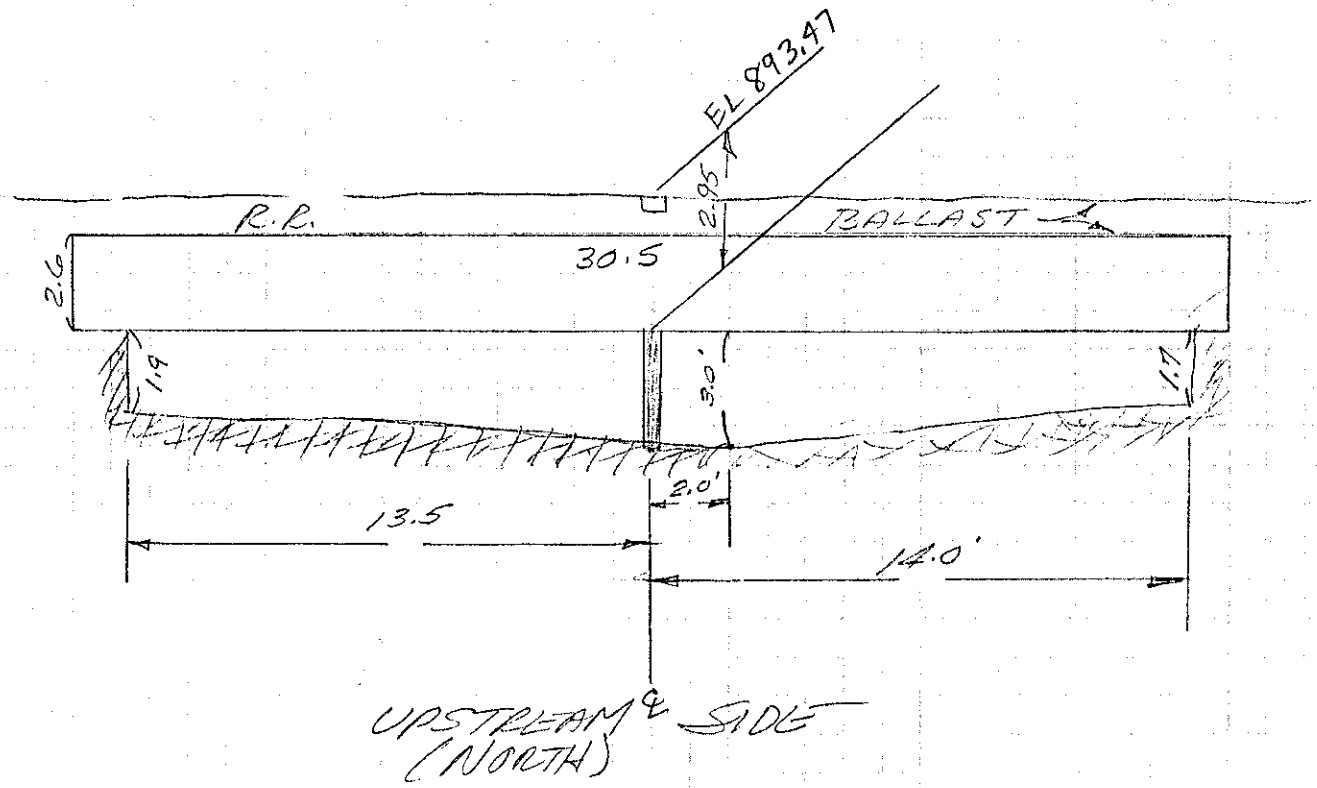
WILSON AVE TO PALO VERDE RD (CON'T)

30.5' x 15.5' WOOD TRESTLE #17

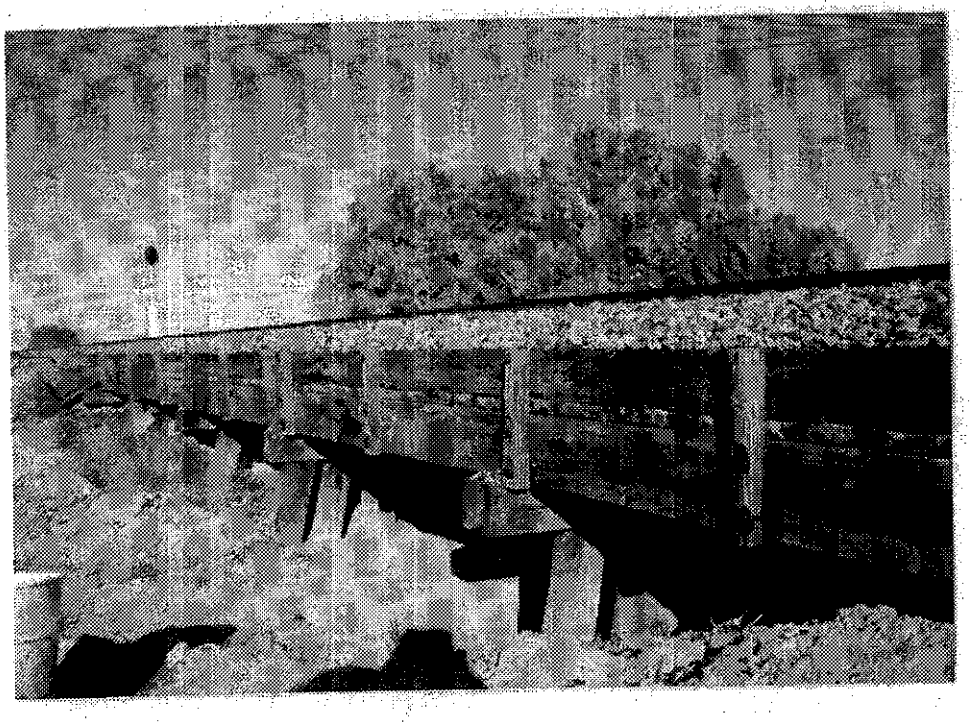
47+06 W (RR MP 870.46)
176+36 E

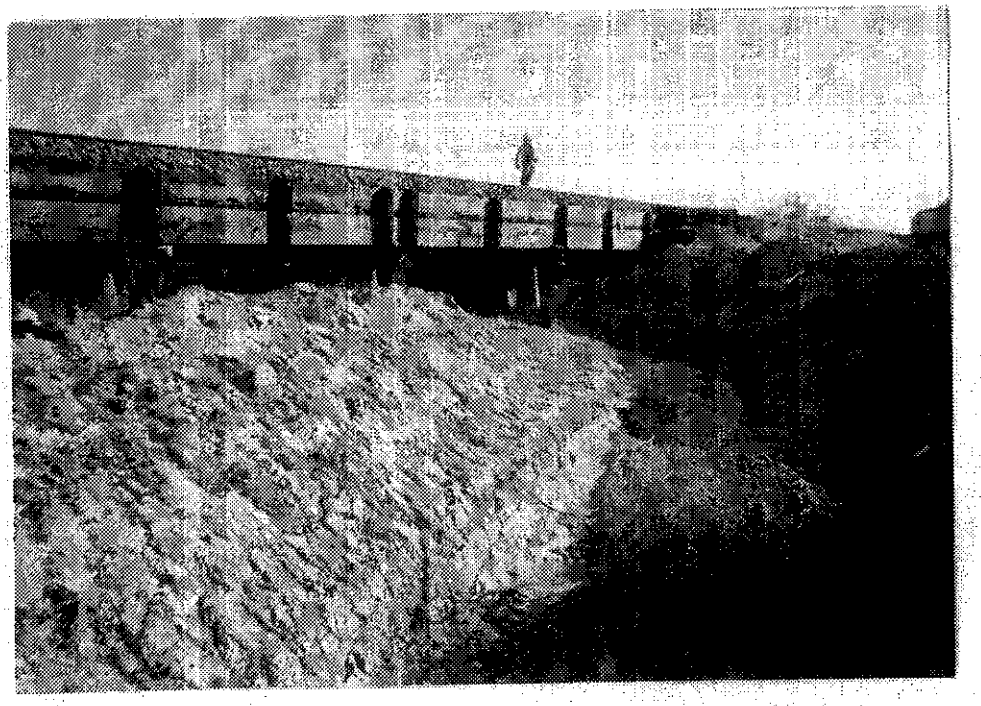
PHOTO 17-5



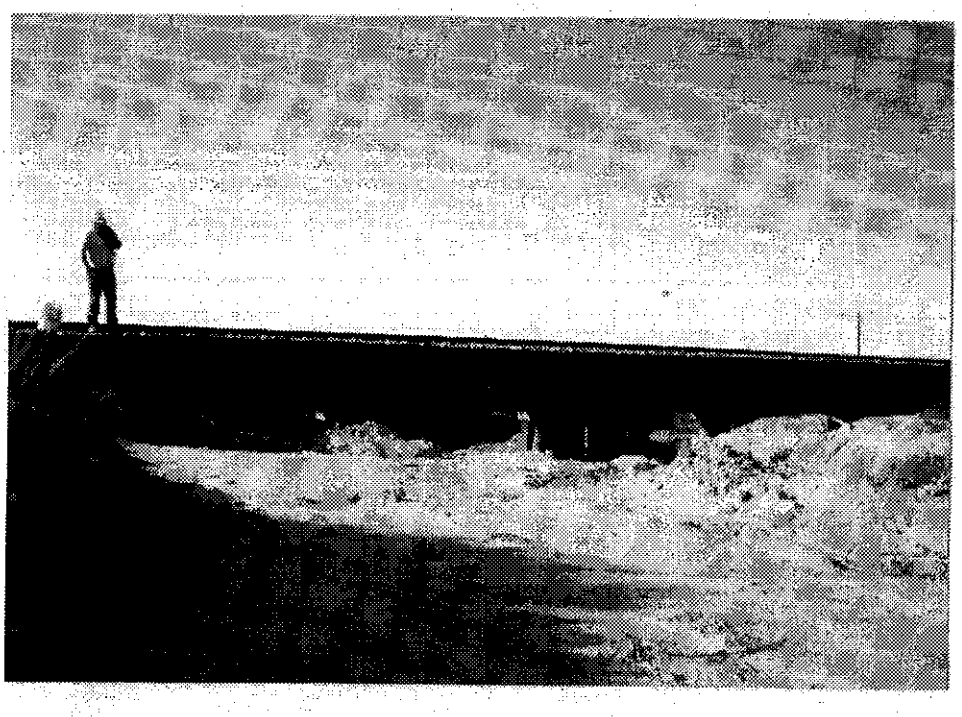


TRESTLE #18



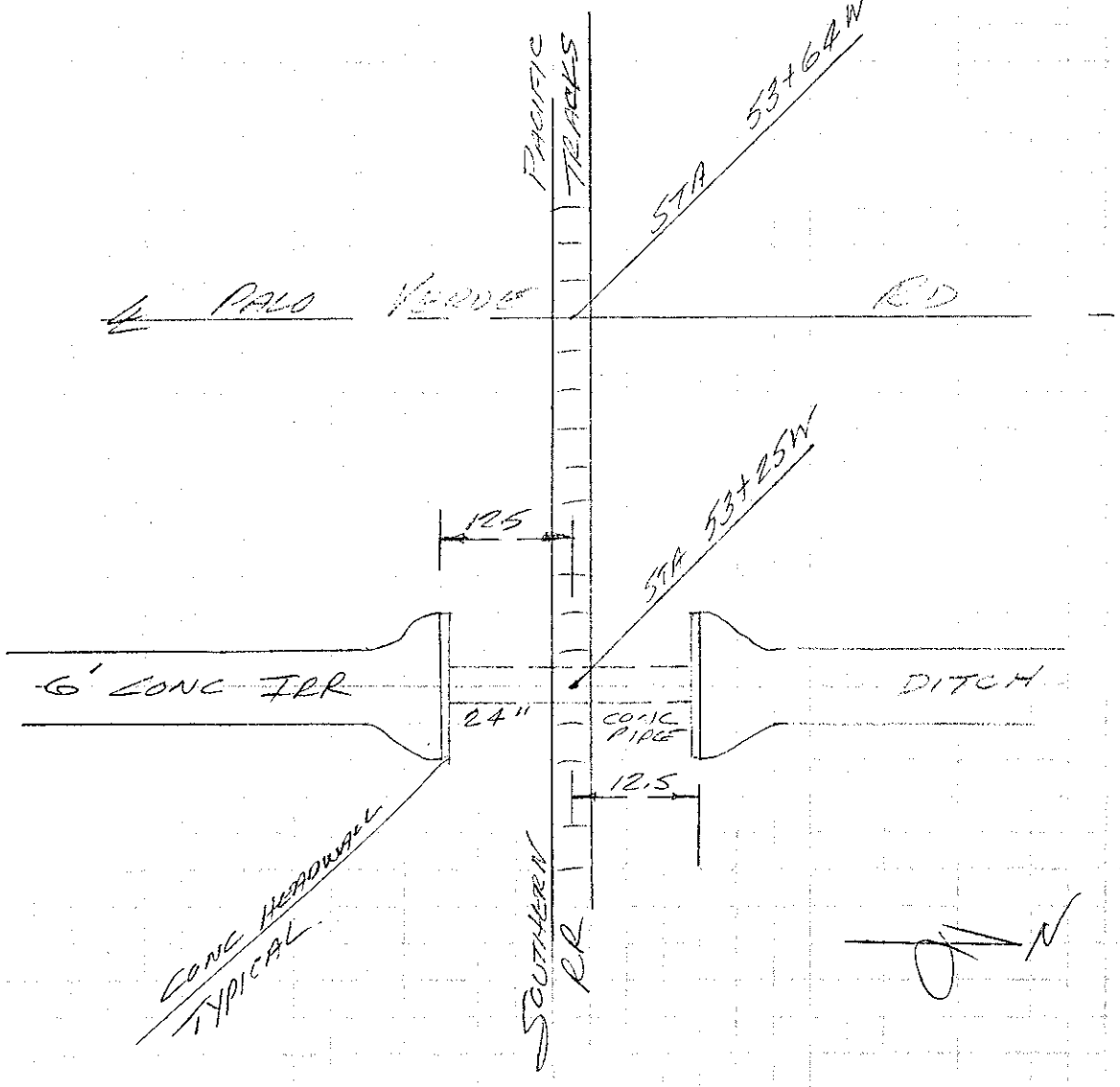


TRESTLE #18



WILSON AVE TO PALO VERDE RD (CONT)

24" CONC PIPE STA 53+25W



TRESTLE #18

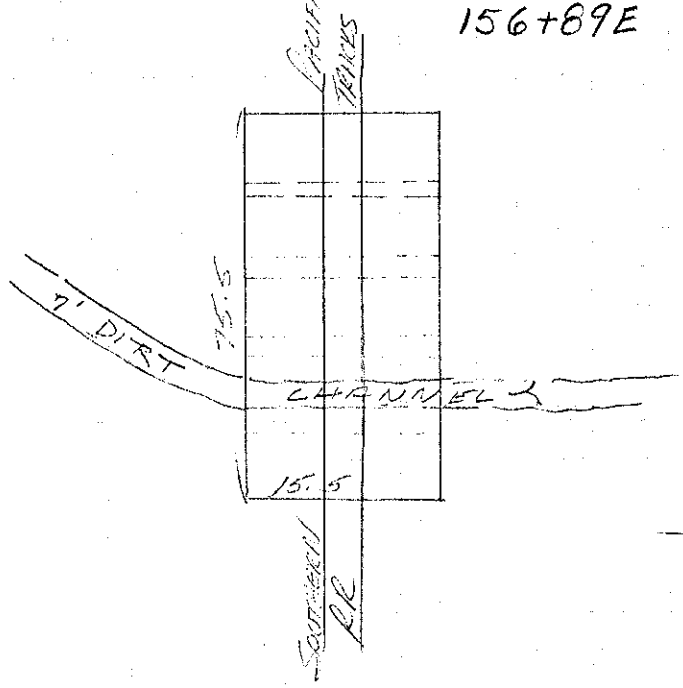
MKE McLaughlin Kmetty Engineers, Ltd.

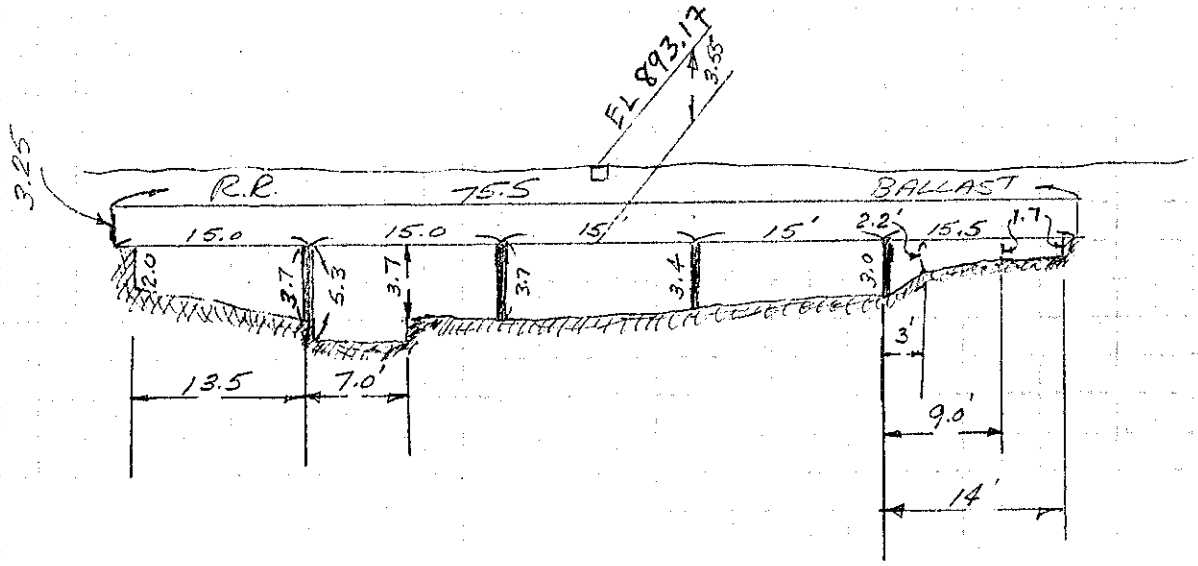
Project Title: BUCKEYE FLOOD INS STUDY Project No. 89-407.02 Date 10-3-91

Subject: SOUTHERN PACIFIC R.R. CROSSINGS Designed _____ Page 29 of 37

PALO VERDE RD (0+00W) TO BRUNER RD (53+17W)

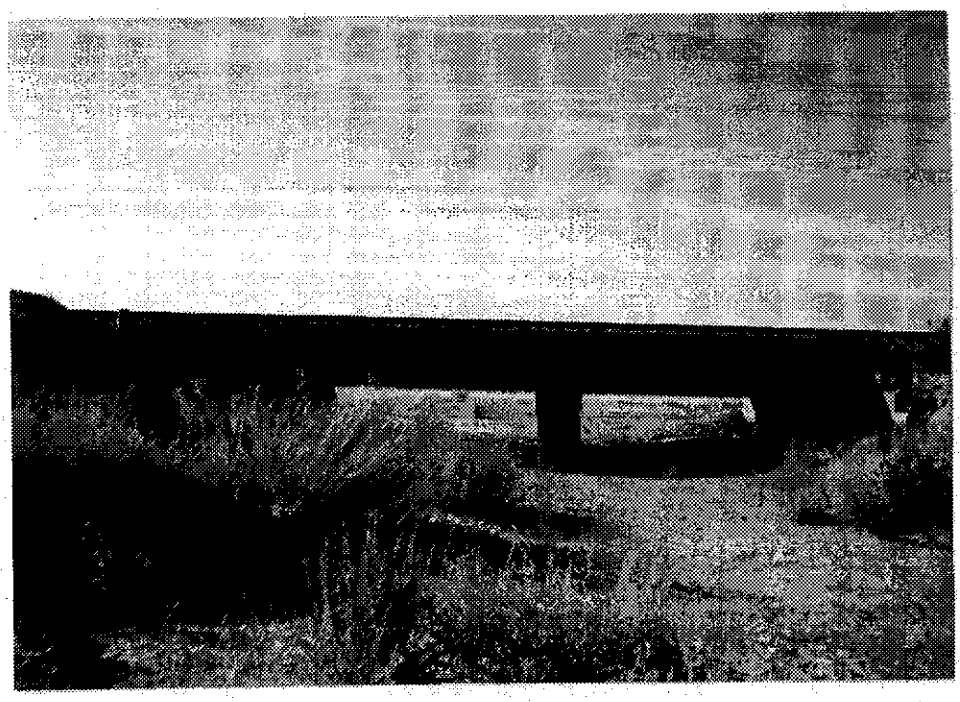
75.5' x 15.5 WOOD TRESTLE #18 — 12+89W 156+89E RR MP (870.08)

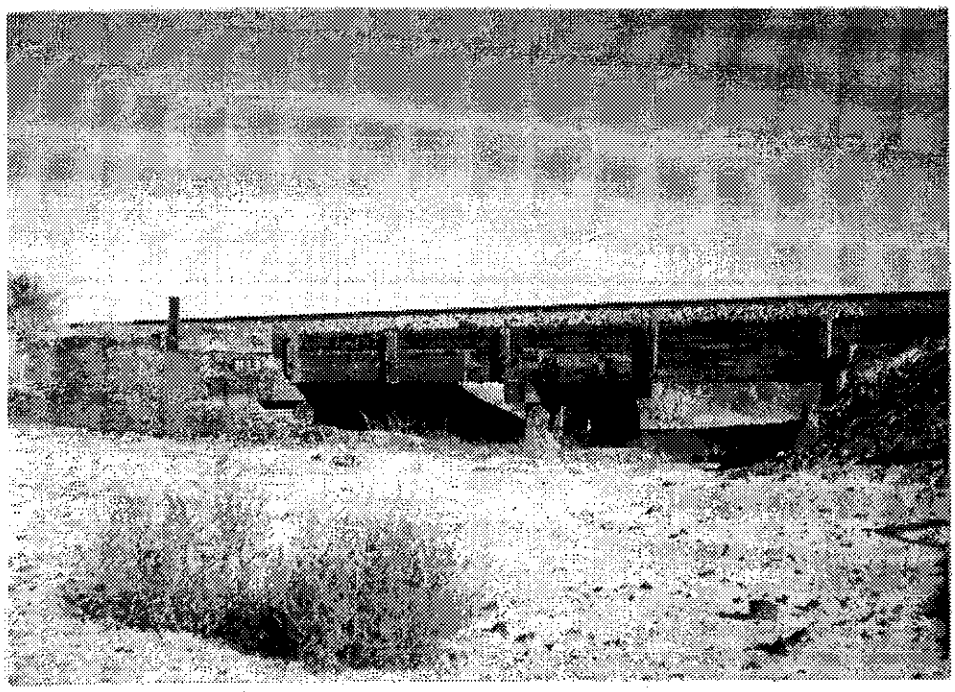




UPSTREAM SIDE (NORTH)

TRESTLE #19





TRESTLE #19

MKE McLaughlin Kmetty Engineers, Ltd.

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PALO VERDE RD TO BRUNER RD (CON'T)

30.5' x 15.5' WOOD TRESTLE #19

224+19W (869.91) RR MP
147+59E

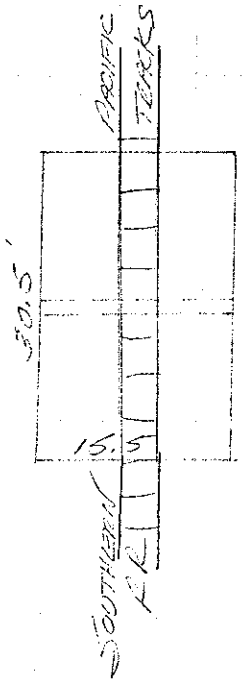
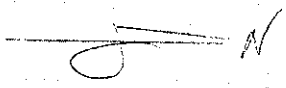
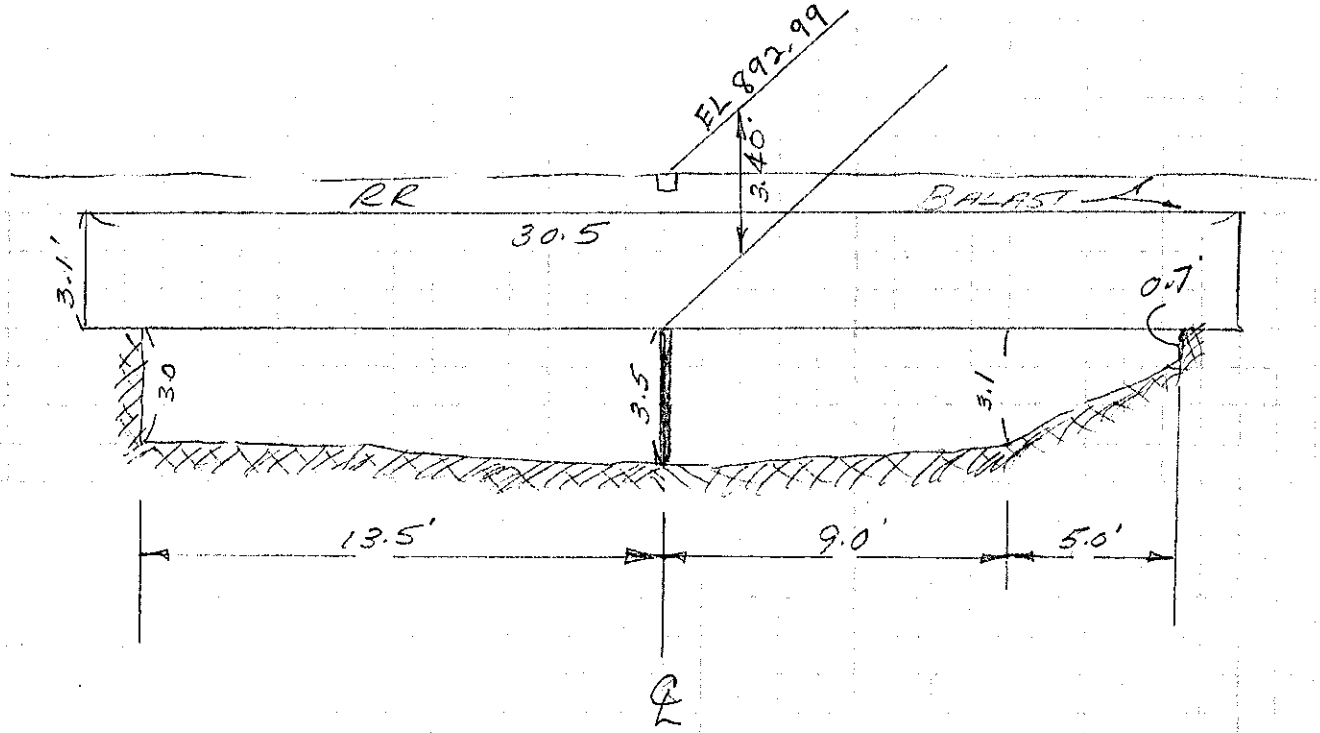


PHOTO -19S

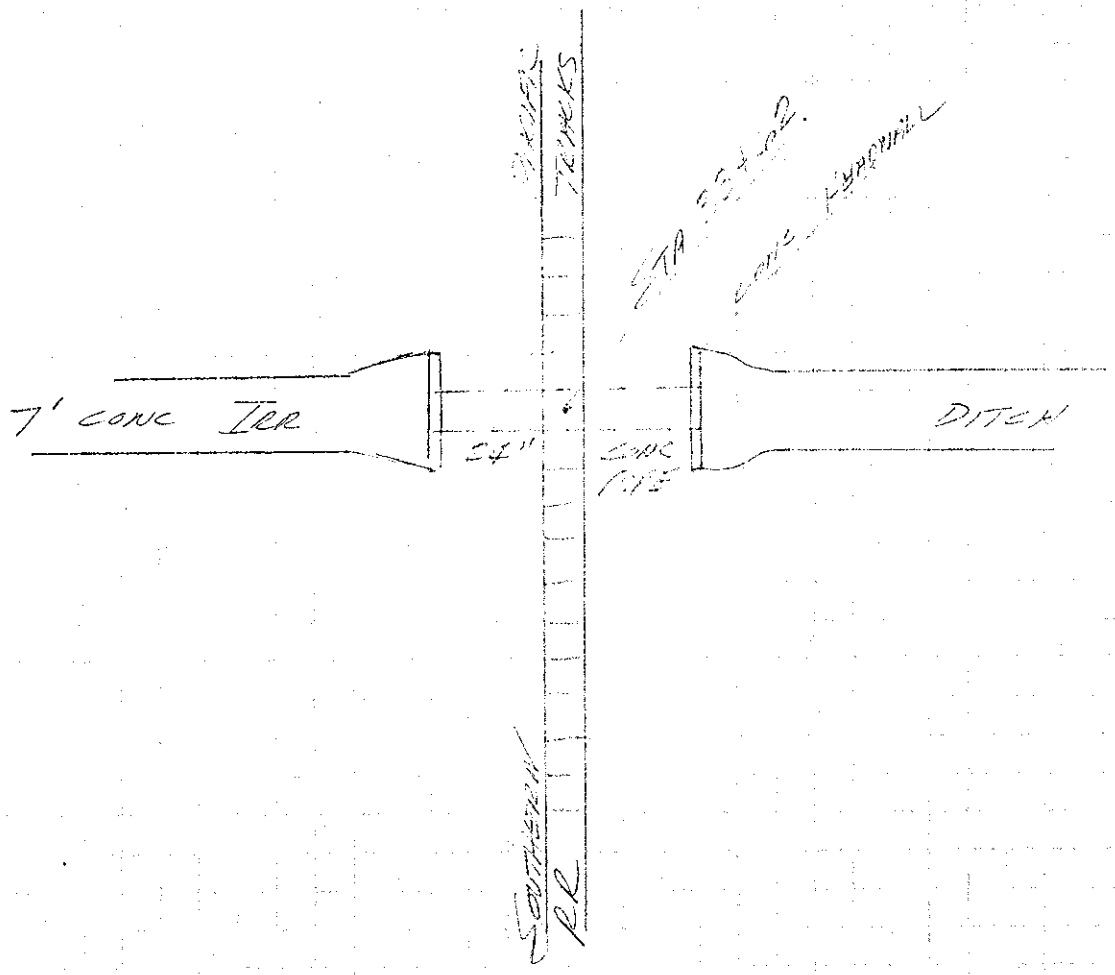
PHOTO 19N



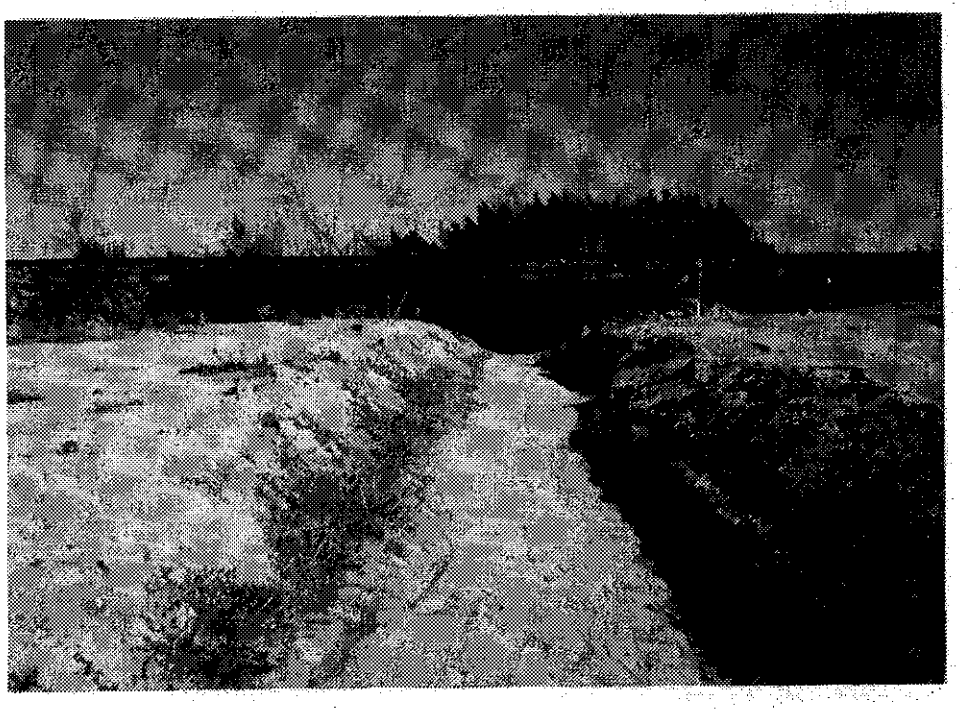


PALO VERDE RD TO BRUNER RD (CONT)

24" CONC PIPE STA 33+62 W



TRESTLE # 20



TRESTLE #20

MKE McLaughlin Kmetty Engineers, Ltd.

Project Title _____ Project No. _____ Date _____

Subject _____ Designed _____ Page 52 of 37

PALO VERDE RD TO BRUWER RD (CONT)

45.5' x 15.5 WOOD TRESTLE #20 — 397+11W (RR MP 269.59)
130+67E

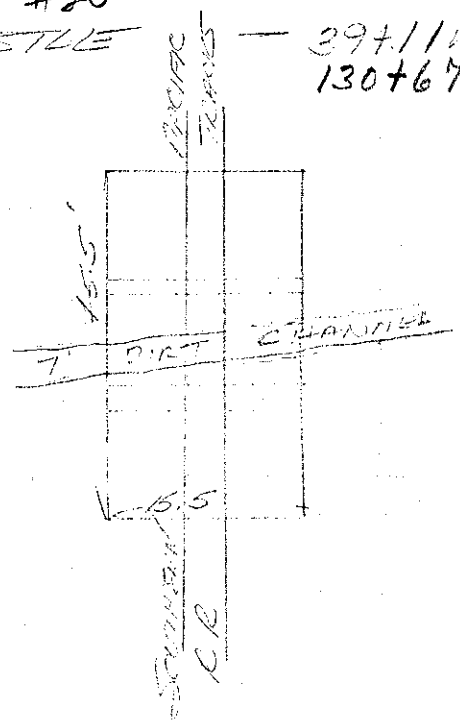
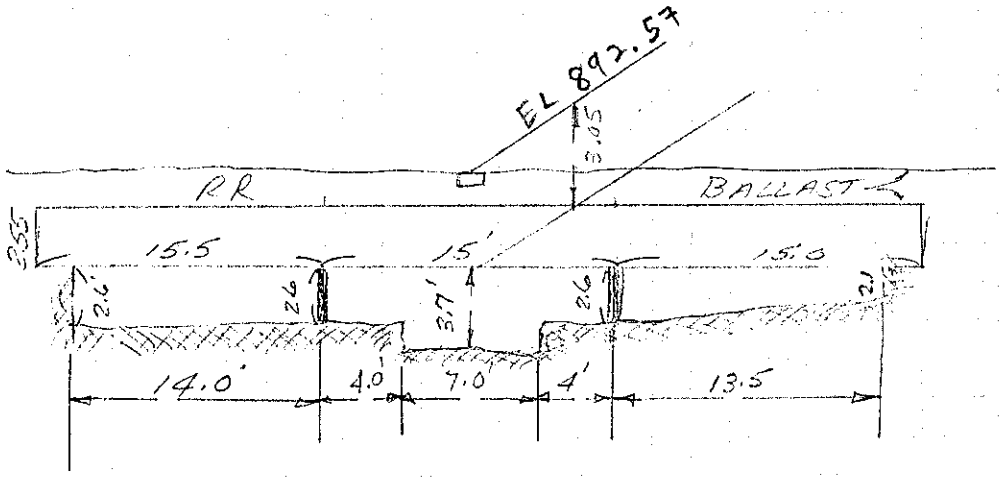


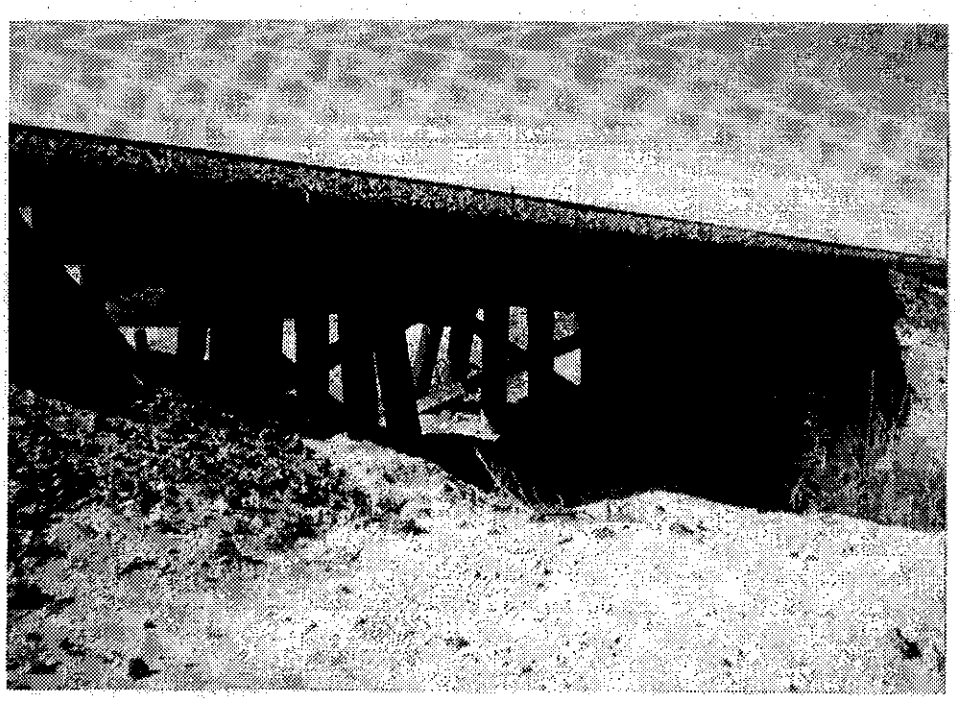
PHOTO 20 S

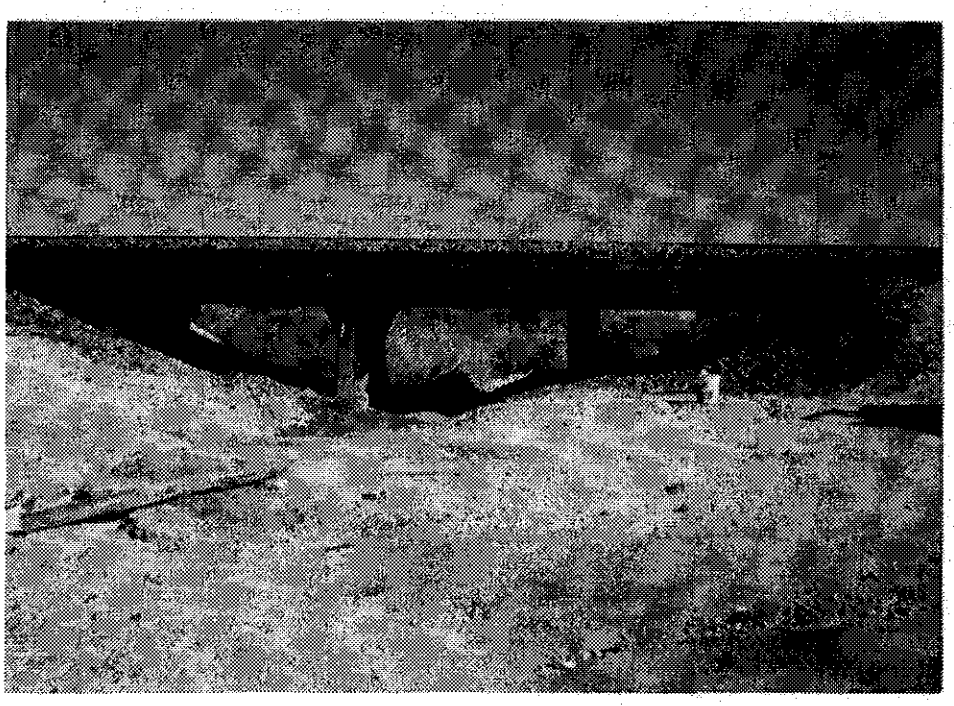
PHOTO 20 N



UPSTREAM SIDE (NORTH)

TRESTLE #21





TRESTLE #21

MKE McLaughlin Kmetty Engineers, Ltd.

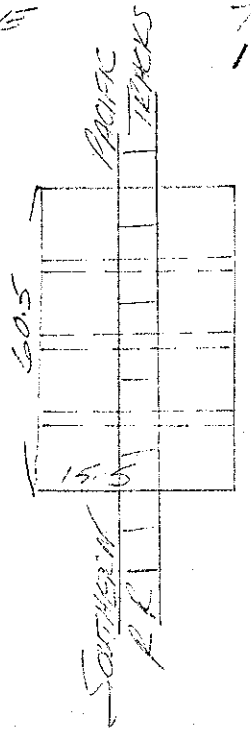
Project Title: BUCKEYE FLOOD INS. STUDY Project No. 89-407.02 Date 10-3-91

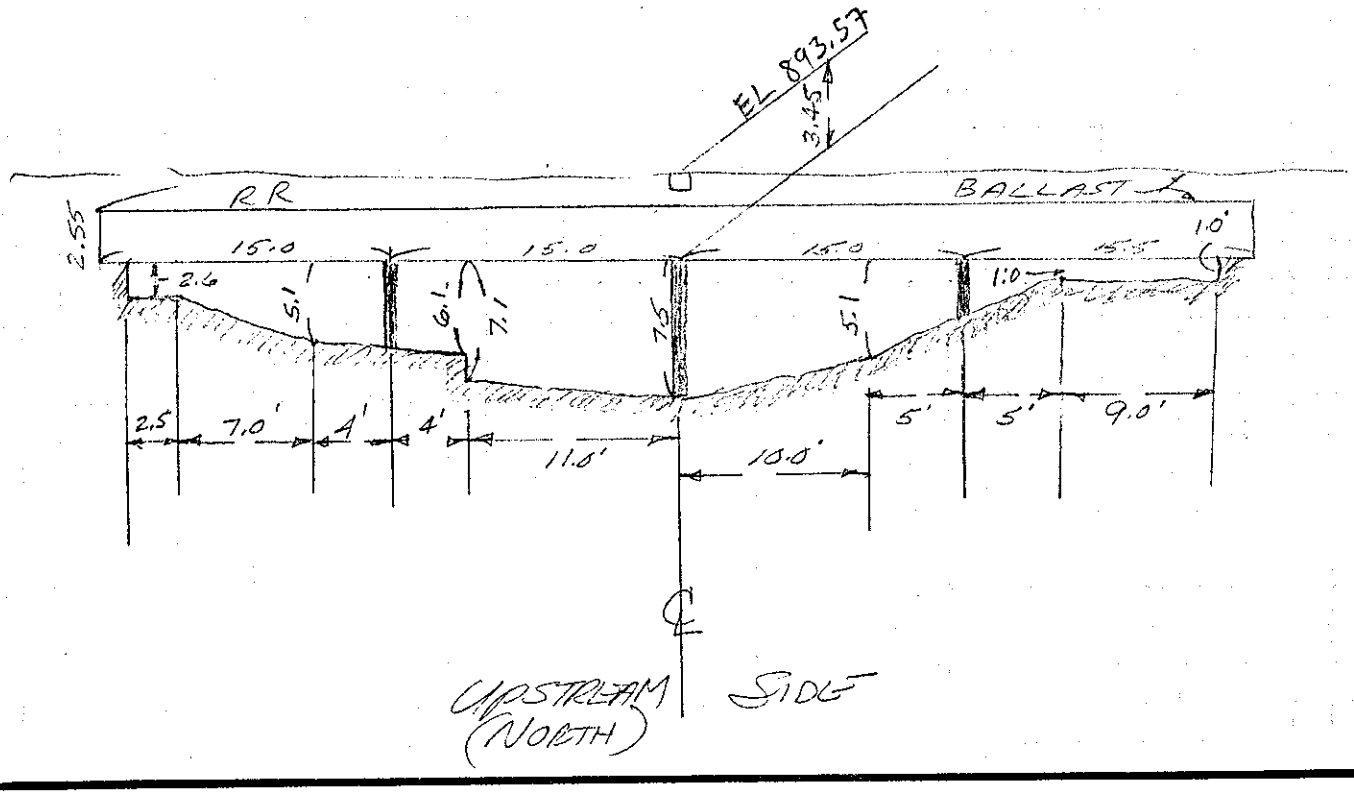
Subject: SOUTHERN PACIFIC RR CROSSINGS Designed _____ Page 33 of 37

BRUNER RD (0+00W) TO JOHNSON RD (54+41W)

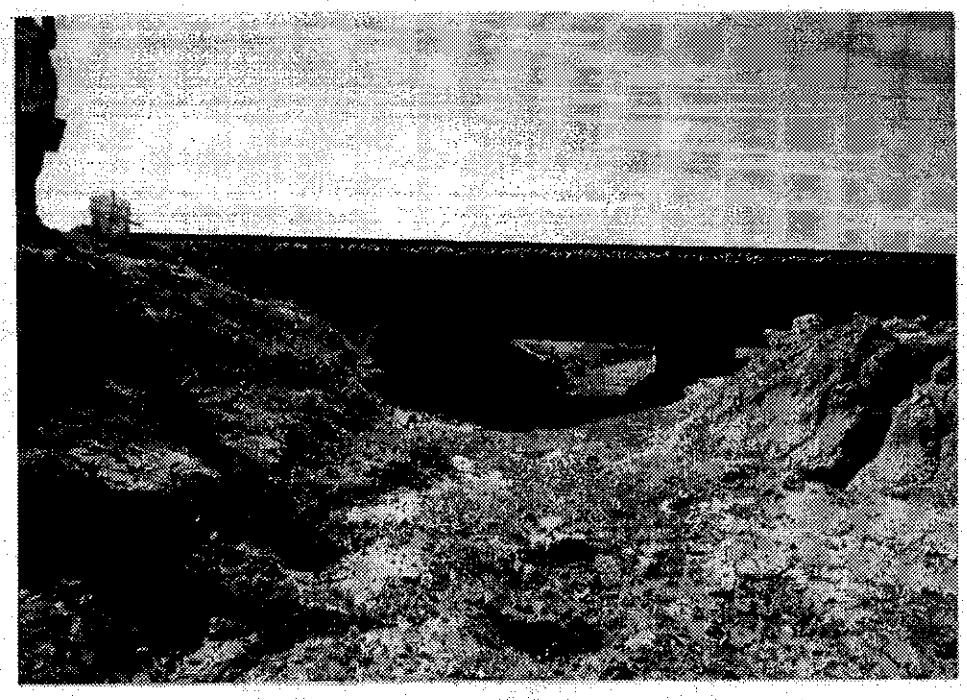
60.5' x 15.5 WOOD TRESTLE #21 7+53W 109+08E RR MP (869.23)

PHOTO 21 S. PHOTO 21 N.





TRESTLE #22



TRESTLE #22

McLaughlin Kmetty Engineers, Ltd.

Project Title _____ Project No. _____ Date _____

Subject _____ Designed _____ Page 34 of 37

BRUNER RD TO JOHNSON RD (CONT)

30.5' x 15.5' WOOD TRESTLE #22 — 40+09W (RR MP 868.58)
76+52E

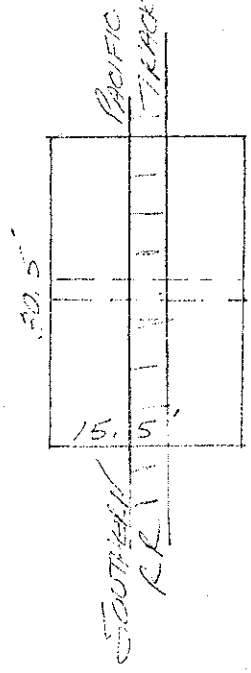
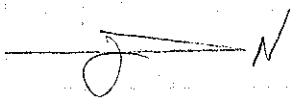
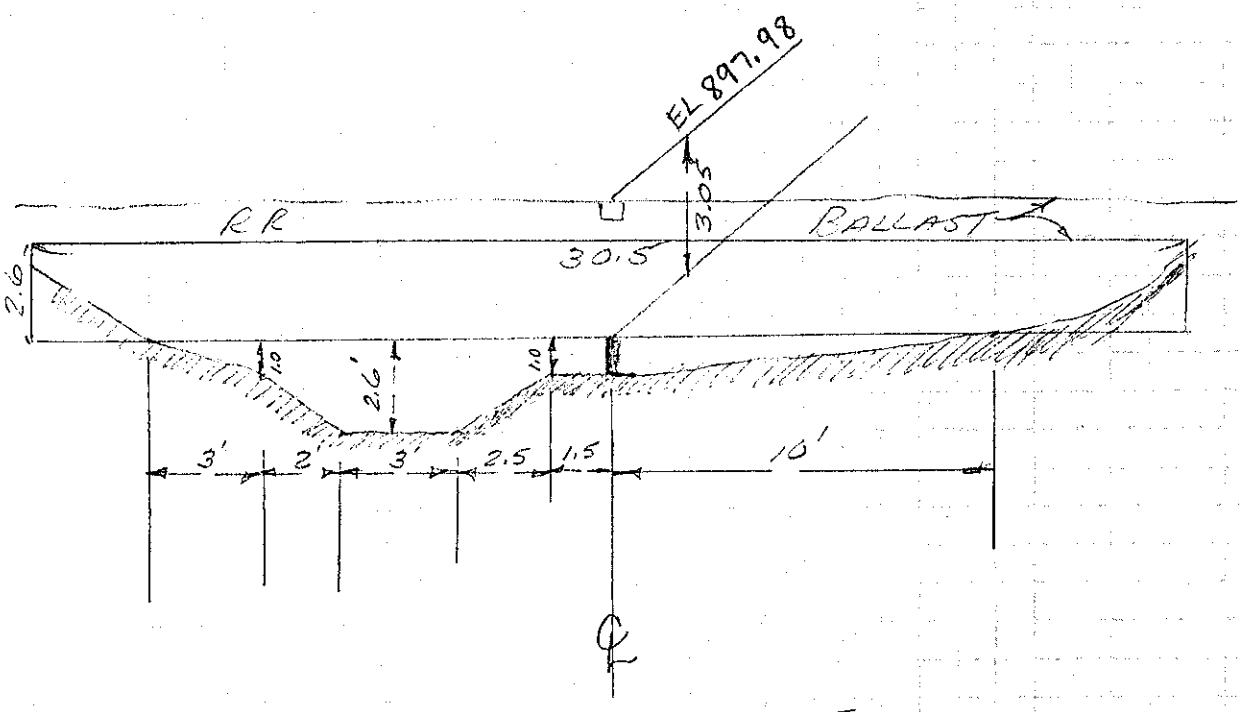


PHOTO 22 S.

PHOTO 22 N.





UPSTREAM SIDE
(NORTH)

TRESTLE #23

TRESTLE #23

MKE McLaughlin Kmetty Engineers, Ltd.

Project Title: BUCKEYE [illegible] INS. STUDY Project No. 89-407.02 Date 10-3-91

Subject: SOUTHERN PACIFIC RR CROSSINGS Designed _____ Page 35 of 37

JOHNSON RD (6+00W) TO HASSAYAMPA RIVER (62+20W)

PI RR - 52+39 W

#23

4.0' x 30.0' WOOD TRESTLE — 2+16 W

60+04 E

PHOTO 23 S.

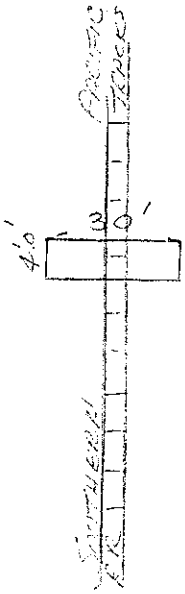
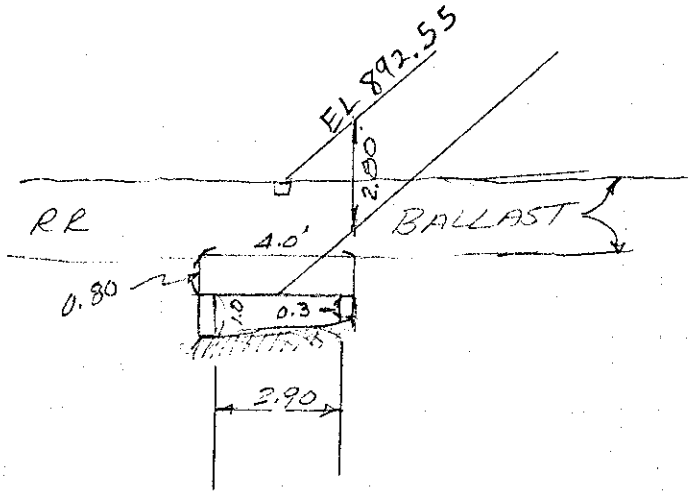


PHOTO 23 N

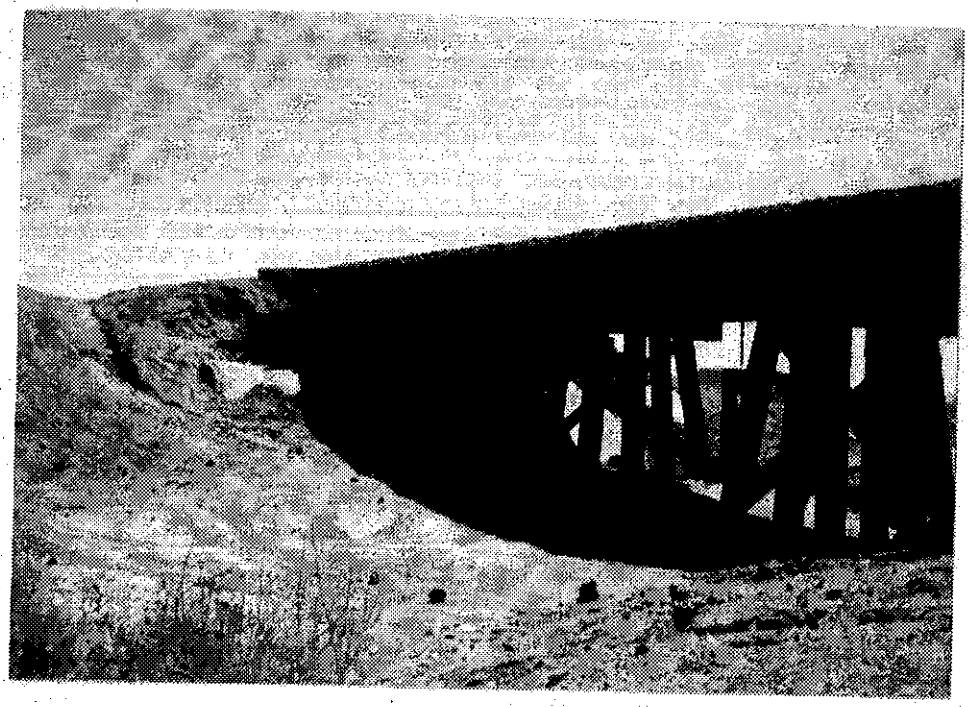
N

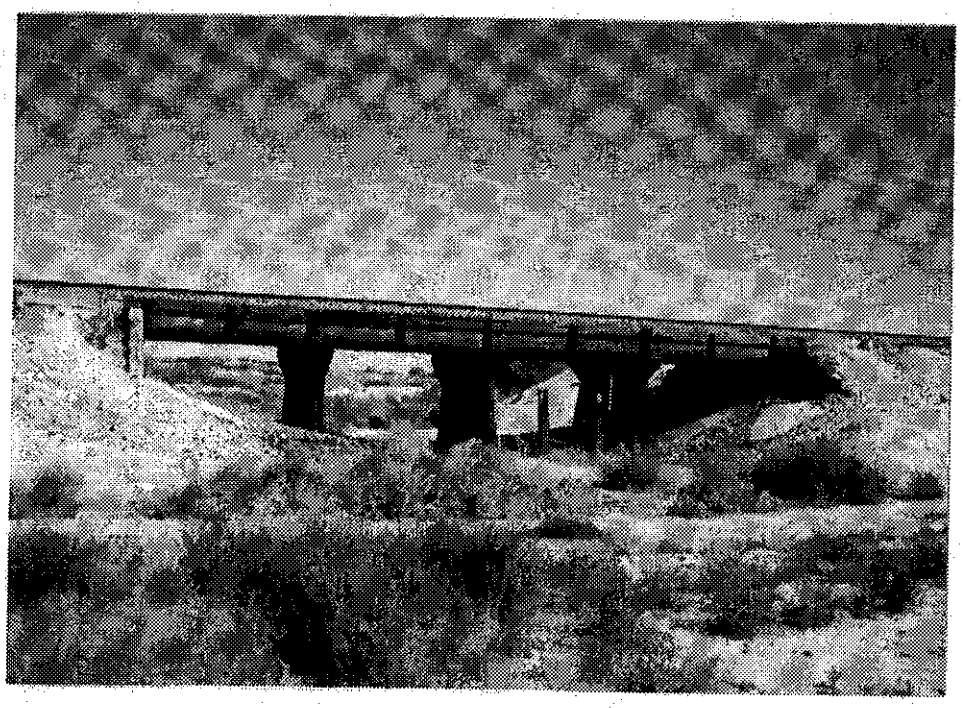


UPSTREAM SIDE

(NORTH)

TRESTLE #24





TRESTLE #24

MKE McLaughlin Kmetty Engineers, Ltd.

Project Title _____ Project No. _____ Date _____

Subject _____ Designed _____ Page 36 of 37

JOHNSON RD TO HASSAYAMPA RIVER

60.0' x 15.5' WOOD TRESTLE #24 — 19+62 W (RR MP 867.92)
42+58 E

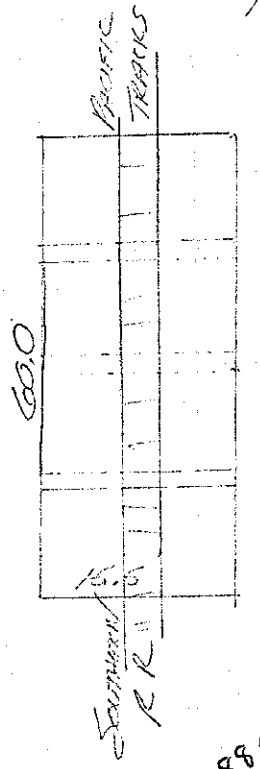
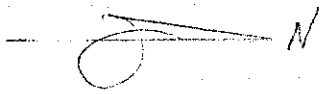
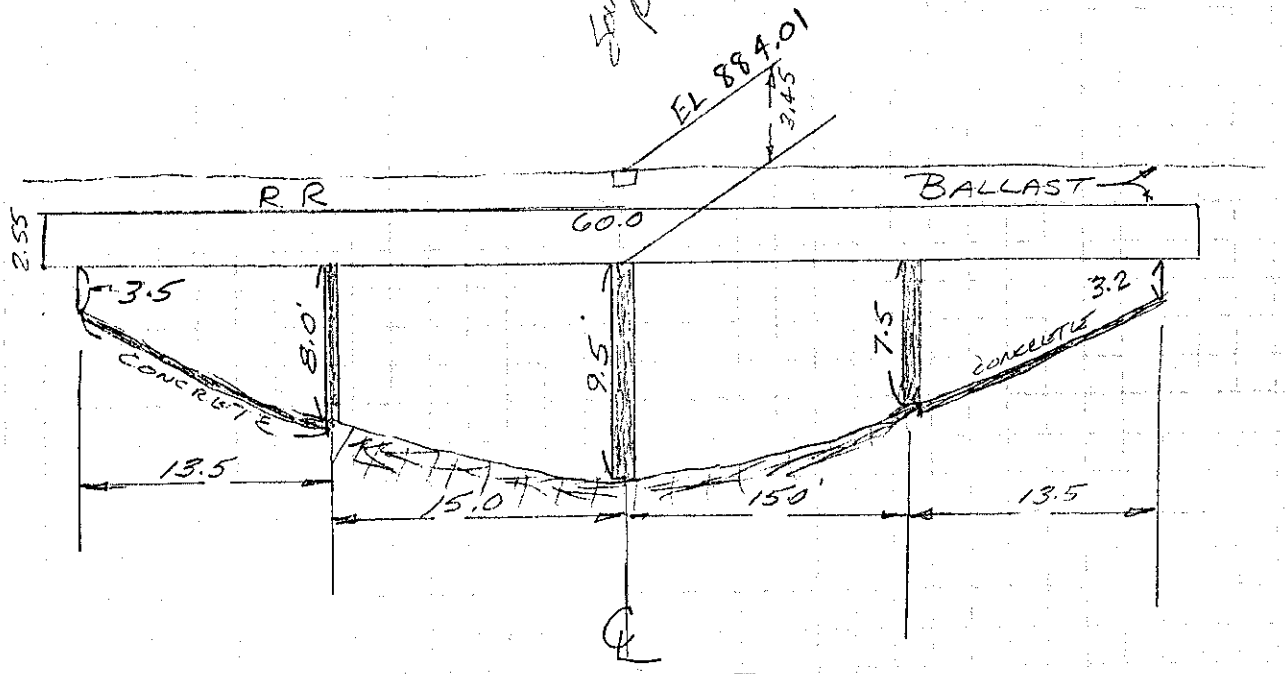


PHOTO 34 S.

PHOTO 24N

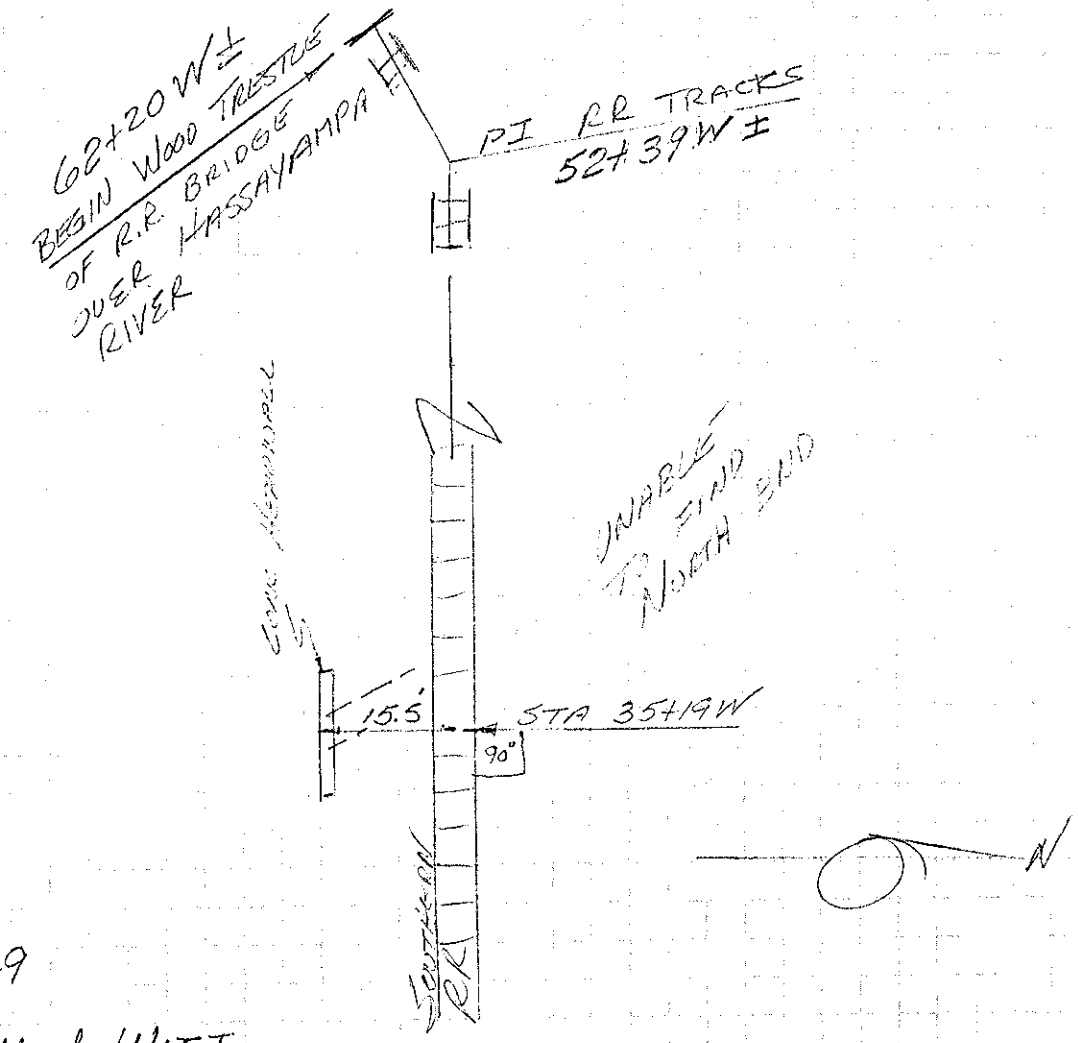




UPSTREAM SIDE (NORTH)

JOHNSON RD TO HASSAYAMPA RIVER (CONT)

24" CONC PIPE STA 35+19 W



FD RM 649

1000'± W. of WEST
END BRIDGE (HASSAYAMPA)
50± S. of R.R. TRACKS
STAMPED L-322

885.96 ELEV

APPENDIX B

RAINFALL WORKSHEETS AND FIGURES

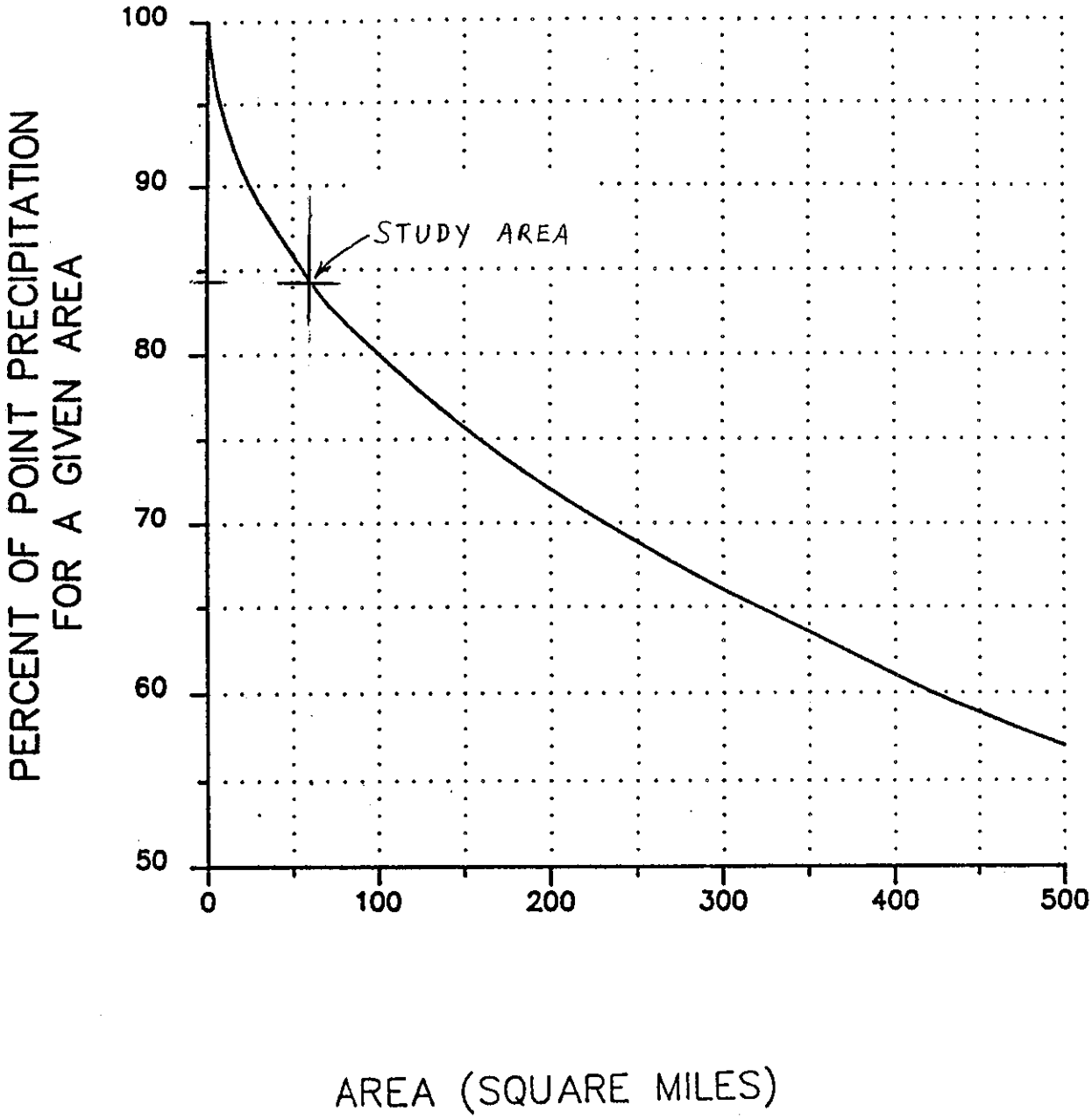


Figure 2.1
Depth-Area Curve for Maricopa County

(To be used only with 6-hour duration rainfall and for all watersheds less than or equal to 100 square miles. Can be used for watersheds greater than 100 square miles, depending on the other site-specific rainfall design criteria that is to be used.)

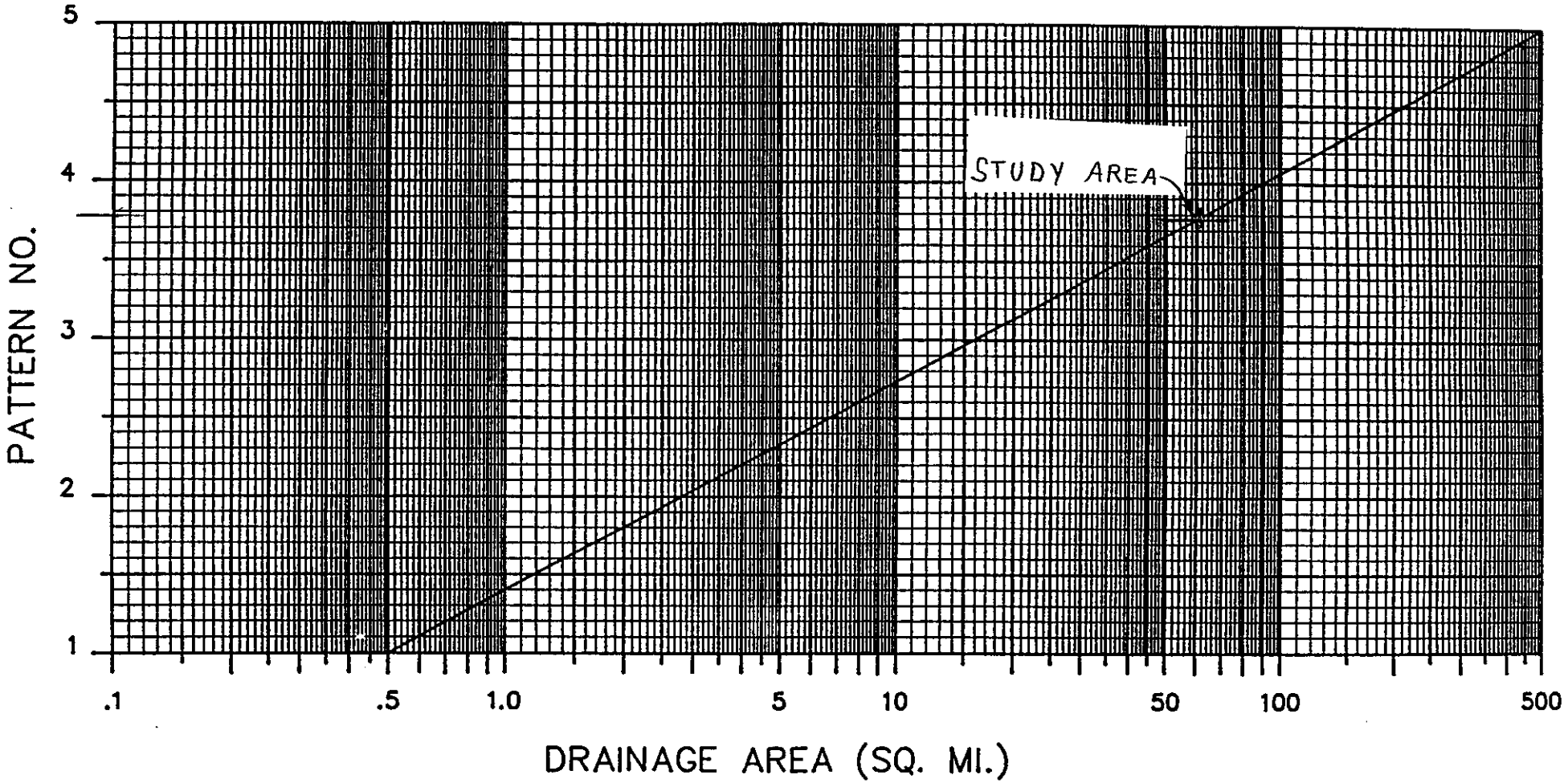


Figure 2.18
Area Versus Pattern Number for Maricopa County

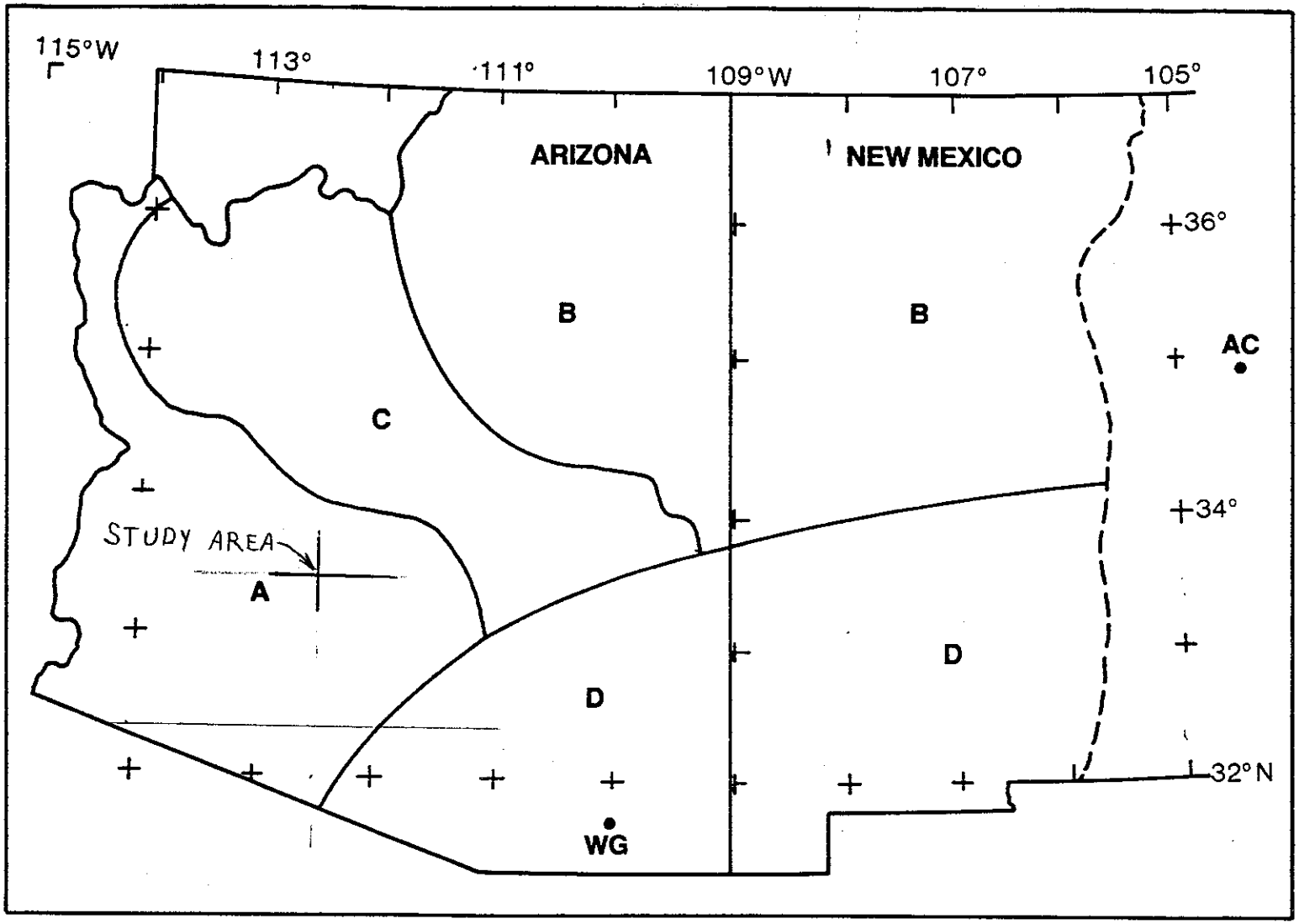
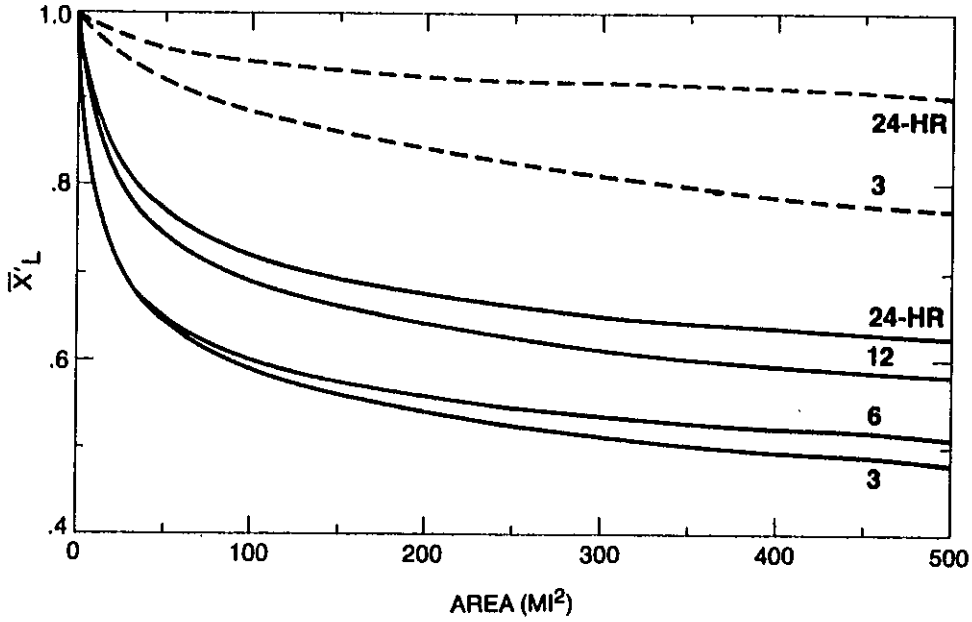
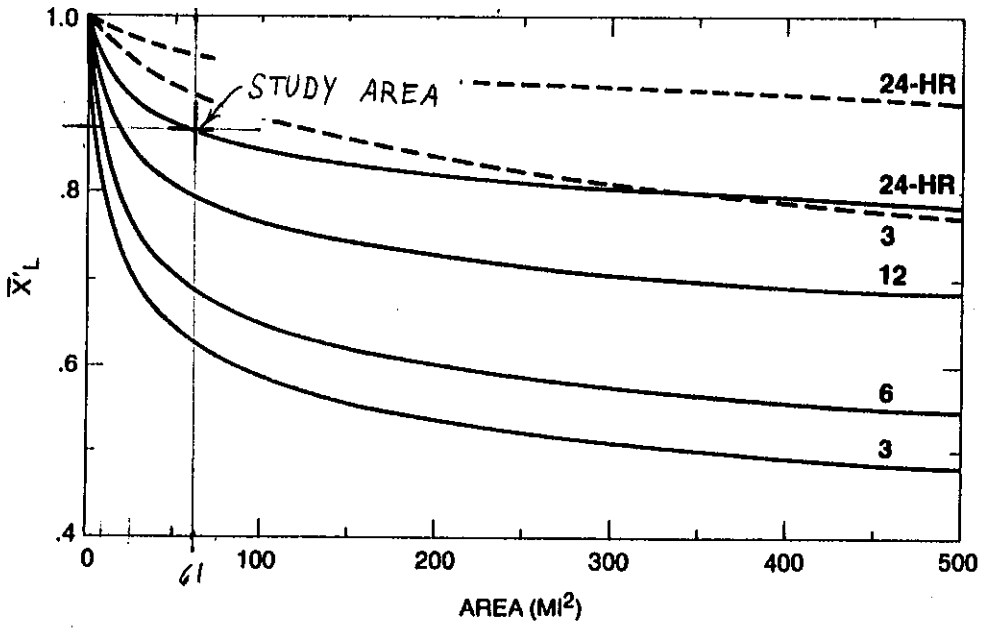


Figure 13.—Map of study area and depth-area zones.



for Zones B & D

Figure 14.--$\bar{X}'_L$ (2.54-yr depth-area ratio, see sec. 4.3) for 3-, 6-, 12-, and 24-hr in southeast Arizona. Dashed lines are 3-hr and 24-hr Chicago $\bar{X}'_L$ (from TR 24)



for Zones A & C

Figure 15.--Same as figure 14, but for central Arizona.

be attributed to a mixture of storm types, but still different from these found in the central Plains.

The recorder-pair data for distances greater than 15 mi contain little information on the structure of 1- and 2-hr storms. This is supported by the low

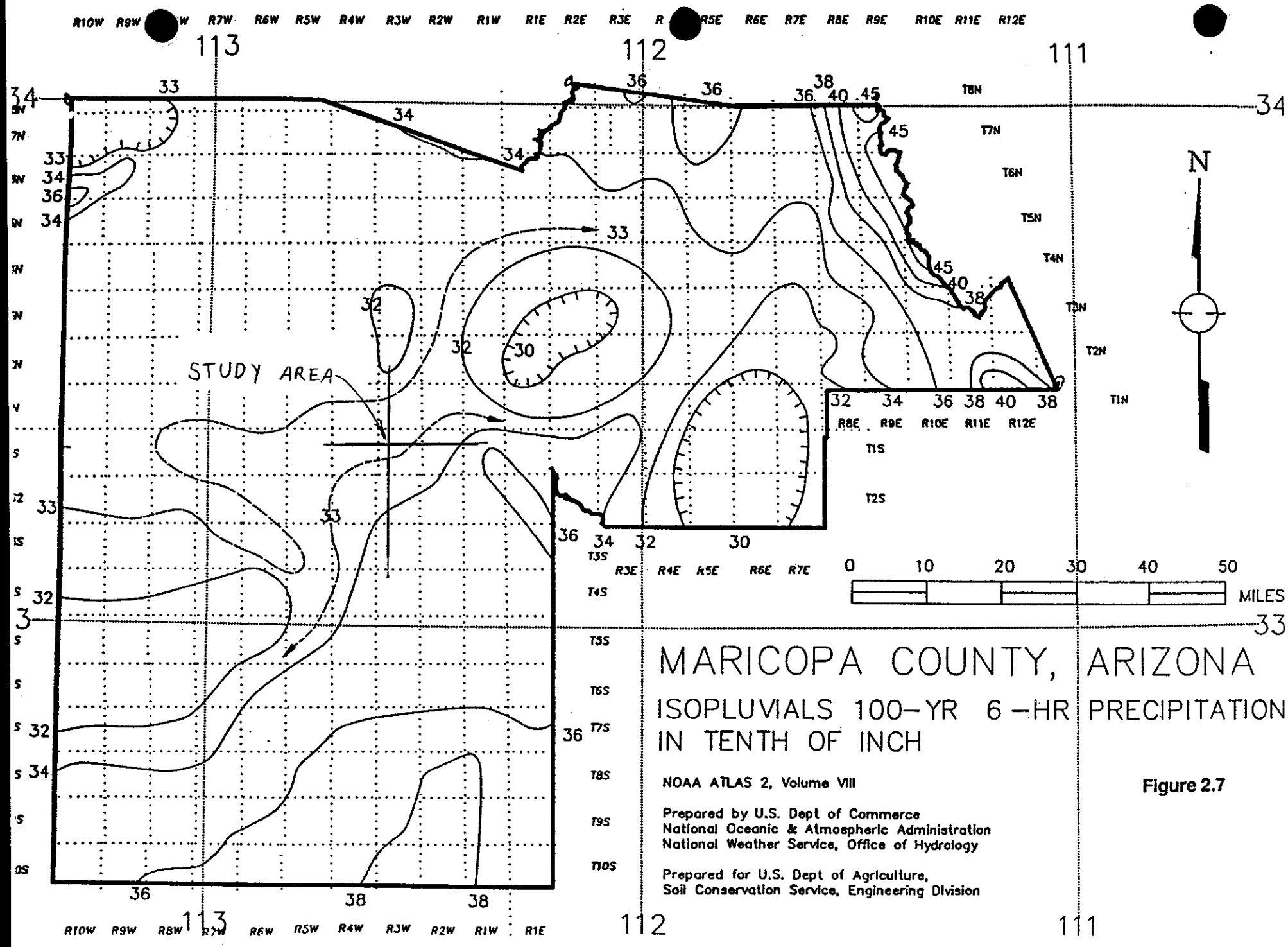
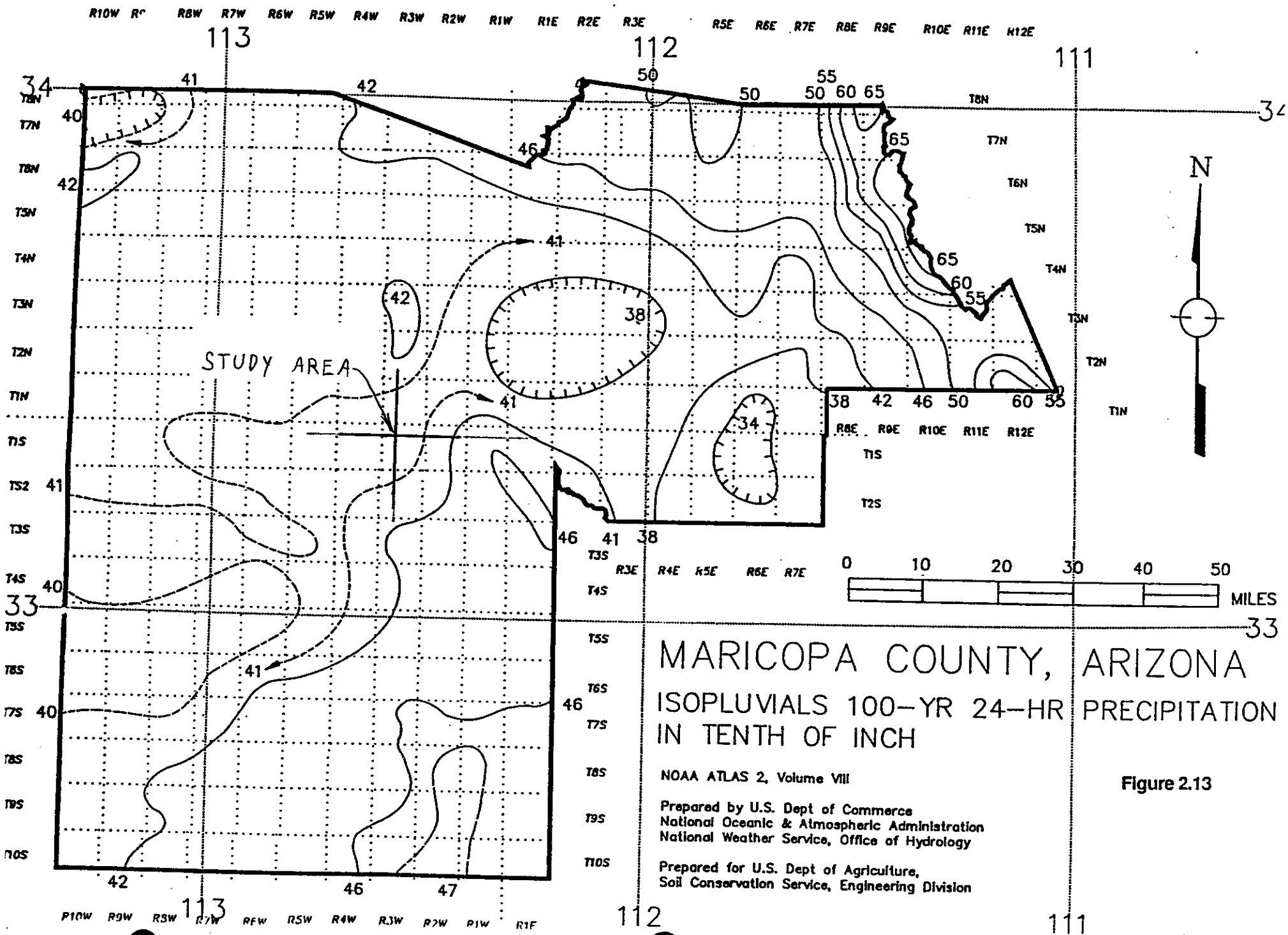

MARICOPA COUNTY, ARIZONA
ISOPLUVIALS 100-YR 6-HR PRECIPITATION
IN TENTH OF INCH
NOAA ATLAS 2, Volume VIII
Prepared by U.S. Dept of Commerce
National Oceanic & Atmospheric Administration
National Weather Service, Office of Hydrology
Prepared for U.S. Dept of Agriculture,
Soil Conservation Service, Engineering Division
STUDY AREA
N
0 10 20 30 40 50
MILES
R10W R9W R8W R7W R6W R5W R4W R3W R2W R1W R1E R2E R3E R4E R5E R6E R7E R8E R9E R10E R11E R12E
T8N T7N T6N T5N T4N T3N T2N T1N T1S T2S T3S T4S T5S T6S T7S T8S T9S T10S
113 112 111
33 34 36 38 40 45 30 32

Figure 2.7



MARICOPA COUNTY, ARIZONA

ISOPLUVIALS 100-YR 24-HR PRECIPITATION IN TENTH OF INCH

NOAA ATLAS 2, Volume VIII

Prepared by U.S. Dept of Commerce
National Oceanic & Atmospheric Administration
National Weather Service, Office of Hydrology

Prepared for U.S. Dept of Agriculture,
Soil Conservation Service, Engineering Division

Figure 2.13

APPENDIX C

RAINFALL LOSS CALCULATION SPREADSHEETS

FOR EACH SUBBASIN

WATERSHED MANAGEMENT BRANCH SUBBASIN LOSS PARAMETER SPREADSHEET -- ASSUMPTIONS AND USE

ASSUMPTIONS

* The minor soils described in the soil survey for a given map unit are evenly represented. Furthermore, all minor soils are present in every area mapped with the given map unit name.

* The composite map unit hydraulic conductivity is best represented by logarithmic averaging of major and minor soils' XKSATs to determine map unit XKSAT values.

* Rock outcrops are not included in the calculation of map unit XKSAT values.

* The percent of rock outcrops stated in the soil surveys for a given map unit is the same in every area mapped as that unit.

* Log averaging of map unit XKSAT values in a subbasin produces the most realistic value of average subbasin hydraulic conductivity.

* The influence of vegetation cover on infiltration is significant <u>only</u> for XKSAT and not for DTHETA or PSIF.

* Actual subbasin land uses can be reasonably represented by the land use categories listed in the spreadsheet <u>and</u> that the impervious areas assigned to these land uses are representative in the subbasin in question. (SEE the accompanying Table and its explanation sheet for the categorization scheme developed for use in this spreadsheet.) Furthermore, the DTHETA condition assigned to these land uses is also representative.

* XKSAT values are only adjusted for vegetation cover if the average subbasin vegetation cover is greater than ten percent.

* Impervious areas from rock outcrops and urban sources are not mutually exclusive. That is to say, rock outcrops potentially covered by urban impervious areas are not included in the calculation of subbasin RTIMP.

The user may compensate for some of the above assumptions if more specific data is available or required. This can be accomplished by disabling the cell protection (Alt-D) of the "idiot" mode of data entry to the spreadsheet.

If good aerial photography exists or needs to be examined for the study, the percent of rock outcrops can be estimated and entered into the spreadsheet directly.

Vegetation cover can also be set as an average for the subbasin by filling in the AVERAGE = cell with the desired value.

The user may also edit and classify land uses according to their desire as long as new rows are not inserted and the DTHETA condition does not change from the condition specified for that particular row. Furthermore, impervious areas not specified in the land use section of the spreadsheet may be defined in place of those given. If DTHETA conditions need to be changed, the cell ranges defined in the

PERCENT SUBBASIN
DRY =
NORMAL =
WET =

section may also be redefined in the cells containing the formulas. To do this global cell protection must be disabled (Alt-D).

USE OF THE SPREADSHEET

DISCLAIMER

This spreadsheet program is intended solely to ease the process of subbasin loss parameters. Use of the spreadsheet does not relieve the user from any liability with respect to its accuracy or the application of data generated with the spreadsheet.

NOTE: This spreadsheet was written on LOTUS 123 release 2.3. It is not known what effect the use of different releases will have upon the performance of the spreadsheet.

Before using the spreadsheet it is suggested that the user make a directory in DOS which will receive the subsequent subbasin files which will be created (i.e. md [dir name]).

To use the spreadsheet, load the LOTUS program by:

cd 123r23 (enter)
123 (enter)
/File Retrieve (select appropriate spreadsheet i.e. SGRAPH.WK1 or CLARK.WK1) (enter)

The spreadsheet loads itself directly into data input mode which allows the user to move only through those cells which appear in blue. To move through these cells use of the right arrow key is recommended.

Enter into cells in the format shown in the cells. The "UNITS" cell must be entered in all capital letters for the spreadsheet to perform properly. The use of square miles (SQ.MI.) is recommended. Map unit names must also be entered in all capital letters since the lookup fuction which finds

Sept. 18, 1991

LAND USE CATEGORIZATION AND USE FOR CALCULATION OF IMPERVIOUS AREAS IN URBAN MARICOPA COUNTY

INTRODUCTION

In order to achieve greater standardization and hence reproducablity of hydrologic models, a method of land use classification was developed to aid in the determination of impervious areas in urban and suburban watersheds in Maricopa County. The method utilizes a classification scheme based on simplified versions of municipal land use/zoning maps. In each case, the assignment of a particular parcel to a land use category was confirmed with actual land uses as shown on the most recent Landiscor aerial photographs. Although judgement is still required in the aerial photo interpretation phase, it is believed that the method provides reasonable and largely reproducable results.

The accompanying Table shows how individual zoning map units were grouped into classes based on impervious areas and the corresponding impervious area value for use in calculation of subbasin impervious areas in HEC-1.

EXPLANATION OF PROCEDURES USED IN THE DEVELOPMENT OF THE LAND USE/IMPERVIOUS AREA TABLE

In the Cave Creek FIS, Burgess and Niple calculated representative percentages of impervious areas found in City of Phoenix zoning classifications including rights-of-way. Utilizing these figures, the zoning units were grouped into six classes according to their similarity in impervious areas. These classes were created to decrease the number of different units that need to be mapped, planimetered, and otherwise accounted for in the hydrologic model. It was felt that this level of generalization was appropriate as it allows for differentiation between significantly different land uses (and hence impervious areas) while still recognizing the limitations of a lumped parameter model such as HEC-1.

Once these impervious area classes were created for the City of Phoenix zoning types, zoning types for the other municipalities represented in (the Gilbert-Chandler Update) were assigned to these classes based on their similarity to the City of Phoenix zoning types. This task was made easier by the fact that many of the zoning types are similarly designated between the various municipalities. In those cases where significantly different zoning types existed, judgement was used to place them in an impervious area class appropriate to that particular land use. Where such designation proved impractical, the zoning type was assigned to the "Miscellaneous" category which were then placed in an impervious class only after interpretation from aerial photography.

Having created a complete classification scheme, aerial photo interpretation and mapping of the impervious area classes was the next step. Utilizing photocopies of the zoning maps

provided on the backs of the most recent Landiscor aerial photographs, zoning types were grouped according to the above developed classification scheme. In every case, the actual aerial photographs were consulted to confirm or disconfirm the correspondence of zoning designation and actual land use to the observed impervious cover. This was done because in some cases areas zoned for a particular use have yet to be developed for that use or the zoning classification has never been updated. "Miscellaneous" zoning types were each individually examined on aerial photographs and assigned to an impervious area class appropriate to the amount of impervious area as seen in the Landiscor aerial photographs.

Land uses/developments may be further segregated based upon the time at which they were constructed. This type of additional division of land uses can be important because drainage requirements and their enforcement have changed over time. New drainage codes have been institued to require new developments to retain flood waters from precipitation events of a specified frequency and duration. The retention requirements differ between local governments. Furthermore, the extent to which these requirements have been enforced has also varied. Although the timing of the construction of developments had already been established for the Gilbert-Chandler Update, these determinations could be made for other studies by investigation of Landiscor aerial photos for those years of interest.

Once the watershed under study has been mapped for the various land use types and their temporal aspects, lumped values for impervious areas can be calculated for individual subbasins in the watershed.

The accompanying Table shows the impervious area classes for zoning types for the Cities of Phoenix, Mesa, and Chandler, the Town of Gilbert, and Maricopa County.

LOSS PARAMETERS FOR SUBBASIN: R1

Soil Survey Used CENTRAL

XKSAT

Map Unit	AREA ACRES	% Area	XKSAT	log(XKSAT) *(% Area)	% ROCK OUTCROP	% Area * %R.O.
PRB	400.000	37.38	0.28	-0.207	0.00	0.00
RAA	159.000	14.86	0.39	-0.061	0.00	0.00
MA	94.000	8.79	0.4	-0.035	0.00	0.00
AL	89.000	8.32	0.4	-0.033	0.00	0.00
ADA	76.000	7.10	0.4	-0.028	0.00	0.00
LB	62.000	5.79	0.4	-0.023	0.00	0.00
AGB	52.000	4.86	0.4	-0.019	0.00	0.00
CV	49.000	4.58	0.39	-0.019	0.00	0.00
GM	46.000	4.30	0.29	-0.023	0.00	0.00
ABA	43.000	4.02	0.38	-0.017	0.00	0.00

TOTAL = 1070.000 ACRES XKSAT = 0.34 %ROCK= 0.00

DTHETA

Dry = 0.35
Normal = 0.25
Wet = 0

PSIF

= 3.98

LAND USE

AREA ACRES	LAND USE type	% Area	DTHETA condition	% veg. cover	% Imp. Inc.ROW	ImpArea ACRES	IA in.	Wgtd. IA in.
********DESERT		100.00	DRY	15.00	0.00	0.00	0.35	0.350

*********=TOTAL AREA OK AVERAGE = 15.00 TOTAL = 0.00 AVG. = 0.350
% = 0.00

PERCENT OF SUBBASIN DRY = 100.00 %
NORMAL = 0.00 %
WET = 0.00 %

SUBBASIN DTHETA WEIGHTED BY LAND USE = 0.350

SUBBASIN XKSAT ADJUSTED FOR VEG. = 0.359

IMPERVIOUS AREA: URBAN @ 0 % effective = 0.00
ROCK OUTCROP @ 0 % effective = 0.00

% EFFECTIVE IMP. = 0.00

INPUT VALUES FOR MCUHP2 PROGRAM

SUBBASIN	AREA sq.mi.	IA inches	DTHETA	PSIF	XKSAT adj.	RTIMP %	LAG min
R1	1.672	0.350	0.350	3.98	0.359	0.00	50

LOSS PARAMETERS FOR SUBBASIN: R2

Soil Survey Used CENTRAL

XKSAT

Map Unit	AREA ACRES	% Area	XKSAT	log(XKSAT) *(% Area)	% ROCK OUTCROP	% Area * %R.O.
CV	226.000	28.50	0.39	-0.117	0.00	0.00
RAA	184.000	23.20	0.39	-0.095	0.00	0.00
AL	133.000	16.77	0.4	-0.067	0.00	0.00
ABA	127.000	16.02	0.38	-0.067	0.00	0.00
ADA	123.000	15.51	0.4	-0.062	0.00	0.00

TOTAL = 793.000 ACRES XKSAT = 0.39 %ROCK= 0.00

DTHETA

Dry = 0.35
Normal = 0.25
Wet = 0

PSIF

= 4.24

LAND USE

AREA ACRES	LAND USE type	% Area	DTHETA condition	% veg. cover	% Imp. Inc.ROW	ImpArea ACRES	IA in.	Wgtd. IA in.
793.000	DESERT	100.00	DRY	15.00	0.00	0.00	0.35	0.350
793.000	=TOTAL AREA OK		AVERAGE =	15.00	TOTAL = % =	0.00 0.00	AVG. =	0.350

PERCENT OF SUBBASIN DRY = 100.00 %
NORMAL = 0.00 %
WET = 0.00 %

SUBBASIN DTHETA WEIGHTED BY LAND USE = 0.350

SUBBASIN XKSAT ADJUSTED FOR VEG. = 0.412

IMPERVIOUS AREA: URBAN @ 0 % effective = 0.00
ROCK OUTCROP @ 0 % effective = 0.00

% EFFECTIVE IMP. = 0.00

INPUT VALUES FOR MCUHP2 PROGRAM

SUBBASIN	AREA sq.mi.	IA inches	DTHETA	PSIF	XKSAT adj.	RTIMP %	LAG min
R2	1.239	0.350	0.350	4.24	0.412	0.00	43

LOSS PARAMETERS FOR SUBBASIN: R3

Soil Survey Used CENTRAL

XKSAT

Map Unit	AREA ACRES	% Area	XKSAT	log(XKSAT) *(% Area)	% ROCK OUTCROP	% Area * %R.O.
ABA	369.000	44.03	0.38	-0.185	0.00	0.00
CV	249.000	29.71	0.39	-0.122	0.00	0.00
PA	97.000	11.58	0.4	-0.046	0.00	0.00
CP	80.000	9.55	0.4	-0.038	0.00	0.00
AM	18.000	2.15	0.39	-0.009	0.00	0.00
AL	15.000	1.79	0.4	-0.007	0.00	0.00
LB	10.000	1.19	0.4	-0.005	0.00	0.00

TOTAL = 838.000 ACRES XKSAT = 0.39 %ROCK= 0.00

DTHETA

Dry = 0.35
Normal = 0.25
Wet = 0

PSIF

= 4.24

LAND USE

AREA ACRES	LAND USE type	% Area	DTHETA condition	% veg. cover	% Imp. Inc.ROW	ImpArea ACRES	IA in.	Wgtd. IA in.
398.000	DESERT	47.49	DRY	15.00	0.00	0.00	0.35	0.166
132.000	ROW CROP	15.75	NORMAL	0.00	0.00	0.00	0.50	0.079
308.000	ROW CROP	36.75	WET	100.00	0.00	0.00	0.50	0.184

838.000 =TOTAL AREA OK AVERAGE = 43.88 TOTAL = 0.00 AVG. = 0.429
% = 0.00

PERCENT OF SUBBASIN DRY = 47.49 %
NORMAL = 15.75 %
WET = 36.75 %

SUBBASIN DTHETA WEIGHTED BY LAND USE = 0.206

SUBBASIN XKSAT ADJUSTED FOR VEG. = 0.535

IMPERVIOUS AREA: URBAN @ 0 % effective = 0.00
ROCK OUTCROP @ 0 % effective = 0.00

% EFFECTIVE IMP. = 0.00

INPUT VALUES FOR MCUHP2 PROGRAM

SUBBASIN	AREA sq.mi.	IA inches	DTHETA	PSIF	XKSAT adj.	RTIMP %	LAG min
R3	1.309	0.429	0.206	4.24	0.535	0.00	53

LOSS PARAMETERS FOR SUBBASIN: R4

Soil Survey Used CENTRAL

XKSAT

Map Unit	AREA ACRES	% Area	XKSAT	log(XKSAT) *(% Area)	% ROCK OUTCROP	% Area * %R.O.
CV	280.000	77.13	0.39	-0.315	0.00	0.00
AM	71.000	19.56	0.39	-0.080	0.00	0.00
CO	5.000	1.38	0.29	-0.007	20.00	0.28
AGB	4.000	1.10	0.4	-0.004	0.00	0.00
ABA	3.000	0.83	0.38	-0.003	0.00	0.00

TOTAL = 363.000 ACRES XKSAT = 0.39 %ROCK= 0.28

DTHETA		PSIF	
Dry =	0.35	=	4.24
Normal =	0.25		
Wet =	0		

LAND USE

AREA ACRES	LAND USE type	% Area	DTHETA condition	% veg. cover	% Imp. Inc.ROW	ImpArea ACRES	IA in.	Wgtd. IA in.
363.000	DESERT	100.00	DRY	15.00	0.00	0.00	0.35	0.350
363.000	=TOTAL AREA OK		AVERAGE =	15.00	TOTAL =	0.00	AVG. =	0.350
					% =	0.00		

PERCENT OF SUBBASIN DRY = 100.00 %
NORMAL = 0.00 %
WET = 0.00 %

SUBBASIN DTHETA WEIGHTED BY LAND USE = 0.350

SUBBASIN XKSAT ADJUSTED FOR VEG. = 0.411

IMPERVIOUS AREA: URBAN @ 0 % effective = 0.00
ROCK OUTCROP @ 100 % effective = 0.28

% EFFECTIVE IMP. = 0.28

INPUT VALUES FOR MCUHP2 PROGRAM

SUBBASIN	AREA sq.mi.	IA inches	DTHETA	PSIF	XKSAT adj.	RTIMP %	LAG min
R4	0.567	0.350	0.350	4.24	0.411	0.28	34

LOSS PARAMETERS FOR SUBBASIN: R5

Soil Survey Used CENTRAL

XKSAT

Map Unit	AREA ACRES	% Area	XKSAT	log(XKSAT) *(% Area)	% ROCK OUTCROP	% Area * %R.O.
CP	241.000	23.00	0.4	-0.092	0.00	0.00
HLC	161.000	15.36	0.14	-0.131	0.00	0.00
AM	154.000	14.69	0.39	-0.060	0.00	0.00
CV	134.000	12.79	0.39	-0.052	0.00	0.00
PRB	123.000	11.74	0.28	-0.065	0.00	0.00
ABA	105.000	10.02	0.38	-0.042	0.00	0.00
AGB	48.000	4.58	0.4	-0.018	0.00	0.00
GYD	36.000	3.44	0.26	-0.020	0.00	0.00
PYD	25.000	2.39	0.2	-0.017	0.00	0.00
LB	21.000	2.00	0.4	-0.008	0.00	0.00

TOTAL = 1048.000 ACRES XKSAT = 0.31 %ROCK= 0.00

DTHETA		PSIF	
Dry =	0.35	=	3.82
Normal =	0.25		
Wet =	0		

LAND USE

AREA ACRES	LAND USE type	% Area	DTHETA condition	% veg. cover	% Imp. Inc.ROW	ImpArea ACRES	IA in.	Wgtd. IA in.
********DESERT		100.00	DRY	15.00	0.00	0.00	0.35	0.350

********=TOTAL AREA OK AVERAGE = 15.00 TOTAL = 0.00 AVG. = 0.350
% = 0.00

PERCENT OF SUBBASIN DRY = 100.00 %
NORMAL = 0.00 %
WET = 0.00 %

SUBBASIN DTHETA WEIGHTED BY LAND USE = 0.350

SUBBASIN XKSAT ADJUSTED FOR VEG. = 0.327

IMPERVIOUS AREA: URBAN @ 0 % effective = 0.00
ROCK OUTCROP @ 0 % effective = 0.00

% EFFECTIVE IMP. = 0.00

INPUT VALUES FOR MCUHP2 PROGRAM

SUBBASIN	AREA sq.mi.	IA inches	DTHETA	PSIF	XKSAT adj.	RTIMP %	LAG min
R5	1.638	0.350	0.350	3.82	0.327	0.00	45

LOSS PARAMETERS FOR SUBBASIN: R6

Soil Survey Used CENTRAL

XKSAT

Map Unit	AREA ACRES	% Area	XKSAT	log(XKSAT) *(% Area)	% ROCK OUTCROP	% Area * %R.O.
HLC	121.000	58.45	0.14	-0.499	0.00	0.00
GWD	33.000	15.94	0.35	-0.073	0.00	0.00
AGB	23.000	11.11	0.4	-0.044	0.00	0.00
RS	14.000	6.76	0.4	-0.027	65.00	4.40
CV	11.000	5.31	0.39	-0.022	0.00	0.00
CO	5.000	2.42	0.29	-0.013	20.00	0.48

TOTAL = 207.000 ACRES XKSAT = 0.21 %ROCK= 4.88

DTHETA

Dry = 0.37
Normal = 0.25
Wet = 0

PSIF

= 4.74

LAND USE

AREA ACRES	LAND USE type	% Area	DTHETA condition	% veg. cover	% Imp. Inc.ROW	ImpArea ACRES	IA in.	Wgtd. IA in.
207.000	DESERT	100.00	DRY	15.00	0.00	0.00	0.35	0.350

207.000 =TOTAL AREA OK AVERAGE = 15.00 TOTAL = 0.00 AVG. = 0.350
% = 0.00

PERCENT OF SUBBASIN DRY = 100.00 %
NORMAL = 0.00 %
WET = 0.00 %

SUBBASIN DTHETA WEIGHTED BY LAND USE = 0.370

SUBBASIN XKSAT ADJUSTED FOR VEG. = 0.222

IMPERVIOUS AREA: URBAN @ 0 % effective = 0.00
ROCK OUTCROP @ 100 % effective = 4.88

% EFFECTIVE IMP. = 4.88

INPUT VALUES FOR MCUHP2 PROGRAM

SUBBASIN	AREA sq.mi.	IA inches	DTHETA	PSIF	XKSAT adj.	RTIMP %	LAG min
R6	0.323	0.350	0.370	4.74	0.222	4.88	17

LOSS PARAMETERS FOR SUBBASIN: R7

Soil Survey Used CENTRAL

XKSAT

Map Unit	AREA ACRES	% Area	XKSAT	log(XKSAT) *(% Area)	% ROCK OUTCROP	% Area * %R.O.
AGB	138.000	52.27	0.4	-0.208	0.00	0.00
GWD	112.000	42.42	0.35	-0.193	0.00	0.00
GYD	14.000	5.30	0.26	-0.031	0.00	0.00

TOTAL = 264.000 ACRES XKSAT = 0.37 %ROCK= 0.00

DTHETA

Dry = 0.35
Normal = 0.25
Wet = 0

PSIF

= 4.14

LAND USE

AREA ACRES	LAND USE type	% Area	DTHETA condition	% veg. cover	% Imp. Inc.ROW	ImpArea ACRES	IA in.	Wgtd. IA in.
264.000	DESERT	100.00	DRY	15.00	0.00	0.00	0.35	0.350
264.000	=TOTAL AREA OK		AVERAGE =	15.00	TOTAL = % =	0.00 0.00	AVG. =	0.350

PERCENT OF SUBBASIN
DRY = 100.00 %
NORMAL = 0.00 %
WET = 0.00 %

SUBBASIN DTHETA WEIGHTED BY LAND USE = 0.350

SUBBASIN XKSAT ADJUSTED FOR VEG. = 0.391

IMPERVIOUS AREA:
URBAN @ 0 % effective = 0.00
ROCK OUTCROP @ 0 % effective = 0.00

% EFFECTIVE IMP. = 0.00

INPUT VALUES FOR MCUHP2 PROGRAM

SUBBASIN	AREA sq.mi.	IA inches	DTHETA	PSIF	XKSAT adj.	RTIMP %	LAG min
R7	0.413	0.350	0.350	4.14	0.391	0.00	19

LOSS PARAMETERS FOR SUBBASIN: R8

Soil Survey Used CENTRAL

XKSAT

Map Unit	AREA ACRES	% Area	XKSAT	log(XKSAT) *(% Area)	% ROCK OUTCROP	% Area * %R.O.
CV	109.000	44.49	0.39	-0.182	0.00	0.00
AGB	85.000	34.69	0.4	-0.138	0.00	0.00
AL	40.000	16.33	0.4	-0.065	0.00	0.00
HLC	11.000	4.49	0.14	-0.038	0.00	0.00

TOTAL = 245.000 ACRES XKSAT = 0.38 %ROCK= 0.00

DTHETA

Dry = 0.35
Normal = 0.25
Wet = 0

PSIF

= 4.19

LAND USE

AREA ACRES	LAND USE type	% Area	DTHETA condition	% veg. cover	% Imp. Inc.ROW	ImpArea ACRES	IA in.	Wgtd. IA in.
245.000	DESERT	100.00	DRY	15.00	0.00	0.00	0.35	0.350

245.000 =TOTAL AREA OK AVERAGE = 15.00 TOTAL = 0.00 AVG. = 0.350
% = 0.00

PERCENT OF SUBBASIN DRY = 100.00 %
NORMAL = 0.00 %
WET = 0.00 %

SUBBASIN DTHETA WEIGHTED BY LAND USE = 0.350

SUBBASIN XKSAT ADJUSTED FOR VEG. = 0.401

IMPERVIOUS AREA: URBAN @ 0 % effective = 0.00
ROCK OUTCROP @ 0 % effective = 0.00

% EFFECTIVE IMP. = 0.00

INPUT VALUES FOR MCUHP2 PROGRAM

SUBBASIN	AREA sq.mi.	IA inches	DTHETA	PSIF	XKSAT adj.	RTIMP %	LAG min
R8	0.383	0.350	0.350	4.19	0.401	0.00	34

LOSS PARAMETERS FOR SUBBASIN: R9

Soil Survey Used CENTRAL

XKSAT

Map Unit	AREA ACRES	% Area	XKSAT	log(XKSAT) *(% Area)	% ROCK OUTCROP	% Area * %R.O.
AGB	335.000	74.12	0.4	-0.295	0.00	0.00
AE	100.000	22.12	0.39	-0.090	0.00	0.00
GYD	17.000	3.76	0.26	-0.022	0.00	0.00

TOTAL = 452.000 ACRES XKSAT = 0.39 %ROCK= 0.00

DTHETA

Dry = 0.35
Normal = 0.25
Wet = 0

PSIF

= 4.24

LAND USE

AREA ACRES	LAND USE type	% Area	DTHETA condition	% veg. cover	% Imp. Inc.ROW	ImpArea ACRES	IA in.	Wgtd. IA in.
452.000	DESERT	100.00	DRY	15.00	0.00	0.00	0.35	0.350
452.000	=TOTAL AREA OK		AVERAGE =	15.00	TOTAL = % =	0.00 0.00	AVG. =	0.350

PERCENT OF SUBBASIN
DRY = 100.00 %
NORMAL = 0.00 %
WET = 0.00 %

SUBBASIN DTHETA WEIGHTED BY LAND USE = 0.350

SUBBASIN XKSAT ADJUSTED FOR VEG. = 0.412

IMPERVIOUS AREA:
URBAN @ 0 % effective = 0.00
ROCK OUTCROP @ 0 % effective = 0.00

% EFFECTIVE IMP. = 0.00

INPUT VALUES FOR MCUHP2 PROGRAM

SUBBASIN	AREA sq.mi.	IA inches	DTHETA	PSIF	XKSAT adj.	RTIMP %	LAG min
R9	0.706	0.350	0.350	4.24	0.412	0.00	23

LOSS PARAMETERS FOR SUBBASIN: R10

Soil Survey Used CENTRAL

XKSAT

Map Unit	AREA ACRES	% Area	XKSAT	log(XKSAT) *(% Area)	% ROCK OUTCROP	% Area * %R.O.
AL	414.000	49.17	0.4	-0.196	0.00	0.00
AGB	219.000	26.01	0.4	-0.104	0.00	0.00
GYD	175.000	20.78	0.26	-0.122	0.00	0.00
CV	24.000	2.85	0.39	-0.012	0.00	0.00
ABA	8.000	0.95	0.38	-0.004	0.00	0.00
CP	2.000	0.24	0.4	-0.001	0.00	0.00

TOTAL = 842.000 ACRES XKSAT = 0.37 %ROCK= 0.00

DTHETA

Dry = 0.35
Normal = 0.25
Wet = 0

PSIF

= 4.14

LAND USE

AREA ACRES	LAND USE type	% Area	DTHETA condition	% veg. cover	% Imp. Inc.ROW	ImpArea ACRES	IA in.	Wgtd. IA in.
745.000	DESERT	88.48	DRY	15.00	0.00	0.00	0.35	0.310
97.000	V.L.D.R	11.52	NORMAL	0.00	15.00	14.55	0.10	0.012

842.000 =TOTAL AREA OK AVERAGE = 13.27 TOTAL = 14.55 AVG. = 0.321
% = 1.73

PERCENT OF SUBBASIN DRY = 88.48 %
NORMAL = 11.52 %
WET = 0.00 %

SUBBASIN DTHETA WEIGHTED BY LAND USE = 0.338

SUBBASIN XKSAT ADJUSTED FOR VEG. = 0.383

IMPERVIOUS AREA: URBAN @ 100 % effective = 1.73
ROCK OUTCROP @ 0 % effective = 0.00

% EFFECTIVE IMP. = 1.73

INPUT VALUES FOR MCUHP2 PROGRAM

SUBBASIN	AREA sq.mi.	IA inches	DTHETA	PSIF	XKSAT adj.	RTIMP %	LAG min
R10	1.316	0.321	0.338	4.14	0.383	1.73	42

LOSS PARAMETERS FOR SUBBASIN: R11

Soil Survey Used CENTRAL

XKSAT

Map Unit	AREA ACRES	% Area	XKSAT	log(XKSAT) *(% Area)	% ROCK OUTCROP	% Area * %R.O.
AGB	394.000	48.58	0.4	-0.193	0.00	0.00
TSC	185.000	22.81	0.14	-0.195	0.00	0.00
GYD	171.000	21.09	0.26	-0.123	0.00	0.00
RAA	19.000	2.34	0.39	-0.010	0.00	0.00
AL	19.000	2.34	0.4	-0.009	0.00	0.00
PA	13.000	1.60	0.4	-0.006	0.00	0.00
CP	4.000	0.49	0.4	-0.002	0.00	0.00
HLC	3.000	0.37	0.14	-0.003	0.00	0.00
MA	3.000	0.37	0.4	-0.001	0.00	0.00

TOTAL = 811.000 ACRES XKSAT = 0.29 %ROCK= 0.00

DTHETA		PSIF	
Dry =	0.35	=	3.71
Normal =	0.25		
Wet =	0		

LAND USE

AREA ACRES	LAND USE type	% Area	DTHETA condition	% veg. cover	% Imp. Inc.ROW	ImpArea ACRES	IA in.	Wgtd. IA in.
811.000	DESERT	100.00	DRY	15.00	0.00	0.00	0.35	0.350

811.000 =TOTAL AREA OK AVERAGE = 15.00 TOTAL = 0.00 AVG. = 0.350
% = 0.00

PERCENT OF SUBBASIN DRY = 100.00 %
NORMAL = 0.00 %
WET = 0.00 %

SUBBASIN DTHETA WEIGHTED BY LAND USE = 0.350

SUBBASIN XKSAT ADJUSTED FOR VEG. = 0.306

IMPERVIOUS AREA: URBAN @ 0 % effective = 0.00
ROCK OUTCROP @ 0 % effective = 0.00

% EFFECTIVE IMP. = 0.00

INPUT VALUES FOR MCUHP2 PROGRAM

SUBBASIN	AREA sq.mi.	IA inches	DTHETA	PSIF	XKSAT adj.	RTIMP %	LAG min
R11	1.267	0.350	0.350	3.71	0.306	0.00	36

LOSS PARAMETERS FOR SUBBASIN: R12

Soil Survey Used CENTRAL

XKSAT

Map Unit	AREA ACRES	% Area	XKSAT	log(XKSAT) *(% Area)	% ROCK OUTCROP	% Area * %R.O.
GYD	206.000	32.96	0.26	-0.193	0.00	0.00
AGB	183.000	29.28	0.4	-0.117	0.00	0.00
HLC	157.000	25.12	0.14	-0.214	0.00	0.00
PYD	45.000	7.20	0.2	-0.050	0.00	0.00
CV	14.000	2.24	0.39	-0.009	0.00	0.00
TSC	11.000	1.76	0.14	-0.015	0.00	0.00
PRB	4.000	0.64	0.28	-0.004	0.00	0.00
TB	3.000	0.48	0.4	-0.002	0.00	0.00
ABA	2.000	0.32	0.38	-0.001	0.00	0.00

TOTAL = 625.000 ACRES XKSAT = 0.25 %ROCK= 0.00

DTHETA

Dry = 0.35
Normal = 0.25
Wet = 0

PSIF

= 3.5

LAND USE

AREA ACRES	LAND USE type	% Area	DTHETA condition	% veg. cover	% Imp. Inc.ROW	ImpArea ACRES	IA in.	Wgtd. IA in.
625.000	DESERT	100.00	DRY	15.00	0.00	0.00	0.35	0.350

625.000 =TOTAL AREA OK AVERAGE = 15.00 TOTAL = 0.00 AVG. = 0.350
% = 0.00

PERCENT OF SUBBASIN DRY = 100.00 %
NORMAL = 0.00 %
WET = 0.00 %

SUBBASIN DTHETA WEIGHTED BY LAND USE = 0.350

SUBBASIN XKSAT ADJUSTED FOR VEG. = 0.264

IMPERVIOUS AREA: URBAN @ 0 % effective = 0.00
ROCK OUTCROP @ 0 % effective = 0.00

% EFFECTIVE IMP. = 0.00

INPUT VALUES FOR MCUHP2 PROGRAM

SUBBASIN	AREA sq.mi.	IA inches	DTHETA	PSIF	XKSAT adj.	RTIMP %	LAG min
R12	0.977	0.350	0.350	3.50	0.264	0.00	32

LOSS PARAMETERS FOR SUBBASIN: R13

Soil Survey Used CENTRAL

XKSAT

Map Unit	AREA ACRES	% Area	XKSAT	log(XKSAT) *(% Area)	% ROCK OUTCROP	% Area * %R.O.
AGB	110.000	38.46	0.4	-0.153	0.00	0.00
CV	60.000	20.98	0.39	-0.086	0.00	0.00
PRB	35.000	12.24	0.28	-0.068	0.00	0.00
AL	30.000	10.49	0.4	-0.042	0.00	0.00
GYD	25.000	8.74	0.26	-0.051	0.00	0.00
CP	8.000	2.80	0.4	-0.011	0.00	0.00
ABA	7.000	2.45	0.38	-0.010	0.00	0.00
VH	7.000	2.45	0.27	-0.014	0.00	0.00
HLC	4.000	1.40	0.14	-0.012	0.00	0.00

TOTAL = 286.000 ACRES XKSAT = 0.36 %ROCK= 0.00

DTHETA		PSIF	
Dry =	0.35	=	4.08
Normal =	0.25		
Wet =	0		

LAND USE

AREA ACRES	LAND USE type	% Area	DTHETA condition	% veg. cover	% Imp. Inc.ROW	ImpArea ACRES	IA in.	Wgtd. IA in.
286.000	DESERT	100.00	DRY	15.00	0.00	0.00	0.35	0.350
286.000	=TOTAL AREA OK		AVERAGE =	15.00	TOTAL =	0.00	AVG. =	0.350
					% =	0.00		

PERCENT OF SUBBASIN DRY = 100.00 %
NORMAL = 0.00 %
WET = 0.00 %

SUBBASIN DTHETA WEIGHTED BY LAND USE = 0.350

SUBBASIN XKSAT ADJUSTED FOR VEG. = 0.380

IMPERVIOUS AREA: URBAN @ 0 % effective = 0.00
ROCK OUTCROP @ 0 % effective = 0.00

% EFFECTIVE IMP. = 0.00

INPUT VALUES FOR MCUHP2 PROGRAM

SUBBASIN	AREA sq.mi.	IA inches	DTHETA	PSIF	XKSAT adj.	RTIMP %	LAG min
R13	0.447	0.350	0.350	4.08	0.380	0.00	32

LOSS PARAMETERS FOR SUBBASIN: R14

Soil Survey Used CENTRAL

XKSAT

Map Unit	AREA ACRES	% Area	XKSAT	log(XKSAT) *(% Area)	% ROCK OUTCROP	% Area * %R.O.
CP	201.000	39.88	0.4	-0.159	0.00	0.00
AGB	92.000	18.25	0.4	-0.073	0.00	0.00
VH	80.000	15.87	0.27	-0.090	0.00	0.00
AL	76.000	15.08	0.4	-0.060	0.00	0.00
PA	35.000	6.94	0.4	-0.028	0.00	0.00
ABA	10.000	1.98	0.38	-0.008	0.00	0.00
CB	10.000	1.98	0.4	-0.008	0.00	0.00

TOTAL = 504.000 ACRES XKSAT = 0.38 %ROCK= 0.00

DTHETA		PSIF	
Dry =	0.35	=	4.19
Normal =	0.25		
Wet =	0		

LAND USE

AREA ACRES	LAND USE type	% Area	DTHETA condition	% veg. cover	% Imp. Inc.ROW	ImpArea ACRES	IA in.	Wgtd. IA in.
504.000	DESERT	100.00	DRY	15.00	0.00	0.00	0.50	0.500
504.000	=TOTAL AREA OK		AVERAGE =	15.00	TOTAL =	0.00	AVG. =	0.500
					% =	0.00		

PERCENT OF SUBBASIN DRY = 100.00 %
NORMAL = 0.00 %
WET = 0.00 %

SUBBASIN DTHETA WEIGHTED BY LAND USE = 0.350

SUBBASIN XKSAT ADJUSTED FOR VEG. = 0.401

IMPERVIOUS AREA: URBAN @ 0 % effective = 0.00
ROCK OUTCROP @ 0 % effective = 0.00

% EFFECTIVE IMP. = 0.00

INPUT VALUES FOR MCUHP2 PROGRAM

SUBBASIN	AREA sq.mi.	IA inches	DTHETA	PSIF	XKSAT adj.	RTIMP %	LAG min
R14	0.788	0.500	0.350	4.19	0.401	0.00	26

LOSS PARAMETERS FOR SUBBASIN: R15

Soil Survey Used CENTRAL

XKSAT

Map Unit	AREA ACRES	% Area	XKSAT	log(XKSAT) *(% Area)	% ROCK OUTCROP	% Area * %R.O.
PRB	226.000	26.53	0.28	-0.147	0.00	0.00
CP	182.000	21.36	0.4	-0.085	0.00	0.00
RAA	151.000	17.72	0.39	-0.072	0.00	0.00
MA	60.000	7.04	0.4	-0.028	0.00	0.00
LB	59.000	6.92	0.4	-0.028	0.00	0.00
GGA	47.000	5.52	0.25	-0.033	0.00	0.00
ABA	39.000	4.58	0.38	-0.019	0.00	0.00
PEA	33.000	3.87	0.37	-0.017	0.00	0.00
PA	31.000	3.64	0.4	-0.014	0.00	0.00
RBA	24.000	2.82	0.26	-0.016	0.00	0.00

TOTAL = 852.000 ACRES XKSAT = 0.35 %ROCK= 0.00

DTHETA

Dry = 0.35
Normal = 0.25
Wet = 0

PSIF

= 4.03

LAND USE

AREA ACRES	LAND USE type	% Area	DTHETA condition	% veg. cover	% Imp. Inc.ROW	ImpArea ACRES	IA in.	Wgtd. IA in.
320.000	DESERT	37.56	DRY	15.00	0.00	0.00	0.35	0.131
160.000	ROW CROP	18.78	NORMAL	0.00	0.00	0.00	0.50	0.094
372.000	ROW CROP	43.66	WET	100.00	0.00	0.00	0.50	0.218

852.000 =TOTAL AREA OK AVERAGE = 49.30 TOTAL = 0.00 AVG. = 0.444
% = 0.00

PERCENT OF SUBBASIN DRY = 37.56 %
NORMAL = 18.78 %
WET = 43.66 %

SUBBASIN DTHETA WEIGHTED BY LAND USE = 0.178

SUBBASIN XKSAT ADJUSTED FOR VEG. = 0.501

IMPERVIOUS AREA: URBAN @ 0 % effective = 0.00
ROCK OUTCROP @ 0 % effective = 0.00

% EFFECTIVE IMP. = 0.00

INPUT VALUES FOR MCUHP2 PROGRAM

SUBBASIN	AREA sq.mi.	IA inches	DTHETA	PSIF	XKSAT adj.	RTIMP %	LAG min
R15	1.331	0.444	0.178	4.03	0.501	0.00	205

LOSS PARAMETERS FOR SUBBASIN: R16

Soil Survey Used CENTRAL

XKSAT

Map Unit	AREA ACRES	% Area	XKSAT	log(XKSAT) *(% Area)	% ROCK OUTCROP	% Area * %R.O.
LB	209.000	35.48	0.4	-0.141	0.00	0.00
RAA	143.000	24.28	0.39	-0.099	0.00	0.00
ABA	106.000	18.00	0.38	-0.076	0.00	0.00
LCA	52.000	8.83	0.25	-0.053	0.00	0.00
CRB	39.000	6.62	0.4	-0.026	0.00	0.00
ADA	24.000	4.07	0.4	-0.016	0.00	0.00
CP	16.000	2.72	0.4	-0.011	0.00	0.00

TOTAL = 589.000 ACRES XKSAT = 0.38 %ROCK= 0.00

DTHETA

Dry = 0.35
Normal = 0.25
Wet = 0

PSIF

= 4.19

LAND USE

AREA ACRES	LAND USE type	% Area	DTHETA condition	% veg. cover	% Imp. Inc.ROW	ImpArea ACRES	IA in.	Wgtd. IA in.
508.000	OPEN	86.25	DRY	0.00	0.00	0.00	0.30	0.259
24.000	ROW CROP	4.07	NORMAL	0.00	0.00	0.00	0.50	0.020
57.000	ROW CROP	9.68	WET	100.00	0.00	0.00	0.50	0.048

589.000 =TOTAL AREA OK AVERAGE = 9.68 TOTAL = 0.00 AVG. = 0.328
% = 0.00

PERCENT OF SUBBASIN DRY = 86.25 %
NORMAL = 4.07 %
WET = 9.68 %

SUBBASIN DTHETA WEIGHTED BY LAND USE = 0.312

SUBBASIN XKSAT ADJUSTED FOR VEG. = 0.380

IMPERVIOUS AREA: URBAN @ 0 % effective = 0.00
ROCK OUTCROP @ 0 % effective = 0.00

% EFFECTIVE IMP. = 0.00

INPUT VALUES FOR MCUHP2 PROGRAM

SUBBASIN	AREA sq.mi.	IA inches	DTHETA	PSIF	XKSAT adj.	RTIMP %	LAG min
R16	0.920	0.328	0.312	4.19	0.380	0.00	162

LOSS PARAMETERS FOR SUBBASIN: R17

Soil Survey Used CENTRAL

XKSAT

Map Unit	AREA ACRES	% Area	XKSAT	log(XKSAT) *(% Area)	% ROCK OUTCROP	% Area * %R.O.
CP	243.000	43.16	0.4	-0.172	0.00	0.00
ABA	216.000	38.37	0.38	-0.161	0.00	0.00
CV	57.000	10.12	0.39	-0.041	0.00	0.00
LB	19.000	3.37	0.4	-0.013	0.00	0.00
VA	18.000	3.20	0.39	-0.013	0.00	0.00
GGA	10.000	1.78	0.25	-0.011	0.00	0.00

TOTAL = 563.000 ACRES XKSAT = 0.39 %ROCK= 0.00

DTHETA

Dry = 0.35
Normal = 0.25
Wet = 0

PSIF

= 4.24

LAND USE

AREA ACRES	LAND USE type	% Area	DTHETA condition	% veg. cover	% Imp. Inc.ROW	ImpArea ACRES	IA in.	Wgtd. IA in.
193.000	DESERT	34.28	DRY	15.00	0.00	0.00	0.35	0.120
111.000	ROW CROP	19.72	NORMAL	0.00	0.00	0.00	0.50	0.099
259.000	ROW CROP	46.00	WET	100.00	0.00	0.00	0.50	0.230

563.000 =TOTAL AREA OK AVERAGE = 51.15 TOTAL = 0.00 AVG. = 0.449
% = 0.00

PERCENT OF SUBBASIN
DRY = 34.28 %
NORMAL = 19.72 %
WET = 46.00 %

SUBBASIN DTHETA WEIGHTED BY LAND USE = 0.169

SUBBASIN XKSAT ADJUSTED FOR VEG. = 0.567

IMPERVIOUS AREA:
URBAN @ 0 % effective = 0.00
ROCK OUTCROP @ 0 % effective = 0.00

% EFFECTIVE IMP. = 0.00

INPUT VALUES FOR MCUHP2 PROGRAM

SUBBASIN	AREA sq.mi.	IA inches	DTHETA	PSIF	XKSAT adj.	RTIMP %	LAG min
R17	0.880	0.449	0.169	4.24	0.567	0.00	159

LOSS PARAMETERS FOR SUBBASIN: R18

Soil Survey Used CENTRAL

XKSAT

Map Unit	AREA ACRES	% Area	XKSAT	log(XKSAT) *(% Area)	% ROCK OUTCROP	% Area * %R.O.
ABA	270.000	46.63	0.38	-0.196	0.00	0.00
CP	144.000	24.87	0.4	-0.099	0.00	0.00
GGA	48.000	8.29	0.25	-0.050	0.00	0.00
MA	47.000	8.12	0.4	-0.032	0.00	0.00
VA	40.000	6.91	0.39	-0.028	0.00	0.00
LB	30.000	5.18	0.4	-0.021	0.00	0.00

TOTAL = 579.000 ACRES XKSAT = 0.37 %ROCK= 0.00

DTHETA

Dry = 0.35
Normal = 0.25
Wet = 0

PSIF

= 4.14

LAND USE

AREA ACRES	LAND USE type	% Area	DTHETA condition	% veg. cover	% Imp. Inc.ROW	ImpArea ACRES	IA in.	Wgtd. IA in.
243.000	DESERT	41.97	DRY	15.00	0.00	0.00	0.35	0.147
101.000	ROW CROP	17.44	NORMAL	0.00	0.00	0.00	0.50	0.087
235.000	ROW CROP	40.59	WET	100.00	0.00	0.00	0.50	0.203

579.000 =TOTAL AREA OK AVERAGE = 46.88 TOTAL = 0.00 AVG. = 0.437
% = 0.00

PERCENT OF SUBBASIN
DRY = 41.97 %
NORMAL = 17.44 %
WET = 40.59 %

SUBBASIN DTHETA WEIGHTED BY LAND USE = 0.191

SUBBASIN XKSAT ADJUSTED FOR VEG. = 0.520

IMPERVIOUS AREA:
URBAN @ 0 % effective = 0.00
ROCK OUTCROP @ 0 % effective = 0.00

% EFFECTIVE IMP. = 0.00

INPUT VALUES FOR MCUHP2 PROGRAM

SUBBASIN	AREA sq.mi.	IA inches	DTHETA	PSIF	XKSAT adj.	RTIMP %	LAG min
R18	0.905	0.437	0.191	4.14	0.520	0.00	139

LOSS PARAMETERS FOR SUBBASIN: R19

Soil Survey Used CENTRAL

XKSAT

Map Unit	AREA ACRES	% Area	XKSAT	log(XKSAT) *(% Area)	% ROCK OUTCROP	% Area * %R.O.
CP	210.000	55.26	0.4	-0.220	0.00	0.00
LB	106.000	27.89	0.4	-0.111	0.00	0.00
ABA	64.000	16.84	0.38	-0.071	0.00	0.00

TOTAL = 380.000 ACRES XKSAT = 0.40 %ROCK= 0.00

DTHETA

Dry = 0.35
Normal = 0.25
Wet = 0

PSIF

= 4.3

LAND USE

AREA ACRES	LAND USE type	% Area	DTHETA condition	% veg. cover	% Imp. Inc.ROW	ImpArea ACRES	IA in.	Wgtd. IA in.
114.000	ROW CROP	30.00	NORMAL	0.00	0.00	0.00	0.50	0.150
266.000	ROW CROP	70.00	WET	100.00	0.00	0.00	0.50	0.350

380.000 =TOTAL AREA OK AVERAGE = 70.00 TOTAL = 0.00 AVG. = 0.500
% = 0.00

PERCENT OF SUBBASIN
DRY = 0.00 %
NORMAL = 30.00 %
WET = 70.00 %

SUBBASIN DTHETA WEIGHTED BY LAND USE = 0.075

SUBBASIN XKSAT ADJUSTED FOR VEG. = 0.664

IMPERVIOUS AREA:
URBAN @ 0 % effective = 0.00
ROCK OUTCROP @ 0 % effective = 0.00

% EFFECTIVE IMP. = 0.00

INPUT VALUES FOR MCUHP2 PROGRAM

SUBBASIN	AREA sq.mi.	IA inches	DTHETA	PSIF	XKSAT adj.	RTIMP %	LAG min
R19	0.594	0.500	0.075	4.30	0.664	0.00	168

LOSS PARAMETERS FOR SUBBASIN: R20

Soil Survey Used CENTRAL

XKSAT

Map Unit	AREA ACRES	% Area	XKSAT	log(XKSAT) *(% Area)	% ROCK OUTCROP	% Area * %R.O.
CP	206.000	48.36	0.4	-0.192	0.00	0.00
LB	105.000	24.65	0.4	-0.098	0.00	0.00
ABA	95.000	22.30	0.38	-0.094	0.00	0.00
AE	20.000	4.69	0.39	-0.019	0.00	0.00

TOTAL = 426.000 ACRES XKSAT = 0.39 %ROCK= 0.00

DTHETA		PSIF	
Dry =	0.35	=	4.24
Normal =	0.25		
Wet =	0		

LAND USE

AREA ACRES	LAND USE type	% Area	DTHETA condition	% veg. cover	% Imp. Inc.ROW	ImpArea ACRES	IA in.	Wgtd. IA in.
128.000	ROW CROP	30.05	NORMAL	0.00	0.00	0.00	0.50	0.150
298.000	ROW CROP	69.95	WET	100.00	0.00	0.00	0.50	0.350

426.000 =TOTAL AREA OK AVERAGE = 69.95 TOTAL = 0.00 AVG. = 0.500
% = 0.00

PERCENT OF SUBBASIN DRY = 0.00 %
NORMAL = 30.05 %
WET = 69.95 %

SUBBASIN DTHETA WEIGHTED BY LAND USE = 0.075

SUBBASIN XKSAT ADJUSTED FOR VEG. = 0.647

IMPERVIOUS AREA: URBAN @ 0 % effective = 0.00
ROCK OUTCROP @ 0 % effective = 0.00

% EFFECTIVE IMP. = 0.00

INPUT VALUES FOR MCUHP2 PROGRAM

SUBBASIN	AREA sq.mi.	IA inches	DTHETA	PSIF	XKSAT adj.	RTIMP %	LAG min
R20	0.666	0.500	0.075	4.24	0.647	0.00	122

LOSS PARAMETERS FOR SUBBASIN: R21

Soil Survey Used CENTRAL

XKSAT

Map Unit	AREA ACRES	% Area	XKSAT	log(XKSAT) *(% Area)	% ROCK OUTCROP	% Area * %R.O.
AE	311.000	88.10	0.39	-0.360	0.00	0.00
ABA	32.000	9.07	0.38	-0.038	0.00	0.00
CP	10.000	2.83	0.4	-0.011	0.00	0.00

TOTAL = 353.000 ACRES XKSAT = 0.39 %ROCK= 0.00

DTHETA

Dry = 0.35
Normal = 0.25
Wet = 0

PSIF

= 4.24

LAND USE

AREA ACRES	LAND USE type	% Area	DTHETA condition	% veg. cover	% Imp. Inc.ROW	ImpArea ACRES	IA in.	Wgtd. IA in.
106.000	ROW CROP	30.03	NORMAL	0.00	0.00	0.00	0.50	0.150
247.000	ROW CROP	69.97	WET	100.00	0.00	0.00	0.50	0.350

353.000 =TOTAL AREA OK AVERAGE = 69.97 TOTAL = 0.00 AVG. = 0.500
% = 0.00

PERCENT OF SUBBASIN DRY = 0.00 %
NORMAL = 30.03 %
WET = 69.97 %

SUBBASIN DTHETA WEIGHTED BY LAND USE = 0.075

SUBBASIN XKSAT ADJUSTED FOR VEG. = 0.647

IMPERVIOUS AREA: URBAN @ 0 % effective = 0.00
ROCK OUTCROP @ 0 % effective = 0.00

% EFFECTIVE IMP. = 0.00

INPUT VALUES FOR MCUHP2 PROGRAM

SUBBASIN	AREA sq.mi.	IA inches	DTHETA	PSIF	XKSAT adj.	RTIMP %	LAG min
R21	0.552	0.500	0.075	4.24	0.647	0.00	164

LOSS PARAMETERS FOR SUBBASIN: R22

Soil Survey Used CENTRAL

XKSAT

Map Unit	AREA ACRES	% Area	XKSAT	log(XKSAT) *(% Area)	% ROCK OUTCROP	% Area * %R.O.
ABA	135.000	36.59	0.38	-0.154	0.00	0.00
CP	124.000	33.60	0.4	-0.134	0.00	0.00
MA	68.000	18.43	0.4	-0.073	0.00	0.00
MO	19.000	5.15	0.39	-0.021	0.00	0.00
RAA	15.000	4.07	0.39	-0.017	0.00	0.00
LCA	6.000	1.63	0.25	-0.010	0.00	0.00
CV	1.000	0.27	0.39	-0.001	0.00	0.00
AGB	1.000	0.27	0.4	-0.001	0.00	0.00

TOTAL = 369.000 ACRES XKSAT = 0.39 %ROCK= 0.00

DTHETA		PSIF	
Dry =	0.35	=	4.24
Normal =	0.25		
Wet =	0		

LAND USE

AREA ACRES	LAND USE type	% Area	DTHETA condition	% veg. cover	% Imp. Inc.ROW	ImpArea ACRES	IA in.	Wgtd. IA in.
111.000	ROW CROP	30.08	NORMAL	0.00	0.00	0.00	0.50	0.150
258.000	ROW CROP	69.92	WET	100.00	0.00	0.00	0.50	0.350

369.000 =TOTAL AREA OK AVERAGE = 69.92 TOTAL = 0.00 AVG. = 0.500
% = 0.00

PERCENT OF SUBBASIN DRY = 0.00 %
NORMAL = 30.08 %
WET = 69.92 %

SUBBASIN DTHETA WEIGHTED BY LAND USE = 0.075

SUBBASIN XKSAT ADJUSTED FOR VEG. = 0.647

IMPERVIOUS AREA: URBAN @ 0 % effective = 0.00
ROCK OUTCROP @ 0 % effective = 0.00

% EFFECTIVE IMP. = 0.00

INPUT VALUES FOR MCUHP2 PROGRAM

SUBBASIN	AREA sq.mi.	IA inches	DTHETA	PSIF	XKSAT adj.	RTIMP %	LAG min
R22	0.577	0.500	0.075	4.24	0.647	0.00	167

LOSS PARAMETERS FOR SUBBASIN: R23

Soil Survey Used CENTRAL

XKSAT

Map Unit	AREA ACRES	% Area	XKSAT	log(XKSAT) *(% Area)	% ROCK OUTCROP	% Area * %R.O.
CP	183.000	54.30	0.4	-0.216	0.00	0.00
MA	65.000	19.29	0.4	-0.077	0.00	0.00
RAA	55.000	16.32	0.39	-0.067	0.00	0.00
ABA	32.000	9.50	0.38	-0.040	0.00	0.00
PA	1.000	0.30	0.4	-0.001	0.00	0.00
AL	1.000	0.30	0.4	-0.001	0.00	0.00

TOTAL = 337.000 ACRES XKSAT = 0.40 %ROCK= 0.00

DTHETA

Dry = 0.35
Normal = 0.25
Wet = 0

PSIF

= 4.3

LAND USE

AREA ACRES	LAND USE type	% Area	DTHETA condition	% veg. cover	% Imp. Inc.ROW	ImpArea ACRES	IA in.	Wgtd. IA in.
101.000	ROW CROP	29.97	NORMAL	0.00	0.00	0.00	0.50	0.150
236.000	ROW CROP	70.03	WET	100.00	0.00	0.00	0.50	0.350

337.000 =TOTAL AREA OK AVERAGE = 70.03 TOTAL = 0.00 AVG. = 0.500
% = 0.00

PERCENT OF SUBBASIN DRY = 0.00 %
NORMAL = 29.97 %
WET = 70.03 %

SUBBASIN DTHETA WEIGHTED BY LAND USE = 0.075

SUBBASIN XKSAT ADJUSTED FOR VEG. = 0.664

IMPERVIOUS AREA: URBAN @ 0 % effective = 0.00
ROCK OUTCROP @ 0 % effective = 0.00

% EFFECTIVE IMP. = 0.00

INPUT VALUES FOR MCUHP2 PROGRAM

SUBBASIN	AREA sq.mi.	IA inches	DTHETA	PSIF	XKSAT adj.	RTIMP %	LAG min
R23	0.527	0.500	0.075	4.30	0.664	0.00	184

LOSS PARAMETERS FOR SUBBASIN: R24

Soil Survey Used CENTRAL

XKSAT

Map Unit	AREA ACRES	% Area	XKSAT	log(XKSAT) *(% Area)	% ROCK OUTCROP	% Area * %R.O.
HLC	76.000	24.44	0.14	-0.209	0.00	0.00
PRB	66.000	21.22	0.28	-0.117	0.00	0.00
CV	52.000	16.72	0.39	-0.068	0.00	0.00
PA	32.000	10.29	0.4	-0.041	0.00	0.00
MA	28.000	9.00	0.4	-0.036	0.00	0.00
ABA	16.000	5.14	0.38	-0.022	0.00	0.00
CP	15.000	4.82	0.4	-0.019	0.00	0.00
AGB	14.000	4.50	0.4	-0.018	0.00	0.00
LCA	8.000	2.57	0.25	-0.015	0.00	0.00
AL	4.000	1.29	0.4	-0.005	0.00	0.00

TOTAL = 311.000 ACRES XKSAT = 0.28 %ROCK= 0.00

DTHETA

Dry = 0.35
Normal = 0.25
Wet = 0

PSIF

= 3.66

LAND USE

AREA ACRES	LAND USE type	% Area	DTHETA condition	% veg. cover	% Imp. Inc.ROW	ImpArea ACRES	IA in.	Wgtd. IA in.
311.000	V.L.D.R	100.00	NORMAL	5.00	15.00	46.65	0.20	0.200
311.000	=TOTAL AREA OK		AVERAGE =	5.00	TOTAL = % =	46.65 15.00	AVG. =	0.200

PERCENT OF SUBBASIN
DRY = 0.00 %
NORMAL = 100.00 %
WET = 0.00 %

SUBBASIN DTHETA WEIGHTED BY LAND USE = 0.250

SUBBASIN XKSAT ADJUSTED FOR VEG. = 0.280

IMPERVIOUS AREA:
URBAN @ 50 % effective = 7.50
ROCK OUTCROP @ 0 % effective = 0.00

% EFFECTIVE IMP. = 7.50

INPUT VALUES FOR MCUHP2 PROGRAM

SUBBASIN	AREA sq.mi.	IA inches	DTHETA	PSIF	XKSAT adj.	RTIMP %	LAG min
R24	0.486	0.200	0.250	3.66	0.280	7.50	127

LOSS PARAMETERS FOR SUBBASIN: R25

Soil Survey Used CENTRAL

XKSAT

Map Unit	AREA ACRES	% Area	XKSAT	log(XKSAT) *(% Area)	% ROCK OUTCROP	% Area * %R.O.
PA	76.000	43.93	0.4	-0.175	0.00	0.00
MA	38.000	21.97	0.4	-0.087	0.00	0.00
LCA	26.000	15.03	0.25	-0.090	0.00	0.00
PEA	18.000	10.40	0.37	-0.045	0.00	0.00
ABA	15.000	8.67	0.38	-0.036	0.00	0.00

TOTAL = 173.000 ACRES XKSAT = 0.37 %ROCK= 0.00

DTHETA		PSIF	
Dry =	0.35	=	4.14
Normal =	0.25		
Wet =	0		

LAND USE

AREA ACRES	LAND USE type	% Area	DTHETA condition	% veg. cover	% Imp. Inc.ROW	ImpArea ACRES	IA in.	Wgtd. IA in.
52.000	ROW CROP	30.06	NORMAL	0.00	0.00	0.00	0.50	0.150
121.000	ROW CROP	69.94	WET	100.00	0.00	0.00	0.50	0.350

173.000 =TOTAL AREA OK AVERAGE = 69.94 TOTAL = 0.00 AVG. = 0.500
% = 0.00

PERCENT OF SUBBASIN DRY = 0.00 %
NORMAL = 30.06 %
WET = 69.94 %

SUBBASIN DTHETA WEIGHTED BY LAND USE = 0.075

SUBBASIN XKSAT ADJUSTED FOR VEG. = 0.614

IMPERVIOUS AREA: URBAN @ 0 % effective = 0.00
ROCK OUTCROP @ 0 % effective = 0.00

% EFFECTIVE IMP. = 0.00

INPUT VALUES FOR MCUHP2 PROGRAM

SUBBASIN	AREA sq.mi.	IA inches	DTHETA	PSIF	XKSAT adj.	RTIMP %	LAG min
R25	0.270	0.500	0.075	4.14	0.614	0.00	149

LOSS PARAMETERS FOR SUBBASIN: R26

Soil Survey Used CENTRAL

XKSAT

Map Unit	AREA ACRES	% Area	XKSAT	log(XKSAT) *(% Area)	% ROCK OUTCROP	% Area * %R.O.
CP	256.000	77.11	0.4	-0.307	0.00	0.00
PA	47.000	14.16	0.4	-0.056	0.00	0.00
LCA	17.000	5.12	0.25	-0.031	0.00	0.00
VH	9.000	2.71	0.27	-0.015	0.00	0.00
ABA	3.000	0.90	0.38	-0.004	0.00	0.00

TOTAL = 332.000 ACRES XKSAT = 0.39 %ROCK= 0.00

DTHETA

Dry = 0.35
Normal = 0.25
Wet = 0

PSIF

= 4.24

LAND USE

AREA ACRES	LAND USE type	% Area	DTHETA condition	% veg. cover	% Imp. Inc.ROW	ImpArea ACRES	IA in.	Wgtd. IA in.
332.000	V.L.D.R	100.00	NORMAL	0.00	15.00	49.80	0.20	0.200
332.000	=TOTAL AREA OK		AVERAGE =	0.00	TOTAL = % =	49.80 15.00	AVG. =	0.200

PERCENT OF SUBBASIN
DRY = 0.00 %
NORMAL = 100.00 %
WET = 0.00 %

SUBBASIN DTHETA WEIGHTED BY LAND USE = 0.250

SUBBASIN XKSAT ADJUSTED FOR VEG. = 0.390

IMPERVIOUS AREA:
URBAN @ 50 % effective = 7.50
ROCK OUTCROP @ 0 % effective = 0.00

% EFFECTIVE IMP. = 7.50

INPUT VALUES FOR MCUHP2 PROGRAM

SUBBASIN	AREA sq.mi.	IA inches	DTHETA	PSIF	XKSAT adj.	RTIMP %	LAG min
R26	0.519	0.200	0.250	4.24	0.390	7.50	174

LOSS PARAMETERS FOR SUBBASIN: R27

Soil Survey Used CENTRAL

XKSAT

Map Unit	AREA ACRES	% Area	XKSAT	log(XKSAT) *(% Area)	% ROCK OUTCROP	% Area * %R.O.
AE	42.000	28.38	0.39	-0.116	0.00	0.00
RAA	39.000	26.35	0.39	-0.108	0.00	0.00
LB	26.000	17.57	0.4	-0.070	0.00	0.00
CP	26.000	17.57	0.4	-0.070	0.00	0.00
MA	9.000	6.08	0.4	-0.024	0.00	0.00
ABA	6.000	4.05	0.38	-0.017	0.00	0.00

TOTAL = 148.000 ACRES XKSAT = 0.39 %ROCK= 0.00

DTHETA		PSIF	
Dry =	0.35	=	4.24
Normal =	0.25		
Wet =	0		

LAND USE

AREA ACRES	LAND USE type	% Area	DTHETA condition	% veg. cover	% Imp. Inc.ROW	ImpArea ACRES	IA in.	Wgtd. IA in.
44.000	ROW CROP	29.73	NORMAL	0.00	0.00	0.00	0.50	0.149
104.000	ROW CROP	70.27	WET	100.00	0.00	0.00	0.50	0.351

148.000 =TOTAL AREA OK AVERAGE = 70.27 TOTAL = 0.00 AVG. = 0.500
% = 0.00

PERCENT OF SUBBASIN DRY = 0.00 %
NORMAL = 29.73 %
WET = 70.27 %

SUBBASIN DTHETA WEIGHTED BY LAND USE = 0.074

SUBBASIN XKSAT ADJUSTED FOR VEG. = 0.649

IMPERVIOUS AREA: URBAN @ 0 % effective = 0.00
ROCK OUTCROP @ 0 % effective = 0.00

% EFFECTIVE IMP. = 0.00

INPUT VALUES FOR MCUHP2 PROGRAM

SUBBASIN	AREA sq.mi.	IA inches	DTHETA	PSIF	XKSAT adj.	RTIMP %	LAG min
R27	0.231	0.500	0.074	4.24	0.649	0.00	98

LOSS PARAMETERS FOR SUBBASIN: R28

Soil Survey Used CENTRAL

XKSAT

Map Unit	AREA ACRES	% Area	XKSAT	log(XKSAT) *(% Area)	% ROCK OUTCROP	% Area * %R.O.
LB	121.000	58.17	0.4	-0.231	0.00	0.00
LCA	32.000	15.38	0.25	-0.093	0.00	0.00
ABA	25.000	12.02	0.38	-0.051	0.00	0.00
AE	17.000	8.17	0.39	-0.033	0.00	0.00
CP	9.000	4.33	0.4	-0.017	0.00	0.00
MA	4.000	1.92	0.4	-0.008	0.00	0.00

TOTAL = 208.000 ACRES XKSAT = 0.37 %ROCK= 0.00

DTHETA		PSIF	
Dry =	0.35	=	4.14
Normal =	0.25		
Wet =	0		

LAND USE

AREA ACRES	LAND USE type	% Area	DTHETA condition	% veg. cover	% Imp. Inc.ROW	ImpArea ACRES	IA in.	Wgtd. IA in.
62.000	ROW CROP	29.81	NORMAL	0.00	0.00	0.00	0.50	0.149
146.000	ROW CROP	70.19	WET	100.00	0.00	0.00	0.50	0.351

208.000 =TOTAL AREA OK AVERAGE = 70.19 TOTAL = 0.00 AVG. = 0.500
% = 0.00

PERCENT OF SUBBASIN DRY = 0.00 %
NORMAL = 29.81 %
WET = 70.19 %

SUBBASIN DTHETA WEIGHTED BY LAND USE = 0.075

SUBBASIN XKSAT ADJUSTED FOR VEG. = 0.615

IMPERVIOUS AREA: URBAN @ 0 % effective = 0.00
ROCK OUTCROP @ 0 % effective = 0.00

% EFFECTIVE IMP. = 0.00

INPUT VALUES FOR MCUHP2 PROGRAM

SUBBASIN	AREA sq.mi.	IA inches	DTHETA	PSIF	XKSAT adj.	RTIMP %	LAG min
R28	0.325	0.500	0.075	4.14	0.615	0.00	129

LOSS PARAMETERS FOR SUBBASIN: R29

Soil Survey Used CENTRAL

XKSAT

Map Unit	AREA ACRES	% Area	XKSAT	log(XKSAT) *(% Area)	% ROCK OUTCROP	% Area * %R.O.
RAA	228.000	35.63	0.39	-0.146	0.00	0.00
LB	158.000	24.69	0.4	-0.098	0.00	0.00
CP	129.000	20.16	0.4	-0.080	0.00	0.00
PA	54.000	8.44	0.4	-0.034	0.00	0.00
ABA	48.000	7.50	0.38	-0.032	0.00	0.00
AE	23.000	3.59	0.39	-0.015	0.00	0.00

TOTAL = 640.000 ACRES XKSAT = 0.39 %ROCK= 0.00

DTHETA		PSIF	
Dry =	0.35	=	4.24
Normal =	0.25		
Wet =	0		

LAND USE

AREA ACRES	LAND USE type	% Area	DTHETA condition	% veg. cover	% Imp. Inc.ROW	ImpArea ACRES	IA in.	Wgtd. IA in.
192.000	ROW CROP	30.00	NORMAL	0.00	0.00	0.00	0.50	0.150
448.000	ROW CROP	70.00	WET	100.00	0.00	0.00	0.50	0.350

640.000 =TOTAL AREA OK AVERAGE = 70.00 TOTAL = 0.00 AVG. = 0.500
% = 0.00

PERCENT OF SUBBASIN DRY = 0.00 %
NORMAL = 30.00 %
WET = 70.00 %

SUBBASIN DTHETA WEIGHTED BY LAND USE = 0.075

SUBBASIN XKSAT ADJUSTED FOR VEG. = 0.647

IMPERVIOUS AREA: URBAN @ 0 % effective = 0.00
ROCK OUTCROP @ 0 % effective = 0.00

% EFFECTIVE IMP. = 0.00

INPUT VALUES FOR MCUHP2 PROGRAM

SUBBASIN	AREA sq.mi.	IA inches	DTHETA	PSIF	XKSAT adj.	RTIMP %	LAG min
R29	1.000	0.500	0.075	4.24	0.647	0.00	165

LOSS PARAMETERS FOR SUBBASIN: R30

Soil Survey Used CENTRAL

XKSAT

Map Unit	AREA ACRES	% Area	XKSAT	log(XKSAT) *(% Area)	% ROCK OUTCROP	% Area * %R.O.
CP	251.000	39.22	0.4	-0.156	0.00	0.00
LB	220.000	34.38	0.4	-0.137	0.00	0.00
AE	103.000	16.09	0.39	-0.066	0.00	0.00
ABA	24.000	3.75	0.38	-0.016	0.00	0.00
AA	21.000	3.28	0.26	-0.019	0.00	0.00
GGA	11.000	1.72	0.25	-0.010	0.00	0.00
MA	10.000	1.56	0.4	-0.006	0.00	0.00

TOTAL = 640.000 ACRES XKSAT = 0.39 %ROCK= 0.00

DTHETA		PSIF	
Dry =	0.35	=	4.24
Normal =	0.25		
Wet =	0		

LAND USE

AREA ACRES	LAND USE type	% Area	DTHETA condition	% veg. cover	% Imp. Inc.ROW	ImpArea ACRES	IA in.	Wgtd. IA in.
192.000	ROW CROP	30.00	NORMAL	0.00	0.00	0.00	0.50	0.150
448.000	ROW CROP	70.00	WET	100.00	0.00	0.00	0.50	0.350

640.000 =TOTAL AREA OK AVERAGE = 70.00 TOTAL = 0.00 AVG. = 0.500
% = 0.00

PERCENT OF SUBBASIN DRY = 0.00 %
NORMAL = 30.00 %
WET = 70.00 %

SUBBASIN DTHETA WEIGHTED BY LAND USE = 0.075

SUBBASIN XKSAT ADJUSTED FOR VEG. = 0.647

IMPERVIOUS AREA: URBAN @ 0 % effective = 0.00
ROCK OUTCROP @ 0 % effective = 0.00
% EFFECTIVE IMP. = 0.00

INPUT VALUES FOR MCUHP2 PROGRAM

SUBBASIN	AREA sq.mi.	IA inches	DTHETA	PSIF	XKSAT adj.	RTIMP %	LAG min
R30	1.000	0.500	0.075	4.24	0.647	0.00	164

LOSS PARAMETERS FOR SUBBASIN: R31

Soil Survey Used CENTRAL

XKSAT

Map Unit	AREA ACRES	% Area	XKSAT	log(XKSAT) *(% Area)	% ROCK OUTCROP	% Area * %R.O.
LB	499.000	73.38	0.4	-0.292	0.00	0.00
ABA	107.000	15.74	0.38	-0.066	0.00	0.00
CP	30.000	4.41	0.4	-0.018	0.00	0.00
GE	22.000	3.24	0.26	-0.019	0.00	0.00
GGA	12.000	1.76	0.25	-0.011	0.00	0.00
PEA	7.000	1.03	0.37	-0.004	0.00	0.00
VA	3.000	0.44	0.39	-0.002	0.00	0.00

TOTAL = 680.000 ACRES XKSAT = 0.39 %ROCK= 0.00

DTHETA		PSIF	
Dry =	0.35	=	4.24
Normal =	0.25		
Wet =	0		

LAND USE

AREA ACRES	LAND USE type	% Area	DTHETA condition	% veg. cover	% Imp. Inc.ROW	ImpArea ACRES	IA in.	Wgtd. IA in.
204.000	ROW CROP	30.00	NORMAL	0.00	0.00	0.00	0.50	0.150
476.000	ROW CROP	70.00	WET	100.00	0.00	0.00	0.50	0.350

680.000 =TOTAL AREA OK AVERAGE = 70.00 TOTAL = 0.00 AVG. = 0.500
% = 0.00

PERCENT OF SUBBASIN DRY = 0.00 %
NORMAL = 30.00 %
WET = 70.00 %

SUBBASIN DTHETA WEIGHTED BY LAND USE = 0.075

SUBBASIN XKSAT ADJUSTED FOR VEG. = 0.647

IMPERVIOUS AREA: URBAN @ 0 % effective = 0.00
ROCK OUTCROP @ 0 % effective = 0.00

% EFFECTIVE IMP. = 0.00

INPUT VALUES FOR MCUHP2 PROGRAM

SUBBASIN	AREA sq.mi.	IA inches	DTHETA	PSIF	XKSAT adj.	RTIMP %	LAG min
R31	1.063	0.500	0.075	4.24	0.647	0.00	191

LOSS PARAMETERS FOR SUBBASIN: R32

Soil Survey Used CENTRAL

XKSAT

Map Unit	AREA ACRES	% Area	XKSAT	log(XKSAT) *(% Area)	% ROCK OUTCROP	% Area * %R.O.
LB	244.000	43.26	0.4	-0.172	0.00	0.00
ABA	131.000	23.23	0.38	-0.098	0.00	0.00
CP	110.000	19.50	0.4	-0.078	0.00	0.00
VA	59.000	10.46	0.39	-0.043	0.00	0.00
GE	13.000	2.30	0.26	-0.013	0.00	0.00
AE	7.000	1.24	0.39	-0.005	0.00	0.00

TOTAL = 564.000 ACRES XKSAT = 0.39 %ROCK= 0.00

DTHETA

Dry = 0.35
Normal = 0.25
Wet = 0

PSIF

= 4.24

LAND USE

AREA ACRES	LAND USE type	% Area	DTHETA condition	% veg. cover	% Imp. Inc.ROW	ImpArea ACRES	IA in.	Wgtd. IA in.
169.000	ROW CROP	29.96	NORMAL	0.00	0.00	0.00	0.50	0.150
395.000	ROW CROP	70.04	WET	100.00	0.00	0.00	0.50	0.350

564.000 =TOTAL AREA OK AVERAGE = 70.04 TOTAL = 0.00 AVG. = 0.500
% = 0.00

PERCENT OF SUBBASIN DRY = 0.00 %
NORMAL = 29.96 %
WET = 70.04 %

SUBBASIN DTHETA WEIGHTED BY LAND USE = 0.075

SUBBASIN XKSAT ADJUSTED FOR VEG. = 0.648

IMPERVIOUS AREA: URBAN @ 0 % effective = 0.00
ROCK OUTCROP @ 0 % effective = 0.00

% EFFECTIVE IMP. = 0.00

INPUT VALUES FOR MCUHP2 PROGRAM

SUBBASIN	AREA sq.mi.	IA inches	DTHETA	PSIF	XKSAT adj.	RTIMP %	LAG min
R32	0.881	0.500	0.075	4.24	0.648	0.00	179

LOSS PARAMETERS FOR SUBBASIN: R33

Soil Survey Used CENTRAL

XKSAT

Map Unit	AREA ACRES	% Area	XKSAT	log(XKSAT) *(% Area)	% ROCK OUTCROP	% Area * %R.O.
LB	418.000	66.77	0.4	-0.266	0.00	0.00
CP	116.000	18.53	0.4	-0.074	0.00	0.00
ABA	75.000	11.98	0.38	-0.050	0.00	0.00
MO	17.000	2.72	0.39	-0.011	0.00	0.00

TOTAL = 626.000 ACRES XKSAT = 0.40 %ROCK= 0.00

DTHETA

Dry = 0.35
Normal = 0.25
Wet = 0

PSIF

= 4.3

LAND USE

AREA ACRES	LAND USE type	% Area	DTHETA condition	% veg. cover	% Imp. Inc.ROW	ImpArea ACRES	IA in.	Wgtd. IA in.
188.000	ROW CROP	30.03	NORMAL	0.00	0.00	0.00	0.50	0.150
438.000	ROW CROP	69.97	WET	100.00	0.00	0.00	0.50	0.350

626.000 =TOTAL AREA OK AVERAGE = 69.97 TOTAL = 0.00 AVG. = 0.500
% = 0.00

PERCENT OF SUBBASIN DRY = 0.00 %
NORMAL = 30.03 %
WET = 69.97 %

SUBBASIN DTHETA WEIGHTED BY LAND USE = 0.075

SUBBASIN XKSAT ADJUSTED FOR VEG. = 0.664

IMPERVIOUS AREA: URBAN @ 0 % effective = 0.00
ROCK OUTCROP @ 0 % effective = 0.00

% EFFECTIVE IMP. = 0.00

INPUT VALUES FOR MCUHP2 PROGRAM

SUBBASIN	AREA sq.mi.	IA inches	DTHETA	PSIF	XKSAT adj.	RTIMP %	LAG min
R33	0.978	0.500	0.075	4.30	0.664	0.00	174

LOSS PARAMETERS FOR SUBBASIN: R34

Soil Survey Used CENTRAL

XKSAT

Map Unit	AREA ACRES	% Area	XKSAT	log(XKSAT) *(% Area)	% ROCK OUTCROP	% Area * %R.O.
ABA	135.000	33.75	0.38	-0.142	0.00	0.00
LB	105.000	26.25	0.4	-0.104	0.00	0.00
AE	82.000	20.50	0.39	-0.084	0.00	0.00
CP	78.000	19.50	0.4	-0.078	0.00	0.00

TOTAL = 400.000 ACRES XKSAT = 0.39 %ROCK= 0.00

DTHETA

Dry = 0.35
Normal = 0.25
Wet = 0

PSIF

= 4.24

LAND USE

AREA ACRES	LAND USE type	% Area	DTHETA condition	% veg. cover	% Imp. Inc.ROW	ImpArea ACRES	IA in.	Wgtd. IA in.
120.000	ROW CROP	30.00	NORMAL	0.00	0.00	0.00	0.50	0.150
280.000	ROW CROP	70.00	WET	100.00	0.00	0.00	0.50	0.350

400.000 =TOTAL AREA OK AVERAGE = 70.00 TOTAL = 0.00 AVG. = 0.500
% = 0.00

PERCENT OF SUBBASIN DRY = 0.00 %
NORMAL = 30.00 %
WET = 70.00 %

SUBBASIN DTHETA WEIGHTED BY LAND USE = 0.075

SUBBASIN XKSAT ADJUSTED FOR VEG. = 0.647

IMPERVIOUS AREA: URBAN @ 0 % effective = 0.00
ROCK OUTCROP @ 0 % effective = 0.00

% EFFECTIVE IMP. = 0.00

INPUT VALUES FOR MCUHP2 PROGRAM

SUBBASIN	AREA sq.mi.	IA inches	DTHETA	PSIF	XKSAT adj.	RTIMP %	LAG min
R34	0.625	0.500	0.075	4.24	0.647	0.00	143

LOSS PARAMETERS FOR SUBBASIN: R35

Soil Survey Used CENTRAL

XKSAT

Map Unit	AREA ACRES	% Area	XKSAT	log(XKSAT) *(% Area)	% ROCK OUTCROP	% Area * %R.O.
CP	370.000	38.50	0.4	-0.153	0.00	0.00
LB	312.000	32.47	0.4	-0.129	0.00	0.00
ABA	201.000	20.92	0.38	-0.088	0.00	0.00
AE	39.000	4.06	0.39	-0.017	0.00	0.00
MA	26.000	2.71	0.4	-0.011	0.00	0.00
VA	9.000	0.94	0.39	-0.004	0.00	0.00
LCA	4.000	0.42	0.25	-0.003	0.00	0.00

TOTAL = 961.000 ACRES XKSAT = 0.39 %ROCK= 0.00

DTHETA		PSIF	
Dry =	0.35	=	4.24
Normal =	0.25		
Wet =	0		

LAND USE

AREA ACRES	LAND USE type	% Area	DTHETA condition	% veg. cover	% Imp. Inc.ROW	ImpArea ACRES	IA in.	Wgtd. IA in.
288.000	ROW CROP	29.97	NORMAL	0.00	0.00	0.00	0.50	0.150
673.000	ROW CROP	70.03	WET	100.00	0.00	0.00	0.50	0.350

961.000 =TOTAL AREA OK AVERAGE = 70.03 TOTAL = 0.00 AVG. = 0.500
% = 0.00

PERCENT OF SUBBASIN DRY = 0.00 %
NORMAL = 29.97 %
WET = 70.03 %

SUBBASIN DTHETA WEIGHTED BY LAND USE = 0.075

SUBBASIN XKSAT ADJUSTED FOR VEG. = 0.648

IMPERVIOUS AREA: URBAN @ 0 % effective = 0.00
ROCK OUTCROP @ 0 % effective = 0.00

% EFFECTIVE IMP. = 0.00

INPUT VALUES FOR MCUHP2 PROGRAM

SUBBASIN	AREA sq.mi.	IA inches	DTHETA	PSIF	XKSAT adj.	RTIMP %	LAG min
R35	1.502	0.500	0.075	4.24	0.648	0.00	198

LOSS PARAMETERS FOR SUBBASIN: R36

Soil Survey Used CENTRAL

XKSAT

Map Unit	AREA ACRES	% Area	XKSAT	log(XKSAT) *(% Area)	% ROCK OUTCROP	% Area * %R.O.
CP	670.000	74.86	0.4	-0.298	0.00	0.00
ABA	85.000	9.50	0.38	-0.040	0.00	0.00
AE	77.000	8.60	0.39	-0.035	0.00	0.00
LB	44.000	4.92	0.4	-0.020	0.00	0.00
MA	19.000	2.12	0.4	-0.008	0.00	0.00

TOTAL = 895.000 ACRES XKSAT = 0.40 %ROCK= 0.00

DTHETA

Dry = 0.35
Normal = 0.25
Wet = 0

PSIF

= 4.3

LAND USE

AREA ACRES	LAND USE type	% Area	DTHETA condition	% veg. cover	% Imp. Inc.ROW	ImpArea ACRES	IA in.	Wgtd. IA in.
269.000	ROW CROP	30.06	NORMAL	0.00	0.00	0.00	0.50	0.150
626.000	ROW CROP	69.94	WET	100.00	0.00	0.00	0.50	0.350

895.000 =TOTAL AREA OK AVERAGE = 69.94 TOTAL = 0.00 AVG. = 0.500
% = 0.00

PERCENT OF SUBBASIN DRY = 0.00 %
NORMAL = 30.06 %
WET = 69.94 %

SUBBASIN DTHETA WEIGHTED BY LAND USE = 0.075

SUBBASIN XKSAT ADJUSTED FOR VEG. = 0.664

IMPERVIOUS AREA: URBAN @ 0 % effective = 0.00
ROCK OUTCROP @ 0 % effective = 0.00

% EFFECTIVE IMP. = 0.00

INPUT VALUES FOR MCUHP2 PROGRAM

SUBBASIN	AREA sq.mi.	IA inches	DTHETA	PSIF	XKSAT adj.	RTIMP %	LAG min
R36	1.398	0.500	0.075	4.30	0.664	0.00	179

LOSS PARAMETERS FOR SUBBASIN: R37

Soil Survey Used CENTRAL

XKSAT

Map Unit	AREA ACRES	% Area	XKSAT	log(XKSAT) *(% Area)	% ROCK OUTCROP	% Area * %R.O.
CP	569.000	61.71	0.4	-0.246	0.00	0.00
LB	101.000	10.95	0.4	-0.044	0.00	0.00
LCA	98.000	10.63	0.25	-0.064	0.00	0.00
ABA	61.000	6.62	0.38	-0.028	0.00	0.00
RAA	59.000	6.40	0.39	-0.026	0.00	0.00
MA	30.000	3.25	0.4	-0.013	0.00	0.00
PA	4.000	0.43	0.4	-0.002	0.00	0.00

TOTAL = 922.000 ACRES XKSAT = 0.38 %ROCK= 0.00

DTHETA		PSIF	
Dry =	0.35	=	4.19
Normal =	0.25		
Wet =	0		

LAND USE

AREA ACRES	LAND USE type	% Area	DTHETA condition	% veg. cover	% Imp. Inc.ROW	ImpArea ACRES	IA in.	Wgtd. IA in.
277.000	ROW CROP	30.04	NORMAL	0.00	0.00	0.00	0.50	0.150
645.000	ROW CROP	69.96	WET	100.00	0.00	0.00	0.50	0.350

922.000 =TOTAL AREA OK AVERAGE = 69.96 TOTAL = 0.00 AVG. = 0.500
% = 0.00

PERCENT OF SUBBASIN DRY = 0.00 %
NORMAL = 30.04 %
WET = 69.96 %

SUBBASIN DTHETA WEIGHTED BY LAND USE = 0.075

SUBBASIN XKSAT ADJUSTED FOR VEG. = 0.631

IMPERVIOUS AREA: URBAN @ 0 % effective = 0.00
ROCK OUTCROP @ 0 % effective = 0.00

% EFFECTIVE IMP. = 0.00

INPUT VALUES FOR MCUHP2 PROGRAM

SUBBASIN	AREA sq.mi.	IA inches	DTHETA	PSIF	XKSAT adj.	RTIMP %	LAG min
R37	1.441	0.500	0.075	4.19	0.631	0.00	223

LOSS PARAMETERS FOR SUBBASIN: R38

Soil Survey Used CENTRAL

XKSAT

Map Unit	AREA ACRES	% Area	XKSAT	log(XKSAT) *(% Area)	% ROCK OUTCROP	% Area * %R.O.
CP	119.000	35.42	0.4	-0.141	0.00	0.00
RAA	56.000	16.67	0.39	-0.068	0.00	0.00
LB	52.000	15.48	0.4	-0.062	0.00	0.00
MA	50.000	14.88	0.4	-0.059	0.00	0.00
PA	43.000	12.80	0.4	-0.051	0.00	0.00
ABA	16.000	4.76	0.38	-0.020	0.00	0.00

TOTAL = 336.000 ACRES XKSAT = 0.40 %ROCK= 0.00

DTHETA		PSIF	
Dry =	0.35	=	4.3
Normal =	0.25		
Wet =	0		

LAND USE

AREA ACRES	LAND USE type	% Area	DTHETA condition	% veg. cover	% Imp. Inc.ROW	ImpArea ACRES	IA in.	Wgtd. IA in.
101.000	ROW CROP	30.06	NORMAL	0.00	0.00	0.00	0.50	0.150
235.000	ROW CROP	69.94	WET	100.00	0.00	0.00	0.50	0.350

336.000 =TOTAL AREA OK AVERAGE = 69.94 TOTAL = 0.00 AVG. = 0.500
% = 0.00

PERCENT OF SUBBASIN DRY = 0.00 %
NORMAL = 30.06 %
WET = 69.94 %

SUBBASIN DTHETA WEIGHTED BY LAND USE = 0.075

SUBBASIN XKSAT ADJUSTED FOR VEG. = 0.664

IMPERVIOUS AREA: URBAN @ 0 % effective = 0.00
ROCK OUTCROP @ 0 % effective = 0.00

% EFFECTIVE IMP. = 0.00

INPUT VALUES FOR MCUHP2 PROGRAM

SUBBASIN	AREA sq.mi.	IA inches	DTHETA	PSIF	XKSAT adj.	RTIMP %	LAG min
R38	0.525	0.500	0.075	4.30	0.664	0.00	153

LOSS PARAMETERS FOR SUBBASIN: R39

Soil Survey Used CENTRAL

XKSAT

Map Unit	AREA ACRES	% Area	XKSAT	log(XKSAT) *(% Area)	% ROCK OUTCROP	% Area * %R.O.
LCA	159.000	34.79	0.25	-0.209	0.00	0.00
MA	122.000	26.70	0.4	-0.106	0.00	0.00
PA	64.000	14.00	0.4	-0.056	0.00	0.00
LB	50.000	10.94	0.4	-0.044	0.00	0.00
ABA	36.000	7.88	0.38	-0.033	0.00	0.00
PEA	19.000	4.16	0.37	-0.018	0.00	0.00
BS	7.000	1.53	0.39	-0.006	0.00	0.00

TOTAL = 457.000 ACRES XKSAT = 0.34 %ROCK= 0.00

DTHETA		PSIF	
Dry =	0.35	=	3.98
Normal =	0.25		
Wet =	0		

LAND USE

AREA ACRES	LAND USE type	% Area	DTHETA condition	% veg. cover	% Imp. Inc.ROW	ImpArea ACRES	IA in.	Wgtd. IA in.
137.000	ROW CROP	29.98	NORMAL	0.00	0.00	0.00	0.50	0.150
320.000	ROW CROP	70.02	WET	100.00	0.00	0.00	0.50	0.350

457.000 =TOTAL AREA OK AVERAGE = 70.02 TOTAL = 0.00 AVG. = 0.500
% = 0.00

PERCENT OF SUBBASIN DRY = 0.00 %
NORMAL = 29.98 %
WET = 70.02 %

SUBBASIN DTHETA WEIGHTED BY LAND USE = 0.075

SUBBASIN XKSAT ADJUSTED FOR VEG. = 0.564

IMPERVIOUS AREA: URBAN @ 0 % effective = 0.00
ROCK OUTCROP @ 0 % effective = 0.00

% EFFECTIVE IMP. = 0.00

INPUT VALUES FOR MCUHP2 PROGRAM

SUBBASIN	AREA sq.mi.	IA inches	DTHETA	PSIF	XKSAT adj.	RTIMP %	LAG min
R39	0.714	0.500	0.075	3.98	0.564	0.00	165

LOSS PARAMETERS FOR SUBBASIN: R40

Soil Survey Used CENTRAL

XKSAT

Map Unit	AREA ACRES	% Area	XKSAT	log(XKSAT) *(% Area)	% ROCK OUTCROP	% Area * %R.O.
PEA	193.000	31.69	0.37	-0.137	0.00	0.00
LCA	134.000	22.00	0.25	-0.132	0.00	0.00
CP	109.000	17.90	0.4	-0.071	0.00	0.00
MA	79.000	12.97	0.4	-0.052	0.00	0.00
LB	47.000	7.72	0.4	-0.031	0.00	0.00
ABA	26.000	4.27	0.38	-0.018	0.00	0.00
VA	21.000	3.45	0.39	-0.014	0.00	0.00

TOTAL = 609.000 ACRES XKSAT = 0.35 %ROCK= 0.00

DTHETA

Dry = 0.35
Normal = 0.25
Wet = 0

PSIF

= 4.03

LAND USE

AREA ACRES	LAND USE type	% Area	DTHETA condition	% veg. cover	% Imp. Inc.ROW	ImpArea ACRES	IA in.	Wgtd. IA in.
183.000	ROW CROP	30.05	NORMAL	0.00	0.00	0.00	0.50	0.150
426.000	ROW CROP	69.95	WET	100.00	0.00	0.00	0.50	0.350

609.000 =TOTAL AREA OK AVERAGE = 69.95 TOTAL = 0.00 AVG. = 0.500
% = 0.00

PERCENT OF SUBBASIN DRY = 0.00 %
NORMAL = 30.05 %
WET = 69.95 %

SUBBASIN DTHETA WEIGHTED BY LAND USE = 0.075

SUBBASIN XKSAT ADJUSTED FOR VEG. = 0.581

IMPERVIOUS AREA: URBAN @ 0 % effective = 0.00
ROCK OUTCROP @ 0 % effective = 0.00
% EFFECTIVE IMP. = 0.00

INPUT VALUES FOR MCUHP2 PROGRAM

SUBBASIN	AREA sq.mi.	IA inches	DTHETA	PSIF	XKSAT adj.	RTIMP %	LAG min
R40	0.952	0.500	0.075	4.03	0.581	0.00	178

LOSS PARAMETERS FOR SUBBASIN: R41

Soil Survey Used CENTRAL

XKSAT

Map Unit	AREA ACRES	% Area	XKSAT	log(XKSAT) *(% Area)	% ROCK OUTCROP	% Area * %R.O.
LB	286.000	37.00	0.4	-0.147	0.00	0.00
CP	284.000	36.74	0.4	-0.146	0.00	0.00
RAA	135.000	17.46	0.39	-0.071	0.00	0.00
ABA	41.000	5.30	0.38	-0.022	0.00	0.00
PA	27.000	3.49	0.4	-0.014	0.00	0.00

TOTAL = 773.000 ACRES XKSAT = 0.40 %ROCK= 0.00

DTHETA		PSIF	
Dry =	0.35	=	4.3
Normal =	0.25		
Wet =	0		

LAND USE

AREA ACRES	LAND USE type	% Area	DTHETA condition	% veg. cover	% Imp. Inc.ROW	ImpArea ACRES	IA in.	Wgtd. IA in.
232.000	ROW CROP	30.01	NORMAL	0.00	0.00	0.00	0.50	0.150
541.000	ROW CROP	69.99	WET	100.00	0.00	0.00	0.50	0.350

773.000 =TOTAL AREA OK AVERAGE = 69.99 TOTAL = 0.00 AVG. = 0.500
% = 0.00

PERCENT OF SUBBASIN DRY = 0.00 %
NORMAL = 30.01 %
WET = 69.99 %

SUBBASIN DTHETA WEIGHTED BY LAND USE = 0.075

SUBBASIN XKSAT ADJUSTED FOR VEG. = 0.664

IMPERVIOUS AREA: URBAN @ 0 % effective = 0.00
ROCK OUTCROP @ 0 % effective = 0.00

% EFFECTIVE IMP. = 0.00

INPUT VALUES FOR MCUHP2 PROGRAM

SUBBASIN	AREA sq.mi.	IA inches	DTHETA	PSIF	XKSAT adj.	RTIMP %	LAG min
R41	1.208	0.500	0.075	4.30	0.664	0.00	166

LOSS PARAMETERS FOR SUBBASIN: R42

Soil Survey Used CENTRAL

XKSAT

Map Unit	AREA ACRES	% Area	XKSAT	log(XKSAT) *(% Area)	% ROCK OUTCROP	% Area * %R.O.
LB	289.000	58.27	0.4	-0.232	0.00	0.00
LCA	111.000	22.38	0.25	-0.135	0.00	0.00
PA	32.000	6.45	0.4	-0.026	0.00	0.00
ABA	31.000	6.25	0.38	-0.026	0.00	0.00
AA	15.000	3.02	0.26	-0.018	0.00	0.00
MA	15.000	3.02	0.4	-0.012	0.00	0.00
CP	2.000	0.40	0.4	-0.002	0.00	0.00
BS	1.000	0.20	0.39	-0.001	0.00	0.00

TOTAL = 496.000 ACRES XKSAT = 0.35 %ROCK= 0.00

DTHETA

Dry = 0.35
Normal = 0.25
Wet = 0

PSIF

= 4.03

LAND USE

AREA ACRES	LAND USE type	% Area	DTHETA condition	% veg. cover	% Imp. Inc.ROW	ImpArea ACRES	IA in.	Wgtd. IA in.
149.000	ROW CROP	30.04	NORMAL	0.00	0.00	0.00	0.50	0.150
347.000	ROW CROP	69.96	WET	100.00	0.00	0.00	0.50	0.350

496.000 =TOTAL AREA OK AVERAGE = 69.96 TOTAL = 0.00 AVG. = 0.500
% = 0.00

PERCENT OF SUBBASIN DRY = 0.00 %
NORMAL = 30.04 %
WET = 69.96 %

SUBBASIN DTHETA WEIGHTED BY LAND USE = 0.075

SUBBASIN XKSAT ADJUSTED FOR VEG. = 0.581

IMPERVIOUS AREA: URBAN @ 0 % effective = 0.00
ROCK OUTCROP @ 0 % effective = 0.00

% EFFECTIVE IMP. = 0.00

INPUT VALUES FOR MCUHP2 PROGRAM

SUBBASIN	AREA sq.mi.	IA inches	DTHETA	PSIF	XKSAT adj.	RTIMP %	LAG min
R42	0.775	0.500	0.075	4.03	0.581	0.00	162

LOSS PARAMETERS FOR SUBBASIN: R43

Soil Survey Used CENTRAL

XKSAT

Map Unit	AREA ACRES	% Area	XKSAT	log(XKSAT) *(% Area)	% ROCK OUTCROP	% Area * %R.O.
LB	590.000	92.19	0.4	-0.367	0.00	0.00
ABA	47.000	7.34	0.38	-0.031	0.00	0.00
VA	3.000	0.47	0.39	-0.002	0.00	0.00

TOTAL = 640.000 ACRES XKSAT = 0.40 %ROCK= 0.00

DTHETA		PSIF	
Dry =	0.35	=	4.3
Normal =	0.25		
Wet =	0		

LAND USE

AREA ACRES	LAND USE type	% Area	DTHETA condition	% veg. cover	% Imp. Inc.ROW	ImpArea ACRES	IA in.	Wgtd. IA in.
192.000	ROW CROP	30.00	NORMAL	0.00	0.00	0.00	0.50	0.150
448.000	ROW CROP	70.00	WET	100.00	0.00	0.00	0.50	0.350

640.000 =TOTAL AREA OK AVERAGE = 70.00 TOTAL = 0.00 AVG. = 0.500
% = 0.00

PERCENT OF SUBBASIN DRY = 0.00 %
NORMAL = 30.00 %
WET = 70.00 %

SUBBASIN DTHETA WEIGHTED BY LAND USE = 0.075

SUBBASIN XKSAT ADJUSTED FOR VEG. = 0.664

IMPERVIOUS AREA: URBAN @ 0 % effective = 0.00
ROCK OUTCROP @ 0 % effective = 0.00

% EFFECTIVE IMP. = 0.00

INPUT VALUES FOR MCUHP2 PROGRAM

SUBBASIN	AREA sq.mi.	IA inches	DTHETA	PSIF	XKSAT adj.	RTIMP %	LAG min
R43	1.000	0.500	0.075	4.30	0.664	0.00	142

LOSS PARAMETERS FOR SUBBASIN: R44

Soil Survey Used CENTRAL

XKSAT

Map Unit	AREA ACRES	% Area	XKSAT	log(XKSAT) *(% Area)	% ROCK OUTCROP	% Area * %R.O.
LB	355.000	55.47	0.4	-0.221	0.00	0.00
ABA	126.000	19.69	0.38	-0.083	0.00	0.00
LCA	59.000	9.22	0.25	-0.056	0.00	0.00
CP	47.000	7.34	0.4	-0.029	0.00	0.00
VA	17.000	2.66	0.39	-0.011	0.00	0.00
MO	16.000	2.50	0.39	-0.010	0.00	0.00
TU	8.000	1.25	0.25	-0.008	0.00	0.00
MA	8.000	1.25	0.4	-0.005	0.00	0.00
GE	4.000	0.63	0.26	-0.004	0.00	0.00

TOTAL = 640.000 ACRES XKSAT = 0.38 %ROCK= 0.00

DTHETA		PSIF	
Dry =	0.35	=	4.19
Normal =	0.25		
Wet =	0		

LAND USE

AREA ACRES	LAND USE type	% Area	DTHETA condition	% veg. cover	% Imp. Inc.ROW	ImpArea ACRES	IA in.	Wgtd. IA in.
192.000	ROW CROP	30.00	NORMAL	0.00	0.00	0.00	0.50	0.150
448.000	ROW CROP	70.00	WET	100.00	0.00	0.00	0.50	0.350

640.000 =TOTAL AREA OK AVERAGE = 70.00 TOTAL = 0.00 AVG. = 0.500
% = 0.00

PERCENT OF SUBBASIN DRY = 0.00 %
NORMAL = 30.00 %
WET = 70.00 %

SUBBASIN DTHETA WEIGHTED BY LAND USE = 0.075

SUBBASIN XKSAT ADJUSTED FOR VEG. = 0.631

IMPERVIOUS AREA: URBAN @ 0 % effective = 0.00
ROCK OUTCROP @ 0 % effective = 0.00

% EFFECTIVE IMP. = 0.00

INPUT VALUES FOR MCUHP2 PROGRAM

SUBBASIN	AREA sq.mi.	IA inches	DTHETA	PSIF	XKSAT adj.	RTIMP %	LAG min
R44	1.000	0.500	0.075	4.19	0.631	0.00	137

LOSS PARAMETERS FOR SUBBASIN: R45

Soil Survey Used CENTRAL

XKSAT

Map Unit	AREA ACRES	% Area	XKSAT	log(XKSAT) *(% Area)	% ROCK OUTCROP	% Area * %R.O.
LB	634.000	86.38	0.4	-0.344	0.00	0.00
ABA	81.000	11.04	0.38	-0.046	0.00	0.00
LCA	19.000	2.59	0.25	-0.016	0.00	0.00

TOTAL = 734.000 ACRES XKSAT = 0.39 %ROCK= 0.00

DTHETA

Dry = 0.35
Normal = 0.25
Wet = 0

PSIF

= 4.24

LAND USE

AREA ACRES	LAND USE type	% Area	DTHETA condition	% veg. cover	% Imp. Inc.ROW	ImpArea ACRES	IA in.	Wgtd. IA in.
220.000	ROW CROP	29.97	NORMAL	0.00	0.00	0.00	0.50	0.150
514.000	ROW CROP	70.03	WET	100.00	0.00	0.00	0.50	0.350

734.000 =TOTAL AREA OK AVERAGE = 70.03 TOTAL = 0.00 AVG. = 0.500
% = 0.00

PERCENT OF SUBBASIN DRY = 0.00 %
NORMAL = 29.97 %
WET = 70.03 %

SUBBASIN DTHETA WEIGHTED BY LAND USE = 0.075

SUBBASIN XKSAT ADJUSTED FOR VEG. = 0.648

IMPERVIOUS AREA: URBAN @ 0 % effective = 0.00
ROCK OUTCROP @ 0 % effective = 0.00

% EFFECTIVE IMP. = 0.00

INPUT VALUES FOR MCUHP2 PROGRAM

SUBBASIN	AREA sq.mi.	IA inches	DTHETA	PSIF	XKSAT adj.	RTIMP %	LAG min
R45	1.147	0.500	0.075	4.24	0.648	0.00	162

LOSS PARAMETERS FOR SUBBASIN: R46

Soil Survey Used CENTRAL

XKSAT

Map Unit	AREA ACRES	% Area	XKSAT	log(XKSAT) *(% Area)	% ROCK OUTCROP	% Area * %R.O.
LB	339.000	38.52	0.4	-0.153	0.00	0.00
CP	186.000	21.14	0.4	-0.084	0.00	0.00
LCA	146.000	16.59	0.25	-0.100	0.00	0.00
ABA	144.000	16.36	0.38	-0.069	0.00	0.00
MO	53.000	6.02	0.39	-0.025	0.00	0.00
MA	6.000	0.68	0.4	-0.003	0.00	0.00
GE	6.000	0.68	0.26	-0.004	0.00	0.00

TOTAL = 880.000 ACRES XKSAT = 0.37 %ROCK= 0.00

DTHETA

Dry = 0.35
Normal = 0.25
Wet = 0

PSIF

= 4.14

LAND USE

AREA ACRES	LAND USE type	% Area	DTHETA condition	% veg. cover	% Imp. Inc.ROW	ImpArea ACRES	IA in.	Wgtd. IA in.
264.000	ROW CROP	30.00	NORMAL	0.00	0.00	0.00	0.50	0.150
616.000	ROW CROP	70.00	WET	100.00	0.00	0.00	0.50	0.350

880.000 =TOTAL AREA OK AVERAGE = 70.00 TOTAL = 0.00 AVG. = 0.500
% = 0.00

PERCENT OF SUBBASIN DRY = 0.00 %
NORMAL = 30.00 %
WET = 70.00 %

SUBBASIN DTHETA WEIGHTED BY LAND USE = 0.075

SUBBASIN XKSAT ADJUSTED FOR VEG. = 0.614

IMPERVIOUS AREA: URBAN @ 0 % effective = 0.00
ROCK OUTCROP @ 0 % effective = 0.00

% EFFECTIVE IMP. = 0.00

INPUT VALUES FOR MCUHP2 PROGRAM

SUBBASIN	AREA sq.mi.	IA inches	DTHETA	PSIF	XKSAT adj.	RTIMP %	LAG min
R46	1.375	0.500	0.075	4.14	0.614	0.00	174

LOSS PARAMETERS FOR SUBBASIN: R47

Soil Survey Used CENTRAL

XKSAT

Map Unit	AREA ACRES	% Area	XKSAT	log(XKSAT) *(% Area)	% ROCK OUTCROP	% Area * %R.O.
LCA	237.000	59.70	0.25	-0.359	0.00	0.00
LB	106.000	26.70	0.4	-0.106	0.00	0.00
CP	54.000	13.60	0.4	-0.054	0.00	0.00

TOTAL = 397.000 ACRES XKSAT = 0.30 %ROCK= 0.00

DTHETA

Dry = 0.35
Normal = 0.25
Wet = 0

PSIF

= 3.77

LAND USE

AREA ACRES	LAND USE type	% Area	DTHETA condition	% veg. cover	% Imp. Inc.ROW	ImpArea ACRES	IA in.	Wgtd. IA in.
119.000	ROW CROP	29.97	NORMAL	0.00	0.00	0.00	0.50	0.150
278.000	ROW CROP	70.03	WET	100.00	0.00	0.00	0.50	0.350

397.000 =TOTAL AREA OK AVERAGE = 70.03 TOTAL = 0.00 AVG. = 0.500
% = 0.00

PERCENT OF SUBBASIN DRY = 0.00 %
NORMAL = 29.97 %
WET = 70.03 %

SUBBASIN DTHETA WEIGHTED BY LAND USE = 0.075

SUBBASIN XKSAT ADJUSTED FOR VEG. = 0.498

IMPERVIOUS AREA: URBAN @ 0 % effective = 0.00
ROCK OUTCROP @ 0 % effective = 0.00

% EFFECTIVE IMP. = 0.00

INPUT VALUES FOR MCUHP2 PROGRAM

SUBBASIN	AREA sq.mi.	IA inches	DTHETA	PSIF	XKSAT adj.	RTIMP %	LAG min
R47	0.620	0.500	0.075	3.77	0.498	0.00	152

LOSS PARAMETERS FOR SUBBASIN: R48

Soil Survey Used CENTRAL

XKSAT

Map Unit	AREA ACRES	% Area	XKSAT	log(XKSAT) *(% Area)	% ROCK OUTCROP	% Area * %R.O.
LB	145.000	46.62	0.4	-0.186	0.00	0.00
LCA	130.000	41.80	0.25	-0.252	0.00	0.00
CP	36.000	11.58	0.4	-0.046	0.00	0.00

TOTAL = 311.000 ACRES XKSAT = 0.33 %ROCK= 0.00

DTHETA

Dry = 0.35
Normal = 0.25
Wet = 0

PSIF

= 3.92

LAND USE

AREA ACRES	LAND USE type	% Area	DTHETA condition	% veg. cover	% Imp. Inc.ROW	ImpArea ACRES	IA in.	Wgtd. IA in.
93.000	ROW CROP	29.90	NORMAL	0.00	0.00	0.00	0.50	0.150
218.000	ROW CROP	70.10	WET	100.00	0.00	0.00	0.50	0.350

311.000 =TOTAL AREA OK AVERAGE = 70.10 TOTAL = 0.00 AVG. = 0.500
% = 0.00

PERCENT OF SUBBASIN
DRY = 0.00 %
NORMAL = 29.90 %
WET = 70.10 %

SUBBASIN DTHETA WEIGHTED BY LAND USE = 0.075

SUBBASIN XKSAT ADJUSTED FOR VEG. = 0.548

IMPERVIOUS AREA:
URBAN @ 0 % effective = 0.00
ROCK OUTCROP @ 0 % effective = 0.00

% EFFECTIVE IMP. = 0.00

INPUT VALUES FOR MCUHP2 PROGRAM

SUBBASIN	AREA sq.mi.	IA inches	DTHETA	PSIF	XKSAT adj.	RTIMP %	LAG min
R48	0.486	0.500	0.075	3.92	0.548	0.00	121

LOSS PARAMETERS FOR SUBBASIN: R49

Soil Survey Used CENTRAL

XKSAT

Map Unit	AREA ACRES	% Area	XKSAT	log(XKSAT) *(% Area)	% ROCK OUTCROP	% Area * %R.O.
LB	266.000	41.56	0.4	-0.165	0.00	0.00
PA	266.000	41.56	0.4	-0.165	0.00	0.00
MA	72.000	11.25	0.4	-0.045	0.00	0.00
ABA	18.000	2.81	0.38	-0.012	0.00	0.00
BS	18.000	2.81	0.39	-0.012	0.00	0.00

TOTAL = 640.000 ACRES XKSAT = 0.40 %ROCK= 0.00

DTHETA

Dry = 0.35
Normal = 0.25
Wet = 0

PSIF

= 4.3

LAND USE

AREA ACRES	LAND USE type	% Area	DTHETA condition	% veg. cover	% Imp. Inc.ROW	ImpArea ACRES	IA in.	Wgtd. IA in.
192.000	ROW CROP	30.00	NORMAL	0.00	0.00	0.00	0.50	0.150
448.000	ROW CROP	70.00	WET	100.00	0.00	0.00	0.50	0.350

640.000 =TOTAL AREA OK AVERAGE = 70.00 TOTAL = 0.00 AVG. = 0.500
% = 0.00

PERCENT OF SUBBASIN DRY = 0.00 %
NORMAL = 30.00 %
WET = 70.00 %

SUBBASIN DTHETA WEIGHTED BY LAND USE = 0.075

SUBBASIN XKSAT ADJUSTED FOR VEG. = 0.664

IMPERVIOUS AREA: URBAN @ 0 % effective = 0.00
ROCK OUTCROP @ 0 % effective = 0.00

% EFFECTIVE IMP. = 0.00

INPUT VALUES FOR MCUHP2 PROGRAM

SUBBASIN	AREA sq.mi.	IA inches	DTHETA	PSIF	XKSAT adj.	RTIMP %	LAG min
R49	1.000	0.500	0.075	4.30	0.664	0.00	199

LOSS PARAMETERS FOR SUBBASIN: R50

Soil Survey Used CENTRAL

XKSAT

Map Unit	AREA ACRES	% Area	XKSAT	log(XKSAT) *(% Area)	% ROCK OUTCROP	% Area * %R.O.
MA	168.000	26.25	0.4	-0.104	0.00	0.00
BS	156.000	24.38	0.39	-0.100	0.00	0.00
LCA	127.000	19.84	0.25	-0.119	0.00	0.00
PA	122.000	19.06	0.4	-0.076	0.00	0.00
LB	58.000	9.06	0.4	-0.036	0.00	0.00
GGA	9.000	1.41	0.25	-0.008	0.00	0.00

TOTAL = 640.000 ACRES XKSAT = 0.36 %ROCK= 0.00

DTHETA		PSIF	
Dry =	0.35	=	4.08
Normal =	0.25		
Wet =	0		

LAND USE

AREA ACRES	LAND USE type	% Area	DTHETA condition	% veg. cover	% Imp. Inc.ROW	ImpArea ACRES	IA in.	Wgtd. IA in.
192.000	ROW CROP	30.00	NORMAL	0.00	0.00	0.00	0.50	0.150
448.000	ROW CROP	70.00	WET	100.00	0.00	0.00	0.50	0.350

640.000 =TOTAL AREA OK AVERAGE = 70.00 TOTAL = 0.00 AVG. = 0.500
% = 0.00

PERCENT OF SUBBASIN DRY = 0.00 %
NORMAL = 30.00 %
WET = 70.00 %

SUBBASIN DTHETA WEIGHTED BY LAND USE = 0.075

SUBBASIN XKSAT ADJUSTED FOR VEG. = 0.598

IMPERVIOUS AREA: URBAN @ 0 % effective = 0.00
ROCK OUTCROP @ 0 % effective = 0.00

% EFFECTIVE IMP. = 0.00

INPUT VALUES FOR MCUHP2 PROGRAM

SUBBASIN	AREA sq.mi.	IA inches	DTHETA	PSIF	XKSAT adj.	RTIMP %	LAG min
R50	1.000	0.500	0.075	4.08	0.598	0.00	194

LOSS PARAMETERS FOR SUBBASIN: R51

Soil Survey Used CENTRAL

XKSAT

Map Unit	AREA ACRES	% Area	XKSAT	log(XKSAT) *(% Area)	% ROCK OUTCROP	% Area + %R.O.
LCA	204.000	31.92	0.25	-0.192	0.00	0.00
ABA	154.000	24.10	0.38	-0.101	0.00	0.00
PEB	112.000	17.53	0.38	-0.074	0.00	0.00
GGA	75.000	11.74	0.25	-0.071	0.00	0.00
PEA	58.000	9.08	0.37	-0.039	0.00	0.00
MA	36.000	5.63	0.4	-0.022	0.00	0.00

TOTAL = 639.000 ACRES XKSAT = 0.32 %ROCK= 0.00

DTHETA		PSIF	
Dry =	0.35	=	3.87
Normal =	0.25		
Wet =	0		

LAND USE

AREA ACRES	LAND USE type	% Area	DTHETA condition	% veg. cover	% Imp. Inc.ROW	ImpArea ACRES	IA in.	Wgtd. IA in.
192.000	ROW CROP	30.05	NORMAL	0.00	0.00	0.00	0.50	0.150
447.000	ROW CROP	69.95	WET	100.00	0.00	0.00	0.50	0.350

639.000 =TOTAL AREA OK AVERAGE = 69.95 TOTAL = 0.00 AVG. = 0.500
% = 0.00

PERCENT OF SUBBASIN DRY = 0.00 %
NORMAL = 30.05 %
WET = 69.95 %

SUBBASIN DTHETA WEIGHTED BY LAND USE = 0.075

SUBBASIN XKSAT ADJUSTED FOR VEG. = 0.531

IMPERVIOUS AREA: URBAN @ 0 % effective = 0.00
ROCK OUTCROP @ 0 % effective = 0.00

% EFFECTIVE IMP. = 0.00

INPUT VALUES FOR MCUHP2 PROGRAM

SUBBASIN	AREA sq.mi.	IA inches	DTHETA	PSIF	XKSAT adj.	RTIMP %	LAG min
R51	0.998	0.500	0.075	3.87	0.531	0.00	197

LOSS PARAMETERS FOR SUBBASIN: R52

Soil Survey Used CENTRAL

XKSAT

Map Unit	AREA ACRES	% Area	XKSAT	log(XKSAT) *(% Area)	% ROCK OUTCROP	% Area * %R.O.
CP	155.000	29.69	0.4	-0.118	0.00	0.00
LB	107.000	20.50	0.4	-0.082	0.00	0.00
PA	104.000	19.92	0.4	-0.079	0.00	0.00
PEA	54.000	10.34	0.37	-0.045	0.00	0.00
ABA	47.000	9.00	0.38	-0.038	0.00	0.00
PEB	38.000	7.28	0.38	-0.031	0.00	0.00
LCA	17.000	3.26	0.25	-0.020	0.00	0.00

TOTAL = 522.000 ACRES XKSAT = 0.39 %ROCK= 0.00

DTHETA

Dry = 0.35
Normal = 0.25
Wet = 0

PSIF

= 4.24

LAND USE

AREA ACRES	LAND USE type	% Area	DTHETA condition	% veg. cover	% Imp. Inc.ROW	ImpArea ACRES	IA in.	Wgtd. IA in.
157.000	ROW CROP	30.08	NORMAL	0.00	0.00	0.00	0.50	0.150
365.000	ROW CROP	69.92	WET	100.00	0.00	0.00	0.50	0.350

522.000 =TOTAL AREA OK AVERAGE = 69.92 TOTAL = 0.00 AVG. = 0.500
% = 0.00

PERCENT OF SUBBASIN DRY = 0.00 %
NORMAL = 30.08 %
WET = 69.92 %

SUBBASIN DTHETA WEIGHTED BY LAND USE = 0.075

SUBBASIN XKSAT ADJUSTED FOR VEG. = 0.647

IMPERVIOUS AREA: URBAN @ 0 % effective = 0.00
ROCK OUTCROP @ 0 % effective = 0.00

% EFFECTIVE IMP. = 0.00

INPUT VALUES FOR MCUHP2 PROGRAM

SUBBASIN	AREA sq.mi.	IA inches	DTHETA	PSIF	XKSAT adj.	RTIMP %	LAG min
R52	0.816	0.500	0.075	4.24	0.647	0.00	171

LOSS PARAMETERS FOR SUBBASIN: R53

Soil Survey Used CENTRAL

XKSAT

Map Unit	AREA ACRES	% Area	XKSAT	log(XKSAT) *(% Area)	% ROCK OUTCROP	% Area * %R.O.
LB	149.000	68.35	0.4	-0.272	0.00	0.00
MA	25.000	11.47	0.4	-0.046	0.00	0.00
BS	14.000	6.42	0.39	-0.026	0.00	0.00
LCA	13.000	5.96	0.25	-0.036	0.00	0.00
ABA	7.000	3.21	0.38	-0.013	0.00	0.00
PA	6.000	2.75	0.4	-0.011	0.00	0.00
BR	4.000	1.83	1.05	0.000	0.00	0.00

TOTAL = 218.000 ACRES XKSAT = 0.39 %ROCK= 0.00

DTHETA		PSIF	
Dry =	0.35	=	4.24
Normal =	0.25		
Wet =	0		

LAND USE

AREA ACRES	LAND USE type	% Area	DTHETA condition	% veg. cover	% Imp. Inc.ROW	ImpArea ACRES	IA in.	Wgtd. IA in.
65.000	ROW CROP	29.82	NORMAL	0.00	0.00	0.00	0.50	0.149
153.000	ROW CROP	70.18	WET	100.00	0.00	0.00	0.50	0.351

218.000 =TOTAL AREA OK AVERAGE = 70.18 TOTAL = 0.00 AVG. = 0.500
% = 0.00

PERCENT OF SUBBASIN DRY = 0.00 %
NORMAL = 29.82 %
WET = 70.18 %

SUBBASIN DTHETA WEIGHTED BY LAND USE = 0.075

SUBBASIN XKSAT ADJUSTED FOR VEG. = 0.648

IMPERVIOUS AREA: URBAN @ 0 % effective = 0.00
ROCK OUTCROP @ 0 % effective = 0.00

% EFFECTIVE IMP. = 0.00

INPUT VALUES FOR MCUHP2 PROGRAM

SUBBASIN	AREA sq.mi.	IA inches	DTHETA	PSIF	XKSAT adj.	RTIMP %	LAG min
R53	0.341	0.500	0.075	4.24	0.648	0.00	82

LOSS PARAMETERS FOR SUBBASIN: R54

Soil Survey Used CENTRAL

XKSAT

Map Unit	AREA ACRES	% Area	XKSAT	log(XKSAT) *(% Area)	% ROCK OUTCROP	% Area * %R.O.
LB	202.000	83.13	0.4	-0.331	0.00	0.00
ABA	20.000	8.23	0.38	-0.035	0.00	0.00
VA	14.000	5.76	0.39	-0.024	0.00	0.00
GE	7.000	2.88	0.26	-0.017	0.00	0.00

TOTAL = 243.000 ACRES XKSAT = 0.39 %ROCK= 0.00

DTHETA		PSIF	
Dry =	0.35	=	4.24
Normal =	0.25		
Wet =	0		

LAND USE

AREA ACRES	LAND USE type	% Area	DTHETA condition	% veg. cover	% Imp. Inc.ROW	ImpArea ACRES	IA in.	Wgtd. IA in.
73.000	ROW CROP	30.04	NORMAL	0.00	0.00	0.00	0.50	0.150
170.000	ROW CROP	69.96	WET	100.00	0.00	0.00	0.50	0.350

243.000 =TOTAL AREA OK AVERAGE = 69.96 TOTAL = 0.00 AVG. = 0.500
% = 0.00

PERCENT OF SUBBASIN DRY = 0.00 %
NORMAL = 30.04 %
WET = 69.96 %

SUBBASIN DTHETA WEIGHTED BY LAND USE = 0.075

SUBBASIN XKSAT ADJUSTED FOR VEG. = 0.647

IMPERVIOUS AREA: URBAN @ 0 % effective = 0.00
ROCK OUTCROP @ 0 % effective = 0.00

% EFFECTIVE IMP. = 0.00

INPUT VALUES FOR MCUHP2 PROGRAM

SUBBASIN	AREA sq.mi.	IA inches	DTHETA	PSIF	XKSAT adj.	RTIMP %	LAG min
R54	0.380	0.500	0.075	4.24	0.647	0.00	158

LOSS PARAMETERS FOR SUBBASIN: R55

Soil Survey Used CENTRAL

XKSAT

Map Unit	AREA ACRES	% Area	XKSAT	log(XKSAT) *(% Area)	% ROCK OUTCROP	% Area * %R.O.
LB	125.000	73.53	0.4	-0.293	0.00	0.00
ABA	20.000	11.76	0.38	-0.049	0.00	0.00
LCA	17.000	10.00	0.25	-0.060	0.00	0.00
MA	4.000	2.35	0.4	-0.009	0.00	0.00
TU	4.000	2.35	0.25	-0.014	0.00	0.00

TOTAL = 170.000 ACRES XKSAT = 0.38 %ROCK= 0.00

DTHETA

Dry = 0.35
Normal = 0.25
Wet = 0

PSIF

= 4.19

LAND USE

AREA ACRES	LAND USE type	% Area	DTHETA condition	% veg. cover	% Imp. Inc.ROW	ImpArea ACRES	IA in.	Wgtd. IA in.
51.000	ROW CROP	30.00	NORMAL	0.00	0.00	0.00	0.05	0.015
119.000	ROW CROP	70.00	WET	100.00	0.00	0.00	0.50	0.350

170.000 =TOTAL AREA OK AVERAGE = 70.00 TOTAL = 0.00 AVG. = 0.365
% = 0.00

PERCENT OF SUBBASIN DRY = 0.00 %
NORMAL = 30.00 %
WET = 70.00 %

SUBBASIN DTHETA WEIGHTED BY LAND USE = 0.075

SUBBASIN XKSAT ADJUSTED FOR VEG. = 0.631

IMPERVIOUS AREA: URBAN @ 0 % effective = 0.00
ROCK OUTCROP @ 0 % effective = 0.00

% EFFECTIVE IMP. = 0.00

INPUT VALUES FOR MCUHP2 PROGRAM

SUBBASIN	AREA sq.mi.	IA inches	DTHETA	PSIF	XKSAT adj.	RTIMP %	LAG min
R55	0.266	0.365	0.075	4.19	0.631	0.00	140

LOSS PARAMETERS FOR SUBBASIN: R56

Soil Survey Used CENTRAL

XKSAT

Map Unit	AREA ACRES	% Area	XKSAT	log(XKSAT) *(% Area)	% ROCK OUTCROP	% Area * %R.O.
LB	242.000	51.38	0.4	-0.204	0.00	0.00
ABA	146.000	31.00	0.38	-0.130	0.00	0.00
PA	53.000	11.25	0.4	-0.045	0.00	0.00
MA	30.000	6.37	0.4	-0.025	0.00	0.00

TOTAL = 471.000 ACRES XKSAT = 0.39 %ROCK= 0.00

DTHETA

Dry = 0.35
Normal = 0.25
Wet = 0

PSIF

= 4.24

LAND USE

AREA ACRES	LAND USE type	% Area	DTHETA condition	% veg. cover	% Imp. Inc.ROW	ImpArea ACRES	IA in.	Wgtd. IA in.
141.000	ROW CROP	29.94	NORMAL	0.00	0.00	0.00	0.50	0.150
330.000	ROW CROP	70.06	WET	100.00	0.00	0.00	0.50	0.350

471.000 =TOTAL AREA OK AVERAGE = 70.06 TOTAL = 0.00 AVG. = 0.500
% = 0.00

PERCENT OF SUBBASIN
DRY = 0.00 %
NORMAL = 29.94 %
WET = 70.06 %

SUBBASIN DTHETA WEIGHTED BY LAND USE = 0.075

SUBBASIN XKSAT ADJUSTED FOR VEG. = 0.648

IMPERVIOUS AREA:
URBAN @ 0 % effective = 0.00
ROCK OUTCROP @ 0 % effective = 0.00

% EFFECTIVE IMP. = 0.00

INPUT VALUES FOR MCUHP2 PROGRAM

SUBBASIN	AREA sq.mi.	IA inches	DTHETA	PSIF	XKSAT adj.	RTIMP %	LAG min
R56	0.736	0.500	0.075	4.24	0.648	0.00	177

LOSS PARAMETERS FOR SUBBASIN: R57

Soil Survey Used CENTRAL

XKSAT

Map Unit	AREA ACRES	% Area	XKSAT	log(XKSAT) *(% Area)	% ROCK OUTCROP	% Area * %R.O.
GGA	76.000	23.38	0.25	-0.141	0.00	0.00
LB	74.000	22.77	0.4	-0.091	0.00	0.00
BS	61.000	18.77	0.39	-0.077	0.00	0.00
MA	54.000	16.62	0.4	-0.066	0.00	0.00
ABA	52.000	16.00	0.38	-0.067	0.00	0.00
PA	8.000	2.46	0.4	-0.010	0.00	0.00

TOTAL = 325.000 ACRES XKSAT = 0.35 %ROCK= 0.00

DTHETA		PSIF	
Dry =	0.35	=	4.03
Normal =	0.25		
Wet =	0		

LAND USE

AREA ACRES	LAND USE type	% Area	DTHETA condition	% veg. cover	% Imp. Inc.ROW	ImpArea ACRES	IA in.	Wgtd. IA in.
98.000	ROW CROP	30.15	NORMAL	0.00	0.00	0.00	0.50	0.151
227.000	ROW CROP	69.85	WET	100.00	0.00	0.00	0.50	0.349

325.000 =TOTAL AREA OK AVERAGE = 69.85 TOTAL = 0.00 AVG. = 0.500
% = 0.00

PERCENT OF SUBBASIN
DRY = 0.00 %
NORMAL = 30.15 %
WET = 69.85 %

SUBBASIN DTHETA WEIGHTED BY LAND USE = 0.075

SUBBASIN XKSAT ADJUSTED FOR VEG. = 0.580

IMPERVIOUS AREA:
URBAN @ 0 % effective = 0.00
ROCK OUTCROP @ 0 % effective = 0.00

% EFFECTIVE IMP. = 0.00

INPUT VALUES FOR MCUHP2 PROGRAM

SUBBASIN	AREA sq.mi.	IA inches	DTHETA	PSIF	XKSAT adj.	RTIMP %	LAG min
R57	0.508	0.500	0.075	4.03	0.580	0.00	147

LOSS PARAMETERS FOR SUBBASIN: R58

Soil Survey Used CENTRAL

XKSAT

Map Unit	AREA ACRES	% Area	XKSAT	log(XKSAT) *(% Area)	% ROCK OUTCROP	% Area * %R.O.
ABA	42.000	31.11	0.38	-0.131	0.00	0.00
GGA	41.000	30.37	0.25	-0.183	0.00	0.00
MA	31.000	22.96	0.4	-0.091	0.00	0.00
PEB	20.000	14.81	0.38	-0.062	0.00	0.00
LCA	1.000	0.74	0.25	-0.004	0.00	0.00

TOTAL = 135.000 ACRES XKSAT = 0.34 %ROCK= 0.00

DTHETA		PSIF	
Dry =	0.35	=	3.98
Normal =	0.25		
Wet =	0		

LAND USE

AREA ACRES	LAND USE type	% Area	DTHETA condition	% veg. cover	% Imp. Inc.ROW	ImpArea ACRES	IA in.	Wgtd. IA in.
41.000	ROW CROP	30.37	NORMAL	0.00	0.00	0.00	0.50	0.152
94.000	ROW CROP	69.63	WET	100.00	0.00	0.00	0.50	0.348

135.000 =TOTAL AREA OK AVERAGE = 69.63 TOTAL = 0.00 AVG. = 0.500
% = 0.00

PERCENT OF SUBBASIN DRY = 0.00 %
NORMAL = 30.37 %
WET = 69.63 %

SUBBASIN DTHETA WEIGHTED BY LAND USE = 0.076

SUBBASIN XKSAT ADJUSTED FOR VEG. = 0.563

IMPERVIOUS AREA: URBAN @ 0 % effective = 0.00
ROCK OUTCROP @ 0 % effective = 0.00

% EFFECTIVE IMP. = 0.00

INPUT VALUES FOR MCUHP2 PROGRAM

SUBBASIN	AREA sq.mi.	IA inches	DTHETA	PSIF	XKSAT adj.	RTIMP %	LAG min
R58	0.211	0.500	0.076	3.98	0.563	0.00	129

LOSS PARAMETERS FOR SUBBASIN: R59

Soil Survey Used CENTRAL

XKSAT

Map Unit	AREA ACRES	% Area	XKSAT	log(XKSAT) *(% Area)	% ROCK OUTCROP	% Area * %R.O.
ABA	47.000	31.13	0.38	-0.131	0.00	0.00
CP	33.000	21.85	0.4	-0.087	0.00	0.00
CF	25.000	16.56	0.5	-0.050	0.00	0.00
PA	19.000	12.58	0.4	-0.050	0.00	0.00
GE	12.000	7.95	0.26	-0.046	0.00	0.00
PEB	10.000	6.62	0.38	-0.028	0.00	0.00
GYD	5.000	3.31	0.26	-0.019	0.00	0.00

TOTAL = 151.000 ACRES XKSAT = 0.39 %ROCK= 0.00

DTHETA

Dry = 0.35
Normal = 0.25
Wet = 0

PSIF

= 4.24

LAND USE

AREA ACRES	LAND USE type	% Area	DTHETA condition	% veg. cover	% Imp. Inc.ROW	ImpArea ACRES	IA in.	Wgtd. IA in.
45.000	ROW CROP	29.80	NORMAL	0.00	0.00	0.00	0.50	0.149
106.000	ROW CROP	70.20	WET	100.00	0.00	0.00	0.50	0.351

151.000 =TOTAL AREA OK AVERAGE = 70.20 TOTAL = 0.00 AVG. = 0.500
% = 0.00

PERCENT OF SUBBASIN DRY = 0.00 %
NORMAL = 29.80 %
WET = 70.20 %

SUBBASIN DTHETA WEIGHTED BY LAND USE = 0.075

SUBBASIN XKSAT ADJUSTED FOR VEG. = 0.648

IMPERVIOUS AREA: URBAN @ 0 % effective = 0.00
ROCK OUTCROP @ 0 % effective = 0.00

% EFFECTIVE IMP. = 0.00

INPUT VALUES FOR MCUHP2 PROGRAM

SUBBASIN	AREA sq.mi.	IA inches	DTHETA	PSIF	XKSAT adj.	RTIMP %	LAG min
R59	0.236	0.500	0.075	4.24	0.648	0.00	70

LOSS PARAMETERS FOR SUBBASIN: R60

Soil Survey Used CENTRAL

XKSAT

Map Unit	AREA ACRES	% Area	XKSAT	log(XKSAT) *(% Area)	% ROCK OUTCROP	% Area * %R.O.
PEA	206.000	28.07	0.37	-0.121	0.00	0.00
CP	156.000	21.25	0.4	-0.085	0.00	0.00
LB	111.000	15.12	0.4	-0.060	0.00	0.00
PEB	91.000	12.40	0.38	-0.052	0.00	0.00
PA	51.000	6.95	0.4	-0.028	0.00	0.00
ABA	30.000	4.09	0.38	-0.017	0.00	0.00
LCA	27.000	3.68	0.25	-0.022	0.00	0.00
RPE	27.000	3.68	0.29	-0.020	0.00	0.00
RAA	25.000	3.41	0.39	-0.014	0.00	0.00
BS	10.000	1.36	0.39	-0.006	0.00	0.00

TOTAL = 734.000 ACRES XKSAT = 0.38 %ROCK= 0.00

DTHETA

Dry =	0.35
Normal =	0.25
Wet =	0

PSIF

= 4.19

LAND USE

AREA ACRES	LAND USE type	% Area	DTHETA condition	% veg. cover	% Imp. Inc.ROW	ImpArea ACRES	IA in.	Wgtd. IA in.
220.000	ROW CROP	29.97	NORMAL	0.00	0.00	0.00	0.50	0.150
514.000	ROW CROP	70.03	WET	100.00	0.00	0.00	0.50	0.350

734.000 =TOTAL AREA OK AVERAGE = 70.03 TOTAL = 0.00 AVG. = 0.500
% = 0.00

PERCENT OF SUBBASIN DRY = 0.00 %
NORMAL = 29.97 %
WET = 70.03 %

SUBBASIN DTHETA WEIGHTED BY LAND USE = 0.075

SUBBASIN XKSAT ADJUSTED FOR VEG. = 0.631

IMPERVIOUS AREA: URBAN @ 0 % effective = 0.00
ROCK OUTCROP @ 0 % effective = 0.00

% EFFECTIVE IMP. = 0.00

INPUT VALUES FOR MCUHP2 PROGRAM

SUBBASIN	AREA sq.mi.	IA inches	DTHETA	PSIF	XKSAT adj.	RTIMP %	LAG min
R60	1.147	0.500	0.075	4.19	0.631	0.00	177

LOSS PARAMETERS FOR SUBBASIN: R61

Soil Survey Used CENTRAL

XKSAT

Map Unit	AREA ACRES	% Area	XKSAT	log(XKSAT) *(% Area)	% ROCK OUTCROP	% Area * %R.O.
LB	131.000	59.01	0.4	-0.235	0.00	0.00
AE	57.000	25.68	0.39	-0.105	0.00	0.00
CP	23.000	10.36	0.4	-0.041	0.00	0.00
MA	11.000	4.95	0.4	-0.020	0.00	0.00

TOTAL = 222.000 ACRES XKSAT = 0.40 %ROCK= 0.00

DTHETA		PSIF	
Dry =	0.35	=	4.3
Normal =	0.25		
Wet =	0		

LAND USE

AREA ACRES	LAND USE type	% Area	DTHETA condition	% veg. cover	% Imp. Inc.ROW	ImpArea ACRES	IA in.	Wgtd. IA in.
67.000	ROW CROP	30.18	NORMAL	0.00	0.00	0.00	0.50	0.151
155.000	ROW CROP	69.82	WET	100.00	0.00	0.00	0.50	0.349

222.000 =TOTAL AREA OK AVERAGE = 69.82 TOTAL = 0.00 AVG. = 0.500
% = 0.00

PERCENT OF SUBBASIN DRY = 0.00 %
NORMAL = 30.18 %
WET = 69.82 %

SUBBASIN DTHETA WEIGHTED BY LAND USE = 0.075

SUBBASIN XKSAT ADJUSTED FOR VEG. = 0.663

IMPERVIOUS AREA: URBAN @ 0 % effective = 0.00
ROCK OUTCROP @ 0 % effective = 0.00

% EFFECTIVE IMP. = 0.00

INPUT VALUES FOR MCUHP2 PROGRAM

SUBBASIN	AREA sq.mi.	IA inches	DTHETA	PSIF	XKSAT adj.	RTIMP %	LAG min
R61	0.347	0.500	0.075	4.30	0.663	0.00	102

LOSS PARAMETERS FOR SUBBASIN: R62

Soil Survey Used CENTRAL

XKSAT

Map Unit	AREA ACRES	% Area	XKSAT	log(XKSAT) *(% Area)	% ROCK OUTCROP	% Area * %R.O.
LB	282.000	76.01	0.4	-0.302	0.00	0.00
ABA	74.000	19.95	0.38	-0.084	0.00	0.00
PEA	3.000	0.81	0.37	-0.003	0.00	0.00
WG	3.000	0.81	0.03	-0.012	0.00	0.00
TU	3.000	0.81	0.25	-0.005	0.00	0.00
MO	3.000	0.81	0.39	-0.003	0.00	0.00
AO	3.000	0.81	0.04	-0.011	0.00	0.00

TOTAL = 371.000 ACRES XKSAT = 0.38 %ROCK= 0.00

DTHETA

Dry = 0.35
Normal = 0.25
Wet = 0

PSIF

= 4.19

LAND USE

AREA ACRES	LAND USE type	% Area	DTHETA condition	% veg. cover	% Imp. Inc.ROW	ImpArea ACRES	IA in.	Wgtd. IA in.
111.000	ROW CROP	29.92	NORMAL	0.00	0.00	0.00	0.50	0.150
260.000	ROW CROP	70.08	WET	100.00	0.00	0.00	0.50	0.350

371.000 =TOTAL AREA OK AVERAGE = 70.08 TOTAL = 0.00 AVG. = 0.500
% = 0.00

PERCENT OF SUBBASIN DRY = 0.00 %
NORMAL = 29.92 %
WET = 70.08 %

SUBBASIN DTHETA WEIGHTED BY LAND USE = 0.075

SUBBASIN XKSAT ADJUSTED FOR VEG. = 0.631

IMPERVIOUS AREA: URBAN @ 0 % effective = 0.00
ROCK OUTCROP @ 0 % effective = 0.00

% EFFECTIVE IMP. = 0.00

INPUT VALUES FOR MCUHP2 PROGRAM

SUBBASIN	AREA sq.mi.	IA inches	DTHETA	PSIF	XKSAT adj.	RTIMP %	LAG min
R62	0.580	0.500	0.075	4.19	0.631	0.00	121

LOSS PARAMETERS FOR SUBBASIN: R63

Soil Survey Used CENTRAL

XKSAT

Map Unit	AREA ACRES	% Area	XKSAT	log(XKSAT) *(% Area)	% ROCK OUTCROP	% Area * %R.O.
LB	281.000	85.67	0.4	-0.341	0.00	0.00
ABA	20.000	6.10	0.38	-0.026	0.00	0.00
WG	14.000	4.27	0.03	-0.065	0.00	0.00
MO	10.000	3.05	0.39	-0.012	0.00	0.00
LCA	2.000	0.61	0.25	-0.004	0.00	0.00
MA	1.000	0.30	0.4	-0.001	0.00	0.00

TOTAL = 328.000 ACRES XKSAT = 0.36 %ROCK= 0.00

DTHETA		PSIF	
Dry =	0.35	=	4.08
Normal =	0.25		
Wet =	0		

LAND USE

AREA ACRES	LAND USE type	% Area	DTHETA condition	% veg. cover	% Imp. Inc.ROW	ImpArea ACRES	IA in.	Wgtd. IA in.
98.000	ROW CROP	29.88	NORMAL	0.00	0.00	0.00	0.50	0.149
230.000	ROW CROP	70.12	WET	100.00	0.00	0.00	0.50	0.351

328.000 =TOTAL AREA OK AVERAGE = 70.12 TOTAL = 0.00 AVG. = 0.500
% = 0.00

PERCENT OF SUBBASIN DRY = 0.00 %
NORMAL = 29.88 %
WET = 70.12 %

SUBBASIN DTHETA WEIGHTED BY LAND USE = 0.075

SUBBASIN XKSAT ADJUSTED FOR VEG. = 0.598

IMPERVIOUS AREA: URBAN @ 0 % effective = 0.00
ROCK OUTCROP @ 0 % effective = 0.00

% EFFECTIVE IMP. = 0.00

INPUT VALUES FOR MCUHP2 PROGRAM

SUBBASIN	AREA sq.mi.	IA inches	DTHETA	PSIF	XKSAT adj.	RTIMP %	LAG min
R63	0.513	0.500	0.075	4.08	0.598	0.00	114

LOSS PARAMETERS FOR SUBBASIN: R64

Soil Survey Used CENTRAL

XKSAT

Map Unit	AREA ACRES	% Area	XKSAT	log(XKSAT) *(% Area)	% ROCK OUTCROP	% Area * %R.O.
LB	160.000	58.61	0.4	-0.233	0.00	0.00
LCA	56.000	20.51	0.25	-0.123	0.00	0.00
ABA	43.000	15.75	0.38	-0.066	0.00	0.00
MR	7.000	2.56	0.05	-0.033	0.00	0.00
CN	4.000	1.47	0.01	-0.029	0.00	0.00
VA	3.000	1.10	0.39	-0.004	0.00	0.00

TOTAL = 273.000 ACRES XKSAT = 0.32 %ROCK= 0.00

DTHETA		PSIF	
Dry =	0.35	=	3.87
Normal =	0.25		
Wet =	0		

LAND USE

AREA ACRES	LAND USE type	% Area	DTHETA condition	% veg. cover	% Imp. Inc.ROW	ImpArea ACRES	IA in.	Wgtd. IA in.
82.000	ROW CROP	30.04	NORMAL	0.00	0.00	0.00	0.50	0.150
191.000	ROW CROP	69.96	WET	100.00	0.00	0.00	0.50	0.350

273.000 =TOTAL AREA OK AVERAGE = 69.96 TOTAL = 0.00 AVG. = 0.500
% = 0.00

PERCENT OF SUBBASIN DRY = 0.00 %
NORMAL = 30.04 %
WET = 69.96 %

SUBBASIN DTHETA WEIGHTED BY LAND USE = 0.075

SUBBASIN XKSAT ADJUSTED FOR VEG. = 0.531

IMPERVIOUS AREA: URBAN @ 0 % effective = 0.00
ROCK OUTCROP @ 0 % effective = 0.00

% EFFECTIVE IMP. = 0.00

INPUT VALUES FOR MCUHP2 PROGRAM

SUBBASIN	AREA sq.mi.	IA inches	DTHETA	PSIF	XKSAT adj.	RTIMP %	LAG min
R64	0.427	0.500	0.075	3.87	0.531	0.00	101

LOSS PARAMETERS FOR SUBBASIN: R65

Soil Survey Used CENTRAL

XKSAT

Map Unit	AREA ACRES	% Area	XKSAT	log(XKSAT) *(% Area)	% ROCK OUTCROP	% Area * %R.O.
GE	90.000	34.75	0.26	-0.203	0.00	0.00
CP	67.000	25.87	0.4	-0.103	0.00	0.00
LCA	33.000	12.74	0.25	-0.077	0.00	0.00
VA	31.000	11.97	0.39	-0.049	0.00	0.00
LB	20.000	7.72	0.4	-0.031	0.00	0.00
AO	10.000	3.86	0.04	-0.054	0.00	0.00
WG	8.000	3.09	0.03	-0.047	0.00	0.00

TOTAL = 259.000 ACRES XKSAT = 0.27 %ROCK= 0.00

DTHETA		PSIF	
Dry =	0.35	=	3.61
Normal =	0.25		
Wet =	0		

LAND USE

AREA ACRES	LAND USE type	% Area	DTHETA condition	% veg. cover	% Imp. Inc.ROW	ImpArea ACRES	IA in.	Wgtd. IA in.
78.000	ROW CROP	30.12	NORMAL	0.00	0.00	0.00	0.50	0.151
181.000	ROW CROP	69.88	WET	100.00	0.00	0.00	0.50	0.349

259.000 =TOTAL AREA OK AVERAGE = 69.88 TOTAL = 0.00 AVG. = 0.500
% = 0.00

PERCENT OF SUBBASIN DRY = 0.00 %
NORMAL = 30.12 %
WET = 69.88 %

SUBBASIN DTHETA WEIGHTED BY LAND USE = 0.075

SUBBASIN XKSAT ADJUSTED FOR VEG. = 0.448

IMPERVIOUS AREA: URBAN @ 0 % effective = 0.00
ROCK OUTCROP @ 0 % effective = 0.00

% EFFECTIVE IMP. = 0.00

INPUT VALUES FOR MCUHP2 PROGRAM

SUBBASIN	AREA sq.mi.	IA inches	DTHETA	PSIF	XKSAT adj.	RTIMP %	LAG min
R65	0.405	0.500	0.075	3.61	0.448	0.00	103

LOSS PARAMETERS FOR SUBBASIN: R66

Soil Survey Used CENTRAL

XKSAT

Map Unit	AREA ACRES	% Area	XKSAT	log(XKSAT) *(% Area)	% ROCK OUTCROP	% Area * %R.O.
LB	130.000	71.04	0.4	-0.283	0.00	0.00
LCA	28.000	15.30	0.25	-0.092	0.00	0.00
GGA	19.000	10.38	0.25	-0.063	0.00	0.00
AO	4.000	2.19	0.04	-0.031	0.00	0.00
WG	2.000	1.09	0.03	-0.017	0.00	0.00

TOTAL = 183.000 ACRES XKSAT = 0.33 %ROCK= 0.00

DTHETA

Dry = 0.35
Normal = 0.25
Wet = 0

PSIF

= 3.92

LAND USE

AREA ACRES	LAND USE type	% Area	DTHETA condition	% veg. cover	% Imp. Inc.ROW	ImpArea ACRES	IA in.	Wgtd. IA in.
55.000	ROW CROP	30.05	NORMAL	0.00	0.00	0.00	0.50	0.150
128.000	ROW CROP	69.95	WET	100.00	0.00	0.00	0.50	0.350

183.000 =TOTAL AREA OK AVERAGE = 69.95 TOTAL = 0.00 AVG. = 0.500
% = 0.00

PERCENT OF SUBBASIN
DRY = 0.00 %
NORMAL = 30.05 %
WET = 69.95 %

SUBBASIN DTHETA WEIGHTED BY LAND USE = 0.075

SUBBASIN XKSAT ADJUSTED FOR VEG. = 0.548

IMPERVIOUS AREA:
URBAN @ 0 % effective = 0.00
ROCK OUTCROP @ 0 % effective = 0.00

% EFFECTIVE IMP. = 0.00

INPUT VALUES FOR MCUHP2 PROGRAM

SUBBASIN	AREA sq.mi.	IA inches	DTHETA	PSIF	XKSAT adj.	RTIMP %	LAG min
R66	0.286	0.500	0.075	3.92	0.548	0.00	109

LOSS PARAMETERS FOR SUBBASIN: R67

Soil Survey Used CENTRAL

XKSAT

Map Unit	AREA ACRES	% Area	XKSAT	log(XKSAT) *(% Area)	% ROCK OUTCROP	% Area * %R.O.
LB	182.000	58.15	0.4	-0.231	0.00	0.00
LCA	96.000	30.67	0.25	-0.185	0.00	0.00
GGA	23.000	7.35	0.25	-0.044	0.00	0.00
ABA	12.000	3.83	0.38	-0.016	0.00	0.00

TOTAL = 313.000 ACRES XKSAT = 0.33 %ROCK= 0.00

DTHETA

Dry = 0.35
Normal = 0.25
Wet = 0

PSIF

= 3.92

LAND USE

AREA ACRES	LAND USE type	% Area	DTHETA condition	% veg. cover	% Imp. Inc.ROW	ImpArea ACRES	IA in.	Wgtd. IA in.
313.000	M.D.R.	100.00	NORMAL	0.00	45.00	140.85	0.20	0.200

313.000 =TOTAL AREA OK AVERAGE = 0.00 TOTAL = 140.85 AVG. = 0.200
% = 45.00

PERCENT OF SUBBASIN
DRY = 0.00 %
NORMAL = 100.00 %
WET = 0.00 %

SUBBASIN DTHETA WEIGHTED BY LAND USE = 0.250

SUBBASIN XKSAT ADJUSTED FOR VEG. = 0.330

IMPERVIOUS AREA:
URBAN @ 50 % effective = 22.50
ROCK OUTCROP @ 0 % effective = 0.00

% EFFECTIVE IMP. = 22.50

INPUT VALUES FOR MCUHP2 PROGRAM

SUBBASIN	AREA sq.mi.	IA inches	DTHETA	PSIF	XKSAT adj.	RTIMP %	LAG min
R67	0.489	0.200	0.250	3.92	0.330	22.50	106

LOSS PARAMETERS FOR SUBBASIN: R68

Soil Survey Used CENTRAL

XKSAT

Map Unit	AREA ACRES	% Area	XKSAT	log(XKSAT) *(% Area)	% ROCK OUTCROP	% Area * %R.O.
GYD	66.000	37.08	0.26	-0.217	0.00	0.00
PA	55.000	30.90	0.4	-0.123	0.00	0.00
ABA	53.000	29.78	0.38	-0.125	0.00	0.00
PEB	4.000	2.25	0.38	-0.009	0.00	0.00

TOTAL = 178.000 ACRES XKSAT = 0.34 %ROCK= 0.00

DTHETA

Dry = 0.35
Normal = 0.25
Wet = 0

PSIF

= 3.98

LAND USE

AREA ACRES	LAND USE type	% Area	DTHETA condition	% veg. cover	% Imp. Inc.ROW	ImpArea ACRES	IA in.	Wgtd. IA in.
53.000	ROW CROP	29.78	NORMAL	0.00	0.00	0.00	0.50	0.149
125.000	ROW CROP	70.22	WET	100.00	0.00	0.00	0.50	0.351

178.000 =TOTAL AREA OK AVERAGE = 70.22 TOTAL = 0.00 AVG. = 0.500
% = 0.00

PERCENT OF SUBBASIN DRY = 0.00 %
NORMAL = 29.78 %
WET = 70.22 %

SUBBASIN DTHETA WEIGHTED BY LAND USE = 0.074

SUBBASIN XKSAT ADJUSTED FOR VEG. = 0.565

IMPERVIOUS AREA: URBAN @ 0 % effective = 0.00
ROCK OUTCROP @ 0 % effective = 0.00

% EFFECTIVE IMP. = 0.00

INPUT VALUES FOR MCUHP2 PROGRAM

SUBBASIN	AREA sq.mi.	IA inches	DTHETA	PSIF	XKSAT adj.	RTIMP %	LAG min
R68	0.278	0.500	0.074	3.98	0.565	0.00	96

LOSS PARAMETERS FOR SUBBASIN: R69

Soil Survey Used CENTRAL

XKSAT

Map Unit	AREA ACRES	% Area	XKSAT	log(XKSAT) *(% Area)	% ROCK OUTCROP	% Area * %R.O.
GGA	36.000	40.91	0.25	-0.246	0.00	0.00
LB	23.000	26.14	0.4	-0.104	0.00	0.00
LCA	21.000	23.86	0.25	-0.144	0.00	0.00
ABA	8.000	9.09	0.38	-0.038	0.00	0.00

TOTAL = 88.000 ACRES XKSAT = 0.29 %ROCK= 0.00

DTHETA		PSIF	
Dry =	0.35	=	3.71
Normal =	0.25		
Wet =	0		

LAND USE

AREA ACRES	LAND USE type	% Area	DTHETA condition	% veg. cover	% Imp. Inc.ROW	ImpArea ACRES	IA in.	Wgtd. IA in.
88.000	M.D.R.	100.00	NORMAL	0.00	45.00	39.60	0.20	0.200
88.000	=TOTAL AREA OK		AVERAGE =	0.00	TOTAL = % =	39.60 45.00	AVG. =	0.200

PERCENT OF SUBBASIN DRY = 0.00 %
NORMAL = 100.00 %
WET = 0.00 %

SUBBASIN DTHETA WEIGHTED BY LAND USE = 0.250

SUBBASIN XKSAT ADJUSTED FOR VEG. = 0.290

IMPERVIOUS AREA: URBAN @ 50 % effective = 22.50
ROCK OUTCROP @ 0 % effective = 0.00

% EFFECTIVE IMP. = 22.50

INPUT VALUES FOR MCUHP2 PROGRAM

SUBBASIN	AREA sq.mi.	IA inches	DTHETA	PSIF	XKSAT adj.	RTIMP %	LAG min
R69	0.138	0.200	0.250	3.71	0.290	22.50	147

LOSS PARAMETERS FOR SUBBASIN: R70

Soil Survey Used CENTRAL

XKSAT

Map Unit	AREA ACRES	% Area	XKSAT	log(XKSAT) *(% Area)	% ROCK OUTCROP	% Area * %R.O.
ABA	53.000	50.00	0.38	-0.210	0.00	0.00
MA	36.000	33.96	0.4	-0.135	0.00	0.00
AO	7.000	6.60	0.04	-0.092	0.00	0.00
LB	6.000	5.66	0.4	-0.023	0.00	0.00
GGA	4.000	3.77	0.25	-0.023	0.00	0.00

TOTAL = 106.000 ACRES XKSAT = 0.33 %ROCK= 0.00

DTHETA		PSIF	
Dry =	0.35	=	3.92
Normal =	0.25		
Wet =	0		

LAND USE

AREA ACRES	LAND USE type	% Area	DTHETA condition	% veg. cover	% Imp. Inc.ROW	ImpArea ACRES	IA in.	Wgtd. IA in.
32.000	ROW CROP	30.19	NORMAL	0.00	0.00	0.00	0.50	0.151
74.000	ROW CROP	69.81	WET	100.00	0.00	0.00	0.50	0.349

106.000 =TOTAL AREA OK AVERAGE = 69.81 TOTAL = 0.00 AVG. = 0.500
% = 0.00

PERCENT OF SUBBASIN DRY = 0.00 %
NORMAL = 30.19 %
WET = 69.81 %

SUBBASIN DTHETA WEIGHTED BY LAND USE = 0.075

SUBBASIN XKSAT ADJUSTED FOR VEG. = 0.547

IMPERVIOUS AREA: URBAN @ 0 % effective = 0.00
ROCK OUTCROP @ 0 % effective = 0.00

% EFFECTIVE IMP. = 0.00

INPUT VALUES FOR MCUHP2 PROGRAM

SUBBASIN	AREA sq.mi.	IA inches	DTHETA	PSIF	XKSAT adj.	RTIMP %	LAG min
R70	0.166	0.500	0.075	3.92	0.547	0.00	144

LOSS PARAMETERS FOR SUBBASIN: R71

Soil Survey Used CENTRAL

XKSAT

Map Unit	AREA ACRES	% Area	XKSAT	log(XKSAT) *(% Area)	% ROCK OUTCROP	% Area * %R.O.
GGA	51.000	57.30	0.25	-0.345	0.00	0.00
ABA	23.000	25.84	0.38	-0.109	0.00	0.00
AO	7.000	7.87	0.04	-0.110	0.00	0.00
MA	4.000	4.49	0.4	-0.018	0.00	0.00
LB	4.000	4.49	0.4	-0.018	0.00	0.00

TOTAL = 89.000 ACRES XKSAT = 0.25 %ROCK= 0.00

DTHETA

Dry = 0.35
Normal = 0.25
Wet = 0

PSIF

= 3.5

LAND USE

AREA ACRES	LAND USE type	% Area	DTHETA condition	% veg. cover	% Imp. Inc.ROW	ImpArea ACRES	IA in.	Wgtd. IA in.
27.000	ROW CROP	30.34	NORMAL	0.00	0.00	0.00	0.50	0.152
62.000	ROW CROP	69.66	WET	100.00	0.00	0.00	0.50	0.348

89.000 =TOTAL AREA OK AVERAGE = 69.66 TOTAL = 0.00 AVG. = 0.500
% = 0.00

PERCENT OF SUBBASIN DRY = 0.00 %
NORMAL = 30.34 %
WET = 69.66 %

SUBBASIN DTHETA WEIGHTED BY LAND USE = 0.076

SUBBASIN XKSAT ADJUSTED FOR VEG. = 0.414

IMPERVIOUS AREA: URBAN @ 0 % effective = 0.00
ROCK OUTCROP @ 0 % effective = 0.00

% EFFECTIVE IMP. = 0.00

INPUT VALUES FOR MCUHP2 PROGRAM

SUBBASIN	AREA sq.mi.	IA inches	DTHETA	PSIF	XKSAT adj.	RTIMP %	LAG min
R71	0.139	0.500	0.076	3.50	0.414	0.00	112

LOSS PARAMETERS FOR SUBBASIN: R72

Soil Survey Used CENTRAL

XKSAT

Map Unit	AREA ACRES	% Area	XKSAT	log(XKSAT) *(% Area)	% ROCK OUTCROP	% Area * %R.O.
GGA	25.000	58.14	0.25	-0.350	0.00	0.00
MA	17.000	39.53	0.4	-0.157	0.00	0.00
AO	1.000	2.33	0.04	-0.033	0.00	0.00

TOTAL = 43.000 ACRES XKSAT = 0.29 %ROCK= 0.00

DTHETA

Dry = 0.35
Normal = 0.25
Wet = 0

PSIF

= 3.71

LAND USE

AREA ACRES	LAND USE type	% Area	DTHETA condition	% veg. cover	% Imp. Inc.ROW	ImpArea ACRES	IA in.	Wgtd. IA in.
13.000	ROW CROP	30.23	NORMAL	0.00	0.00	0.00	0.50	0.151
30.000	ROW CROP	69.77	WET	100.00	0.00	0.00	0.50	0.349

43.000 =TOTAL AREA OK AVERAGE = 69.77 TOTAL = 0.00 AVG. = 0.500
% = 0.00

PERCENT OF SUBBASIN
DRY = 0.00 %
NORMAL = 30.23 %
WET = 69.77 %

SUBBASIN DTHETA WEIGHTED BY LAND USE = 0.076

SUBBASIN XKSAT ADJUSTED FOR VEG. = 0.481

IMPERVIOUS AREA:
URBAN @ 0 % effective = 0.00
ROCK OUTCROP @ 0 % effective = 0.00

% EFFECTIVE IMP. = 0.00

INPUT VALUES FOR MCUHP2 PROGRAM

SUBBASIN	AREA sq.mi.	IA inches	DTHETA	PSIF	XKSAT adj.	RTIMP %	LAG min
R72	0.067	0.500	0.076	3.71	0.481	0.00	109

LOSS PARAMETERS FOR SUBBASIN: R73

Soil Survey Used CENTRAL

XKSAT

Map Unit	AREA ACRES	% Area	XKSAT	log(XKSAT) *(% Area)	% ROCK OUTCROP	% Area * %R.O.
GYD	747.000	56.63	0.26	-0.331	0.00	0.00
GWD	177.000	13.42	0.35	-0.061	0.00	0.00
ADA	142.000	10.77	0.4	-0.043	0.00	0.00
PRB	133.000	10.08	0.28	-0.056	0.00	0.00
PT	71.000	5.38	0.4	-0.021	0.00	0.00
AGB	49.000	3.71	0.4	-0.015	0.00	0.00

TOTAL = 1319.000 ACRES XKSAT = 0.30 %ROCK= 0.00

DTHETA

Dry = 0.35
Normal = 0.25
Wet = 0

PSIF

= 3.77

LAND USE

AREA ACRES	LAND USE type	% Area	DTHETA condition	% veg. cover	% Imp. Inc.ROW	ImpArea ACRES	IA in.	Wgtd. IA in.
********DESERT		100.00	DRY	15.00	0.00	0.00	0.35	0.350
*********=TOTAL AREA OK			AVERAGE =	15.00	TOTAL =	0.00	AVG. =	0.350
					% =	0.00		

PERCENT OF SUBBASIN DRY = 100.00 %
NORMAL = 0.00 %
WET = 0.00 %

SUBBASIN DTHETA WEIGHTED BY LAND USE = 0.350

SUBBASIN XKSAT ADJUSTED FOR VEG. = 0.317

IMPERVIOUS AREA: URBAN @ 0 % effective = 0.00
ROCK OUTCROP @ 0 % effective = 0.00

% EFFECTIVE IMP. = 0.00

INPUT VALUES FOR MCUHP2 PROGRAM

SUBBASIN	AREA sq.mi.	IA inches	DTHETA	PSIF	XKSAT adj.	RTIMP %	LAG min
R73	2.061	0.350	0.350	3.77	0.317	0.00	65

LOSS PARAMETERS FOR SUBBASIN: R74

Soil Survey Used CENTRAL

XKSAT

Map Unit	AREA ACRES	% Area	XKSAT	log(XKSAT) *(% Area)	% ROCK OUTCROP	% Area * %R.O.
PRB	587.000	34.09	0.28	-0.188	0.00	0.00
GWD	363.000	21.08	0.35	-0.096	0.00	0.00
PT	277.000	16.09	0.4	-0.064	0.00	0.00
GYD	257.000	14.92	0.26	-0.087	0.00	0.00
AGB	175.000	10.16	0.4	-0.040	0.00	0.00
GGA	49.000	2.85	0.25	-0.017	0.00	0.00
PEA	14.000	0.81	0.37	-0.004	0.00	0.00

TOTAL = 1722.000 ACRES XKSAT = 0.32 %ROCK= 0.00

DTHETA		PSIF	
Dry =	0.35	=	3.87
Normal =	0.25		
Wet =	0		

LAND USE

AREA ACRES	LAND USE type	% Area	DTHETA condition	% veg. cover	% Imp. Inc.ROW	ImpArea ACRES	IA in.	Wgtd. IA in.
********DESERT		100.00	DRY	15.00	0.00	0.00	0.35	0.350

********=TOTAL AREA OK AVERAGE = 15.00 TOTAL = 0.00 AVG. = 0.350
% = 0.00

PERCENT OF SUBBASIN DRY = 100.00 %
NORMAL = 0.00 %
WET = 0.00 %

SUBBASIN DTHETA WEIGHTED BY LAND USE = 0.350

SUBBASIN XKSAT ADJUSTED FOR VEG. = 0.338

IMPERVIOUS AREA: URBAN @ 0 % effective = 0.00
ROCK OUTCROP @ 0 % effective = 0.00

% EFFECTIVE IMP. = 0.00

INPUT VALUES FOR MCUHP2 PROGRAM

SUBBASIN	AREA sq.mi.	IA inches	DTHETA	PSIF	XKSAT adj.	RTIMP %	LAG min
R74	2.691	0.350	0.350	3.87	0.338	0.00	69

LOSS PARAMETERS FOR SUBBASIN: R75

Soil Survey Used CENTRAL

XKSAT

Map Unit	AREA ACRES	% Area	XKSAT	log(XKSAT) *(% Area)	% ROCK OUTCROP	% Area * %R.O.
GYD	336.000	97.11	0.26	-0.568	0.00	0.00
PRB	10.000	2.89	0.28	-0.016	0.00	0.00

TOTAL = 346.000 ACRES XKSAT = 0.26 %ROCK= 0.00

DTHETA		PSIF	
Dry =	0.35	=	3.55
Normal =	0.25		
Wet =	0		

LAND USE

AREA ACRES	LAND USE type	% Area	DTHETA condition	% veg. cover	% Imp. Inc.ROW	ImpArea ACRES	IA in.	Wgtd. IA in.
346.000	DESERT	100.00	DRY	15.00	0.00	0.00	0.35	0.350

346.000 =TOTAL AREA OK AVERAGE = 15.00 TOTAL = 0.00 AVG. = 0.350
% = 0.00

PERCENT OF SUBBASIN DRY = 100.00 %
NORMAL = 0.00 %
WET = 0.00 %

SUBBASIN DTHETA WEIGHTED BY LAND USE = 0.350

SUBBASIN XKSAT ADJUSTED FOR VEG. = 0.274

IMPERVIOUS AREA: URBAN @ 0 % effective = 0.00
ROCK OUTCROP @ 0 % effective = 0.00

% EFFECTIVE IMP. = 0.00

INPUT VALUES FOR MCUHP2 PROGRAM

SUBBASIN	AREA sq.mi.	IA inches	DTHETA	PSIF	XKSAT adj.	RTIMP %	LAG min
R75	0.541	0.350	0.350	3.55	0.274	0.00	47

LOSS PARAMETERS FOR SUBBASIN: R76

Soil Survey Used CENTRAL

XKSAT

Map Unit	AREA ACRES	% Area	XKSAT	log(XKSAT) *(% Area)	% ROCK OUTCROP	% Area * %R.O.
PRB	27.000	69.23	0.28	-0.383	0.00	0.00
GYD	12.000	30.77	0.26	-0.180	0.00	0.00

TOTAL = 39.000 ACRES XKSAT = 0.27 %ROCK= 0.00

DTHETA		PSIF	
Dry =	0.35	=	3.61
Normal =	0.25		
Wet =	0		

LAND USE

AREA ACRES	LAND USE type	% Area	DTHETA condition	% veg. cover	% Imp. Inc.ROW	ImpArea ACRES	IA in.	Wgtd. IA in.
39.000	DESERT	100.00	DRY	15.00	0.00	0.00	0.35	0.350
39.000	=TOTAL AREA OK		AVERAGE =	15.00	TOTAL = % =	0.00 0.00	AVG. =	0.350

PERCENT OF SUBBASIN DRY = 100.00 %
NORMAL = 0.00 %
WET = 0.00 %

SUBBASIN DTHETA WEIGHTED BY LAND USE = 0.350

SUBBASIN XKSAT ADJUSTED FOR VEG. = 0.285

IMPERVIOUS AREA: URBAN @ 0 % effective = 0.00
ROCK OUTCROP @ 0 % effective = 0.00

% EFFECTIVE IMP. = 0.00

INPUT VALUES FOR MCUHP2 PROGRAM

SUBBASIN	AREA sq.mi.	IA inches	DTHETA	PSIF	XKSAT adj.	RTIMP %	LAG min
R76	0.061	0.350	0.350	3.61	0.285	0.00	14

LOSS PARAMETERS FOR SUBBASIN: R77

Soil Survey Used CENTRAL

XKSAT

Map Unit	AREA ACRES	% Area	XKSAT	log(XKSAT) *(% Area)	% ROCK OUTCROP	% Area * %R.O.
LB	53.000	36.05	0.4	-0.143	0.00	0.00
PRB	33.000	22.45	0.28	-0.124	0.00	0.00
PEA	32.000	21.77	0.37	-0.094	0.00	0.00
PA	15.000	10.20	0.4	-0.041	0.00	0.00
RAA	7.000	4.76	0.39	-0.019	0.00	0.00
ABA	6.000	4.08	0.38	-0.017	0.00	0.00
PEB	1.000	0.68	0.38	-0.003	0.00	0.00

TOTAL = 147.000 ACRES XKSAT = 0.36 %ROCK= 0.00

DTHETA		PSIF	
Dry =	0.35	=	4.08
Normal =	0.25		
Wet =	0		

LAND USE

AREA ACRES	LAND USE type	% Area	DTHETA condition	% veg. cover	% Imp. Inc.ROW	ImpArea ACRES	IA in.	Wgtd. IA in.
147.000	DESERT	100.00	DRY	15.00	0.00	0.00	0.35	0.350
147.000	=TOTAL AREA OK		AVERAGE =	15.00	TOTAL = % =	0.00 0.00	AVG. =	0.350

PERCENT OF SUBBASIN DRY = 100.00 %
NORMAL = 0.00 %
WET = 0.00 %

SUBBASIN DTHETA WEIGHTED BY LAND USE = 0.350

SUBBASIN XKSAT ADJUSTED FOR VEG. = 0.380

IMPERVIOUS AREA: URBAN @ 0 % effective = 0.00
ROCK OUTCROP @ 0 % effective = 0.00

% EFFECTIVE IMP. = 0.00

INPUT VALUES FOR MCUHP2 PROGRAM

SUBBASIN	AREA sq.mi.	IA inches	DTHETA	PSIF	XKSAT adj.	RTIMP %	LAG min
R77	0.230	0.350	0.350	4.08	0.380	0.00	28

LOSS PARAMETERS FOR SUBBASIN: R78

Soil Survey Used CENTRAL

XKSAT

Map Unit	AREA ACRES	% Area	XKSAT	log(XKSAT) *(%.Area)	% ROCK OUTCROP	% Area * %R.O.
GYD	220.000	83.02	0.26	-0.486	0.00	0.00
ABA	26.000	9.81	0.38	-0.041	0.00	0.00
PRB	19.000	7.17	0.28	-0.040	0.00	0.00

TOTAL = 265.000 ACRES XKSAT = 0.27 %ROCK= 0.00

DTHETA

Dry = 0.35
Normal = 0.25
Wet = 0

PSIF

= 3.61

LAND USE

AREA ACRES	LAND USE type	% Area	DTHETA condition	% veg. cover	% Imp. Inc.ROW	ImpArea ACRES	IA in.	Wgtd. IA in.
265.000	DESERT	100.00	DRY	15.00	0.00	0.00	0.35	0.350
265.000	=TOTAL AREA OK		AVERAGE =	15.00	TOTAL =	0.00	AVG. =	0.350
					% =	0.00		

PERCENT OF SUBBASIN
DRY = 100.00 %
NORMAL = 0.00 %
WET = 0.00 %

SUBBASIN DTHETA WEIGHTED BY LAND USE = 0.350

SUBBASIN XKSAT ADJUSTED FOR VEG. = 0.285

IMPERVIOUS AREA:
URBAN @ 0 % effective = 0.00
ROCK OUTCROP @ 0 % effective = 0.00

% EFFECTIVE IMP. = 0.00

INPUT VALUES FOR MCUHP2 PROGRAM

SUBBASIN	AREA sq.mi.	IA inches	DTHETA	PSIF	XKSAT adj.	RTIMP %	LAG min
R78	0.414	0.350	0.350	3.61	0.285	0.00	27

LOSS PARAMETERS FOR SUBBASIN: R79

Soil Survey Used CENTRAL

XKSAT

Map Unit	AREA ACRES	% Area	XKSAT	log(XKSAT) *(% Area)	% ROCK OUTCROP	% Area * %R.O.
GYD	335.000	66.87	0.26	-0.391	0.00	0.00
PRB	130.000	25.95	0.28	-0.143	0.00	0.00
ABA	36.000	7.19	0.38	-0.030	0.00	0.00

TOTAL = 501.000 ACRES XKSAT = 0.27 %ROCK= 0.00

DTHETA

Dry = 0.35
Normal = 0.25
Wet = 0

PSIF

= 3.61

LAND USE

AREA ACRES	LAND USE type	% Area	DTHETA condition	% veg. cover	% Imp. Inc.ROW	ImpArea ACRES	IA in.	Wgtd. IA in.
501.000	DESERT	100.00	DRY	15.00	0.00	0.00	0.35	0.350
501.000	=TOTAL AREA OK		AVERAGE =	15.00	TOTAL =	0.00	AVG. =	0.350
					% =	0.00		

PERCENT OF SUBBASIN
DRY = 100.00 %
NORMAL = 0.00 %
WET = 0.00 %

SUBBASIN DTHETA WEIGHTED BY LAND USE = 0.350

SUBBASIN XKSAT ADJUSTED FOR VEG. = 0.285

IMPERVIOUS AREA:
URBAN @ 0 % effective = 0.00
ROCK OUTCROP @ 0 % effective = 0.00
% EFFECTIVE IMP. = 0.00

INPUT VALUES FOR MCUHP2 PROGRAM

SUBBASIN	AREA sq.mi.	IA inches	DTHETA	PSIF	XKSAT adj.	RTIMP %	LAG min
R79	0.783	0.350	0.350	3.61	0.285	0.00	44

LOSS PARAMETERS FOR SUBBASIN: R80

Soil Survey Used CENTRAL

XKSAT

Map Unit	AREA ACRES	% Area	XKSAT	log(XKSAT) *(% Area)	% ROCK OUTCROP	% Area * %R.O.
GYD	106.000	25.73	0.26	-0.151	0.00	0.00
CF	104.000	25.24	0.5	-0.076	0.00	0.00
PEA	77.000	18.69	0.37	-0.081	0.00	0.00
PRB	61.000	14.81	0.28	-0.082	0.00	0.00
PEB	25.000	6.07	0.38	-0.025	0.00	0.00
ABA	15.000	3.64	0.38	-0.015	0.00	0.00
RAA	13.000	3.16	0.39	-0.013	0.00	0.00
PA	11.000	2.67	0.4	-0.011	0.00	0.00

TOTAL = 412.000 ACRES XKSAT = 0.35 %ROCK= 0.00

DTHETA

Dry =	0.35
Normal =	0.25
Wet =	0

PSIF

= 4.03

LAND USE

AREA ACRES	LAND USE type	% Area	DTHETA condition	% veg. cover	% Imp. Inc.ROW	ImpArea ACRES	IA in.	Wgtd. IA in.
325.000	DESERT	78.88	DRY	15.00	0.00	0.00	0.35	0.276
26.000	ROW CROP	6.31	NORMAL	0.00	0.00	0.00	0.50	0.032
61.000	ROW CROP	14.81	WET	100.00	0.00	0.00	0.50	0.074

412.000 =TOTAL AREA OK AVERAGE = 26.64 TOTAL = 0.00 AVG. = 0.382

% = 0.00

PERCENT OF SUBBASIN

DRY =	78.88	%
NORMAL =	6.31	%
WET =	14.81	%

SUBBASIN DTHETA WEIGHTED BY LAND USE = 0.292

SUBBASIN XKSAT ADJUSTED FOR VEG. = 0.414

IMPERVIOUS AREA:

URBAN @	0	% effective =	0.00
ROCK OUTCROP @	0	% effective =	0.00
		% EFFECTIVE IMP. =	0.00

INPUT VALUES FOR MCUHP2 PROGRAM

SUBBASIN	AREA sq.mi.	IA inches	DTHETA	PSIF	XKSAT adj.	RTIMP %	LAG min
R80	0.644	0.382	0.292	4.03	0.414	0.00	38

LOSS PARAMETERS FOR SUBBASIN: R81

Soil Survey Used CENTRAL

XKSAT

Map Unit	AREA ACRES	% Area	XKSAT	log(XKSAT) *(% Area)	% ROCK OUTCROP	% Area * %R.O.
GYD	102.000	25.19	0.26	-0.147	0.00	0.00
PA	81.000	20.00	0.4	-0.080	0.00	0.00
ABA	76.000	18.77	0.38	-0.079	0.00	0.00
CF	56.000	13.83	0.5	-0.042	0.00	0.00
PEB	36.000	8.89	0.38	-0.037	0.00	0.00
PRB	22.000	5.43	0.28	-0.030	0.00	0.00
BS	20.000	4.94	0.39	-0.020	0.00	0.00
AE	12.000	2.96	0.39	-0.012	0.00	0.00

TOTAL = 405.000 ACRES XKSAT = 0.36 %ROCK= 0.00

DTHETA

Dry = 0.35
Normal = 0.25
Wet = 0

PSIF

= 4.08

LAND USE

AREA ACRES	LAND USE type	% Area	DTHETA condition	% veg. cover	% Imp. Inc.ROW	ImpArea ACRES	IA in.	Wgtd. IA in.
280.000	DESERT	69.14	DRY	15.00	0.00	0.00	0.35	0.242
38.000	ROW CROP	9.38	NORMAL	0.00	0.00	0.00	0.50	0.047
87.000	ROW CROP	21.48	WET	100.00	0.00	0.00	0.50	0.107

405.000 =TOTAL AREA OK AVERAGE = 31.85 TOTAL = 0.00 AVG. = 0.396
% = 0.00

PERCENT OF SUBBASIN DRY = 69.14 %
NORMAL = 9.38 %
WET = 21.48 %

SUBBASIN DTHETA WEIGHTED BY LAND USE = 0.265

SUBBASIN XKSAT ADJUSTED FOR VEG. = 0.447

IMPERVIOUS AREA: URBAN @ 0 % effective = 0.00
ROCK OUTCROP @ 0 % effective = 0.00

% EFFECTIVE IMP. = 0.00

INPUT VALUES FOR MCUHP2 PROGRAM

SUBBASIN	AREA sq.mi.	IA inches	DTHETA	PSIF	XKSAT adj.	RTIMP %	LAG min
R81	0.633	0.396	0.265	4.08	0.447	0.00	32

LOSS PARAMETERS FOR SUBBASIN: R82

Soil Survey Used CENTRAL

XKSAT

Map Unit	AREA ACRES	% Area	XKSAT	log(XKSAT) *(% Area)	% ROCK OUTCROP	% Area * %R.O.
GYD	55.000	33.33	0.26	-0.195	0.00	0.00
CF	49.000	29.70	0.5	-0.089	0.00	0.00
ABA	39.000	23.64	0.38	-0.099	0.00	0.00
PA	19.000	11.52	0.4	-0.046	0.00	0.00
PEB	2.000	1.21	0.38	-0.005	0.00	0.00
AE	1.000	0.61	0.39	-0.002	0.00	0.00

TOTAL = 165.000 ACRES XKSAT = 0.37 %ROCK= 0.00

DTHETA

Dry = 0.35
Normal = 0.25
Wet = 0

PSIF

= 4.14

LAND USE

AREA ACRES	LAND USE type	% Area	DTHETA condition	% veg. cover	% Imp. Inc.ROW	ImpArea ACRES	IA in.	Wgtd. IA in.
165.000	DESERT	100.00	DRY	15.00	0.00	0.00	0.35	0.350
165.000	=TOTAL AREA OK		AVERAGE =	15.00	TOTAL =	0.00	AVG. =	0.350
					% =	0.00		

PERCENT OF SUBBASIN DRY = 100.00 %
NORMAL = 0.00 %
WET = 0.00 %

SUBBASIN DTHETA WEIGHTED BY LAND USE = 0.350

SUBBASIN XKSAT ADJUSTED FOR VEG. = 0.390

IMPERVIOUS AREA: URBAN @ 0 % effective = 0.00
ROCK OUTCROP @ 0 % effective = 0.00

% EFFECTIVE IMP. = 0.00

INPUT VALUES FOR MCUHP2 PROGRAM

SUBBASIN	AREA sq.mi.	IA inches	DTHETA	PSIF	XKSAT adj.	RTIMP %	LAG min
R82	0.258	0.350	0.350	4.14	0.390	0.00	35

LOSS PARAMETERS FOR SUBBASIN: R83

Soil Survey Used CENTRAL

XKSAT

Map Unit	AREA ACRES	% Area	XKSAT	log(XKSAT) *(% Area)	% ROCK OUTCROP	% Area * %R.O.
HLC	361.000	64.81	0.14	-0.553	0.00	0.00
AL	86.000	15.44	0.4	-0.061	0.00	0.00
AGB	56.000	10.05	0.4	-0.040	0.00	0.00
CP	29.000	5.21	0.4	-0.021	0.00	0.00
GYD	15.000	2.69	0.26	-0.015	0.00	0.00
ABA	10.000	1.80	0.38	-0.008	0.00	0.00

TOTAL = 557.000 ACRES XKSAT = 0.20 %ROCK= 0.00

DTHETA		PSIF	
Dry =	0.38	=	5.05
Normal =	0.25		
Wet =	0		

LAND USE

AREA ACRES	LAND USE type	% Area	DTHETA condition	% veg. cover	% Imp. Inc.ROW	ImpArea ACRES	IA in.	Wgtd. IA in.
557.000	DESERT	100.00	DRY	15.00	0.00	0.00	0.35	0.350

557.000 =TOTAL AREA OK AVERAGE = 15.00 TOTAL = 0.00 AVG. = 0.350
% = 0.00

PERCENT OF SUBBASIN DRY = 100.00 %
NORMAL = 0.00 %
WET = 0.00 %

SUBBASIN DTHETA WEIGHTED BY LAND USE = 0.380

SUBBASIN XKSAT ADJUSTED FOR VEG. = 0.211

IMPERVIOUS AREA: URBAN @ 0 % effective = 0.00
ROCK OUTCROP @ 0 % effective = 0.00

% EFFECTIVE IMP. = 0.00

INPUT VALUES FOR MCUHP2 PROGRAM

SUBBASIN	AREA sq.mi.	IA inches	DTHETA	PSIF	XKSAT adj.	RTIMP %	LAG min
R83	0.870	0.350	0.380	5.05	0.211	0.00	34

APPENDIX D

MAP UNIT XKSAT TABLES

FROM THE FLOOD CONTROL DISTRICT

ASSUMPTIONS/CRITERIA USED IN DEVELOPING
XKSAT TABLES FOR THE 1992 UPDATE,
DRAINAGE DESIGN MANUAL FOR MARICOPA COUNTY, ARIZONA
VOLUME I - HYDROLOGY

1. Soil textures determined in the SCS Soil Surveys were used as a basis for calculating XKSAT rather than individual soil sieve analyses.

2. If a soil texture was described as "gravelly", "very gravelly", "extremely gravelly", etc., it's textural classification was bumped up one level in Table 4.2 to account for higher infiltration rates caused by increased biotic activity below surface gravels, and the decrease in areal pore clogging from falling raindrops. Example: a "gravelly loam" became a "sandy loam". Exception: sandy loams were not bumped to loamy sands unless they were described as "very gravelly" or "extremely gravelly". Also, in the reverse manner, "fine" and "very fine" sandy loams were bumped down to loams, due to their sieve analyses.

3. If a surface soil horizon was less than 3 inches deep, it's XKSAT value was compared to the adjoining horizon, and the slower rate was reported in the table.

4. Minor Soil Textures: If more than one texture is assigned to a soil name in the map unit descriptions, then it's minor soil designation was assigned as that which most closely matched the major soil(s) for the map unit in question. Each minor soil was given equal weight in determining the weighted map unit average XKSAT.

5. Rock Outcrop: Soil percentages within map units were normalized based on the percentage of rock outcrop stated in the Soil Surveys. Rock outcrop listed as a minor soil was ignored, since the chances are good that minor outcrop areas are not hydrologically connected to a subbasin concentration point.

6. In the Maricopa Central Part soil survey: In the few cases where a minor soil percentages were not given, 5-15% was assumed depending on percentages assigned to other soils in the series. In the Eastern Maricopa survey, minor soils were ignored since no percentages were given and because their textures generally match those of the major soils.

FLOOD CONTROL DISTRICT OF MARICOPA COUNTY

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DETAIL ____ COMPUTED ____ DATE ____

____ CHECKED BY ____ DATE ____

EXAMPLES OF XKSAT CALCULATIONS USED TO CONSTRUCT TABLES IN APPENDICIES A, B, and C.

APPENDIX A

MAP UNIT No. 65 : GREYEAGLE - CONTINENTAL - NICKEL ASSOCIATION

MAJOR SOILS: GREYEAGLE GRAVELLY LOAM AT 1 to 5 inches (45%)
CONTINENTAL CLAY LOAM AT 2 to 5 inches (25%)
NICKEL VERY GRAVELLY LOAM AT 0 to 5 inches (15%)

MINOR SOILS: OHACO CLAY LOAM
SUN CITY SANDY CLAY LOAM
CAVE LOAM
MOHAVE CLAY LOAM
ARIZO LOAMY SAND
} 3% each

IN TABLE 4.2, GRAVELLY AND VERY GRAVELLY LOAMS (GREYEAGLE AND NICKEL) WILL BE ASSIGNED THE XKSAT VALUE FOR SANDY LOAM.

$$XKSAT = ALOG[.45(\log .40) + .25(\log .04) + .15(\log .40) + .03(\log .04) + .03(\log .06) + .03(\log .25) + .03(\log .04) + .03(\log 1.2)] = \underline{0.19\ in/hr}$$

APPENDIX B

MAP UNIT CO : CHERIONI - ROCK OUTCROP COMPLEX

MAJOR SOILS: CHERIONI VERY GRAVELLY LOAM AT 0-6 inches (50%)
ROCK OUTCROP (20%)

MINOR SOILS: GACHADO VERY GRAVELLY CLAY LOAM
PINAL LOAM
GUNSIGHT LOAM
RILLITO LOAM
} 30%

SINCE THIS MAP UNIT CONTAINS ROCK OUTCROP, THE SOIL PERCENTAGES MUST BE NORMALIZED:

CHERIONI → 50/100-20 = 62.5%

MINOR SOILS → 30/80 = 37.5% / 4 = 9.4% each

IN TABLE 4.2, VERY GRAVELLY LOAM (CHERIONI) WILL BE ASSIGNED THE XKSAT VALUE FOR SANDY LOAM; VERY GRAVELLY CLAY LOAM WILL BE ASSIGNED THE VALUE FOR SANDY CLAY LOAM.

$$XKSAT = ALOG[.625(\log .40) + .094(\log .06) + 3(.094)(\log .25)] = \underline{0.29\ in/hr}$$

FLOOD CONTROL DISTRICT OF MARICOPA COUNTY

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DETAIL XKSAT CALCS. COMPUTED ____ DATE 8/91

Soil Survey: Maricopa Central CHECKED BY ____ DATE ____

MAP UNIT No.	SOIL NAME	USDA SOIL TEXTURE	% OF MAP UNIT	CONTROL HORIZON DEPTH (in)	TEXTURAL CLASS	XKSAT (in/hr)
Aa	AGUALT	L	85	0-11	L	
	Gilman	L			L	
	Maripo	SL	3%		SL	0.26
	Antho	SL	each		SL	
	Carrizo	gSL			SL	
	Laveen	L			L	
AbA	ANTHO	SL	85	0-13	SL	
	Maripo	SL			SL	
	Agualt	L	2.143%		L	
	Valencia	SL	each		SL	0.38
	Estrella	L			L	
	Gilman	L			L	
	Coolidge	SL			SL	
	Antho	L			L	
AbB	ANTHO	SL	85	0-13	SL	
	Gilman	L			L	
	Maripo	SL	3.75%		SL	0.39
	Coolidge	SL	each		SL	
	Antho	gSL			SL	
Ac	ANTHO	SL	80	0-13	SL	
	Valencia	SL			SL	
	Gilman	L	4%		L	0.39
	Laveen	L	each		L	
	Antho	SL			SL	
	Coolidge	SL			SL	
AdA	ANTHO	gSL	85	0-13	SL	
	Antho	SL			SL	
	Maripo	SL	3.75%		SL	0.40
	Brios	SL	each		SL	
	Valencia	gSL			SL	
AdB	ANTHO	gSL	85	0-13	SL	
	Valencia	gSL			SL	
	Rillito	SL	3.75%		SL	
	Carrizo	gSL	each		SL	0.40
	Coolidge	gSL			SL	

FLOOD CONTROL DISTRICT OF MARICOPA COUNTY

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DETAIL XKSAT CALCS. COMPUTED DATE 8/91

Soil Survey: Maricopa Central CHECKED BY DATE

MAP UNIT No.	SOIL NAME	USDA SOIL TEXTURE	% OF MAP UNIT	CONTROL HORIZON DEPTH (in)	TEXTURAL CLASS	XKSAT (in/hr)
Ae	ANTHO	SL	45	0-13	SL	
	BRIOS	SL	25	0-14	SL	
	MARIPO	SL	20	0-34	SL	
	Carrizo	gSL			SL	0.39
	Gilman	fSL	2.5%		L	
	Agualt	L	each		L	
	Valencia	SL			SL	
AfA	Antho	SL	50	0-13	SL	
	CARRIZO	gSL	30	0-5	SL	
	Maripo	SL			SL	0.38
	Valencia	SL	5%		SL	
	Vint	fSL	each		L	
	GILMAN	fSL			L	
AfB	ANTHO	SL	40	0-13	SL	
	CARRIZO	gSL	25	0-5	SL	
	MARIPO	SL	20	0-34	SL	0.40
	Valencia	gSL	7.5		SL	
	Rillito	SL	7.5		SL	
AGB	ANTHO	SL	35	0-13	SL	
	CARRIZO	gSL	30	0-5	SL	
	MARIPO	SL	20	0-34	SL	0.40
	Brios	SL			SL	
	Harqua	gL			SL	
	Valencia	SL			SL	
AHC	ANTHO	gSL	40	0-13	SL	
	TREMANT	gL	30	0-10	SL	
	Gunsight				L	
	Maripo				SL	
	Rillito		3.33%		SL	0.38
	Laveen		each		L	
	Carrizo				SL	
	Mohall				SL	
	Gilman				L	
	Valencia				SL	
	Estrella				L	

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DETAIL XKSAT CALCS. COMPUTED ____ DATE 8/91

Soil Survey: Maricopa Central CHECKED BY ____ DATE ____

MAP UNIT No.	SOIL NAME	USDA SOIL TEXTURE	% OF MAP UNIT	CONTROL HORIZON DEPTH (in)	TEXTURAL CLASS	XKSAT (in/hr)
AkB	ANTHO	gSL	35	0-13	SL	
	ANTHO	SL	15	0-13	SL	
	TREMANT	gCL	20	1-8	SCL	
	MOHALL	gSL	15	0-10	SL	0.27
	Cacio/Torrio	—	5		SL	
	Carrizo	gSL	5		SL	
	Gilman	fSL	5		L	
AL	ANTHO	SL	55	0-13	SL	
	ANTHO	gSL	30	0-13	SL	
	Coolidge	SL			SL	
	Laveen	SL	3%		SL	0.40
	Valencia	SL	each.		SL	
	Carrizo	gSL			SL	
	Maripo	SL			SL	
AM	ANTHO	SL	40	0-13	SL	
	VALENCIA	SL	40	0-10	SL	
	Coolidge	SL			SL	0.39
	Mohall	SL	6.67%		SL	
	Gilman	fSL	each		L	
An	AVONDA	CL	75	0-13	CL	
	Avondale	CL			CL	
	Glenbar	CL	6.25%		CL	0.05
	Agualt	L	each		L	
	Gilman	L			L	
Ao	AVONDALE	CL	85	0-12	CL	
	Glenbar	CL	5		CL	0.04
	Gilman	L	5		L	
	Trix	CL	5		CL	

FLOOD CONTROL DISTRICT OF MARICOPA COUNTY

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DETAIL XKSAT CALCS. COMPUTED ____ DATE 8/91

Soil Survey: Maricopa Central CHECKED BY ____ DATE ____

MAP UNIT No.	SOIL NAME	USDA SOIL TEXTURE	% OF MAP UNIT	CONTROL HORIZON DEPTH (in)	TEXTURAL CLASS	XKSAT (in/hr)
Ap	AVONDALE	CL	85	0-12	CL	
	Glenbar	CL	5		CL	0.04
	Cashion	C	5		C	
	Gilman	L	5		L	
BE	BEARDSLEY	L	90	0-3	L	
	Vecont	C			C	
	Suncity	vgL	2.5%		SL	0.24
	Pinal	gL	each		SL	
	Beardsley	gL			SL	
Br	BRIOS	LS	90	0-14	LS	
	Carrizo	gSL	5		SL	1.05
	Vint	fSL	5		L	
Bt	BRIOS	L	8(			
	Anthony	SL	4			
	Maripo	SL	4			0.25
	Carrizo	gSL	4			
	Vint	CL	4			
Cb	CA2 Calciorthids/ Torriorthents	Varies				
	80% 0-60	SL				0.40
	Gunsight	L	5%			
	Pinal	L	5%			
		0.38 in/hr				
CeD				0-5	SL	
				2-13	SCL	0.19
					SCL	

Bs

BRIOS	SL	80	0-14	SL	
Vint	fSL			L	
Carrizo	gSL	4%		SL	
Maripo	SL	ea.		SL	
Antho	SL			SL	
Brios	SL			SL	

XKSAT = .39

FLOOD CONTROL DISTRICT OF MARICOPA COUNTY

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DETAIL XKSAT CALCS. COMPUTED DATE 8/91

Soil Survey: Maricopa Central CHECKED BY DATE

MAP UNIT No.	SOIL NAME	USDA SOIL TEXTURE	% OF MAP UNIT	CONTROL HORIZON DEPTH (in)	TEXTURAL CLASS	XKSAT (in/hr)
CF	CARRIZO	SL	45	0-5	SL	0.50
	BRIOS	SL	35	0-14	SL	
	VINT	LS	20	0-60	LS	
Cg	CASA GRANDE	L	85	1-3	L	0.24
	Laveen	L	3.75% ea.		L	
	Harqua	gCL			SCL	
	Valencia	SL			SL	
	Tucson	L			L	
Ch	CASA GRANDE	L	85	0-3	L	0.24
	Laveen	L	3.75% ea.		L	
	Estrella	L			L	
	Harqua	gCL			SCL	
	Tucson	L			L	
Ck	CASA GRANDE	L	75	0-3	L	0.30
	Laveen	L	8.33% ea.		L	
	Harqua	gSL			SL	
	Dune Land	LS			LS	
Cm	CASA GRANDE	L	40	1-3	L	0.26
	LAVEEN	L	40	0-15	L	
	Gilman	L	6.67% ea.		L	
	Coolidge	SL			SL	
	Estrella	L			L	
Cn	CASHION	C	80	0-27	C	0.01
	Gadsden	C	5		C	
	Avondale	CL	5		CL	
	Wintersburg	CL	5		CL	
	Glenbar	CL	5		CL	

FLOOD CONTROL DISTRICT OF MARICOPA COUNTY

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DETAIL XKSAT CALCS. COMPUTED DATE 8/9

Soil Survey: MARICOPA CENTRAL CHECKED BY DATE

MAP UNIT No.	SOIL NAME	USDA SOIL TEXTURE	% OF MAP UNIT	CONTROL HORIZON DEPTH (in)	TEXTURAL CLASS	XKSAT (in/hr)
CO	CHERIONI	vgL	62.5	0-6	SL	
	Rock Outcrop		20			
	Gachado	vgCL			SCL	0.29
	Pinal	L	9.38%		L	
	Gunsight	L	ea.		L	
	Rillito	L			L	
Cp	COOLIDGE	SL	80	0-13	SL	
	Laveen	SL			SL	
	Antho	SL	4%		SL	0.40
	Rillito	SL	ea.		SL	
	Perryville	SL			SL	
	Valencia	SL			SL	
CrB	COOLIDGE	gSL	85	0-13	SL	
	Rillito	SL	5		SL	0.40
	Perryville	SL	5		SL	
	Antho	gSL	5		SL	
Cs	COOLIDGE	gSL	50	0-12	SL	
	TREMANT	CL	30	1-8	CL	
	Laveen	L			L	0.19
	Perryville	gL	5%		SL	
	Antho	SL	each		SL	
	Rillito	L			L	
CV	COOLIDGE	SL	40	0-13	SL	
	LAVEEN	SL	40	0-15	SL	
	Antho	SL			SL	0.39
	Perryville	gL	6.667%		SL	
	Rillito	L	each		L	
Dn	Dune Land	S	100	0-60	LS	1.20

FLOOD CONTROL DISTRICT OF MARICOPA COUNTY

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DETAIL XKSAT CALCS. COMPUTED DATE 8/91

Soil Survey: Maricopa Central CHECKED BY DATE

MAP UNIT No.	SOIL NAME	USDA SOIL TEXTURE	% OF MAP UNIT	CONTROL HORIZON DEPTH (in)	TEXTURAL CLASS	XKSAT (in/hr)
EbD	Ebon	vcCL	75	2-13	SCL	0.10
	Pinamt	gL	8.333% each		SL	
	Carrizo	gSL			SL	
	Tremant	gL			SL	
EPD	Ebon	vcCL	40	2-13	SCL	0.12
	PINAMT	vgSL	25	2-6	SL	
	TremANT	CL	20	1-8	CL	
	Gunsight	gL	3.75% each		SL	
	Carrizo	gSL			SL	
	Rillito	L			L	
	Antho	SL			SL	
Es	ESTRELLA	L	85	0-11	L	0.25
	GILMAN	L	3.75% each		L	
	Valencia	SL			SL	
	Mohall	L			L	
	Laveen	L			L	
Et	ESTRELLA	L	80	0-11	L	0.25
	Casa Grande	L	6.667% each		L	
	Laveen	L			L	
	Gilman	L			L	
GA	GACHADO	vgCL	66.67	0-1	SCL	0.10
	ROCK OUTCROP	—	40%	—	—	
	Cherioni	vgL	8.333% each		SL	
	Rillito	L			L	
	Pinal	L			L	
	Gunsight	L			L	
Gb	GADSDEN	CL	80	0-14	CL	0.04
	Glenbar	CL	5		CL	
	Cashion	C	5		C	
	Avondale	CL	5		CL	
	Gadsden	L	5		L	

FLOOD CONTROL DISTRICT OF MARICOPA COUNTY

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DETAIL XKSAT CALCS. COMPUTED ____ DATE 8/9

Soil Survey: Maricopa Central CHECKED BY ____ DATE ____

MAP UNIT No.	SOIL NAME	USDA SOIL TEXTURE	% OF MAP UNIT	CONTROL HORIZON DEPTH (in)	TEXTURAL CLASS	XKSAT (in/hr)
Gc	GADSDEN	C	80	0-10	C	
	Glenbar	C	5		C	
	Cashion	C	5		C	0.01
	Avondale	CL	5		CL	
	Gadsden	CL	5		CL	
Gd	GADSDEN	C	85	0-10	C	
	Glenbar	CL			CL	
	Cashion	C	3.75%		C	0.01
	Avondale	CL	each		CL	
	Gadsden	C			C	
Ge	GILMAN	L	80	0-5	L	
	Antho	SL			SL	
	Agualt	L	3.33%		L	0.26
	Vint	fSL	each		L	
	Estrella	L			L	
	Valencia	SL			SL	
	Laveen	SL			SL	
Gf	GILMAN	fSL	80	0-14	L	
	Vint	fSL	5		L	
	Antho	SL	5		SL	0.24
	Avondale	CL	5		CL	
	Maripo	SL	5		SL	
Gh	GILMAN	L	85	0-5	L	
	Laveen	L			L	
	Antho	SL	3.75%		SL	0.24
	Estrella	L	each		L	
	Avondale	CL			CL	
GL	GILMAN	L	40	0-5	L	
	GILMAN (other)	L	40	0-5	L	
	ANTHO	SL	5	0-13	SL	0.25
	GILMAN	L	5	0-5	L	
	Estrella	L	2.5%		L	
	Carrizo	gSL			SL	
	Maripo	SL	each		SL	
	Harqua	gCL				

FLOOD CONTROL DISTRICT OF MARICOPA COUNTY

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Soil Survey: Maricopa Central CHECKED BY DATE

MAP UNIT No.	SOIL NAME	USDA SOIL TEXTURE	% OF MAP UNIT	CONTROL HORIZON DEPTH (in)	TEXTURAL CLASS	XKSAT (in/hr)
GM	GILMAN	L	50	0-5	L	0.29
	ANTHO	SL	25	0-60	SL	
	AGUALT	L	10	0-11	L	
	Laveen	L	3.75% each		L	
	Maripo	SL			SL	
	Estrella	L			L	
	Carrizo	gSL			SL	
Go3	GILMAN	L	55	0-5	L	0.19
	ANTHO	SL	25	0-60	SL	
	GLENBAR	CL	20	0-15	CL	
GN	GILMAN	L	45	0-5	L	0.25
	LAVEEN	L	30	0-15	L	
	Estrella	L	20		L	
	Mohall	L	1.25		L	
	Tremant	L	1.25		L	
	Coolidge	SL	1.25		SL	
	Agualt	L	1.25		L	
GgA	GILMAN	L	80	0-5	L	0.25
	Agualt	L	4% each		L	
	Antho	SL			SL	
	Estrella	L			L	
	Glenbar	L			L	
	Laveen	L			L	
GgB	GILMAN	L	80	0-5	L	0.26
	Antho	SL	6.667% each		SL	
	Gilman	L			L	
	Laveen	L			L	
G	GILMAN VARIANT	L	95	0-3	L	0.24
	Avondale	CL	1.667% each		CL	
	Gadsden	CL			CL	
	Gilman	L			L	

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Soil Survey: Maricopa Central CHECKED BY DATE

MAP UNIT No.	SOIL NAME	USDA SOIL TEXTURE	% OF MAP UNIT	CONTROL HORIZON DEPTH (in)	TEXTURAL CLASS	XKSAT (in/hr)
Gr	GLENBAR	L	85	0-13	L	0.23
	Gilman	L	5		L	
	Avondale	CL	5		CL	
	Gilman Variant	L	5		L	
Gs	GLENBAR	L	85	0-12	L	0.23
	Gilman	L	5		L	
	Estrella	L	5		L	
	Gadsden	CL	5		CL	
Gt	GLENBAR	CL	80	0-15	CL	0.04
	Avondale	CL	5		CL	
	Gilman	L	5		L	
	Trix	CL	5		CL	
	Gadsden	CL	5		CL	
Gu	GLENBAR	CL	80	0-15	CL	0.04
	Avondale	CL	5		CL	
	Cashion	C	5		C	
	Gadsden	C	5		C	
	Gilman	L	5		L	
Gv	GLENBAR	C	85	0-20	C	0.01
	Cashion	C	5		C	
	Gadsden	C	5		C	
	Avondale	CL	5		CL	
GWD	Gunsight	L	40	1-3	L	0.35
	Pinal	gL	30	0-8	SL	
	Pinamt	vgSL	12	2-6	SL	
	Rillito	gL	6		SL	
	Antho	gSL	6		SL	
	Carrizo	vgS	6		LS	

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Soil Survey: Maricopa Central CHECKED BY DATE

MAP UNIT No.	SOIL NAME	USDA SOIL TEXTURE	% OF MAP UNIT	CONTROL HORIZON DEPTH (in)	TEXTURAL CLASS	XKSAT (in/hr)
GxA	GUNSIGHT	L	45	1-3	L	
	RILLITO	fSL	45	2-10	L	0.23
	Laveen	L	5		L	
	Harqua	gCL	5		SCL	
GxB	GUNSIGHT	L	45	1-3	L	
	RILLITO	fSL	45	2-10	L	
	Laveen	L			L	0.24
	Pinal	L	2.5%		L	
	Coolidge	gSL	each		SL	
	Harqua	gCL			SCL	
GYD	GUNSIGHT	L	40	1-3	L	
	RILLITO	fSL	40	2-10	L	
	Perryville	gL			SL	
	Laveen	L			L	0.26
	Pinal	L	3.33%		L	
	Gilman	L	each		L	
	Antho	gSL			SL	
	Carrizo	gSL			SL	
HAB	HARQUA	gCL	85	0-1	SCL	
	Harqua	gCL			SCL	
	Rillito	gL	3%		SL	0.07
	Gunsight	gL	each		SL	
	Casa Grande	L			L	
	Valencia	SL			SL	
HAC	HARQUA	gCL	65	0-1	SCL	
	HARQUA	C	20		C	0.05
	Rillito	gL	5		SL	
	Gunsight	gL	5		SL	
	Laveen	L	5		L	

FLOOD CONTROL DISTRICT OF MARICOPA COUNTY

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Soil Survey: Maricopa Central CHECKED BY DATE

MAP UNIT No.	SOIL NAME	USDA SOIL TEXTURE	% OF MAP UNIT	CONTROL HORIZON DEPTH (in)	TEXTURAL CLASS	XKSAT (in/hr)
HLC	HARQUA	gCL	40	0-1	SCL	
	Gunsight	L	35	1-3	L	
	RILLITO	L	20	0-2	L	0.14
	Rillito	gL	1.667%		SL	
	Gunsight	gL	each		SL	
	Laveen	L			L	
HM	HARQUA	gCL	40	0-1	SCL	
	LAVEEN	fSL	35	0-15	L	0.15
	Rillito	L	15		L	
	Gunsight	gL	5		SL	
	Valencia	SL	5		SL	
HrB	HARQUA	CL	50	0-1	CL	
	Rillito	gL	20	0-2	SL	
	GUNSIGHT	gL	15	1-3	SL	
	Gilman	L			L	0.12
	Antho	gSL	2.143%		SL	
	Laveen	L	each		L	
	Estrella	L			L	
	Valencia	SL			SL	
	Tremant	gL			SL	
	Coolidge	SL			SL	
La	LA PALMA	vfSL	80	0-5	L	
	Pinal	L	5		L	0.26
	Casa Grande	L	5		L	
	Laveen	L	5		L	
	Harqua	gL	5		SL	
Lb	LAVEEN	SL	80	0-14	SL	
	Perryville	SL			SL	
	Coolidge	SL	3.75%		SL	0.40
	Valencia	SL	each		SL	
	Antho	SL			SL	

FLOOD CONTROL DISTRICT OF MARICOPA COUNTY

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Soil Survey: Maricopa Central CHECKED BY DATE

MAP UNIT No.	SOIL NAME	USDA SOIL TEXTURE	% OF MAP UNIT	CONTROL HORIZON DEPTH (in)	TEXTURAL CLASS	XKSAT (in/hr)
LcA	LAVEEN	L	85	0-6	L	0.25
	Gilman	L	3% each		L	
	Mohall	L			L	
	Estrella	L			L	
	Perryville	gL			gL	
	Rillito	L			L	
LcB	LAVEEN	L	90	0-6	L	0.25
	Perryville	gL	3.33% each		gL	
	Gilman	L			L	
	Rillito				L	
Le	LAVEEN				CL	0.04
	Mohall				CL	
	Tremant				CL	
	Vecont				C	
	Tucson				CL	
Lf	LAVEEN				L	0.33
	LAVEEN				SL	
	ANTHO				SL	
	Coolidge				SL	
	Gilman				L	
	Casa Grande				SL	
Ma	MARIPO				SL	0.40
	Antho	SL	5		SL	
	Valencia	SL	5		SL	
	Coolidge	SL	5		SL	
Mo	MOHALL	SL	92	0-12	SL	0.39
	Laveen	SL	2		SL	
	Coolidge	SL	2		SL	
	Valencia	SL	2		SL	
	Tremant	L	2		L	

← Ld

Laveen	L	80	0-6	L	
Casa Grande	L	4% ea.		L	
Gilman	L			L	
Estrella	L			L	
Perryville	L			L	
Laveen	L			L	

XKSAT = .25

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MAP UNIT No.	SOIL NAME	USDA SOIL TEXTURE	% OF MAP UNIT	CONTROL HORIZON DEPTH (in)	TEXTURAL CLASS	XKSAT (in/hr)
Mp	MOHALL	L	92	0-16	L	0.25
	Laveen	L	2		L	
	Estrella	L	2		L	
	Gilman	L	2		L	
	Tremant	L	2		L	
Mr	MOHALL	CL	90	0-12	CL	0.05
	Laveen	L	2		L	
	Estrella	L	2		L	
	Tucson	L	2		L	
	Tremant	L	2		L	
	Vecont	L	2		L	
MTB	MOHALL	L	40	0-12	L	0.15
	MOHALL	CL	10	0-12	CL	
	TREMANT	CL	20	1-8	CL	
	ESTRELLA	L	15	0-11	L	
	Rillito	L	5		L	
	Coolidge	SL	5		SL	
	Laveen	L	2.5		L	
	Gilman	L	2.5		L	
MV	MOHALL	CL	25	0-12	CL	0.15
	MOHALL	L	20	0-12	L	
	LAVEEN	L	20	0-15	L	
	LAVEEN	SL	15	0-14	SL	
	Estrella	L	6.667% each		L	
	Gilman	L			L	
	Tremant	gCL			SCL	
Pa	PERRYVILLE	SL	85	0-12	SL	0.40
	Laveen	SL	5		SL	
	Coolidge	SL	5		SL	
	Rillito	SL	5		SL	

FLOOD CONTROL DISTRICT OF MARICOPA COUNTY

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Soil Survey: Maricopa County Central CHECKED BY ____ DATE ____

MAP UNIT No.	SOIL NAME	USDA SOIL TEXTURE	% OF MAP UNIT	CONTROL HORIZON DEPTH (in)	TEXTURAL CLASS	XKSAT (in/hr)
Pb	PERRYVILLE	gL	80	0-9	SL	0.38
	Rillito	L	5		L	
	Laveen	L	5		L	
	Coolidge	SL	5		SL	
	Perryville	gL	5		SL	
PeA	PERRYVILLE	gL	78	0-9	SL	0.37
	Rillito	L	10		L	
	Tremant	L	4		L	
	Coolidge	SL	4		SL	
	Laveen	L	4		L	
PeB	PERRYVILLE	gL	80	0-9	SL	0.38
	Rillito	L	6.667% each		L	
	Laveen	L			L	
	Coolidge	SL			SL	
PsA	← PRB			0-8	L	0.25
	PERRYVILLE	L 35	0-9	L	L	
	RILLITO	fSL 30	2-10	L	L	
	PERRYVILLE	SL 10	0-9	SL	L	
	RILLITO	fSL 10	2-10	L	SL	
	Antho	SL	3.75% each	SL		
PsB	Coolidge	SL		SL	L	0.26
	Laveen	SL		SL	SL	
	Gunsight	gL		SL	SL	
	XKSAT = 0.28				L	
					L	
					SL	
PT	PINAL	gL	85	0-8	SL	0.40
	Gunsight	gL	7.5		SL	
	Cherioni	vgL	7.5		SL	

FLOOD CONTROL DISTRICT OF MARICOPA COUNTY

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MAP UNIT No.	SOIL NAME	USDA SOIL TEXTURE	% OF MAP UNIT	CONTROL HORIZON DEPTH (in)	TEXTURAL CLASS	XKSAT (in/hr)
PvB	Pinal	L	50	0-8	L	0.25
	LA PALMA	vfSL	25	0-5	L	
	TOLTEC	L	15	0-12	L	
	Laveen	L	5		L	
	Pinal	L	5		L	
PWB	PINAL	gL	55	0-8	SL	0.38
	SUNCITY	gL	35	0-3	SL	
	Beardsley	L	5		L	
	Gunsight	L	5		L	
PYD	PINAMT	vgSL	40	0-6	SL	0.20
	TREMANT	CL	30	1-8	CL	
	Gunsight	gL	6% each		SL	
	Antho	gSL			SL	
	Rillito	gL			SL	
	Ebon	gL			SL	
	Carrizo	gSL			SL	
RaA	RILLITO	SL	80	0-12	SL	0.39
	Coolidge	SL	4% each		SL	
	Laveen	SL			SL	
	Tremant	L			L	
					SL	
					L	
RbA	← RaB					0.26
	RILLITO SL 80 0-10 SL			0-2	L	
	Laveen SL 5 SL				L	
	Coolidge gSL 5 SL				SL	
	Perryville gSL 5 SL				SL	
	Pinal L 5 L				L	

XKSAT = 0.39

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Soil Survey: MARICOPA CENTRAL CHECKED BY ____ DATE ____

MAP UNIT No.	SOIL NAME	USDA SOIL TEXTURE	% OF MAP UNIT	CONTROL HORIZON DEPTH (in)	TEXTURAL CLASS	XKSAT (in/hr)
RbB	RILLITO	L	80	0-10	L	0.25
	Laveen	L	6.667% each		L	
	Perryville	gL			SL	
	Pinal	L			L	
RhB	RILLITO	L	10	2-10	L	0.23
	RILLITO	L	10	2-10	L	
	RILLITO	L	10	2-10	L	
	HARQUA	gCL	10	0-3	SCL	
	HARQUA	gL	10	0-3	SL	
	HARQUA	L	10	0-3	L	
	GUNSIGHT	L	15	1-3	L	
	GUNSIGHT	L	15	1-3	L	
	Gilman	L	1.25% each		L	
	Gilman	fSL			L	
	Antho	gSL			SL	
	Antho	SL			SL	
	Carrizo	gSL			SL	
	Valencia	SL			SL	
	Estrella	L			L	
	Estrella	L			L	
RpE	RILLITO	L	15	2-10	L	0.29
	RILLITO	L	15	2-10	L	
	PERRYVILLE	gL	30	0-9	SL	
	GUNSIGHT	L	7.5	1-3	L	
	GUNSIGHT	L	7.5	1-3	L	
	PINAL	gL	15	0-8	SL	
	Harqua	gCL	5		SCL	
	Calciol Torrio	SL	5		SL	

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MAP UNIT No.	SOIL NAME	USDA SOIL TEXTURE	% OF MAP UNIT	CONTROL HORIZON DEPTH (in)	TEXTURAL CLASS	XKSAT (in/hr)
RS	ROCK OUTCROP	—	65%	—		0.40
	CHERIONI	vgL	67	1-6	SL	
	Gachado	vgL	33		SL	
Ta	TOLTEC	L	90	0-12	L	0.25
	Gilman	L	3.33% each		L	
	Laveen	L			L	
	Tucson	L			L	
TB Tc	TORRIFLUVENTS TORRIORTHENTS	SL	100%	0-60	SL	0.40
TD	TORRIPSAMMENTS TORRIFLUVENTS	LS	100%	0-60	LS	1.20
Te	TREMANT	L	85	0-12	L	0.25
	Rillito	L	5		L	
	Laveen	L	5		L	
	Mohall	L	5		L	
TfA	TREMANT	gL	85	0-12	SL	0.37
	Tremant	gSL	3% each		SL	
	Laveen	L			L	
	Rillito	gL			SL	
	Mohall	L			L	
	Harqua	gCL			SCL	
TfB	TREMANT	gL	85	0-12	SL	0.36
	Harqua	gCL	3.75% each		SCL	
	Rillito	L			L	
	Gunsight	gL			SL	
	Laveen	L			L	
Tg	TREMANT	CL	85	0-12	CL	0.04
	Mohall	CL	3% each		CL	
	Vecont	C			C	
	Laveen	L			L	
	Harqua	gCL			SCL	
	Rillito	L			L	

FLOOD CONTROL DISTRICT OF MARICOPA COUNTY

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DETAIL XKSAT CALCS. COMPUTED DATE 8/91

Soil Survey: Maricopa Central CHECKED BY DATE

MAP UNIT No.	SOIL NAME	USDA SOIL TEXTURE	% OF MAP UNIT	CONTROL HORIZON DEPTH (in)	TEXTURAL CLASS	XKSAT (in/hr)
Th	TREMANT	CL	85	1-8	CL	0.04
	Rillito	L	3% each		L	
	Mohall	C			C	
	Laveen	L			L	
	Pinamt	gCL			SCL	
	Harqua	gCL			SCL	
TPB	TREMANT	CL	40	1-8	CL	0.12
	TREMANT	vgL	40	0-12	SL	
	Mohall	L	4% each		L	
	Estrella	L			L	
	Pinamt	gL			SL	
	Laveen	L			L	
	Gilman	L			L	
TrA	TREMANT	CL	40	1-8	CL	0.11
	RILLITO	fSL	25	2-10	L	
	GUNSIGHT	L	20	1-3	L	
	Laveen	L	5% each		L	
	Harqua	gCL			SCL	
	Perryville	gL			SL	
TrB	Tremant	CL	35	1-8	CL	0.13
	RILLITO	fSL	30	2-10	L	
	GUNSIGHT	L	25	1-3	L	
	Laveen	L	2.5% each		L	
	Coolidge	gL			SL	
	Perryville	gL			SL	
	Harqua	gCL			SCL	
TSC	TREMANT	CL	35	1-8	CL	0.14
	RILLITO	fSL	30	2-10	L	
	GUNSIGHT	L	20	1-3	L	
	Carrizo	gSL	3.75% each		SL	
	Laveen	SL			SL	
	Coolidge	gSL			SL	
	Perryville	gL			SL	

FLOOD CONTROL DISTRICT OF MARICOPA COUNTY

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DETAIL XKSAT CALCS. COMPUTED ____ DATE 8/91

Soil Survey: Maricopa Central CHECKED BY ____ DATE ____

MAP UNIT No.	SOIL NAME	USDA SOIL TEXTURE	% OF MAP UNIT	CONTROL HORIZON DEPTH (in)	TEXTURAL CLASS	XKSAT (in/hr)
Tt	TRIX	CL	88	0-10	CL	0.04
	Avondale	CL	3% each		CL	
	Glenbar	CL			CL	
	Mohall	CL			CL	
	Laveen	CL			CL	
Tu	TUCSON	L	85	0-14	L	0.25
	Casa Grande	L	3% each		L	
	Laveen	L			L	
	Gilman	L			L	
	Estrella	L			L	
	Tremant	L			L	
Tw	TUCSON	CL	82	0-14	CL	0.05
	Casa Grande	L	3.6% each		L	
	Mohall	CL			CL	
	Laveen	L			L	
	Gilman	L			L	
	Estrella	L			L	
Va	VALENCIA	SL	85	0-10	SL	0.39
	Coolidge	SL	5		SL	
	Estrella	L	5		L	
	Mohall	SL	5		SL	
Vb	VALENCIA	SL	70	0-10	SL	0.39
	Casa Grande	SL	7.5% each		SL	
	Antho	SL			SL	
	Estrella	L			L	
	Coolidge	SL			SL	
Vc	VALENCIA	gSL	80	0-30	SL	0.39
	Antho	gSL	6.67% each		SL	
	Carrizo	gSL			SL	
	Estrella	L			L	

FLOOD CONTROL DISTRICT OF MARICOPA COUNTY

PROJECT 1991 HDMMC UPDATE PAGE 21 OF

DETAIL XKSAT CALCS. COMPUTED DATE 8/91

Soil Survey: Maricopa Central CHECKED BY DATE

MAP UNIT No.	SOIL NAME	USDA SOIL TEXTURE	% OF MAP UNIT	CONTROL HORIZON DEPTH (in)	TEXTURAL CLASS	XKSAT (in/hr)
Ve	VECONT	L	85	0-10	L	0.25
	Mohall	L	5		L	
	Gilman	L	5		L	
	Laveen	L	5		L	
Vf	VECONT	C	85	0-15	C	0.01
	Mohall	CL	5		CL	
	Estrella	L	5		L	
	Laveen	L	5		L	
Vg	VINT	LfS	77	0-27	LS	0.91
	Antho	SL	4.6% each		SL	
	Carrizo	gSL			SL	
	Brios	SL			SL	
	Maripo	SL			SL	
	Gilman	fSL			L	
Vh	VINT	fSL	80	0-14	L	0.27
	Antho	SL	6.67% each		SL	
	Brios	SL			SL	
	Maripo	SL			SL	
Vk	VINT	L	80	0-14	L	0.26
	Antho	SL	5% each		SL	
	Maripo	SL			SL	
	Gilman	L			L	
	Brios	L			L	
Vn	VINT	CL	80	0-14	CL	0.04
	Cashion	C	5% each		C	
	Avondale	CL			CL	
	Avonda	CL			CL	
	Brios	L			L	

FLOOD CONTROL DISTRICT OF MARICOPA COUNTY

PROJECT 1991 HDMMC UPDATE PAGE 22 OF ____

DETAIL XKSAT CALCS. COMPUTED ____ DATE 8/91

Soil Survey: Maricopa Central CHECKED BY ____ DATE ____

MAP UNIT No.	SOIL NAME	USDA SOIL TEXTURE	% OF MAP UNIT	CONTROL HORIZON DEPTH (in)	TEXTURAL CLASS	XKSAT (in/hr)
Vr	VINT	fSL	28	0-14	L	
	VINT	LfS	27	0-14	LS	
	CARRIZO	gSL	15	0-5	SL	
	CARRIZO	gS	15	0-5	S	0.63
	Brios	LS	3.75% each		LS	
	Antho	SL			SL	
	Torripsamments	LS			LS	
	Torrifluvents	LS			LS	
Wg	WINTERSBURG	CL	50	0-12	CL	
	WINTERSBURG	C	35	0-18	C	
	Cashion	C	3.75% each		C	0.03
	Avondale	CL			CL	
	Laveen	L			L	
	Wintersberg	CL			CL	

FLOOD CONTROL DISTRICT OF MARICOPA COUNTY

PROJECT Maricopa Central PAGE 1 OF ____

DETAIL XKSAT CALCS COMPUTED ____ DATE ____

____ CHECKED BY ____ DATE ____

MAP UNIT

Aa .91 (log .25) + .09 (log .40) = .26

AbA .9143 (log .40) + .0857 (log .25) = .38

AbB .9625 (log .40) + .0375 (log .25) = .39

Ac .92 (log .40) + .08 (log .25) = .39

Ae .95 (log .40) + .05 (log .25) = .39

AfA .90 (log .40) + .10 (log .25) = .38

AHC .8667 (log .40) + .1333 (log .25) = .38

AkB .75 (log .40) + .20 (log .06) + .05 (log .25) = 0.27

AM .9333 (log .40) + .0667 (log .25) = .39

An .875 (log .04) + .125 (log .25) = .05

Ao .95 (log .04) + .05 (log .25) = .04

Ap .90 (log .04) + .05 (log .01) + .05 (log .25) = .04

BE .90 (log .25) + .025 (log .01) + .075 (log .40) = .24

Br .90 (log 1.2) + .05 (log .40) + .05 (log .25) = 1.05

Bt .84 (log .25) + .12 (log .40) + .04 (log .04) = .25

Cb .91 (log .40) + .03 (log 1.2) + .06 (log .25) = .40

CAa .90 (log .40) + .10 (log .25) = .38

FLOOD CONTROL DISTRICT OF MARICOPA COUNTY

PROJECT MARICOPA CENTRAL PAGE 2 OF

DETAIL XKSAT CALCS. COMPUTED DATE

CHECKED BY DATE

MAP UNIT

CeD .60(log.40) + .40(log.06) = .19

CF .80(log.40) + .20(log 1.2) = .50

Cg .925(log.25) + .0375(log.40) + .0375(log.06) = .24

Ch .9625(log.25) + .0375(log.06) = .24

Ck .8333(log.25) + .0833(log.40) + .0833(log 1.2) = .30

Cm .9323(log.25) + .0667(log.40) = .26

Cn .85(log.01) + .15(log.04) = .01

CO .625(log.40) + .0938(log.06) + .2814(log.25) = .29

Cs .60(log.40) + .10(log.25) + .30(log.04) = .19

CV .9333(log.40) + .0667(log.25) = .39

EbD .75(log.06) + .25(log.40) = .10

EPD .40(log.06) + .3625(log.40) + .0375(log.25) + .20(log.04) = .12

Es .9625(log.25) + .0375(log.40) =

GA .6667(log.06) + .0833(log.40) + .25(log.25) = .10

Gb .90(log.04) + .05(log.01) + .05(log.25) = .04

Gc .90(log.01) + .10(log.04) = .01

FLOOD CONTROL DISTRICT OF MARICOPA COUNTY

PROJECT 1991 Maricopa Central PAGE 3 OF

DETAIL XKSAT CALCS. COMPUTED DATE

CHECKED BY DATE

MAP UNIT	
Gd	.925(log.01) + .075 (log.04) = .01
Ge	.90(log.25) + .10 (log.40) = .26
Gf	.85 (log.25) + .10 (log.40) + .05 (log.04) = .24
Gh	.925 (log.25) + .0375(log.40) + .0375 (log.04) = .24
GL	.875 (log.25) + .10 (log .40) + .025 (log.06) = .25
GM	.675 (log.25) + .325 (log.40) = .29
Go3	.55 (log.25) + .25 (log.40) + .20(log.04) = .19
GgA	.96 (log.25) + .04 (log.40) = .25
GgB	.9333 (log.25) + .0667 (log.40) = .26
Gp	.9667 (log.25) + .0333 (log.04) = .24
Gr	.95 (log .25) + .05 (log.04) = .23
Gs	.95 (log .25) + .05 (log .04) = .23
Gt	.95 (log.04) + .05 (log.25) = .04
Gu	.85 (log.04) + .10 (log.01) + .05 (log.25) = .04
Gv	.95 (log.01) + .05 (log.04) = .01
GWD	.40 (log.25) + .54 (log.40) + .06 (log 1.2) = .35
GxA	.95 (log.25) + .05 (log.06) = .23
GxB	.95 (log.25) + .025 (log.40) + .025 (log.06) =

FLOOD CONTROL DISTRICT OF MARICOPA COUNTY

PROJECT Maricopa Central PAGE 4 OF

DETAIL XKSAT CALCS. COMPUTED DATE

CHECKED BY DATE

MAP UNIT

GYD .90 (log .25) + .10 (log .40) = .26

HAB .88 (log .06) + .12 (log .40) + .03 (log .25) = .07

HAC .65 (log .06) + .20 (log .01) + .10 (log .40) + .05 (log .25) = .05

HLC .40 (log .06) + .5667 (log .25) + .0353 (log .40) = 14

HM .40 (log .06) + .50 (log .25) + .10 (log .40) = .15

HrB .50 (log .04) + .4357 (log .40) + .0643 (log .25) = .12

La .95 (log .25) + .05 (log .40) = .26

LcA .97 (log .25) + .03 (log .40) = .25

LcB .9667 (log .25) + .0333 (log .40) = .25

Le .9625 (log .04) + .0325 (log .01) = .04

Lf .40 (log .25) + .60 (log .40) = .33

Mo .92 (log .40) + .08 (log .25) = .39

Mr .90 (log .04) + .10 (log .25) = .05

MTB .65 (log .25) + .30 (log .04) + .05 (log .40) = .15

MV .25 (log .04) + .5333 (log .25) + .15 (log .40) + .0667 (log .06) = .15

Pb .90 (log .40) + .10 (log .25) = .38

PeA .82 (log .40) + .18 (log .25) = .37

FLOOD CONTROL DISTRICT OF MARICOPA COUNTY

PROJECT Maricopa Central PAGE 5 OF

DETAIL XKSAT CALCS. COMPUTED DATE

CHECKED BY DATE

MAP UNIT

PeB .8667 (log .40) + .1333 (log .25) = .38

PsA .9625 (log .25) + .0375 (log .40) = .25

PsB .88 (log .25) + .12 (log .40) = .26

PWB .90 (log .40) + .10 (log .25) = .38

PYD .70 (log .40) + .30 (log .04) = .20

RaA .92 (log .40) + .08 (log .25) = .39

RbA .90 (log .25) + .10 (log .40) = .26

RbB .9333 (log .25) + .0667 (log .40) = .25

RhB .75 (log .25) + .10 (log .06) + .15 (log .40) = .23

RpE .45 (log .25) + .50 (log .40) + .05 (log .06) = .29

TfA .91 (log .40) + .06 (log .25) + .03 (log .06) = .37

TfB .8875 (log .40) + .075 (log .25) + .0375 (log .06) = .36

Tg .88 (log .04) + .06 (log .25) + .03 (log .01) + .03 (log .06) = .04

Th .85 (log .04) + .06 (log .25) + .03 (log .01) + .06 (log .06) = .04

TPB .40 (log .04) + .44 (log .40) + .16 (log .25) = .12

TrA .40 (log .04) + .50 (log .25) + .05 (log .06) + .05 (log .40) = .11

FLOOD CONTROL DISTRICT OF MARICOPA COUNTY

PROJECT MARICOPA CENTRAL PAGE 6 OF

DETAIL XKSAT CALCS. COMPUTED DATE

CHECKED BY DATE

TRB .35 (log .04) + .575 (log .25) + .05 (log .40) + .025 (log .06) = .13

TSC .35 (log .04) + .50 (log .25) + .15 (log .40) = .14

Tw .856 (log .04) + .144 (log .25) = .05

Va .95 (log .40) + .05 (log .25) = .39

Vb .925 (log .40) + .075 (log .25) = .39

Vc .933 (log .40) + .067 (log .25) = .39

Vf .85 (log .01) + .10 (log .25) + .05 (log .04) = .01

Vg .77 (log 1.2) + .184 (log .40) + .046 (log .25) = .91

Vh .80 (log .25) + .20 (log .40) = .27

Vk .90 (log .25) + .10 (log .40) = .26

Vn .90 (log .04) + .05 (log .01) + .05 (log .25) = .04

Vr .28 (log .25) + .5325 (log 1.2) + .1875 (log .40) = .63

Wg .575 (log .04) + .3875 (log .01) + .0375 (log .25) = .03

BS .96 (log .40) + .04 (log .25) = .39

PRB .25 (log .40) + .75 (log .25) = .28

RaB .95 (log .40) + .05 (log .25) = .39

APPENDIX E

ROUTING SECTION

DISCHARGE RATING CURVES

GEORGE V. SABOL CONSULTING ENGINEERS, INC.

SHEET 1 OF 1

CLIENT Buckeye FIS

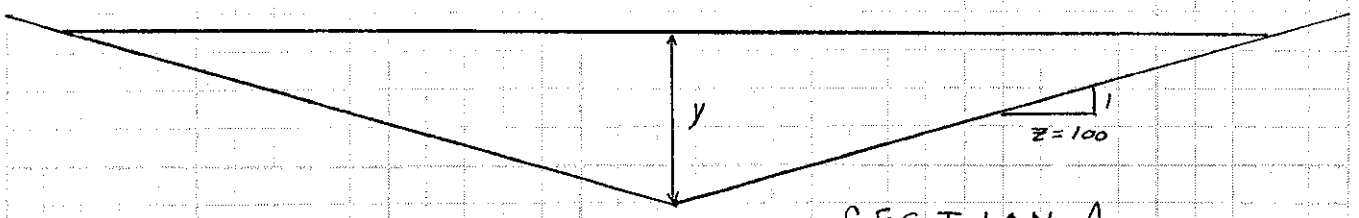
DATE 3/26/92

PROJECT

BY DTP

SUBJECT X-SECTION A Stage-Section Factor curve data

PROJECT NO. 28



SECTION A

NO SCALE

EQUATIONS:

$$A = zy^2$$

$$P = 2y\sqrt{1+z^2}$$

$$R_H = \frac{zy}{2\sqrt{1+z^2}} = \frac{1}{2}y$$

$$AR_H^{2/3} = (100y^2)\left(\frac{1}{2}y\right)^{2/3}$$

DATA:

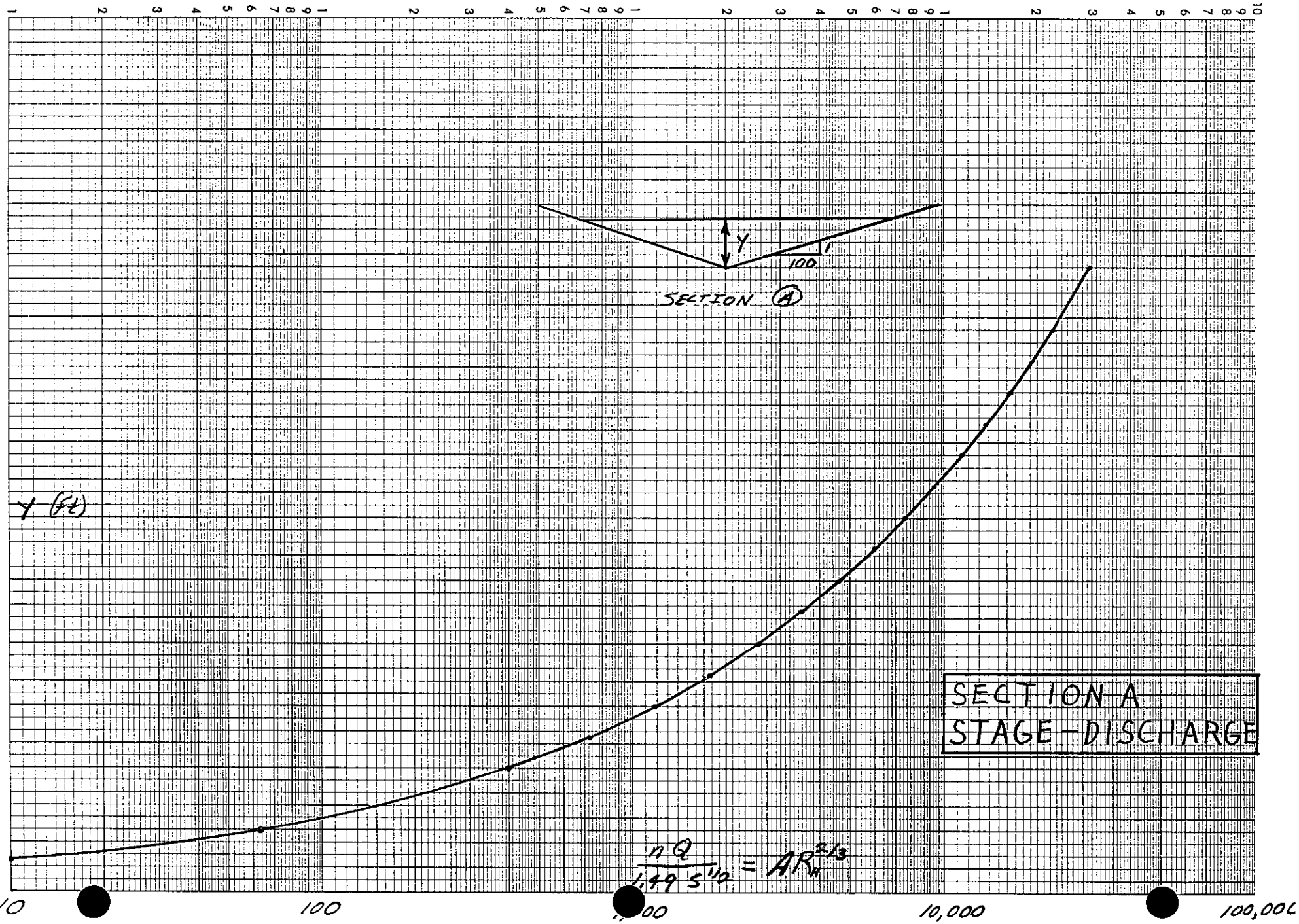
y	$AR_H^{2/3}$
0.5	10
1.0	63
2.0	400
2.5	725
3.0	1179
3.5	1779
4.0	2540
4.5	3477
5.0	4605

y	$R_H^{2/3}$
5.5	5937
6.0	7488
6.5	9270
7.0	11 295
7.5	13 577
8.0	16 126
8.5	18 956
9.0	22 077
10	29 239

college line

25410

Semi-Logarithmic 4 Cycles X 10 Divisions Per Inch



GEORGE V. SABOL CONSULTING ENGINEERS, INC.

SHEET 1 OF 2

CLIENT Buckeye - FES

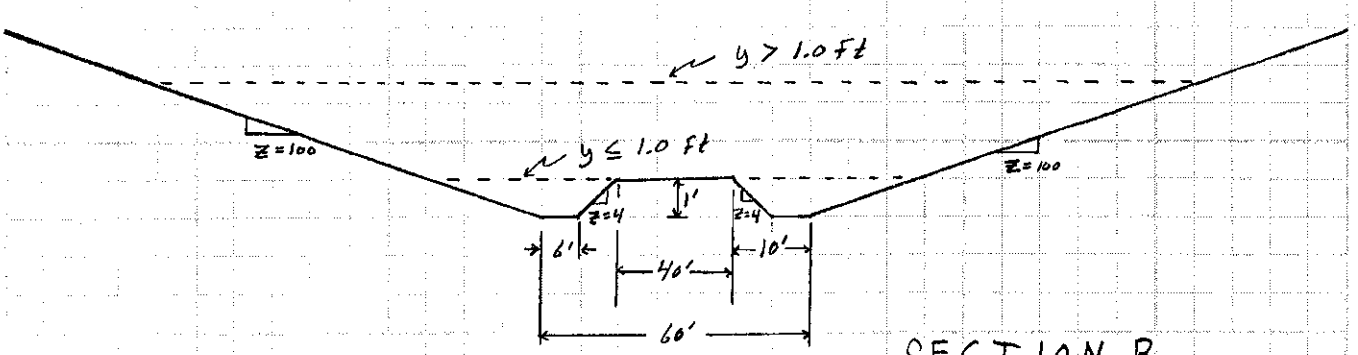
DATE 3/26/92

PROJECT

BY DTP

SUBJECT X-SECTION B Stage-Section Factor relationship

PROJECT NO. 26



SECTION B
NO SCALE

When $y \le 1.0$ ft

$$A_{y\le1} = (z_1 y + z_2 y + 2b)\,y = (100y + 4y + 2(6))\,y$$

$$A_{y\le1} = 104y^2 + (12\text{ ft})\,y$$

$$P_{y\le1} = 2b + 2y\left(\sqrt{1+z_1^2}\right)\left(\sqrt{1+z_2^2}\right)$$

$$P_{y\le1} = 12\text{ ft} + (208.256\text{ ft})\,y$$

so

$$R_{H_{y\le1}} = \frac{104y^2 + 12y}{12 + 208.256y}$$

When $y > 1.0$ ft

$$A_{y>1} = (b + zy)_{whole}\,y - (b + zy)_{road}\,y = (60\text{ ft} + 100y)\,y - (40\text{ ft} + 4(1\text{ ft}))\,1\text{ ft}$$

$$A_{y>1} = 100y^2 + (60\text{ ft})\,y - 44\text{ ft}^2$$

$$P_{y>1} = 2y\sqrt{1+z_1^2} + 2(1\text{ ft})\sqrt{1+z_2^2} + 2b_2 + b_1$$

$$P_{y>1} = 200.01y + 8.246\text{ ft} + 2(6\text{ ft}) + 40\text{ ft}$$

$$P_{y>1} = 200.01y + 60.246\text{ ft}$$

so

$$R_{H_{y>1}} = \frac{100y^2 + 60y - 44}{200.01y + 60.246}$$

GEORGE V. SABOL CONSULTING ENGINEERS, INC.

SHEET 2 OF 2

CLIENT Buckeye - FTS

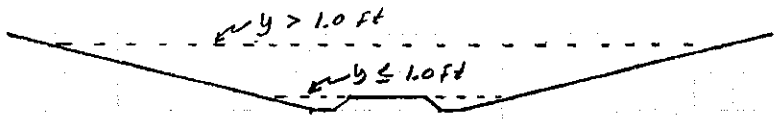
DATE 3/26/92

PROJECT

BY DTP

SUBJECT X-SECTION B Stage - Section Factor curve data.

PROJECT NO. 28



EQUATIONS:

$$AR_H^{2/3} = \frac{A^{5/3}}{P^{2/3}}$$

For $y \le 1.0$ ft $\quad AR_H^{2/3} = \dfrac{(104y^2 + 12y)^{5/3}}{(12 + 208.565y)^{2/3}}$; $\forall\, y \le 1.0$ ft

For $y > 1.0$ ft $\quad AR_H^{2/3} = \dfrac{(100y^2 + 60y - 44)^{5/3}}{(200.01y + 60.246)^{2/3}}$; $\forall\, y > 1.0$ ft

DATA:

y	$AR_H^{2/3}$	y	$AR_H^{2/3}$
0.5	13	5.5	6661
1.0	76	6.0	8338
1.5	224	6.5	10 255
2.0	487	7.0	12 423
2.5	873	7.5	14 854
3.0	1399	8.0	17 561
3.5	2081	8.5	20 555
4.0	2934	9.0	23 847
4.5	3972	9.5	27 449
5.0	5210	10.0	31 372

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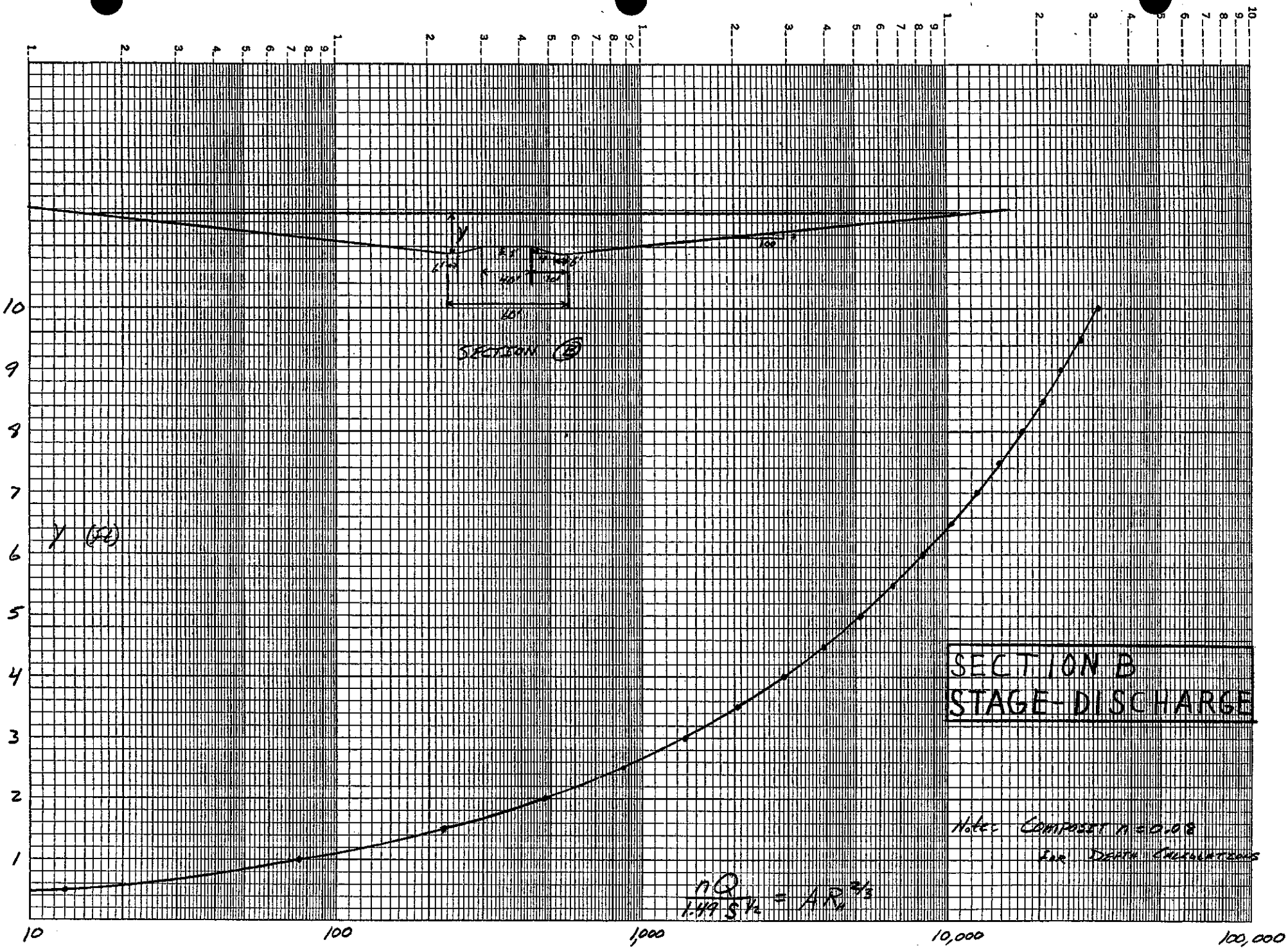

GEORGE V. SABOL CONSULTING ENGINEERS, INC.

SHEET 1 OF 1

CLIENT Buckeye - FIS

DATE 2/27/92

PROJECT

BY DRP

SUBJECT X-SECTION C Stage - Flowrate curve data

PROJECT NO. 28

DATA was Taken From HEC-1 output.

NOTE: All C section routing reaches have same slope, thus one curve.

SECTION (C)

Q (cfs)	stage (ft)
0	0
2.46	0.26
15.60	0.53
45.99	0.79
99.04	1.05
179.57	1.32
292.00	1.58
440.47	1.84
628.86	2.11
860.92	2.37
1140.21	2.63
1470.16	2.89
1910.20	3.16
2448.13	3.42
3051.73	3.68
3724.64	3.95
4470.03	4.21
5290.90	4.47
6190.09	4.74
7170.38	5.00

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4 CYCLES X 10 DIVISIONS PER INCH

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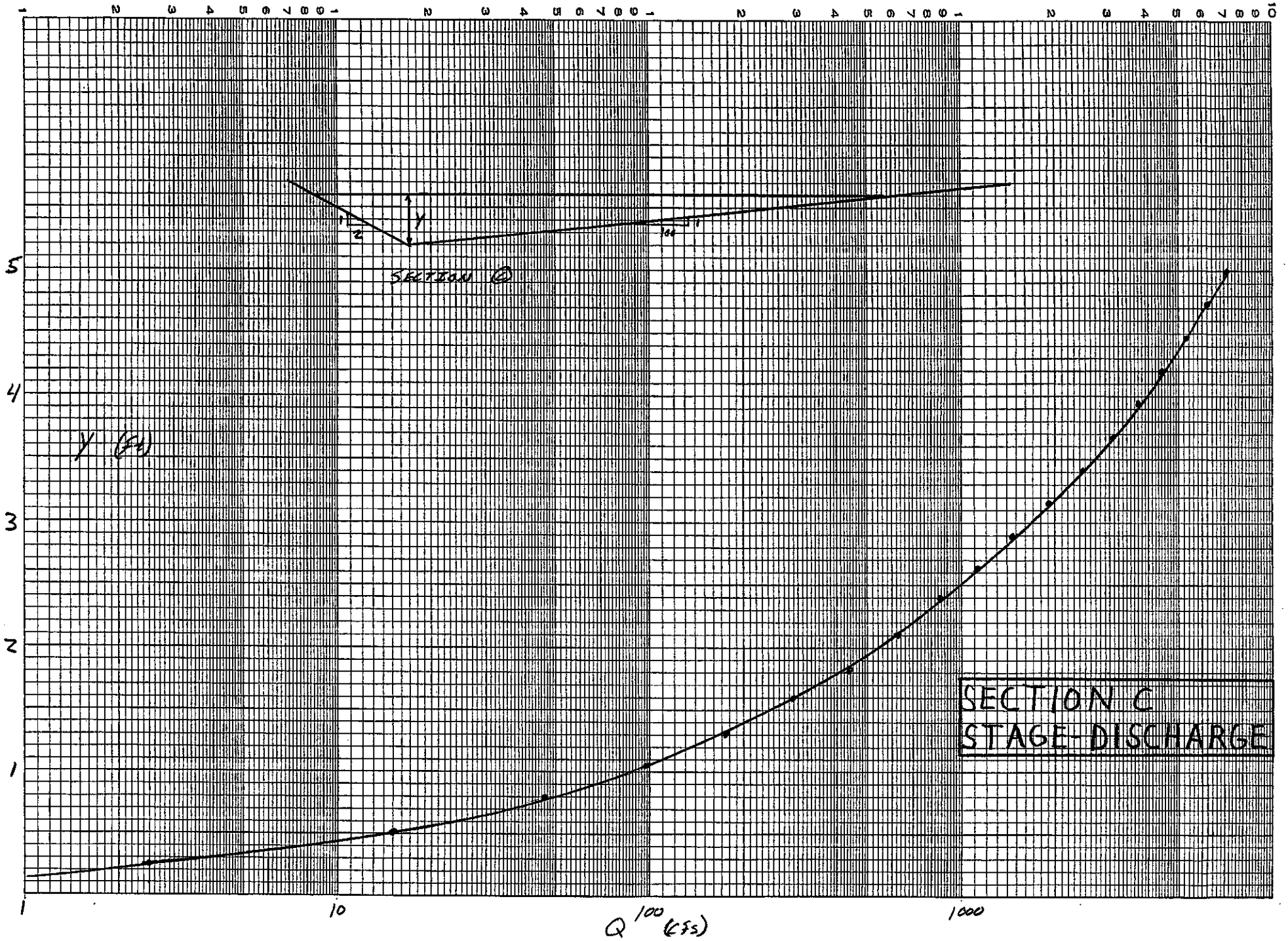

GEORGE V. SABOL CONSULTING ENGINEERS, INC.

SHEET 1 OF 1

CLIENT Buckeye FFS

DATE 3/27/92

PROJECT

BY DTP

SUBJECT X-Section D stage-flowrate curve data

PROJECT NO. 28

DATA was taken from HEC-1 output.

SECTION (D)

REACH D1-D2 Q (cfs)	REACH D2-D3 Q (cfs)	REACH D3-D4 Q (cfs)	STAGE (ft)
8.81	10.71	8.04	0.37
28.22	32.59	23.76	0.74
56.07	64.74	51.18	1.11
91.63	105.80	83.65	1.47
134.59	155.41	122.87	1.84
184.82	213.41	168.72	2.21
242.27	279.75	221.16	2.58
306.98	354.47	280.23	2.95
379.00	437.63	345.98	3.23
458.43	529.35	418.49	3.68
545.38	629.75	497.86	4.05
639.98	738.98	584.22	4.42
742.35	857.19	677.67	4.79
862.16	995.54	787.04	5.16
1014.35	1171.28	925.98	5.53
1203.12	1389.25	1098.30	5.89
1440.52	1663.36	1315.01	6.26
1736.91	2005.61	1585.57	6.63
2101.67	2426.80	1918.55	7.00

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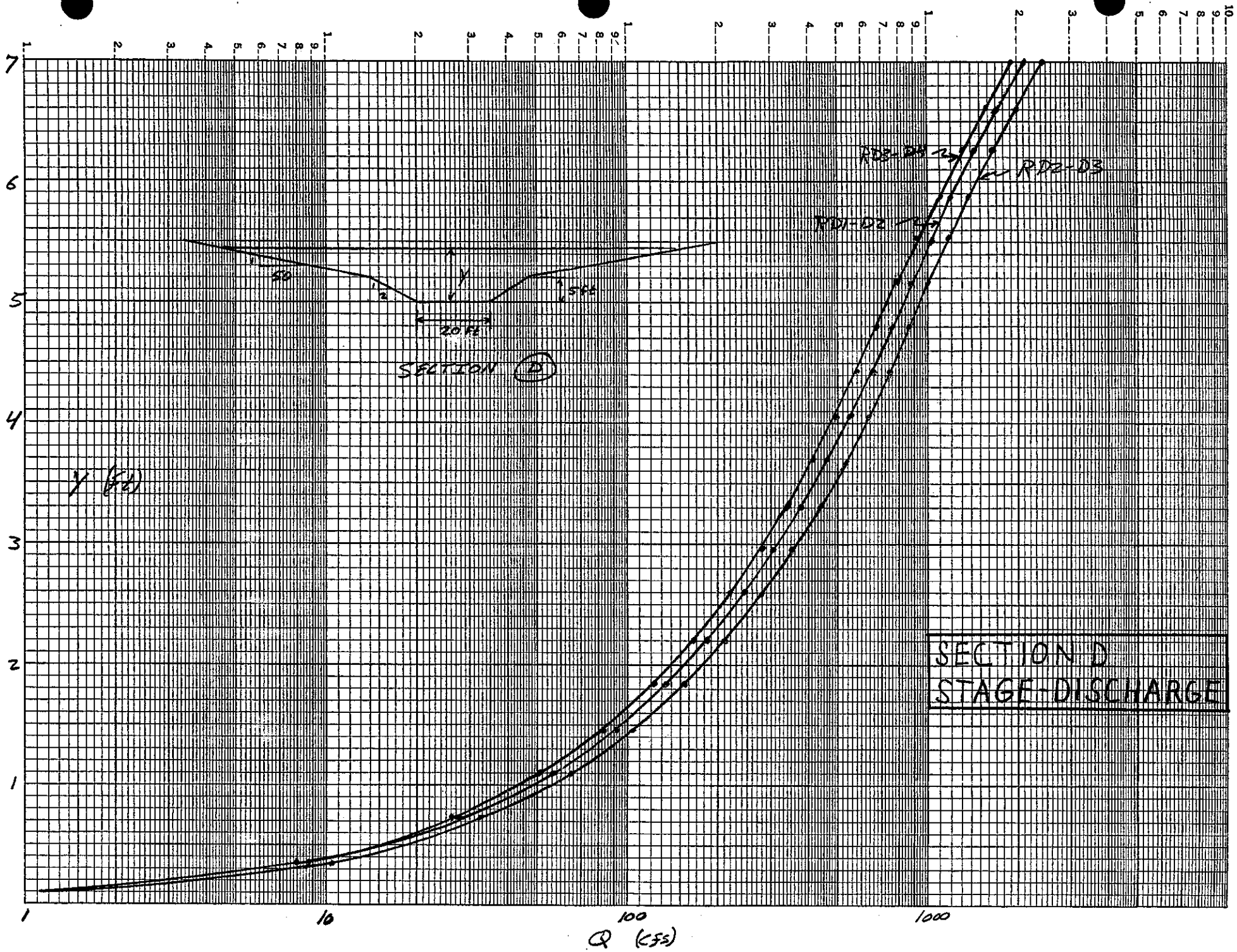


APPENDIX F

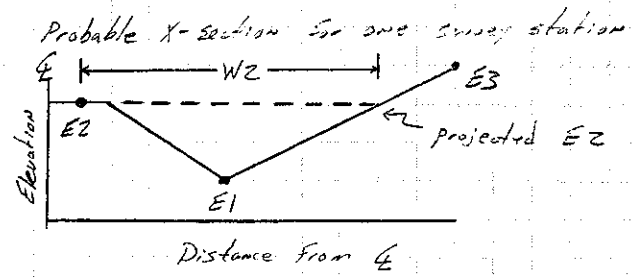
THREE-POINT CROSS-SECTIONAL DATA AND ANALYSIS OF THE STAGE-STORAGE RELATIONS FOR PONDING AREAS BEHIND THE RC, THE SPRR, AND THE BC

STORAGE VOLUME

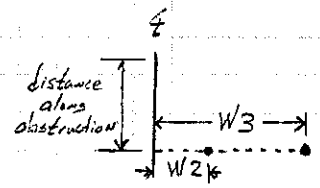
In order to compute the volume of storage along the North side of the canals and SPRR from 3-point cross sectional survey data, using the conic method in HEC-1, an area elevation relationship is developed.

SA Record (Areas):

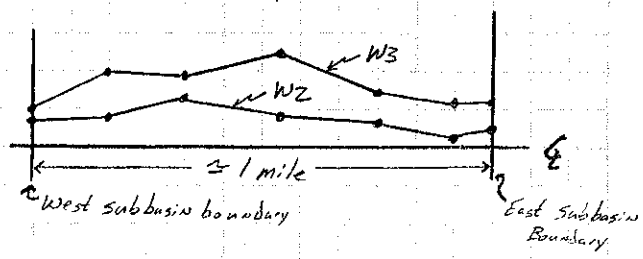
- Step 1: For each mile (sub basin) along the obstruction, the individual cross sections (from survey data) are plotted to scale. The W2 distance for each X-section can then be measured.



- Step 2: For each survey station or X-section within the sub basin, a plan view of distance along the obstruction vs. W2 & W3 distances are plotted.



- Step 3: Connect the W2 distance stations & the W3 distance stations.



AREAS:

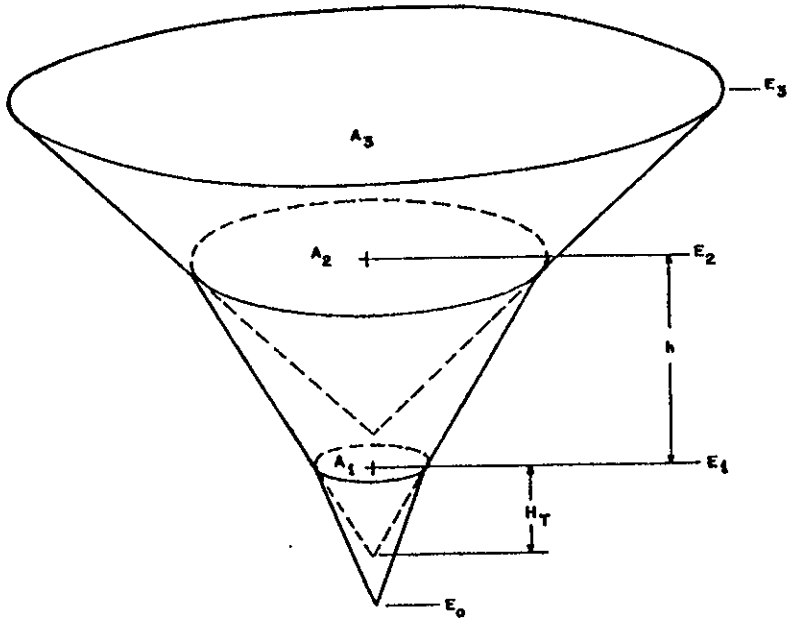
A1 associated with E1 is assumed to be zero.

A2 = area planimetered around W2 on the plan view.

A3 = area planimetered around W3 on the plan view.

SE Record (Elevations):

For simplification, the respective elevations (E1, E2 & E3) of each surveyed stational cross section, within the sub basin, are averaged for the SE Record.



$$\Delta V_{12} = \frac{h}{3}(A_1 + A_2 + \sqrt{A_1 A_2})$$

$$H_T = h/(\sqrt{A_2/A_1} - 1)$$

Where

ΔV_{12} = volume between base areas 1 and 2,

A_i = surface area of base i,

E_i = elevation of base i,

h = vertical distance ($E_2 - E_1$) between bases A_1 and A_2, and

H_T = height of truncated part of cone.

Figure 3.11 Conic Method for Reservoir Volumes

Reference: HEC-1 Flood Hydrograph Package User's Manual, September 1990, page 45.

Ponding area equals width times length of canal (L) between adjacent survey locations

A1 = W1xL = 0.0
A2 = W2xL
A3 = W3xL

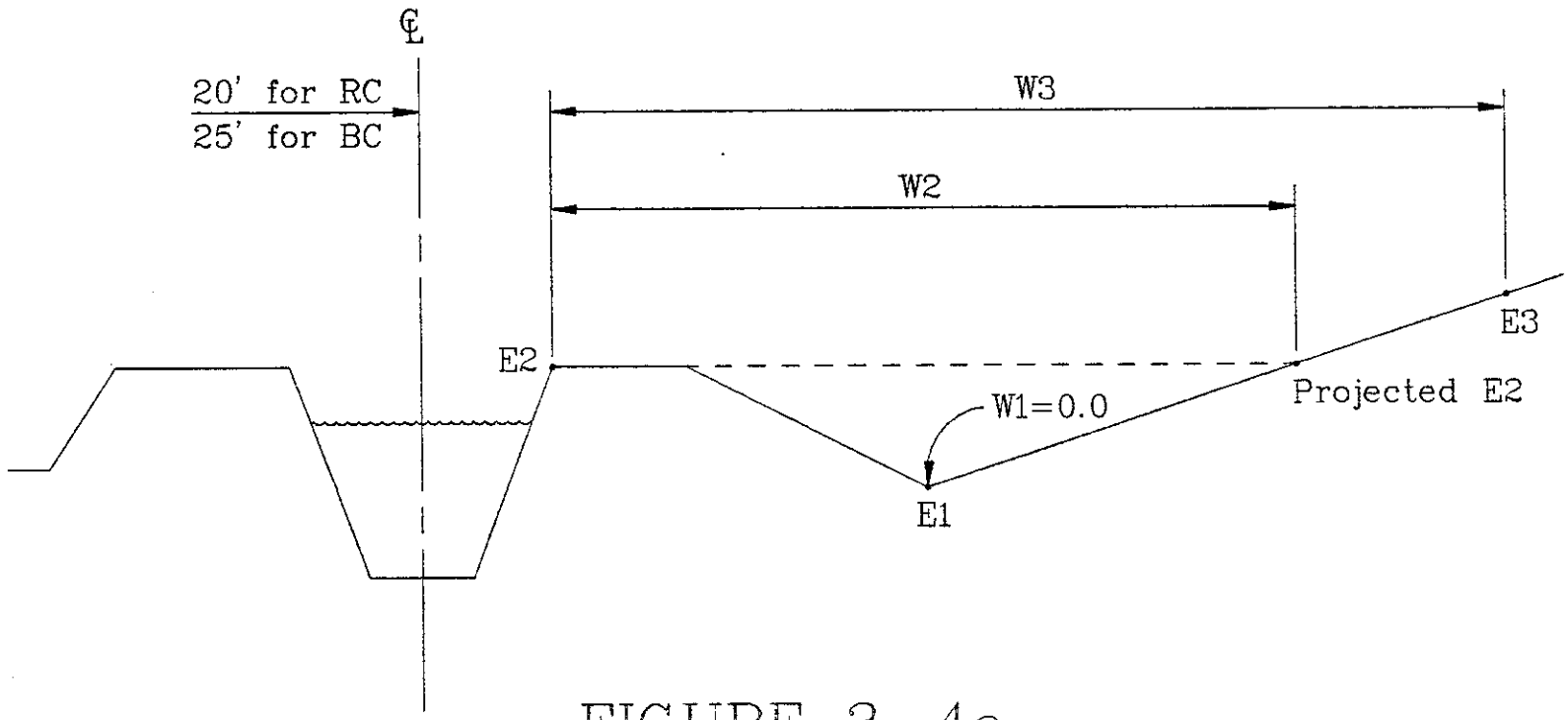


FIGURE 3-4a

DEFINITION SKETCH OF THREE POINT CROSS-SECTIONAL FIELD SURVEY DATA ALONG THE RC AND THE BC.

(Not to Scale)

Ponding area equals width times length of canal (L) between adjacent survey locations

A1 = W1xL = 0.0
A2 = W2xL
A3 = W3xL

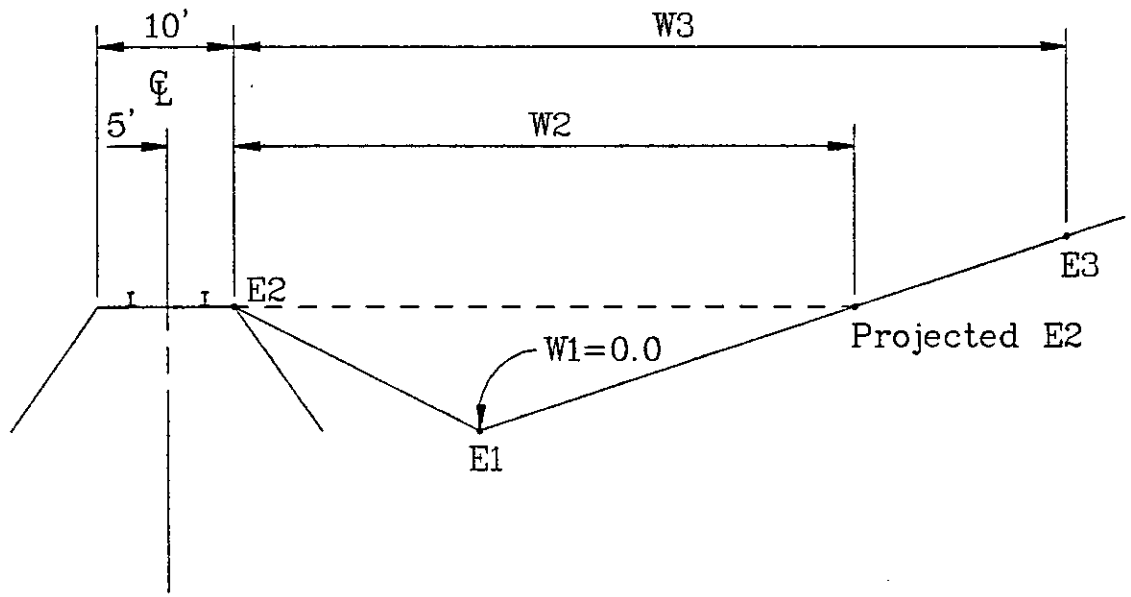
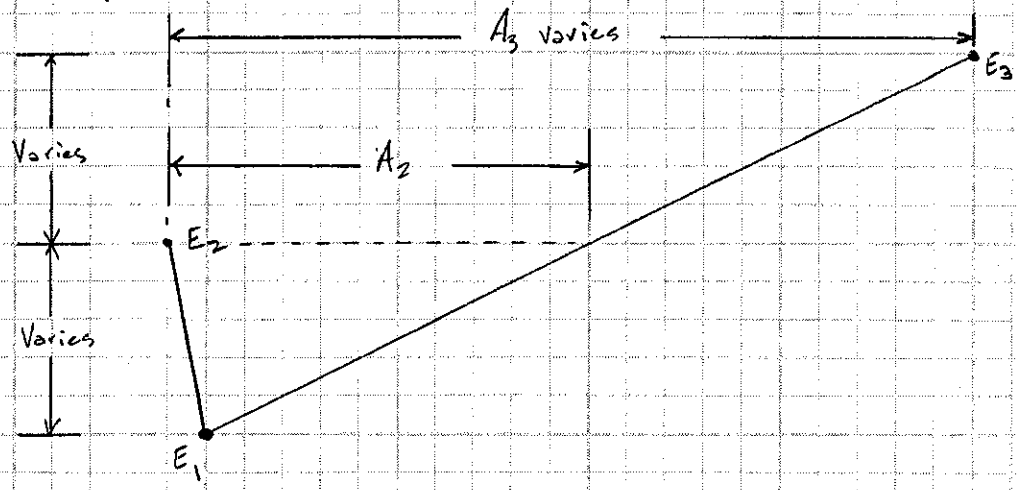


FIGURE 3-4b

DEFINITION SKETCH OF THREE POINT CROSS-SECTIONAL FIELD SURVEY DATA ALONG THE SPRR

(Not to Scale)

Assumed typical three point cross-section:



REACH LOCATION	Elevation E1	Elevation E2	Elevation E3	Area A_2	Area A_3
DEAN to Rainbow	998.19	999.12	1000.12	12.2	30.7
Rainbow to Watson	995.25	996.79	998.26	17.9	29.4
Watson to Cemetery	995.68	996.49	997.48	19.2	38.6
Cemetery to Miller	994.91	995.14	996.13	3.4	34.9
Miller to Rooks	992.43	994.01	995.0	17.7	39.9
Rooks to Ogelsby	991.22	991.44	992.39	10.0	48.5
Ogelsby to Turner	988.35	989.6	990.7	29.0	51.5
Turner to Wilson	986.58	988.31	989.32	33.7	57.4
Wilson to Palo Verde	985.66	987.39	988.4	47.7	81.8
Palo Verde to Bruner	983.14	986.04	987.03	94.2	118.2
Bruner to Johnson	982.04	984.23	985.5	127.3	145.3
Johnson to EOC	980.41	981.09	982.10	23.3	36.1

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SHEET 2 OF 42

CLIENT Flood Control District of Maricopa Co.

DATE 25 Nov. 91

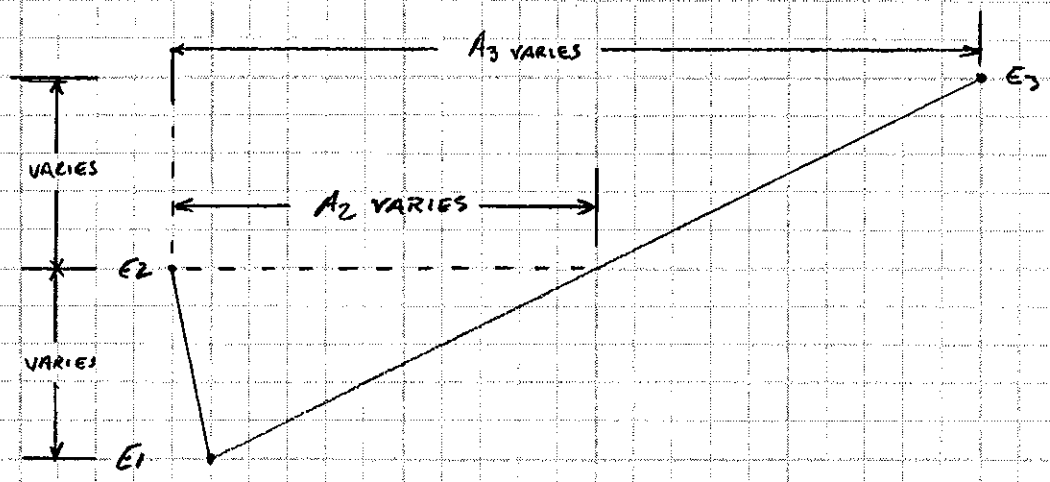
PROJECT FCD 90-69 Buckeye FIS

BY JWK

SUBJECT Buckeye Canal Storage Vol. Calculations

PROJECT NO. 28

Assumed typical three point cross-section



REACH LOCATION	Elevation E1	Elevation E2	Elevation E3	Area A2	Area A3
Dean to Rainbow	887.73	889.35	889.72	36.8	45.9
Rainbow to Watson	885.62	888.24	890.18	79.0	87.4
Watson to Cemetery	883.23	886.33	886.55	73.4	84.4
* Cemetery to Miller	879.0	883.90	886.0	70.0	108
Miller to Rooks	878.35	882.05	883.05	95.0	119.5
Rooks to Ogelsby	877.46	880.43	881.52	76.0	100.9
Ogelsby to Turner	876.47	878.29	879.60	60.7	91.4
Turner to Wilson	874.67	877.40	878.39	62.1	100.5
Wilson to Palo Verde	872.35	875.90	876.90	84.6	119.7
Palo Verde to Bruner	872.29	875.46	876.56	94.3	140.6
Bruner to Johnson	870.66	873.08	874.34	80.6	136.7
Johnson to EDC	866.70	867.65	868.81	15.1	44.7

* SEE AIR TOPO

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SHEET 3 OF 42

CLIENT Flood Control District of Maricopa Co.

DATE 7 Nov.

PROJECT FCD 90-69 Buckeye FIS

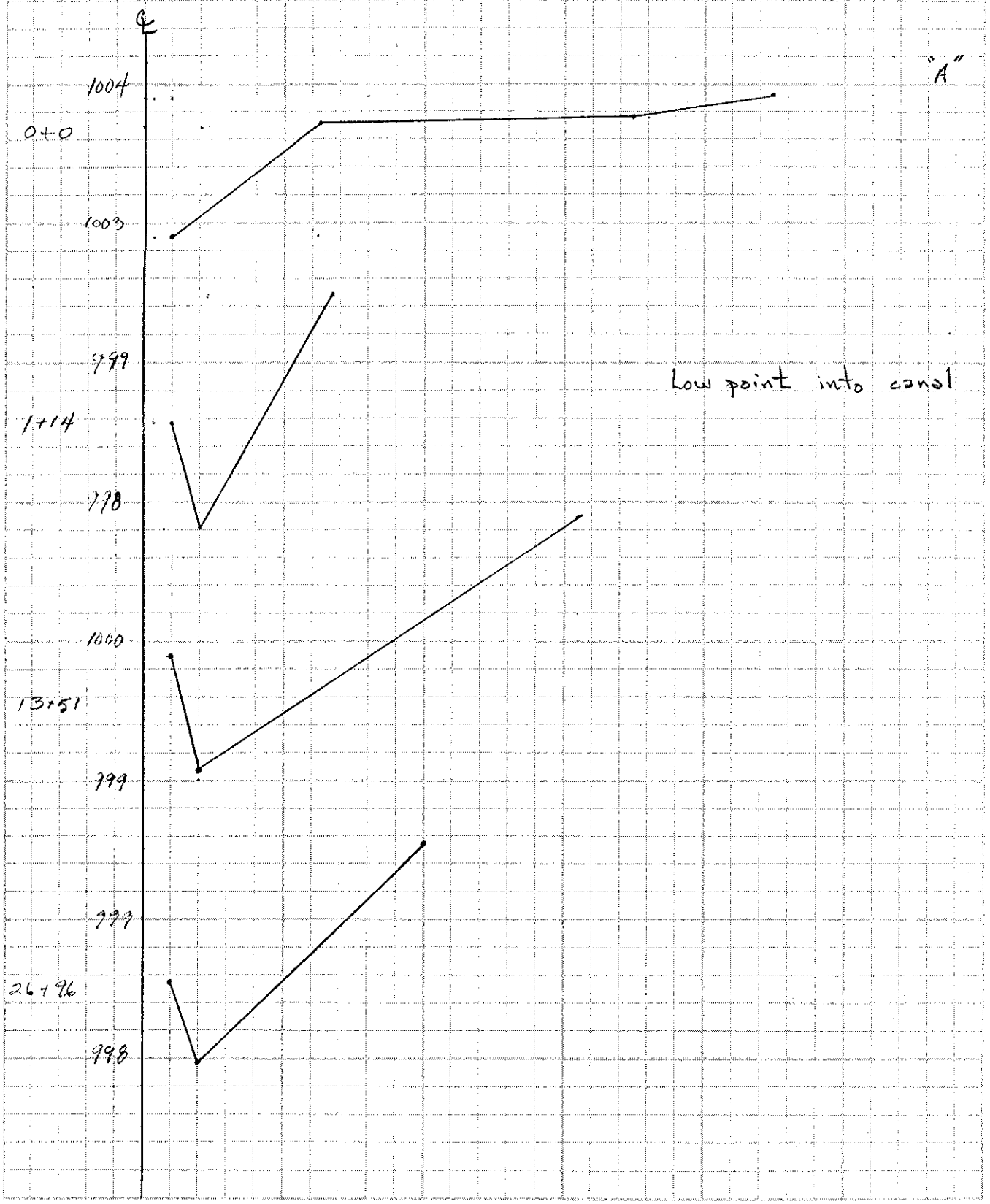
BY JMR

SUBJECT 3-pt. X-sections along Roosevelt Canal

PROJECT NO. 28

DEAN Road to Rainbow Road

Scale: 1" = 1' V
1" = 100' H



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SHEET 4 OF 42

CLIENT Flood Control District of Maricopa Co

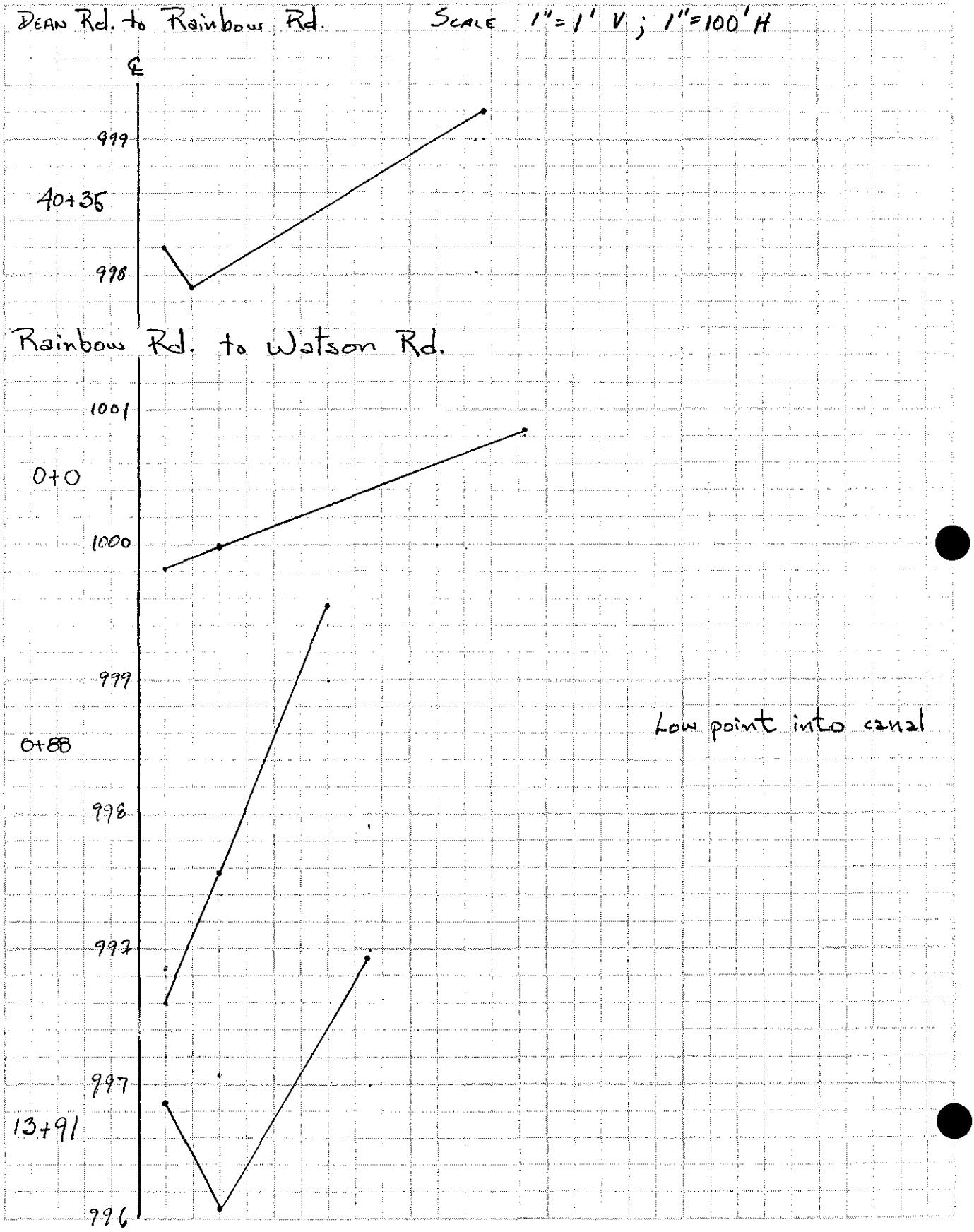
DATE 7 Nov. 91

PROJECT FCD 90-69 Buckeye FIS

BY [illegible]

SUBJECT 3 pt. X-sec. along Roosevelt Canal

PROJECT NO. 28



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SHEET 5 OF 42

CLIENT Flood Control District of Maricopa Co

DATE 7 Nov. 91

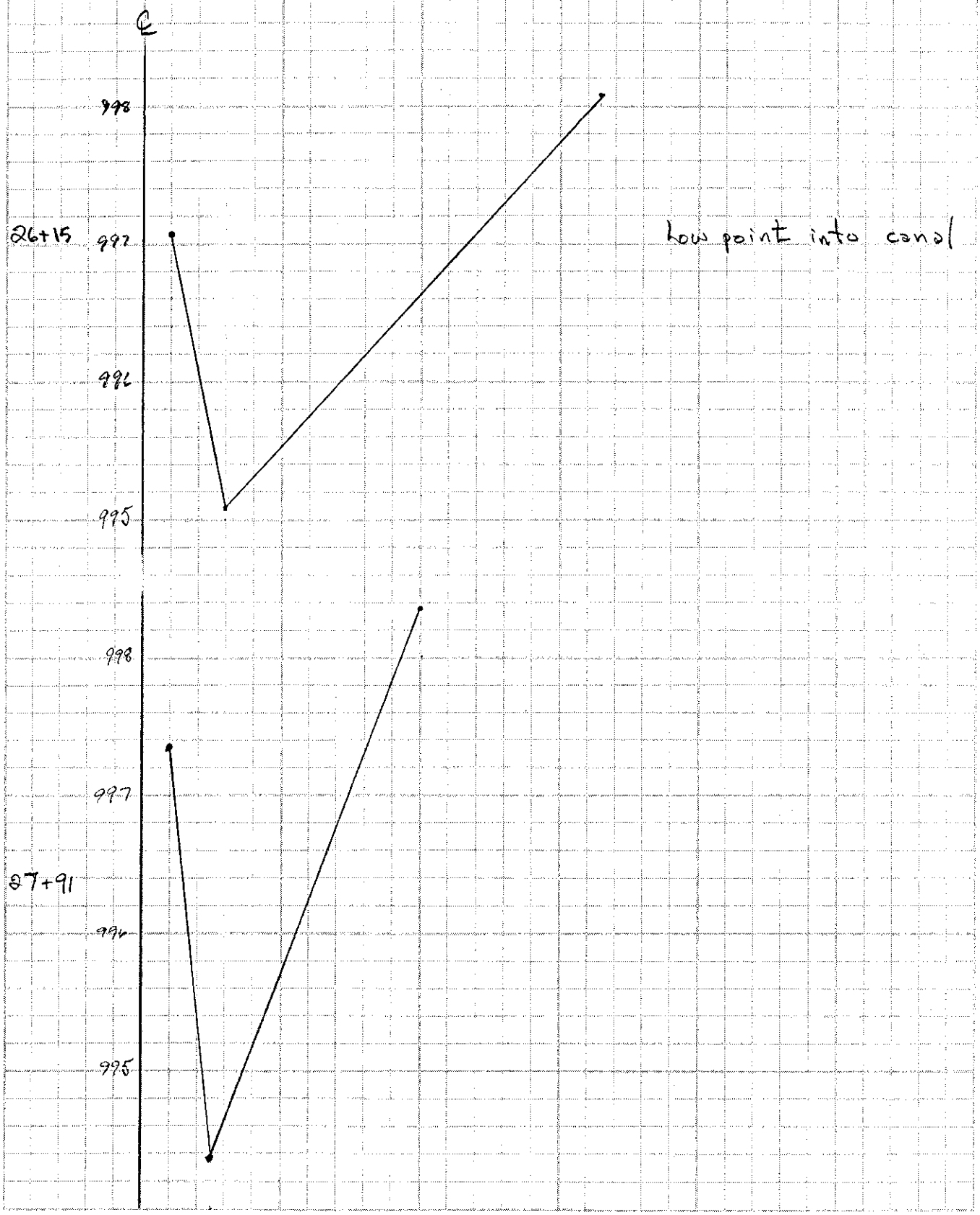
PROJECT FCD 90-69 Buckeye FIS

BY JMC

SUBJECT 3 pt. X-sections along Roosevelt Canal

PROJECT NO. 28

Rainbow Rd. to Watson Rd.



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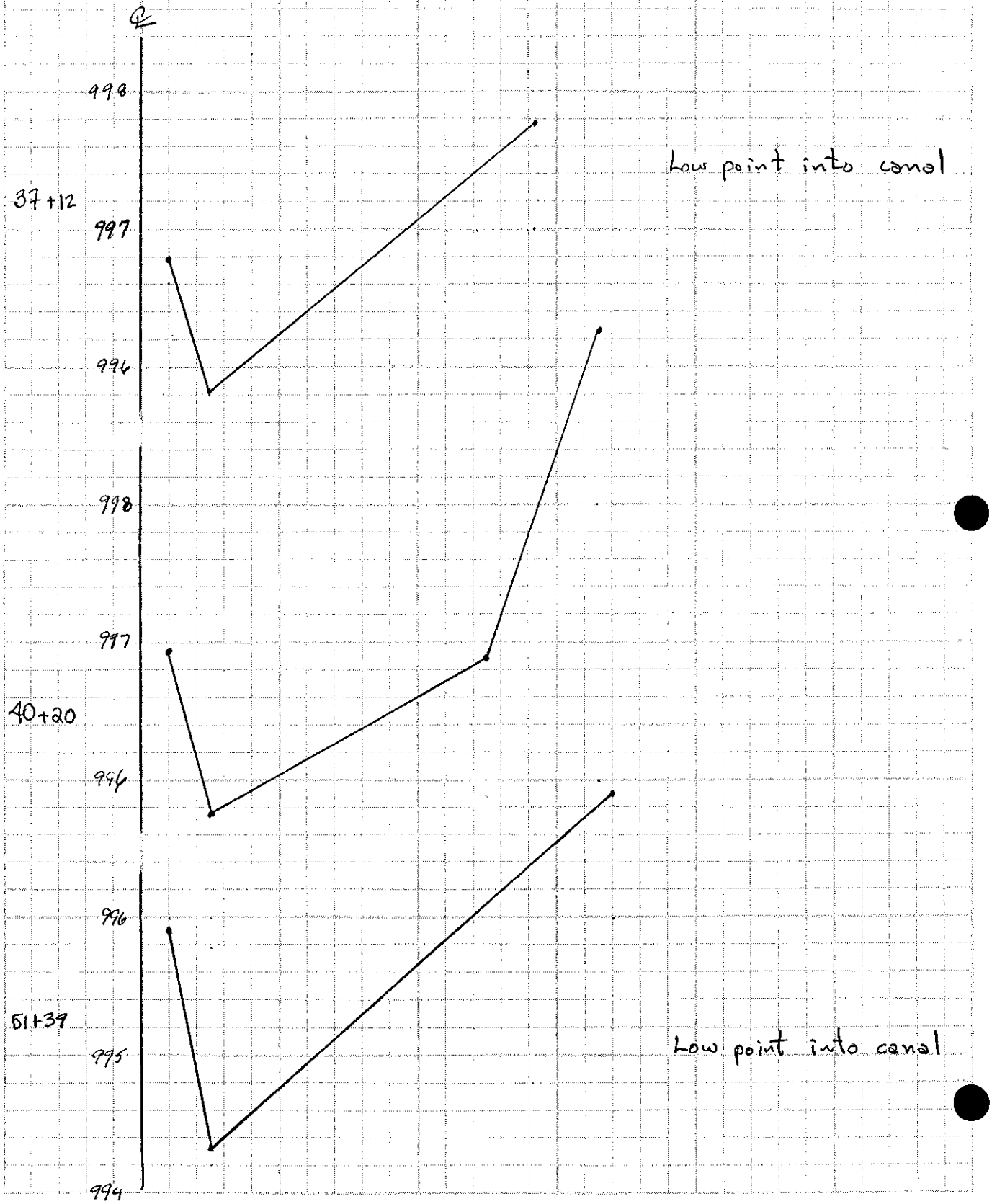
SHEET 6 OF 42
CLIENT Flood Control District of Maricopa Co
DATE 7 Nov. 91
PROJECT FCD 90-69 Buckeye FIS
BY [illegible]
SUBJECT 3pt. x-sections along Roosevelt Canal
PROJECT NO. 28

Rainbow Rd. to Watson Rd.



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SHEET 7 OF 42

CLIENT Flood Control District of Maricopa Co.

DATE 7 Nov. 91

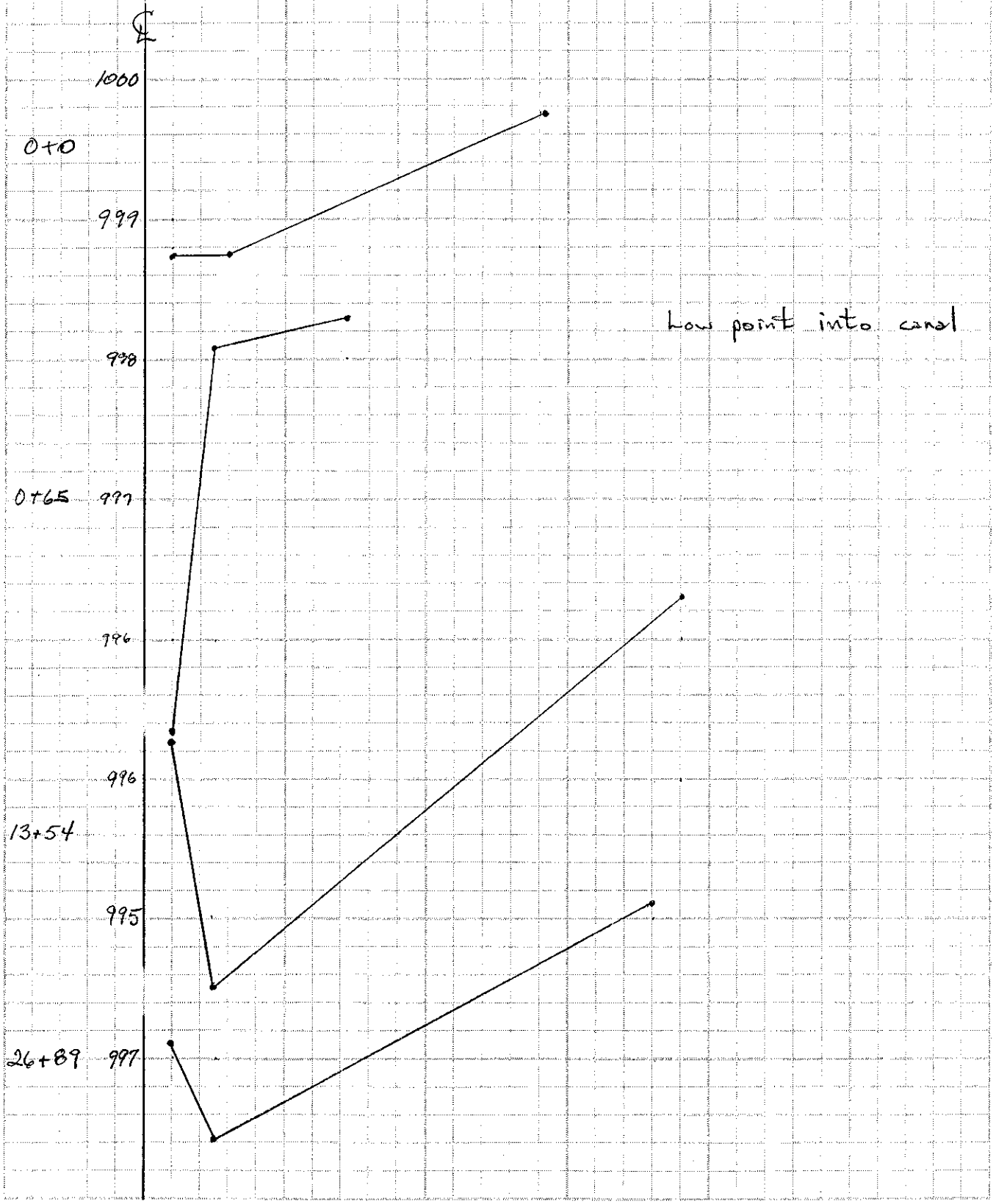
PROJECT FCD 90-69 Buckeye FIS

BY JMT2

SUBJECT 3pt X-sec along Roosevelt Canal

PROJECT NO. 23

Watson Rd to Apache Rd.



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SHEET 8 OF 42

CLIENT Flood Control District of Maricopa Co

DATE 7 Nov. 91

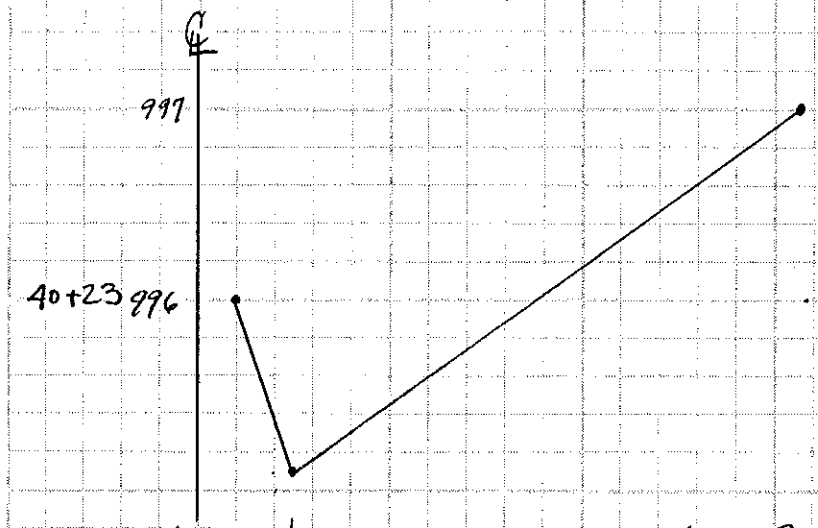
PROJECT FCD 90-69 Buckeye FIS

BY JMR

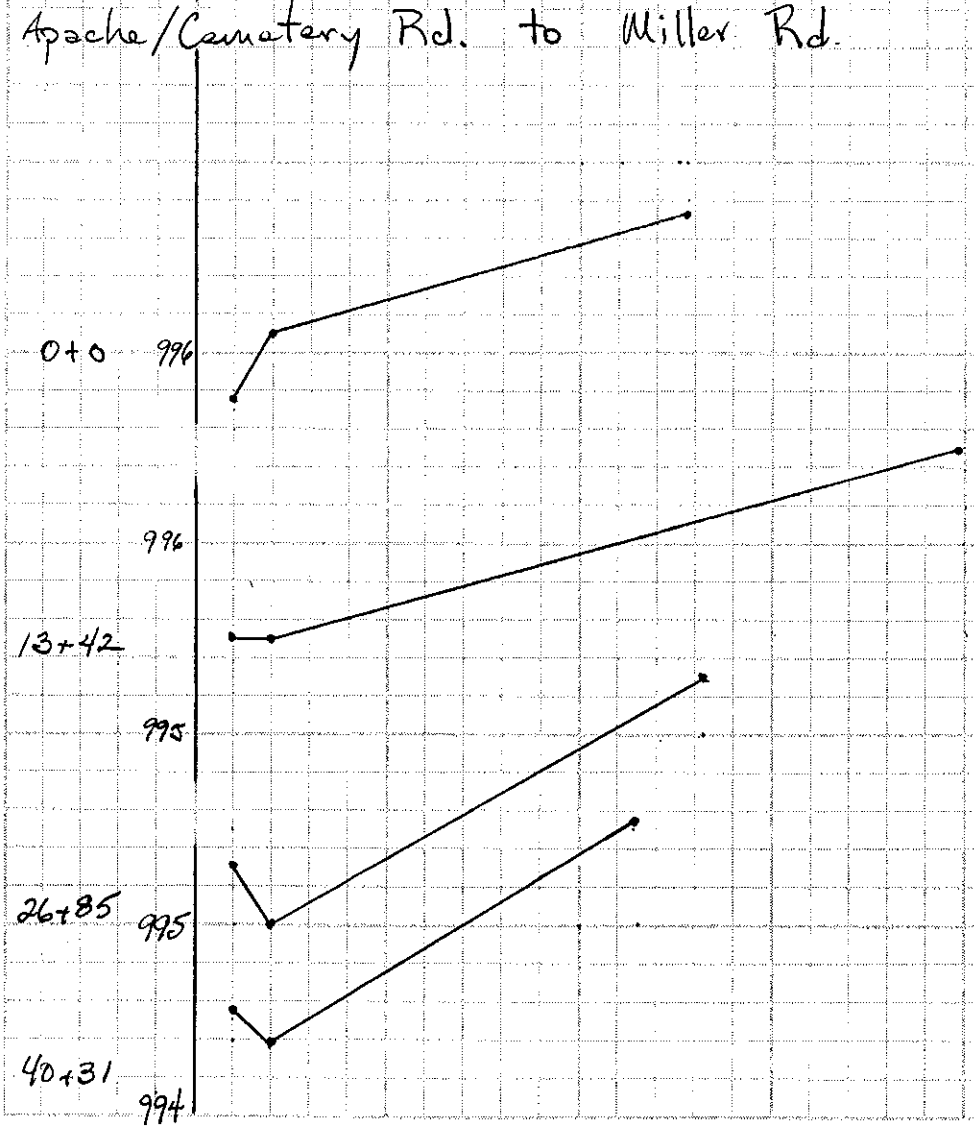
SUBJECT 3pt. X-sec's along Roosevelt Canal

PROJECT NO. 28

Watson Rd to Apache/Cemetary Rd.



Apache/Cemetary Rd. to Miller Rd.



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SHEET 9 OF 42

CLIENT Flood Control District of Maricopa Co.

DATE 7 Nov. 91

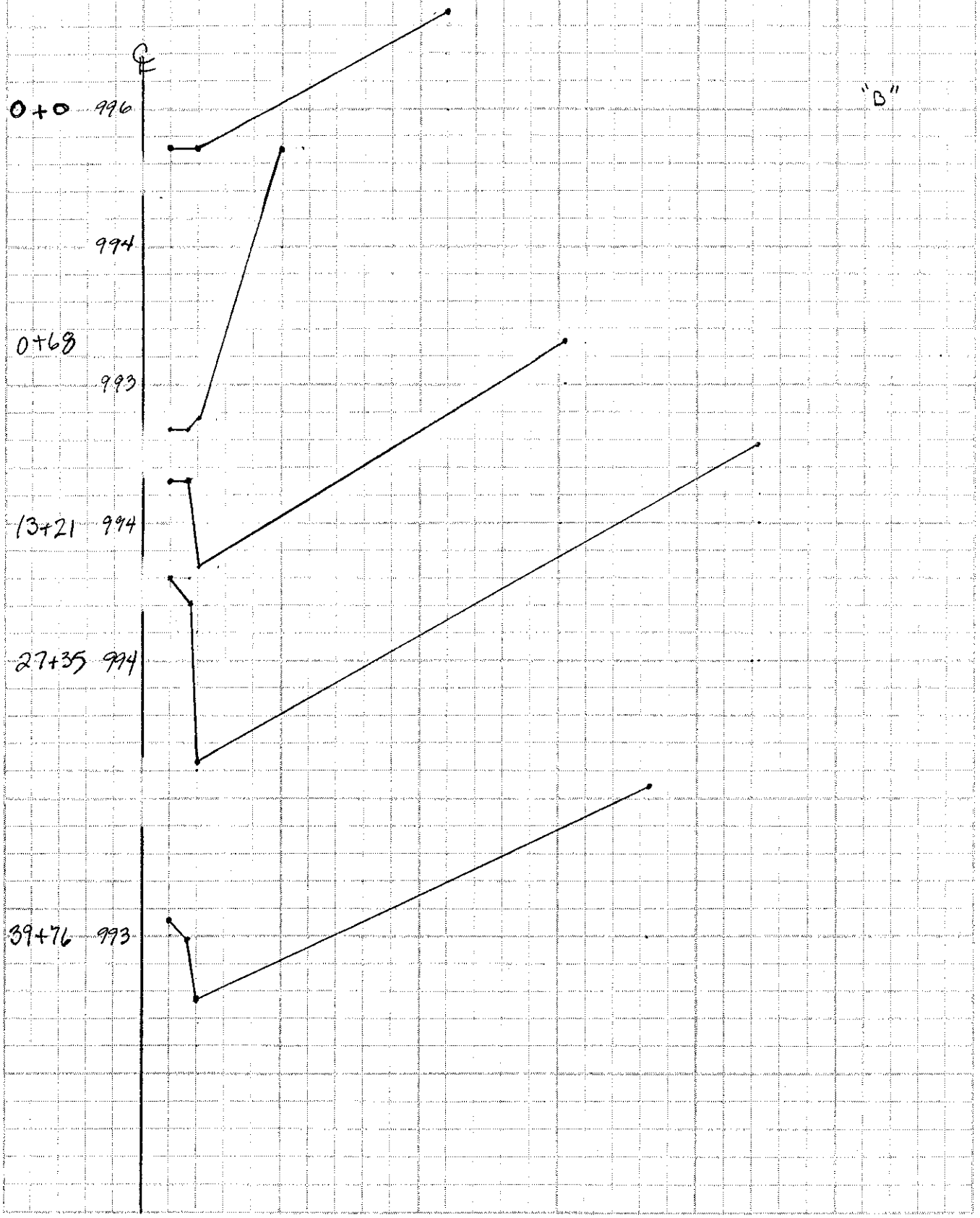
PROJECT FCD 90-69 Buckeye FIS

BY JMM

SUBJECT 3pt. X-sec's along Roosevelt Canal

PROJECT NO. 28

Miller Rd to Rooks Rd.



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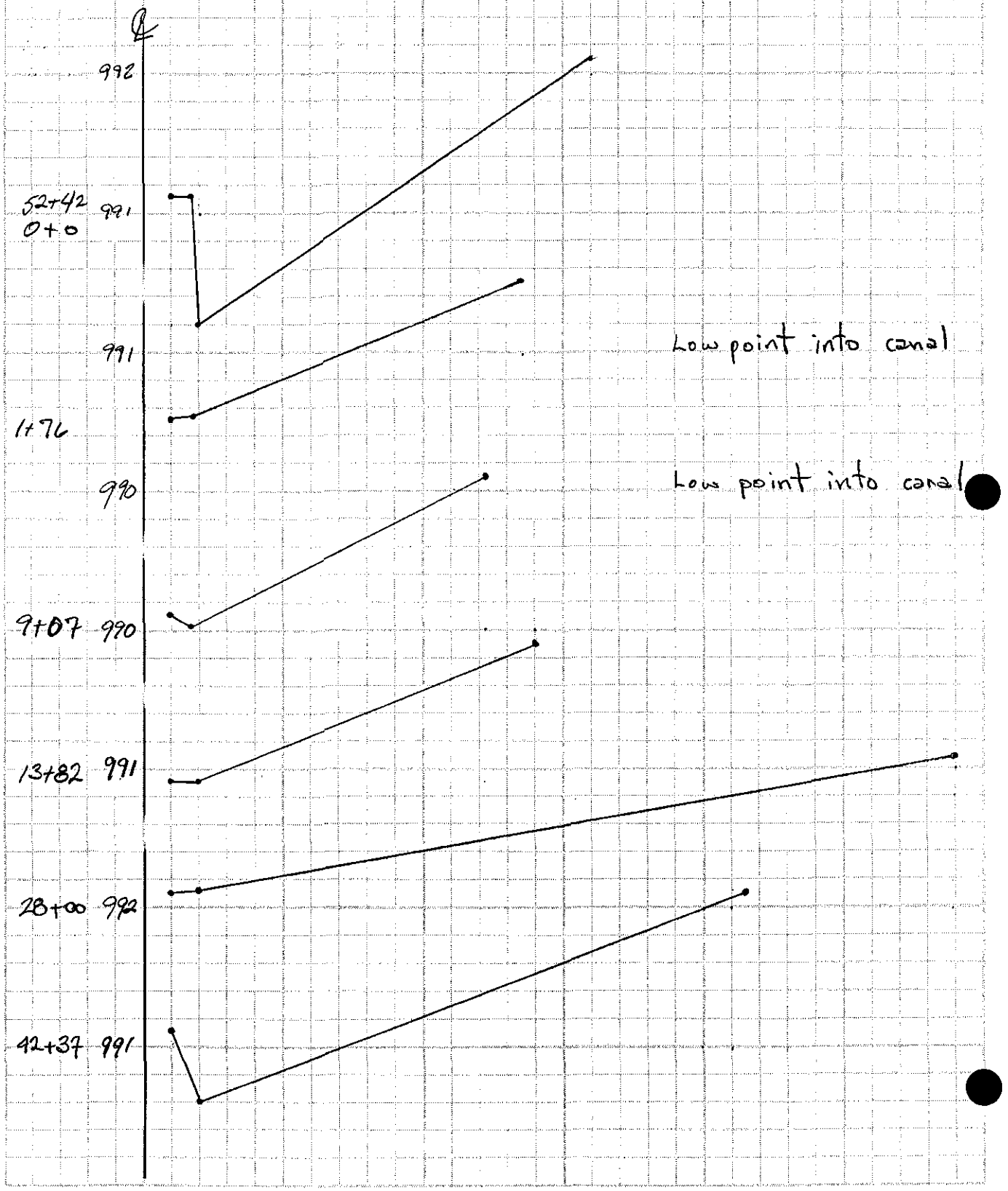
SHEET 10 OF 42
DATE 7 Nov. 91
BY Jane
PROJECT NO. 28

CLIENT Flood Control District of Maricopa Co
PROJECT FLD.90-69 Buckeye FIS
SUBJECT 3 pt X-sec's along Roosevelt Canal

Rooks Rd. to Ogelsby Rd.

"B"



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SHEET 11 OF 42

CLIENT Flood Control District of Maricopa Co.

DATE 7 Nov. 91

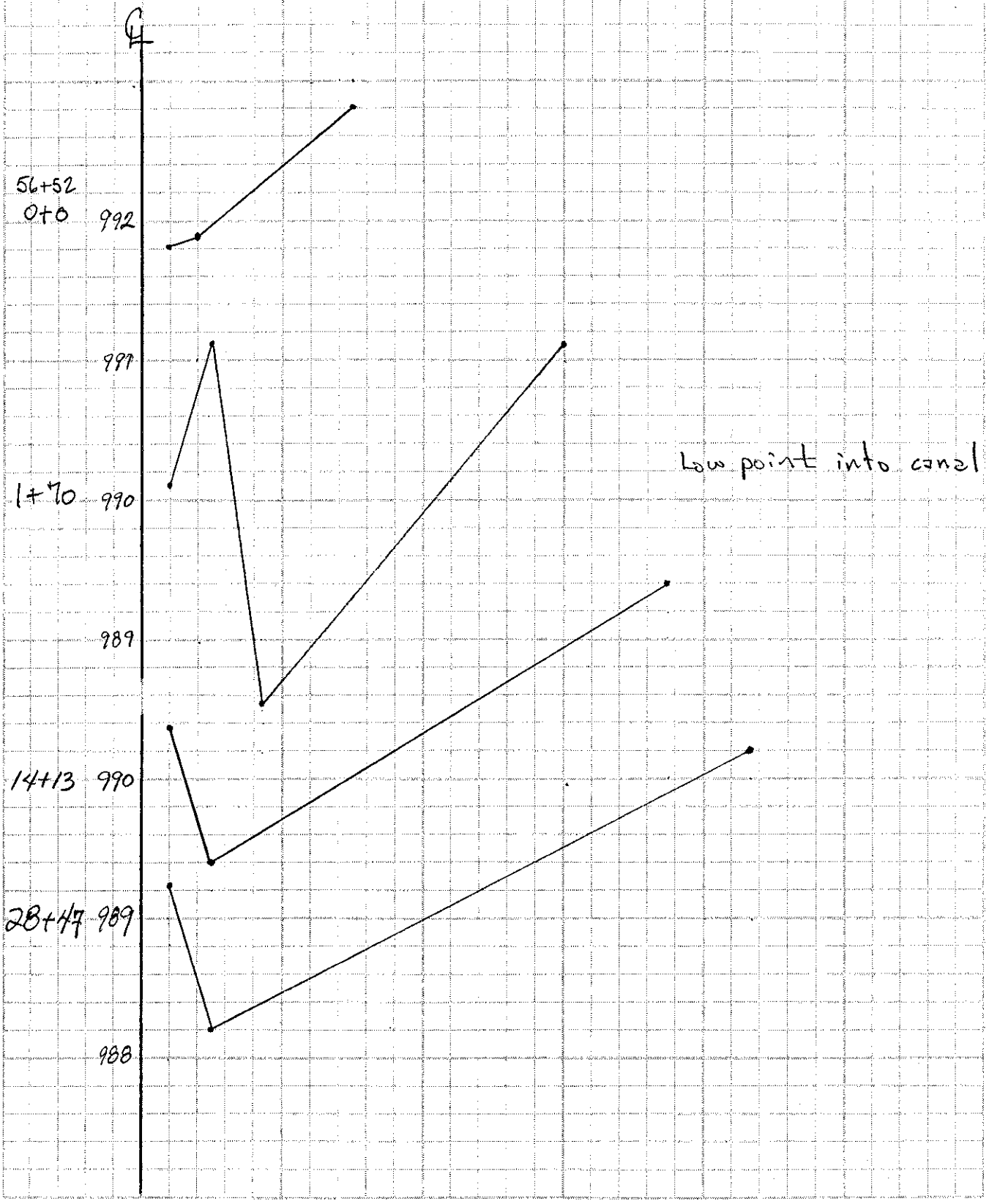
PROJECT FCD 90-69 Buckeye FIS

BY JMR

SUBJECT 3pt. X-sections along Roosevelt C.

PROJECT NO. 28

Ogelsby Rd to. Turner Rd.



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SHEET 12 OF 42

CLIENT Flood Control District of Maricopa Co

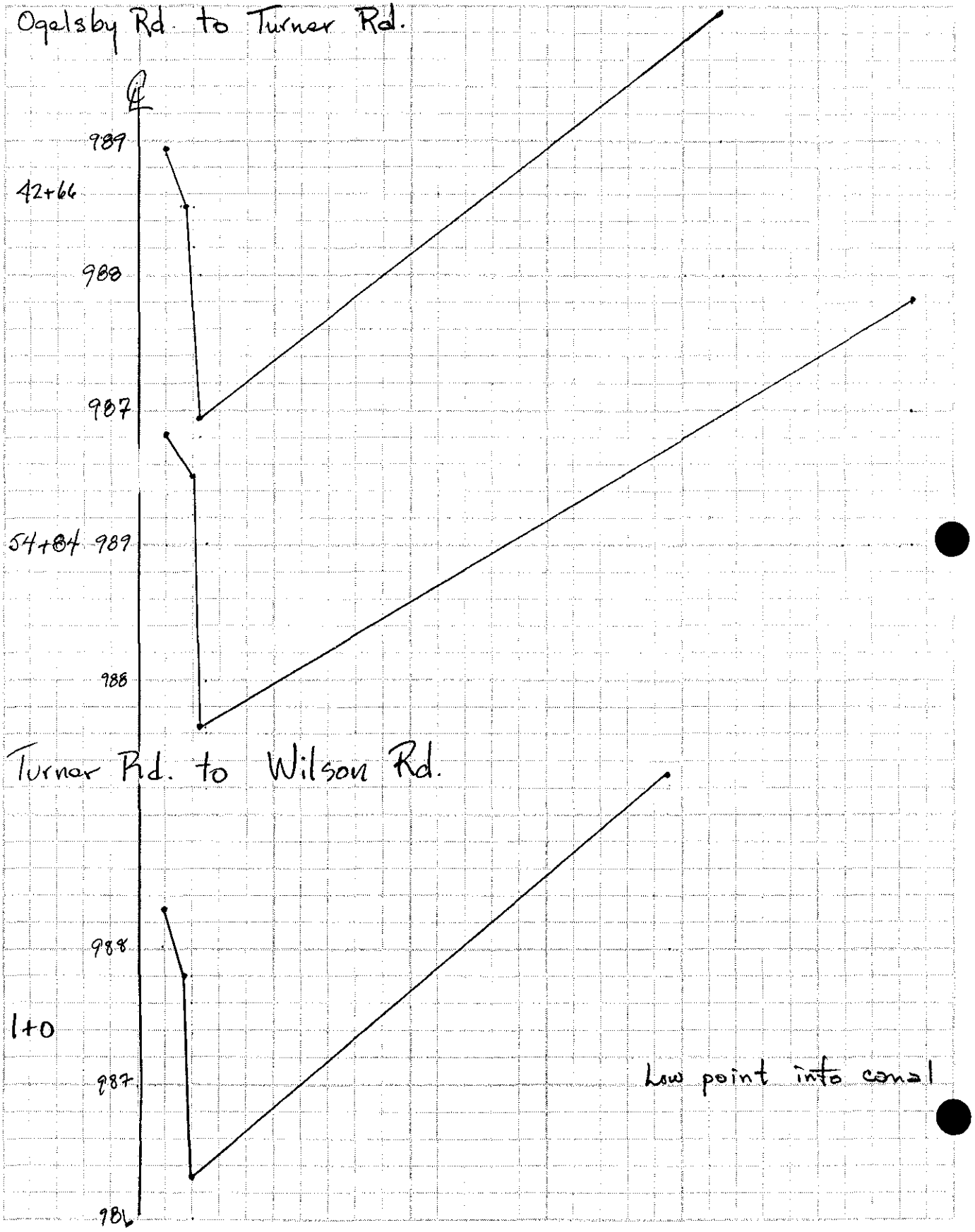
DATE 7 Nov. 91

PROJECT FED 90-69 Buckeye FIS

BY [illegible]

SUBJECT 3 pt. x-sec's. along Roosevelt Canal

PROJECT NO. 28



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SHEET 13 OF 42

CLIENT Flood Control District of Maricopa Co.

DATE 7 Nov. 91

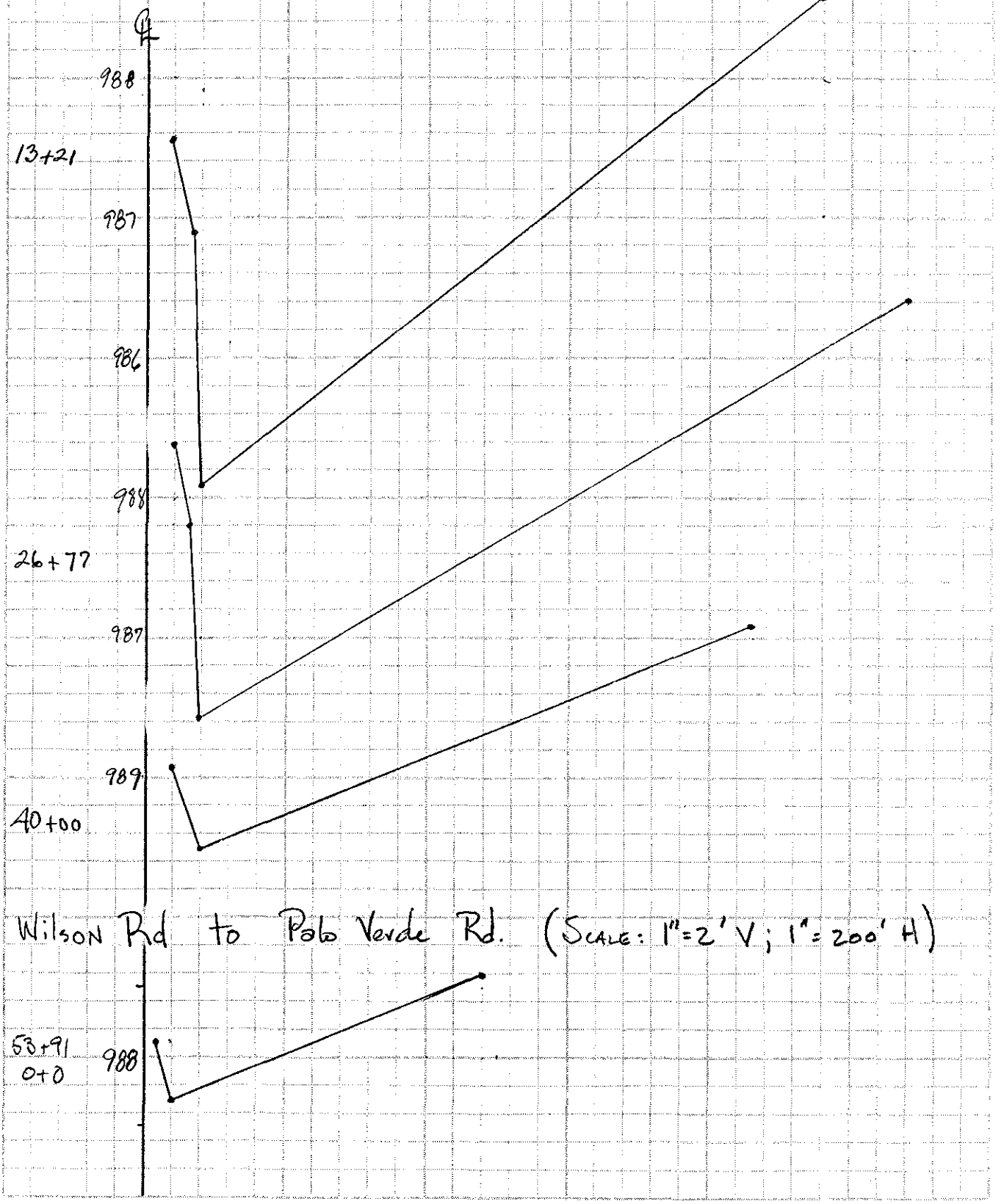
PROJECT FCD 90-69 Buckeye FIS

BY JMK

SUBJECT 3 pt. X-secis. along Roosevelt Canal

PROJECT NO. 28

Turner Rd. to Wilson Rd.



Wilson Rd to Palo Verde Rd. (SCALE: 1" = 2' V; 1" = 200' H)

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SHEET 14 OF 42

CLIENT Flood Control District of Maricopa Co.

DATE 7 Nov. 91

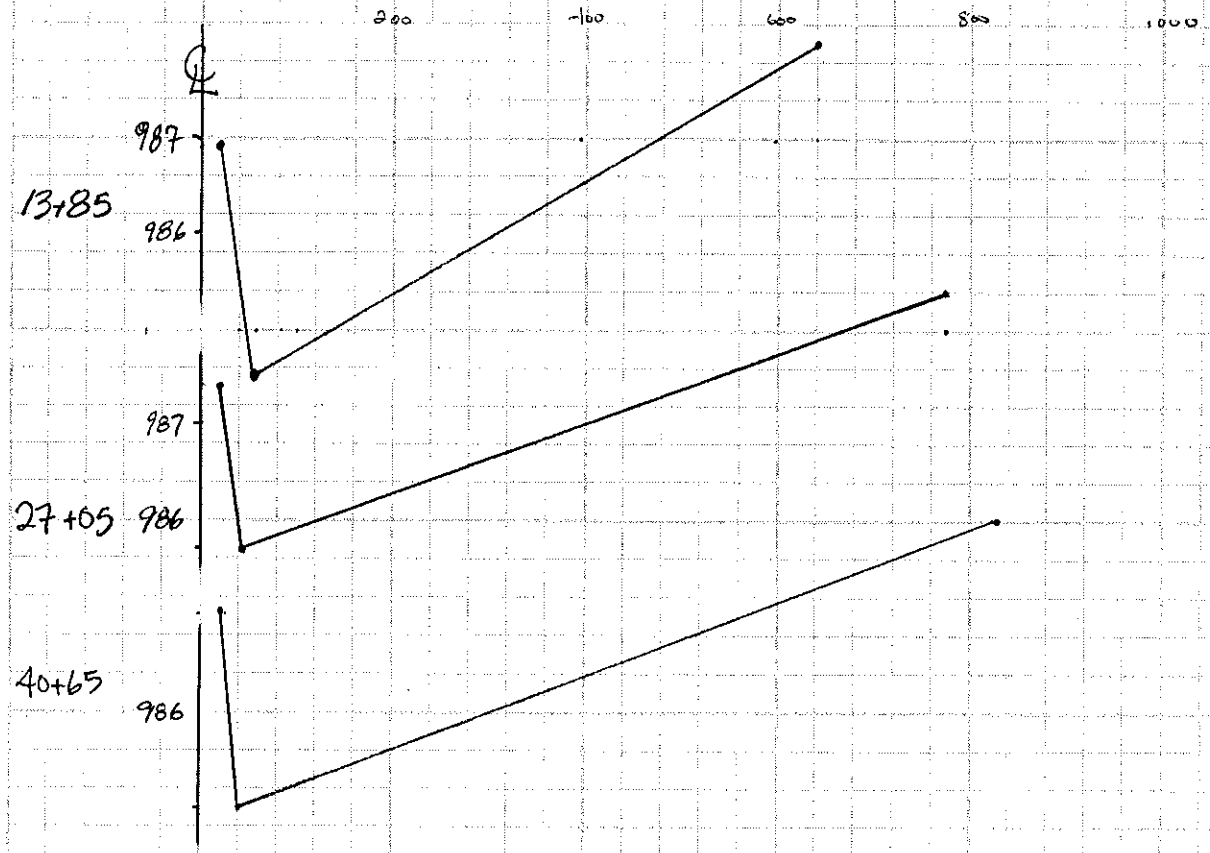
PROJECT FCD 90-69 Buckeye FIS

BY JMR

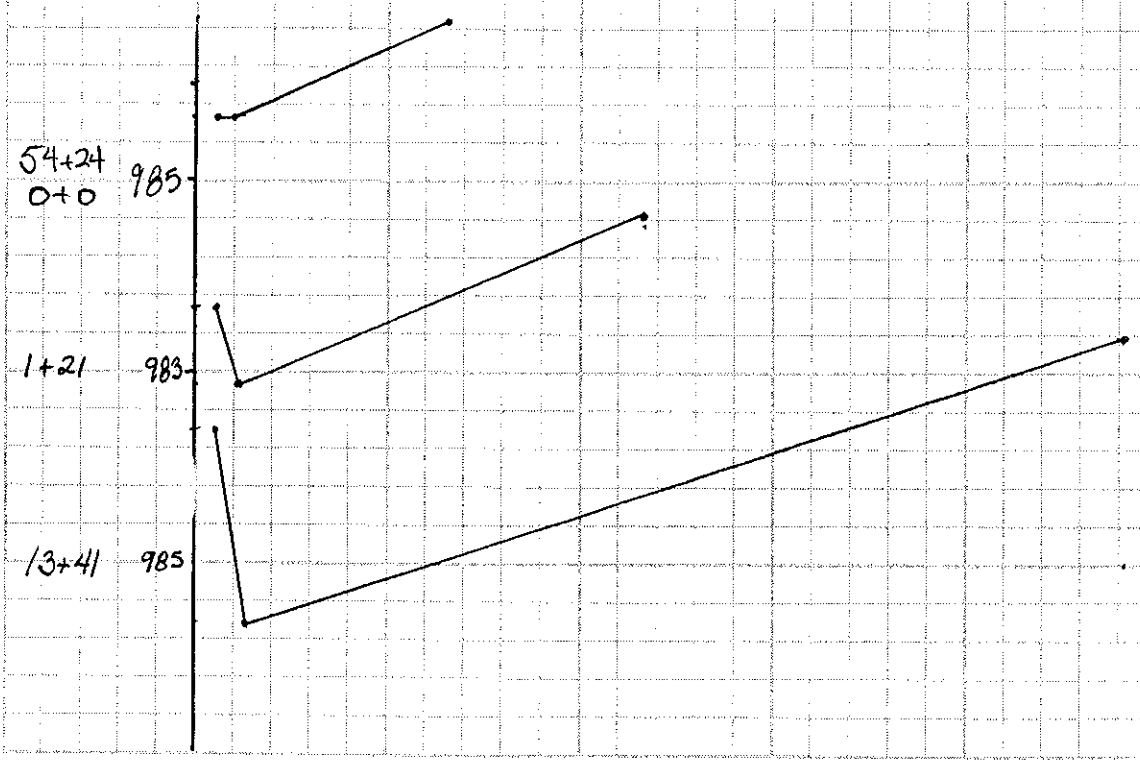
SUBJECT 3 pt. x-sects. along Roosevelt Canal

PROJECT NO. 28

Wilson Rd to Palo Verde Rd. (SCALE 1"=2' V; 1"=200' H)



Palo Verde Rd to Bruner Rd.



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SHEET 15 OF 42

CLIENT Flood Control District of Maricopa Co

DATE 7 Nov. 91

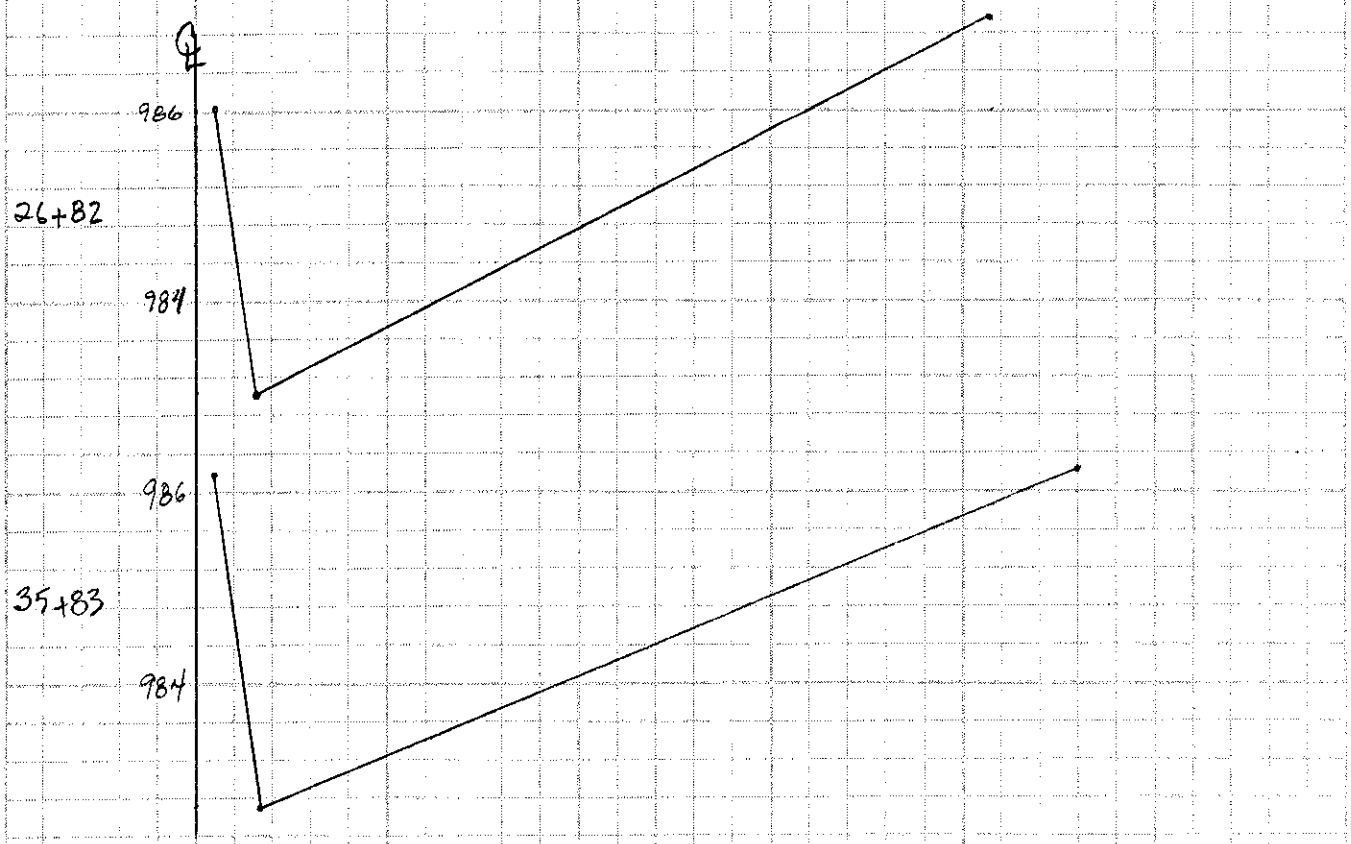
PROJECT FCD 90-69 Buckeye FIS

BY JMR

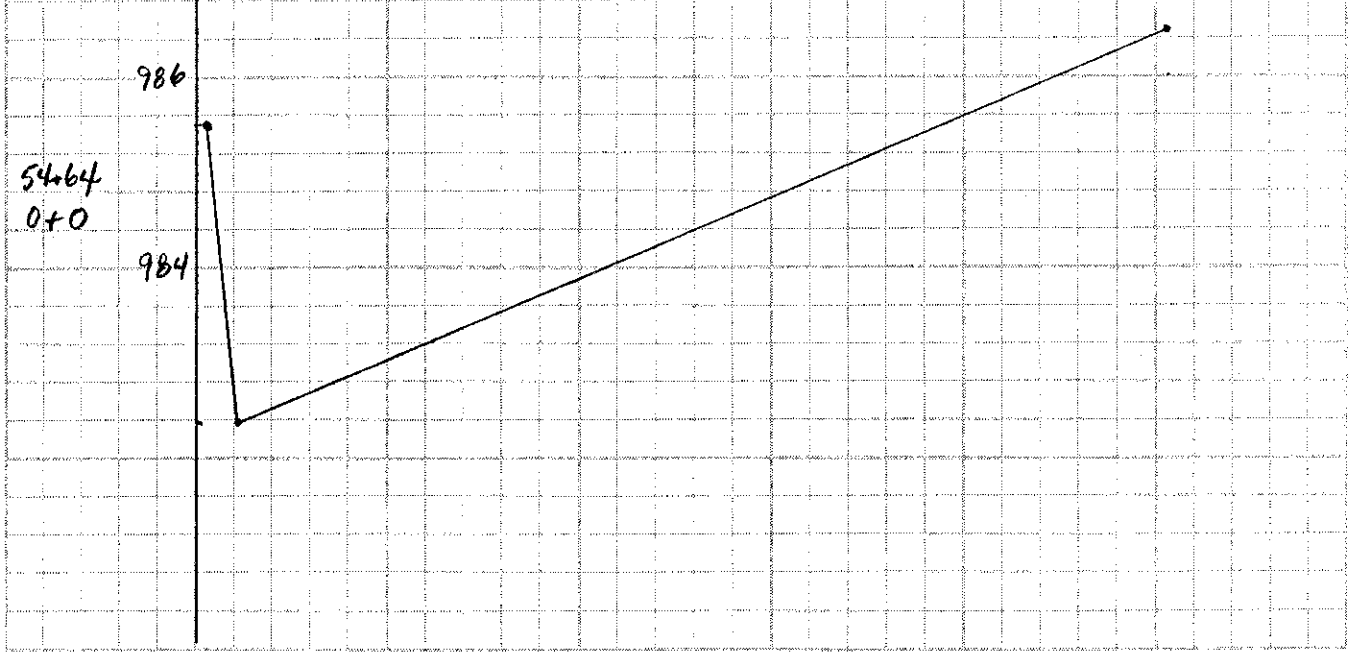
SUBJECT 3pt. x-sec's along Roosevelt Canal

PROJECT NO. 28

Palo Verde Rd to Bruner Rd. (Scale 1"=2' V; 1"=200' H)



Bruner Rd. to Johnson Rd. (SCALE 1"=2' V; 1"=300' H)



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SHEET 16 OF 42

CLIENT Flood Control District of Maricopa Co.

DATE 7 Nov. 91

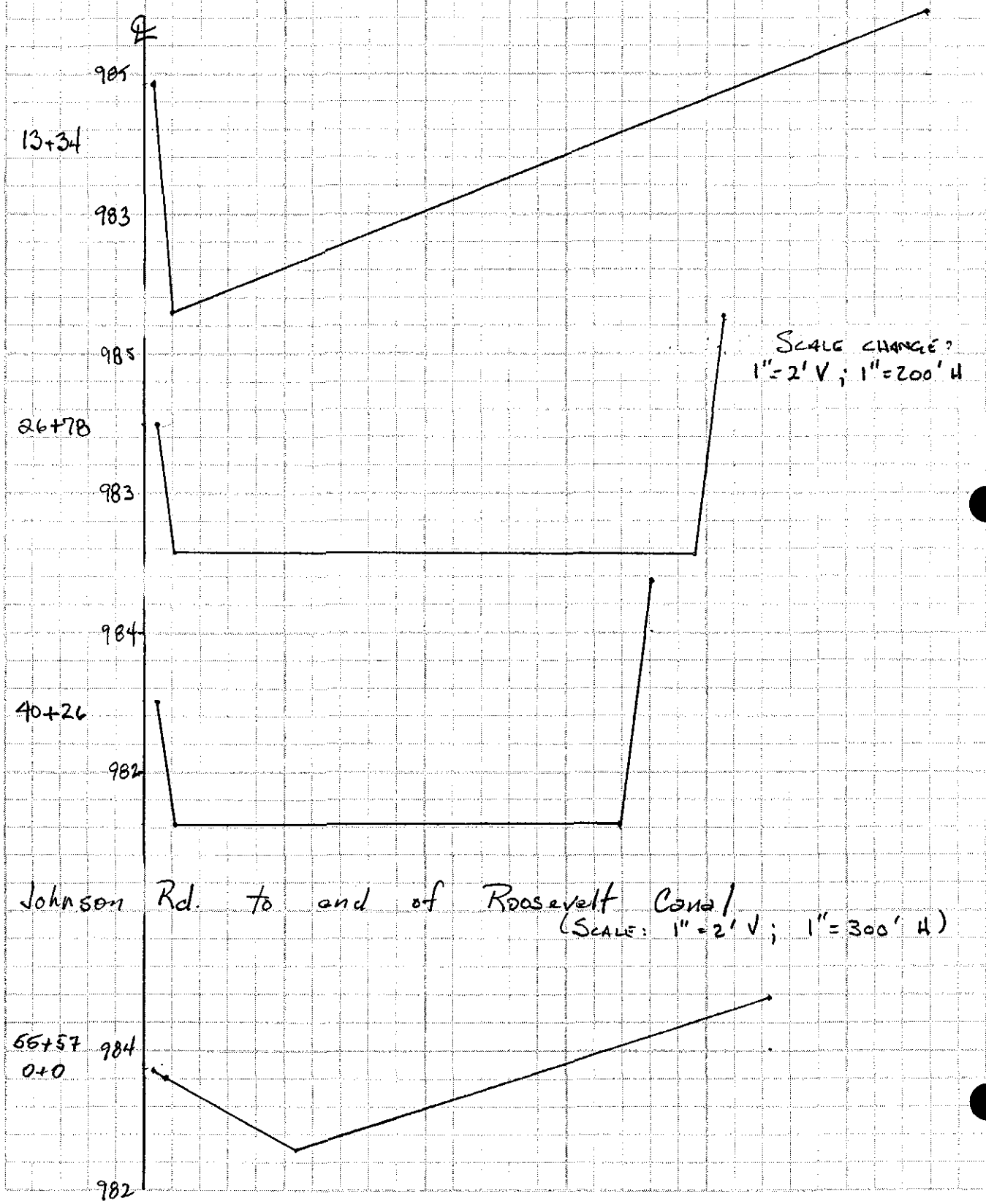
PROJECT FCD 90-69 Buckeye FIS

BY JMR

SUBJECT 3pt. x-sec's along Roosevelt Canal

PROJECT NO. 28

Bruner Rd to Johnson Rd. (Scale 1"=2' V, 1"=300' H)



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SHEET 17 OF 42

CLIENT Flood Control District of Maricopa Co.

DATE 7 Nov. 91

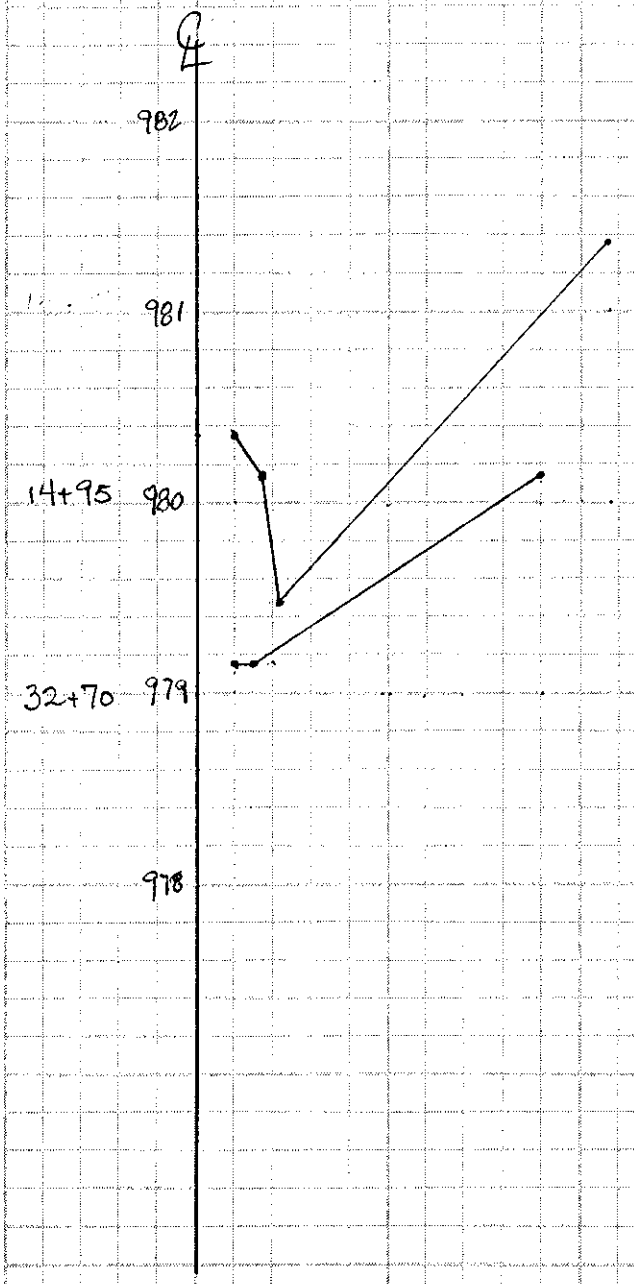
PROJECT FCD 90-69 Buckeye FIS

BY JMR

SUBJECT 3pt. X-sec.s along Roosevelt Canal

PROJECT NO. 28

Johnson Rd. to end of Roosevelt Canal (SCALE: 1" = 1' V; 1" = 100' H)



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SHEET 18 OF 42

CLIENT Flood Control District of Maricopa Co.

DATE 19 Nov. 91

PROJECT Buckeye FIS FCD 90-69

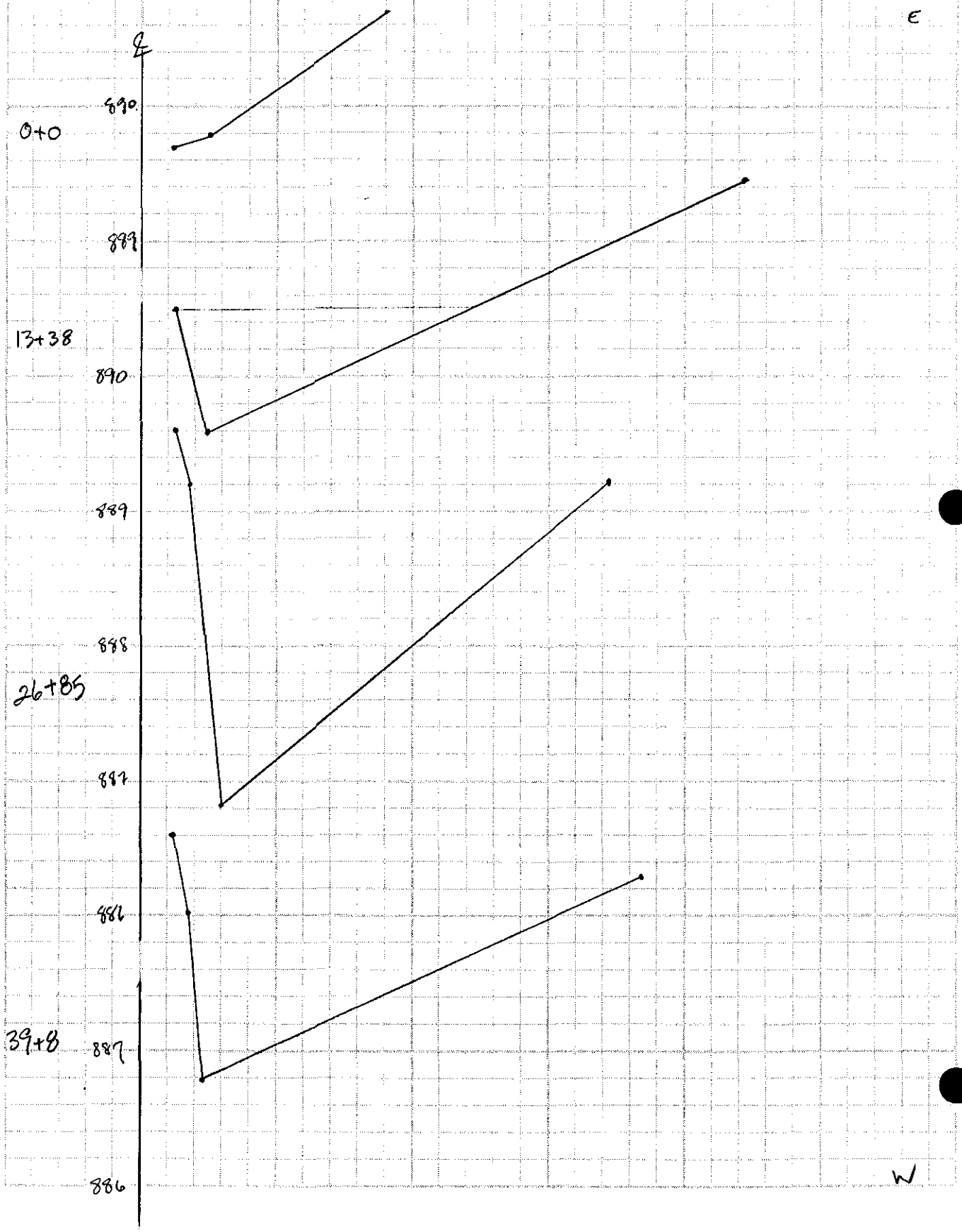
BY [illegible]

SUBJECT 3 pt. X-sections along Buckeye Canal

PROJECT NO. 28

SCALE: 1" = 100' H 1" = 1' V

DEAN Rd. to Rainbow Rd.



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SHEET 19 OF 42

CLIENT Flood Control District of Maricopa Co

DATE 19 Nov. 91

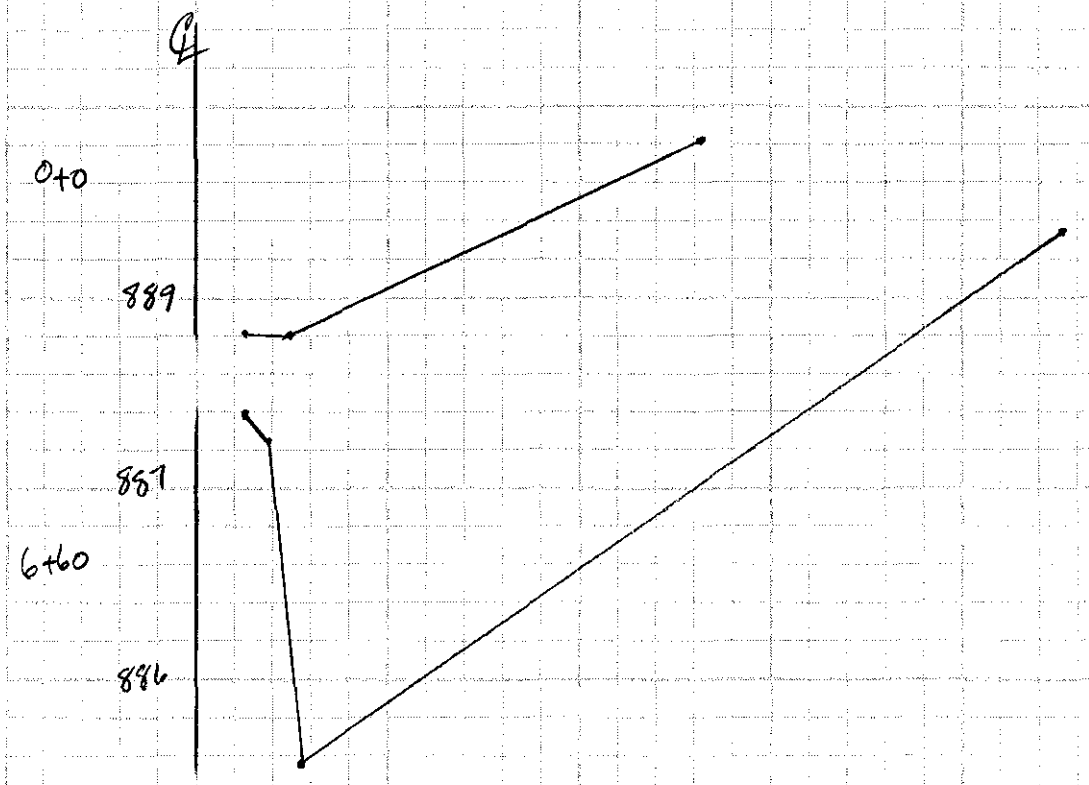
PROJECT FCD 90-69 Buckeye FIS

BY JMR

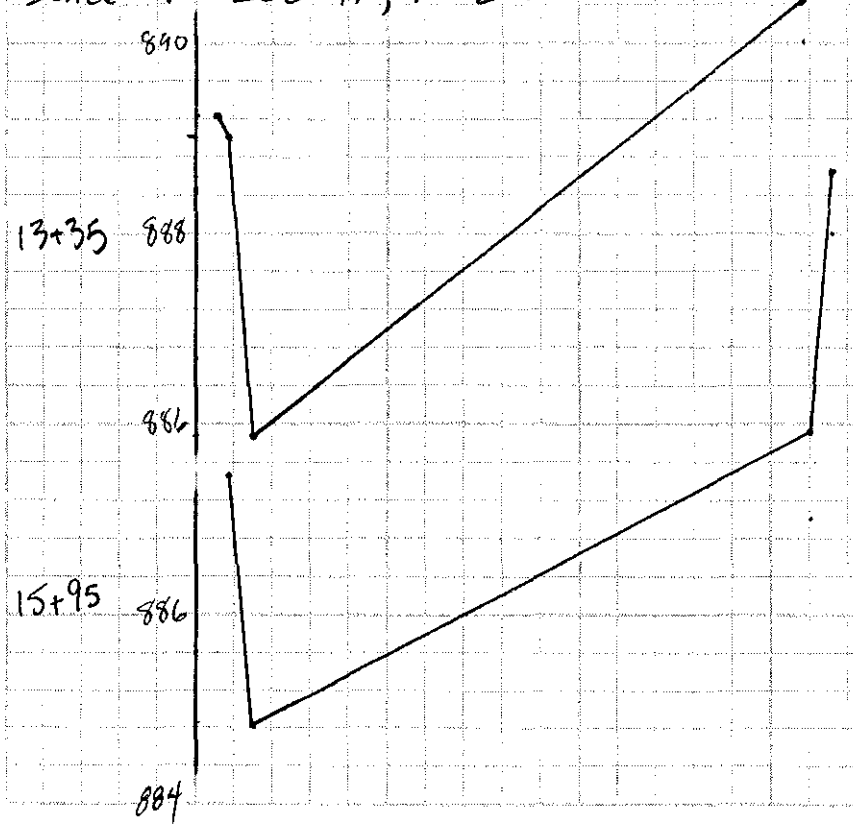
SUBJECT 3pt. X-sections along Buckeye Canal

PROJECT NO. 28

SCALE: 1"=100' H ; 1"=1' Rainbow Rd to Watson Rd.



SCALE 1"=200' H ; 1"=2' V



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SHEET 20 OF 42

CLIENT Flood Control District of Maricopa Co.

DATE 19 Nov. 91

PROJECT FCD 90-69 Buckeye FIS

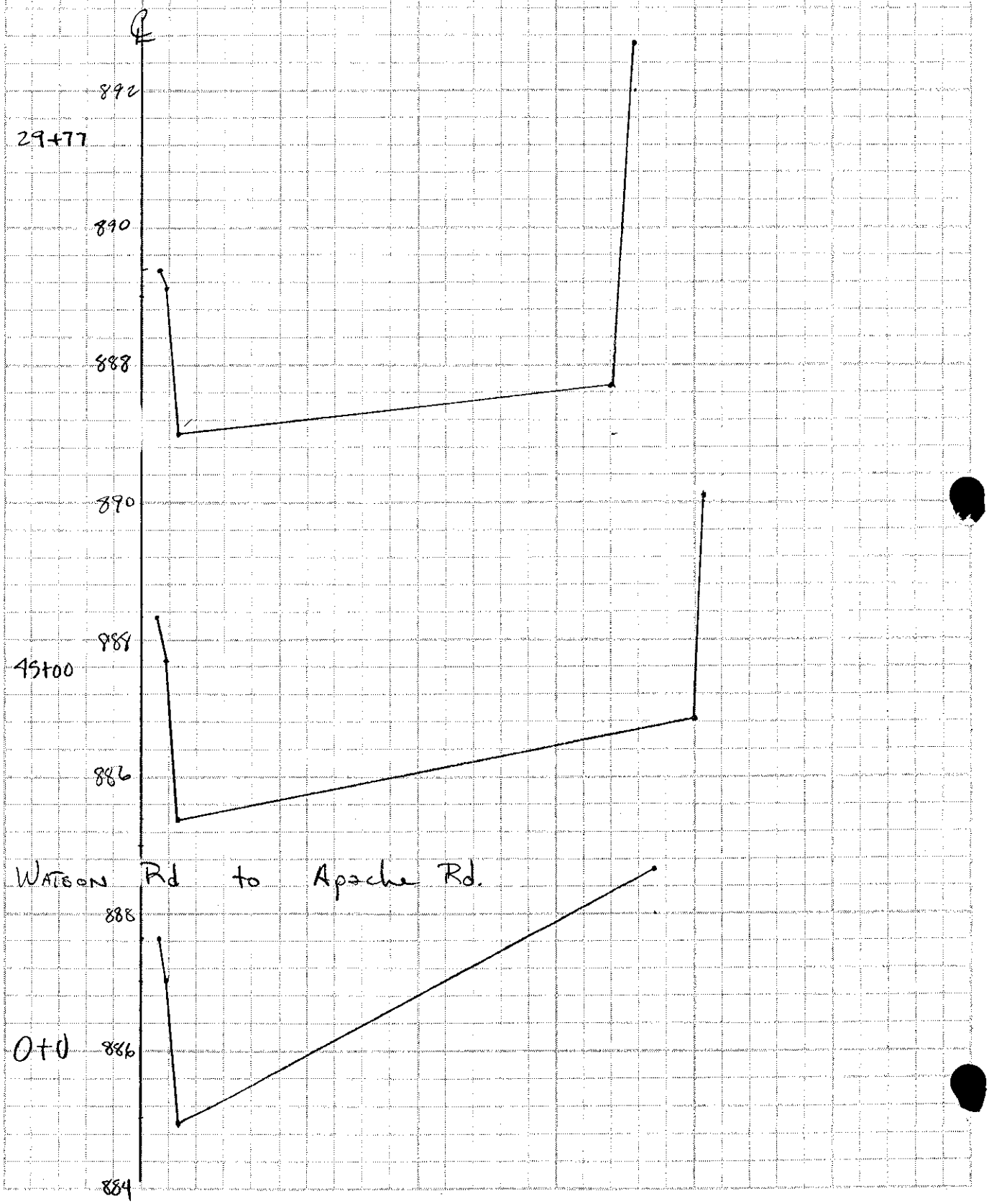
BY JWR

SUBJECT 3 pt. X-sections along Buckeye Canal

PROJECT NO. 28

SCALE 1"=200' H; 1"=2' V

Rainbow to Watson Rd.



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SHEET 21 OF 42

CLIENT Flood Control District of Maricopa Co.

DATE 19 Nov. 91

PROJECT FCD 90-69 Buckeye FIS

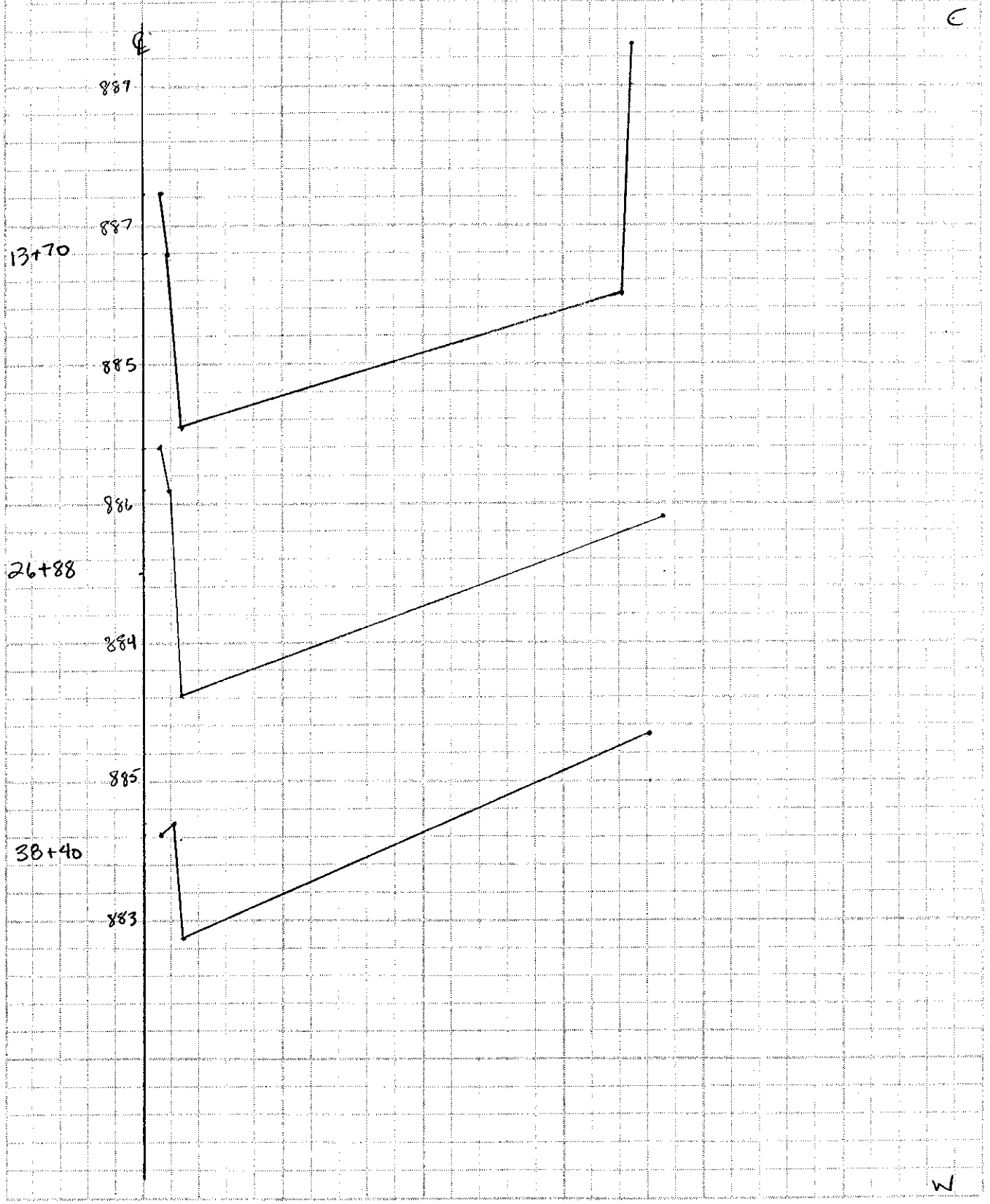
BY JMR

SUBJECT 3 pt. X-sections along Buckeye Canal

PROJECT NO. 28

SCALE 1" = 200' H, 1" = 2' V

WATSON Rd to APACHE Rd.



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SHEET 22 OF 42

CLIENT Flood Control District of Maricopa Co.

DATE 19 Nov. 91

PROJECT FCD 90-69 Buckeye FIS

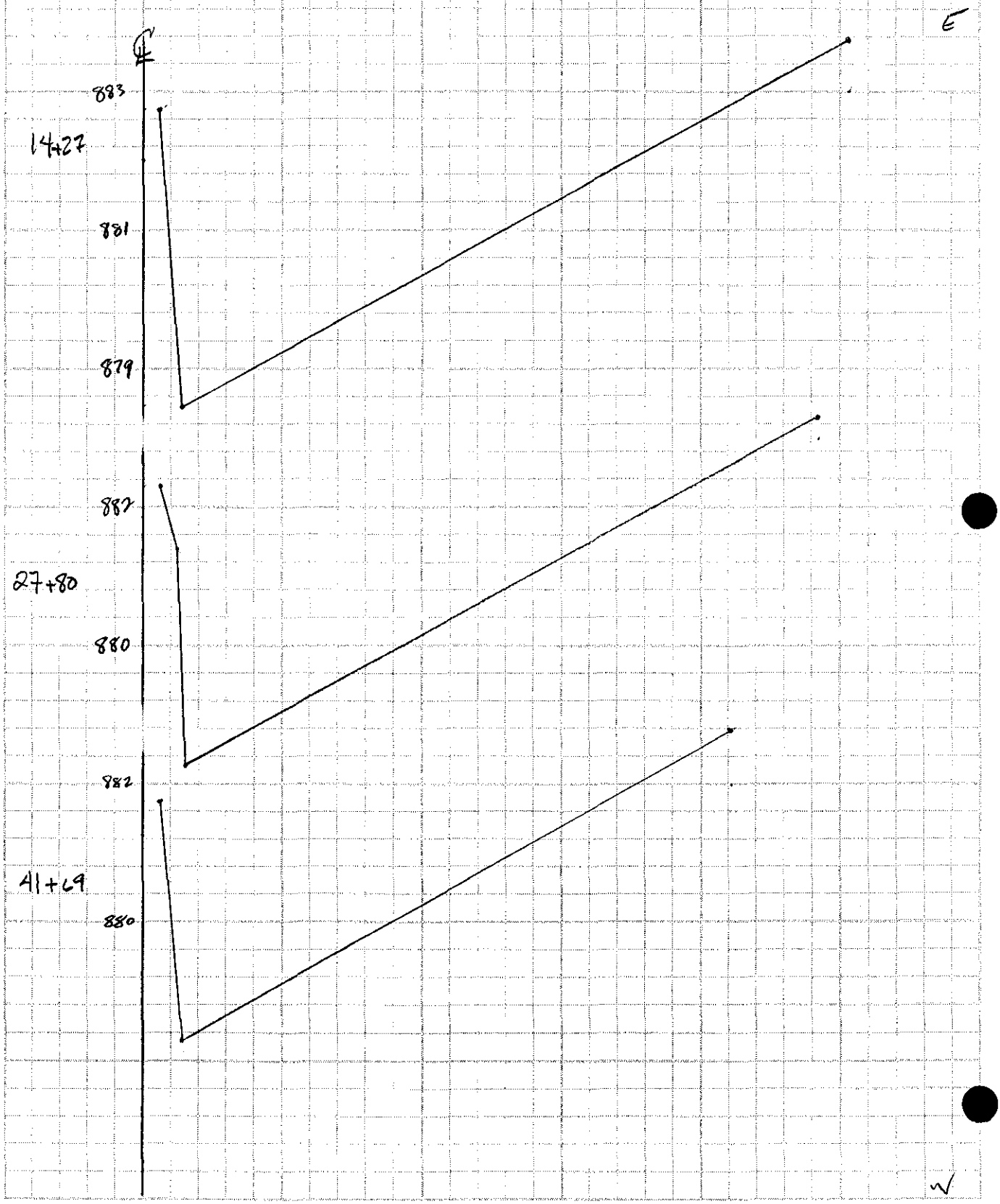
BY HWR

SUBJECT 3 pt. X-sections along Buckeye Canal

PROJECT NO. 28

SCALE 1" = 200' H ; 1" = 2' V

Miller Rd. to Rooks



GEORGE V. SABOL CONSULTING ENGINEERS, INC.

SHEET 23 OF 42

CLIENT Flood Control District of Maricopa Co.

DATE 19 Nov. 91

PROJECT FCD 90-69 Buckeye FIS

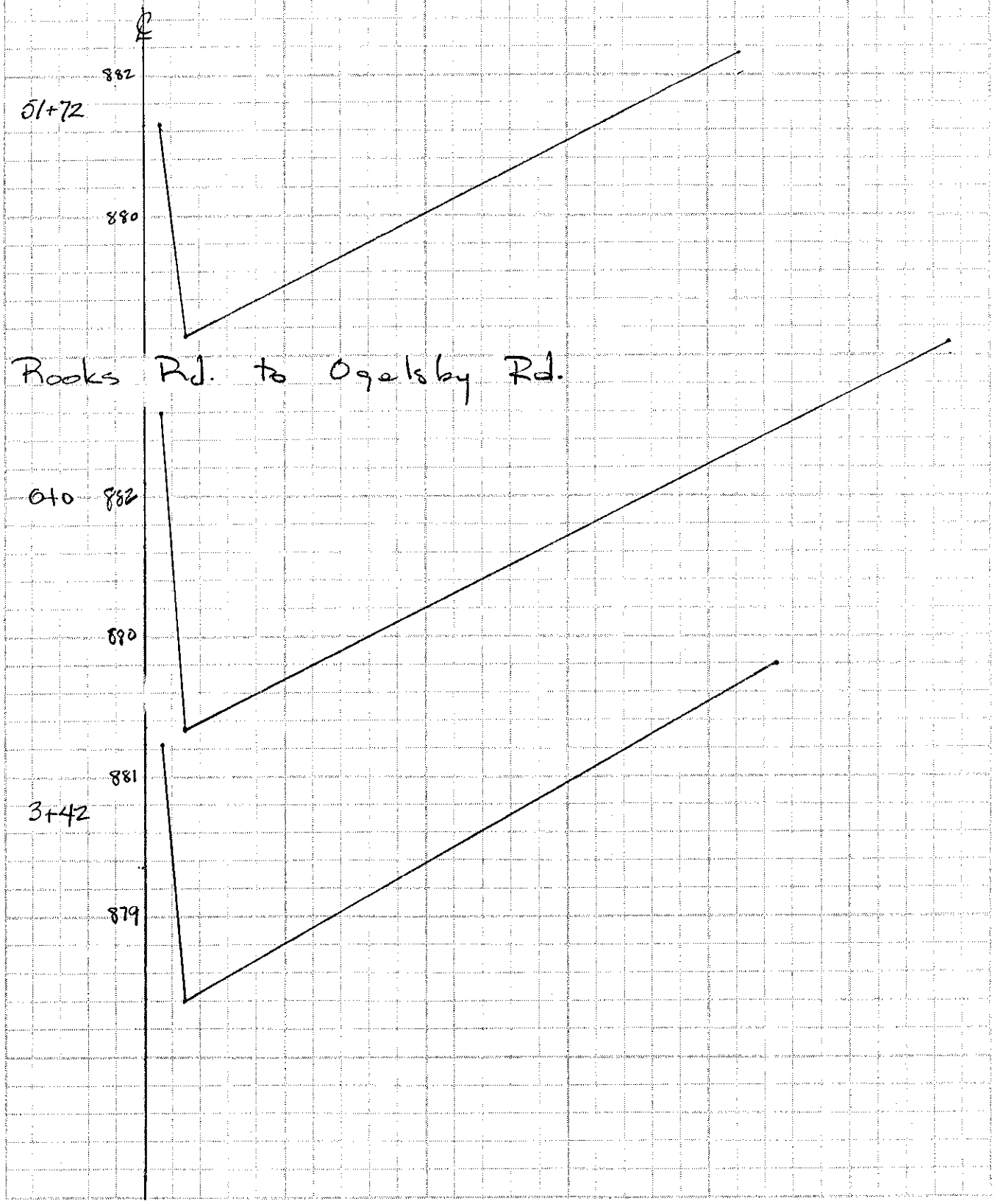
BY [illegible]

SUBJECT 3 pt. X-sections along Buckeye Canal

PROJECT NO. 28

SCALE: 1" = 200' H ; 1" = 2' V

Miller Rd to Rooks Rd.



GEORGE V. SABOL CONSULTING ENGINEERS, INC.

SHEET 24 OF 42

CLIENT Flood Control District of Maricopa Co.

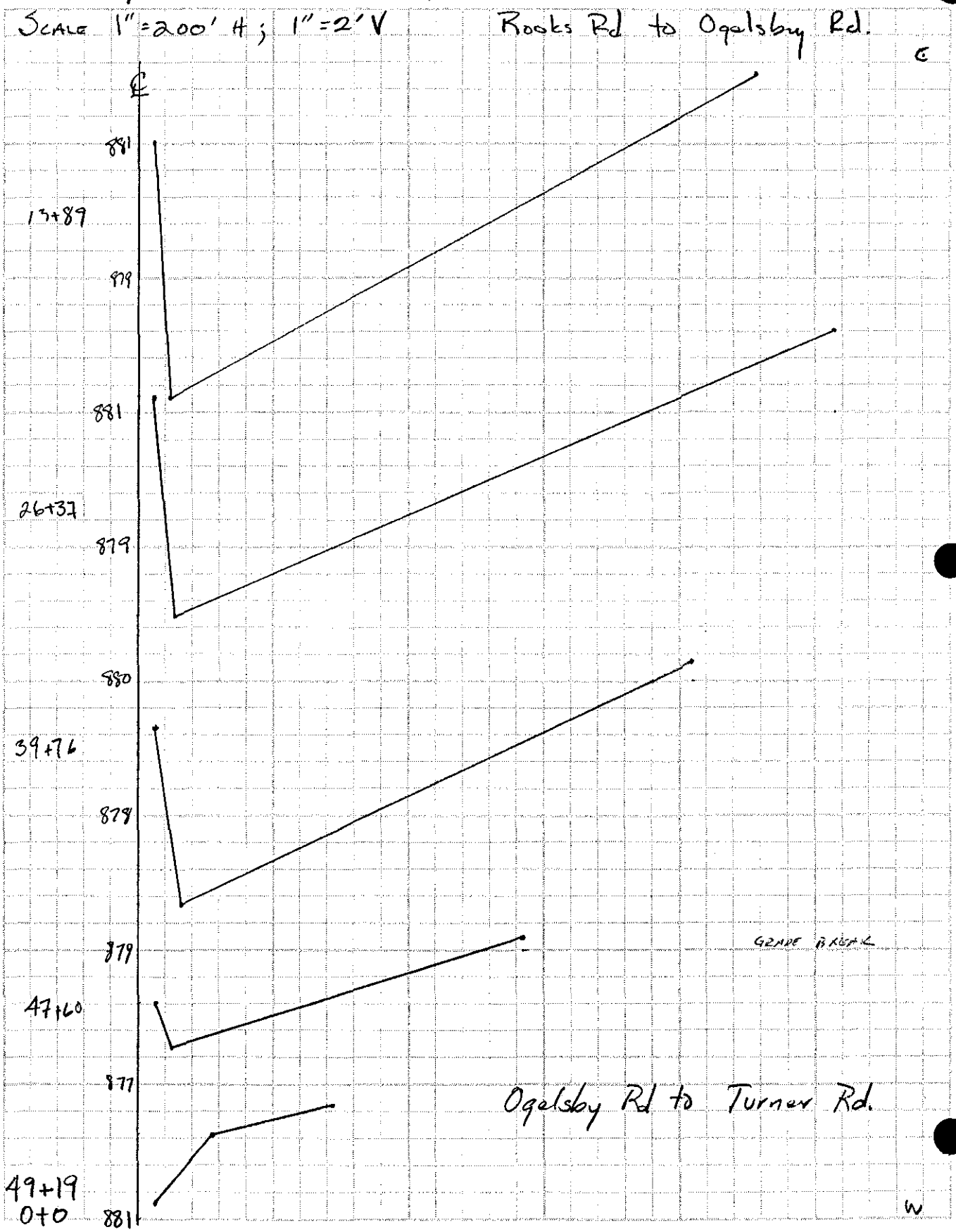
DATE 19 Nov. 91

PROJECT FCD 90-69 Buckeye FIS

BY JMK

SUBJECT 3 pt. X-sections along Buckeye Canal

PROJECT NO. 28



GEORGE V. SABOL CONSULTING ENGINEERS, INC.

SHEET 25 OF 42

CLIENT Flood Control District of Maricopa Co

DATE 19 Nov. 91

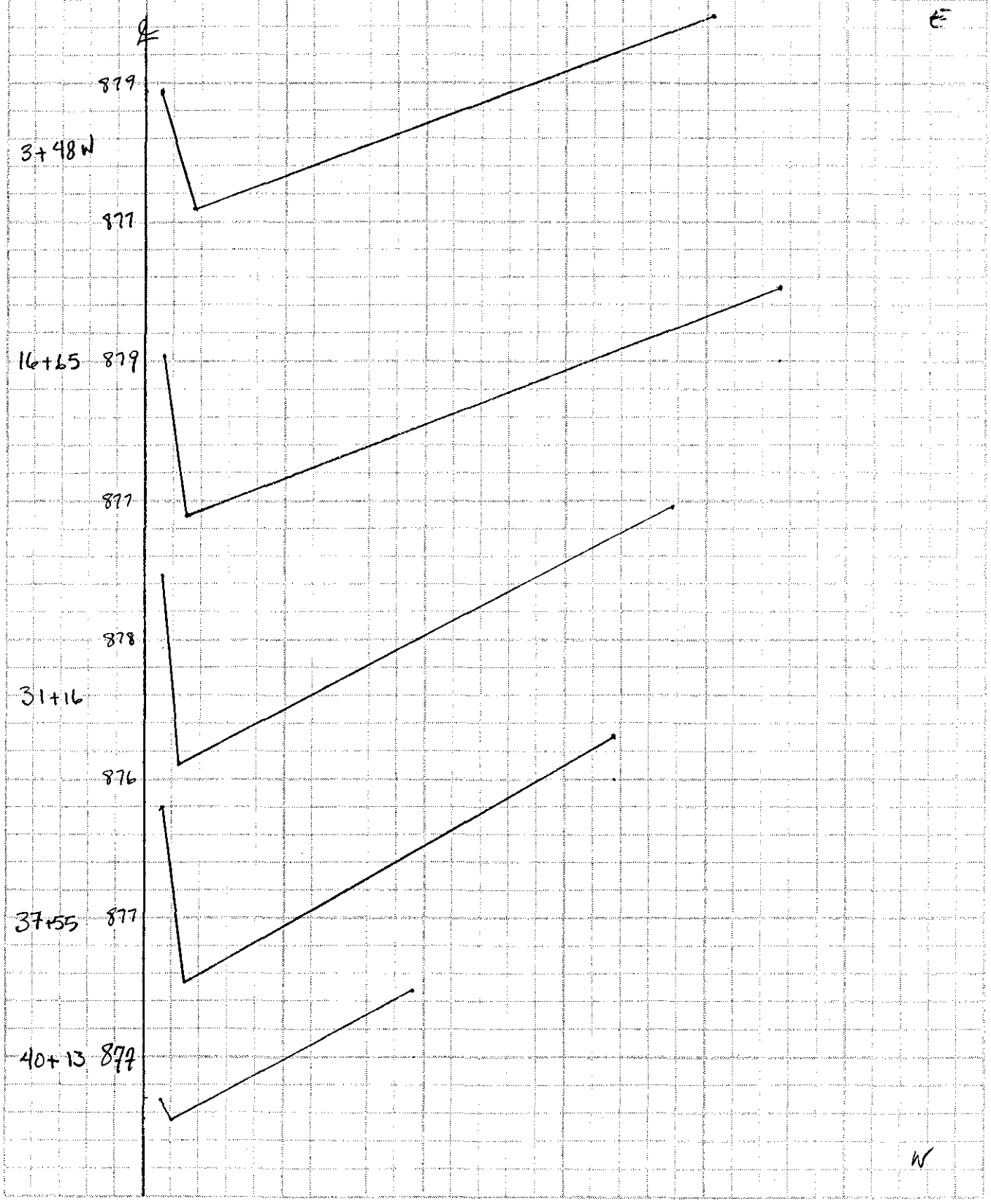
PROJECT FCD 90-69 Buckeye FIS

BY VMR

SUBJECT 3pt. X-sections along Buckeye Canal

PROJECT NO. 28

SCALE 1" = 200' H ; 1" = 2' V Ogelsby Rd to Turner Rd.



GEORGE V. SABOL CONSULTING ENGINEERS, INC.

SHEET 26 OF 42

CLIENT Flood Control District of Maricopa Co.

DATE 19 Nov. 91

PROJECT FCD 90-69 Buckeye FIS

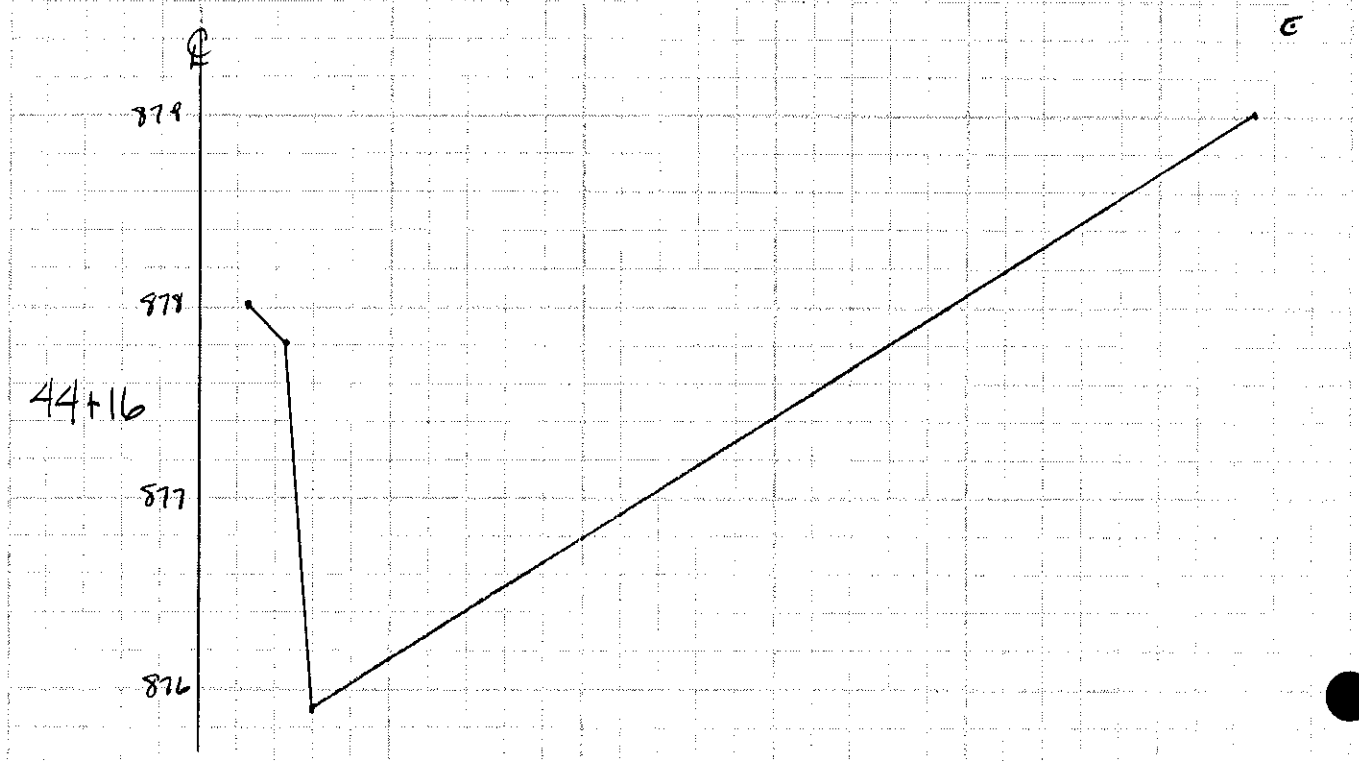
BY JMR

SUBJECT 3 pt. X-section along Buckeye Canal

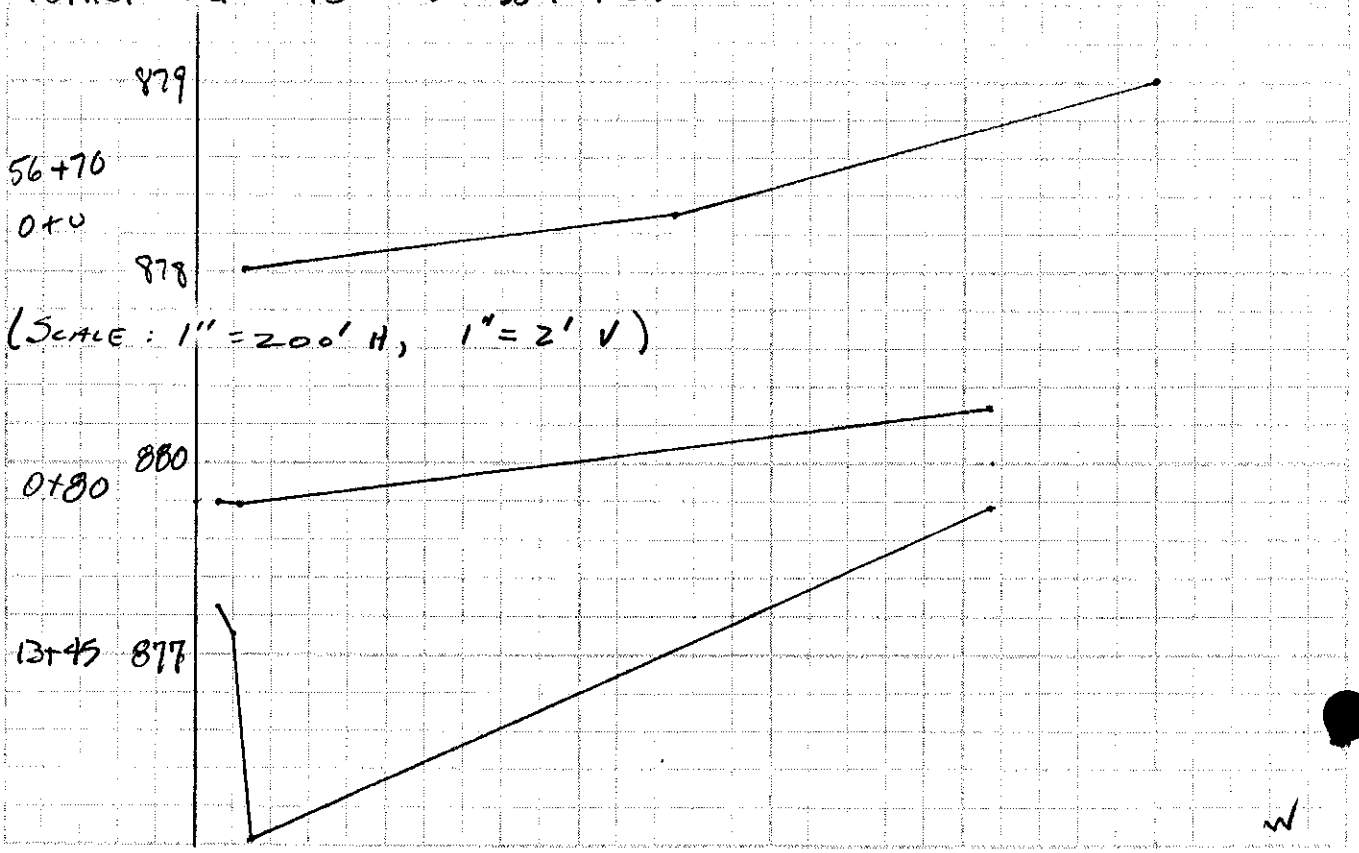
PROJECT NO. 28

SCALE 1" = 100' H ; 1" = 1' V

Ogelsby Rd. to Turner Rd



Turner Rd to Wilson Rd.



GEORGE V. SABOL CONSULTING ENGINEERS, INC.

SHEET 27 OF 42

CLIENT Flood Control District of Maricopa Co.

DATE 25 Nov. 91

PROJECT FCD 90-69 Buckeye FIS

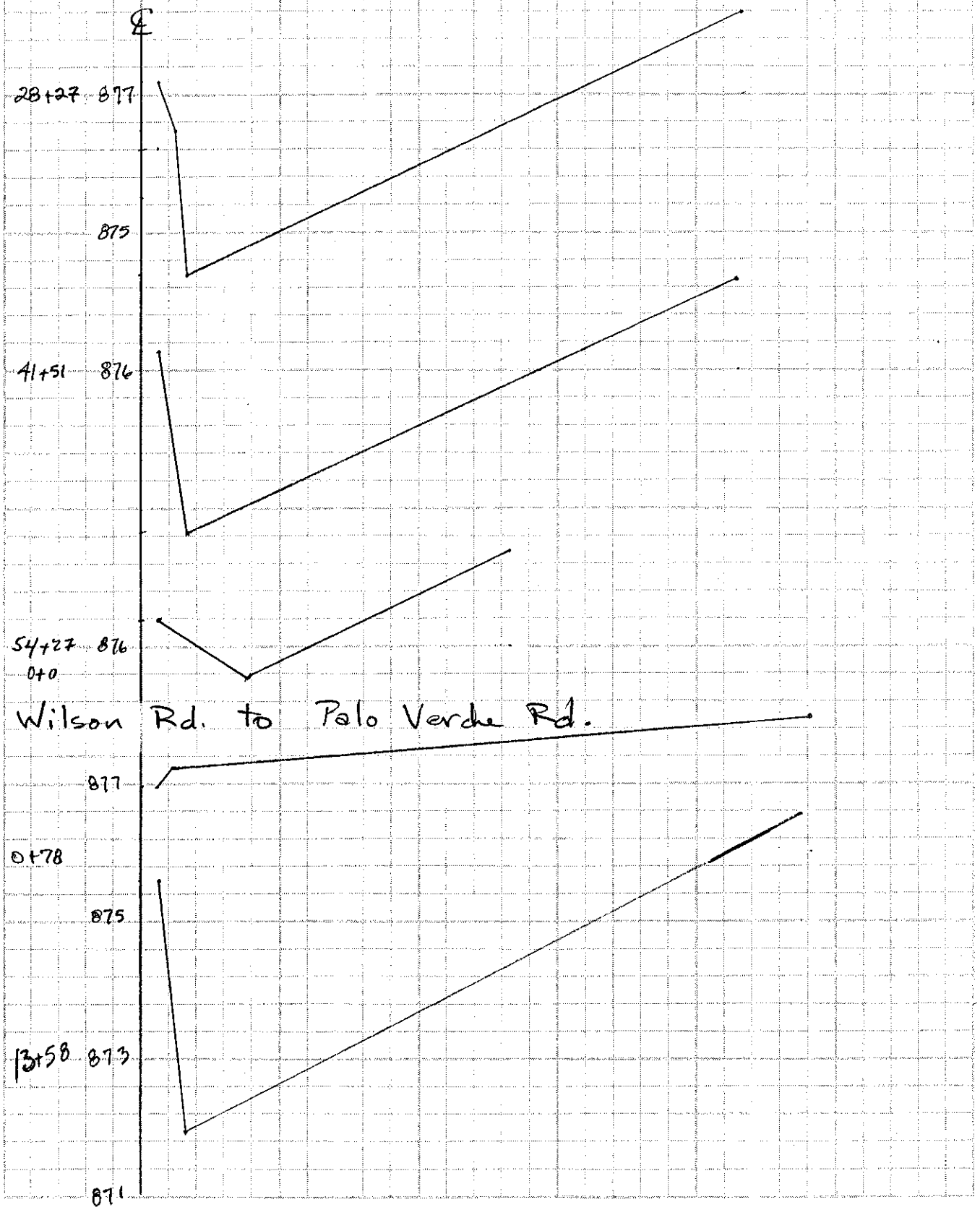
BY JMR

SUBJECT 3pt. X-sections along Buckeye Canal

PROJECT NO. 22

SCALE: 1" = 200' H ; 1" = 2' V

Turner Rd to Wilson Rd.



GEORGE V. SABOL CONSULTING ENGINEERS, INC.

SHEET 28 OF 42

CLIENT Flood Control District of Maricopa Co

DATE 25 Nov 91

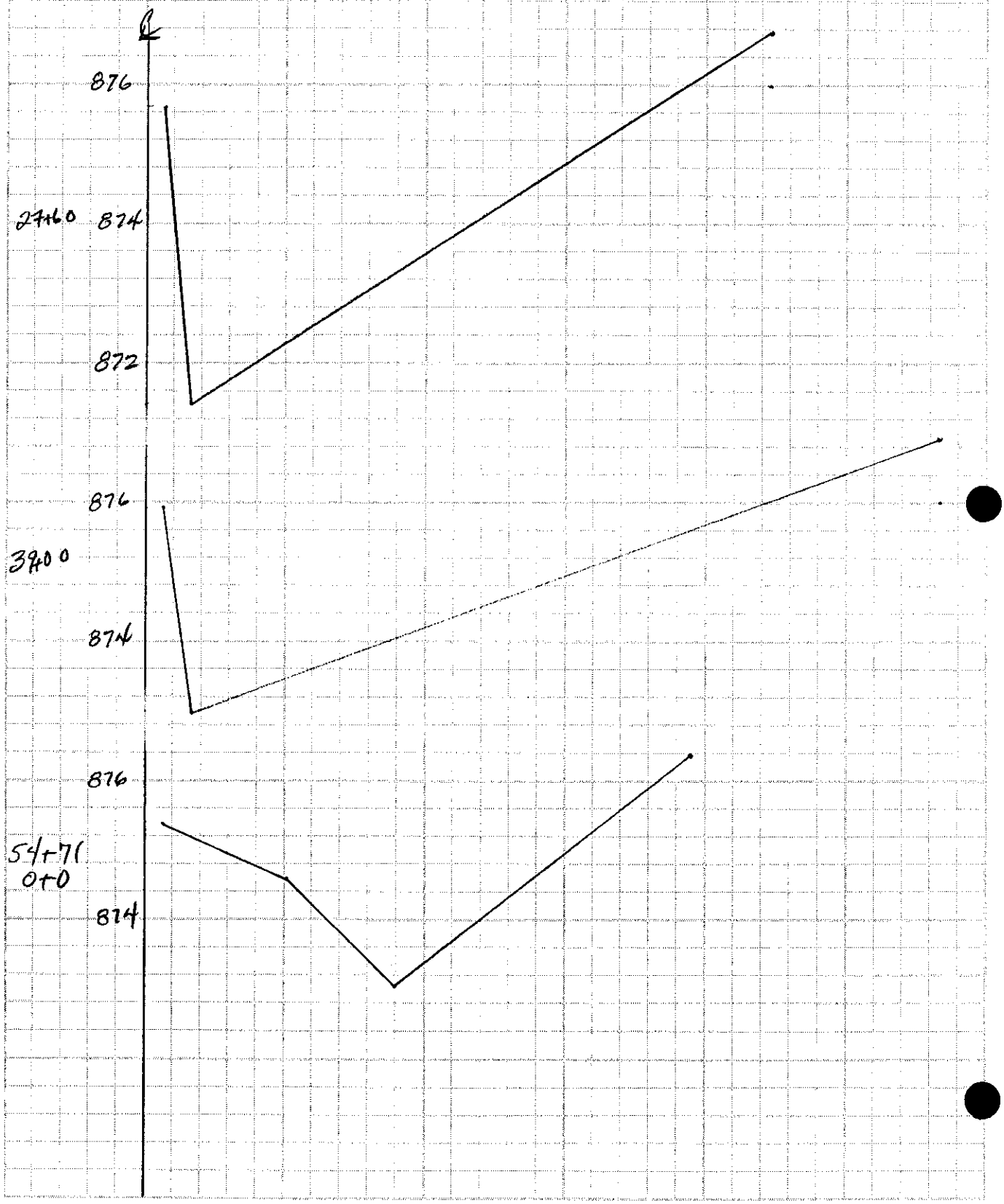
PROJECT FCD 90-69 Buckeye FIS

BY mcr

SUBJECT 3pt. X-sections along Buckeye Canal

PROJECT NO. 28

Scale 1"=200' Ht ; 1"=2' V Wilson Rd to Polo Verde Rd.



GEORGE V. SABOL CONSULTING ENGINEERS, INC.

SHEET 29 OF 42

CLIENT Flood Control District of Maricopa Co.

DATE 25 Nov. 91

PROJECT FCD 90-69 Buckeye FIS

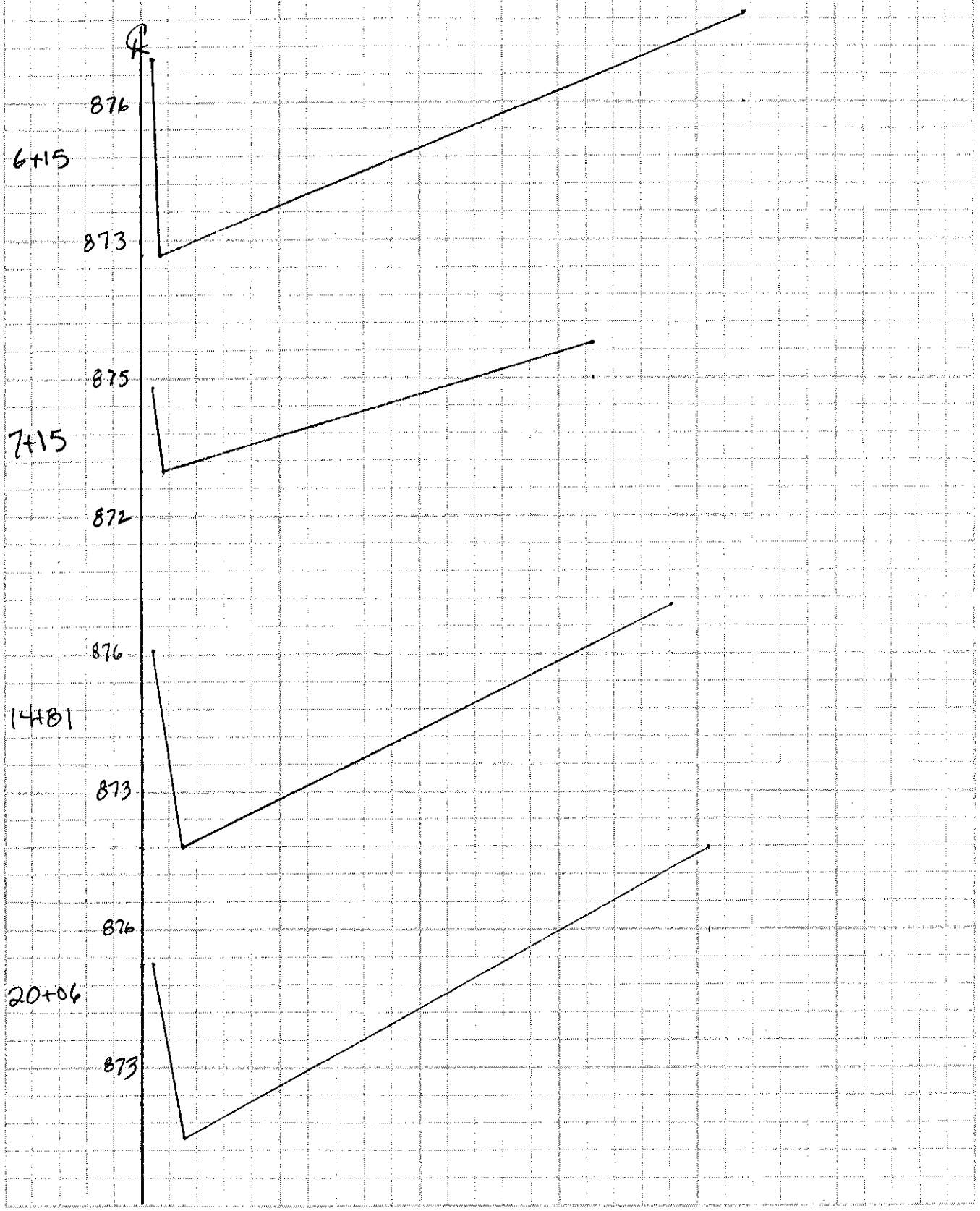
BY JMR

SUBJECT Spt. X-sections along Buckeye Canal

PROJECT NO. 28

SCALE: 1" = 300' H ; 1" = 3' V

PALO VERDE Rd. to BRUNER Rd.

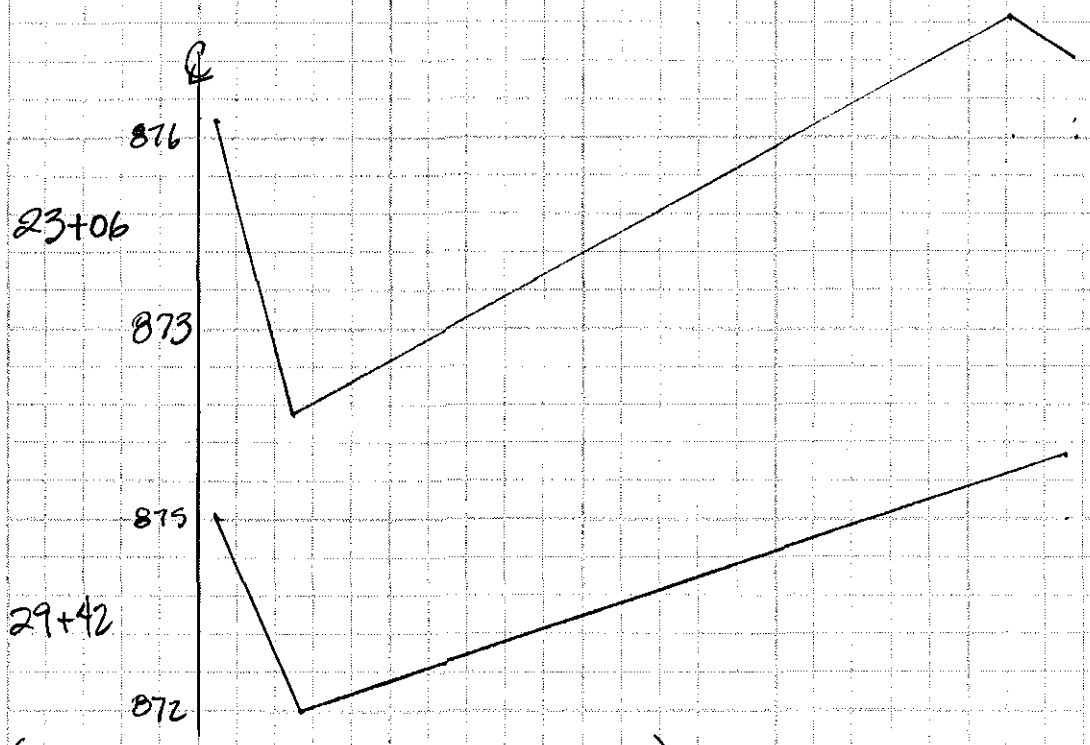


GEORGE V. SABOL CONSULTING ENGINEERS, INC.

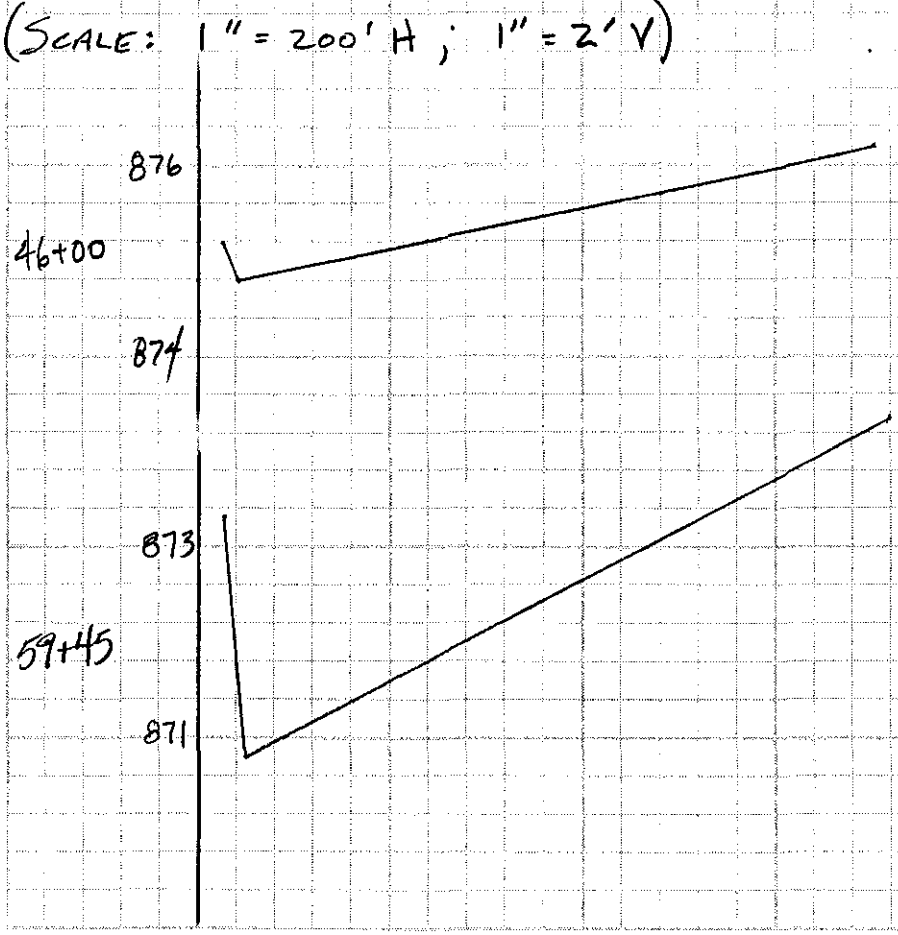
SHEET 30 OF 42
DATE 25 Nov. 91
BY JMR
PROJECT NO. 28

CLIENT Flood Control District of Maricopa Co.
PROJECT FCD 90-69 Buckeye FIS
SUBJECT 3 pt. X-sections along Buckeye Canal

Scale: 1" = 300' H, 1" = 3' V Palo Verde Rd. to Bruner Rd.



(SCALE: 1" = 200' H ; 1" = 2' V)



GEORGE V. SABOL CONSULTING ENGINEERS, INC.

SHEET 31 OF 42

CLIENT Flood Control District of Maricopa Co

DATE 25 Nov. 91

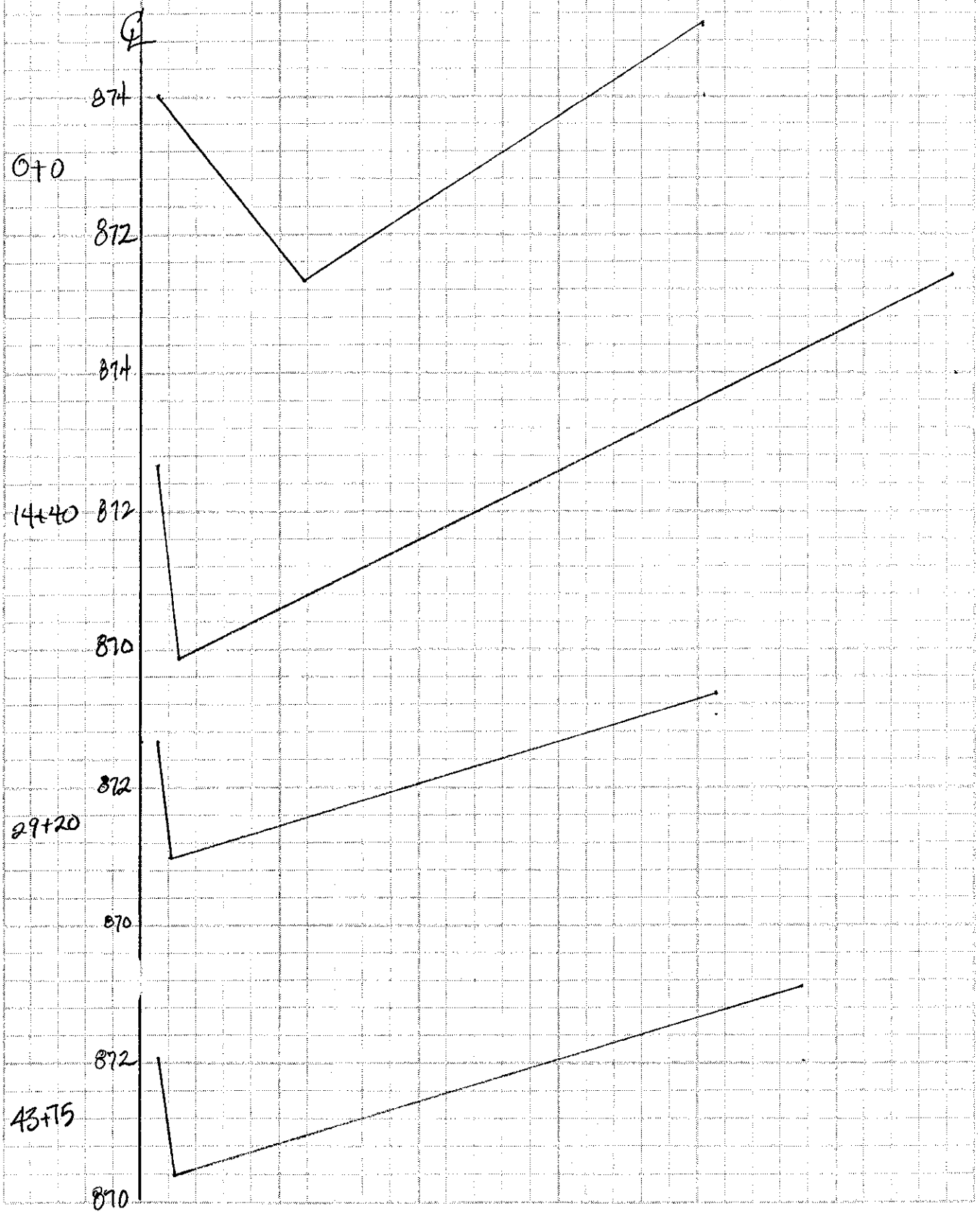
PROJECT FCD 90-69 Buckeye FIS

BY JMR

SUBJECT 3pt. X-sections along Buckeye Canal

PROJECT NO. 28

SCALE: 1" = 200' H; 1" = 2' V Brunner Rd to Johnson Rd



GEORGE V. SABOL CONSULTING ENGINEERS, INC.

SHEET 32 OF 42

CLIENT Flood Control District of Maricopa Co.

DATE 25 Nov. 91

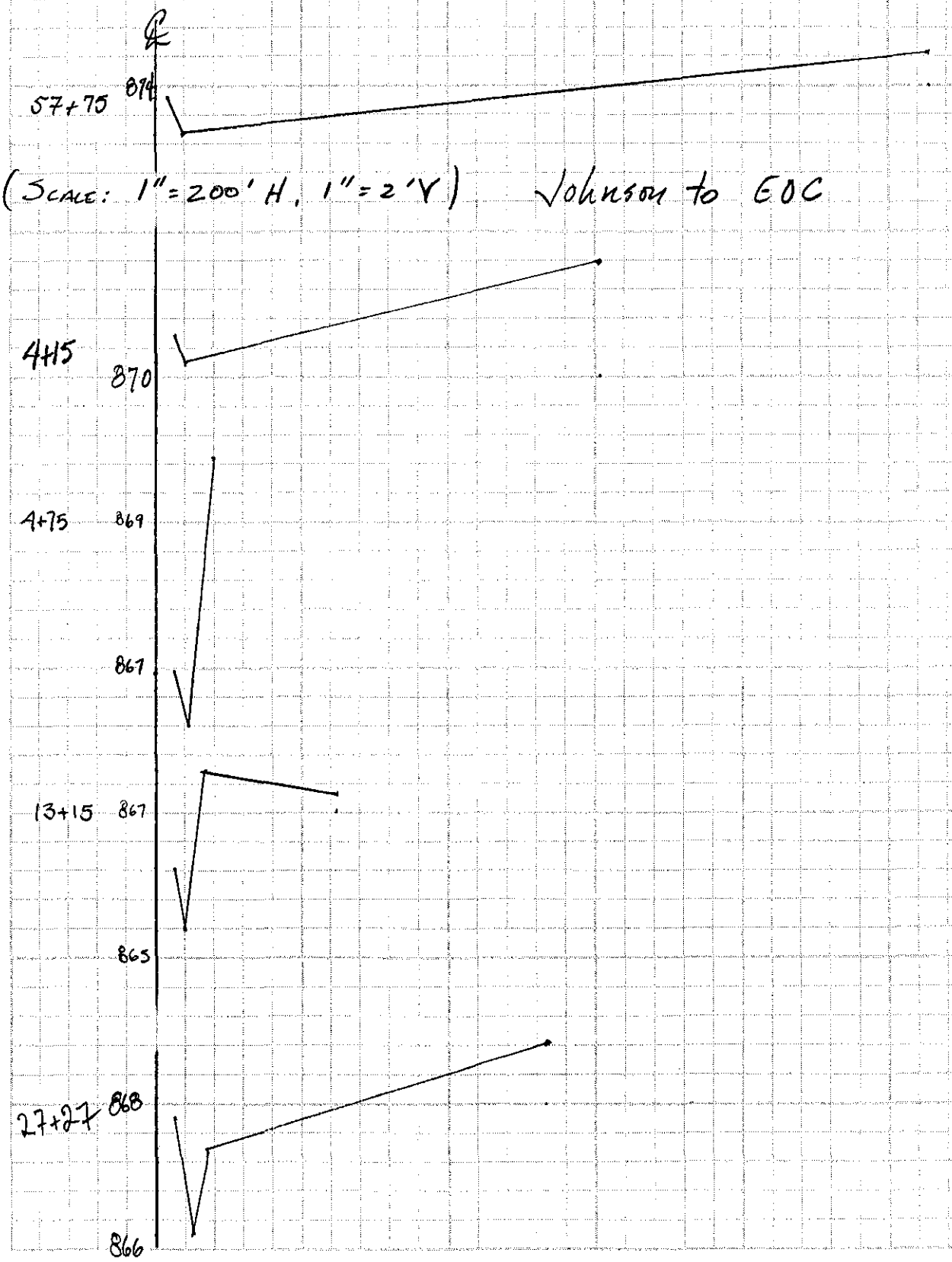
PROJECT FCD 90-69 Buckeye FIS

BY JMR

SUBJECT 3 pt. X-sections along Buckeye Canal

PROJECT NO. 28

SCALE 1"=300' H, 1"=3' V Briner to Johnson Rd.



GEORGE V. SABOL CONSULTING ENGINEERS, INC.

SHEET 33 OF 42

CLIENT Flood Control District of N.C.

DATE Nov. 91

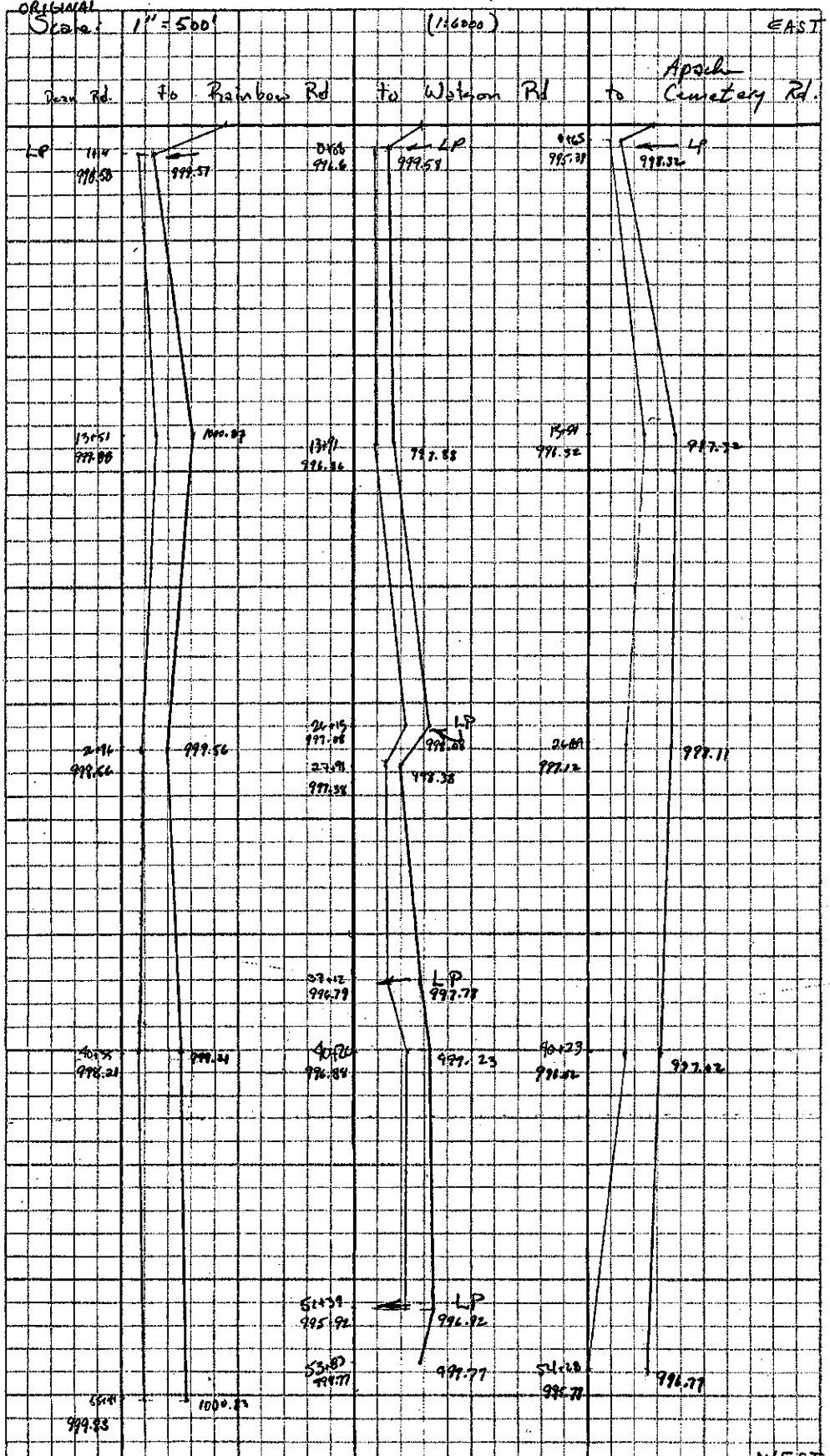
PROJECT FCD 90-69 Buckeye FIS

BY JMR

SUBJECT Plan of Roosevelt Canal 3pt. X-sec

PROJECT NO. 28

ORIGINAL Scale: 1" = 500' (1:6000)

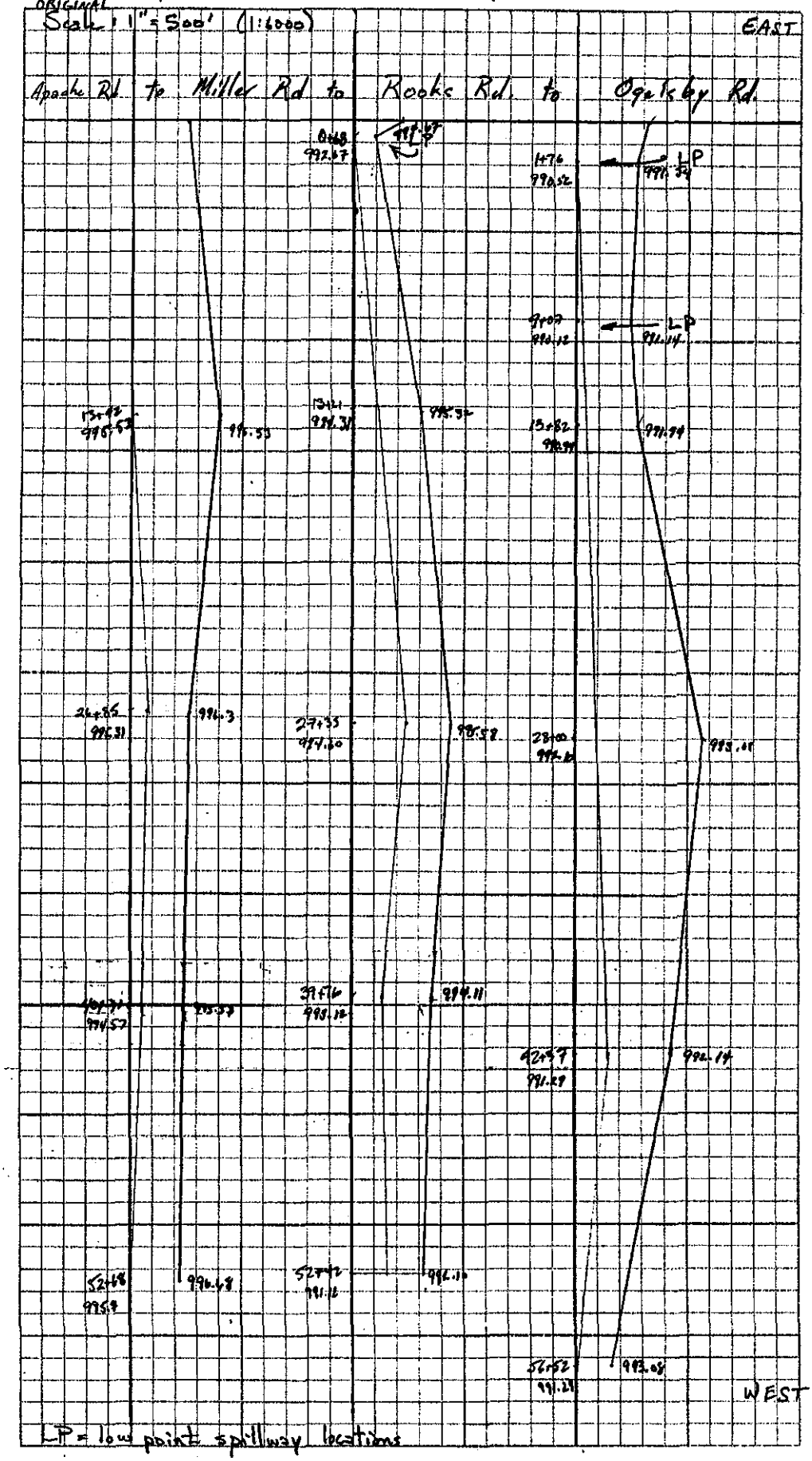


LP = Low point, spillway location

GEORGE V. SABOL CONSULTING ENGINEERS, INC.

SHEET 34 OF 42
CLIENT Flood Control District of M.C.
DATE Nov. 91
PROJECT FCD 90-69 Buckeye FIS
BY JMR
SUBJECT Plan of Roosevelt Canal 3pt. X-sec.
PROJECT NO. 28

ORIGINAL

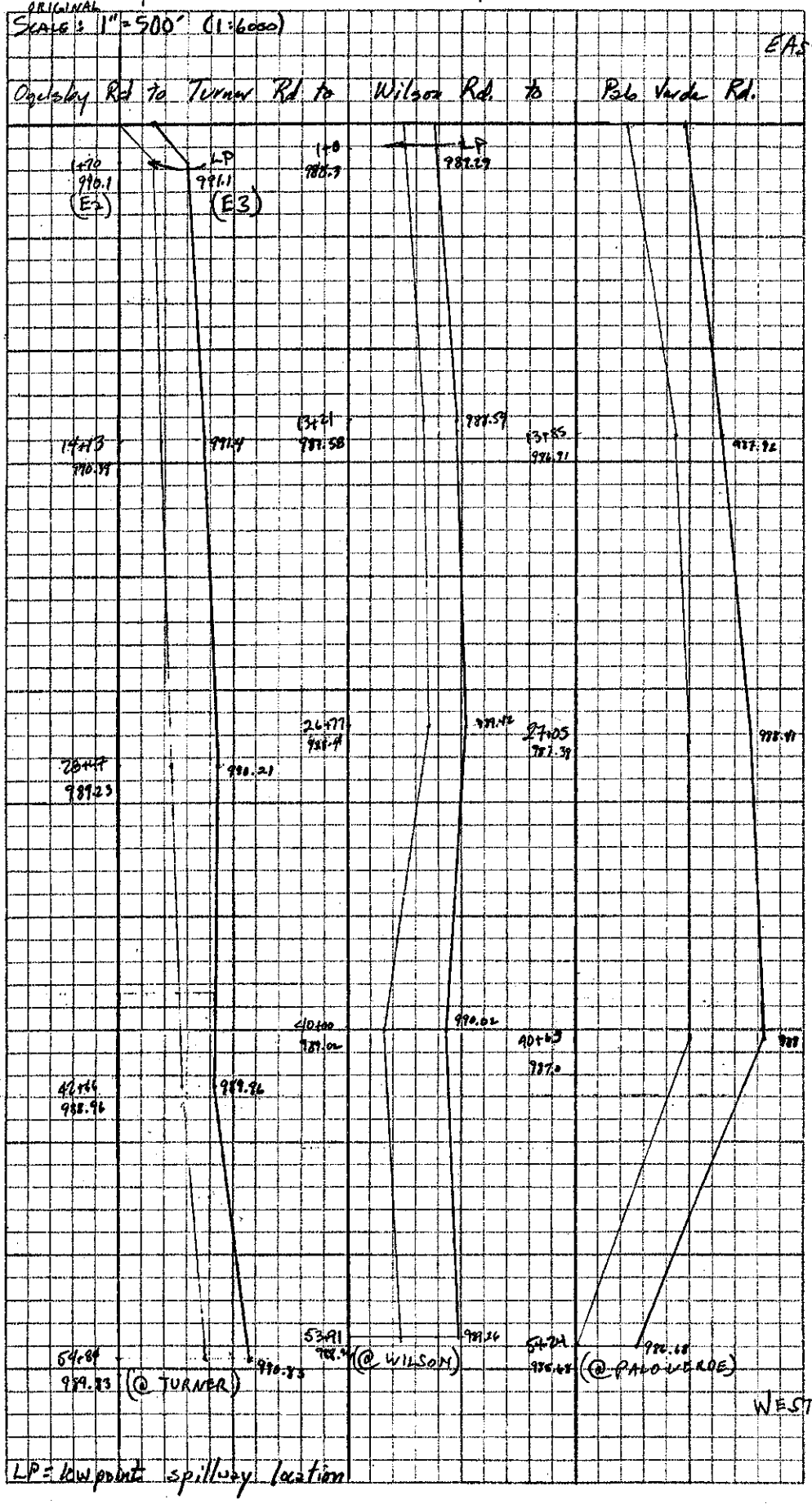


LP = low point spillway locations

GEORGE V. SABOL CONSULTING ENGINEERS, INC.

SHEET 35 OF 42
CLIENT Flood Control District of M.C.
DATE Nov. 91
PROJECT FCD 90-69 Buckeye FIS
BY JME
SUBJECT Plan of Roosevelt Canal 3pt. X-sec
PROJECT NO. 28

ORIGINAL
SCALE: 1" = 500' (1:6000)

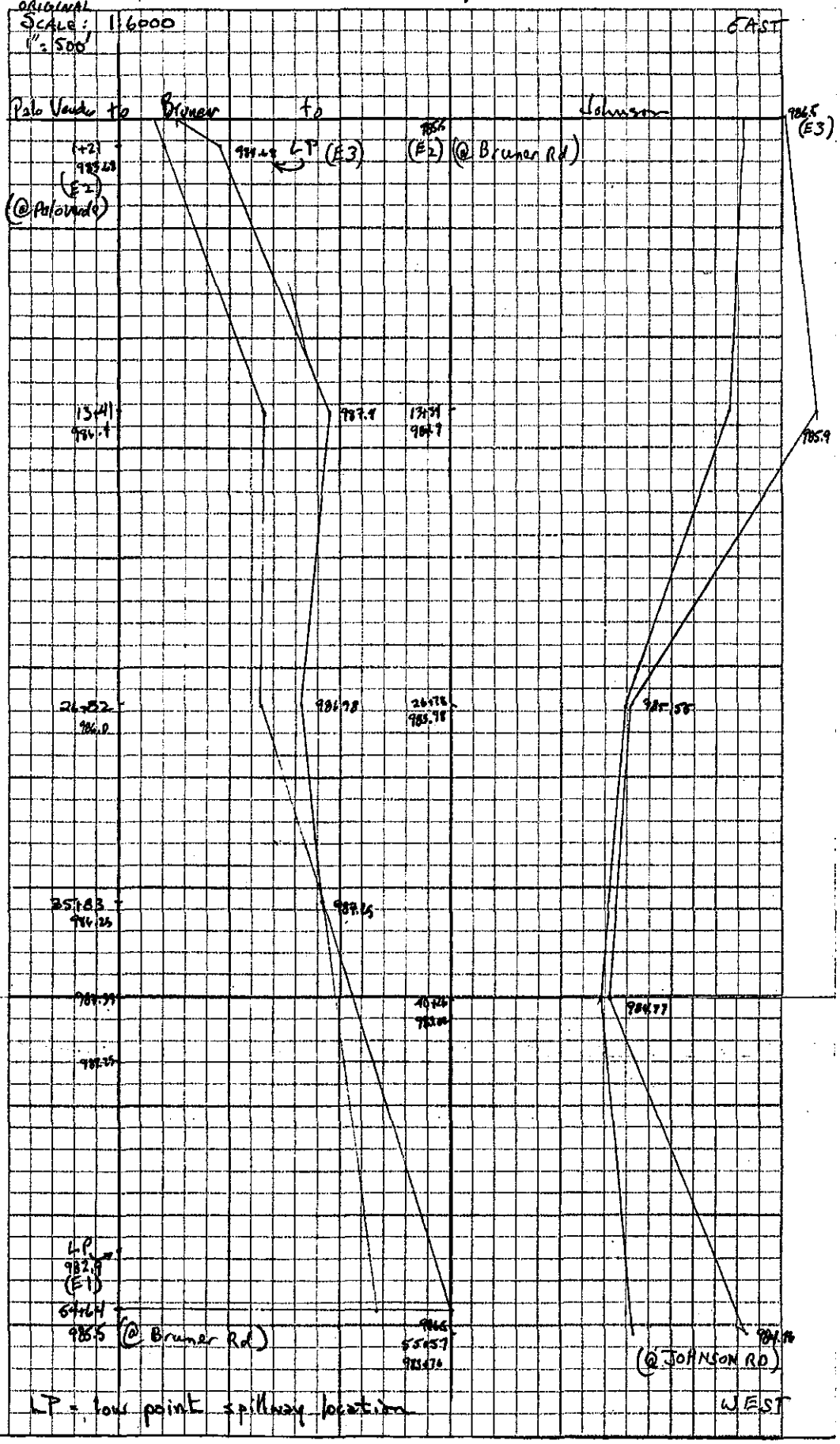


LP = low point spillway location

GEORGE V. SABOL CONSULTING ENGINEERS, INC.

SHEET 36 OF 42
DATE Nov. 91
BY JMR
PROJECT NO. 28

CLIENT Flood Control District of M.C.
PROJECT FCD 90-69 Buckeye FIS
SUBJECT Plan & Roosevelt Canal Spot X-Sec.



GEORGE V. SABOL CONSULTING ENGINEERS, INC.

SHEET 38 OF 42

CLIENT Flood Control District of Maricopa Co.

DATE 19 Nov. 91

PROJECT FCD 90-69 Buckeye FIS

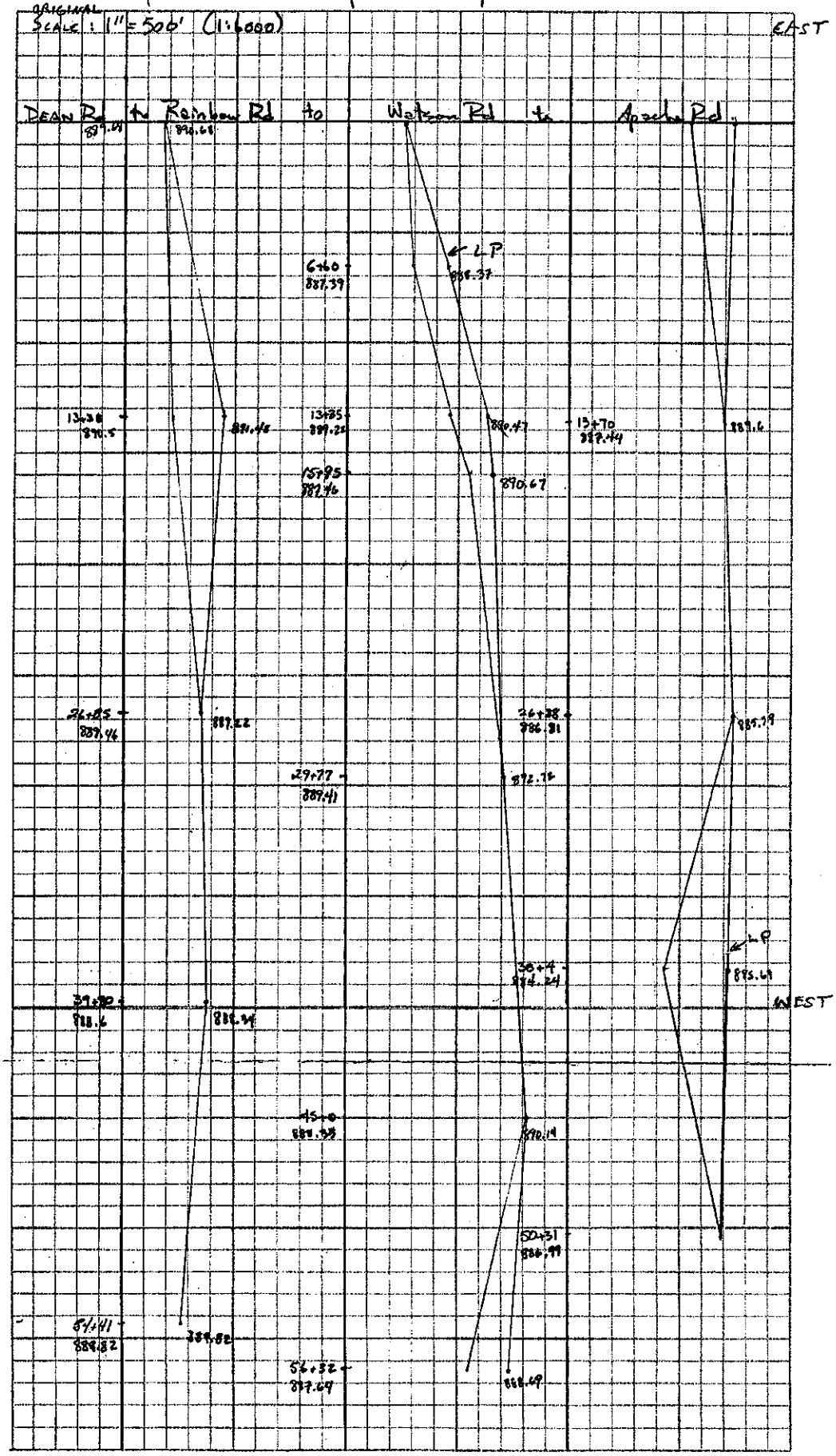
BY [illegible]

SUBJECT Plan of Buckeye Canal 3pt. X-sec.

PROJECT NO. 28

ORIGINAL

SCALE: 1" = 500' (1:6000)



GEORGE V. SABOL CONSULTING ENGINEERS, INC.

SHEET 39 OF 42

CLIENT Flood Control District of Maricopa Co.

DATE 19 Nov. 91

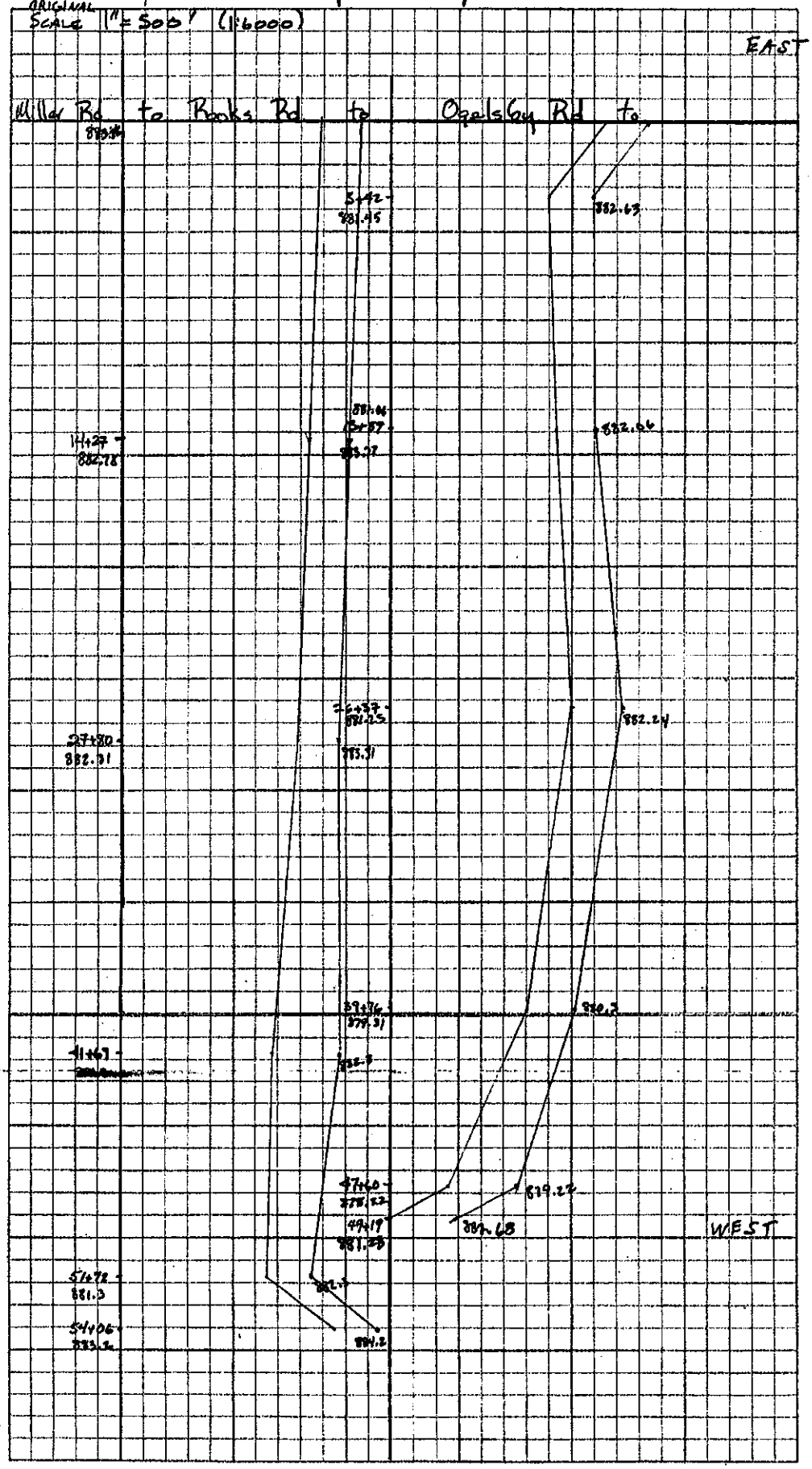
PROJECT FCD 90-69 Buckeye FIS

BY [illegible]

SUBJECT Plan of Buckeye Canal 3pt. X-secs

PROJECT NO. 28

ORIGINAL SCALE 1" = 500' (1:6000)



GEORGE V. SABOL CONSULTING ENGINEERS, INC.

SHEET 40 OF 42

CLIENT Flood Control District of Maricopa Co.

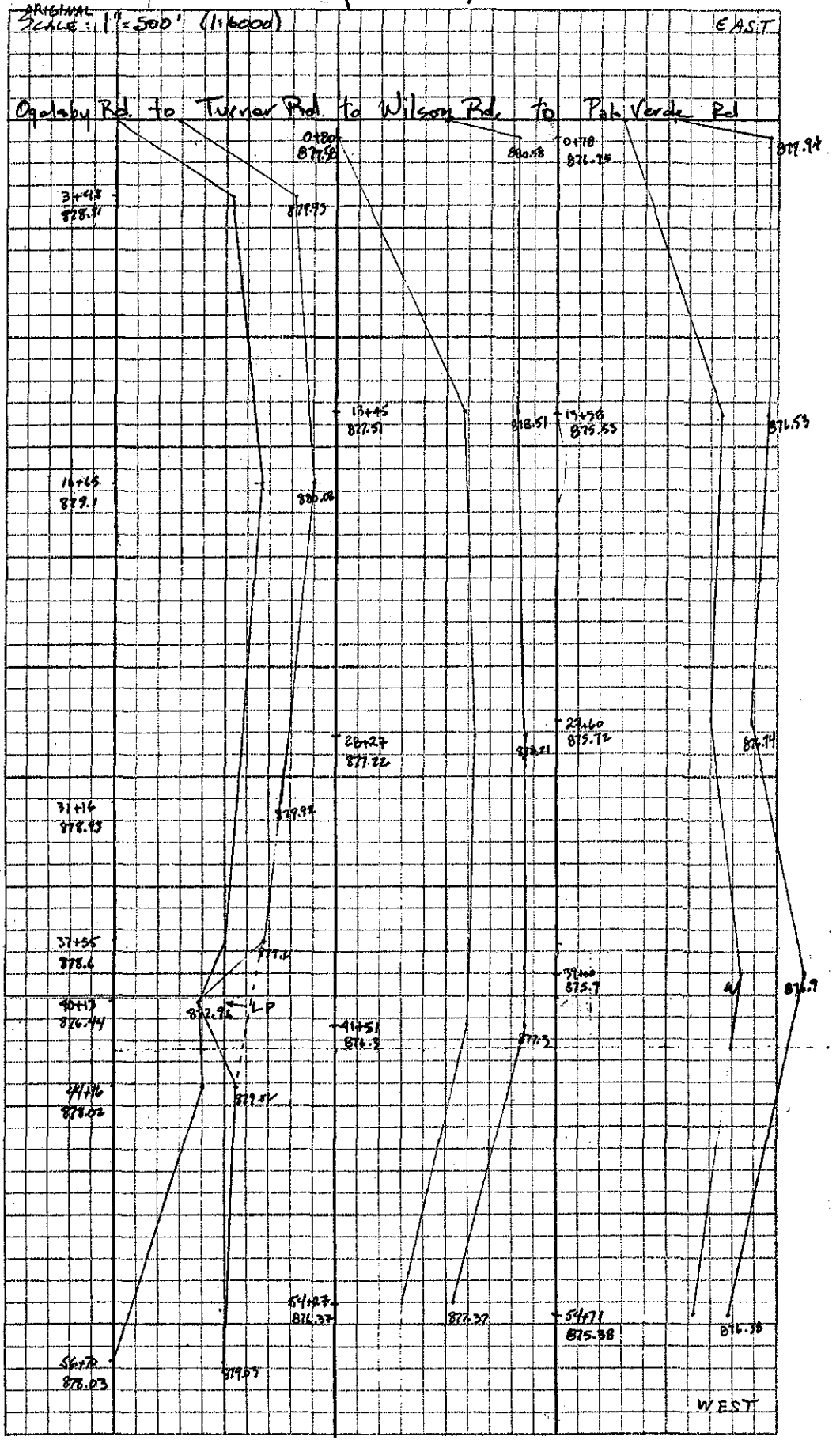
DATE 19 NOV. 91

PROJECT FCD 90-69 Buckeye FIS

BY JMR

SUBJECT Plan of Buckeye Canal 3pt. Xsec.'s

PROJECT NO. 28



GEORGE V. SABOL CONSULTING ENGINEERS, INC.

SHEET 41 OF 42

CLIENT Flood Control District of Maricopa Co.

DATE 25 Nov. 91

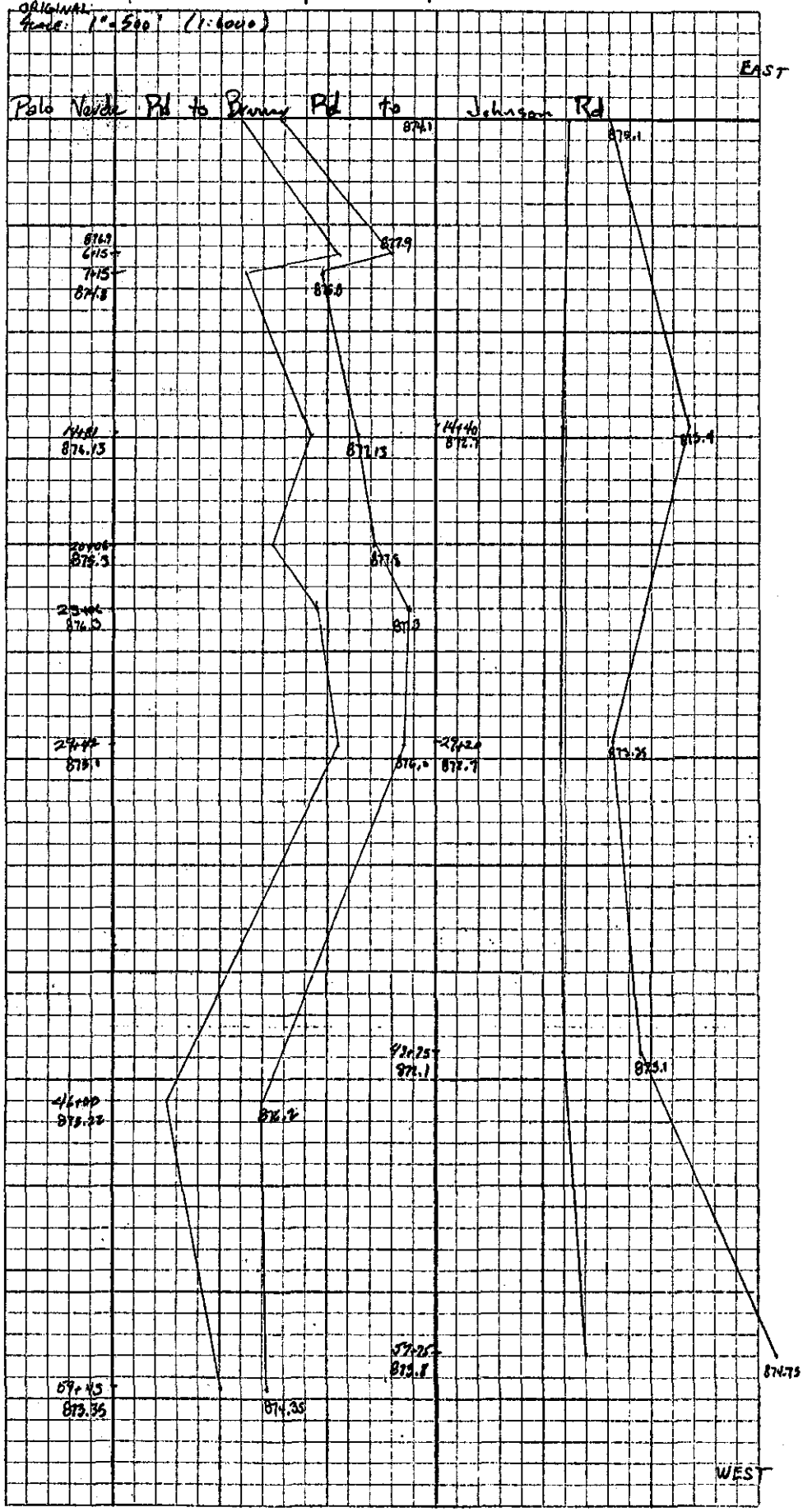
PROJECT FCD 90-69 Buckeye FIS

BY VMK

SUBJECT Plan of Buckeye Canal 3pt. X-sect's.

PROJECT NO. 28

ORIGINAL Scale: 1" = 500' (1:6000)



SOUTHERN PACIFIC R.R.

STAGE STORAGE DATA

JOHNSON ROAD TO END (SUB 68 STORAGE)

STORAGE AREA was planimetered directly off of blue line sheets 8 and 9 of 23.

EL	875	=	0 Acres
EL	880	=	33.8 Acres
EL	890	=	72.7 Acres

HEC-1 INPUT CARDS:

SA	0	33.8	72.7
SE	875	880	890

SOUTHERN PACIFIC R.R.

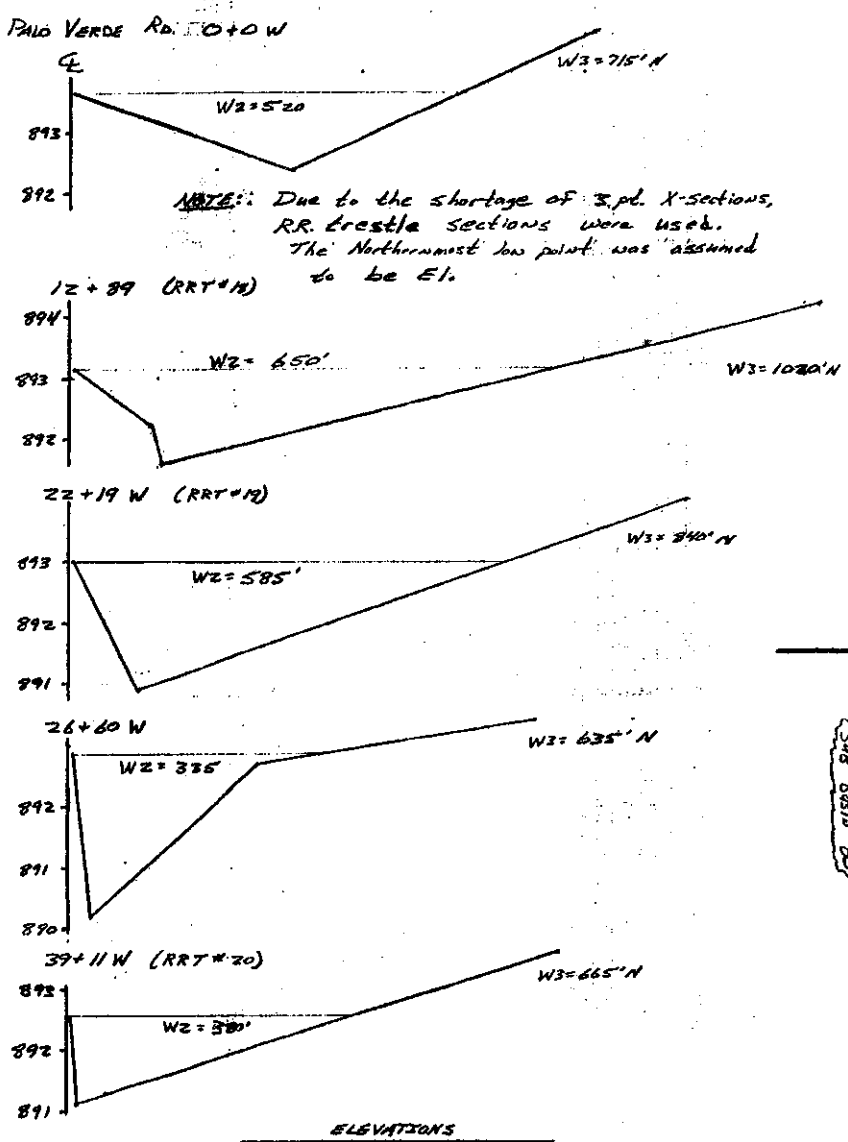
STAGE STORAGE DATA

PALO VERDE TO BRUNER ROADS

(SUB 53 storage → divert to 60 & 61)

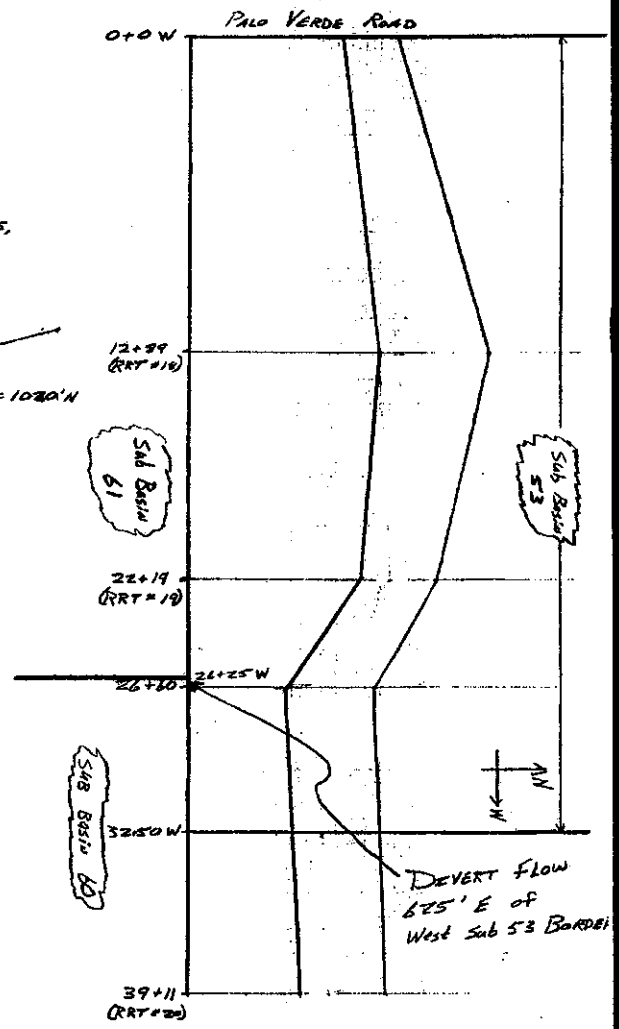
STATION & SECTION PROFILES

SCALE: 1" = 2' Vert.
1" = 200' Horz.



PLAN VIEW

SCALE: 1" = 500' (1:6000)
500'



STATION	ELEVATIONS E1	E2	E3
0+0 W	892.4	893.65	894.65
12+89 W	890.6	893.17	894.2
22+19 W	890.9	892.99	894.0
26+60 W	890.2	892.84	894.4
39+11 W	891.1	892.57	893.6
AVG	891.04	893.04	894.17

PLANIMETERED AREA:

A_{W2} = 39.3 acres

A_{W3} = 61.1 acres

HEC-1 INPUT CARDS:

SA	0	39.3	61.1
SE	891.04	893.04	894.17

SOUTHERN PACIFIC R.R.

STAGE STORAGE DATA

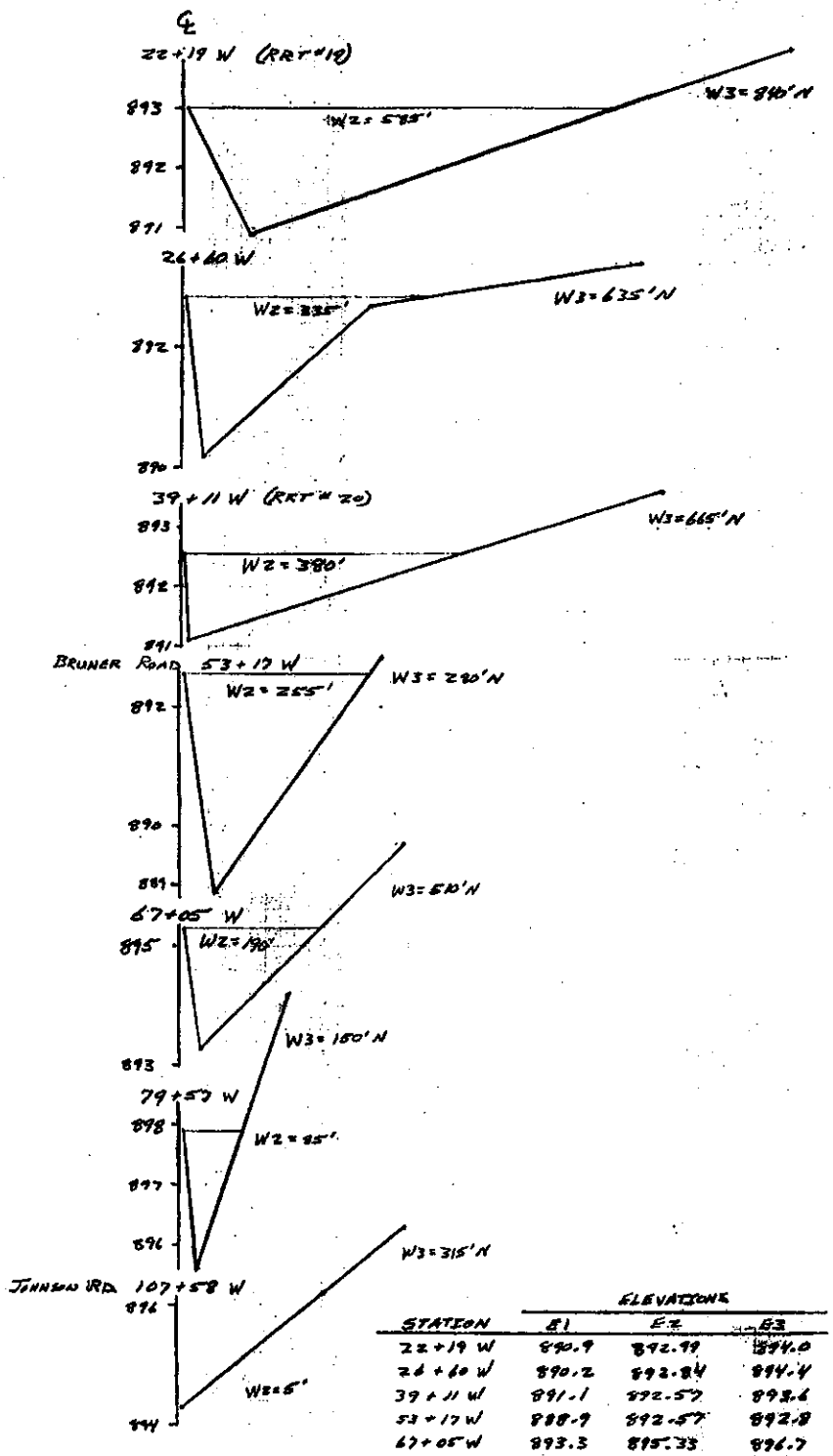
BRUNER TO JOHNSON ROADS (SUB 5'2 storage)

DTP for GVS
5/13/92

STATION X-SECTION PROFILES

SCALE: 1" = 2' Vert.
1" = 200' Horz.

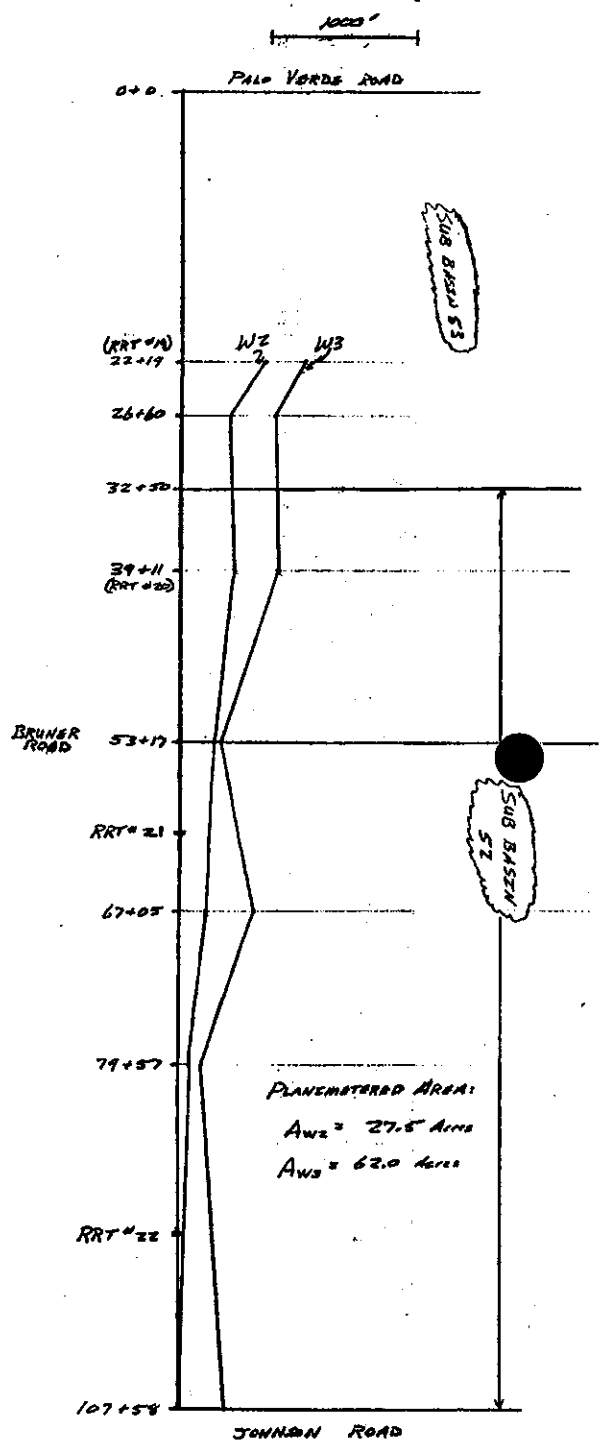
Note: Distances are referenced to PALO VERDE RD = 0+0 W



STATION	ELEVATIONS E1	E2	E3
22+19 W	890.9	892.99	894.0
26+60 W	890.2	892.84	894.4
39+11 W	891.1	892.57	893.6
53+17 W	888.9	892.57	892.8
67+05 W	893.3	895.33	896.7
79+57 W	895.6	897.90	900.2
107+58 W	896.2	894.30	897.3
AVG	892.31	894.07	895.57

PLAN VIEW

SCALE 1" = 1000' (1:12 000)



HEC-1 INPUT CARDS:

SA	0	27.5	0
SE	892.31	894.07	895.57

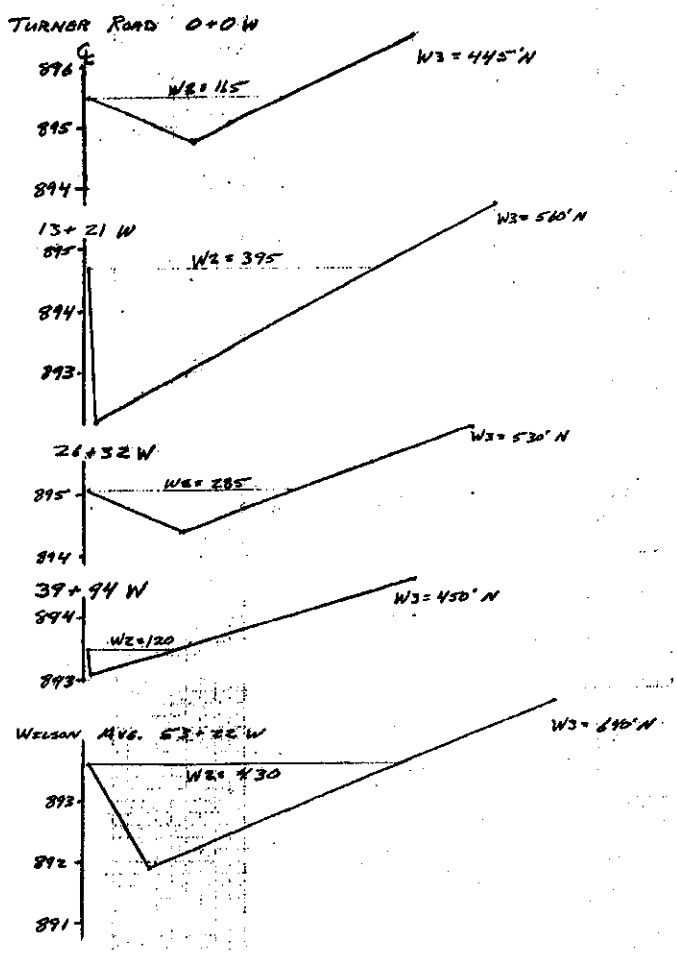
SOUTHERN PACIFIC R.R.

STAGE STORAGE DATA

TURNER ROAD TO WILSON AVENUE (SUB 55 Storage)

STATION X-SECTION PROFILES

SCALE: 1" = 2' Vert.
1" = 200' Horiz



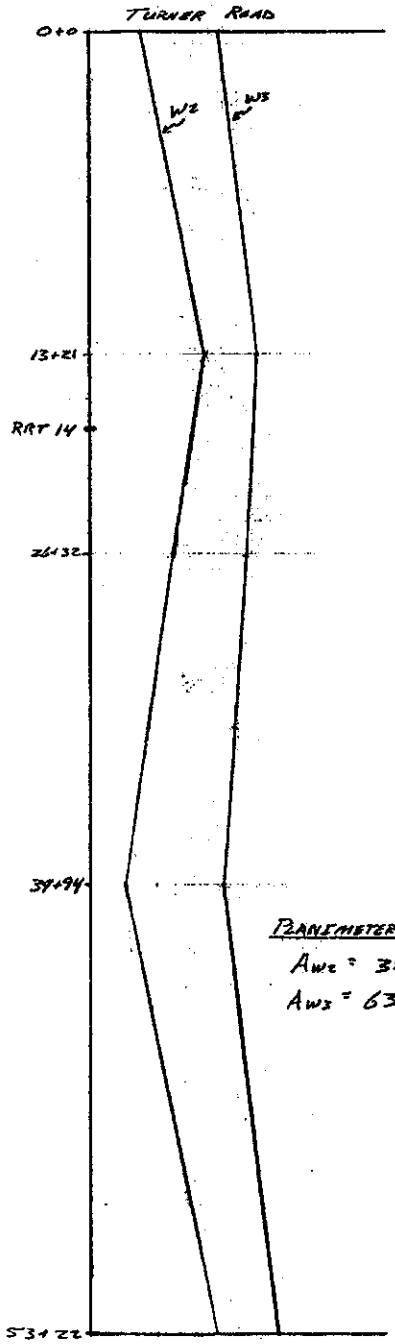
STATION	ELEVATIONS E1	E2	E3
0+0 W	894.75	895.50	896.50
13+21 W	892.2	894.70	895.7
26+32 W	894.4	895.09	896.1
39+94 W	893.1	893.55	893.6
53+22 W	891.9	893.61	894.6
AVG.	893.11	894.49	895.30

HEC-1 INPUT CARDS:

SA	0	32.1	63.7
SE	893.11	894.49	895.30

PLAN VIEW

SCALE: 1" = 500' (1:6000)



PLANIMETERED AREA:
A_{W2} = 32.1 acres
A_{W3} = 63.7 acres

9 of 12
DTP for GVS
5/13/92

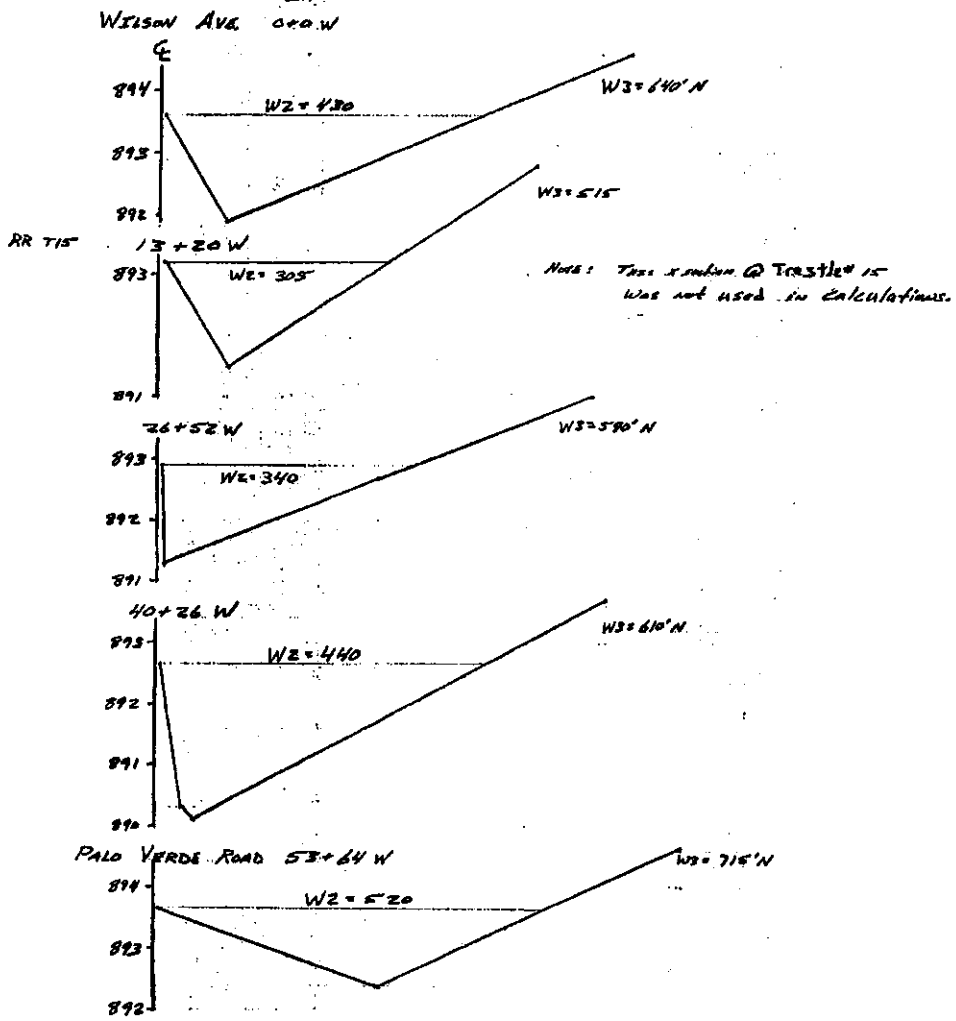
SOUTHERN PACIFIC R.R.

STAGE STORAGE DATA

WILSON AVE to PALO VERDE ROAD (SUB 54 storage)

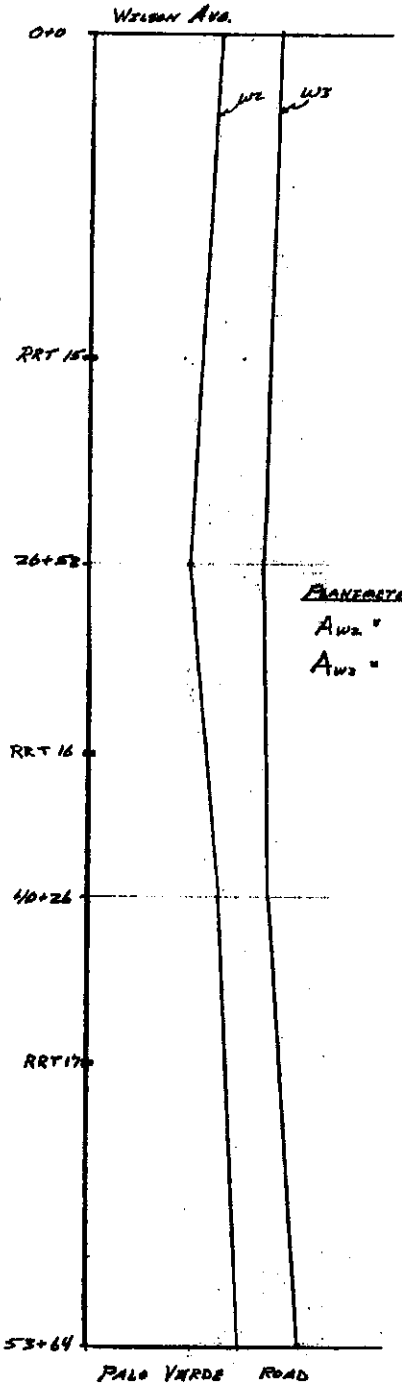
STATION X-SECTION PROFILES

SCALE: 1" = 2' Vert.
1" = 200' Horz.



PLAN VIEW

SCALE: 1" = 500' (1:6000)



PLANIMETERED AREA:
A_{W2} = 51.7 acres
A_{W3} = 76.9 acres

STATION	ELEVATIONS E1	E2	E3
0+0 W	891.9	893.61	894.6
26+52 W	891.3	892.94	894.0
40+26 W	890.1	892.67	893.7
53+64 W	892.4	893.65	894.65
AVE	891.43	893.22	894.24

HEC 1 INPUT CARDS:

SA	0	51.7	76.9
SE	891.43	893.22	894.24

SOUTHERN PACIFIC R.R.

STAGE STORAGE DATA

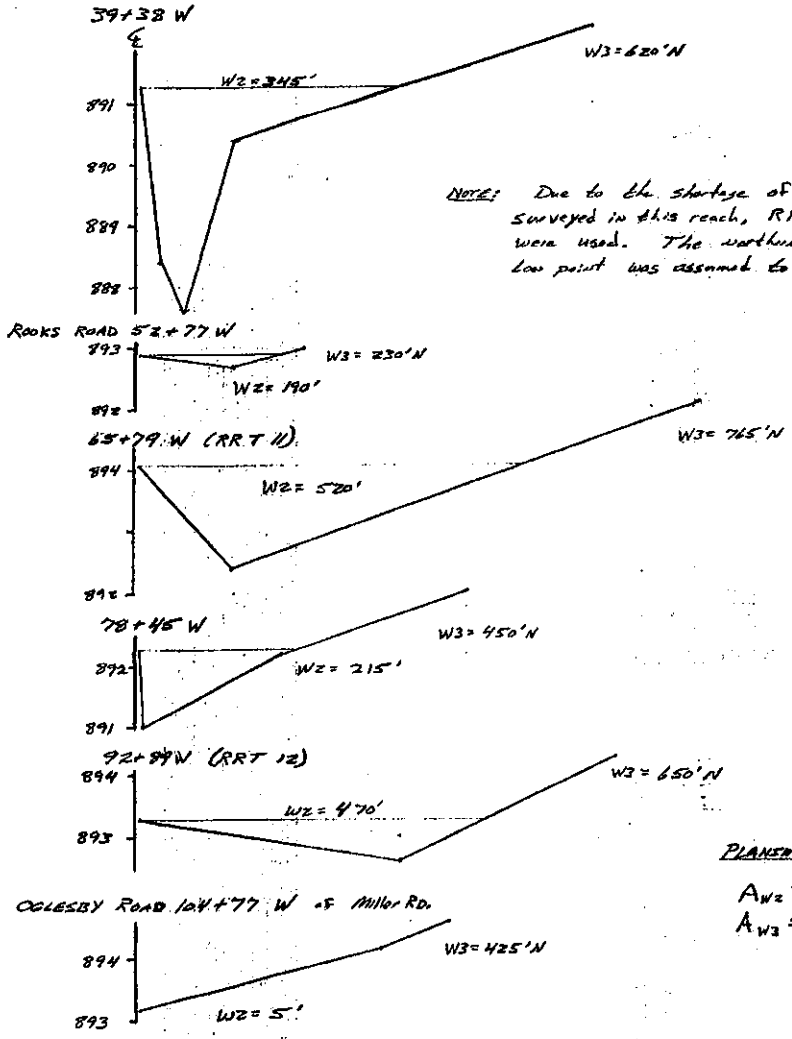
ROOKS TO OGLESBY ROADS

(SUB 46 STORAGE → DIVERT TO 65 & 66)

STATION X-SECTION PROFILES

SCALE: 1" = 2' Vert.
1" = 200' HORZ.
200'

NOTE: Distances are referenced to MILLER RD = 0+0 W



NOTE: Due to the shortage of X-sections surveyed in this reach, RR trestles were used. The northernmost low point was assumed to be El.

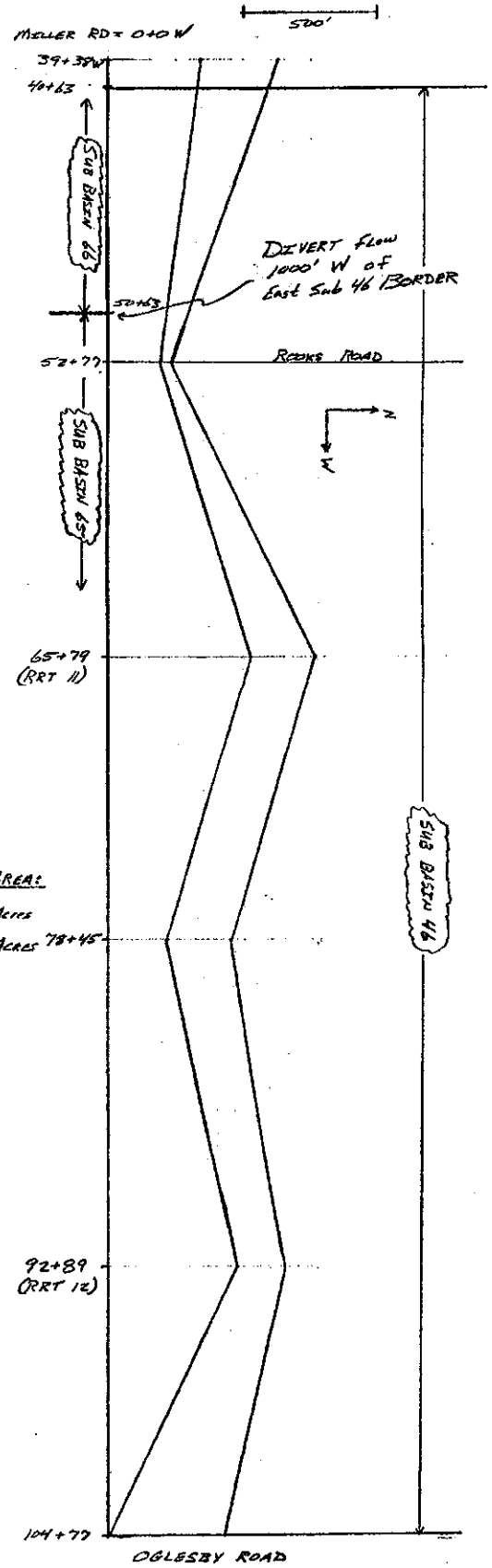
STATION	ELEVATIONS E1	E2	E3
39+38 W	887.6	891.24	892.25
52+77 W	892.7	892.90	893.0
65+79 W	892.4	894.08	895.1
78+45 W	891.0	892.25	893.25
92+89 W	892.6	893.29	894.3
104+77 W	893.18	893.18	894.6
AVG	891.58	892.82	893.75

HEC-1 INPUT CARDS:

SA	0	46.5	76.3
SE	891.58	892.82	893.75

PLAN VIEW

SCALE: 1" = 500' (1:6000)
500'



PLANIMETERED AREA:

A_{W2} = 46.5 Acres
A_{W3} = 76.3 Acres

SOUTHERN PACIFIC R.R.

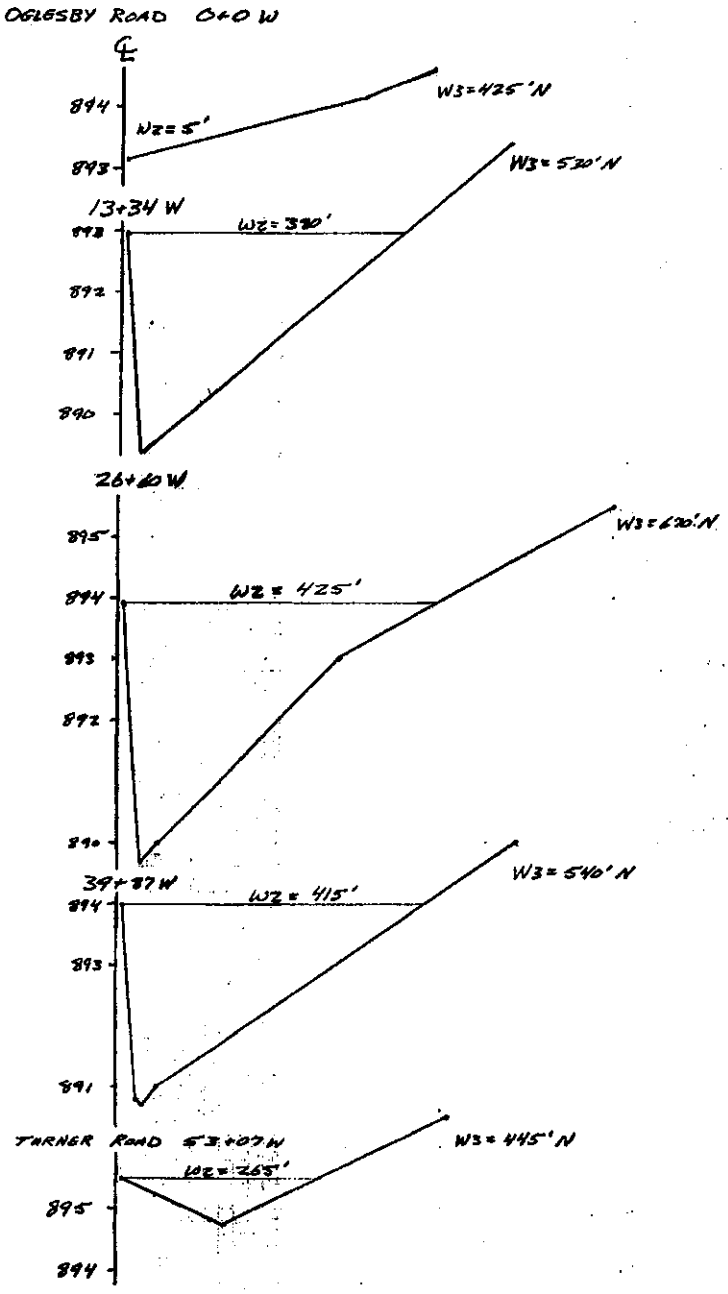
STAGE STORAGE DATA

OGLESBY TO TURNER ROADS (SUB 45 storage)

STATION X-SECTION PROFILES

SCALE: 1" = 2' Vert
1" = 200' Horz

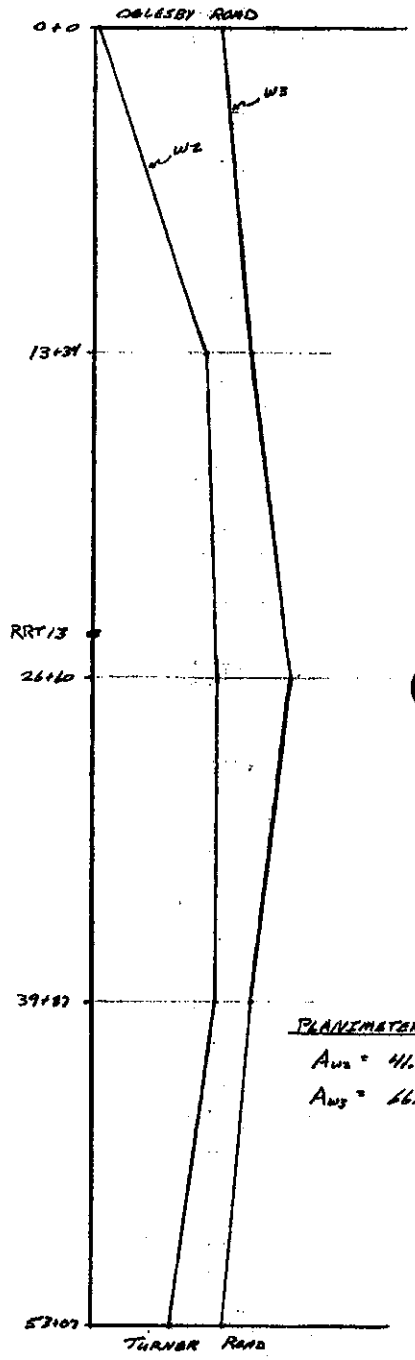
200'



PLAN VIEW

SCALE: 1" = 500' (1:6000)

500'



PLANIMETERED AREA:
A_{W2} = 41.3 ACRES
A_{W3} = 66.0 ACRES

STATION	ELEVATIONS E1	E2	E3
0+0 W	893.18	893.18	894.6
13+34 W	889.4	892.98	894.4
26+60 W	889.7	893.94	895.5
39+87 W	890.7	893.99	895.0
53+07 W	894.75	895.50	896.50
AVG	891.55	893.92	895.20

HEC-1 INPUT CARDS:

SA	0	41.3	66.0
SE	891.55	893.92	895.20

SOUTHERN PACIFIC R.R.

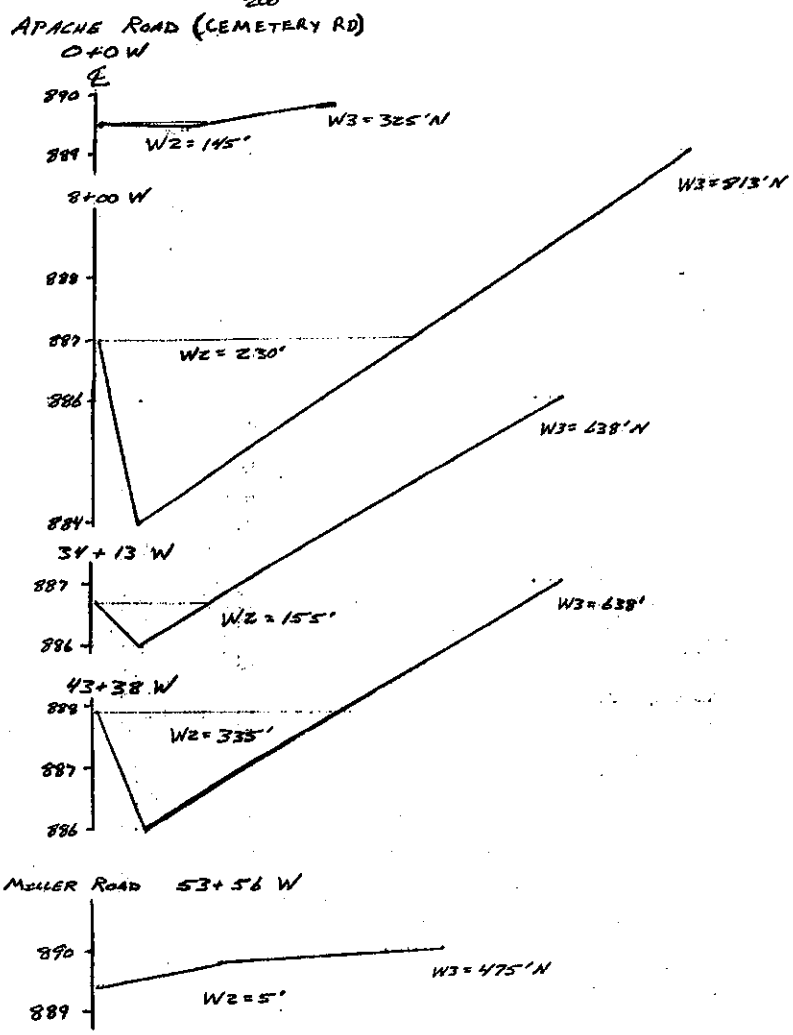
4 of 12
DTP for GVS
5/19/92

STAGE STORAGE DATA

APACHE TO MILLER ROADS (SUB 67 STORAGE)
(CEMETERY)

STATION X-SECTION PROFILES

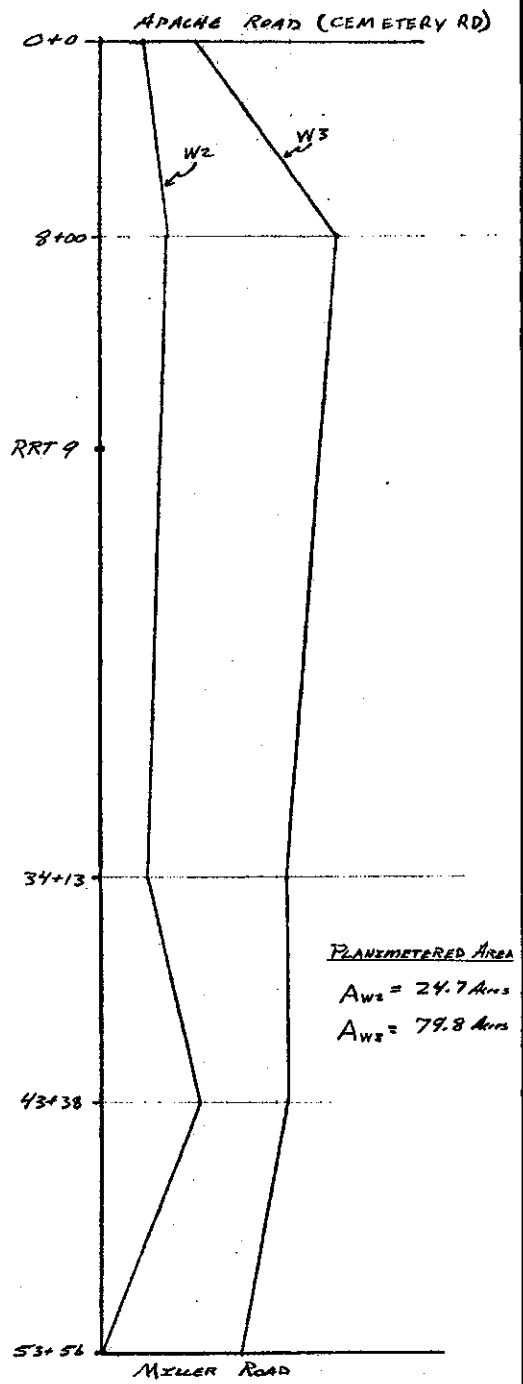
SCALE: 1" = 2' Vert.
1" = 200' Horz



STATION	ELEVATIONS E1	E2	E3
0+0 W	889.5	889.52	889.8
8+00 W	884.0	887.00	890
34+13 W	886.0	886.70	890
43+38 W	886.0	887.90	890
53+56 W	889.8	889.405	890
AVG	887.06	888.11	889.96

PLAN VIEW

SCALE: 1" = 500' (1: 6000)



PLANIMETERED AREA
A_{W2} = 24.7 Acres
A_{W3} = 79.8 Acres

HEC-1 INPUT CARDS:

SA	0	24.7	79.8
SE	887.06	888.11	889.96

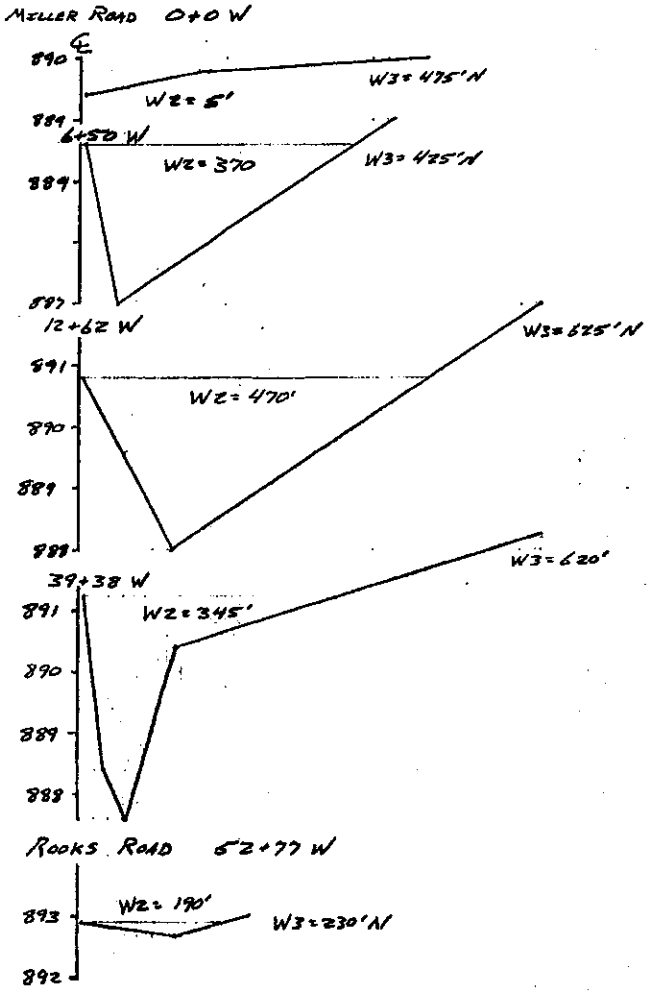
SOUTHERN PACIFIC R.R.

STAGE STORAGE DATA

MILLER TO ROOKS ROADS (SUB 47 STORAGE)

STATION X-SECTION PROFILES

SCALE: 1" = 2' Vert.
1" = 200' Horz.



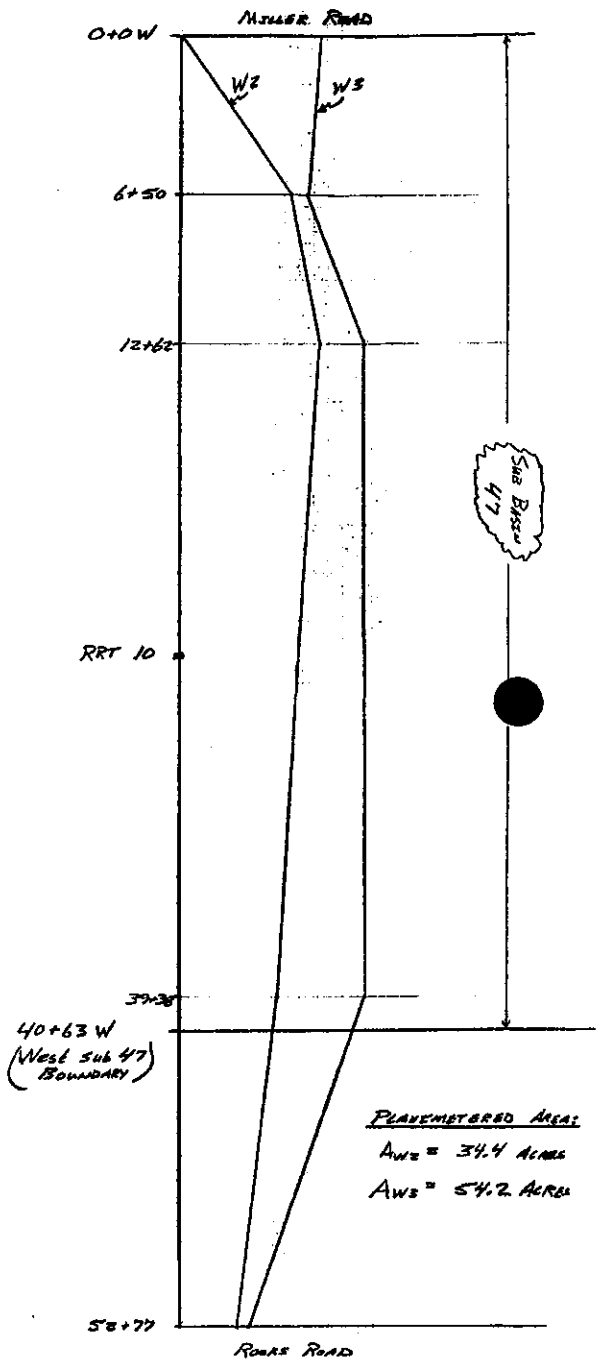
STATION	ELEVATION E1	E2	E3
0+0 W	889.405	889.405	890
6+50 W	887.0	889.60	890
12+62 W	888.0	890.80	892
39+38 W	887.6	891.24	892.25
52+77 W	892.7	892.90	893.0
AVG	888.94	890.79	891.45

HEC-1 INPUT CARDS:

SA	0	34.4	54.2
SE	888.94	890.79	891.45

PLAN VIEW

SCALE: 1" = 500' (1:6000)



PLANIMETERED AREA:
A_{W2} = 34.4 ACRES
A_{W3} = 54.2 ACRES

SOUTHERN PACIFIC R.R.

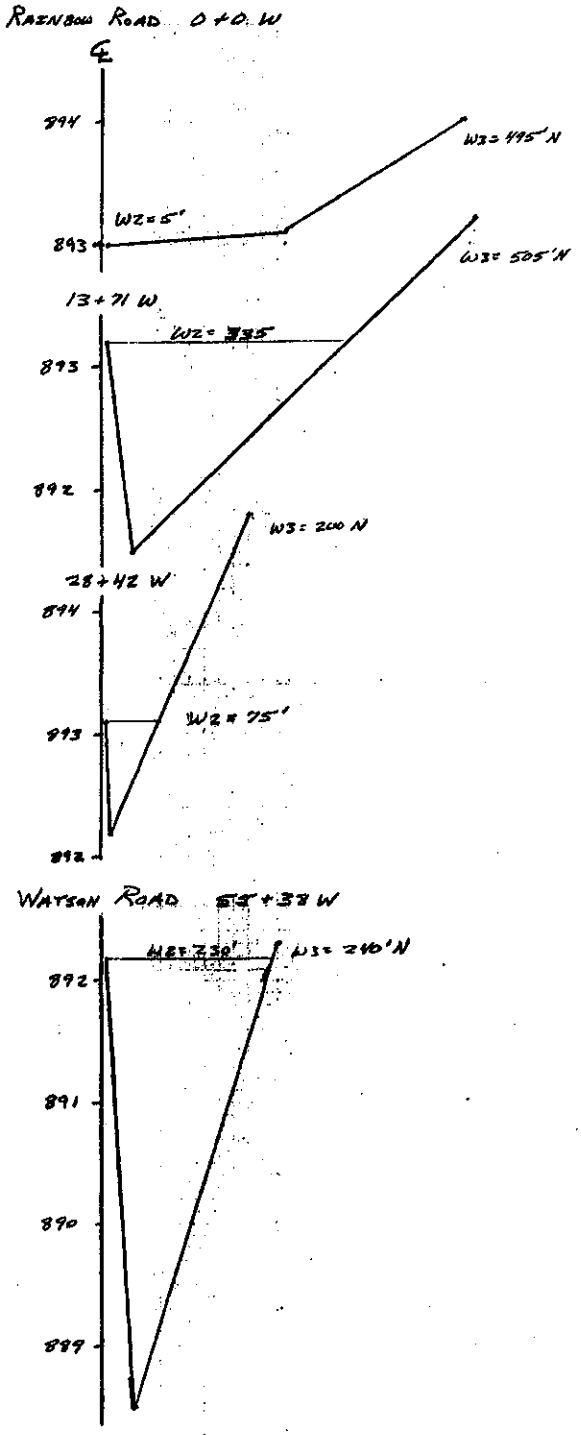
STAGE STORAGE DATA

RAINBOW TO WATSON ROADS (548 ac-ft storage)

STATION X-SECTION PROFILES

SCALE: 1" = 1' Vert
1" = 200' Horz

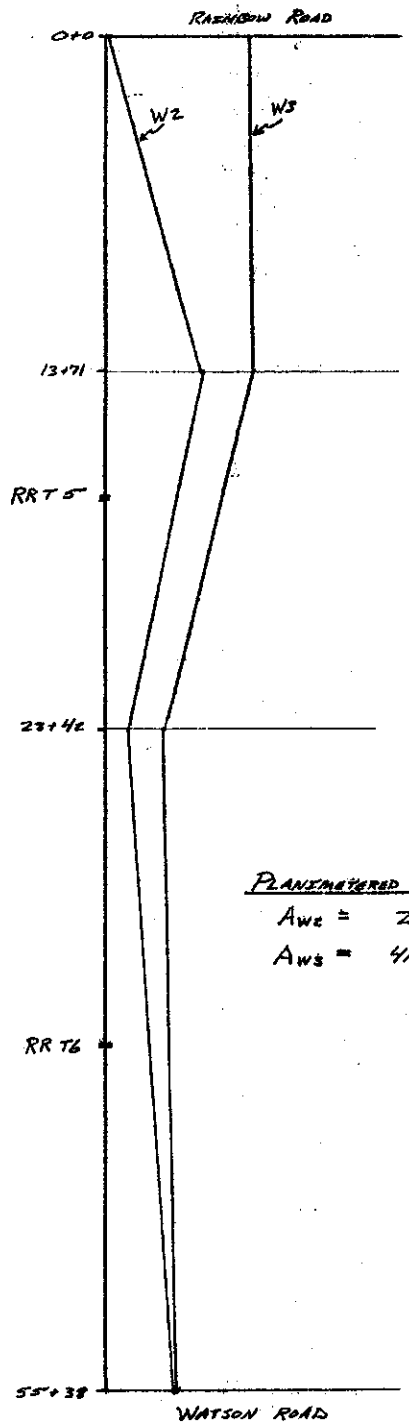
200 ft



PLAN VIEW

SCALE: 1" = 500' (1:6000)

500 ft



PLANIMETERED AREAS:

A_{W2} = 21.4 ACRES

A_{W3} = 41.0 ACRES

STATION	ELEVATIONS #1	#2	#3
0+0 W	892.98	892.98	894.0
13+71 W	891.5	893.22	894.2
28+42 W	892.2	893.09	894.8
55+38 W	888.5	892.18	892.3
AVG	891.30	892.87	893.83

HEC-1 INPUT CARDS:

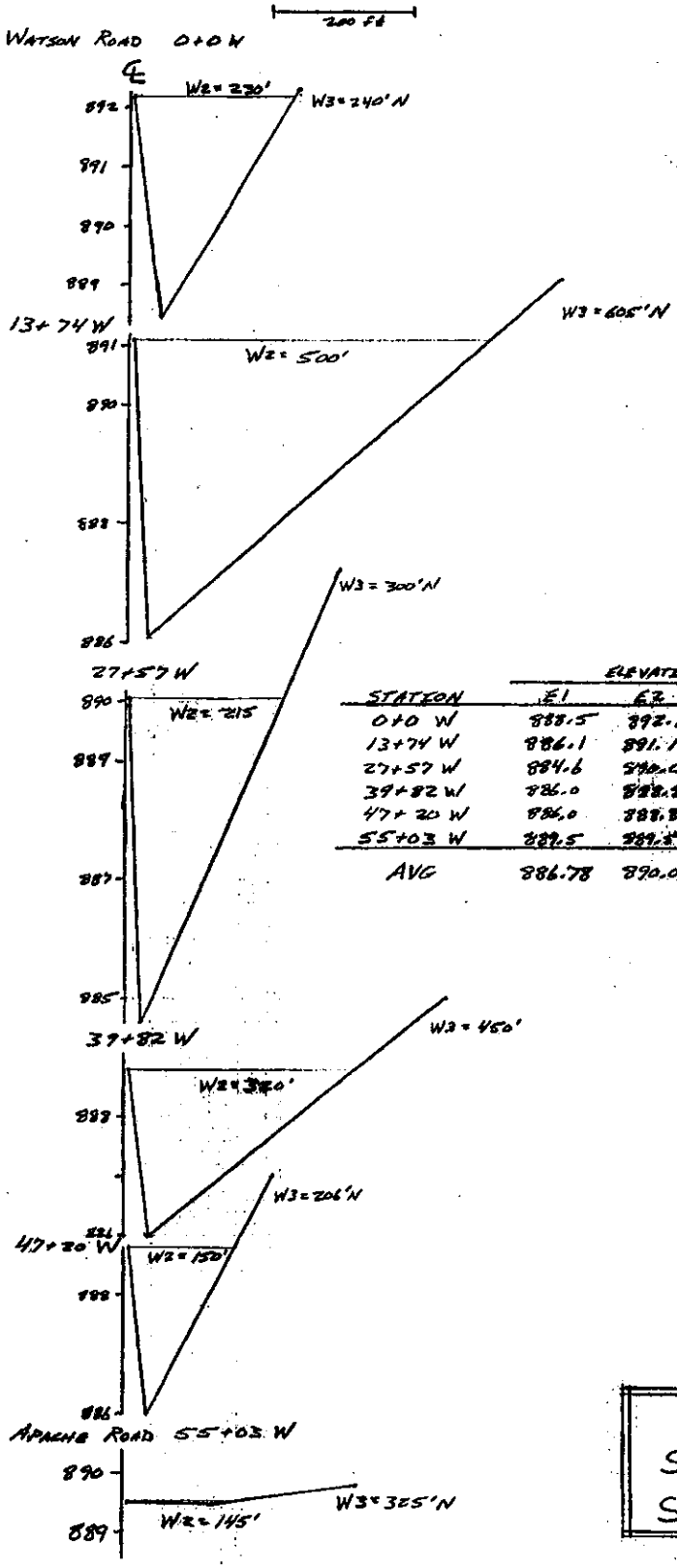
SA	0	21.4	41.0
SE	891.30	892.87	893.83

SOUTHERN PACIFIC R.R.

STAGE STORAGE DATA
WATSON TO APACHE ROADS (SUB 58 STORAGE)
(CEMETERY)

STATION X-SECTION PROFILES

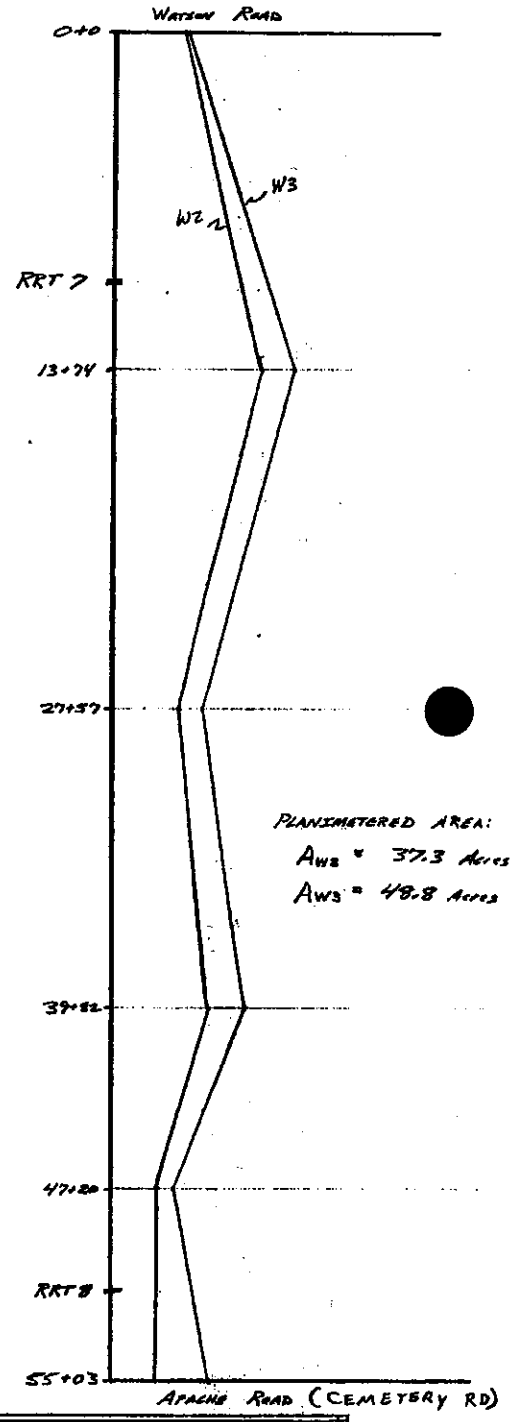
SCALE: 1" = 2' Vert.
1" = 200' Horz



STATION	ELEVATIONS E1	E2	E3
0+0 W	888.5	892.13	892.3
13+74 W	886.1	891.12	892.1
27+57 W	884.6	890.05	892.2
39+82 W	886.0	888.8	890
47+20 W	886.0	888.8	890
55+03 W	889.5	889.52	889.8
AVG	886.78	890.08	891.07

PLAN VIEW

SCALE: 1" = 500' (1:6000)
500'



PLANIMETERED AREA:
A_{W2} = 37.3 Acres
A_{W3} = 48.8 Acres

HEC-1 INPUT CARDS:

SA	0	37.3	48.8
SE	886.78	890.08	891.07

GEORGE V. SABOL CONSULTING ENGINEERS, INC.

SHEET 42 OF 42

CLIENT Flood Control District of Maricopa Co.

DATE 25 Nov. 91

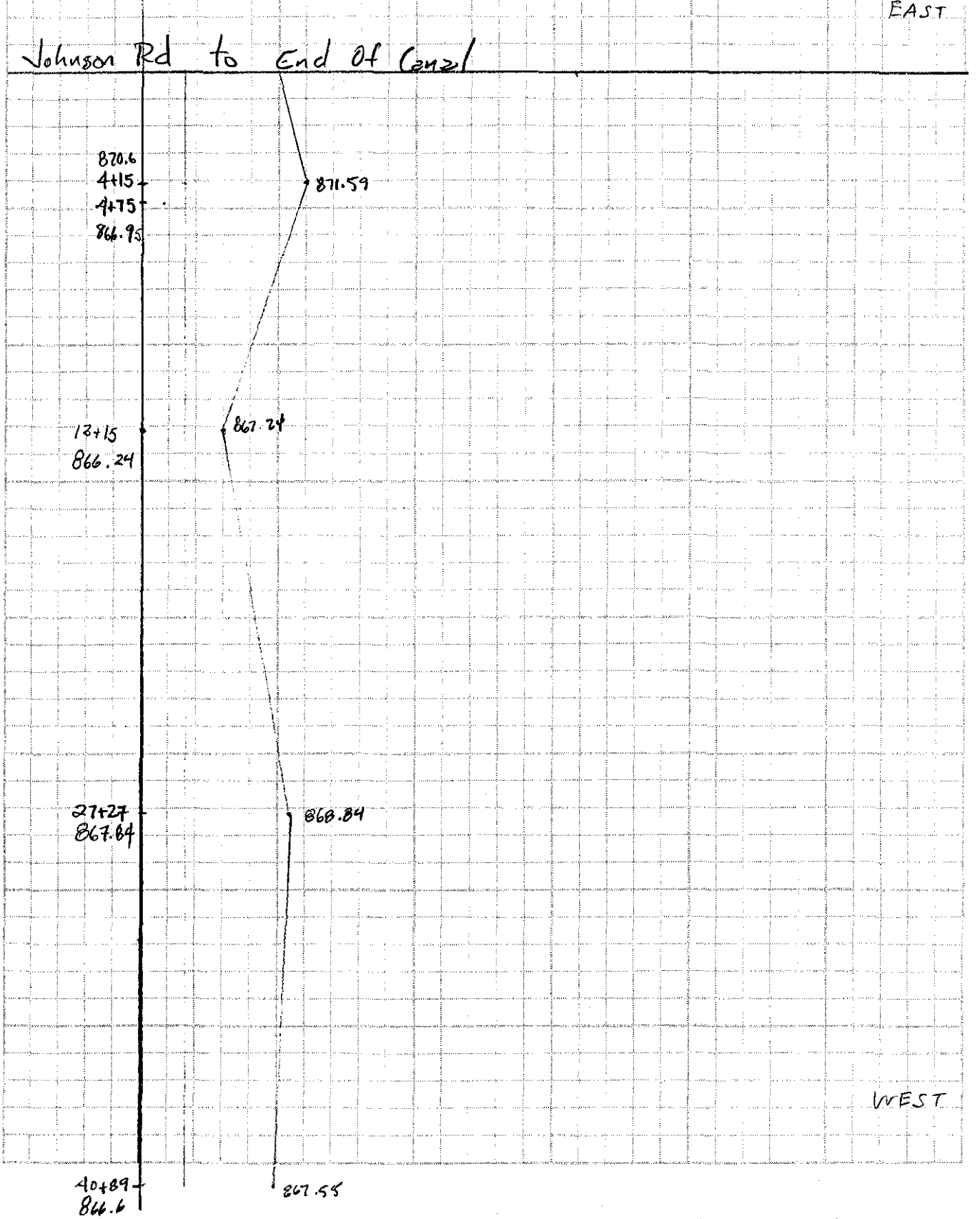
PROJECT FCD 90-69 Buckeye FIS

BY JMR

SUBJECT Plan of Buckeye Canal 3pt. X-sect.'s.

PROJECT NO. 28

ORIGINAL SCALE: 1" = 500' (1:6000)



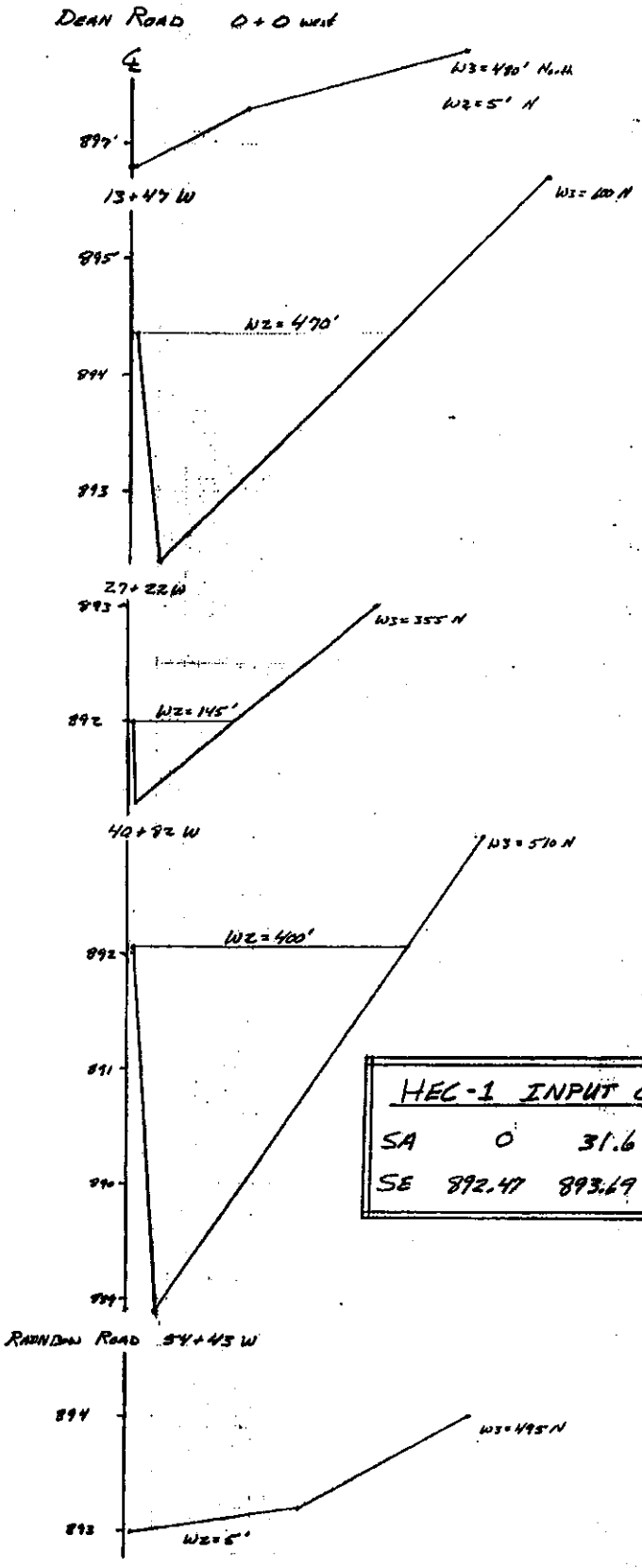
SOUTHERN PACIFIC R.R.

STAGE STORAGE DATA

DEAN TO RAINBOW ROADS (SUB 54 storage)

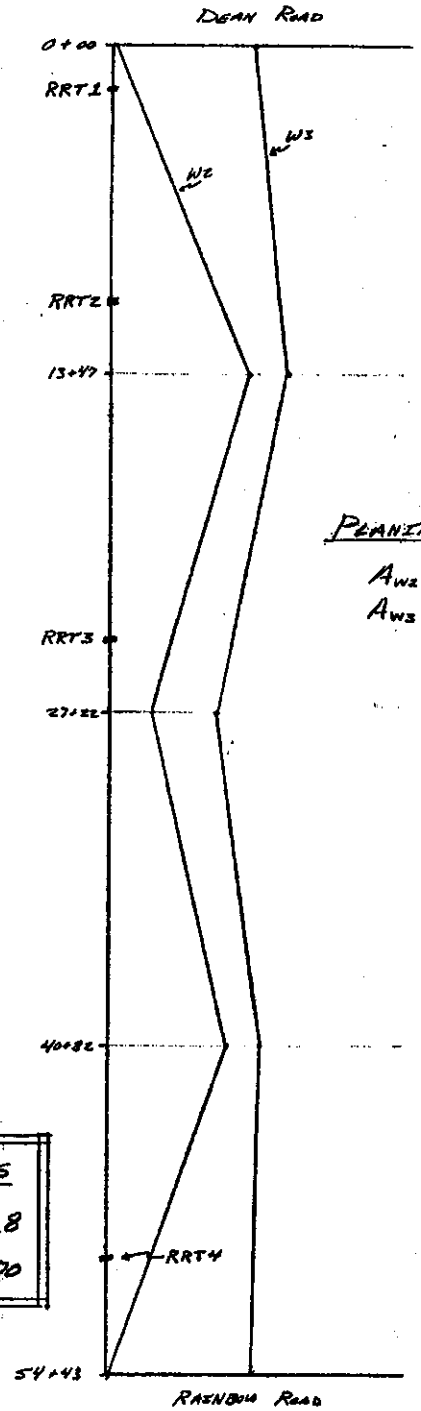
STATION X-SECTION PROFILES

SCALE: 1" = 1' Vert.
1" = 200' Horz. (1 inch / 200 ft)



PLAN VIEW

SCALE: 1" = 500' (1:6000) (1 inch / 500 ft)



PLANIMETERED AREAS:

A_{W2} = 31.6 ACRES
A_{W3} = 60.8 ACRES

HEC-1 INPUT CARDS

SA	0	31.6	60.8
SE	892.47	893.69	894.70

STATION	ELEVATIONS E1	E2	E3
0+0 W	894.79	896.79	897.80
13+47 W	892.4	894.67	895.7
27+22 W	891.3	891.98	893.0
40+82 W	892.9	892.05	893.0
54+43 W	892.98	892.98	894.0
AVG	892.47	893.69	894.70

APPENDIX G

UNEVEN WEIR DATA AND STAGE-DISCHARGE RELATIONS FOR THE RC

```
*********************************************
    UNEVEN WEIR FLOW PROGRAM
    FORTRAN VERSION 1.0
*********************************************

    PROJECT:  BFIS RC  SUB15
1   ENGINEER:  DTP

    DATE:   6/ 2/1992
    TIME:  17:32.53
```

INPUT PARAMETERS

STARTING WSEL:	982.80
MAXIMUM WSEL:	984.80
STEP SIZE:	0.10
BREADTH OF WEIR:	70.00

```
*********************************************
    INPUT ELEVATION/STATION TABLE.
    PROJECT:  BFIS RC  SUB15
    DATE:   6/ 2/1992
    TIME:  17:32.53
*********************************************
```

POINT	ELEVATION	STATION
1	985.00	3537.00
2	983.71	3538.00
3	982.80	4433.00
4	983.02	5069.00
5	983.98	6417.00
6	984.90	7761.00
7	985.50	9095.00

```
*********************************************
    WEIR COEFFICIENT TABLE
    PROJECT:  BFIS RC  SUB15
    DATE:   6/ 2/1992
    TIME:  17:32.53
*********************************************
```

INPUT COEFFICENT VALUES.

POINT	HEAD	COEFFICIENT
1	0.00	2.6300
2	1.00	2.6300
3	2.00	2.6300

```
*********************************************
    UNEVEN WEIR FLOW PROGRAM
    FORTRAN VERSION 1.0
    PROJECT:  BFIS RC  SUB15
    DATE:   6/ 2/1992
    TIME:  17:32.53
*********************************************
```

ELEVATION	DISCHARGE (CFS)	ELEVATION	DISCHARGE (CFS)
982.80	0.00	984.30	8055.15
982.90	12.88	984.40	9292.17
983.00	72.86	984.50	10622.83
983.10	197.95	984.60	12048.51
983.20	390.70	984.70	13570.68
983.30	655.22		
983.40	996.74		
983.50	1420.43		
983.60	1931.30		
983.70	2534.14		
983.80	3231.05		
983.90	4017.71		
984.00	4892.81		
984.10	5856.69		
984.20	6910.42		

```
*********************************************
    UNEVEN WEIR FLOW PROGRAM
    FORTRAN VERSION 1.0
*********************************************
```

PROJECT: BFIS RC SUB16
ENGINEER: DTP

DATE: 6/ 2/1992
TIME: 17:24.59

INPUT PARAMETERS

STARTING WSEL:	982.90
MAXIMUM WSEL:	985.90
STEP SIZE:	0.10
BREADTH OF WEIR:	70.00

```
*********************************************
    INPUT ELEVATION/STATION TABLE.
    PROJECT:  BFIS RC  SUB16
    DATE:   6/ 2/1992
    TIME:  17:24.59
*********************************************
```

POINT	ELEVATION	STATION
1	986.00	9094.00
2	985.50	9095.00
3	982.90	9379.00
4	986.50	9514.00
5	989.25	10239.00
6	987.39	10536.00
7	986.95	10917.00
8	986.25	10976.00
9	986.00	11877.00
10	986.37	13218.00

```
*********************************************
    WEIR COEFFICIENT TABLE
    PROJECT:  BFIS RC  SUB16
    DATE:   6/ 2/1992
    TIME:  17:24.59
*********************************************
```

INPUT COEFFICENT VALUES.

POINT	HEAD	COEFFICIENT
1	0.00	2.6300
2	1.00	2.6300
3	2.00	2.6300
4	3.00	2.6300

****
UNEVEN WEIR FLOW PROGRAM
FORTRAN VERSION 1.0
PROJECT: BFIS RC SUB16
DATE: 6/ 2/1992
TIME: 17:24.59
****

ELEVATION	DISCHARGE (CFS)	ELEVATION	DISCHARGE (CFS)
982.90	0.00	984.40	425.11
983.00	0.49	984.50	499.55
983.10	2.76	984.60	581.30
983.20	7.60	984.70	670.59
983.30	15.61	984.80	767.64
983.40	27.27	984.90	872.67
983.50	43.02	985.00	985.88
983.60	63.24	985.10	1107.47
983.70	88.31	985.20	1237.64
983.80	118.54	985.30	1376.59
983.90	154.27	985.40	1524.49
984.00	195.78	985.50	1681.55
984.10	243.35	985.60	1847.58
984.20	297.26	985.70	2021.81
984.30	357.76	985.80	2203.85

```
*********************************************
    UNEVEN WEIR FLOW PROGRAM
    FORTRAN VERSION 1.0
*********************************************
```

PROJECT: BFIS RC SUB17
ENGINEER: DTP

DATE: 6/ 2/1992
TIME: 17: 7.11

INPUT PARAMETERS

STARTING WSEL:	983.68
MAXIMUM WSEL:	985.68
STEP SIZE:	0.10
BREADTH OF WEIR:	70.00

```
*********************************************
```

INPUT ELEVATION/STATION TABLE.
PROJECT: BFIS RC SUB17
DATE: 6/ 2/1992
TIME: 17: 7.11

```
*********************************************
```

POINT	ELEVATION	STATION
1	986.37	13218.00
2	983.68	14438.00
3	985.68	14559.00
4	987.00	15918.00

```
*********************************************
```

WEIR COEFFICIENT TABLE
PROJECT: BFIS RC SUB17
DATE: 6/ 2/1992
TIME: 17: 7.11

```
*********************************************
```

INPUT COEFFICENT VALUES.

POINT	HEAD	COEFFICIENT
1	0.00	2.6300
2	1.00	2.6300
3	2.00	2.6300

****
UNEVEN WEIR FLOW PROGRAM
FORTRAN VERSION 1.0
PROJECT: BFIS RC SUB17
DATE: 6/ 2/1992
TIME: 17: 7.11
****

ELEVATION	DISCHARGE (CFS)	ELEVATION	DISCHARGE (CFS)
983.68	0.00	985.18	1489.25
983.78	1.71	985.28	1750.01
983.88	9.67	985.38	2036.40
983.98	26.64	985.48	2349.21
984.08	54.69	985.58	2689.21
984.18	95.54		
984.28	150.70		
984.38	221.56		
984.48	309.36		
984.58	415.29		
984.68	540.43		
984.78	685.84		
984.88	852.50		
984.98	1041.35		
985.08	1253.32		

****
UNEVEN WEIR FLOW PROGRAM
FORTRAN VERSION 1.0
****

PROJECT: BFIS RC SUB18&19
ENGINEER: DTP

DATE: 6/ 2/1992
TIME: 17: 2.13

INPUT PARAMETERS

STARTING WSEL: 987.50
MAXIMUM WSEL: 989.00
STEP SIZE: 0.10
BREADTH OF WEIR: 70.00

****
INPUT ELEVATION/STATION TABLE.
PROJECT: BFIS RC SUB18&19
DATE: 6/ 2/1992
TIME: 17: 2.13
****

POINT	ELEVATION	STATION
1	989.02	21374.00
2	988.40	22697.00
3	987.56	24055.00
4	988.30	25247.00
5	989.83	25434.00

****
WEIR COEFFICIENT TABLE
PROJECT: BFIS RC SUB18&19
DATE: 6/ 2/1992
TIME: 17: 2.13
****

INPUT COEFFICENT VALUES.

POINT	HEAD	COEFFICIENT
1	0.00	2.6300
2	1.00	2.6300
3	2.00	2.6300

```
*********************************************
    UNEVEN WEIR FLOW PROGRAM
    FORTRAN VERSION 1.0
    PROJECT:  BFIS RC  SUB18&19
    DATE:    6/ 2/1992
    TIME:  17: 2.13
*********************************************
```

ELEVATION	DISCHARGE (CFS)
987.50	0.00
987.60	1.08
987.70	24.88
987.80	95.74
987.90	228.70
988.00	435.72
988.10	727.06
988.20	1111.83
988.30	1598.35
988.40	2189.35
988.50	2880.58
988.60	3675.33
988.70	4576.82
988.80	5588.23
988.90	6712.73

```
*********************************************
    UNEVEN WEIR FLOW PROGRAM
    FORTRAN VERSION 1.0
*********************************************

    PROJECT:  BFIS RC  SUB20
    ENGINEER:  DTP

    DATE:   6/ 2/1992
    TIME:  16:56.49
```

INPUT PARAMETERS

STARTING WSEL:	990.10
MAXIMUM WSEL:	991.10
STEP SIZE:	0.10
BREADTH OF WEIR:	70.00

```
*********************************************
    INPUT ELEVATION/STATION TABLE.
    PROJECT:  BFIS RC  SUB20
    DATE:   6/ 2/1992
    TIME:  16:56.49
*********************************************
```

POINT	ELEVATION	STATION
1	992.10	29504.00
2	990.39	29505.00
3	990.10	30745.00
4	991.82	30918.00
5	992.60	31480.00
6	991.13	32333.00
7	992.10	33770.00

```
*********************************************
    WEIR COEFFICIENT TABLE
    PROJECT:  BFIS RC  SUB20
    DATE:   6/ 2/1992
    TIME:  16:56.49
*********************************************
```

INPUT COEFFICENT VALUES.

POINT	HEAD	COEFFICIENT
1	0.00	2.6300
2	1.00	2.6300
3	2.00	2.6300

****
UNEVEN WEIR FLOW PROGRAM
FORTRAN VERSION 1.0
PROJECT: BFIS RC SUB20
DATE: 6/ 2/1992
TIME: 16:56.49
****

ELEVATION	DISCHARGE (CFS)
990.10	0.00
990.20	14.55
990.30	82.30
990.40	226.74
990.50	447.56
990.60	722.57
990.70	1042.64
990.80	1402.66
990.90	1799.19
991.00	2229.73

```
*********************************************
    UNEVEN WEIR FLOW PROGRAM
    FORTRAN VERSION 1.0
*********************************************
```

PROJECT: BFIS RC SUB21
ENGINEER: DTP

DATE: 6/ 2/1992
TIME: 16:43.32

INPUT PARAMETERS

STARTING WSEL:	990.10
MAXIMUM WSEL:	992.10
STEP SIZE:	0.10
BREADTH OF WEIR:	70.00

```
*********************************************
    INPUT ELEVATION/STATION TABLE.
    PROJECT:  BFIS RC  SUB21
    DATE:   6/ 2/1992
    TIME:  16:43.32
*********************************************
```

POINT	ELEVATION	STATION
1	992.10	33770.00
2	990.94	35188.00
3	990.12	35663.00
4	990.52	36394.00
5	991.12	36570.00
6	993.12	37836.00

```
*********************************************
    WEIR COEFFICIENT TABLE
    PROJECT:  BFIS RC  SUB21
    DATE:   6/ 2/1992
    TIME:  16:43.32
*********************************************
```

INPUT COEFFICENT VALUES.

POINT	HEAD	COEFFICIENT
1	0.00	2.6300
2	1.00	2.6300
3	2.00	2.6300

****
UNEVEN WEIR FLOW PROGRAM
FORTRAN VERSION 1.0
PROJECT: BFIS RC SUB21
DATE: 6/ 2/1992
TIME: 16:43.32
****

ELEVATION	DISCHARGE (CFS)	ELEVATION	DISCHARGE (CFS)
990.10	0.00	991.60	5083.85
990.20	4.58	991.70	5932.36
990.30	34.77	991.80	6866.73
990.40	104.95	991.90	7890.19
990.50	225.19	992.00	9005.86
990.60	400.94		
990.70	626.04		
990.80	897.89		
990.90	1216.03		
991.00	1581.32		
991.10	1999.44		
991.20	2476.14		
991.30	3018.08		
991.40	3630.50		
991.50	4317.78		

```
*********************************************
    UNEVEN WEIR FLOW PROGRAM
    FORTRAN VERSION 1.0
*********************************************
```

PROJECT: BFIS RC SUB22
ENGINEER: DTP

DATE: 6/ 2/1992
TIME: 16:34.54

INPUT PARAMETERS

STARTING WSEL: 992.67
MAXIMUM WSEL: 995.67
STEP SIZE: 0.10
BREADTH OF WEIR: 70.00

```
*********************************************
    INPUT ELEVATION/STATION TABLE.
    PROJECT:  BFIS RC  SUB22
    DATE:   6/ 2/1992
    TIME:  16:34.54
*********************************************
```

POINT	ELEVATION	STATION
1	995.80	41706.00
2	994.60	41707.00
3	992.67	41752.00
4	995.70	41812.00
5	994.57	43049.00
6	995.31	44399.00
7	995.53	45738.00
8	995.78	47080.00

```
*********************************************
    WEIR COEFFICIENT TABLE
    PROJECT:  BFIS RC  SUB22
    DATE:   6/ 2/1992
    TIME:  16:34.54
*********************************************
```

INPUT COEFFICENT VALUES.

POINT	HEAD	COEFFICIENT
1	0.00	2.6300
2	1.00	2.6300
3	2.00	2.6300
4	3.00	2.6300

****
UNEVEN WEIR FLOW PROGRAM
FORTRAN VERSION 1.0
PROJECT: BFIS RC SUB22
DATE: 6/ 2/1992
TIME: 16:34.54
****

ELEVATION	DISCHARGE (CFS)	ELEVATION	DISCHARGE (CFS)
992.67	0.00	994.17	124.92
992.77	0.14	994.27	146.79
992.87	0.81	994.37	170.82
992.97	2.23	994.47	197.06
993.07	4.59	994.57	225.58
993.17	8.01	994.67	266.00
993.27	12.64	994.77	343.99
993.37	18.58	994.87	475.21
993.47	25.95	994.97	671.33
993.57	34.83	995.07	942.14
993.67	45.33	995.17	1296.24
993.77	57.53	995.27	1741.42
993.87	71.51	995.37	2288.68
993.97	87.35	995.47	2978.53
994.07	105.13	995.57	3845.78

****
UNEVEN WEIR FLOW PROGRAM
FORTRAN VERSION 1.0
****

PROJECT: BFIS RC SUB23
ENGINEER: DTP

DATE: 6/ 2/1992
TIME: 16:12.10

INPUT PARAMETERS

STARTING WSEL: 995.32
MAXIMUM WSEL: 997.12
STEP SIZE: 0.10
BREADTH OF WEIR: 70.00

****
INPUT ELEVATION/STATION TABLE.
PROJECT: BFIS RC SUB23
DATE: 6/ 2/1992
TIME: 16:12.10
****

POINT	ELEVATION	STATION
1	999.00	47079.00
2	995.78	47080.00
3	996.02	48475.00
4	997.12	49819.00
5	996.32	51154.00
6	995.38	52443.00
7	998.77	52508.00

****
WEIR COEFFICIENT TABLE
PROJECT: BFIS RC SUB23
DATE: 6/ 2/1992
TIME: 16:12.10
****

INPUT COEFFICENT VALUES.

POINT	HEAD	COEFFICIENT
1	0.00	2.6300
2	1.00	2.6300
3	2.00	2.6300

```
*************************************************
    UNEVEN WEIR FLOW PROGRAM
    FORTRAN VERSION 1.0
    PROJECT:  BFIS RC  SUB23
    DATE:   6/ 2/1992
    TIME:  16:12.10
*************************************************
```

ELEVATION	DISCHARGE (CFS)	ELEVATION	DISCHARGE (CFS)
995.32	0.00	996.82	7670.38
995.42	0.47	996.92	9160.23
995.52	10.72	997.02	10800.17
995.62	41.25		
995.72	98.53		
995.82	189.66		
995.92	357.94		
996.02	651.22		
996.12	1084.96		
996.22	1643.44		
996.32	2323.53		
996.42	3127.12		
996.52	4059.17		
996.62	5124.15		
996.72	6326.45		

```
*********************************************
    UNEVEN WEIR FLOW PROGRAM
    FORTRAN VERSION 1.0
*********************************************


    PROJECT:  BFIS RC  SUB25
    ENGINEER:  DTP

    DATE:    6/ 2/1992
    TIME:  15:58.38

---------------------------------------------
    INPUT PARAMETERS
---------------------------------------------

    STARTING WSEL:          995.90
    MAXIMUM WSEL:           998.80
    STEP SIZE:                0.10
    BREADTH OF WEIR:         70.00

*********************************************
    INPUT ELEVATION/STATION TABLE.
    PROJECT:  BFIS RC  SUB25
    DATE:    6/ 2/1992
    TIME:  15:58.38
*********************************************
```

POINT	ELEVATION	STATION
1	998.80	52508.00
2	995.92	52752.00
3	995.90	53566.00
4	996.88	53871.00
5	996.79	54179.00
6	997.38	55100.00
7	997.08	55276.00
8	996.87	56500.00
9	996.60	57803.00
10	999.83	57891.00

```
*********************************************
    WEIR COEFFICIENT TABLE
    PROJECT:  BFIS RC  SUB25
    DATE:    6/ 2/1992
    TIME:  15:58.38
*********************************************

    INPUT COEFFICENT VALUES.
```

POINT	HEAD	COEFFICIENT
1	0.00	2.6300
2	1.00	2.6300
3	2.00	2.6300
4	3.00	2.6300

****
UNEVEN WEIR FLOW PROGRAM
FORTRAN VERSION 1.0
PROJECT: BFIS RC SUB25
DATE: 6/ 2/1992
TIME: 15:58.38
****

ELEVATION	DISCHARGE (CFS)	ELEVATION	DISCHARGE (CFS)
995.90	0.00	997.40	8604.42
996.00	59.08	997.50	10277.56
996.10	184.40	997.60	12083.06
996.20	354.12	997.70	14009.81
996.30	562.34	997.80	16049.84
996.40	806.18	997.90	18196.92
996.50	1083.99	998.00	20445.94
996.60	1394.77	998.10	22792.59
996.70	1754.01	998.20	25233.19
996.80	2204.25	998.30	27764.51
996.90	2792.15	998.40	30383.70
997.00	3567.12	998.50	33088.23
997.10	4547.82	998.60	35875.82
997.20	5726.01	998.70	38744.42
997.30	7083.07		

```
*************************************************
    UNEVEN WEIR FLOW PROGRAM
    FORTRAN VERSION 1.0
*************************************************
```

PROJECT: BFIS RC SUB26
ENGINEER: DTP

DATE: 6/ 2/1992
TIME: 15:50. 6

INPUT PARAMETERS

STARTING WSEL:	998.20
MAXIMUM WSEL:	999.80
STEP SIZE:	0.10
BREADTH OF WEIR:	70.00

```
*************************************************
    INPUT ELEVATION/STATION TABLE.
    PROJECT:  BFIS RC  SUB26
    DATE:   6/ 2/1992
    TIME:  15:50. 6
*************************************************
```

POINT	ELEVATION	STATION
1	999.83	57803.00
2	998.21	59397.00
3	998.56	60736.00
4	999.88	62081.00
5	998.58	63318.00
6	1002.92	63432.00

```
*************************************************
    WEIR COEFFICIENT TABLE
    PROJECT:  BFIS RC  SUB26
    DATE:   6/ 2/1992
    TIME:  15:50. 6
*************************************************
```

INPUT COEFFICENT VALUES.

POINT	HEAD	COEFFICIENT
1	0.00	2.6300
2	1.00	2.6300
3	2.00	2.6300

****
UNEVEN WEIR FLOW PROGRAM
FORTRAN VERSION 1.0
PROJECT: BFIS RC SUB26
DATE: 6/ 2/1992
TIME: 15:50. 6
****

ELEVATION	DISCHARGE (CFS)	ELEVATION	DISCHARGE (CFS)
998.20	0.00	999.70	10974.00
998.30	12.28		
998.40	79.56		
998.50	229.00		
998.60	479.42		
998.70	833.37		
998.80	1292.16		
998.90	1860.51		
999.00	2543.67		
999.10	3346.95		
999.20	4275.60		
999.30	5334.74		
999.40	6529.36		
999.50	7864.33		
999.60	9344.35		

APPENDIX H

UNEVEN WEIR DATA AND STAGE-DISCHARGE RELATIONS FOR THE BC

```
*********************************************
    UNEVEN WEIR FLOW PROGRAM
    FORTRAN VERSION 1.0
*********************************************
```

PROJECT: BFIS BC SUB59
ENGINEER: DTP

DATE: 6/ 8/1992
TIME: 16:30.10

INPUT PARAMETERS

STARTING WSEL: 866.20
MAXIMUM WSEL: 868.20
STEP SIZE: 0.10
BREADTH OF WEIR: 70.00

```
*********************************************
    INPUT ELEVATION/STATION TABLE.
    PROJECT:  BFIS BC  SUB59
    DATE:   6/ 8/1992
    TIME:  16:30.10
*********************************************
```

POINT	ELEVATION	STATION
1	870.00	555.00
2	866.56	556.00
3	867.84	1918.00
4	866.24	3330.00
5	866.95	4170.00
6	870.59	4230.00
7	870.75	4520.00
8	874.95	4618.00
9	873.59	4645.00
10	871.37	4679.00
11	871.60	5540.00

```
*********************************************
    WEIR COEFFICIENT TABLE
    PROJECT:  BFIS BC  SUB59
    DATE:   6/ 8/1992
    TIME:  16:30.10
*********************************************
```

INPUT COEFFICENT VALUES.

POINT	HEAD	COEFFICIENT
1	0.00	2.6300
2	1.00	2.6300
3	2.00	2.6300

2/2

****
UNEVEN WEIR FLOW PROGRAM
FORTRAN VERSION 1.0
PROJECT: BFIS BC SUB59
DATE: 6/ 8/1992
TIME: 16:30.10
****

ELEVATION	DISCHARGE (CFS)	ELEVATION	DISCHARGE (CFS)
866.20	0.00	867.70	6548.75
866.30	1.92	867.80	7700.03
866.40	22.24	867.90	8955.58
866.50	74.86	868.00	10302.53
866.60	169.24	868.10	11730.35
866.70	319.87		
866.80	541.21		
866.90	843.92		
867.00	1236.50		
867.10	1718.56		
867.20	2289.30		
867.30	2950.46		
867.40	3704.37		
867.50	4553.60		
867.60	5500.83		

1/2

```
*********************************************
    UNEVEN WEIR FLOW PROGRAM
    FORTRAN VERSION 1.0
*********************************************

    PROJECT:  BFIS BC  SUB60
    ENGINEER:  DTP

    DATE:   6/ 8/1992
    TIME:  16:24.54
```

INPUT PARAMETERS

```
    STARTING WSEL:          870.70
    MAXIMUM WSEL:           872.70
    STEP SIZE:                0.10
    BREADTH OF WEIR:         70.00

*********************************************
    INPUT ELEVATION/STATION TABLE.
    PROJECT:  BFIS BC  SUB60
    DATE:   6/ 8/1992
    TIME:  16:24.54
*********************************************
```

POINT	ELEVATION	STATION
1	873.00	5539.00
2	871.60	5540.00
3	871.67	5812.00
4	871.16	7462.00
5	873.76	7637.00
6	872.10	9237.00
7	870.73	10575.00
8	872.66	10692.00
9	872.69	12172.00
10	874.05	13612.00
11	875.35	14627.00
12	872.71	15242.00
13	875.22	15972.00
14	875.01	17630.00

```
*********************************************
    WEIR COEFFICIENT TABLE
    PROJECT:  BFIS BC  SUB60
    DATE:   6/ 8/1992
    TIME:  16:24.54
*********************************************
```

INPUT COEFFICENT VALUES.

POINT	HEAD	COEFFICIENT
1	0.00	2.6300
2	1.00	2.6300
3	2.00	2.6300

2/2

```
*********************************************
    UNEVEN WEIR FLOW PROGRAM
    FORTRAN VERSION 1.0
    PROJECT:  BFIS BC  SUB60
    DATE:   6/ 8/1992
    TIME:  16:24.54
*********************************************
```

ELEVATION	DISCHARGE (CFS)	ELEVATION	DISCHARGE (CFS)
870.70	0.00	872.20	6317.12
870.80	1.42	872.30	7541.17
870.90	13.00	872.40	8861.97
871.00	41.32	872.50	10278.48
871.10	90.83	872.60	11790.07
871.20	165.38		
871.30	285.92		
871.40	484.49		
871.50	781.19		
871.60	1191.92		
871.70	1742.12		
871.80	2435.63		
871.90	3246.91		
872.00	4167.04		
872.10	5191.49		

1/2

```
*********************************************
    UNEVEN WEIR FLOW PROGRAM
    FORTRAN VERSION 1.0
*********************************************
```

PROJECT: BFIS BC SUB61
ENGINEER: DTP

DATE: 6/ 8/1992
TIME: 16:19.39

INPUT PARAMETERS

STARTING WSEL:	874.80
MAXIMUM WSEL:	876.80
STEP SIZE:	0.10
BREADTH OF WEIR:	70.00

```
*********************************************
    INPUT ELEVATION/STATION TABLE.
    PROJECT:  BFIS BC  SUB61
    DATE:   6/ 8/1992
    TIME:  16:19.39
*********************************************
```

POINT	ELEVATION	STATION
1	877.00	17629.00
2	875.01	17630.00
3	876.30	18266.00
4	875.30	18566.00
5	876.13	19091.00
6	874.80	19857.00
7	876.91	19957.00
8	875.38	20572.00
9	877.00	20573.00

```
*********************************************
    WEIR COEFFICIENT TABLE
    PROJECT:  BFIS BC  SUB61
    DATE:   6/ 8/1992
    TIME:  16:19.39
*********************************************
```

INPUT COEFFICENT VALUES.

POINT	HEAD	COEFFICIENT
1	0.00	2.6300
2	1.00	2.6300
3	2.00	2.6300

2/

```
*********************************************
    UNEVEN WEIR FLOW PROGRAM
    FORTRAN VERSION 1.0
    PROJECT:  BFIS BC  SUB61
    DATE:   6/ 8/1992
    TIME:  16:19.39
*********************************************
```

ELEVATION	DISCHARGE (CFS)	ELEVATION	DISCHARGE (CFS)
874.80	0.00	876.30	4095.00
874.90	2.07	876.40	4941.75
875.00	11.72	876.50	5862.80
875.10	33.56	876.60	6853.89
875.20	74.47	876.70	7912.23
875.30	139.33		
875.40	235.12		
875.50	375.46		
875.60	571.71		
875.70	832.36		
875.80	1164.65		
875.90	1575.05		
876.00	2069.46		
876.10	2653.37		
876.20	3330.32		

1/2

```
*********************************************
    UNEVEN WEIR FLOW PROGRAM
    FORTRAN VERSION 1.0
*********************************************
```

PROJECT: BFIS BC SUB62
ENGINEER: DTP

DATE: 6/ 8/1992
TIME: 16: 4.55

INPUT PARAMETERS

STARTING WSEL:	875.30
MAXIMUM WSEL:	877.30
STEP SIZE:	0.10
BREADTH OF WEIR:	70.00

```
*********************************************
    INPUT ELEVATION/STATION TABLE.
    PROJECT:  BFIS BC  SUB62
    DATE:   6/ 6/1992
    TIME:  16: 4.55
*********************************************
```

POINT	ELEVATION	STATION
1	878.00	20571.00
2	875.38	20572.00
3	876.38	22025.00
4	875.90	22143.00
5	875.72	23283.00
6	875.53	24685.00
7	876.95	25965.00
8	878.00	25966.00

```
*********************************************
    WEIR COEFFICIENT TABLE
    PROJECT:  BFIS BC  SUB62
    DATE:   6/ 8/1992
    TIME:  16: 4.55
*********************************************
```

INPUT COEFFICENT VALUES.

POINT	HEAD	COEFFICIENT
1	0.00	2.6300
2	1.00	2.6300
3	2.00	2.6300

2/2

```
*********************************************
    UNEVEN WEIR FLOW PROGRAM
    FORTRAN VERSION 1.0
    PROJECT:  BFIS BC  SUB62
    DATE:    6/ 8/1992
    TIME:   16: 4.55
*********************************************
```

ELEVATION	DISCHARGE (CFS)	ELEVATION	DISCHARGE (CFS)
875.30	0.00	876.80	13040.91
875.40	0.09	876.90	15067.01
875.50	7.62	877.00	17212.34
875.60	45.92	877.10	19468.22
875.70	192.10	877.20	21826.58
875.80	502.21		
875.90	1007.41		
876.00	1714.61		
876.10	2594.79		
876.20	3637.78		
876.30	4840.09		
876.40	6200.66		
876.50	7711.32		
876.60	9359.08		
876.70	11137.14		

1/2

```
*********************************************
    UNEVEN WEIR FLOW PROGRAM
    FORTRAN VERSION 1.0
*********************************************


    PROJECT:  BFIS BC  SUB63
    ENGINEER:  DTP

    DATE:   6/ 8/1992
    TIME:  16: 0.52

---------------------------------------------
    INPUT PARAMETERS
---------------------------------------------

    STARTING WSEL:        876.20
    MAXIMUM WSEL:         878.20
    STEP SIZE:              0.10
    BREADTH OF WEIR:       70.00

*********************************************
    INPUT ELEVATION/STATION TABLE.
    PROJECT:  BFIS BC  SUB63
    DATE:   6/ 8/1992
    TIME:  16: 0.52
*********************************************
```

POINT	ELEVATION	STATION
1	879.00	26042.00
2	876.37	26043.00
3	876.29	27319.00
4	877.22	28643.00
5	877.51	30125.00
6	879.58	31390.00
7	878.03	31470.00
8	879.00	31471.00

```
*********************************************
    WEIR COEFFICIENT TABLE
    PROJECT:  BFIS BC  SUB63
    DATE:   6/ 8/1992
    TIME:  16: 0.52
*********************************************

    INPUT COEFFICENT VALUES.
```

POINT	HEAD	COEFFICIENT
1	0.00	2.6300
2	1.00	2.6300
3	2.00	2.6300

2/2

```
*********************************************
    UNEVEN WEIR FLOW PROGRAM
    FORTRAN VERSION 1.0
    PROJECT:  BFIS BC  SUB63
    DATE:   6/ 8/1992
    TIME:  16: 0.52
*********************************************
```

ELEVATION	DISCHARGE (CFS)	ELEVATION	DISCHARGE (CFS)
876.20	0.00	877.70	9458.09
876.30	0.18	877.80	10952.58
876.40	70.70	877.90	12552.17
876.50	267.01	878.00	14252.29
876.60	552.03	878.10	16049.65
876.70	917.24		
876.80	1359.97		
876.90	1879.61		
877.00	2476.48		
877.10	3151.43		
877.20	3905.62		
877.30	4747.32		
877.40	5710.17		
877.50	6817.72		
877.60	8075.56		

1/2

```
*********************************************
    UNEVEN WEIR FLOW PROGRAM
    FORTRAN VERSION 1.0
*********************************************
```

PROJECT: BFIS BC SUB64
ENGINEER: DTP

DATE: 6/ 8/1992
TIME: 15:56.56

INPUT PARAMETERS

STARTING WSEL:	876.40
MAXIMUM WSEL:	878.40
STEP SIZE:	0.10
BREADTH OF WEIR:	70.00

```
*********************************************
    INPUT ELEVATION/STATION TABLE.
    PROJECT:  BFIS BC  SUB64
    DATE:   6/ 8/1992
    TIME:  15:56.56
*********************************************
```

POINT	ELEVATION	STATION
1	879.00	31469.00
2	878.03	31470.00
3	878.02	32724.00
4	876.44	33127.00
5	876.60	33385.00
6	878.93	34024.00
7	879.10	35475.00
8	878.91	36792.00
9	881.28	37140.00

```
*********************************************
    WEIR COEFFICIENT TABLE
    PROJECT:  BFIS BC  SUB64
    DATE:   6/ 8/1992
    TIME:  15:56.56
*********************************************
```

INPUT COEFFICENT VALUES.

POINT	HEAD	COEFFICIENT
1	0.00	2.6300
2	1.00	2.6300
3	2.00	2.6300

2/2

```
*********************************************
    UNEVEN WEIR FLOW PROGRAM
    FORTRAN VERSION 1.0
    PROJECT:  BFIS BC  SUB64
    DATE:    6/ 8/1992
    TIME:  15:56.56
*********************************************
```

ELEVATION	DISCHARGE (CFS)	ELEVATION	DISCHARGE (CFS)
876.40	0.00	877.90	2346.35
876.50	1.73	878.00	2705.49
876.60	20.11	878.10	3160.91
876.70	63.25	878.20	3750.00
876.80	127.54	878.30	4426.35
876.90	212.47		
877.00	318.47		
877.10	446.20		
877.20	596.45		
877.30	770.02		
877.40	967.72		
877.50	1190.38		
877.60	1438.80		
877.70	1713.75		
877.80	2016.01		

1/2

```
*********************************************
    UNEVEN WEIR FLOW PROGRAM
    FORTRAN VERSION 1.0
*********************************************


    PROJECT:  BFIS BC  SUB65
    ENGINEER:  DTPO

    DATE:   6/ 8/1992
    TIME:  15:48.10

---------------------------------------------
    INPUT PARAMETERS
---------------------------------------------

    STARTING WSEL:          878.20
    MAXIMUM WSEL:           880.20
    STEP SIZE:                0.10
    BREADTH OF WEIR:         70.00


*********************************************
    INPUT ELEVATION/STATION TABLE.
    PROJECT:  BFIS BC  SUB65
    DATE:   6/ 8/1992
    TIME:  15:48.10
*********************************************
```

POINT	ELEVATION	STATION
1	881.28	37140.00
2	878.22	37299.00
3	879.31	38083.00
4	881.25	39422.00
5	881.06	40670.00
6	881.45	41717.00
7	883.20	42059.00

```
*********************************************
    WEIR COEFFICIENT TABLE
    PROJECT:  BFIS BC  SUB65
    DATE:   6/ 8/1992
    TIME:  15:48.10
*********************************************


    INPUT COEFFICENT VALUES.
```

POINT	HEAD	COEFFICIENT
1	0.00	2.6300
2	1.00	2.6300
3	2.00	2.6300

2/2

****
UNEVEN WEIR FLOW PROGRAM
FORTRAN VERSION 1.0
PROJECT: BFIS BC SUB65
DATE: 6/ 8/1992
TIME: 15:48.10
****

ELEVATION	DISCHARGE (CFS)	ELEVATION	DISCHARGE (CFS)
878.20	0.00	879.70	2157.85
878.30	1.47	879.80	2539.30
878.40	11.15	879.90	2958.17
878.50	33.65	880.00	3415.57
878.60	72.19	880.10	3912.58
878.70	129.45		
878.80	207.76		
878.90	309.21		
879.00	435.72		
879.10	589.08		
879.20	770.95		
879.30	982.92		
879.40	1226.41		
879.50	1502.59		
879.60	1812.67		

```
*********************************************
    UNEVEN WEIR FLOW PROGRAM
    FORTRAN VERSION 1.0
*********************************************

    PROJECT:  BFIS BC  SUB66
    ENGINEER:  DTP

    DATE:   6/ 8/1992
    TIME:  15:43.56
```

INPUT PARAMETERS

STARTING WSEL:	881.30
MAXIMUM WSEL:	883.30
STEP SIZE:	0.10
BREADTH OF WEIR:	70.00

```
*********************************************
    INPUT ELEVATION/STATION TABLE.
    PROJECT:  BFIS BC  SUB66
    DATE:   6/ 8/1992
    TIME:  15:43.56
*********************************************
```

POINT	ELEVATION	STATION
1	884.00	42058.00
2	883.20	42059.00
3	881.30	42293.00
4	881.80	43296.00
5	882.31	44685.00
6	882.78	46038.00
7	883.60	47465.00

```
*********************************************
    WEIR COEFFICIENT TABLE
    PROJECT:  BFIS BC  SUB66
    DATE:   6/ 8/1992
    TIME:  15:43.56
*********************************************
```

INPUT COEFFICENT VALUES.

POINT	HEAD	COEFFICIENT
1	0.00	2.6500
2	1.00	2.6300
3	2.00	2.6300

i

26

```
*****************************************
    UNEVEN WEIR FLOW PROGRAM
    FORTRAN VERSION 1.0
    PROJECT:  BFIS BC  SUB66
    DATE:    6/ 8/1992
    TIME:  15:43.56
*****************************************
```

ELEVATION	DISCHARGE (CFS)	ELEVATION	DISCHARGE (CFS)
881.30	0.00	882.80	6958.17
881.40	7.13	882.90	8251.29
881.50	40.32	883.00	9668.82
881.60	111.06	883.10	11211.21
881.70	227.90	883.20	12879.66
881.80	397.97		
881.90	629.73		
882.00	935.25		
882.10	1323.57		
882.20	1802.34		
882.30	2378.45		
882.40	3058.37		
882.50	3849.43		
882.60	4759.15		
882.70	5793.89		

```
*****************************************
UNEVEN WEIR FLOW PROGRAM
FORTRAN VERSION 1.0
*****************************************

PROJECT:  BFIS BC  SUB69
ENGINEER:  DTP

DATE:   6/11/1992
TIME:  12:51.13
```

INPUT PARAMETERS

```
STARTING WSEL:          883.40
MAXIMUM WSEL:           885.40
STEP SIZE:                0.10
BREADTH OF WEIR:         70.00

*****************************************
INPUT ELEVATION/STATION TABLE.
PROJECT:  BFIS BC  SUB69
DATE:   6/11/1992
TIME:  12:51.13
*****************************************
```

POINT	ELEVATION	STATION
1	886.00	47466.00
2	883.46	47465.00
3	884.03	48833.00
4	884.09	50567.00
5	885.50	51989.00
6	886.50	52910.00

```
*****************************************
WEIR COEFFICIENT TABLE
PROJECT:  BFIS BC  SUB69
DATE:   6/11/1992
TIME:  12:51.13
*****************************************
```

INPUT COEFFICENT VALUES.

POINT	HEAD	COEFFICIENT
1	0.00	2.6300
2	1.00	2.6300
3	2.00	2.6300

1

2/2

****
UNEVEN WEIR FLOW PROGRAM
FORTRAN VERSION 1.0
PROJECT: BFIS BC SUB69
DATE: 6/11/1992
TIME: 12:51.13
****

ELEVATION	DISCHARGE (CFS)	ELEVATION	DISCHARGE (CFS)
883.40	0.00	884.90	9630.99
883.50	0.80	885.00	10077.85
883.60	16.48	885.10	11622.15
883.70	71.13	885.20	13263.25
883.80	169.96	885.30	15000.73
883.90	323.84		
884.00	540.41		
884.10	862.00		
884.20	1401.97		
884.30	2093.40		
884.40	2911.41		
884.50	3844.80		
884.60	4887.02		
884.70	6033.89		
884.80	7282.34		

```
*********************************************
    UNEVEN WEIR FLOW PROGRAM
    FORTRAN VERSION 1.0
*********************************************


    PROJECT:  BFIS BC  SUB70
    ENGINEER:  DTP

    DATE:    6/ 8/1992
    TIME:  15:23.39

---------------------------------------------
    INPUT PARAMETERS
---------------------------------------------

    STARTING WSEL:          884.20
    MAXIMUM WSEL:           886.20
    STEP SIZE:                0.10
    BREADTH OF WEIR:         70.00

*********************************************
    INPUT ELEVATION/STATION TABLE.
    PROJECT:  BFIS BC  SUB70
    DATE:    6/ 8/1992
    TIME:  15:23.39
*********************************************
```

POINT	ELEVATION	STATION
1	886.99	53361.00
2	884.35	53498.00
3	884.24	54552.00
4	886.81	55704.00
5	887.44	57022.00
6	887.64	58392.00

```
*********************************************
    WEIR COEFFICIENT TABLE
    PROJECT:  BFIS BC  SUB70
    DATE:    6/ 8/1992
    TIME:  15:23.39
*********************************************


    INPUT COEFFICENT VALUES.
```

POINT	HEAD	COEFFICIENT
1	0.00	2.6300
2	1.00	2.6300
3	2.00	2.6300

2/2

```
*****************************************
    UNEVEN WEIR FLOW PROGRAM
    FORTRAN VERSION 1.0
    PROJECT:  BFIS BC  SUB70
    DATE:    6/ 8/1992
    TIME:  15:23.39
*****************************************
```

ELEVATION	DISCHARGE (CFS)	ELEVATION	DISCHARGE (CFS)
884.20	0.00	885.70	5945.07
884.30	9.30	885.80	6687.63
884.40	102.42	885.90	7471.67
884.50	276.25	886.00	8297.44
884.60	507.02	886.10	9165.21
884.70	787.46		
884.80	1113.94		
884.90	1484.37		
885.00	1897.46		
885.10	2352.40		
885.20	2848.70		
885.30	3386.06		
885.40	3964.37		
885.50	4583.59		
885.60	5243.78		

1/2

```
*********************************************
    UNEVEN WEIR FLOW PROGRAM
    FORTRAN VERSION 1.0
*********************************************
```

PROJECT: BFIS BC SUB71
ENGINEER: DTP

DATE: 6/ 8/1992
TIME: 15:14. 4

INPUT PARAMETERS

STARTING WSEL:	887.30
MAXIMUM WSEL:	889.30
STEP SIZE:	0.10
BREADTH OF WEIR:	70.00

```
*********************************************
    INPUT ELEVATION/STATION TABLE.
    PROJECT:  BFIS BC  SUB71
    DATE:   6/ 8/1992
    TIME:  15:14. 4
*********************************************
```

POINT	ELEVATION	STATION
1	890.00	58391.00
2	887.64	58392.00
3	888.33	59524.00
4	889.41	61047.00
5	887.46	62429.00
6	889.22	62689.00
7	887.39	63364.00
8	888.82	64024.00
9	890.00	64025.00

```
*********************************************
    WEIR COEFFICIENT TABLE
    PROJECT:  BFIS BC  SUB71
    DATE:   6/ 8/1992
    TIME:  15:14. 4
*********************************************
```

INPUT COEFFICENT VALUES.

POINT	HEAD	COEFFICIENT
1	0.00	2.6300
2	1.00	2.6300
3	2.00	2.6300

2/2

****
UNEVEN WEIR FLOW PROGRAM
FORTRAN VERSION 1.0
PROJECT: BFIS BC SUB71
DATE: 6/ 8/1992
TIME: 15:14. 4
****

ELEVATION	DISCHARGE (CFS)	ELEVATION	DISCHARGE (CFS)
887.30	0.00	888.80	6395.41
887.40	0.01	888.90	7699.99
887.50	3.79	889.00	9146.18
887.60	24.23	889.10	10736.17
887.70	73.60	889.20	12472.83
887.80	172.24		
887.90	337.12		
888.00	580.61		
888.10	913.20		
888.20	1344.20		
888.30	1882.06		
888.40	2534.30		
888.50	3306.30		
888.60	4203.47		
888.70	5231.37		

1/2

```
*****************************************
    UNEVEN WEIR FLOW PROGRAM
    FORTRAN VERSION 1.0
*****************************************

    PROJECT:  BFIS BC  SUB72
    ENGINEER:  DTP

    DATE:   6/ 8/1992
    TIME:  15: 4.29
```

INPUT PARAMETERS

STARTING WSEL:	888.60
MAXIMUM WSEL:	890.60
STEP SIZE:	0.10
BREADTH OF WEIR:	70.00

```
*****************************************
    INPUT ELEVATION/STATION TABLE.
    PROJECT:  BFIS BC  SUB72
    DATE:   6/ 8/1992
    TIME:  15: 4.29
*****************************************
```

POINT	ELEVATION	STATION
1	891.00	64023.00
2	888.82	64024.00
3	888.60	65485.00
4	889.46	66780.00
5	890.50	68127.00
6	889.68	69465.00
7	891.00	69466.00

```
*****************************************
    WEIR COEFFICIENT TABLE
    PROJECT:  BFIS BC  SUB72
    DATE:   6/ 8/1992
    TIME:  15: 4.29
*****************************************
```

INPUT COEFFICENT VALUES.

POINT	HEAD	COEFFICIENT
1	0.00	2.6300
2	1.00	2.6300
3	2.00	2.6300

2/2

```
*********************************************
    UNEVEN WEIR FLOW PROGRAM
    FORTRAN VERSION 1.0
    PROJECT:  BFIS BC  SUB72
    DATE:    6/ 8/1992
    TIME:  15: 4.29
*********************************************
```

ELEVATION	DISCHARGE (CFS)	ELEVATION	DISCHARGE (CFS)
888.60	0.00	890.10	10785.99
888.70	27.08	890.20	12347.78
888.80	153.20	890.30	14047.52
888.90	409.56	890.40	15890.59
889.00	770.78	890.50	17882.03
889.10	1224.55		
889.20	1767.11		
889.30	2397.17		
889.40	3114.63		
889.50	3919.96		
889.60	4812.66		
889.70	5792.37		
889.80	6867.64		
889.90	8052.68		
890.00	9356.40		

APPENDIX I

UNEVEN WEIR DATA AND STAGE-DISCHARGE RELATIONS FOR THE SPRR

```
*****************************************
    UNEVEN WEIR FLOW PROGRAM
    FORTRAN VERSION 1.0
*****************************************
```

PROJECT: BFIS SPRR SUB68
ENGINEER: DTP

DATE: 6/ 1/1992
TIME: 16:39.34

INPUT PARAMETERS

STARTING WSEL:	879.11
MAXIMUM WSEL:	882.11
STEP SIZE:	0.10
BREADTH OF WEIR:	10.00

```
*****************************************
    INPUT ELEVATION/STATION TABLE.
    PROJECT: BFIS SPRR SUB68
    DATE: 6/ 1/1992
    TIME: 16:39.34
*****************************************
```

NOTE: STATIONING FOR THESE CALCULATIONS DO NOT FOLLOW RAILROAD STATIONING ON PLAN & PROFILE SHEETS. (FLOODPLAIN MAPS).

POINT	ELEVATION	STATION	
1	894.30	0.00	= Johnson Rd.
2	893.22	216.00	
3	886.31	1559.00	
4	884.68	1962.00	
5	879.11	3104.00	
6	879.66	3687.00	west of Johnson Rd.
7	883.00	3687.01	

```
*****************************************
    WEIR COEFFICIENT TABLE
    PROJECT: BFIS SPRR SUB68
    DATE: 6/ 1/1992
    TIME: 16:39.34
*****************************************
```

INPUT COEFFICENT VALUES.

POINT	HEAD	COEFFICIENT
1	0.00	2.6300
2	1.00	2.6300
3	2.00	2.6300
4	3.00	2.6300

****
UNEVEN WEIR FLOW PROGRAM
FORTRAN VERSION 1.0
PROJECT: BFIS SPRR SUB68
DATE: 6/ 1/1992
TIME: 16:39.34
****

ELEVATION	DISCHARGE (CFS)	ELEVATION	DISCHARGE (CFS)
879.11	0.00	880.61	2685.09
879.21	4.21	880.71	3048.17
879.31	23.79	880.81	3431.51
879.41	65.56	880.91	3835.08
879.51	134.59	881.01	4258.84
879.61	235.12	881.11	4702.80
879.71	370.26	881.21	5166.96
879.81	535.57	881.31	5651.38
879.91	726.56	881.41	6156.10
880.01	941.34	881.51	6681.17
880.11	1178.73	881.61	7226.67
880.21	1437.99	881.71	7792.67
880.31	1718.59	881.81	8379.26
880.41	2020.14	881.91	8986.52
880.51	2342.37	882.01	9614.56

```
*****************************************
    UNEVEN WEIR FLOW PROGRAM
    FORTRAN VERSION 1.0
*****************************************

    PROJECT:  BFIS SPRR  SUB52
    ENGINEER:  DTP

    DATE:   6/ 1/1992
    TIME:  16:34.42
```

INPUT PARAMETERS

STARTING WSEL:	892.57
MAXIMUM WSEL:	894.57
STEP SIZE:	0.10
BREADTH OF WEIR:	10.00

```
*****************************************
    INPUT ELEVATION/STATION TABLE.
    PROJECT:  BFIS SPRR  SUB52
    DATE:   6/ 1/1992
    TIME:  16:34.42
*****************************************
```

POINT	ELEVATION	STATION	
1	895.00	6219.99	
2	894.30	6220.00	= JOHNSON RD
3	898.65	7652.00	
4	898.57	8972.00	
5	896.00	10293.00	
6	894.24	10908.00	
7	892.57	11631.00	= BRUNER RD
8	893.24	13067.00	
9	893.37	13728.00	
10	895.00	13728.01	

- THIS SHEET FOLLOWS STANDARD RAILROAD STATIONING ON PLAN + PROFILE SHEETS (FLOODPLAIN MAPS)

```
*****************************************
    WEIR COEFFICIENT TABLE
    PROJECT:  BFIS SPRR  SUB52
    DATE:   6/ 1/1992
    TIME:  16:34.42
*****************************************
```

INPUT COEFFICENT VALUES.

POINT	HEAD	COEFFICIENT
1	0.00	2.6300
2	1.00	2.6300
3	2.00	2.6300

```
*********************************************
    UNEVEN WEIR FLOW PROGRAM
    FORTRAN VERSION 1.0
    PROJECT:  BFIS SPRR  SUB52
    DATE:    6/ 1/1992
    TIME:  16:34.42
*********************************************
```

ELEVATION	DISCHARGE (CFS)	ELEVATION	DISCHARGE (CFS)
892.57	0.00	894.07	7165.62
892.67	8.48	894.17	8238.70
892.77	47.95	894.27	9373.16
892.87	132.13	894.37	10567.84
892.97	271.24	894.47	11823.87
893.07	473.63		
893.17	747.44		
893.27	1099.35		
893.37	1553.42		
893.47	2122.40		
893.57	2781.16		
893.67	3516.77		
893.77	4329.38		
893.87	5209.12		
893.97	6155.23		

```
*****************************************
    UNEVEN WEIR FLOW PROGRAM
    FORTRAN VERSION 1.0
*****************************************
```

PROJECT: BFIS SPRR SUB53
ENGINEER: DTP

DATE: 6/ 1/1992
TIME: 16:33.54

INPUT PARAMETERS

STARTING WSEL:	893.37
MAXIMUM WSEL:	895.37
STEP SIZE:	0.10
BREADTH OF WEIR:	10.00

```
*****************************************
    INPUT ELEVATION/STATION TABLE.
    PROJECT: BFIS SPRR SUB53
    DATE: 6/ 1/1992
    TIME: 16:33.54
*****************************************
```

POINT	ELEVATION	STATION	
1	896.00	-0.01	
2	893.65	0.00	= PALO VERDE RD
3	893.84	1289.00	
4	893.66	2219.00	
5	893.51	2660.00	
6	893.37	3250.00	WEST OF PALO VERDE
7	896.00	3250.01	

```
*****************************************
    WEIR COEFFICIENT TABLE
    PROJECT: BFIS SPRR SUB53
    DATE: 6/ 1/1992
    TIME: 16:33.54
*****************************************
```

INPUT COEFFICENT VALUES.

POINT	HEAD	COEFFICIENT
1	0.00	2.6300
2	1.00	2.6300
3	2.00	2.6300

****

UNEVEN WEIR FLOW PROGRAM
FORTRAN VERSION 1.0
PROJECT: BFIS SPRR SUB53
DATE: 6/ 1/1992
TIME: 16:33.54

****

ELEVATION	DISCHARGE (CFS)	ELEVATION	DISCHARGE (CFS)
893.37	0.00	894.87	11289.36
893.47	14.01	894.97	12720.62
893.57	79.07	895.07	14208.30
893.67	205.12	895.17	15750.32
893.77	447.08	895.27	17344.80
893.87	886.16		
893.97	1504.95		
894.07	2250.55		
894.17	3101.80		
894.27	4046.08		
894.37	5074.59		
894.47	6180.71		
894.57	7359.21		
894.67	8605.79		
894.77	9916.86		

```
*****************************************
    UNEVEN WEIR FLOW PROGRAM
    FORTRAN VERSION 1.0
*****************************************
```

PROJECT: BFIS SPRR SUB54
ENGINEER: DTP

DATE: 6/ 1/1992
TIME: 16:33. 7

INPUT PARAMETERS

STARTING WSEL: 893.34
MAXIMUM WSEL: 895.34
STEP SIZE: 0.10
BREADTH OF WEIR: 10.00

```
*****************************************
    INPUT ELEVATION/STATION TABLE.
    PROJECT:  BFIS SPRR  SUB54
    DATE:   6/ 1/1992
    TIME:  16:33. 7
*****************************************
```

POINT	ELEVATION	STATION	
1	896.00	-0.01	
2	893.61	0.00	= WILSON AVE
3	893.86	1320.00	
4	893.61	2652.00	
5	893.64	3442.00	
6	893.34	4026.00	
7	894.14	4706.00	
8	893.65	5364.00	WEST OF WILSON AVE = PALO VERDE AVE
9	896.00	5364.01	

```
*****************************************
    WEIR COEFFICIENT TABLE
    PROJECT:  BFIS SPRR  SUB54
    DATE:   6/ 1/1992
    TIME:  16:33. 7
*****************************************
```

INPUT COEFFICENT VALUES.

POINT	HEAD	COEFFICIENT
1	0.00	2.6300
2	1.00	2.6300
3	2.00	2.6300

2/2

```
*********************************************
    UNEVEN WEIR FLOW PROGRAM
    FORTRAN VERSION 1.0
    PROJECT:  BFIS SPRR  SUB54
    DATE:    6/ 1/1992
    TIME:  16:33. 7
*********************************************
```

ELEVATION	DISCHARGE (CFS)	ELEVATION	DISCHARGE (CFS)
893.34	0.00	894.84	17003.21
893.44	9.30	894.94	19293.41
893.54	52.50	895.04	21679.72
893.64	150.98	895.14	24158.35
893.74	443.56	895.24	26725.93
893.84	995.39		
893.94	1827.66		
894.04	2886.66		
894.14	4144.41		
894.24	5581.62		
894.34	7172.28		
894.44	8900.68		
894.54	10755.78		
894.64	12729.01		
894.74	14815.43		

```
*****************************************
    UNEVEN WEIR FLOW PROGRAM
    FORTRAN VERSION 1.0
*****************************************
```

PROJECT: BFIS SPRR SUB55
ENGINEER: DTP

DATE: 6/ 1/1992
TIME: 16:32.11

INPUT PARAMETERS

STARTING WSEL:	893.61
MAXIMUM WSEL:	895.61
STEP SIZE:	0.10
BREADTH OF WEIR:	10.00

```
*****************************************
    INPUT ELEVATION/STATION TABLE.
    PROJECT:  BFIS SPRR  SUB55
    DATE:    6/ 1/1992
    TIME:  16:32.11
*****************************************
```

POINT	ELEVATION	STATION	
1	896.00	-0.10	
2	895.50	0.00	= TURNER RD
3	895.36	1321.00	
4	895.60	1615.00	
5	895.75	2632.00	
6	894.22	3994.00	
7	893.61	5322.00	WEST OF TURNER = WILSON AVE
8	896.00	5322.01	

```
*****************************************
    WEIR COEFFICIENT TABLE
    PROJECT:  BFIS SPRR  SUB55
    DATE:    6/ 1/1992
    TIME:  16:32.11
*****************************************
```

INPUT COEFFICENT VALUES.

POINT	HEAD	COEFFICIENT
1	0.00	2.6300
2	1.00	2.6300
3	2.00	2.6300

```
*****************************************
    UNEVEN WEIR FLOW PROGRAM
    FORTRAN VERSION 1.0
    PROJECT:  BFIS SPRR  SUBS5
    DATE:    6/ 1/1992
    TIME:  16:32.11
*****************************************
```

ELEVATION	DISCHARGE (CFS)	ELEVATION	DISCHARGE (CFS)
893.61	0.00	895.11	5296.83
893.71	7.24	895.21	6092.91
893.81	40.95	895.31	6947.09
893.91	112.83	895.41	7866.34
894.01	231.62	895.51	8930.02
894.11	404.63		
894.21	638.28		
894.31	935.10		
894.41	1289.00		
894.51	1697.67		
894.61	2160.51		
894.71	2677.52		
894.81	3249.07		
894.91	3875.68		
895.01	4558.02		

```
*****************************************
    UNEVEN WEIR FLOW PROGRAM
    FORTRAN VERSION 1.0
*****************************************

    PROJECT:  BFIS SPRR  SUB45
    ENGINEER:  DTP

    DATE:   6/ 1/1992
    TIME:  16:31.28
```

INPUT PARAMETERS

STARTING WSEL:	893.18
MAXIMUM WSEL:	895.18
STEP SIZE:	0.10
BREADTH OF WEIR:	10.00

```
*****************************************
    INPUT ELEVATION/STATION TABLE.
    PROJECT:  BFIS SPRR  SUB45
    DATE:   6/ 1/1992
    TIME:  16:31.28
*****************************************
```

POINT	ELEVATION	STATION	
1	896.00	-0.10	
2	893.18	0.00	= OGLESBY RD
3	893.65	1334.00	
4	894.73	2477.00	
5	894.60	2660.00	
6	894.65	3987.00	
7	895.50	5307.00	WEST OF OGLESBY = TURNER RD

```
*****************************************
    WEIR COEFFICIENT TABLE
    PROJECT:  BFIS SPRR  SUB45
    DATE:   6/ 1/1992
    TIME:  16:31.28
*****************************************
```

INPUT COEFFICENT VALUES.

POINT	HEAD	COEFFICIENT
1	0.00	2.6300
2	1.00	2.6300
3	2.00	2.6300

2/2

```
*********************************************
    UNEVEN WEIR FLOW PROGRAM
    FORTRAN VERSION 1.0
    PROJECT:  BFIS SPRR  SUB45
    DATE:    6/ 1/1992
    TIME:  16:31.28
*********************************************
```

ELEVATION	DISCHARGE (CFS)	ELEVATION	DISCHARGE (CFS)
893.18	0.00	894.68	6257.38
893.28	9.44	894.78	7364.96
893.38	53.36	894.88	8633.86
893.48	147.09	894.98	10044.55
893.58	301.95	895.08	11589.45
893.68	527.20		
893.78	820.71		
893.88	1175.90		
893.98	1591.16		
894.08	2066.25		
894.18	2601.52		
894.28	3197.63		
894.38	3855.41		
894.48	4575.83		
894.58	5359.92		

1/2

```
*****************************************
    UNEVEN WEIR FLOW PROGRAM
    FORTRAN VERSION 1.0
*****************************************
```

PROJECT: BFIS SPRR SUB46
ENGINEER: DTP

DATE: 5/28/1992
TIME: 13:46.17

INPUT PARAMETERS

STARTING WSEL:	892.87
MAXIMUM WSEL:	894.87
STEP SIZE:	0.10
BREADTH OF WEIR:	10.00

```
*****************************************
    INPUT ELEVATION/STATION TABLE.
    PROJECT:  BFIS SPRR  SUB46
    DATE:   5/28/1992
    TIME:  13:46.17
*****************************************
```

POINT	ELEVATION	STATION	
1	895.00	39362.01	THIS SHEET FOLLOWS STANDARD RAILROAD STATIONING ON PLAN + PROFILE SHEETS (FLOODPLAIN MAPS)
2	892.87	39362.00	
3	892.90	38148.00	= ROOKS RD
4	894.75	36846.00	
5	892.95	35580.00	
6	893.95	34136.00	
7	893.18	32971.00	= OGLESBY RD
8	895.00	32970.99	

```
*****************************************
    WEIR COEFFICIENT TABLE
    PROJECT:  BFIS SPRR  SUB46
    DATE:   5/28/1992
    TIME:  13:46.17
*****************************************
```

INPUT COEFFICENT VALUES.

POINT	HEAD	COEFFICIENT
1	0.00	2.6300
2	1.00	2.6300
3	2.00	2.6300

2

```
*********************************************
     UNEVEN WEIR FLOW PROGRAM
     FORTRAN VERSION 1.0
     PROJECT:  BFIS SPRR  SUB46
     DATE:    5/28/1992
     TIME:  13:46.17
*********************************************
```

ELEVATION	DISCHARGE (CFS)	ELEVATION	DISCHARGE (CFS)
892.87	0.00	894.37	15240.51
892.97	80.46	894.47	17484.96
893.07	274.20	894.57	19871.31
893.17	564.98	894.67	22398.31
893.27	958.73	894.77	25065.02
893.37	1473.17		
893.47	2121.72		
893.57	2915.60		
893.67	3864.97		
893.77	4979.24		
893.87	6267.28		
893.97	7737.32		
894.07	9382.45		
894.17	11185.74		
894.27	13139.85		

1/2

```
*********************************************
    UNEVEN WEIR FLOW PROGRAM
    FORTRAN VERSION 1.0
*********************************************

    PROJECT:  BFIS SPRR  SUB47
    ENGINEER:  DTP

    DATE:    6/ 1/1992
    TIME:   16:30.34
```

INPUT PARAMETERS

```
    STARTING WSEL:          889.41
    MAXIMUM WSEL:           892.41
    STEP SIZE:                0.10
    BREADTH OF WEIR:         10.00

*********************************************
    INPUT ELEVATION/STATION TABLE.
    PROJECT:  BFIS SPRR  SUB47
    DATE:    6/ 1/1992
    TIME:   16:30.34
*********************************************
```

POINT	ELEVATION	STATION	
1	893.00	-0.01	
2	889.41	0.00	= MILLER RD.
3	890.56	1324.00	
4	891.81	2540.00	
5	891.91	3938.00	
6	892.87	4063.00	WEST OF MILLER RD.

```
*********************************************
    WEIR COEFFICIENT TABLE
    PROJECT:  BFIS SPRR  SUB47
    DATE:    6/ 1/1992
    TIME:   16:30.34
*********************************************
```

INPUT COEFFICENT VALUES.

POINT	HEAD	COEFFICIENT
1	0.00	2.6300
2	1.50	2.6300
3	3.00	2.6300

****

UNEVEN WEIR FLOW PROGRAM
FORTRAN VERSION 1.0
PROJECT: BFIS SPRR SUB47
DATE: 6/ 1/1992
TIME: 16:30.34

****

ELEVATION	DISCHARGE (CFS)	ELEVATION	DISCHARGE (CFS)
889.41	0.00	890.91	3321.93
889.51	3.83	891.01	3894.07
889.61	21.65	891.11	4518.91
889.71	59.67	891.21	5197.71
889.81	122.48	891.31	5931.74
889.91	213.97	891.41	6722.23
890.01	337.53	891.51	7570.44
890.11	496.22	891.61	8477.56
890.21	692.88	891.71	9444.79
890.31	930.12	891.81	10473.32
890.41	1210.41	891.91	11606.89
890.51	1536.08	892.01	12916.33
890.61	1909.25	892.11	14350.46
890.71	2330.71	892.21	15887.85
890.81	2801.22	892.31	17517.76

```
*****************************************
    UNEVEN WEIR FLOW PROGRAM
    FORTRAN VERSION 1.0
*****************************************
```

PROJECT: BFIS SPRR SUB67
ENGINEER: DTP

DATE: 6/ 1/1992
TIME: 16:29.44

INPUT PARAMETERS

STARTING WSEL:	887.07
MAXIMUM WSEL:	889.07
STEP SIZE:	0.10
BREADTH OF WEIR:	10.00

```
*****************************************
    INPUT ELEVATION/STATION TABLE.
    PROJECT:  BFIS SPRR SUB67
    DATE:    6/ 1/1992
    TIME:   16:29.44
*****************************************
```

POINT	ELEVATION	STATION	
1	889.52	0.00	= APACHE/CEMETERY RD.
2	888.14	588.00	= BASELINE RD
3	887.48	1659.00	
4	887.07	2673.00	
5	888.08	4033.00	= 4TH ST.
6	889.41	5356.00	= MILLER RD.
7	887.46	1334.00	

```
*****************************************
    WEIR COEFFICIENT TABLE
    PROJECT:  BFIS SPRR SUB67
    DATE:    6/ 1/1992
    TIME:   16:29.44
*****************************************
```

INPUT COEFFICENT VALUES.

POINT	HEAD	COEFFICIENT
1	0.00	2.6300
2	1.00	2.6300
3	2.00	2.6300

2/2

****

UNEVEN WEIR FLOW PROGRAM
FORTRAN VERSION 1.0
PROJECT: BFIS SPRR SU367
DATE: 6/ 1/1992
TIME: 16:29.44

****

ELEVATION	DISCHARGE (CFS)	ELEVATION	DISCHARGE (CFS)
887.07	0.00	888.57	6929.02
887.17	12.70	888.67	7775.82
887.27	71.84	888.77	8642.13
887.37	197.97	888.87	9524.71
887.47	406.37	888.97	10420.64
887.57	699.09		
887.67	1062.06		
887.77	1490.02		
887.87	1980.74		
887.97	2533.21		
888.07	3147.03		
888.17	3821.13		
888.27	4545.55		
888.37	5309.21		
888.47	6105.40		

****
UNEVEN WEIR FLOW PROGRAM
FORTRAN VERSION 1.0
****

PROJECT: BFIS SPRR SUB56
ENGINEER: DTP

DATE: 6/ 1/1992
TIME: 16:26.39

INPUT PARAMETERS

STARTING WSEL: 889.52
MAXIMUM WSEL: 892.12
STEP SIZE: 0.10
BREADTH OF WEIR: 10.00

****
INPUT ELEVATION/STATION TABLE.
PROJECT: BFIS SPRR SUB56
DATE: 6/ 1/1992
TIME: 16:26.39
****

POINT	ELEVATION	STATION	
1	892.18	0.00	= WATSON RD
2	892.30	1013.00	
3	891.79	1374.00	
4	890.72	2757.00	
5	890.09	4117.00	
6	889.89	5144.00	
7	889.52	5503.00	= APACHE RD
8	892.12	5503.01	

****
WEIR COEFFICIENT TABLE
PROJECT: BFIS SPRR SUB56
DATE: 6/ 1/1992
TIME: 16:26.39
****

INPUT COEFFICENT VALUES.

POINT	HEAD	COEFFICIENT
1	0.00	2.6300
2	1.50	2.6300
3	3.00	2.6300

2/2

****

UNEVEN WEIR FLOW PROGRAM
FORTRAN VERSION 1.0
PROJECT: BFIS SPRR SUB56
DATE: 6/ 1/1992
TIME: 16:26.39

****

ELEVATION	DISCHARGE (CFS)	ELEVATION	DISCHARGE (CFS)
889.52	0.00	891.02	6099.63
889.62	3.23	891.12	7188.92
889.72	19.25	891.22	8368.05
889.82	50.29	891.32	9637.56
889.92	103.91	891.42	10998.17
890.02	206.97	891.52	12450.73
890.12	394.96	891.62	13996.16
890.22	672.92	891.72	15635.47
890.32	1035.29	891.82	17369.60
890.42	1483.38	891.92	19196.18
890.52	2019.93	892.02	21111.64
890.62	2648.13		
890.72	3371.33		
890.92	4190.03		
890.92	5099.92		

```
*********************************************
    UNEVEN WEIR FLOW PROGRAM
    FORTRAN VERSION 1.0
*********************************************
```

PROJECT: BFIS SPRR SUB57
ENGINEER: DTP

DATE: 6/ 1/1992
TIME: 16:22.46

INPUT PARAMETERS

STARTING WSEL:	892.18
MAXIMUM WSEL:	894.18
STEP SIZE:	0.10
BREADTH OF WEIR:	10.00

```
*********************************************
    INPUT ELEVATION/STATION TABLE.
    PROJECT:  BFIS SPRR  SUB57
    DATE:    6/ 1/1992
    TIME:  16:22.46
*********************************************
```

POINT	ELEVATION	STATION	
1	894.16	-0.01	
2	892.98	0.00	= RAINBOW RD
3	893.89	1371.00	
4	894.14	1888.00	
5	893.76	2842.00	
6	893.70	4118.00	
7	892.18	5538.00	= WATSON RD ALIGNMENT
8	894.18	5538.01	

```
*********************************************
    WEIR COEFFICIENT TABLE
    PROJECT:  BFIS SPRR  SUB57
    DATE:    6/ 1/1992
    TIME:  16:22.46
*********************************************
```

INPUT COEFFICENT VALUES.

POINT	HEAD	COEFFICIENT
1	0.00	2.6300
2	1.00	2.6300
3	2.00	2.6300

****
UNEVEN WEIR FLOW PROGRAM
FORTRAN VERSION 1.0
PROJECT: BFIS SPRR SUB57
DATE: 6/ 1/1992
TIME: 16:22.46
****

ELEVATION	DISCHARGE (CFS)	ELEVATION	DISCHARGE (CFS)
892.18	0.00	893.68	3355.50
892.28	3.11	893.78	4123.81
892.38	17.57	893.88	5112.20
892.48	48.42	893.98	6292.21
892.58	99.39	894.08	7665.15
892.68	173.65		
892.78	273.89		
892.88	402.66		
892.98	562.23		
893.08	759.73		
893.18	1010.45		
893.28	1324.41		
893.38	1709.43		
893.48	2172.31		
893.58	2719.13		

****
UNEVEN WEIR FLOW PROGRAM
FORTRAN VERSION 1.0
****

PROJECT: BFIS SPRR SUB58
ENGINEER: DTP

DATE: 6/ 1/1992
TIME: 16:17. 8

INPUT PARAMETERS

STARTING WSEL: 892.65
MAXIMUM WSEL: 895.65
STEP SIZE: 0.10
BREADTH OF WEIR: 10.00

****
INPUT ELEVATION/STATION TABLE.
PROJECT: BFIS SPRR SUB58
DATE: 6/ 1/1992
TIME: 16:17. 8
****

POINT	ELEVATION	STATION	
1	896.79	0.00	= DEAN RD
2	896.40	187.00	
3	896.06	1056.00	
4	895.34	1347.00	
5	892.90	2423.00	
6	892.65	2722.00	
7	892.72	4082.00	
8	892.75	4968.00	
9	892.98	5443.00	= RAINBOW RD
10	896.65	5443.01	

****
WEIR COEFFICIENT TABLE
PROJECT: BFIS SPRR SUB58
DATE: 6/ 1/1992
TIME: 16:17. 8
****

INPUT COEFFICENT VALUES.

POINT	HEAD	COEFFICIENT
1	0.00	2.6300
2	1.50	2.6300
3	3.00	2.6300

****
UNEVEN WEIR FLOW PROGRAM
FORTRAN VERSION 1.0
PROJECT: BFIS SPRR SUB58
DATE: 6/ 1/1992
TIME: 16:17. 8
****

ELEVATION	DISCHARGE (CFS)	ELEVATION	DISCHARGE (CFS)
892.65	0.00	894.15	14160.82
892.75	70.27	894.25	15772.67
892.85	361.45	894.35	17453.19
892.95	821.64	894.45	19201.58
893.05	1425.94	894.55	21017.15
893.15	2148.86	894.65	22899.31
893.25	2975.07	894.75	24847.55
893.35	3895.71	894.85	26861.44
893.45	4904.69	894.95	28940.59
893.55	5997.48	895.05	31084.69
893.65	7170.62	895.15	33293.45
893.75	8421.34	895.25	35566.64
893.85	9747.42	895.35	37904.05
893.95	11147.00	895.45	40305.39
894.05	12618.56	895.55	42770.18

APPENDIX J

STAGE-DISCHARGE RATING CURVES FOR THE SPRR CROSS-DRAINAGE STRUCTURES

GEORGE V. SABOL CONSULTING ENGINEERS, INC.

SHEET 1 OF 40

CLIENT Buckeye FIS

DATE 5/21/92

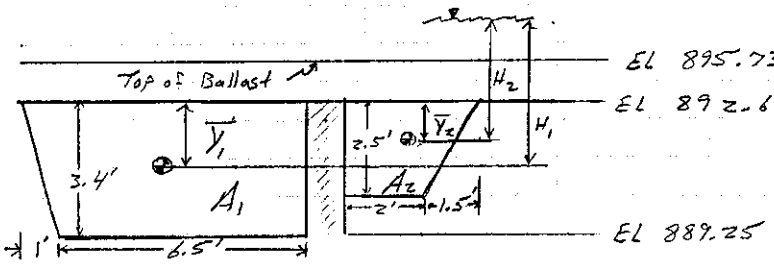
PROJECT FCD 90-69

BY DTP

SUBJECT SPRR Outlet Rating Curve

PROJECT NO. 29

TRESTLE #1 (1+87 W of Dean Road)



$Q = \Sigma Q_i$

$Q_i = CA_i(2gH_i)^{1/2}$

$C = 0.6$

$A_1 = 6.5'(3.4') + \frac{1}{2}(1')(3.4') = (22.1 + 1.7)\,ft^2$ $\qquad A_1 = 23.8\,ft^2$

$A_2 = 2'(2.5') + \frac{1}{2}(1.5')(2.5') = (5 + 1.9)\,ft^2$ $\qquad A_2 = 6.9\,ft^2$

$\bar{Y}_1 = \dfrac{\frac{1}{2}(3.4')22.1 + \frac{1}{3}(3.4')1.7}{23.8} = 1.66\,ft$ $\qquad EL\ \bar{Y}_1 = 890.99$

$\bar{Y}_2 = \dfrac{\frac{1}{2}(2.5')5 + \frac{1}{3}(2.5')1.9}{6.9} = 1.14\,ft$ $\qquad EL\ \bar{Y}_2 = 891.51$

SPRR Outlet Rating Cuve TRESTLE # 1 1 of SUB 58

Bottom Channel Elevation = 889.25
Centroid Elevation; Y1 EL = 890.99 A1 = 23.8
Centroid Elevation; Y2 EL = 891.51 A2 = 6.9
Centroid Elevation; Y3 EL = A3 =
Centroid Elevation; Y4 EL = A4 =
Centroid Elevation; Y5 EL = A5 =

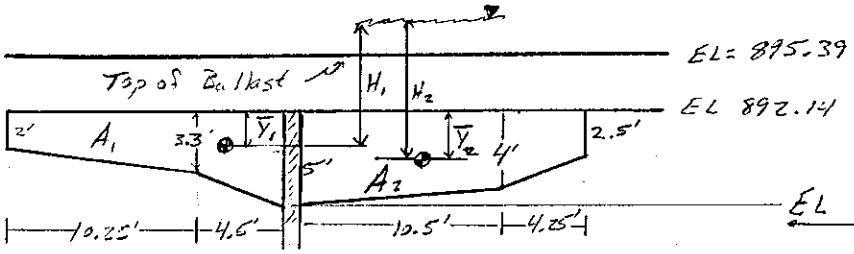
Orrifice Coefficient; C = 0.60

Stage ft	WS EL ft	H1 ft	H2 ft	H3 ft	Q1 cfs	Q2 cfs	Q3 cfs	Total Q cfs
0.0	889.25	-1.74	-2.26		0.0	0.0	0.0	0.0
2.0	891.25	0.26	N/A		58.4	0.0	0.0	58.4
2.5	891.75	0.76	0.24		99.9	16.3	0.0	116.2
3.0	892.25	1.26	0.74		128.6	28.6	0.0	157.2
3.5	892.75	1.76	1.24		152.0	37.0	0.0	189.0
4.0	893.25	2.26	1.74		172.3	43.8	0.0	216.1
4.5	893.75	2.76	2.24		190.4	49.7	0.0	240.1
5.0	894.25	3.26	2.74		206.9	55.0	0.0	261.9
5.5	894.75	3.76	3.24		222.2	59.8	0.0	282.0
6.0	895.25	4.26	3.74		236.5	64.3	0.0	300.8
6.5	895.75	4.76	4.24		250.0	68.4	0.0	318.4
7.0	896.25	5.26	4.74		262.8	72.3	0.0	335.2
7.5	896.75	5.76	5.24		275.0	76.1	0.0	351.1
8.0	897.25	6.26	5.74		286.7	79.6	0.0	366.3
8.5	897.75	6.76	6.24		298.0	83.0	0.0	380.9
9.0	898.25	7.26	6.74		308.8	86.3	0.0	395.0
9.5	898.75	7.76	7.24		319.2	89.4	0.0	408.6
10.0	899.25	8.26	7.74		329.4	92.4	0.0	421.8

GEORGE V. SABOL CONSULTING ENGINEERS, INC.

SHEET 2 OF 40
CLIENT Buckeye FJS
DATE 5/21/92
PROJECT FCD 90-69
BY DTA
SUBJECT SPRR Outlet Rating Curve
PROJECT NO. 38

TRESTLE # 2: (10+56 W Dean Road)



$Q = \Sigma Q_i$

$Q_i = C A_i (2gH_i)^{1/2}$

$C = 0.6$

$A_1 = 10.25(2) + \frac{1}{2}(10.25)1.3 + 4.5(3.3) + \frac{1}{2}(4.5)1.7 = (20.5 + 6.7 + 14.9 + 3.8)\,ft^2$

$A_2 = 10.5(4) + \frac{1}{2}(10.5)1 + 4.25(2.5) + \frac{1}{2}(4.25)1.5 = (42 + 5.3 + 10.6 + 3.2)\,ft^2$

$A_1 = 45.9\ ft^2$

$A_2 = 61.1\ ft^2$

$$\bar{Y}_1 = \frac{\frac{2}{2}(20.5) + [\frac{1}{3}(1.3) + 2]\,6.7 + \frac{3.3}{2}(14.9) + [\frac{1}{3}(1.7) + 3.3]\,3.8}{45.9} = 1.66'$$

$$\bar{Y}_2 = \frac{\frac{4}{2}(42) + [\frac{1}{3}(\frac{1}{2}) + 4]\,5.3 + \frac{2.5}{2}(10.6) + [\frac{1}{3}(1.5) + 2.5]\,3.2}{61.1} = 2.11'$$

$\bar{Y}_1$ EL = 890.48

$\bar{Y}_2$ EL = 890.03

SPRR Outlet Rating Curve TRESTLE # 2 IN SUB 58

Bottom Channel Elevation = 887.14
Centroid Elevation; Y1 EL = 890.48 A1 = 45.9
Centroid Elevation; Y2 EL = 890.03 A2 = 61.1
Centroid Elevation; Y3 EL = A3 =
Centroid Elevation; Y4 EL = A4 =
Centroid Elevation; Y5 EL = A5 =

Orrifice Coefficient; C = 0.60

Stage ft	WS EL ft	H1 ft	H2 ft	H3 ft	Q1 cfs	Q2 cfs	Q3 cfs	Total Q cfs
0.0	887.14	-3.34	-2.89		0.0	0.0	0.0	0.0
3.5	890.64	0.16	0.61		88.4	229.8	0.0	318.2
4.0	891.14	0.66	1.11		179.5	310.0	0.0	489.5
4.5	891.64	1.16	1.61		238.0	373.3	0.0	611.3
5.0	892.14	1.66	2.11		284.7	427.3	0.0	712.1
5.5	892.64	2.16	2.61		324.8	475.3	0.0	800.1
6.0	893.14	2.66	3.11		360.5	518.8	0.0	879.3
6.5	893.64	3.16	3.61		392.9	559.0	0.0	951.8
7.0	894.14	3.66	4.11		422.8	596.4	0.0	1019.2
7.5	894.64	4.16	4.61		450.8	631.7	0.0	1082.4
8.0	895.14	4.66	5.11		477.1	665.0	0.0	1142.1
8.5	895.64	5.16	5.61		502.0	696.8	0.0	1198.8
9.0	896.14	5.66	6.11		525.8	727.2	0.0	1253.0
9.5	896.64	6.16	6.61		548.5	756.4	0.0	1304.9
10.0	897.14	6.66	7.11		570.4	784.5	0.0	1354.8
10.5	897.64	7.16	7.61		591.4	811.6	0.0	1402.9
11.0	898.14	7.66	8.11		611.7	837.8	0.0	1449.5
11.5	898.64	8.16	8.61		631.3	863.3	0.0	1494.6

GEORGE V. SABOL CONSULTING ENGINEERS, INC.

SHEET 3 OF 40

CLIENT Buckeye FES

DATE 5/21/93

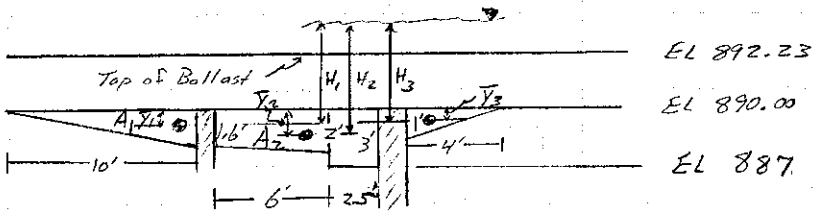
PROJECT FCD 90-69

BY DTP

SUBJECT SPRR Outlet Rating Curves

PROJECT NO. 28

TRESTLE # 3: (24+23 W of Dean Road)



$Q = \Sigma Q_i$

$Q_i = C A_i (2g H_i)^{1/2}$

$A_1 = \frac{1}{2}(10')1.6' = 8\ ft^2$ $\qquad A_1 = 8\ ft^2$

$A_2 = 6'\left(\frac{1.6+2}{2}\right) + 2.5(3) = (10.8 + 7.5)\ ft^2$ $\qquad A_2 = 18.3\ ft^2$

$A_3 = \frac{1}{2}(4)1 = 2\ ft^2$ $\qquad A_3 = 2\ ft^2$

$\bar{Y}_1 = \frac{1}{3}(1.6') = 0.53'$ $\qquad \bar{Y}_1$ EL = 889.47

$\bar{Y}_2 = \frac{[\frac{1}{2}(1.8)]\,10.8 + [\frac{1}{2}(3)]\,7.5}{18.3} = 1.15$ $\qquad \bar{Y}_2$ EL = 888.85

$\bar{Y}_3 = \frac{1}{3}(1') = 0.33'$ $\qquad \bar{Y}_3$ EL = 889.67

SPRR Outlet Rating Cuve TRESTLE # 3 IN SUB S8

Bottom Channel Elevation = 887.00
Centroid Elevation; Y1 EL = 889.47 A1 = 8.0
Centroid Elevation; Y2 EL = 888.85 A2 = 18.3
Centroid Elevation; Y3 EL = 889.67 A3 = 2.0
Centroid Elevation; Y4 EL = A4 =
Centroid Elevation; Y5 EL = A5 =

Orrifice Coefficient; C = 0.60

Stage ft	WS EL ft	H1 ft	H2 ft	H3 ft	Q1 cfs	Q2 cfs	Q3 cfs	Total Q cfs
0.0	887.00	-2.47	-1.85	-2.67	0.0	0.0	0.0	0.0
2.5	889.50	0.03	0.65	---	6.7	71.0	0.0	77.7
3.0	890.00	0.53	1.15	0.33	28.0	94.5	5.5	128.1
3.5	890.50	1.03	1.65	0.83	39.1	113.2	8.8	161.1
4.0	891.00	1.53	2.15	1.33	47.6	129.2	11.1	188.0
4.5	891.50	2.03	2.65	1.83	54.9	143.4	13.0	211.3
5.0	892.00	2.53	3.15	2.33	61.3	156.4	14.7	232.4
5.5	892.50	3.03	3.65	2.83	67.1	168.3	16.2	251.6
6.0	893.00	3.53	4.15	3.33	72.4	179.5	17.6	269.4
6.5	893.50	4.03	4.65	3.83	77.3	190.0	18.8	286.2
7.0	894.00	4.53	5.15	4.33	82.0	200.0	20.0	302.0
7.5	894.50	5.03	5.65	4.83	86.4	209.4	21.2	317.0
8.0	895.00	5.53	6.15	5.33	90.6	218.5	22.2	331.3
8.5	895.50	6.03	6.65	5.83	94.6	227.2	23.3	345.1
9.0	896.00	6.53	7.15	6.33	98.4	235.6	24.2	358.3
9.5	896.50	7.03	7.65	6.83	102.1	243.7	25.2	371.0
10.0	897.00	7.53	8.15	7.33	105.7	251.5	26.1	383.3
10.5	897.50	8.03	8.65	7.83	109.2	259.2	26.9	395.3

GEORGE V. SABOL CONSULTING ENGINEERS, INC.

SHEET 4 OF 40

CLIENT Buckeye FCS

DATE 5/21/92

PROJECT FCD 90-69

BY DCP

SUBJECT SPRR Outlet Rating Curves

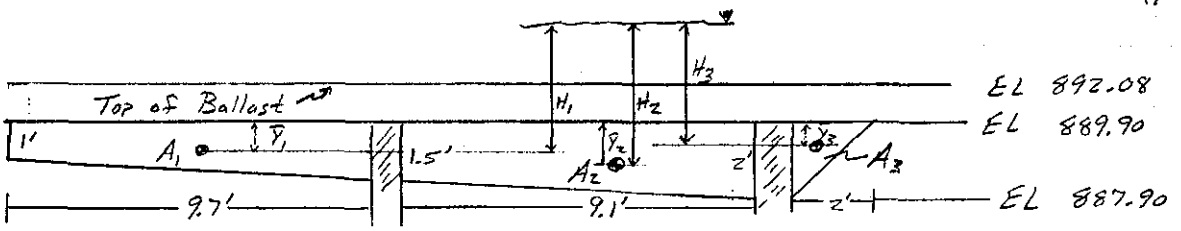
PROJECT NO. 28

$Q = \Sigma Q_i$

$Q_i = C A_i (2g H_i)^{\frac{1}{2}}$

$C = 0.6$

TRESTLE # 4: (49+68 W of Dean Road)



$A_1 = 9.7(1) + \frac{1}{2}(9.7)(0.5) = (9.7 + 2.4)\ ft^2$ $\qquad A_1 = 12.1\ ft^2$

$A_2 = 9.1(1.5) + \frac{1}{2}(9.1)(0.5) = (13.7 + 2.3)\ ft^2$ $\qquad A_2 = 16.0\ ft^2$

$A_3 = \frac{1}{2}(2)(2) = 2\ ft^2$ $\qquad A_3 = 2\ ft^2$

$\bar{Y}_1 = \dfrac{\frac{1}{2}(1)(9.7) + [\frac{1}{3}(0.5) + 1]\,2.4}{12.1} = 0.63'$ $\qquad \bar{Y}_1$ EL = 889.27

$\bar{Y}_2 = \dfrac{\frac{1}{2}(1.5)\,13.7 + [\frac{1}{3}(0.5) + 1.5]\,2.3}{16} = 0.88'$ $\qquad \bar{Y}_2$ EL = 889.02

$\bar{Y}_3 = \frac{1}{3}(2') = 0.67'$ $\qquad \bar{Y}_3$ EL = 889.23

SPRR Outlet Rating Curve TRESTLE # 4 IN SUB S8

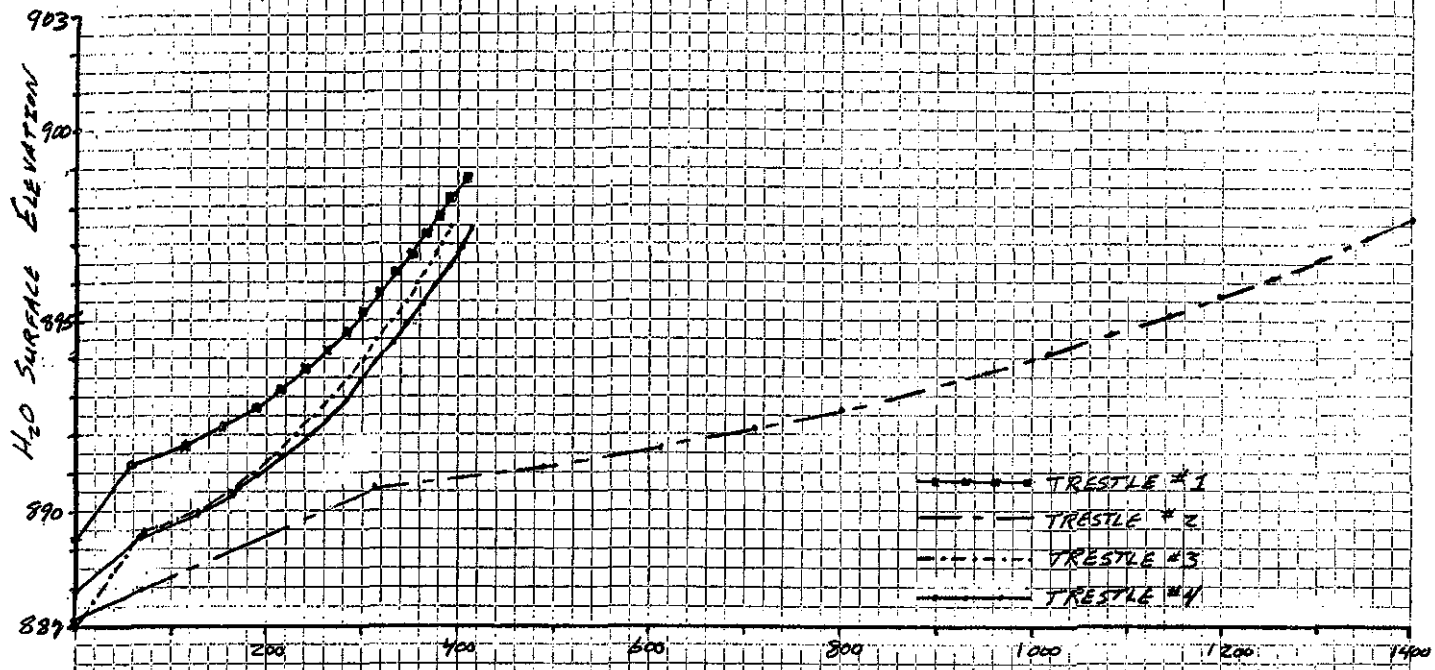
Bottom Channel Elevation = 887.90
Centroid Elevation; Y1 EL = 889.27 A1 = 12.1
Centroid Elevation; Y2 EL = 889.02 A2 = 16.0
Centroid Elevation; Y3 EL = 889.23 A3 = 2.0
Centroid Elevation; Y4 EL = A4 =
Centroid Elevation; Y5 EL = A5 =

Orrifice Coefficient; C = 0.60

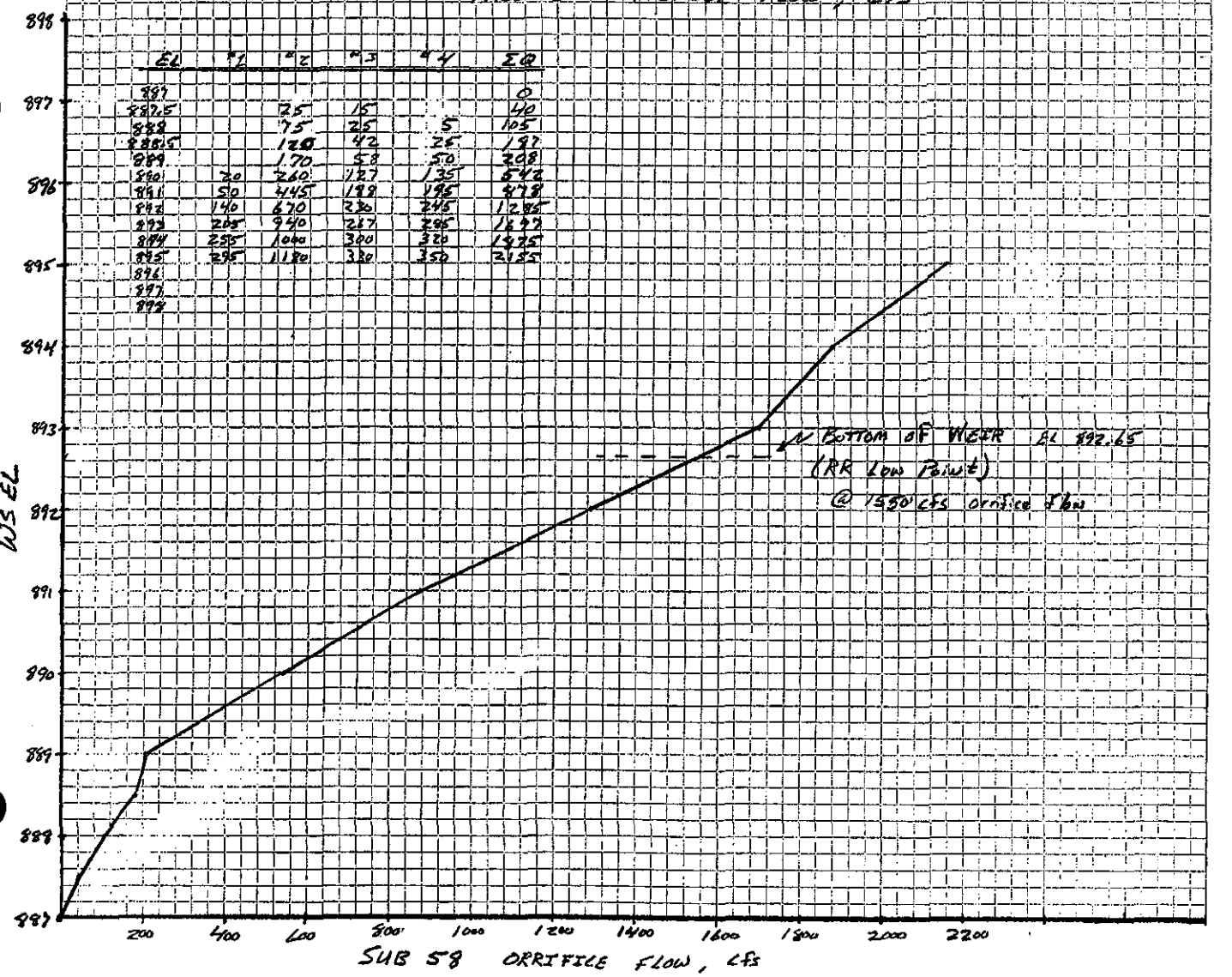
Stage ft	WS EL ft	H1 ft	H2 ft	H3 ft	Q1 cfs	Q2 cfs	Q3 cfs	Total Q cfs
0.0	887.90	-1.37	-1.12	-1.33	0.0	0.0	0.0	0.0
1.5	889.40	0.13	0.38	0.17	21.0	47.5	4.0	72.5
2.0	889.90	0.63	0.88	0.67	46.2	72.3	7.9	126.4
2.5	890.40	1.13	1.38	1.17	61.9	90.5	10.4	162.8
3.0	890.90	1.63	1.88	1.67	74.4	105.6	12.4	192.5
3.5	891.40	2.13	2.38	2.17	85.0	118.9	14.2	218.1
4.0	891.90	2.63	2.88	2.67	94.5	130.7	15.7	241.0
4.5	892.40	3.13	3.38	3.17	103.1	141.6	17.1	261.9
5.0	892.90	3.63	3.88	3.67	111.0	151.8	18.4	281.2
5.5	893.40	4.13	4.38	4.17	118.4	161.2	19.7	299.3
6.0	893.90	4.63	4.88	4.67	125.4	170.2	20.8	316.4
6.5	894.40	5.13	5.38	5.17	132.0	178.7	21.9	332.5
7.0	894.90	5.63	5.88	5.67	138.2	186.8	22.9	348.0
7.5	895.40	6.13	6.38	6.17	144.2	194.6	23.9	362.8
8.0	895.90	6.63	6.88	6.67	150.0	202.1	24.9	377.0
8.5	896.40	7.13	7.38	7.17	155.6	209.3	25.8	390.6
9.0	896.90	7.63	7.88	7.67	160.9	216.3	26.7	403.9
9.5	897.40	8.13	8.38	8.17	166.1	223.0	27.5	416.7

SPRR OUTLET RATEAR CURVES

DEAN TO RAINBOW ROADS
(SUB 58 ORRIFICE FLOW)



EL	#1	#2	#3	#4	ΣQ
887					0
887.5		25	15		40
888		75	25	5	105
888.5		120	42	25	187
889		170	58	50	208
890	20	260	127	135	542
891	50	445	188	195	878
892	140	670	230	245	1285
893	205	940	287	295	1677
894	255	1060	300	320	1975
895	295	1180	330	350	2155
896					
897					
898					



10 X 10 TO THE INCH 7 X 10 INCHES KEUFFEL & ESSER CO. MADE IN U.S.A.

GEORGE V. SABOL CONSULTING ENGINEERS, INC.

SHEET 6 OF 40

CLIENT Buckeye FES

DATE 5/21/92

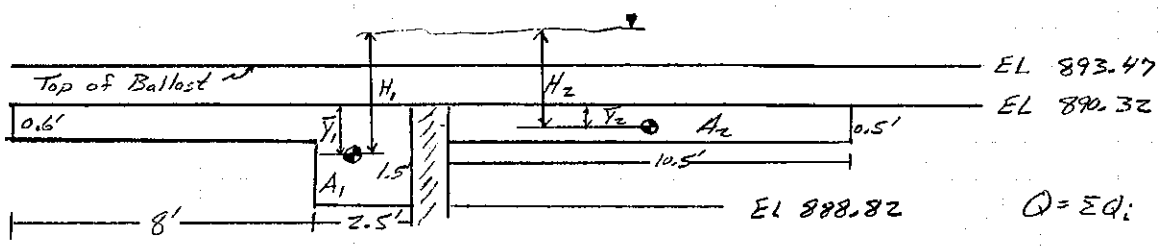
PROJECT FCD 90-69

BY DTP

SUBJECT SPRR Outlet Rating Curves

PROJECT NO. 29

TRESTLE #5: (18+88 W of Rainbow Road)



$Q = \Sigma Q_i$

$Q_i = C A_i (2g H_i)^{1/2}$

$C = 0.6$

$A_1 = 8(0.6) + 2.5(1.5) = (4.8 + 3.8)\ ft^2$

$A_2 = 10.5(0.5) = 5.3\ ft^2$

$A_1 = 8.6\ ft^2$

$A_2 = 5.3\ ft^2$

$\bar{Y}_1 = \dfrac{\frac{1}{2}(0.6)\,4.8 + \frac{1}{2}(1.5)\,3.8}{8.6} = 0.20'$

$\bar{Y}_1$ EL = 890.12

$\bar{Y}_2 = \frac{1}{2}(0.5) = 0.25'$

$\bar{Y}_2$ EL = 890.07

SPRR Outlet Rating Cuve TRESTLE # 5 IN SUB 57

Bottom Channel Elevation = 888.82
Centroid Elevation; Y1 EL = 890.12 A1 = 8.6
Centroid Elevation; Y2 EL = 890.07 A2 = 5.3
Centroid Elevation; Y3 EL = A3 =
Centroid Elevation; Y4 EL = A4 =
Centroid Elevation; Y5 EL = A5 =

Orrifice Coefficient; C = 0.60

Stage ft	WS EL ft	H1 ft	H2 ft	H3 ft	Q1 cfs	Q2 cfs	Q3 cfs	Total Q cfs
0.0	888.82	-1.30	-1.25	888.82	0.0	0.0	0.0	0.0
1.5	890.32	0.20	0.25		18.5	12.8	0.0	31.3
2.0	890.82	0.70	0.75		34.6	22.1	0.0	56.7
2.5	891.32	1.20	1.25		45.4	28.5	0.0	73.9
3.0	891.82	1.70	1.75		54.0	33.8	0.0	87.7
3.5	892.32	2.20	2.25		61.4	38.3	0.0	99.7
4.0	892.82	2.70	2.75		68.0	42.3	0.0	110.4
4.5	893.32	3.20	3.25		74.1	46.0	0.0	120.1
5.0	893.82	3.70	3.75		79.7	49.4	0.0	129.1
5.5	894.32	4.20	4.25		84.9	52.6	0.0	137.5
6.0	894.82	4.70	4.75		89.8	55.6	0.0	145.4
6.5	895.32	5.20	5.25		94.4	58.5	0.0	152.9
7.0	895.82	5.70	5.75		98.9	61.2	0.0	160.1
7.5	896.32	6.20	6.25		103.1	63.8	0.0	166.9
8.0	896.82	6.70	6.75		107.2	66.3	0.0	173.5
8.5	897.32	7.20	7.25		111.1	68.7	0.0	179.8
9.0	897.82	7.70	7.75		114.9	71.0	0.0	185.9
9.5	898.32	8.20	8.25		118.6	73.3	0.0	191.9

GEORGE V. SABOL CONSULTING ENGINEERS, INC.

SHEET 7 OF 40

CLIENT

DATE 5/21/92

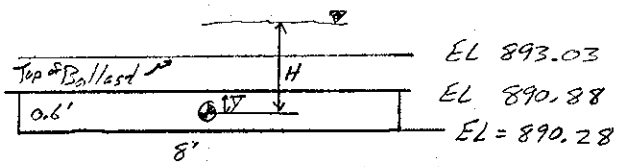
PROJECT

BY DTT

SUBJECT SPRR Outflow Rating Curves

PROJECT NO. 28

TRESTLE # 6: (41 + 18 W of Rainbow Road)



$Q = CA(2gH)^{1/2}$

$A = 4.8\ ft^2$

$\bar{y} = 0.3'$ $\bar{y}$ EL = 890.58

SPRR Outlet Rating Cuve TRESTLE # 6 SUB 57

Bottom Channel Elevation = 890.28
Centroid Elevation; Y1 EL = 890.58 A1 = 4.8
Centroid Elevation; Y2 EL = A2 =
Centroid Elevation; Y3 EL = A3 =
Centroid Elevation; Y4 EL = A4 =
Centroid Elevation; Y5 EL = A5 =

Orrifice Coefficient; C = 0.60

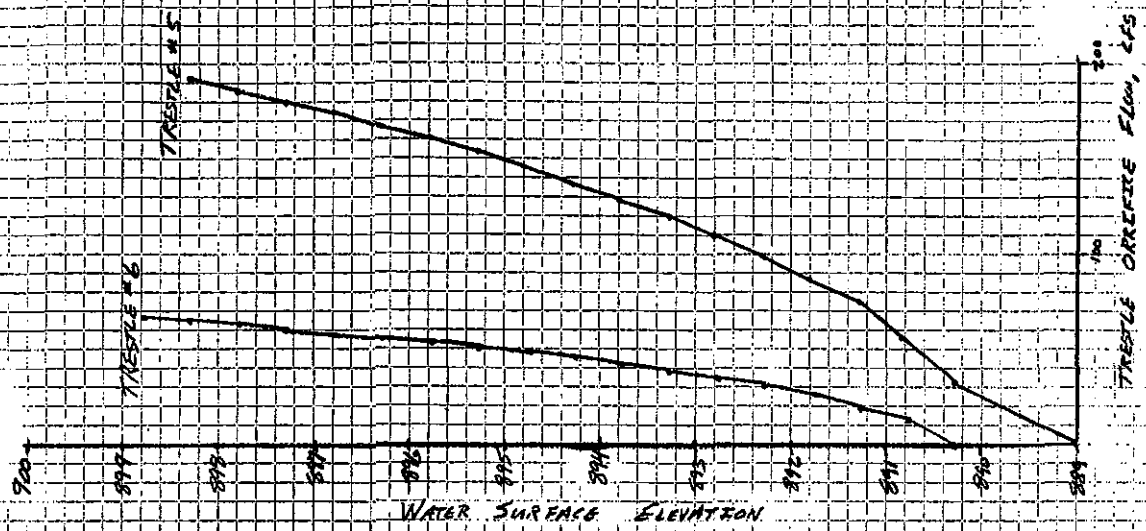
Stage ft	WS EL ft	H1 ft	H2 ft	H3 ft	Q1 cfs	Q2 cfs	Q3 cfs	Total Q cfs
0.0	890.28	-0.30	890.28	890.28	0.0	0.0	0.0	0.0
0.5	890.78	0.20	890.78		10.3	0.0	0.0	10.3
1.0	891.28	0.70	891.28		19.3	0.0	0.0	19.3
1.5	891.78	1.20	891.78		25.3	0.0	0.0	25.3
2.0	892.28	1.70	892.28		30.1	0.0	0.0	30.1
2.5	892.78	2.20	892.78		34.3	0.0	0.0	34.3
3.0	893.28	2.70	893.28		38.0	0.0	0.0	38.0
3.5	893.78	3.20	893.78		41.3	0.0	0.0	41.3
4.0	894.28	3.70	894.28		44.5	0.0	0.0	44.5
4.5	894.78	4.20	894.78		47.4	0.0	0.0	47.4
5.0	895.28	4.70	895.28		50.1	0.0	0.0	50.1
5.5	895.78	5.20	895.78		52.7	0.0	0.0	52.7
6.0	896.28	5.70	896.28		55.2	0.0	0.0	55.2
6.5	896.78	6.20	896.78		57.5	0.0	0.0	57.5
7.0	897.28	6.70	897.28		59.8	0.0	0.0	59.8
7.5	897.78	7.20	897.78		62.0	0.0	0.0	62.0
8.0	898.28	7.70	898.28		64.1	0.0	0.0	64.1
8.5	898.78	8.20	898.78		66.2	0.0	0.0	66.2

DTP for GUS 81/40

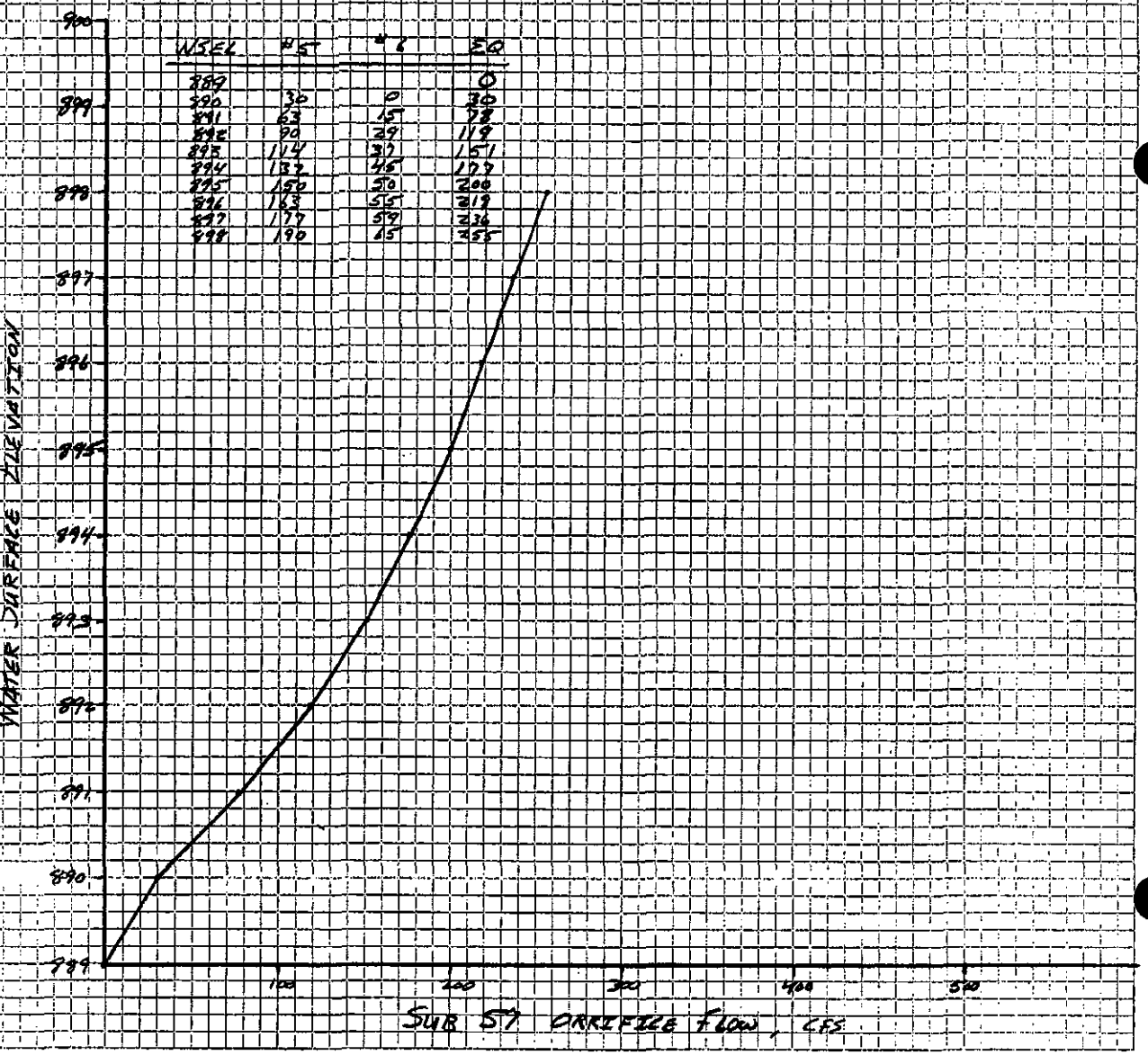
SPRR Outlet Rating Curves 5/26/92

RAINBOW TO WATSON ROADS

(SUB 57 ORRIFICE FLOW)



WSEL	#5	#6	EQ
889			0
890	30	0	30
891	63	15	78
892	90	29	119
893	114	37	151
894	132	45	177
895	150	50	200
896	163	55	219
897	177	59	236
898	190	65	255



GEORGE V. SABOL CONSULTING ENGINEERS, INC.

SHEET 9 OF 40

CLIENT

DATE 5/21/92

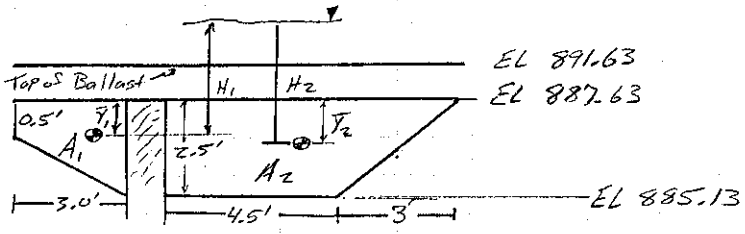
PROJECT

BY DTP

SUBJECT SPRR Outlet Rating Curves

PROJECT NO. 28

TRESTLE #7: (10+13 W of Watson Road)



$Q = \Sigma Q_i$

$Q_i = C A_i (2g H_i)^{1/2}$

$C = 0.6$

$A_1 = 3(0.5) + \frac{1}{2}(3)2 = (1.5 + 3)\,ft^2$ $\qquad A_1 = 4.5\,ft^2$

$A_2 = 4.5(2.5) + \frac{1}{2}(3)(2.5) = (11.3 + 3.8)\,ft^2$ $\qquad A_2 = 15.1\,ft^2$

$\bar{Y}_1 = \dfrac{\frac{1}{2}(0.5)\,1.5 + [\frac{1}{3}(2) + 0.5]3}{4.5} = 0.86'$ $\qquad \bar{Y}_1$ EL = 886.77

$\bar{Y}_2 = \dfrac{\frac{1}{2}(2.5)\,11.3 + \frac{1}{3}(2.5)\,3.8}{15.1} = 1.15'$ $\qquad \bar{Y}_2$ EL = 886.48

SPRR Outlet Rating Curve TRESTLE # 7 SUB 56

Bottom Channel Elevation = 885.13
Centroid Elevation; Y1 EL = 886.77 A1 = 4.5
Centroid Elevation; Y2 EL = 886.48 A2 = 15.1
Centroid Elevation; Y3 EL = A3 =
Centroid Elevation; Y4 EL = A4 =
Centroid Elevation; Y5 EL = A5 =

Orrifice Coefficient; C = 0.60

Stage ft	WS EL ft	H1 ft	H2 ft	H3 ft	Q1 cfs	Q2 cfs	Q3 cfs	Total Q cfs
0.0	885.13	-1.64	-1.35	885.13	0.0	0.0	0.0	0.0
2.0	887.13	0.36	0.65		13.0	58.6	0.0	71.6
2.5	887.63	0.86	1.15		20.1	78.0	0.0	98.1
3.0	888.13	1.36	1.65		25.3	93.4	0.0	118.7
3.5	888.63	1.86	2.15		29.6	106.6	0.0	136.2
4.0	889.13	2.36	2.65		33.3	118.4	0.0	151.6
4.5	889.63	2.86	3.15		36.6	129.0	0.0	165.7
5.0	890.13	3.36	3.65		39.7	138.9	0.0	178.6
5.5	890.63	3.86	4.15		42.6	148.1	0.0	190.7
6.0	891.13	4.36	4.65		45.2	156.8	0.0	202.0
6.5	891.63	4.86	5.15		47.8	165.0	0.0	212.8
7.0	892.13	5.36	5.65		50.2	172.8	0.0	223.0
7.5	892.63	5.86	6.15		52.5	180.3	0.0	232.8
8.0	893.13	6.36	6.65		54.6	187.5	0.0	242.1
8.5	893.63	6.86	7.15		56.8	194.4	0.0	251.2
9.0	894.13	7.36	7.65		58.8	201.1	0.0	259.9
9.5	894.63	7.86	8.15		60.7	207.6	0.0	268.3
10.0	895.13	8.36	8.65		62.6	213.8	0.0	276.5

GEORGE V. SABOL CONSULTING ENGINEERS, INC.

SHEET 10 OF 40

CLIENT

DATE 5/21/92

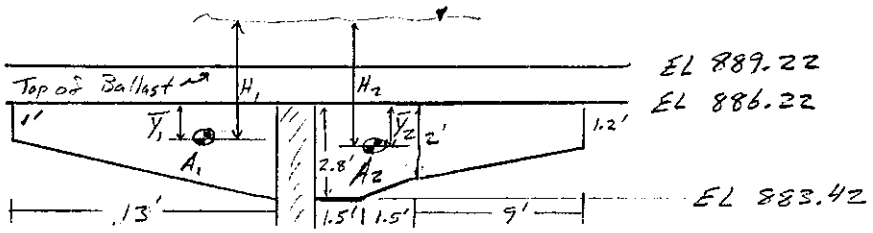
PROJECT

BY DT

SUBJECT SPRR Outlet Rating Curves

PROJECT NO. 28

TRESTLE # 8: (51+44 W of Watson Road)



$Q = \Sigma Q_i$

$Q_i = C A_i (2g H_i)^{1/2}$

$C = 0.6$

$A_1 = 13(1) + \frac{1}{2}(13)1.8 = (13 + 11.7)\,ft^2$ $\qquad A_1 = 24.7\ ft^2$

$A_2 = 1.5(2.8) + 1.5(2) + \frac{1}{2}(1.5)0.8 + 9(1.2) + \frac{1}{2}(9)0.8$

$A_2 = (4.2 + 3 + 0.6 + 10.8 + 3.6)\,ft^2$ $\qquad A_2 = 22.2\ ft^2$

$\bar{Y}_1 = \dfrac{\frac{1}{2}(1)13 + [\frac{1}{3}(1.8) + 1]11.7}{24.7} = 1.02'$ $\qquad \bar{Y}_1$ EL = 885.20

$\bar{Y}_2$ EL = 885.23

$\bar{Y}_2 = \dfrac{\frac{1}{2}(2.8)4.2 + \frac{1}{2}(2)3 + [\frac{1}{3}(0.8) + 2]0.6 + \frac{1}{2}(1.2)10.8 + [\frac{1}{3}(0.8) + 1.2]3.6}{22.2} = 0.99$

SPRR Outlet Rating Cuve TRESTLE # 8 SUB 56

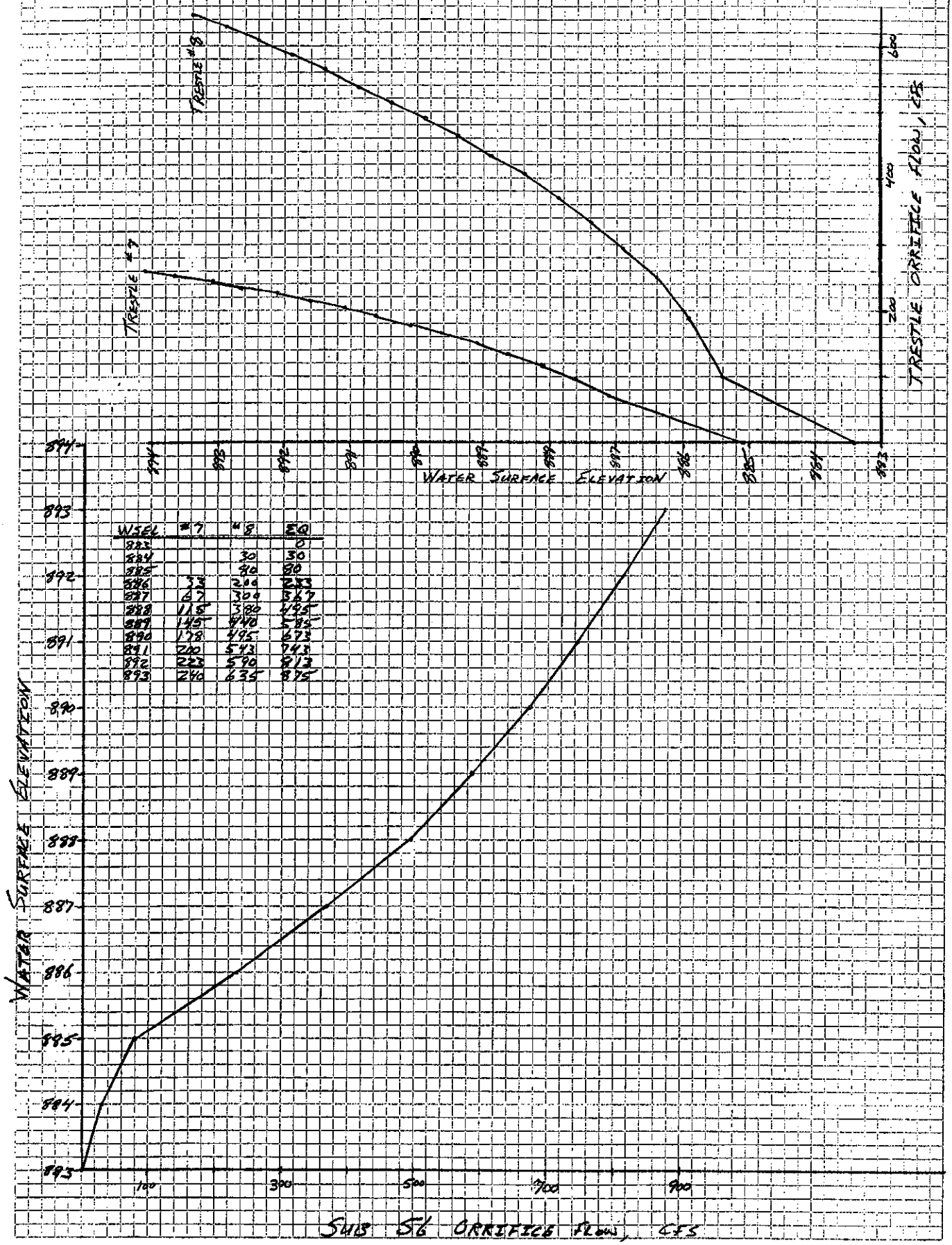
Bottom Channel Elevation = 883.42
Centroid Elevation; Y1 EL = 885.20 A1 = 24.7
Centroid Elevation; Y2 EL = 885.23 A2 = 22.2
Centroid Elevation; Y3 EL = A3 =
Centroid Elevation; Y4 EL = A4 =
Centroid Elevation; Y5 EL = A5 =

Orrifice Coefficient; C = 0.60

Stage ft	WS EL ft	H1 ft	H2 ft	H3 ft	Q1 cfs	Q2 cfs	Q3 cfs	Total Q cfs
0.0	883.42	-1.78	-1.81	883.42	0.0	0.0	0.0	0.0
2.0	885.42	0.22	0.19		55.8	46.6	0.0	102.4
2.5	885.92	0.72	0.69		100.9	88.8	0.0	189.7
3.0	886.42	1.22	1.19		131.4	116.6	0.0	248.0
3.5	886.92	1.72	1.69		156.0	139.0	0.0	294.9
4.0	887.42	2.22	2.19		177.2	158.2	0.0	335.4
4.5	887.92	2.72	2.69		196.1	175.3	0.0	371.5
5.0	888.42	3.22	3.19		213.4	190.9	0.0	404.3
5.5	888.92	3.72	3.69		229.4	205.3	0.0	434.7
6.0	889.42	4.22	4.19		244.3	218.8	0.0	463.1
6.5	889.92	4.72	4.69		258.4	231.5	0.0	489.9
7.0	890.42	5.22	5.19		271.7	243.5	0.0	515.2
7.5	890.92	5.72	5.69		284.4	255.0	0.0	539.4
8.0	891.42	6.22	6.19		296.6	265.9	0.0	562.6
8.5	891.92	6.72	6.69		308.3	276.5	0.0	584.8
9.0	892.42	7.22	7.19		319.6	286.6	0.0	606.2
9.5	892.92	7.72	7.69		330.4	296.4	0.0	626.9
10.0	893.42	8.22	8.19		341.0	305.9	0.0	646.9

SPRR OUTLET RATING CURVES

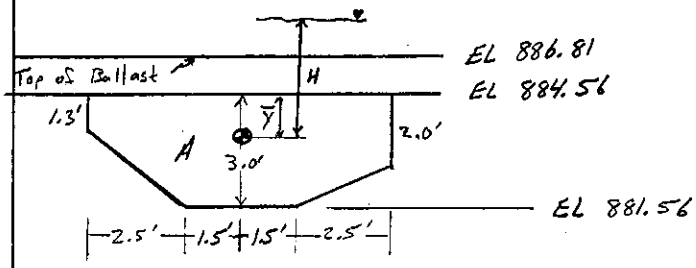
WATSON TO APACHE ROADS
(SUB 56 ORRIFICE FLOW)



WSEL	#7	#8	EQ
883			0
884		30	30
885		80	80
886	33	200	233
887	67	300	367
888	115	380	495
889	145	440	585
890	178	495	673
891	200	543	743
892	223	590	813
893	240	635	875

AG 0707
K+E 10 X 10 TO THE INCH • 7 X 10 INCHES KEUFFEL & ESSER CO. MADE IN U.S.A.

TRESTLE # 9: (16+59 W of Apache Road)



$Q = CA(2gH)^{1/2}$

$C = 0.6$

$A = 3(3) + 2.5'(1.3') + \frac{1}{2}(2.5)(1.7) + 2.5(2) + \frac{1}{2}(2.5)(1)$

$A = (9 + 3.3 + 2.1 + 5 + 1.3)\ ft^2$ $\qquad A = 20.7\ ft^2$

$\bar{y} = \dfrac{\frac{1}{2}(3)9 + \frac{1}{2}(1.3)3.3 + [\frac{1}{3}(1.7) + 1.3]2.1 + \frac{1}{2}(2)5 + [\frac{1}{3}(1) + 2]1.3}{20.7}$

$\bar{y} = 1.33'$ $\qquad \bar{y}$ EL $= 883.23$

SPRR Outlet Rating Cuve TRESTLE # 9 SUB 67

Bottom Channel Elevation = 881.56
Centroid Elevation; Y1 EL = 883.23 A1 = 20.7
Centroid Elevation; Y2 EL = A2 =
Centroid Elevation; Y3 EL = A3 =
Centroid Elevation; Y4 EL = A4 =
Centroid Elevation; Y5 EL = A5 =

Orrifice Coefficient; C = 0.60

Stage ft	WS EL ft	H1 ft	H2 ft	H3 ft	Q1 cfs	Q2 cfs	Q3 cfs	Total Q cfs
0.0	881.56	-1.67	881.56	881.56	0.0	0.0	0.0	0.0
2.0	883.56	0.33	883.56		57.3	0.0	0.0	57.3
2.5	884.06	0.83	884.06		90.8	0.0	0.0	90.8
3.0	884.56	1.33	884.56		114.9	0.0	0.0	114.9
3.5	885.06	1.83	885.06		134.8	0.0	0.0	134.8
4.0	885.56	2.33	885.56		152.1	0.0	0.0	152.1
4.5	886.06	2.83	886.06		167.7	0.0	0.0	167.7
5.0	886.56	3.33	886.56		181.9	0.0	0.0	181.9
5.5	887.06	3.83	887.06		195.1	0.0	0.0	195.1
6.0	887.56	4.33	887.56		207.4	0.0	0.0	207.4
6.5	888.06	4.83	888.06		219.0	0.0	0.0	219.0
7.0	888.56	5.33	888.56		230.1	0.0	0.0	230.1
7.5	889.06	5.83	889.06		240.7	0.0	0.0	240.7
8.0	889.56	6.33	889.56		250.8	0.0	0.0	250.8
8.5	890.06	6.83	890.06		260.5	0.0	0.0	260.5
9.0	890.56	7.33	890.56		269.8	0.0	0.0	269.8
9.5	891.06	7.83	891.06		278.9	0.0	0.0	278.9
10.0	891.56	8.33	891.56		287.7	0.0	0.0	287.7

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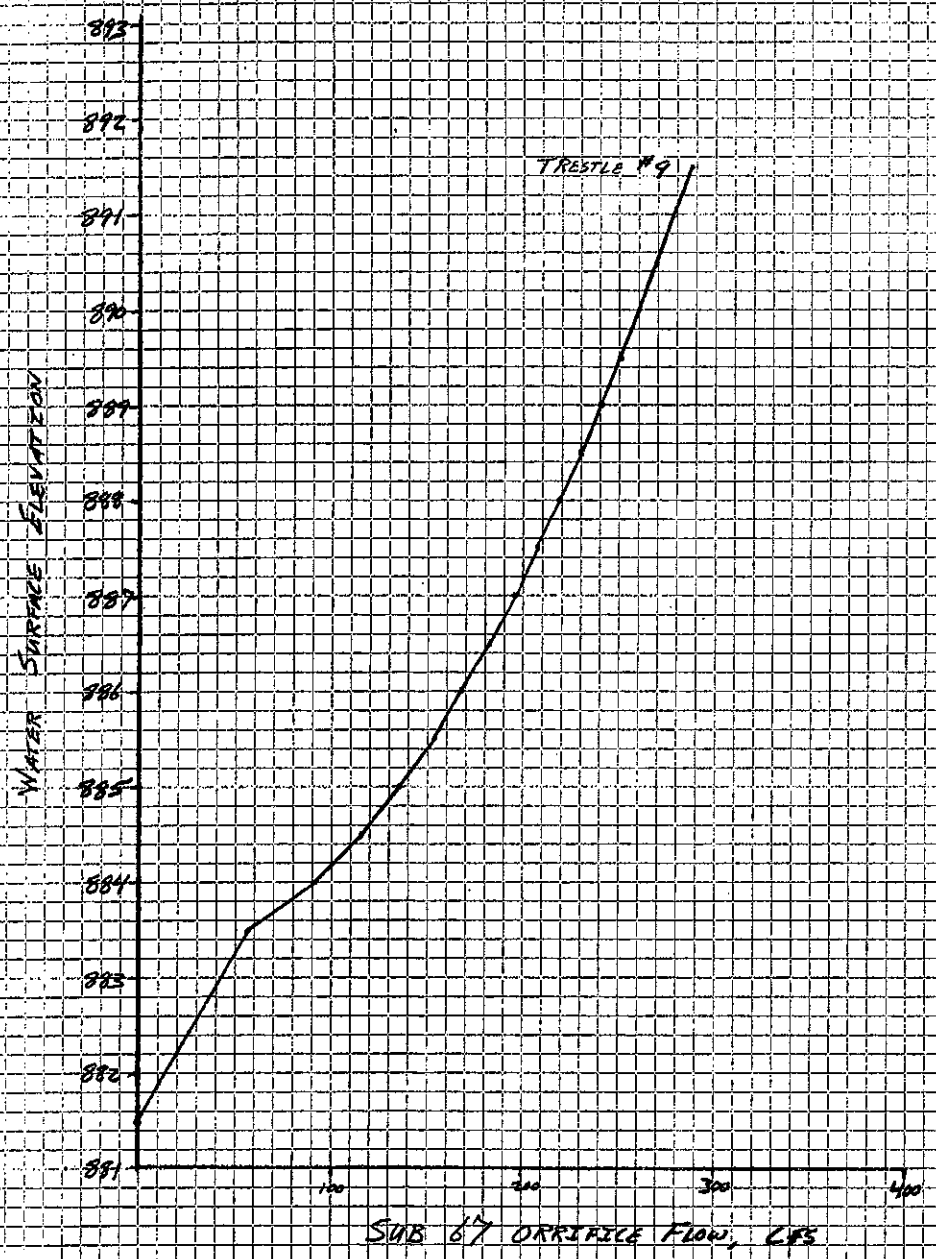
SPRR OUTLET RATING CURVE

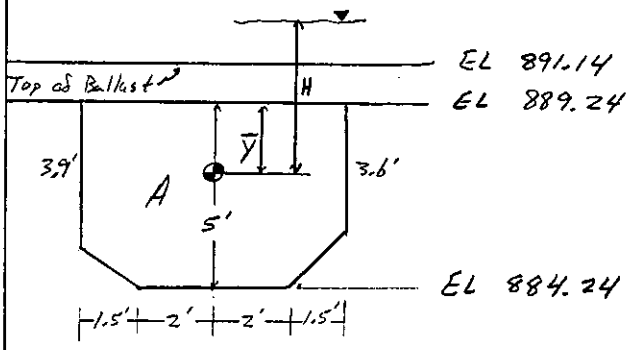
APACHE TO MILLER ROADS

(SUB 67 ORRIFICE FLOW)



46 0707
K+E 10 X 10 TO THE INCH • 7 X 10 INCHES KEUFFEL & ESSER CO. MADE IN U.S.A.

TRESTLE # 10: (25 + 40 W of Miller Road)



$Q = CA(2gH)^{1/2}$

$C = 0.6$

$A = 4(5) + 1.5(3.9) + \frac{1}{2}(1.5)(1.1) + 1.5(3.6) + \frac{1}{2}(1.5)(1.4) = (20 + 5.9 + 0.8 + 5.4 + 1.1)\ ft^2$

$A = 33.2\ ft^2$

$$\bar{y} = \frac{\frac{1}{2}(5)20 + \frac{1}{2}(3.9)5.9 + \left[\frac{1}{3}(1.1 + 3.9)\right]0.8 + \frac{1}{2}(3.6)5.4 + \left[\frac{1}{3}(1.4) + 3.6\right]1.1}{33.2}$$

$\bar{y} = 2.38'$

$\bar{y}$ EL = 886.86

SPRR Outlet Rating Cuve TRESTLE # 10 SUB 47

Bottom Channel Elevation = 884.24
Centroid Elevation; Y1 EL = 886.86 A1 = 33.2
Centroid Elevation; Y2 EL = A2 =
Centroid Elevation; Y3 EL = A3 =
Centroid Elevation; Y4 EL = A4 =
Centroid Elevation; Y5 EL = A5 =

Orrifice Coefficient; C = 0.60

Stage ft	WS EL ft	H1 ft	H2 ft	H3 ft	Q1 cfs	Q2 cfs	Q3 cfs	Total Q cfs
0.0	884.24	-2.62	884.24	884.24	0.0	0.0	0.0	0.0
3.0	887.24	0.38	887.24		98.5	0.0	0.0	98.5
3.5	887.74	0.88	887.74		150.0	0.0	0.0	150.0
4.0	888.24	1.38	888.24		187.8	0.0	0.0	187.8
4.5	888.74	1.88	888.74		219.2	0.0	0.0	219.2
5.0	889.24	2.38	889.24		246.6	0.0	0.0	246.6
5.5	889.74	2.88	889.74		271.3	0.0	0.0	271.3
6.0	890.24	3.38	890.24		293.9	0.0	0.0	293.9
6.5	890.74	3.88	890.74		314.9	0.0	0.0	314.9
7.0	891.24	4.38	891.24		334.6	0.0	0.0	334.6
7.5	891.74	4.88	891.74		353.1	0.0	0.0	353.1
8.0	892.24	5.38	892.24		370.8	0.0	0.0	370.8
8.5	892.74	5.88	892.74		387.6	0.0	0.0	387.6
9.0	893.24	6.38	893.24		403.8	0.0	0.0	403.8
9.5	893.74	6.88	893.74		419.3	0.0	0.0	419.3
10.0	894.24	7.38	894.24		434.3	0.0	0.0	434.3
10.5	894.74	7.88	894.74		448.7	0.0	0.0	448.7
11.0	895.24	8.38	895.24		462.8	0.0	0.0	462.8

NATIONAL 42-182 100 SHEETS Made in U.S.A.

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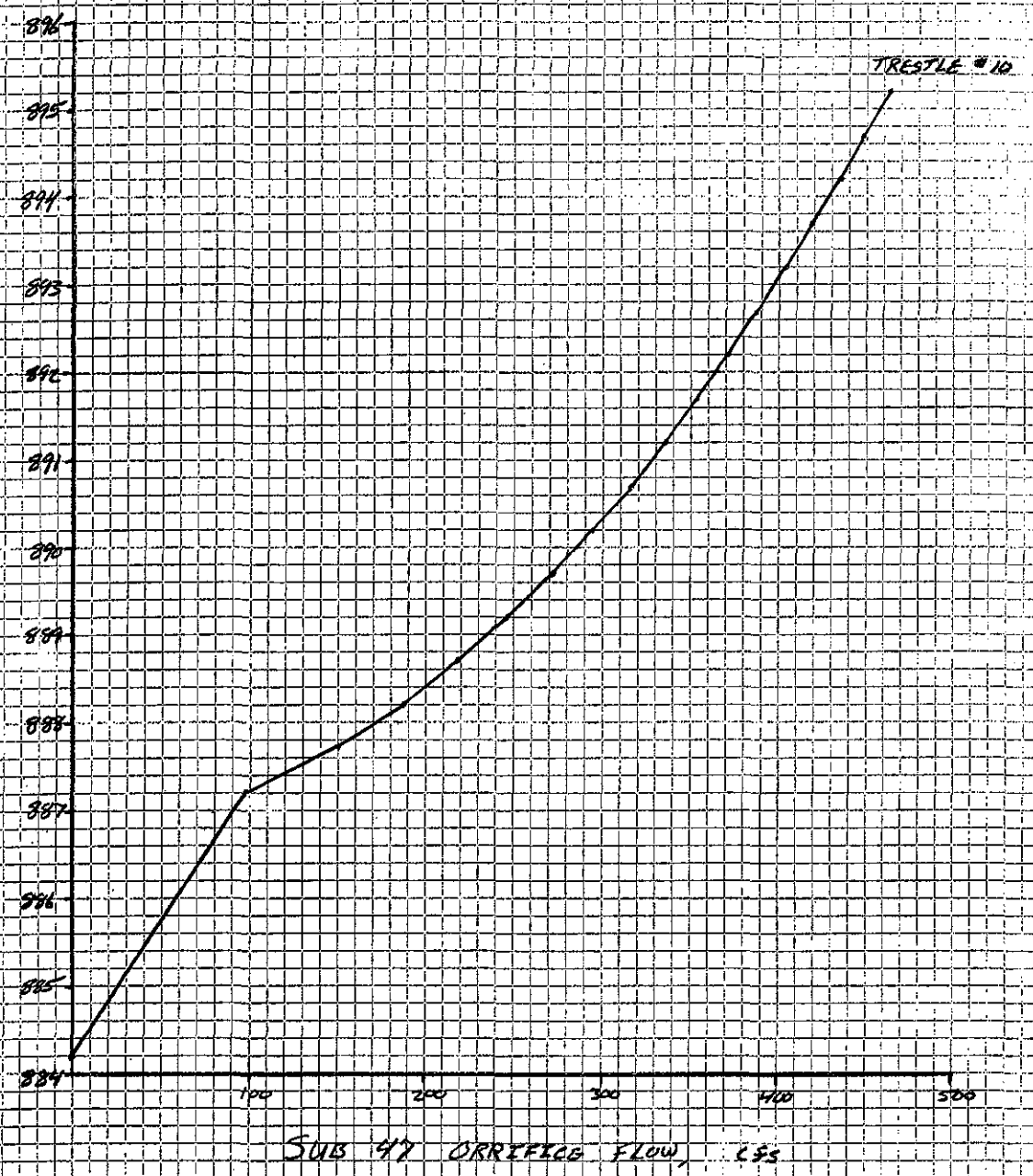
15/40

SPRR OUTLET RATING CURVES

MILLER TO ROOKS ROADS
(SUB 47 ORRIFICE FLOW)



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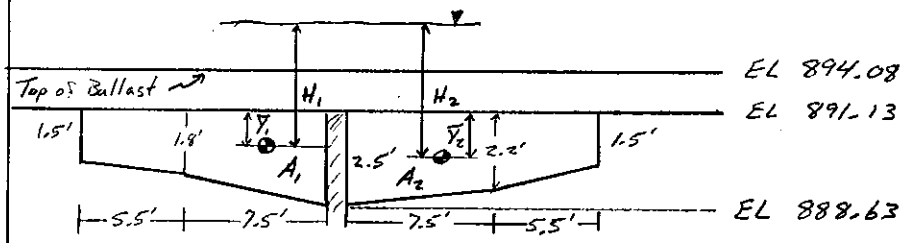
TRESTLE # 11: (13+02 W of Rooks Road)



$Q = \Sigma Q_i$

$Q_i = C A_i (2gH_i)^{1/2}$

$C = 0.6$

$A_1 = 5.5(1.5) + \frac{1}{2}(5.5)(0.3) + 7.5(1.8) + \frac{1}{2}(7.5)(0.7) = (8.3 + 0.8 + 13.5 + 2.6)\,ft^2$

$A_1 = 25.2\ ft^2$

$A_2 = 7.5(2.2) + \frac{1}{2}(7.5)(0.3) + 5.5(1.5) + \frac{1}{2}(5.5)(0.7) = (16.5 + 1.1 + 8.3 + 1.9)\,ft^2$

$A_2 = 27.8\ ft^2$

$$\bar{Y}_1 = \frac{\frac{1}{2}(1.5)8.3 + [\frac{1}{3}(0.3) + 1.5]0.8 + \frac{1}{2}(1.8)(13.5) + [\frac{1}{3}(0.7) + 1.8]2.6}{25.2} = 0.99'$$

$\bar{Y}_1$ EL = 890.14

$$\bar{Y}_2 = \frac{\frac{1}{2}(2.2)16.5 + [\frac{1}{3}(0.3) + 2.2]1.1 + \frac{1}{2}(1.5)8.3 + [\frac{1}{3}(0.7) + 1.5]1.9}{27.8}$$

$\bar{Y}_2 = 1.08'$

$\bar{Y}_2$ EL = 890.05'

SPRR Outlet Rating Cuve TRESTLE # 11 SUB 46

Bottom Channel Elevation = 888.63
Centroid Elevation; Y1 EL = 890.14 A1 = 25.2
Centroid Elevation; Y2 EL = 890.05 A2 = 27.8
Centroid Elevation; Y3 EL = A3 =
Centroid Elevation; Y4 EL = A4 =
Centroid Elevation; Y5 EL = A5 =

Orrifice Coefficient; C = 0.60

Stage ft	WS EL ft	H1 ft	H2 ft	H3 ft	Q1 cfs	Q2 cfs	Q3 cfs	Total Q cfs
0.0	888.63	-1.51	-1.42	888.63	0.0	0.0	0.0	0.0
1.5	890.13	-0.01	0.08		ERR	37.9	0.0	ERR
2.0	890.63	0.49	0.58		84.9	101.9	0.0	186.9
2.5	891.13	0.99	1.08		120.7	139.1	0.0	259.8
3.0	891.63	1.49	1.58		148.1	168.3	0.0	316.4
3.5	892.13	1.99	2.08		171.2	193.1	0.0	364.2
4.0	892.63	2.49	2.58		191.5	215.0	0.0	406.5
4.5	893.13	2.99	3.08		209.8	234.9	0.0	444.7
5.0	893.63	3.49	3.58		226.7	253.3	0.0	479.9
5.5	894.13	3.99	4.08		242.4	270.4	0.0	512.7
6.0	894.63	4.49	4.58		257.1	286.5	0.0	543.6
6.5	895.13	4.99	5.08		271.0	301.7	0.0	572.7
7.0	895.63	5.49	5.58		284.3	316.2	0.0	600.5
7.5	896.13	5.99	6.08		297.0	330.1	0.0	627.0
8.0	896.63	6.49	6.58		309.1	343.4	0.0	652.5
8.5	897.13	6.99	7.08		320.8	356.2	0.0	677.0
9.0	897.63	7.49	7.58		332.1	368.5	0.0	700.6
9.5	898.13	7.99	8.08		343.0	380.5	0.0	723.5

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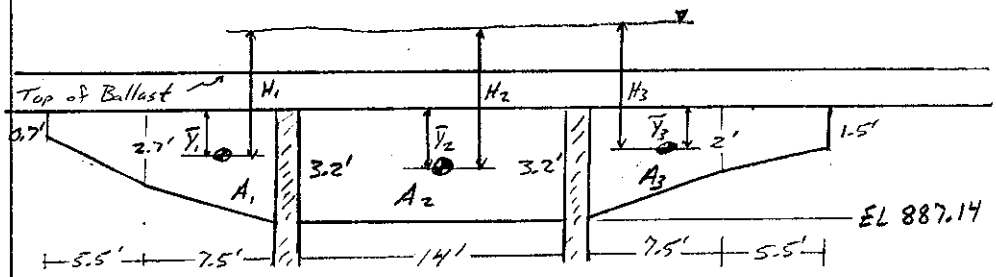
TRESTLE # 12: (40 + 12 W of Rooks Road)



$Q = \Sigma Q_i$

$Q_i = C A_i (2gH_i)^{1/2}$

$C = 0.6$

$A_1 = 5.5(0.7) + \frac{1}{2}(5.5)2 + 7.5(2.7) + \frac{1}{2}(7.5)0.5 = (3.9 + 5.5 + 20.3 + 1.9)\,ft^2$

$A_1 = 31.6\ ft^2$

$A_2 = 14(3.2)$

$A_2 = 44.8\ ft^2$

$A_3 = 7.5(2) + \frac{1}{2}(7.5)1.2 + 5.5(1.5) + \frac{1}{2}(5.5)0.5 = (14 + 4.5 + 8.3 + 1.4)\,ft^2$

$A_3 = 28.2\ ft^2$

$\bar{Y}_1 = \dfrac{\frac{1}{2}(0.7)3.9 + [\frac{1}{3}(2) + 0.7]5.5 + \frac{1}{2}(2.7)20.3 + [\frac{1}{3}(0.5) + 2.7]1.9}{31.6} = 1.32'$ $\quad \bar{Y}_1\ EL = 889.02$

$\bar{Y}_2 = \frac{1}{2}(3.2) = 1.6'$ $\quad \bar{Y}_2\ EL = 888.74$

$\bar{Y}_3 = \dfrac{\frac{1}{2}(2)14 + [\frac{1}{3}(1.2) + 2]4.5 + \frac{1}{2}(1.5)8.3 + [\frac{1}{3}(0.5) + 1.5]1.4}{28.2} = 1.18'$ $\quad \bar{Y}_3\ EL = 889.16$

SPRR Outlet Rating Cuve TRESTLE # 12 SOB 46

Bottom Channel Elevation = 887.14
Centroid Elevation; Y1 EL = 889.02 A1 = 31.6
Centroid Elevation; Y2 EL = 888.74 A2 = 44.8
Centroid Elevation; Y3 EL = 889.16 A3 = 28.2
Centroid Elevation; Y4 EL = A4 =
Centroid Elevation; Y5 EL = A5 =

Orrifice Coefficient; C = 0.60

Stage ft	WS EL ft	H1 ft	H2 ft	H3 ft	Q1 cfs	Q2 cfs	Q3 cfs	Total Q cfs
0.0	887.14	-1.88	-1.60	-2.02	0.0	0.0	0.0	0.0
2.0	889.14	0.12	0.40	-0.02	52.7	136.4	---	189.1
2.5	889.64	0.62	0.90	0.48	119.8	204.6	94.1	418.5
3.0	890.14	1.12	1.40	0.98	161.0	255.2	134.4	550.7
3.5	890.64	1.62	1.90	1.48	193.7	297.3	165.2	656.2
4.0	891.14	2.12	2.40	1.98	221.5	334.2	191.1	746.8
4.5	891.64	2.62	2.90	2.48	246.3	367.3	213.8	827.5
5.0	892.14	3.12	3.40	2.98	268.8	397.8	234.4	900.9
5.5	892.64	3.62	3.90	3.48	289.5	426.0	253.3	968.8
6.0	893.14	4.12	4.40	3.98	308.8	452.5	270.9	1032.2
6.5	893.64	4.62	4.90	4.48	327.0	477.5	287.4	1091.9
7.0	894.14	5.12	5.40	4.98	344.3	501.3	303.0	1148.6
7.5	894.64	5.62	5.90	5.48	360.7	524.0	317.9	1202.5
8.0	895.14	6.12	6.40	5.98	376.4	545.7	332.0	1254.2
8.5	895.64	6.62	6.90	6.48	391.5	566.6	345.6	1303.8
9.0	896.14	7.12	7.40	6.98	406.0	586.8	358.7	1351.5
9.5	896.64	7.62	7.90	7.48	420.0	606.3	371.4	1397.7
10.0	897.14	8.12	8.40	7.98	433.6	625.2	383.6	1442.3

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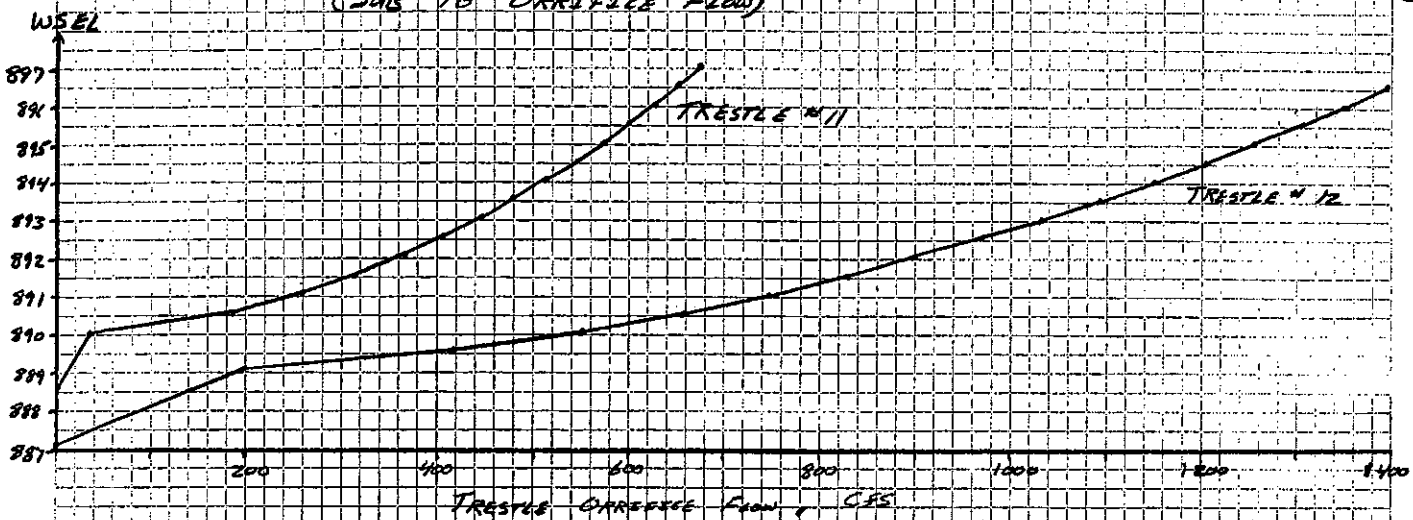
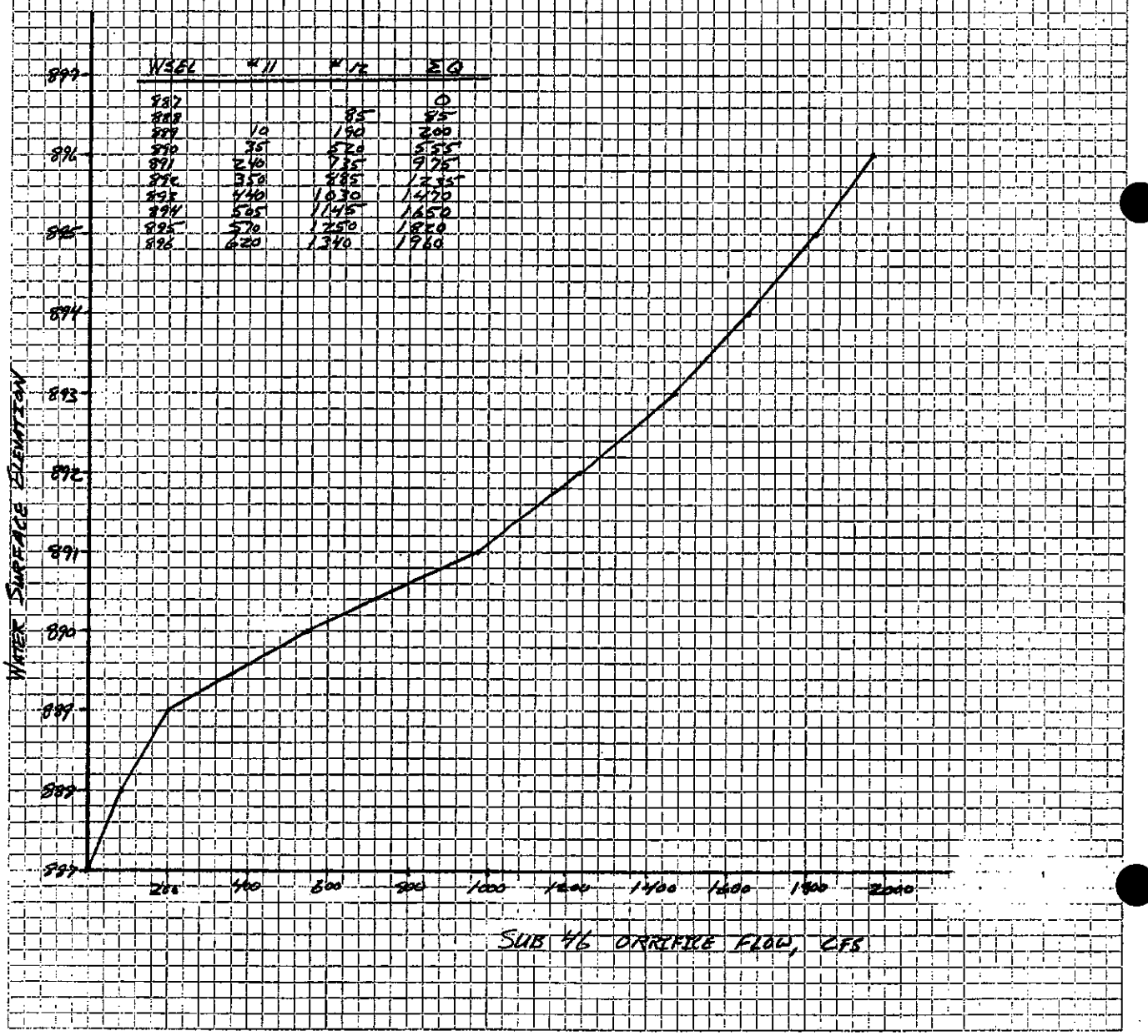
SPRR OUTLET RATING CURVES

ROOKS TO OGLESBY ROADS

(SUB #6 ORIFICE FLOW)



WSEL	#11	#12	ΣQ
887			0
888		85	85
889	10	190	200
890	35	520	555
891	240	735	975
892	350	885	1235
893	440	1030	1470
894	505	1145	1650
895	570	1250	1820
896	620	1340	1960



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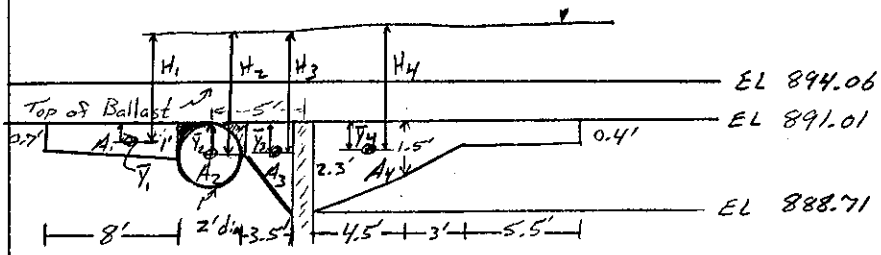
TRESTLE # 13: (24+77 W of OGLESBY ROAD)



$Q = \Sigma Q_i$

$Q_i = C A_i (2g H_i)^{1/2}$

$C = 0.6$

$A_1 = 8(0.7) + \frac{1}{2}(8)0.3 = (5.6 + 1.2)\ ft^2$ $\qquad A_1 = 6.8\ ft^2$

$A_2 = \frac{\pi}{4}(2)^2 = 3.1\ ft^2$ $\qquad A_2 = 3.1\ ft^2$

$A_3 = 3.5(1') + \frac{1}{2}(3.5)1.3 = (3.5 + 2.3)\ ft^2$ $\qquad A_3 = 5.8\ ft^2$

$A_4 = 4.5(1.5) + \frac{1}{2}(4.5)0.8 + 8.5(0.4) + \frac{1}{2}(3)1.1 = (6.8 + 1.8 + 3.4 + 1.7)\ ft^2$ $\qquad A_4 = 13.7\ ft^2$

$\bar{Y}_1 = \frac{\frac{1}{2}(0.7)(5.6) + [\frac{1}{3}(0.3) + 0.7]1.2}{6.8} = 0.14'$ $\qquad \bar{Y}_1\ EL = 890.87$

$\bar{Y}_2 = \frac{1}{2}(2) = 1'$ $\qquad \bar{Y}_2\ EL = 890.01$

$\bar{Y}_3 = \frac{\frac{1}{2}(1)3.5 + [\frac{1}{3}(1.3) + 1]2.3}{5.8} = 0.97$ $\qquad \bar{Y}_3\ EL = 890.04$

$\bar{Y}_4 = \frac{\frac{1}{2}(1.5)6.8 + [\frac{1}{3}(0.8) + 1.5]1.8 + \frac{1}{2}(0.4)3.4 + [\frac{1}{3}(1.1) + 0.4]1.7}{13.7}$ $\qquad \bar{Y}_4\ EL = 890.26$

$\bar{Y}_4 = 0.75'$

SPRR Outlet Rating Cuve TRESTLE # 13 SUB 45

Bottom Channel Elevation = 888.71
Centroid Elevation; Y1 EL = 890.87
Centroid Elevation; Y2 EL = 890.01
Centroid Elevation; Y3 EL = 890.04
Centroid Elevation; Y4 EL = 890.26
Centroid Elevation; Y5 EL =

A1 = 6.8 ft^2
A2 = 3.1 ft^2
A3 = 5.8 ft^2
A4 = 13.7 ft^2
A5 = ft^2

Orrifice Coefficient; C = 0.60

Stage ft	WS EL ft	H1 ft	H2 ft	H3 ft	H4 ft	Q1 cfs	Q2 cfs	Q3 cfs	Q4 cfs	Total Q cfs
0.0	888.71	-2.16	-1.30	-1.33	-1.55	0.0	0.0	0.0	0.0	0.0
2.0	890.71	-0.16	0.70	0.67	0.45	---	12.5	22.9	44.3	79.6
2.5	891.21	0.34	1.20	1.17	0.95	19.1	16.4	30.2	64.3	129.9
3.0	891.71	0.84	1.70	1.67	1.45	30.0	19.5	36.1	79.4	165.0
3.5	892.21	1.34	2.20	2.17	1.95	37.9	22.1	41.1	92.1	193.3
4.0	892.71	1.84	2.70	2.67	2.45	44.4	24.5	45.6	103.3	217.8
4.5	893.21	2.34	3.20	3.17	2.95	50.1	26.7	49.7	113.3	239.8
5.0	893.71	2.84	3.70	3.67	3.45	55.2	28.7	53.5	122.5	259.9
5.5	894.21	3.34	4.20	4.17	3.95	59.8	30.6	57.0	131.1	278.6
6.0	894.71	3.84	4.70	4.67	4.45	64.2	32.4	60.4	139.2	296.0
6.5	895.21	4.34	5.20	5.17	4.95	68.2	34.0	63.5	146.8	312.5
7.0	895.71	4.84	5.70	5.67	5.45	72.0	35.6	66.5	154.0	328.2
7.5	896.21	5.34	6.20	6.17	5.95	75.7	37.2	69.4	160.9	343.1
8.0	896.71	5.84	6.70	6.67	6.45	79.1	38.6	72.1	167.5	357.4
8.5	897.21	6.34	7.20	7.17	6.95	82.4	40.1	74.8	173.9	371.2
9.0	897.71	6.84	7.70	7.67	7.45	85.6	41.4	77.3	180.0	384.4
9.5	898.21	7.34	8.20	8.17	7.95	88.7	42.7	79.8	186.0	397.3
10.0	898.71	7.84	8.70	8.67	8.45	91.7	44.0	82.2	191.8	409.7

42-182 100 SHEETS
NATIONAL
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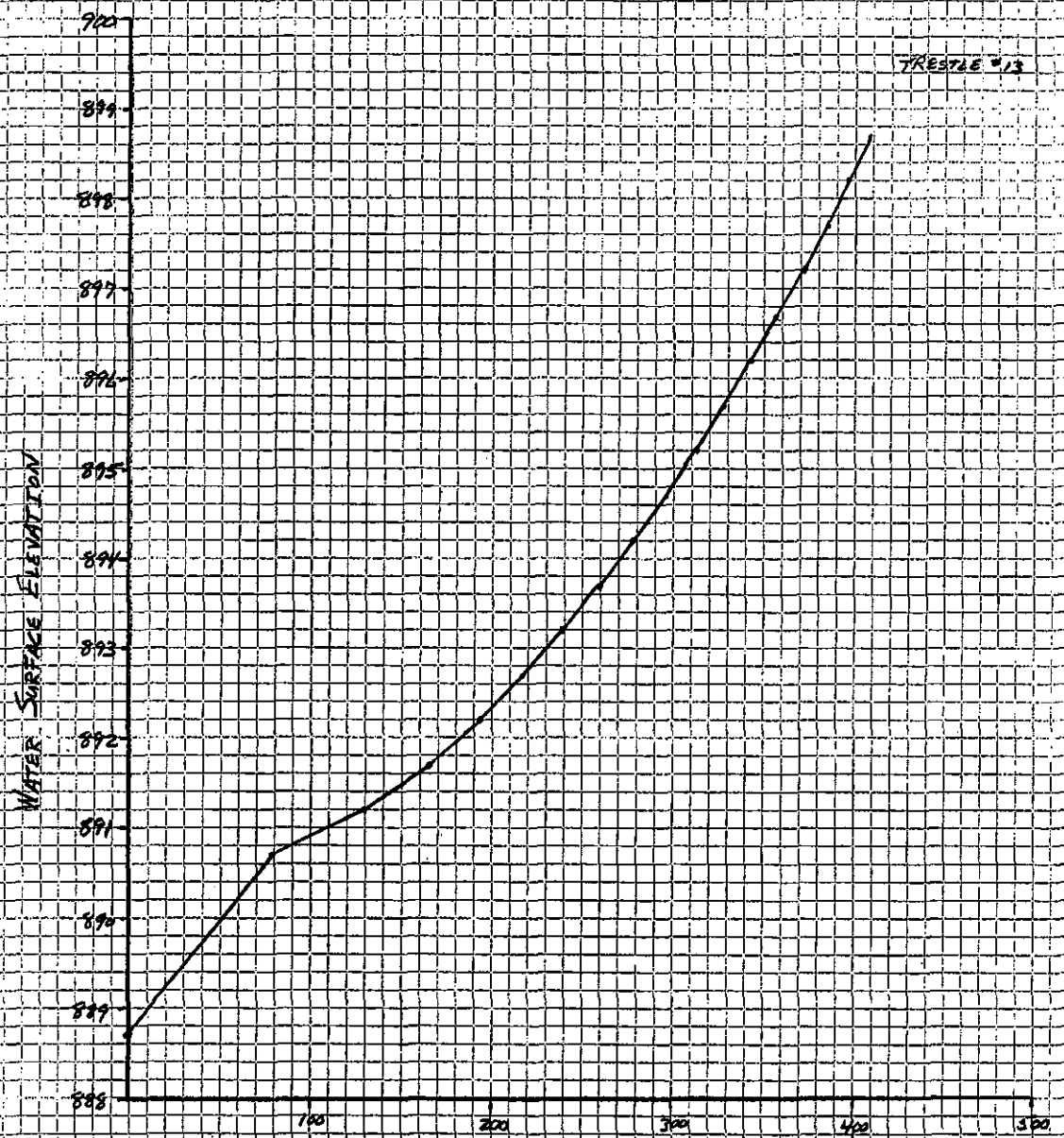
20/40

SPRR OUTLET RATING CURVES

OGLESBY TO TURNER ROADS

(SUB 45 ORRIFICE FLOW)



46 0707
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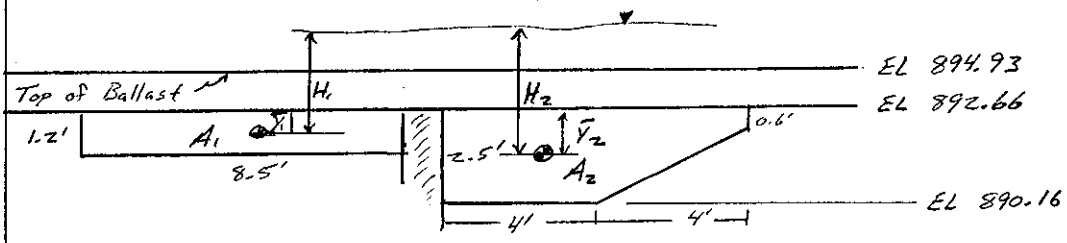
TRESTLE # 14: (16 + 15 W of TURNER ROAD)



$$Q = \Sigma Q_i$$

$$Q_i = C A_i (2g H_i)^{1/2}$$

$C = 0.6$

$$A_1 = 8.5(1.2) = 10.2\ ft^2$$

$$A_2 = 4(2.5) + 4(0.6) + \tfrac{1}{2}(4)1.9 = (10 + 2.4 + 3.8)\ ft^2$$

$$\bar{Y}_1 = \tfrac{1}{2}(1.2) = 0.6'$$

$$\bar{Y}_2 = \frac{\tfrac{1}{2}(2.5)10 + \tfrac{1}{2}(0.6)2.4 + [\tfrac{1}{3}(1.9) + 0.6]3.8}{16.2}$$

$$\bar{Y}_2 = 1.11'$$

$A_1 = 10.2\ ft^2$

$A_2 = 16.2\ ft^2$

$\bar{Y}_1$ EL = 892.06

$\bar{Y}_2$ EL = 891.55

SPRR Outlet Rating Cuve TRESTLE # 14 SUB SS

Bottom Channel Elevation = 890.16
Centroid Elevation; Y1 EL = 892.06 A1 = 10.2
Centroid Elevation; Y2 EL = 891.55 A2 = 16.2
Centroid Elevation; Y3 EL = A3 =
Centroid Elevation; Y4 EL = A4 =
Centroid Elevation; Y5 EL = A5 =

Orrifice Coefficient; C = 0.60

Stage ft	WS EL ft	H1 ft	H2 ft	H3 ft	Q1 cfs	Q2 cfs	Q3 cfs	Total Q cfs
0.0	890.16	-1.90	-1.39	890.16	0.0	0.0	0.0	0.0
1.5	891.66	-0.40	0.11		ERR	25.9	0.0	ERR
2.0	892.16	0.10	0.61		15.5	60.9	0.0	76.5
2.5	892.66	0.60	1.11		38.0	82.2	0.0	120.2
3.0	893.16	1.10	1.61		51.5	99.0	0.0	150.5
3.5	893.66	1.60	2.11		62.1	113.3	0.0	175.4
4.0	894.16	2.10	2.61		71.2	126.0	0.0	197.2
4.5	894.66	2.60	3.11		79.2	137.6	0.0	216.8
5.0	895.16	3.10	3.61		86.5	148.2	0.0	234.7
5.5	895.66	3.60	4.11		93.2	158.1	0.0	251.3
6.0	896.16	4.10	4.61		99.4	167.5	0.0	266.9
6.5	896.66	4.60	5.11		105.3	176.3	0.0	281.7
7.0	897.16	5.10	5.61		110.9	184.8	0.0	295.7
7.5	897.66	5.60	6.11		116.2	192.8	0.0	309.0
8.0	898.16	6.10	6.61		121.3	200.5	0.0	321.8
8.5	898.66	6.60	7.11		126.2	208.0	0.0	334.2
9.0	899.16	7.10	7.61		130.9	215.2	0.0	346.0
9.5	899.66	7.60	8.11		135.4	222.1	0.0	357.5

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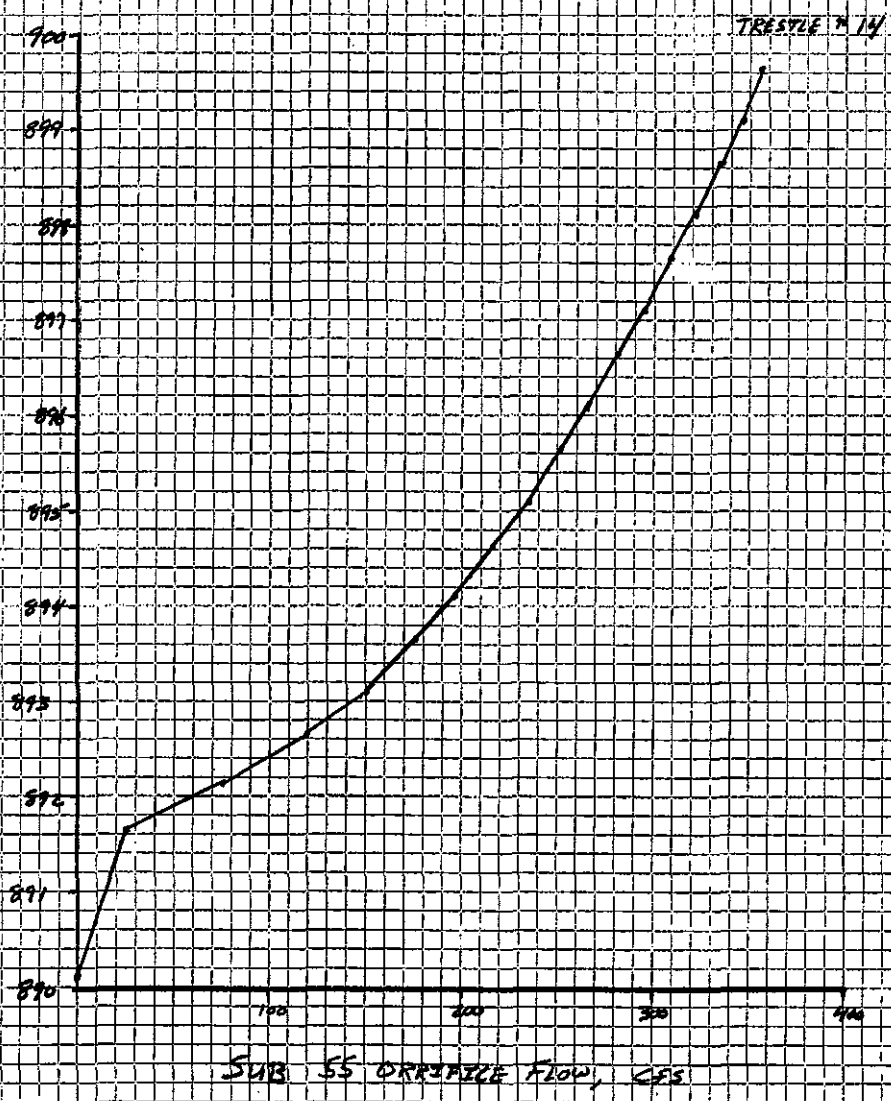
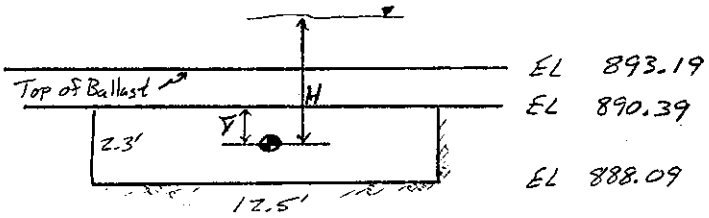
SPRR OUTLET RATING CURVES

TURNER RD TO WILSON AVE
(SUB 55 ORRIFICE FLOW)



TRESTLE # 15: (13 + 20 W of Wilson Ave.)



$Q = CA(2gH)^{1/2}$

$C = 0.6$

$A = 12.5(2.3) = 28.8\ ft^2$

$\bar{Y} = \frac{1}{2}(2.3) = 1.2'$

$A = 28.8\ ft^2$

$\bar{Y}$ EL = 889.19

SPRR Outlet Rating Cuve TRESTLE # 15 SUB 54

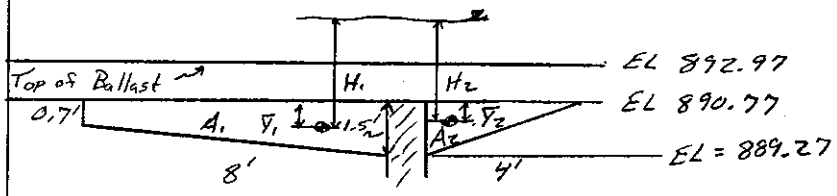
Bottom Channel Elevation = 888.09
Centroid Elevation; Y1 EL = 889.19 A1 = 28.8
Centroid Elevation; Y2 EL = A2 =
Centroid Elevation; Y3 EL = A3 =
Centroid Elevation; Y4 EL = A4 =
Centroid Elevation; Y5 EL = A5 =

Orrifice Coefficient; C = 0.60

Stage ft	WS EL ft	H1 ft	H2 ft	H3 ft	Q1 cfs	Q2 cfs	Q3 cfs	Total Q cfs
0.0	888.09	-1.10	888.09	888.09	0.0	0.0	0.0	0.0
1.5	889.59	0.40	889.59		87.7	0.0	0.0	87.7
2.0	890.09	0.90	890.09		131.6	0.0	0.0	131.6
2.5	890.59	1.40	890.59		164.1	0.0	0.0	164.1
3.0	891.09	1.90	891.09		191.1	0.0	0.0	191.1
3.5	891.59	2.40	891.59		214.8	0.0	0.0	214.8
4.0	892.09	2.90	892.09		236.1	0.0	0.0	236.1
4.5	892.59	3.40	892.59		255.7	0.0	0.0	255.7
5.0	893.09	3.90	893.09		273.9	0.0	0.0	273.9
5.5	893.59	4.40	893.59		290.9	0.0	0.0	290.9
6.0	894.09	4.90	894.09		307.0	0.0	0.0	307.0
6.5	894.59	5.40	894.59		322.2	0.0	0.0	322.2
7.0	895.09	5.90	895.09		336.8	0.0	0.0	336.8
7.5	895.59	6.40	895.59		350.8	0.0	0.0	350.8
8.0	896.09	6.90	896.09		364.3	0.0	0.0	364.3
8.5	896.59	7.40	896.59		377.2	0.0	0.0	377.2
9.0	897.09	7.90	897.09		389.8	0.0	0.0	389.8
9.5	897.59	8.40	897.59		401.9	0.0	0.0	401.9

NATIONAL 42-182 100 SHEETS Made in U.S.A.

TRESTLE # 16: (34+24 W of Wilson Ave)



$Q = \Sigma Q_i$

$Q_i = C A_i (2gH_i)^{1/2}$

$A_1 = 8(0.7) + \frac{1}{2}(8)0.8 = (5.6 + 3.2)\ ft^2$ $\qquad A_1 = 8.8\ ft^2$

$A_2 = \frac{1}{2}(4)1.5 = 3\ ft^2$ $\qquad A_2 = 3\ ft^2$

$\bar{Y}_1 = \dfrac{\frac{1}{2}(0.7)5.6 + [\frac{1}{3}(0.8) + 0.7]3.2}{8.8} = 0.57'$ $\qquad \bar{Y}_1\ EL = 890.20$

$\bar{Y}_2 = \frac{1}{3}(1.5) = 0.5'$ $\qquad \bar{Y}_2\ EL = 890.27$

SPRR Outlet Rating Cuve TRESTLE # 16 SUB 54

Bottom Channel Elevation = 889.27
Centroid Elevation; Y1 EL = 890.20 A1 = 8.8
Centroid Elevation; Y2 EL = 890.27 A2 = 3.0
Centroid Elevation; Y3 EL = A3 =
Centroid Elevation; Y4 EL = A4 =
Centroid Elevation; Y5 EL = A5 =

Orrifice Coefficient; C = 0.60

Stage ft	WS EL ft	H1 ft	H2 ft	H3 ft	Q1 cfs	Q2 cfs	Q3 cfs	Total Q cfs
0.0	889.27	-0.93	-1.00	889.27	0.0	0.0	0.0	0.0
1.0	890.27	0.07	0.00		11.2	0.0	0.0	11.2
1.5	890.77	0.57	0.50		32.0	10.2	0.0	42.2
2.0	891.27	1.07	1.00		43.8	14.4	0.0	58.3
2.5	891.77	1.57	1.50		53.1	17.7	0.0	70.8
3.0	892.27	2.07	2.00		61.0	20.4	0.0	81.4
3.5	892.77	2.57	2.50		67.9	22.8	0.0	90.8
4.0	893.27	3.07	3.00		74.2	25.0	0.0	99.3
4.5	893.77	3.57	3.50		80.1	27.0	0.0	107.1
5.0	894.27	4.07	4.00		85.5	28.9	0.0	114.4
5.5	894.77	4.57	4.50		90.6	30.6	0.0	121.2
6.0	895.27	5.07	5.00		95.4	32.3	0.0	127.7
6.5	895.77	5.57	5.50		100.0	33.9	0.0	133.9
7.0	896.27	6.07	6.00		104.4	35.4	0.0	139.8
7.5	896.77	6.57	6.50		108.6	36.8	0.0	145.4
8.0	897.27	7.07	7.00		112.7	38.2	0.0	150.9
8.5	897.77	7.57	7.50		116.6	39.6	0.0	156.1
9.0	898.27	8.07	8.00		120.4	40.9	0.0	161.2

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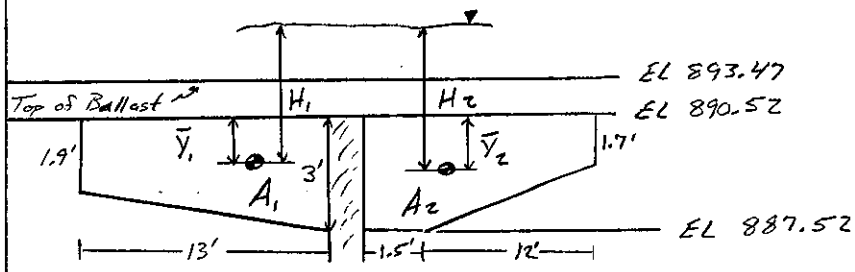
TRESTLE # 17: (47+06 W of Wilson Ave)



$Q = \Sigma Q_i$

$Q_i = C A_i (2 g H_i)^{1/2}$

$C = 0.6$

$A_1 = 13(1.9) + \frac{1}{2}(13)1.1 = (24.7 + 7.2)\,ft^2$ $\qquad A_1 = 31.9\ ft^2$

$A_2 = 1.5(3) + 12(1.7) + \frac{1}{2}(12)(1.3) = (4.5 + 20.4 + 7.8)\,ft^2$ $\qquad A_2 = 32.7\ ft^2$

$\bar{Y}_1 = \dfrac{\frac{1}{2}(1.9)\,24.7 + [\frac{1}{3}(1.1) + 1.9]\,7.2}{31.9} = 1.25'$ $\qquad \bar{Y}_1\ EL = 889.27$

$\bar{Y}_2 = \dfrac{\frac{1}{2}(3)\,4.5 + \frac{1}{2}(1.7)\,20.4 + [\frac{1}{3}(1.3) + 1.7]\,7.8}{32.7} = 1.25'$ $\qquad \bar{Y}_2\ EL = 889.27$

SPRR Outlet Rating Cuve TRESTLE # 17 SUB 54

Bottom Channel Elevation = 887.52
Centroid Elevation; Y1 EL = 889.27 A1 = 31.9
Centroid Elevation; Y2 EL = 889.27 A2 = 32.7
Centroid Elevation; Y3 EL = A3 =
Centroid Elevation; Y4 EL = A4 =
Centroid Elevation; Y5 EL = A5 =

Orrifice Coefficient; C = 0.60

Stage ft	WS EL ft	H1 ft	H2 ft	H3 ft	Q1 cfs	Q2 cfs	Q3 cfs	Total Q cfs
0.0	887.52	-1.75	-1.75	887.52	0.0	0.0	0.0	0.0
2.0	889.52	0.25	0.25		76.8	78.7	0.0	155.5
2.5	890.02	0.75	0.75		133.0	136.4	0.0	269.4
3.0	890.52	1.25	1.25		171.7	176.0	0.0	347.8
3.5	891.02	1.75	1.75		203.2	208.3	0.0	411.5
4.0	891.52	2.25	2.25		230.4	236.2	0.0	466.6
4.5	892.02	2.75	2.75		254.7	261.1	0.0	515.8
5.0	892.52	3.25	3.25		276.9	283.8	0.0	560.7
5.5	893.02	3.75	3.75		297.4	304.9	0.0	602.3
6.0	893.52	4.25	4.25		316.6	324.6	0.0	641.2
6.5	894.02	4.75	4.75		334.8	343.2	0.0	677.9
7.0	894.52	5.25	5.25		351.9	360.8	0.0	712.7
7.5	895.02	5.75	5.75		368.3	377.6	0.0	745.9
8.0	895.52	6.25	6.25		384.0	393.6	0.0	777.6
8.5	896.02	6.75	6.75		399.1	409.1	0.0	808.1
9.0	896.52	7.25	7.25		413.6	423.9	0.0	837.5
9.5	897.02	7.75	7.75		427.6	438.3	0.0	865.9
10.0	897.52	8.25	8.25		441.2	452.2	0.0	893.4

NATIONAL 42-182 100 SHEETS Made in U.S.A.

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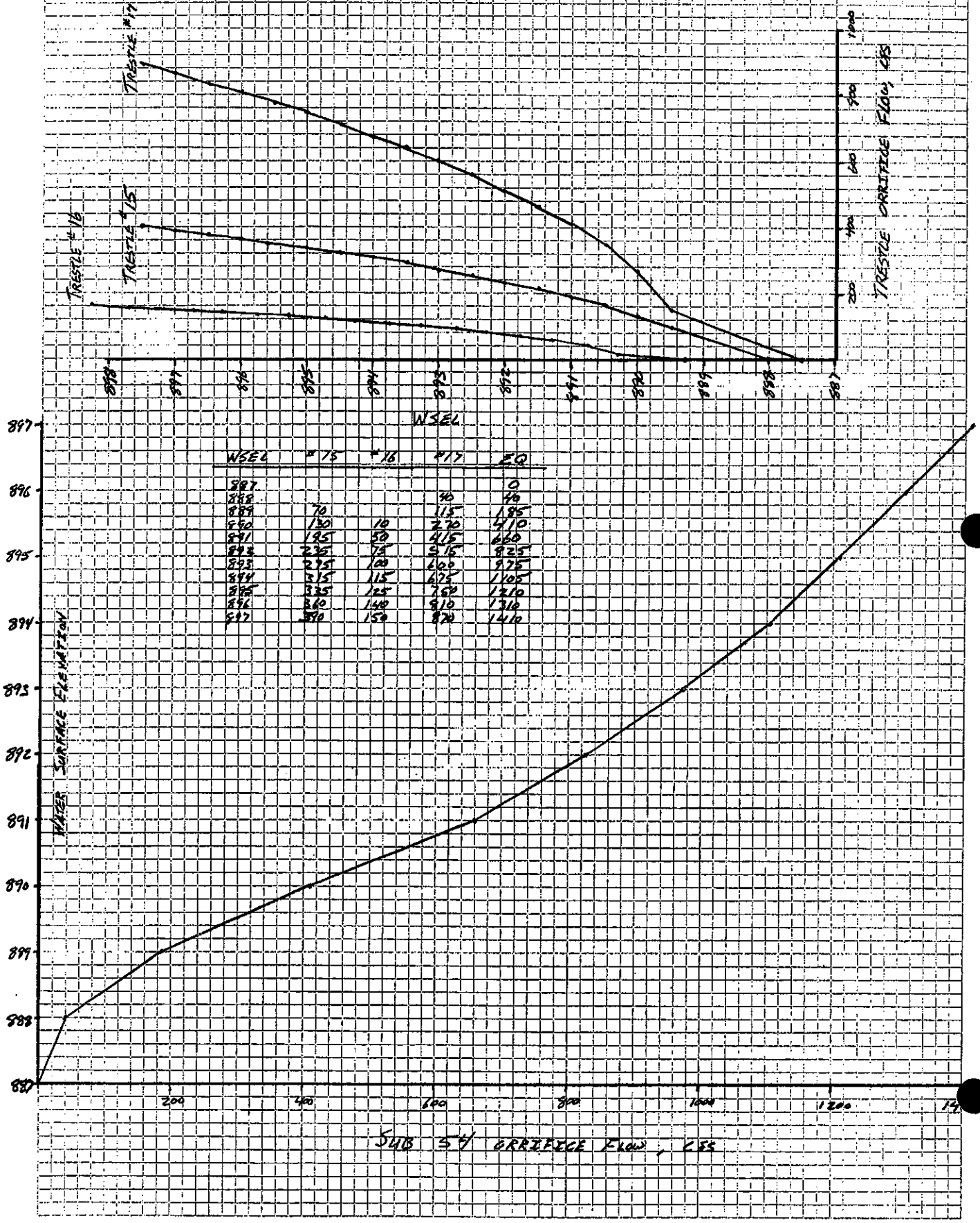
26/40

SPRR OUTLET CURVES

WILSON AVE TO PALO VERDE ROAD

(SUB 54 ORRIFICE FLOW)

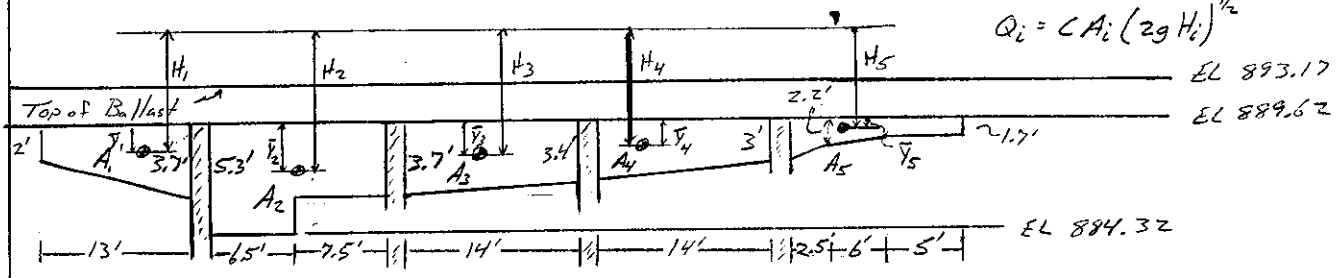


WSEL	#15	#16	#17	EQ
887				0
888			40	40
889	70		115	185
890	130	10	270	410
891	195	50	415	660
892	235	75	515	825
893	275	100	600	975
894	315	115	675	1105
895	335	125	750	1210
896	360	140	810	1310
897	390	150	870	1410

TRESTLE # 18: (12+89 w/ of Palo Verde Rd)

$$Q = \Sigma Q_i$$

$$Q_i = C A_i (2g H_i)^{1/2}$$



$A_1 = 13(2) + \frac{1}{2}(13)1.7 = (26 + 11.1)\ ft^2$ — $A_1 = 37.1\ ft^2$

$A_2 = 6.5(5.3) + 7.5(3.7) = (34.5 + 27.8)\ ft^2$ — $A_2 = 62.3\ ft^2$

$A_3 = 14(3.4) + \frac{1}{2}(14)0.3 = (47.6 + 2.1)\ ft^2$ — $A_3 = 49.7\ ft^2$

$A_4 = 14(3) + \frac{1}{2}(14)(0.4) = (42 + 2.8)\ ft^2$ — $A_4 = 42.8\ ft$

$A_5 = 2.5(2.2) + \frac{1}{2}(2.5)0.8 + 11(1.7) + \frac{1}{2}(6)(0.5) = (5.5 + 1 + 18.7 + 1.5)\ ft^2$ — $A_5 = 26.7\ ft^2$

$\bar{Y}_1 = \frac{\frac{1}{2}(2)26 + [\frac{1}{3}(1.7) + 2]11.1}{37.1} = 1.47'$ — $\bar{Y}_1$ EL = 888.15

$\bar{Y}_2 = \frac{\frac{1}{2}(5.3)34.5 + \frac{1}{2}(3.7)(27.8)}{62.3} = 2.29'$ — $\bar{Y}_2$ EL = 887.33

$\bar{Y}_3 = \frac{\frac{1}{2}(3.4)47.6 + [\frac{1}{3}(0.3) + 3.4]2.1}{49.7} = 1.78$ — $\bar{Y}_3$ EL = 887.84

$\bar{Y}_4 = \frac{\frac{1}{2}(3)42 + [\frac{1}{3}(0.4) + 3]2.8}{42.8} = 1.68'$ — $\bar{Y}_4$ EL = 887.94

$\bar{Y}_5 = \frac{\frac{1}{2}(2.2)5.5 + [\frac{1}{3}(0.8) + 2.2]1 + \frac{1}{2}(1.7)18.7 + [\frac{1}{3}(0.5) + 1.7]1.5}{26.7} = 1.02'$ — $\bar{Y}_5$ EL = 888.60

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SPRR Outlet Rating Cuve TRESTLE # 18 SUB 53

Bottom Channel Elevation = 884.32
Centroid Elevation; Y1 EL = 888.15 A1 = 37.1 ft^2
Centroid Elevation; Y2 EL = 887.33 A2 = 62.3 ft^2
Centroid Elevation; Y3 EL = 887.84 A3 = 49.7 ft^2
Centroid Elevation; Y4 EL = 887.94 A4 = 42.8 ft^2
Centroid Elevation; Y5 EL = 888.60 A5 = 26.7 ft^2

Orrifice Coefficient; C = 0.60

Stage ft	WS EL ft	H1 ft	H2 ft	H3 ft	H4 ft	H5 ft	Q1 cfs	Q2 cfs	Q3 cfs	Q4 cfs	Q5 cfs	Total Q cfs
0.0	884.32	-3.83	-3.01	-3.52	-3.62	-4.28	0.0	0.0	0.0	0.0	ERR	ERR
3.5	887.82	-0.33	0.49	-0.02	-0.12	-0.78	---	210.0	---	---	---	210.0
4.0	888.32	0.17	0.99	0.48	0.38	-0.28	73.7	298.5	165.8	127.0	---	665.0
4.5	888.82	0.67	1.49	0.98	0.88	0.22	146.2	366.2	236.9	193.3	60.3	1002.9
5.0	889.32	1.17	1.99	1.48	1.38	0.72	193.2	423.2	291.1	242.1	109.1	1258.7
5.5	889.82	1.67	2.49	1.98	1.88	1.22	230.8	473.3	336.7	282.6	142.0	1465.5
6.0	890.32	2.17	2.99	2.48	2.38	1.72	263.1	518.7	376.9	317.9	168.6	1645.2
6.5	890.82	2.67	3.49	2.98	2.88	2.22	291.9	560.4	413.1	349.7	191.5	1806.7
7.0	891.32	3.17	3.99	3.48	3.38	2.72	318.1	599.2	446.4	378.9	212.0	1954.6
7.5	891.82	3.67	4.49	3.98	3.88	3.22	342.2	635.6	477.4	405.9	230.7	2091.9
8.0	892.32	4.17	4.99	4.48	4.38	3.72	364.8	670.1	506.5	431.3	248.0	2220.6
8.5	892.82	4.67	5.49	4.98	4.88	4.22	386.0	702.9	534.0	455.2	264.1	2342.3
9.0	893.32	5.17	5.99	5.48	5.38	4.72	406.2	734.2	560.2	478.0	279.3	2457.8
9.5	893.82	5.67	6.49	5.98	5.88	5.22	425.4	764.2	585.2	499.7	293.7	2568.2
10.0	894.32	6.17	6.99	6.48	6.38	5.72	443.7	793.1	609.2	520.5	307.5	2674.0
10.5	894.82	6.67	7.49	6.98	6.88	6.22	461.4	821.0	632.2	540.5	320.6	2775.7
11.0	895.32	7.17	7.99	7.48	7.38	6.72	478.3	847.9	654.5	559.8	333.3	2873.8
11.5	895.82	7.67	8.49	7.98	7.88	7.22	494.7	874.0	676.0	578.5	345.4	2968.7
12.0	896.32	8.17	8.99	8.48	8.38	7.72	510.6	899.4	696.9	596.6	357.2	3060.7
12.5	896.82	8.67	9.49	8.98	8.88	8.22	526.0	924.1	717.1	614.1	368.6	3149.9
13.0	897.32	9.17	9.99	9.48	9.38	8.72	540.9	948.1	736.8	631.2	379.6	3236.7
13.5	897.82	9.67	10.49	9.98	9.88	9.22	555.5	971.6	756.0	647.8	390.4	3321.2

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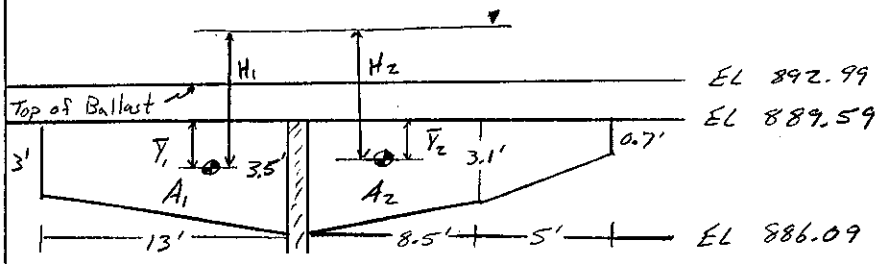
TRESTLE # 19: (22+19 W of Palo Verde Rd)



$Q = \Sigma Q_i$

$Q_i = C A_i (2g H_i)^{1/2}$

$C = 0.6$

$A_1 = 13(3) + \frac{1}{2}(13)0.5 = (39 + 3.3)\ ft^2$ $\qquad A_1 = 42.3\ ft^2$

$A_2 = 8.5(3.1) + \frac{1}{2}(8.5)0.4 + 5(0.7) + \frac{1}{2}(5)2.4 = (26.4 + 1.7 + 3.5 + 6)\ ft^2$ $\qquad A_2 = 37.6\ ft^2$

$\bar{Y}_1 = \dfrac{\frac{1}{2}(3)\,39 + [\frac{1}{3}(0.5) + 3]\,3.3}{42.3} = 1.63'$ $\qquad \bar{Y}_1\ EL = 887.96$

$\bar{Y}_2 = \dfrac{\frac{1}{2}(3.1)\,26.4 + [\frac{1}{3}(0.4) + 3.1]\,1.7 + \frac{1}{2}(0.7)\,3.5 + [\frac{1}{3}(2.4) + 0.7]\,6}{37.6} = 1.51'$ $\qquad \bar{Y}_2\ EL = 888.08$

SPRR Outlet Rating Cuve TRESTLE # 19 SUB 53

Bottom Channel Elevation = 886.09
Centroid Elevation; Y1 EL = 887.96 A1 = 42.3
Centroid Elevation; Y2 EL = 888.08 A2 = 37.6
Centroid Elevation; Y3 EL = A3 =
Centroid Elevation; Y4 EL = A4 =
Centroid Elevation; Y5 EL = A5 =

Orrifice Coefficient; C = 0.60

Stage ft	WS EL ft	H1 ft	H2 ft	H3 ft	Q1 cfs	Q2 cfs	Q3 cfs	Total Q cfs
0.0	886.09	-1.87	-1.99	886.09	0.0	0.0	0.0	0.0
2.0	888.09	0.13	0.01	888.09	73.4	18.1	0.0	91.5
2.5	888.59	0.63	0.51	888.59	161.7	129.3	0.0	291.0
3.0	889.09	1.13	1.01	889.09	216.5	181.9	0.0	398.5
3.5	889.59	1.63	1.51	889.59	260.0	222.5	0.0	482.5
4.0	890.09	2.13	2.01	890.09	297.3	256.7	0.0	553.9
4.5	890.59	2.63	2.51	890.59	330.3	286.8	0.0	617.1
5.0	891.09	3.13	3.01	891.09	360.3	314.1	0.0	674.4
5.5	891.59	3.63	3.51	891.59	388.1	339.2	0.0	727.2
6.0	892.09	4.13	4.01	892.09	413.9	362.5	0.0	776.5
6.5	892.59	4.63	4.51	892.59	438.3	384.5	0.0	822.7
7.0	893.09	5.13	5.01	893.09	461.3	405.2	0.0	866.5
7.5	893.59	5.63	5.51	893.59	483.3	425.0	0.0	908.2
8.0	894.09	6.13	6.01	894.09	504.3	443.8	0.0	948.1
8.5	894.59	6.63	6.51	894.59	524.4	461.9	0.0	986.4
9.0	895.09	7.13	7.01	895.09	543.9	479.3	0.0	1023.2
9.5	895.59	7.63	7.51	895.59	562.6	496.1	0.0	1058.7
10.0	896.09	8.13	8.01	896.09	580.7	512.4	0.0	1093.1
10.5	896.59	8.63	8.51	896.59	598.3	528.1	0.0	1126.5
11.0	897.09	9.13	9.01	897.09	615.4	543.4	0.0	1158.8
11.5	897.59	9.63	9.51	897.59	632.0	558.3	0.0	1190.4
12.0	898.09	10.13	10.01	898.09	648.2	572.8	0.0	1221.0

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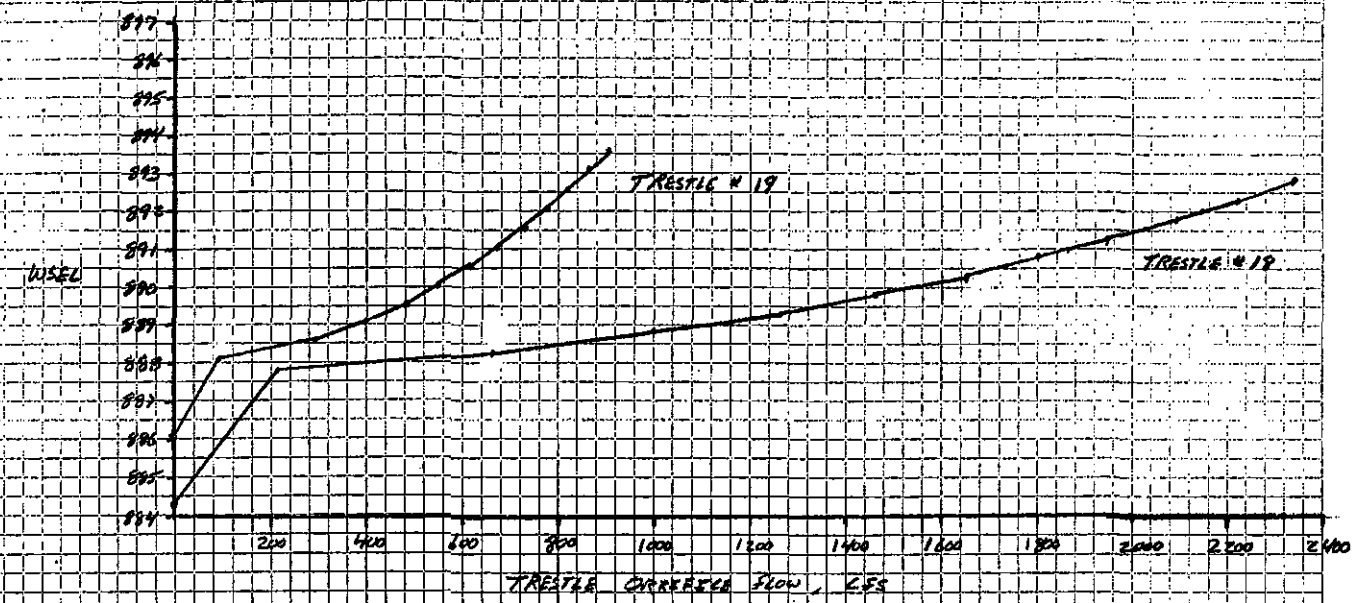
DTP for GUS
5/27/92

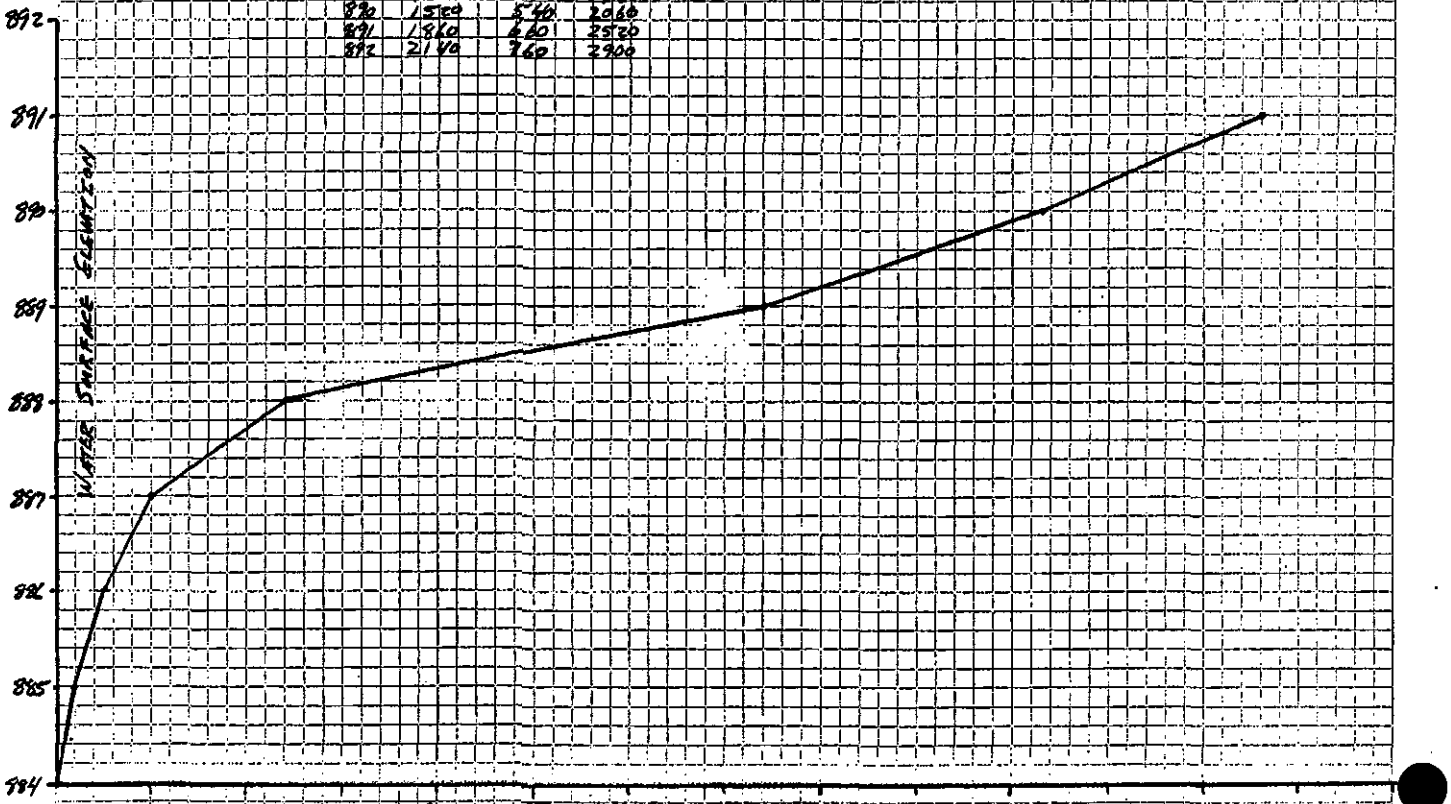
30/40

SPRR OUTLET RATING CURVES

PALO VERDE TO BURNER ROADS
(SUB 53 ORRIFICE FLOW)

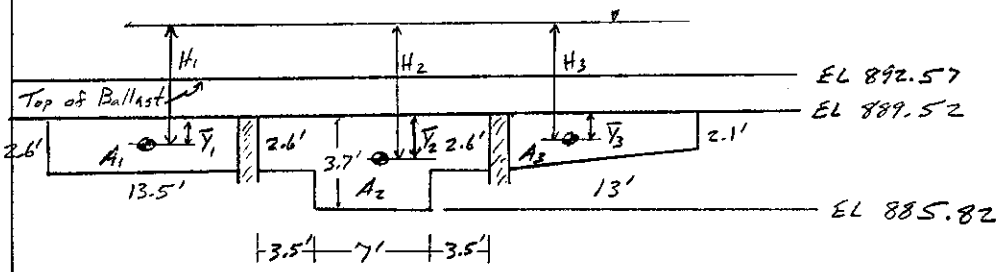


WSEL	#19	#19	ΣQ
884			0
885	40		40
886	100		100
887	160	40	200
888	400	80	480
889	1100	380	1480
890	1520	540	2060
891	1860	660	2520
892	2140	760	2900



46 0707
K&E 10 X 10 TO THE INCH • 7 X 10 INCHES KEUFFEL & ESSER CO. MADE IN U.S.A.

TRESTLE # 20: (39 + 11 W of Palo Verde Rd) Sub 52 Drainage



$Q = \Sigma Q_i$

$Q_i = C A_i (2g H_i)^{1/2}$

$C = 0.6$

$A_1 = 13.5(2.6)$ $\qquad A_1 = 35.1\ ft^2$

$A_2 = 3.5(2.6) + 7(3.7) + 3.5(2.6) = (9.1 + 25.9 + 9.1)\ ft^2$ $\qquad A_2 = 44.1\ ft^2$

$A_3 = 13(2.1) + \frac{1}{2}(13)\,0.5 = (27.3 + 3.3)\ ft^2$ $\qquad A_3 = 30.6\ ft^2$

$\bar{Y}_1 = \frac{1}{2}(2.6) = 1.3'$ $\qquad \bar{Y}_1\ EL = 888.22$

$\bar{Y}_2 = \dfrac{\frac{1}{2}(2.6)\,9.1 + \frac{1}{2}(3.7)\,25.9 + \frac{1}{2}(2.6)\,9.1}{44.1} = 1.62'$ $\qquad \bar{Y}_2\ EL = 887.90$

$\bar{Y}_3 = \dfrac{\frac{1}{2}(2.1)\,27.3 + [\frac{1}{3}(0.5) + 2.1]\,3.3}{30.6} = 1.18$ $\qquad \bar{Y}_3\ EL = 888.34$

SPRR Outlet Rating Cuve TRESTLE # 20 SUB 52

Bottom Channel Elevation = 885.82
Centroid Elevation; Y1 EL = 888.22 A1 = 35.1
Centroid Elevation; Y2 EL = 887.90 A2 = 44.1
Centroid Elevation; Y3 EL = 888.34 A3 = 30.6
Centroid Elevation; Y4 EL = A4 =
Centroid Elevation; Y5 EL = A5 =

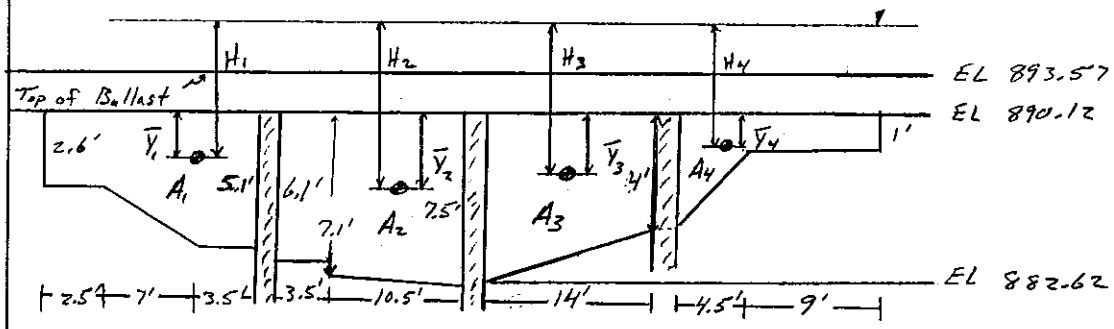
Orrifice Coefficient; C = 0.60

Stage ft	WS EL ft	H1 ft	H2 ft	H3 ft	Q1 cfs	Q2 cfs	Q3 cfs	Total Q cfs
0.0	885.82	-2.40	-2.08	-2.52	0.0	0.0	0.0	0.0
2.5	888.32	0.10	0.42	-0.02	53.4	137.6	---	191.1
3.0	888.82	0.60	0.92	0.48	130.9	203.7	102.1	436.7
3.5	889.32	1.10	1.42	0.98	177.3	253.0	145.9	576.1
4.0	889.82	1.60	1.92	1.48	213.8	294.2	179.2	687.2
4.5	890.32	2.10	2.42	1.98	244.9	330.3	207.3	782.6
5.0	890.82	2.60	2.92	2.48	272.5	362.8	232.0	867.4
5.5	891.32	3.10	3.42	2.98	297.6	392.7	254.3	944.6
6.0	891.82	3.60	3.92	3.48	320.7	420.4	274.9	1015.9
6.5	892.32	4.10	4.42	3.98	342.2	446.4	293.9	1082.6
7.0	892.82	4.60	4.92	4.48	362.5	471.0	311.9	1145.3
7.5	893.32	5.10	5.42	4.98	381.7	494.3	328.8	1204.8
8.0	893.82	5.60	5.92	5.48	399.9	516.6	344.9	1261.5
8.5	894.32	6.10	6.42	5.98	417.4	538.0	360.3	1315.7
9.0	894.82	6.60	6.92	6.48	434.2	558.6	375.1	1367.8
9.5	895.32	7.10	7.42	6.98	450.3	578.4	389.3	1418.0
10.0	895.82	7.60	7.92	7.48	465.9	597.6	403.0	1466.5
10.5	896.32	8.10	8.42	7.98	481.0	616.2	416.2	1513.4
11.0	896.82	8.60	8.92	8.48	495.6	634.2	429.1	1558.9
11.5	897.32	9.10	9.42	8.98	509.8	651.7	441.5	1603.1
12.0	897.82	9.60	9.92	9.48	523.6	668.8	453.6	1646.1
12.5	898.32	10.10	10.42	9.98	537.1	685.4	465.5	1688.0

TRESTLE # 21: (7 + 53 W of Bruner Rd)

$Q = \Sigma Q_i$

$Q_i = C A_i (2g H_i)^{1/2}$



$A_1 = 9.5(2.6) + \frac{1}{2}(7)(2.5) + 3.5(5.1) = (24.7 + 8.8 + 17.9)\ ft^2$ $\qquad A_1 = 51.4\ ft^2$

$A_2 = 3.5(6.1) + 10.5(7.1) + \frac{1}{2}(10.5)0.4 = (21.4 + 74.6 + 2.1)\ ft^2$ $\qquad A_2 = 98.1\ ft^2$

$A_3 = 14(4) + \frac{1}{2}(14)\,3.5 = (56 + 24.5)\ ft^2$ $\qquad A_3 = 80.5\ ft^2$

$A_4 = 13.5(1) + \frac{1}{2}(4.5)\,3 = (13.5 + 6.8)\ ft^2$ $\qquad A_4 = 20.3\ ft^2$

$\bar{Y}_1 = \dfrac{\frac{1}{2}(2.6)\,24.7 + [\frac{1}{3}(2.5) + 2.6]\,8.8 + \frac{1}{2}(5.1)\,17.9}{51.4} = 2.10'$ $\qquad \bar{Y}_1$ EL = 888.02

$\bar{Y}_2 = \dfrac{\frac{1}{2}(6.1)\,21.4 + \frac{1}{2}(7.1)\,74.6 + [\frac{1}{3}(0.4) + 7.1]\,2.1}{98.1} = 3.52$ $\qquad \bar{Y}_2$ EL = 886.60

$\bar{Y}_3 = \dfrac{\frac{1}{2}(4)\,56 + [\frac{1}{3}(3.5) + 4]\,24.5}{80.5} = 2.96'$ $\qquad \bar{Y}_3$ EL = 887.16

$\bar{Y}_4 = \dfrac{\frac{1}{2}(1)(13.5) + [\frac{1}{3}(3) + 1]\,6.8}{20.3} = 1.00'$ $\qquad \bar{Y}_4$ EL = 889.12

NATIONAL 42-182 100 SHEETS Made in U.S.A.

SPRR Outlet Rating Cuve TRESTLE # 21 SUB 52

Bottom Channel Elevation = 882.62
Centroid Elevation; Y1 EL = 888.02 A1 = 51.4 ft^2
Centroid Elevation; Y2 EL = 886.60 A2 = 98.1 ft^2
Centroid Elevation; Y3 EL = 887.16 A3 = 80.5 ft^2
Centroid Elevation; Y4 EL = 889.12 A4 = 20.3 ft^2
Centroid Elevation; Y5 EL = A5 = ft^2

Orrifice Coefficient; C = 0.60

Stage ft	WS EL ft	H1 ft	H2 ft	H3 ft	H4 ft	Q1 cfs	Q2 cfs	Q3 cfs	Q4 cfs	Total Q cfs
0.0	882.62	-5.40	-3.98	-4.54	-6.50	0.0	0.0	0.0	0.0	0.0
4.5	887.12	-0.90	0.52	-0.04	-2.00	---	340.6	---	---	340.6
5.0	887.62	-0.40	1.02	0.46	-1.50	---	477.0	262.9	---	739.9
5.5	888.12	0.10	1.52	0.96	-1.00	78.3	582.4	379.8	---	1040.4
6.0	888.62	0.60	2.02	1.46	-0.50	191.7	671.3	468.3	---	1331.4
6.5	889.12	1.10	2.52	1.96	0.00	259.6	749.8	542.6	0.0	1552.0
7.0	889.62	1.60	3.02	2.46	0.50	313.1	820.9	607.9	69.1	1811.0
7.5	890.12	2.10	3.52	2.96	1.00	358.6	886.2	666.9	97.7	2009.5
8.0	890.62	2.60	4.02	3.46	1.50	399.1	947.1	721.0	119.7	2186.8
8.5	891.12	3.10	4.52	3.96	2.00	435.8	1004.2	771.3	138.2	2349.5
9.0	891.62	3.60	5.02	4.46	2.50	469.6	1058.3	818.6	154.5	2501.0
9.5	892.12	4.10	5.52	4.96	3.00	501.1	1109.8	863.2	169.3	2643.4
10.0	892.62	4.60	6.02	5.46	3.50	530.8	1158.9	905.7	182.9	2778.3
10.5	893.12	5.10	6.52	5.96	4.00	558.9	1206.1	946.3	195.5	2906.8
11.0	893.62	5.60	7.02	6.46	4.50	585.7	1251.5	985.2	207.3	3029.7
11.5	894.12	6.10	7.52	6.96	5.00	611.3	1295.3	1022.6	218.6	3147.7
12.0	894.62	6.60	8.02	7.46	5.50	635.8	1337.7	1058.7	229.2	3261.4
12.5	895.12	7.10	8.52	7.96	6.00	659.5	1378.7	1093.6	239.4	3371.2
13.0	895.62	7.60	9.02	8.46	6.50	682.3	1418.6	1127.4	249.2	3477.5
13.5	896.12	8.10	9.52	8.96	7.00	704.4	1457.4	1160.2	258.6	3580.6
14.0	896.62	8.60	10.02	9.46	7.50	725.8	1495.2	1192.2	267.7	3680.8
14.5	897.12	9.10	10.52	9.96	8.00	746.6	1532.0	1223.3	276.5	3778.4

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GEORGE V. SABOL CONSULTING ENGINEERS, INC.

SHEET 34 OF 40

CLIENT Buckeye Fire

DATE 5/26/92

PROJECT FCD 90-69

BY DTP

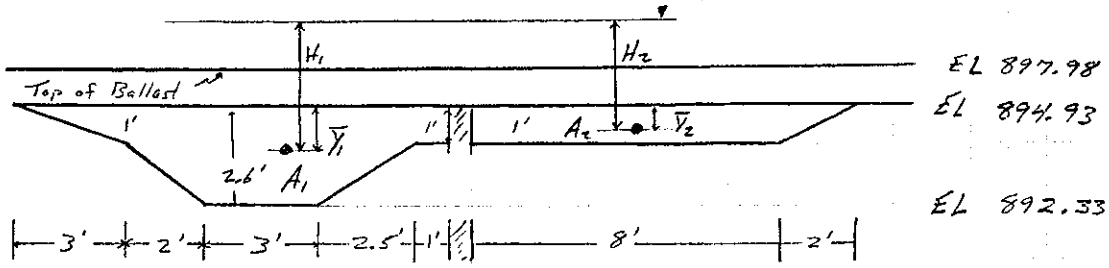
SUBJECT SPRR Outlet Rating Curves

PROJECT NO. 28

TRESTLE # 22: (40+09 W of Bruner Rd)

$Q = \Sigma Q_i$

$Q_i = C A_i (2g H_i)^{1/2}$



$A_1 = \frac{1}{2}(3)1 + 8.5(1) + \frac{1}{2}(2)1.6 + 3(1.6) + \frac{1}{2}(2.5)1.6 = (1.5 + 8.5 + 1.6 + 4.8 + 2)\ ft^2$

$A_1 = 18.4\ ft^2$

$A_2 = 8(1) + \frac{1}{2}(2)1 = (8+1)\ ft^2$

$A_2 = 9\ ft^2$

$\bar{Y}_1 = \dfrac{\frac{1}{3}(1)1.5 + \frac{1}{2}(1)8.5 + [\frac{1}{3}(1.6)+1]1.6 + [\frac{1}{2}(1.6)+1]4.8 + [\frac{1}{3}(1.6)+1]2}{18.4} = 1.03$

$\bar{Y}_1$ EL = 893.90

$\bar{Y}_2 = \dfrac{\frac{1}{2}(1)8 + \frac{1}{3}(1)1}{9} = 0.48'$

$\bar{Y}_2$ EL = 894.45

SPRR Outlet Rating Cuve TRESTLE # 22 SUB 52

Bottom Channel Elevation = 892.33
Centroid Elevation: Y1 EL = 893.90 A1 = 18.4
Centroid Elevation: Y2 EL = 894.45 A2 = 9.0
Centroid Elevation: Y3 EL = A3 =
Centroid Elevation: Y4 EL = A4 =
Centroid Elevation: Y5 EL = A5 =

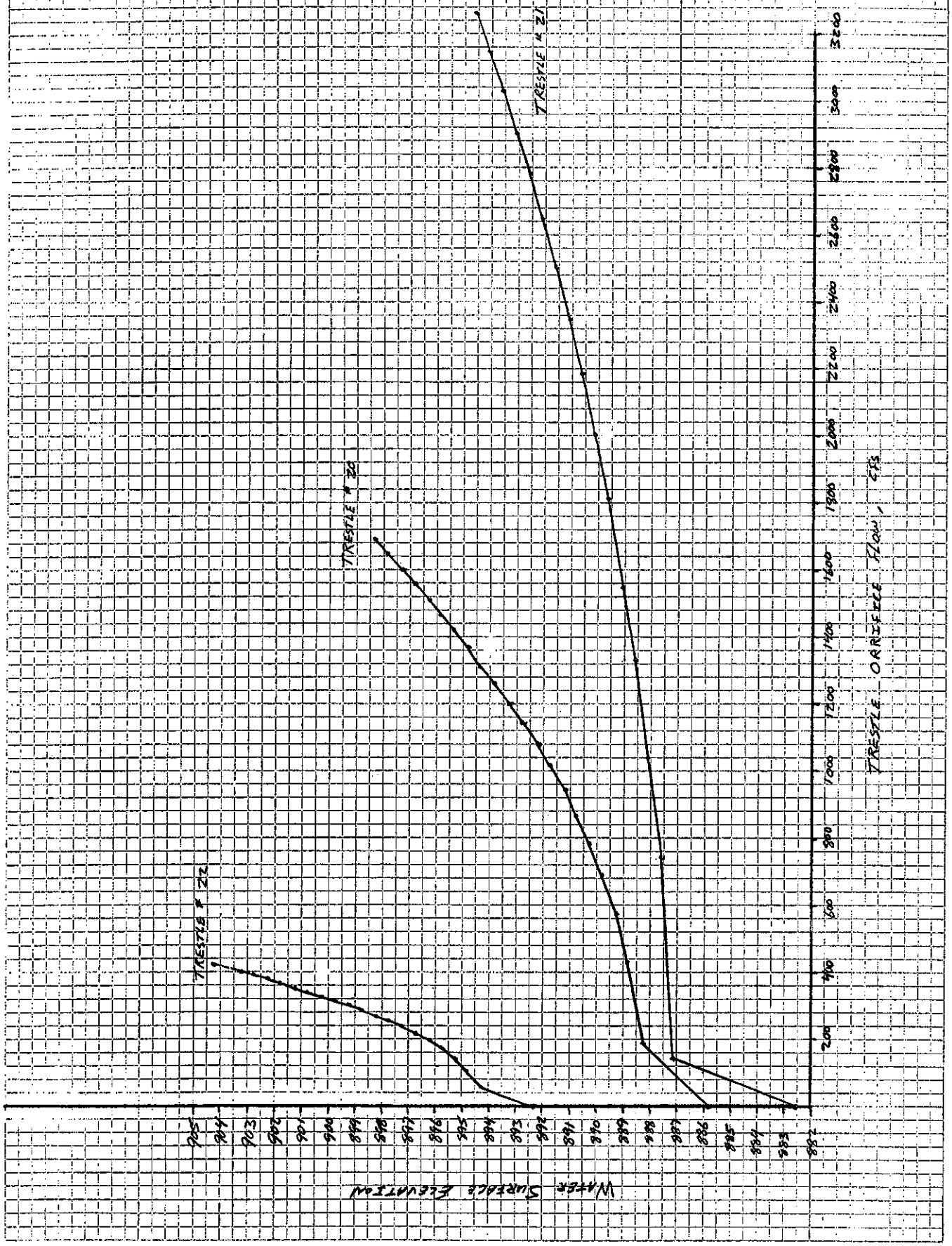
Orrifice Coefficient: C = 0.60

Stage ft	WS EL ft	H1 ft	H2 ft	H3 ft	Q1 cfs	Q2 cfs	Q3 cfs	Total Q cfs
0.0	892.33	-1.57	-2.12	892.33	0.0	0.0	0.0	0.0
2.0	894.33	0.43	-0.12	894.33	58.1	---	0.0	58.1
2.5	894.83	0.93	0.38	894.83	85.4	26.7	0.0	112.2
3.0	895.33	1.43	0.88	895.33	105.9	40.7	0.0	146.6
3.5	895.83	1.93	1.38	895.83	123.1	50.9	0.0	174.0
4.0	896.33	2.43	1.88	896.33	138.1	59.4	0.0	197.5
4.5	896.83	2.93	2.38	896.83	151.7	66.9	0.0	218.5
5.0	897.33	3.43	2.88	897.33	164.1	73.5	0.0	237.6
5.5	897.83	3.93	3.38	897.83	175.6	79.7	0.0	255.3
6.0	898.33	4.43	3.88	898.33	186.5	85.4	0.0	271.8
6.5	898.83	4.93	4.38	898.83	196.7	90.7	0.0	287.4
7.0	899.33	5.43	4.88	899.33	206.4	95.7	0.0	302.2
7.5	899.83	5.93	5.38	899.83	215.7	100.5	0.0	316.3
8.0	900.33	6.43	5.88	900.33	224.7	105.1	0.0	329.7
8.5	900.83	6.93	6.38	900.83	233.2	109.5	0.0	342.7
9.0	901.33	7.43	6.88	901.33	241.5	113.7	0.0	355.2
9.5	901.83	7.93	7.38	901.83	249.5	117.7	0.0	367.2
10.0	902.33	8.43	7.88	902.33	257.2	121.6	0.0	378.9
10.5	902.83	8.93	8.38	902.83	264.8	125.4	0.0	390.2
11.0	903.33	9.43	8.88	903.33	272.1	129.1	0.0	401.2
11.5	903.83	9.93	9.38	903.83	279.2	132.7	0.0	411.9
12.0	904.33	10.43	9.88	904.33	286.1	136.2	0.0	422.3

SPRR OUTLET RATING CURVES

BRUNER TO JOHNSON ROADS

(SUB 52 ORIFICE FLOW) - SEE TOTAL P. 36/40

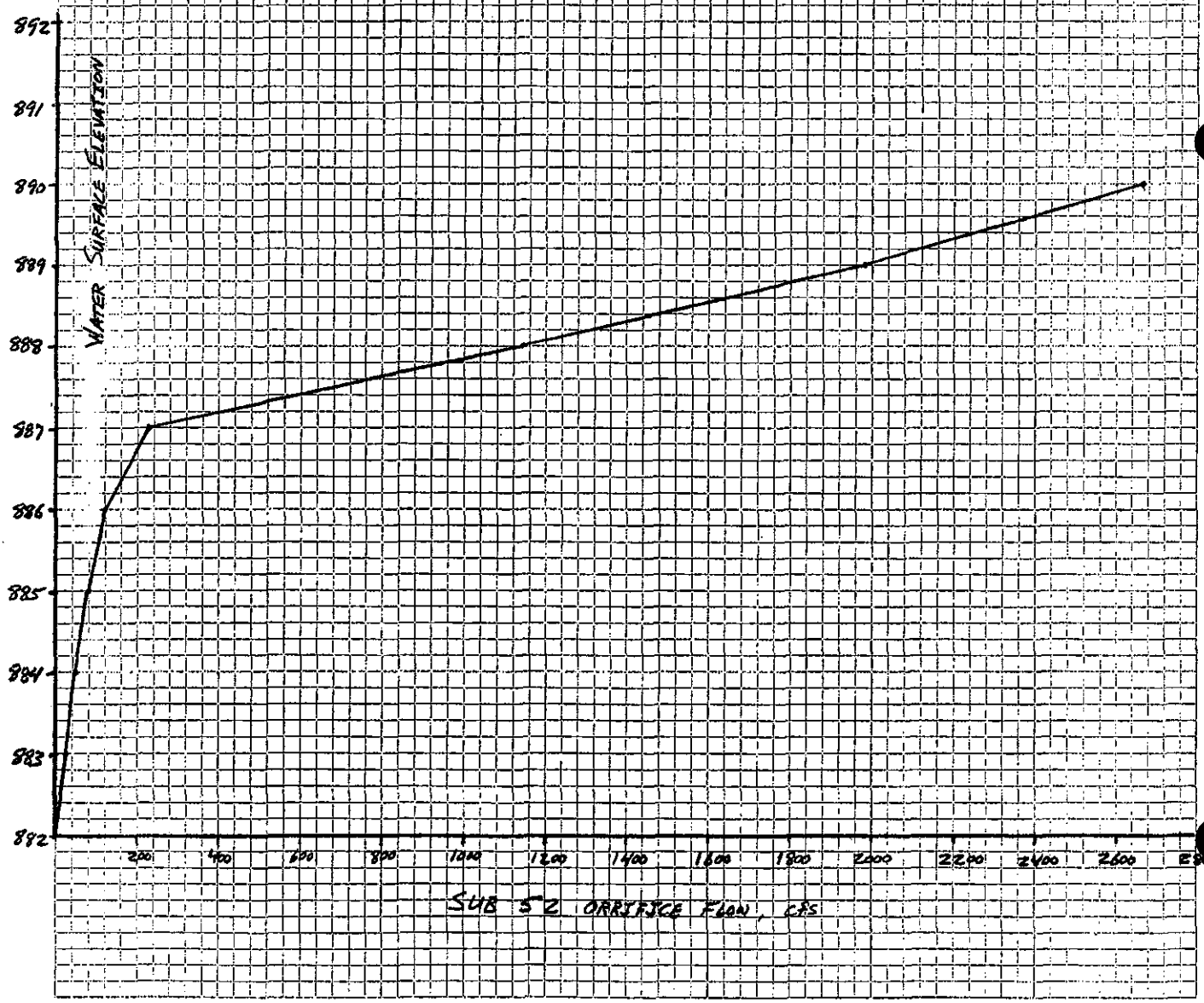


SPRR OUTLET RATING CURVES 5/27/92

BRUNER TO JOHNSON ROADS

(SUB 52 ORIFICE FLOW)

WSEL	#21	#20	#22	ΣQ
882				0
883	15			15
884	45			45
885	80			80
886	110	10		120
887	140	90		230
888	980	165		1145
889	1500	480		1980
890	1950	720		2670
891	2520	1140		3660



46 0707
K&E 10 X 10 TO THE INCH 7 X 10 INCHES KEUFFEL & ESSER CO. MADE IN U.S.A.

GEORGE V. SABOL CONSULTING ENGINEERS, INC.

SHEET 37 OF 40

CLIENT Buckeye Fcs

DATE 5/25/92

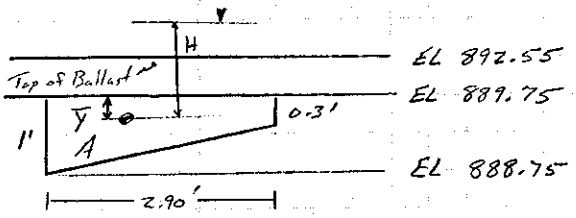
PROJECT FCD 90-59

BY DTP

SUBJECT SPRR Outlet Rating Curves

PROJECT NO. 28

TRESTLE # 23: (2 + 16 W of Johnson Rd)



$Q = C A (2gH)^{1/2}$

$A = 2.9(0.3) + \frac{1}{2}(2.9)0.7 = (0.9 + 1.0)\ ft^2$

$A = 1.9\ ft^2$

$\bar{y} = \dfrac{\frac{1}{2}(0.3)0.9 + [\frac{1}{3}(0.7) + 0.3]1}{1.9} = 0.35'$

$\bar{y} = 889.40$

SPRR Outlet Rating Cuve TRESTLE # 23 SUB 68

Bottom Channel Elevation : 888.75
Centroid Elevation; Y1 EL : 889.40 A1 : 1.9
Centroid Elevation; Y2 EL : A2 :
Centroid Elevation; Y3 EL : A3 :
Centroid Elevation; Y4 EL : A4 :
Centroid Elevation; Y5 EL : A5 :

Orrifice Coefficient: C : 0.60

Stage ft	WS EL ft	H1 ft	H2 ft	H3 ft	Q1 cfs	Q2 cfs	Q3 cfs	Total Q cfs
0.0	888.75	-0.65	888.75	888.75	0.0	0.0	0.0	0.0
1.0	889.75	0.35	889.75	889.75	5.4	---	0.0	5.4
1.5	890.25	0.85	890.25	890.25	8.4	0.0	0.0	8.4
2.0	890.75	1.35	890.75	890.75	10.6	0.0	0.0	10.6
2.5	891.25	1.85	891.25	891.25	12.4	0.0	0.0	12.4
3.0	891.75	2.35	891.75	891.75	14.0	0.0	0.0	14.0
3.5	892.25	2.85	892.25	892.25	15.4	0.0	0.0	15.4
4.0	892.75	3.35	892.75	892.75	16.7	0.0	0.0	16.7
4.5	893.25	3.85	893.25	893.25	18.0	0.0	0.0	18.0
5.0	893.75	4.35	893.75	893.75	19.1	0.0	0.0	19.1
5.5	894.25	4.85	894.25	894.25	20.1	0.0	0.0	20.1
6.0	894.75	5.35	894.75	894.75	21.2	0.0	0.0	21.2
6.5	895.25	5.85	895.25	895.25	22.1	0.0	0.0	22.1
7.0	895.75	6.35	895.75	895.75	23.1	0.0	0.0	23.1
7.5	896.25	6.85	896.25	896.25	23.9	0.0	0.0	23.9
8.0	896.75	7.35	896.75	896.75	24.8	0.0	0.0	24.8
8.5	897.25	7.85	897.25	897.25	25.6	0.0	0.0	25.6
9.0	897.75	8.35	897.75	897.75	26.4	0.0	0.0	26.4
9.5	898.25	8.85	898.25	898.25	27.2	0.0	0.0	27.2
10.0	898.75	9.35	898.75	898.75	28.0	0.0	0.0	28.0
10.5	899.25	9.85	899.25	899.25	28.7	0.0	0.0	28.7
11.0	899.75	10.35	899.75	899.75	29.4	0.0	0.0	29.4

GEORGE V. SABOL CONSULTING ENGINEERS, INC.

SHEET 38 OF 40

CLIENT Buckeye FIS

DATE 5/26/92

PROJECT FCD 90-69

BY DTP

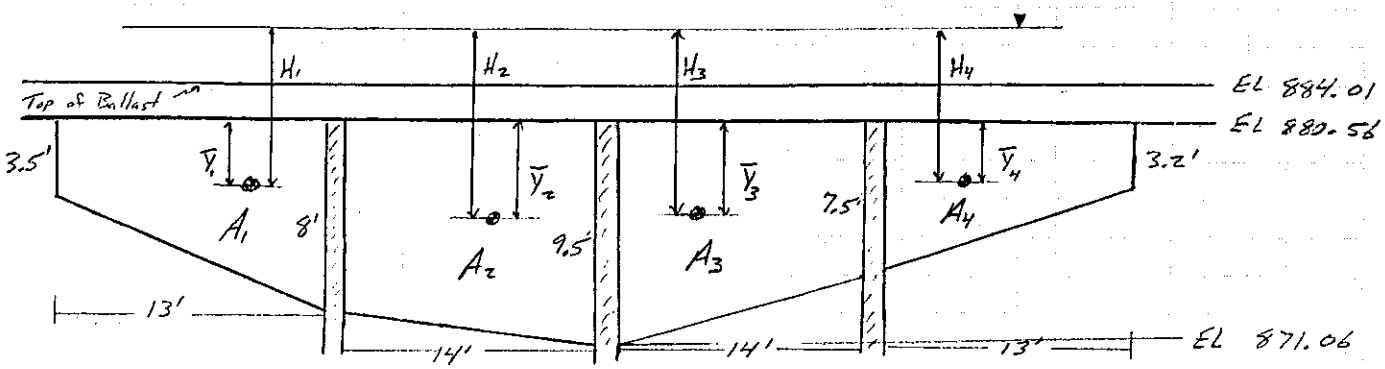
SUBJECT SPRR Outlet Rating Curve

PROJECT NO. 28

TRESTLE # 24: (19+62 W of Johnson Rd)

$Q = \Sigma Q_i$

$Q_i = C A_i (2g H_i)^{1/2}$



$A_1 = 13(3.5) + \frac{1}{2}(13)(4.5) = (45.5 + 29.3)\ ft^2$ $\qquad A_1 = 74.8\ ft^2$

$A_2 = 14(8) + \frac{1}{2}(14)(1.5) = (112 + 10.5)\ ft^2$ $\qquad A_2 = 122.5\ ft^2$

$A_3 = 14(7.5) + \frac{1}{2}(14)(2) = (105 + 14)\ ft^2$ $\qquad A_3 = 119.0\ ft^2$

$A_4 = 13(3.2) + \frac{1}{2}(13)\,4.3 = (41.6 + 28)\ ft^2$ $\qquad A_4 = 69.6\ ft^2$

$\bar{Y}_1 = \dfrac{\frac{1}{2}(3.5)\,45.5 + [\frac{1}{3}(4.5) + 3.5]\,29.3}{74.4} = 3.04'$ $\qquad \bar{Y}_1$ EL = 877.52

$\bar{Y}_2 = \dfrac{\frac{1}{2}(8)\,112 + [\frac{1}{3}(1.5) + 8]\,10.5}{122.5} = 4.39'$ $\qquad \bar{Y}_2$ EL = 876.17

$\bar{Y}_3 = \dfrac{\frac{1}{2}(7.5)\,105 + [\frac{1}{3}(2) + 7.5]\,14}{119} = 4.27'$ $\qquad \bar{Y}_3$ EL = 876.29

$\bar{Y}_4 = \dfrac{\frac{1}{2}(3.2)\,41.6 + [\frac{1}{3}(4.3) + 3.2]\,28}{69.6} = 2.82'$ $\qquad \bar{Y}_4$ EL = 877.74

39/

SPRR Outlet Rating Cuve TRESTLE # 24 SOB 68

Bottom Channel Elevation = 871.06
Centroid Elevation: Y1 EL = 877.52 A1 = 74.8 ft^2
Centroid Elevation: Y2 EL = 876.17 A2 = 122.5 ft^2
Centroid Elevation: Y3 EL = 876.29 A3 = 119.0 ft^2
Centroid Elevation: Y4 EL = 877.74 A4 = 69.6 ft^2
Centroid Elevation: Y5 EL = A5 = ft^2

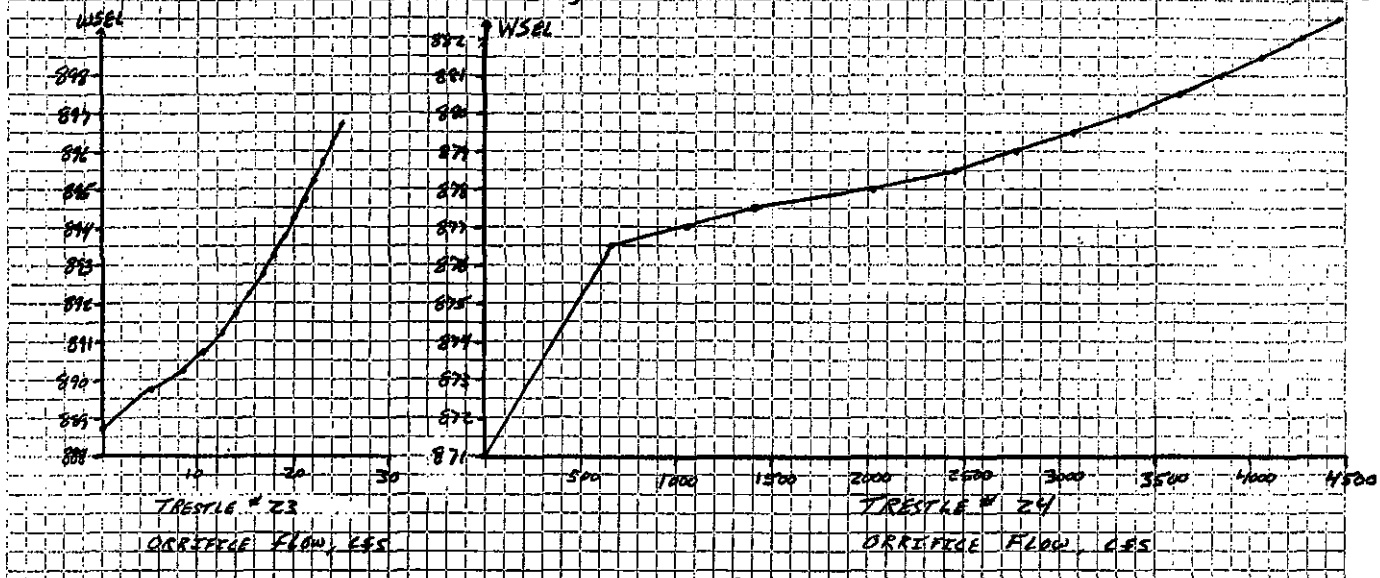
Orrifice Coefficient: C = 0.60

Stage ft	WS EL ft	H1 ft	H2 ft	H3 ft	H4 ft	Q1 cfs	Q2 cfs	Q3 cfs	Q4 cfs	Total Q cfs
0.0	871.06	-6.46	-5.11	-5.23	-6.68	0.0	0.0	0.0	0.0	0.0
5.5	876.56	-0.96	0.39	0.27	-1.18	---	368.4	297.7	---	666.1
6.0	877.06	-0.46	0.89	0.77	-0.68	---	556.4	502.8	---	1059.2
6.5	877.56	0.04	1.39	1.27	-0.18	72.0	695.4	645.7	---	1413.2
7.0	878.06	0.54	1.89	1.77	0.32	264.7	810.9	762.3	189.6	2027.4
7.5	878.56	1.04	2.39	2.27	0.82	367.3	911.9	863.3	303.5	2445.9
8.0	879.06	1.54	2.89	2.77	1.32	446.9	1002.7	953.6	385.0	2788.3
8.5	879.56	2.04	3.39	3.27	1.82	514.4	1086.0	1036.1	452.1	3088.6
9.0	880.06	2.54	3.89	3.77	2.32	574.0	1163.3	1112.5	510.4	3360.3
9.5	880.56	3.04	4.39	4.27	2.82	628.0	1235.8	1184.0	562.8	3610.6
10.0	881.06	3.54	4.89	4.77	3.32	677.6	1304.3	1251.4	610.6	3844.0
10.5	881.56	4.04	5.39	5.27	3.82	723.9	1369.4	1315.4	655.0	4063.7
11.0	882.06	4.54	5.89	5.77	4.32	767.4	1431.5	1376.4	696.5	4271.8
11.5	882.56	5.04	6.39	6.27	4.82	808.6	1491.0	1434.7	735.7	4470.1
12.0	883.06	5.54	6.89	6.77	5.32	847.7	1548.2	1490.9	773.0	4659.8
12.5	883.56	6.04	7.39	7.27	5.82	885.1	1603.4	1544.9	808.5	4842.0
13.0	884.06	6.54	7.89	7.77	6.32	921.1	1656.8	1597.2	842.5	5017.5
13.5	884.56	7.04	8.39	8.27	6.82	955.6	1708.5	1647.8	875.2	5187.0
14.0	885.06	7.54	8.89	8.77	7.32	989.0	1758.7	1696.8	906.7	5351.2
14.5	885.56	8.04	9.39	9.27	7.82	1021.2	1807.4	1744.5	937.1	5510.4
15.0	886.06	8.54	9.89	9.77	8.32	1052.5	1854.9	1791.0	966.6	5665.1
15.5	886.56	9.04	10.39	10.27	8.82	1082.9	1901.2	1836.2	995.3	5815.6
16.0	887.06	9.54	10.89	10.77	9.32	1112.4	1946.5	1880.4	1023.1	5962.4
16.5	887.56	10.04	11.39	11.27	9.82	1141.2	1990.6	1923.5	1050.2	6105.6
17.0	888.06	10.54	11.89	11.77	10.32	1169.3	2033.9	1965.8	1076.6	6245.5

SPRR OUTLET RATING CURVES

JOHNSON ROAD to END

(SUB 68 ORRIFICE FLOW)



SUB 68 ORRIFICE FLOW, CFS

NOTE: TRESTLE # 24 is much larger and lower than # 23, thus SUB 68 flow = Trestle # 24 flow

WSEL	SUB 68 Orrifice flow
871	0
872	100
873	240
874	360
875	480
876	600
877	1020
878	2000
879	2760
880	3350

46 0707
K+E 10 X 10 TO THE INCH • 7 X 10 INCHES KEUFFEL & ESSER CO. MADE IN U.S.A.

APPENDIX K

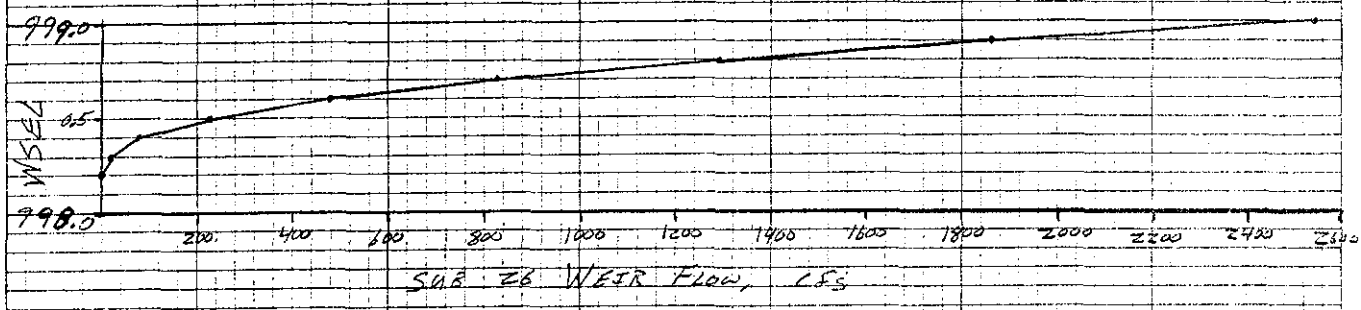
STAGE-DISCHARGE-STORAGE RELATIONS

AND HEC-1 INPUT FOR THE RC

RC STORAGE ROUTING 6/3/92

DEAN TO RAINBOW ROADS

(SUB 26 STORAGE ROUTING)



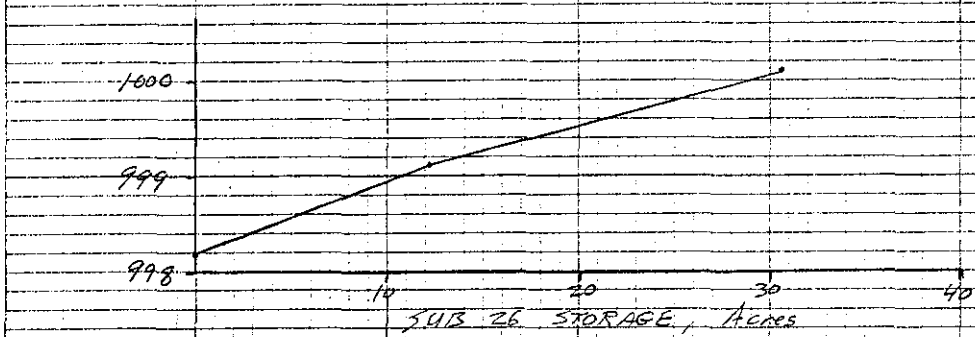
WSEL	Q
998.2	0
998.3	12
998.4	80
998.5	229
998.6	479
998.7	833
998.8	1292
998.9	1860
999.0	2543
999.1	3347

FROM UNDSW Weir program output

FROM STORAGE - AREA Data (pg 1/42 App. E)

E1 = 998.19 E2 = 999.12 E3 = 1000.12

A1 = 0 A2 = 12.2 A3 = 30.7



HEC-1 INPUT CARDS:

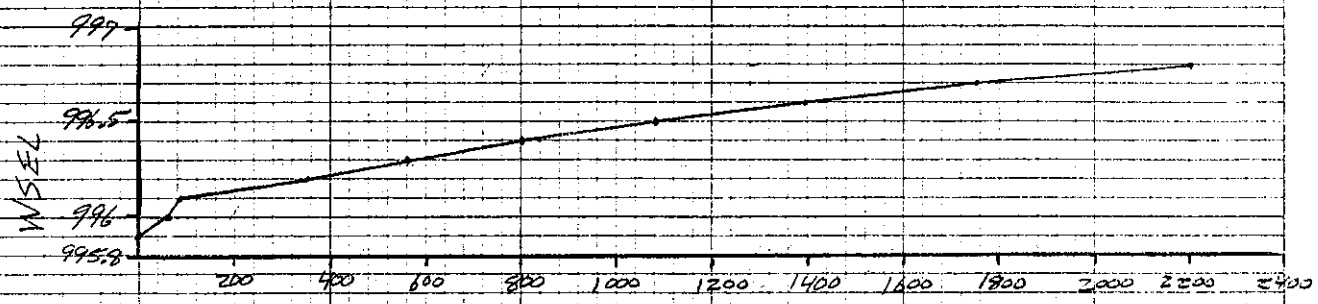
RS	1	ELEV	998.19						
SA	0	0.1	1.5	3	4.2	5.4	8	11	12
SQ	0	0	12	80	229	479	1292	2543	3347
SE	998.19	998.2	998.3	998.4	998.5	998.6	998.8	999.0	999.1

46 0707
K&E 10 X 10 TO THE INCH • 7 X 10 INCHES KEUFFEL & ESSER CO. MADE IN U.S.A.

RC STORAGE ROUTING

RAINBOW TO WATSON ROADS

(SUB 25 STORAGE ROUTING)



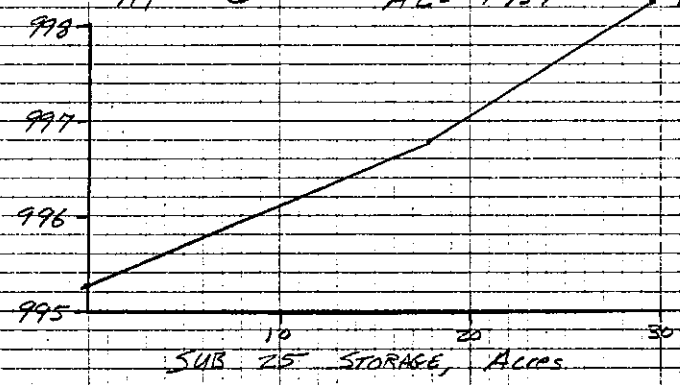
WSEL	Q
995.9	0
996.0	59
996.1	184
996.2	354
996.3	562
996.4	806
996.5	1084
996.6	1395
996.7	1754
996.8	2204
996.9	2797
997.0	3567

UNEVEN WEIR PROGRAM OUTPUT

FROM STORAGE-AREA DATA (PG 1/42 APP. E)

E1 = 995.25 E2 = 996.79 E3 = 998.26

A1 = 0 A2 = 17.9 A3 = 29.4



HEC-1 INPUT CARDS:

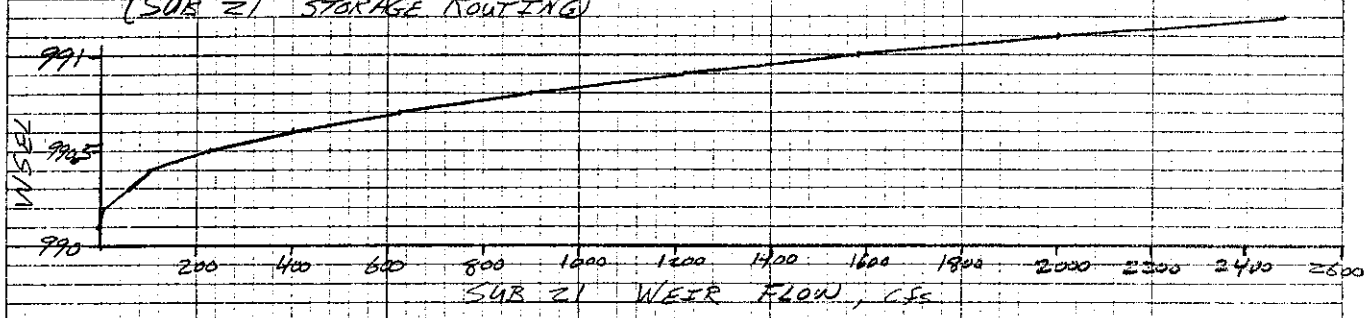
RS	1	ELEV 995.25							
SA	0	7.5	8.9	10	11.1	13.4	16	18	19.6
SQ	0	0	59	184	354	806	1395	2204	3567
SE	995.25	995.9	996.0	996.1	996.2	996.4	996.6	996.8	997.0

46 0707
K+E 10 X 10 TO THE INCH • 7 X 10 INCHES KEUFFEL & ESSER CO. MADE IN U.S.A.

DTP for GUS
6/3/92

RC STORAGE ROUTING

MILLER TO ROOKS ROADS
(SUB 21 STORAGE ROUTING)



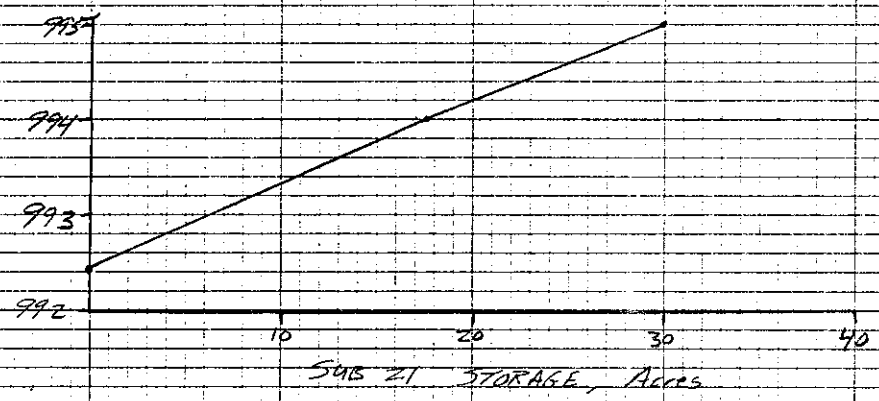
WSEL	Q
990.1	0
990.2	5
990.3	35
990.4	105
990.5	225
990.6	401
990.7	626
990.8	898
990.9	1216
991.0	1581
991.1	1999
991.2	2476
991.3	3018

} from Uneven Weir program output

FROM STAGE STORAGE DATA (PG 1/42 APP E)

E1 = 992.43 E2 = 994.01 E3 = 995.0

A1 = 0 A2 = 17.7 E3 = 39.9



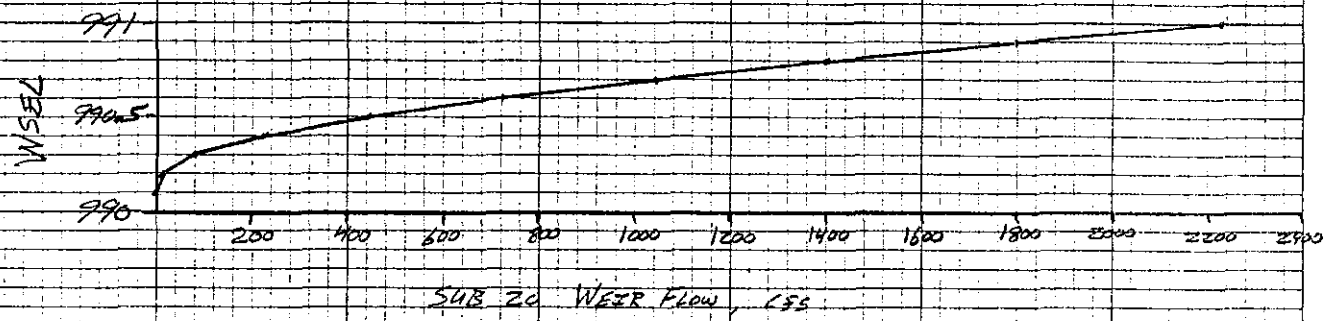
HEC-1 INPUT CARDS:

RS	1	ELEV	990.1					
SA	0	0.01	0.02	0.04	0.06	0.08	0.09	0.1
SQ	0	35	105	225	626	1216	1999	3018
SE	990.1	990.3	990.4	990.5	990.7	990.9	991.1	991.3

46 0707
K+E 10 X 10 TO THE INCH • 7 X 10 INCHES KEUFFEL & ESSER CO. MADE IN U.S.A.

RC STORAGE ROUTING

ROOKS TO OGLESBY ROADS
(SUB 20 STORAGE ROUTING)



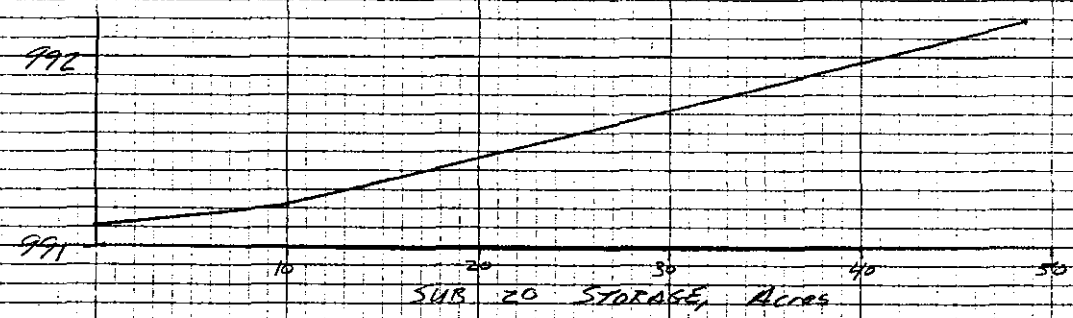
WSEL	Q
990.1	0
990.2	15
990.3	82
990.4	227
990.5	448
990.6	723
990.7	1043
990.8	1403
990.9	1799
191.0	2230

from Uneven Weir Program Output

From STAGE STORAGE DATA (pg 1/42 APP E)

E1 = 991.22 E2 = 991.44 E3 = 992.39

A1 = 0 A2 = 10.0 A3 = 48.5



HEC-1 INPUT CARDS:

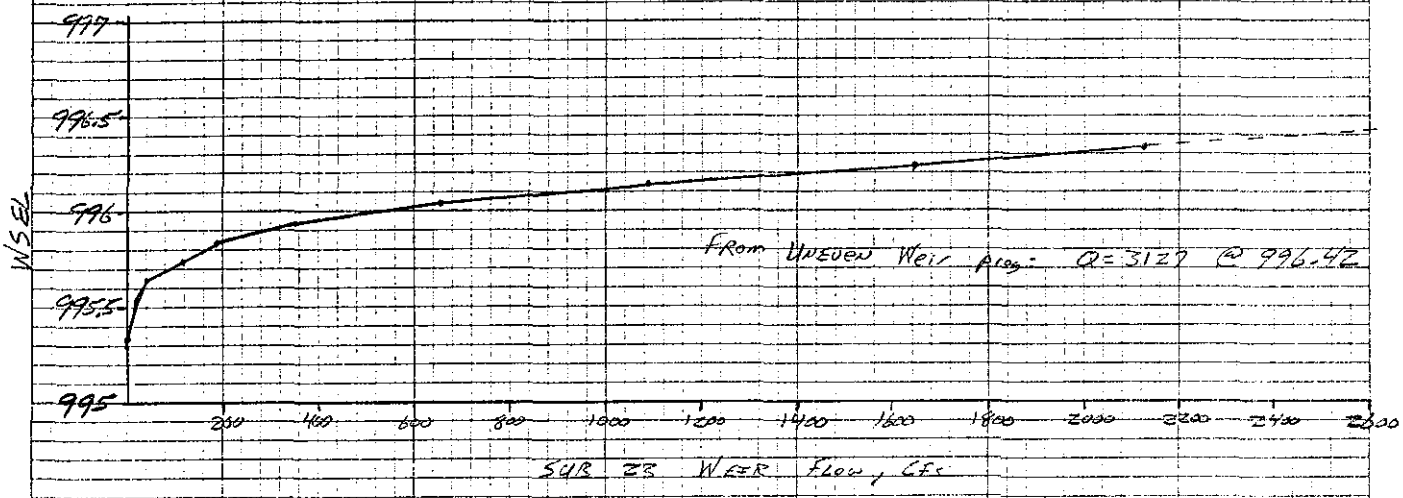
RS	1	ELEV	990.1							
SA	0	0.01	0.02	0.03	0.04	0.05	0.06	0.07	0.08	0.1
SQ	0	15	82	227	448	723	1043	1403	1799	2230
SE	990.1	990.2	990.3	990.4	990.5	990.6	990.7	990.8	990.9	991

46 0707
K+E 10 X 10 TO THE INCH • 7 X 10 INCHES KEUFFEL & ESSER CO. MADE IN U.S.A.

RC STORAGE ROUTING 6/3/92

WATSON TO CEMETERY ROADS

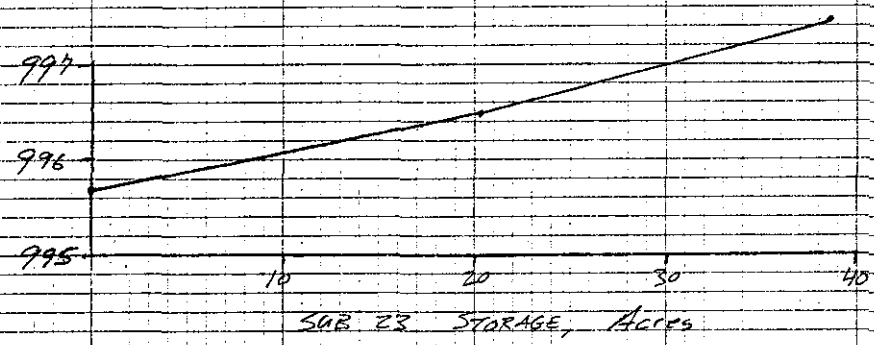
(SUB 23 STORAGE ROUTING)



FROM STORAGE - STAGE DATA (6/1/92 AREE)

E1 = 995.68 E2 = 996.49 E3 = 997.48

A1 = 0 A2 = 19.2 A3 = 38.6



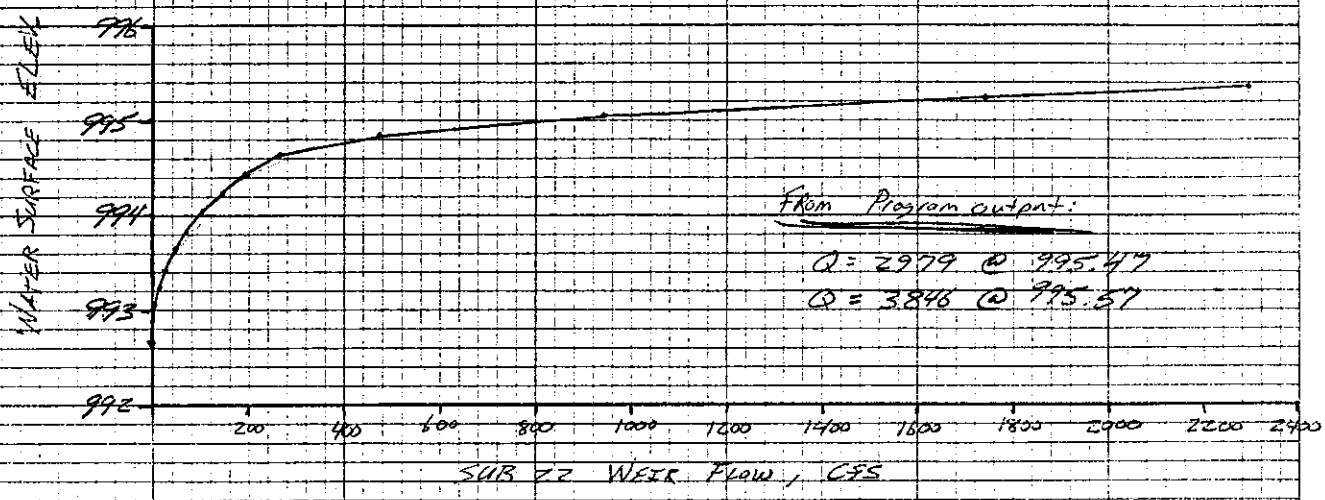
HEC-1 INPUT CARDS:

RS	1	ELEV	995.32						
SA	0	0.1	3	5.5	8	10.5	13	15.6	19
SQ	0	70	165	300	530	925	1440	1960	3127
SE	995.32	995.68	995.8	995.9	996.0	996.1	996.2	996.3	996.42

46 0707
K+E 10 X 10 TO THE INCH • 7 X 10 INCHES KEUFFEL & ESSER CO. MADE IN U.S.A.

RC STORAGE ROUTING

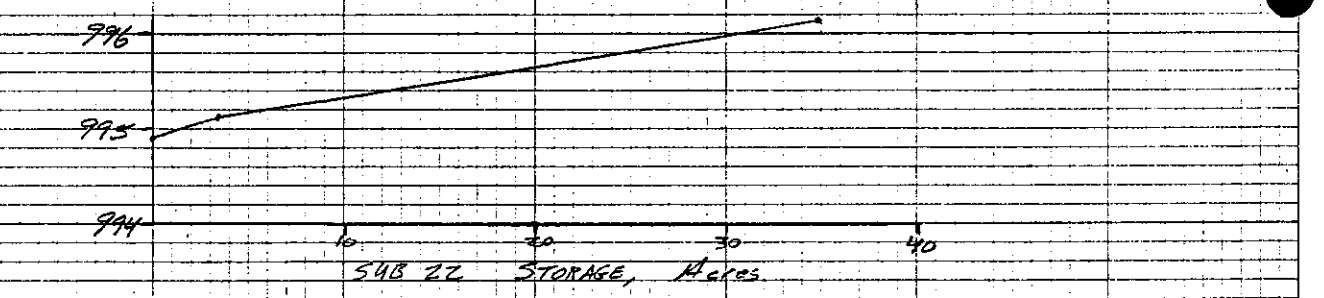
CEMETERY TO MILLER ROADS
(SUB 22 STORAGE ROUTING)



FROM STAGE-STORAGE DATA (PS 1/42 APP. E):

E1 = 994.91 E2 = 995.14 E3 = 996.13

A1 = 0 A2 = 3.4 A3 = 34.9

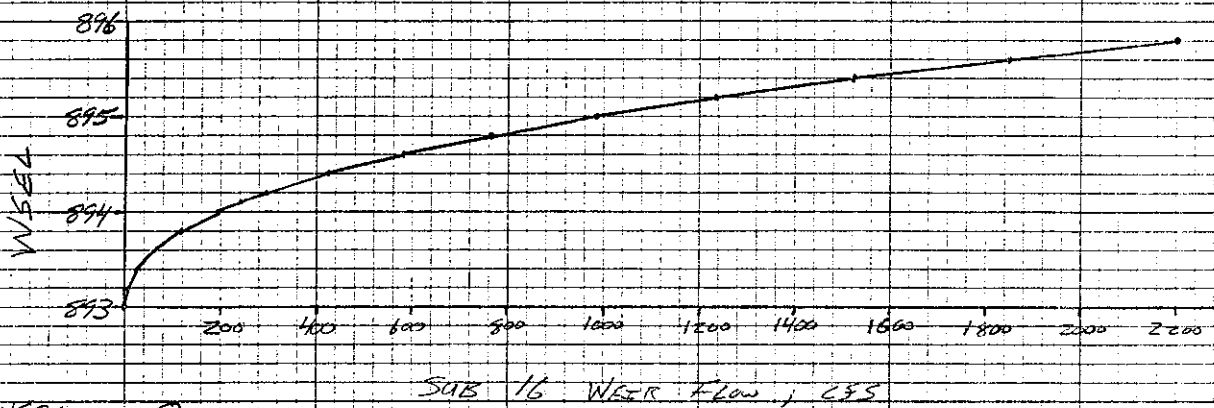


HEC-1 INPUT CARDS:

RS	1	ELEV	993					
SA	0	0.03	0.05	0.08	0.1	5.6	14.4	17
SQ	0	40	180	320	630	1580	2979	3846
SE	993	993.6	994.4	994.7	994.91	995.2	995.47	995.57

46 0707
K+E 10 X 10 TO THE INCH • 7 X 10 INCHES KEUFFEL & ESSER CO. MADE IN U.S.A.

PALO VERDE TO BRUNER ROADS
(SUB 16 STORAGE ROUTING)



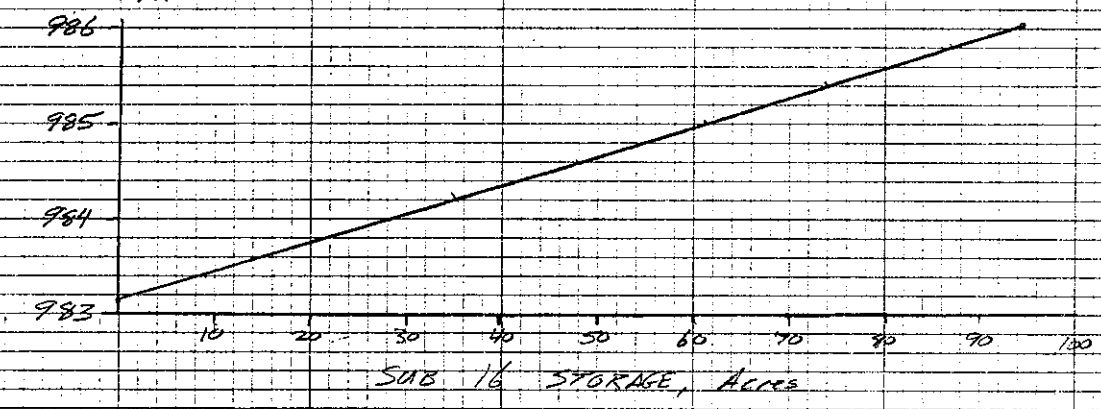
WSEL	Q
983.0	0
983.2	8
983.4	27
983.6	63
983.8	119
984	196
984.2	297
984.4	425
984.6	581
984.8	769
985	986
985.2	1238
985.4	1524
985.6	1848
985.8	2204

FROM NUEVON WEIR OUTPUT

FROM STAGE-STORAGE DATA (PG 1/42 APP. E)

E1 = 983.14 E2 = 986.04 E3 = 987.03

A1 = 0 A2 = 94.2 A3 = 118.2



HEC-1 INPUT CARDS:

RS	1	ELEV	983						
SA	0	0.1	8.4	21.5	35	48	61	74	87
SQ	0	3	27	119	297	581	986	1524	2204
SE	983	983.14	983.4	983.8	984.2	984.6	985	985.4	985.8

46 0707
K+E 10 X 10 TO THE INCH • 7 X 10 INCHES KEUFFEL & ESSER CO. MADE IN U.S.A.

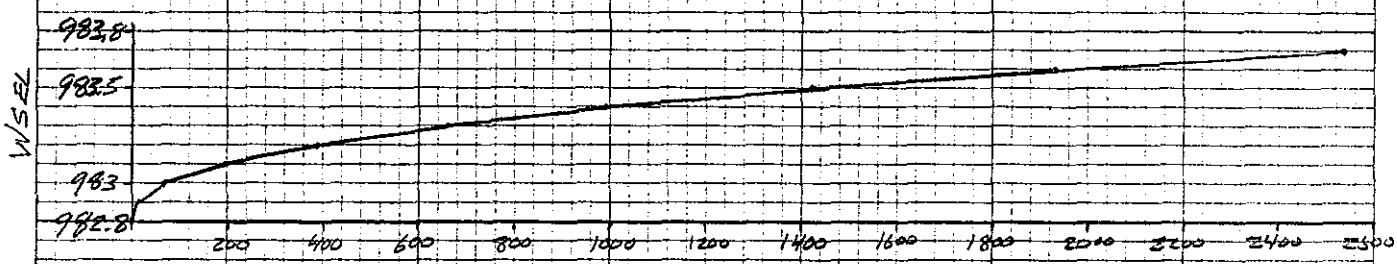
DTP for GUS 10/10

6/3/92

RC STORAGE ROUTING

BRUNER TO JOHNSON ROADS

(SUB 15 STORAGE ROUTING)



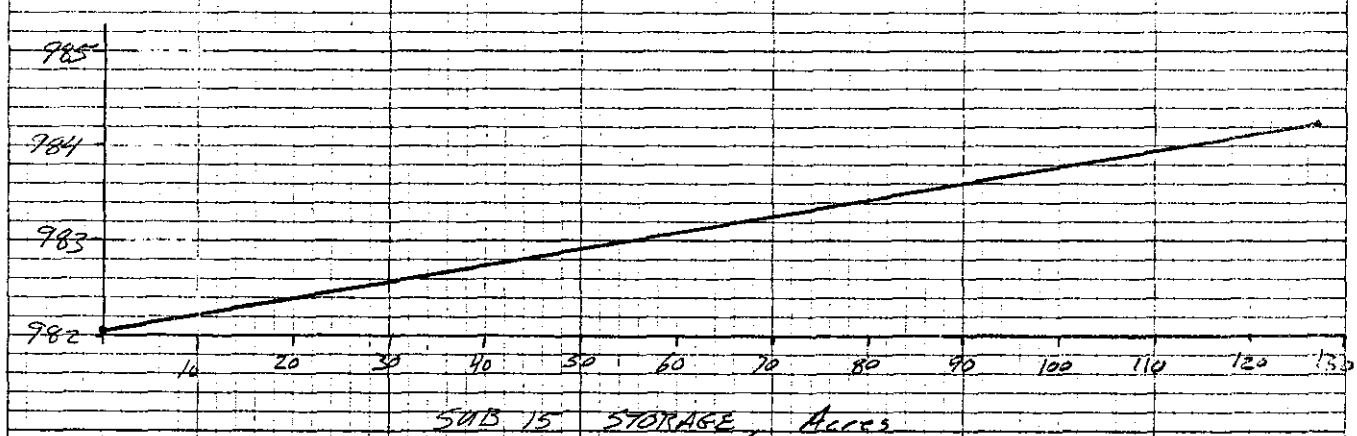
WSEL	Q
982.8	0
982.9	13
983.0	73
983.1	198
983.2	391
983.3	656
983.4	997
983.5	1420
983.6	1931
983.7	2534
983.8	3231

From Uneven Weir program output

FROM STAGE-STORAGE DATA (PS 1/42 ADDE)

E1 = 982.04 E2 = 984.23 E3 = 985.5

A1 = 0 A2 = 127.3 A3 = 145.3



HEC-1 INPUT CARDS:

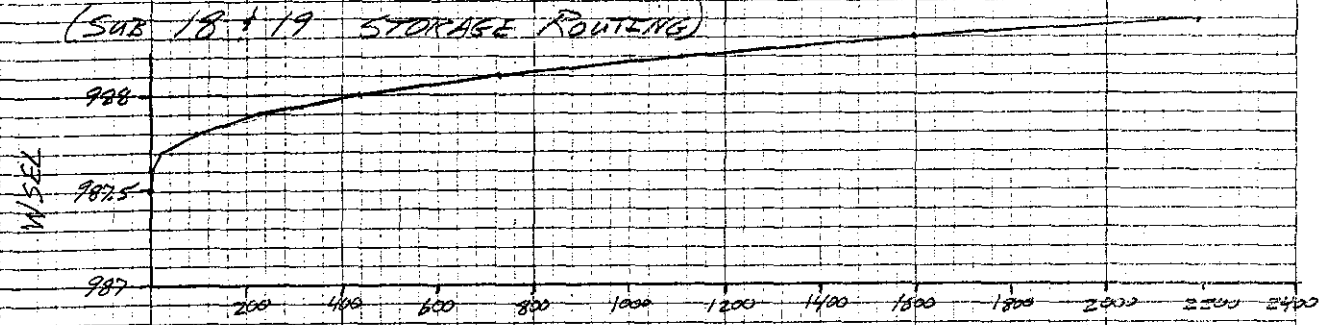
RS	1	ELEV 982.04							
SA	0	43	49	55	61	66	78	90	102
SQ	0	0	13	73	198	391	997	1931	3231
SE	982.04	982.8	982.9	983	983.1	983.2	983.4	983.6	983.8

46 0707
K+E 10 X 10 TO THE INCH • 7 X 10 INCHES KEUFFEL & ESSER CO. MADE IN U.S.A.

RC STORAGE ROUTING

OGLESBY TO WILSON ROADS

(SUB 18 + 19 STORAGE ROUTING)



WSEL	Q
987.5	0
987.6	1
987.7	25
987.8	96
987.9	229
988.0	436
988.1	727
988.2	1112
988.3	1598
988.4	2189
988.5	2881
988.6	3675

NOTE: SUB 19 RUNOFF DRAINS INTO SUB 18 AND THEN IS ROUTED OVER ROSSWEIT CANAL.

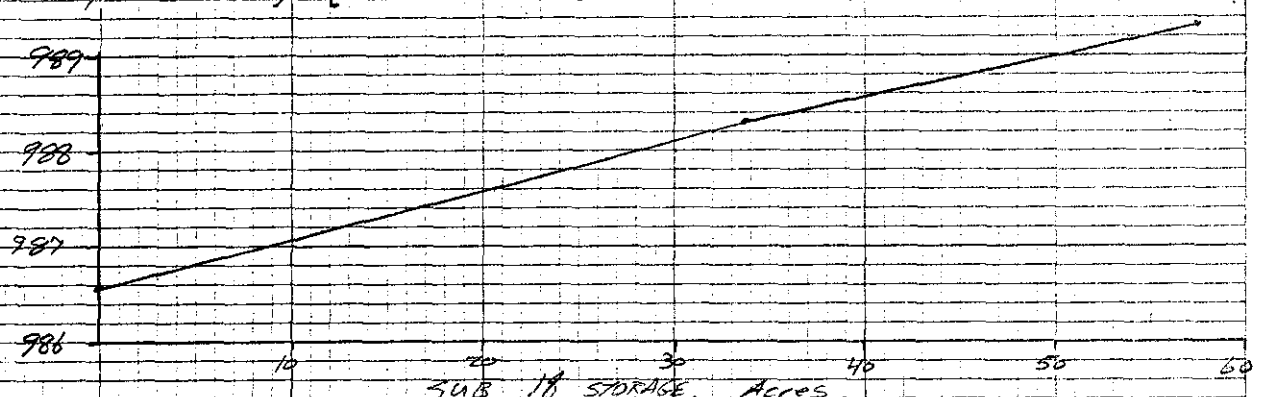
FROM UNDER WEIR PLOT OUTPUT

FROM STAGE-STORAGE DATA (PG 1/42 APP E)

E1 = 986.58 E2 = 988.31 E3 = 989.32

A1 = 0 A2 = 33.7 A3 = 57.4

NOTE: USED TURNER TO WILSON STAGE-STORAGE DUE TO LOCATION OF CONCENTRATION POINT I2, (MAJORITY OF STORAGE WILL OCCUR BETWEEN TURNER & WILSON)



HEC-1 INPUT CARDS:

RS	1	ELEV 986.58							
SA	0	20.5	23.5	24.4	26.4	28.2	32	36.1	40.8
SQ	0	1	25	96	229	436	1112	2189	3675
SE	986.58	987.6	987.7	987.8	987.9	988.0	988.2	988.4	988.6

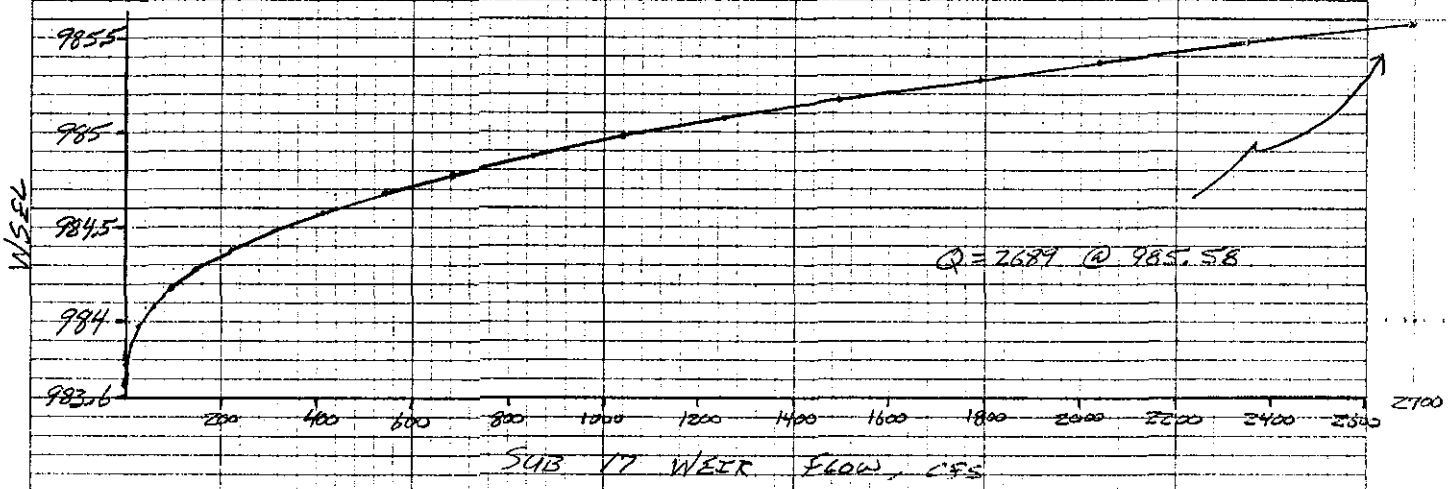
46 0707
K+E 10 X 10 TO THE INCH • 7 X 10 INCHES KEUFFEL & ESSER CO. MADE IN U.S.A.

LTP for GUS
6/3/92

8/10

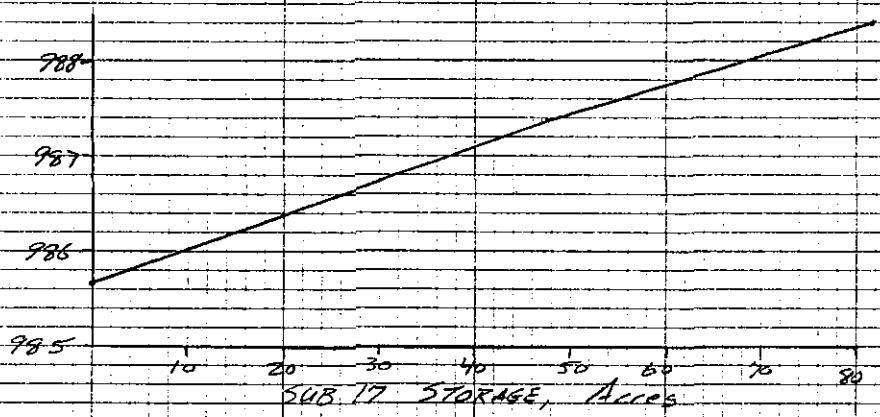
RC STORAGE ROUTING

WILSON AVE TO PALO VERDE RD
(SUB 17 STORAGE ROUTING)



FROM STAGE-STORAGE DATA (pg 1/42 App. E)

E1 = 985.66 E2 = 987.39 E3 = 988.4
A1 = 0 A2 = 47.7 A3 = 81.8



HEC-1 INPUT CARDS:

RS	1	ELEV 983.78								
SA	0	0.01	0.02	0.03	0.04	0.05	0.06	0.07	0.08	0.1
SQ	0	12	20	100	220	420	720	1080	1860	2689
SE	983.78	983.9	984	984.2	984.4	984.6	984.8	985.0	985.3	985.5

46 0707
K+E 10 X 10 TO THE INCH • 7 X 10 INCHES KEUFFEL & ESSER CO. MADE IN U.S.A.

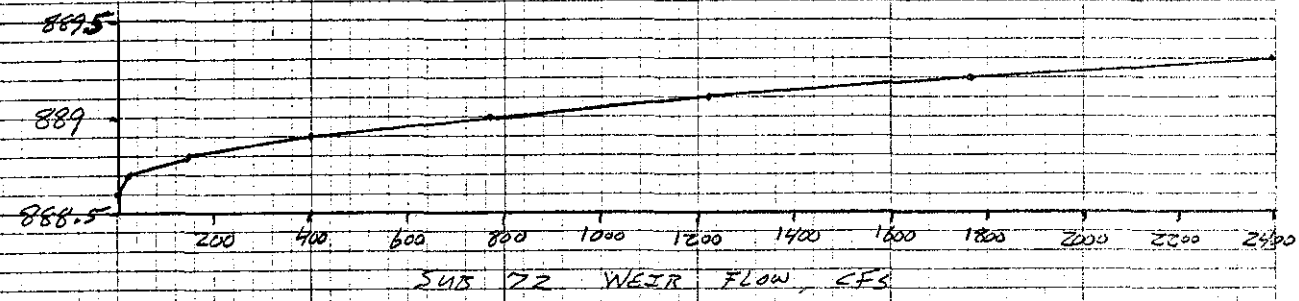
APPENDIX L

STAGE-DISCHARGE-STORAGE RELATIONS

AND HEC-1 INPUT FOR THE BC

BC STORAGE ROUTING 6/8/92

DEAN TO RAINBOW ROADS
(SUB 72 STORAGE ROUTING)

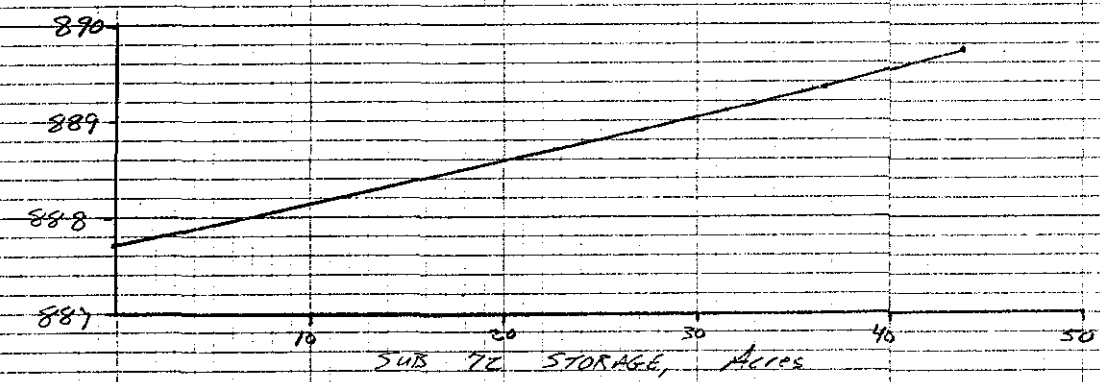


WSEL	Q
888.6	0
888.7	27
888.8	153
888.9	410
889.0	771
889.1	1225
889.2	1767
889.3	2397

from HAVEN weir program output.

FROM STORAGE-AREA DATA (PG 2/42 APP E)

E1 = 887.73 E2 = 889.35 E3 = 889.72
A1 = 0 A2 = 36.8 A3 = 43.9



HEC-1 INPUT CARDS:

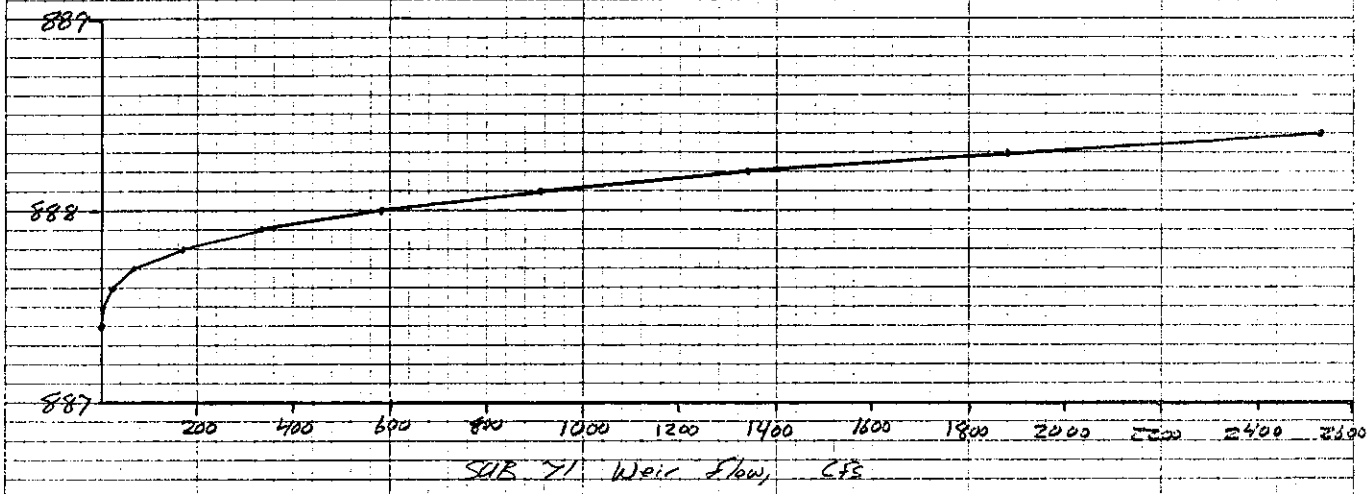
RS	1	ELEV	887.73						
SA	0	20	22.5	24.8	27.1	29.2	31.4	33.5	35.5
SQ	0	0	27	153	410	771	1225	1767	2397
SE	887.73	888.6	888.7	888.8	888.9	889.0	889.1	889.2	889.3

46 0707
K+E 10 X 10 TO THE INCH • 7 X 10 INCHES KEUFFEL & ESSER CO. MADE IN U.S.A.

BC STORAGE ROUTING 6/8/92

RAINBOW TO WATSON ROADS

(SUB 71 STORAGE ROUTING)



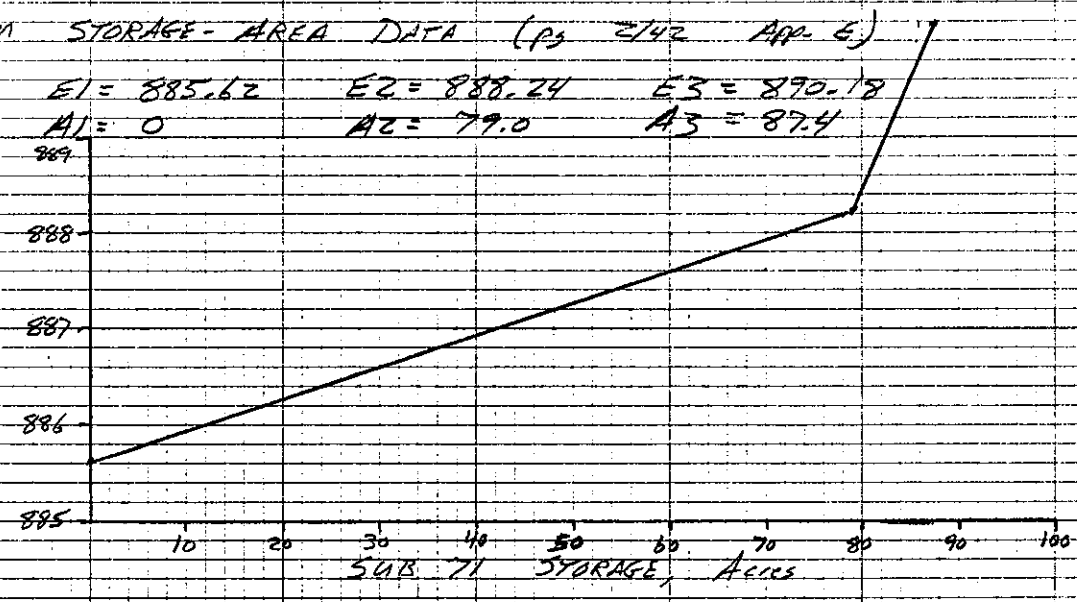
WSEL	Q
887.4	0
887.5	4
887.6	24
887.7	74
887.8	172
887.9	337
888.0	581
888.1	913
888.2	1344
888.3	1882
888.4	2534

FROM Uneven Weir program output.

FROM STORAGE-AREA DATA (pg 2/42 App. E)

E1 = 885.62 E2 = 888.24 E3 = 890.18

A1 = 0 A2 = 79.0 A3 = 87.4



HEC-1 INPUT CARDS:

RS	1	ELEV 885.62							
SA	0	54	57	60.5	63	66.5	72	78	7
SQ	0	0	4	24	74	172	581	1344	2534
SE	885.62	887.4	887.5	887.6	887.7	887.8	888.0	888.2	888.4

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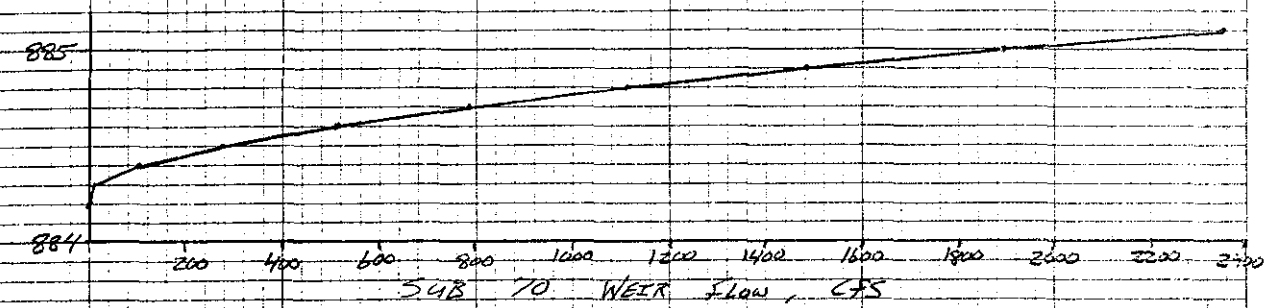
K&E 10 X 10 TO THE INCH • 7 X 10 INCHES KEUFFEL & ESSER CO. MADE IN U.S.A.

DTP for GUS 3/12

BC STORAGE ROUTING 6/8/92

WATSON TO CEMETERY ROADS
(SUB 70 STORAGE ROUTING)

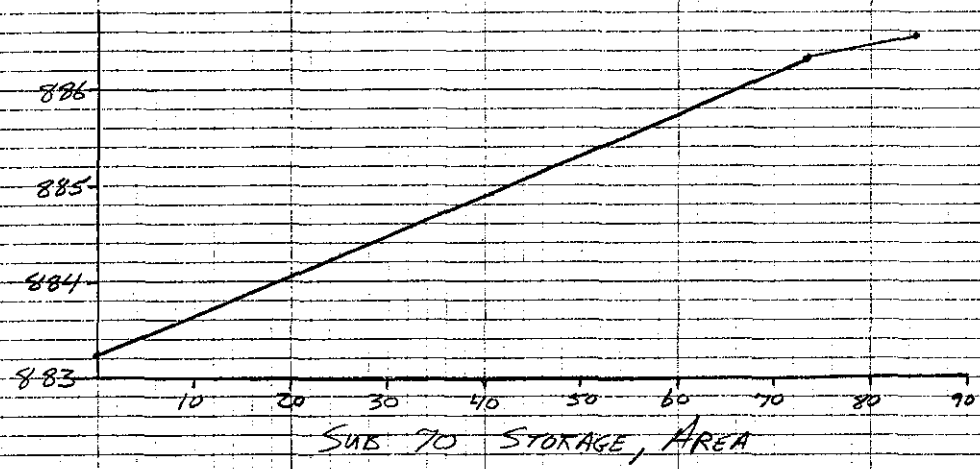


WSEL	Q
884.2	0
884.3	9
884.4	102
884.5	276
884.6	507
884.7	787
884.8	1114
884.9	1484
885.0	1897
885.1	2352

From uneven weir program output

FROM STORAGE - AREA DATA (pg 2/42 App E)

E1 = 883.23 E2 = 886.33 E3 = 886.55
A1 = 0 A2 = 73.4 A3 = 84.4



HEC-1 INPUT CARDS:

RS	1	ELEV	883.23							
SA	0	23.5	26	28	31	33	35	38	40.5	45
SQ	0	0	9	102	276	507	787	1114	1484	235.
SE	883.23	884.2	884.3	884.4	884.5	884.6	884.7	884.8	884.9	885.

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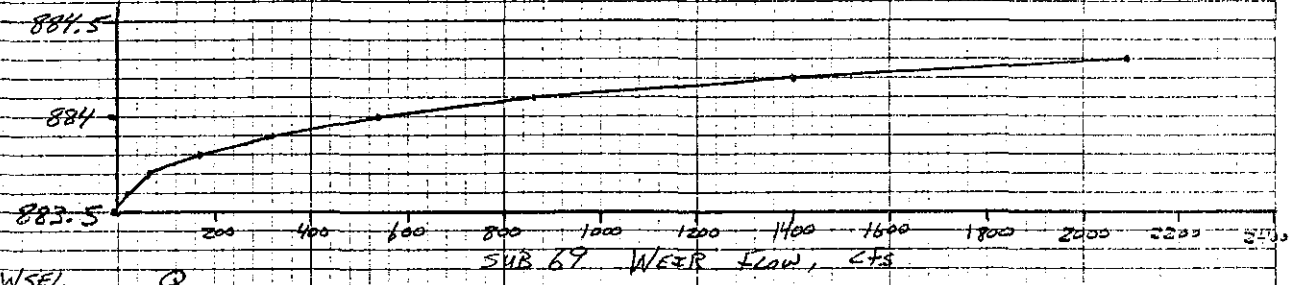
DTP for GUS 4/12

BC STORAGE ROUTING 6/9/92

CEMETERY TO MILLER ROADS
(SUB 69 STORAGE ROUTING)

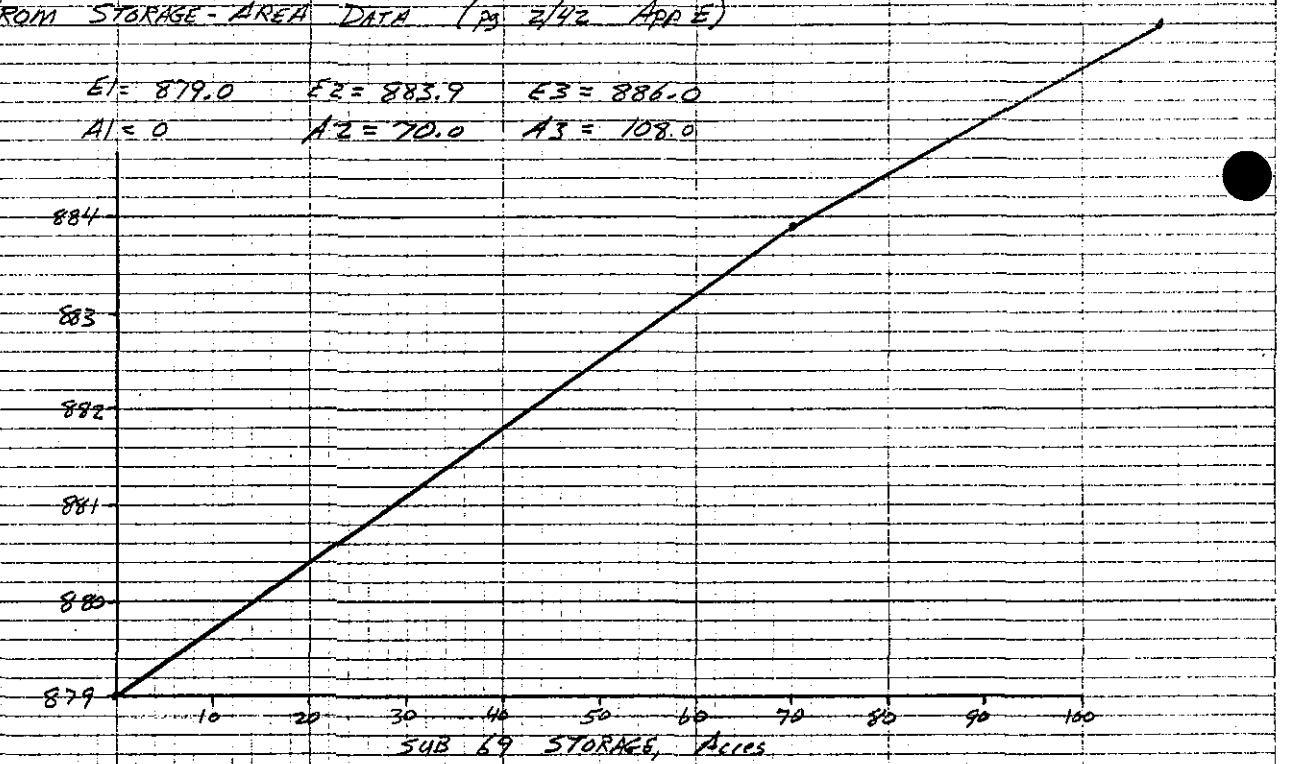


WSEL	Q
883.5	0
883.6	18
883.7	71
883.8	170
883.9	324
884.0	540
884.1	862
884.2	1402
884.3	2093

FROM Uneven Weir Program output

FROM STORAGE-AREA DATA (pg 2/42 APP E)

E1 = 879.0 E2 = 883.9 E3 = 886.0
A1 = 0 A2 = 70.0 A3 = 108.0



HEC-1 INPUT CARDS:

RS	1	ELEV	879							
SA	0	64.5	65.8	67	68.5	70	72	74	75.5	77.5
SQ	0	0	18	71	170	324	540	862	1402	2093
SE	879	883.5	883.6	883.7	883.8	883.9	884.0	884.1	884.2	884.3

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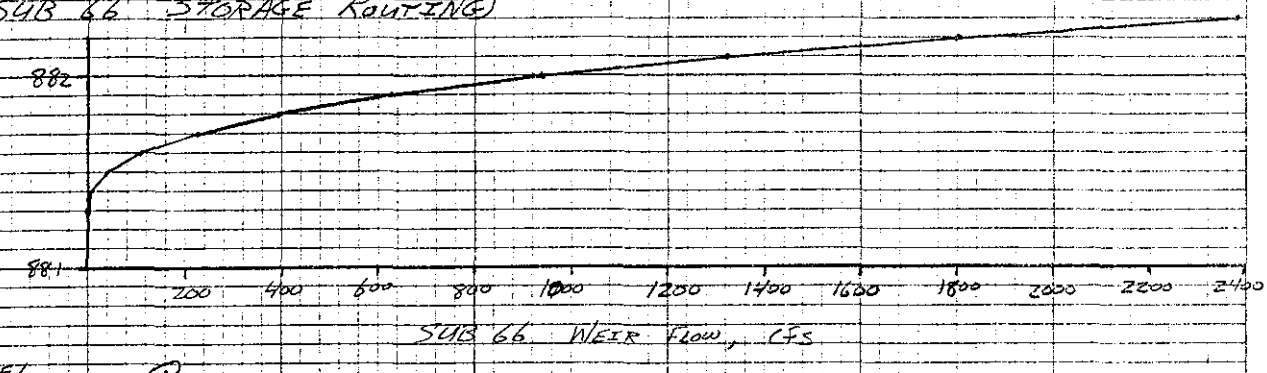
K+E 10 X 10 TO THE INCH • 7 X 10 INCHES KEUFFEL & ESSER CO. MADE IN U.S.A.

BC STORAGE ROUTING 6/9/92

MILLER TO ROOKS ROADS

(SUB 66 STORAGE ROUTING)



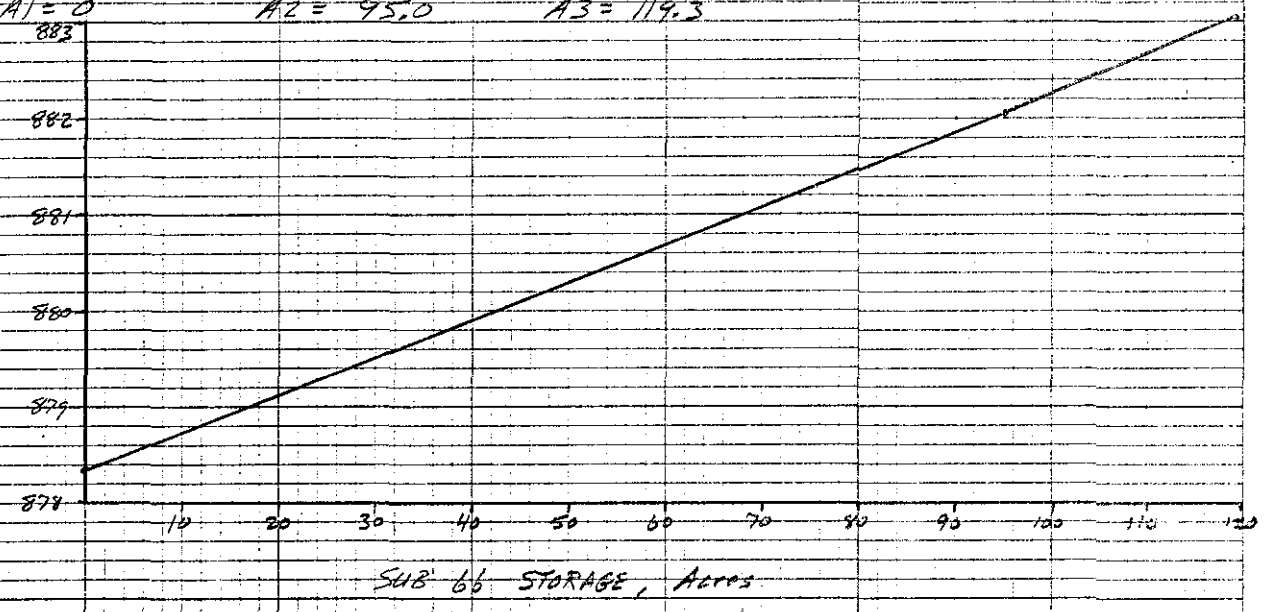
WSEL	Q
881.3	0
881.4	7
881.5	40
881.6	111
881.7	228
881.8	378
881.9	630
882.0	935
882.1	1324
882.2	1802
882.3	2378

from Uneven Weir program output.

FROM STORAGE AREA DATA:

E1 = 878.35 E2 = 882.05 E3 = 883.05

A1 = 0 A2 = 95.0 A3 = 119.3



HEC-1 INPUT CARDS:

RS	1	ELEV	878.35						
SA	0	75.5	78.5	81	83.5	86	91	96	101
SQ	0	0	7	40	111	228	630	1324	2378
SE	878.35	881.3	881.4	881.5	881.6	881.7	881.9	882.1	882.3

46 0707
K&E 10 X 10 TO THE INCH • 7 X 10 INCHES KEUFFEL & ESSER CO. MADE IN U.S.A.

DTP for GUS

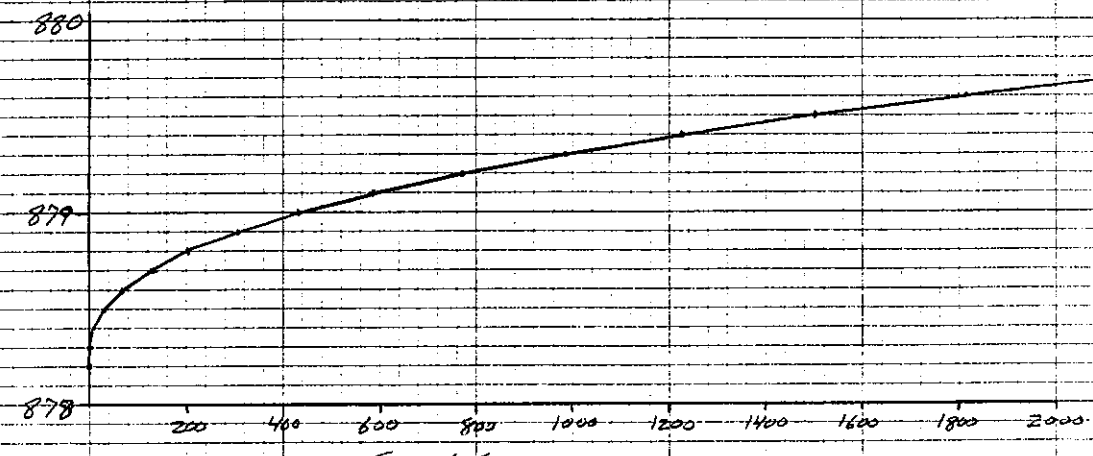
6/9/92

6/12

RC STORAGE ROUTING

ROOKS TO OGLESBY ROADS

(SUB 65 STORAGE ROUTING)



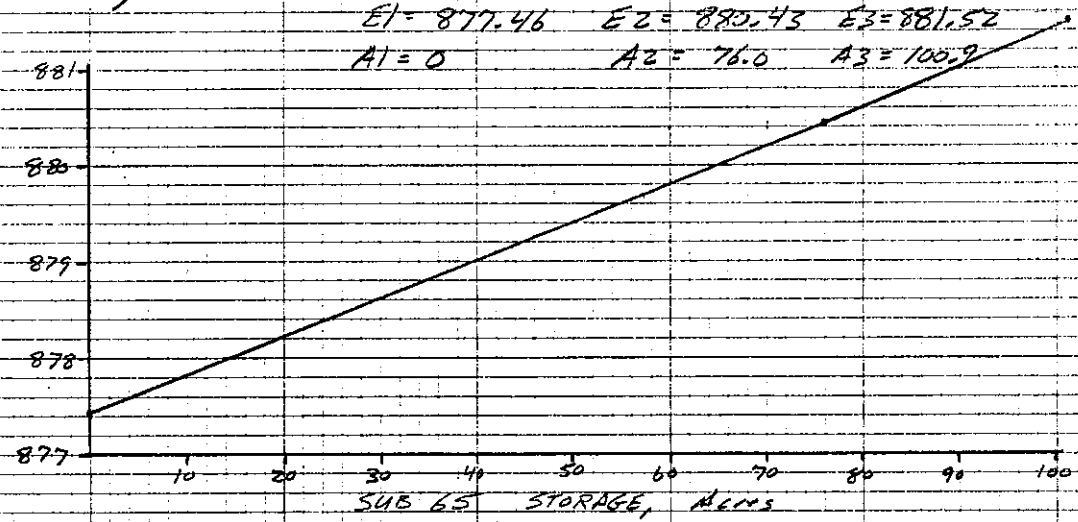
WSEL	Q
878.3	0
878.4	11
878.5	34
878.6	72
878.7	129
878.8	208
878.9	309
879.0	436
879.1	589
879.2	771
879.3	983
879.4	1276
879.5	1503
879.6	1813
879.7	2158

from Uneven Weir program output.

FROM STORAGE - AREA Data (pg 2/42 KM ≡)

E1 = 877.46 E2 = 880.43 E3 = 881.52

A1 = 0 A2 = 76.0 A3 = 100.9



HEC-1 INPUT CARDS:

RS	1	ELEV	877.46							
SA	0	22	24.5	27	32	37	42	47	52	57
SQ	0	0	11	34	129	309	589	983	1503	[illegible]
SE	877.46	878.3	878.4	878.5	878.7	878.9	879.1	879.3	879.5	879.7

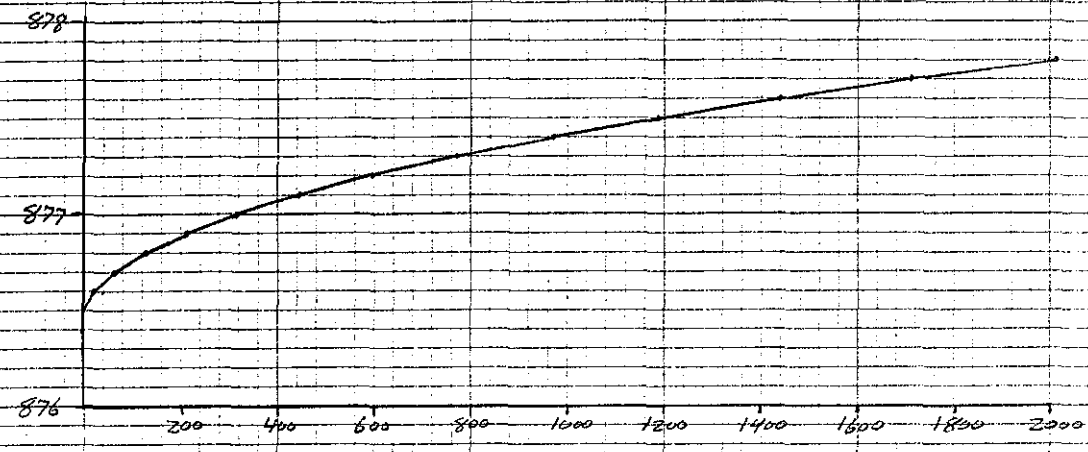
46 0707

K+E 10 X 10 TO THE INCH • 7 X 10 INCHES KEUFFEL & ESSER CO. MADE IN U.S.A.

BC STORAGE ROUTING 6/9/92

OGLESBY TO TURNER ROADS

(SUB 64 STORAGE ROUTING)



SUB 64 WEIR FLOW

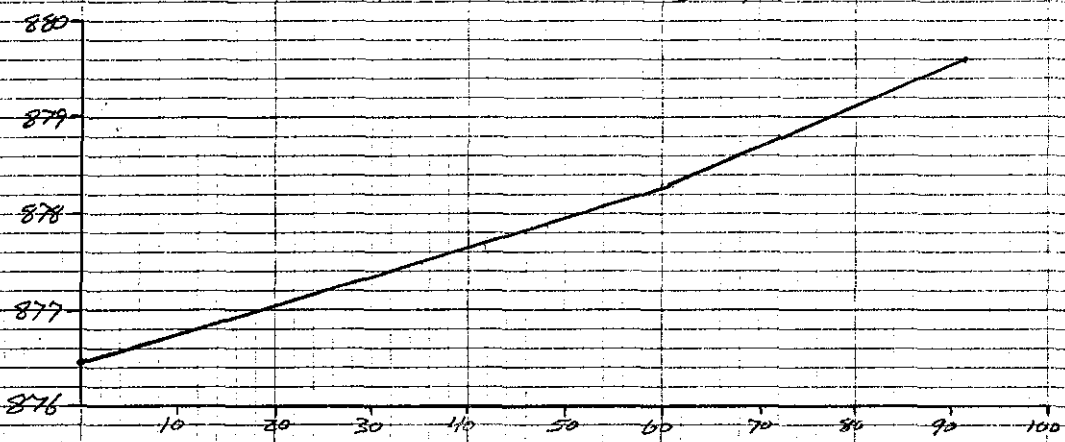
WSEL	Q
876.5	0
876.6	20
876.7	63
876.8	128
876.9	212
877.0	318
877.1	446
877.2	596
877.3	770
877.4	968
877.5	1190
877.6	1439
877.8	1714
877.8	2016
877.9	2346

From Uneven Weir program Output.

FROM STORAGE - AREA DATA (pg 2/42 APP E)

E1 = 876.47 E2 = 878.29 E3 = 879.60

A1 = 0 A2 = 60.7 A3 = 91.4



SUB 64 STORAGE, Acres

HEC-1 INPUT CARDS:

RS	1	ELEV	876.47							
SA	0	2	5	8.5	15	22	28.5	35	41.5	48
SQ	0	0	20	63	212	446	770	1190	1714	2346
SE	876.47	876.5	876.6	876.7	876.9	877.1	877.3	877.5	877.7	877.9

46 0707
K+E 10 X 10 TO THE INCH • 7 X 10 INCHES KEUFFEL & ESSER CO. MADE IN U.S.A.

DTP for GUS

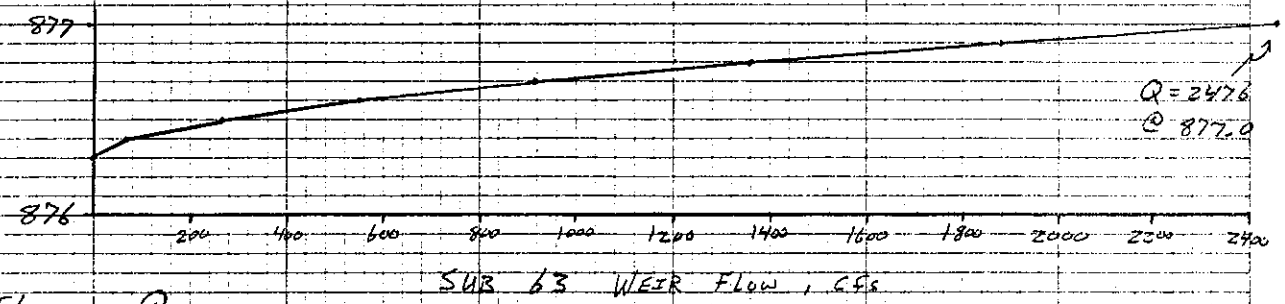
8/12

BC STORAGE ROUTING

6/9/92

TURNER TO WILSON ROADS

(SUB 63 STORAGE ROUTING)



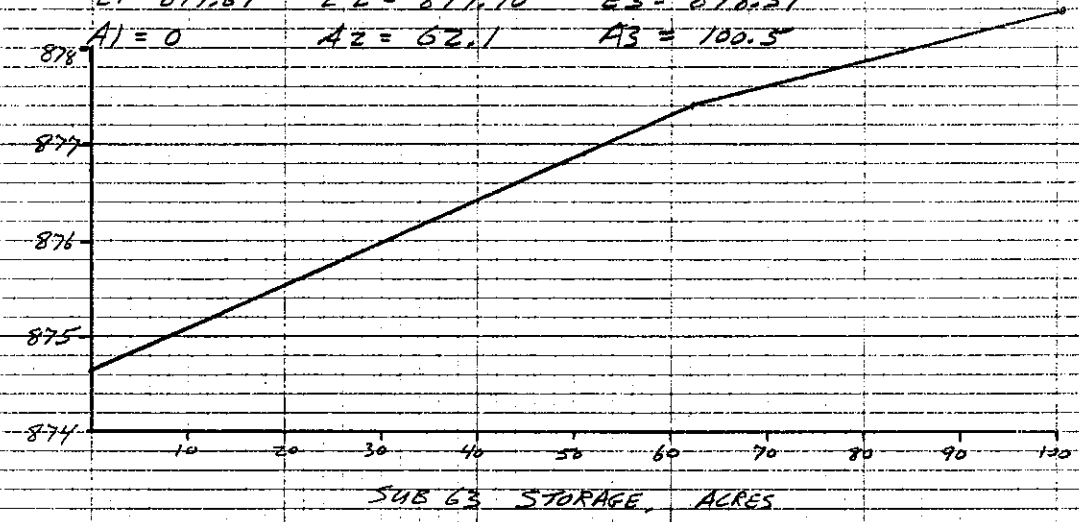
WSEL	Q
876.3	0
876.4	71
876.5	267
876.6	552
876.7	917
876.8	1360
876.9	1880
877.0	2476

from Nwesen weir program output.

FROM STORAGE AREA DATA (pg 2/42 App. E)

E1 = 874.67 E2 = 877.40 E3 = 878.39

A1 = 0 A2 = 62.1 A3 = 100.5



HEC-1 INPUT CARDS:

RS	1	ELEV	874.67						
SA	0	37	39.5	42	44	46.5	48.5	51	53
SQ	0	0	71	267	552	917	1360	1880	2476
SE	874.67	876.3	876.4	876.5	876.6	876.7	876.8	876.9	877.0

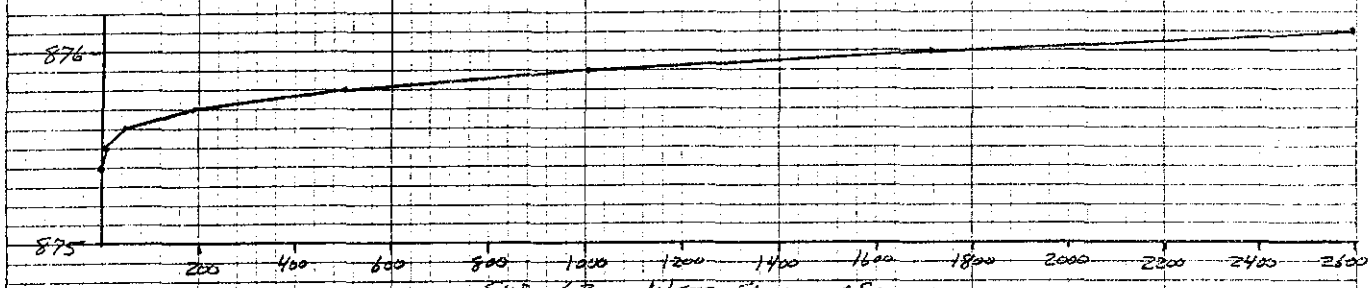
46 0707

K&E 10 X 10 TO THE INCH • 7 X 10 INCHES KEUFFEL & ESSER CO. MADE IN U.S.A.

BC STORAGE ROUTING 6/11/92

WILSON TO PALO VERDE ROADS

(SUB 62 STORAGE ROUTING)



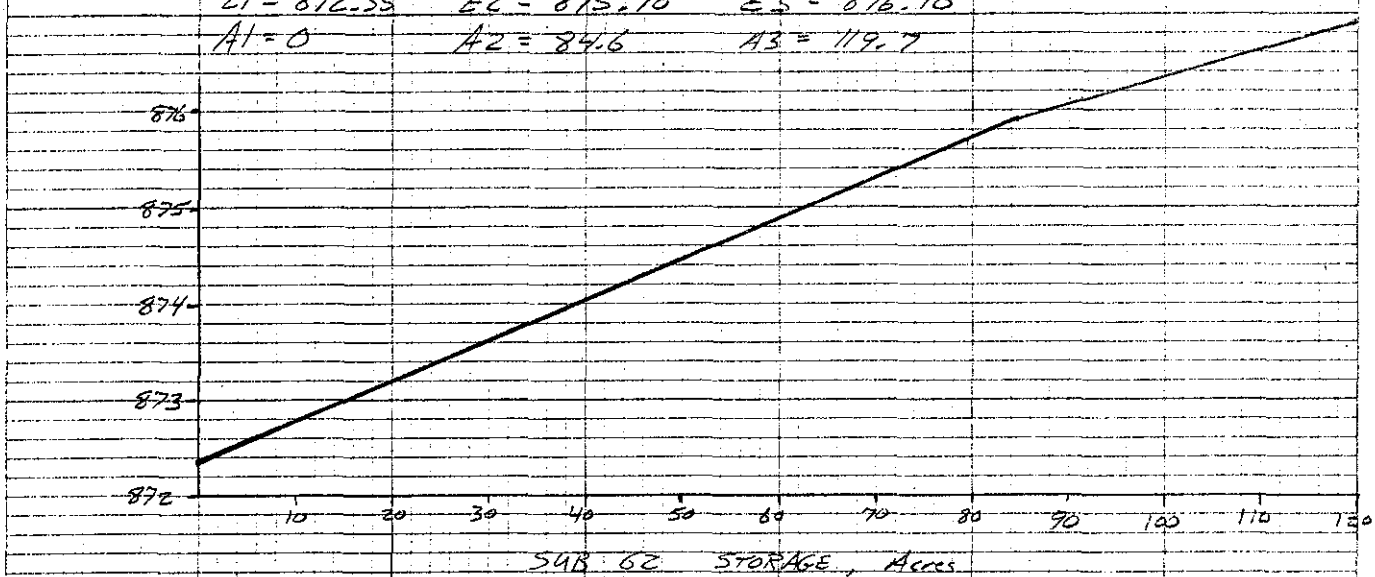
WSEL	Q
875.4	0
875.5	8
875.6	46
875.7	192
875.8	502
875.9	1007
876.0	1715
876.1	2595

From Uneven Weir program output.

FROM STORAGE AREA DATA (Pg 2/42 APP. E)

E1 = 872.35 E2 = 875.90 E3 = 876.90

A1 = 0 A2 = 84.6 A3 = 119.7



HEC-1 INPUT CARDS:

RS	1	ELEV	872.35							
SA	0	38	72	75	77	79.5	82	84.6	88	91.3
SQ	0	0	0	8	46	192	502	1007	1715	2595
SE	872.35	874	875.4	875.5	875.6	875.7	875.8	875.9	876.0	876.1

46 0707
K&E 10 X 10 TO THE INCH • 7 X 10 INCHES KEUFFEL & ESSER CO. MADE IN U.S.A.

DTP for GUS

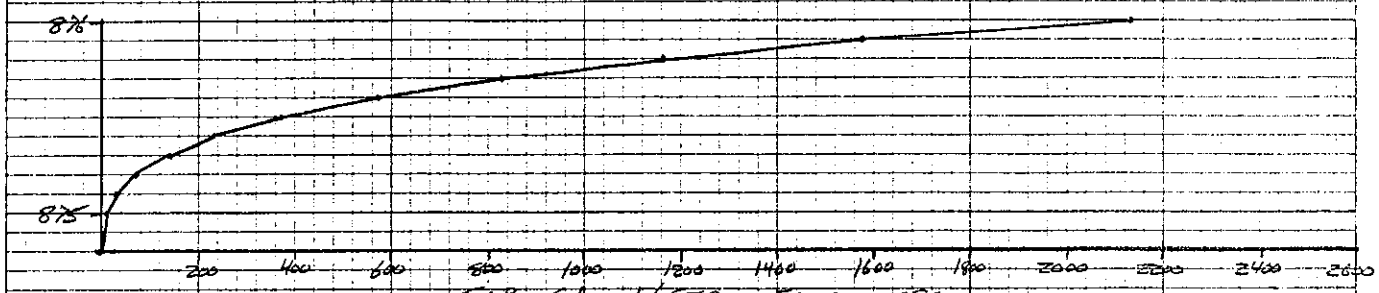
10/12

BC STORAGE ROUTING

6/11/92

PALO VERDE TO BRUNER ROADS

(SUB 61 STORAGE ROUTING)



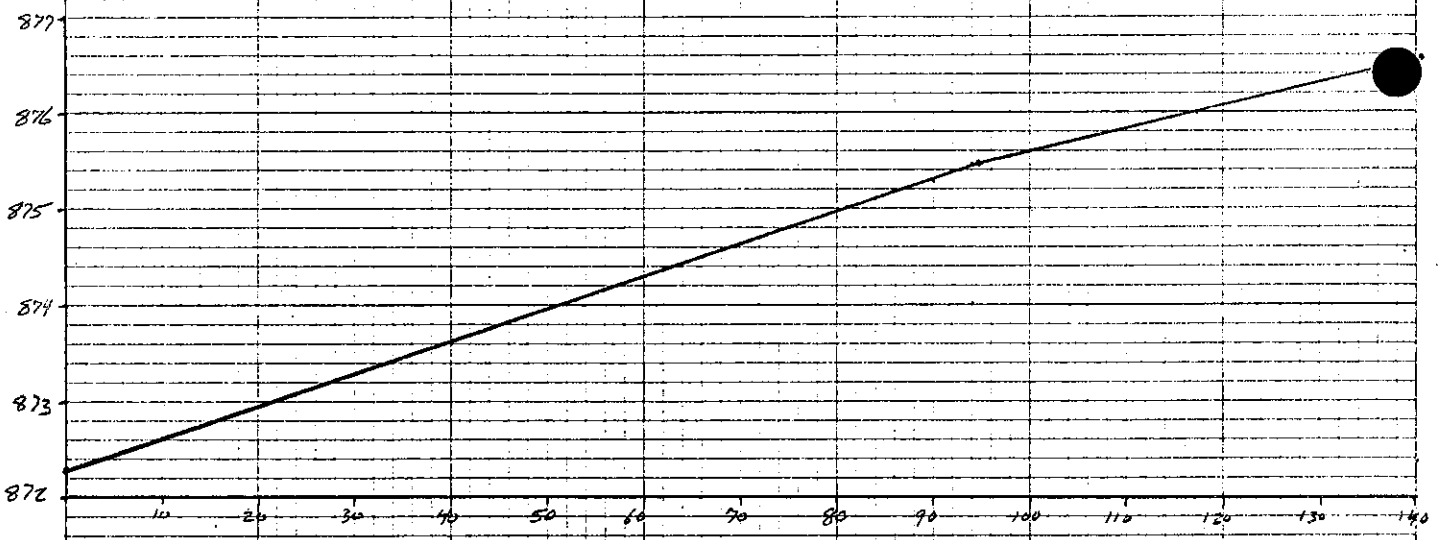
WSEL	Q
874.8	0
874.9	2
875.0	12
875.1	34
875.2	74
875.3	139
875.4	235
875.5	375
875.6	572
875.7	832
875.8	1165
875.9	1575
876.0	2069

From Uneven Weir program output.

FROM STORAGE AREA DATA (pg 2/42 App. 5)

E1 = 872.29 E2 = 875.46 E3 = 876.56

A1 = 0 A2 = 94.3 A3 = 140.6



HEC-1 INPUT CARDS:

RS	1	ELEV 872.29								
SA	0	75	81	84	86.5	90	93	100	108.5	118
SQ	0	0	12	34	74	139	235	572	1165	2069
SE	872.29	874.8	875	875.1	875.2	875.3	875.4	875.6	875.8	876.0

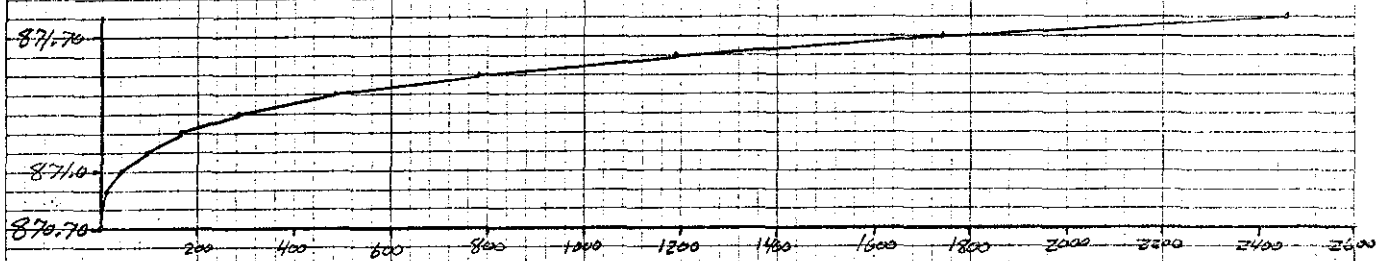
46 0707

K&E 10 X 10 TO THE INCH • 7 X 10 INCHES KEUFFEL & ESSER CO. MADE IN U.S.A.

BC STORAGE ROUTING

BRUNER TO JOHNSON ROADS

(SUB 60 STORAGE ROUTING



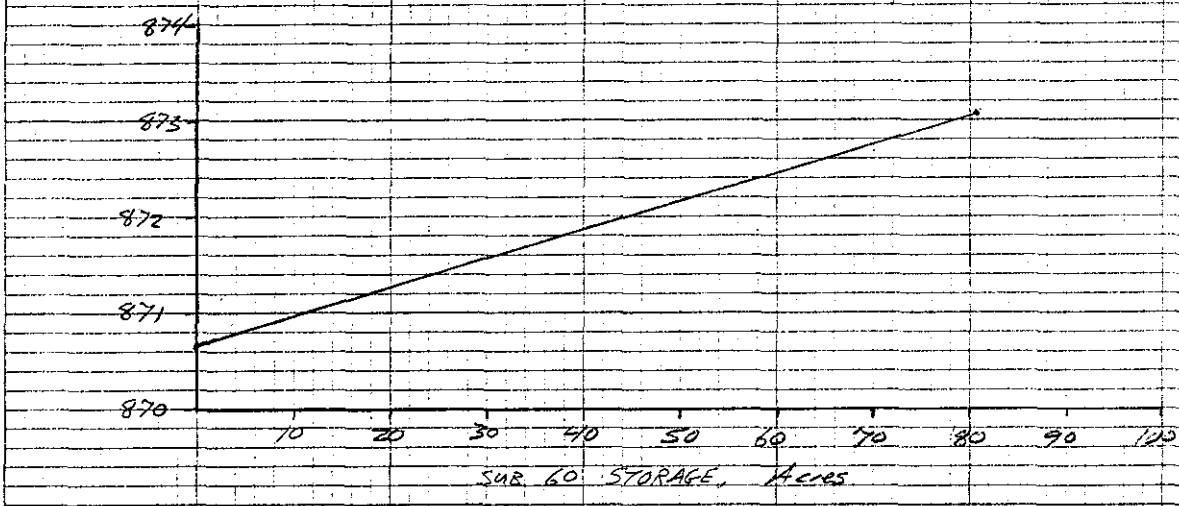
WSEL	Q
870.7	0
870.8	1
870.9	13
871.0	41
871.1	91
871.2	165
871.3	286
871.4	484
871.5	781
871.6	1192
871.7	1742
871.8	2436

from uneven weir program output

FROM STORAGE-AREA DATA (p. 2/42 App. E)

E1 = 870.66 E2 = 873.08 E3 = 874.34

A1 = 0 A2 = 80.6 A3 = 136.7



HEC-1 INPUT CARDS:

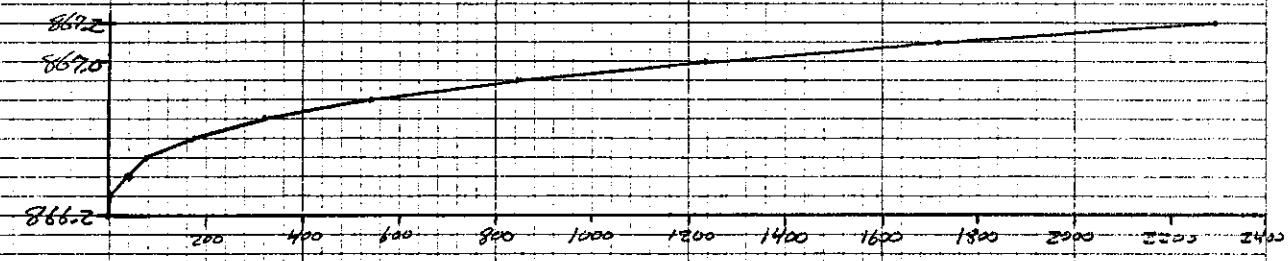
RS	1	ELEV	870.66							
SA	0	1	4.5	8	11	14.5	18	24.5	31	38
SQ	0	0	1	13	41	91	165	484	1192	2436
SE	870.66	870.7	870.8	870.9	871	871.1	871.2	871.4	871.6	871.8

46 0707
K+E 10 X 10 TO THE INCH • 7 X 10 INCHES KEUFFEL & ESSER CO. MADE IN U.S.A.

BC STORAGE ROUTING 6/11/92

JOHNSON ROAD TO EOC (END OF CANAL)

(SUB 59 STORAGE ROUTING)



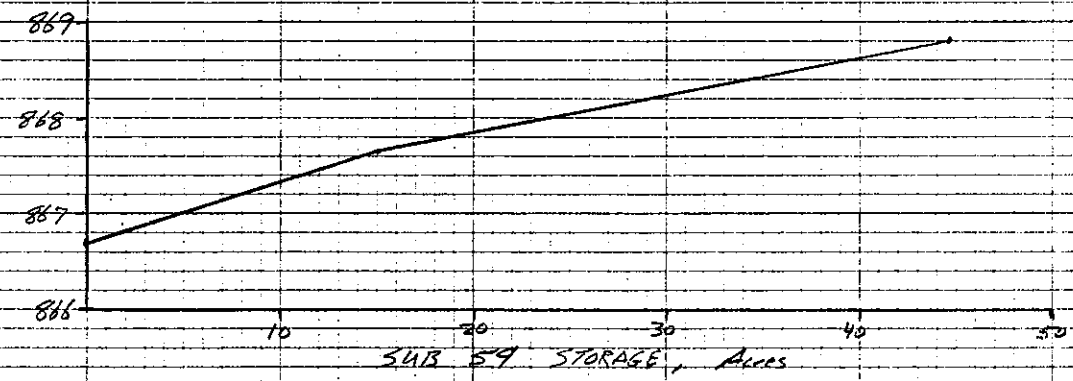
WSEL	Q
866.2	0
866.3	2
866.4	22
866.5	75
866.6	169
866.7	320
866.8	541
866.9	844
867.0	1237
867.1	1719
867.2	2289
867.3	2950
867.4	3704

} FROM UNEVEN WEIR program output

FROM STORAGE AREA DATA (PS 2/42 APP. E)

E1 = 866.70 E2 = 867.65 E3 = 868.81

A1 = 0 A2 = 15.1 A3 = 44.7



HEC-1 INPUT CARDS:

RS	1	ELEV	866.2							
SA	0	0.02	0.04	0.06	0.08	0.1	1.8	4.9	8	11.1
SQ	0	2	22	75	169	320	541	1237	2289	3704
SE	866.2	866.3	866.4	866.5	866.6	866.7	866.8	867.0	867.2	867.4

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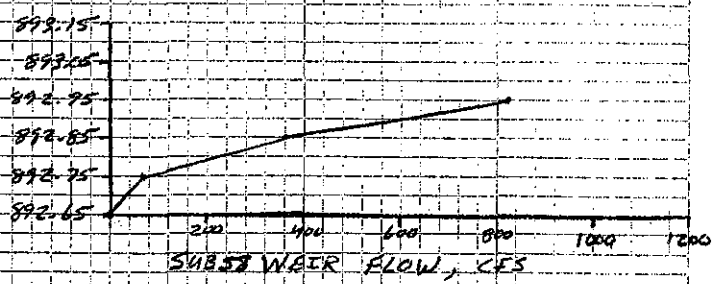
APPENDIX M

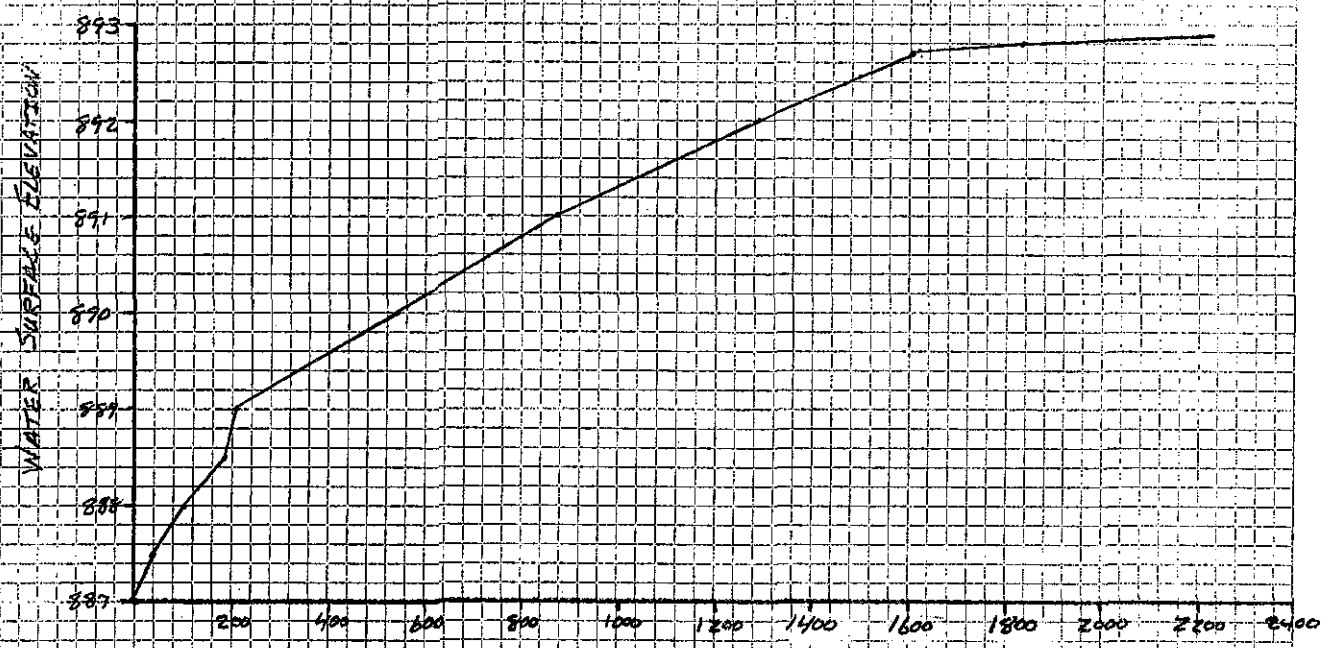
STAGE-DISCHARGE-STORAGE RELATIONS

AND HEC-1 INPUT FOR THE SPRR

DEAN TO RAINBOW ROADS
(SUB 58 STORAGE ROUTING)

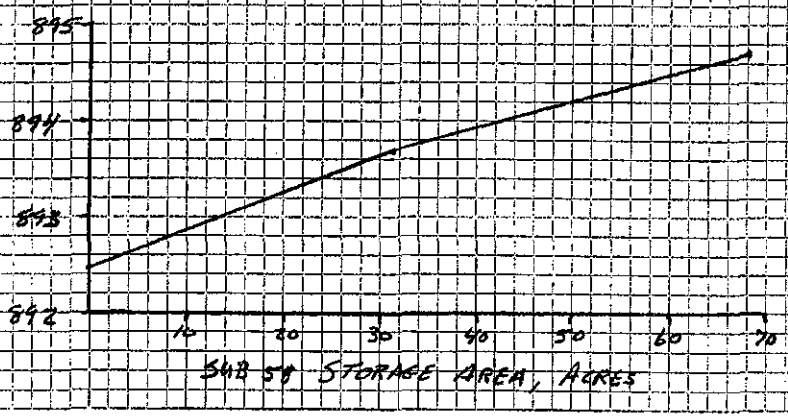
WSEL	ORRIFICE	WEIR	EQ
887	0	0	0
887.5	40		40
888	105		105
888.5	187		187
889	208		208
890	542		542
891	878		878
892	1285	0	1285
892.7	1570	35	1605
892.8	1610	225	1835
892.9	1630	600	2230





FROM STAGE STORAGE DATA:

SA	0	31.6	60.8
SE	892.47	893.69	894.70



46 0707
K+E 10 X 10 TO THE INCH 7 X 10 INCHES KEUFFEL & ESSER CO. MADE IN U.S.A.

GEORGE V. SABOL CONSULTING ENGINEERS, INC.

CLIENT Buckeye FIS
PROJECT FCD 90-69
SUBJECT SPRR STORAGE ROUTING

DATE 5/29/92
BY DTP
PROJECT NO. 28

DEAN TO RAINBOW ROADS

(SUB 58 STORAGE ROUTING)

HEC-1 INPUT CARDS:

RS	1	ELEV	887			
SA	0	0.03	0.06	0.1	6	11
SQ	0	105	542	1495	1605	2230
SE	887	888	890	892.47	892.7	892.9

NOTE: OVERTOPING WILL START @ EL 892.66

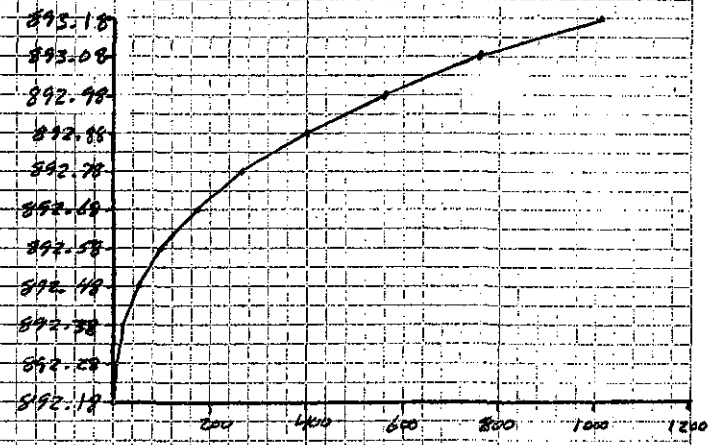
Q = 1605 cfs @ 892.7

@ just no overtopping

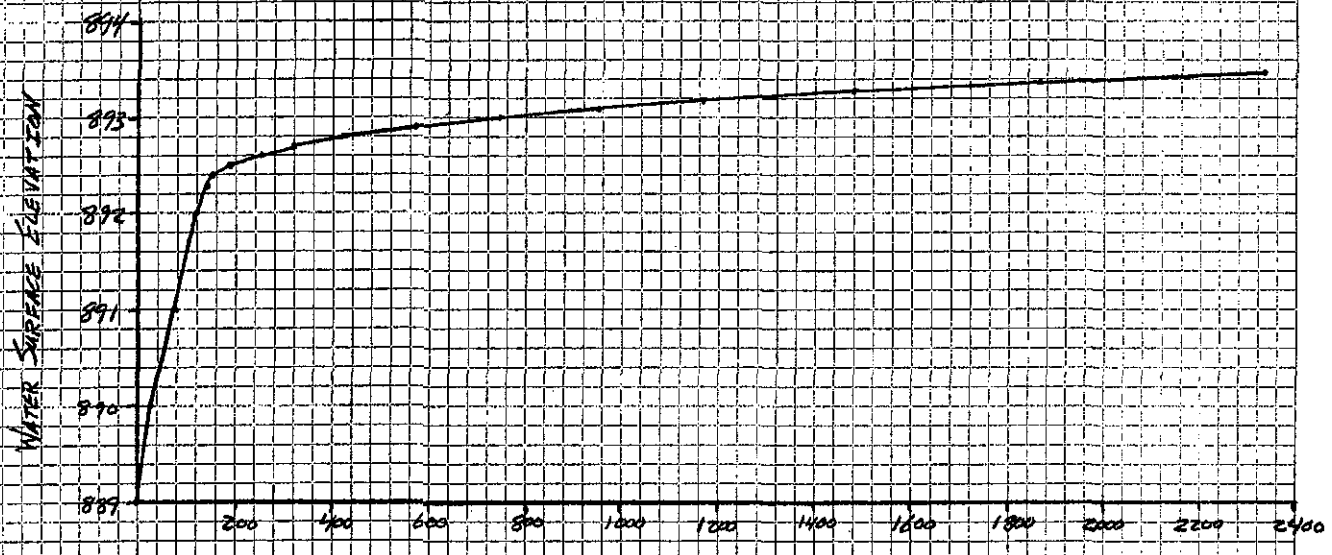
SPRR STORAGE ROUTING

RAINBOW TO WATSON ROADS
(SUB 57 STORAGE ROUTING)

WSEL	ORIFICE	WEIR	ΣQ
889	0	0	0
890	30		30
891	78		78
892	119	0	119
892.3	129	10	139
892.4	131	20	151
892.5	135	60	195
892.6	138	110	248
892.7	140	180	320
892.8	144	280	424
892.9	148	420	568
893.0	151	595	746
893.1	154	800	954
893.28	155	1010	1165
893.28	157	1324 *	1481
893.38	160	1709 *	1869
893.48	162	2172 *	2334

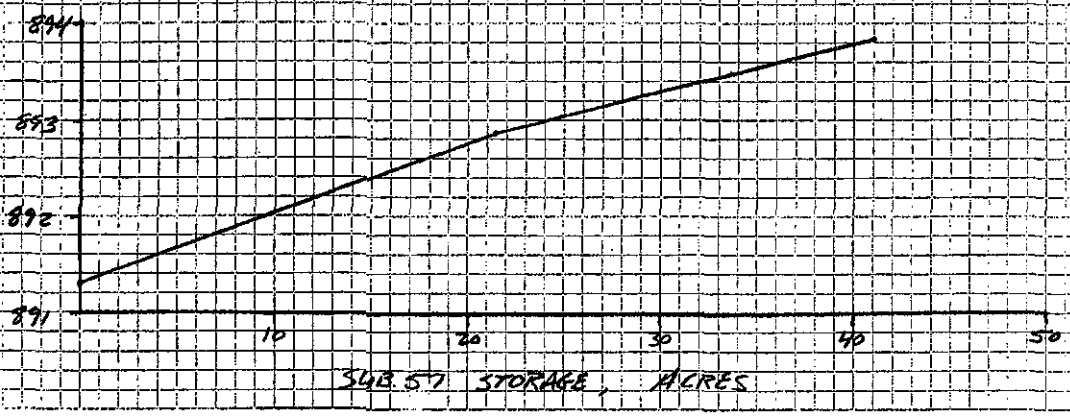


* Interpolated values taken from Rainbow weir flow rate program output



FROM STAGE - STORAGE DATA:

54	0	21.4	410
56	891.30	892.87	893.83



RAINBOW TO WATSON ROADS

(SUB 57 STORAGE ROUTING)

RS	1	ELEV	889						
SA	0	0.05	0.1	15.0	18.0	21.4	26.0	30.0	33.7
SQ	0	78	85	151	248	540	954	1560	2334
SE	889	891	891.3	892.4	892.6	892.87	893.1	893.3	893.48

NOTE: OVERTOPING WILL START @ EL 892.19

Q = 139 cfs @ 892.3 expect over-topping

From HEC-1 output: Max Routing Discharge = 1250 cfs @ ≈ 893.2

MIN RR ELEV = 892.2 ∴ Overtoping depth = 893.2 - 892.2 = 1.0'

Orrifice flow @ 893.2 = 155 cfs

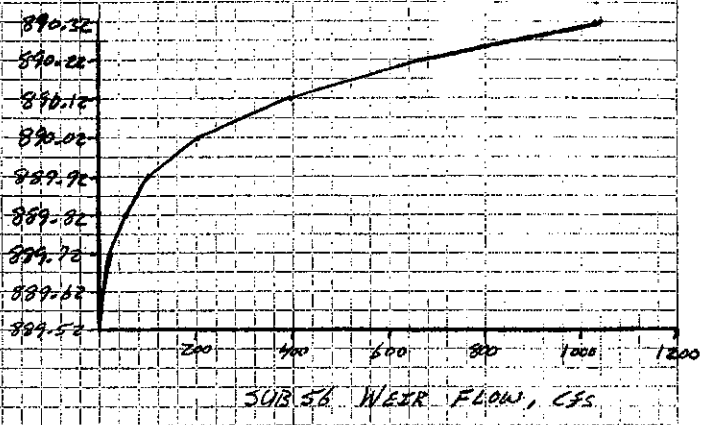
∴ Overtoping flow = 1250 - 155 = 1095 cfs

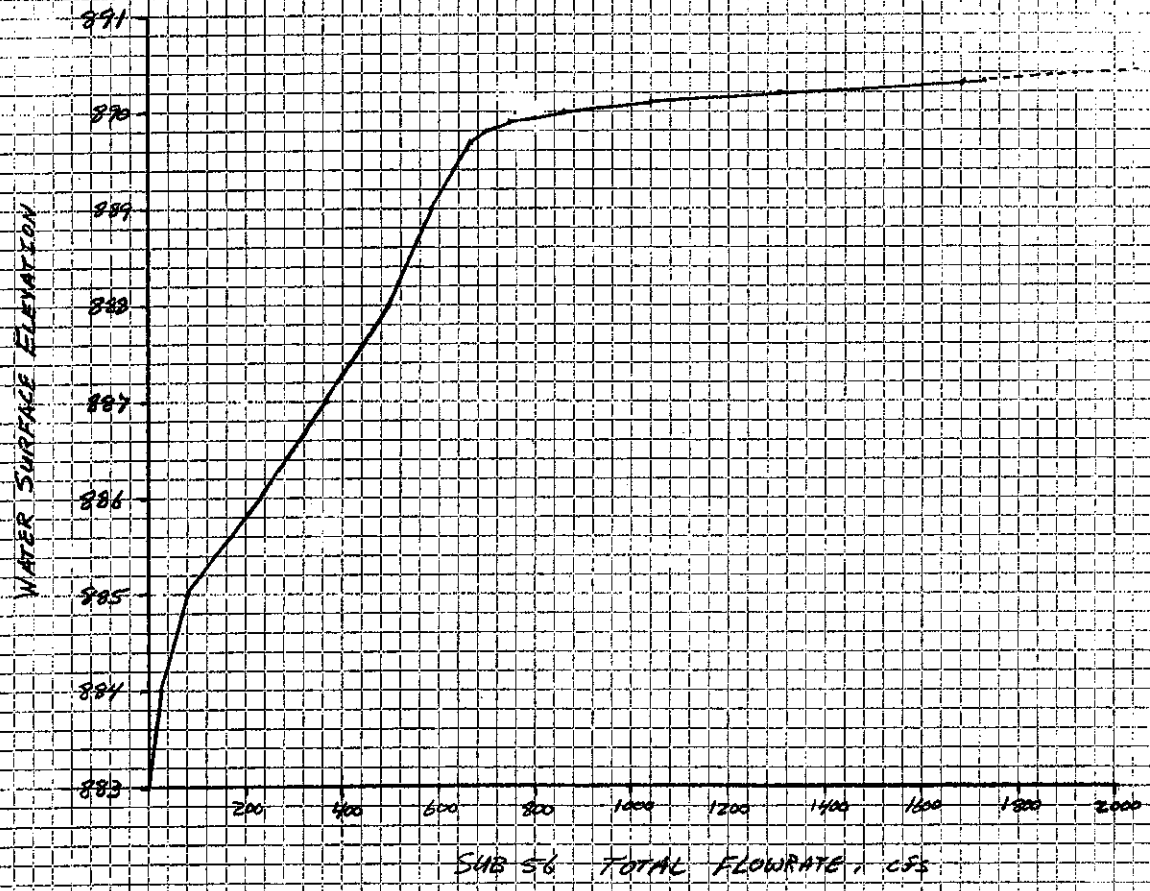
SPRR STORAGE ROUTING 5/29/92

WATSON TO APACHE ROADS

(SUB 56 STORAGE ROUTING)

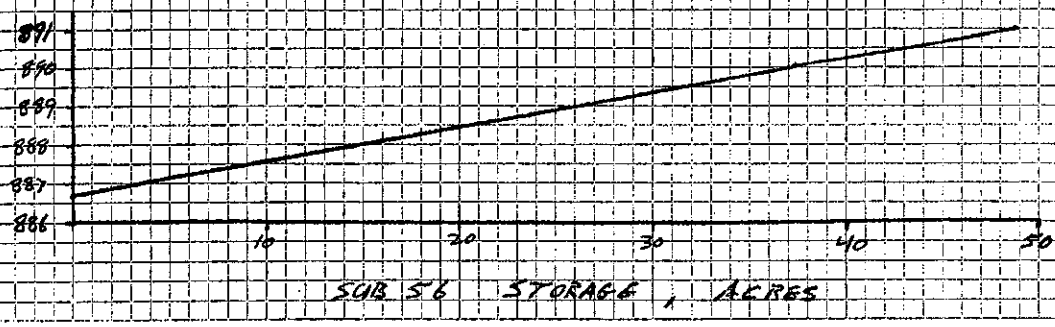
WSEL	ORIFICE	WEIR	ΣQ
883			0
884	30		30
885	80		80
886	233		233
887	367		367
888	495		495
889	585		585
889.7	647	17	664
889.8	655	45	700
889.9	661	90	751
890.0	673	185	858
890.1	680	360	1040
890.2	688	620	1308
890.3	693	990	1683
890.32	696	1035	1731





FROM STAGE - STORAGE DATA:

SA	0	37.3	48.8
SE	886.78	890.08	891.67



GEORGE V. SABOL CONSULTING ENGINEERS, INC.

SHEET 6 OF 22
CLIENT Buckeye FCS
DATE 5/27/92
PROJECT FCD 90-69
BY DTP
SUBJECT SPRR STORAGE ROUTING
PROJECT NO. 28

WATSON TO APACHE ROADS
(SUB 56 STORAGE ROUTING)

RS	1	ELEV	883						
SA	0	0.03	0.06	0.1	15.0	23.7	37.3	39.0	41.1
SQ	0	80	233	335	495	700	1020	1308	1731
SE	883	885	886	886.78	888	888.8	890.08	890.2	890.32

NOTE: OVERTOPING WILL START @ EL 889.53

$\boxed{Q = 664 \text{ cfs} \quad @ \quad 889.7}$ overtopping

---

From HEC-1 output: Max Routing discharge = 776 cfs @ = 889.9

MIN RR ELEV = 889.5 ∴ Overtopping depth = 889.9 - 889.5 = 0.4'

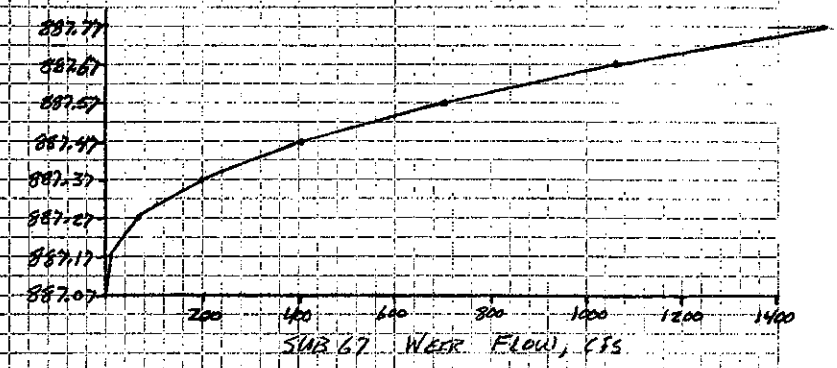
Orifice flow @ 889.9 = 661 cfs

∴ overtopping flow ≈ 776 - 661 = 115 cfs

SPRR STORAGE ROUTING

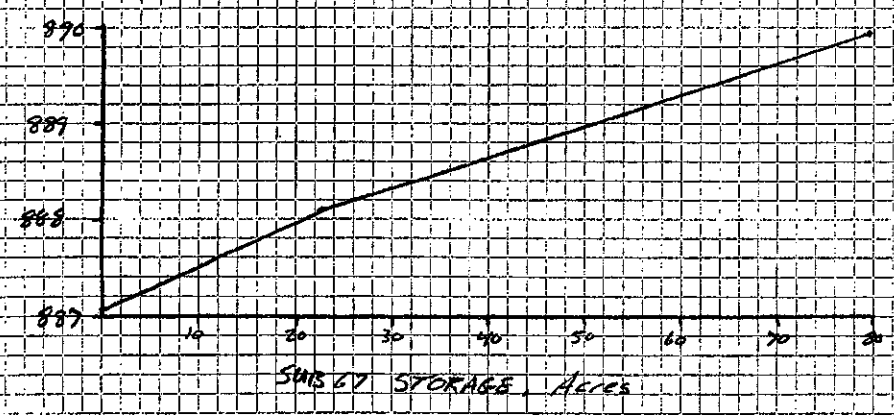
APACHE TO MILLER ROADS
(SUB 67 STORAGE ROUTING)

WSEL	ORIFICE	WEIR	ΣQ
881.5			0
883	42		42
884	91		91
885	135		135
886	168		168
887	195	0	195
887.2	201	25	226
887.3	204	110	314
887.4	205	260	465
887.5	207	500	707
887.6	210	800	1010
887.7	212	1200	1412
887.77	213	1490	1703



FROM STAGE - DISCHARGE DATA:

SA	0	24.7	79.8
SE	887.06	888.11	889.96



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CLIENT Buckeye FIS
PROJECT FCD 90-69
SUBJECT SPRR STORAGE ROUTING

DATE 5/22/92
BY CP
PROJECT NO. 28

APACHE TO MILLER ROADS

(SUB 67 STORAGE ROUTING)

HEC-1 INPUT CARDS:

RS	1	ELEV	881.5					
SA	0	0.03	0.06	0.1	3	8	12	15.5
SQ	0	42	135	200	226	465	1010	1703
SE	881.5	883	885	887.06	887.2	887.4	887.6	887.77

NOTE: OVERTOPING STARTS @ EL 887.08

$\boxed{Q = 226 \text{ cfs} \quad @ \quad 887.2}$ exact Overtopping

---

From HEC-1 output Max Routing discharge = 522 cfs @ 887.4

min RR ELEV = 887.1 ∴ Overtopping depth = 887.4 - 887.1 = 0.3

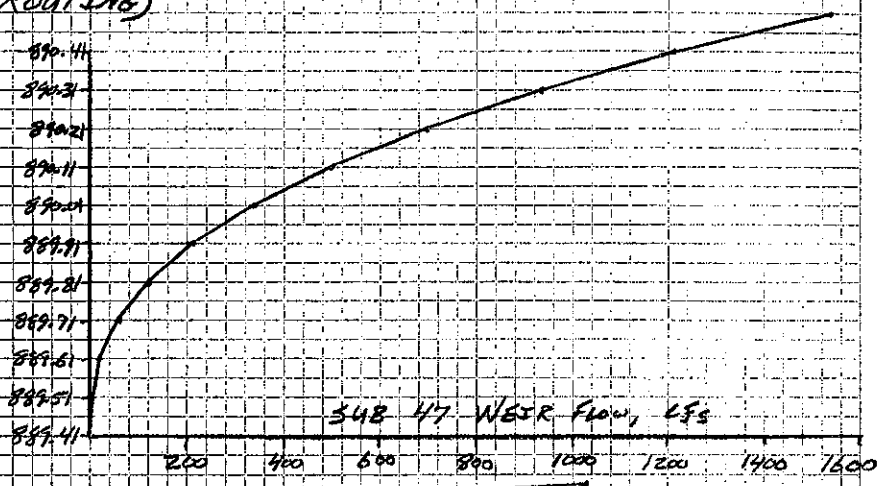
Orifice flow @ 887.4 = 205 cfs

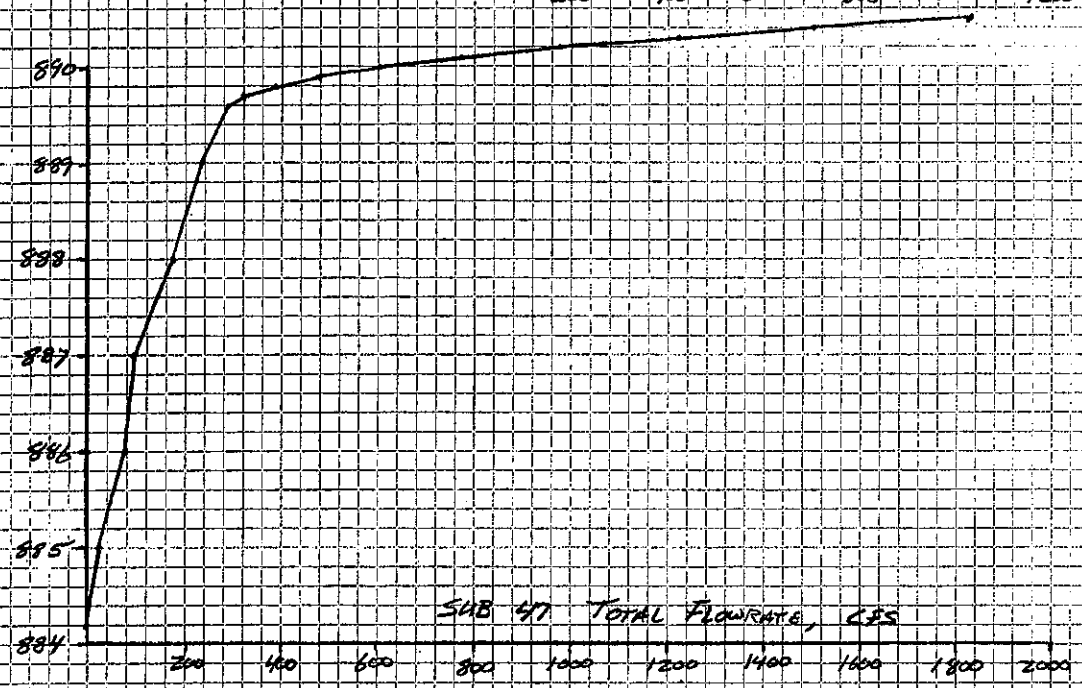
∴ Overtoping flow = 522 - 205 = 317 cfs

SPRR STORAGE ROUTING

MILLER TO ROOKS ROADS
(SUB 47 STORAGE ROUTING)

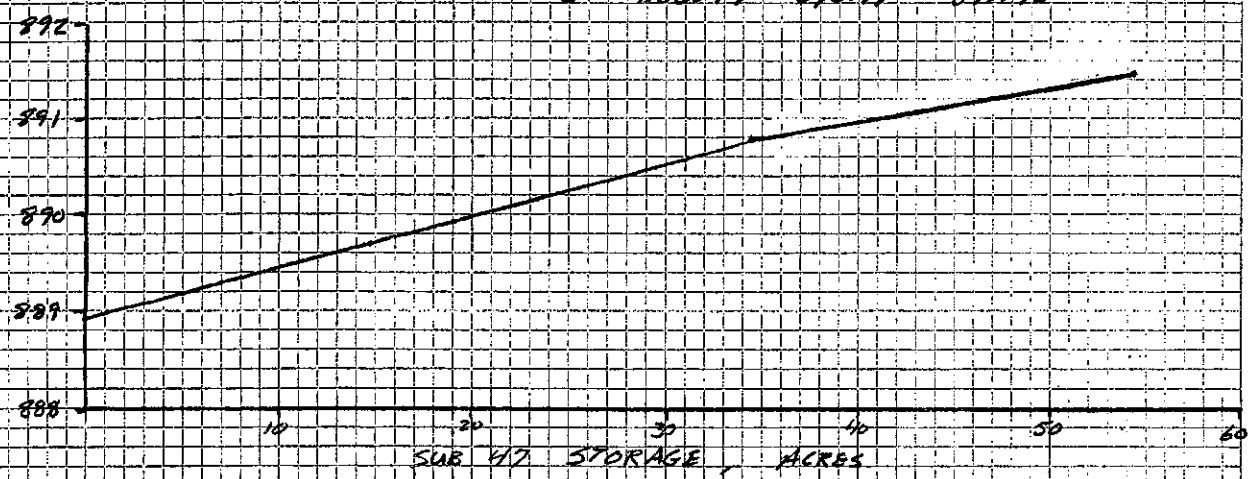
WSEL	ORRIFICE	WEIR	EQ
884.2			0
885	25		25
886	59		59
887	90		90
888	172		172
889	235		235
889.6	266	20	286
889.7	271	52	323
889.8	276	115	391
889.9	280	200	480
890.0	285	320	605
890.1	289	480	769
890.2	294	680	974
890.3	298	920	1218
890.4	304	1200	1504
890.5	308	1520	1828





FROM STAGE - STORAGE DATA:

SA	0	34.4	54.2
SE	888.94	890.79	891.45



GEORGE V. SABOL CONSULTING ENGINEERS, INC.

SHEET 10 OF 22
CLIENT BUCKEYE FIS
DATE 5/29/92
PROJECT FCD 90-69
BY DTP
SUBJECT SPRR STORAGE ROUTING
PROJECT NO. 29

MILLER TO ROOKS ROADS

(SUB 47 STORAGE ROUTING)

HEC-1 INPUT CARDS:

RS	1	ELEV	884.2						
SA	0	0.03	0.06	0.1	14.7	18.5	22.2	25.0	29.6
SQ	0	59	172	230	323	480	769	1218	1828
SE	884.2	886	888	888.94	889.7	889.9	890.1	890.3	890.5

NOTE: OVERTOPING STARTS @ EL 889.42

Q = 286 cfs @ 889.6 — expect OVERTOPING

---

from HEC-1 output — Max Routing discharge = 1180 cfs @ ≈ 890.05'

Min RR elev = 889.4 ∴ flow depth = 890.05 - 889.4 = 0.7

Orifice flow @ 890.05 = 287 cfs

∴ Overtoping flow = 1180 - 287 = 893 cfs

DTP for GUS

5/28/92

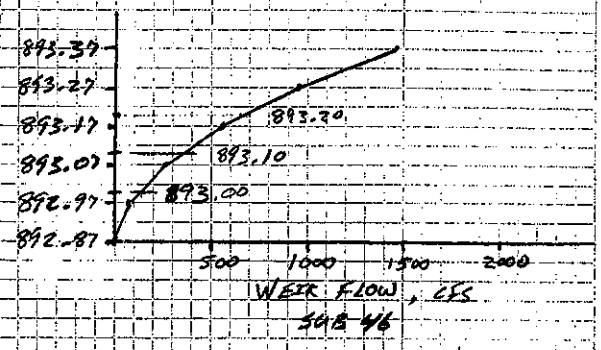
11/22

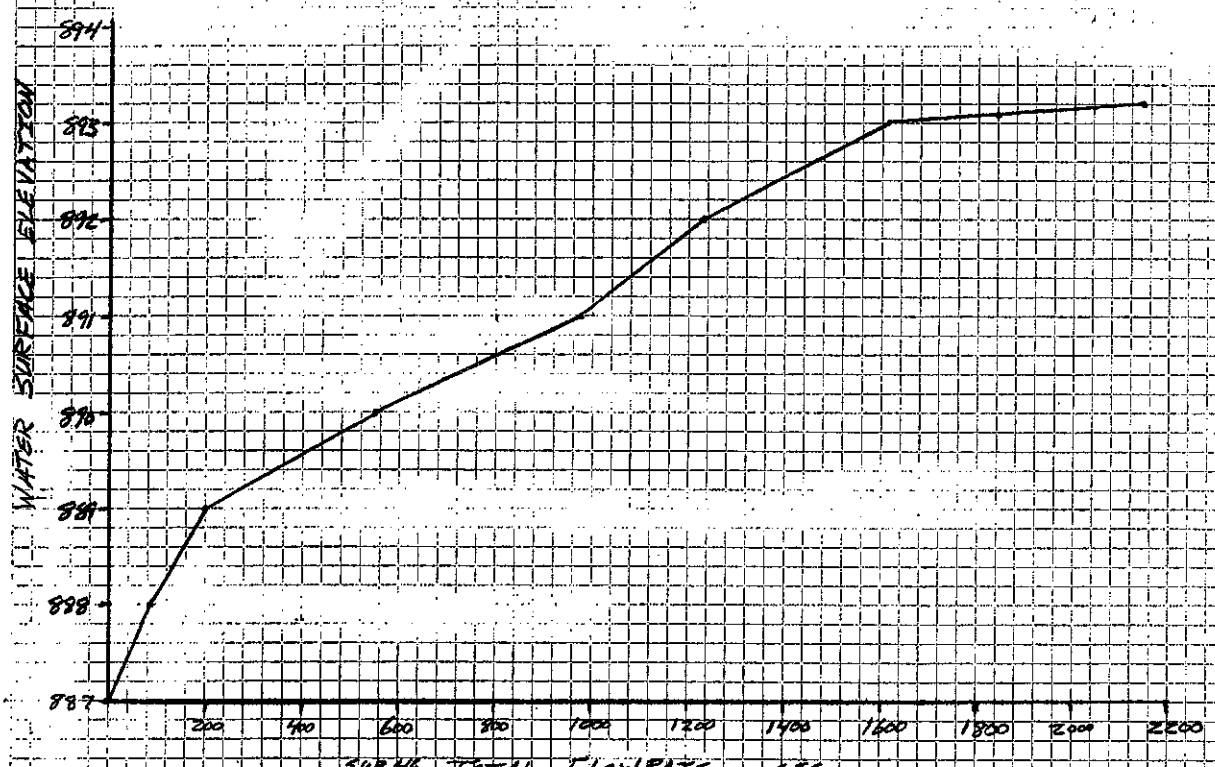
SPRR STORAGE ROUTING

ROCKS TO OGLESBY ROADS

(SUB 46 STORAGE ROUTING)

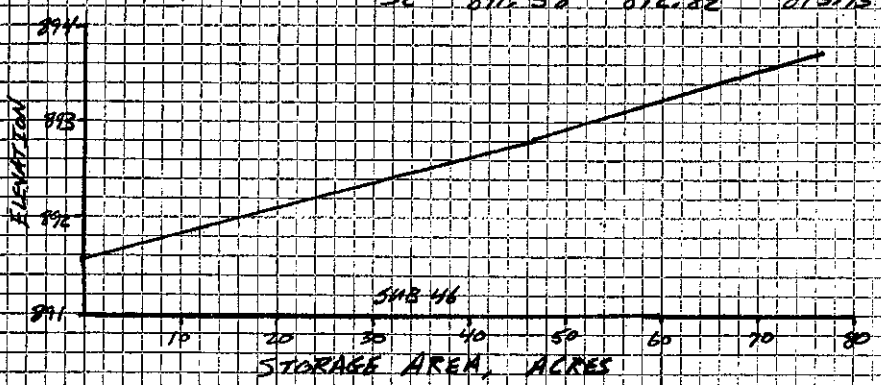
WSEL	ORIFICE	WEIR	ΣQ
887	0	0	0
888	85		85
889	200		200
890	555		555
891	975		975
892	1235		1235
893	1470	140	1610
893.1	1480	360	1840
893.2	1500	650	2150





FROM STAGE STORAGE DATA:

SA	0	46.5	76.3
SE	891.58	892.82	893.75



GEORGE V. SABOL CONSULTING ENGINEERS, INC.

SHEET 12 OF 22
DATE 5/28/92
BY DTP
PROJECT NO. 28

CLIENT Buckeye FIS
PROJECT FCD 90-69
SUBJECT SPRR Storage Routing

Rooks to Oglesby Roads

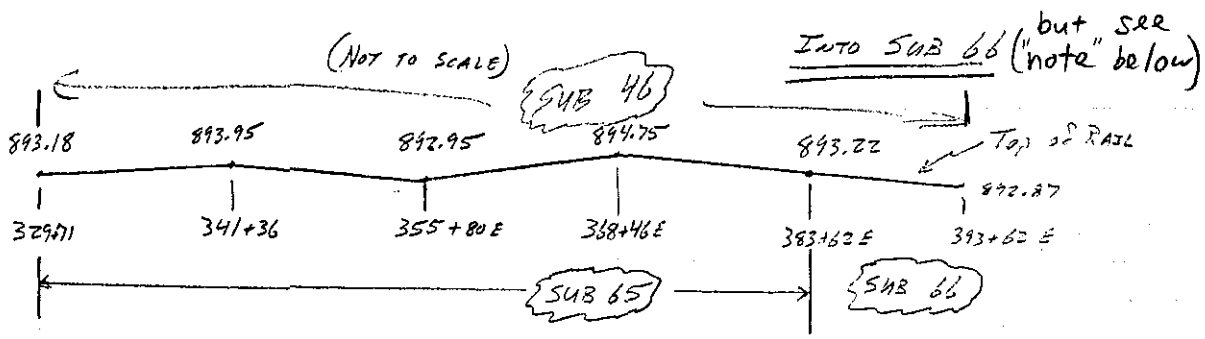
(Sub 46 Storage Routing)

HEC-1 Input Cards:

RS	1	ELEV	887					
SA	0	0.03	0.06	0.1	46.5	48	52	59
SQ	0	200	975	1120	1555	1565	1610	2150
SE	887	889	891	891.58	892.82	892.88	893	893.20

Diversion

Note: Overtoping Will Start @ EL 892.88



Overtopping into Sub 65 starts @ EL 892.95

Note: Expect flows less than 1500 cfs ∴ no overtopping

DTP for GUS

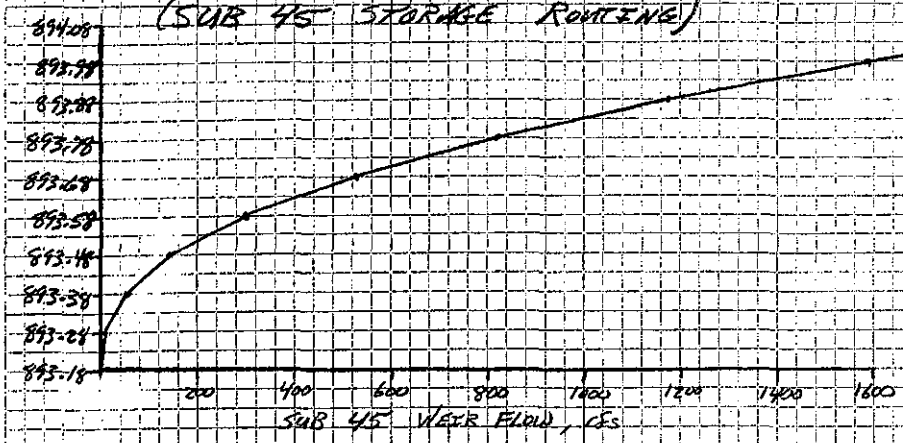
13/22

SPRR STORAGE ROUTING

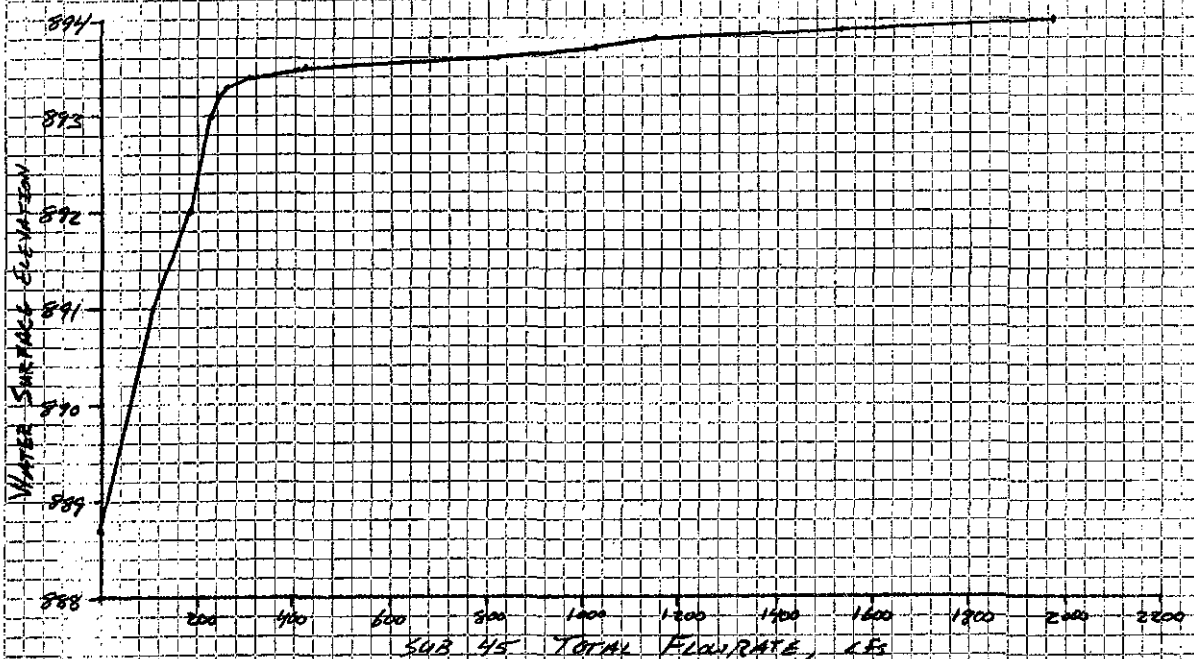
6/1/92

OGLESBY TO TURNER ROADS

(SUB 45 STORAGE ROUTING)

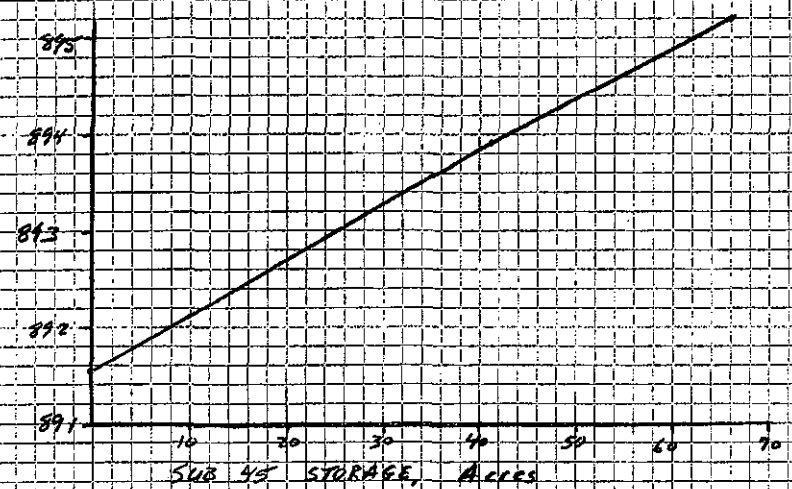


WSEL	ORIFICE	WEIR	EQ
888.7			0
891	110		110
892	183		183
893	230		230
893.2	239	2	241
893.3	243	15	258
893.4	248	60	308
893.5	251	170	421
893.6	255	570	825
893.7	260	770	1030
893.8	264	880	1144
893.9	267	1260	1527
894.0	270	1700	1970



FROM STAGE - STORAGE DATA:

SA	0	41.3	66.0
SE	891.55	893.72	895.20



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GEORGE V. SABOL CONSULTING ENGINEERS, INC.

CLIENT Buckeye FIS
PROJECT FED 90-69
SUBJECT SPRR Storage Routing

DATE 6/1/92
BY DTP
PROJECT NO. 28

OGLESBY TO TURNER ROADS:
(SUB 45 storage Routing)

HEC-1 INPUT CARDS

RS	1	ELEV	888.7				
SA	0	0.1	25	32	35.9	39	43
SQ	0	150	230	308	825	1144	1970
SE	888.7	891.55	893	893.4	893.6	893.8	894.0

NOTE: OVERTOPPING OCCURES @ EL 893.19 $\boxed{Q = 241 \text{ cfs} @ 893.2}$

∴ expect overtopping

Overtoping = 0.02'

From Hec-1 output MAX Routed flow = 828 cfs @ 893.6

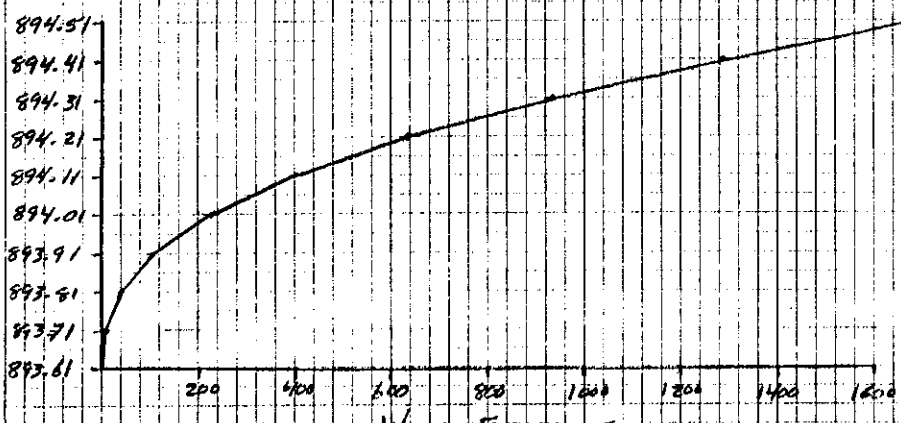
Min RR elev = 893.2 ∴ flow depth = 893.6 - 893.2 = 0.4'

Orifice flow @ 893.6 = 255 cfs

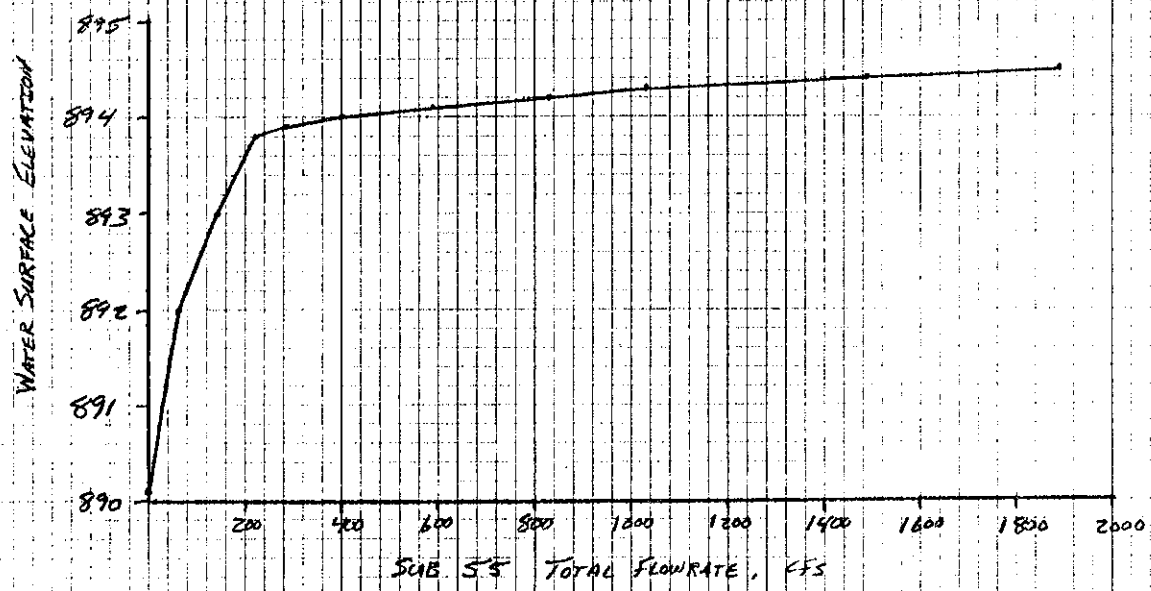
∴ Overtoping flow = 828 - 255 = 573 cfs

SPRR STORAGE ROUTING

TURNER RD. TO WILSON AVE.
(SUB 55 STORAGE ROUTING)

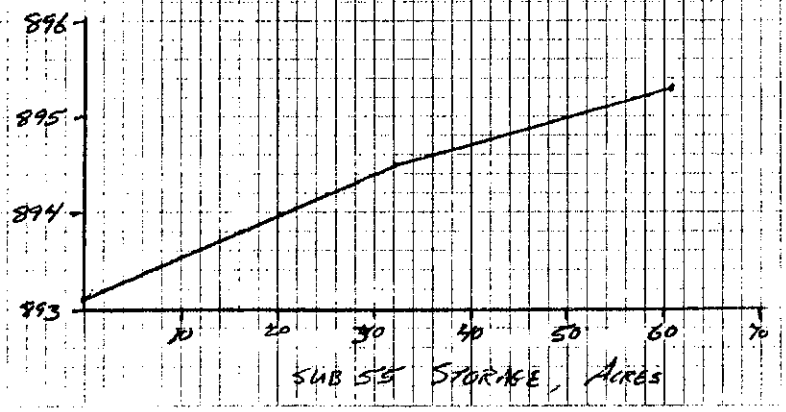


WSEL	ORIFICE	WEIR	ΣQ
890.1			0
892	60		60
893	143		143
893.8	181	40	221
893.9	185	100	285
894.0	190	210	400
894.1	195	395	590
894.2	200	630	830
894.3	204	930	1134
894.4	208	1280	1488
894.5	212	1680	1892



FROM STAGE-STORAGE DATA:

SA	0	32.1	63.7
SE	893.11	894.49	895.30



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GEORGE V. SABOL CONSULTING ENGINEERS, INC.

SHEET 16 OF 22
CLIENT Buckeye FIS
DATE 6/1/92
PROJECT FCD 90-69
BY DTP
SUBJECT SPRR Storage Routing
PROJECT NO. 28

TURNER RD TO WILSON AVE
(SUB 55 STORAGE ROUTING)

HEC-1 INPUT CARDS:

RS	1	ELEV	890.1						
SA	0	0.05	0.1	16.5	21	25.5	28	30	32.5
SQ	0	60	150	221	400	830	1134	1488	1892
SE	890.1	892	893.11	893.8	894	894.2	894.3	894.4	894.5

NOTE: Overtopping starts @ EL 893.62

Q = 221 cfs @ 893.8 Overtopping = 0.2'

---

from HEC-1 output

MAX Routed flow = 1074 cfs @ ~894.3'

MAX H_2O Depth = 894.3 - 893.6 = 0.7' (893.6 = min TR elev)

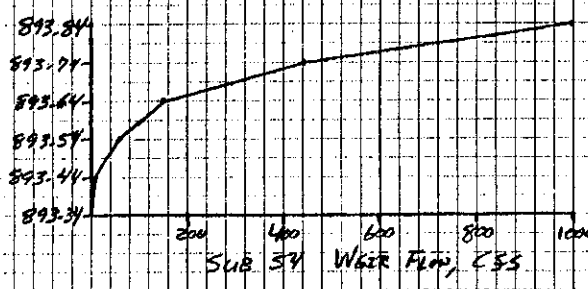
Orifice flow @ 894.3 = 204 cfs

∴ Overtopping flow = 1074 - 204 = 870 cfs

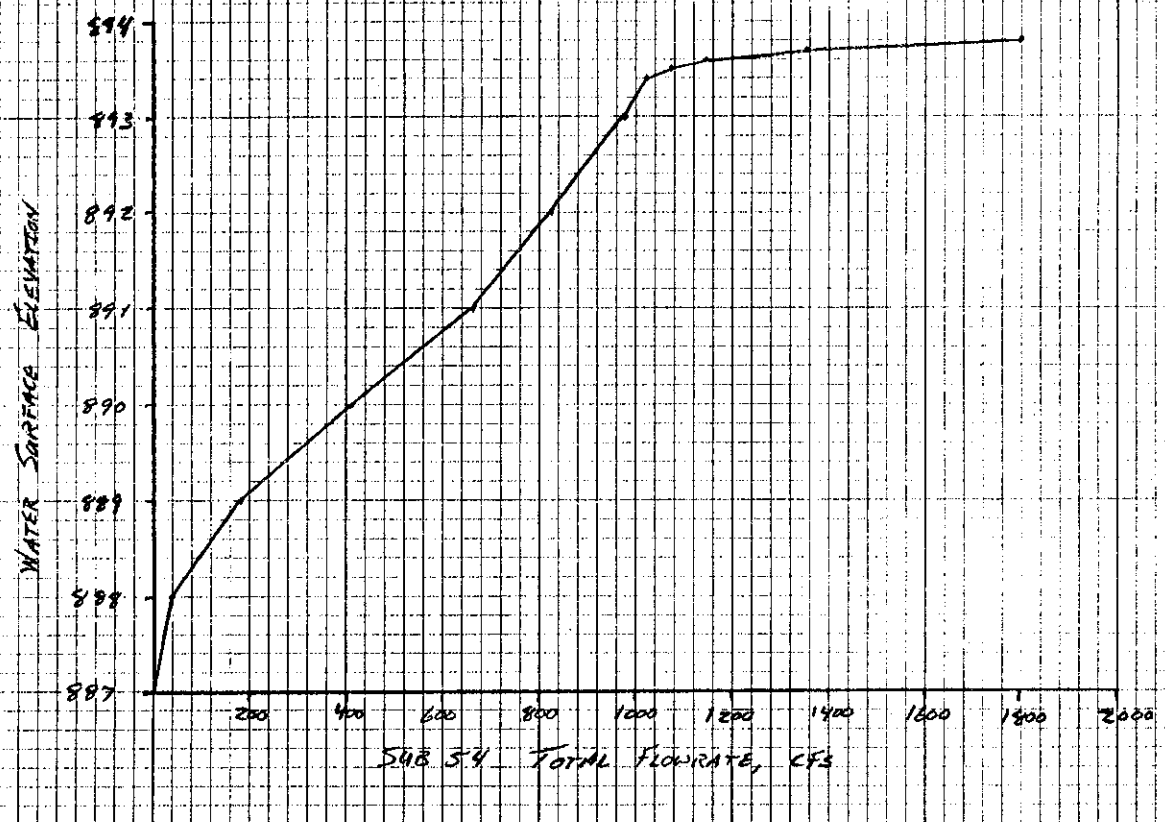
DTP for GVS 17/22
6/1/92

SPRR STORAGE ROUTING

WILSON AVE TO PALO VERDE RD
(SUB 54 STORAGE ROUTING)

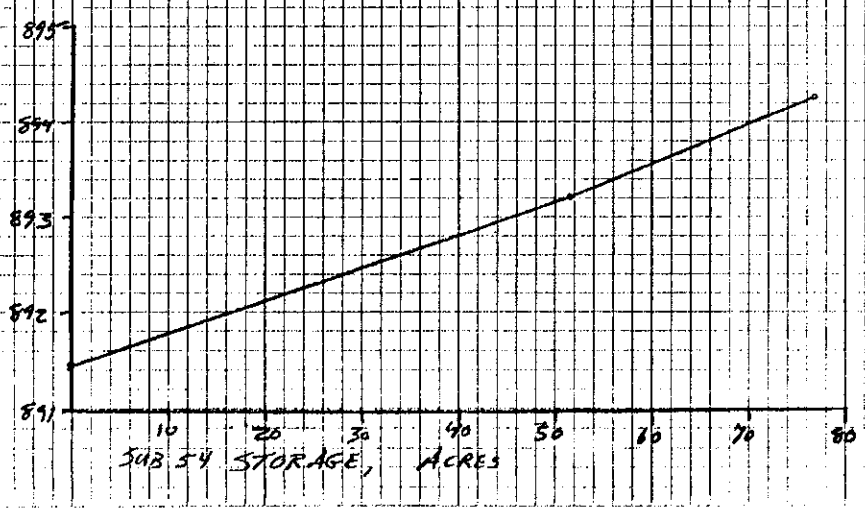


WSEL	ORIFICE	WEIR	EQ
887			0
888	40		40
889	155		155
890	410		410
891	660		660
892	825		825
893	975		975
893.4	1020	5	1025
893.5	1035	40	1075
893.6	1050	100	1150
893.7	1065	290	1355
893.8	1080	720	1800



FROM STAGE - STORAGE DATA:

SA	0	51.7	76.9
SE	891.43	893.22	894.24



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GEORGE V. SABOL CONSULTING ENGINEERS, INC.

SHEET 18 OF 22
CLIENT BUCKEYE FIS
DATE 6/1/92
PROJECT FCD 90-59
BY DTP
SUBJECT SPRR STORAGE ROUTING
PROJECT NO. 7R

WILSON AVE TO PALO VERDE RD

(SUB 54 STORAGE ROUTING)

HEC-1 INPUT CARDS:

RS	1	ELEV	887					
SA	0	0.05	0.1	56	58.5	61	63	66
SQ	0	185	720	1025	1075	1150	1355	1800
SE	887	889	891.43	893.4	893.5	893.6	893.7	893.8

NOTE: Overtopping starts @ EL 893.35

Q = 1025 cfs @ 893.4 0.05' overtopping

6/1/92

SPRR STORAGE ROUTING

PALO VERDE TO BRUNER ROADS

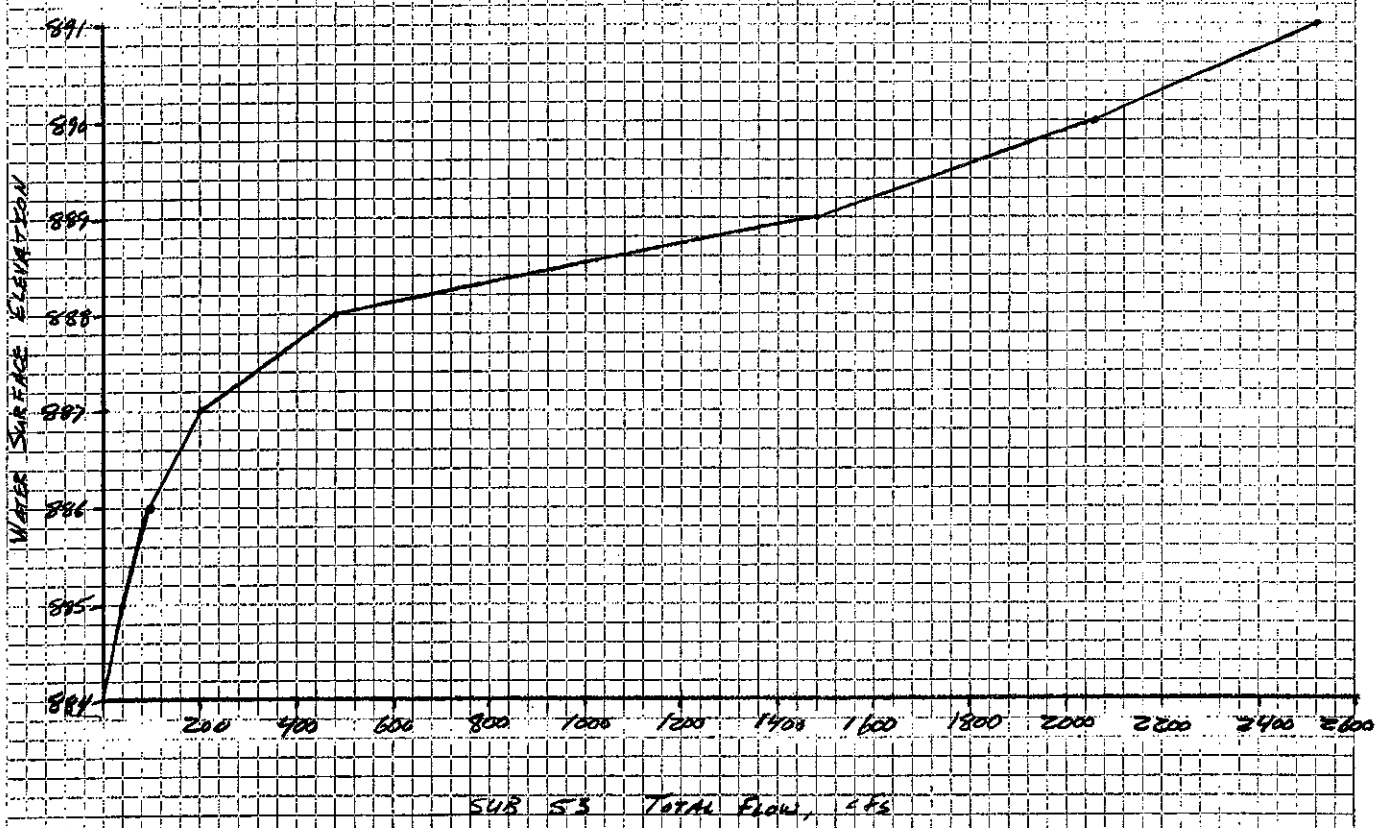
(SUB 53 STORAGE ROUTING)

SINCE ORRIFICE FLOW WILL handel more than the expected flow in this reach, weir flow was not added.

See pg 30 of SPRR OUTLET RUTING CURVES.

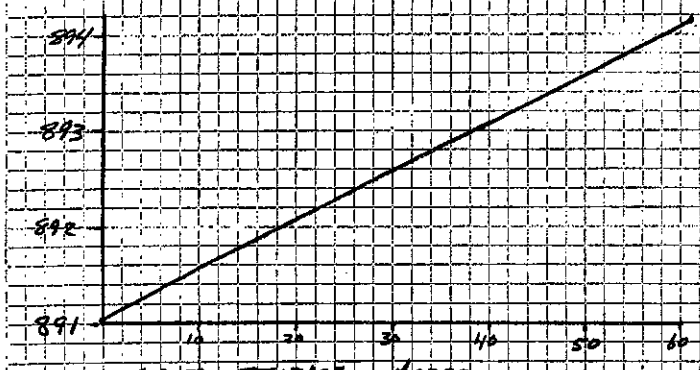
Q = 1520 cfs @ EL 891 ; WEIR flow starts @ EL 893.37

(This also solves the Diversion question - since OVERTOPING WILL NOT occur)



FROM STAGE-STORAGE DATA:

SA	0	39.3	61.1
SE	891.04	893.04	894.17



GEORGE V. SABOL CONSULTING ENGINEERS, INC.

CLIENT Buckeye FCS
DATE 6/1/92
PROJECT FCD 90-69
BY DTP
SUBJECT SPRR STORAGE ROUTING
PROJECT NO. 38

PALO VERDE TO BRUNER ROADS

(SUB 53 STORAGE ROUTING)

HEC-1 INPUT CARDS:

RS	1	ELEV	884					
SA	0	0.01	0.02	0.04	0.06	0.08	0.1	18.5
SQ	0	100	200	480	1480	2060	2520	2900
SE	884	886	887	888	889	890	891	892

NOTE: OVERTOPING WILL NOT OCCUR

OVERTOPING STARTS @ EL 893.38

GEORGE V. SABOL CONSULTING ENGINEERS, INC.

SHEET 21 OF 22
DATE 6/1/92
BY DTP
PROJECT NO. 28

CLIENT BFIS
PROJECT FCD 90-69
SUBJECT SPRR STORAGE ROUTING

BRUNER TO JOHNSON ROADS
(SUB 52 STORAGE ROUTING)

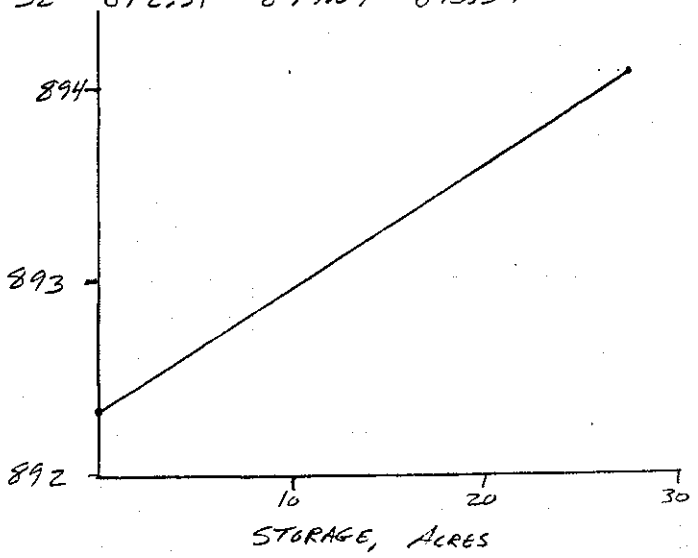
OVERTOPING or WEIR FLOW WILL NOT OCCUR as Orifice Flow is 2670 cfs @ EL 890 and Bottom of Rail is @ EL 892.57.

See pg 36 of SPRR OUTLET RATING CURVES for TOTAL FLOW CURVE.

WSEL	ORIFICE	WEIR	ΣQ
882	0	0	0
883	15	0	15
884	45	0	45
885	80	0	80
886	120	0	120
887	230	0	230
888	1145	0	1145
889	1980	0	1980
890	2670	0	2670

from Stage - Storage Data:

SA	0	27.5	62.0
SE	892.31	894.07	895.57



HEC-1 INPUT CARDS:

RS	1	ELEV	882				
SA	0	0.01	0.02	0.04	0.06	0.08	0.1
SQ	0	80	120	230	1145	1980	2670
SE	882	885	886	887	888	889	890

GEORGE V. SABOL CONSULTING ENGINEERS, INC.

CLIENT BFIS
DATE 6/1/92
PROJECT FCD 90-69
BY DTP
SUBJECT SPRR STORAGE ROUTING
PROJECT NO. 28

JOHNSON ROAD TO END

(SUB 68 STORAGE ROUTING)

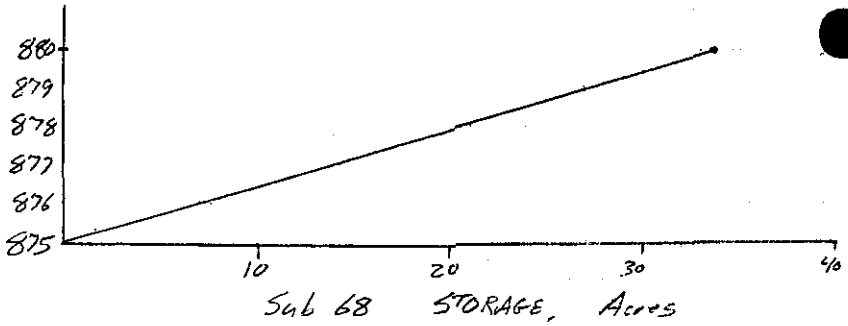
NOTE: RR Trestle #24 is large enough and also low enough to handle more than the expected flow, thus OVERTOPPING WILL NOT OCCUR.

from SPRR outlet rating curves (pg 40):

WSEL	Q
871	0
872	100
873	240
874	360
875	480
876	600
877	1020
878	2000
879	2760

From Stage-Storage Data:

SA	0	33.8	72.7
SE	875	880	890



HEC-1 INPUT CARDS:

```
RS   1   ELEV   871
SA   0   0.01   0.03   0.06   0.1   7.2   14   20.5   27.5
SQ   0   100   240   360   480   600   1020   2000   2760
SE   871   872   873   874   875   876   877   878   879
```

APPENDIX N

HEC-1 OUTPUT FOR THE 100-YR, 6-HR MODEL

```
1****************************************
*                                      *
*   FLOOD HYDROGRAPH PACKAGE  (HEC-1)  *
*          SEPTEMBER 1990              *
*           VERSION 4.0                *
*                                      *
* RUN DATE  06/15/1992  TIME  15:59:42 *
*                                      *
****************************************
```

```
****************************************
*                                      *
*   U.S. ARMY CORPS OF ENGINEERS       *
*   HYDROLOGIC ENGINEERING CENTER      *
*         609 SECOND STREET            *
*      DAVIS, CALIFORNIA 95616         *
*          (916) 756-1104              *
*                                      *
****************************************
```

APPENDIX N

100 YR 6 HR MODEL

filenames: input BFIS6D.DAT
output BFIS6D.OUT

```
X     X  XXXXXXX   XXXXX          X
X     X  X        X     X        XX
X     X  X        X              X
XXXXXXX  XXXX     X       XXXXX  X
X     X  X        X              X
X     X  X        X     X        X
X     X  XXXXXXX   XXXXX         XXX
```

THIS PROGRAM REPLACES ALL PREVIOUS VERSIONS OF HEC-1 KNOWN AS HEC1 (JAN 73), HEC1GS, HEC1DB, AND HEC1KW.

THE DEFINITIONS OF VARIABLES -RTIMP- AND -RTIOR- HAVE CHANGED FROM THOSE USED WITH THE 1973-STYLE INPUT STRUCTURE.
THE DEFINITION OF -AMSKK- ON RM-CARD WAS CHANGED WITH REVISIONS DATED 28 SEP 81. THIS IS THE FORTRAN77 VERSION
NEW OPTIONS: DAMBREAK OUTFLOW SUBMERGENCE , SINGLE EVENT DAMAGE CALCULATION, DSS:WRITE STAGE FREQUENCY,
DSS:READ TIME SERIES AT DESIRED CALCULATION INTERVAL LOSS RATE:GREEN AND AMPT INFILTRATION
KINEMATIC WAVE: NEW FINITE DIFFERENCE ALGORITHM

1 HEC-1 INPUT PAGE 1

```
LINE          ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10

              *DIAGRAM
  1           ID   BUCKEYE FIS, D.T. PHELPS FOR G.V. SABOL  12 JUNE 92
  2           ID   100 YEAR 6 HOUR LOCAL STORM WITH A DEPTH OF 3.3 INCHES
  3           ID   ENTIRE STUDY AREA MODEL
  4           ID   MODEL D    ADDED STORAGE ROUTING TO SPRR, RC & BC
  5           IT      15                    150
  6           IO       5
  7           IN      15
  8           JD    3.30    0.01
  9           PC    .000    .008    .016    .025    .033    .041    .050    .058    .066    .074
 10           PC    .087    .099    .118    .138    .216    .377    .834    .911    .931    .950
 11           PC    .962    .972    .983    .991   1.000
 12           JD    3.28    0.50
 13           JD    3.23    2.80
 14           PC    .000    .009    .016    .025    .034    .042    .051    .059    .067    .076
 15           PC    .087    .100    .120    .163    .252    .451    .694    .837    .900    .938
 16           PC    .950    .963    .975    .988   1.000
 17           JD    3.04    16.0
 18           PC    .000    .015    .020    .030    .048    .063    .076    .090    .105    .119
 19           PC    .135    .152    .175    .222    .304    .472    .670    .796    .868    .912
 20           PC    .946    .960    .973    .987   1.000
 21           JD    2.79    61.0
```

```
22          PC    .000    .020    .032    .046    .066    .082    .098    .117    .134    .151
23          PC    .169    .190    .219    .268    .351    .494    .661    .778    .847    .893
24          PC    .931    .948    .966    .983   1.000

25          KK      76
26          KM   ******************************************************************************
27          KM   ************************   SUB-WATERSHED A   ********************************
28          KM   ******************************************************************************
29          KM   BASIN 76
30          KM    THE FOLLOWING PARAMETERS WERE PROVIDED FOR THIS BASIN
31          KM    L=     0.38  Lca=     0.23   S=   50.0  Kn= .050  LAG=  14.0
32          KM    PHOENIX VALLEY S-GRAPH WAS USED FOR THIS BASIN
33          BA     .06
34          LG     .35     .35    3.61    .285     .00
35          UI     89.     64.      0.      0.      0.      0.      0.      0.      0.      0.

36          KK  RA1-A2
37          KM   ROUTE RUNOFF FROM BASIN 76 CONCENTRATED AT A1 TO A2 (CHANNEL C)
38          RD
39          RC    .035    .035    .035    2500    .004
40          RX       0       2      12     112     212     312     412     512
41          RY       5       5       0       1       2       3       4       5

42          KK      75
43          KM   BASIN 75
44          KM    THE FOLLOWING PARAMETERS WERE PROVIDED FOR THIS BASIN
45          KM    L=     1.89  Lca=     0.92   S=   29.0  Kn= .050  LAG=  47.0
46          KM    PHOENIX VALLEY S-GRAPH WAS USED FOR THIS BASIN
47          BA     .54
48          LG     .35     .35    3.55    .274     .00
49          UI     65.    204.    365.    374.    222.     94.     46.     12.     12.      0.
```



```
LINE        ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10


50          KK     @A2
51          KM   COMBINE ROUTED HYDROGRAPH FROM A1 WITH RUNOFF FROM 75 @A2
52          HC       2

53          KK  RA2-A3
54          KM   ROUTE COMBINED HYDROGRAPH FROM A2 TO A3  (CHANNEL C)
55          RD
56          RC    .035    .035    .035    4500    .004
57          RX       0       2      12     112     212     312     412     512
58          RY       5       5       0       1       2       3       4       5

59          KK      73
60          KM   BASIN 73
61          KM    THE FOLLOWING PARAMETERS WERE PROVIDED FOR THIS BASIN
62          KM    L=     2.75  Lca=     1.67   S=   33.0  Kn= .050  LAG=  66.0
63          KM    PHOENIX VALLEY S-GRAPH WAS USED FOR THIS BASIN
64          BA    2.06
65          LG     .35     .35    3.77    .317     .00
66          UI    105.    421.    634.    958.   1186.    806.    561.    291.    164.     93.
67          UI     32.     32.     32.      0.      0.      0.      0.      0.      0.      0.

68          KK     @A3
69          KM   COMBINE ROUTED HYDROGRAPH FROM A2 WITH RUNOFF FROM 73 AT A3
70          HC       2
```

```
 71          KM   ******************************************************************************
 72          KM   **************************   SUB-WATERSHED B   ******************************
 73          KM   ******************************************************************************

 74          KK      78
 75          KM   BASIN 78
 76          KM    THE FOLLOWING PARAMETERS WERE PROVIDED FOR THIS BASIN
 77          KM    L=     1.02  Lca=     0.59   S=   59.0  Kn= .050  LAG=  27.0
 78          KM    PHOENIX VALLEY S-GRAPH WAS USED FOR THIS BASIN
 79          BA     .41
 80          LG     .35     .35    3.61    .285     .00
 81          UI    158.    485.    322.     81.     17.      0.      0.      0.      0.      0.
 82          KM   ******************************************************************************
 83          KM   *************************  SUB-WATERSHED C  ******************************
 84          KM   ******************************************************************************

 85          KK      79
 86          KM   BASIN 79
 87          KM    THE FOLLOWING PARAMETERS WERE PROVIDED FOR THIS BASIN
 88          KM    L=     1.63  Lca=     1.11   S=   42.0  Kn= .050  LAG=  44.0
 89          KM    PHOENIX VALLEY S-GRAPH WAS USED FOR THIS BASIN
 90          BA     .78
 91          LG     .35     .35    3.61    .285     .00
 92          UI    108.    332.    615.    505.    282.    104.     42.     18.      0.      0.
 93          KM   ******************************************************************************
 94          KM   ************************  SUB-WATERSHED D  ********************************
 95          KM   ******************************************************************************
```



```
LINE         ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10

 96          KK      74
 97          KM   BASIN 74
 98          KM    THE FOLLOWING PARAMETERS WERE PROVIDED FOR THIS BASIN
 99          KM    L=      3.1  Lca=      1.5   S=   30.0  Kn= .050  LAG=  69.0
100          KM    PHOENIX VALLEY S-GRAPH WAS USED FOR THIS BASIN
101          BA    2.69
102          LG     .35     .35    3.87     .34     .00
103          UI    131.    498.    761.   1095.   1549.   1094.    773.    492.    225.    151.
104          UI     66.     40.     40.      0.      0.      0.      0.      0.      0.      0.

105          KK      77
106          KM   BASIN 77
107          KM    THE FOLLOWING PARAMETERS WERE PROVIDED FOR THIS BASIN
108          KM    L=     1.14  Lca=     0.38   S=   25.0  Kn= .050  LAG=  28.0
109          KM    PHOENIX VALLEY S-GRAPH WAS USED FOR THIS BASIN
110          BA     .23
111          LG     .35     .35    4.08     .38     .00
112          UI     82.    255.    188.     52.     12.      0.      0.      0.      0.      0.

113          KK     @D1
114          KM   COMBINE RUNOFF FROM 74 WITH RUNOFF FROM 77 AT D1
115          HC       2

116          KK  RD1-D2
117          KM   ROUTE COMBINED HYDROGRAPH FROM D1 TO D2  (CHANNEL D)
118          RD
119          RC     .05     .05     .05    7200    .006
120          RX       0     200     250     260     280     290     340     540
```

```
121          RY      10       6       5       0       0       5       6      10

122          KK      80
123          KM   BASIN 80
124          KM    THE FOLLOWING PARAMETERS WERE PROVIDED FOR THIS BASIN
125          KM    L=     1.42  Lca=     0.73   S=   31.0  Kn= .050  LAG=  38.0
126          KM    PHOENIX VALLEY S-GRAPH WAS USED FOR THIS BASIN
127          BA     .64
128          LG     .38     .29    4.03    .414     .00
129          UI    123.    360.    609.    359.    137.     47.     17.      0.      0.      0.

130          KK     @D2
131          KM   COMBINE ROUTED HYDROGRAPH FROM D1 WITH RUNOFF FROM 80 AT D2
132          HC       2

133          KK  RD2-D3
134          KM   ROUTE COMBINED HYDROGRAPH FROM D2 TO D3  (CHANNEL D)
135          RD
136          RC     .05     .05     .05    5300    .008
137          RX       0     200     250     260     280     290     340     540
138          RY      10       6       5       0       0       5       6      10
```



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LINE         ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10


139          KK      81
140          KM   BASIN 81
141          KM    THE FOLLOWING PARAMETERS WERE PROVIDED FOR THIS BASIN
142          KM    L=     1.04  Lca=     0.62   S=   31.0  Kn= .050  LAG=  32.0
143          KM    PHOENIX VALLEY S-GRAPH WAS USED FOR THIS BASIN
144          BA     .63
145          LG     .40     .26    4.08    .447     .00
146          UI    172.    530.    597.    238.     68.     20.      0.      0.      0.      0.

147          KK     @D3
148          KM   COMBINE ROUTED HYDROGRAPH FROM D2 WITH RUNOFF FROM 81 AT D3
149          HC       2

150          KK  RD3-D4
151          KM   ROUTE COMBINED HYDROGRAPH FROM D3 TO D4  (CHANNEL D)
152          RD
153          RC     .05     .05     .05    5200    .005
154          RX       0     200     250     260     280     290     340     540
155          RY      10       6       5       0       0       5       6      10

156          KK      82
157          KM   BASIN 82
158          KM    THE FOLLOWING PARAMETERS WERE PROVIDED FOR THIS BASIN
159          KM    L=     1.06  Lca=      0.8   S=   32.0  Kn= .050  LAG=  35.0
160          KM    PHOENIX VALLEY S-GRAPH WAS USED FOR THIS BASIN
161          BA    .258
162          LG     .39     .27    4.03     .40     .00
163          UI     59.    172.    253.    125.     38.     11.      0.      0.      0.      0.

164          KK     @D4
165          KM   COMBINE ROUTED HYDROGRAPH FROM D3 WITH RUNOFF FROM 82 AT D4
166          HC       2

167          KK   HASSY
```

```
168        KM   COMBINE HYDROGRAPHS THAT DRAIN DIRECTLY TO THE HASSAYAMPA RIVER
169        HC       4
170        KM   ******************************************************************************
171        KM   ******************************** SUB-WATERSHED E  ****************************
172        KM   ******************************************************************************

173        KK      68
174        KM   BASIN 68
175        KM    THE FOLLOWING PARAMETERS WERE PROVIDED FOR THIS BASIN
176        KM    L=       .9  Lca=       .4   S=   46.0  Kn= .200  LAG=  96.0
177        KM    PHOENIX VALLEY S-GRAPH WAS USED FOR THIS BASIN
178        BA     .28
179        LG     .50     .08    3.98     .56     .00
180        UI     10.     22.     44.     57.     72.    104.    112.     84.     66.     51.
181        UI     35.     18.     15.     10.      5.      3.      3.      3.      3.      0.
1                                          HEC-1 INPUT                                          PAGE  5

LINE       ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10


182        KK  SR@S-E
183        KM   STORAGE ROUTE AT SPRR BETWEEN EOC AND JOHNSON ROAD (SUB 68 SR)
184        KM   OVERTOPING WILL NOT OCCUR (All flow values are for orrifice flow)
185        RS       1    ELEV     871
186        SA       0     .01     .03     .06      .1     7.2      14    20.5    27.5
187        SQ       0     100     240     360     480     600    1020    2000    2760
188        SE     871     872     873     874     875     876     877     878     879

189        KK  RE1-E2
190        KM   ROUTE RUNOFF FROM SPRR AT E1 TO E2  (CHANNEL A)
191        RD    1200    .002     .10            TRAP       0     100

192        KK      59
193        KM   BASIN 59
194        KM    THE FOLLOWING PARAMETERS WERE PROVIDED FOR THIS BASIN
195        KM    L=       .57  Lca=      .28   S=   46.0  Kn= .200  LAG=  69.0
196        KM    PHOENIX VALLEY S-GRAPH WAS USED FOR THIS BASIN
197        BA     .24
198        LG     .50     .08    4.24     .65     .00
199        UI     12.     44.     67.     96.    136.     96.     68.     43.     20.     13.
200        UI      6.      4.      4.      0.      0.      0.      0.      0.      0.      0.

201        KK     @E2
202        KM   COMBINE ROUTED HYDROGRAPH FROM E1 WITH RUNOFF FROM 59 AT E2
203        HC       2

204        KK  SR@B-E
205        KM   STORAGE ROUTE AT BUCKEYE CANAL BETWEEN JOHNSON ROAD AND EOC (SUB 59 SR)
206        RS       1    ELEV   866.2
207        SA       0     .02     .04     .06     .08      .1     1.8     4.9       8    11.1
208        SQ       0       2      22      75     169     320     541    1237    2289    3704
209        SE   866.2   866.3   866.4   866.5   866.6   866.7   866.8   867.0   867.2   867.4
210        KM   ******************************************************************************
211        KM   ******************************  SUB-WATERSHED F  ***************************
212        KM   ******************************************************************************

213        KK      15
214        KM   BASIN 15
215        KM    THE FOLLOWING PARAMETERS WERE PROVIDED FOR THIS BASIN
216        KM    L=       2.1  Lca=      1.1   S=   30.0  Kn= .200  LAG= 205.0
```

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217          KM    PHOENIX VALLEY S-GRAPH WAS USED FOR THIS BASIN
218          BA    1.33
219          LG     .44     .18    4.03     .50     .00
220          UI     22.     22.     22.     65.     84.    103.    115.    127.    141.    160.
221          UI    178.    221.    273.    268.    225.    198.    179.    160.    141.    127.
222          UI    111.     98.     76.     56.     39.     37.     36.     28.     22.     22.
223          UI     15.      7.      7.      7.      7.      7.      7.      7.      7.      7.

224          KK  SR@R-F
225          KM   STORAGE ROUTE AT THE ROOSEVELT CANAL BETWEEN BRUNER & JOHNSON ROADS (SUB 15)
226          RS      1    ELEV  982.04
227          SA      0      43      49      55      61      66      78      90     102
228          SQ      0       0      13      73     198     391     997    1931    3231
229          SE  982.04   982.8   982.9   983.0   983.1   983.2   983.4   983.6   983.8
1                                          HEC-1 INPUT                                                    PAGE  6

LINE         ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10


230          KK  RF1-F2
231          KM   ROUTE HYDROGRAPH AT ROOSEVELT CANAL FROM F1 TO F2 (CHANNEL A)
232          RD    2600    .004     .10            TRAP       0     100

233          KK      27
234          KM   BASIN 27
235          KM    THE FOLLOWING PARAMETERS WERE PROVIDED FOR THIS BASIN
236          KM    L=       .7  Lca=       .3   S=   15.0  Kn= .200  LAG=  98.0
237          KM    PHOENIX VALLEY S-GRAPH WAS USED FOR THIS BASIN
238          BA     .23
239          LG     .50     .08    4.24     .65     .00
240          UI      8.     17.     35.     46.     57.     80.     95.     71.     56.     44.
241          UI     32.     17.     13.      8.      6.      2.      2.      2.      2.      0.

242          KK     @F2
243          KM   COMBINE ROUTED HYDROGRAPH FROM ROOSEVELT CANAL WITH RUNOFF FROM 27 AT F2
244          HC      2

245          KK  RF2-F3
246          KM   ROUTE COMBINED HYDROGRAPH FROM F2 TO F3 (CHANNEL A)
247          RD    5280    .006     .10            TRAP       0     100

248          KK      29
249          KM   BASIN 29
250          KM    THE FOLLOWING PARAMETERS WERE PROVIDED FOR THIS BASIN
251          KM    L=      1.5  Lca=       .8   S=   24.0  Kn= .200  LAG= 165.0
252          KM    PHOENIX VALLEY S-GRAPH WAS USED FOR THIS BASIN
253          BA    1.00
254          LG     .50     .08    4.24     .65     .00
255          UI     20.     20.     42.     75.     97.    112.    126.    146.    169.    220.
256          UI    263.    217.    184.    163.    140.    122.    103.     87.     63.     38.
257          UI     35.     34.     21.     20.     15.      6.      6.      6.      6.      6.
258          UI      6.      6.      0.      0.      0.      0.      0.      0.      0.      0.

259          KK     @F3
260          KM   COMBINE ROUTED HYDROGRAPH FROM F2 WITH RUNOFF FROM 29 AT F3
261          HC      2

262          KK  RF3-F4
263          KM   ROUTE COMBINED HYDROGRAPH FROM F3 TO F4  (CHANNEL A)
264          RD    5280    .006     .10            TRAP       0     100
```

```
265          KK      41
266          KM   BASIN 41
267          KM    THE FOLLOWING PARAMETERS WERE PROVIDED FOR THIS BASIN
268          KM    L=      1.5  Lca=       .8   S=   24.0  Kn= .200  LAG= 166.0
269          KM    PHOENIX VALLEY S-GRAPH WAS USED FOR THIS BASIN
270          BA    1.21
271          LG     .50     .08    4.30     .66     .00
272          UI     25.     25.     50.     90.    116.    133.    151.    174.    201.    262.
273          UI    314.    265.    223.    197.    170.    148.    126.    107.     78.     49.
274          UI     42.     40.     28.     25.     20.      8.      8.      8.      8.      8.
275          UI      8.      8.      8.      0.      0.      0.      0.      0.      0.      0.
```



```
LINE         ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10

276          KK     @F4
277          KM   COMBINE ROUTED HYDROGRAPH FROM F3 WITH RUNOFF FROM 41 AT F4
278          HC       2

279          KK  RF4-F5
280          KM   ROUTE COMBINED HYDROGRAPH FROM F4 TO F5  (CHANNEL A)
281          RD   3200    .005     .10            TRAP       0     100

282          KK      52
283          KM   BASIN 52
284          KM    THE FOLLOWING PARAMETERS WERE PROVIDED FOR THIS BASIN
285          KM    L=      1.5  Lca=       .8   S=   21.0  Kn= .200  LAG= 171.0
286          KM    PHOENIX VALLEY S-GRAPH WAS USED FOR THIS BASIN
287          BA     .82
288          LG     .50     .08    4.24     .65     .00
289          UI     16.     16.     30.     58.     74.     86.     96.    110.    126.    158.
290          UI    203.    186.    155.    135.    120.    103.     90.     77.     62.     42.
291          UI     28.     27.     25.     16.     16.     10.      5.      5.      5.      5.
292          UI      5.      5.      5.      5.      0.      0.      0.      0.      0.      0.

293          KK     @F5
294          KM   COMBINE ROUTED HYDROGRAPH FROM F4 WITH RUNOFF FROM 52 AT F5
295          HC       2

296          KK  SR@S-F
297          KM   STORAGE ROUTE AT SPRR BETWEEN BRUNER AND JOHNSON ROADS (SUB 52)
298          KM   OVERTOPPING WILL NOT OCCUR (All flow is orrifice flow)
299          RS       1    ELEV     882
300          SA       0     .01     .02     .04     .06     .08      .1
301          SQ       0      80     120     230    1145    1980    2670
302          SE     882     885     886     887     888     889     890

303          KK  RF5-F6
304          KM   ROUTE HYDROGRAPH FROM SPRR @ F5 TO F6  (CHANNEL A)
305          RD   3500    .006     .10            TRAP       0     100

306          KK      60
307          KM   BASIN 60
308          KM    THE FOLLOWING PARAMETERS WERE PROVIDED FOR THIS BASIN
309          KM    L=      1.4  Lca=       .7   S=   13.0  Kn= .200  LAG= 177.0
310          KM    PHOENIX VALLEY S-GRAPH WAS USED FOR THIS BASIN
311          BA    1.15
312          LG     .50     .08    4.19     .63     .00
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313        UI     22.     22.     36.     77.     97.    113.    127.    144.    165.    196.
314        UI    255.    276.    225.    195.    174.    151.    132.    114.     99.     74.
315        UI     50.     39.     36.     31.     22.     22.     13.      7.      7.      7.
316        UI      7.      7.      7.      7.      7.      0.      0.      0.      0.      0.

317        KK     @F6
318        KM   COMBINE ROUTED HYDROGRAPH FROM F5 WITH RUNOFF FROM 60 AT F6
319        HC      2
1                                        HEC-1 INPUT                                          PAGE  8

LINE       ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10


320        KK  SR@B-F
321        KM   STORAGE ROUTE AT THE BUCKEYE CANAL BETWEEN BRUNER AND JOHNSON ROADS (SUB 60)
322        RS      1    ELEV  870.66
323        SA      0       1     4.5       8      11    14.5      18    24.5      31      38
324        SQ      0       0       1      13      41      91     165     484    1192    2436
325        SE  870.66   870.7   870.8   870.9     871   871.1   871.2   871.4   871.6   871.8
326        KM   ******************************************************************************
327        KM   **************************  SUB-WATERSHED G  ******************************
328        KM   ******************************************************************************

329        KK      1
330        KM   BASIN 1
331        KM    THE FOLLOWING PARAMETERS WERE PROVIDED FOR THIS BASIN
332        KM    L=   2.5     Lca=    1.3     S=   24.0  Kn= .050  LAG=  62.0
333        KM    PHOENIX VALLEY S-GRAPH WAS USED FOR THIS BASIN
334        BA    1.67
335        LG     .35     .35    3.98     .36     .00
336        UI    101.    385.    579.    944.    907.    616.    393.    175.    108.     43.
337        UI     28.     28.      0.      0.      0.      0.      0.      0.      0.      0.

338        KK      2
339        KM   BASIN 2
340        KM    THE FOLLOWING PARAMETERS WERE PROVIDED FOR THIS BASIN
341        KM    L=      1.8  Lca=      .9   S=   37.0  Kn= .050  LAG=  43.0
342        KM    PHOENIX VALLEY S-GRAPH WAS USED FOR THIS BASIN
343        BA    1.24
344        LG     .35     .35    4.24     .41     .00
345        UI    180.    550.   1013.    782.    421.    148.     57.     30.      0.      0.

346        KK     @G2
347        KM   COMBINE HYDROGRAPHS FROM 1 AND 2 AT G2
348        HC      2

349        KK  RG2-G3
350        KM   ROUTE COMBINED HYDROGRAPH FROM G2 TO G3  (CHANNEL A)
351        RD    3400    .005     .10            TRAP       0     100

352        KK     16
353        KM   BASIN 16
354        KM    THE FOLLOWING PARAMETERS WERE PROVIDED FOR THIS BASIN
355        KM    L=      1.6  Lca=      .8   S=   31.0  Kn= .200  LAG= 162.0
356        KM    PHOENIX VALLEY S-GRAPH WAS USED FOR THIS BASIN
357        BA     .92
358        LG     .33     .31    4.19     .38     .00
359        UI     19.     19.     42.     72.     92.    106.    120.    139.    164.    216.
360        UI    242.    196.    167.    147.    126.    109.     93.     75.     50.     34.
361        UI     32.     27.     19.     19.      8.      6.      6.      6.      6.      6.
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 362        UI      6.      6.      0.      0.      0.      0.      0.      0.      0.      0.
1                                          HEC-1 INPUT                                          PAGE  9

LINE        ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10


 363        KK     @G3
 364        KM   COMBINE ROUTED HYROGRAPH FROM G2 WITH RUNOFF FROM 16 AT G3
 365        HC       2

 366        KK  SR@R-G
 367        KM   STORAGE ROUTE @ ROOSEVELT CANAL FROM PALO VERDE & BURNER ROADS (SUB16 SR)
 368        RS       1    ELEV     983
 369        SA       0      .1     8.4    21.5      35      48      61      74      87
 370        SQ       0       3      27     119     297     581     986    1524    2204
 371        SE     983  983.14   983.4   983.8   984.2   984.6     985   985.4   985.8

 372        KK  RG3-G4
 373        KM   ROUTE HYDROGRAPH FROM ROOSEVELT CANAL AT G3 TO G4  (CHANNEL A)
 374        RD    1500    .009     .10            TRAP       0     100

 375        KK      28
 376        KM   BASIN 28
 377        KM    THE FOLLOWING PARAMETERS WERE PROVIDED FOR THIS BASIN
 378        KM    L=       .9  Lca=       .5   S=   14.0  Kn= .200  LAG= 129.0
 379        KM    PHOENIX VALLEY S-GRAPH WAS USED FOR THIS BASIN
 380        BA     .32
 381        LG     .50     .08    4.14     .62     .00
 382        UI      8.      9.     30.     40.     48.     57.     68.     94.    104.     81.
 383        UI     68.     56.     47.     38.     26.     15.     14.     10.      8.      4.
 384        UI      3.      3.      3.      3.      3.      0.      0.      0.      0.      0.

 385        KK     @G4
 386        KM   COMBINE STORAGE ROUTED HYDROGRAPH FROM G3 WITH RUNOFF FROM 28 AT G4
 387        HC       2

 388        KK  RG4-G5
 389        KM   ROUTE COMBINED HYDROGRAPH FROM G4 TO G5  (CHANNEL A)
 390        RD    5400    .007     .10            TRAP       0     100

 391        KK      30
 392        KM   BASIN 30
 393        KM    THE FOLLOWING PARAMETERS WERE PROVIDED FOR THIS BASIN
 394        KM    L=      1.5  Lca=       .8   S=   25.0  Kn= .200  LAG= 164.0
 395        KM    PHOENIX VALLEY S-GRAPH WAS USED FOR THIS BASIN
 396        BA    1.00
 397        LG     .50     .08    4.24     .65     .00
 398        UI     21.     21.     43.     77.     98.    113.    127.    148.    172.    225.
 399        UI    263.    216.    184.    162.    139.    120.    103.     86.     61.     36.
 400        UI     35.     33.     21.     21.     13.      6.      6.      6.      6.      6.
 401        UI      6.      6.      0.      0.      0.      0.      0.      0.      0.      0.

 402        KK     @G5
 403        KM   COMBINE ROUTED HYDROGRAPH FROM G4 WITH RUNOFF FROM 30 AT G5
 404        HC       2
1                                          HEC-1 INPUT                                          PAGE 10

LINE        ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10
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405          KK  RG5-G6
406          KM   ROUTE COMBINED HYDROGRAPH FROM G5 TO G6  (CHANNEL A)
407          RD    5300    .006     .10            TRAP       0     100

408          KK      42
409          KM   BASIN 42
410          KM    THE FOLLOWING PARAMETERS WERE PROVIDED FOR THIS BASIN
411          KM    L=      1.5  Lca=       .8   S=   26.0  Kn= .200  LAG= 162.0
412          KM    PHOENIX VALLEY S-GRAPH WAS USED FOR THIS BASIN
413          BA     .77
414          LG     .50     .08    4.03     .58     .00
415          UI     16.     16.     35.     61.     77.     89.    101.    117.    138.    182.
416          UI    204.    165.    141.    124.    106.     92.     78.     63.     42.     28.
417          UI     27.     23.     16.     16.      7.      5.      5.      5.      5.      5.
418          UI      5.      5.      0.      0.      0.      0.      0.      0.      0.      0.

419          KK     @G6
420          KM   COMBINE ROUTED HYDROGRAPH FROM G5 WITH RUNOFF FROM 42 AT G6
421          HC       2

422          KK  RG6-G7
423          KM   ROUTE COMBINED HYDROGRAPH FROM G6 TO G7  (CHANNEL A)
424          RD    2200    .005     .10            TRAP       0     100

425          KK      53
426          KM   BASIN 53
427          KM    THE FOLLOWING PARAMETERS WERE PROVIDED FOR THIS BASIN
428          KM    L=       .6  Lca=       .3   S=   25.0  Kn= .200  LAG=  82.0
429          KM    PHOENIX VALLEY S-GRAPH WAS USED FOR THIS BASIN
430          BA     .34
431          LG     .50     .08    4.24     .65     .00
432          UI     14.     41.     72.     94.    135.    163.    118.     88.     64.     33.
433          UI     23.     14.      6.      4.      4.      4.      0.      0.      0.      0.

434          KK     @G7
435          KM   COMBINE ROUTED HYDROGRAPH FROM G6 WITH RUNOFF FROM 53 AT G7
436          HC       2

437          KK  SR@S-G
438          KM   STORAGE ROUTE @ SPRR FROM PALO VERDE TO BURNER ROADS (SUB53 STORAGE ROUTING)
439          KM   OVERTOPING WILL NOT OCCUR (All flow is orrifice flow)
440          RS       1    ELEV     884
441          SA       0     .01     .02     .04     .06     .08      .1    18.5
442          SQ       0     100     200     480    1480    2060    2520    2900
443          SE     884     886     887     888     889     890     891     892

444          KK  RG7-G8
445          KM   ROUTE HYDROGRAPH FROM SPRR AT G7 TO G8  (CHANNEL A)
446          RD    3500    .005      .1            TRAP       0     100
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LINE         ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10

447          KK      61
448          KM   BASIN 61
449          KM    THE FOLLOWING PARAMETERS WERE PROVIDED FOR THIS BASIN
450          KM    L=       .8  Lca=       .4   S=   25.0  Kn= .200  LAG= 102.0
451          KM    PHOENIX VALLEY S-GRAPH WAS USED FOR THIS BASIN
452          BA     .35
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453        LG     .50     .08    4.30     .66     .00
454        UI     11.     23.     49.     64.     79.    106.    141.    110.     88.     69.
455        UI     54.     33.     20.     16.     11.      5.      4.      4.      4.      4.

456        KK     @G8
457        KM   COMBINE ROUTED HYDROGRAPH FROM G7 WITH RUNOFF FROM 61 AT G8
458        HC       2

459        KK  SR@B-G
460        KM   STORAGE ROUTE AT THE BUCKEYE CANAL BETWEEN PALO VERDE AND BRUNER ROADS (SUB61
461        RS       1    ELEV  872.29
462        SA       0      75      81      84    86.5      90      93     100   108.5     118
463        SQ       0       0      12      34      74     139     235     572    1165    2069
464        SE  872.29   874.8   875.0   875.1   875.2   875.3   875.4   875.6   875.8   876.0

465        KK  PVWEST
466        KM   COMBINE HYDROGRAPHS ALONG BUCKEYE CANAL WEST OF PALO VERDE ROAD
467        HC       3
468        KM   ******************************************************************************
469        KM   ****************************  SUB-WATERSHED H  ****************************
470        KM   ******************************************************************************

471        KK       4
472        KM   BASIN 4
473        KM    THE FOLLOWING PARAMETERS WERE PROVIDED FOR THIS BASIN
474        KM    L=      1.3  Lca=       .7   S=   41.0  Kn= .050  LAG=  34.0
475        KM    PHOENIX VALLEY S-GRAPH WAS USED FOR THIS BASIN
476        BA     .57
477        LG     .35     .35    4.24     .41     .28
478        UI    137.    407.    554.    256.     78.     20.      0.      0.      0.      0.

479        KK  RH1-H2
480        KM   ROUTE RUNOFF FROM 4 AT H1 TO H2  (CHANNEL C)
481        RD
482        RC    .035    .035    .035    5500    .004
483        RX       0       2      12     112     212     312     412     512
484        RY       5       5       0       1       2       3       4       5

485        KK       3
486        KM   BASIN 3
487        KM    THE FOLLOWING PARAMETERS WERE PROVIDED FOR THIS BASIN
488        KM    L=      1.8  Lca=      1.4   S=   36.0  Kn= .050  LAG=  53.0
489        KM    PHOENIX VALLEY S-GRAPH WAS USED FOR THIS BASIN
490        BA    1.31
491        LG     .43     .21    4.24     .54     .00
492        UI    119.    398.    630.    941.    616.    373.    155.     82.     26.     26.
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LINE       ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10


493        KK     @H2
494        KM   COMBINE ROUTED HYDROGRAPH FROM H1 WITH RUNOFF FROM 3 AT H2
495        HC       2

496        KK  RH2-H3
497        KM   ROUTE COMBINED HYDROGRAPH FROM H2 TO H3  (CHANNEL B)
498        RD
499        RC     .10    .020     .10    2600    .008
500        RX       0    1000    1006    1010    1050    1054    1060    2060
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501          RY      10       0       0       1       1       0       0      10

502          KK      17
503          KM   BASIN 17
504          KM    THE FOLLOWING PARAMETERS WERE PROVIDED FOR THIS BASIN
505          KM    L=      1.6  Lca=       .8   S=   36.0  Kn= .200  LAG= 159.0
506          KM    PHOENIX VALLEY S-GRAPH WAS USED FOR THIS BASIN
507          BA     .88
508          LG     .45     .17    4.24     .57     .00
509          UI     19.     19.     43.     72.     91.    104.    119.    138.    166.    222.
510          UI    227.    183.    158.    138.    118.    101.     87.     63.     41.     32.
511          UI     31.     22.     19.     15.      6.      6.      6.      6.      6.      6.
512          UI      6.      0.      0.      0.      0.      0.      0.      0.      0.      0.

513          KK     @H3
514          KM   COMBINE ROUTED HYDROGRAPH FROM H2 WITH RUNOFF FROM 17 AT H3
515          HC       2

516          KK  SR@R-H
517          KM   STORAGE ROUTE @ ROOSEVELT CANAL FROM WILSON TO PALO VERDE ROADS (SUB17 SR)
518          RS       1    ELEV  983.78
519          SA       0     .01     .02     .03     .04     .05     .06     .07     .08      .1
520          SQ       0      12      20     100     220     420     720    1080    1860    2689
521          SE  983.78   983.9     984   984.2   984.4   984.6   984.8   985.0   985.3  985.58

522          KK  RH3-H4
523          KM   ROUTE HYDROGRAPH FROM ROOSEVELT CANAL AT H3 TO H4  (CHANNEL B)
524          RD
525          RC     .10    .020     .10    6500    .007
526          RX       0    1000    1006    1010    1050    1054    1060    2060
527          RY      10       0       0       1       1       0       0      10

528          KK      31
529          KM   BASIN 31
530          KM    THE FOLLOWING PARAMETERS WERE PROVIDED FOR THIS BASIN
531          KM    L=      1.9  Lca=      1.0   S=   29.0  Kn= .200  LAG= 191.0
532          KM    PHOENIX VALLEY S-GRAPH WAS USED FOR THIS BASIN
533          BA    1.06
534          LG     .50     .08    4.24     .65     .00
535          UI     19.     19.     22.     63.     78.     92.    104.    115.    131.    147.
536          UI    178.    228.    234.    193.    168.    151.    134.    117.    103.     91.
537          UI     76.     55.     35.     33.     31.     25.     19.     19.     12.      6.
538          UI      6.      6.      6.      6.      6.      6.      6.      6.      0.      0.
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LINE         ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10


539          KK     @H4
540          KM   COMBINE STORAGE ROUTED HYDROGRAPH FROM H3 WITH RUNOFF FROM 31 AT H4
541          HC       2

542          KK  RH4-H5
543          KM   ROUTE COMBINED HYDROGRAPH FROM H4 TO H5  (CHANNEL B)
544          RD
545          RC     .10    .020     .10    5280    .006
546          RX       0    1000    1006    1010    1050    1054    1060    2060
547          RY      10       0       0       1       1       0       0      10

548          KK      43
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549          KM   BASIN 43
550          KM    THE FOLLOWING PARAMETERS WERE PROVIDED FOR THIS BASIN
551          KM    L=      2.0  Lca=      1.0   S=   23.0  Kn= .200  LAG= 207.0
552          KM    PHOENIX VALLEY S-GRAPH WAS USED FOR THIS BASIN
553          BA    1.00
554          LG     .50     .08    4.30     .66     .00
555          UI     16.     16.     16.     47.     62.     76.     85.     94.    104.    118.
556          UI    131.    159.    200.    204.    171.    150.    135.    122.    107.     96.
557          UI     84.     76.     60.     46.     29.     28.     27.     23.     16.     16.
558          UI     15.      5.      5.      5.      5.      5.      5.      5.      5.      5.
559          UI      5.      0.      0.      0.      0.      0.      0.      0.      0.      0.

560          KK     @H5
561          KM   COMBINE ROUTED HYDROGRAPH FROM H4 WITH RUNOFF FROM 43 AT H5
562          HC       2

563          KK  RH5-H6
564          KM   ROUTE COMBINED HYDROGRAPH FROM H5 TO H6  (CHANNEL B)
565          RD
566          RC     .10    .020     .10    2200    .006
567          RX       0    1000    1006    1010    1050    1054    1060    2060
568          RY      10       0       0       1       1       0       0      10

569          KK      54
570          KM   BASIN 54
571          KM    THE FOLLOWING PARAMETERS WERE PROVIDED FOR THIS BASIN
572          KM    L=      1.2  Lca=       .6   S=   11.0  Kn= .200  LAG= 158.0
573          KM    PHOENIX VALLEY S-GRAPH WAS USED FOR THIS BASIN
574          BA     .38
575          LG     .50     .08    4.24     .65     .00
576          UI      8.      8.     19.     32.     40.     46.     52.     61.     73.     98.
577          UI     97.     79.     68.     59.     51.     43.     37.     27.     17.     14.
578          UI     13.      9.      8.      6.      2.      2.      2.      2.      2.      2.
579          UI      2.      0.      0.      0.      0.      0.      0.      0.      0.      0.

580          KK     @H6
581          KM   COMBINE ROUTED HYDROGRAPH FROM H5 WITH RUNOFF FROM 54 AT H6
582          HC       2
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LINE         ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10


583          KK  SR@S-H
584          KM   STORAGE ROUTE @ SPRR FROM WILSON TO PALO VERDE ROADS (SUB 54 STORAGE ROUTING)
585          KM   OVERTOPING STARTS @ Q=1025cfs, EL=893.4 (OVERTOPING = 0.05 ft)
586          RS       1    ELEV     887
587          SA       0     .05      .1      56    58.5      61      63      66
588          SQ       0     185     720    1025    1075    1150    1355    1800
589          SE     887     889  891.43   893.4   893.5   893.6   893.7   893.8

590          KK  RH6-H7
591          KM   ROUTE HYDROGRAPH FROM SPRR AT H6 TO H7  (CHANNEL A)
592          RD    2800    .006     .10            TRAP       0     100

593          KK      62
594          KM   BASIN 62
595          KM    THE FOLLOWING PARAMETERS WERE PROVIDED FOR THIS BASIN
596          KM    L=       .9  Lca=       .5   S=   22.0  Kn= .200  LAG= 121.0
597          KM    PHOENIX VALLEY S-GRAPH WAS USED FOR THIS BASIN
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598        BA     .58
599        LG     .50     .08    4.19     .63     .00
600        UI     16.     21.     59.     80.     95.    115.    146.    202.    170.    137.
601        UI    114.     93.     75.     52.     29.     27.     18.     16.      5.      5.
602        UI      5.      5.      5.      5.      0.      0.      0.      0.      0.      0.

603        KK     @H7
604        KM   COMBINE ROUTED HYDROGRAPN FROM H6 WITH RUNOFF FROM 62 AT H7
605        HC       2

606        KK  SR@B-H
607        KM   STORAGE ROUTE AT THE BUCKEYE CANAL FROM WILSON TO PALO VERDE ROADS (SUB 62 SR
608        RS       1    ELEV  872.35
609        SA       0      38      72      75      77    79.5      82    84.6      88    91.3
610        SQ       0       0       0       8      46     192     502    1007    1715    2595
611        SE  872.35   874.0   875.4   875.5   875.6   875.7   875.8   875.9   876.0   876.1
612        KM   ******************************************************************************
613        KM   ******************************** SUB-WATERSHED I ****************************
614        KM   ******************************************************************************

615        KK       5
616        KM   BASIN 5
617        KM    THE FOLLOWING PARAMETERS WERE PROVIDED FOR THIS BASIN
618        KM    L=      1.7  Lca=      1.2   S=   44.0  Kn= .050  LAG=  45.0
619        KM    PHOENIX VALLEY S-GRAPH WAS USED FOR THIS BASIN
620        BA    1.64
621        LG     .35     .35    3.82     .33     .00
622        UI    216.    667.   1231.   1080.    622.    239.     99.     38.      0.      0.

623        KK  RI1-I2
624        KM   ROUTE RUNOFF FROM 5 CONCENTRATED AT I1 TO I2  (CHANNEL B)
625        RD
626        RC     .10    .020     .10    2100    .007
627        RX       0    1000    1006    1010    1050    1054    1060    2060
628        RY      10       0       0       1       1       0       0      10
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LINE       ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10


629        KK      18
630        KM   BASIN 18
631        KM    THE FOLLOWING PARAMETERS WERE PROVIDED FOR THIS BASIN
632        KM    L=      1.4  Lca=       .7   S=   44.0  Kn= .200  LAG= 139.0
633        KM    PHOENIX VALLEY S-GRAPH WAS USED FOR THIS BASIN
634        BA     .90
635        LG     .44     .19    4.14     .52     .00
636        UI     22.     22.     68.     96.    117.    136.    161.    200.    273.    245.
637        UI    199.    171.    143.    120.     99.     70.     41.     37.     30.     22.
638        UI     18.      7.      7.      7.      7.      7.      7.      0.      0.      0.

639        KK      19
640        KM   BASIN 19
641        KM    THE FOLLOWING PARAMETERS WERE PROVIDED FOR THIS BASIN
642        KM    L=      1.5  Lca=       .7   S=   19.0  Kn= .200  LAG= 168.0
643        KM    PHOENIX VALLEY S-GRAPH WAS USED FOR THIS BASIN
644        BA     .59
645        LG     .50     .08    4.30     .66     .00
646        UI     12.     12.     23.     43.     56.     64.     72.     83.     96.    125.
647        UI    151.    132.    111.     97.     85.     73.     63.     55.     40.     27.
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648        UI     21.     20.     15.     12.     12.      4.      4.      4.      4.      4.
649        UI      4.      4.      4.      0.      0.      0.      0.      0.      0.      0.

650        KK     @I2
651        KM   COMBINE ROUTED HYDROGRAPH FROM I1 WITH RUNOFF FROM 18 & 19 AT I2
652        HC      3

653        KK  SR@R-I
654        KM   STORAGE ROUTE AT ROOSEVELT CANAL FROM OGELSBY TO WILSON ROADS (SUB 19 SR)
655        RS      1    ELEV  986.58
656        SA      0    20.5    23.5    24.4    26.4    28.2      32    36.1    40.8
657        SQ      0       1      25      96     229     436    1112    2189    3675
658        SE  986.58   987.6   987.7   987.8   987.9   988.0   988.2   988.4   988.6

659        KK  RI2-I4
660        KM   ROUTE HYDROGRAPH FROM ROOSEVELT CANAL AT I2 TO I4  (CHANNEL B)
661        RD
662        RC     .10    .020     .10    9600    .009
663        RX      0    1000    1006    1010    1050    1054    1060    2060
664        RY     10       0       0       1       1       0       0      10

665        KK      44
666        KM   BASIN 44
667        KM    THE FOLLOWING PARAMETERS WERE PROVIDED FOR THIS BASIN
668        KM    L=      2.0  Lca=      1.0   S=   28.0  Kn= .200  LAG= 199.0
669        KM    PHOENIX VALLEY S-GRAPH WAS USED FOR THIS BASIN
670        BA    1.00
671        LG     .50     .08    4.19     .63     .00
672        UI     17.     17.     17.     54.     68.     81.     92.    101.    112.    127.
673        UI    146.    186.    219.    192.    164.    145.    132.    116.    103.     90.
674        UI     80.     67.     49.     31.     29.     28.     24.     17.     17.     13.
675        UI      5.      5.      5.      5.      5.      5.      5.      5.      5.      0.
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LINE       ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10

676        KK     @I4
677        KM   COMBINE ROUTED HYDROGRAPH FROM I2 WITH RUNOFF FROM 44 AT I4
678        HC      2

679        KK  RI4-I5
680        KM   ROUTE COMBINED HYDROGRAPH FROM I4 TO I5  (CHANNEL A)
681        RD    2000    .003     .10            TRAP       0     100

682        KK      32
683        KM   BASIN 32
684        KM   THE FOLOWING PARAMETERS WERE PROVIDED FOR THIS BASIN
685        KM   L=     1.8     Lca=    .9         S=    32.0   Kn= .200      LAG= 179.0
686        KM   PHOENIX VALLEY S-GRAPH WAS USED FOR THIS BASIN
687        BA     .88
688        LG     .50     .08    4.24     .65     .00
689        UI     17.     17.     26.     58.     73.     85.     96.    108.    124.    145.
690        UI    187.    213.    176.    151.    134.    118.    102.     89.     78.     60.
691        UI     42.     29.     28.     27.     17.     17.     13.      5.      5.      5.
692        UI      5.      5.      5.      5.      5.      0.      0.      0.      0.      0.

693        KK  RI3-I5
694        KM   ROUTE RUNOFF FROM 32 CONCENTRATED AT I3 TO I5  (CHANNEL B)
695        RD
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696        RC     .10     .02     .10   10400    .005
697        RX       0    1000    1006    1010    1050    1054    1060    2060
698        RY      10       0       0       1       1       0       0      10

699        KK      55
700        KM   BASIN 55
701        KM    THE FOLLOWING PARAMETERS WERE PROVIDED FOR THIS BASIN
702        KM    L=       .9  Lca=       .5   S=    8.0  Kn= .200  LAG= 140.0
703        KM    PHOENIX VALLEY S-GRAPH WAS USED FOR THIS BASIN
704        BA     .27
705        LG     .37     .08    4.19     .63     .00
706        UI      6.      6.     20.     28.     34.     39.     47.     57.     79.     73.
707        UI     59.     51.     42.     36.     30.     21.     13.     11.      9.      6.
708        UI      6.      2.      2.      2.      2.      2.      2.      0.      0.      0.

709        KK     @I5
710        KM   COMBINE ROUTED HYDROGRAPHS FROM I3 AND I4 WITH RUNOFF FROM 55 AT I5
711        HC       3

712        KK  SR@S-I
713        KM   STORAGE ROUTE @ SPRR FROM TURNER TO WILSON ROADS (SUB 55 STORAGE ROUTING)
714        KM   OVERTOPING STARTS @ Q=221cfs, EL=893.8 (OVERTOPING = 0.18 ft)
715        RS       1    ELEV   890.1
716        SA       0     .05      .1    16.5      21    25.5      28      30    32.5
717        SQ       0      60     150     221     400     830    1134    1488    1892
718        SE   890.1     892  893.11   893.8     894   894.2   894.3   894.4   894.5
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LINE       ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10

719        KK  RI5-I6
720        KM   ROUTE HYDROGRAPH FROM SPRR AT I5 TO I6  (CHANNEL A)
721        RD    3000    .007     .10            TRAP       0     100

722        KK      63
723        KM   BASIN 63
724        KM    THE FOLLOWING PARAMETERS WERE PROVIDED FOR THIS BASIN
725        KM    L=       .9  Lca=       .5   S=   26.0  Kn= .200  LAG= 114.0
726        KM    PHOENIX VALLEY S-GRAPH WAS USED FOR THIS BASIN
727        BA     .51
728        LG     .50     .08    4.08     .60     .00
729        UI     15.     24.     59.     78.     94.    115.    159.    185.    141.    117.
730        UI     94.     75.     54.     30.     25.     18.     15.      5.      5.      5.
731        UI      5.      5.      0.      0.      0.      0.      0.      0.      0.      0.

732        KK     @I6
733        KM   COMBINE ROUTED HYDROGRAPH FROM I5 WITH RUNOFF FROM 63 AT I6
734        HC       2

735        KK  SR@B-I
736        KM   STORAGE ROUTE AT THE BUCKEYE CANAL FROM TURNER TO WILSON ROADS (SUB 63 SR)
737        RS       1    ELEV  874.67
738        SA       0      37    39.5      42      44    46.5    48.5      51      53
739        SQ       0       0      71     267     552     917    1360    1880    2476
740        SE  874.67   876.3   876.4   876.5   876.6   876.7   876.8   876.9   877.0
741        KM   ******************************************************************************
742        KM   *************************  SUB-WATERSHED J  ********************************
743        KM   ******************************************************************************
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```
744        KK      6
745        KM   BASIN 6
746        KM    THE FOLLOWING PARAMETERS WERE PROVIDED FOR THIS BASIN
747        KM    L=      .73  Lca=      .23   S=   62.0  Kn= .050  LAG=  17.0
748        KM    PHOENIX VALLEY S-GRAPH WAS USED FOR THIS BASIN
749        BA     .32
750        LG     .35     .37    4.74     .22    4.88
751        UI    310.    461.     55.      0.      0.      0.      0.      0.      0.      0.

752        KK  RJ1-J2
753        KM   ROUTE RUNOFF FROM 6 CONCENTRATED AT J1 TO J2  (CHANNEL A)
754        RD    4000    .005    .035            TRAP       0     100

755        KK      8
756        KM   BASIN 8
757        KM    THE FOLLOWING PARAMETERS WERE PROVIDED FOR THIS BASIN
758        KM    L=      1.3  Lca=      .5   S=   22.0  Kn= .050  LAG=  34.0
759        KM    PHOENIX VALLEY S-GRAPH WAS USED FOR THIS BASIN
760        BA     .38
761        LG     .35     .35    4.19     .40     .00
762        UI     92.    275.    374.    173.     52.     13.      0.      0.      0.      0.
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LINE       ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10

763        KK    @J2
764        KM   COMBINE ROUTED HYDROGRAPH FROM J1 WITH RUNOFF FROM 8 AT J2
765        HC      2

766        KK  RJ2-J3
767        KM   ROUTE COMBINED HYDROGRAPH FROM J2 TO J3  (CHANNEL B)
768        RD
769        RC     .10    .020     .10    2900    .009
770        RX       0    1000    1006    1010    1050    1054    1060    2060
771        RY      10       0       0       1       1       0       0      10

772        KK      20
773        KM   BASIN 20
774        KM    THE FOLLOWING PARAMETERS WERE PROVIDED FOR THIS BASIN
775        KM    L=      1.0  Lca=      .5   S=   27.0  Kn= .200  LAG= 122.0
776        KM    PHOENIX VALLEY S-GRAPH WAS USED FOR THIS BASIN
777        BA     .67
778        LG     .50     .08    4.24     .65     .00
779        UI     18.     24.     67.     91.    108.    130.    164.    229.    197.    158.
780        UI    132.    108.     89.     61.     35.     31.     22.     18.      8.      6.
781        UI      6.      6.      6.      6.      0.      0.      0.      0.      0.      0.

782        KK    @J3
783        KM   COMBINE ROUTED HYDROGRAPH FROM J2 WITH RUNOFF FROM 20 AT J3
784        HC      2

785        KK  SR@R-J
786        KM   STORAGE ROUTE AT ROOSEVELT CANAL BETWEEN ROOKS AND OGELSBY ROADS (SUB 20 SR)
787        RS       1    ELEV   990.1
788        SA       0     .01     .02     .03     .04     .05     .06     .07     .08      .1
789        SQ       0      15      82     227     448     723    1043    1403    1799    2230
790        SE   990.1   990.2   990.3   990.4   990.5   990.6   990.7   990.8   990.9   991.0

791        KK  RJ3-J4
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792          KM   ROUTE HYDROGRAPH FROM ROOSEVELT CANAL AT J3 TO J4  (CHANNEL B)
793          RD
794          RC     .10    .020     .10    6000    .009
795          RX       0    1000    1006    1010    1050    1054    1060    2060
796          RY      10       0       0       1       1       0       0      10

797          KK      33
798          KM   BASIN 33
799          KM    THE FOLLOWING PARAMETERS WERE PROVIDED FOR THIS BASIN
800          KM    L=      1.7  Lca=       .9   S=   31.0  Kn= .200  LAG= 174.0
801          KM    PHOENIX VALLEY S-GRAPH WAS USED FOR THIS BASIN
802          BA     .98
803          LG     .50     .08    4.30     .66     .00
804          UI     19.     19.     33.     68.     86.    100.    112.    127.    146.    178.
805          UI    232.    230.    189.    164.    146.    126.    110.     95.     80.     58.
806          UI     36.     33.     31.     22.     19.     18.      6.      6.      6.      6.
807          UI      6.      6.      6.      6.      0.      0.      0.      0.      0.      0.
1                                          HEC-1 INPUT                                          PAGE 19

LINE         ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10


808          KK     @J4
809          KM   COMBINE STORAGE ROUTED HYDROGRAPH FROM J3 WITH RUNOFF FROM 33 AT J4
810          HC       2

811          KK  RJ4-J5
812          KM   ROUTE COMBINED HYDROGRAPH FROM J4 TO J5  (CHANNEL A)
813          RD    7600    .006     .10            TRAP       0     100

814          KK      45
815          KM   BASIN 45
816          KM    THE FOLLOWING PARAMETERS WERE PROVIDED FOR THIS BASIN
817          KM    L=      1.5  Lca=       .8   S=   28.0  Kn= .200  LAG= 162.0
818          KM    PHOENIX VALLEY S-GRAPH WAS USED FOR THIS BASIN
819          BA    1.15
820          LG     .50     .08    4.24     .65     .00
821          UI     24.     24.     52.     90.    114.    132.    149.    174.    204.    270.
822          UI    302.    244.    208.    184.    157.    136.    116.     93.     62.     42.
823          UI     40.     34.     24.     24.     10.      7.      7.      7.      7.      7.
824          UI      7.      7.      0.      0.      0.      0.      0.      0.      0.      0.

825          KK     @J5
826          KM   COMBINE ROUTED HYDROGRAPH FROM J4 WITH RUNOFF FROM 45 AT J5
827          HC       2

828          KK  SR@S-J
829          KM   STORAGE ROUTE @ SPRR FROM OGLESBY TO TURNER ROADS (SUB 45 STORAGE ROUTING)
830          KM   OVERTOPING STARTS @ Q=241cfs, EL=893.2 (OVERTOPING = 0.02 ft)
831          RS       1    ELEV   888.7
832          SA       0      .1      25      32    35.9      39      43
833          SQ       0     150     230     308     825    1144    1970
834          SE   888.7  891.55   893.0   893.4   893.6   893.8   894.0

835          KK  RJ5-J6
836          KM   ROUTE HYDROGRAPH FROM SPRR AT J5 TO J6  (CHANNEL A)
837          RD    2000    .008     .10            TRAP       0     100

838          KK      64
839          KM   BASIN 64
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840        KM    THE FOLLOWING PARAMETERS WERE PROVIDED FOR THIS BASIN
841        KM    L=       .8  Lca=       .4   S=   26.0  Kn= .200  LAG= 101.0
842        KM    PHOENIX VALLEY S-GRAPH WAS USED FOR THIS BASIN
843        BA     .43
844        LG     .50     .08    3.87     .53     .00
845        UI     14.     29.     62.     80.     99.    136.    174.    134.    107.     84.
846        UI     65.     38.     24.     19.     14.      5.      4.      4.      4.      4.

847        KK     @J6
848        KM   COMBINE ROUTED HYDROGRAPH FROM J5 WITH RUNOFF FROM 64 AT J6
849        HC      2
1                                        HEC-1 INPUT                                          PAGE 20

LINE       ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10


850        KK  SR@B-J
851        KM   STORAGE ROUTE AT THE BUCKEYE CANAL BETWEEN OGELSBY AND TURNER ROADS (SUB 64)
852        RS      1    ELEV  876.47
853        SA      0       2       5     8.5      15      22    28.5      35    41.5      48
854        SQ      0       0      20      63     212     446     770    1190    1714    2346
855        SE  876.47   876.5   876.6   876.7   876.9   877.1   877.3   877.5   877.7   877.9
856        KM   ****************************************************************************
857        KM   **************************  SUB-WATERSHED K  ******************************
858        KM   ****************************************************************************

859        KK      7
860        KM   BASIN 7
861        KM    THE FOLLOWING PARAMETERS WERE PROVIDED FOR THIS BASIN
862        KM    L=      .76  Lca=      .33   S=   64.0  Kn= .050  LAG=  19.0
863        KM    PHOENIX VALLEY S-GRAPH WAS USED FOR THIS BASIN
864        BA     .41
865        LG     .35     .35    4.14    .391     .00
866        UI    310.    621.    118.      0.      0.      0.      0.      0.      0.      0.

867        KK  RK1-K2
868        KM   ROUTE RUNOFF FROM 7 CONCENTRATED AT K1 TO K2  (CHANNEL A)
869        RD    4000    .008    .035            TRAP       0     100

870        KK      9
871        KM   BASIN 9
872        KM    THE FOLLOWING PARAMETERS WERE PROVIDED FOR THIS BASIN
873        KM    L=      1.0  Lca=      .4   S=   54.0  Kn= .050  LAG=  23.0
874        KM    PHOENIX VALLEY S-GRAPH WAS USED FOR THIS BASIN
875        BA     .71
876        LG     .35     .35    4.24     .41     .00
877        UI    365.    981.    391.     67.      0.      0.      0.      0.      0.      0.

878        KK     @K2
879        KM   COMBINE ROUTED HYDROGRAPH FROM K1 WITH RUNOFF FROM 9 AT K2
880        HC      2

881        KK  RK2-K3
882        KM   ROUTE COMBINED HYDROGRAPH FROM K2 TO K3  (CHANNEL A)
883        RD    4200    .007     .10            TRAP       0     100

884        KK      21
885        KM   BASIN 21
886        KM    THE FOLLOWING PARAMETERS WERE PROVIDED FOR THIS BASIN
887        KM    L=      1.4  Lca=      .7   S=   20.0  Kn= .200  LAG= 164.0
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888          KM    PHOENIX VALLEY S-GRAPH WAS USED FOR THIS BASIN
889          BA     .55
890          LG     .50     .08    4.24     .65     .00
891          UI     11.     11.     24.     42.     54.     62.     70.     81.     95.    124.
892          UI    145.    119.    101.     89.     77.     66.     57.     47.     33.     20.
893          UI     19.     18.     11.     11.      7.      3.      3.      3.      3.      3.
894          UI      3.      3.      0.      0.      0.      0.      0.      0.      0.      0.
1                                                HEC-1 INPUT                                                    PAGE 21

LINE         ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10


895          KK     @K3
896          KM   COMBINE ROUTED HYDROGRAPH FROM K2 WITH RUNOFF FROM 21 AT K3
897          HC      2

898          KK  SR@R-K
899          KM   STORAGE ROUTE AT ROOSEVELT CANAL BETWEEN MILLER AND ROOKS ROADS (SUB 21 SR)
900          RS      1    ELEV   990.1
901          SA      0     .01     .02     .04     .06     .08     .09      .1
902          SQ      0      35     105     225     626    1216    1999    3018
903          SE  990.1   990.3   990.4   990.5   990.7   990.9   991.1   991.3

904          KK  RK3-K4
905          KM   ROUTE HYDROGRAPH FROM ROOSEVELT CANAL AT K3 TO K4  (CHANNEL B)
906          RD
907          RC    .10    .020     .10    2200    .011
908          RX      0    1000    1006    1010    1050    1054    1060    2060
909          RY     10       0       0       1       1       0       0      10

910          KK     34
911          KM   BASIN 34
912          KM    THE FOLLOWING PARAMETERS WERE PROVIDED FOR THIS BASIN
913          KM    L=      1.2  Lca=       .6   S=   19.0  Kn= .200  LAG= 143.0
914          KM    PHOENIX VALLEY S-GRAPH WAS USED FOR THIS BASIN
915          BA     .63
916          LG     .50     .08    4.24     .65     .00
917          UI     15.     15.     43.     63.     77.     89.    105.    126.    173.    177.
918          UI    141.    120.    102.     86.     72.     56.     35.     26.     24.     16.
919          UI     15.      8.      5.      5.      5.      5.      5.      5.      0.      0.

920          KK     @K4
921          KM   COMBINE STORAGE ROUTED HYDROGRAPH FROM K3 WITH RUNOFF FROM 34 AT K4
922          HC      2

923          KK  RK4-K5
924          KM   ROUTE COMBINED HYDROGRAPH FROM K4 TO K5  (CHANNEL B)
925          RD
926          RC    .10    .020     .10    5280    .008
927          RX      0    1000    1006    1010    1050    1054    1060    2060
928          RY     10       0       0       1       1       0       0      10

929          KK     35
930          KM   BASIN 35
931          KM    THE FOLLOWING PARAMETERS WERE PROVIDED FOR THIS BASIN
932          KM    L=      2.0  Lca=      1.0   S=   26.0  Kn= .200  LAG= 198.0
933          KM    PHOENIX VALLEY S-GRAPH WAS USED FOR THIS BASIN
934          BA    1.50
935          LG     .50     .08    4.24     .65     .00
936          UI     26.     26.     26.     82.    103.    122.    139.    152.    171.    194.
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937        UI    223.    282.    333.    286.    245.    218.    197.    173.    154.    134.
938        UI    121.     96.     71.     45.     44.     42.     33.     26.     26.     17.
939        UI      8.      8.      8.      8.      8.      8.      8.      8.      8.      0.
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LINE       ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10

940        KK     @K5
941        KM    COMBINE ROUTED HYDROGRAPH FROM K5 WITH RUNOFF FROM 35 AT K6
942        HC       2

943        KK  RK5-K6
944        KM   ROUTE COMBINED HYDROGRAPH FROM K5 TO K6  (CHANNEL B)
945        RD
946        RC     .10    .020     .10    5600    .006
947        RX       0    1000    1006    1010    1050    1054    1060    2060
948        RY      10       0       0       1       1       0       0      10

949        KK      46
950        KM   BASIN 46
951        KM    THE FOLLOWING PARAMETERS WERE PROVIDED FOR THIS BASIN
952        KM    L=      1.7  Lca=       .9   S=   30.0  Kn= .200  LAG= 174.0
953        KM    PHOENIX VALLEY S-GRAPH WAS USED FOR THIS BASIN
954        BA    1.38
955        LG     .50     .08    4.14     .61     .00
956        UI     27.     27.     47.     95.    121.    140.    157.    179.    205.    250.
957        UI    325.    323.    265.    231.    205.    177.    155.    133.    112.     82.
958        UI     51.     46.     44.     31.     27.     25.      8.      8.      8.      8.
959        UI      8.      8.      8.      8.      0.      0.      0.      0.      0.      0.

960        KK     @K6
961        KM   COMBINE ROUTED HYDROGRAPH FROM K5 WITH RUNOFF FROM 46 AT K6
962        HC       2

963        KK  SR@S-K
964        KM   STORAGE ROUTE @ SPRR FROM ROOKS TO OGLESBY ROADS (SUB 46 STORAGE ROUTING)
965        KM   OVERTOPING STARTS @ Q=1565cfs, EL=892.88 (OVERTOPING = 0.01 ft)
966        RS       1    ELEV     887
967        SA       0     .03     .06      .1    46.5      48      52      59
968        SQ       0     200     975    1120    1555    1565    1610    2150
969        SE     887     889     891  891.58  892.82  892.88     893  893.20

970        KK  RK6-K7
971        KM   ROUTE HYDROGRAPH FROM SPRR AT K6 TO K7  (CHANNEL A)
972        RD    2600    .007     .10            TRAP       0     100

973        KK      65
974        KM   BASIN 65
975        KM    THE FOLLOWING PARAMETERS WERE PROVIDED FOR THIS BASIN
976        KM    L=       .8  Lca=       .4   S=   21.0  Kn= .200  LAG= 103.0
977        KM    PHOENIX VALLEY S-GRAPH WAS USED FOR THIS BASIN
978        BA     .41
979        LG     .50     .08    3.61     .45     .00
980        UI     13.     26.     56.     73.     91.    119.    165.    129.    104.     82.
981        UI     64.     42.     23.     20.     13.      7.      4.      4.      4.      4.
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LINE       ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10
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 982        KK     @K7
 983        KM   COMBINE ROUTED HYDROGRAPH FROM K6 WITH RUNOFF FROM 65 AT K7
 984        HC       2

 985        KK  SR@B-K
 986        KM   STORAGE ROUTE AT THE BUCKEYE CANAL BETWEEN ROOKS AND OGLESBY ROADS (SUB 65 SR
 987        RS       1    ELEV  877.46
 988        SA       0      22    24.5      27      32      37      42      47      52      57
 989        SQ       0       0      11      34     129     309     589     983    1503    2158
 990        SE  877.46   878.3   878.4   878.5   878.7   878.9   879.1   879.3   879.5   879.7

 991        KK  PVTORR
 992        KM   COMBINE HYDROGRAPHS ALONG THE BUCKEYE CANAL BETWEEN PALO VERDE AND ROOKS RD.
 993        HC       4
 994        KM   ******************************************************************************
 995        KM   **************************  SUB-WATERSHED L  **********************************
 996        KM   ******************************************************************************

 997        KK      10
 998        KM   BASIN 10
 999        KM    THE FOLLOWING PARAMETERS WERE PROVIDED FOR THIS BASIN
1000        KM    L=      1.6  Lca=    106.0   S=   47.0  Kn= .050  LAG=  42.0
1001        KM    PHOENIX VALLEY S-GRAPH WAS USED FOR THIS BASIN
1002        BA    1.32
1003        LG     .32     .34    4.14     .38    1.73
1004        UI    201.    611.   1116.    813.    411.    150.     51.     32.      0.      0.

1005        KK  RL1-L2
1006        KM   ROUTE RUNOFF FROM 10 CONCENTRATED AT L1 TO L2  (CHANNEL B)
1007        RO
1008        RC     .10    .020     .10    2640    .009
1009        RX       0    1000    1006    1010    1050    1054    1060    2060
1010        RY      10       0       0       1       1       0       0      10

1011        KK      22
1012        KM   BASIN 22
1013        KM    THE FOLLOWING PARAMETERS WERE PROVIDED FOR THIS BASIN
1014        KM    L=      1.5  Lca=      .7   S=   20.0  Kn= .200  LAG= 167.0
1015        KM    PHOENIX VALLEY S-GRAPH WAS USED FOR THIS BASIN
1016        BA     .58
1017        LG     .50     .08    4.24     .65     .00
1018        UI     12.     12.     23.     42.     55.     63.     71.     82.     94.    123.
1019        UI    148.    127.    107.     94.     82.     71.     61.     52.     38.     25.
1020        UI     20.     19.     14.     12.     11.      4.      4.      4.      4.      4.
1021        UI      4.      4.      4.      0.      0.      0.      0.      0.      0.      0.

1022        KK     @L2
1023        KM   COMBINE ROUTED HYDROGRAPH FROM L1 WITH RUNOFF FROM 22 AT L2
1024        HC       2
```



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LINE        ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10


1025        KK  SR@R-L
1026        KM   STORAGE ROUTE AT ROOSEVELT CANAL BETWEEN APACHE AND MILLER ROADS (SUB 22 SR)
1027        RS       1    ELEV     993
1028        SA       0     .03     .05     .08      .1     5.6    14.4      17
1029        SQ       0      40     180     320     630    1580    2979    3846
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1030        SE     993   993.6   994.4   994.7  994.91   995.2  995.47  995.57

1031        KK  RL2-L3
1032        KM   ROUTE HYDROGRAPH FROM ROOSEVELT CANAL AT L2 TO L3  (CHANNEL B)
1033        RD
1034        RC    .10    .020     .10    7600    .009
1035        RX      0    1000    1006    1010    1050    1054    1060    2060
1036        RY     10       0       0       1       1       0       0      10

1037        KK     36
1038        KM   BASIN 36
1039        KM    THE FOLLOWING PARAMETERS WERE PROVIDED FOR THIS BASIN
1040        KM    L=      1.9  Lca=       .9   S=   36.0  Kn= .200  LAG= 179.0
1041        KM    PHOENIX VALLEY S-GRAPH WAS USED FOR THIS BASIN
1042        BA    .68
1043        LG    .50     .08    4.30     .66     .00
1044        UI    13.     13.     20.     45.     57.     66.     74.     84.     96.    113.
1045        UI   145.    165.    136.    117.    104.     91.     79.     69.     61.     47.
1046        UI    33.     23.     22.     21.     13.     13.     10.      4.      4.      4.
1047        UI     4.      4.      4.      4.      4.      0.      0.      0.      0.      0.

1048        KK    @L3
1049        KM   COMBINE STORAGE ROUTED HYDROGRAPH FROM L2 WITH RUNOFF FROM 36 AT L3
1050        HC      2

1051        KK  RL3-L4
1052        KM   ROUTE COMBINED HYDROGRAPH FROM L3 TO L4  (CHANNEL B)
1053        RD
1054        RC    .10    .020     .10    6000    .006
1055        RX      0    1000    1006    1010    1050    1054    1060    2060
1056        RY     10       0       0       1       1       0       0      10

1057        KK     47
1058        KM   BASIN 47
1059        KM    THE FOLLOWING PARAMETERS WERE PROVIDED FOR THIS BASIN
1060        KM    L=      1.4  Lca=       .7   S=   27.0  Kn= .200  LAG= 152.0
1061        KM    PHOENIX VALLEY S-GRAPH WAS USED FOR THIS BASIN
1062        BA    .62
1063        LG    .50     .08    3.77     .50     .00
1064        UI    14.     14.     35.     56.     69.     79.     92.    107.    140.    173.
1065        UI   150.    124.    108.     92.     79.     67.     52.     33.     24.     23.
1066        UI    17.     14.     10.      4.      4.      4.      4.      4.      4.      4.

1067        KK    @L4
1068        KM   COMBINE ROUTED HYDROGRAPH FROM L3 WITH RUNOFF FROM 47 AT L4
1069        HC      2
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LINE        ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10


1070        KK  SR@S-L
1071        KM   STORAGE ROUTE @ SPRR FROM MILLER TO ROOKS ROADS (SUB 47 STORAGE ROUTING)
1072        KM   OVERTOPING STARTS @ Q=286cfs, EL=889.6 (OVERTOPING = 0.18 ft)
1073        RS      1    ELEV   884.2
1074        SA      0     .03     .06      .1    14.7    18.5    22.2    26.0    29.6
1075        SQ      0      59     172     230     323     480     769    1218    1828
1076        SE  884.2     886     888  888.94   889.7   889.9   890.1   890.3   890.5

1077        KK  RL4-L5
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1078        KM   ROUTE HYDROGRAPH FROM SPRR AT L4 TO L5  (CHANNEL A)
1079        RD    1500    .005     .10            TRAP       0     100

1080        KK      66
1081        KM   BASIN 66
1082        KM    THE FOLLOWING PARAMETERS WERE PROVIDED FOR THIS BASIN
1083        KM    L=       .7  Lca=       .4   S=   12.0  Kn= .200  LAG= 109.0
1084        KM    PHOENIX VALLEY S-GRAPH WAS USED FOR THIS BASIN
1085        BA     .29
1086        LG     .50     .08    3.92     .55     .00
1087        UI      9.     15.     36.     47.     57.     72.    104.     98.     76.     62.
1088        UI     49.     39.     22.     15.     12.      9.      4.      3.      3.      3.
1089        UI      3.      0.      0.      0.      0.      0.      0.      0.      0.      0.

1090        KK     @L5
1091        KM   COMBINE ROUTED HYDROGRAPH FROM L4 WITH RUNOFF FROM 66 AT L5
1092        HC       2

1093        KK  SR@B-L
1094        KM   STORAGE ROUTE AT THE BUCKEYE CANAL BETWEEN MILLER AND ROOKS ROADS (SUB 66 SR)
1095        RS       1    ELEV  878.35
1096        SA       0    75.5    78.5      81    83.5      86      91      96     101
1097        SQ       0       0       7      40     111     228     630    1324    2378
1098        SE  878.35   881.3   881.4   881.5   881.6   881.7   881.9   882.1   882.3
1099        KM   ******************************************************************************
1100        KM   ***************************  SUB-WATERSHED M  ******************************
1101        KM   ******************************************************************************

1102        KK      37
1103        KM   BASIN 37
1104        KM    THE FOLLOWING PARAMETERS WERE PROVIDED FOR THIS BASIN
1105        KM    L=      2.4  Lca=      1.2   S=   30.0  Kn= .200  LAG= 223.0
1106        KM    PHOENIX VALLEY S-GRAPH WAS USED FOR THIS BASIN
1107        BA    1.44
1108        LG     .50     .08    4.19     .63     .00
1109        UI     22.     22.     22.     51.     78.     94.    108.    120.    131.    144.
1110        UI    162.    179.    218.    269.    275.    233.    205.    185.    170.    151.
1111        UI    135.    121.    108.     96.     75.     58.     38.     38.     36.     33.
1112        UI     22.     22.     22.     10.      7.      7.      7.      7.      7.      7.
1113        UI      7.      7.      7.      7.      0.      0.      0.      0.      0.      0.
```



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LINE        ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10


1114        KK  RM1-M2
1115        KM   ROUTE RUNOFF FROM 37 AT M1 TO M2  (CHANNEL A)
1116        RD    2600    .009     .10            TRAP       0     100

1117        KK      48
1118        KM   BASIN 48
1119        KM    THE FOLLOWING PARAMETERS WERE PROVIDED FOR THIS BASIN
1120        KM    L=      1.0  Lca=       .5   S=   22.0  Kn= .200  LAG= 121.0
1121        KM    PHOENIX VALLEY S-GRAPH WAS USED FOR THIS BASIN
1122        BA     .49
1123        LG     .50     .08    3.92     .55     .00
1124        UI     14.     18.     50.     67.     80.     96.    122.    170.    142.    115.
1125        UI     96.     78.     63.     44.     24.     22.     15.     14.      4.      4.
1126        UI      4.      4.      4.      4.      0.      0.      0.      0.      0.      0.
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1127        KK     @M2
1128        KM   COMBINE ROUTED HYDROGRAPH FROM M1 WITH RUNOFF FROM 48 AT M2
1129        HC       2

1130        KK  RM2-M3
1131        KM   ROUTE COMBINED HYDROGRAPH FROM M2 TO M3  (CHANNEL A)
1132        RD    3500    .007    .025            TRAP       0     100

1133        KK      67
1134        KM   BASIN 67
1135        KM    THE FOLLOWING PARAMETERS WERE PROVIDED FOR THIS BASIN
1136        KM    L=       .9  Lca=       .4   S=   25.0  Kn= .200  LAG= 106.0
1137        KM    PHOENIX VALLEY S-GRAPH WAS USED FOR THIS BASIN
1138        BA     .49
1139        LG     .20     .25    3.92     .33   22.50
1140        UI     16.     29.     64.     84.    103.    132.    190.    161.    128.    102.
1141        UI     81.     58.     32.     26.     17.     13.      5.      5.      5.      5.
1142        UI      5.      0.      0.      0.      0.      0.      0.      0.      0.      0.

1143        KK     @M3
1144        KM   COMBINE ROUTED HYDROGRAPH FROM M2 WITH RUNOFF FROM 67 AT M3
1145        HC       2

1146        KK  SR@S-M
1147        KM   STORAGE ROUTE @ SPRR FROM APACHE TO MILLER ROADS (SUB 67 STORAGE ROUTING)
1148        KM   OVERTOPING STARTS @ Q=226cfs, EL=887.2 (OVERTOPING = 0.12 ft)
1149        RS       1    ELEV   881.5
1150        SA       0     .03     .06      .1       3       8      12    15.5
1151        SQ       0      42     135     200     226     465    1010    1703
1152        SE   881.5     883     885  887.06   887.2   887.4   887.6  887.77

1153        KK  RM3-M4
1154        KM   ROUTE HYDROGRAPH FROM SPRR AT M3 TO M4  (CHANNEL A)
1155        RD     400    .001    .025            TRAP       0     100
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LINE        ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10


1156        KK      69
1157        KM   BASIN 69
1158        KM    THE FOLLOWING PARAMETERS WERE PROVIDED FOR THIS BASIN
1159        KM    L=       .9  Lca=       .4   S=    5.0  Kn= .200  LAG= 147.0
1160        KM    PHOENIX VALLEY S-GRAPH WAS USED FOR THIS BASIN
1161        BA     .14
1162        LG     .20     .25    3.71     .29   22.50
1163        UI      3.      3.      9.     13.     16.     19.     22.     26.     34.     40.
1164        UI     32.     27.     23.     20.     17.     14.     10.      6.      5.      4.
1165        UI      3.      3.      1.      1.      1.      1.      1.      1.      1.      0.

1166        KK     @M4
1167        KM   COMBINE ROUTED HYDROGRAPH FROM M3 WITH RUNOFF FROM 69 AT M4
1168        HC       2

1169        KK  SR@B-M
1170        KM   STORAGE ROUTE AT THE BUCKEYE CANAL BETWEEN CEMETERY AND MILLER ROADS (SUB 69)
1171        RS       1    ELEV     879
1172        SA       0    64.5    65.8      67    68.5      70      72      74    75.5    77.5
1173        SQ       0       0      18      71     170     324     540     862    1402    2093
1174        SE     879   883.5   883.6   883.7   883.8   883.9   884.0   884.1   884.2   884.3
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1175        KM   ******************************************************************************
1176        KM   **************************  SUB-WATERSHED N  ********************************
1177        KM   ******************************************************************************

1178        KK      11
1179        KM   BASIN 11
1180        KM    THE FOLLOWING PARAMETERS WERE PROVIDED FOR THIS BASIN
1181        KM    L=     1.63  Lca=      .78   S=   63.0  Kn= .050  LAG=  36.0
1182        KM    PHOENIX VALLEY S-GRAPH WAS USED FOR THIS BASIN
1183        BA    1.27
1184        LG     .35     .35    3.71    .306     .00
1185        UI    271.    794.   1236.    652.    210.     66.     36.      0.      0.      0.

1186        KK  RN1-N2
1187        KM   ROUTE RUNOFF FROM 11 AT N1 TO N2  (CHANNEL B)
1188        RD
1189        RC     .10    .020     .10    2300    .007
1190        RX       0    1000    1006    1010    1050    1054    1060    2060
1191        RY      10       0       0       1       1       0       0      10

1192        KK      23
1193        KM   BASIN 23
1194        KM    THE FOLLOWING PARAMETERS WERE PROVIDED FOR THIS BASIN
1195        KM    L=      1.6  Lca=      .8   S=   16.0  Kn= .200  LAG= 184.0
1196        KM    PHOENIX VALLEY S-GRAPH WAS USED FOR THIS BASIN
1197        BA     .53
1198        LG     .50     .08    4.30     .66     .00
1199        UI     10.     10.     14.     33.     41.     49.     55.     61.     70.     80.
1200        UI    103.    123.    109.     92.     81.     73.     63.     56.     48.     41.
1201        UI     31.     20.     17.     16.     13.     10.     10.      6.      3.      3.
1202        UI      3.      3.      3.      3.      3.      3.      0.      0.      0.      0.
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LINE        ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10


1203        KK     @N2
1204        KM   COMBINE ROUTED HYDROGRAPH FROM N1 WITH RUNOFF FROM 23 AT N2
1205        HC       2

1206        KK  SR@R-N
1207        KM   STORAGE ROUTE AT ROOSEVELT CANAL BETWEEN WATSON & CEMETERY ROADS (SUB 23 SR)
1208        RS       1    ELEV  995.32
1209        SA       0      .1       3     5.5       8    10.5      13    15.6      19
1210        SQ       0      70     165     300     530     925    1440    1960    3127
1211        SE  995.32  995.68   995.8   995.9   996.0   996.1   996.2   996.3  996.42

1212        KK  RN2-N3
1213        KM   ROUTE HYDROGRAPH FROM ROOSEVELT CANAL AT N2 TO N3  (CHANNEL B)
1214        RD
1215        RC     .10    .020     .10    3500    .008
1216        RX       0    1000    1006    1010    1050    1054    1060    2060
1217        RY      10       0       0       1       1       0       0      10

1218        KK      38
1219        KM   BASIN 38
1220        KM    THE FOLLOWING PARAMETERS WERE PROVIDED FOR THIS BASIN
1221        KM    L=      1.3  Lca=      .7   S=   22.0  Kn= .200  LAG= 153.0
1222        KM    PHOENIX VALLEY S-GRAPH WAS USED FOR THIS BASIN
1223        BA     .52
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1224        LG     .50     .08    4.30     .66     .00
1225        UI     12.     12.     29.     47.     58.     66.     76.     90.    115.    146.
1226        UI    128.    106.     92.     78.     67.     57.     46.     29.     20.     19.
1227        UI     15.     12.     10.      4.      4.      4.      4.      4.      4.      4.

1228        KK     @N3
1229        KM   COMBINE STORAGE ROUTED HYDROGRAPH FROM N2 WITH RUNOFF FROM 38 AT N3
1230        HC      2

1231        KK  RN3-N4
1232        KM   ROUTE COMBINED HYDROGRAPH FROM N3 TO N4  (CHANNEL B)
1233        RD
1234        RC    .10    .020     .10    5280    .009
1235        RX      0    1000    1006    1010    1050    1054    1060    2060
1236        RY     10       0       0       1       1       0       0      10

1237        KK     49
1238        KM   BASIN 49
1239        KM    THE FOLLOWING PARAMETERS WERE PROVIDED FOR THIS BASIN
1240        KM    L=     1.98  Lca=      .98   S=   27.0  Kn= .200  LAG= 198.0
1241        KM    PHOENIX VALLEY S-GRAPH WAS USED FOR THIS BASIN
1242        BA    1.00
1243        LG     .50     .08    4.30     .66     .00
1244        UI     17.     17.     17.     55.     68.     81.     92.    101.    114.    129.
1245        UI    148.    188.    222.    190.    163.    145.    131.    115.    102.     90.
1246        UI     80.     64.     47.     30.     29.     28.     22.     17.     17.     11.
1247        UI      5.      5.      5.      5.      5.      5.      5.      5.      5.      0.
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LINE        ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10


1248        KK     @N4
1249        KM   COMBINE ROUTED HYDROGRAPH FROM N3 WITH RUNOFF FROM 49 AT N4
1250        HC      2

1251        KK  RN4-N5
1252        KM   ROUTE COMBINED HYDROGRAPH FROM N4 TO N5  (CHANNEL B)
1253        RD
1254        RC    .10    .020     .10    4500    .008
1255        RX      0    1000    1006    1010    1050    1054    1060    2060
1256        RY     10       0       0       1       1       0       0      10

1257        KK     56
1258        KM   BASIN 56
1259        KM    THE FOLLOWING PARAMETERS WERE PROVIDED FOR THIS BASIN
1260        KM    L=      1.6  Lca=       .8   S=   21.0  Kn= .200  LAG= 177.0
1261        KM    PHOENIX VALLEY S-GRAPH WAS USED FOR THIS BASIN
1262        BA     .74
1263        LG     .50     .08    4.24     .65     .00
1264        UI     14.     14.     23.     50.     62.     73.     82.     92.    106.    126.
1265        UI    163.    177.    145.    125.    111.     97.     85.     73.     64.     48.
1266        UI     32.     25.     23.     20.     14.     14.      8.      4.      4.      4.
1267        UI      4.      4.      4.      4.      4.      0.      0.      0.      0.      0.

1268        KK     @N5
1269        KM   COMBINE ROUTED HYDROGRAPH FROM N4 WITH RUNOFF FROM 56 AT N5
1270        HC      2

1271        KK  SR@S-N
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1272        KM   STORAGE ROUTE @ SPRR FROM WATSON TO APACHE ROADS (SUB 56 STORAGE ROUTING)
1273        KM   OVERTOPING STARTS @ Q=664cfs, EL=889.7 (OVERTOPING = 0.17 ft)
1274        RS       1    ELEV     883
1275        SA       0     .03     .06      .1      15    23.7    37.3      39    41.1
1276        SQ       0      80     233     335     495     700    1020    1308    1731
1277        SE     883     885     886  886.78     888   888.8  890.08   890.2  890.32

1278        KK  RN5-N6
1279        KM   ROUTE HYDROGRAPH FROM SPRR AT N5 TO N6  (CHANNEL A)
1280        RD     700    .001     .10            TRAP       0     100

1281        KK      70
1282        KM   BASIN 70
1283        KM    THE FOLLOWING PARAMETERS WERE PROVIDED FOR THIS BASIN
1284        KM    L=       .9  Lca=       .4   S=    5.0  Kn= .200  LAG= 144.0
1285        KM    PHOENIX VALLEY S-GRAPH WAS USED FOR THIS BASIN
1286        BA     .17
1287        LG     .50     .08    3.92     .55     .00
1288        UI      4.      4.     11.     17.     20.     23.     28.     33.     45.     47.
1289        UI     38.     32.     27.     23.     19.     15.     10.      7.      6.      5.
1290        UI      4.      2.      1.      1.      1.      1.      1.      1.      0.      0.
1                                          HEC-1 INPUT                                          PAGE 30

LINE        ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10


1291        KK     @N6
1292        KM   COMBINE ROUTED HYDROGRAPH FROM N5 WITH RUNOFF FROM 70 AT N6
1293        HC       2

1294        KK  SR@B-N
1295        KM   STORAGE ROUTE AT THE BUCKEYE CANAL BETWEEN WATSON AND CEMETERY ROADS (SUB 70)
1296        RS       1    ELEV  883.23
1297        SA       0    23.5      26      28      31      33      35      38    40.5      45
1298        SQ       0       0       9     102     276     507     787    1114    1484    2352
1299        SE  883.23   884.2   884.3   884.4   884.5   884.6   884.7   884.8   884.9   885.1

1300        KK    BUCK
1301        KM   COMBINE HYDROGRAPHS ALONG BUCKEYE CANAL BETWEEN ROOK AND WATSON ROADS
1302        HC       3
1303        KM   ******************************************************************************
1304        KM   *************************  SUB-WATERSHED O  *********************************
1305        KM   ******************************************************************************

1306        KK      12
1307        KM   BASIN 12
1308        KM    THE FOLLOWING PARAMETERS WERE PROVIDED FOR THIS BASIN
1309        KM    L=     1.37  Lca=      .76   S=   77.0  Kn= .050  LAG=  32.0
1310        KM    PHOENIX VALLEY S-GRAPH WAS USED FOR THIS BASIN
1311        BA     .98
1312        LG     .35     .35    3.50    .264     .00
1313        UI    266.    818.    922.    368.    105.     32.      0.      0.      0.      0.

1314        KK  RO1-O3
1315        KM   ROUTE RUNOFF FROM 12 AT O1 TO O3  (CHANNEL A)
1316        RD    2600    .008    .025            TRAP       0     100

1317        KK      24
1318        KM   BASIN 24
1319        KM   THE FOLLOWING PARAMETERS WERE PROVIDED FOR THIS BASIN
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1320        KM   L=    .9    Lca=     .5    S=      15.0       Kn= .200       LAG= 127.0
1321        KM   PHOENIX VALLEY S-GRAPH WAS USED FOR THIS BASIN
1322        BA     .49
1323        LG     .20     .25    3.66     .28     7.5
1324        UI     13.     14.     46.     62.     73.     87.    106.    149.    152.    119.
1325        UI    101.     83.     68.     55.     33.     22.     21.     13.     12.      4.
1326        UI      4.      4.      4.      4.      4.      0.      0.      0.      0.      0.

1327        KK     @03
1328        KM   COMBINE THE ROUTED HYDROGRAPH FORM 01 WITH RUNOFF FROM 24 AT 03
1329        HC       2

1330        KK  R03-04
1331        KM   ROUTE COMBINED HYDROGRAPH FROM 03 TO 04  (CHANNEL A)
1332        RD    4200    .005     .10            TRAP       0     100
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LINE        ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10


1333        KK      13
1334        KM   BASIN 13
1335        KM    THE FOLLOWING PARAMETERS WERE PROVIDED FOR THIS BASIN
1336        KM    L=     1.57  Lca=      .86   S=   73.0  Kn= .050  LAG=  36.0
1337        KM    PHOENIX VALLEY S-GRAPH WAS USED FOR THIS BASIN
1338        BA     .45
1339        LG     .35     .35    4.08     .38     .00
1340        UI     96.    280.    436.    230.     74.     23.     13.      0.      0.      0.

1341        KK  R02-04
1342        KM   ROUTE RUNOFF FROM 13 AT 02 TO 04  (CHANNEL B)
1343        RD
1344        RC     .10    .020     .10    3400    .007
1345        RX       0    1000    1006    1010    1050    1054    1060    2060
1346        RY      10       0       0       1       1       0       0      10

1347        KK      25
1348        KM   BASIN 25
1349        KM    THE FOLLOWING PARAMETERS WERE PROVIDED FOR THIS BASIN
1350        KM    L=      1.3  Lca=       .6   S=   22.0  Kn= .200  LAG= 149.0
1351        KM    PHOENIX VALLEY S-GRAPH WAS USED FOR THIS BASIN
1352        BA     .27
1353        LG     .50     .08    4.14     .61     .00
1354        UI      6.      6.     16.     25.     31.     36.     42.     49.     65.     78.
1355        UI     63.     53.     46.     39.     33.     28.     20.     12.     10.     10.
1356        UI      6.      6.      3.      2.      2.      2.      2.      2.      2.      0.

1357        KK     @04
1358        KM   COMBINE ROUTED HYDROGRAPHS FROM 02 AND 03 WITH RUNOFF FROM 25 AT 04
1359        HC       3

1360        KK  SR@R-0
1361        KM   STORAGE ROUTE AT ROOSEVELT CANAL BETWEEN RAINBOW AND WATSON ROADS (SUB 25 SR)
1362        RS       1    ELEV  995.25
1363        SA       0     7.5     8.9      10    11.1    13.4      16      18    19.6
1364        SQ       0       0      59     184     354     806    1395    2204    3567
1365        SE  995.25   995.9   996.0   996.1   996.2   996.4   996.6   996.8   997.0

1366        KK  R04-05
1367        KM   ROUTE COMBINED HYDROGRAPH FROM ROOSEVELT CANAL AT 04 TO 05  (CHANNEL B)
```

```
1368        RD
1369        RC     .10    .020     .10    4300    .009
1370        RX       0    1000    1006    1010    1050    1054    1060    2060
1371        RY      10       0       0       1       1       0       0      10

1372        KK      39
1373        KM   BASIN 39
1374        KM    THE FOLLOWING PARAMETERS WERE PROVIDED FOR THIS BASIN
1375        KM    L=      1.5  Lca=       .8   S=   25.0  Kn= .200  LAG= 165.0
1376        KM    PHOENIX VALLEY S-GRAPH WAS USED FOR THIS BASIN
1377        BA     .71
1378        LG     .50     .08    3.98     .56     .00
1379        UI     15.     15.     30.     54.     69.     80.     90.    104.    121.    157.
1380        UI    188.    155.    131.    116.    100.     87.     74.     62.     45.     27.
1                                         HEC-1 INPUT                                          PAGE 32

LINE        ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10

1381        UI     25.     24.     15.     15.     10.      4.      4.      4.      4.      4.
1382        UI      4.      4.      0.      0.      0.      0.      0.      0.      0.      0.

1383        KK     @05
1384        KM   COMBINE STORAGE ROUTED HYDROGRAPH FROM O4 WITH RUNOFF FROM 39 AT O5
1385        HC       2

1386        KK  RO5-O6
1387        KM   ROUTE COMBINED HYDROGRAPH FROM O5 TO O6  (CHANNEL B)
1388        RD
1389        RC     .10    .020     .10    5280    .011
1390        RX       0    1000    1006    1010    1050    1054    1060    2060
1391        RY      10       0       0       1       1       0       0      10

1392        KK      50
1393        KM   BASIN 50
1394        KM    THE FOLLOWING PARAMETERS WERE PROVIDED FOR THIS BASIN
1395        KM    L=     1.98  Lca=      .98   S=   31.0  Kn= .200  LAG= 193.0
1396        KM    PHOENIX VALLEY S-GRAPH WAS USED FOR THIS BASIN
1397        BA    1.00
1398        LG     .50     .08    4.08     .60     .00
1399        UI     17.     17.     19.     59.     72.     85.     96.    106.    120.    135.
1400        UI    162.    206.    222.    184.    160.    143.    128.    111.     99.     86.
1401        UI     74.     55.     37.     31.     29.     27.     17.     17.     15.      5.
1402        UI      5.      5.      5.      5.      5.      5.      5.      5.      0.      0.

1403        KK     @06
1404        KM   COMBINE ROUTED HYDROGRAPH FROM O5 WITH RUNOFF FROM 50 AT O6
1405        HC       2

1406        KK  RO6-O7
1407        KM   ROUTE COMBINED HYDROGRAPH FROM O6 TO O7  (CHANNEL B)
1408        RD
1409        RC     .10    .020     .10    3500    .003
1410        RX       0    1000    1006    1010    1050    1054    1060    2060
1411        RY      10       0       0       1       1       0       0      10

1412        KK      57
1413        KM   BASIN 57
1414        KM    THE FOLLOWING PARAMETERS WERE PROVIDED FOR THIS BASIN
1415        KM    L=      1.3  Lca=       .6   S=   22.0  Kn= .200  LAG= 148.0
1416        KM    PHOENIX VALLEY S-GRAPH WAS USED FOR THIS BASIN
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```
1417        BA     .51
1418        LG     .50     .08    4.03     .58     .00
1419        UI     12.     12.     31.     48.     59.     68.     79.     93.    124.    147.
1420        UI    119.    100.     87.     73.     62.     52.     37.     22.     20.     17.
1421        UI     12.     12.      4.      4.      4.      4.      4.      4.      4.      0.

1422        KK     @07
1423        KM   COMBINE ROUTED HYDROGRAPH FROM O6 WITH RUNOFF FROM 57 AT O7
1424        HC       2
1                                          HEC-1 INPUT                                          PAGE 33

LINE        ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10


1425        KK  SR@S-O
1426        KM   STORAGE ROUTE @ SPRR FROM RAINBOW TO WATSON ROADS (SUB 57 STORAGE ROUTING)
1427        KM   OVERTOPING STARTS @ Q=139cfs, EL=892.3 (OVERTOPING = 0.11 ft)
1428        RS       1    ELEV     889
1429        SA       0     .05      .1      15      18    21.4      26      30    33.7
1430        SQ       0      78      85     151     248     540     954    1560    2334
1431        SE     889     891   891.3   892.4   892.6  892.87   893.1   893.3  893.48

1432        KK  RO7-O8
1433        KM   ROUTE HYDROGRAPH FROM SPRR AT O7 TO O8  (CHANNEL A)
1434        RD    1600    .001     .10            TRAP       0     100

1435        KK      71
1436        KM   BASIN 71
1437        KM    THE FOLLOWING PARAMETERS WERE PROVIDED FOR THIS BASIN
1438        KM    L=       .6  Lca=       .3   S=    5.0  Kn= .200  LAG= 112.0
1439        KM    PHOENIX VALLEY S-GRAPH WAS USED FOR THIS BASIN
1440        BA     .14
1441        LG     .50     .08    3.50     .41     .00
1442        UI      4.      7.     16.     22.     26.     32.     46.     49.     38.     31.
1443        UI     25.     20.     13.      7.      7.      4.      3.      1.      1.      1.
1444        UI      1.      1.      0.      0.      0.      0.      0.      0.      0.      0.

1445        KK     @08
1446        KM   COMBINE ROUTED HYDROGRAPH FROM O7 WITH RUNOFF FROM 71 AT O8
1447        HC       2

1448        KK  SR@B-O
1449        KM   STORAGE ROUTE AT THE BUCKEYE CANAL BETWEEN RAINBOW AND WATSON ROADS (SUB 71)
1450        RS       1    ELEV  885.62
1451        SA       0      54      57    60.5      63    66.5      72      78    79.8
1452        SQ       0       0       4      24      74     172     581    1344    2534
1453        SE  885.62   887.4   887.5   887.6   887.7   887.8   888.0   888.2   888.4
1454        KM   ******************************************************************************
1455        KM   *************************  SUB-WATERSHED P  *********************************
1456        KM   ******************************************************************************

1457        KK      14
1458        KM   BASIN 14
1459        KM    THE FOLLOWING PARAMETERS WERE PROVIDED FOR THIS BASIN
1460        KM    L=     1.52  Lca=       .4   S=   72.0  Kn= .050  LAG=  26.0
1461        KM    PHOENIX VALLEY S-GRAPH WAS USED FOR THIS BASIN
1462        BA     .79
1463        LG     .50     .35    4.19    .401     .00
1464        UI    323.    971.    580.    129.     31.      0.      0.      0.      0.      0.
```

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LINE          ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10

1465          KK  RP1-P2
1466          KM   ROUTE RUNOFF FROM 14 CONCENTRATED AT P1 TO P2  (CHANNEL A)
1467          RD    4600    .005    .025            TRAP       0     100

1468          KK      26
1469          KM   BASIN 26
1470          KM    THE FOLLOWING PARAMETERS WERE PROVIDED FOR THIS BASIN
1471          KM    L=      1.6  Lca=       .8   S=   25.0  Kn= .200  LAG= 174.0
1472          KM    PHOENIX VALLEY S-GRAPH WAS USED FOR THIS BASIN
1473          BA     .52
1474          LG     .20     .25    4.24     .39    7.50
1475          UI     10.     10.     18.     36.     46.     53.     59.     67.     77.     94.
1476          UI    123.    122.    100.     87.     77.     67.     58.     50.     42.     31.
1477          UI     19.     17.     16.     12.     10.     10.      3.      3.      3.      3.
1478          UI      3.      3.      3.      3.      0.      0.      0.      0.      0.      0.

1479          KK     @P2
1480          KM   COMBINE ROUTED HYDROGRAPH FROM P1 WITH RUNOFF FROM 26 AT P2
1481          HC      2

1482          KK  SR@R-P
1483          KM   STORAGE ROUTE AT ROOSEVELT CANAL BETWEEN DEAN AND RAINBOW ROADS (SUB 26 SR)
1484          RS      1    ELEV  998.19
1485          SA      0     0.1     1.5       3     4.2     5.4       8      11      12
1486          SQ      0       0      12      80     229     479    1292    2543    3347
1487          SE  998.19   998.2   998.3   998.4   998.5   998.6   998.8   999.0   999.1

1488          KK  RP2-P3
1489          KM   ROUTE HYDROGRAPH FROM ROOSEVELT CANAL AT P2 TO P3  (CHANNEL B)
1490          RD
1491          RC     .10    .020     .10    5900    .009
1492          RX      0    1000    1006    1010    1050    1054    1060    2060
1493          RY     10       0       0       1       1       0       0      10

1494          KK      40
1495          KM   BASIN 40
1496          KM    THE FOLLOWING PARAMETERS WERE PROVIDED FOR THIS BASIN
1497          KM    L=      1.8  Lca=       .9   S=   31.0  Kn= .200  LAG= 178.0
1498          KM    PHOENIX VALLEY S-GRAPH WAS USED FOR THIS BASIN
1499          BA     .95
1500          LG     .50     .08    4.03     .58     .00
1501          UI     18.     18.     29.     64.     80.     93.    105.    118.    136.    160.
1502          UI    207.    230.    188.    162.    144.    126.    110.     95.     84.     63.
1503          UI     44.     32.     30.     27.     18.     18.     12.      6.      6.      6.
1504          UI      6.      6.      6.      6.      6.      0.      0.      0.      0.      0.

1505          KK     @P3
1506          KM   COMBINE STORAGE ROUTED HYDROGRAPH FROM P2 WITH RUNOFF FROM 40 AT P3
1507          HC      2

1508          KK  RP3-P4
1509          KM   ROUTE COMBINED HYDROGRAPH FROM P3 TO P4  (CHANNEL B)
1510          RD
1511          RC     .10    .020     .10    5280    .009
1512          RX      0    1000    1006    1010    1050    1054    1060    2060
1513          RY     10       0       0       1       1       0       0      10
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LINE          ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10

1514          KK      51
1515          KM   BASIN 51
1516          KM    THE FOLLOWING PARAMETERS WERE PROVIDED FOR THIS BASIN
1517          KM    L=     1.98  Lca=      .98   S=   28.0  Kn= .200  LAG= 197.0
1518          KM    PHOENIX VALLEY S-GRAPH WAS USED FOR THIS BASIN
1519          BA    1.00
1520          LG     .50     .08    3.87     .53     .00
1521          UI     17.     17.     17.     56.     69.     82.     93.    102.    114.    130.
1522          UI    151.    190.    222.    189.    162.    144.    130.    114.    102.     88.
1523          UI     79.     61.     45.     30.     29.     28.     21.     17.     17.     10.
1524          UI      5.      5.      5.      5.      5.      5.      5.      5.      5.      0.

1525          KK     @P4
1526          KM   COMBINE ROUTED HYDROGRAPH FROM P3 WITH RUNOFF FROM 51 AT P4
1527          HC       2

1528          KK  RP4-P5
1529          KM   ROUTE COMBINED HYDROGRAPH FROM P4 TO P5  (CHANNEL A)
1530          RD    2500    .004     .10            TRAP       0     100

1531          KK      58
1532          KM   BASIN 58
1533          KM    THE FOLLOWING PARAMETERS WERE PROVIDED FOR THIS BASIN
1534          KM    L=       .9  Lca=       .5   S=   13.0  Kn= .200  LAG= 129.0
1535          KM    PHOENIX VALLEY S-GRAPH WAS USED FOR THIS BASIN
1536          BA     .21
1537          LG     .50     .08    3.98     .56     .00
1538          UI      6.      6.     19.     26.     31.     37.     44.     61.     67.     52.
1539          UI     44.     37.     30.     25.     17.     10.      9.      6.      6.      3.
1540          UI      2.      2.      2.      2.      2.      0.      0.      0.      0.      0.

1541          KK     @P5
1542          KM   COMBINE ROUTED HYDROGRAPH FROM P4 WITH RUNOFF FROM 58 AT P5
1543          HC       2

1544          KK  SR@S-P
1545          KM   STORAGE ROUTE @ SPRR FROM DEAN TO RAINBOW ROADS (SUB 58 STORAGE ROUTING)
1546          KM   OVERTOPING STARTS @ Q=1605cfs, EL=892.7 (OVERTOPING = 0.04 ft)
1547          KM   DO NOT EXPECT OVERTOPING TO OCCUR (All flow SHOULD be orrifice flow)
1548          RS       1    ELEV     887
1549          SA       0     .03     .06      .1       6      11
1550          SQ       0     105     542    1495    1605    2230
1551          SE     887     888     890  892.47   892.7   892.9

1552          KK  RP5-P6
1553          KM   ROUTE HYDROGRAPH FROM SPRR AT P5 TO P6  (CHANNEL A)
1554          RD     700    .001     .10            TRAP       0     100

1555          KK      72
1556          KM   BASIN 72
1557          KM    THE FOLLOWING PARAMETERS WERE PROVIDED FOR THIS BASIN
1558          KM    L=       .6  Lca=       .3   S=    5.0  Kn= .200  LAG= 109.0
1559          KM    PHOENIX VALLEY S-GRAPH WAS USED FOR THIS BASIN
1560          BA     .07
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LINE          ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10

1561          LG     .50     .08    3.71     .48     .00
1562          UI      2.      4.      8.     11.     13.     17.     24.     23.     18.     15.
1563          UI     12.      9.      5.      4.      3.      2.      1.      1.      1.      1.
1564          UI      1.      0.      0.      0.      0.      0.      0.      0.      0.      0.

1565          KK     @P6
1566          KM   COMBINE STORAGE ROUTED HYDROGRAPH FROM P5 WITH RUNOFF FROM 72 AT P6
1567          HC      2

1568          KK  SR@B-P
1569          KM   STORAGE ROUTE AT THE BUCKEYE CANAL BETWEEN DEAN AND RAINBOW ROADS (SUB 72 SR)
1570          RS      1    ELEV  887.73
1571          SA      0      20    22.5    24.8    27.1    29.2    31.4    33.5    35.5
1572          SQ      0       0      27     153     410     771    1225    1767    2397
1573          SE  887.73   888.6   888.7   888.8   888.9   889.0   889.1   889.2   889.3

1574          KK    EAST
1575          KM   COMBINE HYDROGRAPHS ALONG BUCKEYE CANAL BETWEEN WATSON AND DEAN ROADS
1576          HC      2
1577          KM   ******************************************************************************
1578          KM   ************************  SUB-WATERSHED Q  *********************************
1579          KM   ******************************************************************************

1580          KK      83
1581          KM   BASIN 83
1582          KM    THE FOLLOWING PARAMETERS WERE PROVIDED FOR THIS BASIN
1583          KM    L=      1.6  Lca=       .8   S=   75.0  Kn= .050  LAG=  34.0
1584          KM    PHOENIX VALLEY S-GRAPH WAS USED FOR THIS BASIN
1585          BA     .87
1586          LG     .35     .38    5.05     .21     .00
1587          UI    209.    625.    849.    392.    119.     30.      0.      0.      0.      0.
1588          ZZ
1
              SCHEMATIC DIAGRAM OF STREAM NETWORK
 INPUT
  LINE      (V) ROUTING          (--->) DIVERSION OR PUMP FLOW

   NO.      (.) CONNECTOR        (<---) RETURN OF DIVERTED OR PUMPED FLOW

    25          76
                 V
                 V
    36       RA1-A2
                 .
                 .
    42           .          75
                 .           .
                 .           .
    50         @A2............
                 V
                 V
    53       RA2-A3
                 .
                 .
    59           .          73
                 .           .
                 .           .
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68      @A3............
         .
         .
74       .        78
         .         .
         .         .
85       .         .        79
         .         .         .
         .         .         .
96       .         .         .       74
         .         .         .        .
         .         .         .        .
105      .         .         .        .        77
         .         .         .        .         .
         .         .         .        .         .
113      .         .         .      @D1............
         .         .         .        V
         .         .         .        V
116      .         .         .     RD1-D2
         .         .         .        .
         .         .         .        .
122      .         .         .        .        80
         .         .         .        .         .
         .         .         .        .         .
130      .         .         .      @D2............
         .         .         .        V
         .         .         .        V
133      .         .         .     RD2-D3
         .         .         .        .
         .         .         .        .
[illegible]  .         .         .        .        81
         .         .         .        .         .
         .         .         .        .         .
147      .         .         .      @D3............
         .         .         .        V
         .         .         .        V
150      .         .         .     RD3-D4
         .         .         .        .
         .         .         .        .
156      .         .         .        .        82
         .         .         .        .         .
         .         .         .        .         .
164      .         .         .      @D4............
         .         .         .        .
         .         .         .        .
167   HASSY...................................
         .
         .
173      .        68
         .         V
         .         V
182      .      SR@S-E
         .         V
         .         V
189      .      RE1-E2
         .         .
         .         .
192      .         .        59
         .         .         .
         .         .         .
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201   .      @E2............
      .        V
      .        V
204   .    SR@B-E
      .        .
      .        .
213   .        .        15
      .        .         V
      .        .         V
224   .        .     SR@R-F
      .        .         V
      .        .         V
230   .        .     RF1-F2
      .        .         .
      .        .         .
233   .        .         .          27
      .        .         .           .
      .        .         .           .
242   .        .       @F2............
      .        .         V
      .        .         V
245   .        .     RF2-F3
      .        .         .
      .        .         .
248   .        .         .          29
      .        .         .           .
      .        .         .           .
259   .        .       @F3............
      .        .         V
      .        .         V
262   .        .     RF3-F4
      .        .         .
      .        .         .
265   .        .         .          41
      .        .         .           .
      .        .         .           .
276   .        .       @F4............
      .        .         V
      .        .         V
279   .        .     RF4-F5
      .        .         .
      .        .         .
282   .        .         .          52
      .        .         .           .
      .        .         .           .
293   .        .       @F5............
      .        .         V
      .        .         V
296   .        .     SR@S-F
      .        .         V
      .        .         V
303   .        .     RF5-F6
      .        .         .
      .        .         .
306   .        .         .          60
      .        .         .           .
      .        .         .           .
317   .        .       @F6............
      .        .         V
      .        .         V
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320     .       .     SR@B-F
        .       .       .
        .       .       .
329     .       .       .       1
        .       .       .       .
        .       .       .       .
338     .       .       .       .           2
        .       .       .       .           .
        .       .       .       .           .
346     .       .       .     @G2............
        .       .       .       V
        .       .       .       V
349     .       .       .   RG2-G3
        .       .       .       .
        .       .       .       .
352     .       .       .       .          16
        .       .       .       .           .
        .       .       .       .           .
363     .       .       .     @G3............
        .       .       .       V
        .       .       .       V
366     .       .       .   SR@R-G
        .       .       .       V
        .       .       .       V
372     .       .       .   RG3-G4
        .       .       .       .
        .       .       .       .
375     .       .       .       .          28
        .       .       .       .           .
        .       .       .       .           .
[illegible]5    .       .       .     @G4............
        .       .       .       V
        .       .       .       V
388     .       .       .   RG4-G5
        .       .       .       .
        .       .       .       .
391     .       .       .       .          30
        .       .       .       .           .
        .       .       .       .           .
402     .       .       .     @G5............
        .       .       .       V
        .       .       .       V
405     .       .       .   RG5-G6
        .       .       .       .
        .       .       .       .
408     .       .       .       .          42
        .       .       .       .           .
        .       .       .       .           .
419     .       .       .     @G6............
        .       .       .       V
        .       .       .       V
422     .       .       .   RG6-G7
        .       .       .       .
        .       .       .       .
425     .       .       .       .          53
        .       .       .       .           .
        .       .       .       .           .
434     .       .       .     @G7............
        .       .       .       V
        .       .       .       V
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437     .         .         .     SR@S-G
        .         .         .         V
        .         .         .         V
444     .         .         .     RG7-G8
        .         .         .         .
        .         .         .         .
447     .         .         .         .        61
        .         .         .         .         .
        .         .         .         .         .
456     .         .         .       @G8............
        .         .         .         V
        .         .         .         V
459     .         .         .     SR@B-G
        .         .         .         .
        .         .         .         .
465     .     PVWEST.......................
        .         .
        .         .
471     .         .         4
        .         .         V
        .         .         V
479     .         .     RH1-H2
        .         .         .
        .         .         .
485     .         .         .         3
        .         .         .         .
        .         .         .         .
493     .         .       @H2............
        .         .         V
        .         .         V
496     .         .     RH2-H3
        .         .         .
        .         .         .
502     .         .         .        17
        .         .         .         .
        .         .         .         .
513     .         .       @H3............
        .         .         V
        .         .         V
516     .         .     SR@R-H
        .         .         V
        .         .         V
522     .         .     RH3-H4
        .         .         .
        .         .         .
528     .         .         .        31
        .         .         .         .
        .         .         .         .
539     .         .       @H4............
        .         .         V
        .         .         V
542     .         .     RH4-H5
        .         .         .
        .         .         .
548     .         .         .        43
        .         .         .         .
        .         .         .         .
560     .         .       @H5............
        .         .         V
        .         .         V
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563     .       .     RH5-H6
        .       .       .
        .       .       .
569     .       .       .        54
        .       .       .         .
        .       .       .         .
580     .       .     @H6............
        .       .       V
        .       .       V
583     .       .     SR@S-H
        .       .       V
        .       .       V
590     .       .     RH6-H7
        .       .       .
        .       .       .
593     .       .       .        62
        .       .       .         .
        .       .       .         .
603     .       .     @H7............
        .       .       V
        .       .       V
606     .       .     SR@B-H
        .       .       .
        .       .       .
615     .       .       .         5
        .       .       .         V
        .       .       .         V
623     .       .       .      RI1-I2
        .       .       .         .
        .       .       .         .
9       .       .       .         .        18
        .       .       .         .         .
        .       .       .         .         .
639     .       .       .         .         .        19
        .       .       .         .         .         .
        .       .       .         .         .         .
650     .       .       .       @I2........................
        .       .       .         V
        .       .       .         V
653     .       .       .      SR@R-I
        .       .       .         V
        .       .       .         V
659     .       .       .      RI2-I4
        .       .       .         .
        .       .       .         .
665     .       .       .         .        44
        .       .       .         .         .
        .       .       .         .         .
676     .       .       .       @I4............
        .       .       .         V
        .       .       .         V
679     .       .       .      RI4-I5
        .       .       .         .
        .       .       .         .
682     .       .       .         .        32
        .       .       .         .         V
        .       .       .         .         V
693     .       .       .         .      RI3-I5
        .       .       .         .         .
        .       .       .         .         .
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```
699     .         .         .         .         .         55
        .         .         .         .         .         .
        .         .         .         .         .         .
709     .         .         .       @I5.......................
        .         .         .         V
        .         .         .         V
712     .         .         .     SR@S-I
        .         .         .         V
        .         .         .         V
719     .         .         .     RI5-I6
        .         .         .         .
        .         .         .         .
722     .         .         .         .        63
        .         .         .         .         .
        .         .         .         .         .
732     .         .         .       @I6............
        .         .         .         V
        .         .         .         V
735     .         .         .     SR@B-I
        .         .         .         .
        .         .         .         .
744     .         .         .         .         6
        .         .         .         .         V
        .         .         .         .         V
752     .         .         .         .     RJ1-J2
        .         .         .         .         .
        .         .         .         .         .
755     .         .         .         .         .         8
        .         .         .         .         .         .
        .         .         .         .         .         .
763     .         .         .         .       @J2............
        .         .         .         .         V
        .         .         .         .         V
766     .         .         .         .     RJ2-J3
        .         .         .         .         .
        .         .         .         .         .
772     .         .         .         .         .         20
        .         .         .         .         .         .
        .         .         .         .         .         .
782     .         .         .         .       @J3............
        .         .         .         .         V
        .         .         .         .         V
785     .         .         .         .     SR@R-J
        .         .         .         .         V
        .         .         .         .         V
791     .         .         .         .     RJ3-J4
        .         .         .         .         .
        .         .         .         .         .
797     .         .         .         .         .         33
        .         .         .         .         .         .
        .         .         .         .         .         .
808     .         .         .         .       @J4............
        .         .         .         .         V
        .         .         .         .         V
811     .         .         .         .     RJ4-J5
        .         .         .         .         .
        .         .         .         .         .
814     .         .         .         .         .         45
        .         .         .         .         .         .
        .         .         .         .         .         .
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825   .   .   .   .   @J5............
      .   .   .   .     V
      .   .   .   .     V
828   .   .   .   .  SR@S-J
      .   .   .   .     V
      .   .   .   .     V
835   .   .   .   .  RJ5-J6
      .   .   .   .     .
      .   .   .   .     .
838   .   .   .   .     .        64
      .   .   .   .     .         .
      .   .   .   .     .         .
847   .   .   .   .   @J6............
      .   .   .   .     V
      .   .   .   .     V
850   .   .   .   .  SR@B-J
      .   .   .   .     .
      .   .   .   .     .
859   .   .   .   .     .         7
      .   .   .   .     .         V
      .   .   .   .     .         V
867   .   .   .   .     .     RK1-K2
      .   .   .   .     .         .
      .   .   .   .     .         .
870   .   .   .   .     .         .          9
      .   .   .   .     .         .          .
      .   .   .   .     .         .          .
878   .   .   .   .     .       @K2............
      .   .   .   .     .         V
      .   .   .   .     .         V
      .   .   .   .     .     RK2-K3
      .   .   .   .     .         .
      .   .   .   .     .         .
884   .   .   .   .     .         .         21
      .   .   .   .     .         .          .
      .   .   .   .     .         .          .
895   .   .   .   .     .       @K3............
      .   .   .   .     .         V
      .   .   .   .     .         V
898   .   .   .   .     .     SR@R-K
      .   .   .   .     .         V
      .   .   .   .     .         V
904   .   .   .   .     .     RK3-K4
      .   .   .   .     .         .
      .   .   .   .     .         .
910   .   .   .   .     .         .         34
      .   .   .   .     .         .          .
      .   .   .   .     .         .          .
920   .   .   .   .     .       @K4............
      .   .   .   .     .         V
      .   .   .   .     .         V
923   .   .   .   .     .     RK4-K5
      .   .   .   .     .         .
      .   .   .   .     .         .
929   .   .   .   .     .         .         35
      .   .   .   .     .         .          .
      .   .   .   .     .         .          .
940   .   .   .   .     .       @K5............
      .   .   .   .     .         V
      .   .   .   .     .         V
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943     .       .       .       .       .   RK5-K6
        .       .       .       .       .       .
        .       .       .       .       .       .
949     .       .       .       .       .       .       46
        .       .       .       .       .       .        .
        .       .       .       .       .       .        .
960     .       .       .       .       .     @K6............
        .       .       .       .       .       V
        .       .       .       .       .       V
963     .       .       .       .       .   SR@S-K
        .       .       .       .       .       V
        .       .       .       .       .       V
970     .       .       .       .       .   RK6-K7
        .       .       .       .       .       .
        .       .       .       .       .       .
973     .       .       .       .       .       .       65
        .       .       .       .       .       .        .
        .       .       .       .       .       .        .
982     .       .       .       .       .     @K7............
        .       .       .       .       .       V
        .       .       .       .       .       V
985     .       .       .       .       .   SR@B-K
        .       .       .       .       .       .
        .       .       .       .       .       .
991     .       .   PVTORR..................................
        .       .       .
        .       .       .
997     .       .       .      10
        .       .       .       V
        .       .       .       V
1005    .       .       .    RL1-L2
        .       .       .       .
        .       .       .       .
1011    .       .       .       .       22
        .       .       .       .        .
        .       .       .       .        .
1022    .       .       .     @L2............
        .       .       .       V
        .       .       .       V
1025    .       .       .    SR@R-L
        .       .       .       V
        .       .       .       V
1031    .       .       .    RL2-L3
        .       .       .       .
        .       .       .       .
1037    .       .       .       .       36
        .       .       .       .        .
        .       .       .       .        .
1048    .       .       .     @L3............
        .       .       .       V
        .       .       .       V
1051    .       .       .    RL3-L4
        .       .       .       .
        .       .       .       .
1057    .       .       .       .       47
        .       .       .       .        .
        .       .       .       .        .
1067    .       .       .     @L4............
        .       .       .       V
        .       .       .       V
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1070  .  .  .  SR@S-L
      .  .  .      V
      .  .  .      V
1077  .  .  .  RL4-L5
      .  .  .      .
      .  .  .      .
1080  .  .  .      .      66
      .  .  .      .       .
      .  .  .      .       .
1090  .  .  .    @L5............
      .  .  .      V
      .  .  .      V
1093  .  .  .  SR@B-L
      .  .  .      .
      .  .  .      .
1102  .  .  .      .      37
      .  .  .      .       V
      .  .  .      .       V
1114  .  .  .      .   RM1-M2
      .  .  .      .       .
      .  .  .      .       .
1117  .  .  .      .       .      48
      .  .  .      .       .       .
      .  .  .      .       .       .
1127  .  .  .      .     @M2............
      .  .  .      .       V
      .  .  .      .       V
1130  .  .  .      .   RM2-M3
      .  .  .      .       .
      .  .  .      .       .
      .  .  .      .       .      67
      .  .  .      .       .       .
      .  .  .      .       .       .
1143  .  .  .      .     @M3............
      .  .  .      .       V
      .  .  .      .       V
1146  .  .  .      .   SR@S-M
      .  .  .      .       V
      .  .  .      .       V
1153  .  .  .      .   RM3-M4
      .  .  .      .       .
      .  .  .      .       .
1156  .  .  .      .       .      69
      .  .  .      .       .       .
      .  .  .      .       .       .
1166  .  .  .      .     @M4............
      .  .  .      .       V
      .  .  .      .       V
1169  .  .  .      .   SR@B-M
      .  .  .      .       .
      .  .  .      .       .
1178  .  .  .      .       .      11
      .  .  .      .       .       V
      .  .  .      .       .       V
1186  .  .  .      .       .   RN1-N2
      .  .  .      .       .       .
      .  .  .      .       .       .
1192  .  .  .      .       .       .      23
      .  .  .      .       .       .       .
      .  .  .      .       .       .       .
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1203    .       .       .       .       .       @N2............
        .       .       .       .       .         V
        .       .       .       .       .         V
1206    .       .       .       .       .     SR@R-N
        .       .       .       .       .         V
        .       .       .       .       .         V
1212    .       .       .       .       .     RN2-N3
        .       .       .       .       .         .
        .       .       .       .       .         .
1218    .       .       .       .       .         .         38
        .       .       .       .       .         .          .
        .       .       .       .       .         .          .
1228    .       .       .       .       .       @N3............
        .       .       .       .       .         V
        .       .       .       .       .         V
1231    .       .       .       .       .     RN3-N4
        .       .       .       .       .         .
        .       .       .       .       .         .
1237    .       .       .       .       .         .         49
        .       .       .       .       .         .          .
        .       .       .       .       .         .          .
1248    .       .       .       .       .       @N4............
        .       .       .       .       .         V
        .       .       .       .       .         V
1251    .       .       .       .       .     RN4-N5
        .       .       .       .       .         .
        .       .       .       .       .         .
1257    .       .       .       .       .         .         56
        .       .       .       .       .         .          .
        .       .       .       .       .         .          .
1268    .       .       .       .       .       @N5............
        .       .       .       .       .         V
        .       .       .       .       .         V
1271    .       .       .       .       .     SR@S-N
        .       .       .       .       .         V
        .       .       .       .       .         V
1278    .       .       .       .       .     RN5-N6
        .       .       .       .       .         .
        .       .       .       .       .         .
1281    .       .       .       .       .         .         70
        .       .       .       .       .         .          .
        .       .       .       .       .         .          .
1291    .       .       .       .       .       @N6............
        .       .       .       .       .         V
        .       .       .       .       .         V
1294    .       .       .       .       .     SR@B-N
        .       .       .       .       .         .
        .       .       .       .       .         .
1300    .       .       .     BUCK......................
        .       .       .       .
        .       .       .       .
1306    .       .       .       .       12
        .       .       .       .        V
        .       .       .       .        V
1314    .       .       .       .     RO1-O3
        .       .       .       .       .
        .       .       .       .       .
1317    .       .       .       .       .         24
        .       .       .       .       .          .
        .       .       .       .       .          .
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1327                                    @03............
                                         V
                                         V
1330                                    R03-04
                                         .
                                         .
1333                                     .          13
                                         .           V
                                         .           V
1341                                     .       R02-04
                                         .           .
                                         .           .
1347                                     .           .        25
                                         .           .         .
                                         .           .         .
1357                                    @04........................
                                         V
                                         V
1360                                    SR@R-0
                                         V
                                         V
1366                                    R04-05
                                         .
                                         .
1372                                     .          39
                                         .           .
                                         .           .
1383                                    @05............
                                         V
                                         V
1386                                    R05-06
                                         .
                                         .
1392                                     .          50
                                         .           .
                                         .           .
1403                                    @06............
                                         V
                                         V
1406                                    R06-07
                                         .
                                         .
1412                                     .          57
                                         .           .
                                         .           .
1422                                    @07............
                                         V
                                         V
1425                                    SR@S-0
                                         V
                                         V
1432                                    R07-08
                                         .
                                         .
1435                                     .          71
                                         .           .
                                         .           .
1445                                    @08............
                                         V
                                         V
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1448   .    .    .    .   SR@B-O
       .    .    .    .      .
       .    .    .    .      .
1457   .    .    .    .      .      14
       .    .    .    .      .       V
       .    .    .    .      .       V
1465   .    .    .    .      .    RP1-P2
       .    .    .    .      .       .
       .    .    .    .      .       .
1468   .    .    .    .      .       .          26
       .    .    .    .      .       .           .
       .    .    .    .      .       .           .
1479   .    .    .    .      .     @P2............
       .    .    .    .      .       V
       .    .    .    .      .       V
1482   .    .    .    .      .    SR@R-P
       .    .    .    .      .       V
       .    .    .    .      .       V
1488   .    .    .    .      .    RP2-P3
       .    .    .    .      .       .
       .    .    .    .      .       .
1494   .    .    .    .      .       .          40
       .    .    .    .      .       .           .
       .    .    .    .      .       .           .
1505   .    .    .    .      .     @P3............
       .    .    .    .      .       V
       .    .    .    .      .       V
1508   .    .    .    .      .    RP3-P4
       .    .    .    .      .       .
       .    .    .    .      .       .
1514   .    .    .    .      .       .          51
       .    .    .    .      .       .           .
       .    .    .    .      .       .           .
1525   .    .    .    .      .     @P4............
       .    .    .    .      .       V
       .    .    .    .      .       V
1528   .    .    .    .      .    RP4-P5
       .    .    .    .      .       .
       .    .    .    .      .       .
1531   .    .    .    .      .       .          58
       .    .    .    .      .       .           .
       .    .    .    .      .       .           .
1541   .    .    .    .      .     @P5............
       .    .    .    .      .       V
       .    .    .    .      .       V
1544   .    .    .    .      .    SR@S-P
       .    .    .    .      .       V
       .    .    .    .      .       V
1552   .    .    .    .      .    RP5-P6
       .    .    .    .      .       .
       .    .    .    .      .       .
1555   .    .    .    .      .       .          72
       .    .    .    .      .       .           .
       .    .    .    .      .       .           .
1565   .    .    .    .      .     @P6............
       .    .    .    .      .       V
       .    .    .    .      .       V
1568   .    .    .    .      .    SR@B-P
       .    .    .    .      .       .
       .    .    .    .      .       .
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1574          .          .          .          .       EAST............
              .          .          .          .          .
              .          .          .          .          .
1580          .          .          .          .          .          83

(***) RUNOFF ALSO COMPUTED AT THIS LOCATION
1****************************************
*                                      *
*   FLOOD HYDROGRAPH PACKAGE  (HEC-1)  *
*            SEPTEMBER 1990            *
*             VERSION 4.0              *
*                                      *
*  RUN DATE  06/15/1992  TIME  15:59:42 *
*                                      *
****************************************

****************************************
*                                      *
*    U.S. ARMY CORPS OF ENGINEERS      *
*    HYDROLOGIC ENGINEERING CENTER     *
*          609 SECOND STREET           *
*       DAVIS, CALIFORNIA 95616        *
*           (916) 756-1104             *
*                                      *
****************************************

                    BUCKEYE FIS, D.T. PHELPS FOR G.V. SABOL  12 JUNE 92
                    100 YEAR 6 HOUR LOCAL STORM WITH A DEPTH OF 3.3 INCHES
                    ENTIRE STUDY AREA MODEL
                    MODEL D    ADDED STORAGE ROUTING TO SPRR, RC & BC

  6 IO        OUTPUT CONTROL VARIABLES
                    IPRNT          5  PRINT CONTROL
                    IPLOT          0  PLOT CONTROL
                    QSCAL         0.  HYDROGRAPH PLOT SCALE

  IT          HYDROGRAPH TIME DATA
                     NMIN         15  MINUTES IN COMPUTATION INTERVAL
                    IDATE     1    0  STARTING DATE
                    ITIME       0000  STARTING TIME
                       NQ        150  NUMBER OF HYDROGRAPH ORDINATES
                   NDDATE     2    0  ENDING DATE
                   NDTIME       1315  ENDING TIME
                    ICENT         19  CENTURY MARK

              COMPUTATION INTERVAL     .25 HOURS
                   TOTAL TIME BASE   37.25 HOURS

        ENGLISH UNITS
             DRAINAGE AREA          SQUARE MILES
             PRECIPITATION DEPTH    INCHES
             LENGTH, ELEVATION      FEET
             FLOW                   CUBIC FEET PER SECOND
             STORAGE VOLUME         ACRE-FEET
             SURFACE AREA           ACRES
             TEMPERATURE            DEGREES FAHRENHEIT

  8 JD        INDEX STORM NO. 1
                    STRM       3.30  PRECIPITATION DEPTH
                    TRDA        .01  TRANSPOSITION DRAINAGE AREA

  PI           PRECIPITATION PATTERN
                   .01       .01       .01       .01       .01       .01       .01       .01       .01       .01
                   .01       .02       .02       .08       .16       .46       .08       .02       .02       .01
                   .01       .01       .01       .01
```

```
12 JD          INDEX STORM NO. 2
                     STRM        3.28  PRECIPITATION DEPTH
                     TRDA         .50  TRANSPOSITION DRAINAGE AREA

 0 PI            PRECIPITATION PATTERN
                   .01       .01       .01       .01       .01       .01       .01       .01       .01       .01
                   .01       .02       .02       .08       .16       .46       .08       .02       .02       .01
                   .01       .01       .01       .01

13 JD          INDEX STORM NO. 3
                     STRM        3.23  PRECIPITATION DEPTH
                     TRDA        2.80  TRANSPOSITION DRAINAGE AREA

14 PI            PRECIPITATION PATTERN
                   .01       .01       .01       .01       .01       .01       .01       .01       .01       .01
                   .01       .02       .04       .09       .20       .24       .14       .06       .04       .01
                   .01       .01       .01       .01

17 JD          INDEX STORM NO. 4
                     STRM        3.04  PRECIPITATION DEPTH
                     TRDA       16.00  TRANSPOSITION DRAINAGE AREA

18 PI            PRECIPITATION PATTERN
                   .02       .01       .01       .02       .02       .01       .01       .02       .01       .02
                   .02       .02       .05       .08       .17       .20       .13       .07       .04       .03
                   .01       .01       .01       .01

21 JD          INDEX STORM NO. 5
                     STRM        2.79  PRECIPITATION DEPTH
                     TRDA       61.00  TRANSPOSITION DRAINAGE AREA

22 PI            PRECIPITATION PATTERN
                   .02       .01       .01       .02       .02       .02       .02       .02       .02       .02
                   .02       .03       .05       .08       .14       .17       .12       .07       .05       .04
                   .02       .02       .02       .02
1
```

RUNOFF SUMMARY
FLOW IN CUBIC FEET PER SECOND
TIME IN HOURS, AREA IN SQUARE MILES

	OPERATION	STATION	PEAK FLOW	TIME OF PEAK	AVERAGE FLOW FOR MAXIMUM PERIOD 6-HOUR	24-HOUR	72-HOUR	BASIN AREA	MAXIMUM STAGE	TIME OF MAX STAGE
+	HYDROGRAPH AT	76	134.	4.00	11.	3.	2.	.06		
+	ROUTED TO	RA1-A2	102.	4.50	11.	3.	2.	.06		
+	HYDROGRAPH AT	75	594.	4.50	97.	24.	16.	.54		
+	2 COMBINED AT	@A2	683.	4.50	107.	27.	17.	.60		
+	ROUTED TO	RA2-A3	644.	5.00	106.	26.	17.	.60		
	HYDROGRAPH AT									

+	73	1375.	5.00	296.	74.	48.	2.06
2 COMBINED AT							
+	@A3	1811.	5.00	376.	94.	61.	2.66
HYDROGRAPH AT							
+	78	732.	4.25	73.	18.	12.	.41
HYDROGRAPH AT							
+	79	891.	4.50	132.	33.	21.	.78
HYDROGRAPH AT							
+	74	1603.	5.00	355.	89.	57.	2.69
HYDROGRAPH AT							
+	77	353.	4.25	36.	9.	6.	.23
2 COMBINED AT							
+	@D1	1603.	5.00	379.	95.	61.	2.92
ROUTED TO							
+	RD1-D2	1513.	5.50	379.	95.	61.	2.92
HYDROGRAPH AT							
+	80	792.	4.50	97.	24.	16.	.64
2 COMBINED AT							
+	@D2	1513.	5.25	445.	111.	72.	3.56
ROUTED TO							
+	RD2-D3	1483.	5.50	441.	110.	71.	3.56
HYDROGRAPH AT							
+	81	757.	4.50	94.	24.	15.	.63
2 COMBINED AT							
+	@D3	1477.	4.75	504.	126.	81.	4.19
ROUTED TO							
+	RD3-D4	1441.	5.25	499.	125.	80.	4.19
HYDROGRAPH AT							
+	82	351.	4.50	41.	10.	7.	.26
2 COMBINED AT							
+	@D4	1446.	5.25	524.	131.	84.	4.45
4 COMBINED AT							
+	HASSY	3130.	5.00	930.	232.	150.	8.30
HYDROGRAPH AT							
+	68	171.	5.50	48.	12.	8.	.28
ROUTED TO							
+	SR@S-E	171.	5.50	48.	12.	8.	.28
ROUTED TO							
+	RE1-E2	155.	5.75	47.	12.	8.	.28
HYDROGRAPH AT							

+		59	193.	5.00	38.	9.	6.	.24
	2 COMBINED AT							
+		@E2	255.	5.00	85.	21.	14.	.52
	ROUTED TO							
+		SR@B-E	255.	5.00	85.	21.	14.	.52
	HYDROGRAPH AT							
+		15	341.	7.00	172.	46.	30.	1.33
	ROUTED TO							
+		SR@R-F	294.	7.50	145.	40.	26.	1.33
	ROUTED TO							
+		RF1-F2	285.	8.25	144.	40.	26.	1.33
	HYDROGRAPH AT							
+		27	136.	5.50	37.	9.	6.	.23
	2 COMBINED AT							
+		@F2	283.	8.25	148.	48.	31.	1.56
	ROUTED TO							
+		RF2-F3	274.	9.25	145.	47.	30.	1.56
	HYDROGRAPH AT							
+		29	338.	6.50	141.	36.	23.	1.00
	2 COMBINED AT							
+		@F3	352.	6.50	219.	74.	48.	2.56
	ROUTED TO							
+		RF3-F4	338.	7.75	218.	74.	48.	2.56
	HYDROGRAPH AT							
+		41	387.	6.50	164.	42.	27.	1.21
	2 COMBINED AT							
+		@F4	468.	7.50	293.	104.	67.	3.77
	ROUTED TO							
+		RF4-F5	462.	8.25	292.	103.	67.	3.77
	HYDROGRAPH AT							
+		52	274.	6.50	118.	30.	20.	.82
	2 COMBINED AT							
+		@F5	542.	7.25	344.	122.	79.	4.59
	ROUTED TO							
+		SR@S-F	541.	7.25	344.	122.	79.	4.59
	ROUTED TO							
+		RF5-F6	533.	8.00	343.	122.	79.	4.59
	HYDROGRAPH AT							
+		60	354.	6.75	160.	42.	27.	1.15
	2 COMBINED AT							

+	@F6	646.	7.75	416.	148.	96.	5.74
ROUTED TO							
+	SR@B-F	643.	8.00	416.	148.	96.	5.74
HYDROGRAPH AT							
+	1	1109.	4.75	228.	57.	37.	1.67
HYDROGRAPH AT							
+	2	1112.	4.50	160.	40.	26.	1.24
2 COMBINED AT							
+	@G2	1745.	4.75	347.	87.	56.	2.91
ROUTED TO							
+	RG2-G3	1638.	5.25	346.	86.	56.	2.91
HYDROGRAPH AT							
+	16	319.	6.50	133.	34.	22.	.92
2 COMBINED AT							
+	@G3	1679.	5.25	437.	110.	71.	3.83
ROUTED TO							
+	SR@R-G	1144.	5.75	435.	110.	71.	3.83
ROUTED TO							
+	RG3-G4	1126.	6.00	435.	110.	71.	3.83
HYDROGRAPH AT							
+	28	153.	6.00	53.	13.	9.	.32
2 COMBINED AT							
+	@G4	1213.	6.00	465.	118.	76.	4.15
ROUTED TO							
+	RG4-G5	1191.	6.75	463.	118.	76.	4.15
HYDROGRAPH AT							
+	30	338.	6.50	142.	36.	23.	1.00
2 COMBINED AT							
+	@G5	1363.	6.75	536.	141.	91.	5.15
ROUTED TO							
+	RG5-G6	1341.	7.50	534.	141.	91.	5.15
HYDROGRAPH AT							
+	42	290.	6.50	121.	31.	20.	.77
2 COMBINED AT							
+	@G6	1422.	7.50	582.	160.	103.	5.92
ROUTED TO							
+	RG6-G7	1358.	8.00	582.	160.	103.	5.92
HYDROGRAPH AT							
+	53	233.	5.25	54.	14.	9.	.34
2 COMBINED AT							

+	@G7	1350.	8.00	581.	168.	108.	6.26
ROUTED TO							
+	SR@S-G	1347.	8.00	579.	167.	108.	6.26
ROUTED TO							
+	RG7-G8	1279.	8.50	578.	167.	108.	6.26
HYDROGRAPH AT							
+	61	201.	5.50	55.	14.	9.	.35
2 COMBINED AT							
+	@G8	1266.	8.50	578.	175.	112.	6.61
ROUTED TO							
+	SR@B-G	843.	9.50	460.	138.	90.	6.61
3 COMBINED AT							
+	PVWEST	1054.	9.75	661.	251.	164.	12.87
HYDROGRAPH AT							
+	4	702.	4.50	83.	21.	13.	.57
ROUTED TO							
+	RH1-H2	599.	5.00	84.	21.	14.	.57
HYDROGRAPH AT							
+	3	989.	4.75	164.	41.	26.	1.31
2 COMBINED AT							
+	@H2	1288.	4.75	223.	56.	36.	1.88
ROUTED TO							
+	RH2-H3	1209.	5.25	227.	57.	37.	1.88
HYDROGRAPH AT							
+	17	280.	6.50	118.	30.	19.	.88
2 COMBINED AT							
+	@H3	1219.	5.25	309.	78.	50.	2.76
ROUTED TO							
+	SR@R-H	1218.	5.25	309.	78.	50.	2.76
ROUTED TO							
+	RH3-H4	1578.	6.00	321.	81.	52.	2.76
HYDROGRAPH AT							
+	31	301.	7.00	145.	38.	25.	1.06
2 COMBINED AT							
+	@H4	1497.	6.00	414.	107.	69.	3.82
ROUTED TO							
+	RH4-H5	1389.	6.75	420.	109.	70.	3.82
HYDROGRAPH AT							
+	43	264.	7.00	134.	36.	23.	1.00
2 COMBINED AT							

+	@H5	1351.	6.75	489.	131.	85.	4.82
ROUTED TO							
+	RH5-H6	1274.	7.25	491.	132.	85.	4.82
HYDROGRAPH AT							
+	54	145.	6.25	60.	15.	10.	.38
2 COMBINED AT							
+	@H6	1298.	7.25	512.	140.	90.	5.20
ROUTED TO							
+	SR@S-H	920.	7.75	512.	141.	91.	5.20
ROUTED TO							
+	RH6-H7	937.	8.25	511.	141.	91.	5.20
HYDROGRAPH AT							
+	62	289.	5.75	92.	23.	15.	.58
2 COMBINED AT							
+	@H7	948.	8.00	527.	154.	99.	5.78
ROUTED TO							
+	SR@B-H	785.	9.25	372.	104.	67.	5.78
HYDROGRAPH AT							
+	5	1468.	4.50	235.	59.	38.	1.64
ROUTED TO							
+	RI1-I2	1430.	4.75	233.	58.	38.	1.64
HYDROGRAPH AT							
+	18	344.	6.00	126.	32.	20.	.90
HYDROGRAPH AT							
+	19	213.	6.50	89.	23.	15.	.59
3 COMBINED AT							
+	@I2	1430.	4.75	393.	99.	64.	3.13
ROUTED TO							
+	SR@R-I	1399.	5.00	368.	94.	61.	3.13
ROUTED TO							
+	RI2-I4	1668.	6.00	405.	105.	68.	3.13
HYDROGRAPH AT							
+	44	289.	7.00	139.	37.	24.	1.00
2 COMBINED AT							
+	@I4	1510.	6.00	485.	129.	83.	4.13
ROUTED TO							
+	RI4-I5	1154.	6.50	481.	128.	83.	4.13
HYDROGRAPH AT							
+	32	281.	6.75	125.	33.	21.	.88
ROUTED TO							

+	RI3-I5	248.	9.25	123.	33.	21.	.88
HYDROGRAPH AT							
+	55	121.	6.00	44.	11.	7.	.27
3 COMBINED AT							
+	@I5	1156.	6.75	547.	154.	100.	5.28
ROUTED TO							
+	SR@S-I	1074.	6.75	541.	154.	100.	5.28
ROUTED TO							
+	RI5-I6	1017.	7.25	537.	154.	99.	5.28
HYDROGRAPH AT							
+	63	274.	5.75	85.	21.	14.	.51
2 COMBINED AT							
+	@I6	1028.	7.50	540.	166.	107.	5.79
ROUTED TO							
+	SR@B-I	994.	7.50	537.	156.	101.	5.79
HYDROGRAPH AT							
+	6	653.	4.25	60.	15.	10.	.32
ROUTED TO							
+	RJ1-J2	647.	4.50	60.	15.	10.	.32
HYDROGRAPH AT							
+	8	493.	4.50	57.	14.	9.	.38
2 COMBINED AT							
+	@J2	1058.	4.50	113.	28.	18.	.70
ROUTED TO							
+	RJ2-J3	867.	4.75	115.	29.	19.	.70
HYDROGRAPH AT							
+	20	316.	5.75	102.	26.	17.	.67
2 COMBINED AT							
+	@J3	833.	4.75	197.	50.	32.	1.37
ROUTED TO							
+	SR@R-J	832.	5.00	197.	50.	32.	1.37
ROUTED TO							
+	RJ3-J4	815.	5.75	209.	53.	34.	1.37
HYDROGRAPH AT							
+	33	305.	6.50	136.	35.	23.	.98
2 COMBINED AT							
+	@J4	943.	6.00	310.	79.	51.	2.35
ROUTED TO							
+	RJ4-J5	875.	7.50	309.	80.	51.	2.35
HYDROGRAPH AT							

+	45	379.	6.50	159.	41.	26.	1.15
2 COMBINED AT							
+	@J5	988.	7.50	393.	108.	70.	3.50
ROUTED TO							
+	SR@S-J	828.	7.75	374.	108.	70.	3.50
ROUTED TO							
+	RJ5-J6	934.	8.00	374.	108.	70.	3.50
HYDROGRAPH AT							
+	64	270.	5.50	75.	19.	12.	.43
2 COMBINED AT							
+	@J6	885.	8.00	389.	120.	78.	3.93
ROUTED TO							
+	SR@B-J	762.	8.25	388.	120.	78.	3.93
HYDROGRAPH AT							
+	7	795.	4.25	62.	16.	10.	.41
ROUTED TO							
+	RK1-K2	737.	4.50	67.	17.	11.	.41
HYDROGRAPH AT							
+	9	1150.	4.25	99.	25.	16.	.71
2 COMBINED AT							
+	@K2	1325.	4.25	151.	38.	24.	1.12
ROUTED TO							
+	RK2-K3	1101.	5.00	154.	39.	25.	1.12
HYDROGRAPH AT							
+	21	207.	6.50	85.	22.	14.	.55
2 COMBINED AT							
+	@K3	1101.	5.00	220.	55.	36.	1.67
ROUTED TO							
+	SR@R-K	1078.	5.00	216.	54.	35.	1.67
ROUTED TO							
+	RK3-K4	1040.	5.25	221.	56.	36.	1.67
HYDROGRAPH AT							
+	34	248.	6.00	96.	24.	16.	.63
2 COMBINED AT							
+	@K4	1097.	5.25	285.	72.	46.	2.30
ROUTED TO							
+	RK4-K5	967.	6.00	280.	71.	46.	2.30
HYDROGRAPH AT							
+	35	400.	7.00	193.	51.	33.	1.50
2 COMBINED AT							

+	@K5	976.	6.00	414.	108.	70.	3.80
ROUTED TO							
+	RK5-K6	846.	7.25	417.	109.	70.	3.80
HYDROGRAPH AT							
+	46	420.	6.50	190.	49.	32.	1.38
2 COMBINED AT							
+	@K6	1037.	7.50	512.	142.	92.	5.18
ROUTED TO							
+	SR@S-K	1097.	7.50	512.	142.	92.	5.18
ROUTED TO							
+	RK6-K7	1046.	8.00	511.	142.	92.	5.18
HYDROGRAPH AT							
+	65	269.	5.50	75.	19.	12.	.41
2 COMBINED AT							
+	@K7	1040.	8.00	534.	154.	99.	5.59
ROUTED TO							
+	SR@B-K	987.	8.00	523.	151.	97.	5.59
4 COMBINED AT							
+	PVTORR	1849.	9.00	1186.	367.	238.	21.09
HYDROGRAPH AT							
+	10	1283.	4.50	186.	47.	30.	1.32
ROUTED TO							
+	RL1-L2	1180.	4.75	186.	47.	30.	1.32
HYDROGRAPH AT							
+	22	210.	6.50	88.	23.	15.	.58
2 COMBINED AT							
+	@L2	1180.	4.75	255.	65.	42.	1.90
ROUTED TO							
+	SR@R-L	1122.	4.75	249.	63.	41.	1.90
ROUTED TO							
+	RL2-L3	1199.	5.75	259.	66.	43.	1.90
HYDROGRAPH AT							
+	36	225.	6.75	100.	26.	17.	.68
2 COMBINED AT							
+	@L3	1199.	5.75	328.	85.	55.	2.58
ROUTED TO							
+	RL3-L4	1145.	6.75	329.	86.	55.	2.58
HYDROGRAPH AT							
+	47	271.	6.25	107.	27.	17.	.62
2 COMBINED AT							

+	@L4	1214.	6.75	380.	105.	68.	3.20
ROUTED TO							
+	SR@S-L	1091.	7.00	380.	105.	68.	3.20
ROUTED TO							
+	RL4-L5	983.	7.25	380.	105.	68.	3.20
HYDROGRAPH AT							
+	66	164.	5.50	50.	12.	8.	.29
2 COMBINED AT							
+	@L5	962.	7.25	399.	113.	73.	3.49
ROUTED TO							
+	SR@B-L	439.	8.75	254.	74.	48.	3.49
HYDROGRAPH AT							
+	37	343.	7.50	184.	50.	32.	1.44
ROUTED TO							
+	RM1-M2	337.	7.75	184.	50.	33.	1.44
HYDROGRAPH AT							
+	48	263.	5.75	84.	21.	14.	.49
2 COMBINED AT							
+	@M2	348.	7.75	236.	66.	42.	1.93
ROUTED TO							
+	RM2-M3	345.	8.00	236.	66.	42.	1.93
HYDROGRAPH AT							
+	67	348.	5.50	107.	27.	18.	.49
2 COMBINED AT							
+	@M3	522.	6.00	310.	88.	57.	2.42
ROUTED TO							
+	SR@S-M	522.	6.00	310.	88.	57.	2.42
ROUTED TO							
+	RM3-M4	517.	6.00	310.	88.	57.	2.42
HYDROGRAPH AT							
+	69	76.	6.25	31.	8.	5.	.14
2 COMBINED AT							
+	@M4	573.	6.00	334.	95.	61.	2.56
ROUTED TO							
+	SR@B-M	287.	8.75	155.	46.	29.	2.56
HYDROGRAPH AT							
+	11	1491.	4.50	197.	49.	32.	1.27
ROUTED TO							
+	RN1-N2	1400.	4.75	194.	49.	31.	1.27
HYDROGRAPH AT							

+	23	177.	6.75	79.	21.	13.	.53
2 COMBINED AT							
+	@N2	1400.	4.75	259.	66.	42.	1.80
ROUTED TO							
+	SR@R-N	1419.	4.75	252.	64.	41.	1.80
ROUTED TO							
+	RN2-N3	1310.	5.00	267.	68.	44.	1.80
HYDROGRAPH AT							
+	38	210.	6.25	81.	21.	13.	.52
2 COMBINED AT							
+	@N3	1336.	5.00	324.	83.	53.	2.32
ROUTED TO							
+	RN3-N4	1159.	5.75	318.	82.	53.	2.32
HYDROGRAPH AT							
+	49	285.	7.00	135.	36.	23.	1.00
2 COMBINED AT							
+	@N4	1138.	5.75	409.	107.	69.	3.32
ROUTED TO							
+	RN4-N5	955.	6.75	411.	108.	70.	3.32
HYDROGRAPH AT							
+	56	241.	6.75	108.	28.	18.	.74
2 COMBINED AT							
+	@N5	1140.	6.75	463.	126.	81.	4.06
ROUTED TO							
+	SR@S-N	776.	7.50	463.	126.	81.	4.06
ROUTED TO							
+	RN5-N6	760.	7.75	460.	125.	81.	4.06
HYDROGRAPH AT							
+	70	73.	6.25	28.	7.	5.	.17
2 COMBINED AT							
+	@N6	773.	7.75	471.	130.	84.	4.23
ROUTED TO							
+	SR@B-N	770.	8.00	466.	126.	81.	4.23
3 COMBINED AT							
+	BUCK	937.	9.00	627.	187.	121.	10.28
HYDROGRAPH AT							
+	12	1238.	4.50	166.	42.	27.	.98
ROUTED TO							
+	R01-03	1222.	4.50	163.	41.	26.	.98
HYDROGRAPH AT							

+	24	277.	5.75	100.	25.	16.	.49
2 COMBINED AT							
+	@03	1222.	4.50	249.	63.	40.	1.47
ROUTED TO							
+	R03-04	1103.	5.25	250.	63.	41.	1.47
HYDROGRAPH AT							
+	13	591.	4.50	70.	17.	11.	.45
ROUTED TO							
+	R02-04	530.	5.00	66.	16.	11.	.45
HYDROGRAPH AT							
+	25	116.	6.25	44.	11.	7.	.27
3 COMBINED AT							
+	@04	1393.	5.25	333.	84.	54.	2.19
ROUTED TO							
+	SR@R-0	1373.	5.25	331.	83.	54.	2.19
ROUTED TO							
+	R04-05	1325.	5.75	330.	83.	54.	2.19
HYDROGRAPH AT							
+	39	274.	6.50	114.	29.	19.	.71
2 COMBINED AT							
+	@05	1386.	5.75	406.	105.	67.	2.90
ROUTED TO							
+	R05-06	1388.	6.50	408.	105.	68.	2.90
HYDROGRAPH AT							
+	50	300.	7.00	144.	38.	24.	1.00
2 COMBINED AT							
+	@06	1430.	6.75	495.	131.	85.	3.90
ROUTED TO							
+	R06-07	1282.	7.25	497.	132.	85.	3.90
HYDROGRAPH AT							
+	57	222.	6.25	84.	21.	14.	.51
2 COMBINED AT							
+	@07	1331.	7.25	527.	146.	94.	4.41
ROUTED TO							
+	SR@S-0	1250.	7.50	519.	146.	94.	4.41
ROUTED TO							
+	R07-08	976.	8.00	510.	144.	93.	4.41
HYDROGRAPH AT							
+	71	83.	5.75	26.	7.	4.	.14
2 COMBINED AT							

+	@08	973.	8.00	510.	149.	96.	4.55
ROUTED TO							
+	SR@B-O	851.	8.50	454.	131.	85.	4.55
HYDROGRAPH AT							
+	14	1096.	4.25	104.	26.	17.	.79
ROUTED TO							
+	RP1-P2	1012.	4.50	105.	26.	17.	.79
HYDROGRAPH AT							
+	26	206.	6.50	92.	24.	15.	.52
2 COMBINED AT							
+	@P2	1012.	4.50	190.	48.	31.	1.31
ROUTED TO							
+	SR@R-P	840.	4.50	181.	46.	30.	1.31
ROUTED TO							
+	RP2-P3	826.	5.50	186.	48.	31.	1.31
HYDROGRAPH AT							
+	40	317.	6.75	142.	37.	24.	.95
2 COMBINED AT							
+	@P3	769.	5.50	293.	77.	50.	2.26
ROUTED TO							
+	RP3-P4	866.	6.50	294.	78.	50.	2.26
HYDROGRAPH AT							
+	51	317.	7.00	152.	40.	26.	1.00
2 COMBINED AT							
+	@P4	1041.	6.50	392.	108.	70.	3.26
ROUTED TO							
+	RP4-P5	886.	7.00	391.	108.	70.	3.26
HYDROGRAPH AT							
+	58	103.	6.00	36.	9.	6.	.21
2 COMBINED AT							
+	@P5	897.	7.00	403.	114.	73.	3.47
ROUTED TO							
+	SR@S-P	894.	7.00	403.	114.	73.	3.47
ROUTED TO							
+	RP5-P6	711.	7.25	400.	114.	73.	3.47
HYDROGRAPH AT							
+	72	40.	5.50	12.	3.	2.	.07
2 COMBINED AT							
+	@P6	711.	7.25	402.	116.	75.	3.54
ROUTED TO							

```
+                    SR@B-P      710.    7.50        401.        113.        73.       3.54

      2 COMBINED AT
+                     EAST      1233.    8.75        719.        214.       139.       8.09

      HYDROGRAPH AT
+                       83      1142.    4.50        146.         36.        23.        .87
1
                                   SUMMARY OF KINEMATIC WAVE - MUSKINGUM-CUNGE ROUTING
                                      (FLOW IS DIRECT RUNOFF WITHOUT BASE FLOW)
                                                                          INTERPOLATED TO
                                                                       COMPUTATION INTERVAL
        ISTAQ    ELEMENT      DT       PEAK    TIME TO     VOLUME      DT       PEAK    TIME TO     VOLUME
                                                  PEAK                                    PEAK

                            (MIN)     (CFS)     (MIN)      (IN)    (MIN)     (CFS)     (MIN)       (IN)

        FOR STORM = 1  STORM AREA (SQ MI) =        .01
          RA1-A2  MANE        1.50    119.95    261.00      1.66    15.00    102.82    270.00       1.76

CONTINUITY SUMMARY (AC-FT) - INFLOW= .5277E+01 EXCESS= .0000E+00 OUTFLOW= .5301E+01 BASIN STORAGE= .8860E-03 PERCENT ERROR=   -.5

        FOR STORM = 2  STORM AREA (SQ MI) =        .50
          RA1-A2  MANE        1.50    118.89    261.00      1.64    15.00    102.07    270.00       1.74

CONTINUITY SUMMARY (AC-FT) - INFLOW= .5226E+01 EXCESS= .0000E+00 OUTFLOW= .5250E+01 BASIN STORAGE= .8710E-03 PERCENT ERROR=   -.5

        FOR STORM = 3  STORM AREA (SQ MI) =       2.80
          RA1-A2  MANE        2.25     74.25    265.50      1.36    15.00     71.14    270.00       1.42

CONTINUITY SUMMARY (AC-FT) - INFLOW= .4308E+01 EXCESS= .0000E+00 OUTFLOW= .4348E+01 BASIN STORAGE= .1491E-02 PERCENT ERROR=  -1.0

        FOR STORM = 4  STORM AREA (SQ MI) =      16.00
          RA1-A2  MANE        2.25     53.56    267.75      1.03    15.00     52.72    270.00       1.00

CONTINUITY SUMMARY (AC-FT) - INFLOW= .3258E+01 EXCESS= .0000E+00 OUTFLOW= .3288E+01 BASIN STORAGE= .1267E-02 PERCENT ERROR=  -1.0

        FOR STORM = 5  STORM AREA (SQ MI) =      61.00
          RA1-A2  MANE        2.25     36.91    270.00       .72    15.00     36.91    270.00        .70

CONTINUITY SUMMARY (AC-FT) - INFLOW= .2275E+01 EXCESS= .0000E+00 OUTFLOW= .2293E+01 BASIN STORAGE= .1458E-02 PERCENT ERROR=   -.9

        FOR STORM = 1  STORM AREA (SQ MI) =        .01
          RA2-A3  MANE        3.00    683.90    294.00      1.70    15.00    665.87    300.00       1.68

CONTINUITY SUMMARY (AC-FT) - INFLOW= .5439E+02 EXCESS= .0000E+00 OUTFLOW= .5443E+02 BASIN STORAGE= .1877E-02 PERCENT ERROR=   -.1

        FOR STORM = 2  STORM AREA (SQ MI) =        .50
```

THE REMAINING CONTINUITY SUMMARY OMITTED - SEE COMPLETE FILE ON FLOPPY DISK

APPENDIX O

HEC-1 OUTPUT FOR THE 100-YR, 24-HR MODEL

```
1*****************************************
*                                       *
*   FLOOD HYDROGRAPH PACKAGE  (HEC-1)   *
*          SEPTEMBER 1990               *
*           VERSION 4.0                 *
*                                       *
* RUN DATE  06/16/1992  TIME  12:08:37  *
*                                       *
*****************************************
```

```
*****************************************
*                                       *
*   U.S. ARMY CORPS OF ENGINEERS        *
*   HYDROLOGIC ENGINEERING CENTER       *
*         609 SECOND STREET             *
*      DAVIS, CALIFORNIA 95616          *
*          (916) 756-1104               *
*                                       *
*****************************************
```

APPENDIX D

100 YR 24 HR MODEL

filenames: input BFIS24D.DAT
output BFIS24D.OUT

```
X     X  XXXXXXX   XXXXX          X
X     X  X        X     X        XX
X     X  X        X              X
XXXXXXX  XXXX     X        XXXXX X
X     X  X        X              X
X     X  X        X     X        X
X     X  XXXXXXX   XXXXX         XXX
```

THIS PROGRAM REPLACES ALL PREVIOUS VERSIONS OF HEC-1 KNOWN AS HEC1 (JAN 73), HEC1GS, HEC1DB, AND HEC1KW.

THE DEFINITIONS OF VARIABLES -RTIMP- AND -RTIOR- HAVE CHANGED FROM THOSE USED WITH THE 1973-STYLE INPUT STRUCTURE.
THE DEFINITION OF -AMSKK- ON RM-CARD WAS CHANGED WITH REVISIONS DATED 28 SEP 81. THIS IS THE FORTRAN77 VERSION
NEW OPTIONS: DAMBREAK OUTFLOW SUBMERGENCE , SINGLE EVENT DAMAGE CALCULATION, DSS:WRITE STAGE FREQUENCY,
DSS:READ TIME SERIES AT DESIRED CALCULATION INTERVAL LOSS RATE:GREEN AND AMPT INFILTRATION
KINEMATIC WAVE: NEW FINITE DIFFERENCE ALGORITHM

1 HEC-1 INPUT PAGE 1

```
LINE          ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10

              *DIAGRAM
   1          ID   BUCKEYE FIS, D.T. PHELPS FOR G.V. SABOL, 11 JUNE 92
   2          ID   100 YEAR 24 HOUR GENERAL STORM WITH A DEPTH OF 4.1 INCHES
   3          ID   ENTIRE STUDY AREA MODEL
   4          ID   MODEL D    ADDED STORAGE ROUTING TO SPRR, RC & BC
   5          IT     15                    150
   6          IO      5
   7          IN     30
   8          JD   4.10    0.01
   9          PC   .000    .005    .011    .016    .022    .028    .035    .041    .048    .056
  10          PC   .063    .071    .080    .089    .098    .109    .120    .133    .147    .163
  11          PC   .181    .204    .235    .283    .663    .735    .772    .799    .820    .838
  12          PC   .854    .868    .880    .891    .902    .912    .921    .929    .937    .945
  13          PC   .952    .959    .965    .972    .978    .984    .989    .995   1.000
  14          JD   3.9       6
  15          JD   3.73     25
  16          JD   3.57     61
```

NOTE: THE REMAINING INPUT FILE IS THE SAME AS THE 100 YR 6 HR STORM, THUS IS OMITTED.

```
  17          KK     76
  18          KM   ****************************************************************************
  19          KM   ************************  SUB-WATERSHED A  ******************************
  20          KM   ****************************************************************************
```

STRM 3.90 PRECIPITATION DEPTH
TRDA 6.00 TRANSPOSITION DRAINAGE AREA

See NOTE ON PRECEEDING PAGE

0 PI PRECIPITATION PATTERN

.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
.00	.00	.00	.00	.00	.00	.00	.00	.01	.01
.01	.01	.01	.01	.01	.01	.01	.01	.01	.01
.01	.01	.02	.02	.02	.02	.19	.19	.04	.04
.02	.02	.01	.01	.01	.01	.01	.01	.01	.01
.01	.01	.01	.01	.01	.01	.01	.01	.00	.00
.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
.00	.00	.00	.00	.00	.00				

15 JD INDEX STORM NO. 3
STRM 3.73 PRECIPITATION DEPTH
TRDA 25.00 TRANSPOSITION DRAINAGE AREA

0 PI PRECIPITATION PATTERN

.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
.00	.00	.00	.00	.00	.00	.00	.00	.01	.01
.01	.01	.01	.01	.01	.01	.01	.01	.01	.01
.01	.01	.02	.02	.02	.02	.19	.19	.04	.04
.02	.02	.01	.01	.01	.01	.01	.01	.01	.01
.01	.01	.01	.01	.01	.01	.01	.01	.00	.00
.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
.00	.00	.00	.00	.00	.00				

16 JD INDEX STORM NO. 4
STRM 3.57 PRECIPITATION DEPTH
TRDA 61.00 TRANSPOSITION DRAINAGE AREA

0 PI PRECIPITATION PATTERN

.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
.00	.00	.00	.00	.00	.00	.00	.00	.01	.01
.01	.01	.01	.01	.01	.01	.01	.01	.01	.01
.01	.01	.02	.02	.02	.02	.19	.19	.04	.04
.02	.02	.01	.01	.01	.01	.01	.01	.01	.01
.01	.01	.01	.01	.01	.01	.01	.01	.00	.00
.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
.00	.00	.00	.00	.00	.00				

1

RUNOFF SUMMARY
FLOW IN CUBIC FEET PER SECOND
TIME IN HOURS, AREA IN SQUARE MILES

	OPERATION	STATION	PEAK FLOW	TIME OF PEAK	AVERAGE FLOW FOR MAXIMUM PERIOD 6-HOUR	24-HOUR	72-HOUR	BASIN AREA	MAXIMUM STAGE	TIME OF MAX STAGE
+	HYDROGRAPH AT	76	92.	12.00	8.	2.	1.	.06		
+	ROUTED TO	RA1-A2	74.	12.25	8.	2.	1.	.06		

HYDROGRAPH AT							
+	75	441.	12.50	70.	17.	11.	.54
2 COMBINED AT							
+	@A2	504.	12.50	78.	19.	13.	.60
ROUTED TO							
+	RA2-A3	451.	13.00	78.	20.	13.	.60
HYDROGRAPH AT							
+	73	1193.	12.75	247.	62.	40.	2.06
2 COMBINED AT							
+	@A3	1631.	12.75	323.	81.	52.	2.66
HYDROGRAPH AT							
+	78	478.	12.25	52.	13.	8.	.41
HYDROGRAPH AT							
+	79	657.	12.50	98.	25.	16.	.78
HYDROGRAPH AT							
+	74	1435.	13.00	312.	78.	50.	2.69
HYDROGRAPH AT							
+	77	236.	12.25	26.	7.	4.	.23
2 COMBINED AT							
+	@D1	1456.	12.75	336.	84.	54.	2.92
ROUTED TO							
+	RD1-D2	1431.	13.25	339.	85.	55.	2.92
HYDROGRAPH AT							
+	80	512.	12.50	72.	18.	12.	.64
2 COMBINED AT							
+	@D2	1461.	13.25	408.	102.	66.	3.56
ROUTED TO							
+	RD2-D3	1436.	13.50	409.	102.	66.	3.56
HYDROGRAPH AT							
+	81	583.	12.25	70.	18.	11.	.63
2 COMBINED AT							
+	@D3	1465.	12.75	477.	119.	77.	4.19
ROUTED TO							
+	RD3-D4	1420.	13.00	476.	119.	77.	4.19
HYDROGRAPH AT							
+	82	231.	12.25	30.	7.	5.	.26
2 COMBINED AT							
+	@D4	1445.	13.00	505.	126.	81.	4.45
4 COMBINED AT							
+	HASSY	3350.	12.75	953.	238.	154.	8.30

	HYDROGRAPH AT							
+		68	122.	13.25	34.	8.	5.	.28
	ROUTED TO							
+		SR@S-E	122.	13.25	34.	8.	5.	.28
	ROUTED TO							
+		RE1-E2	109.	13.75	33.	8.	5.	.28
	HYDROGRAPH AT							
+		59	124.	13.00	27.	7.	4.	.24
	2 COMBINED AT							
+		@E2	171.	13.00	60.	15.	10.	.52
	ROUTED TO							
+		SR@B-E	171.	13.00	60.	15.	10.	.52
	HYDROGRAPH AT							
+		15	283.	15.00	140.	37.	24.	1.33
	ROUTED TO							
+		SR@R-F	229.	15.50	114.	32.	21.	1.33
	ROUTED TO							
+		RF1-F2	223.	16.25	113.	32.	21.	1.33
	HYDROGRAPH AT							
+		27	93.	13.25	26.	7.	4.	.23
	2 COMBINED AT							
+		@F2	225.	16.25	115.	38.	25.	1.56
	ROUTED TO							
+		RF2-F3	220.	17.25	114.	38.	25.	1.56
	HYDROGRAPH AT							
+		29	252.	14.25	109.	28.	18.	1.00
	2 COMBINED AT							
+		@F3	316.	14.50	190.	65.	42.	2.56
	ROUTED TO							
+		RF3-F4	299.	15.75	189.	65.	42.	2.56
	HYDROGRAPH AT							
+		41	300.	14.50	131.	34.	22.	1.21
	2 COMBINED AT							
+		@F4	450.	15.50	275.	98.	63.	3.77
	ROUTED TO							
+		RF4-F5	439.	16.25	274.	98.	63.	3.77
	HYDROGRAPH AT							
+		52	204.	14.50	89.	23.	15.	.82
	2 COMBINED AT							
+		@F5	537.	15.25	336.	120.	78.	4.59

	ROUTED TO						
+	SR@S-F	536.	15.25	336.	120.	78.	4.59
	ROUTED TO						
+	RF5-F6	529.	15.75	335.	120.	77.	4.59
	HYDROGRAPH AT						
+	60	281.	14.50	126.	33.	21.	1.15
	2 COMBINED AT						
+	@F6	674.	15.75	425.	152.	98.	5.74
	ROUTED TO						
+	SR@B-F	666.	15.75	424.	151.	98.	5.74
	HYDROGRAPH AT						
+	1	982.	12.75	190.	48.	31.	1.67
	HYDROGRAPH AT						
+	2	897.	12.50	132.	33.	21.	1.24
	2 COMBINED AT						
+	@G2	1683.	12.50	319.	80.	51.	2.91
	ROUTED TO						
+	RG2-G3	1576.	13.00	315.	79.	51.	2.91
	HYDROGRAPH AT						
+	16	244.	14.25	103.	26.	17.	.92
	2 COMBINED AT						
+	@G3	1673.	13.00	415.	104.	67.	3.83
	ROUTED TO						
+	SR@R-G	1096.	13.75	413.	104.	67.	3.83
	ROUTED TO						
+	RG3-G4	1091.	13.75	414.	105.	67.	3.83
	HYDROGRAPH AT						
+	28	107.	13.75	38.	9.	6.	.32
	2 COMBINED AT						
+	@G4	1193.	13.75	447.	114.	73.	4.15
	ROUTED TO						
+	RG4-G5	1164.	14.50	446.	114.	73.	4.15
	HYDROGRAPH AT						
+	30	255.	14.25	110.	28.	18.	1.00
	2 COMBINED AT						
+	@G5	1405.	14.50	535.	141.	91.	5.15
	ROUTED TO						
+	RG5-G6	1382.	15.25	535.	141.	91.	5.15
	HYDROGRAPH AT						
+	42	212.	14.25	90.	23.	15.	.77

2 COMBINED AT							
+	@G6	1502.	15.25	595.	163.	105.	5.92
ROUTED TO							
+	RG6-G7	1458.	15.75	595.	163.	105.	5.92
HYDROGRAPH AT							
+	53	158.	13.00	39.	10.	6.	.34
2 COMBINED AT							
+	@G7	1458.	15.75	598.	172.	111.	6.26
ROUTED TO							
+	SR@S-G	1457.	15.75	597.	172.	111.	6.26
ROUTED TO							
+	RG7-G8	1386.	16.25	597.	172.	111.	6.26
HYDROGRAPH AT							
+	61	132.	13.50	39.	10.	6.	.35
2 COMBINED AT							
+	@G8	1384.	16.25	603.	181.	117.	6.61
ROUTED TO							
+	SR@B-G	976.	17.25	489.	144.	93.	6.61
3 COMBINED AT							
+	PVWEST	1401.	17.25	812.	297.	192.	12.87
HYDROGRAPH AT							
+	4	482.	12.25	61.	15.	10.	.57
ROUTED TO							
+	RH1-H2	461.	12.75	62.	16.	10.	.57
HYDROGRAPH AT							
+	3	764.	12.75	137.	34.	22.	1.31
2 COMBINED AT							
+	@H2	1211.	12.75	197.	49.	32.	1.88
ROUTED TO							
+	RH2-H3	1091.	13.00	199.	50.	32.	1.88
HYDROGRAPH AT							
+	17	223.	14.25	92.	24.	15.	.88
2 COMBINED AT							
+	@H3	1176.	13.00	288.	73.	47.	2.76
ROUTED TO							
+	SR@R-H	1177.	13.00	288.	73.	47.	2.76
ROUTED TO							
+	RH3-H4	1465.	14.00	299.	76.	49.	2.76
HYDROGRAPH AT							
+	31	241.	14.75	113.	30.	19.	1.06

2 COMBINED AT							
+	@H4	1618.	14.00	405.	105.	67.	3.82
ROUTED TO							
+	RH4-H5	1615.	14.75	411.	107.	69.	3.82
HYDROGRAPH AT							
+	43	210.	15.00	104.	28.	18.	1.00
2 COMBINED AT							
+	@H5	1801.	14.75	499.	134.	86.	4.82
ROUTED TO							
+	RH5-H6	1763.	15.00	501.	134.	86.	4.82
HYDROGRAPH AT							
+	54	103.	14.25	42.	11.	7.	.38
2 COMBINED AT							
+	@H6	1827.	15.00	530.	144.	93.	5.20
ROUTED TO							
+	SR@S-H	951.	15.50	530.	144.	93.	5.20
ROUTED TO							
+	RH6-H7	959.	16.25	530.	144.	93.	5.20
HYDROGRAPH AT							
+	62	199.	13.75	66.	17.	11.	.58
2 COMBINED AT							
+	@H7	970.	16.25	558.	160.	103.	5.78
ROUTED TO							
+	SR@B-H	889.	16.75	402.	110.	71.	5.78
HYDROGRAPH AT							
+	5	1275.	12.50	192.	48.	31.	1.64
ROUTED TO							
+	RI1-I2	1217.	12.75	191.	48.	31.	1.64
HYDROGRAPH AT							
+	18	265.	14.00	98.	25.	16.	.90
HYDROGRAPH AT							
+	19	148.	14.50	65.	17.	11.	.59
3 COMBINED AT							
+	@I2	1365.	12.75	349.	88.	57.	3.13
ROUTED TO							
+	SR@R-I	1319.	12.75	332.	85.	55.	3.13
ROUTED TO							
+	RI2-I4	1174.	14.00	343.	89.	57.	3.13
HYDROGRAPH AT							
+	44	218.	15.00	107.	28.	18.	1.00

	2 COMBINED AT						
+	@I4	1305.	14.00	436.	117.	75.	4.13
	ROUTED TO						
+	RI4-I5	1008.	14.50	434.	116.	75.	4.13
	HYDROGRAPH AT						
+	32	209.	14.50	95.	25.	16.	.88
	ROUTED TO						
+	RI3-I5	193.	17.25	94.	25.	16.	.88
	HYDROGRAPH AT						
+	55	83.	14.00	31.	8.	5.	.27
	3 COMBINED AT						
+	@I5	1067.	14.50	521.	148.	95.	5.28
	ROUTED TO						
+	SR@S-I	1064.	14.75	516.	148.	95.	5.28
	ROUTED TO						
+	RI5-I6	1032.	15.25	515.	148.	96.	5.28
	HYDROGRAPH AT						
+	63	188.	13.50	60.	15.	10.	.51
	2 COMBINED AT						
+	@I6	1061.	15.25	526.	163.	105.	5.79
	ROUTED TO						
+	SR@B-I	1008.	15.50	524.	153.	98.	5.79
	HYDROGRAPH AT						
+	6	468.	12.00	45.	12.	8.	.32
	ROUTED TO						
+	RJ1-J2	482.	12.50	45.	12.	8.	.32
	HYDROGRAPH AT						
+	8	331.	12.25	42.	10.	7.	.38
	2 COMBINED AT						
+	@J2	760.	12.50	86.	22.	14.	.70
	ROUTED TO						
+	RJ2-J3	679.	13.00	88.	22.	14.	.70
	HYDROGRAPH AT						
+	20	224.	13.75	75.	19.	12.	.67
	2 COMBINED AT						
+	@J3	801.	13.00	161.	41.	26.	1.37
	ROUTED TO						
+	SR@R-J	802.	13.00	161.	41.	26.	1.37
	ROUTED TO						
+	RJ3-J4	854.	14.00	168.	43.	27.	1.37

HYDROGRAPH AT							
+	33	240.	14.50	106.	27.	18.	.98
2 COMBINED AT							
+	@J4	1027.	14.00	270.	69.	45.	2.35
ROUTED TO							
+	RJ4-J5	843.	15.50	270.	70.	45.	2.35
HYDROGRAPH AT							
+	45	298.	14.25	126.	32.	21.	1.15
2 COMBINED AT							
+	@J5	996.	15.50	365.	101.	65.	3.50
ROUTED TO							
+	SR@S-J	824.	15.75	347.	101.	65.	3.50
ROUTED TO							
+	RJ5-J6	898.	16.00	347.	101.	65.	3.50
HYDROGRAPH AT							
+	64	177.	13.25	53.	13.	8.	.43
2 COMBINED AT							
+	@J6	902.	16.00	367.	114.	73.	3.93
ROUTED TO							
+	SR@B-J	780.	16.25	366.	114.	73.	3.93
HYDROGRAPH AT							
+	7	478.	12.00	45.	11.	7.	.41
ROUTED TO							
+	RK1-K2	408.	12.50	46.	12.	7.	.41
HYDROGRAPH AT							
+	9	699.	12.25	75.	19.	12.	.71
2 COMBINED AT							
+	@K2	1089.	12.25	121.	30.	19.	1.12
ROUTED TO							
+	RK2-K3	838.	12.75	121.	30.	20.	1.12
HYDROGRAPH AT							
+	21	142.	14.25	61.	16.	10.	.55
2 COMBINED AT							
+	@K3	889.	13.00	181.	46.	29.	1.67
ROUTED TO							
+	SR@R-K	890.	13.00	181.	46.	29.	1.67
ROUTED TO							
+	RK3-K4	849.	13.25	191.	48.	31.	1.67
HYDROGRAPH AT							
+	34	184.	14.00	70.	18.	11.	.63

	2 COMBINED AT						
+	@K4	948.	13.25	258.	65.	42.	2.30
	ROUTED TO						
+	RK4-K5	827.	13.75	267.	68.	44.	2.30
	HYDROGRAPH AT						
+	35	322.	15.00	158.	42.	27.	1.50
	2 COMBINED AT						
+	@K5	981.	14.00	417.	109.	70.	3.80
	ROUTED TO						
+	RK5-K6	977.	14.75	418.	109.	70.	3.80
	HYDROGRAPH AT						
+	46	347.	14.50	153.	40.	25.	1.38
	2 COMBINED AT						
+	@K6	1287.	14.75	534.	148.	95.	5.18
	ROUTED TO						
+	SR@S-K	1173.	15.00	534.	148.	95.	5.18
	ROUTED TO						
+	RK6-K7	1171.	15.25	534.	148.	95.	5.18
	HYDROGRAPH AT						
+	65	178.	13.50	53.	13.	8.	.41
	2 COMBINED AT						
+	@K7	1189.	15.25	560.	160.	103.	5.59
	ROUTED TO						
+	SR@B-K	1103.	15.75	549.	157.	101.	5.59
	4 COMBINED AT						
+	PVTORR	2771.	16.50	1661.	496.	320.	21.09
	HYDROGRAPH AT						
+	10	1025.	12.50	152.	39.	25.	1.32
	ROUTED TO						
+	RL1-L2	1104.	12.75	155.	39.	25.	1.32
	HYDROGRAPH AT						
+	22	145.	14.50	63.	16.	11.	.58
	2 COMBINED AT						
+	@L2	1150.	12.75	216.	55.	36.	1.90
	ROUTED TO						
+	SR@R-L	1139.	12.75	216.	55.	36.	1.90
	ROUTED TO						
+	RL2-L3	1233.	13.75	226.	58.	37.	1.90
	HYDROGRAPH AT						
+	36	161.	14.50	74.	19.	12.	.68

	2 COMBINED AT						
+	@L3	1312.	13.75	293.	76.	49.	2.58
	ROUTED TO						
+	RL3-L4	1305.	14.75	301.	79.	51.	2.58
	HYDROGRAPH AT						
+	47	188.	14.25	76.	19.	12.	.62
	2 COMBINED AT						
+	@L4	1432.	14.75	354.	98.	63.	3.20
	ROUTED TO						
+	SR@S-L	1180.	15.00	354.	98.	63.	3.20
	ROUTED TO						
+	RL4-L5	1088.	15.25	353.	97.	63.	3.20
	HYDROGRAPH AT						
+	66	115.	13.50	35.	9.	6.	.29
	2 COMBINED AT						
+	@L5	1101.	15.25	375.	106.	68.	3.49
	ROUTED TO						
+	SR@B-L	408.	16.75	228.	66.	43.	3.49
	HYDROGRAPH AT						
+	37	287.	15.25	149.	41.	26.	1.44
	ROUTED TO						
+	RM1-M2	282.	15.75	149.	41.	26.	1.44
	HYDROGRAPH AT						
+	48	176.	13.75	59.	15.	10.	.49
	2 COMBINED AT						
+	@M2	301.	15.75	198.	55.	36.	1.93
	ROUTED TO						
+	RM2-M3	295.	16.00	198.	55.	36.	1.93
	HYDROGRAPH AT						
+	67	242.	13.50	82.	24.	15.	.49
	2 COMBINED AT						
+	@M3	435.	13.75	268.	79.	51.	2.42
	ROUTED TO						
+	SR@S-M	437.	14.00	268.	79.	51.	2.42
	ROUTED TO						
+	RM3-M4	435.	14.00	268.	79.	51.	2.42
	HYDROGRAPH AT						
+	69	54.	14.00	24.	7.	5.	.14
	2 COMBINED AT						
+	@M4	487.	14.00	290.	86.	55.	2.56

	ROUTED TO						
+	SR@B-M	213.	17.00	121.	37.	24.	2.56
	HYDROGRAPH AT						
+	11	1150.	12.25	155.	39.	25.	1.27
	ROUTED TO						
+	RN1-N2	1087.	12.50	154.	38.	25.	1.27
	HYDROGRAPH AT						
+	23	121.	14.75	57.	15.	10.	.53
	2 COMBINED AT						
+	@N2	1106.	12.50	208.	53.	34.	1.80
	ROUTED TO						
+	SR@R-N	1182.	12.75	208.	53.	34.	1.80
	ROUTED TO						
+	RN2-N3	1085.	13.00	213.	54.	35.	1.80
	HYDROGRAPH AT						
+	38	143.	14.25	58.	15.	10.	.52
	2 COMBINED AT						
+	@N3	1147.	13.00	268.	68.	44.	2.32
	ROUTED TO						
+	RN3-N4	1168.	13.75	276.	71.	45.	2.32
	HYDROGRAPH AT						
+	49	214.	15.00	105.	28.	18.	1.00
	2 COMBINED AT						
+	@N4	1278.	13.75	373.	98.	63.	3.32
	ROUTED TO						
+	RN4-N5	841.	14.50	370.	97.	63.	3.32
	HYDROGRAPH AT						
+	56	178.	14.50	80.	21.	13.	.74
	2 COMBINED AT						
+	@N5	1014.	14.50	432.	117.	76.	4.06
	ROUTED TO						
+	SR@S-N	737.	15.50	432.	117.	76.	4.06
	ROUTED TO						
+	RN5-N6	723.	15.75	428.	117.	75.	4.06
	HYDROGRAPH AT						
+	70	53.	14.00	20.	5.	3.	.17
	2 COMBINED AT						
+	@N6	736.	15.75	442.	122.	78.	4.23
	ROUTED TO						
+	SR@B-N	734.	15.75	437.	118.	76.	4.23

3 COMBINED AT							
+	BUCK	1180.	16.75	718.	212.	136.	10.28
HYDROGRAPH AT							
+	12	1041.	12.25	127.	32.	20.	.98
ROUTED TO							
+	R01-03	910.	12.50	125.	31.	20.	.98
HYDROGRAPH AT							
+	24	201.	13.75	73.	20.	13.	.49
2 COMBINED AT							
+	@03	979.	12.50	197.	50.	33.	1.47
ROUTED TO							
+	R03-04	996.	13.25	198.	51.	33.	1.47
HYDROGRAPH AT							
+	13	374.	12.25	50.	13.	8.	.45
ROUTED TO							
+	R02-04	351.	13.00	48.	12.	8.	.45
HYDROGRAPH AT							
+	25	78.	14.00	31.	8.	5.	.27
3 COMBINED AT							
+	@04	1305.	13.25	274.	70.	45.	2.19
ROUTED TO							
+	SR@R-0	1297.	13.25	273.	69.	45.	2.19
ROUTED TO							
+	R04-05	1244.	13.75	270.	69.	44.	2.19
HYDROGRAPH AT							
+	39	192.	14.25	83.	21.	14.	.71
2 COMBINED AT							
+	@05	1364.	13.75	345.	90.	58.	2.90
ROUTED TO							
+	R05-06	1142.	14.50	347.	90.	58.	2.90
HYDROGRAPH AT							
+	50	232.	14.75	110.	29.	19.	1.00
2 COMBINED AT							
+	@06	1341.	14.50	444.	118.	76.	3.90
ROUTED TO							
+	R06-07	1185.	15.25	443.	119.	77.	3.90
HYDROGRAPH AT							
+	57	150.	14.00	60.	15.	10.	.51
2 COMBINED AT							
+	@07	1257.	15.25	478.	133.	86.	4.41

	ROUTED TO						
+	SR@S-O	1172.	15.25	470.	133.	86.	4.41
	ROUTED TO						
+	RO7-O8	892.	16.00	462.	132.	85.	4.41
	HYDROGRAPH AT						
+	71	60.	13.50	19.	5.	3.	.14
	2 COMBINED AT						
+	@O8	894.	16.00	464.	137.	88.	4.55
	ROUTED TO						
+	SR@B-O	794.	16.50	409.	118.	76.	4.55
	HYDROGRAPH AT						
+	14	763.	12.25	82.	21.	13.	.79
	ROUTED TO						
+	RP1-P2	723.	12.50	85.	21.	14.	.79
	HYDROGRAPH AT						
+	26	148.	14.50	67.	19.	12.	.52
	2 COMBINED AT						
+	@P2	753.	12.50	151.	39.	25.	1.31
	ROUTED TO						
+	SR@R-P	782.	12.50	151.	39.	25.	1.31
	ROUTED TO						
+	RP2-P3	909.	13.50	155.	41.	26.	1.31
	HYDROGRAPH AT						
+	40	240.	14.50	108.	28.	18.	.95
	2 COMBINED AT						
+	@P3	1018.	13.50	257.	68.	44.	2.26
	ROUTED TO						
+	RP3-P4	811.	14.50	260.	69.	45.	2.26
	HYDROGRAPH AT						
+	51	234.	14.75	115.	30.	20.	1.00
	2 COMBINED AT						
+	@P4	1014.	14.50	360.	99.	64.	3.26
	ROUTED TO						
+	RP4-P5	940.	15.00	359.	99.	64.	3.26
	HYDROGRAPH AT						
+	58	72.	13.75	26.	6.	4.	.21
	2 COMBINED AT						
+	@P5	970.	15.00	373.	105.	68.	3.47
	ROUTED TO						
+	SR@S-P	973.	15.00	373.	105.	68.	3.47

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        ROUTED TO
+                    RP5-P6      689.   15.25        370.        105.        68.      3.47

        HYDROGRAPH AT
+                        72       28.   13.50          9.          2.         1.       .07

        2 COMBINED AT
+                       @P6      693.   15.25        373.        107.        69.      3.54

        ROUTED TO
+                    SR@B-P      698.   15.25        371.        104.        67.      3.54

        2 COMBINED AT
+                      EAST     1286.   16.50        730.        218.       141.      8.09

        HYDROGRAPH AT
+                        83      870.   12.25        111.         28.        18.       .87
1
                                   SUMMARY OF KINEMATIC WAVE - MUSKINGUM-CUNGE ROUTING
                                       (FLOW IS DIRECT RUNOFF WITHOUT BASE FLOW)
                                                                      INTERPOLATED TO
                                                                   COMPUTATION INTERVAL
         ISTAQ    ELEMENT      DT       PEAK    TIME TO    VOLUME      DT       PEAK    TIME TO    VOLUME
                                                  PEAK                                   PEAK

                             (MIN)     (CFS)     (MIN)     (IN)     (MIN)     (CFS)     (MIN)      (IN)

        FOR STORM = 1  STORM AREA (SQ MI) =        .01
          RA1-A2  MANE        1.50     83.90    739.50      1.24     15.00     75.98    735.00       1.28

CONTINUITY SUMMARY (AC-FT) - INFLOW= .3925E+01 EXCESS= .0000E+00 OUTFLOW= .3953E+01 BASIN STORAGE= .1428E-02 PERCENT ERROR=   -.7

        FOR STORM = 2  STORM AREA (SQ MI) =       6.00
          RA1-A2  MANE        1.50     77.89    741.00      1.14     15.00     69.06    735.00       1.19

CONTINUITY SUMMARY (AC-FT) - INFLOW= .3618E+01 EXCESS= .0000E+00 OUTFLOW= .3639E+01 BASIN STORAGE= .1307E-02 PERCENT ERROR=   -.6

        FOR STORM = 3  STORM AREA (SQ MI) =      25.00
          RA1-A2  MANE        1.50     72.80    741.00      1.06     15.00     63.04    735.00       1.12

CONTINUITY SUMMARY (AC-FT) - INFLOW= .3380E+01 EXCESS= .0000E+00 OUTFLOW= .3398E+01 BASIN STORAGE= .1221E-02 PERCENT ERROR=   -.6

        FOR STORM = 4  STORM AREA (SQ MI) =      61.00
          RA1-A2  MANE        1.50     67.86    741.00       .99     15.00     57.18    735.00       1.06

CONTINUITY SUMMARY (AC-FT) - INFLOW= .3156E+01 EXCESS= .0000E+00 OUTFLOW= .3176E+01 BASIN STORAGE= .1179E-02 PERCENT ERROR=   -.7

        FOR STORM = 1  STORM AREA (SQ MI) =        .01
          RA2-A3  MANE        3.00    500.72    771.00      1.27     15.00    474.22    765.00       1.28
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THE REMAINING CONTINUITY SUMMARY OMITTED; SEE COMPLETE FILE ON FLOPPY DISK

SEE NOTE PRECEEDING PAGE

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CONTINUITY SUMMARY (AC-FT) - INFLOW= .2102E+03 EXCESS= .0000E+00 OUTFLOW= .2101E+03 BASIN STORAGE= .1018E-01 PERCENT ERROR=    .0

        FOR STORM = 2  STORM AREA (SQ MI) =       6.00
          RP4-P5  MANE        15.00    943.86    900.00      1.12     15.00    943.86    900.00        1.12

CONTINUITY SUMMARY (AC-FT) - INFLOW= .1951E+03 EXCESS= .0000E+00 OUTFLOW= .1951E+03 BASIN STORAGE= .1020E-01 PERCENT ERROR=    .0

        FOR STORM = 3  STORM AREA (SQ MI) =      25.00
          RP4-P5  MANE        15.00    878.40    900.00      1.04     15.00    878.40    900.00        1.04

CONTINUITY SUMMARY (AC-FT) - INFLOW= .1816E+03 EXCESS= .0000E+00 OUTFLOW= .1816E+03 BASIN STORAGE= .8998E-02 PERCENT ERROR=    .0

        FOR STORM = 4  STORM AREA (SQ MI) =      61.00
          RP4-P5  MANE        15.00    803.39    915.00       .97     15.00    803.39    915.00         .97

CONTINUITY SUMMARY (AC-FT) - INFLOW= .1687E+03 EXCESS= .0000E+00 OUTFLOW= .1686E+03 BASIN STORAGE= .9697E-02 PERCENT ERROR=    .1

        FOR STORM = 1  STORM AREA (SQ MI) =        .01
          RP5-P6  MANE        14.58    783.86    904.24      1.20     15.00    759.82    900.00        1.20

CONTINUITY SUMMARY (AC-FT) - INFLOW= .2234E+03 EXCESS= .0000E+00 OUTFLOW= .2227E+03 BASIN STORAGE= .5069E-02 PERCENT ERROR=    .3

        FOR STORM = 2  STORM AREA (SQ MI) =       6.00
          RP5-P6  MANE        14.62    727.84    906.65      1.12     15.00    687.76    915.00        1.12

CONTINUITY SUMMARY (AC-FT) - INFLOW= .2073E+03 EXCESS= .0000E+00 OUTFLOW= .2066E+03 BASIN STORAGE= .4726E-02 PERCENT ERROR=    .3

        FOR STORM = 3  STORM AREA (SQ MI) =      25.00
          RP5-P6  MANE        14.91    668.15    909.41      1.04     15.00    654.45    915.00        1.04

CONTINUITY SUMMARY (AC-FT) - INFLOW= .1931E+03 EXCESS= .0000E+00 OUTFLOW= .1925E+03 BASIN STORAGE= .4172E-02 PERCENT ERROR=    .3

        FOR STORM = 4  STORM AREA (SQ MI) =      61.00
          RP5-P6  MANE        15.00    647.50    915.00       .97     15.00    647.50    915.00         .97

CONTINUITY SUMMARY (AC-FT) - INFLOW= .1793E+03 EXCESS= .0000E+00 OUTFLOW= .1787E+03 BASIN STORAGE= .4042E-02 PERCENT ERROR=    .3


*** NORMAL END OF HEC-1 ***
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