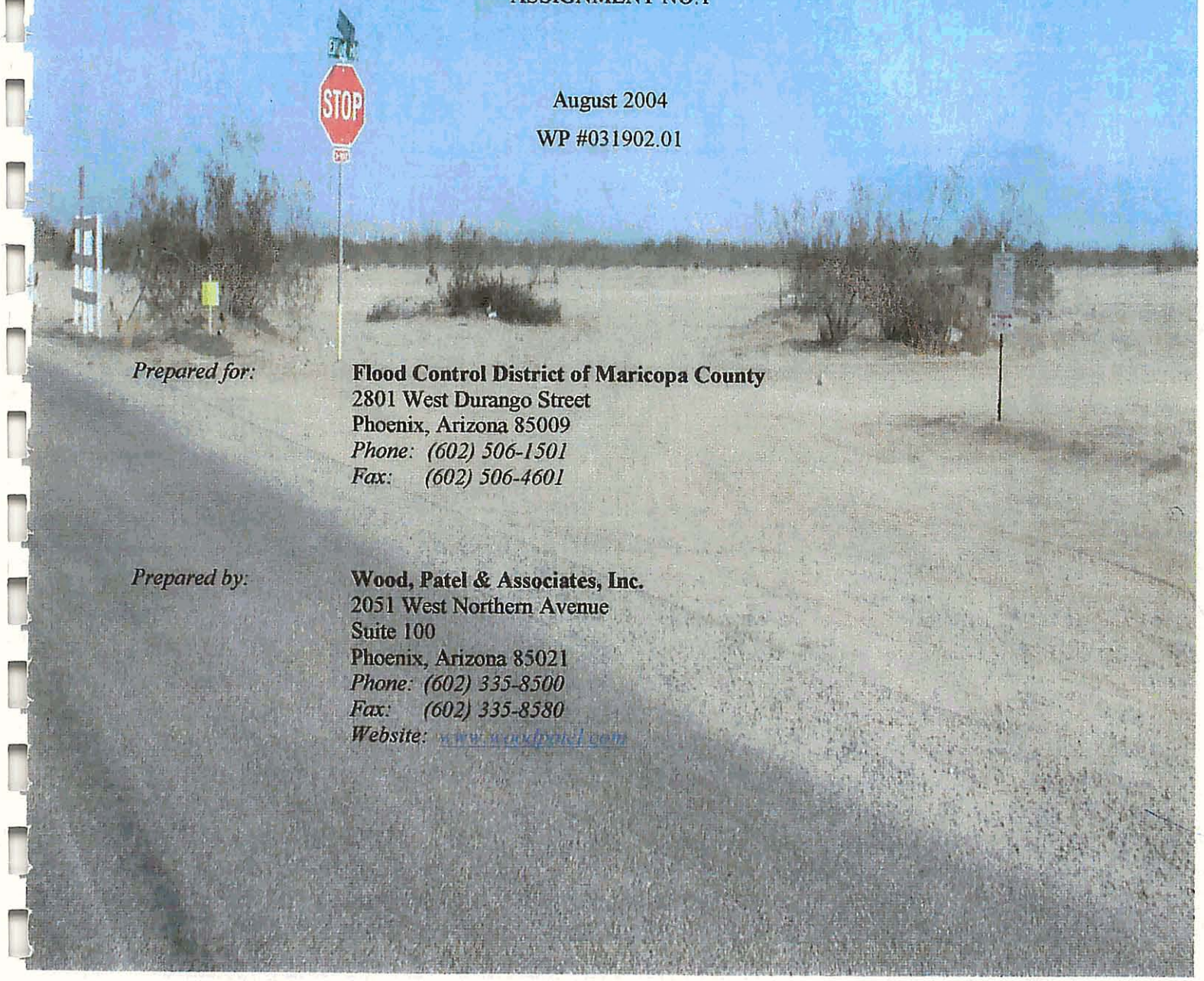
SIPHON DRAW DRAINAGE IMPROVEMENTS PRE-DESIGN STUDY REPORT

CONTRACT FCD 2003 C019
ASSIGNMENT NO.1

August 2004

WP #031902.01



Prepared for:

Flood Control District of Maricopa County
2801 West Durango Street
Phoenix, Arizona 85009
Phone: (602) 506-1501
Fax: (602) 506-4601

Prepared by:

Wood, Patel & Associates, Inc.
2051 West Northern Avenue
Suite 100
Phoenix, Arizona 85021
Phone: (602) 335-8500
Fax: (602) 335-8580
Website: www.woodpatel.com

TABLE OF CONTENTS

1.0 EXECUTIVE SUMMARY 1
- 1.1 Project Background 1
- 1.2 Development of Alternatives 2
- 1.3 Hydrologic Modeling 3
- 1.4 Evaluation of Alternatives 4
- 1.5 Preferred Alternative 4
- 1.6 Conclusions and Recommendations 4

2.0 INTRODUCTION 6
- 2.1 Description 6
- 2.2 Purpose 6
- 2.3 Agencies 6

3.0 STUDY AREA 7
- 3.1 Location 7
- 3.2 Characteristics 7
- 3.3 Utilities 12
- 3.4 Jurisdictional Delineation 12
- 3.5 FEMA FIRM Panel 13

4.0 PREVIOUS STUDIES 14
- 4.1 East Mesa ADMP 14
- 4.2 Elliot Road Detention Basins and Outfall Channel 15
- 4.3 Drainage Design of Siphon Draw Wash for Meridian Pointe 16
- 4.4 Meridian Road Access Control and Corridor Improvement Study 18

5.0 DEVELOPMENT OF ALTERNATIVES 19
- 5.1 Constraints to the Drainage System Alternatives 19
- 5.2 Potential Drainage Elements 19
- 5.3 Detention Basins Options within Pinal County 20
  - 5.3.1 Single Basin Options 21
  - 5.3.2 Two-Basin Option 1 22
  - 5.3.3 Three-Basin Option 22
  - 5.3.4 Two-Basin Option 2 23
- 5.4 Collection System Options within Pinal County 24
  - 5.4.1 Option 1 – Concrete Channel 24
  - 5.4.2 Option 2 – Earthen Channel 25
  - 5.4.3 Option 3 – Pipe/Concrete Channel 25
- 5.5 Outfall System Options within Maricopa County 25
  - 5.5.1 Option 1 – Elements G, H, I, and K 26
  - 5.5.2 Option 2 – Elements H, I, and K 26
  - 5.5.3 Option 3 – Elements F, G, and H 26
  - 5.5.4 Option 4 – Elements G, H, I, and J 27
  - 5.5.5 Option 5 – Elements F, G, H, I, and J 27
- 5.6 Hydrologic Modeling 27
  - 5.6.1 HEC-1 Base Models 27
  - 5.6.2 Formulating Alternatives 29
  - 5.6.3 Hydrologic Modeling of Alternatives 30
  - 5.6.4 Modeling Results 30

5.7 Probable Cost of Alternatives 31
5.7.1 Land Acquisition Cost within Pinal County 31
5.7.2 Construction Cost within Pinal County 31
5.7.3 Outfall System Cost Within Maricopa County 32

6.0 PREFERRED ALTERNATIVE SELECTION AND ONCLUSIONS 33
6.1 Preferred Alternative 33
6.2 Conclusions 34

7.0 PRELIMINARY DESIGN PLANS 35
7.1 System Description of the Preferred Alternative 35
7.2 Meridian Road Collection System 37
7.3 Siphon Draw and Guadalupe Basins 38
7.4 Elliot Road Storm Drain System 38
7.5 Meridian Road Box Culverts 39
7.6 Basin Diversion Structures 39
7.7 Siphon Draw Wash Corridor 40
7.8 Preliminary Landscape Concept 40
7.9 Probable Cost of Construction 40

8.0 FINAL DESIGN – ISSUES AND RECOMMENDATIONS 41

9.0 REFERENCES 42

TABLES

Table 1 Peak Flow Summary Table
Table 2 Drainage System Element Summary Table
Table 3 Drainage Element Preliminary Geometric Data
Table 4 Cost Summary Table
Table 5 Probable Cost for Preferred Alternative

APPENDICES

Appendix A HEC-1 Model Input and Output Files for Preferred Alternative
Appendix B Supporting Hydraulic Design Calculations for Preferred Alternative
Appendix C Supporting Cost Estimation Sheets

PLATES

Plate 1	Project Location and Vicinity Map
Plate 2	Preliminary 404 Delineation of Siphon Draw Wash (prepared by FCDMC)
Plate 3	Flood Insurance Rate Map (FIRM)
Plate 4	Major Drainage System Elements
Plate 5	Pinal County Detention Basin Option 1
Plate 6	Pinal County Detention Basin Option 2
Plate 7	Pinal County Detention Basin Option 3
Plate 8	Pinal County Detention Basin Option 4
Plate 9	Pinal County Detention Basin Option 5
Plate 10	Pinal County Detention Basin Option 6
Plate 11	Pinal County Detention Basin Option 7
Plate 12	Maricopa County Outfall System Option 1
Plate 13	Maricopa County Outfall System Option 2
Plate 14	Maricopa County Outfall System Option 3
Plate 15	Maricopa County Outfall System Option 4
Plate 16	Maricopa County Outfall System Option 5
Plate 17	Preferred Alternative
Plate 18	General Plan for City of Apache Junction
Plate 19	HEC-1 Schematic for Preferred Alternative

EXHIBITS

Exhibit A	Preliminary Design Plans and Profiles for Preferred Alternative
Exhibit B	CD Containing Electronic Files

ac
Y:\WP\Reports\Hydrology\031902.01 Siphon Draw Drainage Improvements Report.doc

1.0 EXECUTIVE SUMMARY

1.1 Project Background

The East Mesa Area Drainage Master Plan (ADMP) (FCD #95-32) was completed by Dibble & Associates in July 1998 for the Flood Control District of Maricopa County (FCDMC). Siphon Draw Detention Basin, Sunland Springs Channel (Meridian Road Collection System), and Elliot Road Channel were among the recommended improvements with high priorities. Since the completion of the ADMP, development has occurred which impacts the facilities that were recommended. In 2003, Wood, Patel & Associates, Inc. was contracted to provide pre-design plans for the Siphon Draw Drainage Improvements which include Siphon Draw Detention Basin, Meridian Road Collection System, and Elliot Road Channel Phase 2 (from 104th St. to Meridian Road).

The project study limits are approximately from the 104th Street alignment to the west, Elliot Road to the south, the CAP Canal to the east and Baseline Road to the north. The project lies within the Cities of Mesa (Maricopa County) and Apache Junction (Pinal County). Project alignment is shown on Plate 1.

The major goal of the Siphon Draw Drainage Improvements is to intercept flood water at Meridian Road to protect properties being developed to the west. This requires an interception system along Meridian Road leading to Elliot Road. An outfall system would be constructed along Elliot Road to carry these flows to an existing 78" diameter piped outfall that carries flows to the west. Because the estimated flows reaching the Elliot Road-Meridian Road intersection are above 2,000 cfs, and because the capacity of the existing outfall west of 104th Street is 508 cfs, flow attenuation is needed.

The ADMP recommended a single basin at the northeast corner of Elliot Road and Meridian Road to attenuate the flows downstream from that point. The ADMP also recommended no flow be sent down Siphon Draw Wash west of Meridian Road.

The objectives of this pre-design study were to investigate alternatives for providing flood protection west of Meridian Road along the project corridor. Specifically, this pre-design study modified the ADMP hydrologic model to include the changes in land use into the existing drainage systems; revised the model hydrologic conditions in Pinal

County; evaluated the ADMP-recommended improvements of Siphon Draw Drainage System; identified potential detention basin locations and sizes; determined appropriate collection and conveyance system locations, alignments, cross sections, and Right-Of-Way (ROW) requirements east of the 104th Street alignment; and developed probable cost estimates for each of the alternatives. The pre-design study also investigated various conveyance cross-sections for each segment of the conveyance system. Design plans were prepared for the preferred alternative to the 20% level.

The Flood Control District of Maricopa County is the lead agency for this project. Other study stakeholders include the City of Mesa, the City of Apache Junction, and Maricopa County Department of Transportation (MCDOT).

1.2 Development of Alternatives

One of the major constraints to the alternative development is the detention basin location. Potential detention basins must be located within Pinal County since there is no land available at desired locations within Maricopa County.

A total of seven options were evaluated for detention basins within Pinal County. Four of them include a single basin as recommended by the ADMP located at the northeast corner of Elliot Road and Meridian Road. Two options include two basins and one option includes three basins. Some of the options required berms to meet the storage requirements; however these berms are not jurisdictional dams. Each option includes approximately 30% increase in land area over what is needed for storage to allow varying side slopes and other kinder and gentler treatments.

The Meridian Road Collection System was recommended by the ADMP and was described as "Sunland Springs Channel." This channel is located on the east side of Meridian Road alignment extending from about 3,400 ft north of the Guadalupe Road alignment south to the proposed Siphon Draw Basin. The main purpose of this channel is to collect surface runoff from areas east of Meridian Road and convey it to south into the proposed Siphon Draw Basin drainage system. Flows into the channel vary from location to location and are different for different detention basins options. Therefore, open channel and/or pipe can be used for different portions of the system. The primary differences are the cross sections, lining material, and longitudinal slopes. The selection

of Collection System options does not have significant impact on hydrologic modeling. Therefore, the preferred option for Collection System can be determined relatively independent of hydrologic modeling.

The Siphon Draw Basin Outfall System was recommended by the East Mesa ADMP and was described as "Elliot Channel (Phase 2)" in the recommended design report. This system is located adjacent to Elliot Road and runs from the Siphon Draw Detention Basin to the 104th Street alignment. The main purpose of this system is to convey discharge from the Meridian Road Collection System and Siphon Draw Basin to the Elliot Road Channel Phase 1 storm drain.

Siphon Draw Wash Corridor is designed to convey up to 758 cfs flow from Meridian Road to Mountain Road through the Meridian Pointe development. Since the downstream reach from Mountain Road to 104th Street has capacity, though not as great as upstream, Siphon Draw Wash is proposed to be one of the drainage corridors evaluated for the alternative analysis. Five options were evaluated for the Outfall System which included different drainage element combinations.

The number of possible combined drainage systems (alternatives) of the Meridian Road Collection System, Detention Basins, and Outfall System is very high. Seven alternatives were formulated by the combinations of seven detention basin options and five outfall system options. The Outfall System Option 5 was combined with Detention Basin Options 5, 6, and 7.

1.3 Hydrologic Modeling

The hydrologic analysis was performed using HEC-1 software. As per the Scope of Work, three base HEC-1 models were prepared: a HEC-1 model for Elliot Basin and Outfall Channel; a HEC-1 model for the corrected future conditions without Siphon Draw Drainage Improvements; and a HEC-1 model for the post project conditions. Seven HEC-1 hydrologic models were developed for the seven alternatives of the post project conditions. Existing condition land uses were assumed within Pinal County, and future condition land uses were used within Maricopa County.

1.4 Evaluation of Alternatives

The probable cost to implement each alternative was estimated to assist with alternative selection. Among all the detention basin options evaluated within Pinal County, the option that best fulfills the goals of the project and had the lowest total cost is Option 7. Other criteria or objectives considered in the alternative selection include safety, agency acceptance (City of Mesa and FCDMC), low maintenance efforts, and environmental impacts.

For the five Outfall System options evaluated within Maricopa County, Option 5 is preferred despite a slightly higher cost associated with this outfall system since it would provide benefits to the City of Mesa's proposed water treatment plant west of Meridian Pointe. For the three Collection System options evaluated within Pinal County, the combination of pipe and concrete channel is preferred in conjunction with detention basin Option 7.

1.5 Preferred Alternative

The preferred alternative of the Siphon Draw Drainage Improvements include drainage elements of two detention basins (Siphon Draw Basin and Guadalupe Basin), the Meridian Road Collection System, Siphon Draw Wash, and the Elliot Road storm drain. The preliminary opinion of probable cost for the preferred alternative is $19,190,000. Exhibit A shows the preliminary design plans.

1.6 Conclusions and Recommendations

The recommended drainage system alternative is Alternative 7 which is the combination of Detention Basin Option 7, Collection System Option 3, and Outfall System Option 5. Currently a 72" pipe is proposed along Elliott Road. It may be feasible to reduce this pipe to 66" in the final design by having a better understanding of the local hydrology and utility conflicts.

The detention basin footprint includes a variable side slope type detention basin. The basin bottom area is big enough to allow various sport fields including soccer, softball, basketball, etc. Depending upon the needs of the communities, the basin footprint can be reshaped to accommodate a combination of sport activities in both basins. At that time, the basins shape can be reconfigured to maintain a kinder and gentler character for these

areas. The proposed basin site includes approximately 30% more area than simple basin needs to allow for these considerations.

This report includes only an RGRCP as a choice for the pipe material. There are a number of locations where alternative material types can be explored to reduce the improvement costs.

A potential for fissure activity exists about 1 to 1.5 miles east of the Meridian Road alignment. Although no detailed data is available at the time of this report, the final design should review the best available data and incorporate appropriate measures to address the fissure or subsidence issue. It is possible that cast in place pipe (CIPP) may not be appropriate as an alternate pipe material due to potential subsidence.

2.0 INTRODUCTION

2.1 Description

The East Mesa Area Drainage Master Plan (ADMP) (FCD #95-32) was completed by Dibble & Associates in July 1998 for the Flood Control District of Maricopa County (FCDMC). Siphon Draw Detention Basin, Sunland Springs Channel (Meridian Road Collection System), and Elliot Road Channel were among the recommended improvements with high priorities. Since the completion of the ADMP, development has occurred which impacts the facilities that were recommended. In 2003, Wood, Patel & Associates, Inc. was contracted to provide pre-design plans for the Siphon Draw Drainage Improvements which include Siphon Draw Detention Basin, Meridian Road Collection System, and Elliot Road Channel Phase 2 (from 104th St. to Meridian Road). The downstream drainage system, Elliot Road Channel Phase 1, has been constructed for the ultimate conditions.

2.2 Purpose

The objectives of this pre-design study were to modify the ADMP hydrologic model to include the changes in land use into the existing drainage systems; revise the model hydrologic conditions in Pinal County; evaluate the ADMP-recommended improvements of Siphon Draw Drainage System; identify potential detention basin locations and sizes; and determine appropriate collection and conveyance system locations, alignments, cross sections, and Right-Of-Way (ROW) requirements east of the 104th Street alignment. The pre-design study investigated alternatives for providing flood protection west of Meridian Road along the project corridor and developed probable cost estimates for each of the alternatives. The pre-design study also investigated various conveyance cross-sections for each segment of the conveyance system. Design plans were prepared for the preferred alternative to the 20% level.

2.3 Agencies

The Flood Control District of Maricopa County is the lead agency for this project. Other study stakeholders include the City of Mesa, the City of Apache Junction, and Maricopa County Department of Transportation (MCDOT).

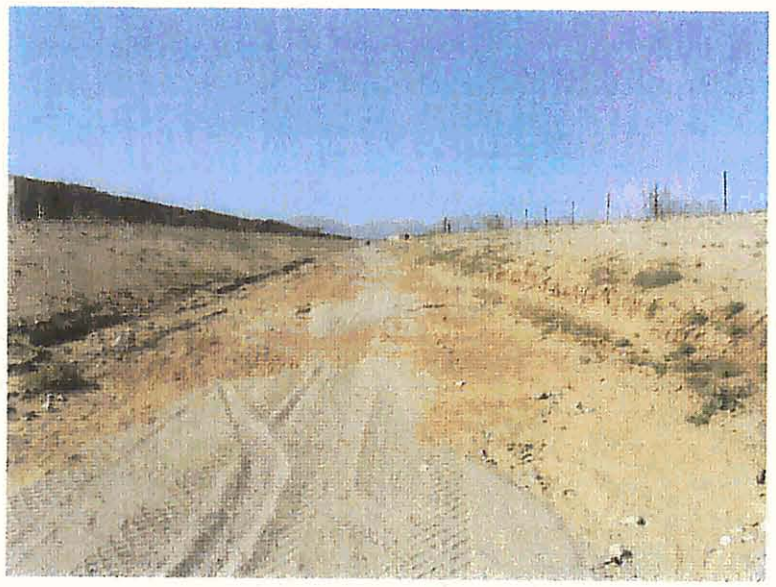
3.0 STUDY AREA

3.1 Location

The project limits are approximately from the 104th Street alignment to the west, Elliot Road to the south, the CAP Canal to the east and Baseline Road to the north. The project lies within the Cities of Mesa (Maricopa County) and Apache Junction (Pinal County). The ADMP recommended Siphon Draw Basin is located at northeast corner of Meridian Road and Elliot Road. The Meridian Road Collection System follows the Meridian Road alignment north of the Siphon Draw Basin, adjacent to the Sunland Springs Village development. The Siphon Draw Basin Outfall System is adjacent to Elliot Road from the Siphon Draw Basin at Meridian Road to the 104th Street alignment. Plate 1 shows the project location.

3.2 Characteristics

The contributing watershed to the Siphon Draw Basin and Outfall System extends northeast of the basin towards the CAP Canal, which forms the east watershed boundary. The Meridian Road collection system forms the west watershed boundary. The watershed area comprises largely undeveloped natural desert with slopes of approximately 1.8 percent toward the south and west. The Siphon Draw Wash runs through the watershed from east to south and west. The wash crosses Meridian Road about 1,200 ft north of Elliot Road, and bisects the Meridian Pointe development west of Meridian Road. Two CAP Canal overchutes carry significant surface water runoff from areas north of the Canal into the project watershed. Before the Sunland Springs developments, these flows continued southwesterly and crossed Meridian Road alignment into Siphon Draw Wash at the 104th Street alignment. With the development of Sunland Springs, however, an open channel has been constructed between Baseline Road and the north limit of the Meridian Pointe development along the Meridian Road alignment. This is parallel with the proposed Meridian Road Collection System which collects flows into Siphon Draw Basin. On the south side of the CAP Canal south overchute, an earth dike and an earthen road were constructed which modified the natural flood water path on the south area. The following pictures show some of these features.



Open channel on east side of Sunland Springs along Meridian Road alignment looking north

CAP canal south overchute (2-72" pipe) looking northeast

Earthen road downstream of CAP canal south overchute looking southwest

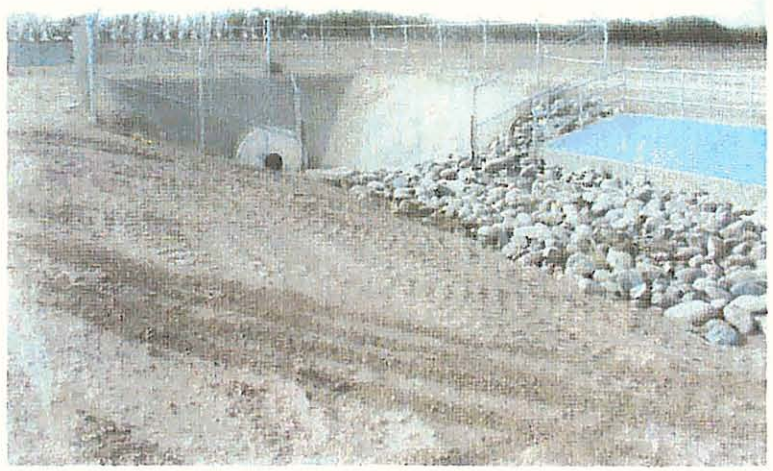
Dike directing flow from CAP canal south overchute to south direction looking southwest

Siphon Draw Wash at Meridian Road looking east (upstream)

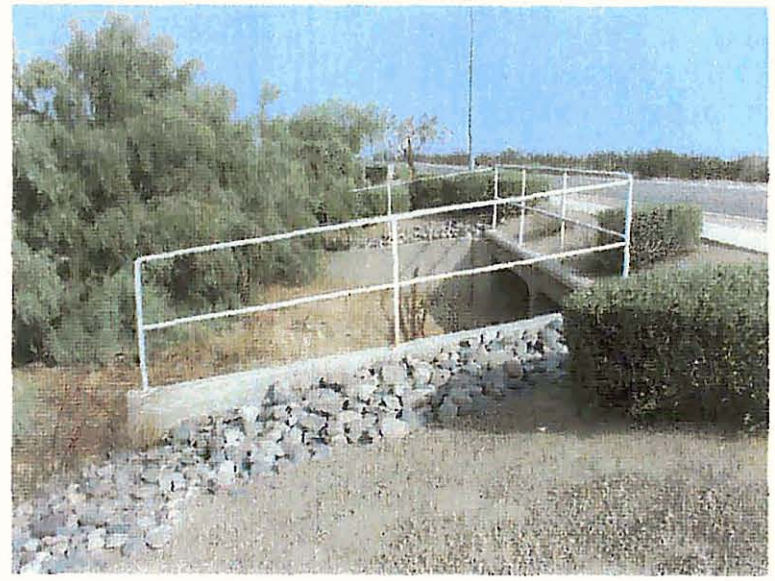
Siphon Draw Wash at Meridian Road looking west (downstream)

Elliot Road detention basins and outfall channel (storm drain) have been constructed at the downstream limit of the project (104th Street alignment) to the ultimate conditions described in the East Mesa ADMP.

Meridian Road bounds the Meridian Pointe property to the east. A drainage collection channel is located on the west side of Meridian Road on the east side of the development to intercept flows from the east. Meridian Road adjacent to Meridian Pointe is elevated above natural ground. At the main branch of Siphon Draw Wash, a 2-10'x4' concrete box culvert with a design flow of 393 cfs has been constructed across Meridian Road. An additional 1-10'x3' concrete box culvert has been constructed to intercept flow from a tributary to Siphon Draw Wash (design flow 241 cfs). Pipe culverts at two locations (one to the north of Siphon Draw Wash, another to the south of Siphon Draw Wash) have also been built to receive flows from local small washes. The following pictures show some of these drainage improvements.



Elliot Basin diversion inlet structure and bypass channel; pipe culvert into Elliot Storm Drain. Looking southwest at Elliot Road and 104th Street



Siphon Draw Wash 2-10'x 4' concrete box culverts at Meridian Road looking

3.3 Utilities

The main wet utility conflict in Elliot Road is a 16-inch water line. The water line is 30 ft north of centerline west of Signal Butte Road and 30 ft south of centerline between Signal Butte Road and Meridian Road. There are water services connected to the 16-inch line between Signal Butte Road and Meridian Road that feed subdivisions on the north side of Elliot Road. There is also a waterline within Meridian Road that goes north/south and connects into the Elliot Road waterline and a waterline at Mountain Road that goes south from the Elliot Road waterline. The Meridian Road 12-inch waterline is approximately 40.5 ft west of the centerline north of Elliot Road. Based on City of Mesa utility maps, there does not appear to be any sewer conflicts within Elliot Road or Meridian Road. Existing dry utilities such as, gas, electricity, and cable were not reviewed within this scope of work.

3.4 Jurisdictional Delineation

A few washes within the study watershed may be jurisdictional Waters of the US. A preliminary U.S. Army Corps of Engineers' Section 404 jurisdictional delineation was performed for the Siphon Draw Wash and other washes in the project area, east of Meridian Road, by the FCDMC for project planning purposes. The delineation

represents our understanding of characteristics of the Waters of the U.S. and how they apply to the site as it exists today. Only the U.S. Army Corps of Engineers can make the final determination as to whether or not the washes are jurisdictional. Refer to Plate 2 for the preliminary delineation.

3.5 FEMA FIRM Panel

Federal Emergency Management Agency (FEMA) Flood Insurance Rate Map (FIRM) Panel 040077 0125D (Pinal County), dated March 5, 1990, has designated this portion of the Siphon Draw Wash as Special Flood Hazard Area Zone A:

> Zone "A" is defined as: *A special flood hazard area inundated by 100-year flood. No base flood elevations determined.*

No FIRM Panel is published for Siphon Draw Wash west of Meridian Road alignment within Maricopa County. See Plate 3 for the Effective FEMA FIRM Panel of the project area.

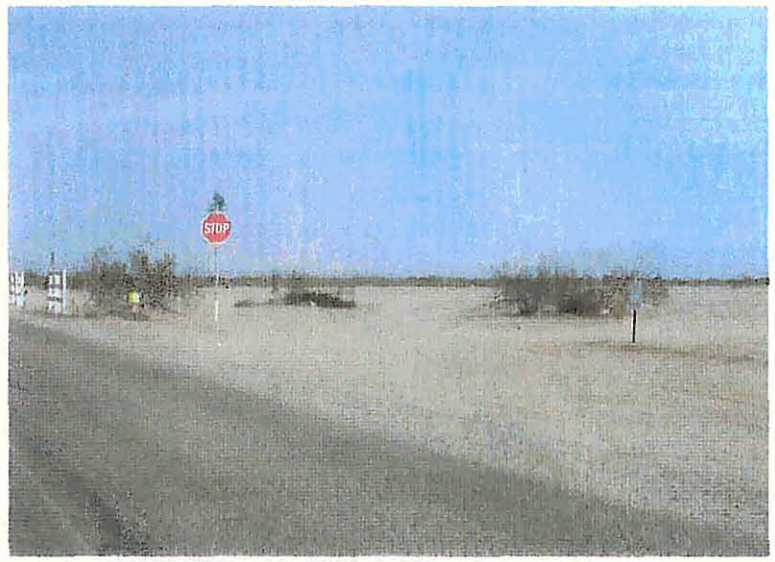
4.0 PREVIOUS STUDIES

This section briefly describes studies and reports that contain information pertinent to this project.

4.1 East Mesa ADMP

Dibble & Associates, *East Mesa Area Drainage Master Plan – Recommended Design Report (FCD #95-32), July 1998.* The FCDMC initially prepared the hydrology for the existing condition and then modified the existing condition hydrology to incorporate the selected design hydrologic criteria and the future condition land use from the new MAG 1997 land use maps. Dibble and Associates then revised the FCDMC-supplied hydrology to reflect changes in flow routing from the planned channels, storm drains, and detention basins. This study included the preliminary design plans that described planned improvements, project costs, and special issues to be considered during final planning and design. Siphon Draw Drainage Improvements were recommended by this study and described as "Sunland Springs Channel & Siphon Draw Detention Basin" and "Elliot Channel (Phase 2)."

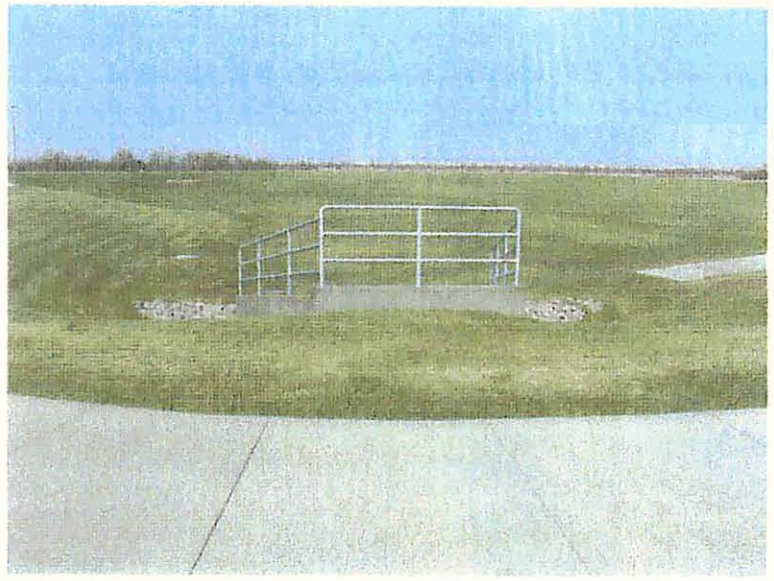
Elliot Road and Meridian Road looking north



Northeast corner of Elliot Road and Meridian Road, Proposed Siphon Draw Basin Site looking northeast

4.2 Elliot Road Detention Basins and Outfall Channel

Wood, Patel & Associates, Inc., *Elliot Road Detention Basins and Outfall Channel (FCD #98-44), March 2000.* These improvements were also identified and recommended by the East Mesa ADMP. They were described as "Elliot Detention Basin" and "Elliot Channel (Phase 1)" in the recommended design report. This project performed channel alternative analysis, and prepared final design plans and special provisions for the Elliot Road Detention Basins and Outfall Channel. That drainage system included detention basins, inlet works, outlet works, and the outfall pipe from the detention basins along Elliot Road to the downstream side of Ellsworth Road where the pipe daylights in its historical drainage corridor. The upstream improvement limit of the storm drain is the south side of Elliot Road at the 104th Street alignment.



Elliot Detention Project – East Basin looking west

4.3 Drainage Design of Siphon Draw Wash for Meridian Pointe

Coe & Van Loo Consultants, Inc., *Drainage Design Report for Meridian Pointe – A Subdivision in Mesa, Arizona, September 1998.* The purpose of this report was to document the hydrologic conditions which impact the site and to show the basis for the design of on-site and off-site drainage channels and culverts storm drainage systems and retention basins. Meridian Pointe is located east of Mountain Road, west of Meridian Road, south of the Olney Road alignment, and north of Elliot Road. Since the improvements recommended by the East Mesa ADMP, specifically, the Sunland Springs Channel & Siphon Draw Detention Basin, are not in place, and the generalized nature of the watershed boundaries were developed for the regional drainage system, the modeling results from the East Mesa ADMP cannot be applied directly in this project which precedes the ADMP plans implementation.

A HEC-1 model was developed for the contributing watershed for the project in order to define the off-site flows under existing conditions. The estimated 100-year, 24-hour storm peak flow was 758 cfs for Siphon Draw Wash at the Meridian Road alignment. A HEC-RAS model was also developed to model the hydraulics of the Siphon Draw Wash within the project reach. The Siphon Draw Wash bisects the site and will remain in its natural condition in compliance with the U.S. Army Corps of Engineers Section 404 Permit requirement. A manmade berm and concrete cutoff wall were constructed in the

Meridian Pointe project where the computed water surface elevations exceed the natural bank elevation. Several culverts were constructed to route flows east to west across Meridian Road.

Siphon Draw Wash box culverts at Calderon within Meridian Pointe

Siphon Draw Wash at Calderon within Meridian Pointe looking east (upstream)

4.4 Meridian Road Access Control and Corridor Improvement Study

URS, *Meridian Road Access Control and Corridor Improvement Study – Draft Technical Memorandum No. 8: Alternative Development and Evaluation. June 2004.* The purpose of Technical Memorandum No. 8 was to document the evaluation of alternatives considered for the Meridian Road Access Control and Corridor Improvement Study. Information obtained from adjacent jurisdictions and stakeholders was used in conjunction with MCDOT design guidelines and criteria to develop and evaluate the alternatives. The projected 2010 and 2020 traffic volumes were applied to evaluate the interim and ultimate facility needs.

5.0 DEVELOPMENT OF ALTERNATIVES

5.1 Constraints to the Drainage System Alternatives

Siphon Draw Drainage Improvements are part of the recommended regional drainage system by the East Mesa ADMP. Some of the recommended improvements have already been implemented in conjunction with area developments. Therefore, there are some constraints or requirements to the proposed drainage system alternatives:

A) Elliot Road detention basins and outfall channel (storm drain) have been constructed at the downstream limit of the project (104th Street). The design flow for the system at this point for the 78" pipe is 508 cfs as established by the ADMP based on the ultimate conditions of the watershed. The storm drain pipe invert elevation is 1,429.0 ft and the design hydraulic grade line is 1,436.4 ft at the 104th Street alignment.

B) The constructed East Detention Basin located on the west side of the 104th alignment has a storage volume of 35 ac-ft with design water surface elevation of 1,439.0 ft.

C) Since the Meridian Pointe subdivision has been built and Siphon Draw Wash bisects this subdivision, the design conveyance capacity of the Siphon Draw Wash within this reach limits the amount of flow that can be bypassed from east of Meridian Road.

D) Potential detention basins must be located within Pinal County since there is no land available at desired locations within Maricopa County.

E) The designed detention basins should be able to be bled-off by gravity flow within a 36-hour period and meet the Arizona Department of Water Resources' non-jurisdictional requirement.

5.2 Potential Drainage Elements

Following is a list of the potential major drainage elements identified for alternatives analysis of the project. For the feasibility analysis, some common elements such as

inlets, culverts, manholes, utility relocations, splitter/diversion structures and minor drainage elements have been excluded. It should be noted that Siphon Draw Basin was the only basin proposed in the ADMP recommended design report. However, during the preliminary alternatives review process Wood/Patel was instructed by the FCDMC to include other detention basins options. Four potential detention basin sites were identified and evaluated as follows:

Element A: Siphon Draw Detention Basin;

Element B: Guadalupe Detention Basin;

Element C: Detention Basin at south of the CAP Canal north overchute;

Element D: Detention Basin at south of the CAP Canal south overchute.

The specific basin location, size, bottom elevation, high water elevation, and their combinations can vary for different alternatives. Other major drainage elements are:

Element E: Meridian Road Collection System which can be concrete channel, earthen channel, pipe, or a combination of channel and pipe;

Element F: Bypass Storm Drain along Meridian Road between Siphon Draw Wash and Elliot Road;

Element G: Elliot Road Storm Drain between Meridian Road and west of Mountain Road;

Element H: Elliot Road Storm Drain between west of Mountain Road and the 104th Street alignment;

Element I: Siphon Draw Wash between Meridian Road and Mountain Road;

Element J: Siphon Draw Wash between Mountain Road and the 104th Street alignment;

Element K: Mountain Road Channel/Pipe;

Plate 4 shows all of the major drainage system elements.

5.3 Detention Basins Options within Pinal County

A total of seven options were evaluated for detention basins within Pinal County. Four of them include a basin as recommended by the ADMP located at the northeast corner of Elliot Road and Meridian Road. Two include two basins: the first one is located at the northeast corner of Elliot Road and Meridian Road; the second one is located at northeast corner of Meridian Road and Guadalupe Road alignments. One of the options include

three basins: the first one is located at the northeast corner of Elliot Road and Meridian Road north of the Siphon Draw Wash; the second one is located at south of the CAP Canal north overchute; and the third one is located at south of the CAP Canal south overchute. The basins were designed with variable side slopes of 4:1 to 8:1. Some of the options required berms along the downstream perimeter of the basin to meet the storage requirements; however these berms are not jurisdictional dams. Each option is further described below. Table 3A shows the basin geometric data for all detention basins options.

5.3.1 Single Basin Options

There are four options using a single basin. The differences are based on relative depth of the resulting floodpool and the relative elevation of the basin bottom. The lower floodpool options can be contained using natural ground levels; but by adding berms a deeper floodpool can be achieved. The options having a higher basin bottom can be bled-off by gravity through Siphon Draw Wash; while options having a lower basin bottom gain basin volume and can be bled-off through the storm drain pipe only.

In each case, the single basin is located at the northeast corner of Elliot Road and Meridian Road, and is designed as an offline basin. Each option includes approximately 30% increase in land area over what is needed for storage to allow varying side slopes and other kinder and gentler treatments. Plates 5 to 8 show the general location and preliminary design parameters of the basin for these four options. The main features of the four single basin options are shown as follows:

Option No.	Description	Area Ac.	Storage Ac-Ft.	Water Surface Elev., Ft.	Basin Bottom Elev., Ft.
1	Low Floodpool, Low Bottom	38	160	1494.0	1487.0
2	High Floodpool, High Bottom	49	160	1496.0	1491.0
3	High Floodpool, Low Bottom	29	160	1496.0	1487.0
4	Low Floodpool, High Bottom	83	160	1494.0	1491.0

5.3.2 Two-Basin Option 1

This option is Detention Basin Option 5 and includes two detention basins. This option is different from the ADMP recommendation. The first basin is located east of Meridian Road and north of the Siphon Draw Wash in consideration of 404 permit issues; the second one is located at the northeast corner of Meridian Road and Guadalupe Road alignments. Both basins will be operated as off-line basins. Surface runoff from the CAP Canal north overchute and contributing areas northeast corner of Meridian Road and Guadalupe Road alignments will be collected near this detention basin. Some base flow will bypass to the south through the Meridian Road Collection System. The peak flow above the base flow will be diverted into the proposed Guadalupe Basin. Runoff from the CAP Canal south overchute and the local drainage areas between Guadalupe Basin and Siphon Draw Basin will be collected by the Meridian Road Collection System and concentrated upstream of Siphon Draw Basin. There, the base flow will bypass to the west through the Siphon Draw Wash and/or to the south within a storm drain along Meridian Road to the Elliot Road storm drain. The peak flow above the base flow will be diverted into the proposed Siphon Draw Basin. The proposed design water surface elevation of the Siphon Draw Basin is 1,496.0 ft; the proposed Siphon Draw Basin average bottom elevation is 1,490.0 ft; the estimated total flood storage is 80 ac-ft; and the estimated total land requirement is about 24 acres including approximately 30% land for kinder and gentler purposes. The proposed design water surface elevation of the Guadalupe Basin is 1,520.0 ft; the proposed Guadalupe Basin average bottom elevation is 1,510.0 ft; the estimated total flood storage is 90 ac-ft; and the estimated total land requirement is about 18 acres including approximately 30% land for kinder and gentler purposes. Plate 9 shows the general locations and preliminary design parameters of these two basins.

5.3.3 Three-Basin Option

This option is Detention Basin Option 6 and consists of three detention basins. The first basin is located east of Meridian Road and north of the Siphon Draw Wash in consideration of 404 permit issues; the second basin is located south of the CAP Canal north overchute; and the third basin is located south of the CAP Canal south overchute. All three basins will be operated as off-line basins. The

base flow from CAP Canal north overchute will bypass to the southwest through natural drainage path to Meridian Road Collection System. The peak flow above the base flow will be diverted into the proposed basin. The base flow from CAP Canal south overchute will bypass to the southwest through the existing wash to the Meridian Road Collection System. The peak flow above the base flow will be diverted into the proposed basin south of the CAP Canal south overchute. Surface runoff from the local drainage areas between the CAP Canal and Siphon Draw Basin will be collected by the Meridian Road Collection System and concentrated north of the Siphon Draw Basin. The base flow will bypass to the west through Siphon Draw Wash and/or to the south through a storm drain along Meridian Road to the Elliot Road storm drain. The peak flow above the base flow will be diverted into the proposed Siphon Draw Basin. The proposed design water surface elevation of the Siphon Draw Basin is 1,496.0 ft; the proposed Siphon Draw Basin average bottom elevation is 1,490.0 ft; the estimated total flood storage is 90 ac-ft; and the estimated total land requirement is about 27 acres including approximately 30% land for kinder and gentler purposes. The proposed design water surface elevation of both basins at south of the CAP Canal is 1,568.0 ft; the proposed average bottom elevation of both basins at south of the CAP Canal is 1,562.0 ft; the estimated total flood storage for each of the two basins south of the CAP Canal is 40 ac-ft; and the estimated total land requirement for each of the two basins south of the CAP Canal is about 12 acres including approximately 30% land for kinder and gentler purposes. Plate 10 shows the general locations and preliminary design parameters of these three basins.

5.3.4 Two-Basin Option 2

This option is Detention Basin Option 7 and is quite similar to Detention Basin Option 5. The second basin is located at the northeast corner of Meridian Road and Guadalupe Road alignments. However, the first basin is moved to south of Siphon Draw Wash and is located at the northeast corner of Elliot Road and Meridian Road. This basin location is more cost effective since the natural ground south of the Siphon Draw Wash is a few feet lower than that north of the Siphon Draw Wash. Both basins will be operated as off-line basins as described in Section 5.3.2. The proposed design water surface elevation of the Siphon

Draw Basin is about 1,495.5 ft; the proposed Siphon Draw Basin average bottom elevation is 1,487.0 ft; the estimated total flood storage is 80 ac-ft; and the estimated total land requirement is about 19 acres including approximately 30% land for kinder and gentler purposes. The proposed design water surface elevation of the Guadalupe Basin is 1,520.0 ft; the proposed Guadalupe Basin average bottom elevation is 1,510.0 ft; the estimated total flood storage is 90 ac-ft; and the estimated total land requirement is about 19 acres including approximately 30% land for kinder and gentler purposes. Plate 11 shows the general locations and preliminary design parameters of these two basins.

5.4 Collection System Options within Pinal County

The Meridian Road Collection System was recommended by the ADMP and was described as "Sunland Springs Channel." This channel is located on the east side of Meridian Road alignment extending from about 3,400 ft north of the Guadalupe Road alignment south to the proposed Siphon Draw Basin. The main purpose of this channel is to collect surface runoff from areas east of Meridian Road and convey it to south into the proposed Siphon Draw Basin drainage system. Flows into the channel vary from location to location and are different for different detention basins options. Therefore, open channel and/or pipe can be used for different portions of the system. Three options were proposed and each of them is further described below. Please note that this collection system will be part of the Siphon Draw Drainage Improvements no matter what detention basin options are selected. The primary differences are the cross sections, lining material, and longitudinal slopes. The selection of Collection System options does not have significant impact on hydrologic modeling. Therefore, the preferred option for Collection System can be determined relatively independent of hydrologic modeling. Table 3B shows the collection channel geometric data for all options.

5.4.1 Option 1 – Concrete Channel

This option consists of constructing a 6-inch thick concrete-lined channel with landscaping in the overbank areas. The channel typically has 2:1 side slopes, and will provide at least 2.0 feet of freeboard. It will be at a longitudinal slope of 0.45%, and will have a maximum flow velocity of 15 ft/s. The channel bottom width varies with design flows from segment to segment.

5.4.2 Option 2 – Earthen Channel

The native earth channel will be in a natural setting including kinder and gentler features. It would require drops to maintain sub-critical flow conditions and maximum allowable flow velocity requirement. The proposed channel slope is 0.18% with 4:1 side slopes, and minimum of 1.0 ft of freeboard. The maximum permissible velocity is estimated to be 4.0 ft/s based on preliminary soil data analysis. The channel bottom width varies with design flows from segment to segment. This option would require large land acquisition and multiple drop structures to meet FCDMC design requirements.

5.4.3 Option 3 – Pipe/Concrete Channel

Since the flows are reduced significantly upstream of the channel for options with two or three detention basins, pipe is a feasible option for portion of the Collection System. Some combination of pipe and concrete-lined channel may be more cost-effective than a single type of construction to meet the site specific design grades, inverts, covers etc.

5.5 Outfall System Options within Maricopa County

The Siphon Draw Basin Outfall System was recommended by the East Mesa ADMP and was described as "Elliot Channel (Phase 2)" in the recommended design report. This system is located adjacent to Elliot Road and runs from the Siphon Draw Detention Basin to the 104th Street alignment. The main purpose of this system is to convey discharge from the Meridian Road Collection System and Siphon Draw Basin to the Elliot Road Channel Phase 1 storm drain.

Siphon Draw Wash Corridor is designed to convey up to 758 cfs flow from Meridian Road to Mountain Road through the Meridian Pointe development. Since the downstream reach from Mountain Road to 104th Street has capacity, though not as great as upstream, Siphon Draw Wash is proposed to be one of the drainage corridors evaluated for the alternative analysis. Five basic options, each having different combinations of drainage elements, were evaluated in this study and each of them is further described below. The storm drain sizes vary with the flows bypassed to the system. Table 3C shows the outfall system geometric data for all options.

5.5.1 Option 1 – Elements G, H, I, and K

This option consists of Elements G, H, I, and K. Surface runoff from areas east of Meridian Road will be collected by the Meridian Road Collection System and Siphon Draw Wash and concentrated at Meridian Road near Siphon Draw Basin. The base flow will bypass to west through Siphon Draw Wash (I) to Mountain Road, and then to the Elliot Road storm drain through channel Element K. The peak flow above the base flow will be diverted into the proposed Siphon Draw Basin which will be bled-off by pipe to the Elliot Road storm drain between Meridian Road and west of Mountain Road (G). The flows will be combined at west of Mountain Road and continue to the west through the Elliot storm drain (H) and tie into the Elliot Road storm drain Phase 1. Plate 12 shows the configuration of this option.

5.5.2 Option 2 – Elements H, I, and K

This option is quite similar to Option 1 described above except that Element G is eliminated. The proposed Siphon Draw Basin will be bled-off through the Siphon Draw Wash Drainage Corridor. Plate 13 shows the configuration of this option.

5.5.3 Option 3 – Elements F, G, and H

This option does not use Siphon Draw Wash as a major drainage corridor except for receiving low base flows for Section 404 requirements. The Elliot Road storm drain is the only conveyance system. Surface runoff from areas east of Meridian Road will be collected by the Meridian Road Collection System and Siphon Draw Wash and concentrated at Meridian Road near Siphon Draw Basin. The base flow will bypass to south through storm drain (F) to the Elliot Road storm drain. The peak flow above the base flow will be diverted into the proposed Siphon Draw Basin which will be bled-off by pipe to the Elliot Road storm drain (G), continue to the west through the Elliot Road storm drain (H) and tie into the Elliot Road storm drain Phase 1. Plate 14 shows the configuration of this option.

5.5.4 Option 4 – Elements G, H, I, and J

This option uses both Siphon Draw Wash drainage corridor and the Elliot Road storm drain as the major conveyance systems. Surface runoff from areas east of Meridian Road will be collected by the Meridian Road Collection System and Siphon Draw Wash and concentrated at Meridian Road near Siphon Draw Basin. The base flow will bypass to west through Siphon Draw Wash (I), and continue to west through Siphon Draw Wash (J) to Elliot East Detention Basin Inlet at 104th Street. The peak flow above the base flow will be diverted into the proposed Siphon Draw Basin which will be bled-off by pipe to the Elliot Road storm drain (G), continue to the west through the Elliot Road storm drain (H) and tie into the Elliot Road storm drain Phase 1. Plate 15 shows the configuration of this option.

5.5.5 Option 5 – Elements F, G, H, I, and J

This option is similar to Option 4 as described above which uses both Siphon Draw Wash drainage corridor and the Elliot Road storm drain as the major conveyance systems. Surface runoff from areas east of Meridian Road will be collected by the Meridian Road Collection System and Siphon Draw Wash and concentrated at Meridian Road near Siphon Draw Basin. A portion of the base flow will bypass to the south through the storm drain (F) to the Elliot Road storm drain. A portion of the base flow will bypass to the west through Siphon Draw Wash (I), and continue to the west through Siphon Draw Wash (J) to Elliot East Detention Basin Inlet at 104th Street. The peak flow above the base flow will be diverted into the proposed Siphon Draw Basin which will be bled-off by pipe to the Elliot Road storm drain (G), continue to the west through the Elliot Road storm drain (H) and tie into the Elliot Road storm drain Phase 1. Plate 16 shows the configuration of this option.

5.6 Hydrologic Modeling

5.6.1 HEC-1 Base Models

The hydrologic analysis was performed using HEC-1 software. The FCDMC originally prepared the base hydrologic model for the East Mesa ADMP in 1998, and later modified the existing condition hydrology to incorporate the future

condition land use from the new MAG 1997 land use maps. Dibble and Associates then revised the FCDMC supplied hydrology to reflect changes in flow routing from the planned channels, storm drains, and detention basins for the recommended ADMP design report in 1998. Wood, Patel & Associates, Inc. further modified the hydrology for *Elliot Road Detention Basins and Outfall Channel* project in 2000. That project has already been constructed with its upstream storm drain limit at Elliot Road and 104th Street alignment, which is also the downstream limit of this pre-design study.

As per the Scope of Work, three base HEC-1 models were prepared:

1) A HEC-1 model for Elliot Basin and Outfall Channel;
2) A HEC-1 model for the future conditions without Siphon Draw Drainage Improvements (pre-project conditions);
3) A HEC-1 model for the future conditions with Siphon Draw Drainage Improvements (post-project conditions).

The FCDMC provided the base models. The corrected future conditions HEC-1 models were provided by the FCDMC (Cathy Regester, December 2003) with corrections for sub-basins 52, 56, 58, and 65A and without 100-year 2-hour on-site retention for these subbasins (within Pinal County). The HEC-1 file name for the areas north of US 60 is WS2-NEM.DAT; and the HEC-1 file name for the areas south of US 60 is WS4-SEMR.DAT. The proposed condition model reflects the design of the Siphon Draw Drainage Improvements.

Two overchutes carry flood water across the CAP Canal into subbasin 65A, where the Siphon Draw Basin will be located. The ADMP HEC-1 model assumed a storage routing and a constant base flow from each of the overchutes into subbasin 65A. The FCDMC subsequently learned that the storage volume upstream of the overchutes is very small and the two overchutes (2-72" pipe each) have adequate capacity to carry the peak flows across the CAP Canal into subbasin 65A. Therefore, the updated HEC-1 model removed the storage routing operation for the overchute flows in order to accurately model the routing at the overchutes.

For the purpose of this pre-design study HEC-1 model, the FCDMC has agreed that it would be acceptable to make no physical divisions to any of the subbasins. Instead, flow diversions were used for any subbasin split flow evaluations.

5.6.2 Formulating Alternatives

The proposed condition model is a post project model that reflects the design of the Siphon Draw Drainage Improvements. Since there are so many drainage system elements and detention basins options, the number of possible combinations (alternatives) of the elements is very high. However, at the downstream limit of the project (104th Street), Elliot Road detention basins and outfall channel (storm drain) have been constructed, and the design flow for that system at this point is limited to 508 cfs for the 100-year storm. Therefore, the design flow to the outfall channel is also limited to the capacity of the existing drainage system. For the design and modeling purposes, therefore, the outfall system is relatively independent of the Siphon Draw Basin options.

Since the Outfall System within Maricopa County is relatively independent of the Siphon Draw Basin and the Collection System options within Pinal County, a total of seven HEC-1 hydrologic models were developed in conjunction with seven basin options discussed in Section 5.3 for the post project conditions. The Outfall System Option 5 was combined with Detention Basin Options 5, 6, and 7 since it may be the preferred option due to the benefits it would provide the City of Mesa's proposed water treatment plant west of Meridian Pointe and Elliot Road on-site drainage.

As discussed previously, the selection of Collection System options does not have a significant impact on hydrologic modeling and the preferred alternative for Collection System can be determined after the hydrologic modeling is complete.

Therefore, the combinations of seven detention basin options and five outfall system options formulate seven post project condition alternatives.

5.6.3 Hydrologic Modeling of Alternatives

As per the Scope of Work, three base HEC-1 models were prepared: a HEC-1 model for Elliot Basin and Outfall Channel; a HEC-1 model for the corrected (updated) future conditions without Siphon Draw Drainage Improvements (pre-project conditions); and a HEC-1 model for the post project conditions. As discussed above seven HEC-1 hydrologic models were developed for the seven alternatives of the post project conditions. The HEC-1 models, drainage elements, and modeling conditions for all of the seven alternatives are summarized as follows:

HEC-1 Model Name	Modeling Conditions	Major Drainage Elements
FINAL8.DAT	Elliot Basin & Outfall Channel	N/A
S60EM_BP.DAT	Pre-project conditions	N/A
S60EMAP1.DAT	Alternative 1	A, E, G, H, I, & K
S60EMAP2.DAT	Alternative 2	A, E, H, I, & K
S60EMAP3.DAT	Alternative 3	A, E, F, G, & H
S60EMAP4.DAT	Alternative 4	A, E, G, H, I, & J
S60EMAP5.DAT	Alternative 5	A, B, E, F, G, H, I, & J
S60EMAP6.DAT	Alternative 6	A, C, D, E, F, G, H, I, & J
S60EMAP7.DAT	Alternative 7	A, B, E, F, G, H, I, & J

5.6.4 Modeling Results

The entire East Mesa ADMP watershed is divided into two portions and modeled by two HEC-1 models separated by US 60. The original HEC-1 file name for the areas north of US 60 is WS2-NEM.DAT; and the HEC-1 file name for the areas south of US 60 is WS4-SEMR.DAT. These two files were provided by the FCDMC, and modified by Wood, Patel & Associates. The new HEC-1 file name for the areas north of US 60 is N60EM.DAT; and the HEC-1 file name for the areas south of US 60 is S60EMAP#.DAT where "#" indicates the number of the alternative. The hydrologic data connections between areas north and south of US 60 are provided by HEC data file "N60EM.DSS."

Cathy Regester (FCDMC) investigated what might happen to the proposed detention basins and downstream flows if the time of concentration were decreased due to possible channelization from development. She concluded that although increased channelization will have some impacts on the basins the impacts appear to be small and any potential rise in water surface elevation should be easily contained within the basin's freeboard. There were no impacts to the drainage system downstream of the Siphon Draw Basin.

Table 1 summarizes the peak flows for all of the HEC-1 models at key concentration points. Note that the goal for the post-project conditions was that the peak flow should be less than or equal to 508 cfs at the project downstream limit of the Elliot Road storm drain at 104th Street for all alternative models. Table 2 shows the design parameters for major drainage elements of all modeling alternatives.

5.7 Probable Cost of Alternatives

The probable cost to implement each alternative was estimated to assist with alternative selection. Certain common items to all alternatives were ignored in the cost estimation during the feasibility study. It should be noted that the channel hydraulics was modeled using the normal depth method. Detailed hydraulic calculations were not performed at this level for drop structures, detention basins, and flow diversion structures.

5.7.1 Land Acquisition Cost within Pinal County

Land acquisition cost is one of the major costs associated with proposed drainage elements including both detention basins and channel land acquisition. Plate 18 shows the general plan of the area for the City of Apache Junction. The unit price for land acquisition within Pinal County is estimated to be $100,000 per acre according to the FCDMC. The estimated total land acquisition cost for each alternative is listed in Table 4, column 3. Detailed cost computation sheets for all alternatives are included in Appendix C.

5.7.2 Construction Cost within Pinal County

The probable cost of construction for each of the alternatives within Pinal County includes detention basin excavation, collection channel excavation, concrete

channel lining, diversion structures, drop structures, and landscaping. The estimated total construction cost for each alternative is listed in Table 4, column 2. Detailed cost evaluation sheets for all alternatives are included in Appendix C.

5.7.3 Outfall System Cost Within Maricopa County

The probable cost of construction for each of the alternatives within Maricopa County includes storm drain pipes, channel excavation, and manholes. The estimated total construction cost for each alternative is listed in Table 4, column 5. Detailed cost evaluation sheets for all alternatives are included in Appendix C.

6.0 PREFERRED ALTERNATIVE SELECTION AND ONCLUSIONS

6.1 Preferred Alternative

Among all the detention basin options evaluated within Pinal County, the option that best fulfills the goals of the project and had the lowest total cost is Option 7. Other criteria or objectives considered in the alternative selection include safety, agency acceptance (City of Mesa and FCDMC), low maintenance efforts, and environmental impacts.

For the three Collection System options evaluated within Pinal County, the combination of pipe and concrete channel is preferred in conjunction with detention basin Option 7. Earthen channel was rejected since it would require large land acquisition and multiple drop structures to meet FCDMC design requirements. Preliminary cost estimates shown that earthen channel cost would be half million dollars more than that of concrete channel for options 1 to 4 as shown in Table 3.

For the five Outfall System options evaluated within Maricopa County, Option 5 is preferred despite a slightly higher cost associated with this outfall system since it would provide benefits to the City of Mesa's proposed water treatment plant's site plan layout west of Meridian Pointe. It should be noted that each option would have a provision to maintain low flows within the Siphon Draw Wash drainage corridor for Section 404 requirements and to collect flows from the local watershed for storms in excess of the 100-year 2-hour event. The City of Mesa, in the review process, had expressed that they preferred options 3, 4, and 5 since they do not have an open channel across the City Plant site. Considering Mesa's goals, Option 5 was selected since it meets the majority of Mesa's preferences. A pipe option is preferred if it is required to bring flow into the Elliot Road storm drain from Siphon Draw Wash.

Alternative 7 is the combination of these selected options and is the preferred alternative of the drainage system. The preferred alternative is described further in detail in Section 7 – Preliminary Design Plans.

6.2 Conclusions

The pre-design study included review and update of related reports and design plans for the Siphon Draw Drainage Improvements. As necessary, the East Mesa ADMP hydrologic models were modified to include the new developments into the existing drainage systems. It evaluated the recommended improvements of Siphon Draw Drainage System by the ADMP. It also evaluated the detention basin locations and sizes, appropriate collection and conveyance system locations, alignments, cross sections, and ROW requirements east of the 104th Street alignment. Peak flows at critical locations from three HEC-1 hydrologic models were presented: HEC-1 model for Elliot Basin and Outfall Channel; HEC-1 model for the corrected (updated) future conditions without Siphon Draw Drainage Improvements (pre-project conditions); and HEC-1 models for the post project conditions. Seven options for detention basins within Pinal County were evaluated. Three options were evaluated for Meridian Collection System; and five options were analyzed for Siphon Draw Basin Outfall System. Probable costs were estimated for all of the alternatives and drainage elements. The preferred alternative was selected and analyzed.

7.0 PRELIMINARY DESIGN PLANS

7.1 System Description of the Preferred Alternative

The preferred alternative of the Siphon Draw Drainage Improvements include drainage elements of two detention basins: Siphon Draw Basin (element A) and Guadalupe Basin (element B), the Meridian Road Collection System (element E), bypass storm drain between Siphon Draw wash and Elliot Road (element F), the Elliot Road storm drain between Meridian Road and west of Mountain Road (element G), the Elliot Road storm drain between Mountain Road and 104th Street (element H), and Siphon Draw Wash (elements I and J). The major drainage system elements for the preferred alternative are shown on Plate 17. The HEC-1 model for the preferred alternative is titled S60EMAP7.DAT, and it is included in this report. Its schematic is shown on Plate 19. The preliminary design plans and profiles at the pre-design study level for the preferred alternative are presented in Exhibit A.

The Meridian Road Collection System consists of five segments: Guadalupe Basin inlet channel (Sta. 149+00 to Sta. 168+00), Guadalupe Basin bypass storm drain (36" to 42" pipe, Sta. 138+50 to Sta. 149+00), 60" pipe storm drain (Sta. 127+00 to Sta. 138+50), 102" pipe storm drain (Sta. 115+00 to Sta. 127+00), and Siphon Draw Basin inlet channel (Sta. 93+00 to Sta. 115+00).

The Guadalupe Basin inlet channel receives flows from the north most areas of subbasin 65a (See Plate 18) between the CAP Canal and Meridian Road including flow from the CAP Canal north overchute. The design flow for the channel is 855 cfs and the concrete channel bottom width is 15 ft. Flows from areas east of Guadalupe Basin are collected in a concrete swale and flows to the northwest into the inlet channel making the total flow at the basin inlet 984 cfs. A base flow of 50 cfs bypasses the basin and flows to the south through the Guadalupe Basin bypass storm drain (36" to 42" pipe) along Meridian Road, and the remaining flow of 934 cfs is diverted into Guadalupe Basin through a 105 ft wide spillway. A bleed-off flow of 54 cfs from the basin combines with the bypass flow in the storm drain at the southwest corner of the basin and continues south through the 60" pipe storm drain. The design flow for the local flow collection storm drain is 147 cfs which includes flow of 43 cfs from local areas east of Meridian Road. Grated catch basins will be provided at low points adjacent to the storm drain and collect these local flows.

The routed storm water from the CAP Canal south overchute flows into the 102" pipe storm drain between Sta. 115+00 and Sta. 127+00 via grated inlets. The design flow for this pipe is 780 cfs and includes both local area flows and the upstream storm drain flow.

With additional flow into the collection system from northeast local areas, a pipe option south of Sta. 115+00 was found not to be feasible due to cover constraints. Therefore, a concrete open channel is designed for the Siphon Draw Basin inlet channel with a bottom width of 15 ft from Sta. 93+00 to Sta. 115+00 for the design flow of 1,033 cfs.

Siphon Draw Wash and its tributaries collect flows from areas east of Meridian Road and the flows concentrate east of Meridian Road and north of Siphon Draw Basin within Siphon Draw Wash Corridor (480 cfs). The combined total flow immediately upstream of the Siphon Draw Basin is 1,497 cfs. A base flow of 200 cfs bypasses the basin and flows to the west within Siphon Draw Wash. Another 200 cfs base flow bypasses the basin and flows to the south through storm drain element F (72" pipe) along Meridian Road from Sta. 83+29 to Sta. 92+69 to the Elliot Road storm drain. The remaining flow of 1,097 cfs is diverted into Siphon Draw Basin through a 120 ft wide spillway.

The bleed-off flow of 70 cfs from Siphon Draw Basin combines with the bypass flow in the Meridian Road storm drain (72" pipe) at the southwest corner of the basin. The design flow for the entire storm drain system downstream of this point is 270 cfs. The Elliot Road storm drain continues to west from Meridian Road to 104th Street alignment from Sta. 2+84 to Sta. 83+29.

The bypass flow in Siphon Draw Wash Corridor from east of Meridian Road continues west within Siphon Draw Wash to 104th Street alignment. The total flow within Siphon Draw Wash at the 104th Street alignment is about 653 cfs, including approximately 453 cfs from local areas between 104th Street and Meridian Road. A base flow of 200 cfs will bypass the existing Elliot East Basin and be conveyed into the existing Elliot Road storm drain through the existing 104th Street channel and pipe culvert inlet structure (78" pipe with 24" opening). The remaining 453 cfs is diverted into the existing Elliot East Basin which was built with the Elliot Road Detention Basins and Outfall Channel project. It

should be noted that the Elliot Road storm drain inlet structure at 104th Street will need to be modified in order to achieve 200 cfs bypass capacity.

The proposed 72" Elliot Road storm drain will tie-in to the existing 78" Elliot Road storm drain at the 104th Street alignment. The combined flow within the Elliot Road storm drain at 104th Street is 462 cfs, slightly lower than the downstream constructed storm drain capacity (508 cfs), which will improve the performance of the Elliot Road detention basins and outfall channel drainage system.

7.2 Meridian Road Collection System

As discussed previously, the Meridian Road Collection System consists of five segments: Guadalupe Basin inlet channel, Guadalupe Basin bypass storm drain, local flow collection storm drain, CAP Canal south overchute flow collection storm drain, and Siphon Draw Basin inlet channel.

The design flow for the Guadalupe Basin inlet channel is 855 cfs and the concrete channel bottom width is 15 ft. The side slope is 2: 1 (H: V), and the longitudinal slope is 0.0024 ft/ft. The design flow depth is 3.5 ft, the channel velocity is 11.2 ft/s, and the specific energy is about 5.4 ft.

The design flow for the Siphon Draw Basin inlet channel is 1,033 cfs and the concrete channel bottom width is 15 ft. The side slope is 2: 1 (H: V), and the longitudinal slope is 0.0015 ft/ft. The design flow depth is 4.4 ft, the channel velocity is 10.0 ft/s, and the specific energy is about 5.9 ft.

The Guadalupe Basin bypass storm drain reinforced concrete pipe (RCP) varies from 36" to 42" and the design flow is 50 cfs.

The local flow collection storm drain is a 60" RCP, and the design flow for the local flow collection storm drain is 147 cfs.

The CAP Canal south overchute flow collection storm drain is a 102" RCP. The design flow for this pipe is 780 cfs.

Appendix B includes all the detailed hydraulic calculations for the open channels and StormCAD printout for the storm drain pipes. The preliminary design plans are shown in Exhibit A.

7.3 Siphon Draw and Guadalupe Basins

Guadalupe Basin is located at the northeast corner of Meridian Road and Guadalupe Road alignments. Siphon Draw Basin is located at the northeast corner of Elliot Road and Meridian Road. Both basins will be operated as off-line basins as described in the section of Two-Basin Option 1.

The proposed design water surface elevation of the Siphon Draw Basin is approximately 1,495.5 ft; the proposed average bottom elevation is 1,487.0 ft; the estimated total flood storage is 80 ac-ft; and the estimated total land requirement is about 19 acres including approximately 30% land for kinder and gentler purposes. A collection channel is proposed on the east side of the basin in order to collect and convey local flows in the Siphon Draw Wash from areas east of the basin. This channel needs to be designed in conjunction with the final design of the entire drainage system. The preliminary basin elevation, area, volume relationship, and earthwork estimates can be found in Appendix B.

The proposed design water surface elevation of the Guadalupe Basin is 1,520.0 ft; the proposed average bottom elevation is 1,510.0 ft; the estimated total flood storage is 90 ac-ft; and the estimated total land requirement is about 19 acres including approximately 30% land for kinder and gentler purposes. A collection channel is proposed on the east and north sides of the basin in order to direct local flows to the inlet channel from areas east of the basin. This channel needs to be designed in conjunction with the final design of the entire drainage system. The preliminary basin elevation, area, volume relationship, and earthwork estimates can be found in Appendix B. The preliminary design plans for both of the basins are shown in Exhibit A.

7.4 Elliot Road Storm Drain System

The Elliot Road storm drain starts from the Siphon Draw Basin bypass pipe at Siphon Draw Wash and continues south to Elliot Road. The design flow for this segment of the storm drain is 200 cfs and the diameter of the pipe is 72". Then the storm drain turns

west and continues along Elliot Road to the 104th Street alignment, where it ties into the existing 78" storm drain. The design flow for this segment of the storm drain is 270 cfs and the diameter of the pipe is 72". The combined flow within the existing Elliot Road storm drain at 104th Street is 462 cfs. The constructed longitudinal slope varies from 0.004 ft to 0.0073 ft/ft, and flow velocity ranges from 7.1 ft/s to 12.1 ft/s. Appendix B includes all the detailed StormCAD modeling printout for the storm drain pipes. The preliminary design plans are shown in Exhibit A.

7.5 Meridian Road Box Culverts

When Meridian Pointe subdivision was developed, several culverts were constructed to route the flow across Meridian Road: a 2-10'x4' box culvert at the Siphon Draw Wash, a 10'x3' box culvert at the south tributary of the Siphon Draw Wash, and a 2-24" pipe culvert at a local wash. The 10'x3' box culvert and the 2-24" pipe culvert will be abandoned with the completion of this project. One cell of the 2-10'x4' box culvert will be modified to a 5.7'x4' box culvert. An opening will be constructed on the top of the second cell of the box culvert and will be used as emergency spillway outlet of the Siphon Draw Basin. This box will be extended to east of Meridian Road and the Siphon Draw Basin berm with invert elevation of 1,488.4 ft at the inlet. Appendix B includes the detailed hydraulic design calculations and Exhibit A shows the preliminary design plans.

7.6 Basin Diversion Structures

As discussed previously, both Guadalupe Basin and Siphon Draw Basin will be operated as off-line basins. The design flow for Guadalupe Basin is 934 cfs and the broad-crested weir length is 105 ft. The weir crest elevation is 1518.0 ft and the headwater elevation is 1520.2 ft. Appendix B includes the detailed hydraulic design calculations and Exhibit A shows the preliminary design plans.

The design flow for Siphon Draw Basin is 1,097 cfs and the broad-crested weir length is 120 ft. The weir crest elevation is 1493.5 ft and the headwater elevation is 1495.7 ft. Appendix B includes the detailed hydraulic design calculations and Exhibit A shows the preliminary design plans.

7.7 Siphon Draw Wash Corridor

Siphon Draw Wash bisects the Meridian Pointe subdivision, which is located west of Meridian Road. When Meridian Pointe subdivision was developed several culverts were constructed to route the flow across Meridian Road. The design 100-year peak flow is 758 cfs for Siphon Draw Wash at the Meridian Road alignment. A manmade berm and concrete cutoff wall were constructed where the computed water surface elevations exceed the natural bank elevation of the wash. The Siphon Draw Wash main channel remains in its natural condition in compliance with the U.S. Army Corps of Engineers Section 404 Permit requirement. An existing HEC-RAS model was used to evaluate the hydraulics of the wash included various peak flows routing as well as different "n" value considerations. It was concluded that with a significant reduction in the peak flow (from 758 cfs to 200 cfs) for the post-project condition, the high water elevation will be lowered through the Meridian Pointe subdivision.

7.8 Preliminary Landscape Concept

The preliminary landscape concept is provided to ensure that various factors are considered and included as an integral part of the overall design process of the Siphon Draw Drainage Improvements. The key components of this flood control project landscape include:

1) Preservation of the existing indigenous vegetation, where possible;
2) Restoration and re-vegetation of all surface areas disturbed as a result of flood control improvements;
3) Providing opportunities for future recreation amenities, which may include facilities like multi-use trails, pedestrian nodes, and access control points;
4) Integration of aesthetic grading and sculptural earth forms as part of channel and basins grading;
5) Establishing transitional areas to enhance the visual quality of the corridor and provide landscape buffers between adjacent future developments.

7.9 Probable Cost of Construction

The preliminary opinion of probable cost for the preferred alternative is summarized in Table 5. The preliminary opinion of probable cost for the preferred alternative is $19,190,000.

8.0 FINAL DESIGN – ISSUES AND RECOMMENDATIONS

The recommended drainage system alternative is Alternative 7 which is the combination of Detention Basin Option 7, Collection System Option 3, and Outfall System Option 5.

Currently a 72" pipe is proposed along the Elliott Road alignment. It may be feasible to reduce this pipe to 66" in the final design by having a better understanding of the local hydrology and utility conflicts.

The detention basin footprint includes a variable side slope type detention basin. The basin bottom area is big enough to allow various sport fields including soccer, softball, basketball, etc. Depending upon the needs of the communities, the basin footprint can be reshaped to accommodate a combination of sport activities in both basins. At that time, the basins shape can be reconfigured to maintain a kinder and gentler character for these areas. The proposed basin site includes approximately 30% more area than simple basin needs to allow for these considerations.

This report includes only an RGRCP as a choice for the pipe material. There are a number of locations where alternative material types can be explored to reduce the improvement costs.

A potential for fissure activity exists about 1 to 1.5 miles east of the Meridian Road alignment. Although no detailed data is available at the time of this report, the final design should review the best available data and incorporate appropriate measures to address the fissure or subsidence issue. It is possible that cast in place pipe (CIPP) may not be appropriate as an alternate pipe material due to potential subsidence.

9.0 REFERENCES

1. FCDMC, *East Mesa Area Drainage Master Plan – Hydrologic Analysis,* October 1998.

2. Dibble & Associates, *East Mesa Area Drainage Master Plan (FCD #95-32) – Recommended Design Report,* July 1998.

3. Coe & Van Loo Consultants, Inc., *Drainage Design Report for Meridian Pointe – A subdivision in Mesa, Arizona,* September 1998.

4. Wood, Patel & Associates, Inc., *Elliot Road Detention Basins and Outfall Channel (FCD #98-44) – Design Documentation Summary for 100% Plan Submittal,* March 2000.

5. FEMA, *Flood Insurance Study, Maricopa County and Incorporated Areas, Arizona,* 2001.

6. FEMA, *Flood Insurance Study, Pinal County and Incorporated Areas, Arizona,* 1990.

7. Flood Control District of Maricopa County, *Drainage Design Manual for Maricopa County, Arizona; Volume I – Hydrology,* Revised January 1995.

8. Flood Control District of Maricopa County, *Drainage Design Manual for Maricopa County, Arizona; Volume II- Hydraulics,* January 1996.

9. URS, *Meridian Road Access Control and Corridor Improvement Study – Draft Technical Memorandum No. 8: Alternative Development and Evaluation,* June 2004.

TABLE 1

Peak Flow Summary Table

Table 1
Peak Flow (cfs) Summary from HEC-1 Models

Major concentration points/Locations	Hydrograph Name	HEC-1 Model Names									
		FINAL8.DAT	EMADMP98	S60EM_BP.DAT	S60EMAP1.DAT	S60EMAP2.DAT	S60EMAP3.DAT	S60EMAP4.DAT	S60EMAP5.DAT	S60EMAP6.DAT	S60EMAP7.DAT
Model number		1	2	3	4	5	6	7	8	9	10
CAP overchute A	CAP1A	217	217	710	710	710	710	710	710	710	710
CAP overchute B	CAP1B	217	217	710	710	710	710	710	710	710	710
Subbasin 65A	65A	2503	2503	1299	1299	1299	1299	1299	1299	1299	1299
Flow at Meridian Rd. channel (u/s)	C65A1/CBAS1	N/A	N/A	N/A	N/A	N/A	N/A	N/A	104	696	104
Flow at Meridian Rd. channel (d/s)	CHANEL	2618	2618	N/A	1924	1924	1924	1924	1033	1051	1033
Total flow at SDB inlet	SD_TOT	2130	2130	N/A	N/A	N/A	N/A	N/A	1497	1514	1497
By-pass into Siphon Draw Wash (SDW)	DB65A	434	434	N/A	380	405	365	440	200	100	200
Inflow into SDB at SDW	DIDB65	1696	N/A	N/A	1516	1491	1531	1456	N/A	N/A	N/A
Flow from 65A1	DB65A1	N/A	N/A	N/A	480	480	480	480	480	480	480
Total flow into SDB	SD_IN	1696	N/A	N/A	1929	1929	1944	1894	1097	1134	1097
Bleed-off of SDB	SD_BAS	74	N/A	N/A	68	63	82	44	70	64	70
Total flow at SDB outlet	SD_OUT	508	509	N/A	93	468	472	44	270	364	270
Total flow at Mountain Rd.&Elliot Rd.	ET_MTN	N/A	N/A	N/A	470	467	470	44	270	364	270
EA by-pass & storm drain at 104th St	**CP65A**	**538**	**509**	**N/A**	**500**	**495**	**498**	**514**	**462**	**482**	**462**
Release of EA & storm drain	CP65	548	851	1097	508	505	508	523	471	491	471
Crismon Rd by-pass & storm drain	CP66C	956	991	1427	907	904	906	926	863	892	863
W. side of WB in storm drain	RC-WA	973	991	1386	916	913	914	938	866	903	866
Release of WB & storm drain	CP66D	986	1074	1386	916	913	914	938	866	903	866
E. side of Ellsworth Rd in storm drain	66T66D	986	1074	1385	916	913	913	937	866	902	866
At Ellsworth Rd.	C66D	1101	1162	1502	1045	1056	1057	1066	971	1041	971
Box culvert at Ellsworth Rd.	CULVT	1100	1162	1581	1038	1048	1049	1059	977	1034	977
Santan Freeway Channel at Outlet	OUTLET	N/A	1162	1588	1159	1174	1175	1177	1107	1157	1107
2/3 mile S. of Elliot	C70A	1213	1346	1609	1182	1197	1200	1201	1131	1181	1131
Santan Freeway Channel	C76A	1365	1346	1615	1257	1286	1302	1274	1234	1271	1234

Model Explanation

1 FINAL8.DAT = HEC-1 model used for Elliot Basin and Outfall Channel design;
2 EMADMP98 = Peak flows found in the ADMP report for East Mesa, 1998;
3 S60EM_BP.DAT = HEC-1 model for the pre-project condition - Siphon Draw Basin project;
4 S60EMAP1.DAT =HEC-1 model for Alternative 1;
5 S60EMAP2.DAT =HEC-1 model for Alternative 2;
6 S60EMAP3.DAT =HEC-1 model for Alternative 3;
7 S60EMAP4.DAT =HEC-1 model for Alternative 4;
8 S60EMAP5.DAT =HEC-1 model for Alternative 5;
9 S60EMAP6.DAT =HEC-1 model for Alternative 6;
10 S60EMAP7.DAT =HEC-1 model for Alternative 7 (preferred Alternative).

TABLE 2

Drainage System Element Summary Table

Table 2
Siphon Draw Drainage Improvements, System Element Summary

Element ID	Design Components\Parameters	S60EMAP1.DAT	S60EMAP2.DAT	S60EMAP3.DAT	S60EMAP4.DAT	S60EMAP5.DAT	S60EMAP6.DAT	S60EMAP7.DAT
	Model Number	1	2	3	4	5	6	7
A	Siphon Draw Detention Basin	X	X	X	X	X	X	X
B	Guadalupe Detention Basin					X		X
C	CAP North Overchute Detention Basin						X	
D	CAP South Overchute Detention Basin						X	
E	Meridian Road Collection System	X	X	X	X	X	X	X
F	Siphon Draw Basin Bypass Storm Drain			X		X	X	X
G	Elliot Road Storm Drain (upstream)	X		X	X	X	X	X
H	Elliot Road Storm Drain (downstream)	X	X	X	X	X	X	X
I	Siphon Draw Wash (upstream)	X	X		X	X	X	X
J	Siphon Draw Wash (downstream)				X	X	X	X
K	Mountain Road Channel/Pipe	X	X					

Model Explanation

1 S60EMAP1.DAT =HEC-1 model for Alternative 1;
2 S60EMAP2.DAT =HEC-1 model for Alternative 2;
3 S60EMAP3.DAT =HEC-1 model for Alternative 3;
4 S60EMAP4.DAT =HEC-1 model for Alternative 4;
5 S60EMAP5.DAT =HEC-1 model for Alternative 5;
6 S60EMAP6.DAT =HEC-1 model for Alternative 6;
7 S60EMAP7.DAT =HEC-1 model for Alternative 7.

TABLE 3

Drainage Element Preliminary Geometric Data

Table 3A
Detention Basin Options

Basin Option Name	Design WSEL	Design Bottom	Flood Depth	Dike Condition	Basin Length	Basin Width	Basin Cut Area	Total Area*	Storage Volume	Cut Volume	
	(ft)	(ft)	(ft)		(ft)	(ft)	(Acre)	(Acre)	(Ac-Ft)	(CY)	(Ac-Ft)
1	1494	1487	7	No	1819	910	29	38	160	381,000	236
2	1496	1491	5	Yes	2066	1033	38	49	160	331,000	205
3	1496	1487	9	Yes	1589	795	23	29	160	281,000	174
4	1494	1491	3	No	2689	1345	64	83	160	655,000	406
5a	1496	1490	6	Yes	1446	723	18	24	80	211,000	131
5b	1520	1510	10	No	1252	626	14	18	90	205,000	127
6a	1496	1490	6	Yes	1534	767	21	27	90	244,000	151
6b	1568	1562	6	No	1022	511	9	12	40	81,000	50
6c	1568	1562	6	No	1022	511	9	12	40	81,000	50
7a	1495.5	1487	8.5	Yes	750	1110	15	19	80	182,000	113
7b	1520	1510	10	No	1280	650	15	19	90	205,000	127

* -- Total area includes about 30% additional land for K & G purpose.

Table 3B
Collection System Options

Element (option)	Material Type	Bottom Width	Slope	Side Slope H:V	Flow Depth	Velocity	Channel Depth	Length	Channel Top Width	Easmt. Width Required	Concrete Volume	Excavation Required	Area Required
	(ft)	(ft)	(ft/ft)		(ft)	(fps)	(ft)	(ft)	(ft)	(ft)	(CY)	(CY)	(acre)
1 to 4	Concrete	35	0.0046	2	3.1	14.8	5.1	7,500	55	100	8,307	72,340	17.3
5	Concrete	8	0.0046	2	3.9	13.9	6.0	1,700	32	77	1,160	8,715	3.0
5	Concrete	6	0.0046	2	3.9	13.5	6.0	3,300	30	75	2,129	15,329	5.7
5 (pipe)	RGRCP	Dia.=78"	-	-	-	-	-	2,500	-	-	-	-	-
6	Concrete	8	0.0046	2	3.9	13.9	6.0	1,700	32	77	1,160	8,715	3.0
6	Concrete	6	0.0046	2	3.9	13.5	6.0	3,500	30	75	2,258	16,258	6.0
6 (pipe)	RGRCP	Dia.=102"	-	-	-	-	-	2,500	-	-	-	-	-
7 (channel)	Concrete	15	0.0046	2	3.0	13.9	5.0	1,700	35	80	1,239	9,110	3.1
7 (channel)	Concrete	15	0.0046	2	3.4	14.5	5.5	2,200	37	82	1,695	13,347	4.1
7 (pipe)	RGRCP	Dia.=36"	-	-	-	-	-	600	-	-	-	-	-
7 (pipe)	RGRCP	Dia.=42"	-	-	-	-	-	450	-	-	-	-	-
7 (pipe)	RGRCP	Dia.=60"	-	-	-	-	-	1,150	-	-	-	-	-
7 (pipe)	RGRCP	Dia.=102"	-	-	-	-	-	1,200	-	-	-	-	-
7 (pipe)	RGRCP	Dia.=72"	-	-	-	-	-	1,065	-	-	-	-	-
1 to 4	Earth	110	0.0011	4	4.0	3.8	6.0	7,500	158	203	-	223,333	35.0
7 (pipe)	RGRCP	Dia.=36"	-	-	-	-	-	600	-	-	-	-	-
7 (pipe)	RGRCP	Dia.=42"	-	-	-	-	-	450	-	-	-	-	-
7 (pipe)	RGRCP	Dia.=60"	-	-	-	-	-	1,150	-	-	-	-	-
7 (pipe)	RGRCP	Dia.=102"	-	-	-	-	-	1,200	-	-	-	-	-
7 (pipe)	RGRCP	Dia.=72"	-	-	-	-	-	1,065	-	-	-	-	-

Table 3C
Outfall System Options

Element (option)	Diameter	Slope	Length
	(in)	(ft/ft)	(ft)
K(1-2)	b=50 ft	B =100 ft	L=1350 ft
F(1,2,4)	0	-	-
F(3)	78	0.004	950
F(5-7)	72	0.004	950
G(1,4)	42	0.0062	3250
G(2)	0	-	-
G(3)	78	0.0062	3250
G(5-7)	72	0.0062	3250
H(1-3)	78	0.0073	4800
H(4)	42	0.0073	4800
H(5-7)	72	0.0073	4800

Costs for Collection System Options 1 throurh 4

Material	Cost Conc./Ex./Land
Concrete Channel	$4,737,752
Earthen Channel	$5,327,179

TABLE 4

Cost Summary Table

Siphon Draw Drainage Improvements
Flood Control District of Maricopa County
FCD 2003 C019

August 5, 2004
W/P # 031902

TABLE 4 COST SUMMARY (a)

(Estimate of Probable Cost Based on Concept Analysis, Certain Common Items to All Options Are Excluded from This Estimate)

OPTION	PINAL COUNTY			MARICOPA COUNTY
	COLLECTION ELEMENTS	BASIN LAND ACQUISITION	TOTAL	OUTFALL SYSTEM
ADMP	**$6,450,000**	**$5,494,000**	**$11,944,000**	**$2,903,000**
1	$9,801,000	$6,083,000	$15,884,000	$2,899,000
2	$9,778,000	$7,293,000	$17,071,000	$2,236,000
3	$8,629,000	$5,093,000	$13,722,000	$3,956,000
4	$13,901,000	$11,033,000	$24,934,000	$1,713,000
5	$8,743,000	$5,577,000	$14,320,000	$3,534,000
6	$9,710,000	$6,600,000	$16,310,000	
7	$8,650,000	$4,972,000	$13,622,000	

DRAFT

ADMP DESIGN (b)

TOTAL COST=	**$11,944,000**	(Pinal County Portion)
	$2,903,000	(Maricopa County Portion)
	$14,847,000	

PREFERRED DESIGN (a)

TOTAL COST=	**$13,622,000**	(Pinal County Portion)
	$3,534,000	(Maricopa County Portion)
	$17,156,000	

(a) These costs are updated for the year 2004 dollars;
(b) These costs are based on ADMP unit prices.

TABLE 5

Probable Cost for Preferred Alternative

TABLE 5
Preliminary Opinion of Probable Cost for Preferred Alternative

Siphon Draw Basin Preferred Alternative
Flood Control District of Maricopa County
FCD 2003 C019

August 5, 2004
W/P # 031902

MARICOPA COUNTY
MAJOR DRAINAGE ELEMENTS

ITEM	DESCRIPTION	UNIT PRICE	UNIT	QUANTITY	AMOUNT
1	Remove Drop Inlet	$5,000	EA	1	$5,000
2	Inlet Modification	$3,500	EA	1	$3,500
3	72" RGRCP Storm Drain	$240	LF	8,282	$1,987,632
4	Manhole	$6,000	EA	16	$96,000
		MAJOR DRAINAGE ELEMENTS SUBTOTAL			$2,092,132
		CONTINGENCIES:			
		Construction		15%	$313,820
		Design & Field Engineering		15%	$360,893
		Change Orders		5%	$120,298
		MAJOR DRAINAGE ELEMENTS TOTAL			**$2,887,142**
		MARICOPA COUNTY TOTAL			**$2,887,142**

DRAFT

Notes:

1. Construction Contingencies @ 15% of the Total Construction Cost
2. Design and Field Engineering Costs @ 15% of the sum of Total Construction Cost and Construction Contingencies
3. Change Orders @ 5% of the sum of Total Construction Cost and Construction Contingencies

TABLE 5
Preliminary Opinion of Probable Cost for Preferred Alternative

PINAL COUNTY

MAJOR DRAINAGE ELEMENTS

ITEM	DESCRIPTION	UNIT PRICE	UNIT	QUANTITY	AMOUNT
1	Remove 1-3'x10' Box Culvert	$75	LF	85	$6,375
2	Modified Box Culvert Inlet and Emergency Outfall	$3,000	EA	1	$3,000
3	2-10'x4' Box Culvert Extension	$630	LF	100	$63,000
4	Concrete Weir	$80,000	EA	2	$160,000
5	102" RGRCP Storm Drain	$385	LF	1,200	$462,000
6	72" RGRCP Storm Drain	$240	LF	1,155	$277,200
7	60" RGRCP Storm Drain	$200	LF	1,150	$230,000
8	42" RGRCP Storm Drain	$125	LF	600	$75,000
9	36" RGRCP Storm Drain	$100	LF	780	$78,000
10	Manhole	$6,000	EA	10	$60,000
11	3-10'x4' Box Culvert	$900	LF	50	$45,000
12	102" Outlet Headwall	$9,000	EA	1	$9,000
13	72" Inlet Headwall	$5,000	EA	1	$5,000
14	42" Inlet Headwall	$2,000	EA	1	$2,000
15	36" Inlet Headwall	$1,500	EA	2	$3,000
16	Area Drain Inlets	$4,000	EA	4	$16,000
17	Riprap in Basin Bottom at Weir	$40	CY	330	$13,200
18	Concrete Trapezoidal Channel	$6	SF	165,050	$990,300
19	Guadalupe Basin Concrete Interceptor Channel	$6	SF	29,400	$176,400
20	Siphon Draw Basin Concrete Interceptor Channel	$6	SF	16,650	$99,900
21	Channel Excavation	$6	CY	24,569	$147,411
22	Retention Basin Excavation	$6	CY	438,000	$2,628,000
23	Basin Operations and Maintenance Road	$1	SF	107,200	$107,200
24	Basin Berm Construction	$6	CY	19,100	$114,600
25	Basin Landscaping	$0.50	SF	1,717,964	$858,982
26	Channel Landscaping	$0.50	SF	169,100	$84,550
27	42" Flapgate	$2,500	EA	1	$2,500
28	36" Flapgate	$2,000	EA	1	$2,000
		MAJOR DRAINAGE ELEMENTS SUBTOTAL			$6,719,618
		CONTINGENCIES:			
		Construction		15%	$1,007,943
		Design & Field Engineering		15%	$1,159,134
		Change Orders		5%	$386,378
		MAJOR DRAINAGE ELEMENTS TOTAL			**$9,273,073**

DRAFT

Notes:

1. Construction Contingencies @ 15% of the Total Construction Cost
2. Design and Field Engineering Costs @ 15% of the sum of Total Construction Cost and Construction Contingencies
3. Change Orders @ 5% of the sum of Total Construction Cost and Construction Contingencies

TABLE 5
Preliminary Opinion of Probable Cost for Preferred Alternative

BASIN LAND ACQUISITION (PINAL COUNTY):

ITEM	DESCRIPTION	UNIT PRICE	UNIT	QUANTITY	AMOUNT
1	Siphon Draw Basin Land Acquisition	$100,000	AC	19.1	$1,910,000
2	Guadalupe Basin Land Acquisition	$100,000	AC	22.3	$2,230,000
3	Channel/Pipe Land Acquisition	$100,000	AC	9.50	$950,000
4	Meridian Road Right-of-Way Acquisition	$100,000	AC	13	$1,300,000
				SUBTOTAL LAND ACQUISITION	$6,390,000
		CONTINGENCIES :		10%	$639,000
				LAND ACQUISITION TOTAL	**$7,029,000**
				PINAL COUNTY TOTAL	**$16,302,073**
				PROJECT TOTAL	**$19,189,215**

DRAFT

Notes:

1. Construction Contingencies @ 15% of the Total Construction Cost
2. Design and Field Engineering Costs @ 15% of the sum of Total Construction Cost and Construction Contingencies
3. Change Orders @ 5% of the sum of Total Construction Cost and Construction Contingencies

APPENDIX A

HEC-1 Model Input and Output Files for Preferred Alternative

```
****************************************
                                       *
  FLOOD HYDROGRAPH PACKAGE  (HEC-1)    *
            JUN   1998                 *
          VERSION 4.1                  *
                                       *
 RUN DATE   05AUG04  TIME  11:32:14    *
                                       *
****************************************
```

```
****************************************
*                                      *
*    U.S. ARMY CORPS OF ENGINEERS      *
*    HYDROLOGIC ENGINEERING CENTER     *
*          609 SECOND STREET           *
*       DAVIS, CALIFORNIA 95616        *
*           (916) 756-1104             *
*                                      *
****************************************
```

```
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

HEC-1 INPUT PAGE 1

```
LINE          ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10

   1          ID    Option 7 - Preferred Alternative
   2          ID    This is the proposed future conditions HEC-1 model of 100-yr 24-hr storm
   3          ID    for the areas of south US60 for the Siphon Draw Basin project.
   4          ID    Model Name: S60EMAP7.DAT, modified by Wood/patel, July 2004.
   5          ID    Original Model: WS4-SEMR.DAT; Model for North US 60: N60EM.DAT(WS2-NEM.DAT)
   6          ID    Major changes including 1) flow from subbasin 65A is divided into 5 smaller
   7          ID    subbasins by diversion; 2) Guadalupe Basin is added; 3) both Siphon Draw
   8          ID    Wash and the Elliot Road storm drain bypass flow to the west.
   9          ID
  10          ID    ***********************************************************************
  11          ID
  12          ID    MODEL REVISED 9/12/02 TO CHANGE ZW CARD TO ZR CARD AT HYDROGRAPH CAP1B (CWR)
  13          ID
  14          ID    ID  Kirkham Michael:
  15          ID    Last Revised Date:  5/14/02
  16          ID    Filename:  WS4-SEM.DAT
  17          ID
  18          ID    Comments Dated 5/14/02 (CJ)
  19          ID
  20          ID    This model should be used for the Rittenhouse and Chandler Heights Basin
  21          ID    Design Project - 30% Design Analyses.
  22          ID
  23          ID    This model is one of several models that represent the EMF watershed.
  24          ID    This model covers the Southeast Mesa Area and should reference as a DSS
  25          ID    the watershed model for the Northeast Mesa Area (Filename WS2-NEM.DAT).
  26          ID
  27          ID    This model is necessary to determine the input hydrographs for the
  28          ID    Rittenhouse Basin Design HEC-RAS Unsteady State analysis.  To develop
  29          ID    the necessary input hydrographs the following models should be run in order.
  30          ID    Because the files utilize a TAPE21 file to export import hydrographs
  31          ID    between models, prior to running the FIRST model (WS1-NWM.DAT) any existing
  32          ID    TAPE21 file in the directory should be deleted.  The run procedure order is:
  33          ID
  34          ID         1)  WS1-NWM.DAT
  35          ID         2)  WS2-NEM.DAT
  36          ID         3)  WS3-QCSW.DAT
  37          ID         4)  WS4-SEM.DAT (referencing WS2-NEM.DSS for the DSS file)
  38          ID         5)  RT1-BASE.DAT
  39          ID
  40          ID    The necessary input hydrographs for the Rittenhouse Basin analysis
  41          ID    are determined in RT1-BASE.  In that output file, the hydrograph at
  42          ID    RWFLD1 should be exported and used as the input hydrograph at the
  43          ID    EMF Reach 4 Cross Section 17.082.  And the hydrograph at RITTEN should
  44          ID    be exported and used as the input hydrograph for the Rittenhouse Main
  45          ID    Channel at Cross Section 820.00
  46          ID
  47          ID
  48          ID    ***************************************************************************
  49          ID    **** NOTE BY PRIMATECH ENGINEERS:                                      ****
  50          ID    **** DATE: 06/12/2001                                                  ****
  51          ID    **** THE NEW FILE NAME IS: SEBTALT2.DAT                                ****
  52          ID    **** THE FILE WAS RENAMED AS <<RTBTALT2.DAT>> FOR THE EAST MARICOPA    ****
  53          ID    **** FLOODWAY CAPACITY MITIGATION PROJECT, BY FLOOD CONTROL DISTRICT OF ****
  54          ID    **** MARICOPA COUNTY.                                                  ****
  55          ID    **** THE FILE WAS RENAMED <<RTBTALT3.DAT>> AND UPDATED USING GREEN AND ****
```

HEC-1 INPUT PAGE 2

```
LINE          ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10
```

```
 56          ID    **** AMPT FUTURE CONDITIONS FOR BASINS 258 TO 268.                    ****
 57          ID    ***********************************************************************
 58          ID
 59          ID
 60          ID
 61          ID     THIS MODEL WAS ORIGINALLY MIDDOUT.DAT
 62          ID     IT HAS BEEN MODIFIED BY CPE (7/2000)
 63          ID     FOR ALTERNATIVE 2 FOR THE EAST MARICOPA FLOOWAY
 64          ID     CAPACITY MITIGATION AND MULTI-USE CORRIDOR STUDY
 65          ID     TO ROUTE BOTH THE POWERLINE FLOOWAY
 66          ID     AND THE SANTAN FREEWAY CHANNEL INTO THE RAY BASIN PRIOR THEIR OUTFALL
 67          ID     INTO THE EMF
 68          ID
 69          ID    ***************************************************************
 70          ID
 71          ID          Model files changed by Collins/Pina Engineering
 72          ID          to reflect multi-use design concepts (recreation
 73          ID          and environment) proposed throughout the entire
 74          ID          EMF Corridor.    July 2000
 75          ID
 76          ID
 77          ID     VERSION 8.06  CPE 7/31/00
 78          ID
 79          ID   ***********************************************************************
 80          ID
 81          ID
 82          ID   ***********************************************************************
 83          ID    FILENAME: MIDDOUT.DAT
 84          ID
 85          ID    ALL CIP INFRASTRUCTURE IS IN PLACE, FUTURE CONDITIONS LANDUSE IS IN PLACE
 86          ID    FLOW IS ROUTED UP ELLSWORTH ROAD IN A EARTH LINED CHANNEL
 87          ID
 88          ID   ***********************************************************************
 89          ID    PRODUCED BY DIBBLE AND ASSOCIATES AND HOSKIN ENGINEERING CONSULTANTS.
 90          ID    File Name: Final8.Dat
 91          ID    Revised - Jan. 2000 by SZ (Wood/Patel) From Final7.dat - new Z-V & Sideweir
 92          ID    Revised - Jan. 2000 by SZ (Wood/Patel) from Final6.dat - 60% review comments
 93          ID    Revised - Dec. 1999 by SZ (Wood/Patel) from Final5.dat
 94          ID    Revised - Dec. 1999 by SZ (Wood/Patel) from Final4.dat
 95          ID    Revised - Nov. 1999 by SZ (Wood/Patel) from Final3.dat
 96          ID    Revised - June 1999 by SZ (Wood/Patel) for Final Model from Opt1.dat.
 97          ID    Revised - May 1999 by SZ (Wood/Patel) for Option 1, Based on Model SDIB.DAT
 98          ID    REVISED - MAY, 1999 BY VAS TO INCORPORATE INCREASE OF SUBBASIN RETENTION AND
 99          ID              REVISIONS TO THE REGIONAL DETENTION BASIN STORAGE
100          ID    REVISED - FEB, 1999 BY VALERIE SWICK, FCD OF MARICOPA COUNTY
101          ID    REVISED - MAY, 1998 BY D&A
102          ID
103          ID    REVISED BY VALERIE SWICK, FEB. 26, 1998
104          ID
105          ID    FLOWS FROM DETENTION BASIN LOCATED AT NE CORNER OF ELLIOT AND ELLSWORTH ROADS
106          ID    IS ROUTED TO THE SOUTHWEST BY SIPHON DRAW TO SUBBASIN 70A. FROM THERE THEY
107          ID    WILL BE ROUTED BY A CHANNEL TO THE EMF. FLOWS FROM SUBBASINS ADJACENT TO
108          ID    SANTAN FREEWAY ALIGNMENT WILL BE ROUTED SOUTH TO SUBBASIN 70A WHERE THEY WILL
109          ID    BE COMBINED WITH FLOW IN SIPHON DRAW.
110          ID
```



```
LINE         ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10

111          ID    EAST MESA AREA DRAINAGE MASTER PLAN
112          ID    AREA SOUTH OF SUPERSTITION (U.S. HWY 60)
113          ID    AUGUST 1997
114          ID    SOUTHEAST MESA HIGH RESOLUTION MODEL
115          ID
116          ID    ***********FUTURE CONDITION MODEL OF THE WATERSHED************************
117          ID
118          ID   ************ATTENTION*************************************************************
119          ID     SUBBASINS 75, 79A, 79B, 78E,  LANDUSES WERE NOT
120          ID     CHANGED BECAUSE IT WAS FELT THAT THEIR FUTURE CONDITIONS LANDUSES WOULD BE
121          ID     SIMILAR TO THE EXISTING CONDITIONS LANDUSES.
122          ID     RETENTION VOLUMES WILL ALSO NOT BE UTILIZED FOR SUBBASINS 75, 79A, 79B, 78E
123          ID     SOME QUEEN CREEK SUBBASINS WILL ALSO NOT HAVE RETENTION VOLUMES, EITHER
124          ID     BECAUSE THEY LIE IN PINAL COUNTY AND WE DONT KNOW PINAL COUNTIES PLANS OR
125          ID     THEY LIE IN THE SANTAN MOUNTAINS AND WON'T GET DEVELOPED
126          ID     WILLIAMS GATEWAY AIRPORT (SUBBASINS 80A, 80B, 81A, AND 81B) ARE MODELED AS
127          ID     FUTURE CONDITIONS AND HAVE RETENTION VOLUMES FOR THE 100YR 2HR STORM
128          ID   ***********************************************************************
129          ID    FILENAME:  SDIBB.DAT
130          ID
131          ID    THIS MODEL REPRESENTS THE FUTURE CONDITION OF THE WATERSHED.
132          ID    TOTAL DRAINAGE AREA IS APPROXIMATELY 213 SQ. MI.
133          ID    THIS MODEL USES A Kn VALUE OF 0.09 FOR DESERT LAND USE DUE TO SHEET FLOW
134          ID    CONDITIONS.
135          ID
136          ID    100-YEAR 24-HOUR FREQUENCY
137          ID    AREAL REDUCTIONS FROM FCD HYDROLOGY MANUAL
138          ID    THIS MODEL INCLUDES INFLOW FROM NORTH OF THE SUPERSTITION FREEWAY
139          ID    AND EAST OF THE CAP
140          ID
141          ID    DATA FROM THE QUEEN CREEK ADMS HAS BEEN ADDED TO CALCULATE FLOWS INTO THE
142          ID    EMF.   MUSKINGUM ROUTING NSTEPS WERE ADJUSTED TO BE WITHIN THE SUGGESTED
143          ID    RANGE.
144          ID
145          ID    METHODOLOGY
146          ID    THE US CORPS OF ENGINEERS FLOOD HYDROLOGY MODEL HEC-1 DATED SEP1990 VER 4.0
```

```
147          ID   SCS TYPE II RAINFALL DISTRIBUTION
148          ID   S-GRAPH HYDROGRAPH
149          ID   GREEN AND AMPT INFILTRATION EQUATION USED FOR CALCULATING LOSSES
150          ID   NORMAL DEPTH STORAGE CHANNEL ROUTING
151          ID   APPROXIMATE DIRECTION, LOCATION, AND LENGTH OF THE WASHES HAVE BEEN
152          ID   EVALUATED BASED ON FIELD INVESTIGATION, USGS MAPS, LANDIS AERIAL SURVEYS
153          ID   DATED 1994
154          ID   THE NOAA TECHNICAL MEMORANDUM NOAA ATLAS 2 DEPTH AREA RATIOS
155          ID
156          ID   ORIGINAL STUDY PERFORMED BY LISA C. YOUNG AND AFSHIN AHOURAIYAN, UPDATED BY
157          ID   DAVID DEGERNESS (OCT-DEC, 1996). REVIEWED BY VALERIE A. SWICK
158          ID   AND AMIR MOTAMEDI OF THE FLOOD CONTROL DISTRICT
159          ID   HYDROLOGY BRANCH ENGINEERING DIVISION, FLOOD CONTROL
160          ID   DISTRICT OF MARICOPA COUNTY, DECEMBER - JULY 1995.
161          ID
162          ID   ASSUMED VELOCITY OF 1 FT/SEC FOR SHEET FLOW, 2-3 FT/SEC FOR WASH/NATURAL
163          ID   CHANNEL, 3 FT/SEC FOR ROAD AND GRASS CHANNEL, 10FT/SEC FOR CONCRETE CHANNEL
164          ID
165          ID   VELOCITIES FOR ADMP IMPROVEMENT CHANNELS FROM DIBBLE AND ASSOCIATES
                                        HEC-1 INPUT                                          PAGE  4

LINE         ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10

166          ID   SUGGESTED ALTERNATIVES (JULY 1, 1997)
167          ID
168          ID   ***********************************************************************
169          ID   **** THE FOLLOWING NOTE WAS ADDED BY PRIMATECH ENGINEERS ON 06-12-2001 ****
170          ID   ***********************************************************************
171          ID   NOTE: MUST USE NEBUILD.DSS AS THE DSS FILE TO IMPORT FLOWS ACROSS THE
172          ID         SUPERSTITION FREEWAY.
173          ID   ***********************************************************************
174          ID
175          ID
176          ID   NOTE: MUST USE NDIBF.DSS AS THE DSS FILE TO IMPORT FLOWS ACROSS THE
177          ID         SUPERSTITION FREEWAY.
178          ID
179          ID   DDM MCUHP2 SE MESA ADMP - SOUTH OF SUPERSTITION FWY, FUTURE CONDITIONS
             *DIAGRAM
180          IT       5  1APR97    0000    1000
181          IO       5
182          IN      15
183          JD    3.60    0.01
184          PC    .000    .002    .005    .008    .011    .014    .017    .020    .023    .026
185          PC    .029    .032    .035    .038    .041    .044    .048    .052    .056    .060
186          PC    .064    .068    .072    .076    .080    .085    .090    .095    .100    .105
187          PC    .110    .115    .120    .126    .133    .140    .147    .155    .163    .172
188          PC    .181    .191    .203    .218    .236    .257    .283    .387    .663    .707
189          PC    .735    .758    .776    .791    .804    .815    .825    .834    .842    .849
190          PC    .856    .863    .869    .875    .881    .887    .893    .898    .903    .908
191          PC    .913    .918    .922    .926    .930    .934    .938    .942    .946    .950
192          PC    .953    .956    .959    .962    .965    .968    .971    .974    .977    .980
193          PC    .983    .986    .989    .992    .995    .998   1.000
194          JD    3.58     1.0
195          JD    3.49     5.0
196          JD    3.38    10.0
197          JD    3.24    30.0
198          JD    3.10    60.0
199          JD    3.05    90.0
200          JD    3.00   120.0
201          JD    2.97   150.0
             *
             * DDM   ***** Preserved *****

202          KK    SOSS
203          KM   INFLOW FROM SOSSAMAN BASIN VIA SOSSAMAN CHANNEL
204          KM   QI CARDS ARE BASED ON THE PEAK OF 1800CFS TO SOSSAMAN CHANNEL
205          BA   12.50
206          ZR  =QI A=SOSSAMAN DRAIN B=AT SUPERSTITION C=FLOW E=5MIN F=100YR
             *
             * DDM   ***** Preserved *****

207          KK   RSOSS
208          KM   ROUTE FLOWS VIA SOSSAMAN CHANNEL TO BASELINE ROAD
209          RS       1    FLOW      -1
210          RC    .030    .025    .030    3500    .005
211          RX       0       5      10      35      75     110     115     120
212          RY      10      10      10       4       4      10      10      10
             *
             * DDM   ***** Updated *****
                                        HEC-1 INPUT                                          PAGE  5

LINE         ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10

213          KK     59A
214          KM   BASIN 59A
215          KM    THE FOLLOWING PARAMETERS WERE PROVIDED FOR THIS BASIN
216          KM    L=        .9  Lca=        .3   S=   34.9  Kn= .070  LAG=  29.7
217          KM    PHOENIX VALLEY S-GRAPH WAS USED FOR THIS BASIN
218          BA     .26
219          LG     .23     .25    4.55     .42   33.00
220          UI     30.     77.    144.    186.    246.    364.    293.    226.    172.    123.
221          UI     64.     48.     30.     15.      9.      9.      9.      0.      0.      0.
222          UI      0.      0.      0.      0.      0.      0.      0.      0.      0.      0.
             *
```

```
223          KK    R59A
224          KM   RETAIN THE 100 YEAR 2 HOUR RUNOFF VOLUME
225          DT    D59A       2
226          DI       0   10000
227          DQ       0   10000
             *

228          KK    C59A
229          KM    SOSSAMAN DRAIN AT BASELINE ROAD
230          HC       2
             *

231          KK  59A59B
232          KM   ROUTE S59A TO 59B VIA SOSSAMAN CHANNEL
233          KM   BLOCK WALL ON LEFT BANK, SOSSAMAN ROAD ON RIGHT BANK
234          RS       4    FLOW      -1
235          RC    .025    .018    .013    6500   .0015
236          RX       0       3      13      38      78     103     128     203
237          RY      16      10      10       0       0      10       8      10
             *
             * DDM   ***** Updated *****

238          KK     59B
239          KM   BASIN 59B
240          KM    THE FOLLOWING PARAMETERS WERE PROVIDED FOR THIS BASIN
241          KM    L=      1.2  Lca=       .7   S=   33.9  Kn= .087  LAG=  58.3
242          KM    PHOENIX VALLEY S-GRAPH WAS USED FOR THIS BASIN
243          BA     .94
244          LG     .22     .24    4.65     .41   24.00
245          UI     54.     54.     93.    193.    244.    284.    318.    361.    415.    501.
246          UI    653.    666.    546.    473.    422.    364.    319.    273.    233.    172.
247          UI    110.     94.     89.     68.     54.     54.     19.     17.     17.     17.
248          UI     17.     17.     17.     17.      0.      0.      0.      0.      0.      0.
249          UI      0.      0.      0.      0.      0.      0.      0.      0.      0.      0.
             *
             * DDM   ***** Preserved *****
                                        HEC-1 INPUT                                          PAGE  6

LINE         ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10

250          KK    R59B
251          KM   RETAIN 100 YR 2 HR RUNOFF VOLUME
252          DT    D59B      63
253          DI       0   10000
254          DQ       0   10000
             *
             * DDM   ***** Preserved *****

255          KK    C59B
256          KM   SOSSAMAN CHANNEL AT GUADALUPE ROAD
257          HC       2
             *
             * DDM   ***** Preserved *****

258          KK  59BT60
259          KM     ROUTE 59B TO 60 GUADALUPE CHANNEL.  Assumed v=5ft/sec for NSTP calculation
260          RS       4    FLOW      -1
261          RC     .02    .013     .02    5500   .0005
262          RX       0     518     522     522     560     560     580    2580
263          RY     8.5     8.5     8.5       0       0       8       7       6
             *
             * DDM   ***** Updated *****

264          KK      60
265          KM   BASIN 60
266          KM    THE FOLLOWING PARAMETERS WERE PROVIDED FOR THIS BASIN
267          KM    L=      2.4  Lca=      1.4   S=   31.8  Kn= .087  LAG= 102.0
268          KM    PHOENIX VALLEY S-GRAPH WAS USED FOR THIS BASIN
269          BA    2.30
270          LG     .18     .24    4.65     .43   35.00
271          UI     76.     76.     76.     76.    130.    250.    286.    330.    364.    395.
272          UI    422.    452.    484.    522.    571.    607.    689.    820.    915.   1008.
273          UI    885.    793.    723.    669.    626.    591.    536.    496.    459.    424.
274          UI    387.    362.    324.    276.    219.    169.    134.    134.    126.    125.
275          UI    121.     76.     76.     76.     76.     56.     23.     23.     23.     23.
276          UI     23.     23.     23.     23.     23.     23.     23.     23.     23.     23.
277          UI      0.      0.      0.      0.      0.      0.      0.      0.      0.      0.
278          UI      0.      0.      0.      0.      0.      0.      0.      0.      0.      0.
             *
             * DDM   ***** Preserved *****

279          KK     R60
280          KM   RETAIN 100 YR 2 HR RUNOFF VOLUME
281          DT     D60     170
282          DI       0   10000
283          DQ       0   10000
             *
             * DDM   ***** Preserved *****
                                        HEC-1 INPUT                                          PAGE  7

LINE         ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10

284          KK  EMFGUA
285          KM     COMBINE S59 AND S60 AT EMF, GUADALUPE ROAD
```

```
            * KO                                    21
286         HC       2
            *
            * DDM   ***** Preserved *****

287         KK  GUATEL
288         KM   ROUTE EMF FLOW FROM GUADALUPE ROAD TO ELLIOT ROAD
289         RS       3    FLOW      -1
290         RC     .03    .022     .03    6000   .0003
291         RX       0     500     520     553     693     726     740     742
292         RY      14      12      11       0       0      11      11      12
            *
            * DDM   ***** Updated *****

293         KK      64
294         KM   BASIN 64
295         KM    THE FOLLOWING PARAMETERS WERE PROVIDED FOR THIS BASIN
296         KM    L=       1.2  Lca=        .6   S=   25.4  Kn= .051  LAG=  34.4
297         KM    PHOENIX VALLEY S-GRAPH WAS USED FOR THIS BASIN
298         BA     .81
299         LG     .18     .25    4.70     .41   54.00
300         UI     79.    155.    338.    438.    543.    709.    988.    778.    624.    493.
301         UI    388.    253.    139.    120.     79.     45.     24.     24.     24.     24.
302         UI      0.      0.      0.      0.      0.      0.      0.      0.      0.      0.
303         UI      0.      0.      0.      0.      0.      0.      0.      0.      0.      0.
            *
            * DDM   ***** Preserved *****

304         KK     R64
305         KM   R64 IS WHAT REMAINS AFTER THE DIVERSION OF FLOW UP TO 67 AC-FT. THIS IS SENT
306         KM   TO TAPE 21 FOR RECALL INTO FCD'S EMF MODELS.  KK BLOCK THERE MUST BE UPDATED
307         KM   TO REFLECT THE CHANGE OF WHAT GETS SENT TO THE TAPE 21.
308         KM   RETAIN 100 YR 2 HR RUNOFF VOLUME
            * KO                                    21
309         DT     D64      67
310         DI       0   10000
311         DQ       0   10000
            *
            * DDM   ***** Preserved *****

312         KK  EMFELL
313         KM     COMBINE EMF FLOW WITH FLOW FROM SUBBASIN 64 AT ELLIOT ROAD
314         HC       2
            *
            * DDM   ***** Preserved *****

315         KK  ELTWAR
316         KM   ROUTE EMF FLOW AT ELLIOT ROAD TO WARNER ROAD VIA THE EMF
317         RS       2    FLOW      -1
318         RC     .03    .022     .03    5500   .0003
319         RX       0     500     520     553     693     726     740     742
320         RY      14      12      11       0       0      11      11      12
            *
```



```
LINE        ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10

321         KK     62B
322         KM   BASIN 62B
323         KM    THE FOLLOWING PARAMETERS WERE PROVIDED FOR THIS BASIN
324         KM    L=        .6  Lca=        .3   S=   47.5  Kn= .021  LAG=   8.0
325         KM    PHOENIX VALLEY S-GRAPH WAS USED FOR THIS BASIN
326         BA     .23
327         LG     .11     .25    4.65     .46   78.00
328         UI    334.    940.    431.     83.      0.      0.      0.      0.      0.      0.
329         UI      0.      0.      0.      0.      0.      0.      0.      0.      0.      0.
            *

330         KK    R62B
331         KM   RETAIN 100 YR 2 HR RUNOFF VOLUME
332         DT    D62B      19
333         DI       0   10000
334         DQ       0   10000
            *
            * DDM   ***** Preserved *****

335         KK   62BTD
336         KM   ROUTE 62B TO 62D VIA HAWES ROAD
337         RS       6    FLOW      -1
338         RC    .045     .04    .045    5280   .0041
339         RX       0     100     125     127     177     179     224     324
340         RY       3       2    1.50       0       0     1.5       2       3
            *
            * DDM   ***** Updated *****

341         KK     62D
342         KM   BASIN 62D
343         KM    THE FOLLOWING PARAMETERS WERE PROVIDED FOR THIS BASIN
344         KM    L=        .9  Lca=        .3   S=   30.7  Kn= .045  LAG=  21.3
345         KM    PHOENIX MOUNTAIN S-GRAPH WAS USED FOR THIS BASIN
346         BA     .46
347         LG     .23     .25    4.65     .40   50.00
348         UI     76.    300.    519.    753.    475.    369.    286.    203.    163.    111.
349         UI     85.     63.     47.     36.     26.     14.     14.     14.     14.      0.
350         UI      0.      0.      0.      0.      0.      0.      0.      0.      0.      0.
```

```
351          UI      0.      0.      0.      0.      0.      0.      0.      0.      0.      0.
             *
             * DDM   ***** Preserved *****

352          KK    R62D
353          KM   RETAIN 100 YR 2 HR RUNOFF VOLUME
354          DT    D62D      35
355          DI       0   10000
356          DQ       0   10000
             * DDM   ***** Preserved *****
                                        HEC-1 INPUT                                                PAGE  9

LINE         ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10

357          KK   CP62D
358          KM   COMBINE FLOWS FROM SUBBASINS 62B AND 62D
359          HC       2
             *
             * DDM   ***** Preserved *****

360          KK   62DTF
361          KM   ROUTE 62D TO 62F VIA HAWES ROAD
362          RS       4    FLOW      -1
363          RC    .045    .024    .045    3600   .0033
364          RX       0     500     750     753     793     796    1046    1546
365          RY       3     1.5    1.25       0       0    1.25     1.5       3
             *
             * DDM   ***** Updated *****

366          KK     62F
367          KM   BASIN 62F
368          KM    THE FOLLOWING PARAMETERS WERE PROVIDED FOR THIS BASIN
369          KM    L=       .6  Lca=       .4   S=   31.9  Kn= .042  LAG=  18.1
370          KM    PHOENIX VALLEY S-GRAPH WAS USED FOR THIS BASIN
371          BA     .26
372          LG     .21     .25    4.65     .41   54.00
373          UI     66.    224.    350.    546.    371.    235.     98.     56.     18.     15.
374          UI      0.      0.      0.      0.      0.      0.      0.      0.      0.      0.
375          UI      0.      0.      0.      0.      0.      0.      0.      0.      0.      0.
             *
             * DDM   ***** Preserved *****

376          KK    R62F
377          KM   RETAIN 100 YR 2 HR RUNOFF VOLUME
378          DT    D62F      18
379          DI       0   10000
380          DQ       0   10000
             *
             * DDM   ***** Preserved *****

381          KK   CP62F
382          KM   COMBINE FLOWS FROM 62D AND 62F
383          HC       2
             *
             * DDM   ***** Preserved *****

384          KK   62T63
385          KM   ROUTE CP62F TO SUBBASIN 63 VIA WASH.
386          KM   WASH CROSSES HAWES, NORTH OF ELLIOT
387          RS       7    FLOW      -1
388          RC    .045     .04    .045    6000  0.0055
389          RX       0     500     750     770     780     800    1050    1550
390          RY       5       4       3       0       0       3       4       5
             *
             * DDM   ***** Inserted *****
1                                       HEC-1 INPUT                                                PAGE 10

LINE         ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10

391          KK      63
392          KM   BASIN 63
393          KM    THE FOLLOWING PARAMETERS WERE PROVIDED FOR THIS BASIN
394          KM    L=      1.4  Lca=       .7   S=   28.2  Kn= .035  LAG=  26.8
395          KM    PHOENIX VALLEY S-GRAPH WAS USED FOR THIS BASIN
396          BA     .91
397          LG     .18     .25    4.65     .43   55.00
398          UI    114.    346.    595.    780.   1159.   1291.    930.    689.    485.    241.
399          UI    170.    113.     35.     35.     35.     35.      0.      0.      0.      0.
400          UI      0.      0.      0.      0.      0.      0.      0.      0.      0.      0.
             *
             * DDM   ***** Preserved *****

401          KK     R63
402          KM   RETAIN 100 YR 2 HR RUNOFF VOLUME
403          DT     D63      71
404          DI       0   10000
405          DQ       0   10000
             *
             * DDM   ***** Preserved *****

406          KK    CP63
407          KM   COMBINE FLOWS FROM SUBBASIN 63 AND CP62F
408          HC       2
             *
```

```
* DDM   ***** Preserved *****

KK   63T71
KM   ROUTE CP63 TO S71 VIA SHEET FLOW
KM   SOSSAMAN SOUTH OF ELLIOT
RS       6    FLOW      -1
RC    .055    .045    .055    5280   .0005
RX       0    1000    1005    1010    1013    1043    1543    2043
RY       6       5       0       0       3       5       2       5
*
*
* DDM   ***** Updated *****

KK     68B
KM   BASIN 68B
KM    THE FOLLOWING PARAMETERS WERE PROVIDED FOR THIS BASIN
KM    L=        .6  Lca=        .3   S=   32.3  Kn= .020  LAG=   7.7
KM    PHOENIX VALLEY S-GRAPH WAS USED FOR THIS BASIN
BA     .25
LG     .10     .25    5.20     .36   80.00
UI    377.   1018.    412.     72.      0.      0.      0.      0.      0.      0.
UI      0.      0.      0.      0.      0.      0.      0.      0.      0.      0.
*
```

1

HEC-1 INPUT PAGE 11

```
LINE      ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10

KK     R68
KM   RETAIN 100 YR 2 HR RUNOFF VOLUME
DT    D68B      24
DI       0   10000
DQ       0   10000
*

KK  68BT69
KM   ROUTE S68B TO S69 VIA WASH CROSSING HAWES
RS       3    FLOW      -1
RC    .045     .04    .045    2750   .0036
RX       0     500     950    1003    1007    1057    1511    2011
RY       4     3.5       3       0       0       2     2.5       3
*

KK      69
KM   BASIN 69
KM    THE FOLLOWING PARAMETERS WERE PROVIDED FOR THIS BASIN
KM    L=        .7  Lca=        .3   S=   22.4  Kn= .020  LAG=   9.0
KM    PHOENIX VALLEY S-GRAPH WAS USED FOR THIS BASIN
BA     .09
LG     .10     .25    4.70     .45   80.00
UI    104.    320.    213.     54.     11.      0.      0.      0.      0.      0.
UI      0.      0.      0.      0.      0.      0.      0.      0.      0.      0.
*
* DDM   ***** Preserved *****

KK     R69
KM   RETAIN 100 YR 2 HR RUNOFF VOLUME
DT     D69       9
DI       0   10000
DQ       0   10000
*
* DDM   ***** Preserved *****

KK     C69
KM   COMBINE FLOWS FROM SUBBASIN 68B AND 69
HC       2
*
* DDM   ***** Preserved *****

KK   69T71
KM   ROUTE S69 TO S71 VIA WASH AND SHEET FLOW, INCREASE OVERBANK N VALUES
RS       7    FLOW      -1
RC    .055    .045    .055    6000   .0033
RX       0     500    1000    1001    1002    1500    2000    2500
RY       4       3       2       0       0       2       3       4
*
* DDM   ***** Inserted *****
```

1

HEC-1 INPUT PAGE 12

```
LINE      ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10

KK      71
KM   BASIN 71
KM    THE FOLLOWING PARAMETERS WERE PROVIDED FOR THIS BASIN
KM    L=       1.6  Lca=        .8   S=   26.4  Kn= .020  LAG=  16.8
KM    PHOENIX VALLEY S-GRAPH WAS USED FOR THIS BASIN
BA    1.09
LG     .10     .25    4.65     .47   80.00
UI    331.   1085.   1805.   2349.   1459.    780.    329.    144.     67.     67.
UI      0.      0.      0.      0.      0.      0.      0.      0.      0.      0.
UI      0.      0.      0.      0.      0.      0.      0.      0.      0.      0.
*

KK     R71
KM   RETAIN 100 YR 2 HR RUNOFF VOLUME
```

```
471          DT     D71     106
472          DI       0   10000
473          DQ       0   10000
             *
             * DDM   ***** Preserved *****

474          KK     C71
475          KM   original wording "COMBINE S71 WITH S69 AND S68B"
476          KM   was revised by Dibble to be "COMBINE FLOWS FROM S63, S68B, S69 AND S71,
477          KM   WHICH COMBINES HYDROGRAPHS 63T71, 69T71 AND R71"
478          KM   CONCENTRATION POINT IS ALONG SOSSAMAN AT THE MESQUITE ST ALIGNMENT
479          HC       3
             *

480          KK   71T72
481          KM   ROUTE C71 TO S72 VIA DIKE
482          KM    WASH WEST OF INTERSECTION OF SOSSAMAN & WARNER
483          RS       4    FLOW      -1
484          RC    .055    .045    .055    3750   .0037
485          RX       0     500    1000    1007    1017    1025    1530    2030
486          RY       9     8.5       8       0       0       8     8.5       9
             *
             * DDM   ***** Inserted *****

487          KK      72
488          KM   BASIN 72
489          KM    THE FOLLOWING PARAMETERS WERE PROVIDED FOR THIS BASIN
490          KM    L=      1.6  Lca=       .9   S=   13.1  Kn= .020  LAG=  20.3
491          KM    PHOENIX VALLEY S-GRAPH WAS USED FOR THIS BASIN
492          BA     .84
493          LG     .10     .25    5.40     .33   80.00
494          UI    161.    600.    906.   1496.   1347.    912.    566.    247.    153.     50.
495          UI     43.     43.      0.      0.      0.      0.      0.      0.      0.      0.
496          UI      0.      0.      0.      0.      0.      0.      0.      0.      0.      0.
             *
             * DDM   ***** Preserved *****
                                          HEC-1 INPUT                                          PAGE 13
LINE         ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10

497          KK     R72
498          KM   RETAIN 100 YR 2 HR RUNOFF VOLUME
499          DT     D72      83
500          DI       0   10000
501          DQ       0   10000
             *
             * CONCENTRATION POINT ADDED PRIOR TO EMF COMBINE SO THAT FLOWS CAN BE SENT TO
             * TAPE21.

502          KK   CPWAR
             * KO                                    21
503          HC       2
             *
             * DDM   ***** Preserved *****

504          KK  EMFWAR
505          KM   COMBINE ROUTED FLOW FROM 71 WITH 72 WITH EMF (HYDROGRAPH ELTWAR)
506          HC       2
             * DDM   ***** Preserved *****

507          KK  WARTKN
508          KM   ROUTE EMF WARNER ROAD FLOW TO KNOX ROAD
509          RS       1    FLOW      -1
510          RC     .03    .022     .03    2500   .0003
511          RX       0     500     520     553     693     726     740     742
512          RY      14      12      11       0       0      11      11      12
             *

513          KK     70B
514          KM   BASIN 70B
515          KM    THE FOLLOWING PARAMETERS WERE PROVIDED FOR THIS BASIN
516          KM    L=      1.6  Lca=      1.1   S=   29.9  Kn= .022  LAG=  20.7
517          KM    PHOENIX VALLEY S-GRAPH WAS USED FOR THIS BASIN
518          BA     .38
519          LG     .11     .15    8.00     .12   76.00
520          UI     68.    259.    390.    636.    615.    418.    267.    119.     73.     30.
521          UI     19.     19.      0.      0.      0.      0.      0.      0.      0.      0.
522          UI      0.      0.      0.      0.      0.      0.      0.      0.      0.      0.
             *
             * DDM   ***** Preserved *****

523          KK    R70B
524          KM   RETAIN 100 YR 2 HR RUNOFF VOLUME
525          DT    D70B      38
526          DI       0   10000
527          DQ       0   10000
             *

528          KK  70BT76
529          KM   ROUTE 70B TO 76B VIA WASH CROSSING SOSSAMAN, SOUTH OF WARNER ROAD
530          RS       6    FLOW      -1
531          RC    .045     .04    .045    5500   .0041
532          RX       0     500    1000    1003    1007    1011    1511    2011
533          RY       4     3.5       3       0       0       2     2.5       3
             *
```

```
LINE          ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10

 534          KK     76B
 535          KM   BASIN 76B
 536          KM    THE FOLLOWING PARAMETERS WERE PROVIDED FOR THIS BASIN
 537          KM    L=       1.8  Lca=       .9   S=   27.4  Kn= .021  LAG=  18.9
 538          KM    PHOENIX VALLEY S-GRAPH WAS USED FOR THIS BASIN
 539          BA     .64
 540          LG     .10      .15     8.80      .09    78.00
 541          UI    148.     515.     789.    1294.     957.     629.     303.     157.      70.      35.
 542          UI     35.       0.       0.       0.       0.       0.       0.       0.       0.       0.
 543          UI      0.       0.       0.       0.       0.       0.       0.       0.       0.       0.
              *
              * DDM   ***** Preserved *****

 544          KK    R76B
 545          KM   RETAIN 100 YR 2 HR RUNOFF VOLUME
 546          DT    D76B      66
 547          DI       0   10000
 548          DQ       0   10000
              *

 549          KK    KNOX
 550          KM   COMBINE FLOWS AT KNOX ROAD
              * KO                                    21
 551          HC       2
              *

 552          KK  EMFKNX
 553          KM   COMBINE FLOWS INTO THE EMF AT KNOX ROAD
 554          KM   THIS COMBINES HYDROGRAPHS WARTKN, 70BT76 and R76B.
 555          HC       2
              *

 556          KK     65A
 557          KM   BASIN 65A
 558          KM    THE FOLLOWING PARAMETERS WERE PROVIDED FOR THIS BASIN
 559          KM    L=      1.60  Lca=      .90   S=   51.2  Kn= .089  LAG=  69.7
 560          KM    PHOENIX VALLEY S-GRAPH WAS USED FOR THIS BASIN
 561          BA   2.535
 562          LG     .35      .36     5.10      .26    1.00
 563          UI    122.     122.     122.     345.     457.     572.     635.     703.     775.     875.
 564          UI    972.    1166.    1460.    1573.    1316.    1148.    1032.     937.     826.     739.
 565          UI    654.     583.     493.     362.     244.     217.     201.     198.     122.     122.
 566          UI    122.      52.      38.      38.      38.      38.      38.      38.      38.      38.
 567          UI     38.       0.       0.       0.       0.       0.       0.       0.       0.       0.
 568          UI      0.       0.       0.       0.       0.       0.       0.       0.       0.       0.
              *

 569          KK   REMA1
 570          KM   DIVERT 37% OF FLOW TO SUBBASIN 65A1
 571          DT    65A1
 572          DI       0     100     200     500    1000    2000    4000
 573          DQ       0      37      74     185     370     740    1480
              *
```



```
LINE          ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10

 574          KK   REMA2
 575          KM   DIVERT 28.6% OF REMA1 FLOW (18% of 65A) TO SUBBASIN 65A2a
 576          DT   65A2a
 577          DI       0     100     200     500    1000    2000    4000
 578          DQ       0    28.6    57.2     143     286     572    1144
              *

 579          KK   REMA3
 580          KM   DIVERT 15.6% OF REMA2 FLOW (7% of 65A) TO SUBBASIN 65A2b
 581          DT   65A2b
 582          DI       0     100     200     500    1000    2000    4000
 583          DQ       0    15.6    31.2      78     156     312     624
              *

 584          KK    65A3
 585          KM   DIVERT 13.2% OF REMA3 FLOW (5% of 65A) TO SUBBASIN 65A2c
 586          DT   65A2c
 587          DI       0     100     200     500    1000    2000    4000
 588          DQ       0    13.2    26.4      66     132     264     528
              *

 589          KK   CAP1A
 590          KM   INFLOW FROM EAST OF THE CAP THROUGH 2 - 72" PIPE OVERCHUTES
 591          KM   STATION #131+90 AND 158+00 SALT-GILA AQUEDUCT REACH 2
 592          BA   0.965
 593          ZR  =QI A=CAP1A B=OVERCHUTE C=FLOW E=5MIN F=100YEAR
              *

 594          KK  RCAP1A
 595          KM   ROUTE FLOW FROM CAP OVERCHUTE TO A POINT ON THE MARICOPA/PINAL COUNTY LINE
 596          KM   2000 FEET NORTH OF THE GUADALUPE ROAD COUNTY LINE INTERSECTION. ROUTING WIL
 597          KM   BE BY A NATURAL CHANNEL.  THIS IS THEN ROUTED FOR 1200 FT
 598          KM   IN A CHANNEL (DIBBLE ID MN3) TO THE POINT WERE THE ROUTED CAP1B FLOW
```

```
599          KM   INTERCEPTS THE CHANNEL. ORIGINAL SLOPE =.01
600          RS      13     FLOW      -1
601          RC    .045      .04     .045     4900     .010
602          RX       0      500     1000     1006     1026     1032     1511     2011
603          RY       4      3.5        3        0        0        3      3.5        4
             *

604          KK  RRCP1A
605          KM   REACH MN-5 AND CULVERT MNC-1
606          KM   ROUTE FLOW FROM WHERE RCAP1A FLOWS INTO THE NEW CHANNEL ALONG MERIDIAN ROAD
607          KM   USES REVISED ROUTING PARAMETERS, CHANNEL MN-5 SHAPE
608          RS       1     FLOW      -1
609          RC   0.025    0.015    0.025     2350    .0017
610          RX       0        8       16       27       43       53       61       69
611          RY     5.1      5.2      5.3        0        0      5.3      5.2      5.1
             *
```



```
LINE         ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10

612          KK   C65A1
613          KM   COMBINE FLOWS FROM SUBBASIN 65A3 and CAP1A
             * KO      1
614          HC       2     1.53
             *

615          KK   BPAS1
616          KM        DIVERSION STRUCTURE TO ROUTE PEAK FLOW TO GUADALUPE BASIN
617          KM        By-pass 50 cfs to SIPHON DRAW BASIN, and Divert Remaining to Basin
618          DT  D_BAS1
619          DI       0       50      150    300.0      500    600.0      800     1000     1500    2000.
620          DQ       0        0      100    250.0      450    550.0      750      950     1450    1950.
             *

621          KK  BAS1IN
622          KM         RETURN FLOW TO GUADALUPE BASIN
623          DR  D_BAS1
             *

624          KK  GR_BAS
625          KM   GUADALUPE ROAD BASIN
626          KM   OFF-LINE DETENTION BASIN LOCATED AT GUADALUPE AND MERIDIAN ROAD
627          KM   WITH  30" OUTLET PIPE AND 100' WEIR
628          RS       1     STOR       0
629          SA       0    14.35    14.58    14.81    15.76    16.74    17.23    17.74
630          SE    15.5       16     16.5       17       19       21       22       23
631          SL    16.5    4.909      .62       .5
632          SS    22.0      100      2.5      1.5
             *

633          KK   CBAS1
             * KO      1
634          KM   COMBINE FLOWS FROM BASIN OUTLET AND BYPASS
635          HC       2
             *

636          KK   RCHL1
637          KM   ROUTE FLOW FROM GUADALUPE BASIN TO D/S of 65A2c
638          RS       2     FLOW      -1
639          RC   0.025    0.015    0.025     1500    .0015
640          RX     0.0      8.0     16.0       34       56       74       82       90
641          RY     8.8      8.9      9.0        0        0      9.0      8.9      8.8
             *

642          KK  D65A2c
643          KM         RETURN FLOW FROM SUBBASIN 65A2c
644          DR   65A2c
             *
```



```
LINE         ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10

645          KK   CHAN1
             * KO      1
646          KM   TOTAL FLOW AT MERIDIAN ROAD CHANNEL (U/P Stream)
647          HC       2     1.94
             *

648          KK   RCHL2
649          KM   ROUTE FLOW FROM 65A2c TO 65A2b
650          RS       2     FLOW      -1
651          RC   0.025    0.015    0.025     1300    .0015
652          RX     0.0      8.0     16.0       34       56       74       82       90
653          RY     8.8      8.9      9.0        0        0      9.0      8.9      8.8
             *

654          KK  D65A2b
655          KM         RETURN FLOW FROM SUBBASIN 65A2b
656          DR   65A2b
             *

657          KK   CHAN2
             * KO      1
658          KM   TOTAL FLOW AT MERIDIAN ROAD CHANNEL (Middle Reach)
```

```
659          HC       2    2.12
             *

660          KK   RCHL3
661          KM   ROUTE FLOW FROM 65A2b TO 65A2a
662          RS       2    FLOW      -1
663          RC   0.025   0.015   0.025    1200   .0015
664          RX     0.0     8.0    16.0      34      56      74      82      90
665          RY     8.8     8.9     9.0       0       0     9.0     8.9     8.8
             *

666          KK   CAP1B
667          KM   INFLOW FROM EAST OF THE CAP THROUGH 2 - 72" PIPE OVERCHUTES
668          KM   STATION #131+90 AND 158+00 SALT-GILA AQUEDUCT REACH 2
669          BA   0.965
670          ZR  =QI  A=CAP1B  B=OVERCHUTE  C=FLOW  E=5MIN F=100YEAR
             *

671          KK  RCAP1B
672          KM   ROUTE FLOW FROM CAP1B OVERCHUTE TO A POINT ALONG THE MARICOPA/PINAL COUNTY
673          KM   LINE 1000 FEET NORTH OF THE INTERSECTION OF GUADALUPE ROAD AND THE COUNTY
674          KM   LINE. ROUTING WILL BE BY A NATURAL CHANNEL. ORIGINAL SLOPE=.01
675          RS      14    FLOW      -1
676          RC    .045     .04    .045    4900    .010
677          RX       0     500    1000    1006    1026    1032    1511    2011
678          RY       4     3.5       3       0       0       3     3.5       4
             *
                                        HEC-1 INPUT                                          PAGE 18

LINE         ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10

679          KK   CHAN3
             * KO      1
680          KM   TOTAL FLOW AT MERIDIAN ROAD CHANNEL (1000 ft north of SDW)
681          HC       2    3.09
             *

682          KK  D65A2a
683          KM         RETURN FLOW FROM SUBBASIN 65A2a
684          DR   65A2a
             *

685          KK  CHANEL
             * KO      1
686          KM   TOTAL FLOW AT MERIDIAN ROAD CHANNEL at North of Siphon Draw Basin
687          HC       2    3.55
             *

688          KK  DB65A1
689          KM         RETURN FLOW FROM SUBBASIN 65A1
690          DR    65A1
             *

691          KK  SD_TOT
             * KO      1
692          KM   TOTAL FLOW AT SIPHON DRAW BASIN BEFORE BYPASS
693          HC       2    4.48
             *

694          KK  DIDB65
695          KM   DETENTION BASIN DIVERSION STRUCTURE
696          KM   DIVERT FLOW FROM CHANNEL TO OFF-LINE BASIN
697          DT   DB65A
698          DI       0     100     300     400     600    1000    1500    2000    3000
699          DQ       0       0       0       0     200     600    1100    1600    2600
             *

700          KK   D_SDW
701          KM   DIVERT 200 CFS TO SIPHON DRAW WASH AND 200 CFS TO ELLIOT STORM DRAIN
702          DT  D_PIPE
703          DI       0     100     200     400     600    1000    1500    2000    3000
704          DQ       0       0       0     200     400     800    1300    1800    2800
             *

705          KK   RSDW1
706          KM   ROUTE FLOW FROM MERIDIAN ROAD TO MOUNTAIN ROAD THROUGH DRAINAGE CORRIDOR
707          RS       2    FLOW      -1
708          RC    .045    .035    .045    3000   .0070
709          RX     0.0    30.0    88.0     100     150     162     220     250
710          RY     9.0     8.0     4.5       0       0     4.5     8.0     9.0
             *
1                                       HEC-1 INPUT                                          PAGE 19

LINE         ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10

711          KK   RSDW2
712          KM   ROUTE FLOW FROM MOUNTAIN ROAD TO 104TH STREET THROUGH SIPHON DRAW WASH
713          RS       6    FLOW      -1
714          RC    .045    .040    .045    5500   .0060
715          RX     0.0    30.0    88.0     110     140     162     220     250
716          RY     9.0     8.0     4.5       0       0     4.5     8.0     9.0
             *

717          KK    65AW
```

```
718          KM   BASIN 65AW
719          KM    THE FOLLOWING PARAMETERS WERE PROVIDED FOR THIS BASIN
720          KM    L=        .9  Lca=       .6   S=   54.7  Kn= .049  LAG=  26.1
721          KM    PHOENIX VALLEY S-GRAPH WAS USED FOR THIS BASIN
722          BA     .43
723          LG     .24      .25     5.30      .29    32.00
724          UI     56.     176.     295.     391.     603.     594.     432.     316.     210.     101.
725          UI     73.      43.      17.      17.      17.      0.       0.       0.       0.       0.
726          UI      0.       0.       0.       0.       0.      0.       0.       0.       0.       0.
             *

727          KK   R65AW
728          KM   RETAIN 100 YR 2 HR RUNOFF VOLUME
729          DT   D65AW      31
730          DI       0   10000
731          DQ       0   10000
             *

732          KK  65AT65
733          KM   ROUTE C65A TO BASIN 65B VIA A WASH,(THIS WASH IS NORTH OF SIPHON DRAW)
734          KM   THIS IS THE PART OF 65A WHICH IS WEST OF THE MERIDIAN RD ALIGNMENT
             * KO     3
735          RS      11    FLOW      -1
736          RC    .045     .04    .045    9500     .007
737          RX       0     500    1000    1003     1053     1056     1511     2011
738          RY       4     3.5       3       0        0        2      2.5        3
             *

739          KK     65B
740          KM   BASIN 65B
741          KM    THE FOLLOWING PARAMETERS WERE PROVIDED FOR THIS BASIN
742          KM    L=       2.0  Lca=      1.2   S=   37.5  Kn= .036  LAG=  36.6
743          KM    PHOENIX VALLEY S-GRAPH WAS USED FOR THIS BASIN
744          BA    1.37
745          LG     .18      .25     6.00      .24    53.00
746          UI    126.     218.     506.     669.     809.    1014.    1468.    1422.    1102.     901.
747          UI    720.     562.     337.     218.     182.     126.      71.      39.      39.      39.
748          UI     39.       0.       0.       0.       0.       0.       0.       0.       0.       0.
749          UI      0.       0.       0.       0.       0.       0.       0.       0.       0.       0.
             *
```



```
LINE         ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10

750          KK    R65B
751          KM   RETAIN 100 YR 2 HR RUNOFF VOLUME
752          DT    D65B     120
753          DI       0   10000
754          DQ       0   10000
             *

755          KK   CP65B
             * KO     1
756          KM   COMBINE FLOW FROM SUBBASIN 65AW (WEST OF MERIDIAN RD) WITH FLOW FROM
757          KM   SUBBASIN 65B, AND FLOW FROM SIPHON DRAW WASH
758          HC       3
             *

759          KK   DI65B
760          KM        DIVERSION STRUCTURE TO ROUTE PEAK FLOW TO ELLIOT BASIN (EAST)
761          KM        By-pass 200 cfs to Elliot Storm Drain, and Divert Remaining to E Basin
762          DT  DIRS65
763          DI       0     100     200   300.0     450   600.0     800    1000    1300   1800.
764          DQ       0       0       0   100.0     250   400.0     600     800    1100   1600.
             *

765          KK   SD_IN
766          KM         RETURN DIVERT TO SIPHON DRAW BASIN
767          DR   DB65A
             *

768          KK  SD_BAS
769          KM   SIPHON DRAW BASIN
770          KM   OFF-LINE DETENTION BASIN LOCATED AT ELLIOT AND MERIDIAN ROAD
771          KM   WITH  30" OUTLET PIPE AND 100' WEIR
772          RS       1    STOR       0
773          SA       0    9.26     9.44     9.63    10.01    10.79    11.60    12.43    12.86    13.29
774          SE    89.5      90     90.5       91       92       94       96       98       99      100
775          SL    90.5   4.909      .62       .5
776          SS    98.0     100      2.5      1.5
             *

777          KK  DBPIPE
778          KM         RETURN DIVERTED FLOW BACK TO ELLIOT STORM DRAIN
779          DR  D_PIPE
             *

780          KK  SD_OUT
781          KM   COMBINE FLOWS FROM MERIDIAN ROAD CHANNEL BYPASS AND SDB BLEED-OFF
782          HC       2    2.54
             *

783          KK   RMERD
784          KM   ROUTE FROM DETENTION BASIN OUTLET TO ELLIOT ROAD ALONG MERIDIAN ROAD
785          KM   THROUGH 78" PIPE
```

```
786          RD    1500  0.0060   0.012            CIRC     6.5
             *
                                        HEC-1 INPUT                                                          PAGE 21
LINE         ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10

787          KK  65AT-1
788          KM   REACH MN-1
789          KM   ROUTE FROM DETENTION BASIN OUTLET TO MOUNTAIN ROAD ALONG ELLIOT ROAD
790          KM   THROUGH 78" PIPE
791          RD    3000  0.0060   0.012            CIRC     6.5
             *

792          KK  ET_MTN
793          KM   ROUTE FLOW FROM MOUNTAIN ROAD TO 104th ST THROUGH 78" PIPE
794          RD    5500  0.0070   0.012            CIRC     6.5
             *

795          KK   CP65A
796          KM   COMBINE FLOWS FROM ELLIOT STORM DRAIN AND EAST BASIN BYPASS
797          HC       2
             *

798          KK  65AT-3
799          KM   ROUTE FROM 104th ST TO E. BASIN OUTLET
800          RD    1500  0.0065   0.012            CIRC     7.0
             *

801          KK   DR65B
             * KO      1
802          KM        RETURN DIVERT TO EAST DETENTION BASIN
803          DR  DIRS65
             *

804          KK   RS65A
805          KM   ELLIOT BASIN, EAST
             * KO      1
806          RS       1    STOR       0
807          SV       0    5.40    9.30   13.90   18.80   24.00   29.50   35.30   41.40   48.00
808          SE  1429.0  1433.0  1434.0  1435.0  1436.0  1437.0  1438.0  1439.0  1440.0  1441.0
809          SL  1430.0  0.7854     .62      .5
810          SS  1439.0     200     2.5     1.5
             *

811          KK    CP65
812          KM   COMBINE FLOWS FROM EAST ELLIOT BASIN AND ELLIOT STORM DRAIN
813          KM   BEFORE COMBINING WITH FLOWS FROM THE BYPASS CRISMON CHANNEL
             * KO      1
814          HC       2
             *

815          KK   65T66
816          KM   ROUTE FROM E. BASIN OUTLET TO CRISMON ROAD.
817          RD    1200  0.0065   0.012            CIRC     7.5
             *
                                        HEC-1 INPUT                                                          PAGE 22
LINE         ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10

818          KK  ADOT-E
819          KM   INFLOW FROM NORTH OF THE SUPERSTITION FREEWAY ENTERING 67A
820          KM   FROM EAST ADOT DETENTION BASIN 4105.
             *     KO       1
821          BA    0.01
822          ZR  =QI A=ADOT EAST BASIN B=AT SUPERSTITION C=FLOW E=5MIN F=100YR
             *

823          KK  AET67A
824          KM    ROUTE SUPERSTITION FLOW THROUGH 67A TO BASELINE ROAD
825          IN      15
826          RS       6    FLOW      -1
827          RC    .045    .040    .045    5500    .010
828          RX       0     100     110     120     130     140     150     250
829          RY       5       4       3       1       1       3       4       5
             *

830          KK     67A
831          KM   BASIN 67A
832          KM    THE FOLLOWING PARAMETERS WERE PROVIDED FOR THIS BASIN
833          KM    L=      1.0  Lca=       .7   S=   42.9  Kn= .042  LAG=  25.7
834          KM    PHOENIX VALLEY S-GRAPH WAS USED FOR THIS BASIN
835          BA     .30
836          LG     .21     .25    4.70     .39   43.00
837          UI     39.    126.    208.    277.    433.    400.    292.    213.    134.     67.
838          UI     47.     25.     12.     12.     12.      0.      0.      0.      0.      0.
839          UI      0.      0.      0.      0.      0.      0.      0.      0.      0.      0.
             *

840          KK    R67A
841          KM   RETAIN 100 YR 2 HR RUNOFF VOLUME
842          DT    D67A      21
843          DI       0   10000
844          DQ       0   10000
             *
```

```
845          KK    C67A
846          KM    COMBINE FLOWS FROM ADOT-E AND SUBBASIN 67A
847          HC       2
             *

848          KK   67ATC
849          KM   ROUTE 67A TO 67C VIA WASH CROSSING BASELINE
850          RS       7    FLOW      -1
851          RC    .055    .045    .055    6300   .0071
852          RX       0     500     980    1003    1007    1031    1511    2011
853          RY       4     3.5       3       0       0       3     3.5       4
             *
```



```
LINE         ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10

854          KK    SUP2
855          KM   INFLOW FROM NORTH OF SUPERSTITION FREEWAY, DISCHARGING INTO 67B
             *     KO       1
856          BA    0.01
857          ZR  =QI A=ADOT WEST BASIN B=AT SUPERSTITION C=FLOW E=5MIN F=100YR
             *

858          KK   RSUP2
859          KM   ROUTE SUP2 THROUGH SUBBASIN 67B
             * KO                2
860          IN      15
861          RS       5    FLOW      -1
862          RC    .045    .045    .045    4500   .0056
863          RX       0     500    1000    1003    1007    1011    1511    2011
864          RY       4     3.5       3       0       0       2     2.5       3
             *

865          KK     67B
866          KM   BASIN 67B
867          KM    THE FOLLOWING PARAMETERS WERE PROVIDED FOR THIS BASIN
868          KM    L=      1.2  Lca=       .9   S=   28.0  Kn= .034  LAG=  26.4
869          KM    PHOENIX VALLEY S-GRAPH WAS USED FOR THIS BASIN
870          BA     .53
871          LG     .17     .25    4.90     .38   56.00
872          UI     68.    210.    356.    470.    713.    741.    536.    395.    269.    131.
873          UI     94.     59.     21.     21.     21.      0.      0.      0.      0.      0.
874          UI      0.      0.      0.      0.      0.      0.      0.      0.      0.      0.
             *

875          KK    R67B
876          KM   RETAIN 100 YR 2 HR RUNOFF VOLUME
877          DT    D67B      41
878          DI       0   10000
879          DQ       0   10000
             *

880          KK    C67B
881          KM   COMBINE FLOWS FROM SUP2 AND SUBBASIN 67B
             * KO                2
882          HC       2
             *

883          KK   67BTC
884          KM   REACH CN-4, CN-5 plus culvert CNC-4.
885          KM   ROUTE FLOW IN THE CRISMON CHANNEL FROM BASELINE ROAD (C67B) TO
886          KM      GUADALUPE ROAD (C67C)
887          RS       2    FLOW      -1
888          RC    .025    .015    .025    5180   .0019
889          RX       0       8      16    24.4    36.4    44.8    52.8    60.8
890          RY     4.0     4.1     4.2       0       0     4.2     4.1     4.0
             *
```



```
LINE         ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10

891          KK     67C
892          KM   BASIN 67C
893          KM    THE FOLLOWING PARAMETERS WERE PROVIDED FOR THIS BASIN
894          KM    L=      1.2  Lca=       .7   S=   40.2  Kn= .049  LAG=  32.3
895          KM    PHOENIX VALLEY S-GRAPH WAS USED FOR THIS BASIN
896          BA     .93
897          LG     .25     .25    5.10     .32   31.00
898          UI     96.    213.    432.    557.    702.   1006.   1133.    842.    667.    518.
899          UI    365.    193.    157.     96.     59.     30.     30.     30.     30.      0.
900          UI      0.      0.      0.      0.      0.      0.      0.      0.      0.      0.
901          UI      0.      0.      0.      0.      0.      0.      0.      0.      0.      0.
             *

902          KK    R67C
903          KM   RETAIN 100 YR 2 HR RUNOFF VOLUME
904          DT    D67C      67
905          DI       0   10000
906          DQ       0   10000
             *

907          KK    C67C
908          KM   COMBINE SUBBASINS 67C AND 67A AND 67B
```

```
909          HC       3
             *

910          KK  67CT67
911          KM   REACH CN-3 plus culvert CNC-3
912          KM   ROUTE FLOW IN THE CRISMON CHANNEL FROM C67C (@ GUADALUPE ROAD & CRISMON ROAD)
913          KM    TO C67D (AT APPROX. 1/2 MILE SOUTH OF GUADALUPE ROAD).
             *       Sta. 39+00 to Guadalupe Rd.
914          RS       1    FLOW      -1
915          RC    .025    .015    .025    2420   .0018
916          RX       0       6      12      24      64      76      82      88
917          RY       4       3       2       0       0       2       3       4
             *

918          KK     67D
919          KM   BASIN 67D
920          KM    THE FOLLOWING PARAMETERS WERE PROVIDED FOR THIS BASIN
921          KM    L=       .6  Lca=       .4   S=   34.7  Kn= .050  LAG=  20.5
922          KM    PHOENIX VALLEY S-GRAPH WAS USED FOR THIS BASIN
923          BA     .13
924          LG     .25     .25    5.20     .30   30.00
925          UI     23.     87.    132.    216.    202.    137.     86.     38.     23.      9.
926          UI      6.      6.      0.      0.      0.      0.      0.      0.      0.      0.
927          UI      0.      0.      0.      0.      0.      0.      0.      0.      0.      0.
             *

928          KK    R67D
929          KM   RETAIN 100 YR 2 HR RUNOFF VOLUME
930          DT    D67D       9
931          DI       0   10000
932          DQ       0   10000
             *
                                        HEC-1 INPUT                                          PAGE 25
LINE         ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10

933          KK    C67D
934          KM    COMBINE HYDROGRAPHS AT CP67D
935          HC       2
             *

936          KK  67DT66
937          KM   REACH CN-2 plus culvert CNC-2
938          KM   ROUTE FLOW IN THE CRISMON CHANNEL FROM APPROX. 1/2 MILE SOUTH
939          KM    OF GUADALUPE ROAD TO THE INFLOW SPILLWAY FOR THE ELLIOT DETENTION BASIN.
             *       Sta. 20+00 to Sta. 39+00
940          RS       1    FLOW      -1
941          RC    .032    .032    .032    1900  0.0035
942          RX       0       6      12      24      64      76      82      88
943          RY       4       3       2       0       0       2       3       4
             *

944          KK     66A
945          KM   BASIN 66A
946          KM    THE FOLLOWING PARAMETERS WERE PROVIDED FOR THIS BASIN
947          KM    L=       .7  Lca=       .3   S=   55.9  Kn= .047  LAG=  17.1
948          KM    PHOENIX VALLEY S-GRAPH WAS USED FOR THIS BASIN
949          BA     .26
950          LG     .24     .25    6.00     .22   35.00
951          UI     78.    256.    417.    576.    363.    205.     84.     39.     16.     16.
952          UI      0.      0.      0.      0.      0.      0.      0.      0.      0.      0.
953          UI      0.      0.      0.      0.      0.      0.      0.      0.      0.      0.
             *
             * DDM   ***** Preserved *****

954          KK    R66A
955          KM   RETAIN 100 YR 2 HR RUNOFF VOLUME
956          DT    D66A      21
957          DI       0   10000
958          DQ       0   10000
             * DDM   ***** Preserved *****

959          KK   66ATB
960          KM   ROUTE S66A TO 66B VIA WASH CROSSING BASELINE
961          RS       7    FLOW      -1
962          RC    .045     .04    .045    7500    .0077
963          RX       0     500     980    1003    1007    1031    1511    2011
964          RY       4     3.5       3       0       0       3     3.5       4
             *
             * DDM   ***** Updated *****

965          KK     66B
966          KM   BASIN 66B
967          KM    THE FOLLOWING PARAMETERS WERE PROVIDED FOR THIS BASIN
968          KM    L=      1.6  Lca=      1.0   S=   43.3  Kn= .050  LAG=  42.8
969          KM    PHOENIX VALLEY S-GRAPH WAS USED FOR THIS BASIN
970          BA     .67
971          LG     .25     .25    5.00     .33   30.00
972          UI     53.     56.    185.    248.    297.    352.    426.    590.    636.    496.
973          UI    419.    346.    286.    232.    152.     93.     86.     58.     53.     21.
                                        HEC-1 INPUT                                          PAGE 26
LINE         ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10

974          UI     16.     16.     16.     16.     16.      0.      0.      0.      0.      0.
```

```
975          UI      0.      0.      0.      0.      0.      0.      0.      0.      0.      0.
             *
             * DDM   ***** Preserved *****

976          KK    R66B
977          KM   RETAIN 100 YR 2 HR RUNOFF VOLUME
978          DT    D66B      48
979          DI       0   10000
980          DQ       0   10000
             * DDM   ***** Preserved *****

981          KK   CP66B
982          KM   COMBINE S66A AND S66B
983          HC       2
             *
             * DDM   ***** Preserved *****

984          KK   66BTC
985          KM   ROUTE 66B TO 66C VIA WASH
986          RS       7    FLOW      -1
987          RC    .045     .04    .045    6000    .0150
988          RX       0     500     995    1003     1007    1016    1511    2011
989          RY       4     3.5       3       0        0       3     3.5       4
             *
             * DDM   ***** Updated *****

990          KK     66C
991          KM   BASIN 66C
992          KM    THE FOLLOWING PARAMETERS WERE PROVIDED FOR THIS BASIN
993          KM    L=      1.1  Lca=        .7   S=   46.5  Kn= .039  LAG=  24.3
994          KM    PHOENIX VALLEY S-GRAPH WAS USED FOR THIS BASIN
995          BA     .50
996          LG     .19     .25    5.40     .29   48.00
997          UI     69.    243.    385.    528.    817.    635.    463.    325.    159.    103.
998          UI     63.     21.     21.     21.      0.      0.      0.      0.      0.      0.
999          UI      0.      0.      0.      0.      0.      0.      0.      0.      0.      0.
             *
             * DDM   ***** Preserved *****

1000         KK    R66C
1001         KM   RETAIN 100 YR 2 HR RUNOFF VOLUME
1002         DT    D66C      42
1003         DI       0   10000
1004         DQ       0   10000
             *
             * DDM   ***** Preserved *****

1005         KK  CP66C1
1006         KM   Split up hydrograph combination in order to separate flows.
1007         KM   Combine Hydrographs 66BTC (from Sub. 66A)and R66C (from Sub. 66C)
             * KO      2       2
1008         HC       2
             *
```



```
LINE         ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10

1009         KK  CP66C2
1010         KM   Combine Hydrograph CP66C1 (from Subbasins 66A, 66B and 66C)
1011         KM     plus hydrograph 67DT66 ( C67D )
             * KO      1
1012         HC       2
             *

1013         KK    DI66
1014         KM    DIVERT FLOW TO DETENTION BASIN WA
1015         KM    By-pass Flow Reduced to 410 cfs from 458, SZ, 5-17-99
             * KO      1       2
1016         DT    DB66
1017         DI       0     150     363   411.0   456.0     513     577     643     712    1000
1018         DQ       0       0       0    32.0     71.     122     179     239     302     590
             *

1019         KK  66C1T2
1020         KM    ROUTE FLOW FROM DIVERSION STRUCTURE TO ELLIOT CHANNEL at ELLIOT ROAD.
1021         KM    REACH CN-1 plus culvert CNC-1
1022         KM        A single pipe size and an overall slope are used to represent this
1023         KM        1,070 ft long reach which has pipe sizes of 78", 84" and 90", and
1024         KM        about 250' long sideweir and transition open channel.
1025         KM        RD card used for routing (Sta. 9+30 to Sta. 20+00)
1026         RD    1070  0.0130   0.012            CIRC       7
             *

1027         KK   CP66C
1028         KM   COMBINE FLOWS FROM ELLIOT CHANNEL AND CRISMON BYPASS CHANNEL
             * KO      1
1029         HC       2
             *

1030         KK   66CTD
1031         KM   ROUTE FLOWS FROM INTERSECTION OF CRISMON AND ELLIOT CHANNELS
1032         KM      AT THE INTERSECTION OF ELLIOT ROAD and CRISMON ROAD TO THE ELLIOT BASIN
1033         KM      WA Bleed-off Outlet, WHICH IS ABOUT 390 ft WEST OF CRISMON ROAD.
1034         KM     To make the routing work, L changed from 390 to 60 ft
1035         RD     600  0.0015   0.012            CIRC     9.5
```

```
                *
1036            KK    DR66
                * KO     1
1037            KM          RETURN DIVERT TO DETENTION BASIN FROM DIVERSION STRUCTURE
1038            DR    DB66
                *

1039            KK  RS66D1
                * KO     1
1040            KM   ELLIOT BASIN, WEST A
1041            KM   TWO PONDS OPERATING IN SERIES.
1042            KM        Bottom Elevation Lowered to 1415.0 ft from 1420, and 18" Bleed-off
1043            KM        Pipe Added from WA to Elliot Channel
                *       Since the bleed-off pipe length is short, no routing is provided.
                *       Existing SS = 1423   20   2.5   1.5, SZ, 5-18-99
```



```
LINE            ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10

1044            RS       1    STOR       0
1045            SV       0    1.60   10.00   25.50   34.70   44.20   54.10   64.40   75.10   86.00
1046            SE  1415.0    1417    1419    1421    1422    1423    1424    1425    1426    1427
1047            SL  1416.0  1.7672     .62      .5
1048            SS  1423.5      20     3.0     1.5
                *

1049            KK    B-WA
1050            KM        Bleed-off Flow from WA to Elliot Channel = 18" Pipe, SZ, 6-15-99
1051            KM        Divert Flow to WB by Weir Spillover (SS card on RS66D1)
                *       RS66D1 is the total routed flow = SL + SS
                *       This operation is designed to separate weir flow from pipe flow
1052            DT    D-WB
1053            DI       0       5      10      15   17.59   40.87   80.62  131.76  192.12  260.43
1054            DQ       0       0       0       0       0    21.2    60.0   110.2   169.7   237.2
                *

1055            KK    C-WA
1056            KM        Combine Bleed-off Flow from WA with Flow in Elliot Channel
                *       Added by SZ, 5-17-99
1057            HC       2
                *

1058            KK   RC-WA
1059            KM        Route Flow from WA Outlet to WB Outlet in Elliot Channel
                *       Added by SZ, 5-17-99
                * RS     1    FLOW      -1
                * RC  .025    .015    .025     800   .0017
                * RX     0       8      16      28      44      56      64      72
                * RY   5.7     5.8     6.0       0       0     6.0     5.8     5.7
1060            KM      WA Bleed-off Outlet to WB Bleed-off Outlet.
                *       RD card used for routing (Sta. 48+80 to Sta. 57+35)
1061            RD     855  0.0052   0.012            CIRC     9.5
                *

1062            KK   DR-WA
1063            KM        Return Diverted Flow (Spillway) to WB from WA, SZ 5-7-99
                * KO     1
1064            DR    D-WB
                *

1065            KK  RS66D2
                * KO     1
1066            KM   ELLIOT BASIN, WEST B
1067            KM   TWO PONDS OPERATING IN SERIES.
1068            KM        Bottom Elevation Lowered to 1413.5 ft from 1414, and 36" Bleed-off
1069            KM        Pipe Reduced to 18" from WB to Elliot Channel
                *       Since the bleed-off pipe length is short, no routing is provided.
                *       Existing SS = 1420.5   80   2.5   1.5, SZ, 5-18-99
1070            RS       1    STOR       0
1071            SV       0    4.40    8.80   14.50   21.00   28.00   35.30   42.90   50.90   59.20
1072            SE  1412.0    1415    1416    1417    1418    1419    1420    1421    1422    1423
1073            SL  1413.0  1.7672     .62      .5
1074            SS  1422.6      50     2.5     1.5
                *
```



```
LINE            ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10

1075            KK   CP66D
1076            KM       COMBINE FLOWS FROM WEST ELLIOT BASIN AND ELLIOT CHANNEL
1077            KM       AT THE OUTLET PIPE.
                * KO     1
1078            HC       2
                *

1079            KK  66T66D
                * KM REACH ET-6
1080            KM        ROUTE FROM DETENTION BASIN WB OUTLET TO ELLSWORTH RD
1081            KM        2350 -> 3200,  SZ, 5-17-99
                *       First portion
                *       RD card used for routing (Sta. 36+44 to 48+80)
1082            RD    1236  0.0052   0.012            CIRC     9.5
                *
```

```
1083        KK  66-66D
            * KM REACH ET-6
1084        KM        ROUTE FROM DETENTION BASIN WB OUTLET TO ELLSWORTH RD
1085        KM        2350 -> 3200,  SZ, 5-17-99
            *       Second portion
            *       RD card used for routing (Sta. 12+46 to Sta. 36+44)
1086        RD    2398  0.0040   0.012            CIRC     9.5
            *

1087        KK     66D
1088        KM   BASIN 66D
1089        KM    THE FOLLOWING PARAMETERS WERE PROVIDED FOR THIS BASIN
1090        KM    L=      1.0  Lca=       .7   S=   28.6  Kn= .020  LAG=  13.2
1091        KM    PHOENIX VALLEY S-GRAPH WAS USED FOR THIS BASIN
1092        BA     .31
1093        LG     .10      .17    6.80     .19   80.00
1094        UI    162.     480.    845.    540.    232.     89.     24.      0.      0.      0.
1095        UI      0.       0.      0.      0.      0.      0.      0.      0.      0.      0.
            *
            * DDM   ***** Preserved *****

1096        KK    R66D
1097        KM   RETENTION REDUCED BY 77% FROM 31 TO 7 AC-FT
1098        KM   DUE TO DEVELOPMENT USING DETENTION BASIN
            *   The developer does not participate in the basin so the retention volume
            *   increased to 31 A-F
1099        DT    D66D      31
1100        DI       0   10000
1101        DQ       0   10000
            * DDM   ***** Updated *****

1102        KK     61A
1103        KM   BASIN 61A
1104        KM    THE FOLLOWING PARAMETERS WERE PROVIDED FOR THIS BASIN
1105        KM    L=       .9  Lca=       .4   S=   36.8  Kn= .037  LAG=  19.1
1106        KM    PHOENIX VALLEY S-GRAPH WAS USED FOR THIS BASIN
1107        BA     .52
1108        LG     .19      .25    4.20     .56   52.00
```



```
LINE        ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10

1109        UI    117.     412.    628.   1037.    786.    517.    261.    132.     62.     28.
1110        UI     28.       0.      0.      0.      0.      0.      0.      0.      0.      0.
1111        UI      0.       0.      0.      0.      0.      0.      0.      0.      0.      0.
            *
            * DDM   ***** Preserved *****

1112        KK    R61A
1113        KM   RETAIN 100 YR 2 HR RUNOFF VOLUME
1114        DT    D61A      42
1115        DI       0   10000
1116        DQ       0   10000
            * DDM   ***** Preserved *****

1117        KK   61ATB
1118        KM   ROUTING 61A TO 61B VIA ELLSWORTH ROAD
1119        RS       6    FLOW      -1
1120        RC    .035     .024    .035    5280    .005
1121        RX       0      500     750     752     802     852    1102    1602
1122        RY       3        2     1.5     1.2     1.2     1.5       2       3
            * DDM   ***** Updated *****

1123        KK     61B
1124        KM   BASIN 61B
1125        KM    THE FOLLOWING PARAMETERS WERE PROVIDED FOR THIS BASIN
1126        KM    L=      1.4  Lca=       .7   S=   39.7  Kn= .047  LAG=  33.6
1127        KM    PHOENIX VALLEY S-GRAPH WAS USED FOR THIS BASIN
1128        BA    1.09
1129        LG     .24      .25    4.80     .37   35.00
1130        UI    109.     223.    475.    615.    765.   1049.   1335.   1025.    822.    643.
1131        UI    495.     288.    187.    143.    109.     36.     34.     34.     34.     34.
1132        UI      0.       0.      0.      0.      0.      0.      0.      0.      0.      0.
1133        UI      0.       0.      0.      0.      0.      0.      0.      0.      0.      0.
            *
            * DDM   ***** Preserved *****

1134        KK    R61B
1135        KM   RETAIN 100 YR 2 HR RUNOFF VOLUME
1136        DT    D61B      81
1137        DI       0   10000
1138        DQ       0   10000
            * DDM   ***** Preserved *****

1139        KK   CP61B
1140        KM   COMBINE FLOWS FROM S61A AND S61B
1141        HC       2
            * DDM   ***** Preserved *****

1142        KK  61T66D
1143        KM   ROUTE CP61B TO SUBBASIN 66D ALONG ELLSWORTH ROAD. ROUTING WILL BE
1144        KM   THE SAME AS WAS GIVEN FOR SUBBASIN 61A
1145        RS       6    FLOW      -1
1146        RC    .035     .024    .035    5280    .008
1147        RX       0      500     750     752     802     852    1102    1602
1148        RY       3        2     1.5     1.2     1.2     1.5       2       3
```

```
                *
                * DDM   ***** Updated *****
                                          HEC-1 INPUT                                                          PAGE 31
LINE            ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10

1149            KK     67E
1150            KM   BASIN 67E
1151            KM    THE FOLLOWING PARAMETERS WERE PROVIDED FOR THIS BASIN
1152            KM    L=      1.2  Lca=        .7   S=   32.3  Kn= .038  LAG=  26.9
1153            KM    PHOENIX VALLEY S-GRAPH WAS USED FOR THIS BASIN
1154            BA     .58
1155            LG     .19      .25     5.40      .30    50.00
1156            UI     73.     219.     378.     496.    732.     830.     597.     443.     315.     157.
1157            UI    110.      73.      24.      22.     22.      22.       0.       0.       0.       0.
1158            UI      0.       0.       0.       0.      0.       0.       0.       0.       0.       0.
                *
                * DDM   ***** Preserved *****

1159            KK    R67E
1160            KM   RETAIN 100 YR 2 HR RUNOFF VOLUME
1161            KM   DUE TO DEVELOPMENT USING DETENTION BASIN
1162            DT   D67E       50
1163            DI       0   10000
1164            DQ       0   10000
                * DDM   ***** Preserved *****

1165            KK    C67E
1166            KM   COMBINE FLOWS FROM ELLSWORTH ROAD JUST NORTH OF ELLIOT ROAD
1167            HC       2
                *

1168            KK    C66D
1169            KM   COMBINE ELLIOT CHANNEL FLOW WITH HYDROGRAPH C67E @ ELLIOT RD & ELLSWORTH RD.
1170            HC       3
                *

1171            KK  66T70A
1172            KM        Pipe Routing, Reach ET-5
                *       SE corner curve of Elliot Rd. & Ellsworth Rd.
                *       RD card used for routing (Junction Structure to Sta. 12+46), L = 253
1173            RD     400  0.0004   0.012            CIRC     9.5
                *

1174            KK  66T70B
1175            KM        Pipe Routing, Reach ET-5
                *       Elliot Rd. to Culvert along Ellsworth Rd. 2-102" pipe = 144" pipe
                *       RD card used for routing (Sta. 85+65 to Sta. 97+51)
1176            RD    1186  0.0015   0.012            CIRC      12
                *

1177            KK  CULVT
1178            KM        Pipe Routing, Culvert
                *       2-102" pipe culvert crossing Ellsworth Rd.
                *       RD card used for routing l = 196 ft
1179            RD     400  0.0002   0.012            CIRC      12
                *
                                          HEC-1 INPUT                                                          PAGE 32
LINE            ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10

1180            KK  66T70C
1181            KM   REACH ET-4, ET-5( COMPRISED OF ET-5A AND ET-5B).
1182            KM   ROUTE FROM ELLSWORTH Culvert TO SANTAN FREEWAY.
1183            RS       2    FLOW      -1
1184            RC    .032    .032    .032    2490   .0008
1185            RX       0      10      20      56      76     112     120     130
1186            RY     6.5     6.1     6.0       0       0     6.0     6.1     6.5
                *

1187            KK     62A
1188            KM   BASIN 62A
1189            KM    THE FOLLOWING PARAMETERS WERE PROVIDED FOR THIS BASIN
1190            KM    L=        .8  Lca=        .5   S=   30.0  Kn= .020  LAG=  10.2
1191            KM    PHOENIX VALLEY S-GRAPH WAS USED FOR THIS BASIN
1192            BA     .38
1193            LG     .10      .25     4.50      .52    80.00
1194            UI    335.    1057.    1010.     367.     93.      38.       0.       0.       0.       0.
1195            UI      0.       0.       0.       0.      0.       0.       0.       0.       0.       0.
                *

1196            KK    R62A
1197            KM   RETAIN 100 YR 2 HR RUNOFF VOLUME
1198            DT    D62A       33
1199            DI       0   10000
1200            DQ       0   10000
                *

1201            KK   62ATC
1202            KM   ROUTE 62A TO 62C BY A CHANNEL ALONG SANTAN FWY
1203            KM   Concrete Channel, Parameters are approximate
1204            RS       3    FLOW      -1
1205            RC    .016    .016    .016    5280   .0033
1206            RX     100     110     120     130     138     148     158     168
```

```
1207        RY      10      10       5       0       0       5      10      10
            *

1208        KK     62C
1209        KM   BASIN 62C
1210        KM    THE FOLLOWING PARAMETERS WERE PROVIDED FOR THIS BASIN
1211        KM    L=        .6  Lca=        .3   S=   24.2  Kn= .049  LAG=  19.8
1212        KM    PHOENIX VALLEY S-GRAPH WAS USED FOR THIS BASIN
1213        BA     .55
1214        LG     .23     .25    4.65     .40   47.00
1215        UI    112.    406.    615.   1024.    853.    571.    330.    154.     83.     28.
1216        UI     28.      0.      0.      0.      0.      0.      0.      0.      0.      0.
1217        UI      0.      0.      0.      0.      0.      0.      0.      0.      0.      0.
            *
            * DDM   ***** Preserved *****
                                          HEC-1 INPUT                                          PAGE 33
LINE        ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10

1218        KK    R62C
1219        KM   RETAIN 100 YR 2 HR RUNOFF VOLUME
1220        DT    D62C      31
1221        DI       0   10000
1222        DQ       0   10000
            *

1223        KK    C62C
1224        KM   COMBINE FLOW FROM BASIN 62A AND 62C
1225        HC       2
            *

1226        KK   62CTE
1227        KM   ROUTE BASIN 62C TO BASIN 62E BY CHANNEL ON EAST SIDE OF PROPOSED SANTAN
1228        KM   FREEWAY ALIGNMENT
1229        RS       2    FLOW      -1
1230        RC    .030    .030    .030    2000   .0003
1231        RX       0       5      10      25      45      55      60      65
1232        RY       9       7     6.5       0       0     6.5       7       9
            * DDM   ***** Updated *****

1233        KK     62E
1234        KM   BASIN 62E
1235        KM    THE FOLLOWING PARAMETERS WERE PROVIDED FOR THIS BASIN
1236        KM    L=        .6  Lca=        .3   S=   31.9  Kn= .050  LAG=  20.4
1237        KM    PHOENIX VALLEY S-GRAPH WAS USED FOR THIS BASIN
1238        BA     .15
1239        LG     .25     .25    4.65     .39   45.00
1240        UI     29.    108.    163.    268.    246.    167.    104.     46.     28.     10.
1241        UI      8.      8.      0.      0.      0.      0.      0.      0.      0.      0.
1242        UI      0.      0.      0.      0.      0.      0.      0.      0.      0.      0.
            *
            * DDM   ***** Preserved *****

1243        KK    R62E
1244        KM   RETAIN 100 YR 2 HR RUNOFF VOLUME
1245        DT    D62E      12
1246        DI       0   10000
1247        DQ       0   10000
            *
            * DDM   ***** Preserved *****

1248        KK   CP62E
1249        KM   COMBINE FLOWS FROM SUBBASIN 62C AND SUBBASIN 62E
1250        HC       2
            *
            * DDM   ***** Preserved *****

1251        KK  62T68A
1252        KM   ROUTE FLOW FROM CP62E TO SUBBASIN 68A BY CHANNEL ALONG PROPOSED ALIGNMENT
1253        KM   OF THE SANTAN FREEWAY
            * ZW   A=62T68A   B=NORTH OF ELLIOT  C=FLOW    F=100YR FUTURE
1254        RS       2    FLOW      -1
1255        RC    .030    .030    .030    3280  .00015
                                          HEC-1 INPUT                                          PAGE 34
LINE        ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10

1256        RX       0       5      10      20      30      40      45      50
1257        RY      20      15      15       0       0      15      15      20
            *
            * DDM   ***** Updated *****

1258        KK     68A
1259        KM   BASIN 68A
1260        KM    THE FOLLOWING PARAMETERS WERE PROVIDED FOR THIS BASIN
1261        KM    L=        .7  Lca=        .4   S=   37.7  Kn= .032  LAG=  13.7
1262        KM    PHOENIX VALLEY S-GRAPH WAS USED FOR THIS BASIN
1263        BA     .35
1264        LG     .16     .25    5.70     .27   66.00
1265        UI    168.    506.    914.    635.    301.    114.     34.     26.      0.      0.
1266        UI      0.      0.      0.      0.      0.      0.      0.      0.      0.      0.
            *

1267        KK    R68A
1268        KM   RETAIN 100 YR 2 HR RUNOFF VOLUME
```

```
1269        DT    D68A      31
1270        DI       0   10000
1271        DQ       0   10000
            *
            * DDM   ***** Preserved *****

1272        KK   CP68A
1273        KM   COMBINE FLOW FROM SUBBASIN 68A WITH THE ROUTED FLOW FROM C62E
            * KO      3       2
            * ZW  A=COMBINED FLOW, CP68A  B=FROM BASIN AND ROUTE  C=FLOW   F=100YR FUTURE
1274        HC       2
            *
            * DDM   ***** Preserved *****

1275        KK  68T70A
1276        KM   ROUTE FLOW FROM CP68A AT ELLIOT AND SANTAN FREEWAY ALIGNMENT TO SUBBASIN
1277        KM   70A, AT THE POINT WHERE SIPHON DRAW INTERSECTS THE FREEWAY ALIGNMENT
1278        KM   CHANNEL IS NATURAL AND ONLY APPROXIMATE IN ROUTING PARAMETERS
1279        RS       2    FLOW      -1
1280        RC    .030    .030    .030    3960   .0006
1281        RX       0       5      10      20      30      40      45      50
1282        RY      10       5       4       0       0       4       5      10
            *
            *    This combining operation is added for Elliot Basin Outlet
            *

1283        KK  OUTLET
1284        KM   COMBINE FLOWS FROM 68T70A and Elliot Basin Outfall Channel
1285        HC       2
            *

1286        KK   R-OUT
1287        KM   ROUTE FLOW FROM OUTLET SOUTH ELLIOT AND SANTAN FREEWAY ALIGNMENT TO SUBBASIN
1288        KM   70A, AT THE POINT WHERE HAWES ROAD INTERSECTS THE FREEWAY ALIGNMENT
1289        KM   Concrete Channel, Parameters are approximate
1290        RS       1    FLOW      -1
1291        RC    .016    .016    .016    2640   .0030
```



```
LINE        ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10

1292        RX     100     110     120     130     146     156     166     176
1293        RY      10      10       5       0       0       5      10      10
            *
            * DDM   ***** Inserted *****

1294        KK     70A
1295        KM   BASIN 70A
1296        KM    THE FOLLOWING PARAMETERS WERE PROVIDED FOR THIS BASIN
1297        KM    L=       .9  Lca=       .4   S=   23.5  Kn= .025  LAG=  12.7
1298        KM    PHOENIX VALLEY S-GRAPH WAS USED FOR THIS BASIN
1299        BA     .54
1300        LG     .13     .15    7.60     .13   67.00
1301        UI    306.    899.   1524.    903.    346.    120.     44.      0.      0.      0.
1302        UI      0.      0.      0.      0.      0.      0.      0.      0.      0.      0.
            *
            * DDM   ***** Preserved *****

1303        KK    R70A
1304        KM   RETAIN 100 YR 2 HR RUNOFF VOLUME
1305        DT    D70A      52
1306        DI       0   10000
1307        DQ       0   10000
            *
            * DDM   ***** Preserved *****

1308        KK    C70A
1309        KM   COMBINE FLOWS FROM R_OUT AND SUBBASIN 70A
1310        HC       2
            *

1311        KK  70T76A
1312        KM   DIBBLE DRAINAGE FACILITY
1313        KM   ROUTE FLOW ALONG NEW SANTAN FREEWAY ALIGNMENT
1314        KM   REACH ET-3A, ET-3B
1315        RS       2    FLOW      -1
1316        RC    .025    .025    .025    4500  0.0005
1317        RX       0       8      16      59      91     134     142     150
1318        RY     7.4     7.3     7.2       0       0     7.2     7.1     7.0
            *

1319        KK     76A
1320        KM   BASIN 76A
1321        KM    THE FOLLOWING PARAMETERS WERE PROVIDED FOR THIS BASIN
1322        KM    L=       2.9  Lca=      1.7   S=   24.1  Kn= .030  LAG=  42.9
1323        KM    PHOENIX VALLEY S-GRAPH WAS USED FOR THIS BASIN
1324        BA    1.91
1325        LG     .15     .15    8.80     .08   56.00
1326        UI    150.    159.    528.    707.    847.   1004.   1213.   1673.   1826.   1424.
1327        UI   1201.    992.    822.    667.    444.    266.    247.    171.    150.     65.
1328        UI     46.     46.     46.     46.     46.      0.      0.      0.      0.      0.
1329        UI      0.      0.      0.      0.      0.      0.      0.      0.      0.      0.
            *
            * DDM   ***** Preserved *****
```

```
LINE          ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10

1330          KK    R76A
1331          KM   RETAIN 100 YR 2 HR RUNOFF VOLUME
1332          DT    D76A     185
1333          DI       0   10000
1334          DQ       0   10000
              *

1335          KK    C76A
1336          KM    COMBINE HYDROGRAPHS 70T76A (SANTAN FREEWAY CHANNEL FLOWS) WITH SUBBASIN 76A
1337          HC       2
              *
              * KK*DBSAN
              * KM DIVERT FROM SANTAN CHANNEL INTO THE RAY DETENTION BASIN
              * KM ADDED BY CPE IN JUNE 2000.
              * KM USES A REALISTIC SIDE-WEIR EQUATION TO FORM POWER CURVE
              * KM WEIR CREST = 4.5 FT; WEIR LENGTH = 200FT; 4.0 FT DIV STRUCTURE.
              * KO      3
              * DT SANDB    1537
              * DI      0     750     772     819     892     999    1356    8138
              * DQ      0       0       7      31      78     154     439    6509
              *

1338          KK  76ATPR
1339          KM   DIBBLE DRAINAGE FACILITY
1340          KM   ROUTE FLOW ALONG NEW SANTAN FREEWAY ALIGNMENT TO NEW POWERLINE FLOODWAY ALGN.
1341          KM   REACH ET-2A, ET-2B
1342          RS       2    FLOW      -1
1343          RC    .025    .025    .025    5750  0.0005
1344          RX       0       8      16      61      93     138     146     154
1345          RY     7.7     7.6     7.5       0       0     7.5     7.4     7.3
              *

1346          KK  EMFSTN
1347          KM    COMBINE HYDROGRAPHS 76ATPR (SANTAN FREEWAY CHANNEL FLOWS) WITH flow in EMF
1348          HC       2
              *

1349          KK  KNXTRY
1350          KM   ROUTE EMF KNOX ROAD FLOW TO RAY ROAD
1351          RS       1    FLOW      -1
1352          RC     .03    .022     .03    3000   .0003
1353          RX       0     500     520     553     693     726     740     742
1354          RY      14      12      11       0       0      11      11      12
              *

1355          KK     73A
1356          KM   BASIN 73A
1357          KM    THE FOLLOWING PARAMETERS WERE PROVIDED FOR THIS BASIN
1358          KM    L=       2.3  Lca=       1.0   S=   34.9  Kn= .093  LAG=  94.5
1359          KM    PHOENIX VALLEY S-GRAPH WAS USED FOR THIS BASIN
1360          BA     .95
1361          LG     .35     .36    5.00     .27     .00
1362          UI     34.     34.     34.     34.     84.    117.    134.    158.    171.    185.
1363          UI    197.    214.    232.    254.    274.    317.    381.    429.    424.    369.
```



```
LINE          ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10

1364          UI    332.    303.    282.    263.    240.    220.    202.    185.    169.    157.
1365          UI    134.    107.     90.     60.     60.     57.     55.     54.     34.     34.
1366          UI     34.     34.     16.     10.     10.     10.     10.     10.     10.     10.
1367          UI     10.     10.     10.     10.     10.     10.      0.      0.      0.      0.
1368          UI      0.      0.      0.      0.      0.      0.      0.      0.      0.      0.
              *

1369          KK   73ATB
1370          KM   ROUTE 73A TO 73B VIA WASH RUNNING DIAGONALLY ACROSS 73B
1371          RS       3    FLOW      -1
1372          RC     .06     .05     .06    2700   .0074
1373          RX       0     500    1000    1003    1007    1011    1511    2011
1374          RY       4     3.5       3       0       0       2     2.5       3
              *

1375          KK     73B
1376          KM   BASIN 73B
1377          KM    THE FOLLOWING PARAMETERS WERE PROVIDED FOR THIS BASIN
1378          KM    L=        .6  Lca=        .4   S=   26.3  Kn= .050  LAG=  21.6
1379          KM    PHOENIX VALLEY S-GRAPH WAS USED FOR THIS BASIN
1380          BA     .42
1381          LG     .27     .25    5.30     .27   21.00
1382          UI     67.    268.    402.    621.    719.    486.    332.    162.     94.     50.
1383          UI     20.     20.      0.      0.      0.      0.      0.      0.      0.      0.
1384          UI      0.      0.      0.      0.      0.      0.      0.      0.      0.      0.
              *
              * DDM   ***** Preserved *****

1385          KK    R73B
1386          KM   RETAIN 100 YR 2 HR RUNOFF VOLUME
1387          DT    D73B      29
1388          DI       0   10000
1389          DQ       0   10000
              *
              * DDM   ***** Preserved *****
```

```
1390        KK   CP73B
1391        KM   COMBINE S73A AND S73B
1392        HC       2
            *

1393        KK   73BTC
1394        KM   ROUTE 73B TO 73C VIA WASH CROSSING MOUNTAIN ROAD
1395        KM    THEN ROUTED SOUTH ALONG GENERAL MOTORS BERM TO SW CORNER OF 73C
1396        RS       6    FLOW      -1
1397        RC    .035    .022    .035    5000   .0036
1398        RX       0     500     700     710     720     730     930    1430
1399        RY       8     7.5       5       0       0       5     7.5       8
            *
```



```
LINE        ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10

1400        KK     73C
1401        KM   BASIN 73C
1402        KM    THE FOLLOWING PARAMETERS WERE PROVIDED FOR THIS BASIN
1403        KM    L=        .6  Lca=        .3   S=   43.7  Kn= .020  LAG=   7.0
1404        KM    PHOENIX VALLEY S-GRAPH WAS USED FOR THIS BASIN
1405        BA     .58
1406        LG     .10     .25    5.30     .34   80.00
1407        UI   1073.   2551.    742.    111.      0.      0.      0.      0.      0.      0.
1408        UI      0.      0.      0.      0.      0.      0.      0.      0.      0.      0.
            *

1409        KK    R73C
1410        KM   RETAIN 100 YR 2 HR RUNOFF VOLUME
1411        DT    D73C      58
1412        DI       0   10000
1413        DQ       0   10000
            *
            * DDM   ***** Preserved *****

1414        KK   CP73C
1415        KM   COMBINE 73C AND 73B
1416        HC       2
            *
            * DDM   ***** Preserved *****

1417        KK  73T74C
1418        KM   ROUTE 73C TO 74C VIA GM BERM, WEST EDGE OF 74C
1419        RS       4    FLOW      -1
1420        RC    .035    .022    .035    3500   .0034
1421        RX       0     500    1000    1001    1016    1516    2016    2516
1422        RY       6     5.5       5       2       2     3.5     4.5     5.5
            *
            * DDM   ***** Updated *****

1423        KK     74A
1424        KM   BASIN 74A
1425        KM    THE FOLLOWING PARAMETERS WERE PROVIDED FOR THIS BASIN
1426        KM    L=       2.4  Lca=       1.0   S=   42.2  Kn= .095  LAG=  92.9
1427        KM    PHOENIX VALLEY S-GRAPH WAS USED FOR THIS BASIN
            * KO     2       2
1428        BA     .75
1429        LG     .35     .36    5.00     .27     .00
1430        UI     27.     27.     27.     27.     73.     96.    111.    129.    140.    151.
1431        UI    163.    175.    193.    208.    228.    268.    317.    362.    327.    287.
1432        UI    260.    239.    222.    206.    187.    171.    160.    142.    132.    118.
1433        UI     99.     79.     56.     48.     47.     45.     45.     32.     27.     27.
1434        UI     27.     19.      8.      8.      8.      8.      8.      8.      8.      8.
1435        UI      8.      8.      8.      8.      8.      0.      0.      0.      0.      0.
1436        UI      0.      0.      0.      0.      0.      0.      0.      0.      0.      0.
            *
```



```
LINE        ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10

1437        KK   DB74A
1438        KM   NEW BASIN REGRADED ON 18 DEC 97, by Dibble & Associates
1439        KM   revised to be on-line detention basin
1440        KM   DETENTION BASIN LOCATED EAST OF MERIDIAN ROAD & north of Powerline Floodway
1441        KM   WITH 24-INCH OUTFALL & 350-FT WEIR.
            * KO     2       2
1442        RS       1    STOR       0
1443        SA       0    1.43    5.38   11.14   18.97
1444        SE    76.0      78      80      82      84
1445        SL    77.0    3.14     .62      .5
1446        SS   82.20     350     2.5     1.5
            *

1447        KK   74ATB
1448        KM   ROUTE 74A TO 74B VIA WASH CROSSING COUNTY LINE
1449        RS       4    FLOW      -1
1450        RC    .045     .04    .045    3500   .0054
1451        RX       0     500    1000    1003    1007    1011    1511    2011
1452        RY       4     3.5       3       0       0       2     2.5       3
            *

1453        KK     74B
```

```
1454        KM   BASIN 74B
1455        KM    THE FOLLOWING PARAMETERS WERE PROVIDED FOR THIS BASIN
1456        KM    L=        .6  Lca=        .5   S=   32.1  Kn= .050  LAG=  23.3
1457        KM    PHOENIX VALLEY S-GRAPH WAS USED FOR THIS BASIN
1458        BA     .33
1459        LG     .30      .25     6.00      .18     5.00
1460        UI     48.     177.     273.     388.     563.     406.     289.     188.      87.      58.
1461        UI     28.      15.      15.       0.       0.       0.       0.       0.       0.       0.
1462        UI      0.       0.       0.       0.       0.       0.       0.       0.       0.       0.
            *
            * DDM   ***** Preserved *****

1463        KK    R74B
1464        KM   RETAIN 100 YR 2 HR RUNOFF VOLUME
1465        DT    D74B      22
1466        DI       0   10000
1467        DQ       0   10000
            *
            * DDM   ***** Preserved *****

1468        KK   CP74B
1469        KM   COMBINE S74A AND S74B
1470        HC       2
            *
            * DDM   ***** Preserved *****

1471        KK   74BTC
1472        KM   ROUTE 74B TO 74C VIA WASH CROSSING MOUNTAIN ROAD
1473        RS       4    FLOW      -1
1474        RC    .045      .04     .045     3500    .0051
1475        RX       0      500      980     1003     1007     1031     1511     2011
1476        RY       4      3.5        3        0        0        3      3.5        4
            *
            * DDM   ***** Updated *****
```



```
LINE        ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10

1477        KK     74C
1478        KM   BASIN 74C
1479        KM    THE FOLLOWING PARAMETERS WERE PROVIDED FOR THIS BASIN
1480        KM    L=        .7  Lca=        .5   S=   25.4  Kn= .020  LAG=  10.3
1481        KM    PHOENIX VALLEY S-GRAPH WAS USED FOR THIS BASIN
1482        BA     .34
1483        LG     .10      .15     7.00      .17    80.00
1484        UI    303.     950.     940.     348.      92.      35.       0.       0.       0.       0.
1485        UI      0.       0.       0.       0.       0.       0.       0.       0.       0.       0.
            *
            * DDM   ***** Preserved *****

1486        KK    R74C
1487        KM   RETAIN 100 YR 2 HR RUNOFF VOLUME
1488        DT    D74C      35
1489        DI       0   10000
1490        DQ       0   10000
            *
            * DDM   ***** Preserved *****

1491        KK   CP74C
1492        KM   COMBINE 74C AND 74B AND 73C
1493        HC       3
            *
            * DDM   ***** Preserved *****

1494        KK  74CT75
1495        KM    ROUTE CP74C TO S75 VIA POWERLINE FLOODWAY TO ELLSWORTH RD & RAY ROAD.
1496        KM    Vel of 10 ft/sec for NSTP calc.
1497        RS       3    FLOW      -1
1498        RC     .03     .013      .03    10560    .0049
1499        RX       0     1005     1023   1030.5   1036.5     1044     1062     2067
1500        RY       6        5        5        0        0        5        5        6
            *
            * DDM   ***** Updated *****

1501        KK      75
1502        KM   BASIN 75 , WHICH IS THE GENERAL MOTORS DESERT PROVING GROUNDS
1503        KM    THE FOLLOWING PARAMETERS WERE PROVIDED FOR THIS BASIN
1504        KM    L=       4.0  Lca=       3.0   S=   20.0  Kn= .087  LAG= 182.0
1505        KM    PHOENIX VALLEY S-GRAPH WAS USED FOR THIS BASIN
1506        BA    4.01            0.25
1507        KM         THE 0.25 FACTOR IS PER FCDMC, AMIR MOTAMEDI, WHO HAS TOURED THE
1508        KM         PROVING GROUNDS WITH GM PERSONNEL AND FIELD VERIFIED THIS FACTOR.
1509        LG     .34      .35     6.80      .13     3.00
1510        UI     74.      74.      74.      74.      74.      74.      74.      74.     180.     243.
1511        UI    247.     284.     284.     335.     342.     363.     375.     396.     412.     422.
1512        UI    437.     458.     475.     495.     519.     550.     567.     585.     622.     672.
1513        UI    737.     819.     865.     935.    1002.     935.     870.     813.     764.     726.
1514        UI    693.     664.     637.     614.     593.     574.     547.     519.     496.     473.
1515        UI    452.     437.     425.     387.     377.     363.     347.     341.     289.     284.
1516        UI    233.     213.     213.     147.     131.     131.     131.     130.     122.     122.
1517        UI    122.     122.     122.      75.      74.      74.      74.      74.      74.      74.
1518        UI     74.      43.      23.      23.      23.      23.      23.      23.      23.      23.
```



```
LINE        ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10
```

```
UI     23.     23.     23.     23.     23.     23.     23.     23.     23.     23.
UI     23.     23.     23.     23.     23.     23.     23.     23.      0.      0.
UI      0.      0.      0.      0.      0.      0.      0.      0.      0.      0.
*

KK     C75
KM   COMBINE FLOWS FROM C74C AND SUBBASIN 75
HC       2
*
* DDM   ***** Preserved *****

KK   75TPC
KM   ROUTE 75 THROUGH POWERLINE FLOODWAY TO AIR FORCE CHANNEL
RS       2    FLOW      -1
RC     .03    .013     .03    3900   .0041
RX       0    1005    1023  1030.5  1036.5    1044    1062    2067
RY       6       5       5       0       0       5       5       6
*
* DDM   ***** Updated *****

KK     77A
KM   BASIN 77A
KM    THE FOLLOWING PARAMETERS WERE PROVIDED FOR THIS BASIN
KM    L=       2.9  Lca=       1.5   S=   31.1  Kn= .092  LAG= 119.0
KM    PHOENIX VALLEY S-GRAPH WAS USED FOR THIS BASIN
BA    1.74
LG     .35     .36    5.00     .27     .00
UI     49.     49.     49.     49.     49.    108.    162.    185.    205.    230.
UI    244.    264.    278.    293.    311.    333.    358.    380.    406.    462.
UI    537.    584.    659.    601.    541.    496.    461.    430.    407.    385.
UI    362.    334.    311.    293.    273.    252.    238.    226.    189.    161.
UI    141.    104.     87.     87.     83.     81.     81.     73.     49.     49.
UI     49.     49.     49.     22.     15.     15.     15.     15.     15.     15.
UI     15.     15.     15.     15.     15.     15.     15.     15.     15.     15.
UI     15.      0.      0.      0.      0.      0.      0.      0.      0.      0.
UI      0.      0.      0.      0.      0.      0.      0.      0.      0.      0.
*

KK   77ATB
KM   ROUTE 77A TO 77B VIA WASH CROSSING COUNTY LINE
RS       3    FLOW      -1
RC    .045     .04    .045    3000    .006
RX       0     500     980    1003    1007    1031    1511    2011
RY       4     3.5       3       0       0       3     3.5       4
*
* DDM   ***** Updated *****

KK     77B
KM   BASIN 77B
KM    THE FOLLOWING PARAMETERS WERE PROVIDED FOR THIS BASIN
KM    L=        .6  Lca=        .3   S=   26.3  Kn= .050  LAG=  19.3
KM    PHOENIX VALLEY S-GRAPH WAS USED FOR THIS BASIN
BA     .36
LG     .30     .25    5.30     .24    5.00
UI     78.    277.    421.    700.    544.    360.    189.     93.     46.     19.
```



```
LINE      ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10

UI     19.      0.      0.      0.      0.      0.      0.      0.      0.      0.
UI      0.      0.      0.      0.      0.      0.      0.      0.      0.      0.
*
* DDM   ***** Preserved *****

KK    R77B
KM   RETAIN 100 YR 2 HR RUNOFF VOLUME
DT    D77B      16
DI       0   10000
DQ       0   10000
*
* DDM   ***** Preserved *****

KK   CP77B
KM   COMBINE S77A AND S77B
HC       2
*
* DDM   ***** Preserved *****

KK   77BTC
KM   ROUTE 77B TO 77C VIA WASH CROSSING MOUNTAIN ROAD, THEN SOUTH ALONG
KM    WESTERN EDGE OF 77C
RS       5    FLOW      -1
RC    .045     .04    .045    4750   .0042
RX       0     500     950    1003    1007    1061    1511    2011
RY       4     3.5       3       0       0       3     3.5       4
*
* DDM   ***** Updated *****

KK     77C
KM   BASIN 77C
KM    THE FOLLOWING PARAMETERS WERE PROVIDED FOR THIS BASIN
KM    L=        .5  Lca=        .3   S=   32.3  Kn= .020  LAG=   7.2
KM    PHOENIX VALLEY S-GRAPH WAS USED FOR THIS BASIN
BA     .28
LG     .10     .25    5.80     .27   79.00
```

```
1585        UI    492.   1219.    393.     60.      0.      0.      0.      0.      0.      0.
1586        UI      0.      0.      0.      0.      0.      0.      0.      0.      0.      0.
            *
            * DDM   ***** Preserved *****

1587        KK    R77C
1588        KM   RETAIN 100 YR 2 HR RUNOFF VOLUME
1589        DT    D77C      28
1590        DI       0   10000
1591        DQ       0   10000
            *
            * DDM   ***** Preserved *****

1592        KK    C77C
1593        KM   COMBINE FLOWS FROM C77B AND SUBBASIN 77C
1594        HC       2
            *
            * DDM   ***** Preserved *****
                                        HEC-1 INPUT                                          PAGE 43

LINE        ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10

1595        KK  77CT78
1596        RS       3    FLOW      -1
1597        RC   0.035   0.022   0.035    2400   0.002
1598        RX       0     100     110     115     120     125     130     135
1599        RY       4       3     2.5       0       0     2.5       8       9
            *
            * DDM   ***** Updated *****

1600        KK     78A
1601        KM   BASIN 78A
1602        KM    THE FOLLOWING PARAMETERS WERE PROVIDED FOR THIS BASIN
1603        KM    L=       3.3  Lca=       1.3   S=   30.2  Kn= .090  LAG= 118.0
1604        KM    PHOENIX VALLEY S-GRAPH WAS USED FOR THIS BASIN
1605        BA    1.88
1606        LG     .35     .36    5.00     .27     .00
1607        UI     54.     54.     54.     54.     54.    124.    176.    203.    227.    252.
1608        UI    268.    290.    305.    322.    342.    366.    396.    417.    451.    515.
1609        UI    612.    641.    716.    643.    579.    531.    494.    464.    437.    417.
1610        UI    385.    356.    334.    315.    290.    270.    255.    233.    206.    159.
1611        UI    153.     95.     95.     95.     88.     88.     88.     65.     54.     54.
1612        UI     54.     54.     45.     16.     16.     16.     16.     16.     16.     16.
1613        UI     16.     16.     16.     16.     16.     16.     16.     16.     16.     16.
1614        UI      0.      0.      0.      0.      0.      0.      0.      0.      0.      0.
1615        UI      0.      0.      0.      0.      0.      0.      0.      0.      0.      0.
            *

1616        KK   78ATB
1617        KM   ROUTE FLOW FROM 78A TO 78B VIA WASH CROSSING COUNTY LINE
1618        RS       4    FLOW      -1
1619        RC    .045     .04    .045    3500   .0042
1620        RX       0     500     980    1003    1007    1031    1511    2011
1621        RY     4.5     3.5       3       0       0       3     3.5     4.5
            * DDM   ***** Updated *****

1622        KK     78B
1623        KM   BASIN 78B
1624        KM    THE FOLLOWING PARAMETERS WERE PROVIDED FOR THIS BASIN
1625        KM    L=        .6  Lca=        .4   S=   31.6  Kn= .050  LAG=  20.9
1626        KM    PHOENIX VALLEY S-GRAPH WAS USED FOR THIS BASIN
1627        KM    FCDMC REPORTS BASIN ALREADY BUILT-OUT, WITH RURAL 1 TO 2 ACRE LOTS
1628        KM    AND THERE IS NO RETENTION FOR THIS BASIN.
1629        BA     .39
1630        LG     .30     .15    8.40     .07    5.00
1631        UI     68.    262.    393.    635.    638.    433.    283.    126.     78.     34.
1632        UI     19.     19.      0.      0.      0.      0.      0.      0.      0.      0.
1633        UI      0.      0.      0.      0.      0.      0.      0.      0.      0.      0.
            *

1634        KK    C78B
1635        KM   COMBINE FLOW FROM SUBBASIN 78B AND SUBBASIN 78A
1636        HC       2
            *
                                        HEC-1 INPUT                                          PAGE 44

LINE        ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10

1637        KK   78BTC
1638        KM   ROUTE 78B TO 78C VIA WASH CROSSING MOUNTAIN ROAD, THEN SOUTH ALONG
1639        KM    WESTERN EDGE OF 78C.
1640        RS       3    FLOW      -1
1641        RC    .035    .022    .035    4500   .0033
1642        RX       0     100     110     115     120     125     130     135
1643        RY       5       4     3.5       0       0     3.5       8       9
            *

1644        KK     78C
1645        KM   BASIN 78C
1646        KM    THE FOLLOWING PARAMETERS WERE PROVIDED FOR THIS BASIN
1647        KM    L=        .5  Lca=        .3   S=   31.7  Kn= .026  LAG=   9.0
1648        KM    PHOENIX VALLEY S-GRAPH WAS USED FOR THIS BASIN
1649        BA     .28
1650        LG     .13     .10   11.20     .03   64.00
```

```
1651        UI    319.    980.    652.    164.     34.      0.      0.      0.      0.      0.
1652        UI      0.      0.      0.      0.      0.      0.      0.      0.      0.      0.
            *

1653        KK    R78C
1654        KM   RETAIN 100 YR 2 HR RUNOFF VOLUME
1655        DT    D78C      24
1656        DI       0   10000
1657        DQ       0   10000
            *

1658        KK    C78C
1659        KM   COMBINE FLOWS FROM 78B, 78C & 77C @ WILLIAMS FIELD ROAD & SIGNAL BUTTE ROAD.
1660        HC       3
            *

1661        KK  78CT79
1662        KM   ROUTE 78C TO 79A AT ELLSWORTH VIA GM CHANNEL TO
1663        KM    WILLIAMS FIELD RD & ELLSWORTH ROAD.
1664        RS       4    FLOW      -1
1665        RC    .035    .022    .035   10560   .0044
1666        RX       0     500     800     805     820     825    1125    1625
1667        RY       7       6       5       0       0       5       6       7
            *

1668        KK     79A
1669        KM   BASIN 79A
1670        KM    THE FOLLOWING PARAMETERS WERE PROVIDED FOR THIS BASIN
1671        KM    L=       2.3  Lca=       1.2   S=   23.2  Kn= .090  LAG= 106.0
1672        KM    PHOENIX VALLEY S-GRAPH WAS USED FOR THIS BASIN
1673        BA    2.01
1674        LG     .35     .30    8.00     .08     .00
1675        UI     64.     64.     64.     64.     82.    209.    232.    262.    299.    321.
1676        UI    347.    367.    390.    421.    458.    489.    527.    610.    726.    792.
1677        UI    825.    727.    655.    600.    557.    523.    495.    451.    417.    390.
1678        UI    361.    328.    308.    285.    244.    190.    169.    113.    113.    109.
1679        UI    105.    105.     85.     64.     64.     64.     64.     37.     20.     20.
1680        UI     20.     20.     20.     20.     20.     20.     20.     20.     20.     20.
```



```
LINE        ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10

1681        UI     20.     20.     20.      0.      0.      0.      0.      0.      0.      0.
1682        UI      0.      0.      0.      0.      0.      0.      0.      0.      0.      0.
            *

1683        KK   C79A1
1684        KM   COMBINE FLOWS FROM 78C AND 79A @ WILLIAMS FIELD ROAD & ELLSWORTH ROAD.
1685        HC       2
            *

1686        KK     78F
1687        KM   BASIN 78F
1688        KM    THE FOLLOWING PARAMETERS WERE PROVIDED FOR THIS BASIN
1689        KM    L=       3.7  Lca=       2.1   S=   29.8  Kn= .090  LAG= 147.0
1690        KM    PHOENIX VALLEY S-GRAPH WAS USED FOR THIS BASIN
1691        BA    4.19
1692        LG     .35     .36    5.00     .27     .00
1693        UI     96.     96.     96.     96.     96.     96.    148.    315.    325.    368.
1694        UI    399.    442.    468.    495.    521.    541.    566.    595.    626.    663.
1695        UI    706.    737.    774.    845.    936.   1085.   1119.   1276.   1239.   1127.
1696        UI   1033.    968.    907.    862.    820.    782.    751.    712.    667.    629.
1697        UI    597.    570.    541.    502.    472.    454.    436.    368.    339.    276.
1698        UI    276.    174.    170.    170.    168.    158.    158.    158.    156.     96.
1699        UI     96.     96.     96.     96.     96.     79.     29.     29.     29.     29.
1700        UI     29.     29.     29.     29.     29.     29.     29.     29.     29.     29.
1701        UI     29.     29.     29.     29.     29.     29.     29.      0.      0.      0.
1702        UI      0.      0.      0.      0.      0.      0.      0.      0.      0.      0.
            *

1703        KK    82A1
1704        KM   BASIN 82A1
1705        KM    THE FOLLOWING PARAMETERS WERE PROVIDED FOR THIS BASIN
1706        KM    L=       3.6  Lca=        .9   S=   33.9  Kn= .090  LAG= 103.0
1707        KM    PHOENIX VALLEY S-GRAPH WAS USED FOR THIS BASIN
1708        BA    3.12
1709        LG     .35     .36    5.00     .27     .00
1710        UI    102.    102.    102.    102.    163.    335.    381.    436.    485.    526.
1711        UI    564.    599.    644.    693.    757.    801.    901.   1048.   1222.   1356.
1712        UI   1223.   1084.    987.    913.    852.    800.    742.    675.    629.    589.
1713        UI    529.    494.    459.    391.    304.    266.    180.    180.    173.    167.
1714        UI    167.    123.    102.    102.    102.    102.     36.     31.     31.     31.
1715        UI     31.     31.     31.     31.     31.     31.     31.     31.     31.     31.
1716        UI     31.      0.      0.      0.      0.      0.      0.      0.      0.      0.
1717        UI      0.      0.      0.      0.      0.      0.      0.      0.      0.      0.
            *

1718        KK   C82A1
1719        KM   COMBINE FLOWS FROM SUBBASINS 78F AND 82A1 NORTH OF PECOS ROAD AT
1720        KM   NEW DETENTION BASIN
1721        HC       2
            *
```



```
LINE        ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10
```

```
1722        KK  DB82A1
1723        KM   PECOS NORTH BASIN
1724        KM   NEW DETENTION BASIN LOCATED EAST OF MERIDIAN ROAD & 660' NORTH OF PECOS RD.
1725        KM   WITH 1-42" RCP OUTLET & 86' SPILLWAY AT ELEV=44
            * KO     2      2
1726        RS       1    STOR      0
1727        SV       0       8     34     73    113    153    195    237    280    346
1728        SE      36      37     38     39     40     41     42     43     44   46.1
1729        SL    33.5     9.6    .62     .5
1730        SS      44     195      3    1.5
            *

1731        KK    PS-9
1732        KM    REACH PS-9
1733        KM    OUTFLOW CHANNEL FROM NEW DETENTION BASIN 82A TO MAIN CHANNEL @ PECOS
1734        RS       1    FLOW     -1
1735        RC    .025    .025   .025    500   .0005
1736        RX       0       8     16     42     46     72     80     88
1737        RY     5.5     4.2    4.3      0      0    4.3    4.2    4.5
            *

1738        KK    CAP2
1739        KM   INFLOW FROM EAST OF THE CAP THROUGH 1 - 36" PIPE OVERCHUTE
1740        KM   STATION #536+00 SALT-GILA AQUEDUCT REACH 2
1741        KM   QI CARDS BASED ON OVERCHUTE CAPACITY OF 64 CFS
1742        IN     60
1743        BA    .01
1744        QI       0      20     64     64     64     64     64     64     64     64
1745        QI      64      64     64     64     64     64     64     64     64     64
1746        QI      64      64     64     64     64
            *

1747        KK   RCAP2
1748        KM   ROUTE CAP2 THROUGH 82A2 VIA WASH TO SUBBASIN 82A2
1749        IN      15
1750        RS      27    FLOW     -1
1751        RC    .045     .04   .045  24000    .05
1752        RX       0     500   1000   1010   1020   1030   1530   2030
1753        RY       8       5      3      0      0      3      5      8
            *

1754        KK    82A2
1755        KM   BASIN 82A2
1756        KM    THE FOLLOWING PARAMETERS WERE PROVIDED FOR THIS BASIN
1757        KM    L=     4.6  Lca=      2.9   S=   27.2  Kn= .089  LAG= 183.0
1758        KM    PHOENIX VALLEY S-GRAPH WAS USED FOR THIS BASIN
1759        BA    4.13
1760        LG     .35     .36   5.00    .27   1.00
1761        UI     76.     76.    76.    76.    76.    76.    76.    76.   177.   249.
1762        UI    250.    291.   291.   339.   349.   371.   381.   406.   420.   430.
1763        UI    448.    466.   483.   503.   529.   561.   578.   596.   631.   680.
1764        UI    743.    805.   911.   923.  1027.   979.   901.   845.   794.   751.
1765        UI    717.    686.   659.   635.   613.   594.   570.   540.   514.   487.
1766        UI    470.    455.   437.   407.   393.   372.   362.   349.   315.   291.
```



```
LINE        ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10

1767        UI    263.    218.   218.   179.   134.   134.   134.   134.   128.   125.
1768        UI    125.    125.   125.    96.    76.    76.    76.    76.    76.    76.
1769        UI     76.     67.    23.    23.    23.    23.    23.    23.    23.    23.
1770        UI     23.     23.    23.    23.    23.    23.    23.    23.    23.    23.
1771        UI     23.     23.    23.    23.    23.    23.    23.    23.    23.     0.
1772        UI      0.      0.     0.     0.     0.     0.     0.     0.     0.     0.
1773        UI      0.      0.     0.     0.     0.     0.     0.     0.     0.     0.
            *

1774        KK  CP82A2
1775        KM   COMBINE FLOW FROM ROUTED CAP2 AND SUBBASIN 82A2
1776        HC       2
            *

1777        KK    82A4
1778        KM   BASIN 82A4
1779        KM    THE FOLLOWING PARAMETERS WERE PROVIDED FOR THIS BASIN
1780        KM    L=     3.5  Lca=      1.5   S=   29.1  Kn= .090  LAG= 128.0
1781        KM    PHOENIX VALLEY S-GRAPH WAS USED FOR THIS BASIN
1782        BA    2.13
1783        LG     .35     .36   5.00    .27    .00
1784        UI     56.     56.    56.    56.    56.    70.   184.   193.   214.   248.
1785        UI    265.    281.   302.   316.   332.   352.   374.   401.   424.   447.
1786        UI    494.    557.   650.   691.   742.   667.   606.   560.   523.   490.
1787        UI    466.    443.   419.   389.   364.   343.   325.   299.   281.   267.
1788        UI    251.    214.   182.   161.   126.    99.    99.    97.    92.    92.
1789        UI     92.     69.    56.    56.    56.    56.    56.    27.    17.    17.
1790        UI     17.     17.    17.    17.    17.    17.    17.    17.    17.    17.
1791        UI     17.     17.    17.    17.    17.    17.     0.     0.     0.     0.
1792        UI      0.      0.     0.     0.     0.     0.     0.     0.     0.     0.
            *

1793        KK  82A4T3
1794        KM   REACH MN-2
1795        KM   ROUTE FLOW FROM SUBBASIN 82A4 TO DETENTION BASIN 82A3
1796        RS       2    FLOW     -1
1797        RC    .025    .025   .025   1050   .0005
```

```
1798    RX      0      8     16     47    107    138    146    154
1799    RY    5.0    5.1    5.2      0      0    5.2    5.1    5.0
        *

1800    KK    82A3
1801    KM   BASIN 82A3
1802    KM    THE FOLLOWING PARAMETERS WERE PROVIDED FOR THIS BASIN
1803    KM    L=      3.6  Lca=      2.0   S=   28.3  Kn= .090  LAG= 145.0
1804    KM    PHOENIX VALLEY S-GRAPH WAS USED FOR THIS BASIN
1805    BA    2.02
1806    LG     .35    .36   5.00    .27    .00
1807    UI     47.    47.    47.    47.    47.    47.    82.   154.   162.   180.
1808    UI    200.   218.   230.   246.   257.   268.   280.   294.   310.   330.
1809    UI    351.   365.   387.   425.   477.   553.   566.   633.   583.   529.
1810    UI    492.   460.   434.   410.   392.   376.   361.   336.   316.   299.
1811    UI    284.   271.   250.   237.   228.   216.   190.   180.   136.   135.
1812    UI    101.    83.    83.    83.    78.    77.    77.    77.    52.    47.
1813    UI     47.    47.    47.    47.    42.    14.    14.    14.    14.    14.
```



```
LINE    ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10

1814    UI     14.    14.    14.    14.    14.    14.    14.    14.    14.    14.
1815    UI     14.    14.    14.    14.    14.    14.     0.     0.     0.     0.
1816    UI      0.     0.     0.     0.     0.     0.     0.     0.     0.     0.
        *

1817    KK  CP82A3
1818    KM   COMBINE FLOW FROM SUBBASIN 82A4 AND SUBBASIN 82A3 BEFORE DETENTION BASIN
1819    HC       2
        *

1820    KK  CP82A5
1821    KM   COMBINE FLOWS FROM CAP OVERCHUTE AND SUBBASIN 82A
1822    HC       2
        *

1823    KK   DB82B
1824    KM   PECOS SOUTH BASIN
1825    KM   NEW DETENTION BASIN LOCATED EAST OF MERIDIAN ROAD & 660' SOUTH OF PECOS RD.
1826    KM   WITH 1-66" RCP OUTLET & 80' SPILLWAY AT ELEV 41
        * KO     2      2
1827    RS       1   STOR      0
1828    SV       0    3.5    9.6   25.7   62.7  110.5  158.7  207.5  257.3    320
1829    SE    31.5     33     34     35     36     37     38     39     40   42.1
1830    SL      33   23.7    .62     .5
1831    SS      41     80      3    1.5
        *

1832    KK   MN-1
1833    KM   REACH MN-1  plus culvert PSC-7
1834    KM   ROUTE FLOW FROM NEW DETENTION BASIN 82B TO MAIN LINE CHANNEL @ PECOS
1835    RS       1   FLOW     -1
1836    RC    .025   .025   .025   1030  .0005
1837    RX       0      8     16     47     55     87     95    103
1838    RY     5.1    5.2    5.3      0      0    5.3    5.2    5.1
        *

1839    KK  CP82A6
1840    KM         COMBINE FLOWS AFTER DETENTION BASINS.
1841    HC       2
        *

1842    KK  82TBOX
1843    KM   REACH PS-8
1844    KM   ROUTE FLOW FROM DETENTION BASIN DB82B TO 1000' FOOT LONG BOX CULVERT (PSC-6).
1845    RS       1   FLOW     -1
1846    RC    .025   .025   .025    750  .0005
1847    RX       0      8     16   47.2     67     98    106    114
1848    RY     5.0    5.1    5.2      0      0    5.2    5.1    5.0
        *
```



```
LINE    ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10

1849    KK  BOXCLV
1850    KM   REACH PSC-6
1851    KM   ROUTE FLOW THROUGH BOX CULVERT
1852    RS       1   FLOW     -1
1853    RC    .015   .012   .015   1000  .0020
1854    RX       0      8     16  16.01  28.01  28.02     36     44
1855    RY     5.5    5.2      5      0      0      5    5.2    5.5
        *

1856    KK  BOXT78
1857    KM   REACH PS-5, PS-6, PS-7 plus culverts PSC-5 & PSC-4
1858    KM   ROUTE FLOW FROM 1000' BOX CULVERT TO C78D  (SIGNAL BUTTE ROAD)
1859    RS       1   FLOW     -1
1860    RC    .025   .025   .025   3400  .0005
1861    RX       0      8     16     47     67     98    106    114
1862    RY     5.4    5.3    5.2      0      0    5.2    5.3    5.4
        *

1863    KK     78D
1864    KM   BASIN 78D
```

```
1865          KM    THE FOLLOWING PARAMETERS WERE PROVIDED FOR THIS BASIN
1866          KM    L=       1.2  Lca=        .5   S=   21.7  Kn= .030  LAG=  19.5
1867          KM    PHOENIX VALLEY S-GRAPH WAS USED FOR THIS BASIN
1868          BA     .89
1869          LG     .15      .15     8.00     .11    55.00
1870          UI    189.     678.    1029.   1713.    1367.     909.     496.     240.     123.      47.
1871          UI     47.       0.       0.      0.       0.       0.       0.       0.       0.       0.
1872          UI      0.       0.       0.      0.       0.       0.       0.       0.       0.       0.
              *

1873          KK    R78D
1874          KM   RETAIN 100 YR 2 HR RUNOFF VOLUME
1875          DT    D78D      84
1876          DI       0   10000
1877          DQ       0   10000
              *
              * DDM   ***** Updated *****

1878          KK     82B
1879          KM   BASIN 82B
1880          KM    THE FOLLOWING PARAMETERS WERE PROVIDED FOR THIS BASIN
1881          KM    L=        .9  Lca=        .4   S=   21.2  Kn= .030  LAG=  17.2
1882          KM    PHOENIX VALLEY S-GRAPH WAS USED FOR THIS BASIN
1883          BA     .92
1884          LG     .15      .25     5.00     .36    55.00
1885          UI    266.     879.    1420.   2004.    1268.     727.     294.     142.      55.      55.
1886          UI      0.       0.       0.      0.       0.       0.       0.       0.       0.       0.
1887          UI      0.       0.       0.      0.       0.       0.       0.       0.       0.       0.
              *
                                                HEC-1 INPUT                                                    PAGE 50

LINE          ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10

1888          KK     R82
1889          KM   RETAIN 100 YR 2 HR RUNOFF VOLUME
1890          DT     D82       1
1891          DI       0   10000
1892          DQ       0   10000
              *

1893          KK   DTTRW
1894          KM    DIVERTING 110.7 ACRE-FEET DUE TO ON-SITE RETENTION
1895          KM   VOLUMES WERE DERIVED FROM DRAINAGE REPORT - REFERENCE 7.
1896          DT     TRW   110.7
1897          DI       0   10000
1898          DQ       0   10000
              *
              * DDM   ***** Preserved *****

1899          KK    C78D
1900          KM    COMBINE FLOWS FROM 78D, 82B AND ROUTED FLOW 82T78D
1901          KM     @ PECOS ROAD AND SIGNAL BUTTE ROAD.
1902          HC       3
              *
              * DDM   ***** Preserved *****

1903          KK   78DTE
1904          KM   REACH PS-2, PS-3, PS-4 plus culverts PSC-3 AND PSC-2.
1905          KM   ROUTE FLOWS FROM 78D (PECOS RD AND SIGNAL BUTTE RD) TO 78E (PECOS AND CRISMON
1906          RS       2    FLOW      -1
1907          RC    .025    0.025   0.025    5100   .0005
1908          RX       0        8      16    53.2    93.2   130.4   138.4   146.4
1909          RY     6.0      6.1     6.2       0       0     6.3     6.1     6.0
              *

1910          KK     78E
1911          KM   BASIN 78E
1912          KM    THE FOLLOWING PARAMETERS WERE PROVIDED FOR THIS BASIN
1913          KM    L=       1.1  Lca=        .5   S=   17.4  Kn= .087  LAG=  57.4
1914          KM    PHOENIX VALLEY S-GRAPH WAS USED FOR THIS BASIN
1915          BA    1.01
1916          LG     .35      .26     8.80     .06    1.00
1917          UI     59.      59.     108.    212.     271.     313.     351.     402.     460.     565.
1918          UI    741.     698.     577.    502.     447.     382.     335.     289.     241.     166.
1919          UI    104.     100.      97.     60.      59.      45.      18.      18.      18.      18.
1920          UI     18.      18.      18.     18.       0.       0.       0.       0.       0.       0.
1921          UI      0.       0.       0.      0.       0.       0.       0.       0.       0.       0.
              *

1922          KK      83
1923          KM   BASIN 83
1924          KM    THE FOLLOWING PARAMETERS WERE PROVIDED FOR THIS BASIN
1925          KM    L=       2.0  Lca=        .5   S=   15.0  Kn= .030  LAG=  25.8
1926          KM    PHOENIX VALLEY S-GRAPH WAS USED FOR THIS BASIN
1927          BA    1.01
1928          LG     .15      .25     5.00     .36    55.00
1929          UI    131.     423.     700.    931.    1454.    1362.     993.     726.     464.     226.
                                                HEC-1 INPUT                                                    PAGE 51

LINE          ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10

1930          UI    161.      89.      40.     40.      40.       0.       0.       0.       0.       0.
1931          UI      0.       0.       0.      0.       0.       0.       0.       0.       0.       0.
              *
```

```
1932          KK     R83
1933          KM   RETAIN 100 YR 2 HR RUNOFF VOLUME
1934          DT     D83       83
1935          DI       0    10000
1936          DQ       0    10000
              *

1937          KK    C78E
1938          KM   COMBINE FLOWS FROM 78D AND 78E (CRISMON ROAD)
1939          HC       3
              *

1940          KK  78ET84
1941          KM   REACH PS-1
1942          KM   ROUTE FLOWS WEST ALONG PECOS IN A PROPOSED CHANNEL
1943          KM   ROUTE FLOWS FROM CRISMON ROAD TO ELLSWORTH ROAD.
1944          RS       2    FLOW      -1
1945          RC    .025   0.025   0.025    4840   .0005
1946          RX       0       8      16    53.2    93.2   130.4   138.4   146.4
1947          RY     6.0     6.1     6.2       0       0     6.2     6.1     6.0
              *

1948          KK      84
1949          KM   BASIN 84
1950          KM    THE FOLLOWING PARAMETERS WERE PROVIDED FOR THIS BASIN
1951          KM    L=       2.0  Lca=        .5   S=    12.5  Kn= .030  LAG=  26.7
1952          KM    PHOENIX VALLEY S-GRAPH WAS USED FOR THIS BASIN
1953          BA     .99
1954          LG     .15     .25    4.70     .40   55.00
1955          UI    125.    380.    651.    855.   1278.   1399.   1008.    747.    520.    258.
1956          UI    182.    120.     38.     38.     38.      0.      0.      0.      0.      0.
1957          UI      0.      0.      0.      0.      0.      0.      0.      0.      0.      0.
              *

1958          KK     R84
1959          KM   RETAIN 100 YR 2 HR RUNOFF VOLUME
1960          DT     D84       85
1961          DI       0    10000
1962          DQ       0    10000
              *

1963          KK     C84
1964          KM    COMBINE FLOWS FROM 78E AND 84  AT ELLSWORTH AND PECOS ROAD
1965          KM    CHANNEL EAST SIDE OF GATEWAY WILLIAMS FLOWING TO THE NORTH
1966          HC       2
              *
              * DDM    ***** Preserved *****
```



```
LINE          ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10

1967          KK  84T79B
1968          KM   REACH EH-3B
1969          KM   ROUTE FLOWS FROM THE CORNER OF PECOS AND ELLSWORTH ROADS TO
1970          KM   THE SOUTH OF WILLIAMS FIELD ROAD AND ELLSWORTH ROAD
1971          KM   (THIS IS THE COMBINE POINT FROM BASIN 79B)
1972          RS       1    FLOW      -1
1973          RC    .015    .015    .015    3383   .0010
1974          RX       0       8      16      30      55      69      77      85
1975          RY     6.7     6.8     6.9       0       0     6.9     6.8     6.7
              *

1976          KK     79B
1977          KM   BASIN 79B
1978          KM    THE FOLLOWING PARAMETERS WERE PROVIDED FOR THIS BASIN
1979          KM    L=       1.4  Lca=        .6   S=     9.0  Kn= .090  LAG=  77.7
1980          KM    PHOENIX VALLEY S-GRAPH WAS USED FOR THIS BASIN
1981          BA    1.00
1982          LG     .35     .25    9.70     .05     .00
1983          UI     43.     43.     43.     85.    150.    179.    207.    232.    250.    275.
1984          UI    306.    335.    388.    479.    557.    515.    444.    396.    360.    331.
1985          UI    295.    267.    240.    216.    192.    155.    123.     76.     76.     71.
1986          UI     71.     48.     43.     43.     36.     13.     13.     13.     13.     13.
1987          UI     13.     13.     13.     13.     13.     13.      0.      0.      0.      0.
1988          UI      0.      0.      0.      0.      0.      0.      0.      0.      0.      0.
              *

1989          KK   C79B1
1990          KM    FLOWS FROM SOUTH CHANNEL ALONG ELLSWORTH ROAD.
1991          HC       2
              *

1992          KK  79BTB2
1993          KM   REACH EH-3A
1994          KM   ROUTE FLOWS FROM THE COMBINE POINT OF SUB-BASIN 79B TO
1995          KM   WILLIAMS FIELD ROAD AND ELLSWORTH ROAD
1996          RS       2    FLOW      -1
1997          RC    .025    .015    .025    5000   .0010
1998          RX       0       8      16      30      55      69      77      85
1999          RY     6.7     6.8     6.9       0       0     6.9     6.8     6.7
              *

2000          KK   C79B2
2001          KM   COMBINE 79A AND ROUTED 79B (WHICH IS HYDROGRAPH C79B1)
2002          HC       2
```

```
                *
2003            KK  79TPC2
2004            KM   REACH EH-1, EH-2, plus culvert EHC-1
2005            KM   ROUTE FLOWS THROUGH WILLIAMS-GATEWAY (SUBBASIN 80A) BY WAY OF NEW NORTH
2006            KM   PERIMETER CHANNEL ABOUT 1/2 MILE WEST OF ELLSWORTH ROAD
2007            RS       1    FLOW      -1
2008            RC    .025    .015    .025    4760   .0014
2009            RX       0       8      16      33      61      78      86      94
2010            RY     8.4     8.5     8.4       0       0     8.4     8.5     8.4
                *
1                                          HEC-1 INPUT                                                    PAGE 53

LINE            ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10


2011            KK   CPPWR
2012            KM   COMBINE FLOWS FROM 75 AND 79 IN THE POWERLINE FLOODWAY ALONG RAY ROAD
2013            KM   AT ABOUT 1/2 MILE WEST OF ELLSWORTH ROAD
2014            HC       2
                *
                * KK*DBPWR
                * KM DIVERT FROM POWERLINE CHANNEL INTO THE RAY DETENTION BASIN
                * KM USES A REALISTIC SIDE-WEIR EQUATION TO FORM POWER CURVE
                * KM WEIR CREST = 3.25FT; WEIR LENGTH =  750; 4.0FT DIV STRUCTURE.
                * KO     3
                * DT PWRDB    1537
                * DI     0     528     544     576     628     704     955    5730
                * DQ     0       0      11      40      89     162     410    5174
                *

2015            KK  PWRT80
2016            KM   REACH PR-3, PR-4, plus culvert PRC-2
2017            KM   ROUTE FLOWS FROM PLF COMBINE TO CATCH POINT AT 80A VIA PLF IMPROVEMENT
2018            RS       1    FLOW      -1
2019            RC    .025    .015    .025    3680   .0014
2020            RX       0       8      16      34      62      79      87      95
2021            RY     8.5     8.6     8.7       0       0     8.7     8.6     8.5
                *

2022            KK     80A
2023            KM   BASIN 80A
2024            KM    THE FOLLOWING PARAMETERS WERE PROVIDED FOR THIS BASIN
2025            KM    L=      3.8  Lca=      2.2   S=   14.2  Kn= .030  LAG=  58.2
2026            KM    PHOENIX VALLEY S-GRAPH WAS USED FOR THIS BASIN
2027            BA    2.64
2028            LG     .15     .15    9.70     .06   55.00
2029            UI    153.    153.    265.    544.    690.    802.    899.   1020.   1171.   1421.
2030            UI   1851.   1871.   1534.   1330.   1185.   1024.    896.    770.    653.    479.
2031            UI    305.    265.    251.    187.    153.    153.     50.     47.     47.     47.
2032            UI     47.     47.     47.     47.      0.      0.      0.      0.      0.      0.
2033            UI      0.      0.      0.      0.      0.      0.      0.      0.      0.      0.
                *

2034            KK    R80A
2035            KM   RETAIN 100 YR 2 HR RUNOFF VOLUME
2036            DT    D80A      33
2037            DI       0   10000
2038            DQ       0   10000
                *
                *  THE SECTION BELOW COMBINES THE ROUTED FLOW FROM SANTAN AND POWER,
                *  THEN ROUTES THRU THE RAY DB
                * KKDRSNDB
                * KM RETURNS THE DIVERSION FROM THE SANTAN CHANNEL
                * DR SANDB
                *
                * KKDRPWDB
                * KM RETURNS THE DIVERSION FROM THE POWERLINE CHANNEL
                * DR PWRDB
                *
                * KK CPRAY
                * KM COMBINES THE TWO ROUTED FLOWS IN THE RAY DETENTION BASIN
                * HC     2       1
                *
                * KK*RTRAY
                * KM ROUTES THE HYDROGRAPH OUT OF THE RAY BASIN
                * KM Currently incorporates a dummy set of outflow data
                * KO     1
                * RS     1    STOR      -1
                * SV     0     244     493     747    1005    1269    1537
                * SE     0    1.54    3.08    4.63    6.17    7.71    9.25
                * SQ     0       1       2       3       4       5       6
                *
1                                          HEC-1 INPUT                                                    PAGE 54

LINE            ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10


2039            KK   CP80A
2040            KM   COMBINE FLOW IN THE POWERLINE FLOODWAY WITH FLOW COMING FROM SUBBASIN 80A
2041            KM   THE LOCATION FOR THIS COMBINATION AT THE NW CORNER OF SUBBASIN 80A
2042            HC       2
                * HC     3
                *

2043            KK  PWRSAN
```

```
2044        KM   REACH PR-1, PR-2 plus culvert PRC-1
2045        KM   ROUTE FLOWS FROM COMBINE POINT AT 80A VIA PLF RE-ALIGNMENT.
2046        RS       1    FLOW      -1
2047        RC    .015    .015    .015    3500   .0014
2048        RX       0       8      16      74     154     212     220     228
2049        RY     9.5     9.6     9.7       0       0     9.7     9.6     9.5
            *

2050        KK  EMFPOW
2051        KM   COMBINE FLOW FROM THE POWERLINE FLOODWAY WITH FLOW IN THE EMF
2052        HC       2
            *

2053        KK  POWTWI
2054        KM   ROUTE EMF FLOW TO WILLIAMS FIELD ROAD VIA THE EMF
2055        KM   THIS SECTION IS CONCRETE LINED TO PAST POWER ROAD BRIDGE
2056        RS       2    FLOW      -1
2057        RC     .03    .012     .03    4750   .0003
2058        RX       0     500     520     553     693     726     740     742
2059        RY      14      12      11       0       0      11      11      12
            *

2060        KK     80B
2061        KM   BASIN 80B
2062        KM    THE FOLLOWING PARAMETERS WERE PROVIDED FOR THIS BASIN
2063        KM    L=      1.5  Lca=       .9   S=   18.4  Kn= .044  LAG=  41.9
2064        KM    PHOENIX VALLEY S-GRAPH WAS USED FOR THIS BASIN
            * KO                                    21
2065        BA    1.12
2066        LG     .13     .17    6.80     .18   48.00
2067        UI     90.    105.    319.    433.    515.    614.    754.   1063.   1032.    814.
2068        UI    687.    563.    464.    359.    213.    155.    136.     90.     73.     28.
2069        UI     28.     28.     28.     28.     28.      0.      0.      0.      0.      0.
2070        UI      0.      0.      0.      0.      0.      0.      0.      0.      0.      0.
            *

2071        KK    R80B
2072        KM   RETAIN 100 YR 2 HR RUNOFF VOLUME
            * KO                                    21
2073        DT    D80B       4
2074        DI       0   10000
2075        DQ       0   10000
            *
            *
            *    Subbasin 81B routed to EMFWIL per discussions with the FCDMC as part of the
            *    Chandler Heights/Rittenhouse Basin Design Project.          QAZ
            *
```



```
LINE        ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10

2076        KK     81B
2077        KM   BASIN 81B
2078        KM    THE FOLLOWING PARAMETERS WERE PROVIDED FOR THIS BASIN
2079        KM    L=      1.1  Lca=       .4   S=    6.9  Kn= .033  LAG=  24.7
2080        KM    PHOENIX VALLEY S-GRAPH WAS USED FOR THIS BASIN
2081        BA     .84
2082        LG     .10     .25    4.70     .45   67.00
2083        UI    115.    393.    631.    857.   1343.   1088.    796.    566.    296.    185.
2084        UI    115.     39.     35.     35.      0.      0.      0.      0.      0.      0.
2085        UI      0.      0.      0.      0.      0.      0.      0.      0.      0.      0.
            *

2086        KK    R81B
2087        KM   RETAIN 100 YR 2 HR RUNOFF VOLUME
            * KO     3                              21
2088        DT    D81B      35
2089        DI       0   10000
2090        DQ       0   10000
            *
            *      81B to be combined with 80B and exported to EMF routing model by 80B81B
            *      EMFWIL to combine 80B81B with flow from POWTWI for this model
            *      qaz
            *

2091        KK  80B81B
2092        KM       COMBINE FLOWS FROM 80B & 81B AND EXPORT TO ROUTING MODEL
            * KO                                    21
2093        HC       2
            *

2094        KK  EMFWIL
2095        KM   COMBINE FLOWS INTO THE EMF WEST OF WILLIAMS AFB FROM 80B, 81B, EMF POWERLINE
2096        HC       2
            *

2097        KK  WILTSP
2098        KM   ROUTE EMF FLOW FROM WILLIAMS FIELD ROAD TO THE SOUTHERN PACIFIC RAILROAD
2099        KM     (AT RITTENHOUSE ROAD)
2100        RS       3    FLOW      -1
2101        RC     .03    .022     .03    5000   .0003
2102        RX       0     500     520     553     693     726     740     742
2103        RY      14      12      11       0       0      11      11      12
            *
            * DDM   ***** Updated *****
```

```
* KKEMFRT1       Hydrograph name changed by Dibble & Associates to avoid two
* KM             different hydrographs with the same name.
* KM COMBINE 81A & 81B AND RITTENHOUSE(HYDROGRAPH WILTSP, FROM EMFWIL)
* HC     2
*
*
* THE NEXT KK BLOCKS COME FROM THE QUEEN CREEK ADMS
*
*  ***********  UPDATED TO GREEN-AMPT  ***********
```



```
LINE        ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10

2104        KK  SUB258
2105        KM   PINAL COUNTY BASIN.  PARAMETERS BASED ON EXISTING LAND-USE
2106        KM   TO MODEL PINAL COUNTY'S PRE .VS. POST DEVELOPMENT DRAINAGE CRITERIA
2107        KM   BASIN 258
2108        KM    THE FOLLOWING PARAMETERS WERE PROVIDED FOR THIS BASIN
2109        KM    L=      4.6  Lca=      2.5   S=   24.8  Kn= .062  LAG= 122.0
2110        KM    AGRICULTURAL S-GRAPH WAS USED FOR THIS BASIN
2111        BA    3.65
2112        LG     .34     .17    4.70     .42   18.00
2113        UI    110.    110.    110.    110.    110.    217.    232.    299.    386.    574.
2114        UI    583.    717.    579.    644.    772.    918.    802.    927.    927.    927.
2115        UI    927.    927.    927.    927.    834.    772.    772.    772.    866.    865.
2116        UI    583.    579.    583.    650.    605.    458.    421.    421.    381.    331.
2117        UI    315.    309.    352.    309.    211.    211.    190.    178.    178.    159.
2118        UI    136.    136.    136.    125.    101.    101.    101.    101.    101.     74.
2119        UI     63.     63.     63.     63.     63.     63.     63.     63.     29.     14.
2120        UI     14.     14.     14.     14.     14.     14.     14.     14.     14.     14.
2121        UI     14.     14.     14.     14.     14.     14.     14.     14.     14.     14.
2122        UI     14.     14.     14.     14.     14.     14.     14.     14.     14.     14.
2123        UI     14.     14.     14.     14.     14.     14.     14.     14.     14.      0.
2124        UI      0.      0.      0.      0.      0.      0.      0.      0.      0.      0.
2125        UI      0.      0.      0.      0.      0.      0.      0.      0.      0.      0.
            *

2126        KK   RO259
2127        KM        ROUTE SUB258 TO CO262
2128        RM       8    1.57    0.20
            *
            *
            *  ***********  UPDATED TO GREEN-AMPT  ***********

2129        KK  SUB260
2130        KM   MARICOPA COUNTY BASIN.  PARAMETERS BASED ON FUTURE LAND-USE
2131        KM   BASIN 260
2132        KM    THE FOLLOWING PARAMETERS WERE PROVIDED FOR THIS BASIN
2133        KM    L=      1.0  Lca=       .5   S=   23.2  Kn= .045  LAG=  27.3
2134        KM    PHOENIX VALLEY S-GRAPH WAS USED FOR THIS BASIN
2135        BA     .98
2136        LG     .27     .25    4.80     .36   24.00
2137        UI    121.    355.    623.    813.   1175.   1413.   1018.    764.    555.    284.
2138        UI    199.    121.     55.     37.     37.     37.      0.      0.      0.      0.
2139        UI      0.      0.      0.      0.      0.      0.      0.      0.      0.      0.
            *

2140        KK  RETAIN
2141        KM    100-YR, 2HR RETENTION VOLUME FOR SUBBASIN LOCATED IN MARICOPA COUNTY
2142        DT  RETDIV      69
2143        DI       0   10000
2144        DQ       0   10000
            *
            * DDM   ***** Preserved *****
```



```
LINE        ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10

2145        KK   CO262
2146        KM        COMBINE SUB260 AND RO259
2147        HC       2
            * DDM   ***** Preserved *****

2148        KK   RO263
2149        KM        ROUTE CO262 TO CO266
2150        RM       8    1.56    0.20
            *
            *  ***********  UPDATED TO GREEN-AMPT  ***********

2151        KK  SUB264
2152        KM   MARICOPA COUNTY BASIN.  PARAMETERS BASED ON FUTURE LAND-USE
2153        KM   BASIN 264
2154        KM    THE FOLLOWING PARAMETERS WERE PROVIDED FOR THIS BASIN
2155        KM    L=      1.0  Lca=       .6   S=   20.0  Kn= .050  LAG=  32.9
2156        KM    PHOENIX VALLEY S-GRAPH WAS USED FOR THIS BASIN
2157        BA    1.00
2158        LG     .25     .25    4.70     .38   31.00
2159        UI    102.    217.    450.    584.    730.   1015.   1235.    921.    734.    572.
2160        UI    426.    228.    171.    115.     82.     31.     31.     31.     31.      0.
2161        UI      0.      0.      0.      0.      0.      0.      0.      0.      0.      0.
2162        UI      0.      0.      0.      0.      0.      0.      0.      0.      0.      0.
            *

2163        KK  RETAIN
```

```
2164          KM    100-YR, 2HR RETENTION VOLUME FOR SUBBASIN LOCATED IN MARICOPA COUNTY
2165          DT  RETDIV      73
2166          DI       0   10000
2167          DQ       0   10000
              *
              * DDM   ***** Preserved *****

2168          KK   CO266
2169          KM        COMBINE SUB264 AND RO263
2170          HC       2
              *
              * DDM   ***** Preserved *****

2171          KK   RO267
2172          KM        ROUTE CO266 TO CO270
2173          RM      16    3.31    0.20
              *
              *  ***********  UPDATED TO GREEN-AMPT  ***********

2174          KK  SUB268
2175          KM   MARICOPA COUNTY BASIN.  PARAMETERS BASED ON FUTURE LAND-USE
2176          KM   BASIN 268
2177          KM    THE FOLLOWING PARAMETERS WERE PROVIDED FOR THIS BASIN
2178          KM    L=      2.0  Lca=      1.1   S=   13.4  Kn= .046  LAG=  55.1
2179          KM    PHOENIX VALLEY S-GRAPH WAS USED FOR THIS BASIN
2180          BA     .97
2181          LG     .23     .25    4.65     .39   34.00
2182          UI     59.     59.    122.    219.    281.    324.    365.    422.    489.    637.
```



```
LINE          ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10

2183          UI    762.    634.    536.    474.    408.    355.    301.    255.    185.    113.
2184          UI    102.     97.     63.     59.     45.     18.     18.     18.     18.     18.
2185          UI     18.     18.      0.      0.      0.      0.      0.      0.      0.      0.
2186          UI      0.      0.      0.      0.      0.      0.      0.      0.      0.      0.
              *

2187          KK  RETAIN
2188          KM    100-YR, 2HR RETENTION VOLUME FOR SUBBASIN LOCATED IN MARICOPA COUNTY
2189          DT  RETDIV      68
2190          DI       0   10000
2191          DQ       0   10000
              *
              * DDM   ***** Preserved *****

2192          KK   CO270
2193          KM        COMBINE RUNOFF FROM RO267 AND SUB268
2194          HC       2
              *
              * DDM   ***** Preserved *****

2195          KK   RO283
2196          KM        ROUTE CO282 TO CONCENTRATION POINT AT QUEEN CREEK ROAD
2197          RM      14    2.78    0.20
              *
              * THIS IS THE END OF THE QUEEN CREEK ADMS INSERT
              *
              * DDM   ***** Updated *****

2198          KK     88A
2199          KM   BASIN 88A
2200          KM    THE FOLLOWING PARAMETERS WERE PROVIDED FOR THIS BASIN
2201          KM    L=        .8  Lca=        .2   S=   13.2  Kn= .020  LAG=   9.2
2202          KM    PHOENIX VALLEY S-GRAPH WAS USED FOR THIS BASIN
2203          BA     .50
2204          LG     .10     .25    5.00     .40   80.00
2205          UI    549.   1709.   1208.    323.     71.      0.      0.      0.      0.      0.
2206          UI      0.      0.      0.      0.      0.      0.      0.      0.      0.      0.
              *
              * DDM   ***** Preserved *****

2207          KK    R88A
2208          KM   RETAIN 100 YR 2 HR RUNOFF VOLUME
2209          DT    D88A      50
2210          DI       0   10000
2211          DQ       0   10000
              *

2212          KK  88AT89
2213          KM   REACH RH-2b,RH-2a,RH-1,EXISTING CHANNEL (FCD 97-34), plus culvert RHC-1
2214          KM   ROUTE 88A TO 89A VIA THE PROPOSED CHANNEL ALONG QUEEN CREEK ROAD
2215          KM   FROM CRISMON ROAD TO ELLSWORTH ROAD
2216          RS       1    FLOW      -1
2217          RC    .025    .025    .025    5135   .0010
2218          RX       0       8      16      45      55      85      93     101
2219          RY     4.7     4.8     4.9       0       0     4.9     4.8     4.7
              *
```



```
LINE          ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10

2220          KK     89A
2221          KM   BASIN 89A
2222          KM    THE FOLLOWING PARAMETERS WERE PROVIDED FOR THIS BASIN
```

```
2223          KM    L=      1.0  Lca=       .6   S=   19.0  Kn= .020  LAG=  13.5
2224          KM    PHOENIX VALLEY S-GRAPH WAS USED FOR THIS BASIN
2225          BA     .50
2226          LG     .10      .25    4.65      .47   80.00
2227          UI    247.     742.   1328.     891.    408.    158.     41.     38.      0.      0.
2228          UI      0.       0.      0.       0.      0.      0.      0.      0.      0.      0.
              *

2229          KK    R89A
2230          KM   RETAIN 100 YR 2 HR RUNOFF VOLUME
2231          DT    D89A      50
2232          DI       0   10000
2233          DQ       0   10000
              *

2234          KK    C89A
2235          KM   COMBINE FLOWS FROM 88A AND 89A AT QUEEN CREEK ROAD AND ELLSWORTH ROAD
2236          HC       2
              *

2237          KK  89ATRI
2238          KM   ROUTE 89A TO RITTENHOUSE ROAD VIA THE PROPOSED CHANNEL ALONG QUEEN CREEK ROAD
2239          KM    FROM ELLSWORTH ROAD TO RITTENHOUSE ROAD
2240          KM   REVISED 02.24.98 WITH RITTENHOUSE CHANNEL DESIGN.
2241          RS       1    FLOW      -1
2242          RC    .025    .025    .025    3145   .0005
2243          RX       0      10      26      39      49      72      78     100
2244          RY    12.2     9.7     5.7       0       0     5.7     9.7    12.2
              *

2245          KK    C283
2246          KM   COMBINE FLOWS FROM QUEEN CREEK ADMS AND EC ADMP AT QUEEN CREEK ROAD AND
2247          KM   RITTENHOUSE ROAD.
              * KO             2
2248          HC       2
              *

2249          KK  283T90
2250          KM   ROUTE FLOWS FROM CONCENTRATION POINT 283 AT QUEEN CREAK ROAD NORTH IN
2251          KM   RITTENHOUSE CHANNEL TO THE HALF MILE STREET BETWEEN QUEEN CREEK ROAD AND
2252          KM   GERMANN ROAD (RYAN STREET)
2253          KM
2254          KM   REVISED 02.24.98 WITH RITTENHOUSE CHANNEL DESIGN (TYPICAL SECTION #5).
2255          KM
              * KO             2
2256          RS       1    FLOW      -1
2257          RC    .025    .025    .025    4400   .0005
2258          RX       0      22      28      51      61      83      90     108
2259          RY    11.2     9.7     5.7       0       0     5.7     9.7    11.2
              *
```



```
LINE          ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10

2260          KK     90A
2261          KM   BASIN 90A
2262          KM    THE FOLLOWING PARAMETERS WERE PROVIDED FOR THIS BASIN
2263          KM    L=        .6  Lca=       .2   S=   24.2  Kn= .038  LAG=  12.8
2264          KM    PHOENIX VALLEY S-GRAPH WAS USED FOR THIS BASIN
2265          BA     .48
2266          LG     .10      .25    4.60      .49   62.00
2267          UI    269.     789.   1351.     812.    319.    113.     39.      0.      0.      0.
2268          UI      0.       0.      0.       0.      0.      0.      0.      0.      0.      0.
              *

2269          KK    R90A
2270          KM   RETAIN 100 YR 2 HR RUNOFF VOLUME
2271          DT    D90A      42
2272          DI       0   10000
2273          DQ       0   10000
              *

2274          KK    C90A
2275          KM   COMBINE FLOWS FLOW C283 AND SUBBASIN 90 AT RYAN STREET ALIGNMENT
              * KO             2
2276          HC       2
              *

2277          KK   90ATB
2278          KM   ROUTE FLOWS FROM SUBBASIN 90A TO 90B VIA CHANNEL
2279          KM   REVISED 02.24.98 WITH RITTENHOUSE CHANNEL DESIGN (TYPICAL SECTION #4).
2280          KM
              * KO             2
2281          RS       1    FLOW      -1
2282          RC    .025    .025    .025    4400   .0005
2283          RX       0      22      28      51      61      83      90     108
2284          RY    11.2     9.7     5.7       0       0     5.7     9.7    11.2
              *

2285          KK     87A
2286          KM   BASIN 87A
2287          KM    THE FOLLOWING PARAMETERS WERE PROVIDED FOR THIS BASIN
2288          KM    L=      1.0  Lca=       .5   S=   24.8  Kn= .020  LAG=  11.7
2289          KM    PHOENIX VALLEY S-GRAPH WAS USED FOR THIS BASIN
2290          BA     .49
```

```
2291        LG     .10     .25    5.00     .40   80.00
2292        UI    333.    979.   1448.    720.    221.     66.      0.      0.      0.      0.
2293        UI      0.      0.      0.      0.      0.      0.      0.      0.      0.      0.
            *

2294        KK    R87A
2295        KM   RETAIN 100 YR 2 HR RUNOFF VOLUME
2296        DT    D87A      49
2297        DI       0   10000
2298        DQ       0   10000
            *
```



```
LINE        ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10

2299        KK   87ATB
2300        KM   ROUTE 87A TO 87B VIA SHEET FLOW
2301        RS       3    FLOW      -1
2302        RC    .040    .040    .040    2640   .0056
2303        RX       0     500    1000    1005    1006    1011    1511    2011
2304        RY       1      .5       0       0       0      .5       1     1.5
            *

2305        KK     87B
2306        KM   BASIN 87B
2307        KM    THE FOLLOWING PARAMETERS WERE PROVIDED FOR THIS BASIN
2308        KM    L=        .9  Lca=        .5   S=   11.6  Kn= .020  LAG=  12.8
2309        KM    PHOENIX VALLEY S-GRAPH WAS USED FOR THIS BASIN
2310        BA     .49
2311        LG     .10     .25    5.00     .40   80.00
2312        UI    275.    809.   1385.    833.    327.    116.     40.      0.      0.      0.
2313        UI      0.      0.      0.      0.      0.      0.      0.      0.      0.      0.
            *

2314        KK    R87B
2315        KM   RETAIN 100 YR 2 HR RUNOFF VOLUME
2316        DT    D87B      49
2317        DI       0   10000
2318        DQ       0   10000
            *

2319        KK     C87
2320        KM   COMBINE FLOW FROM SUBBASINS 87A AND 87B
2321        HC       2
            *

2322        KK  87T88B
2323        KM     ROUTE S87 TO S88 VIA GERMANN ROAD
2324        RS       6    FLOW      -1
2325        RC    .045    .025    .045    5280    .002
2326        RX       0    1000    1005    1010    1050    1060    1560    2060
2327        RY      14      13      18      12      11      14    14.5      15
            *

2328        KK     88B
2329        KM   BASIN 88B
2330        KM    THE FOLLOWING PARAMETERS WERE PROVIDED FOR THIS BASIN
2331        KM    L=        .9  Lca=        .6   S=   21.2  Kn= .020  LAG=  12.8
2332        KM    PHOENIX VALLEY S-GRAPH WAS USED FOR THIS BASIN
2333        BA     .50
2334        LG     .10     .25    5.00     .40   80.00
2335        UI    279.    819.   1402.    843.    331.    117.     40.      0.      0.      0.
2336        UI      0.      0.      0.      0.      0.      0.      0.      0.      0.      0.
            *
```



```
LINE        ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10

2337        KK    R88B
2338        KM   RETAIN 100 YR 2 HR RUNOFF VOLUME
2339        DT    D88B      50
2340        DI       0   10000
2341        DQ       0   10000
            *

2342        KK    C88B
2343        KM   COMBINE FLOWS FROM SUBBASINS 88A AND 88B
2344        HC       2
            *

2345        KK  88T89B
2346        KM     ROUTE S88 (CRISMON ROAD) TO S89B (ELLSWORTH ROAD) VIA GERMANN ROAD
2347        RS       6    FLOW      -1
2348        RC    .045    .025    .045    5280    .004
2349        RX       0    1000    1005    1010    1050    1060    1560    2060
2350        RY      14      13      18      12      11      14    14.5      15
            *

2351        KK     89B
2352        KM   BASIN 89B
2353        KM    THE FOLLOWING PARAMETERS WERE PROVIDED FOR THIS BASIN
2354        KM    L=        .9  Lca=        .5   S=   23.2  Kn= .020  LAG=  11.7
2355        KM    PHOENIX VALLEY S-GRAPH WAS USED FOR THIS BASIN
2356        BA     .50
```

```
2357          LG     .10     .25    4.80     .43   80.00
2358          UI    336.    987.   1460.    726.    223.     67.      0.      0.      0.      0.
2359          UI      0.      0.      0.      0.      0.      0.      0.      0.      0.      0.
              *

2360          KK    R89B
2361          KM   RETAIN 100 YR 2 HR RUNOFF VOLUME
2362          DT    D89B      49
2363          DI       0   10000
2364          DQ       0   10000
              *

2365          KK    C89B
2366          KM   COMBINE FLOWS FROM SUBBASINS 89A AND 89B
2367          HC       2
              *

2368          KK  89TB90
2369          KM    ROUTE S89B (ELLSWORTH ROAD) TO S90B (AT RITTENHOUSE ROAD) VIA GERMANN ROAD
2370          RS      10    FLOW      -1
2371          RC    .045    .025    .045    8818   .0045
2372          RX       0    1000    1005    1010    1050    1060    1560    2060
2373          RY      14      13      18      12      11      14    14.5      15
              *
              * DDM   ***** Updated *****
                                          HEC-1 INPUT                                          PAGE 63

LINE          ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10

2374          KK     90B
2375          KM   BASIN 90B
2376          KM    THE FOLLOWING PARAMETERS WERE PROVIDED FOR THIS BASIN
2377          KM    L=      2.0  Lca=      1.2   S=   15.3  Kn= .042  LAG=  49.8
2378          KM    PHOENIX VALLEY S-GRAPH WAS USED FOR THIS BASIN
2379          BA     .82
2380          LG     .22     .25    4.65     .38   31.00
2381          UI     56.     56.    147.    232.    283.    327.    379.    444.    588.    709.
2382          UI    583.    490.    427.    359.    306.    259.    187.    117.     96.     91.
2383          UI     56.     56.     28.     17.     17.     17.     17.     17.     17.      0.
2384          UI      0.      0.      0.      0.      0.      0.      0.      0.      0.      0.
2385          UI      0.      0.      0.      0.      0.      0.      0.      0.      0.      0.
              *
              * DDM   ***** Preserved *****

2386          KK    R90B
2387          KM   RETAIN 100 YR 2 HR RUNOFF VOLUME
2388          DT    D90B      23
2389          DI       0   10000
2390          DQ       0   10000
              * DDM   ***** Preserved *****

2391          KK     C90
2392          KM   COMBINE FLOWS FROM 90A AND 90B
2393          HC       3
              *

2394          KK   90T91
2395          KM   REVISED 02.24.98 WITH RITTENHOUSE CHANNEL DESIGN (TYPICAL SECTION #3).
2396          KM
2397          RS       1    FLOW      -1
2398          RC    .025    .025    .025    6400   .0005
2399          RX       0      30      36      60      88     108     114     132
2400          RY     9.7     7.5       6       0       0       6     7.5     9.7
              *

2401          KK      85
2402          KM   BASIN 85
2403          KM    THE FOLLOWING PARAMETERS WERE PROVIDED FOR THIS BASIN
2404          KM    L=      2.0  Lca=       .5   S=   15.0  Kn= .030  LAG=  25.8
2405          KM    PHOENIX VALLEY S-GRAPH WAS USED FOR THIS BASIN
2406          BA    1.00
2407          LG     .15     .25    4.35     .51   55.00
2408          UI    131.    422.    698.    929.   1452.   1359.    991.    725.    463.    226.
2409          UI    161.     89.     40.     40.     40.      0.      0.      0.      0.      0.
2410          UI      0.      0.      0.      0.      0.      0.      0.      0.      0.      0.
              *
              * DDM   ***** Preserved *****
                                          HEC-1 INPUT                                          PAGE 64

LINE          ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10

2411          KK     R85
2412          KM   RETAIN 100 YR 2 HR RUNOFF VOLUME
2413          DT     D85      84
2414          DI       0   10000
2415          DQ       0   10000
              * DDM   ***** Preserved *****

2416          KK   85T86
2417          KM     ROUTE S85 TO S86 VIA WAFB SOUTH PERIMETER CHANNEL
2418          RS       4    FLOW      -1
2419          RC   0.055   0.035   0.055    5280   .0039
2420          RX       0     500    1000    1013    1028    1041    1541    2041
2421          RY     5.5       5     4.5       0       0     4.5       5     5.5
```

```
                *
                * DDM   ***** Updated *****

2422            KK      86
2423            KM   BASIN 86
2424            KM    THE FOLLOWING PARAMETERS WERE PROVIDED FOR THIS BASIN
2425            KM    L=      2.0  Lca=        .5   S=   15.0  Kn= .030  LAG=  25.8
2426            KM    PHOENIX VALLEY S-GRAPH WAS USED FOR THIS BASIN
2427            BA    1.00
2428            LG     .15      .25    4.55     .45   55.00
2429            UI    131.     420.    695.    925.   1446.   1354.    987.    722.    461.    225.
2430            UI    160.      89.     40.     40.     40.      0.      0.      0.      0.      0.
2431            UI      0.       0.      0.      0.      0.      0.      0.      0.      0.      0.
                *
                * DDM   ***** Preserved *****

2432            KK     R86
2433            KM   RETAIN 100 YR 2 HR RUNOFF VOLUME
2434            DT     D86      85
2435            DI       0   10000
2436            DQ       0   10000
                *
                * DDM   ***** Preserved *****

2437            KK     C86
2438            KM     COMBINE 85 AND 86 AT PECOS ROAD AND SOSSAMAN ROAD
2439            HC       2
                *
                * DDM   ***** Preserved *****

2440            KK   86T91
2441            KM     ROUTE S86 TO S91 VIA WAFB SOUTH PERIMETER CHANNEL. Grassy v=3ft/sec
2442            RS       6    FLOW      -1
2443            RC    0.05   0.035    0.05    5500   .0025
2444            RX       0     500    1000    1013    1028    1041    1541    2041
2445            RY     5.5       5     4.5       0       0     4.5       5     5.5
                *
                * DDM   ***** Updated *****
```



```
LINE            ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10

2446            KK      91
2447            KM   BASIN 91
2448            KM    THE FOLLOWING PARAMETERS WERE PROVIDED FOR THIS BASIN
2449            KM    L=      1.4  Lca=        .6   S=   18.4  Kn= .030  LAG=  22.7
2450            KM    PHOENIX VALLEY S-GRAPH WAS USED FOR THIS BASIN
2451            BA     .46
2452            LG     .15      .25    4.65     .42   55.00
2453            UI     68.     262.    399.    586.    792.    554.    390.    234.    116.     73.
2454            UI     28.      21.     21.      0.      0.      0.      0.      0.      0.      0.
2455            UI      0.       0.      0.      0.      0.      0.      0.      0.      0.      0.
                *

2456            KK   RET91
2457            KM   RETAIN 100YR 2HR VOLUME
2458            DT     D91      38
2459            DI       0   10000
2460            DQ       0   10000
                *
                * DDM   ***** Updated *****

2461            KK     81A
2462            KM   BASIN 81A
2463            KM    THE FOLLOWING PARAMETERS WERE PROVIDED FOR THIS BASIN
2464            KM    L=      3.3  Lca=       1.9   S=   16.4  Kn= .029  LAG=  49.0
2465            KM    PHOENIX VALLEY S-GRAPH WAS USED FOR THIS BASIN
2466            BA    1.81
2467            LG     .14      .25    4.70     .41   58.00
2468            UI    125.     125.    341.    523.    642.    737.    863.   1019.   1359.   1576.
2469            UI   1258.    1066.    922.    777.    656.    545.    386.    222.    209.    177.
2470            UI    125.     117.     38.     38.     38.     38.     38.     38.     38.      0.
2471            UI      0.       0.      0.      0.      0.      0.      0.      0.      0.      0.
2472            UI      0.       0.      0.      0.      0.      0.      0.      0.      0.      0.
                *
                * DDM   ***** Preserved *****

2473            KK    R81A
2474            KM   RETAIN 100 YR 2 HR RUNOFF VOLUME
2475            DT    D81A       5
2476            DI       0   10000
2477            DQ       0   10000
                *
                * DDM   ***** Preserved *****

2478            KK    CP91
2479            KM     COMBINE 91, 90, 86 81A AT RITTENHOUSE CHANNEL
2480            HC       4
                *
                * DDM   ***** Preserved *****
                *
```



```
LINE            ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10
```

```
2481          KK  91TEMF
2482          KM   ROUTE 91 TO EMF
              * KO                                    21
2483          RS       4    FLOW      -1
2484          RC   0.035   0.022   0.035    4000   0.003
2485          RX       0     200     230     240     270     280     310     410
2486          RY       9       7       6       0       0       6       7       9
              *
              * DDM   ***** Preserved *****

2487          KK  EMFRIT   Revised by Dibble & Associates to remove combination at "RITTEN"
2488          KM   COMBINE HYDROGRAPHS EMFRT1 AND 91TEMF
2489          HC       2
              *
              * THIS PORTION OF THE MODEL IS USED TO DEVELOPE HYDROGRAPHS FOR THE CAP1A AND
              * CAP1B OVERCHUTES. ALL PARAMETERS ARE FROM THE SEMESA ADMS DATED 1997
              *
              *
              *
2490          KM      *******  \/ \/ \/ modifications by Dibble & Associates \/ \/ \/ **********
2491          KM
2492          KM   On 12.16.97 - made changes to sub-basins 62C & 62D per County
2493          KM   On 12.17.97 - revised detention Basin DB82A1
2494          KM   On 12.18.97 - Siphon Draw basin to be on-line facility, rearranged sequence
2495          KM   On 12.19.97 - Basin MN4B near Powerline Floodway, data based on grading plan
2496          KM                - Revised Channel Routing parameters for Area 1
2497          KM   On 01.05.98 - Revised Detention Basin DB82A1 & DB82B.
2498          KM                - Coordinated file with FB.
2499          KM   On 01.12.98 - Revised Hydrology per County '97 Land Use Parameters
2500          KM                - File Updated by DDMS
2501          KM                - Retention revised per County '97 Land Use Parameters
2502          KM   On 01.14.98 - Revised routing along the Santan Alignment
2503          KM   On 01.19.98 - Revised channel routing parameters, Area 2 for channel design.
2504          KM   On 01.26.98 - Revised channel routing slopes in non-ADMP design areas to
2505          KM                  match the MAG97 values found in file FUTSOUTH.DAT from FCDMC
2506          KM   On 01.26.98 - Revised wording at CAP1A and CAP1B to reflect 217 cfs per
2507          KM                  overchute location, not per pipe.  This per Valerie Swick.
2508          KM   On 01.27.98 - Copied the KK 91 to KK EMFRIT sequence from FUTSOUTH.DAT
2509          KM                  and revised diagram sequence to add in Santan Fwy channel.
2510          KM   On 01.27.98 - Slope and NSTEPS values for some natural channels input from
2511          KM                  the District-supplied file "FUTSOUTH.DAT".
2512          KM   On 01.28.98 - Revised hydrograph names near EMF at Rittenhouse area.
2513          KM   On 02.12.98 - Revised minor station error in channel route 65AT66, RX record
2514          KM   On 02.23.98 - Revised per
2515          KM                  FCDMC comments:  Reworded KM record for route 65AT66.
2516          KM                                   Length for route 65T66 revised to 2400 feet.
2517          KM                                   KM added to 78B to explain why no retention.
2518          KM                                   Added channel route for CP82A4 to CP82A5.
2519          KM                                   Added 0.25 ratio @ Basin 75, removed retention
2520          KM   On 02.24.98 - Revised Rittenhouse Channel routing to reflect plans
2521          KM                  per FCD Contract No. 97-34 (Phase 2)
2522          KM
2523          KM   On 03.03.98 - Received This File as FINAL HYDROLOGY from the FCDMC
2524          KM   On 03.04.98 - Revised flow routing to show the PLF connecting to
```



```
LINE          ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10

2525          KM                  the Santan Channel.  Also re-ordered subbasin 80a
2526          KM                  to enter the system at the proper location.
2527          KM   On 03.06.98 - Revised KM record for EMFKNX to delete reference to C76A.
2528          KM   On 03.10.98 - Revised preliminary channel sizes from design data.
2529          KM                  Added routing reaches represented in design. (Area 1).
2530          KM   On 03.12.98 - Regraded Crismon Basin to avoid ADWR jurisdictional dam.
2531          KM   On 03.13.98 - Revised Siphon Draw Basin to avoid ADWR jurisdictional dam.
2532          KM   On 03.24.98 - Revised normal depth channel routing per Area 2 channel design.
2533          KM   On 04.22.98 - Submitted Hydrology to County.
2534          KM   On 05.20.98 - Revised Hydrology per County Comments
2535          KM   On 06.11.98 - Revised channel properties to reflect earth channels
2536          KM   On 06.12.98 - Submitted file to County (This is a pre-final submittal)
2537          KM
2538          KM   On 06.18.98 - Added combine at Knox Road for better flowrate resolution.
2539          KM
2540          KM   On 07.17.98 - Revised per FCD review comments.  Channel routings revised to
2541          KM                  follow the ADMP Preliminary Design Plans.  More verbal
2542          KM                  descriptions for channel routings added.
2543          KM
2544          KM   On 07.24.98 - This is the final submittal HEC-1 input file.
2545          KM
2546          KM   On 08.06.98 -Back checked entire file against FCDMC review comments printout.
2547          KM
2548          KM   On 10.21.98 -Revised routing at Elliot basin for prelim. 30% design.
2549          KM
2550          KM   On 10.27.98 -Revised divert for retention at Elliot Basin.
2551          KM
2552          KM   On 01.15.99 -File submitted as part of Elliot Basin Addendum to the ADMP.
2553          KM
2554          KM      *******  ^^^^^ modifications by Dibble & Associates ^^^^^   **************
              *
2555          ZZ
```

SCHEMATIC DIAGRAM OF STREAM NETWORK

INPUT LINE (V) ROUTING (--->) DIVERSION OR PUMP FLOW

```
NO.      (.) CONNECTOR        (<---) RETURN OF DIVERTED OR PUMPED FLOW

202        SOSS
             V
             V
207       RSOSS
             .
             .
213          .         59A
             .           .
             .           .
225          .           .-------->    D59A
223          .        R59A
             .           .
             .           .
228        C59A............
             V
             V
231      59A59B
             .
             .
238          .         59B
             .           .
             .           .
252          .           .-------->    D59B
250          .        R59B
             .           .
             .           .
255        C59B............
             V
             V
258      59BT60          \
             .
             .
264          .          60
             .           .
             .           .
281          .           .-------->     D60
279          .         R60
             .           .
             .           .
284      EMFGUA............
             V
             V
287      GUATEL
             .
             .
293          .          64
             .           .
             .           .
309          .           .-------->     D64
304          .         R64
             .           .
             .           .
312      EMFELL............
             V
             V
315      ELTWAR
             .
             .
321          .         62B
             .           .
             .           .
332          .           .-------->    D62B
330          .        R62B
             .           V
             .           V
335          .       62BTD
             .           .
             .           .
341          .           .         62D
             .           .           .
             .           .           .
354          .           .           .-------->    D62D
352          .           .        R62D
             .           .           .
             .           .           .
357          .       CP62D............
             .           V
             .           V
360          .       62DTF
             .           .
             .           .
366          .           .         62F
             .           .           .
             .           .           .
378          .           .           .-------->    D62F
376          .           .        R62F
             .           .           .
             .           .           .
381          .       CP62F............
             .           V
             .           V
384          .       62T63
             .           .
             .           .
```

```
391                 .           .          63
                    .           .           .
                    .           .           .
403                 .           .           .-------->     D63
401                 .           .         R63
                    .           .           .
                    .           .           .
406                 .       CP63............
                    .          V
                    .          V
409                 .      63T71
                    .           .
                    .           .
416                 .           .         68B
                    .           .           .
                    .           .           .
427                 .           .           .-------->    D68B
425                 .           .         R68
                    .           .           V
                    .           .           V
430                 .           .      68BT69
                    .           .           .
                    .           .           .
436                 .           .           .          69
                    .           .           .           .
                    .           .           .           .
447                 .           .           .           .-------->     D69
445                 .           .           .         R69
                    .           .           .           .
                    .           .           .           .
450                 .           .         C69............
                    .           .           V
                    .           .           V
453                 .           .      69T71
                    .           .           .
                    .           .           .
459                 .           .           .          71
                    .           .           .           .
                    .           .           .           .
471                 .           .           .           .-------->     D71
469                 .           .           .         R71
                    .           .           .           .
                    .           .           .           .
474                 .        C71........................
                    .          V
                    .          V
480                 .       71T72
                    .           .
                    .           .
487                 .           .          72
                    .           .           .
                    .           .           .
499                 .           .           .-------->     D72
497                 .           .         R72
                    .           .           .
                    .           .           .
502                 .       CPWAR............
                    .           .
                    .           .
504            EMFWAR............
                   V
                   V
507            WARTKN
                   .
                   .
513                .         70B
                   .           .
                   .           .
525                .           .-------->    D70B
523                .        R70B
                   .          V
                   .          V
528                .      70BT76
                   .           .
                   .           .
534                .           .         76B
                   .           .           .
                   .           .           .
546                .           .           .-------->    D76B
544                .           .         R76B
                   .           .           .
                   .           .           .
549                .        KNOX............
                   .           .
                   .           .
552            EMFKNX............
                   .
                   .
556                .         65A
                   .           .
                   .           .
571                .           .-------->    65A1
569                .       REMA1
                   .           .
                   .           .
576                .           .-------->    65A2a
```

```
574          .      REMA2
             .          .
             .          .
581          .          .-------->   65A2b
579          .      REMA3
             .          .
             .          .
586          .          .-------->   65A2c
584          .       65A3
             .          .
             .          .
589          .          .       CAP1A
             .          .          V
             .          .          V
594          .          .      RCAP1A
             .          .          V
             .          .          V
604          .          .      RRCP1A
             .          .          .
             .          .          .
612          .      C65A1............
             .          .
             .          .
618          .          .-------->  D_BAS1
615          .      BPAS1
             .          .
             .          .
623          .          .           .<-------  D_BAS1
621          .          .      BAS1IN
             .          .          V
             .          .          V
624          .          .      GR_BAS
             .          .          .
             .          .          .
633          .      CBAS1............
             .          V
             .          V
636          .      RCHL1
             .          .
             .          .
644          .          .           .<-------   65A2c
642          .          .      D65A2c
             .          .          .
             .          .          .
645          .      CHAN1............
             .          V
             .          V
648          .      RCHL2
             .          .
             .          .
656          .          .           .<-------   65A2b
654          .          .      D65A2b
             .          .          .
             .          .          .
657          .      CHAN2............
             .          V
             .          V
660          .      RCHL3
             .          .
             .          .
666          .          .       CAP1B
             .          .          V
             .          .          V
671          .          .      RCAP1B
             .          .          .
             .          .          .
679          .      CHAN3............
             .          .
             .          .
684          .          .           .<-------   65A2a
682          .          .      D65A2a
             .          .          .
             .          .          .
685          .     CHANEL............
             .          .
             .          .
690          .          .           .<-------    65A1
688          .          .      DB65A1
             .          .          .
             .          .          .
691          .     SD_TOT............
             .          .
             .          .
697          .          .-------->   DB65A
694          .     DIDB65
             .          .
             .          .
702          .          .-------->  D_PIPE
700          .       D_SDW
             .          V
             .          V
705          .       RSDW1
             .          V
             .          V
711          .       RSDW2
             .          .
```

```
717                 65AW
                      .
                      .
729                   .-------> D65AW
727               R65AW
                      V
                      V
732               65AT65
                      .
                      .
739                   .        65B
                      .         .
                      .         .
752                   .         .-------> D65B
750                   .       R65B
                      .         .
                      .         .
755           CP65B.......................
                 .
                 .
762              .-------> DIRS65
759           DI65B
                 .
                 .
767                   .<-------  DB65A
765               SD_IN
                      V
                      V
768               SD_BAS
                      .
                      .
779                   .         .<-------  D_PIPE
777                   .     DBPIPE
                      .         .
                      .         .
780               SD_OUT............
                      V
                      V
783               RMERD
                      V
                      V
787               65AT-1
                      V
                      V
792               ET_MTN
                      .
                      .
795           CP65A............
                 V
                 V
798           65AT-3
                 .
                 .
803                   .<-------  DIRS65
801               DR65B
                      V
                      V
804               RS65A
                      .
                      .
811           CP65............
                 V
                 V
815           65T66
                 .
                 .
818               ADOT-E
                      V
                      V
823               AET67A
                      .
                      .
830                   .        67A
                      .         .
                      .         .
842                   .         .-------> D67A
840                   .       R67A
                      .         .
                      .         .
845                 C67A............
                      V
                      V
848               67ATC
                      .
                      .
854                   .       SUP2
                      .         V
                      .         V
858                   .      RSUP2
                      .         .
                      .         .
865                   .         .        67B
                      .         .         .
                      .         .         .
877                   .         .         .-------> D67B
```

```
875                                                  R67B
                                                       .
                                                       .
880                                        C67B............
                                              V
                                              V
883                                        67BTC
                                                       .
                                                       .
891                                                  67C
                                                       .
                                                       .
904                                                    .-------->    D67C
902                                                  R67C
                                                       .
                                                       .
907                                  C67C......................
                                        V
                                        V
910                                67CT67
                                        .
                                        .
918                                          67D
                                                       .
                                                       .
930                                                    .------->    D67D
928                                        R67D
                                                       .
                                                       .
933                                  C67D............
                                        V
                                        V
936                                67DT66
                                        .
                                        .
944                                          66A
                                                       .
                                                       .
956                                                    .------->    D66A
954                                        R66A
                                              V
                                              V
959                                        66ATB
                                                       .
                                                       .
965                                                  66B
                                                       .
                                                       .
978                                                    .------->    D66B
976                                                  R66B
                                                       .
                                                       .
981                                        CP66B............
                                              V
                                              V
984                                        66BTC
                                                       .
                                                       .
990                                                  66C
                                                       .
                                                       .
1002                                                   .------->    D66C
1000                                                 R66C
                                                       .
                                                       .
1005                                       CP66C1............
                                                       .
                                                       .
1009                               CP66C2............
                                        .
                                        .
1016                                    .------->    DB66
1013                                 D166
                                        V
                                        V
1019                               66C1T2
                                        .
                                        .
1027                         CP66C............
                                V
                                V
1030                         66CTD
                                .
                                .
1038                                    .<-------    DB66
1036                                 DR66
                                        V
                                        V
1039                               RS66D1
                                        .
                                        .
1052                                    .------->    D-WB
1049                                 B-WA
                                        .
                                        .
1055                         C-WA............
```

```
                 .          V
                 .          V
1058             .      RC-WA
                 .          .
                 .          .
1064             .          .          .<-------    D-WB
1062             .          .      DR-WA
                 .          .          V
                 .          .          V
1065             .          .     RS66D2
                 .          .          .
                 .          .          .
1075             .      CP66D............
                 .          V
                 .          V
1079             .     66T66D
                 .          V
                 .          V
1083             .     66-66D
                 .          .
                 .          .
1087             .          .       66D
                 .          .          .
                 .          .          .
1099             .          .          .------->    D66D
1096             .          .      R66D
                 .          .          .
                 .          .          .
1102             .          .          .        61A
                 .          .          .          .
                 .          .          .          .
1114             .          .          .          .------->    D61A
1112             .          .          .       R61A
                 .          .          .          V
                 .          .          .          V
1117             .          .          .      61ATB
                 .          .          .          .
                 .          .          .          .
1123             .          .          .          .         61B
                 .          .          .          .           .
                 .          .          .          .           .
1136             .          .          .          .           .------->    D61B
1134             .          .          .          .        R61B
                 .          .          .          .           .
                 .          .          .          .           .
1139             .          .          .      CP61B............
                 .          .          .          V
                 .          .          .          V
1142             .          .          .     61T66D
                 .          .          .          .
                 .          .          .          .
1149             .          .          .          .         67E
                 .          .          .          .           .
                 .          .          .          .           .
1162             .          .          .          .           .------->    D67E
1159             .          .          .          .        R67E
                 .          .          .          .           .
                 .          .          .          .           .
1165             .          .          .       C67E............
                 .          .          .          .
                 .          .          .          .
1168             .      C66D........................
                 .          V
                 .          V
1171             .     66T70A
                 .          V
                 .          V
1174             .     66T70B
                 .          V
                 .          V
1177             .      CULVT
                 .          V
                 .          V
1180             .     66T70C
                 .          .
                 .          .
1187             .          .       62A
                 .          .          .
                 .          .          .
1198             .          .          .------->    D62A
1196             .          .      R62A
                 .          .          V
                 .          .          V
1201             .          .     62ATC
                 .          .          .
                 .          .          .
1208             .          .          .        62C
                 .          .          .          .
                 .          .          .          .
1220             .          .          .          .------->    D62C
1218             .          .          .       R62C
                 .          .          .          .
                 .          .          .          .
1223             .          .      C62C............
                 .          .          V
                 .          .          V
```

```
1226                .           .       62CTE
                    .           .          .
                    .           .          .
1233                .           .          .         62E
                    .           .          .          .
                    .           .          .          .
1245                .           .          .          .-------->    D62E
1243                .           .          .       R62E
                    .           .          .          .
                    .           .          .          .
1248                .           .       CP62E...........
                    .           .          V
                    .           .          V
1251                .           .      62T68A
                    .           .          .
                    .           .          .
1258                .           .          .         68A
                    .           .          .          .
                    .           .          .          .
1269                .           .          .          .-------->    D68A
1267                .           .          .       R68A
                    .           .          .          .
                    .           .          .          .
1272                .           .       CP68A...........
                    .           .          V
                    .           .          V
1275                .           .      68T70A
                    .           .          .
                    .           .          .
1283                .       OUTLET..........
                    .           V
                    .           V
1286                .        R-OUT
                    .           .
                    .           .
1294                .           .         70A
                    .           .          .
                    .           .          .
1305                .           .          .-------->    D70A
1303                .           .       R70A
                    .           .          .
                    .           .          .
1308                .        C70A...........
                    .           V
                    .           V
1311                .       70T76A
                    .           .
                    .           .
1319                .           .         76A
                    .           .          .
                    .           .          .
1332                .           .          .-------->    D76A
1330                .           .       R76A
                    .           .          .
                    .           .          .
1335                .        C76A...........
                    .           V
                    .           V
1338                .       76ATPR
                    .           .
                    .           .
1346        EMFSTN...........
                V
                V
1349        KNXTRY
                .
                .
1355                .         73A
                    .           V
                    .           V
1369                .       73ATB
                    .           .
                    .           .
1375                .           .         73B
                    .           .          .
                    .           .          .
1387                .           .          .-------->    D73B
1385                .           .       R73B
                    .           .          .
                    .           .          .
1390                .       CP73B...........
                    .           V
                    .           V
1393                .       73BTC
                    .           .
                    .           .
1400                .           .         73C
                    .           .          .
                    .           .          .
1411                .           .          .-------->    D73C
1409                .           .       R73C
                    .           .          .
                    .           .          .
1414                .       CP73C...........
                    .           V
                    .           V
```

```
1417          .     73T74C
              .        .
              .        .
1423          .        .        74A
              .        .         V
              .        .         V
1437          .        .      DB74A
              .        .         V
              .        .         V
1447          .        .      74ATB
              .        .         .
              .        .         .
1453          .        .         .        74B
              .        .         .         .
              .        .         .         .
1465          .        .         .         .-------->    D74B
1463          .        .         .      R74B
              .        .         .         .
              .        .         .         .
1468          .        .      CP74B............
              .        .         V
              .        .         V
1471          .        .      74BTC
              .        .         .
              .        .         .
1477          .        .         .        74C
              .        .         .         .
              .        .         .         .
1488          .        .         .         .-------->    D74C
1486          .        .         .      R74C
              .        .         .         .
              .        .         .         .
1491          .     CP74C........................
              .        V
              .        V
1494          .     74CT75
              .        .
              .        .
1501          .        .         75
              .        .         .
              .        .         .
1522          .      C75............
              .        V
              .        V
1525          .     75TPC
              .        .
              .        .
1531          .        .        77A
              .        .         V
              .        .         V
1547          .        .      77ATB
              .        .         .
              .        .         .
1553          .        .         .        77B
              .        .         .         .
              .        .         .         .
1565          .        .         .         .-------->    D77B
1563          .        .         .      R77B
              .        .         .         .
              .        .         .         .
1568          .        .      CP77B............
              .        .         V
              .        .         V
1571          .        .      77BTC
              .        .         .
              .        .         .
1578          .        .         .        77C
              .        .         .         .
              .        .         .         .
1589          .        .         .         .-------->    D77C
1587          .        .         .      R77C
              .        .         .         .
              .        .         .         .
1592          .        .       C77C............
              .        .         V
              .        .         V
1595          .        .     77CT78
              .        .         .
              .        .         .
1600          .        .         .        78A
              .        .         .         V
              .        .         .         V
1616          .        .         .      78ATB
              .        .         .         .
              .        .         .         .
1622          .        .         .         .         78B
              .        .         .         .          .
              .        .         .         .          .
1634          .        .         .      C78B............
              .        .         .         V
              .        .         .         V
1637          .        .         .      78BTC
              .        .         .         .
              .        .         .         .
1644          .        .         .         .         78C
              .        .         .         .          .
```

```
1655                                                  .-------->   D78C
1653                                            R78C
                                                  .
                                                  .
1658                      C78C.......................
                            V
                            V
1661                    78CT79
                            .
                            .
1668                            79A
                                .
                                .
1683                      C79A1............
                                .
                                .
1686                            78F
                                .
                                .
1703                                            82A1
                                                  .
                                                  .
1718                          C82A1............
                                V
                                V
1722                        DB82A1
                                V
                                V
1731                          PS-9
                                .
                                .
1738                                            CAP2
                                                  V
                                                  V
1747                                           RCAP2
                                                  .
                                                  .
1754                                                  .        82A2
                                                  .          .
                                                  .          .
1774                                           CP82A2............
                                                  .
                                                  .
1777                                                  .        82A4
                                                  .          V
                                                  .          V
1793                                                  .      82A4T3
                                                  .          .
                                                  .          .
1800                                                  .          .        82A3
                                                  .          .          .
                                                  .          .          .
1817                                                  .      CP82A3............
                                                  .          .
                                                  .          .
1820                                           CP82A5............
                                                  V
                                                  V
1823                                            DB82B
                                                  V
                                                  V
1832                                            MN-1
                                                  .
                                                  .
1839                          CP82A6............
                                V
                                V
1842                          82TBOX
                                V
                                V
1849                          BOXCLV
                                V
                                V
1856                          BOXT78
                                .
                                .
1863                                            78D
                                                  .
                                                  .
1875                                                  .-------->   D78D
1873                                            R78D
                                                  .
                                                  .
1878                                                  .        82B
                                                  .          .
                                                  .          .
1890                                                  .          .-------->     D82
1888                                                  .        R82
                                                  .          .
                                                  .          .
1896                                                  .          .-------->     TRW
1893                                                  .      DTTRW
                                                  .          .
                                                  .          .
1899                            C78D.......................
```

```
                 .          .          .          V
                 .          .          .          V
1903             .          .          .      78DTE
                 .          .          .          .
                 .          .          .          .
1910             .          .          .          .        78E
                 .          .          .          .         .
                 .          .          .          .         .
1922             .          .          .          .         .        83
                 .          .          .          .         .         .
                 .          .          .          .         .         .
1934             .          .          .          .         .         .-------->    D83
1932             .          .          .          .         .       R83
                 .          .          .          .         .         .
                 .          .          .          .         .         .
1937             .          .          .      C78E.......................
                 .          .          .          V
                 .          .          .          V
1940             .          .          .     78ET84
                 .          .          .          .
                 .          .          .          .
1948             .          .          .          .         84
                 .          .          .          .         .
                 .          .          .          .         .
1960             .          .          .          .         .-------->    D84
1958             .          .          .          .        R84
                 .          .          .          .         .
                 .          .          .          .         .
1963             .          .          .        C84............
                 .          .          .          V
                 .          .          .          V
1967             .          .          .     84T79B
                 .          .          .          .
                 .          .          .          .
1976             .          .          .          .        79B
                 .          .          .          .         .
                 .          .          .          .         .
1989             .          .          .      C79B1............
                 .          .          .          V
                 .          .          .          V
1992             .          .          .     79BTB2
                 .          .          .          .
                 .          .          .          .
2000             .          .      C79B2............
                 .          .          V
                 .          .          V
2003             .          .     79TPC2
                 .          .          .
                 .          .          .
2011             .      CPPWR............
                 .          V
                 .          V
2015             .     PWRT8C
                 .          .
                 .          .
2022             .          .        80A
                 .          .          .
                 .          .          .
2036             .          .          .-------->    D80A
2034             .          .       R80A
                 .          .          .
                 .          .          .
2039             .      CP80A............
                 .          V
                 .          V
2043             .     PWRSAN
                 .          .
                 .          .
2050        EMFPOW............
                 V
                 V
2053        POWTWI
                 .
                 .
2060             .        80B
                 .          .
                 .          .
2073             .          .-------->    D80B
2071             .       R80B
                 .          .
                 .          .
2076             .          .        81B
                 .          .          .
                 .          .          .
2088             .          .          .-------->    D81B
2086             .          .       R81B
                 .          .          .
                 .          .          .
2091             .     80B81B............
                 .          .
                 .          .
2094        EMFWIL............
                 V
                 V
2097        WILTSP
                 .
```

```
2104   SUB258
            V
            V
2126   RO259
            .
            .
2129        .      SUB260
            .           .
            .           .
2142        .           .-------> RETDIV
2140        .      RETAIN
            .           .
            .           .
2145   CO262............
            V
            V
2148   RO263
            .
            .
2151        .      SUB264
            .           .
            .           .
2165        .           .-------> RETDIV
2163        .      RETAIN
            .           .
            .           .
2168   CO266............
            V
            V
2171   RO267
            .
            .
2174        .      SUB268
            .           .
            .           .
2189        .           .-------> RETDIV
2187        .      RETAIN
            .           .
            .           .
2192   CO270............
            V
            V
2195   RO283
            .
            .
2198        .         88A
            .           .
            .           .
2209        .           .------->   D88A
2207        .       R88A
            .          V
            .          V
2212        .      88AT89
            .           .
            .           .
2220        .           .        89A
            .           .          .
            .           .          .
2231        .           .          .------->   D89A
2229        .           .      R89A
            .           .          .
            .           .          .
2234        .       C89A............
            .          V
            .          V
2237        .      89ATRI
            .           .
            .           .
2245     C283............
            V
            V
2249   283T90
            .
            .
2260        .         90A
            .           .
            .           .
2271        .           .------->   D90A
2269        .       R90A
            .           .
            .           .
2274     C90A............
            V
            V
2277   90ATB
            .
            .
2285        .         87A
            .           .
            .           .
2296        .           .------->   D87A
2294        .       R87A
            .          V
            .          V
2299        .      87ATB
```

```
2305                    87B
                         .
2316                     .-------->    D87B
2314                   R87B
                         .
2319                C87............
                      V
                      V
2322              87T88B
                      .
2328                    88B
                         .
2339                     .-------->    D88B
2337                   R88B
                         .
2342                C88B...........
                      V
                      V
2345              88T89B
                      .
2351                    89B
                         .
2362                     .-------->    D89B
2360                   R89B
                         .
2365                C89B...........
                      V
                      V
2368              89TB90
                      .
2374                    90B
                         .
2388                     .-------->    D90B
2386                   R90B
                         .
2391          C90........................
                V
                V
2394        90T91
                .
2401                85
                     .
2413                 .-------->    D85
2411               R85
                     V
                     V
2416              85T86
                     .
2422                     86
                         .
2434                     .-------->    D86
2432                   R86
                         .
2437               C86............
                     V
                     V
2440              86T91
                     .
2446                     91
                         .
2458                     .-------->    D91
2456                  RET91
                         .
2461                     .        81A
                         .          .
2475                     .          .-------->    D81A
2473                     .       R81A
                         .          .
2478          CP91.....................................
                V
                V
2481        91TEMF
                .
```

2487 EMFRIT.....

**) RUNOFF ALSO COMPUTED AT THIS LOCATION

```
*************************************                    *************************************
*                                   *                    *                                   *
*  FLOOD HYDROGRAPH PACKAGE  (HEC-1)*                    *   U.S. ARMY CORPS OF ENGINEERS    *
*            JUN   1998             *                    *   HYDROLOGIC ENGINEERING CENTER   *
*          VERSION 4.1              *                    *         609 SECOND STREET         *
*                                   *                    *      DAVIS, CALIFORNIA 95616      *
*  RUN DATE   05AUG04  TIME  11:32:14*                    *          (916) 756-1104           *
*                                   *                    *                                   *
*************************************                    *************************************
```

Option 7 - Preferred Alternative
This is the proposed future conditions HEC-1 model of 100-yr 24-hr storm
for the areas of south US60 for the Siphon Draw Basin project.
Model Name: S60EMAP7.DAT, modified by Wood/patel, July 2004.
Original Model: WS4-SEMR.DAT; Model for North US 60: N60EM.DAT(WS2-NEM.DAT)
Major changes including 1) flow from subbasin 65A is divided into 5 smaller
subbasins by diversion; 2) Guadalupe Basin is added; 3) both Siphon Draw
Wash and the Elliot Road storm drain bypass flow to the west.

****

MODEL REVISED 9/12/02 TO CHANGE ZW CARD TO ZR CARD AT HYDROGRAPH CAP1B (CWR)

ID Kirkham Michael:
Last Revised Date: 5/14/02
Filename: WS4-SEM.DAT

Comments Dated 5/14/02 (CJ)

This model should be used for the Rittenhouse and Chandler Heights Basin
Design Project - 30% Design Analyses.

This model is one of several models that represent the EMF watershed.
This model covers the Southeast Mesa Area and should reference as a DSS
the watershed model for the Northeast Mesa Area (Filename WS2-NEM.DAT).

This model is necessary to determine the input hydrographs for the
Rittenhouse Basin Design HEC-RAS Unsteady State analysis. To develop
the necessary input hydrographs the following models should be run in order.
Because the files utilize a TAPE21 file to export import hydrographs
between models, prior to running the FIRST model (WS1-NWM.DAT) any existing
TAPE21 file in the directory should be deleted. The run procedure order is:

1) WS1-NWM.DAT
2) WS2-NEM.DAT
3) WS3-QCSW.DAT
4) WS4-SEM.DAT (referencing WS2-NEM.DSS for the DSS file)
5) RT1-BASE.DAT

The necessary input hydrographs for the Rittenhouse Basin analysis
are determined in RT1-BASE. In that output file, the hydrograph at
RWFLD1 should be exported and used as the input hydrograph at the
EMF Reach 4 Cross Section 17.082. And the hydrograph at RITTEN should
be exported and used as the input hydrograph for the Rittenhouse Main
Channel at Cross Section 820.00

```
*************************************************************************
**** NOTE BY PRIMATECH ENGINEERS:                                    ****
**** DATE: 06/12/2001                                                ****
**** THE NEW FILE NAME IS: SEBTALT2.DAT                              ****
**** THE FILE WAS RENAMED AS <<RTBTALT2.DAT>> FOR THE EAST MARICOPA  ****
**** FLOODWAY CAPACITY MITIGATION PROJECT, BY FLOOD CONTROL DISTRICT OF ****
**** MARICOPA COUNTY.                                                ****
**** THE FILE WAS RENAMED <<RTBTALT3.DAT>> AND UPDATED USING GREEN AND ****
**** AMPT FUTURE CONDITIONS FOR BASINS 258 TO 268.                   ****
*************************************************************************
```

THIS MODEL WAS ORIGINALLY MIDDOUT.DAT
IT HAS BEEN MODIFIED BY CPE (7/2000)
FOR ALTERNATIVE 2 FOR THE EAST MARICOPA FLOOWAY
CAPACITY MITIGATION AND MULTI-USE CORRIDOR STUDY
TO ROUTE BOTH THE POWERLINE FLOOWAY
AND THE SANTAN FREEWAY CHANNEL INTO THE RAY BASIN PRIOR THEIR OUTFALL
INTO THE EMF

****

Model files changed by Collins/Pina Engineering
to reflect multi-use design concepts (recreation
and environment) proposed throughout the entire
EMF Corridor. July 2000

VERSION 8.06 CPE 7/31/00

```
*****************************************************************************

*****************************************************************************
 FILENAME: MIDDOUT.DAT

 ALL CIP INFRASTRUCTURE IS IN PLACE, FUTURE CONDITIONS LANDUSE IS IN PLACE
 FLOW IS ROUTED UP ELLSWORTH ROAD IN A EARTH LINED CHANNEL

*****************************************************************************
 PRODUCED BY DIBBLE AND ASSOCIATES AND HOSKIN ENGINEERING CONSULTANTS.
 File Name: Final8.Dat
 Revised - Jan. 2000 by SZ (Wood/Patel) From Final7.dat - new Z-V & Sideweir
 Revised - Jan. 2000 by SZ (Wood/Patel) from Final6.dat - 60% review comments
 Revised - Dec. 1999 by SZ (Wood/Patel) from Final5.dat
 Revised - Dec. 1999 by SZ (Wood/Patel) from Final4.dat
 Revised - Nov. 1999 by SZ (Wood/Patel) from Final3.dat
 Revised - June 1999 by SZ (Wood/Patel) for Final Model from Opt1.dat.
 Revised - May 1999 by SZ (Wood/Patel) for Option 1, Based on Model SDIB.DAT
 REVISED - MAY, 1999 BY VAS TO INCORPORATE INCREASE OF SUBBASIN RETENTION AND
           REVISIONS TO THE REGIONAL DETENTION BASIN STORAGE
 REVISED - FEB, 1999 BY VALERIE SWICK, FCD OF MARICOPA COUNTY
 REVISED - MAY, 1998 BY D&A

 REVISED BY VALERIE SWICK, FEB. 26, 1998

 FLOWS FROM DETENTION BASIN LOCATED AT NE CORNER OF ELLIOT AND ELLSWORTH ROADS
 IS ROUTED TO THE SOUTHWEST BY SIPHON DRAW TO SUBBASIN 70A. FROM THERE THEY
 WILL BE ROUTED BY A CHANNEL TO THE EMF. FLOWS FROM SUBBASINS ADJACENT TO
 SANTAN FREEWAY ALIGNMENT WILL BE ROUTED SOUTH TO SUBBASIN 70A WHERE THEY WILL
 BE COMBINED WITH FLOW IN SIPHON DRAW.

 EAST MESA AREA DRAINAGE MASTER PLAN
 AREA SOUTH OF SUPERSTITION (U.S. HWY 60)
 AUGUST 1997
 SOUTHEAST MESA HIGH RESOLUTION MODEL

 ***********FUTURE CONDITION MODEL OF THE WATERSHED************************

************ATTENTION*************************************************************
  SUBBASINS 75, 79A, 79B, 78E,  LANDUSES WERE NOT
  CHANGED BECAUSE IT WAS FELT THAT THEIR FUTURE CONDITIONS LANDUSES WOULD BE
  SIMILAR TO THE EXISTING CONDITIONS LANDUSES.
  RETENTION VOLUMES WILL ALSO NOT BE UTILIZED FOR SUBBASINS 75, 79A, 79B, 78E
  SOME QUEEN CREEK SUBBASINS WILL ALSO NOT HAVE RETENTION VOLUMES, EITHER
  BECAUSE THEY LIE IN PINAL COUNTY AND WE DONT KNOW PINAL COUNTIES PLANS OR
  THEY LIE IN THE SANTAN MOUNTAINS AND WON'T GET DEVELOPED
  WILLIAMS GATEWAY AIRPORT (SUBBASINS 80A, 80B, 81A, AND 81B) ARE MODELED AS
  FUTURE CONDITIONS AND HAVE RETENTION VOLUMES FOR THE 100YR 2HR STORM
*****************************************************************************
 FILENAME:  SDIBB.DAT

 THIS MODEL REPRESENTS THE FUTURE CONDITION OF THE WATERSHED.
 TOTAL DRAINAGE AREA IS APPROXIMATELY 213 SQ. MI.
 THIS MODEL USES A Kn VALUE OF 0.09 FOR DESERT LAND USE DUE TO SHEET FLOW
 CONDITIONS.

 100-YEAR 24-HOUR FREQUENCY
 AREAL REDUCTIONS FROM FCD HYDROLOGY MANUAL
 THIS MODEL INCLUDES INFLOW FROM NORTH OF THE SUPERSTITION FREEWAY
 AND EAST OF THE CAP

 DATA FROM THE QUEEN CREEK ADMS HAS BEEN ADDED TO CALCULATE FLOWS INTO THE
 EMF.   MUSKINGUM ROUTING NSTEPS WERE ADJUSTED TO BE WITHIN THE SUGGESTED
 RANGE.

 METHODOLOGY
 THE US CORPS OF ENGINEERS FLOOD HYDROLOGY MODEL HEC-1 DATED SEP1990 VER 4.0
 SCS TYPE II RAINFALL DISTRIBUTION
 S-GRAPH HYDROGRAPH
 GREEN AND AMPT INFILTRATION EQUATION USED FOR CALCULATING LOSSES
 NORMAL DEPTH STORAGE CHANNEL ROUTING
 APPROXIMATE DIRECTION, LOCATION, AND LENGTH OF THE WASHES HAVE BEEN
 EVALUATED BASED ON FIELD INVESTIGATION, USGS MAPS, LANDIS AERIAL SURVEYS
 DATED 1994
 THE NOAA TECHNICAL MEMORANDUM NOAA ATLAS 2 DEPTH AREA RATIOS

 ORIGINAL STUDY PERFORMED BY LISA C. YOUNG AND AFSHIN AHOURAIYAN, UPDATED BY
 DAVID DEGERNESS (OCT-DEC, 1996). REVIEWED BY VALERIE A. SWICK
 AND AMIR MOTAMEDI OF THE FLOOD CONTROL DISTRICT
 HYDROLOGY BRANCH ENGINEERING DIVISION, FLOOD CONTROL
 DISTRICT OF MARICOPA COUNTY, DECEMBER - JULY 1995.

 ASSUMED VELOCITY OF 1 FT/SEC FOR SHEET FLOW, 2-3 FT/SEC FOR WASH/NATURAL
 CHANNEL, 3 FT/SEC FOR ROAD AND GRASS CHANNEL, 10FT/SEC FOR CONCRETE CHANNEL

 VELOCITIES FOR ADMP IMPROVEMENT CHANNELS FROM DIBBLE AND ASSOCIATES
 SUGGESTED ALTERNATIVES (JULY 1, 1997)

 ***************************************************************************
 **** THE FOLLOWING NOTE WAS ADDED BY PRIMATECH ENGINEERS ON 06-12-2001 ****
 ***************************************************************************
 NOTE: MUST USE NEBUILD.DSS AS THE DSS FILE TO IMPORT FLOWS ACROSS THE
       SUPERSTITION FREEWAY.
 ***************************************************************************
```

NOTE: MUST USE NDIBF.DSS AS THE DSS FILE TO IMPORT FLOWS ACROSS THE SUPERSTITION FREEWAY.

DDM MCUHP2 SE MESA ADMP - SOUTH OF SUPERSTITION FWY, FUTURE CONDITIONS

```
181 IO        OUTPUT CONTROL VARIABLES
                    IPRNT          5  PRINT CONTROL
                    IPLOT          0  PLOT CONTROL
                    QSCAL         0.  HYDROGRAPH PLOT SCALE

  IT          HYDROGRAPH TIME DATA
                     NMIN          5  MINUTES IN COMPUTATION INTERVAL
                    IDATE     1APR97  STARTING DATE
                    ITIME       0000  STARTING TIME
                       NQ       1000  NUMBER OF HYDROGRAPH ORDINATES
                   NDDATE     4APR97  ENDING DATE
                   NDTIME       1115  ENDING TIME
                    ICENT         19  CENTURY MARK

              COMPUTATION INTERVAL     .08 HOURS
                   TOTAL TIME BASE   83.25 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

183 JD          INDEX STORM NO. 1
                     STRM       3.60  PRECIPITATION DEPTH
                     TRDA        .01  TRANSPOSITION DRAINAGE AREA

184 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    .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    .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    .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    .00    .00    .00    .00    .00    .00    .00    .00
                  .00    .00    .00    .00    .00    .00    .00    .01    .00    .01
                  .01    .01    .01    .01    .01    .01    .01    .01    .03    .03
                  .03    .09    .09    .09    .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    .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    .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
                  .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

194 JD          INDEX STORM NO. 2
                     STRM       3.58  PRECIPITATION DEPTH
                     TRDA       1.00  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    .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    .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    .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    .00    .00    .00    .00    .00    .00    .00    .00
                  .00    .00    .00    .00    .00    .00    .00    .01    .00    .01
                  .01    .01    .01    .01    .01    .01    .01    .01    .03    .03
                  .03    .09    .09    .09    .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    .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    .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
                  .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    .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       .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       .00       .00       .00       .00
195 JD        INDEX STORM NO. 3
                STRM        3.49  PRECIPITATION DEPTH
                TRDA        5.00  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       .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       .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       .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       .00       .00       .00       .00       .00       .00       .00       .00
          .00       .00       .00       .00       .00       .00       .00       .01       .00       .01
          .01       .01       .01       .01       .01       .01       .01       .01       .03       .03
          .03       .09       .09       .09       .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       .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       .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
          .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       .00       .00
          .00       .00       .00       .00       .00       .00       .00       .00       .00       .00
          .00       .00       .00       .00       .00       .00       .00       .00
196 JD        INDEX STORM NO. 4
                STRM        3.38  PRECIPITATION DEPTH
                TRDA       10.00  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       .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       .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       .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       .00       .00       .00       .00       .00       .00       .00       .00
          .00       .00       .00       .00       .00       .00       .00       .01       .00       .01
          .01       .01       .01       .01       .01       .01       .01       .01       .03       .03
          .03       .09       .09       .09       .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       .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       .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
          .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       .00       .00
          .00       .00       .00       .00       .00       .00       .00       .00
197 JD        INDEX STORM NO. 5
                STRM        3.24  PRECIPITATION DEPTH
                TRDA       30.00  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       .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       .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       .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       .00       .00       .00       .00       .00       .00       .00       .00
          .00       .00       .00       .00       .00       .00       .00       .01       .00       .01
          .01       .01       .01       .01       .01       .01       .01       .01       .03       .03
          .03       .09       .09       .09       .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	.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	.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
.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	.00	.00
.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
.00	.00	.00	.00	.00	.00	.00	.00	.00	.00

198 JD INDEX STORM NO. 6

STRM 3.10 PRECIPITATION DEPTH

TRDA 60.00 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	.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	.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	.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	.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	.00	.01
.01	.01	.01	.01	.01	.01	.01	.01	.03	.03
.03	.09	.09	.09	.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	.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	.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
.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	.00	.00

199 JD INDEX STORM NO. 7

STRM 3.05 PRECIPITATION DEPTH

TRDA 90.00 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	.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	.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	.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	.00	.00	.00	.00	.00	.00	.00	.00
.00	.00	.00	.00	.00	.00	.00	.01	.00	.01
.01	.01	.01	.01	.01	.01	.01	.01	.03	.03
.03	.09	.09	.09	.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	.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	.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
.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
.00	.00	.00	.00	.00	.00	.00	.00	.00	.00

200 JD INDEX STORM NO. 8

STRM 3.00 PRECIPITATION DEPTH

TRDA 120.00 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	.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	.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	.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	.00	.00	.00	.00	.00	.00	.00	.00
.00	.00	.00	.00	.00	.00	.00	.01	.00	.01
.01	.01	.01	.01	.01	.01	.01	.01	.03	.03
.03	.09	.09	.09	.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	.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	.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
.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	.00	.00
.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
.00	.00	.00	.00	.00	.00	.00	.00		

201 JD INDEX STORM NO. 9

STRM 2.97 PRECIPITATION DEPTH

TRDA 150.00 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	.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	.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	.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	.00	.00	.00	.00	.00	.01	.00	.01
.01	.01	.01	.01	.01	.01	.01	.01	.03	.03
.03	.09	.09	.09	.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	.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	.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
.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		

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	SOSS	1695.	12.67	585.	208.	84.	12.50		
ROUTED TO	RSOSS	1671.	12.75	583.	208.	84.	12.50		
+ HYDROGRAPH AT	59A	302.	12.33	41.	13.	4.	.26		
DIVERSION TO	D59A	4.	8.42	3.	1.	0.	.26		
HYDROGRAPH AT	R59A	302.	12.33	41.	12.	4.	.26		
2 COMBINED AT	C59A	1759.	12.67	616.	218.	87.	12.76		
ROUTED TO	59A59B	1745.	12.83	613.	218.	87.	12.76		
+ HYDROGRAPH AT	59B	637.	12.83	132.	39.	13.	.94		
DIVERSION TO	D59B	637.	12.83	119.	32.	11.	.94		
+ HYDROGRAPH AT									

R59B	137.	13.67	24.	8.	3.	.94
2 COMBINED AT						
C59B	1745.	12.83	622.	222.	89.	13.70
ROUTED TO						
59BT60	1635.	13.33	619.	222.	88.	13.70
HYDROGRAPH AT						
60	1069.	13.50	359.	112.	37.	2.30
DIVERSION TO						
D60	1069.	13.50	313.	86.	29.	2.30
HYDROGRAPH AT						
R60	355.	14.67	86.	27.	9.	2.30
2 COMBINED AT						
EMFGUA	1635.	13.33	665.	241.	95.	16.00
ROUTED TO						
GUATEL	1551.	13.67	635.	240.	94.	16.00
HYDROGRAPH AT						
64	924.	12.42	156.	51.	17.	.81
DIVERSION TO						
D64	924.	12.42	121.	34.	11.	.81
HYDROGRAPH AT						
R64	477.	12.75	57.	18.	6.	.81
2 COMBINED AT						
EMFELL	1612.	13.67	672.	253.	99.	16.81
ROUTED TO						
ELTWAR	1408.	14.08	645.	253.	98.	16.81
HYDROGRAPH AT						
62B	544.	12.00	54.	19.	6.	.23
DIVERSION TO						
D62B	454.	11.92	33.	10.	3.	.23
HYDROGRAPH AT						
R62B	470.	12.08	30.	9.	3.	.23
ROUTED TO						
62BTD	178.	12.50	28.	9.	3.	.23
HYDROGRAPH AT						
62D	609.	12.17	86.	28.	9.	.46
DIVERSION TO						
D62D	609.	12.17	63.	18.	6.	.46
HYDROGRAPH AT						
R62D	275.	12.50	34.	10.	3.	.46
2 COMBINED AT						
CP62D	452.	12.50	62.	19.	6.	.69
ROUTED TO						
62DTF	267.	13.00	61.	19.	6.	.69
HYDROGRAPH AT						
62F	421.	12.17	49.	16.	5.	.26
DIVERSION TO						
D62F	421.	12.17	32.	9.	3.	.26
HYDROGRAPH AT						
R62F	365.	12.25	24.	7.	2.	.26
2 COMBINED AT						
CP62F	360.	12.25	84.	26.	9.	.95
ROUTED TO						
62T63	285.	13.25	82.	26.	9.	.95
HYDROGRAPH AT						
63	1190.	12.33	177.	58.	19.	.91
DIVERSION TO						
D63	1190.	12.33	128.	36.	12.	.91
HYDROGRAPH AT						
R63	787.	12.50	74.	22.	7.	.91
2 COMBINED AT						
CP63	722.	12.50	151.	47.	16.	1.86
ROUTED TO						
63T71	223.	15.33	132.	47.	16.	1.86
HYDROGRAPH AT						

	68B	582.	12.00	58.	20.	7.	.25
DIVERSION TO							
	D68B	582.	12.00	42.	12.	4.	.25
HYDROGRAPH AT							
	R68	293.	12.08	26.	8.	3.	.25
ROUTED TO							
	68BT69	111.	12.42	25.	8.	3.	.25
HYDROGRAPH AT							
	69	208.	12.00	22.	7.	2.	.09
DIVERSION TO							
	D69	208.	12.00	16.	5.	2.	.09
HYDROGRAPH AT							
	R69	106.	12.17	9.	3.	1.	.09
2 COMBINED AT							
	C69	134.	12.42	34.	11.	4.	.34
ROUTED TO							
	69T71	68.	13.92	31.	11.	4.	.34
HYDROGRAPH AT							
	71	1960.	12.17	258.	89.	30.	1.09
DIVERSION TO							
	D71	1960.	12.17	187.	53.	18.	1.09
HYDROGRAPH AT							
	R71	1065.	12.33	114.	35.	12.	1.09
3 COMBINED AT							
	C71	1046.	12.33	243.	90.	30.	3.29
ROUTED TO							
	71T72	677.	12.58	240.	90.	30.	3.29
HYDROGRAPH AT							
	72	1422.	12.17	202.	69.	23.	.84
DIVERSION TO							
	D72	1422.	12.17	146.	42.	14.	.84
HYDROGRAPH AT							
	R72	755.	12.42	89.	28.	9.	.84
2 COMBINED AT							
	CPWAR	1141.	12.50	318.	115.	38.	4.13
2 COMBINED AT							
	EMFWAR	1599.	14.08	843.	346.	130.	20.94
ROUTED TO							
	WARTKN	1534.	14.25	840.	345.	129.	20.94
HYDROGRAPH AT							
	70B	647.	12.17	92.	31.	10.	.38
DIVERSION TO							
	D70B	647.	12.17	68.	19.	6.	.38
HYDROGRAPH AT							
	R70B	363.	12.42	38.	12.	4.	.38
ROUTED TO							
	70BT76	90.	13.92	38.	12.	4.	.38
HYDROGRAPH AT							
	76B	1157.	12.17	158.	53.	18.	.64
DIVERSION TO							
	D76B	1157.	12.17	117.	33.	11.	.64
HYDROGRAPH AT							
	R76B	539.	12.42	66.	20.	7.	.64
2 COMBINED AT							
	KNOX	539.	12.42	102.	32.	11.	1.02
2 COMBINED AT							
	EMFKNX	1634.	14.25	890.	369.	137.	21.96
HYDROGRAPH AT							
	65A	1299.	13.00	257.	65.	22.	2.54
DIVERSION TO							
	65A1	480.	13.00	95.	24.	8.	2.54
HYDROGRAPH AT							
	REMA1	818.	13.00	162.	41.	14.	2.54
DIVERSION TO							

	65A2a	234.	13.00	46.	12.	4.	2.54
HYDROGRAPH AT	REMA2	584.	13.00	116.	29.	10.	2.54
DIVERSION TO	65A2b	91.	13.00	18.	5.	2.	2.54
HYDROGRAPH AT	REMA3	493.	13.00	98.	25.	8.	2.54
DIVERSION TO	65A2c	65.	13.00	13.	3.	1.	2.54
HYDROGRAPH AT	65A3	428.	13.00	85.	21.	7.	2.54
HYDROGRAPH AT	CAP1A	710.	12.67	132.	36.	12.	.96
ROUTED TO	RCAP1A	625.	13.33	132.	36.	12.	.96
ROUTED TO	RRCP1A	618.	13.33	132.	36.	12.	.96
2 COMBINED AT	C65A1	984.	13.00	218.	57.	19.	1.53
DIVERSION TO	D_BAS1	934.	13.00	187.	47.	16.	1.53
HYDROGRAPH AT	BPAS1	50.	12.00	31.	11.	4.	1.53
HYDROGRAPH AT	BAS1IN	934.	13.00	187.	47.	16.	1.53
ROUTED TO	GR_BAS	54.	14.25	50.	37.	14.	1.53
2 COMBINED AT	CBAS1	104.	14.25	73.	46.	18.	1.53
ROUTED TO	RCHL1	104.	14.33	73.	46.	18.	1.53
HYDROGRAPH AT	D65A2c	65.	13.00	13.	3.	1.	2.54
2 COMBINED AT	CHAN1	147.	13.00	86.	49.	19.	1.94
ROUTED TO	RCHL2	147.	13.08	86.	49.	19.	1.94
HYDROGRAPH AT	D65A2b	91.	13.00	18.	5.	2.	2.54
2 COMBINED AT	CHAN2	234.	13.00	103.	53.	20.	2.12
ROUTED TO	RCHL3	234.	13.08	103.	53.	20.	2.12
HYDROGRAPH AT	CAP1B	710.	12.67	132.	36.	12.	.96
ROUTED TO	RCAP1B	627.	13.33	132.	36.	12.	.96
2 COMBINED AT	CHAN3	828.	13.25	233.	87.	32.	3.09
HYDROGRAPH AT	D65A2a	234.	13.00	46.	12.	4.	2.54
2 COMBINED AT	CHANEL	1033.	13.08	278.	98.	36.	3.55
HYDROGRAPH AT	DB65A1	480.	13.00	95.	24.	8.	2.54
2 COMBINED AT	SD_TOT	1497.	13.00	371.	122.	44.	4.48
DIVERSION TO	DB65A	1097.	13.00	173.	43.	14.	4.48
HYDROGRAPH AT	DIDB65	400.	12.25	197.	78.	29.	4.48
DIVERSION TO	D_PIPE	200.	12.25	65.	16.	5.	4.48
HYDROGRAPH AT							

	D_SDW	200.	12.08	132.	62.	24.	4.48
ROUTED TO	RSDW1	200.	13.00	131.	62.	24.	4.48
ROUTED TO	RSDW2	200.	13.42	130.	62.	24.	4.48
HYDROGRAPH AT	65AW	555.	12.25	70.	21.	7.	.43
DIVERSION TO	D65AW	555.	12.25	58.	16.	5.	.43
HYDROGRAPH AT	R65AW	187.	12.58	19.	6.	2.	.43
ROUTED TO	65AT65	58.	13.67	17.	6.	2.	.43
HYDROGRAPH AT	65B	1552.	12.42	271.	88.	29.	1.37
DIVERSION TO	D65B	1552.	12.42	218.	60.	20.	1.37
HYDROGRAPH AT	R65B	669.	12.83	89.	28.	9.	1.37
3 COMBINED AT	CP65B	653.	12.92	219.	91.	33.	6.28
DIVERSION TO	DIRS65	453.	12.92	61.	15.	5.	6.28
HYDROGRAPH AT	DI65B	200.	12.92	158.	76.	28.	6.28
HYDROGRAPH AT	SD_IN	1097.	13.00	173.	43.	14.	4.48
ROUTED TO	SD_BAS	64.	13.83	59.	39.	13.	4.48
HYDROGRAPH AT	DBPIPE	200.	12.25	65.	16.	5.	4.48
2 COMBINED AT	SD_OUT	264.	13.83	118.	56.	19.	2.54
ROUTED TO	RMERD	264.	13.83	118.	56.	19.	2.54
ROUTED TO	65AT-1	264.	13.83	118.	56.	19.	2.54
ROUTED TO	ET_MTN	264.	13.92	118.	56.	19.	2.54
2 COMBINED AT	CP65A	462.	13.83	271.	129.	46.	8.82
ROUTED TO	65AT-3	462.	13.83	271.	128.	46.	8.82
HYDROGRAPH AT	DR65B	453.	12.92	61.	15.	5.	6.28
ROUTED TO	RS65A	11.	15.25	11.	10.	5.	6.28
2 COMBINED AT	CP65	471.	13.83	280.	137.	50.	8.82
ROUTED TO	65T66	471.	13.83	280.	137.	50.	8.82
HYDROGRAPH AT	ADOT-E	251.	14.50	182.	67.	22.	.01
ROUTED TO	AET67A	251.	14.75	182.	67.	22.	.01
HYDROGRAPH AT	67A	387.	12.25	52.	17.	6.	.30
DIVERSION TO	D67A	387.	12.25	38.	11.	4.	.30
HYDROGRAPH AT	R67A	229.	12.50	20.	6.	2.	.30
2 COMBINED AT	C67A	261.	14.75	190.	72.	24.	.31
ROUTED TO							

67ATC	259.	15.08	190.	72.	24.	.31
HYDROGRAPH AT						
SUP2	442.	13.00	384.	218.	73.	.01
ROUTED TO						
RSUP2	397.	16.33	380.	218.	73.	.01
HYDROGRAPH AT						
67B	714.	12.25	105.	35.	12.	.53
DIVERSION TO						
D67B	714.	12.25	73.	21.	7.	.53
HYDROGRAPH AT						
R67B	457.	12.50	46.	14.	5.	.53
2 COMBINED AT						
C67B	495.	12.50	397.	232.	78.	.54
ROUTED TO						
67BTC	414.	16.50	396.	232.	78.	.54
HYDROGRAPH AT						
67C	1019.	12.42	146.	44.	15.	.93
DIVERSION TO						
D67C	1019.	12.42	126.	34.	11.	.93
HYDROGRAPH AT						
R67C	295.	12.83	34.	11.	4.	.93
3 COMBINED AT						
C67C	678.	15.25	602.	313.	105.	1.78
ROUTED TO						
67CT67	677.	15.33	601.	313.	105.	1.78
HYDROGRAPH AT						
67D	183.	12.17	20.	6.	2.	.13
DIVERSION TO						
D67D	183.	12.17	17.	5.	2.	.13
HYDROGRAPH AT						
R67D	52.	12.50	5.	1.	0.	.13
2 COMBINED AT						
C67D	680.	15.33	603.	314.	106.	1.91
ROUTED TO						
67DT66	680.	15.42	603.	314.	106.	1.91
HYDROGRAPH AT						
66A	446.	12.17	46.	14.	5.	.26
DIVERSION TO						
D66A	446.	12.17	39.	11.	4.	.26
HYDROGRAPH AT						
R66A	105.	12.42	11.	3.	1.	.26
ROUTED TO						
66ATB	35.	13.17	10.	3.	1.	.26
HYDROGRAPH AT						
66B	605.	12.58	104.	32.	11.	.67
DIVERSION TO						
D66B	605.	12.58	90.	24.	8.	.67
HYDROGRAPH AT						
R66B	168.	13.08	24.	7.	2.	.67
2 COMBINED AT						
CP66B	196.	13.08	34.	11.	4.	.93
ROUTED TO						
66BTC	169.	13.42	33.	11.	4.	.93
HYDROGRAPH AT						
66C	707.	12.25	94.	30.	10.	.50
DIVERSION TO						
D66C	707.	12.25	77.	21.	7.	.50
HYDROGRAPH AT						
R66C	257.	12.58	29.	9.	3.	.50
2 COMBINED AT						
CP66C1	232.	12.58	58.	19.	6.	1.43
2 COMBINED AT						
CP66C2	720.	15.17	638.	331.	111.	3.34
DIVERSION TO						

	DB66	310.	15.17	234.	72.	24.	3.34
HYDROGRAPH AT							
	DI66	410.	14.83	403.	258.	87.	3.34
ROUTED TO							
	66C1T2	410.	14.92	403.	258.	87.	3.34
2 COMBINED AT							
	CP66C	863.	13.92	658.	387.	135.	12.16
ROUTED TO							
	66CTD	862.	13.92	658.	387.	135.	12.16
HYDROGRAPH AT							
	DR66	310.	15.17	234.	72.	24.	3.34
ROUTED TO							
	RS66D1	202.	18.00	152.	59.	24.	3.34
DIVERSION TO							
	D-WB	179.	18.00	130.	39.	13.	3.34
HYDROGRAPH AT							
	B-WA	23.	18.00	22.	19.	11.	3.34
2 COMBINED AT							
	C-WA	867.	14.00	669.	403.	145.	15.50
ROUTED TO							
	RC-WA	867.	14.00	669.	403.	145.	15.50
HYDROGRAPH AT							
	DR-WA	179.	18.00	130.	39.	13.	3.34
ROUTED TO							
	RS66D2	33.	22.67	29.	25.	13.	3.34
2 COMBINED AT							
	CP66D	867.	14.00	674.	422.	156.	15.50
ROUTED TO							
	66T66D	866.	14.00	674.	422.	156.	15.50
ROUTED TO							
	66-66D	865.	14.00	674.	422.	156.	15.50
HYDROGRAPH AT							
	66D	651.	12.08	75.	26.	9.	.31
DIVERSION TO							
	D66D	651.	12.08	55.	16.	5.	.31
HYDROGRAPH AT							
	R66D	350.	12.25	32.	10.	3.	.31
HYDROGRAPH AT							
	61A	794.	12.17	95.	31.	10.	.52
DIVERSION TO							
	D61A	794.	12.17	76.	21.	7.	.52
HYDROGRAPH AT							
	R61A	333.	12.42	33.	10.	3.	.52
ROUTED TO							
	61ATB	104.	13.25	31.	10.	3.	.52
HYDROGRAPH AT							
	61B	1175.	12.42	176.	55.	18.	1.09
DIVERSION TO							
	D61B	1175.	12.42	151.	41.	14.	1.09
HYDROGRAPH AT							
	R61B	339.	12.83	45.	14.	5.	1.09
2 COMBINED AT							
	CP61B	330.	12.92	73.	23.	8.	1.61
ROUTED TO							
	61T66D	219.	13.67	71.	23.	8.	1.61
HYDROGRAPH AT							
	67E	771.	12.25	111.	36.	12.	.58
DIVERSION TO							
	D67E	771.	12.25	91.	25.	8.	.58
HYDROGRAPH AT							
	R67E	268.	12.67	34.	11.	4.	.58
2 COMBINED AT							
	C67E	249.	13.67	98.	33.	11.	2.19
3 COMBINED AT							

	C66D	993.	14.08	751.	451.	166.	18.00
ROUTED TO	66T70A	988.	14.08	750.	451.	166.	18.00
ROUTED TO	66T70B	987.	14.08	749.	451.	166.	18.00
ROUTED TO	CULVT	978.	14.08	747.	451.	166.	18.00
ROUTED TO	66T70C	966.	14.25	745.	450.	166.	18.00
HYDROGRAPH AT	62A	806.	12.00	89.	31.	10.	.38
DIVERSION TO	D62A	806.	12.00	57.	17.	6.	.38
HYDROGRAPH AT	R62A	554.	12.08	46.	14.	5.	.38
ROUTED TO	62ATC	393.	12.25	46.	14.	5.	.38
HYDROGRAPH AT	62C	835.	12.17	98.	32.	11.	.55
DIVERSION TO	D62C	754.	12.08	55.	16.	5.	.55
HYDROGRAPH AT	R62C	796.	12.25	56.	16.	5.	.55
2 COMBINED AT	C62C	1185.	12.25	102.	30.	10.	.93
ROUTED TO	62CTE	756.	12.42	100.	30.	10.	.93
HYDROGRAPH AT	62E	229.	12.17	27.	9.	3.	.15
DIVERSION TO	D62E	229.	12.17	22.	6.	2.	.15
HYDROGRAPH AT	R62E	75.	12.50	9.	3.	1.	.15
2 COMBINED AT	CP62E	812.	12.42	108.	33.	11.	1.08
ROUTED TO	62T68A	436.	12.83	104.	33.	11.	1.08
HYDROGRAPH AT	68A	695.	12.08	76.	25.	9.	.35
DIVERSION TO	D68A	695.	12.08	55.	16.	5.	.35
HYDROGRAPH AT	R68A	392.	12.25	32.	10.	3.	.35
2 COMBINED AT	CP68A	477.	12.83	133.	42.	14.	1.43
ROUTED TO	68T70A	411.	13.17	129.	42.	14.	1.43
2 COMBINED AT	OUTLET	1107.	14.17	836.	483.	176.	19.43
ROUTED TO	R-OUT	1105.	14.17	835.	483.	176.	19.43
HYDROGRAPH AT	70A	1144.	12.08	124.	41.	14.	.54
DIVERSION TO	D70A	1144.	12.08	94.	26.	9.	.54
HYDROGRAPH AT	R70A	569.	12.25	48.	15.	5.	.54
2 COMBINED AT	C70A	1131.	14.17	856.	493.	180.	19.97
ROUTED TO	70T76A	1117.	14.42	849.	492.	180.	19.97
HYDROGRAPH AT	76A	2137.	12.58	427.	136.	45.	1.91
DIVERSION TO							

D76A	2137.	12.58	338.	93.	31.	1.91
HYDROGRAPH AT						
R76A	987.	13.00	141.	43.	14.	1.91
2 COMBINED AT						
C76A	1227.	13.83	936.	522.	190.	21.88
ROUTED TO						
76ATPR	1202.	14.58	919.	521.	190.	21.88
2 COMBINED AT						
EMFSTN	2595.	14.42	1685.	841.	309.	43.84
ROUTED TO						
KNXTRY	2534.	14.58	1675.	839.	309.	43.84
HYDROGRAPH AT						
73A	378.	13.33	96.	24.	8.	.95
ROUTED TO						
73ATB	306.	13.83	96.	24.	8.	.95
HYDROGRAPH AT						
73B	585.	12.17	61.	18.	6.	.42
DIVERSION TO						
D73B	585.	12.17	56.	15.	5.	.42
HYDROGRAPH AT						
R73B	77.	12.67	10.	3.	1.	.42
2 COMBINED AT						
CP73B	313.	13.83	104.	27.	9.	1.37
ROUTED TO						
73BTC	312.	14.00	104.	27.	9.	1.37
HYDROGRAPH AT						
73C	1399.	12.00	139.	48.	16.	.58
DIVERSION TO						
D73C	1399.	12.00	103.	29.	10.	.58
HYDROGRAPH AT						
R73C	707.	12.08	59.	18.	6.	.58
2 COMBINED AT						
CP73C	600.	12.08	160.	44.	15.	1.95
ROUTED TO						
73T74C	341.	14.33	157.	44.	15.	1.95
HYDROGRAPH AT						
74A	306.	13.33	77.	19.	6.	.75
ROUTED TO						
DB74A	86.	14.42	40.	19.	6.	.75
ROUTED TO						
74ATB	64.	15.33	40.	19.	6.	.75
HYDROGRAPH AT						
74B	452.	12.25	43.	11.	4.	.33
DIVERSION TO						
D74B	452.	12.25	43.	11.	4.	.33
HYDROGRAPH AT						
R74B	1.	17.75	1.	0.	0.	.33
2 COMBINED AT						
CP74B	64.	15.33	40.	19.	6.	1.08
ROUTED TO						
74BTC	62.	15.58	40.	19.	6.	1.08
HYDROGRAPH AT						
74C	767.	12.00	85.	29.	10.	.34
DIVERSION TO						
D74C	767.	12.00	62.	18.	6.	.34
HYDROGRAPH AT						
R74C	491.	12.17	37.	11.	4.	.34
3 COMBINED AT						
CP74C	392.	14.33	219.	72.	24.	3.37
ROUTED TO						
74CT75	388.	14.50	216.	72.	24.	3.37
HYDROGRAPH AT						
75	262.	14.75	119.	32.	11.	4.01
2 COMBINED AT						

C75	615.	14.67	316.	99.	33.	7.38
ROUTED TO						
75TPC	613.	14.75	315.	99.	33.	7.38
HYDROGRAPH AT						
77A	556.	13.75	174.	43.	14.	1.74
ROUTED TO						
77ATB	474.	14.17	173.	43.	14.	1.74
HYDROGRAPH AT						
77B	524.	12.17	44.	12.	4.	.36
DIVERSION TO						
D77B	524.	12.17	32.	8.	3.	.36
HYDROGRAPH AT						
R77B	337.	12.33	13.	3.	1.	.36
2 COMBINED AT						
CP77B	474.	14.17	185.	47.	16.	2.10
ROUTED TO						
77BTC	465.	14.50	183.	46.	15.	2.10
HYDROGRAPH AT						
77C	678.	12.00	67.	23.	8.	.28
DIVERSION TO						
D77C	678.	12.00	50.	14.	5.	.28
HYDROGRAPH AT						
R77C	330.	12.08	29.	9.	3.	.28
2 COMBINED AT						
C77C	480.	14.50	209.	55.	18.	2.38
ROUTED TO						
77CT78	473.	14.75	208.	55.	18.	2.38
HYDROGRAPH AT						
78A	601.	13.75	188.	47.	16.	1.88
ROUTED TO						
78ATB	494.	14.33	187.	47.	16.	1.88
HYDROGRAPH AT						
78B	630.	12.17	67.	17.	6.	.39
2 COMBINED AT						
C78B	633.	12.25	250.	64.	21.	2.27
ROUTED TO						
78BTC	522.	12.50	250.	64.	21.	2.27
HYDROGRAPH AT						
78C	663.	12.00	71.	23.	8.	.28
DIVERSION TO						
D78C	610.	12.00	43.	12.	4.	.28
HYDROGRAPH AT						
R78C	608.	12.08	37.	11.	4.	.28
3 COMBINED AT						
C78C	946.	14.67	480.	126.	42.	4.93
ROUTED TO						
78CT79	939.	14.92	477.	126.	42.	4.93
HYDROGRAPH AT						
79A	944.	13.50	280.	70.	23.	2.01
2 COMBINED AT						
C79A1	1454.	13.58	727.	189.	63.	6.94
HYDROGRAPH AT						
78F	1077.	14.17	403.	102.	34.	4.19
HYDROGRAPH AT						
82A1	1123.	13.50	307.	77.	26.	3.12
2 COMBINED AT						
C82A1	1672.	13.50	681.	172.	57.	7.31
ROUTED TO						
DB82A1	183.	16.17	157.	135.	98.	7.31
ROUTED TO						
PS-9	183.	16.17	157.	135.	98.	7.31
HYDROGRAPH AT						
CAP2	64.	20.00	64.	64.	62.	.01
ROUTED TO						

	RCAP2	64.	21.17	64.	64.	61.	.01
HYDROGRAPH AT	82A2	879.	14.75	392.	104.	35.	4.13
2 COMBINED AT	CP82A2	916.	14.75	432.	159.	96.	4.14
HYDROGRAPH AT	82A4	631.	13.83	210.	53.	18.	2.13
ROUTED TO	82A4T3	623.	14.00	210.	53.	18.	2.13
HYDROGRAPH AT	82A3	536.	14.17	199.	50.	17.	2.02
2 COMBINED AT	CP82A3	1108.	14.08	400.	101.	34.	4.15
2 COMBINED AT	CP82A5	1614.	14.08	794.	251.	126.	8.29
ROUTED TO	DB82B	336.	16.83	315.	246.	126.	8.29
ROUTED TO	MN-1	336.	17.00	314.	246.	126.	8.29
2 COMBINED AT	CP82A6	470.	17.00	454.	369.	219.	15.60
ROUTED TO	82TBOX	470.	17.00	454.	369.	219.	15.60
ROUTED TO	BOXCLV	470.	17.08	454.	369.	219.	15.60
ROUTED TO	BOXT78	470.	17.33	454.	369.	218.	15.60
HYDROGRAPH AT	78D	1545.	12.17	194.	62.	21.	.89
DIVERSION TO	D78D	1545.	12.17	154.	42.	14.	.89
HYDROGRAPH AT	R78D	550.	12.42	64.	20.	7.	.89
HYDROGRAPH AT	82B	1558.	12.17	181.	59.	20.	.92
DIVERSION TO	D82	14.	1.08	2.	1.	0.	.92
HYDROGRAPH AT	R82	1558.	12.17	181.	59.	20.	.92
DIVERSION TO	TRW	1558.	12.17	181.	56.	19.	.92
HYDROGRAPH AT	DTTRW	19.	19.33	12.	3.	1.	.92
3 COMBINED AT	C78D	1277.	12.58	523.	435.	247.	17.41
ROUTED TO	78DTE	488.	17.67	471.	379.	222.	17.41
HYDROGRAPH AT	78E	838.	12.75	158.	40.	13.	1.01
HYDROGRAPH AT	83	1378.	12.25	198.	65.	22.	1.01
DIVERSION TO	D83	1378.	12.25	150.	42.	14.	1.01
HYDROGRAPH AT	R83	731.	12.50	76.	23.	8.	1.01
3 COMBINED AT	C78E	1178.	12.75	557.	423.	239.	19.43
ROUTED TO	78ET84	966.	13.17	550.	422.	238.	19.43
HYDROGRAPH AT	84	1309.	12.25	193.	63.	21.	.99
DIVERSION TO	D84	1309.	12.25	154.	43.	14.	.99
HYDROGRAPH AT							

	R84	599.	12.58	66.	21.	7.	.99
2 COMBINED AT							
	C84	1085.	13.08	593.	436.	243.	20.42
ROUTED TO							
	84T79B	1059.	13.17	591.	436.	243.	20.42
HYDROGRAPH AT							
	79B	674.	13.08	161.	40.	13.	1.00
2 COMBINED AT							
	C79B1	1638.	13.17	704.	467.	254.	21.42
ROUTED TO							
	79BTB2	1596.	13.25	703.	467.	254.	21.42
2 COMBINED AT							
	C79B2	2748.	13.50	1322.	627.	307.	28.36
ROUTED TO							
	79TPC2	2718.	13.50	1318.	627.	307.	28.36
2 COMBINED AT							
	CPPWR	2918.	13.58	1552.	698.	330.	35.74
ROUTED TO							
	PWRT80	2899.	13.67	1549.	698.	330.	35.74
HYDROGRAPH AT							
	80A	2421.	12.83	595.	189.	63.	2.64
DIVERSION TO							
	D80A	73.	8.83	53.	17.	6.	2.64
HYDROGRAPH AT							
	R80A	2421.	12.83	595.	172.	57.	2.64
2 COMBINED AT							
	CP80A	3709.	13.33	1997.	831.	377.	38.38
ROUTED TO							
	PWRSAN	3700.	13.42	1994.	831.	377.	38.38
2 COMBINED AT							
	EMFPOW	4692.	14.50	3173.	1572.	651.	82.22
ROUTED TO							
	POWTWI	4675.	14.67	3166.	1571.	651.	82.22
HYDROGRAPH AT							
	80B	1198.	12.50	223.	71.	24.	1.12
DIVERSION TO							
	D80B	15.	4.00	8.	2.	1.	1.12
HYDROGRAPH AT							
	R80B	1198.	12.50	223.	69.	23.	1.12
HYDROGRAPH AT							
	81B	1215.	12.25	180.	61.	20.	.84
DIVERSION TO							
	D81B	444.	11.92	55.	18.	6.	.84
HYDROGRAPH AT							
	R81B	1215.	12.25	153.	43.	14.	.84
2 COMBINED AT							
	80B81B	2107.	12.33	365.	111.	37.	1.96
2 COMBINED AT							
	EMFWIL	4744.	14.67	3328.	1650.	678.	84.18
ROUTED TO							
	WILTSP	4713.	14.92	3315.	1649.	678.	84.18
HYDROGRAPH AT							
	SUB258	1024.	13.50	462.	136.	45.	3.65
ROUTED TO							
	RO259	931.	15.17	459.	136.	45.	3.65
HYDROGRAPH AT							
	SUB260	1151.	12.33	141.	42.	14.	.98
DIVERSION TO							
	RETDIV	1151.	12.33	131.	35.	12.	.98
HYDROGRAPH AT							
	RETAIN	123.	12.92	21.	7.	2.	.98
2 COMBINED AT							
	CO262	941.	15.17	473.	141.	47.	4.63
ROUTED TO							

	RO263	880.	16.75	469.	141.	47.	4.63
HYDROGRAPH AT							
	SUB264	1066.	12.42	154.	47.	16.	1.00
DIVERSION TO							
	RETDIV	1066.	12.42	137.	37.	12.	1.00
HYDROGRAPH AT							
	RETAIN	235.	12.92	32.	10.	3.	1.00
2 COMBINED AT							
	CO266	888.	16.75	479.	148.	49.	5.63
ROUTED TO							
	RO267	787.	20.08	472.	147.	49.	5.63
HYDROGRAPH AT							
	SUB268	736.	12.75	154.	48.	16.	.97
DIVERSION TO							
	RETDIV	736.	12.75	126.	34.	11.	.97
HYDROGRAPH AT							
	RETAIN	306.	13.33	44.	13.	4.	.97
2 COMBINED AT							
	CO270	789.	20.08	477.	157.	52.	6.60
ROUTED TO							
	RO283	732.	22.92	471.	156.	52.	6.60
HYDROGRAPH AT							
	88A	1139.	12.00	119.	41.	14.	.50
DIVERSION TO							
	D88A	1139.	12.00	88.	25.	8.	.50
HYDROGRAPH AT							
	R88A	602.	12.17	51.	16.	5.	.50
ROUTED TO							
	88AT89	130.	12.42	48.	16.	5.	.50
HYDROGRAPH AT							
	89A	1009.	12.08	118.	41.	14.	.50
DIVERSION TO							
	D89A	1009.	12.08	88.	25.	8.	.50
HYDROGRAPH AT							
	R89A	565.	12.25	50.	16.	5.	.50
2 COMBINED AT							
	C89A	670.	12.25	97.	31.	10.	1.00
ROUTED TO							
	89ATRI	258.	12.58	94.	31.	10.	1.00
2 COMBINED AT							
	C283	746.	22.92	483.	182.	61.	7.60
ROUTED TO							
	283T90	738.	23.17	480.	182.	61.	7.60
HYDROGRAPH AT							
	90A	939.	12.08	98.	33.	11.	.48
DIVERSION TO							
	D90A	939.	12.08	76.	21.	7.	.48
HYDROGRAPH AT							
	R90A	456.	12.25	37.	12.	4.	.48
2 COMBINED AT							
	C90A	742.	23.17	482.	190.	64.	8.08
ROUTED TO							
	90ATB	734.	23.42	480.	190.	64.	8.08
HYDROGRAPH AT							
	87A	1041.	12.08	116.	40.	13.	.49
DIVERSION TO							
	D87A	1041.	12.08	87.	25.	8.	.49
HYDROGRAPH AT							
	R87A	435.	12.25	49.	15.	5.	.49
ROUTED TO							
	87ATB	145.	12.75	46.	15.	5.	.49
HYDROGRAPH AT							
	87B	1022.	12.08	117.	40.	13.	.49
DIVERSION TO							

	D87B	1022.	12.08	87.	25.	8.	.49
HYDROGRAPH AT							
	R87B	512.	12.25	50.	15.	5.	.49
2 COMBINED AT							
	C87	514.	12.25	95.	31.	10.	.98
ROUTED TO							
	87T88B	250.	12.92	92.	31.	10.	.98
HYDROGRAPH AT							
	88B	1034.	12.08	118.	41.	14.	.50
DIVERSION TO							
	D88B	1034.	12.08	89.	25.	8.	.50
HYDROGRAPH AT							
	R88B	518.	12.25	49.	15.	5.	.50
2 COMBINED AT							
	C88B	505.	12.25	137.	45.	15.	1.48
ROUTED TO							
	88T89B	310.	13.33	134.	45.	15.	1.48
HYDROGRAPH AT							
	89B	1047.	12.08	117.	40.	13.	.50
DIVERSION TO							
	D89B	1047.	12.08	87.	25.	8.	.50
HYDROGRAPH AT							
	R89B	438.	12.17	50.	16.	5.	.50
2 COMBINED AT							
	C89B	433.	12.25	177.	60.	20.	1.98
ROUTED TO							
	89TB90	353.	13.83	172.	60.	20.	1.98
HYDROGRAPH AT							
	90B	668.	12.67	128.	39.	13.	.82
DIVERSION TO							
	D90B	379.	12.25	39.	12.	4.	.82
HYDROGRAPH AT							
	R90B	668.	12.67	101.	27.	9.	.82
3 COMBINED AT							
	C90	774.	12.75	509.	260.	87.	10.88
ROUTED TO							
	90T91	740.	23.83	504.	259.	87.	10.88
HYDROGRAPH AT							
	85	1328.	12.25	192.	63.	21.	1.00
DIVERSION TO							
	D85	1328.	12.25	152.	42.	14.	1.00
HYDROGRAPH AT							
	R85	591.	12.58	68.	21.	7.	1.00
ROUTED TO							
	85T86	334.	12.92	66.	21.	7.	1.00
HYDROGRAPH AT							
	86	1342.	12.25	193.	64.	21.	1.00
DIVERSION TO							
	D86	1342.	12.25	154.	43.	14.	1.00
HYDROGRAPH AT							
	R86	594.	12.58	67.	21.	7.	1.00
2 COMBINED AT							
	C86	495.	12.58	126.	40.	13.	2.00
ROUTED TO							
	86T91	451.	13.17	123.	40.	13.	2.00
HYDROGRAPH AT							
	91	667.	12.25	89.	29.	10.	.46
DIVERSION TO							
	D91	667.	12.25	69.	19.	6.	.46
HYDROGRAPH AT							
	RET91	302.	12.50	33.	10.	3.	.46
HYDROGRAPH AT							
	81A	1656.	12.67	359.	119.	40.	1.81
DIVERSION TO							

	D81A	29.	2.67	10.	3.	1.	1.81
HYDROGRAPH AT	R81A	1656.	12.67	359.	117.	39.	1.81
4 COMBINED AT	CP91	1815.	12.67	718.	386.	134.	15.15
ROUTED TO	91TEMF	1797.	12.75	717.	386.	134.	15.15
2 COMBINED AT	EMFRIT	5056.	14.92	3748.	1926.	773.	99.33

*** NORMAL END OF HEC-1 ***

```
-----DSS---ZCLOSE Unit:  71,   File: N60EM.DSS
          Pointer Utilization:    .30
          Number of Records:      75
          File Size:    137.8  Kbytes
          Percent Inactive:    .0
```

APPENDIX B

Supporting Hydraulic Calculations For Preferred Alternative

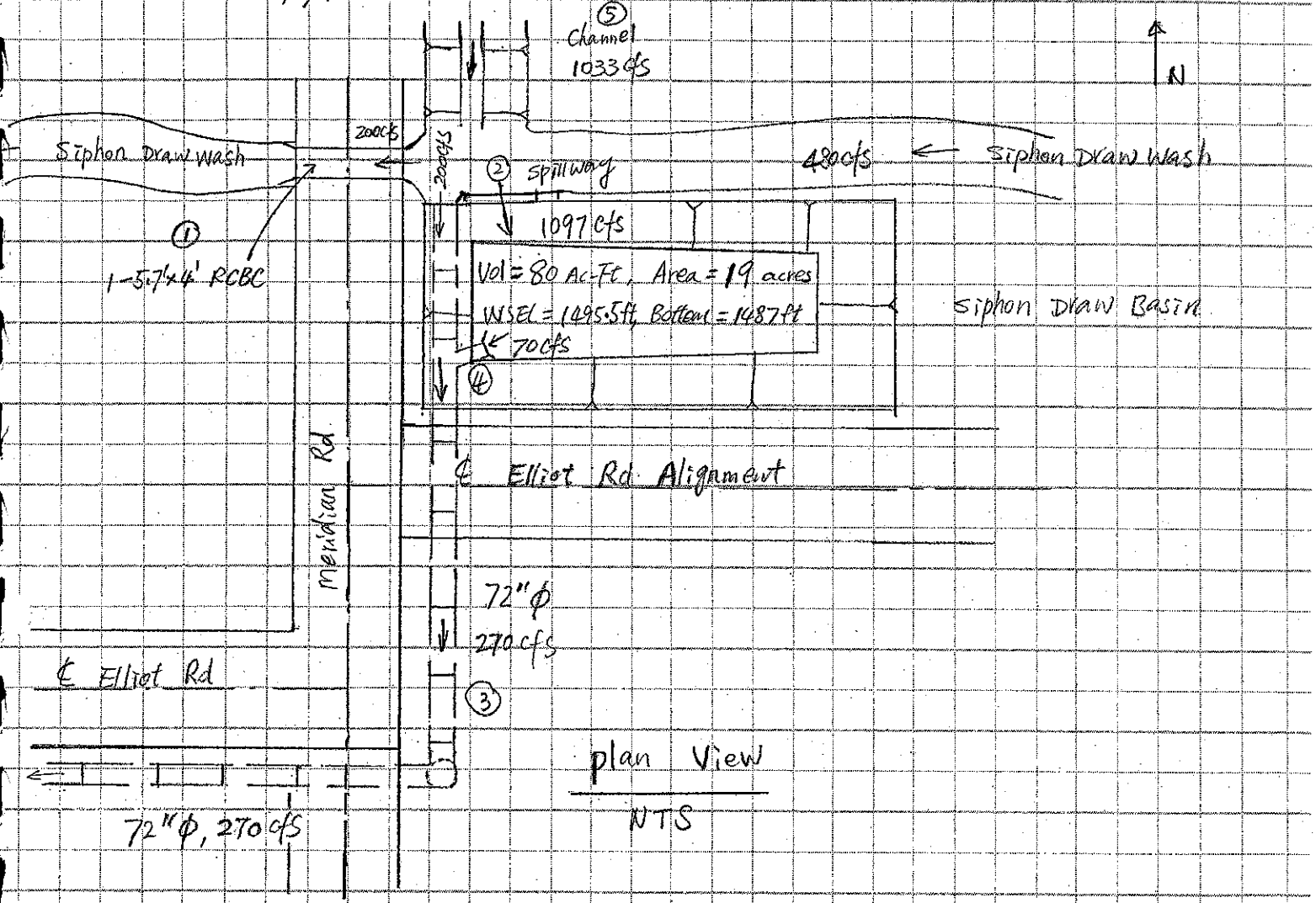
WOOD/PATEL

CIVIL ENGINEERS • HYDROLOGISTS • LAND SURVEYORS

PROJECT Siphon Draw Drainage Improvements

PROJECT NO. 031902.01 SHEET NO. 1 OF 6

CALCULATED BY SZ DATE 7/22/04 CHECKED BY _____ DATE _____



plan View

NTS

Hydraulic Design for 20% plans (Siphon Draw Basin) for preferred Alternative:

1). Box culvert crossing Meridian Rd;

2). Spillway for Siphon Draw Basin;

3) Storm Drain along Elliot Rd & Meridian Rd;

4) Bleed-off pipe for Siphon Draw Basin;

5) Inflow channel along Meridian Rd.

WOOD/PATEL

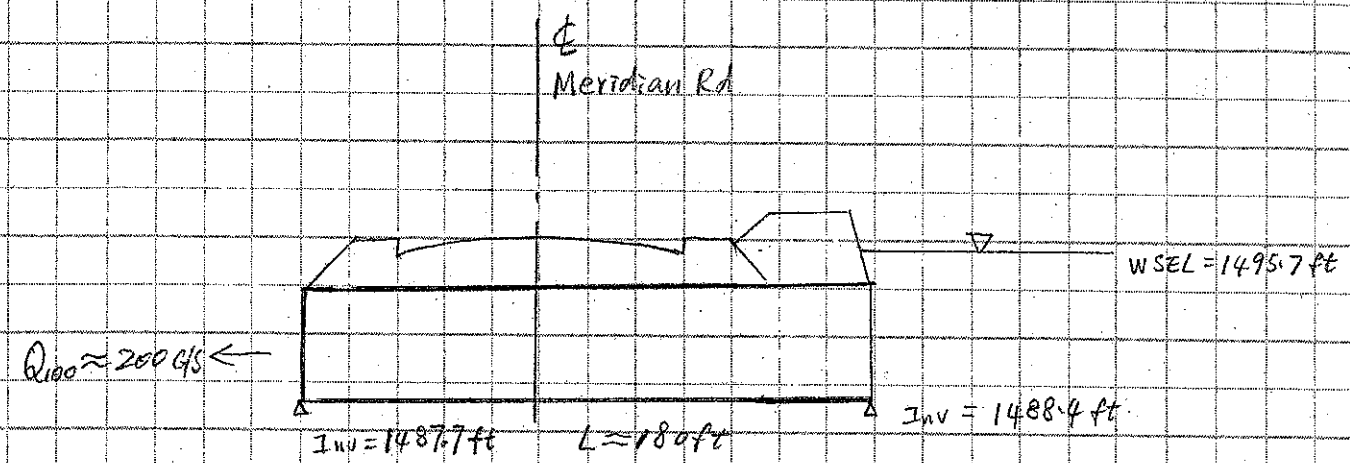
CIVIL ENGINEERS • HYDROLOGISTS • LAND SURVEYORS

PROJECT Siphon Draw Drainage Improvements

PROJECT NO. 031902.01 SHEET NO. 2 OF 6

CALCULATED BY SZ DATE 7/22/04 CHECKED BY _____ DATE _____

1). Box culvert crossing Meridian Rd.



Reduced opening (5.7' x 4') RCBC, Existing 10'x4' Box, one barrel used.

Profile

Looking North

NTS

Design Head water = 7.3 ft.

Design Flow = 200 ± cfs Max. Flow = 235 cfs.

BOX CULVERT ANALYSIS
COMPUTATION OF CULVERT PERFORMANCE CURVE

July 23, 2004

PROGRAM INPUT DATA

DESCRIPTION	VALUE
Culvert Span (ft)	5.7
Culvert Rise (ft)	4.0
FHWA Chart Number	8
FHWA Scale Number (Type of Culvert Entrance)	1
Manning's Roughness Coefficient (n-value)	0.012
Entrance Loss Coefficient of Culvert Opening	0.5
Culvert Length (ft)	180.0
Invert Elevation at Downstream end of Culvert (ft)	1,487.7
Invert Elevation at Upstream end of Culvert (ft)	1,488.4
Culvert Slope (ft/ft)	0.0039
Starting Flow Rate (cfs)	35.0
Incremental Flow Rate (cfs)	20.0
Ending Flow Rate (cfs)	335.0
Starting Tailwater Depth (ft)	0.5
Incremental Tailwater Depth (ft)	0.3
Ending Tailwater Depth (ft)	5.0

COMPUTATION RESULTS

Flow Rate (cfs)	Tailwater Depth (ft)	Headwater (ft) Inlet Control	Headwater (ft) Outlet Control	Normal Depth (ft)	Critical Depth (ft)	Depth at Outlet (ft)	Outlet Velocity (fps)
35.0	0.5	1.65	0.0	0.98	1.05	0.98	6.26
55.0	0.8	2.26	0.0	1.33	1.43	1.33	7.24
75.0	1.1	2.79	0.0	1.65	1.75	1.65	7.96
95.0	1.4	3.29	0.0	1.95	2.05	1.95	8.53
115.0	1.7	3.75	0.0	2.25	2.33	2.25	8.99
135.0	2.0	4.19	0.0	2.53	2.59	2.53	9.38
155.0	2.3	4.61	0.0	2.8	2.84	2.8	9.72
175.0	2.6	5.46	0.0	3.07	3.08	3.07	10.01
195.0	2.9	6.05	5.79	3.33	3.31	3.33	10.28
215.0	3.2	6.66	6.16	3.59	3.54	3.59	10.51
235.0	3.5	7.32	6.53	3.84	3.75	3.84	10.72
255.0	3.8	8.05	5.45	4.0	3.96	4.0	11.18
275.0	4.1	8.83	8.17	4.0	4.0	4.0	12.06
295.0	4.4	9.68	9.19	4.0	4.0	4.0	12.94
315.0	4.7	10.58	10.26	4.0	4.0	4.0	13.82
335.0	5.0	11.54	11.38	4.0	4.0	4.0	14.69

HYDROCALC Hydraulics for Windows, Version 1.2a Copyright (c) 1996
Dodson & Associates, Inc., 5629 FM 1960 West, Suite 314, Houston, TX 77069
Phone:(281)440-3787, Fax:(281)440-4742, Email:software@dodson-hydro.com
All Rights Reserved.

WOOD/PATEL

CIVIL ENGINEERS • HYDROLOGISTS • LAND SURVEYORS

PROJECT Siphon Draw Drainage Improvements

PROJECT NO. 031902.01 SHEET NO. 3 OF 6

CALCULATED BY SZ DATE 7/22/02 CHECKED BY _____ DATE _____

2). Spillway for Siphon Draw Basin:

Spillway Crest Elevation = 1493.5 ft.

Headwater Elevation = 1495.7 ft.

Design 100-Year Flow = 1,097 CFS.

Spillway Length = 120 ft.

Design water surface Elevation at Siphon Draw Basin = 1495.5 ft

Spillway - Siphon Draw Basin
Worksheet for Broad Crested Weir

Project Description	
Worksheet	Weir - SDB Splitter
Type	Broad Crested Weir
Solve For	Crest Length

Input Data		
Discharge	1,097.00	cfs
Headwater Elevation	1,495.70	ft
Crest Elevation	1,493.50	ft
Tailwater Elevation	1,495.50	ft
Crest Surface Type	Paved	
Crest Breadth	10.00	ft

Results		
Crest Length	120.00	ft
Headwater Height Above Crest	2.20	ft
Tailwater Height Above Crest	2.00	ft
Discharge Coefficient	3.07	US
Submergence Factor	0.91	
Adjusted Discharge Coefficient	2.80	US
Flow Area	264.0	ft^2
Velocity	4.16	ft/s
Wetted Perimeter	124.40	ft
Top Width	120.00	ft

Curve
Plotted Curves for Broad Crested Weir

Project Description	
Worksheet	Weir - SDB Splitter
Type	Broad Crested Weir
Solve For	Headwater Elevation

Input Data	
Crest Elevation	1,493.50 ft
Tailwater Elevation	1,495.50 ft
Crest Surface Type	Paved
Crest Breadth	10.00 ft
Crest Length	120.00 ft

Attribute	Minimum	Maximum	Increment
Discharge (cfs)	10.00	1,500.00	100.00

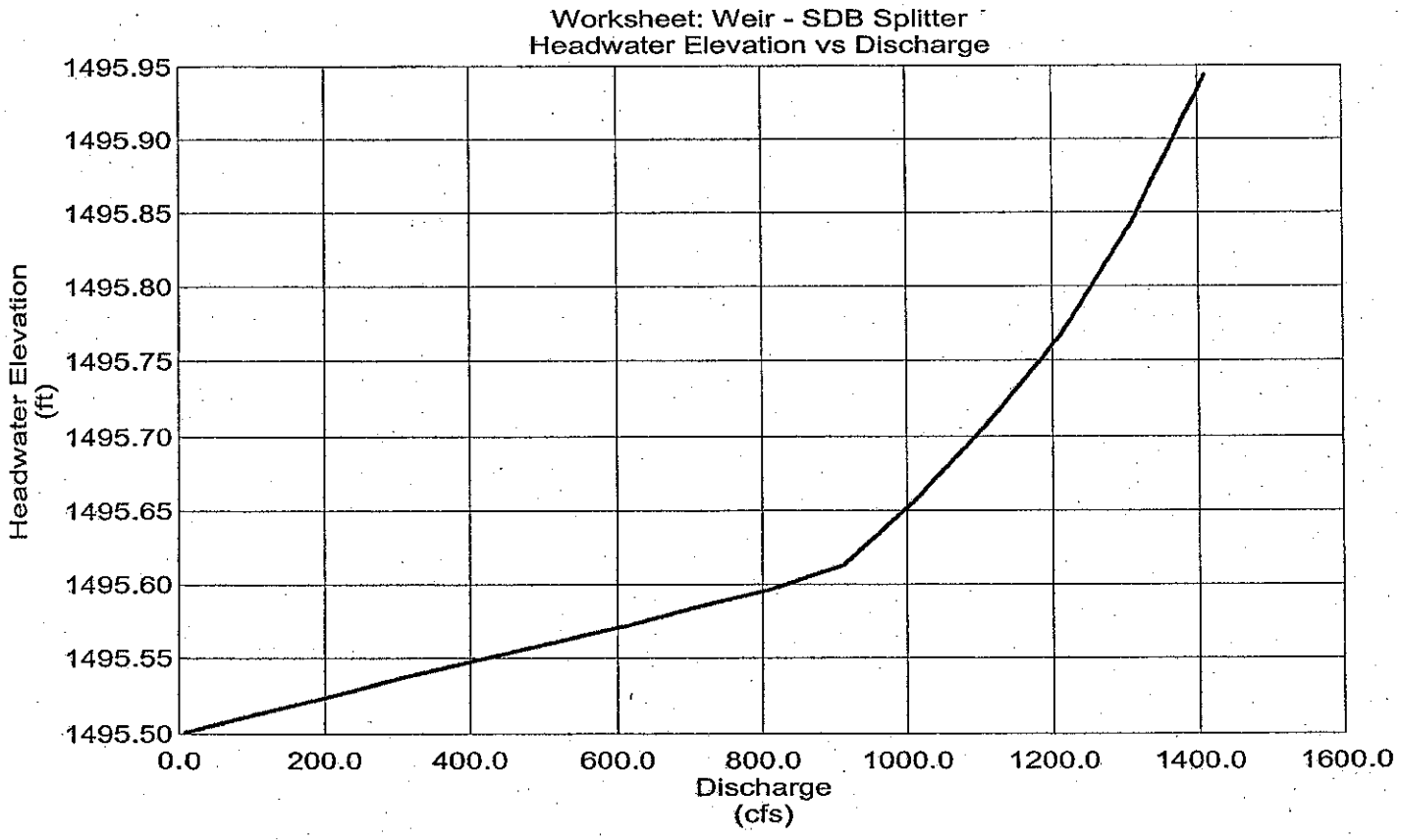


Table
Rating Table for Broad Crested Weir

Project Description	
Worksheet	Weir - SDB Splitter
Type	Broad Crested Weir
Solve For	Headwater Elevation

Input Data		
Crest Elevation	1,493.50	ft
Tailwater Elevation	1,493.50	ft
Crest Surface Type	Paved	
Crest Breadth	10.00	ft
Crest Length	120.00	ft

Attribute	Minimum	Maximum	Increment
Discharge (cfs)	0.00	1,600.00	100.00

Discharge (cfs)	Headwater Elevation (ft)	Velocity (ft/s)
0.00	N/A	N/A
100.00	1,493.93	1.96
200.00	1,494.17	2.48
300.00	1,494.38	2.84
400.00	1,494.56	3.13
500.00	1,494.73	3.37
600.00	1,494.89	3.59
700.00	1,495.04	3.79
800.00	1,495.18	3.96
900.00	1,495.32	4.13
1,000.00	1,495.45	4.28
1,100.00	1,495.57	4.42
1,200.00	1,495.70	4.55
1,300.00	1,495.82	4.68
1,400.00	1,495.93	4.80
1,500.00	1,496.04	4.91
1,600.00	1,496.16	5.02

WOOD/PATEL

CIVIL ENGINEERS • HYDROLOGISTS • LAND SURVEYORS

PROJECT Siphon Drain Drainage Improvements

PROJECT NO. 031902.01 SHEET NO. 4 OF 6

CALCULATED BY SZ DATE 7/23/04 CHECKED BY DATE

3) Storm Drain along Elliot Rd. and Meridian Rd.

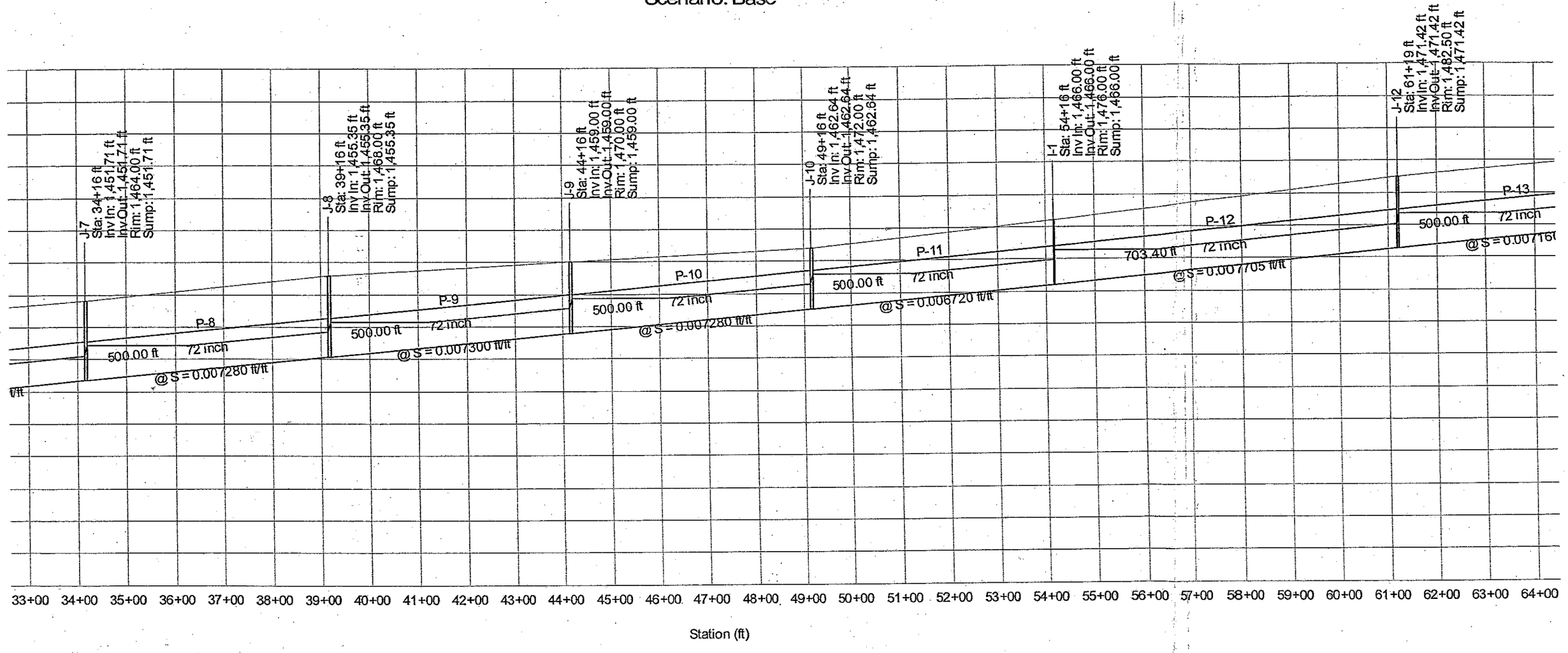
See StormCAD printout.

Hydraulic grade line at upstream pipe = 1494.7 ft.

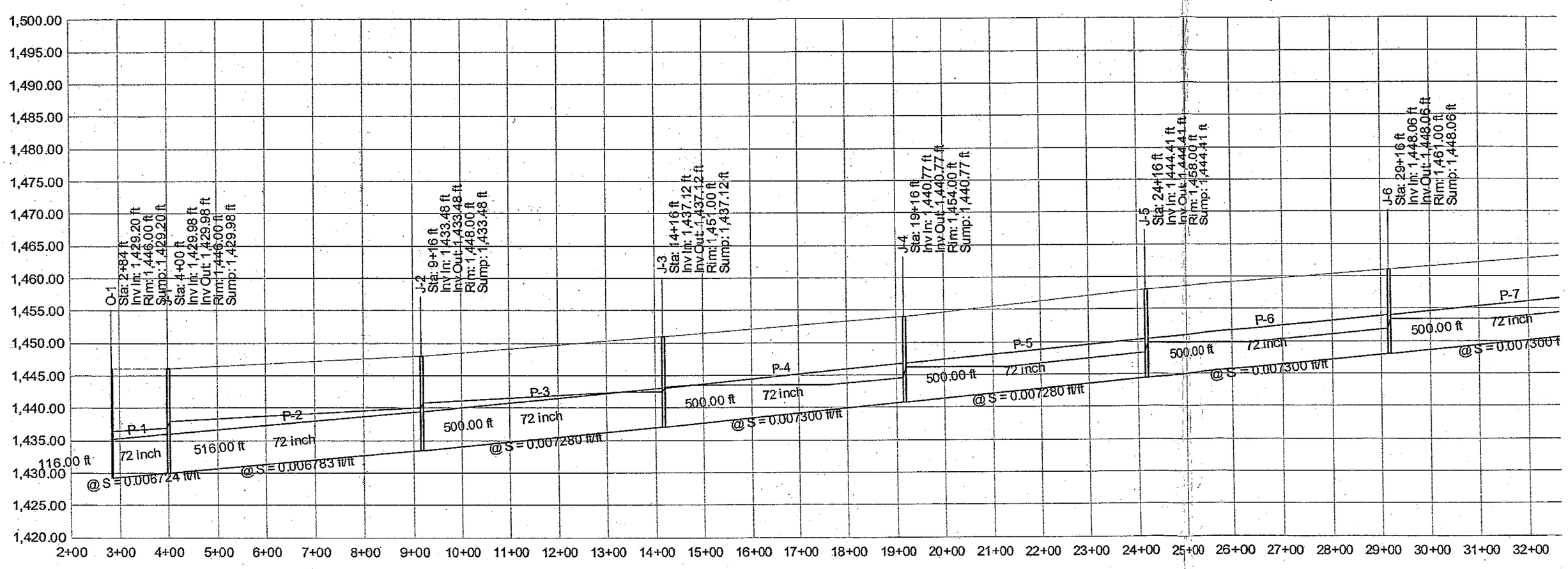
The inlet loss at upstream is assumed to be 1.0 ft.

The required headwater elevation = 1495.7 ft.

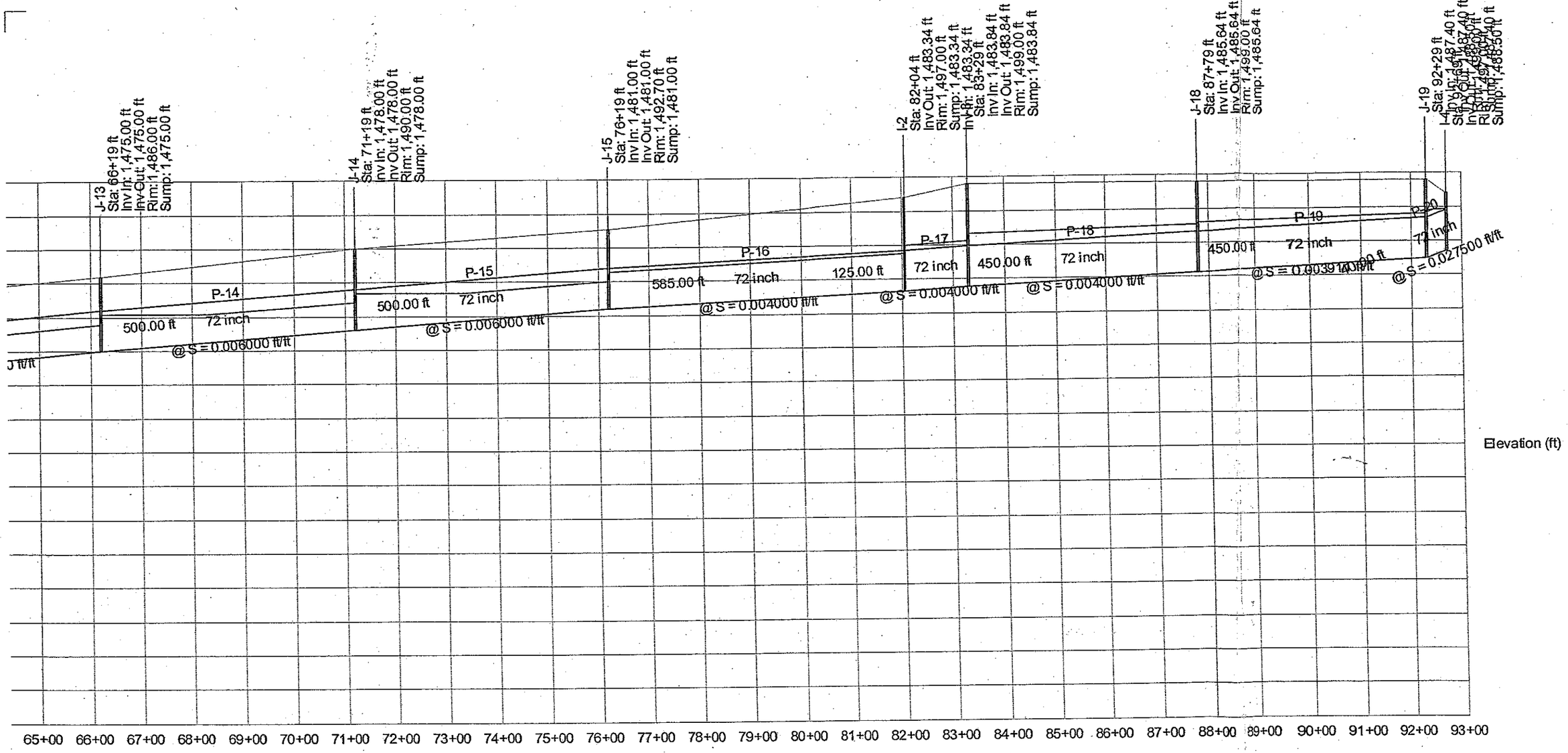
Profile: Profile - 1
Scenario: Base



Profile
Scenario: Base



Profile
Scenario: Base



Combined Pipe\Node Report

Label	Upstream Node	Downstream Node	Length (ft)	Upstream Inlet Area (acres)	Upstream Inlet Rational Coefficient	Upstream Inlet CA (acres)	Upstream Calculated System CA (acres)	Upstream Inlet Rational Flow (cfs)	Section Size	Average Velocity (ft/s)	Upstream Invert Elevation (ft)	Downstream Invert Elevation (ft)	Constructed Slope (ft/ft)	Description	Hydraulic Grade Line In (ft)	Hydraulic Grade Line Out (ft)	Downstream Ground Elevation (ft)	Upstream Ground Elevation (ft)	Hydraulic Slope (ft/ft)	System Known Flow (cfs)
P-20	I-4	J-19	40.00	0.00	0.00	0.00	0.00	0.00	72 inch	7.07	1,488.50	1,487.40	0.027500		1,494.65	1,494.57	1,499.00	1,497.00	0.002230	200.00
P-19	J-19	J-18	450.00	N/A	N/A	N/A	0.00	N/A	72 inch	7.07	1,487.40	1,485.64	0.003911		1,494.10	1,493.10	1,499.00	1,499.00	0.002230	200.00
P-18	J-18	I-3	450.00	N/A	N/A	N/A	0.00	N/A	72 inch	7.07	1,485.64	1,483.84	0.004000		1,492.71	1,491.70	1,499.00	1,499.00	0.002230	200.00
P-17	I-3	I-2	125.00	0.00	0.00	0.00	0.00	0.00	72 inch	9.55	1,483.84	1,483.34	0.004000		1,490.57	1,490.06	1,497.00	1,499.00	0.004065	270.00
P-16	I-2	J-15	585.00	0.00	0.00	0.00	0.00	0.00	72 inch	9.98	1,483.34	1,481.00	0.004000		1,488.83	1,486.45	1,492.70	1,497.00	0.004065	270.00
P-15	J-15	J-14	500.00	N/A	N/A	N/A	0.00	N/A	72 inch	11.48	1,481.00	1,478.00	0.006000		1,485.15	1,483.45	1,490.00	1,492.70	0.003392	270.00
P-14	J-14	J-13	500.00	N/A	N/A	N/A	0.00	N/A	72 inch	11.52	1,478.00	1,475.00	0.006000		1,482.15	1,480.40	1,486.00	1,490.00	0.003501	270.00
P-13	J-13	J-12	500.00	N/A	N/A	N/A	0.00	N/A	72 inch	12.01	1,475.00	1,471.42	0.007160		1,478.89	1,476.81	1,482.50	1,486.00	0.004161	270.00
P-12	J-12	I-1	703.40	N/A	N/A	N/A	0.00	N/A	72 inch	12.20	1,471.42	1,466.00	0.007705		1,475.21	1,471.41	1,476.00	1,482.50	0.005408	270.00
P-11	I-1	J-10	500.00	0.00	0.00	0.00	0.00	0.00	72 inch	11.83	1,466.00	1,462.64	0.006720		1,469.98	1,468.03	1,472.00	1,476.00	0.003889	270.00
P-10	J-10	J-9	500.00	N/A	N/A	N/A	0.00	N/A	72 inch	12.05	1,462.64	1,459.00	0.007280		1,466.51	1,464.39	1,470.00	1,472.00	0.004228	270.00
P-9	J-9	J-8	500.00	N/A	N/A	N/A	0.00	N/A	72 inch	12.06	1,459.00	1,455.35	0.007300		1,462.86	1,460.74	1,468.00	1,470.00	0.004240	270.00
P-8	J-8	J-7	500.00	N/A	N/A	N/A	0.00	N/A	72 inch	12.05	1,455.35	1,451.71	0.007280		1,459.22	1,457.10	1,464.00	1,468.00	0.004228	270.00
P-7	J-7	J-6	500.00	N/A	N/A	N/A	0.00	N/A	72 inch	12.06	1,451.71	1,448.06	0.007300		1,455.57	1,453.45	1,461.00	1,464.00	0.004241	270.00
P-6	J-6	J-5	500.00	N/A	N/A	N/A	0.00	N/A	72 inch	12.06	1,448.06	1,444.41	0.007300		1,451.92	1,449.80	1,458.00	1,461.00	0.004240	270.00
P-5	J-5	J-4	500.00	N/A	N/A	N/A	0.00	N/A	72 inch	12.05	1,444.41	1,440.77	0.007280		1,448.28	1,446.16	1,454.00	1,458.00	0.004228	270.00
P-4	J-4	J-3	500.00	N/A	N/A	N/A	0.00	N/A	72 inch	11.79	1,440.77	1,437.12	0.007300		1,444.63	1,443.29	1,451.00	1,454.00	0.002690	270.00
P-3	J-3	J-2	500.00	N/A	N/A	N/A	0.00	N/A	72 inch	9.83	1,437.12	1,433.48	0.007280		1,442.49	1,440.81	1,448.00	1,451.00	0.003366	270.00
P-2	J-2	J-1	516.00	N/A	N/A	N/A	0.00	N/A	72 inch	9.55	1,433.48	1,429.98	0.006783		1,440.10	1,438.01	1,446.00	1,448.00	0.004065	270.00
P-1	J-1	O-1	116.00	N/A	N/A	N/A	0.00	N/A	72 inch	9.55	1,429.98	1,429.20	0.006724		1,436.87	1,436.40	1,446.00	1,446.00	0.004065	270.00

© Haestad Methods, Inc. 37 Brookside Road Waterbury, CT 06708 USA +1-203-755-1666

WOOD/PATEL

CIVIL ENGINEERS • HYDROLOGISTS • LAND SURVEYORS

PROJECT Siphon Draw Drainage Improvements

PROJECT NO. 031902.01 SHEET NO. 5 OF 6

CALCULATED BY SZ DATE 7/22/04 CHECKED BY _____ DATE _____

4) Bleed-off pipe for Siphon Draw Basin:

Design 100-year Flow = 70 cfs

U/S WSEL = 1495.5 ft

D/S HGL = 1491.7 ft

pipe Length = 150 ft.

Design pipe Diameter = 42".

To prevent any back-flow from the main line into the basin, a flapgate is recommended.

PIPE CULVERT ANALYSIS
COMPUTATION OF CULVERT PERFORMANCE CURVE

July 27, 2004

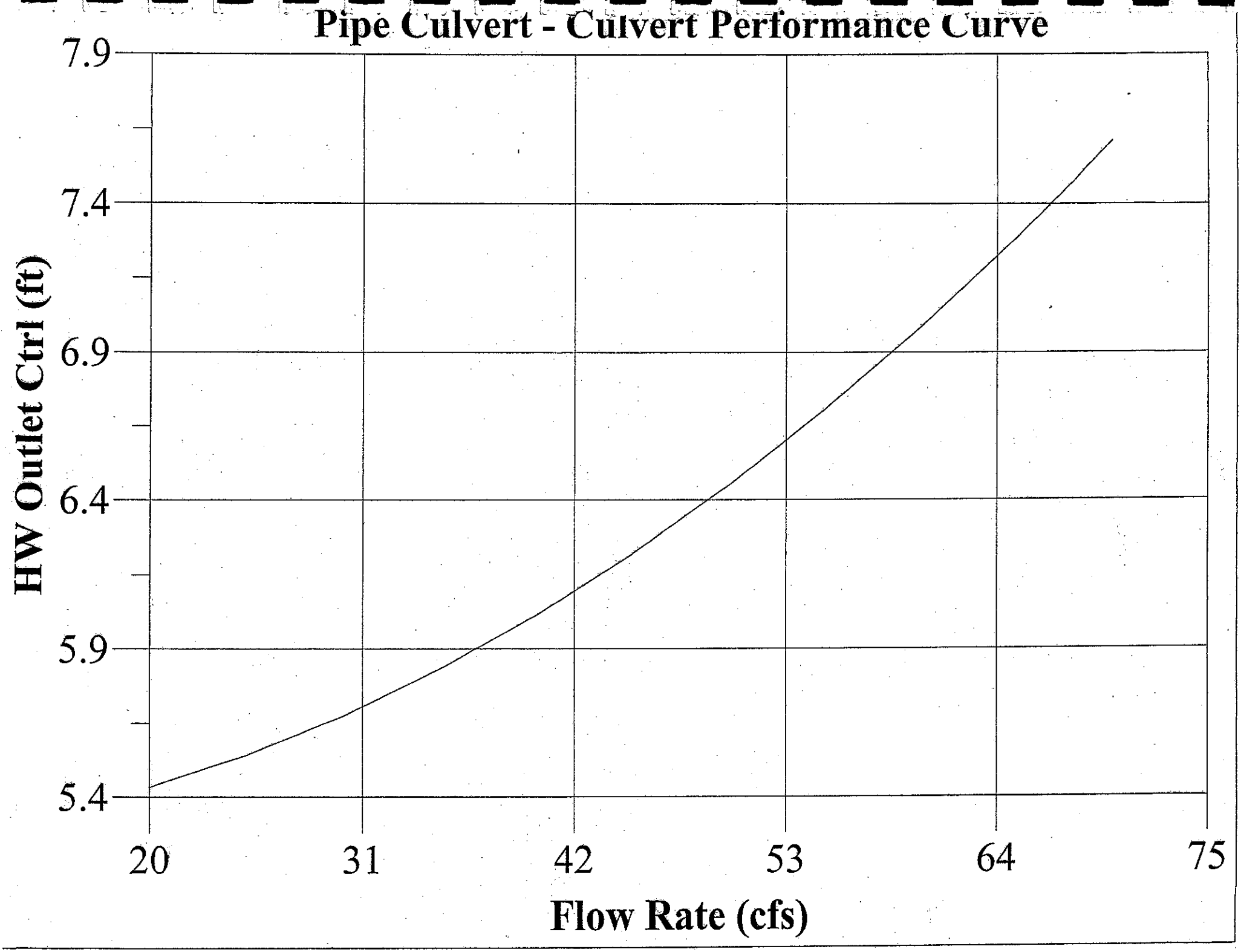
PROGRAM INPUT DATA

DESCRIPTION	VALUE
Culvert Diameter (ft)	3.5
FHWA Chart Number	1
FHWA Scale Number (Type of Culvert Entrance)	1
Manning's Roughness Coefficient (n-value)	0.013
Entrance Loss Coefficient of Culvert Opening	1.0
Culvert Length (ft)	150.0
Invert Elevation at Downstream end of Culvert (ft)	1,483.84
Invert Elevation at Upstream end of Culvert (ft)	1,486.5
Culvert Slope (ft/ft)	0.0177
Starting Flow Rate (cfs)	20.0
Incremental Flow Rate (cfs)	5.0
Ending Flow Rate (cfs)	70.0
Starting Tailwater Depth (ft)	7.9
Incremental Tailwater Depth (ft)	0.0
Ending Tailwater Depth (ft)	7.9

COMPUTATION RESULTS

Flow Rate (cfs)	Tailwater Depth (ft)	Headwater (ft) Inlet Control	Headwater (ft) Outlet Control	Normal Depth (ft)	Critical Depth (ft)	Depth at Outlet (ft)	Outlet Velocity (fps)
20.0	7.9	1.89	5.43	0.91	1.37	3.5	2.08
25.0	7.9	2.16	5.54	1.02	1.54	3.5	2.6
30.0	7.9	2.42	5.68	1.13	1.69	3.5	3.12
35.0	7.9	2.66	5.83	1.22	1.83	3.5	3.64
40.0	7.9	2.91	6.01	1.31	1.97	3.5	4.16
45.0	7.9	3.15	6.22	1.4	2.09	3.5	4.68
50.0	7.9	3.39	6.45	1.48	2.21	3.5	5.2
55.0	7.9	3.63	6.7	1.56	2.32	3.5	5.72
60.0	7.9	3.88	6.98	1.64	2.43	3.5	6.24
65.0	7.9	4.2	7.28	1.72	2.53	3.5	6.76
70.0	7.9	4.49	7.61	1.8	2.62	3.5	7.28

HYDROCALC Hydraulics for Windows, Version 1.2a Copyright (c) 1996
Dodson & Associates, Inc., 5629 FM 1960 West, Suite 314, Houston, TX 77069
Phone:(281)440-3787, Fax:(281)440-4742, Email:software@dodson-hydro.com
All Rights Reserved.


Pipe Culvert - Culvert Performance Curve
HW Outlet Ctrl (ft)
7.9
7.4
6.9
6.4
5.9
5.4
20
31
42
53
64
75
Flow Rate (cfs)

WOOD/PATEL

CIVIL ENGINEERS • HYDROLOGISTS • LAND SURVEYORS

PROJECT Siphon Draw Drainage Improvements

PROJECT NO. 03190201 SHEET NO. 6 OF 6

CALCULATED BY SZ DATE 7/21/04 CHECKED BY _____ DATE _____

5) Inflow channel along Meridian Rd (concrete channel)

Design 100-year Flow = 1033 cfs

Bottom width = 15 ft.

Side slope = 2:1 (H:V)

Profile slope = 0.0011 ft/ft

Flow Depth = 4.73 ft

Flow velocity = 8.9 ft/s.

Specific Energy = 5.97 ft

Downstream Invert Elevation = 1489.4 ft with 1 ft drop.

Open Channel - Channel 1 (North of SDB)
Worksheet for Trapezoidal Channel

Project Description	
Worksheet	Meridian Road Channel1
Flow Element	Trapezoidal Channel
Method	Manning's Formula
Solve For	Channel Depth

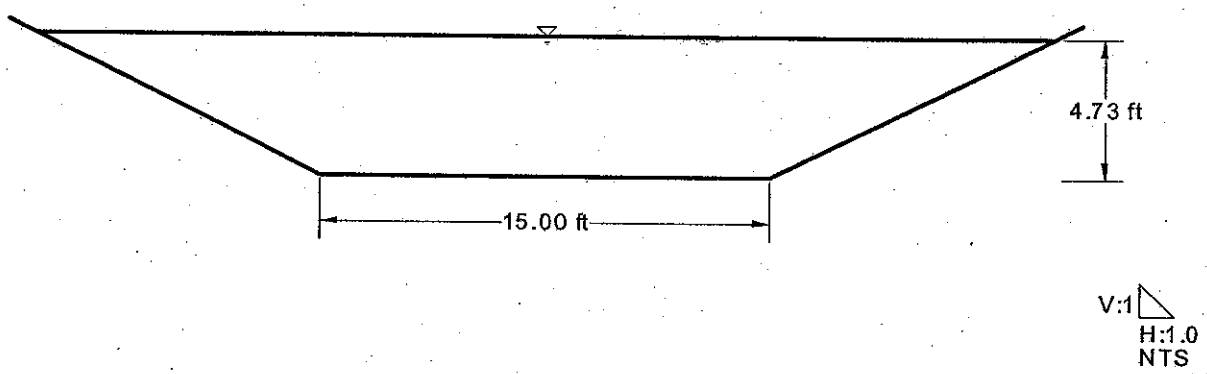
Input Data		
Mannings Coefficient	0.012	
Slope	0.001100	ft/ft
Left Side Slope	2.00	H : V
Right Side Slope	2.00	H : V
Bottom Width	15.00	ft
Discharge	1,033.00	cfs

Results		
Depth	4.73	ft
Flow Area	115.8	ft²
Wetted Perimeter	36.17	ft
Top Width	33.93	ft
Critical Depth	4.33	ft
Critical Slope	0.001551	ft/ft
Velocity	8.92	ft/s
Velocity Head	1.24	ft
Specific Energy	5.97	ft
Froude Number	0.85	
Flow Type	Subcritical	

Cross Section - Channel 1 (North of SDB)
Cross Section for Trapezoidal Channel

Project Description	
Worksheet	Meridian Road Channel1
Flow Element	Trapezoidal Channel
Method	Manning's Formula
Solve For	Channel Depth

Section Data		
Mannings Coefficient	0.012	
Slope	0.001100	ft/ft
Depth	4.73	ft
Left Side Slope	2.00	H : V
Right Side Slope	2.00	H : V
Bottom Width	15.00	ft
Discharge	1,033.00	cfs



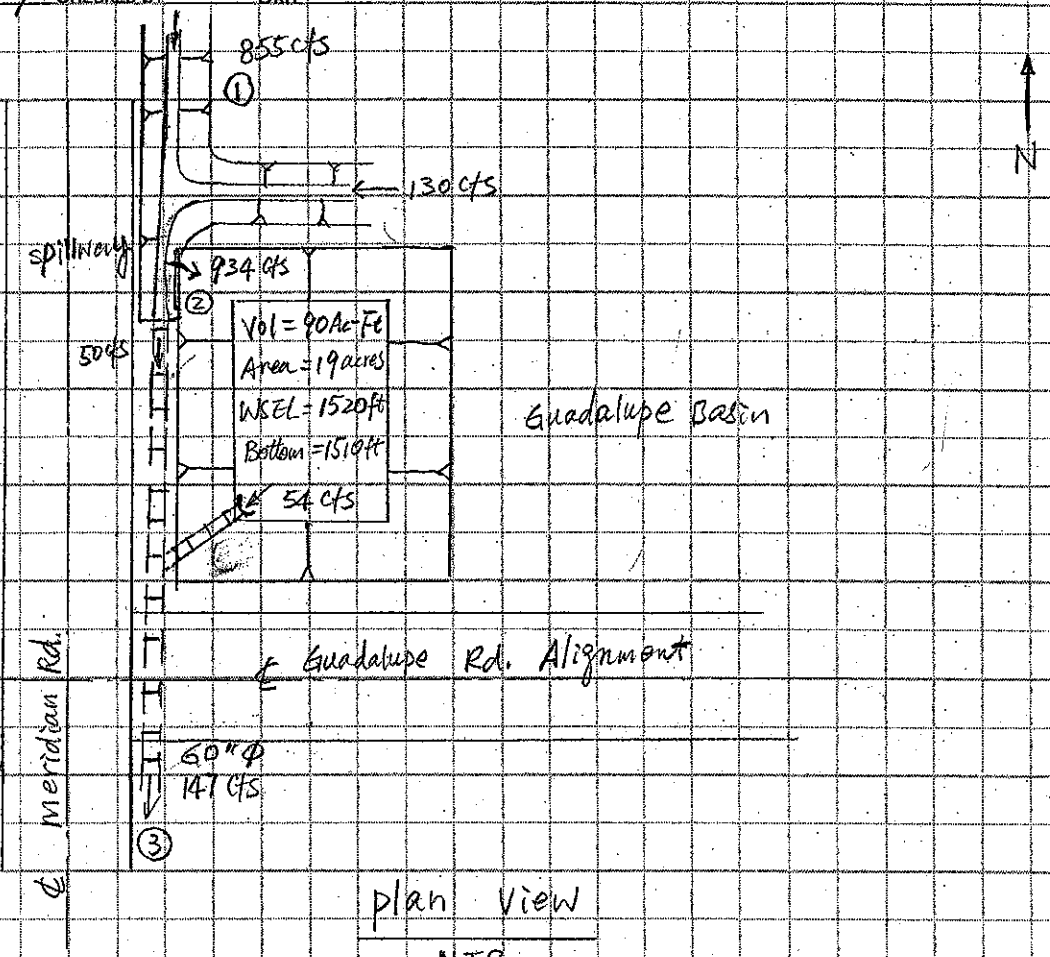
WOOD/PATEL

CIVIL ENGINEERS • HYDROLOGISTS • LAND SURVEYORS

PROJECT Siphon Draw Drainage Improvements

PROJECT NO. 031902.01 SHEET NO. 1 OF 4

CALCULATED BY SZ DATE 7/27/04 CHECKED BY DATE



plan view

NTS

Hydraulic Design for 20% plans (Guadalupe Basin) for preferred Alternative:

1) Inlet channel to Guadalupe Basin;

2) Spillway for Guadalupe Basin;

3) Storm Drain system from Guadalupe Basin to Siphon Draw Basin Inlet channel.

WOOD/PATEL

CIVIL ENGINEERS • HYDROLOGISTS • LAND SURVEYORS

PROJECT Siphon Draw Drainage Improvements

PROJECT NO. 031902.01 SHEET NO. 2 OF 4

CALCULATED BY SZ DATE 7/22/04 CHECKED BY _____ DATE _____

1) Inlet channel to Guadalupe Basin (concrete channel)

Design 100-year Flow = 855 cfs

Bottom width = 15 ft

Side slope = 2:1 (H:V)

profile slope = 0.0024 ft/ft

Flow Depth = 3.5 ft

Flow Velocity = 11.2 ft/s

Specific Energy = 5.4 ft

Open Channel - Inlet Channel of Guadalupe Basin
Worksheet for Trapezoidal Channel

Project Description	
Worksheet	Meridian Road Channel2
Flow Element	Trapezoidal Channel
Method	Manning's Formula
Solve For	Channel Depth

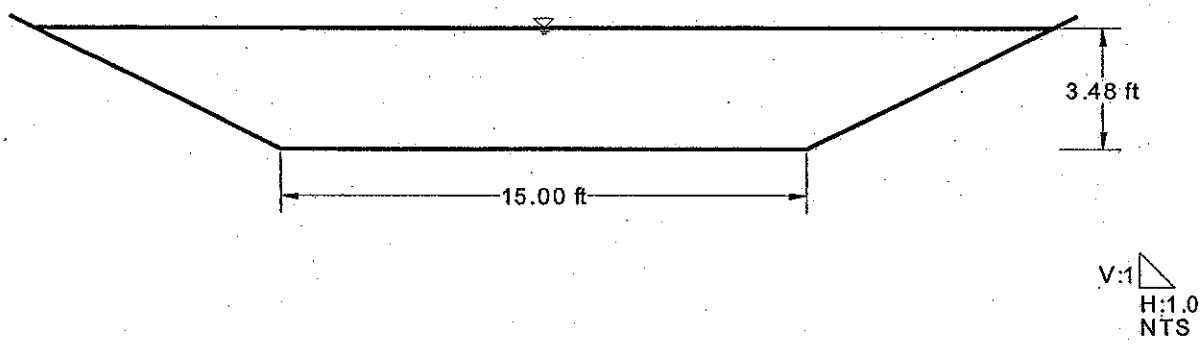
Input Data		
Mannings Coefficient	0.012	
Slope	0.002400	ft/ft
Left Side Slope	2.00	H : V
Right Side Slope	2.00	H : V
Bottom Width	15.00	ft
Discharge	855.00	cfs

Results		
Depth	3.48	ft
Flow Area	76.5	ft²
Wetted Perimeter	30.57	ft
Top Width	28.93	ft
Critical Depth	3.89	ft
Critical Slope	0.001591	ft/ft
Velocity	11.18	ft/s
Velocity Head	1.94	ft
Specific Energy	5.42	ft
Froude Number	1.21	
Flow Type	Supercritical	

Cross Section - Inlet Channel of Guadalupe Basin
Cross Section for Trapezoidal Channel

Project Description	
Worksheet	Meridian Road Channel2
Flow Element	Trapezoidal Channel
Method	Manning's Formula
Solve For	Channel Depth

Section Data		
Mannings Coefficient	0.012	
Slope	0.002400	ft/ft
Depth	3.48	ft
Left Side Slope	2.00	H : V
Right Side Slope	2.00	H : V
Bottom Width	15.00	ft
Discharge	855.00	cfs



WOOD/PATEL

CIVIL ENGINEERS • HYDROLOGISTS • LAND SURVEYORS

PROJECT Siphon Draw Drainage Improvements

PROJECT NO. 031902.01 SHEET NO. 3 OF 4

CALCULATED BY SZ DATE 7/27/04 CHECKED BY _____ DATE _____

2) Spillway for Guadalupe Basin.

Spillway crest Elevation = 1518.0 ft

Headwater Elevation = 1520.2 ft

Design 100-Year Flow = 934 cfs

Spillway Length = 105 ft.

Design water surface Elevation at Guadalupe Basin = 1520.0 ft.

Spillway - Guadalupe Basin
Worksheet for Broad Crested Weir

Project Description	
Worksheet	Weir - GRB Splitter
Type	Broad Crested Weir
Solve For	Crest Length

Input Data		
Discharge	934.00	cfs
Headwater Elevation	1,520.20	ft
Crest Elevation	1,518.00	ft
Tailwater Elevation	1,520.00	ft
Crest Surface Type	Paved	
Crest Breadth	10.00	ft

Results		
Crest Length	102.17	ft
Headwater Height Above Crest	2.20	ft
Tailwater Height Above Crest	2.00	ft
Discharge Coefficient	3.07	US
Submergence Factor	0.91	
Adjusted Discharge Coefficient	2.80	US
Flow Area	224.8	ft^2
Velocity	4.16	ft/s
Wetted Perimeter	106.57	ft
Top Width	102.17	ft

Spillway Rating Curve
Plotted Curves for Broad Crested Weir

Project Description	
Worksheet	Weir - GRB Splitter
Type	Broad Crested Weir
Solve For	Headwater Elevation

Input Data	
Crest Elevation	1,518.00 ft
Tailwater Elevation	1,520.00 ft
Crest Surface Type	Paved
Crest Breadth	10.00 ft
Crest Length	102.17 ft

Attribute	Minimum	Maximum	Increment
Discharge (cfs)	0.00	1,600.00	200.00

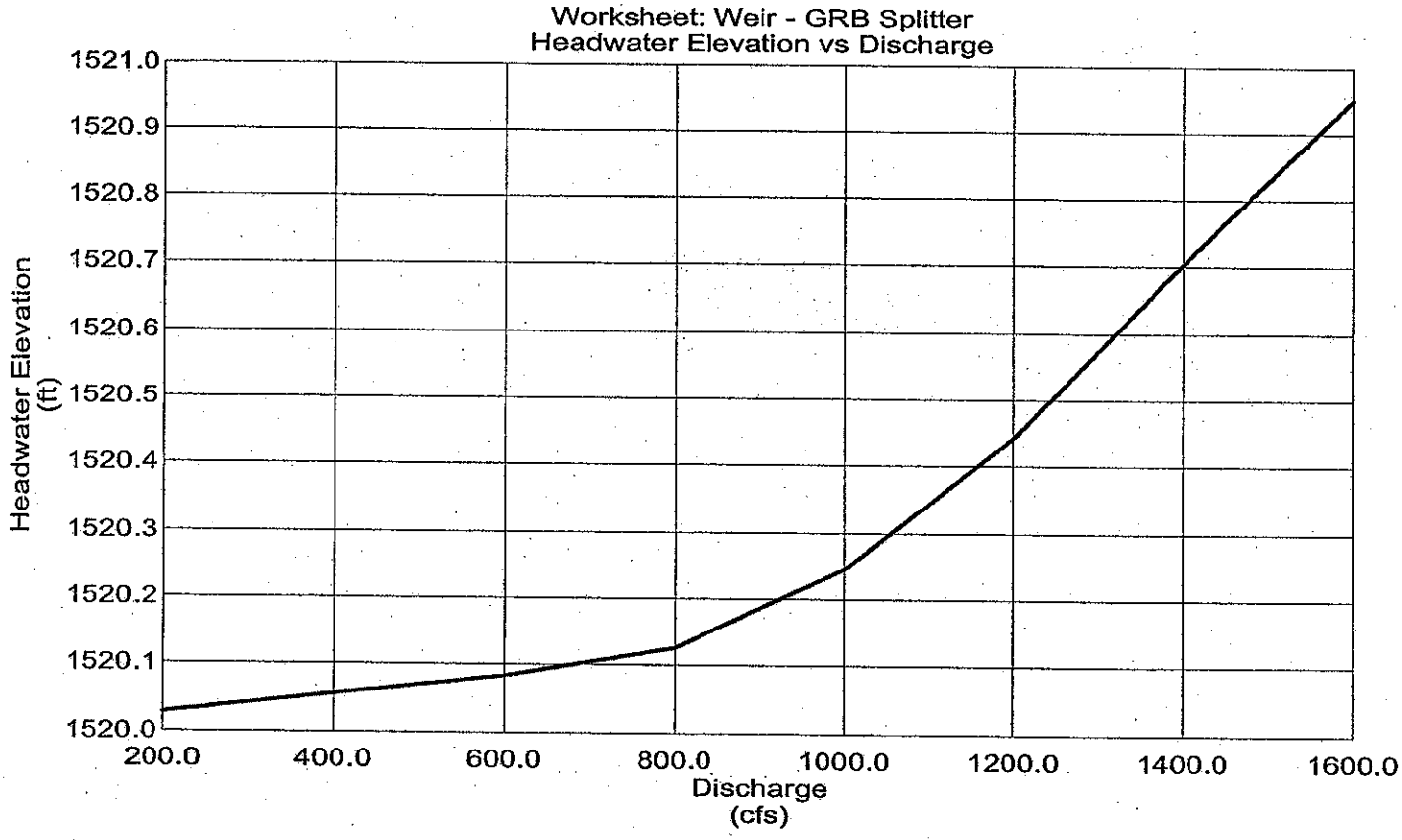


Table
Rating Table for Broad Crested Weir

Project Description	
Worksheet	Weir - GRB Splitter
Type	Broad Crested Weir
Solve For	Headwater Elevation

Input Data	
Crest Elevation	1,518.00 ft
Tailwater Elevation	1,518.00 ft
Crest Surface Type	Paved
Crest Breadth	10.00 ft
Crest Length	102.17 ft

Attribute	Minimum	Maximum	Increment
Discharge (cfs)	0.00	1,600.00	100.00

Discharge (cfs)	Headwater Elevation (ft)	Velocity (ft/s)
0.00	N/A	N/A
100.00	1,518.47	2.07
200.00	1,518.75	2.62
300.00	1,518.98	3.00
400.00	1,519.18	3.31
500.00	1,519.37	3.56
600.00	1,519.55	3.80
700.00	1,519.71	4.00
800.00	1,519.87	4.19
900.00	1,520.02	4.36
1,000.00	1,520.17	4.52
1,100.00	1,520.31	4.67
1,200.00	1,520.44	4.81
1,300.00	1,520.57	4.94
1,400.00	1,520.70	5.07
1,500.00	1,520.83	5.19
1,600.00	1,520.95	5.31

WOOD/PATEL

CIVIL ENGINEERS • HYDROLOGISTS • LAND SURVEYORS

PROJECT Siphon Draw Drainage Improvements

PROJECT NO. 031902.01 SHEET NO. 4 OF 4

CALCULATED BY SZ DATE 7/27/06 CHECKED BY _____ DATE _____

3) Storm Drain system from Guadalupe Basin to Siphon Draw Basin Inlet channel.

See StormCAD printout

Hydraulic grade line at upstream pipe = 1519.2 ft;

The inlet loss at upstream is assumed to be 1.0 ft;

The required headwater elevation = 1520.2 ft.

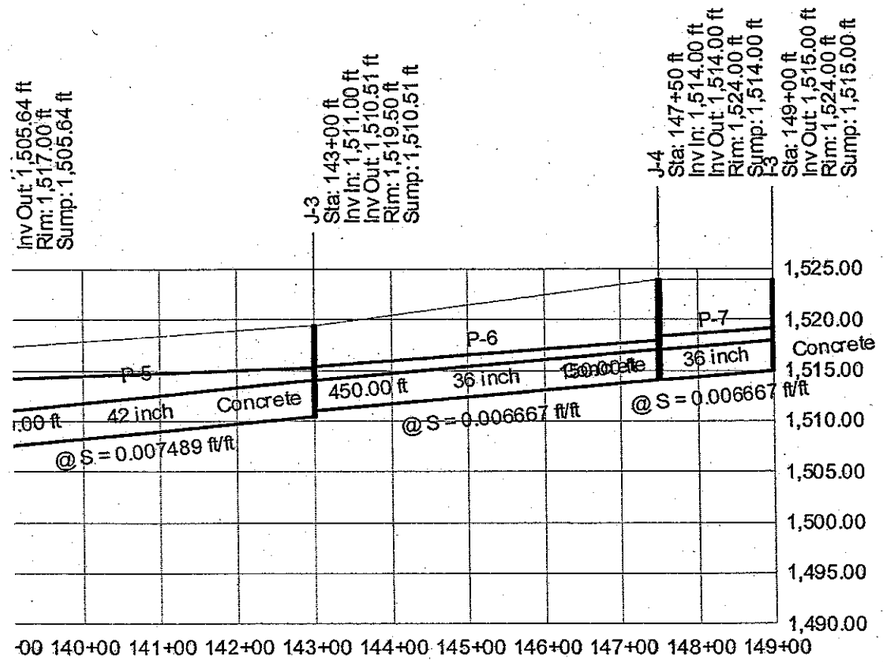
Scenario: Base

Combined Pipe\Node Report

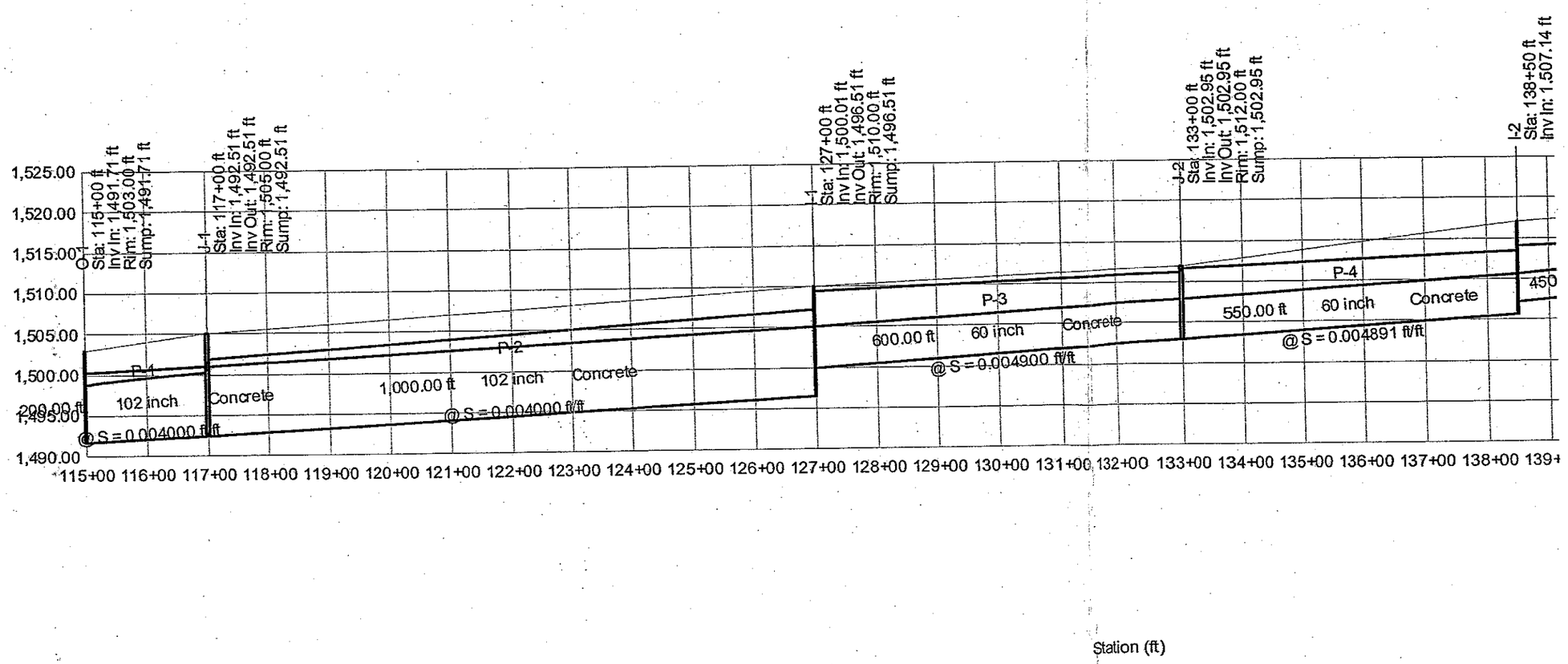
Label	Upstream Node	Downstream Node	Length (ft)	Upstream Inlet Area (acres)	Upstream Inlet Rational Coefficient	Upstream Inlet CA (acres)	Upstream Calculated System CA (acres)	Upstream Inlet Rational Flow (cfs)	Section Size	Average Velocity (ft/s)	Upstream Invert Elevation (ft)	Downstream Invert Elevation (ft)	Constructed Slope (ft/ft)	Description	Hydraulic Grade Line In (ft)	Hydraulic Grade Line Out (ft)	Downstream Ground Elevation (ft)	Upstream Ground Elevation (ft)	Hydraulic Slope (ft/ft)	System Known Flow (cfs)
P-7	I-3	J-4	150.00	0.00	0.00	0.00	0.00	0.00	36 inch	7.07	1,515.00	1,514.00	0.006667		1,519.17	1,518.32	1,524.00	1,524.00	0.005620	50.00
P-6	J-4	J-3	450.00	N/A	N/A	N/A	0.00	N/A	36 inch	7.07	1,514.00	1,511.00	0.006667		1,517.94	1,515.41	1,519.50	1,524.00	0.005620	50.00
P-5	J-3	I-2	450.00	N/A	N/A	N/A	0.00	N/A	42 inch	5.20	1,510.51	1,507.14	0.007489		1,515.20	1,514.09	1,517.00	1,519.50	0.002470	50.00
P-4	I-2	J-2	550.00	0.00	0.00	0.00	0.00	0.00	60 inch	7.49	1,505.64	1,502.95	0.004891		1,513.43	1,511.68	1,512.00	1,517.00	0.003186	147.00
P-3	J-2	I-1	600.00	N/A	N/A	N/A	0.00	N/A	60 inch	7.49	1,502.95	1,500.01	0.004900		1,511.24	1,509.33	1,510.00	1,512.00	0.003186	147.00
P-2	I-1	J-1	1,000.00	0.00	0.00	0.00	0.00	0.00	102 inch	13.75	1,496.51	1,492.51	0.004000		1,507.13	1,501.84	1,505.00	1,510.00	0.005294	780.00
P-1	J-1	O-1	200.00	N/A	N/A	N/A	0.00	N/A	102 inch	13.75	1,492.51	1,491.71	0.004000		1,500.22	1,498.68	1,503.00	1,505.00	0.007709	780.00

Wood Patel & Associates Inc
© Haestad Methods, Inc. 37 Brookside Road Waterbury, CT 06708 USA +1-203-755-1666

Profile
Scenario: Base



Profile
Scenario: Base



WOOD/PATEL

CIVIL ENGINEERS • HYDROLOGISTS • LAND SURVEYORS

PROJECT Siphon Draw Drainage Improvements

PROJECT NO. 031902.01 SHEET NO. 5 OF

CALCULATED BY SE DATE 7/23/04 CHECKED BY DATE

4) Bleed-off pipe for Guadalupe Basin:

Design 100-Year Flow = 54 cfs

U/S WSEL = 1520.0 ft

D/S HGL = 1514.1 ft

pipe Length = 200 ft

Design pipe Diameter = 36"

PIPE CULVERT ANALYSIS
COMPUTATION OF CULVERT PERFORMANCE CURVE

July 27, 2004

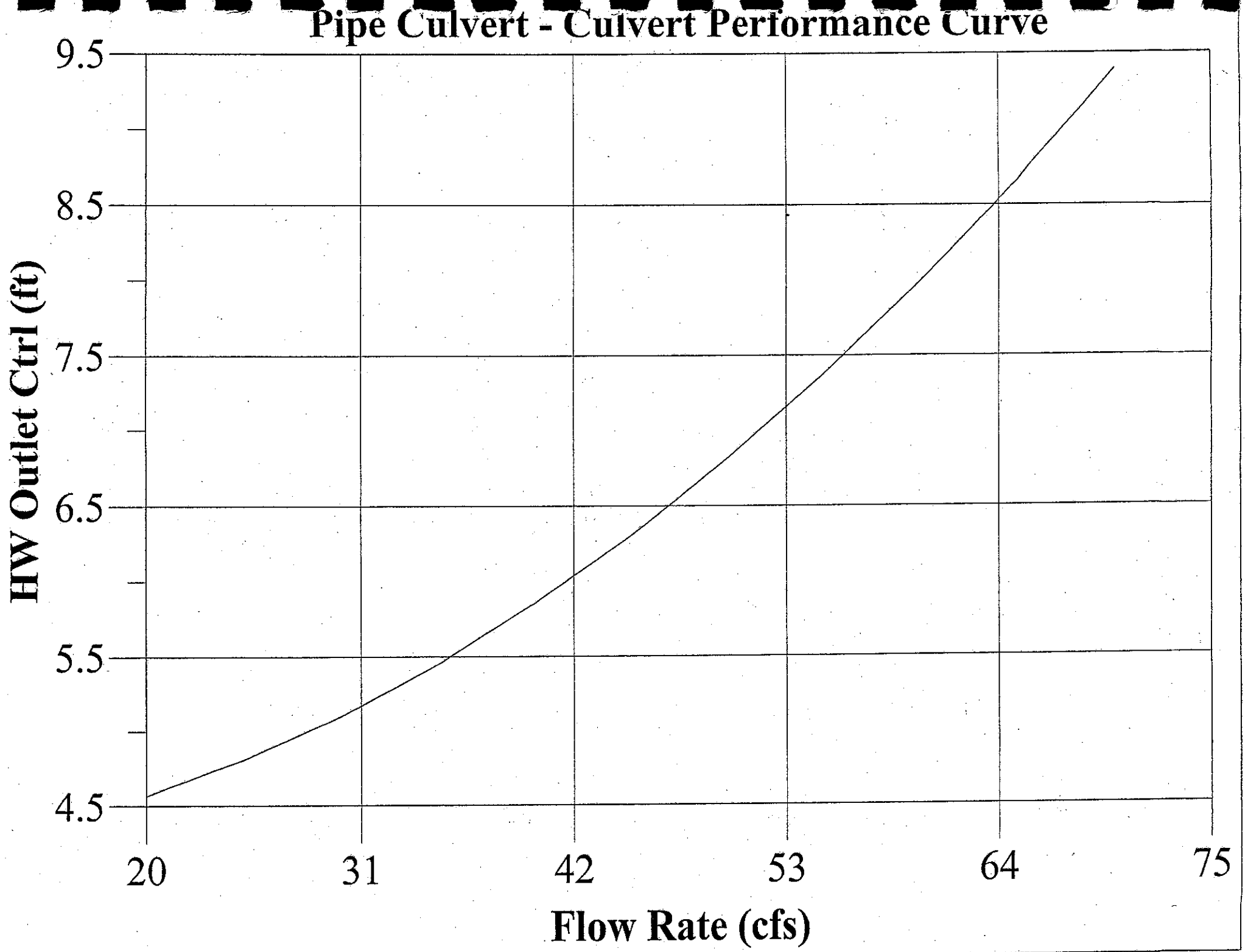
PROGRAM INPUT DATA

DESCRIPTION	VALUE
Culvert Diameter (ft)	3.0
FHWA Chart Number	1
FHWA Scale Number (Type of Culvert Entrance)	1
Manning's Roughness Coefficient (n-value)	0.013
Entrance Loss Coefficient of Culvert Opening	1.0
Culvert Length (ft)	200.0
Invert Elevation at Downstream end of Culvert (ft)	1,505.64
Invert Elevation at Upstream end of Culvert (ft)	1,510.0
Culvert Slope (ft/ft)	0.0218
Starting Flow Rate (cfs)	20.0
Incremental Flow Rate (cfs)	5.0
Ending Flow Rate (cfs)	70.0
Starting Tailwater Depth (ft)	8.5
Incremental Tailwater Depth (ft)	0.0
Ending Tailwater Depth (ft)	8.5

COMPUTATION RESULTS

Flow Rate (cfs)	Tailwater Depth (ft)	Headwater (ft) Inlet Control	Headwater (ft) Outlet Control	Normal Depth (ft)	Critical Depth (ft)	Depth at Outlet (ft)	Outlet Velocity (fps)
20.0	8.5	2.04	4.57	0.92	1.44	3.0	2.83
25.0	8.5	2.35	4.81	1.03	1.61	3.0	3.54
30.0	8.5	2.66	5.1	1.14	1.77	3.0	4.24
35.0	8.5	2.96	5.45	1.24	1.92	3.0	4.95
40.0	8.5	3.27	5.85	1.33	2.06	3.0	5.66
45.0	8.5	3.67	6.31	1.42	2.19	3.0	6.37
50.0	8.5	3.97	6.82	1.51	2.3	3.0	7.07
55.0	8.5	4.39	7.38	1.6	2.41	3.0	7.78
60.0	8.5	4.84	8.0	1.69	2.5	3.0	8.49
65.0	8.5	5.34	8.67	1.78	2.59	3.0	9.2
70.0	8.5	5.88	9.39	1.87	2.66	3.0	9.9

HYDROCALC Hydraulics for Windows, Version 1.2a Copyright (c) 1996
Dodson & Associates, Inc., 5629 FM 1960 West, Suite 314, Houston, TX 77069
Phone:(281)440-3787, Fax:(281)440-4742, Email:software@dodson-hydro.com
All Rights Reserved.


Pipe Culvert - Culvert Performance Curve
HW Outlet Ctrl (ft)
9.5
8.5
7.5
6.5
5.5
4.5
20
31
42
53
64
75
Flow Rate (cfs)

APPENDIX C

Supporting Cost Estimation Sheets

Wood/Patel

Siphon Draw Basin Outfall Options August 5, 2004

Flood Control District of Maricopa County W/P # 031902

FCD 2003 C019

Option 1 (Portion within Maricopa County)

MAJOR OUTFALL ELEMENTS:

ITEM	DESCRIPTION	UNIT PRICE	UNIT	QUANTITY	AMOUNT
1	42" RCRCP Pipe "G"	$125	LF	3,250	$406,250
2	78" RGRCP Pipe "H"	$270	LF	4,800	$1,296,000
3	Channel "K" Excavation	$6.00	CY	10,500	$63,000
4	Manholes	$6,000	EA	15	$90,000
		SUBTOTAL MAJOR OUTFALL ELEMENTS			$1,855,250
		CONTINGENCIES:			
		Construction		25%	$463,813
		Design & Field Engineering		18%	$417,431
		Change Orders		7%	$162,334
		TOTAL MAJOR OUTFALL ELEMENTS			**$2,898,828**

DRAFT

1. Construction Contingencies @ 25% of the Total Construction Cost
2. Design and Field Engineering Costs @ 18% of the sum of Total Construction Cost and Construction Contingencies
3. Change Orders @ 7% of the sum of Total Construction Cost and Construction Contingencies
4. Land for channel H is assumed to be an easement at no cost for this project.
5. Siphon Draw Wash alignment will continue to get flood water from storm events between 100-year 24-hour and 100-year 2-hour.

Wood/Patel

Siphon Draw Basin Outfall Options
Flood Control District of Maricopa County
FCD 2003 C019

August 5, 2004
W/P # 031902

Option 2 (Portion within Maricopa County)

MAJOR OUTFALL ELEMENTS:

ITEM	DESCRIPTION	UNIT PRICE	UNIT	QUANTITY	AMOUNT
1	Channel "K" Excavation	$6.00	CY	10,500	$63,000
2	78" RGRCP Pipe "H"	$270	LF	4,800	$1,296,000
3	Manholes	$6,000	EA	12	$72,000
		SUBTOTAL MAJOR OUTFALL ELEMENTS			$1,431,000
		CONTINGENCIES:			
		Construction		25%	$357,750
		Design & Field Engineering		18%	$321,975
		Change Orders		7%	$125,213
		TOTAL MAJOR OUTFALL ELEMENTS			**$2,235,938**

1. Construction Contingencies @ 25% of the Total Construction Cost
2. Design and Field Engineering Costs @ 18% of the sum of Total Construction Cost and Construction Contingencies
3. Change Orders @ 7% of the sum of Total Construction Cost and Construction Contingencies
4. Land for channel H is assumed to be an easement at no cost to this project.
5. Siphon Draw Wash alignment will continue to get flood water from storm events between 100-year 24-hour and 100-year 2-hour.

DRAFT

Wood/Patel

Siphon Draw Basin Outfall Options August 5, 2004

Flood Control District of Maricopa County W/P # 031902

FCD 2003 C019

Option 3 (Portion within Maricopa County)

MAJOR OUTFALL ELEMENTS:

ITEM	DESCRIPTION	UNIT PRICE	UNIT	QUANTITY	AMOUNT
1	78" RCRCP Pipe "F"&"G"	$270	LF	4,200	$1,134,000
2	78" RCRCP Pipe "H"	$270	LF	4,800	$1,296,000
3	Manholes	$6,000	EA	17	$102,000
		SUBTOTAL MAJOR OUTFALL ELEMENTS			$2,532,000
		CONTINGENCIES:			
		Construction		25%	$633,000
		Design & Field Engineering		18%	$569,700
		Change Orders		7%	$221,550
		TOTAL MAJOR OUTFALL ELEMENTS			**$3,956,250**

1. Construction Contingencies @ 25% of the Total Construction Cost
2. Design and Field Engineering Costs @ 18% of the sum of Total Construction Cost and Construction Contingencies
3. Change Orders @ 7% of the sum of Total Construction Cost and Construction Contingencies
4. Land for channel H is assumed to be an easement at no cost to this project
5. Siphon Draw Wash alignment will continue to get flood water from storm events between 100-year 24-hour and 100-year 2-hour.

DRAFT

Wood/Patel

Siphon Draw Basin Outfall Options August 5, 2004

Flood Control District of Maricopa County W/P # 031902

FCD 2003 C019

Option 4 (Portion within Maricopa County)

MAJOR OUTFALL ELEMENTS:

ITEM	DESCRIPTION	UNIT PRICE	UNIT	QUANTITY	AMOUNT
1	42" RGRCP Pipe "G" & "H"	$125	LF	8,050	$1,006,250
2	Manholes	$6,000	EA	15	$90,000
		SUBTOTAL MAJOR OUTFALL ELEMENTS			$1,096,250
		CONTINGENCIES:			
		Construction		25%	$274,063
		Design & Field Engineering		18%	$246,656
		Change Orders		7%	$95,922
		TOTAL MAJOR OUTFALL ELEMENTS			**$1,712,891**

1. Construction Contingencies @ 25% of the Total Construction Cost
2. Design and Field Engineering Costs @ 18% of the sum of Total Construction Cost and Construction Contingencies
3. Change Orders @ 7% of the sum of Total Construction Cost and Construction Contingencies
4. Land for channel H is assumed to be an easement at no cost to this project.
5. Siphon Draw Wash alignment will continue to get flood water from storm events between 100-year 24-hour and 100-year 2-hour.

DRAFT

Wood/Patel

Siphon Draw Basin Outfall Options
Flood Control District of Maricopa County
FCD 2003 C019

August 5, 2004
W/P # 031902

Option 5 (Portion within Maricopa County)

MAJOR OUTFALL ELEMENTS:

ITEM	DESCRIPTION	UNIT PRICE	UNIT	QUANTITY	AMOUNT
1	72" RCRCP Pipe "F" & "G"	$240	LF	4,200	$1,008,000
2	72" RCRCP Pipe "H"	$240	LF	4,800	$1,152,000
3	Manholes	$6,000	EA	17	$102,000
		SUBTOTAL MAJOR OUTFALL ELEMENTS			$2,262,000
		CONTINGENCIES:			
		Construction		25%	$565,500
		Design & Field Engineering		18%	$508,950
		Change Orders		7%	$197,925
		TOTAL MAJOR OUTFALL ELEMENTS			**$3,534,375**

DRAFT

1. Construction Contingencies @ 25% of the Total Construction Cost.
2. Design and Field Engineering Costs @ 18% of the sum of Total Construction Cost and Construction Contingencies
3. Change Orders @ 7% of the sum of Total Construction Cost and Construction Contingencies
4. Land for channel H is assumed to be an easement at no cost to this project.
5. Siphon Draw Wash alignment will continue to get flood water from storm events between 100-year 24-hour and 100-year 2-hour.

Wood/Patel

Siphon Draw Basin Outfall Options
Flood Control District of Maricopa County
FCD 2003 C019

August 5, 2004
W/P # 031902

Option 1 (Portion within Pinal County)

COLLECTION ELEMENTS:

ITEM	DESCRIPTION	UNIT PRICE	UNIT	QUANTITY	AMOUNT
1	Concrete Channel "L"	$310	CY	8,307	$2,575,170
2	Channel "L" Excavation	$6.00	CY	72,340	$434,040
3	Diversion Structure	$150,000	EA	1	$150,000
4	Basin Excavation	$6.00	CY	381,000	$2,286,000
5	Landscaping	$0.50	SF	1,655,280	$827,640
		SUBTOTAL COLLECTION ELEMENTS			$6,272,850
		CONTINGENCIES:			
		Construction		25%	$1,568,213
		Design & Field Engineering		18%	$1,411,391
		Change Orders		7%	$548,874
		TOTAL COLLECTION ELEMENTS			**$9,801,328**

DRAFT

1. Construction Contingencies @ 25% of the Total Construction Cost
2. Design and Field Engineering Costs @ 18% of the sum of Total Construction Cost and Construction Contingencies
3. Change Orders @ 7% of the sum of Total Construction Cost and Construction Contingencies

LAND ACQUISITION

ITEM	DESCRIPTION	UNIT PRICE	UNIT	QUANTITY	AMOUNT
1	Basin Land Acquisition	$100,000	AC	38	$3,800,000
2	Channel Land Acquisition	$100,000	AC	17.3	$1,730,000
		SUBTOTAL LAND ACQUISITION			$5,530,000
		CONTINGENCIES:		10%	$553,000
		TOTAL LAND ACQUISITION			**$6,083,000**
				TOTAL	**$15,884,328**

Wood/Patel

Siphon Draw Basin Outfall Options August 5, 2004

Flood Control District of Maricopa County W/P # 031902

FCD 2003 C019

Option 2 (Portion within Pinal County)

COLLECTION ELEMENTS:

ITEM	DESCRIPTION	UNIT PRICE	UNIT	QUANTITY	AMOUNT
1	Concrete Channel "L"	$310	CY	8,307	$2,575,170
2	Channel "L" Excavation	$6.00	CY	72,340	$434,040
3	Diversion Structure	$150,000	EA	1	$150,000
4	Basin Excavation	$6.00	CY	331,000	$1,986,000
5	Basin Berm Construction	$6.00	CY	7,600	$45,600
6	Landscaping	$0.50	SF	2,134,440	$1,067,220
		SUBTOTAL COLLECTION ELEMENTS			$6,258,030
		CONTINGENCIES:			
		Construction		25%	$1,564,508
		Design & Field Engineering		18%	$1,408,057
		Change Orders		7%	$547,578
		TOTAL COLLECTION ELEMENTS			**$9,778,172**

DRAFT

1. Construction Contingencies @ 25% of the Total Construction Cost
2. Design and Field Engineering Costs @ 18% of the sum of Total Construction Cost and Construction Contingencies
3. Change Orders @ 7% of the sum of Total Construction Cost and Construction Contingencies

LAND ACQUISITION:

ITEM	DESCRIPTION	UNIT PRICE	UNIT	QUANTITY	AMOUNT
1	Basin Land Acquisition	$100,000	AC	49	$4,900,000
2	Channel Land Acquisition	$100,000	AC	17.3	$1,730,000
		SUBTOTAL LAND ACQUISITION			$6,630,000
		CONTINGENCIES :		10%	$663,000
		TOTAL LAND ACQUISITION			**$7,293,000**
				TOTAL	**$17,071,172**

Wood/Patel

Siphon Draw Basin Outfall Options
Flood Control District of Maricopa County
FCD 2003 C019

August 5, 2004
W/P # 031902

Option 3 (Portion within Pinal County)

COLLECTION ELEMENTS:

ITEM	DESCRIPTION	UNIT PRICE	UNIT	QUANTITY	AMOUNT
1	Concrete Channel "L"	$310	CY	8,307	$2,575,170
2	Channel "L" Excavation	$6.00	CY	72,340	$434,040
3	Basin Excavation	$6.00	CY	281,000	$1,686,000
4	Basin Berm Construction	$6.00	CY	7,600	$45,600
5	Diversion Structure	$150,000	EA	1	$150,000
6	Landscaping	$0.50	SF	1,263,240	$631,620
		SUBTOTAL COLLECTION ELEMENTS			$5,522,430
		CONTINGENCIES:			
		Construction		25%	$1,380,608
		Design & Field Engineering		18%	$1,242,547
		Change Orders		7%	$483,213
		TOTAL COLLECTION ELEMENTS			**$8,628,797**

DRAFT

1. Construction Contingencies @ 25% of the Total Construction Cost
2. Design and Field Engineering Costs @ 18% of the sum of Total Construction Cost and Construction Contingencies
3. Change Orders @ 7% of the sum of Total Construction Cost and Construction Contingencies

LAND ACQUISITION:

ITEM	DESCRIPTION	UNIT PRICE	UNIT	QUANTITY	AMOUNT
1	Basin Land Acquisition	$100,000	AC	29	$2,900,000
2	Channel Land Acquisition	$100,000	AC	17.3	$1,730,000
		SUBTOTAL LAND ACQUISITION			$4,630,000
		CONTINGENCIES :		10%	$463,000
		TOTAL LAND ACQUISITION			**$5,093,000**
				TOTAL	**$13,721,797**

Wood/Patel

Siphon Draw Basin Outfall Options August 5, 2004

Flood Control District of Maricopa County W/P # 031902

FCD 2003 C019

Option 4 (Portion within Pinal County)

COLLECTION ELEMENTS:

ITEM	DESCRIPTION	UNIT PRICE	UNIT	QUANTITY	AMOUNT
1	Concrete Channel "L"	$310	CY	8,307	$2,575,170
2	Channel "L" Excavation	$6.00	CY	72,340	$434,040
3	Basin Excavation	$6.00	CY	655,000	$3,930,000
4	Diversion Structure	$150,000	EA	1	$150,000
5	Landscaping	$0.50	SF	3,615,480	$1,807,740
		SUBTOTAL COLLECTION ELEMENTS			$8,896,950
		CONTINGENCIES:			
		Construction		25%	$2,224,238
		Design & Field Engineering		18%	$2,001,814
		Change Orders		7%	$778,483
		TOTAL COLLECTION ELEMENTS			**$13,901,484**

DRAFT

1. Construction Contingencies @ 25% of the Total Construction Cost
2. Design and Field Engineering Costs @ 18% of the sum of Total Construction Cost and Construction Contingencies
3. Change Orders @ 7% of the sum of Total Construction Cost and Construction Contingencies

LAND ACQUISITION:

ITEM	DESCRIPTION	UNIT PRICE	UNIT	QUANTITY	AMOUNT
1	Basin Land Acquisition	$100,000	AC	83	$8,300,000
2	Channel Land Acquisition	$100,000	AC	17.3	$1,730,000
		SUBTOTAL LAND ACQUISITION			$10,030,000
		CONTINGENCIES :		10%	$1,003,000
		TOTAL LAND ACQUISITION			**$11,033,000**
				TOTAL	**$24,934,484**

Wood/Patel

Siphon Draw Basin Outfall Options August 5, 2004
Flood Control District of Maricopa County W/P # 031902
FCD 2003 C019

Option 5 (Portion within Pinal County)

COLLECTION ELEMENTS:

ITEM	DESCRIPTION	UNIT PRICE	UNIT	QUANTITY	AMOUNT
1	Concrete Channel "L"	$310	CY	3,289	$1,019,590
2	Channel "L" Excavation	$6.00	CY	24,050	$144,300
3	78" RGRCP Pipe	$270	LF	2,500	$675,000
4	Basin Excavation	$6.00	CY	416,000	$2,496,000
5	Diversion Structure	$150,000	EA	2	$300,000
6	Landscaping	$0.50	SF	1,829,520	$914,760
7	Basin Berm Construction	$6.00	CY	7,600	$45,600
				SUBTOTAL COLLECTION ELEMENTS	$5,595,250
		CONTINGENCIES:			
		Construction		25%	$1,398,813
		Design & Field Engineering		18%	$1,258,931
		Change Orders		7%	$489,584
		TOTAL COLLECTION ELEMENTS			**$8,742,578**

DRAFT

1. Construction Contingencies @ 25% of the Total Construction Cost
2. Design and Field Engineering Costs @ 18% of the sum of Total Construction Cost and Construction Contingencies
3. Change Orders @ 7% of the sum of Total Construction Cost and Construction Contingencies

LAND ACQUISITION:

ITEM	DESCRIPTION	UNIT PRICE	UNIT	QUANTITY	AMOUNT
1	Basin Land Acquisition	$100,000	AC	42	$4,200,000
2	Channel Land Acquisition	$100,000	AC	8.7	$870,000
				SUBTOTAL LAND ACQUISITION	$5,070,000
		CONTINGENCIES :		10%	$507,000
				TOTAL LAND ACQUISITION	**$5,577,000**
				TOTAL	**$14,319,578**

Siphon Draw Basin Outfall Options
Flood Control District of Maricopa County
FCD 2003 C019

August 5, 2004
W/P # 031902

Option 6 (Portion within Pinal County)

COLLECTION ELEMENTS:

ITEM	DESCRIPTION	UNIT PRICE	UNIT	QUANTITY	AMOUNT
1	Concrete Channel "L"	$310	CY	3,418	$1,059,580
2	Channel "L" Excavation	$6.00	CY	24,973	$149,838
3	102" RGRCP Pipe	$385	LF	2,500	$962,500
4	Basin Excavation	$6.00	CY	406,000	$2,436,000
5	Diversion Structure	$150,000	EA	3	$450,000
6	Landscaping	$0.50	SF	2,221,560	$1,110,780
7	Basin Berm Construction	$6.00	CY	7,600	$45,600
		SUBTOTAL COLLECTION ELEMENTS			$6,214,298
		CONTINGENCIES:			
		Construction		25%	$1,553,575
		Design & Field Engineering		18%	$1,398,217
		Change Orders		7%	$543,751
		TOTAL COLLECTION ELEMENTS			**$9,709,841**

DRAFT

1. Construction Contingencies @ 25% of the Total Construction Cost
2. Design and Field Engineering Costs @ 18% of the sum of Total Construction Cost and Construction Contingencies
3. Change Orders @ 7% of the sum of Total Construction Cost and Construction Contingencies

LAND ACQUISITION:

ITEM	DESCRIPTION	UNIT PRICE	UNIT	QUANTITY	AMOUNT
1	Basin Land Acquisition	$100,000	AC	51	$5,100,000
2	Channel Land Acquisition	$100,000	AC	9.0	$900,000
		SUBTOTAL LAND ACQUISITION			$6,000,000
		CONTINGENCIES :		10%	$600,000
		TOTAL LAND ACQUISITION			**$6,600,000**
				TOTAL	**$16,309,841**

Siphon Draw Basin Outfall Options
Flood Control District of Maricopa County
FCD 2003 C019

August 5, 2004
W/P # 031902

Option 7 (Portion within Pinal County)

COLLECTION ELEMENTS:

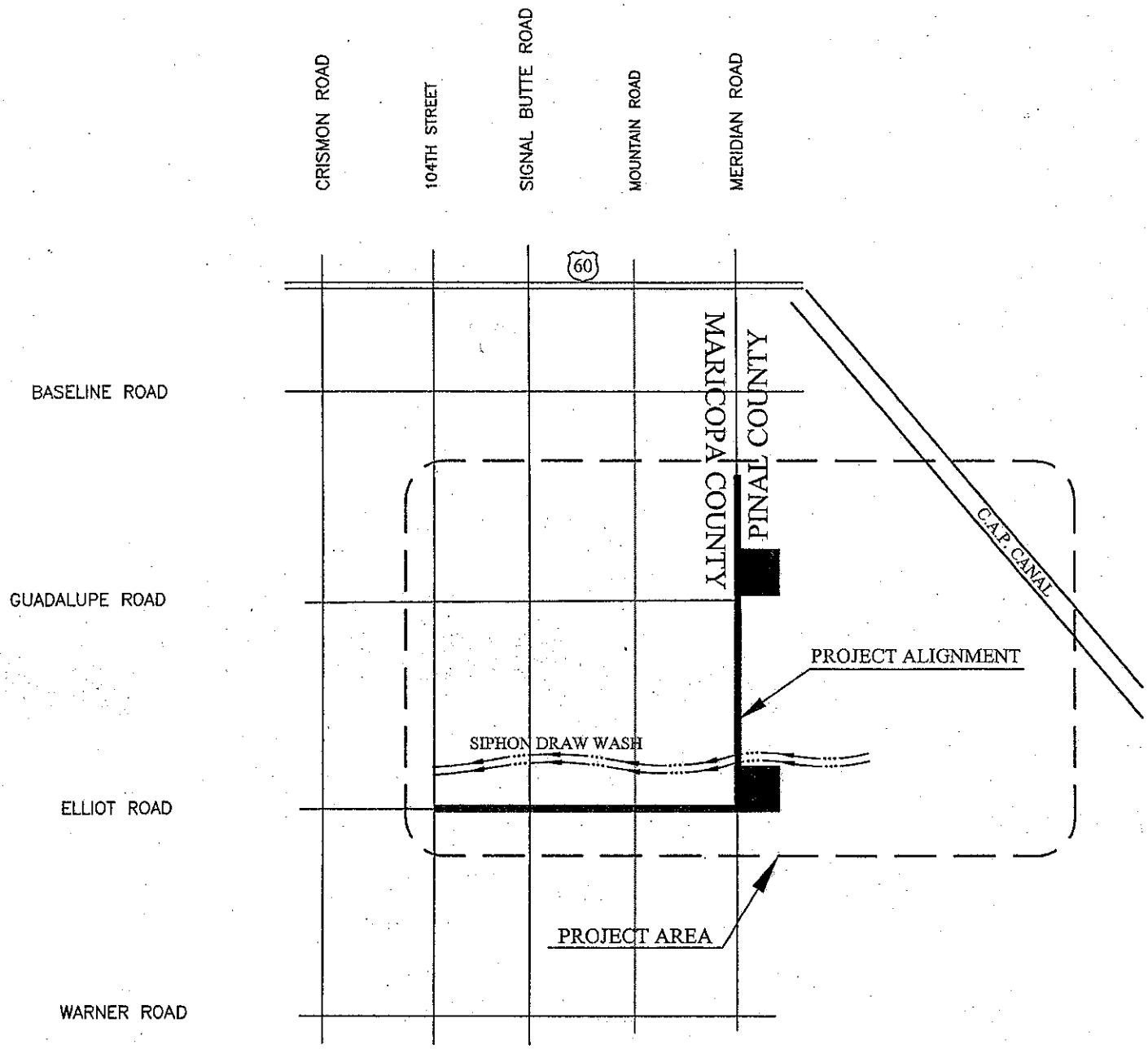
ITEM	DESCRIPTION	UNIT PRICE	UNIT	QUANTITY	AMOUNT
1	Concrete Channel "L"	$310	CY	2,934	$909,540
2	Channel "L" Excavation	$6.00	CY	22,457	$134,742
3	36" RGRCP Pipe	$100	LF	600	$60,000
4	42" RGRCP Pipe	$120	LF	450	$54,000
5	60" RGRCP Pipe	$200	LF	1,150	$230,000
6	72" RGRCP Pipe	$240	LF	1,200	$288,000
7	102" RGRCP Pipe	$385	LF	1,065	$410,025
8	Basin Excavation	$6.00	CY	387,000	$2,322,000
9	Diversion Structure	$150,000	EA	2	$300,000
10	Landscaping	$0.50	SF	1,655,280	$827,640
				SUBTOTAL COLLECTION ELEMENTS	$5,535,947
			CONTINGENCIES:		
			Construction	25%	$1,383,987
			Design & Field Engineering	18%	$1,245,588
			Change Orders	7%	$484,395
				TOTAL COLLECTION ELEMENTS	**$8,649,917**

DRAFT

1. Construction Contingencies @ 25% of the Total Construction Cost
2. Design and Field Engineering Costs @ 18% of the sum of Total Construction Cost and Construction Contingencies
3. Change Orders @ 7% of the sum of Total Construction Cost and Construction Contingencies

LAND ACQUISITION:

ITEM	DESCRIPTION	UNIT PRICE	UNIT	QUANTITY	AMOUNT
1	Basin Land Acquisition	$100,000	AC	38	$3,800,000
2	Channel Land Acquisition	$100,000	AC	7.2	$720,000
				SUBTOTAL LAND ACQUISITION	$4,520,000
			CONTINGENCIES :	10%	$452,000
				TOTAL LAND ACQUISITION	**$4,972,000**
				TOTAL	**$13,621,917**



N

N.T.S.

SIPHON DRAW DRAINAGE IMPROVEMENTS

PROJECT LOCATION AND VICINITY MAP

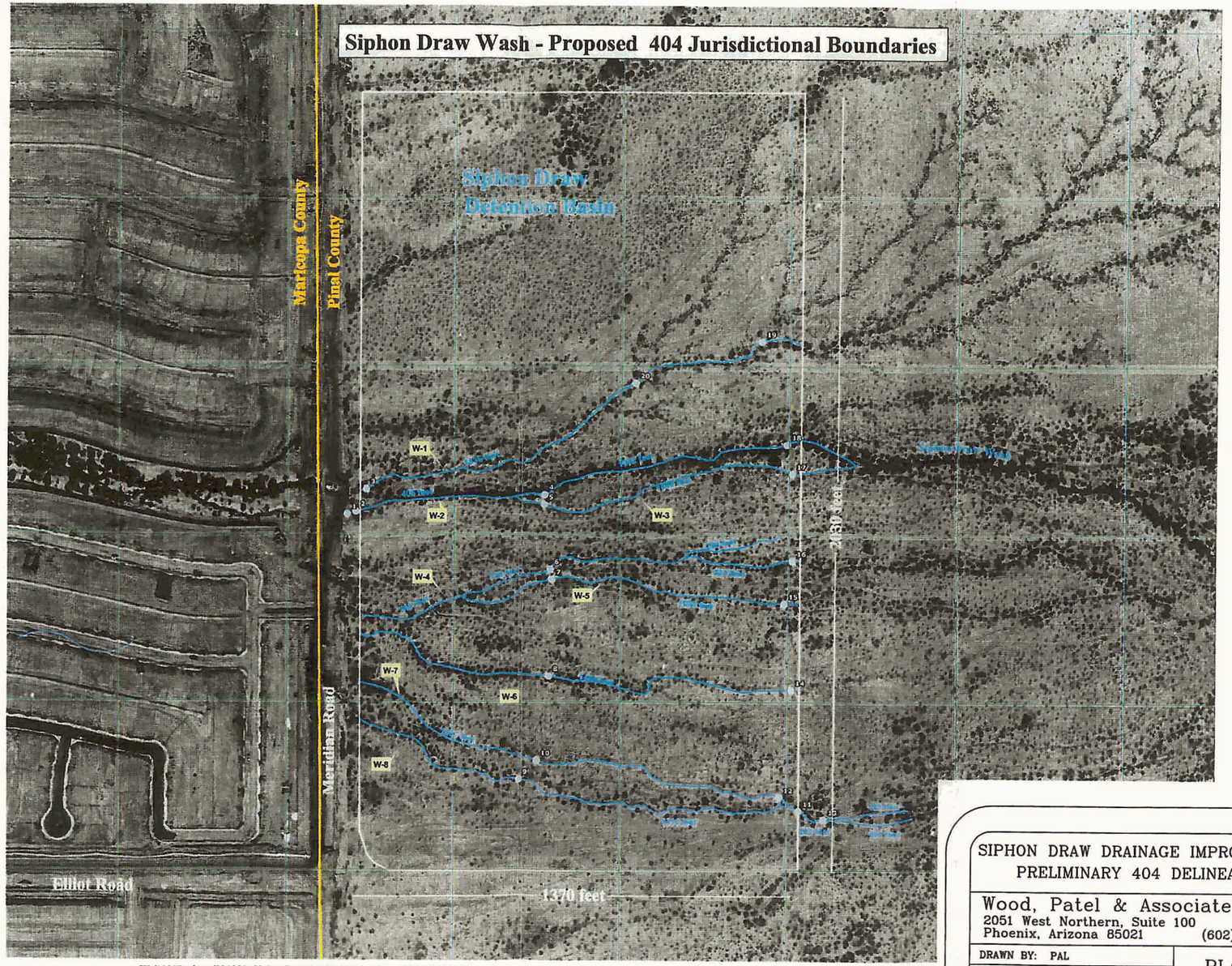
Wood, Patel & Associates, Inc.
2051 West Northern, Suite 100
Phoenix, Arizona 85021 (602) 335-8500

DRAWN BY: PAL

JOB NO: 031902 DATE: 7/04

PLATE 1

W:/2003Projects/031902_Siphon Draw/Documents/Exhibits/VicMap.dwg



N

300 0 150 300

LEGEND

- MEASURING POINTS
- STREAMS
- COUNTY BOUNDARY

W:/2003Projects/031902_Siphon Draw/Documents/Exhibits/404 PLATE2.dwg

SIPHON DRAW DRAINAGE IMPROVEMENTS
PRELIMINARY 404 DELINEATION

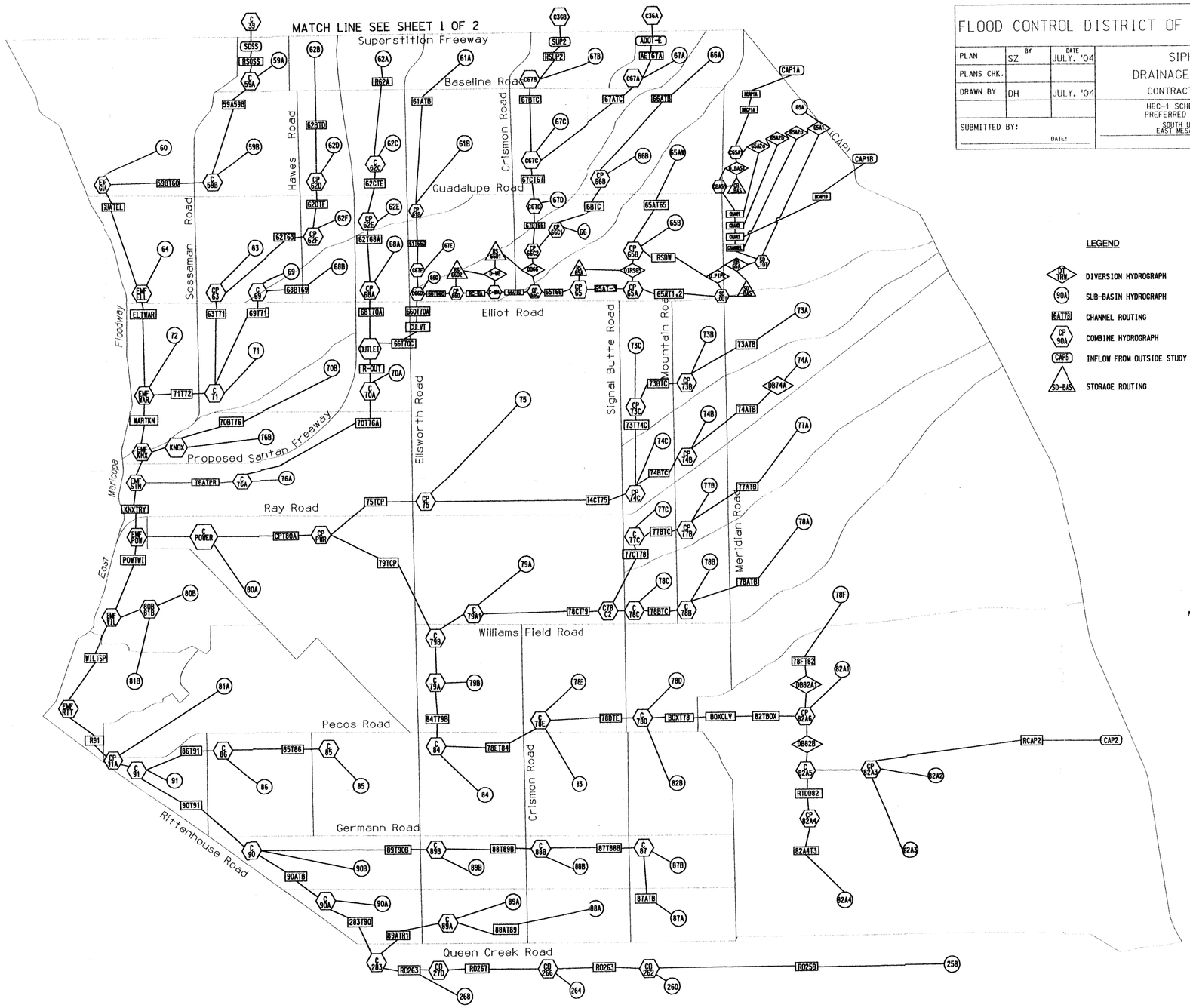
Wood, Patel & Associates, Inc.
2051 West Northern, Suite 100
Phoenix, Arizona 85021 (602) 335-8500

DRAWN BY: PAL
JOB NO: 031902 DATE: 7/04

PLATE 2

PLATE 3

Flood Insurance Rate Map (FIRM)



FLOOD CONTROL DISTRICT OF MARICOPA COUNTY				
PLAN	SZ (BY)	JULY. '04 (DATE)	SIPHON DRAW DRAINAGE IMPROVEMENTS CONTRACT FCD 2003-C019	
PLANS CHK.				
DRAWN BY	DH	JULY. '04	HEC-1 SCHEMATIC FOR PREFERRED ALTERNATIVE SOUTH US 60 EAST MESA ADMP	PLATE 19
SUBMITTED BY:		DATE:		

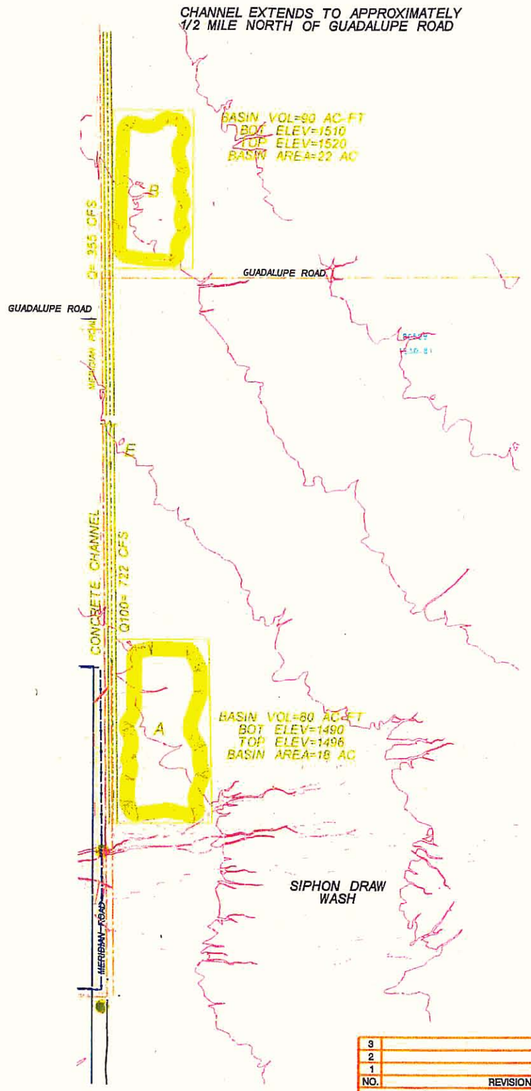
LEGEND

- DIVERSION HYDROGRAPH
- SUB-BASIN HYDROGRAPH
- CHANNEL ROUTING
- COMBINE HYDROGRAPH
- INFLOW FROM OUTSIDE STUDY AREA
- STORAGE ROUTING

N

N.T.S.

Pr:#2003Projects#031902_Siphon Draw#Hydrology#FCDMC#Dec11_03#PrefHEC1.dgn 08/05/2004 11:05:50 AM



DESIGN ELEMENTS

A SIPHON DRAW BASIN
B GUADALUPE BASIN
C BASIN AT SOUTH OF THE C.A.P. CANAL NORTH OVERCHUTE
D BASIN AT SOUTH OF THE C.A.P. CANAL SOUTH OVERCHUTE
E MERIDIAN ROAD COLLECTION SYSTEM
F STORM DRAIN BETWEEN SIPHON DRAW WASH AND ELLIOT ROAD
G STORM DRAIN BETWEEN MERIDIAN ROAD AND WEST OF MOUNTAIN ROAD
H STORM DRAIN BETWEEN 104TH STREET AND WEST OF MOUNTAIN ROAD
I SIPHON DRAW WASH BETWEEN MERIDIAN ROAD AND MOUNTAIN ROAD
J SIPHON DRAW WASH BETWEEN 104TH STREET AND MOUNTAIN ROAD
K MOUNTAIN ROAD CHANNEL / PIPE

N

500 0 500 1000

Scale in Feet

TWO WORKING DAYS BEFORE YOU DIG, CALL
263-1100
BLUE STAKE

NO.	REVISION	BY	DATE
3			
2			
1			

FLOOD CONTROL DISTRICT OF MARICOPA COUNTY
ENGINEERING DIVISION

SIPHON DRAW
DRAINAGE IMPROVEMENTS
FCD CONTRACT NO. 2003 C019

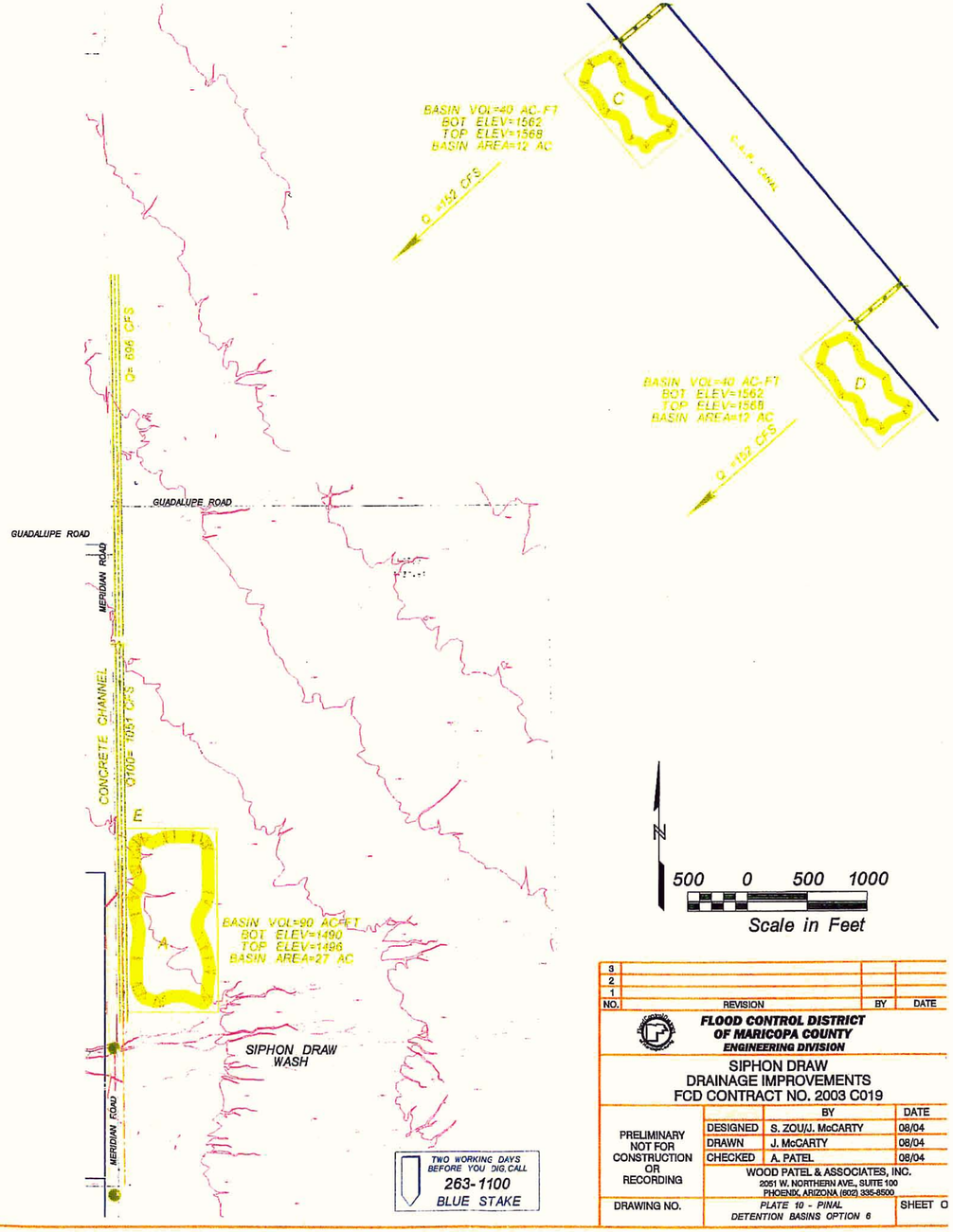
PRELIMINARY NOT FOR CONSTRUCTION OR RECORDING		BY	DATE
	DESIGNED	S. ZOU/J. McCARTY	08/04
	DRAWN	J. McCARTY	08/04
	CHECKED	A. PATEL	08/04

WOOD PATEL & ASSOCIATES, INC.
2051 W. NORTHERN AVE., SUITE 100
PHOENIX, ARIZONA (602) 335-8500

DRAWING NO. PLATE 9 - FINAL DETENTION BASINS OPTION 5 SHEET OF

DESIGN ELEMENTS

A SIPHON DRAW BASIN
B GUADALUPE BASIN
C BASIN AT SOUTH OF THE C.A.P. CANAL NORTH OVERCHUTE
D BASIN AT SOUTH OF THE C.A.P. CANAL SOUTH OVERCHUTE
E MERIDIAN ROAD COLLECTION SYSTEM
F STORM DRAIN BETWEEN SIPHON DRAW WASH AND ELLIOT ROAD
G STORM DRAIN BETWEEN MERIDIAN ROAD AND WEST OF MOUNTAIN ROAD
H STORM DRAIN BETWEEN 104TH STREET AND WEST OF MOUNTAIN ROAD
I SIPHON DRAW WASH BETWEEN MERIDIAN ROAD AND MOUNTAIN ROAD
J SIPHON DRAW WASH BETWEEN 104TH STREET AND MOUNTAIN ROAD
K MOUNTAIN ROAD CHANNEL / PIPE



NO.	REVISION	BY	DATE
3			
2			
1			

FLOOD CONTROL DISTRICT OF MARICOPA COUNTY
ENGINEERING DIVISION

SIPHON DRAW
DRAINAGE IMPROVEMENTS
FCD CONTRACT NO. 2003 C019

PRELIMINARY NOT FOR CONSTRUCTION OR RECORDING

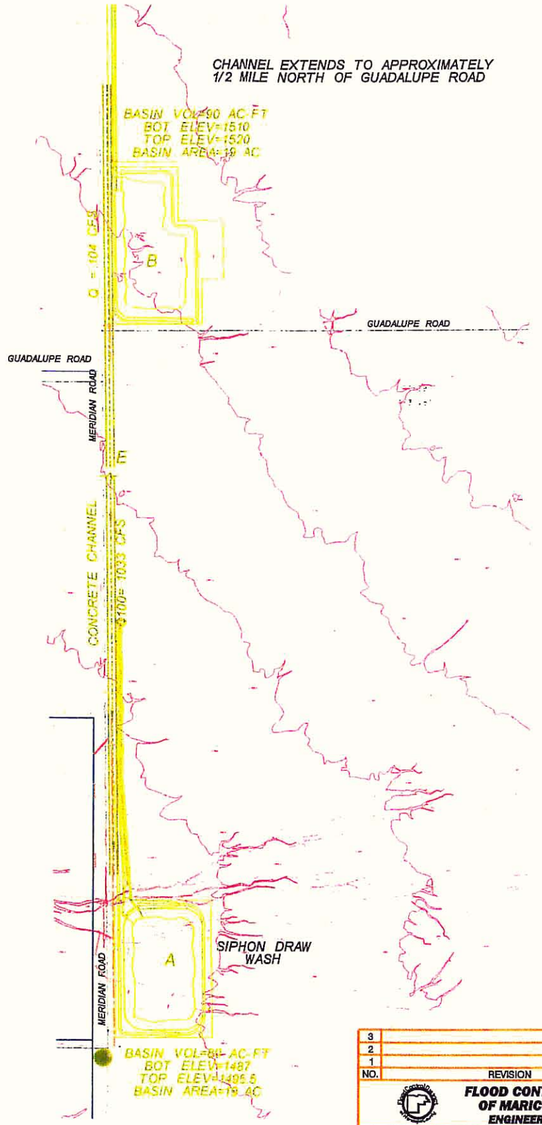
	BY	DATE
DESIGNED	S. ZOU/J. McCARTY	08/04
DRAWN	J. McCARTY	08/04
CHECKED	A. PATEL	08/04

WOOD PATEL & ASSOCIATES, INC.
2051 W. NORTHERN AVE., SUITE 100
PHOENIX, ARIZONA (602) 335-8500

DRAWING NO. PLATE 10 - PINAL DETENTION BASINS OPTION 6 SHEET O

DESIGN ELEMENTS

A SIPHON DRAW BASIN
B GUADALUPE BASIN
C BASIN AT SOUTH OF THE C.A.P. CANAL NORTH OVERCHUTE
D BASIN AT SOUTH OF THE C.A.P. CANAL SOUTH OVERCHUTE
E MERIDIAN ROAD COLLECTION SYSTEM
F STORM DRAIN BETWEEN SIPHON DRAW WASH AND ELLIOT ROAD
G STORM DRAIN BETWEEN MERIDIAN ROAD AND WEST OF MOUNTAIN ROAD
H STORM DRAIN BETWEEN 104TH STREET AND WEST OF MOUNTAIN ROAD
I SIPHON DRAW WASH BETWEEN MERIDIAN ROAD AND MOUNTAIN ROAD
J SIPHON DRAW WASH BETWEEN 104TH STREET AND MOUNTAIN ROAD
K MOUNTAIN ROAD CHANNEL / PIPE



500 0 500 1000
Scale in Feet

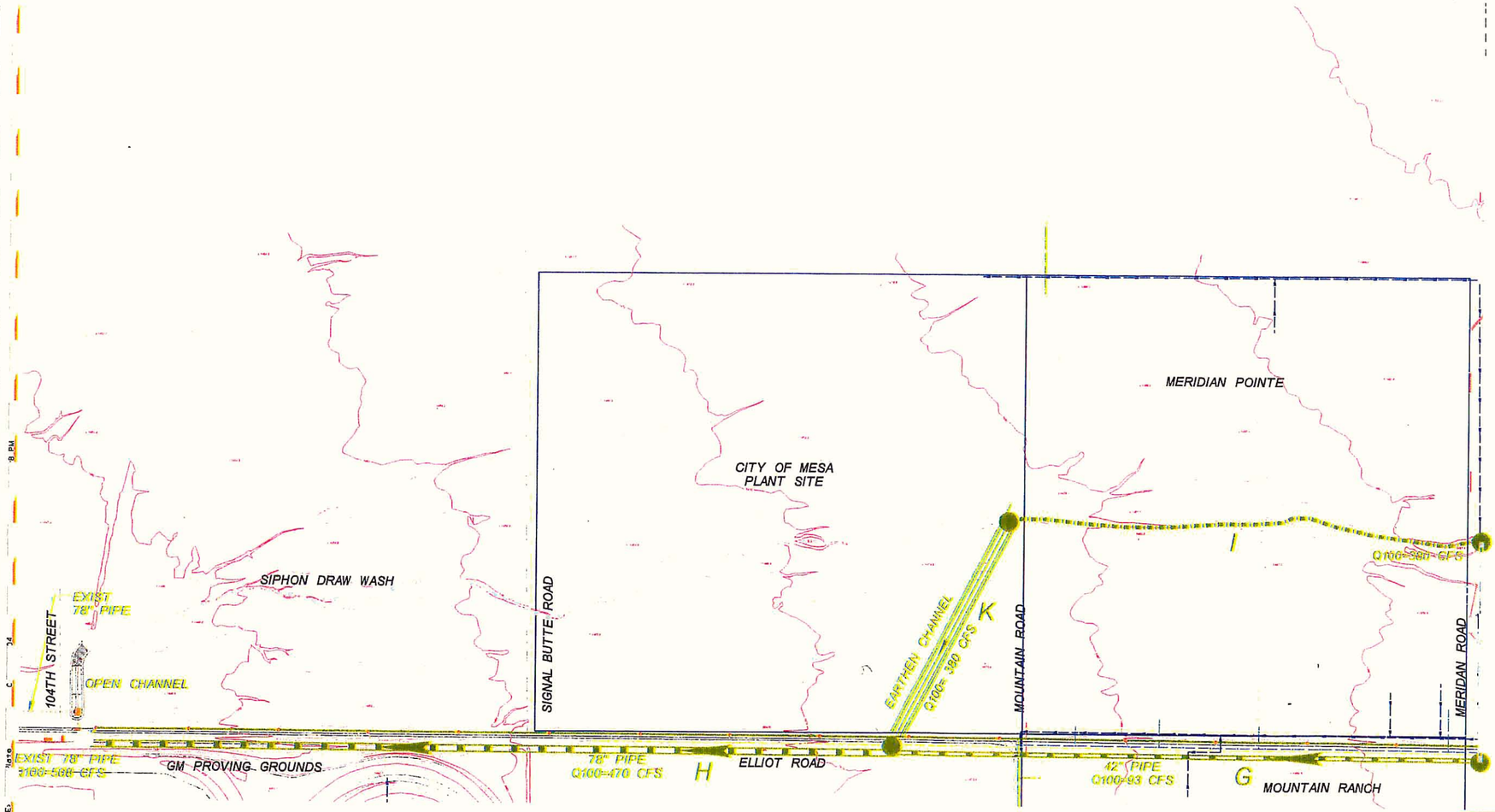
TWO WORKING DAYS
BEFORE YOU DIG, CALL
263-1100
BLUE STAKE

NO.	REVISION	BY	DATE
3			
2			
1			

FLOOD CONTROL DISTRICT OF MARICOPA COUNTY
ENGINEERING DIVISION

SIPHON DRAW
DRAINAGE IMPROVEMENTS
FCD CONTRACT NO. 2003 C019

PRELIMINARY NOT FOR CONSTRUCTION OR RECORDING		BY	DATE
	DESIGNED	S. ZOU/J. McCARTY	08/04
	DRAWN	J. McCARTY	08/04
	CHECKED	A. PATEL	08/04
	WOOD PATEL & ASSOCIATES, INC. 2051 W. NORTHERN AVE., SUITE 100 PHOENIX, ARIZONA (602) 335-8500		
DRAWING NO.	PLATE 11 - PINAL DETENTION BASINS OPTION 7		SHEET C



DESIGN ELEMENTS

A	SIPHON DRAW BASIN
B	GUADALUPE BASIN
C	BASIN AT SOUTH OF THE C.A.P. CANAL NORTH OVERCHUTE
D	BASIN AT SOUTH OF THE C.A.P. CANAL SOUTH OVERCHUTE
E	MERIDIAN ROAD COLLECTION SYSTEM
F	STORM DRAIN BETWEEN SIPHON DRAW WASH AND ELLIOT ROAD
G	STORM DRAIN BETWEEN MERIDIAN ROAD AND WEST OF MOUNTAIN ROAD
H	STORM DRAIN BETWEEN 104TH STREET AND WEST OF MOUNTAIN ROAD
I	SIPHON DRAW WASH BETWEEN MERIDIAN ROAD AND MOUNTAIN ROAD
J	SIPHON DRAW WASH BETWEEN 104TH STREET AND MOUNTAIN ROAD
K	MOUNTAIN ROAD CHANNEL / PIPE

300 0 300 600

Scale in Feet

N

TWO WORKING DAYS BEFORE YOU DIG CALL
263-1100
BLUE STAKE

NO.	REVISION	BY	DATE
3			
2			
1			

FLOOD CONTROL DISTRICT OF MARICOPA COUNTY
ENGINEERING DIVISION

SIPHON DRAW
DRAINAGE IMPROVEMENTS
FCD CONTRACT NO. 2003 C019

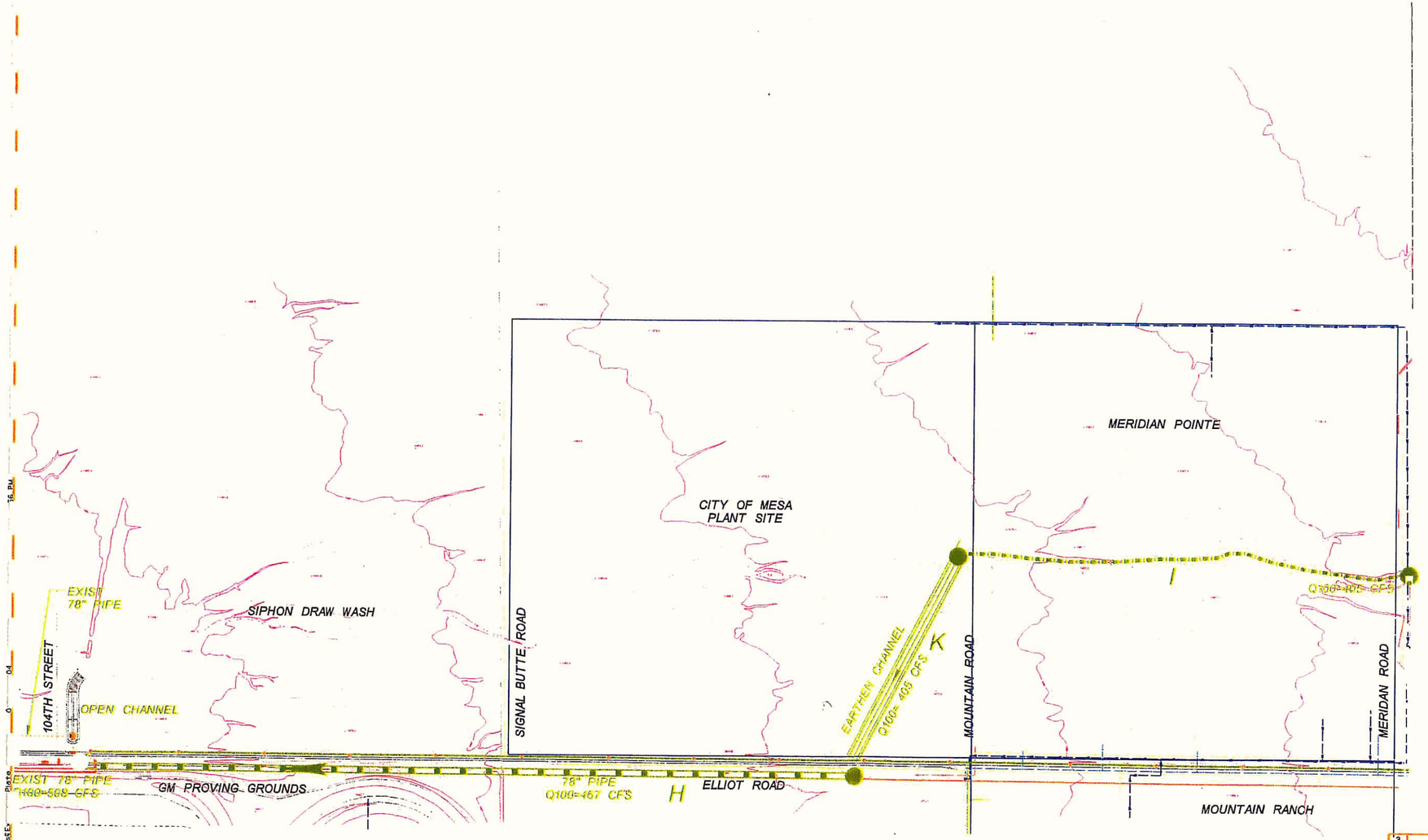
PRELIMINARY NOT FOR CONSTRUCTION OR RECORDING

	BY	DATE
DESIGNED	S. ZOU/J. McCARTY	08/04
DRAWN	J. McCARTY	08/04
CHECKED	A. PATEL	08/04

WOOD PATEL & ASSOCIATES, INC.
2051 W. NORTHERN AVE., SUITE 100
PHOENIX, ARIZONA (602) 335-8500

DRAWING NO. PLATE 12 - MARICOPA OUTFALL SYSTEM OPTION 1

SHEET



DESIGN ELEMENTS

A	SIPHON DRAW BASIN
B	GUADALUPE BASIN
C	BASIN AT SOUTH OF THE C.A.P. CANAL NORTH OVERCHUTE
D	BASIN AT SOUTH OF THE C.A.P. CANAL SOUTH OVERCHUTE
E	MERIDIAN ROAD COLLECTION SYSTEM
F	STORM DRAIN BETWEEN SIPHON DRAW WASH AND ELLIOT ROAD
G	STORM DRAIN BETWEEN MERIDIAN ROAD AND WEST OF MOUNTAIN ROAD
H	STORM DRAIN BETWEEN 104TH STREET AND WEST OF MOUNTAIN ROAD
I	SIPHON DRAW WASH BETWEEN MERIDIAN ROAD AND MOUNTAIN ROAD
J	SIPHON DRAW WASH BETWEEN 104TH STREET AND MOUNTAIN ROAD
K	MOUNTAIN ROAD CHANNEL / PIPE

300 0 300 600

Scale in Feet

N

TWO WORKING DAYS BEFORE YOU DIG, CALL
263-1100
BLUE STAKE

NO.	REVISION	BY	DATE
3			
2			
1			

FLOOD CONTROL DISTRICT OF MARICOPA COUNTY
ENGINEERING DIVISION

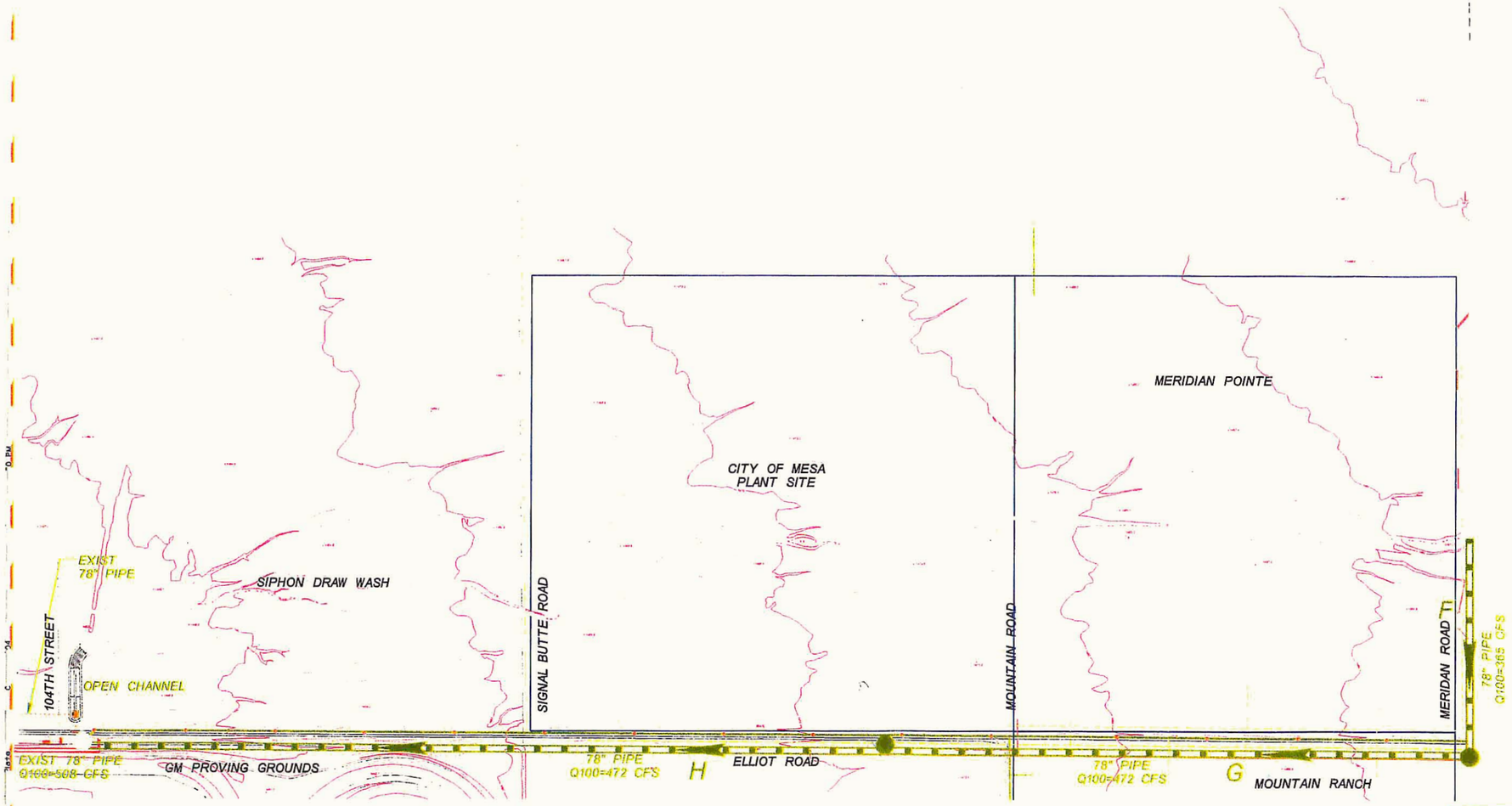
SIPHON DRAW
DRAINAGE IMPROVEMENTS
FCD CONTRACT NO. 2003 C019

PRELIMINARY NOT FOR CONSTRUCTION OR RECORDING		BY	DATE
	DESIGNED	S. ZOU/J. McCARTY	08/04
	DRAWN	J. McCARTY	08/04
	CHECKED	A. PATEL	08/04

WOOD PATEL & ASSOCIATES, INC.
2051 W. NORTHERN AVE., SUITE 100
PHOENIX, ARIZONA (602) 335-8500

DRAWING NO. PLATE 13 - MARICOPA OUTFALL SYSTEM OPTION 2

SHEET O



DESIGN ELEMENTS

A	SIPHON DRAW BASIN
B	GUADALUPE BASIN
C	BASIN AT SOUTH OF THE C.A.P. CANAL NORTH OVERCHUTE
D	BASIN AT SOUTH OF THE C.A.P. CANAL SOUTH OVERCHUTE
E	MERIDIAN ROAD COLLECTION SYSTEM
F	STORM DRAIN BETWEEN SIPHON DRAW WASH AND ELLIOT ROAD
G	STORM DRAIN BETWEEN MERIDIAN ROAD AND WEST OF MOUNTAIN ROAD
H	STORM DRAIN BETWEEN 104TH STREET AND WEST OF MOUNTAIN ROAD
I	SIPHON DRAW WASH BETWEEN MERIDIAN ROAD AND MOUNTAIN ROAD
J	SIPHON DRAW WASH BETWEEN 104TH STREET AND MOUNTAIN ROAD
K	MOUNTAIN ROAD CHANNEL / PIPE

300 0 300 600

Scale in Feet

N

TWO WORKING DAYS BEFORE YOU DIG CALL
263-1100
BLUE STAKE

NO.	REVISION	BY	DATE
3			
2			
1			

FLOOD CONTROL DISTRICT OF MARICOPA COUNTY
ENGINEERING DIVISION

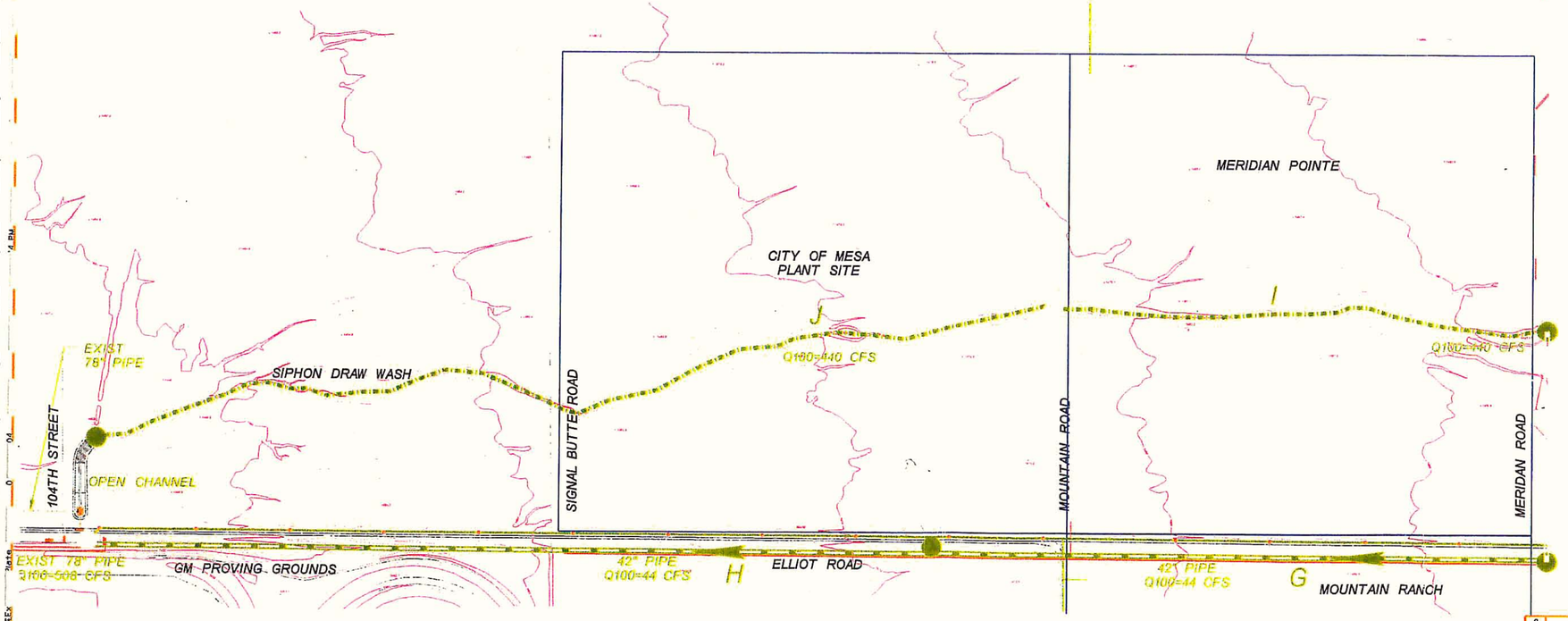
SIPHON DRAW
DRAINAGE IMPROVEMENTS
FCD CONTRACT NO. 2003 C019

PRELIMINARY NOT FOR CONSTRUCTION OR RECORDING		BY	DATE
	DESIGNED	S. ZOU/J. McCARTY	08/04
	DRAWN	J. McCARTY	08/04
	CHECKED	A. PATEL	08/04

WOOD PATEL & ASSOCIATES, INC.
2051 W. NORTHERN AVE., SUITE 100
PHOENIX, ARIZONA (602) 335-8500

DRAWING NO. PLATE 14 - MARICOPA OUTFALL SYSTEM OPTION 3

SHEET OF



DESIGN ELEMENTS

A	SIPHON DRAW BASIN
B	GUADALUPE BASIN
C	BASIN AT SOUTH OF THE C.A.P. CANAL NORTH OVERCHUTE
D	BASIN AT SOUTH OF THE C.A.P. CANAL SOUTH OVERCHUTE
E	MERIDIAN ROAD COLLECTION SYSTEM
F	STORM DRAIN BETWEEN SIPHON DRAW WASH AND ELLIOT ROAD
G	STORM DRAIN BETWEEN MERIDIAN ROAD AND WEST OF MOUNTAIN ROAD
H	STORM DRAIN BETWEEN 104TH STREET AND WEST OF MOUNTAIN ROAD
I	SIPHON DRAW WASH BETWEEN MERIDIAN ROAD AND MOUNTAIN ROAD
J	SIPHON DRAW WASH BETWEEN 104TH STREET AND MOUNTAIN ROAD
K	MOUNTAIN ROAD CHANNEL / PIPE

300 0 300 600

Scale in Feet

N

TWO WORKING DAYS BEFORE YOU DIG, CALL 263-1100 BLUE STAKE

NO.	REVISION	BY	DATE
3			
2			
1			

FLOOD CONTROL DISTRICT OF MARICOPA COUNTY
ENGINEERING DIVISION

SIPHON DRAW
DRAINAGE IMPROVEMENTS
FCD CONTRACT NO. 2003 C019

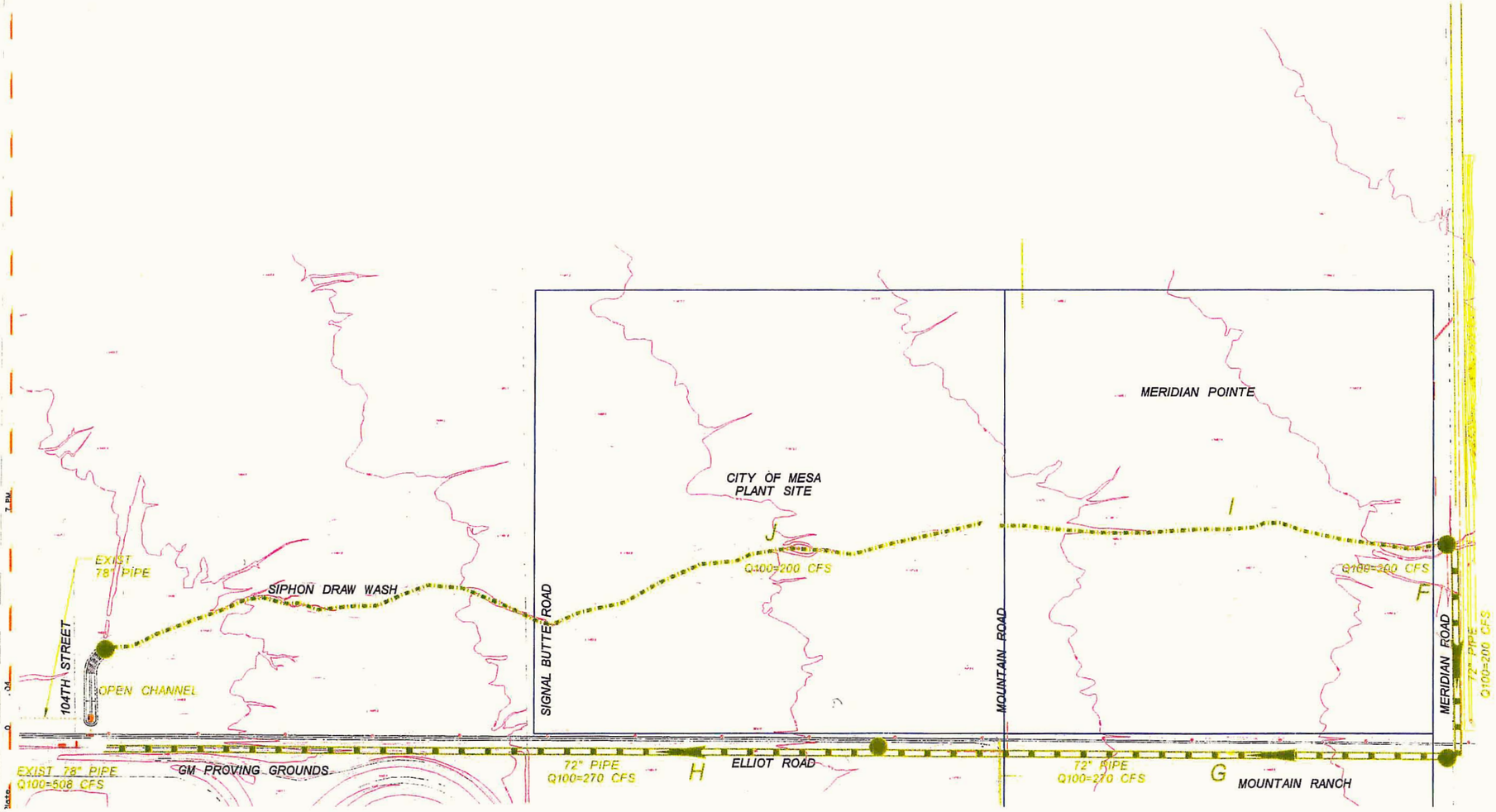
PRELIMINARY NOT FOR CONSTRUCTION OR RECORDING

	BY	DATE
DESIGNED	S. ZOU/J. McCARTY	08/04
DRAWN	J. McCARTY	08/04
CHECKED	A. PATEL	08/04

WOOD PATEL & ASSOCIATES, INC.
2051 W. NORTHERN AVE., SUITE 100
PHOENIX, ARIZONA (602) 335-8500

DRAWING NO. PLATE 15 - MARICOPA OUTFALL SYSTEM OPTION 4

SHEET OF



DESIGN ELEMENTS

A	SIPHON DRAW BASIN
B	GUADALUPE BASIN
C	BASIN AT SOUTH OF THE C.A.P. CANAL NORTH OVERCHUTE
D	BASIN AT SOUTH OF THE C.A.P. CANAL SOUTH OVERCHUTE
E	MERIDIAN ROAD COLLECTION SYSTEM
F	STORM DRAIN BETWEEN SIPHON DRAW WASH AND ELLIOT ROAD
G	STORM DRAIN BETWEEN MERIDIAN ROAD AND WEST OF MOUNTAIN ROAD
H	STORM DRAIN BETWEEN 104TH STREET AND WEST OF MOUNTAIN ROAD
I	SIPHON DRAW WASH BETWEEN MERIDIAN ROAD AND MOUNTAIN ROAD
J	SIPHON DRAW WASH BETWEEN 104TH STREET AND MOUNTAIN ROAD
K	MOUNTAIN ROAD CHANNEL / PIPE

300 0 300 600

Scale in Feet

N

TWO WORKING DAYS BEFORE YOU DIG, CALL 263-1100 BLUE STAKE

NO.	REVISION	BY	DATE
3			
2			
1			

FLOOD CONTROL DISTRICT OF MARICOPA COUNTY
ENGINEERING DIVISION

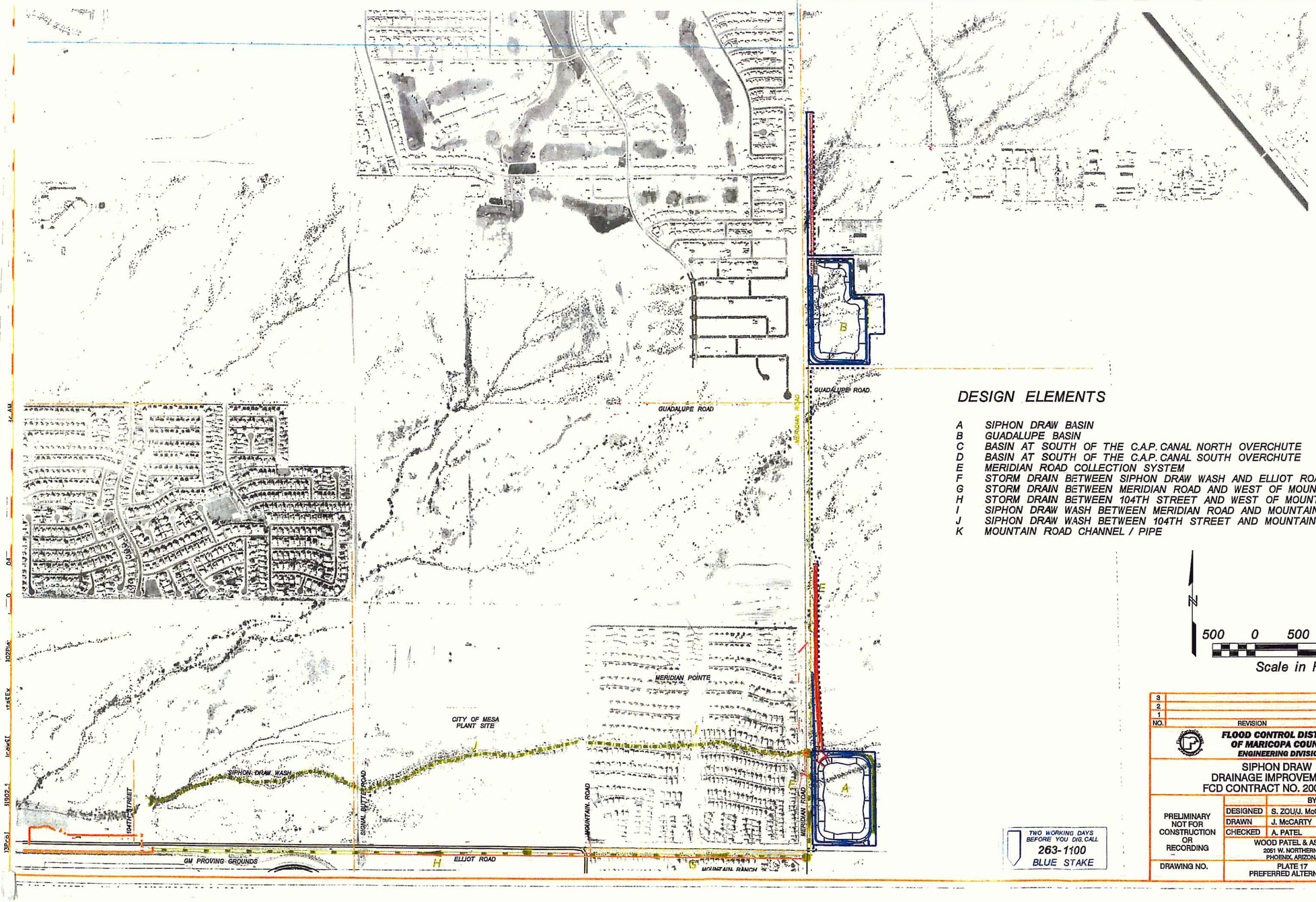
SIPHON DRAW
DRAINAGE IMPROVEMENTS
FCD CONTRACT NO. 2003 C019

PRELIMINARY NOT FOR CONSTRUCTION OR RECORDING		BY	DATE
	DESIGNED	S. ZOU/J. McCARTY	08/04
	DRAWN	J. McCARTY	08/04
	CHECKED	A. PATEL	08/04

WOOD PATEL & ASSOCIATES, INC.
2051 W. NORTHERN AVE., SUITE 100
PHOENIX, ARIZONA (602) 335-8500

DRAWING NO. PLATE 16 - MARICOPA OUTFALL SYSTEM OPTION 5

SHEET OF



DESIGN ELEMENTS

A	SIPHON DRAW BASIN
B	GUADALUPE BASIN
C	BASIN AT SOUTH OF THE C.A.P. CANAL NORTH OVERCHUTE
D	BASIN AT SOUTH OF THE C.A.P. CANAL SOUTH OVERCHUTE
E	MERIDIAN ROAD COLLECTION SYSTEM
F	STORM DRAIN BETWEEN SIPHON DRAW WASH AND ELLIOT ROAD
G	STORM DRAIN BETWEEN MERIDIAN ROAD AND WEST OF MOUNTAIN ROAD
H	STORM DRAIN BETWEEN 104TH STREET AND WEST OF MOUNTAIN ROAD
I	SIPHON DRAW WASH BETWEEN MERIDIAN ROAD AND MOUNTAIN ROAD
J	SIPHON DRAW WASH BETWEEN 104TH STREET AND MOUNTAIN ROAD
K	MOUNTAIN ROAD CHANNEL / PIPE

N

500 0 500 1000

Scale in Feet

TWO WORKING DAYS BEFORE YOU DIG, CALL 263-1100 BLUE STAKE

NO.	REVISION	BY	DATE
3			
2			
1			

FLOOD CONTROL DISTRICT OF MARICOPA COUNTY
ENGINEERING DIVISION

SIPHON DRAW
DRAINAGE IMPROVEMENTS
FCD CONTRACT NO. 2003 C019

PRELIMINARY NOT FOR CONSTRUCTION OR RECORDING

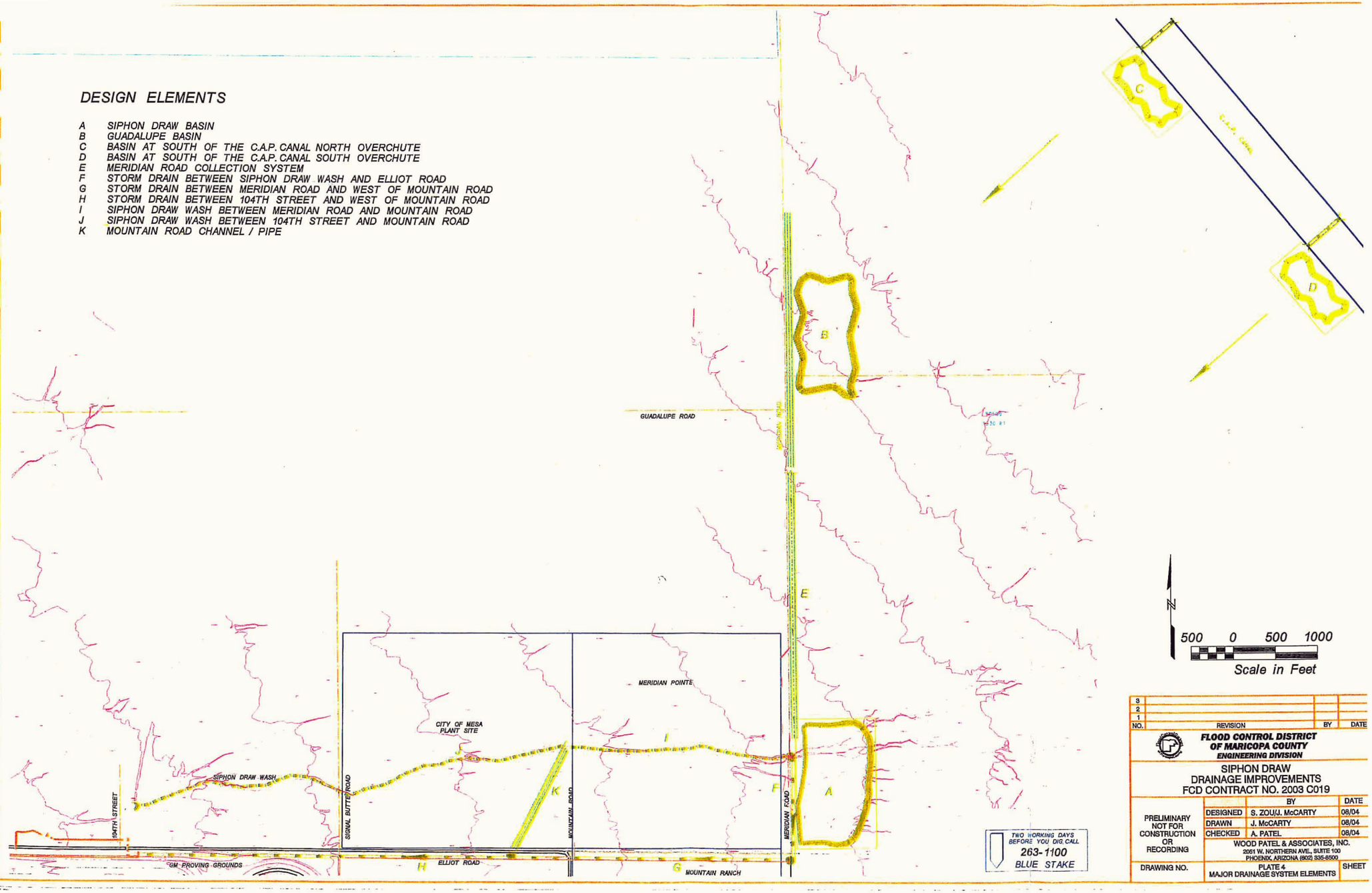
	BY	DATE
DESIGNED	S. ZOU/J. McCARTY	08/04
DRAWN	J. McCARTY	08/04
CHECKED	A. PATEL	08/04

WOOD PATEL & ASSOCIATES, INC.
2051 W. NORTHERN AVE., SUITE 100
PHOENIX, ARIZONA (602) 335-8500

DRAWING NO. PLATE 17 PREFERRED ALTERNATIVE SHEET

DESIGN ELEMENTS

A SIPHON DRAW BASIN
B GUADALUPE BASIN
C BASIN AT SOUTH OF THE C.A.P. CANAL NORTH OVERCHUTE
D BASIN AT SOUTH OF THE C.A.P. CANAL SOUTH OVERCHUTE
E MERIDIAN ROAD COLLECTION SYSTEM
F STORM DRAIN BETWEEN SIPHON DRAW WASH AND ELLIOT ROAD
G STORM DRAIN BETWEEN MERIDIAN ROAD AND WEST OF MOUNTAIN ROAD
H STORM DRAIN BETWEEN 104TH STREET AND WEST OF MOUNTAIN ROAD
I SIPHON DRAW WASH BETWEEN MERIDIAN ROAD AND MOUNTAIN ROAD
J SIPHON DRAW WASH BETWEEN 104TH STREET AND MOUNTAIN ROAD
K MOUNTAIN ROAD CHANNEL / PIPE



NO.	REVISION	BY	DATE
3			
2			
1			

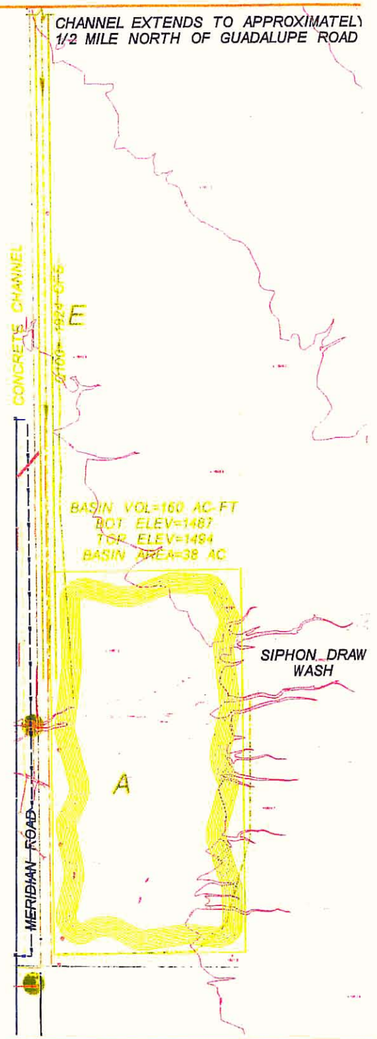
FLOOD CONTROL DISTRICT OF MARICOPA COUNTY
ENGINEERING DIVISION

SIPHON DRAW
DRAINAGE IMPROVEMENTS
FCD CONTRACT NO. 2003 C019

		BY	DATE
PRELIMINARY NOT FOR CONSTRUCTION OR RECORDING	DESIGNED	S. ZOU/J. McCARTY	08/04
	DRAWN	J. McCARTY	08/04
	CHECKED	A. PATEL	08/04

WOOD PATEL & ASSOCIATES, INC.
2051 W. NORTHERN AVE., SUITE 100
PHOENIX, ARIZONA (602) 335-8500

DRAWING NO. PLATE 4 MAJOR DRAINAGE SYSTEM ELEMENTS SHEET



DESIGN ELEMENTS

A	SIPHON DRAW BASIN
B	GUADALUPE BASIN
C	BASIN AT SOUTH OF THE C.A.P. CANAL NORTH OVERCHUTE
D	BASIN AT SOUTH OF THE C.A.P. CANAL SOUTH OVERCHUTE
E	MERIDIAN ROAD COLLECTION SYSTEM
F	STORM DRAIN BETWEEN SIPHON DRAW WASH AND ELLIOT ROAD
G	STORM DRAIN BETWEEN MERIDIAN ROAD AND WEST OF MOUNTAIN ROAD
H	STORM DRAIN BETWEEN 104TH STREET AND WEST OF MOUNTAIN ROAD
I	SIPHON DRAW WASH BETWEEN MERIDIAN ROAD AND MOUNTAIN ROAD
J	SIPHON DRAW WASH BETWEEN 104TH STREET AND MOUNTAIN ROAD
K	MOUNTAIN ROAD CHANNEL / PIPE

300 0 300 600

Scale in Feet

N

TWO WORKING DAYS BEFORE YOU DIG, CALL
263-1100
BLUE STAKE

NO.	REVISION	BY	DATE
3			
2			
1			

FLOOD CONTROL DISTRICT OF MARICOPA COUNTY
ENGINEERING DIVISION

SIPHON DRAW
DRAINAGE IMPROVEMENTS
FCD CONTRACT NO. 2003 C019

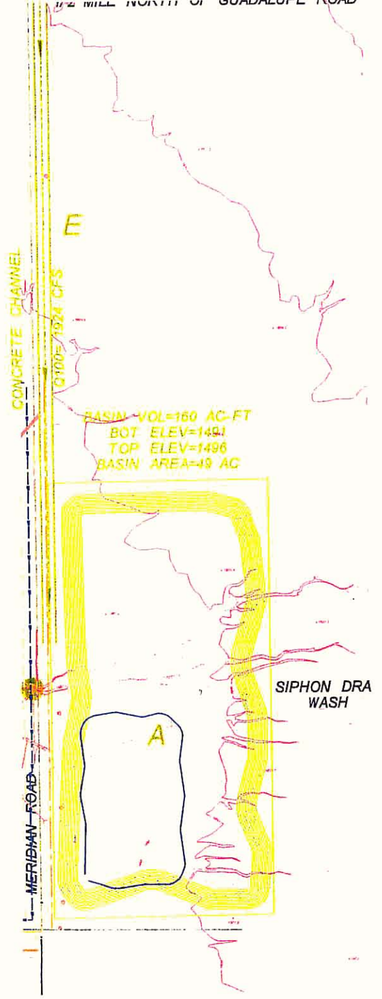
PRELIMINARY NOT FOR CONSTRUCTION OR RECORDING

	BY	DATE
DESIGNED	S. ZOU/J. McCARTY	08/04
DRAWN	J. McCARTY	08/04
CHECKED	A. PATEL	08/04

WOOD PATEL & ASSOCIATES, INC.
2051 W. NORTHERN AVE., SUITE 100
PHOENIX, ARIZONA (602) 335-8500

DRAWING NO. PLATE 5 - FINAL DETENTION BASINS OPTION 1

SHEET OF



DESIGN ELEMENTS

A	SIPHON DRAW BASIN
B	GUADALUPE BASIN
C	BASIN AT SOUTH OF THE C.A.P. CANAL NORTH OVERCHUTE
D	BASIN AT SOUTH OF THE C.A.P. CANAL SOUTH OVERCHUTE
E	MERIDIAN ROAD COLLECTION SYSTEM
F	STORM DRAIN BETWEEN SIPHON DRAW WASH AND ELLIOT ROAD
G	STORM DRAIN BETWEEN MERIDIAN ROAD AND WEST OF MOUNTAIN ROAD
H	STORM DRAIN BETWEEN 104TH STREET AND WEST OF MOUNTAIN ROAD
I	SIPHON DRAW WASH BETWEEN MERIDIAN ROAD AND MOUNTAIN ROAD
J	SIPHON DRAW WASH BETWEEN 104TH STREET AND MOUNTAIN ROAD
K	MOUNTAIN ROAD CHANNEL / PIPE

300 0 300 600

Scale in Feet

N

TWO WORKING DAYS BEFORE YOU DIG, CALL
263-1100
BLUE STAKE

NO.	REVISION	BY	DATE
3			
2			
1			

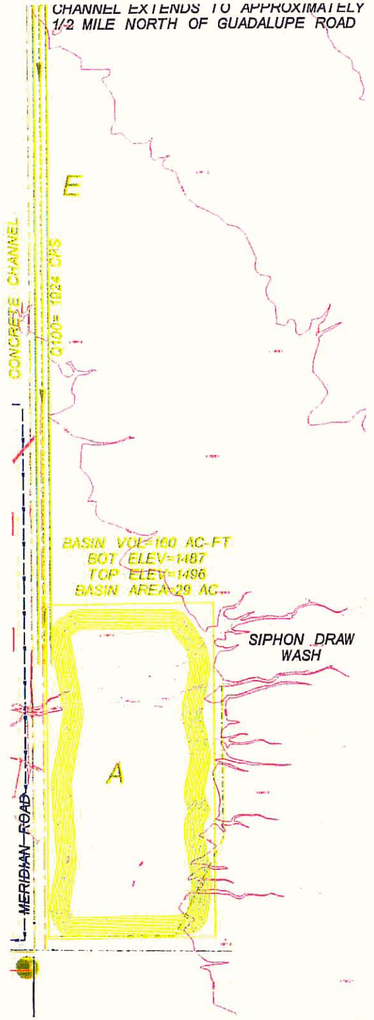
FLOOD CONTROL DISTRICT OF MARICOPA COUNTY
ENGINEERING DIVISION

SIPHON DRAW
DRAINAGE IMPROVEMENTS
FCD CONTRACT NO. 2003 C019

PRELIMINARY NOT FOR CONSTRUCTION OR RECORDING		BY	DATE
	DESIGNED	S. ZOU/J. McCARTY	08/04
	DRAWN	J. McCARTY	08/04
	CHECKED	A. PATEL	08/04

WOOD PATEL & ASSOCIATES, INC.
2051 W. NORTHERN AVE., SUITE 100
PHOENIX, ARIZONA (602) 335-8500

DRAWING NO. PLATE 6 - PINAL DETENTION BASINS OPTION 2 SHEET O



DESIGN ELEMENTS

A	SIPHON DRAW BASIN
B	GUADALUPE BASIN
C	BASIN AT SOUTH OF THE C.A.P. CANAL NORTH OVERCHUTE
D	BASIN AT SOUTH OF THE C.A.P. CANAL SOUTH OVERCHUTE
E	MERIDIAN ROAD COLLECTION SYSTEM
F	STORM DRAIN BETWEEN SIPHON DRAW WASH AND ELLIOT ROAD
G	STORM DRAIN BETWEEN MERIDIAN ROAD AND WEST OF MOUNTAIN ROAD
H	STORM DRAIN BETWEEN 104TH STREET AND WEST OF MOUNTAIN ROAD
I	SIPHON DRAW WASH BETWEEN MERIDIAN ROAD AND MOUNTAIN ROAD
J	SIPHON DRAW WASH BETWEEN 104TH STREET AND MOUNTAIN ROAD
K	MOUNTAIN ROAD CHANNEL / PIPE

300 0 300 600

Scale in Feet

N

TWO WORKING DAYS BEFORE YOU ING. CALL
263-1100
BLUE STAKE

NO.	REVISION	BY	DATE
3			
2			
1			

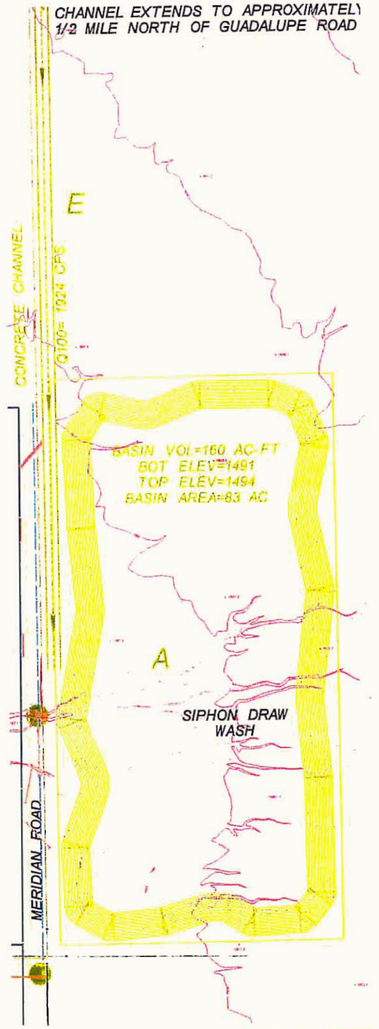
FLOOD CONTROL DISTRICT OF MARICOPA COUNTY
ENGINEERING DIVISION

SIPHON DRAW
DRAINAGE IMPROVEMENTS
FCD CONTRACT NO. 2003 C019

		BY	DATE
PRELIMINARY NOT FOR CONSTRUCTION OR RECORDING	DESIGNED	S. ZOU/J. McCARTY	08/04
	DRAWN	J. McCARTY	08/04
	CHECKED	A. PATEL	08/04

WOOD PATEL & ASSOCIATES, INC.
2051 W. NORTHERN AVE., SUITE 100
PHOENIX, ARIZONA (602) 335-8500

DRAWING NO. PLATE 7 - FINAL DETENTION BASINS OPTION 3 SHEET O



DESIGN ELEMENTS

A	SIPHON DRAW BASIN
B	GUADALUPE BASIN
C	BASIN AT SOUTH OF THE C.A.P. CANAL NORTH OVERCHUTE
D	BASIN AT SOUTH OF THE C.A.P. CANAL SOUTH OVERCHUTE
E	MERIDIAN ROAD COLLECTION SYSTEM
F	STORM DRAIN BETWEEN SIPHON DRAW WASH AND ELLIOT ROAD
G	STORM DRAIN BETWEEN MERIDIAN ROAD AND WEST OF MOUNTAIN ROAD
H	STORM DRAIN BETWEEN 104TH STREET AND WEST OF MOUNTAIN ROAD
I	SIPHON DRAW WASH BETWEEN MERIDIAN ROAD AND MOUNTAIN ROAD
J	SIPHON DRAW WASH BETWEEN 104TH STREET AND MOUNTAIN ROAD
K	MOUNTAIN ROAD CHANNEL / PIPE

300 0 300 600

Scale in Feet

N

TWO WORKING DAYS BEFORE YOU DIG CALL
263-1100
BLUE STAKE

NO.	REVISION	BY	DATE
3			
2			
1			

FLOOD CONTROL DISTRICT OF MARICOPA COUNTY
ENGINEERING DIVISION

SIPHON DRAW
DRAINAGE IMPROVEMENTS
FCD CONTRACT NO. 2003 C019

PRELIMINARY NOT FOR CONSTRUCTION OR RECORDING		BY	DATE
	DESIGNED	S. ZOU/J. McCARTY	08/04
	DRAWN	J. McCARTY	08/04
	CHECKED	A. PATEL	08/04

WOOD PATEL & ASSOCIATES, INC.
2051 W. NORTHERN AVE., SUITE 100
PHOENIX, ARIZONA (602) 335-8500

DRAWING NO. PLATE 8 - PINAL DETENTION BASINS OPTION 4 SHEET

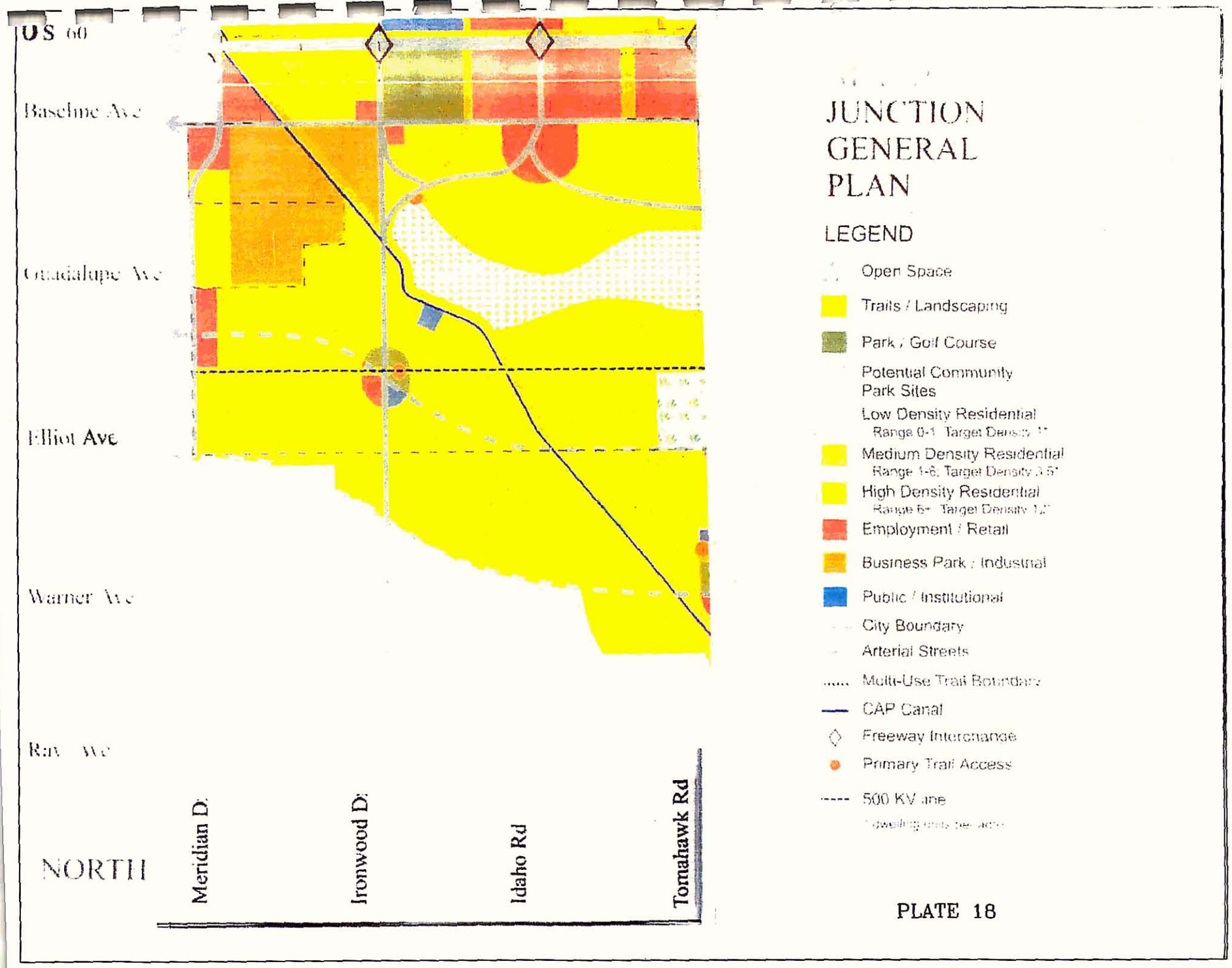
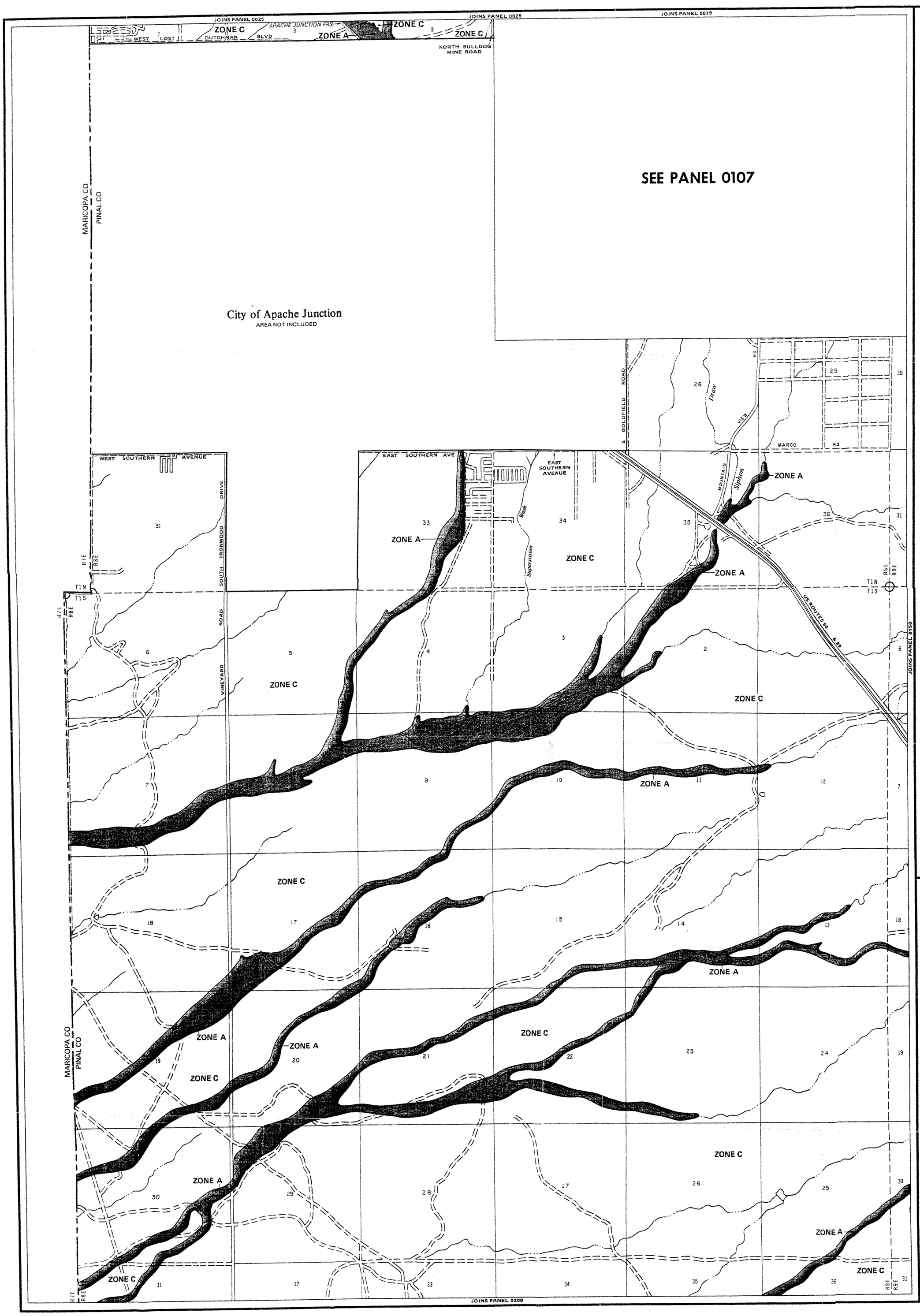

US 60
Baseline Ave
Guadalupe Ave
Elliot Ave
Warner Ave
Ray Ave
NORTH
Meridian Rd
Ironwood Rd
Idaho Rd
Tomahawk Rd
JUNCTION GENERAL PLAN
LEGEND
Open Space
Trails / Landscaping
Park / Golf Course
Potential Community Park Sites
Low Density Residential
Range 0-1 Target Density 1*
Medium Density Residential
Range 1-6; Target Density 3.5*
High Density Residential
Range 6+ Target Density 12*
Employment / Retail
Business Park / Industrial
Public / Institutional
City Boundary
Arterial Streets
Multi-Use Trail Boundary
CAP Canal
Freeway Interchange
Primary Trail Access
500 KV Line
* dwelling units per acre

PLATE 18

PLATE 19

HEC-1 Schematic for Preferred Alternative



KEY TO MAP

500-Year Flood Boundary	
100-Year Flood Boundary	ZONE B
Zone Designations	ZONE A1 / ZONE A
100-Year Flood Boundary	
500-Year Flood Boundary	ZONE B
Base Flood Elevation Line With Elevation In Feet**	513
Base Flood Elevation in Feet Where Uniform Within Zone**	(EL 987)
Elevation Reference Mark	RM7×
Zone D Boundary	
River Mile	•M1.5

**Referenced to the National Geodetic Vertical Datum of 1929

EXPLANATION OF ZONE DESIGNATIONS

ZONE	EXPLANATION
A	Areas of 100-year flood; base flood elevations and flood hazard factors not determined.
AO	Areas of 100-year shallow flooding where depths are between one (1) and three (3) feet; average depths of inundation are shown, but no flood hazard factors are determined.
AH	Areas of 100-year shallow flooding where depths are between one (1) and three (3) feet; base flood elevations are shown, but no flood hazard factors are determined.
A1-A30	Areas of 100-year flood; base flood elevations and flood hazard factors determined.
A99	Areas of 100-year flood to be protected by flood protection system under construction; base flood elevations and flood hazard factors not determined.
B	Areas between limits of the 100-year flood and 500-year flood; or certain areas subject to 100-year flooding with average depths less than one (1) foot or where the contributing drainage area is less than one square mile; or areas protected by levees from the base flood. (Medium shading)
C	Areas of minimal flooding. (No shading)
D	Areas of undetermined, but possible, flood hazards.
V	Areas of 100-year coastal flood with velocity (wave action); base flood elevations and flood hazard factors not determined.
V1-V30	Areas of 100-year coastal flood with velocity (wave action); base flood elevations and flood hazard factors determined.

NOTES TO USER

This map is for use in administering the National Flood Insurance Program; it does not necessarily identify all areas subject to flooding, particularly from local drainage sources of small size, or all planimetric features outside Special Flood Hazard Areas.

Areas of special flood hazard (100-year flood) include Zones A, A1-30, AE, AH, AO, A99, V, V1-30 AND VE.

Certain areas not in the Special Flood Hazard Areas (zones A and V) may be protected by flood control structures.

Coastal base flood elevations apply only landward of the shoreline shown on this map.

For adjoining map panels, see separately printed index to Map Panels.

INITIAL IDENTIFICATION:
JANUARY 10, 1975

FLOOD HAZARD BOUNDARY MAP REVISIONS:
OCTOBER 25, 1977
FEBRUARY 7, 1978
JUNE 26, 1979

FLOOD INSURANCE RATE MAP EFFECTIVE:
AUGUST 15, 1983

FLOOD INSURANCE RATE MAP REVISIONS:
Map revised MARCH 5, 1990 to change corporate limits, to add zone designations, to add base flood elevations, to add street names, to add streets, to change special flood hazard areas, and to change base flood elevations.

To determine if flood insurance is available in this community, contact your insurance agent, or call the National Flood Insurance Program, at (800) 638-6620.

APPROXIMATE SCALE IN FEET
2000 0 2000

NATIONAL FLOOD INSURANCE PROGRAM

FIRM
FLOOD INSURANCE RATE MAP

PINAL COUNTY,
ARIZONA
(UNINCORPORATED AREAS)

PANEL 125 OF 1525
(SEE MAP INDEX FOR PANELS NOT PRINTED)

FLOOD INSURANCE RATE MAP
PLATE 3

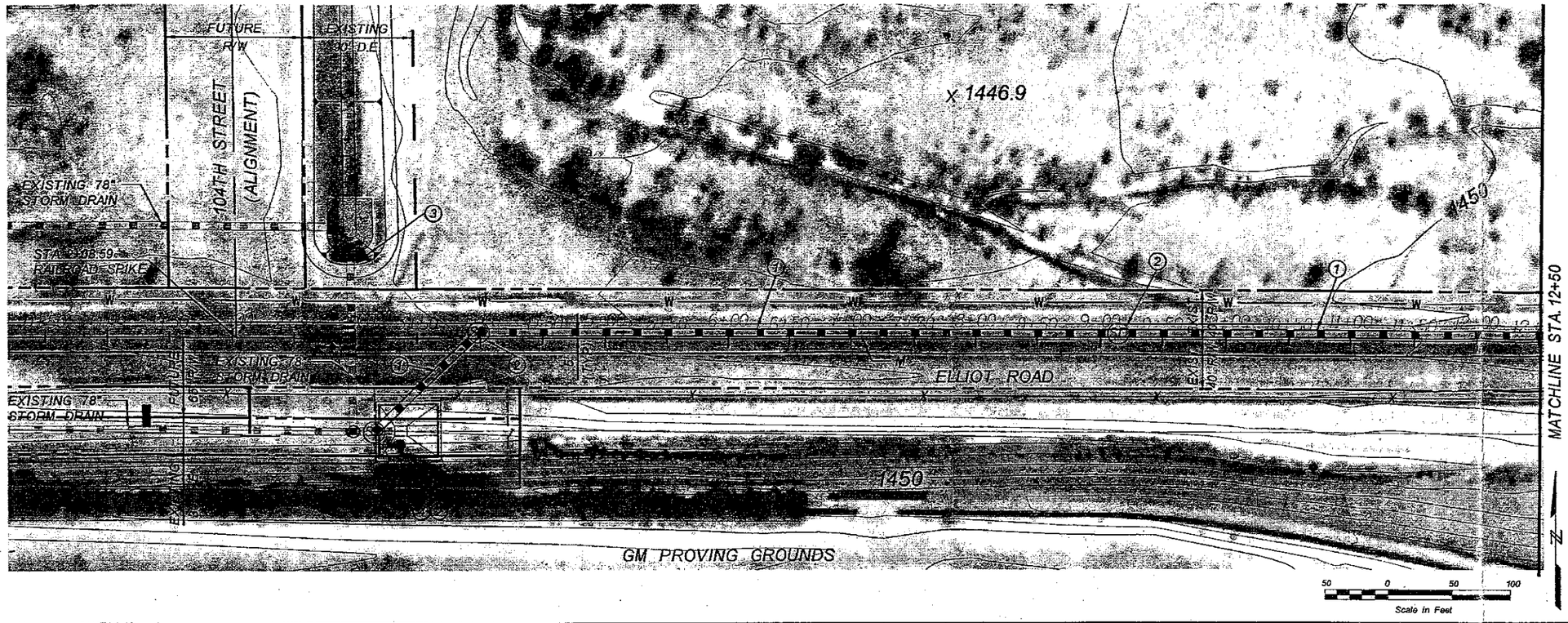
COMMUNITY-PANEL NUMBER
040077 0125 D

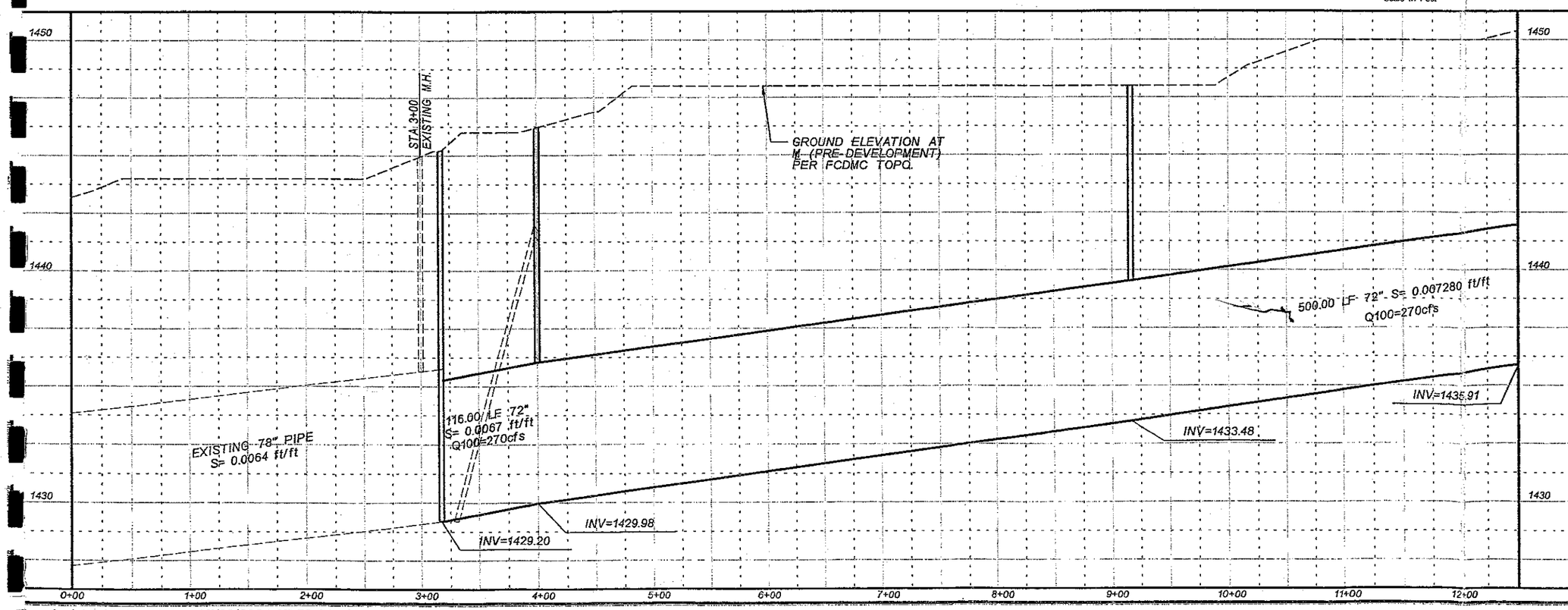
MAP REVISED:
MARCH 5, 1990

Federal Emergency Management Agency

EXHIBIT A

Preliminary Design Plans and Profiles For Preferred Alternative





☐ REMOVE ☐

○ CONSTRUCT ○

1. PROPOSED STORM DRAIN PIPE.
2. PROPOSED STORM DRAIN MANHOLE.
3. MODIFY INLET STRUCTURE TO EXISTING 78" PIPE SO THAT AN ADDITIONAL 100 CFS CAN BE ACCEPTED BY THE PIPE WITHOUT IMPACTING THE BYPASS FLOW WESTERLY.
4. REMOVE EXISTING DROP INLET. CONNECT PROPOSED 72" PIPE TO THE EXISTING 78" PIPE.

NO.	REVISION	BY	DATE
3			
2			
1			

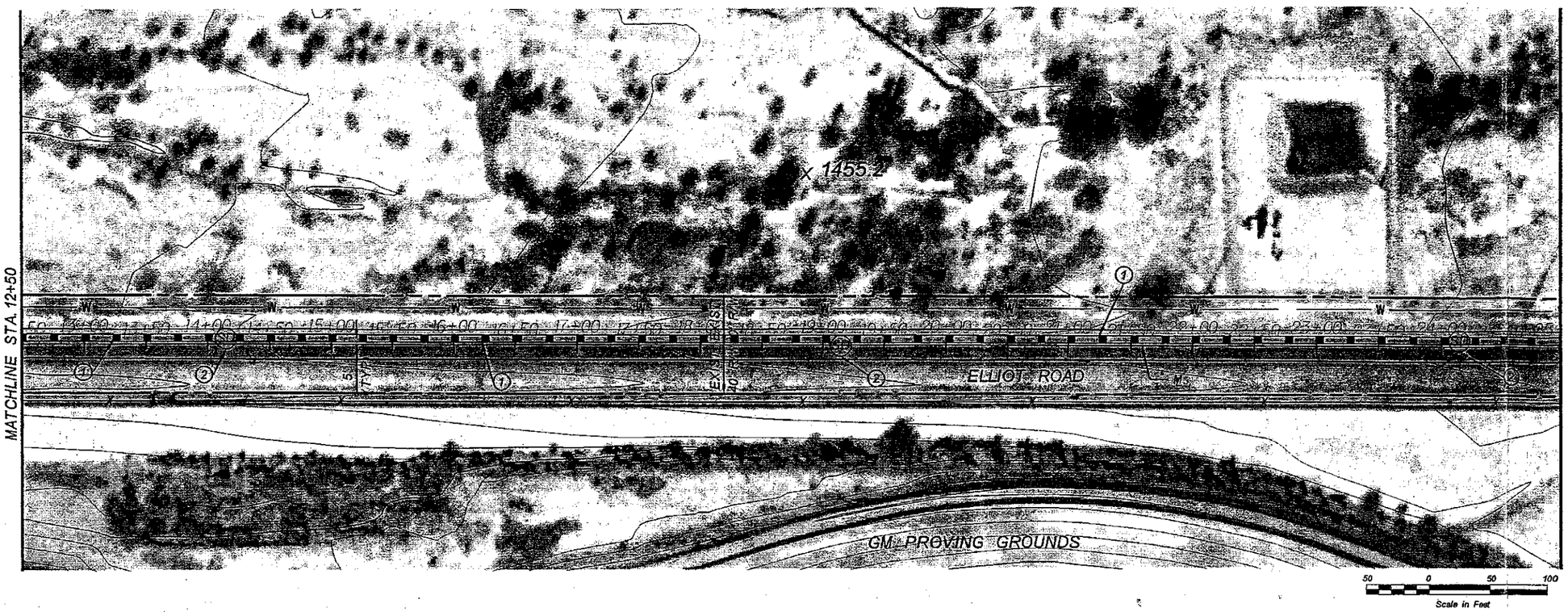
FLOOD CONTROL DISTRICT OF MARICOPA COUNTY
ENGINEERING DIVISION

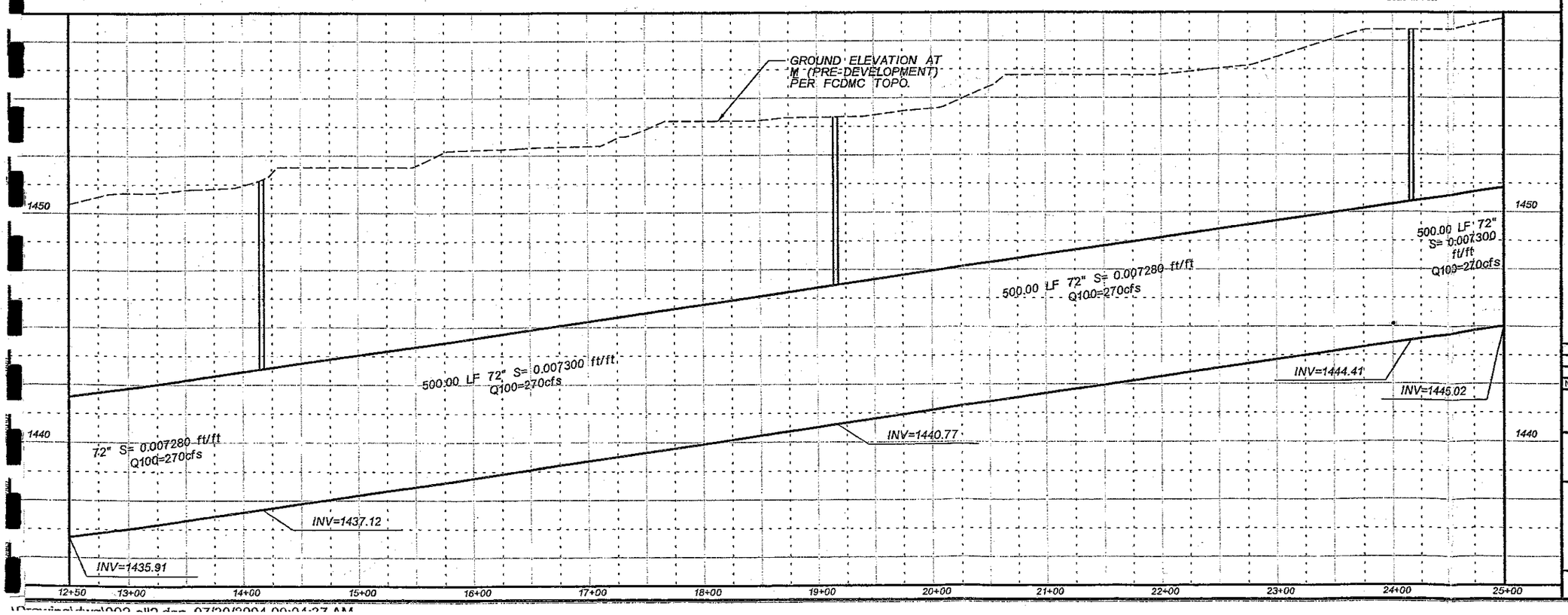
SIPHON DRAW
DRAINAGE IMPROVEMENTS
PREFERRED ALTERNATIVE

		BY	DATE
PRELIMINARY NOT FOR CONSTRUCTION OR RECORDING	DESIGNED	S. ZOU/ J. TAILLON	07/04
	DRAWN	D. HADGES	07/04
	CHECKED	A. PATEL / J. TAILLON	07/04

DRAWING NO.		SHEET OF
P1	PLAN AND PROFILE	

drawing\dwg1002.cil4.dgn 07/20/2004 07:52:21 AM





☐ REMOVE

○ CONSTRUCT

1. PROPOSED STORM DRAIN PIPE.
2. PROPOSED STORM DRAIN MANHOLE.

NO.	REVISION	BY	DATE
3			
2			
1			

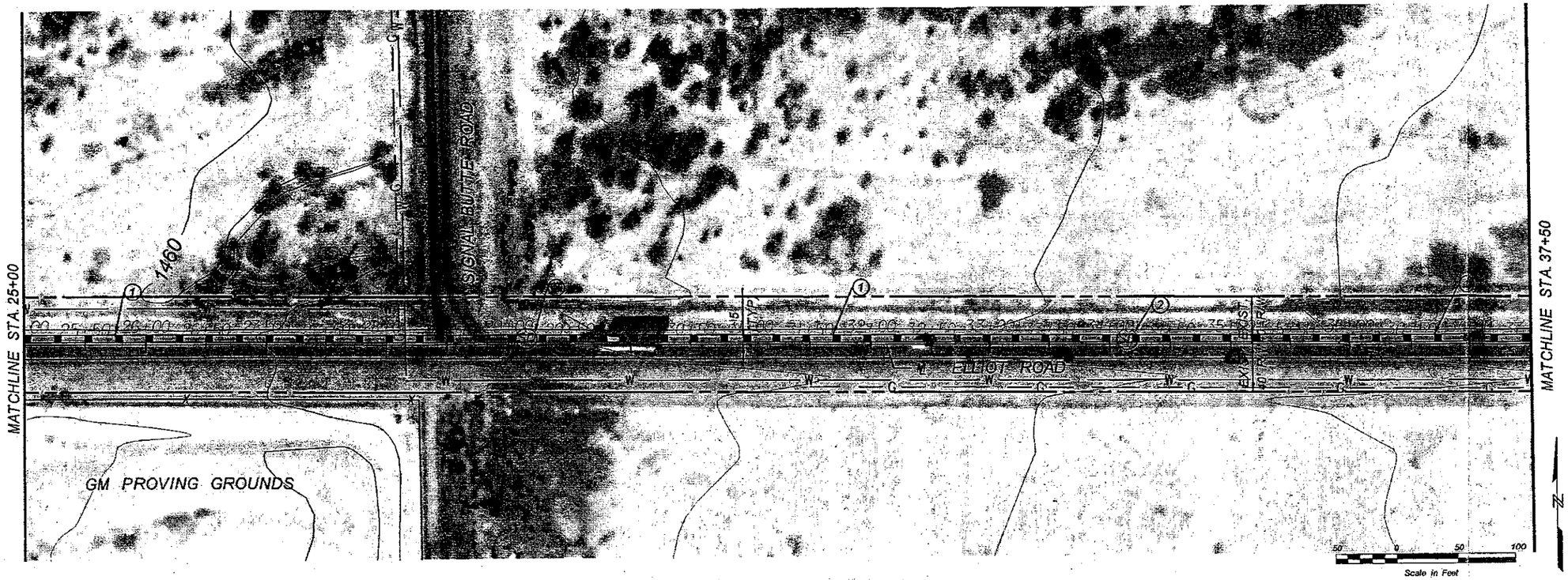
FLOOD CONTROL DISTRICT OF MARICOPA COUNTY
ENGINEERING DIVISION

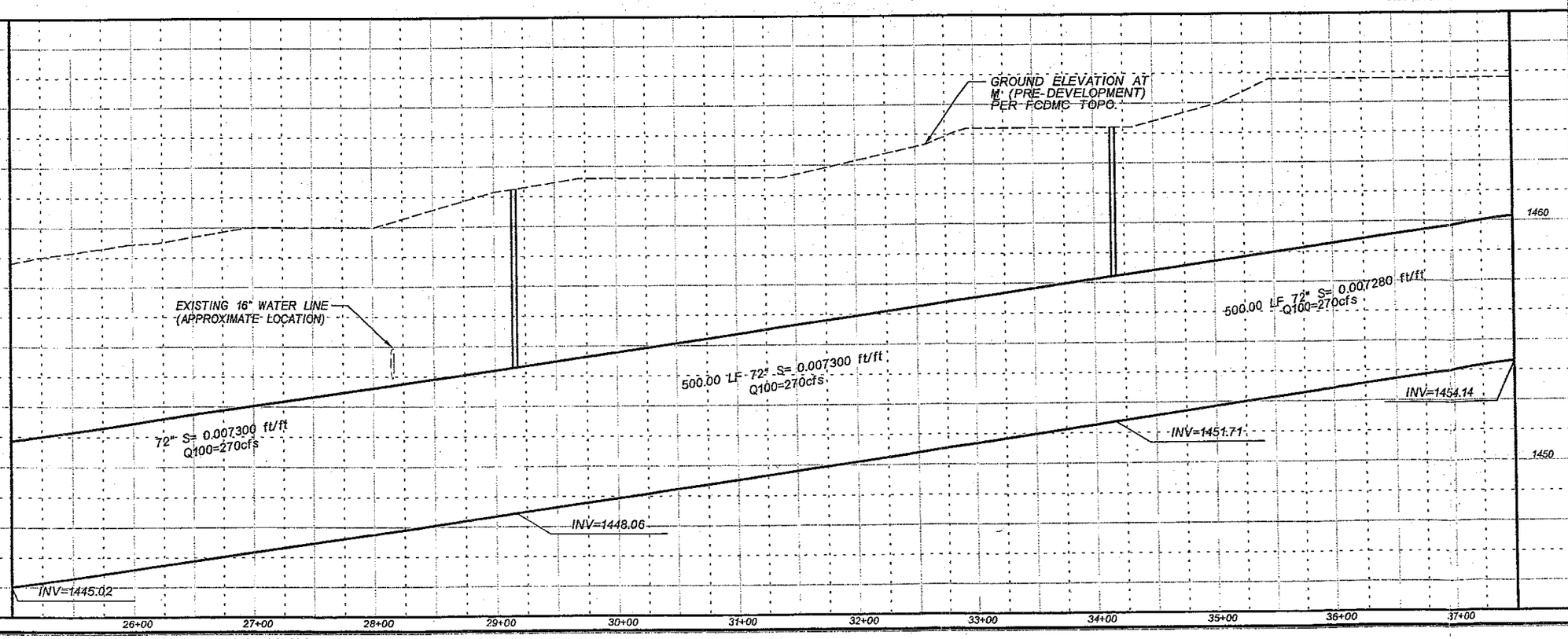
SIPHON DRAW
DRAINAGE IMPROVEMENTS
PREFERRED ALTERNATIVE

	BY	DATE
DESIGNED	S. ZOU/ J. TAILLON	07/04
DRAWN	D. HADGES	07/04
CHECKED	A. PATEL/ J. TAILLON	07/04

PRELIMINARY NOT FOR CONSTRUCTION OR RECORDING

DRAWING NO. P2 | PLAN AND PROFILE | SHEET OF





REMOVE

CONSTRUCT

1. PROPOSED STORM DRAIN PIPE.
2. PROPOSED STORM DRAIN MANHOLE.

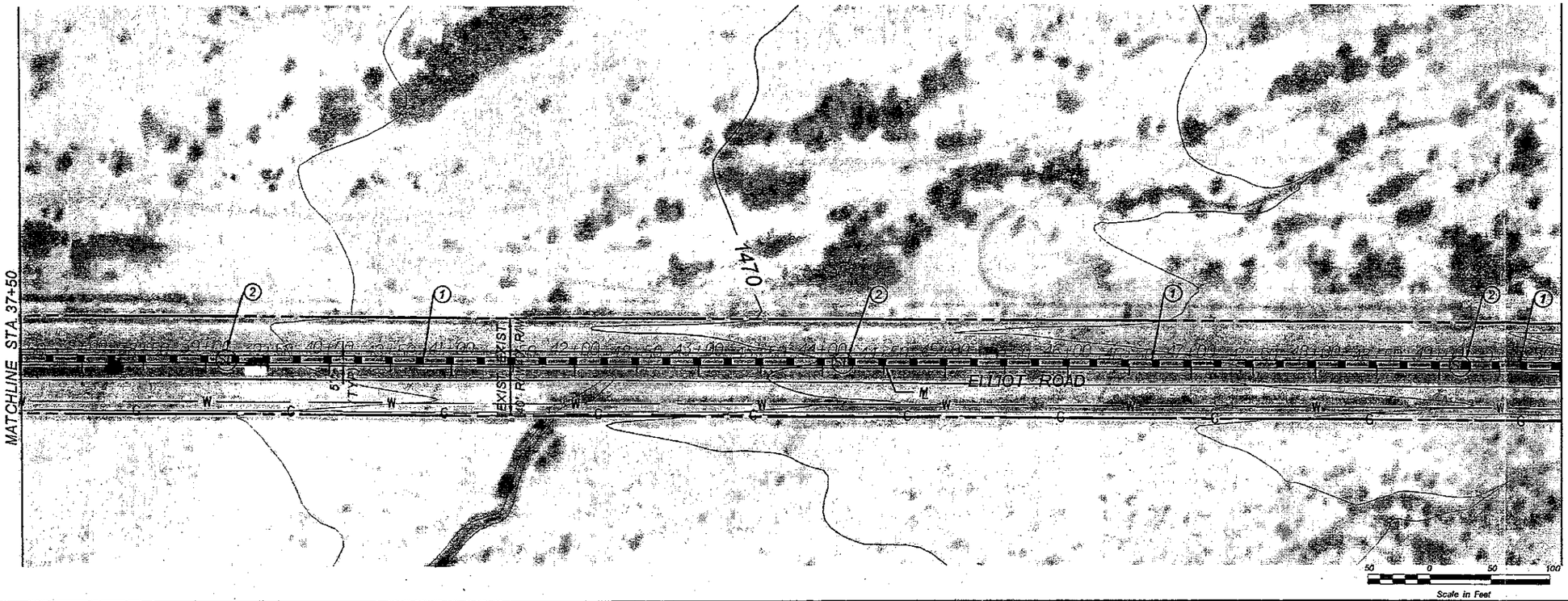
NO.	REVISION	BY	DATE
3			
2			
1			

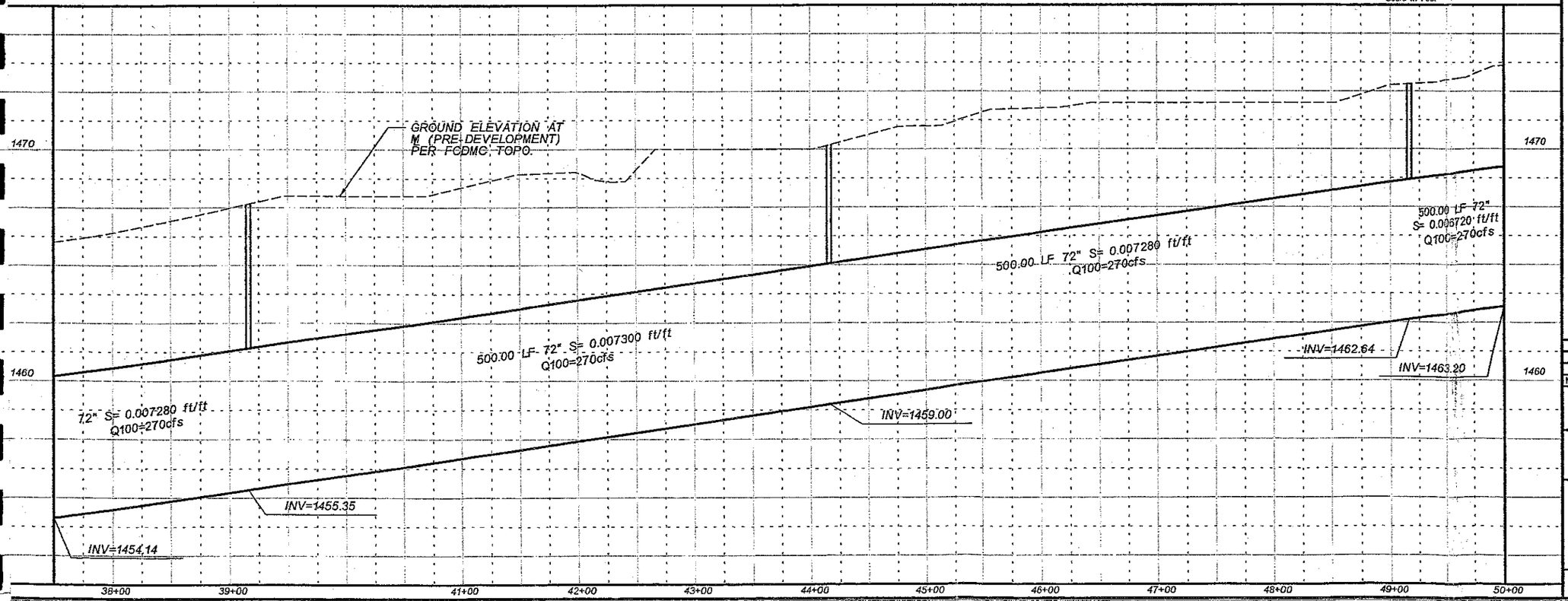
FLOOD CONTROL DISTRICT OF MARICOPA COUNTY
ENGINEERING DIVISION

SIPHON DRAW
DRAINAGE IMPROVEMENTS
PREFERRED ALTERNATIVE

		BY	DATE
PRELIMINARY NOT FOR CONSTRUCTION OR RECORDING	DESIGNED	S. ZOU/ J. TAILLON	07/04
	DRAWN	D. HADGES	07/04
	CHECKED	A. PATEL/ J. TAILLON	07/04

DRAWING NO. P3 | PLAN AND PROFILE | SHEET OF





☐ REMOVE

◯ CONSTRUCT

(1) PROPOSED STORM DRAIN PIPE.

(2) PROPOSED STORM DRAIN MANHOLE.

NO.	REVISION	BY	DATE
3			
2			
1			

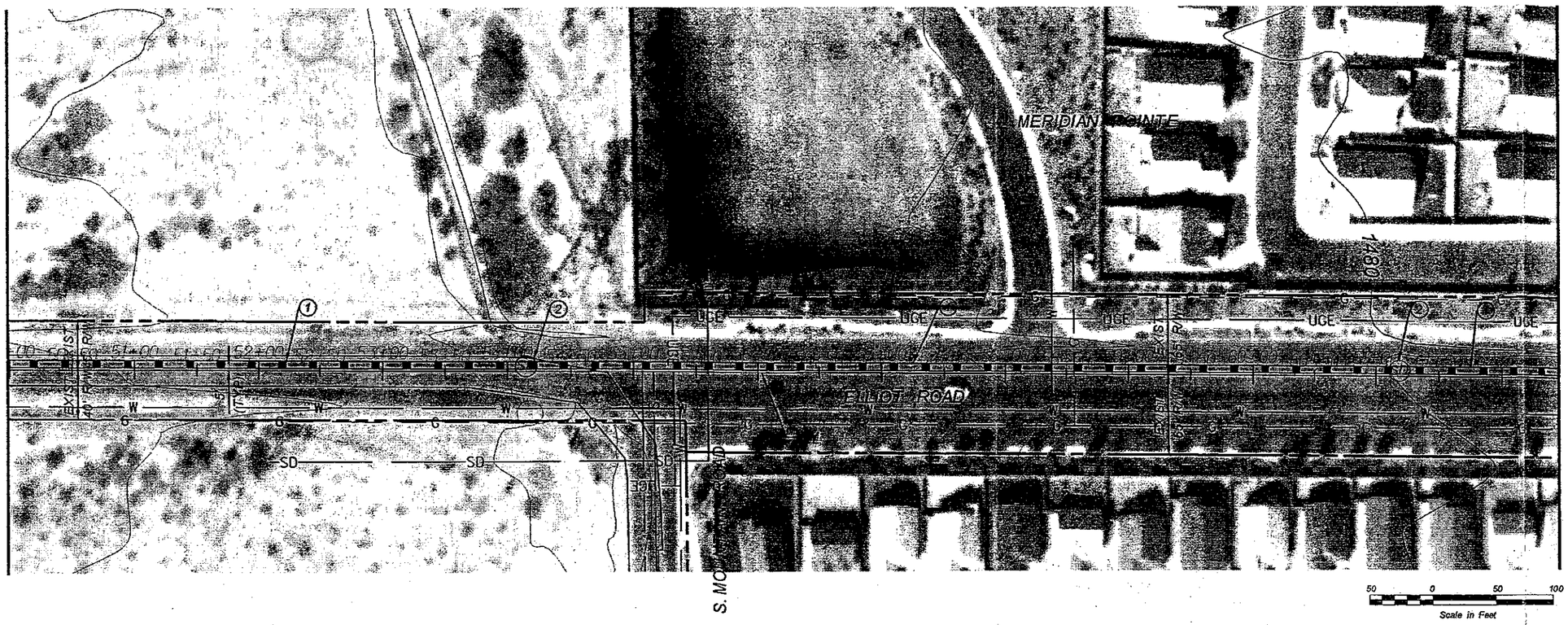
FLOOD CONTROL DISTRICT OF MARICOPA COUNTY
ENGINEERING DIVISION

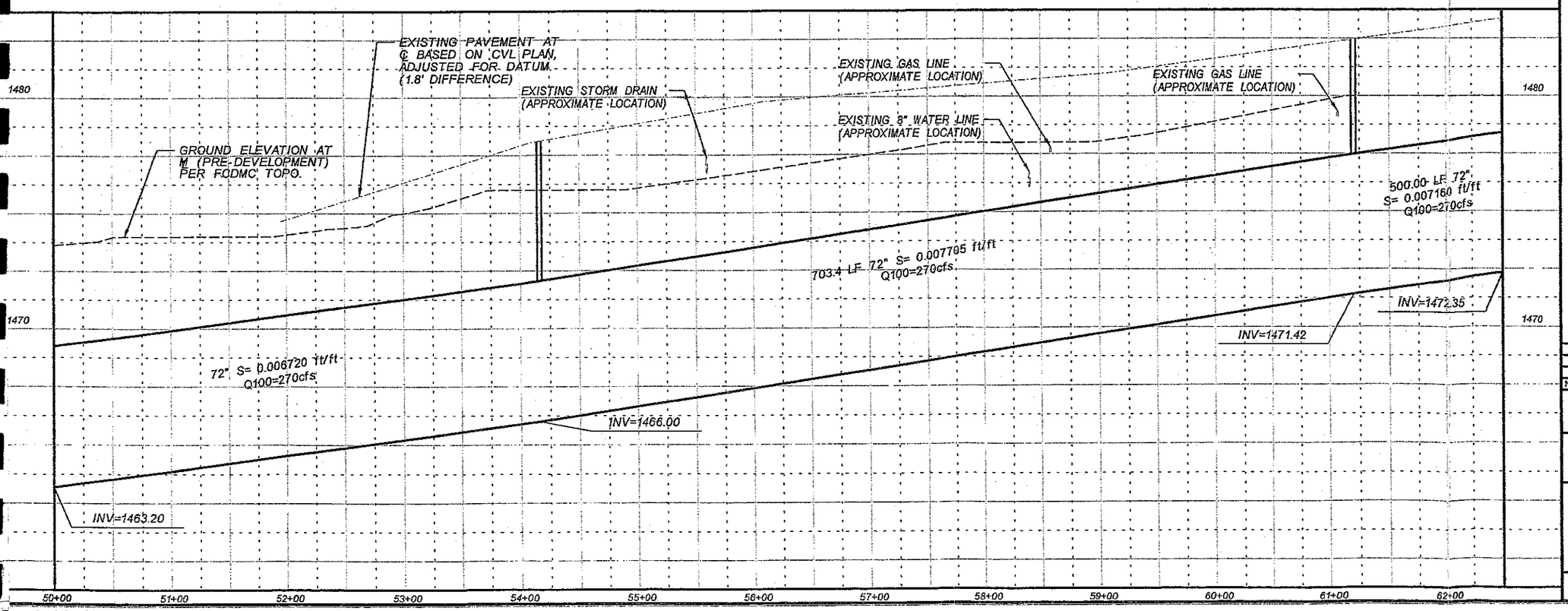
SIPHON DRAW
DRAINAGE IMPROVEMENTS
PREFERRED ALTERNATIVE

		BY	DATE
PRELIMINARY NOT FOR CONSTRUCTION OR RECORDING	DESIGNED	S. ZOU/ J. TAILLON	07/04
	DRAWN	D. HADGES	07/04
	CHECKED	A. PATEL/ J. TAILLON	07/04

DRAWING NO.		SHEET OF
P4	PLAN AND PROFILE	

\Drawings\dwg\002 all4.dwg 07/20/2004 09:05:57 AM





☐ REMOVE

○ CONSTRUCT

1. PROPOSED STORM DRAIN PIPE.
2. PROPOSED STORM DRAIN MANHOLE.

NO.	REVISION	BY	DATE
3			
2			
1			

FLOOD CONTROL DISTRICT OF MARICOPA COUNTY
ENGINEERING DIVISION

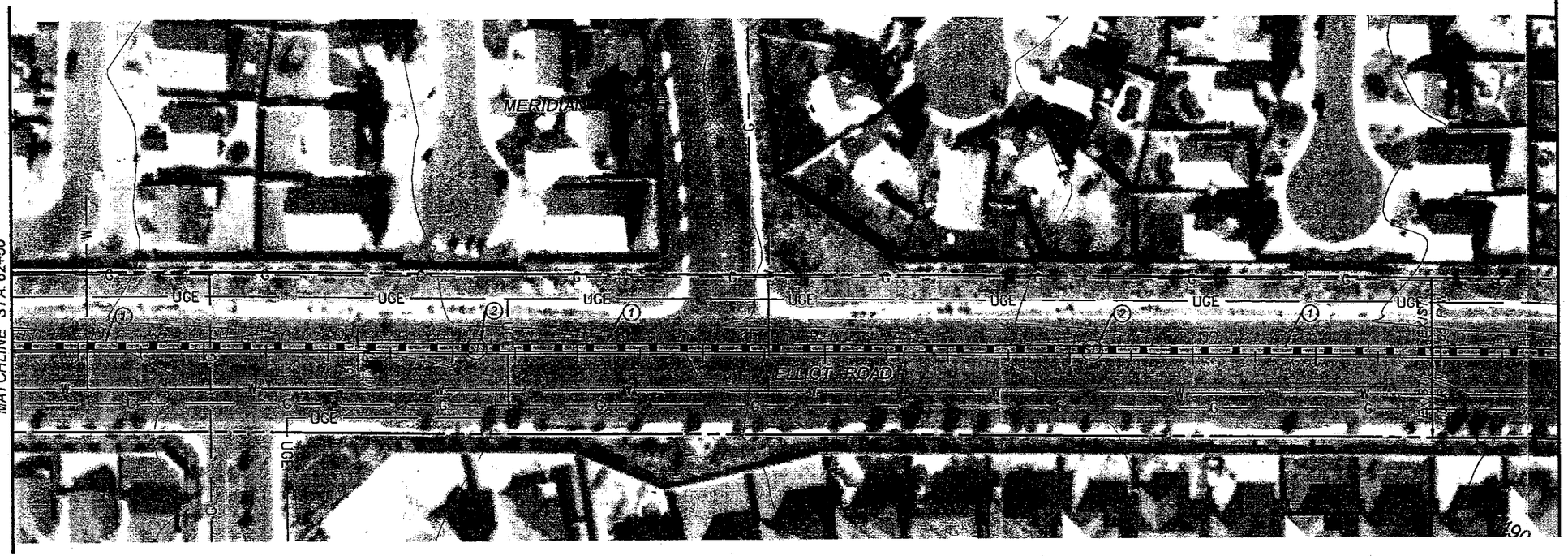
SIPHON DRAW
DRAINAGE IMPROVEMENTS
PREFERRED ALTERNATIVE

PRELIMINARY NOT FOR CONSTRUCTION OR RECORDING

	BY	DATE
DESIGNED	S. ZOU/ J. TAILLON	07/04
DRAWN	D. HADGES	07/04
CHECKED	A. PATEL/ J. TAILLON	07/04

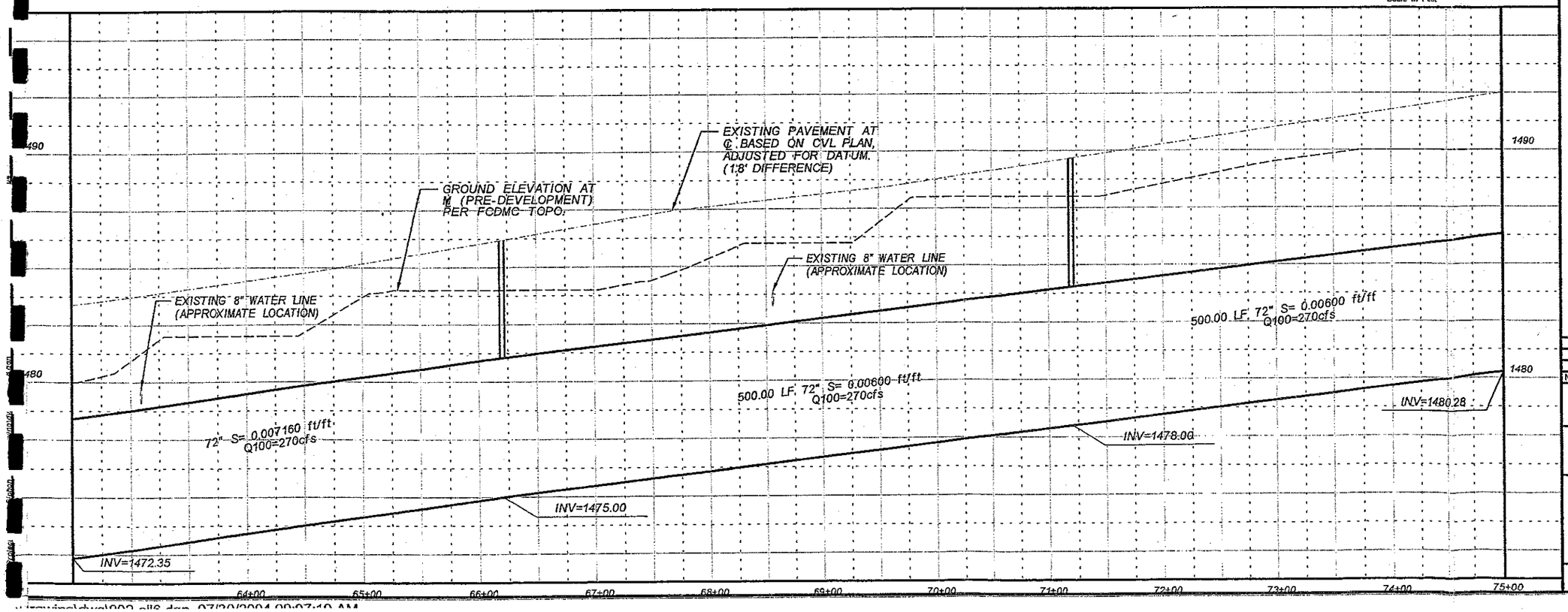
DRAWING NO. P5 | PLAN AND PROFILE | SHEET OF

☐ REMOVE



50 0 50 100
Scale in Feet

N



○ CONSTRUCT ○

1. PROPOSED STORM DRAIN PIPE.
2. PROPOSED STORM DRAIN MANHOLE.

NO.	REVISION	BY	DATE
3			
2			
1			

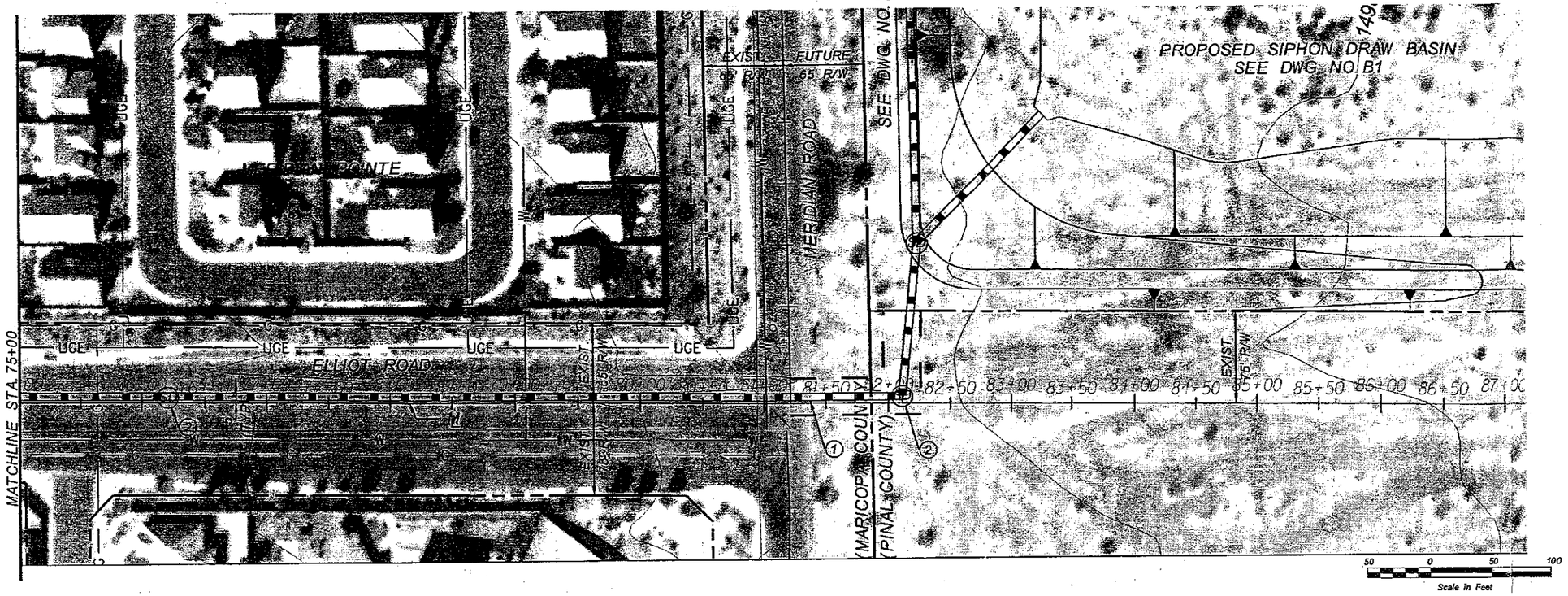
FLOOD CONTROL DISTRICT OF MARICOPA COUNTY
ENGINEERING DIVISION

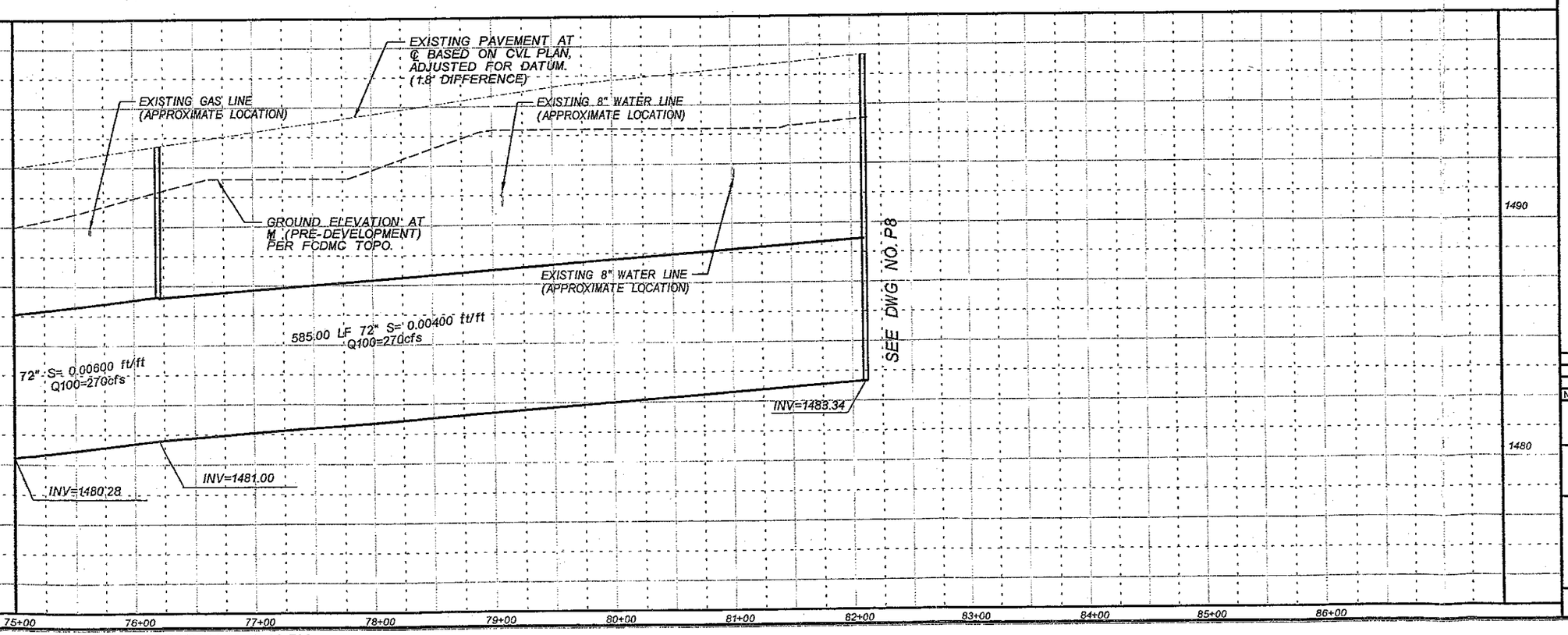
SIPHON DRAW
DRAINAGE IMPROVEMENTS
PREFERRED ALTERNATIVE

PRELIMINARY NOT FOR CONSTRUCTION OR RECORDING

	BY	DATE
DESIGNED	S. ZOU/ J. TAILLON	07/04
DRAWN	D. HADGES	07/04
CHECKED	A. PATEL/ J. TAILLON	07/04

DRAWING NO. P6 | PLAN AND PROFILE | SHEET OF





REMOVE

CONSTRUCT

1. PROPOSED STORM DRAIN PIPE.
2. PROPOSED STORM DRAIN MANHOLE.

NO.	REVISION	BY	DATE
3			
2			
1			

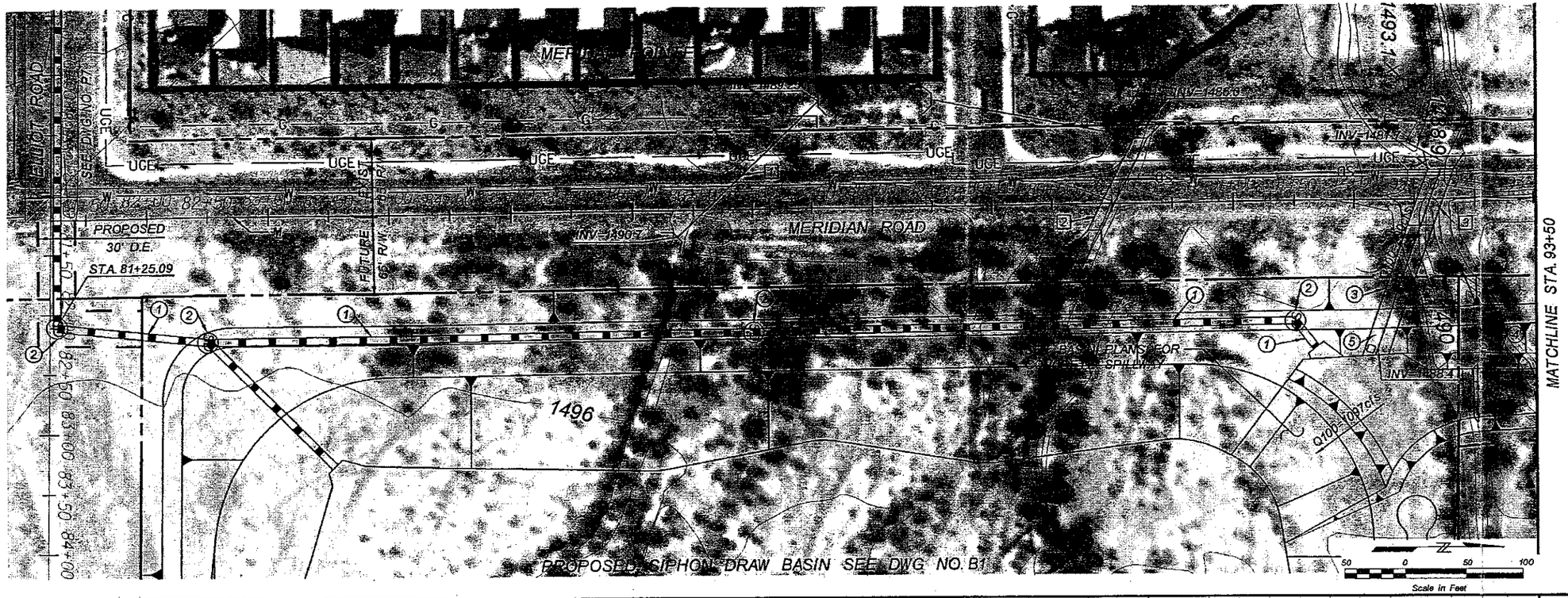
FLOOD CONTROL DISTRICT OF MARICOPA COUNTY
ENGINEERING DIVISION

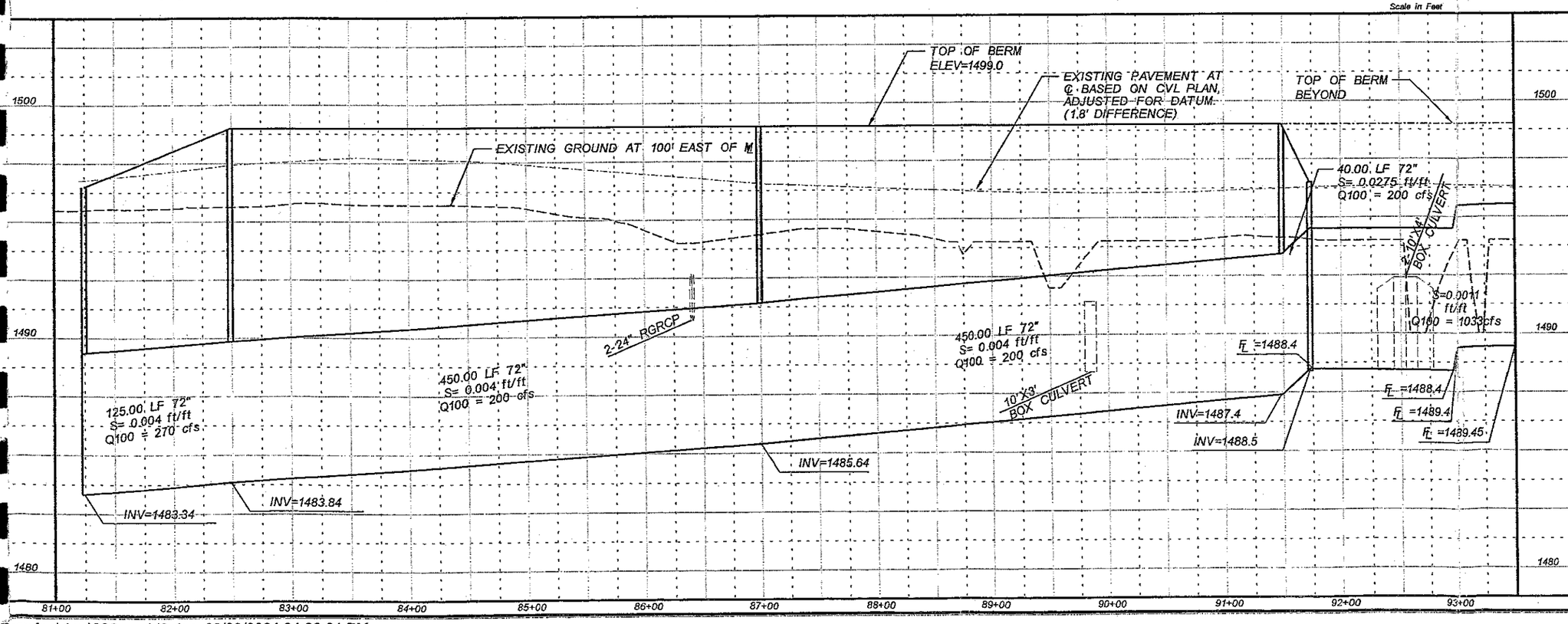
SIPHON DRAW
DRAINAGE IMPROVEMENTS
PREFERRED ALTERNATIVE

	BY	DATE
DESIGNED	S. ZOU/ J. TAILLON	07/04
DRAWN	D. HADGES	07/04
CHECKED	A. PATEL/ J. TAILLON	07/04

PRELIMINARY NOT FOR CONSTRUCTION OR RECORDING

DRAWING NO. P7 | PLAN AND PROFILE | SHEET OF





REMOVE

1. REMOVE/ABANDON 24" STORM DRAIN.
2. REMOVE/ABANDON 10'X3' BOX CULVERT.
3. REMOVE INLET HEADWALL.

CONSTRUCT

1. PROPOSED STORM DRAIN PIPE.
2. PROPOSED STORM DRAIN MANHOLE.
3. PROPOSED 100 LF 2-10'X4' BOX CULVERT EXTENSION.
4. PROPOSED CONCRETE INLET CHANNEL.
5. PROPOSED PLUG AT INLET TO SOUTH CELL OF BOX CULVERT. CONSTRUCT OPENING IN TOP OF SOUTH CELL FOR EMERGENCY OVERFLOW. MODIFY NORTH CELL OPENING TO 5.7'X4' TO RESTRICT OUTFLOW.

NO.	REVISION	BY	DATE
3			
2			
1			

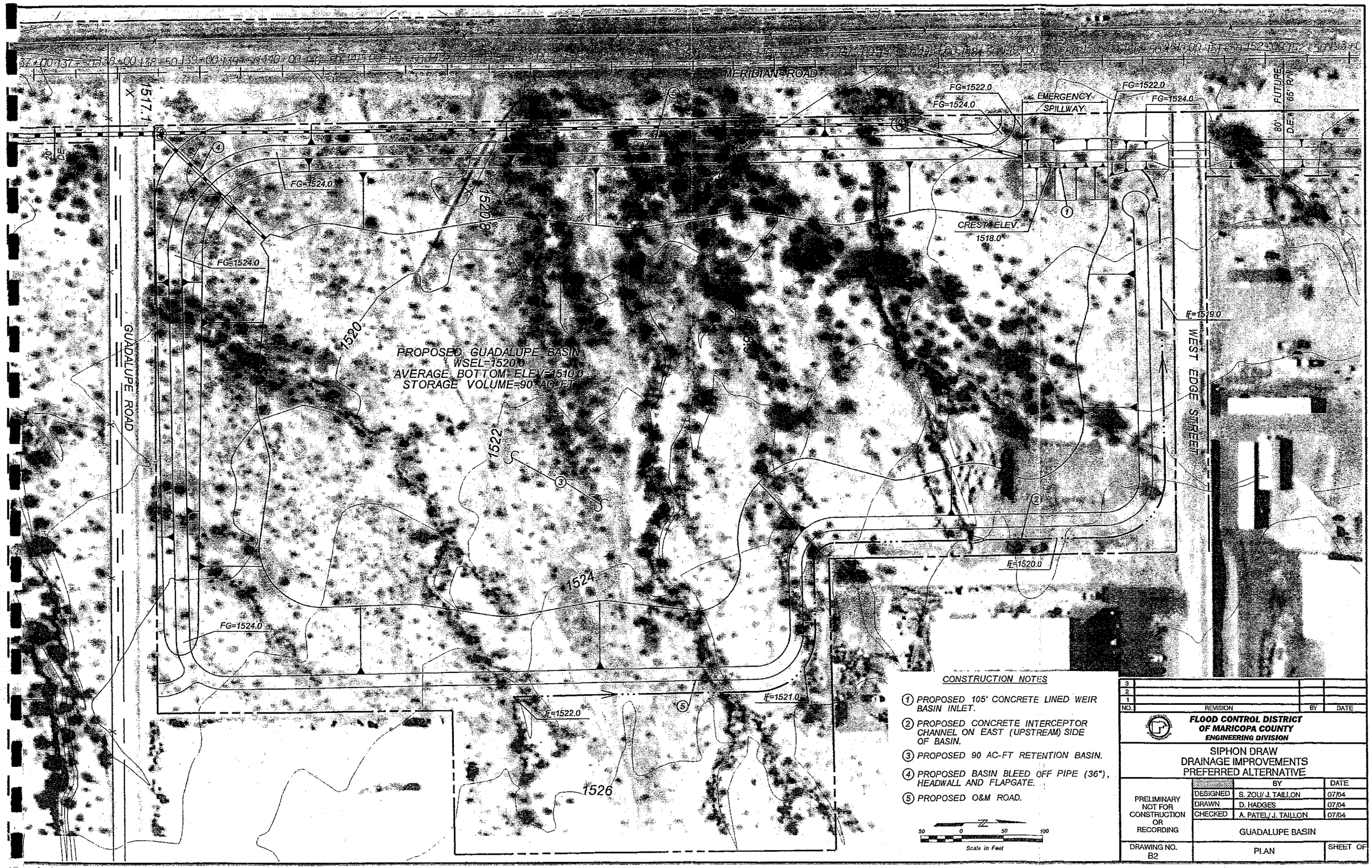
FLOOD CONTROL DISTRICT OF MARICOPA COUNTY
ENGINEERING DIVISION

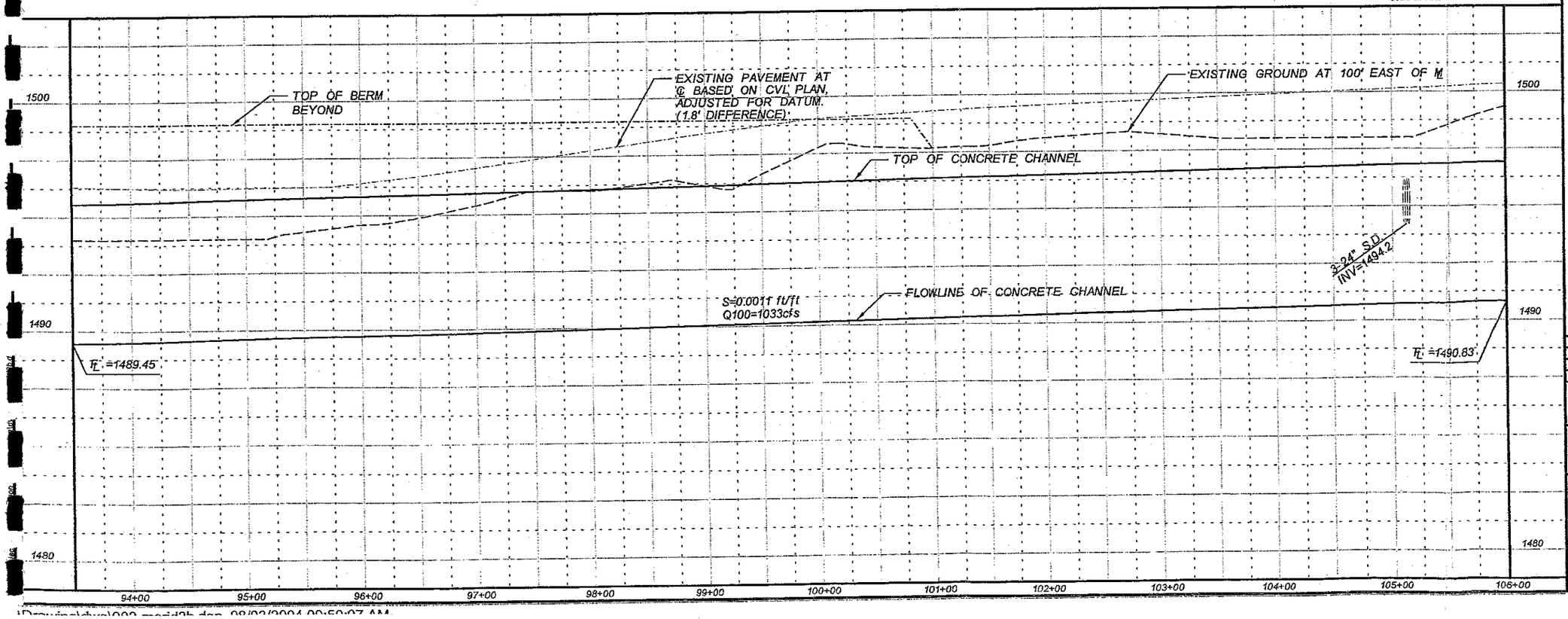
SIPHON DRAW
DRAINAGE IMPROVEMENTS
PREFERRED ALTERNATIVE

PRELIMINARY NOT FOR CONSTRUCTION OR RECORDING

	BY	DATE
DESIGNED	S. ZOU/ J. TAILLON	07/04
DRAWN	D. HADGES	07/04
CHECKED	A. PATEL/ J. TAILLON	07/04

DRAWING NO. P8 | PLAN AND PROFILE | SHEET OF


MERIDIAN ROAD
GUADALUPE ROAD
WEST EDGE STREET
FUTURE 65' R/W
80' D.E.
EMERGENCY SPILLWAY
FG=1522.0
FG=1524.0
CREST ELEV.=1518.0
FL=1519.0
FL=1520.0
FL=1521.0
FL=1522.0
1517.1
1520.8
1520
1522
1524
1526
PROPOSED GUADALUPE BASIN
WSEL=1520.0
AVERAGE BOTTOM ELEV=1510.0
STORAGE VOLUME=90 AC-FT
CONSTRUCTION NOTES
1 PROPOSED 105' CONCRETE LINED WEIR BASIN INLET.
2 PROPOSED CONCRETE INTERCEPTOR CHANNEL ON EAST (UPSTREAM) SIDE OF BASIN.
3 PROPOSED 90 AC-FT RETENTION BASIN.
4 PROPOSED BASIN BLEED OFF PIPE (36"), HEADWALL AND FLAPGATE.
5 PROPOSED O&M ROAD.
50 0 50 100
Scale in Feet
NO. REVISION BY DATE
3
2
1
FLOOD CONTROL DISTRICT OF MARICOPA COUNTY
ENGINEERING DIVISION
SIPHON DRAW
DRAINAGE IMPROVEMENTS
PREFERRED ALTERNATIVE
PRELIMINARY NOT FOR CONSTRUCTION OR RECORDING
BY DATE
DESIGNED S. ZOU/ J. TAILLON 07/04
DRAWN D. HADGES 07/04
CHECKED A. PATEL/ J. TAILLON 07/04
GUADALUPE BASIN
DRAWING NO. B2
PLAN
SHEET OF



☐ REMOVE ☐

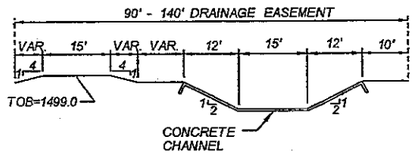
1 REMOVE/ABANDON 24" STORM DRAIN.

◯ CONSTRUCT ◯

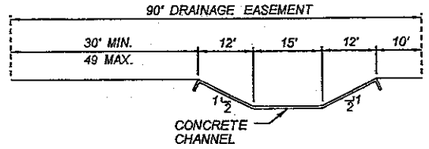
6 PROPOSED EARTHEN BERM PER SECTION A-A.

7 PROPOSED TRAPEZOIDAL CONCRETE CHANNEL PER SECTION A-A.

13 PROPOSED TRAPEZOIDAL CONCRETE CHANNEL PER SECTION B-B, DGW NO. P9.



TRAPEZOIDAL CONCRETE CHANNEL WITH BERM
SECTION A-A



TRAPEZOIDAL CONCRETE CHANNEL
SECTION B-B

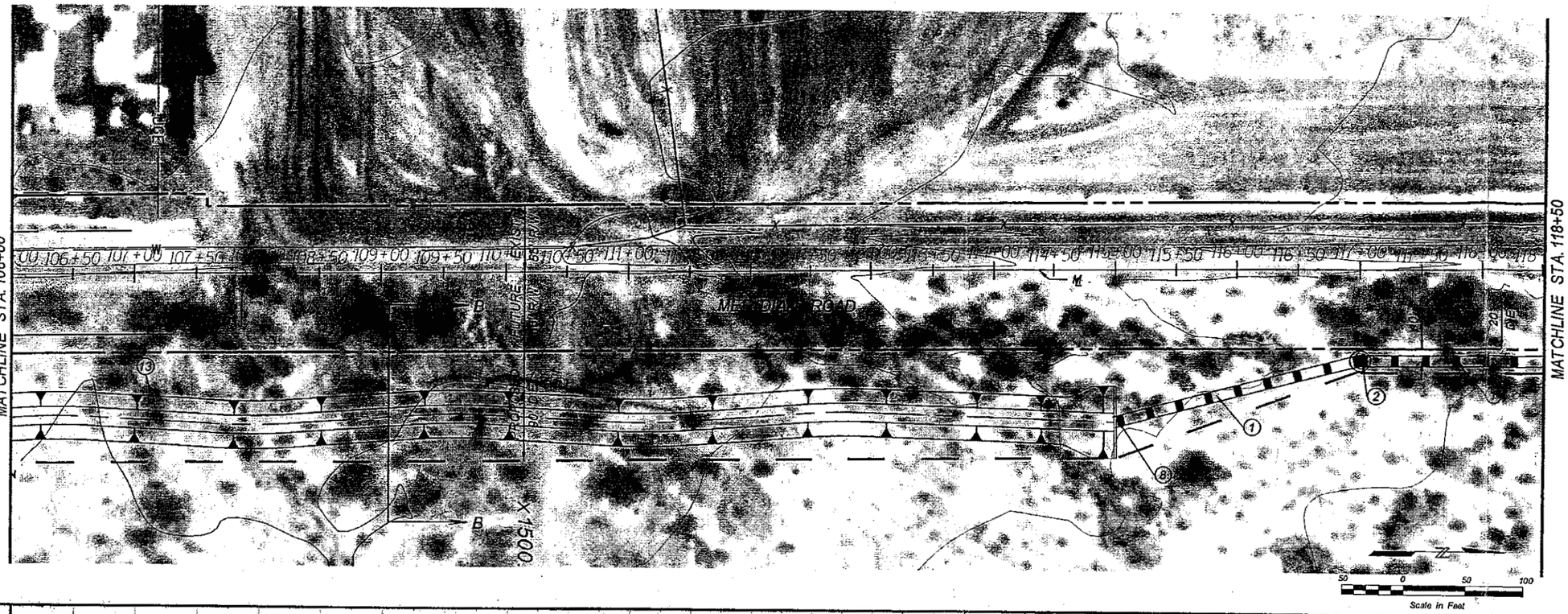
NO.	REVISION	BY	DATE
3			
2			
1			

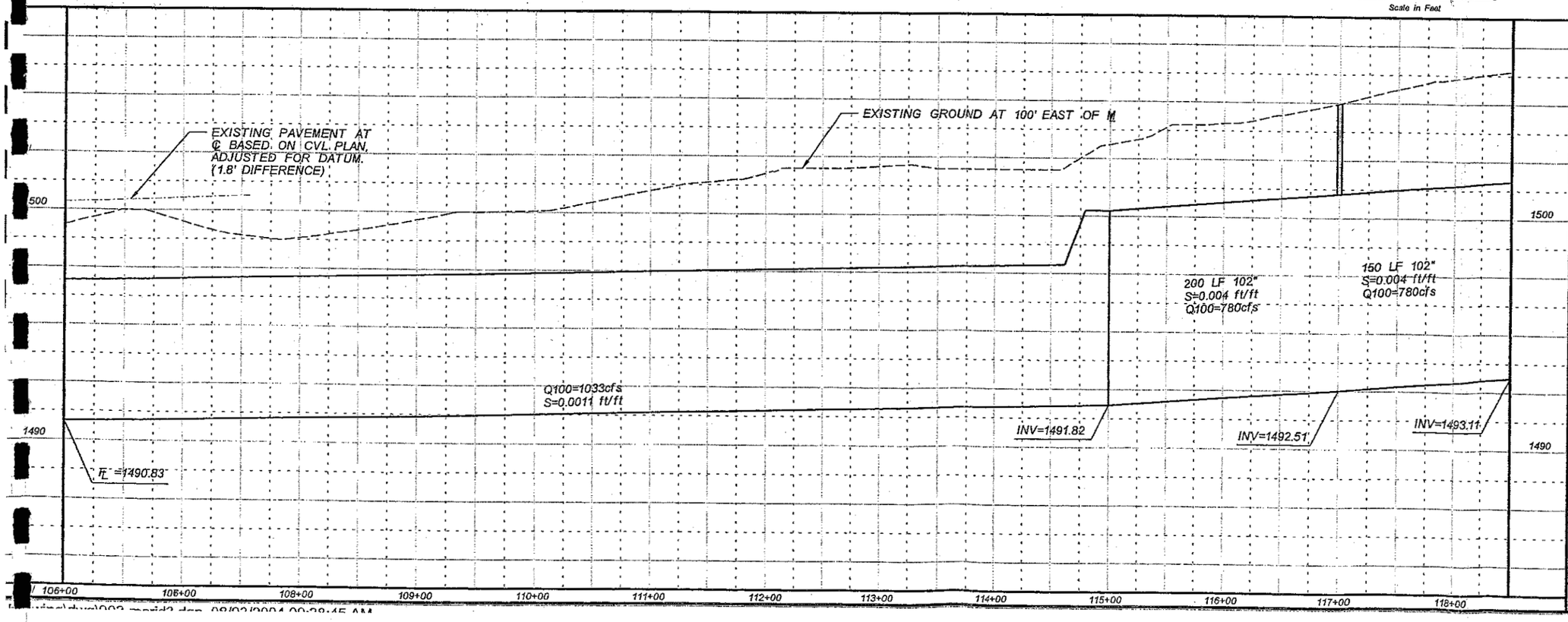
FLOOD CONTROL DISTRICT OF MARICOPA COUNTY
ENGINEERING DIVISION

SIPHON DRAW
DRAINAGE IMPROVEMENTS
PREFERRED ALTERNATIVE

PRELIMINARY NOT FOR CONSTRUCTION OR RECORDING		BY	DATE
	DESIGNED	S. ZOU/ J. TAILLON	07/04
	DRAWN	D. HADGES	07/04
	CHECKED	A. PATEL/ J. TAILLON	07/04

DRAWING NO. P9 | PLAN AND PROFILE | SHEET OF





☐ REMOVE ☐

○ CONSTRUCT ○

(1) PROPOSED STORM DRAIN PIPE.

(2) PROPOSED STORM DRAIN MANHOLE.

(8) PROPOSED OUTLET HEADWALL AND CHANNEL TRANSITION.

(13) PROPOSED TRAPEZOIDAL CONCRETE CHANNEL PER SECTION B-B, DGW NO. P9.

NO.	REVISION	BY	DATE
3			
2			
1			

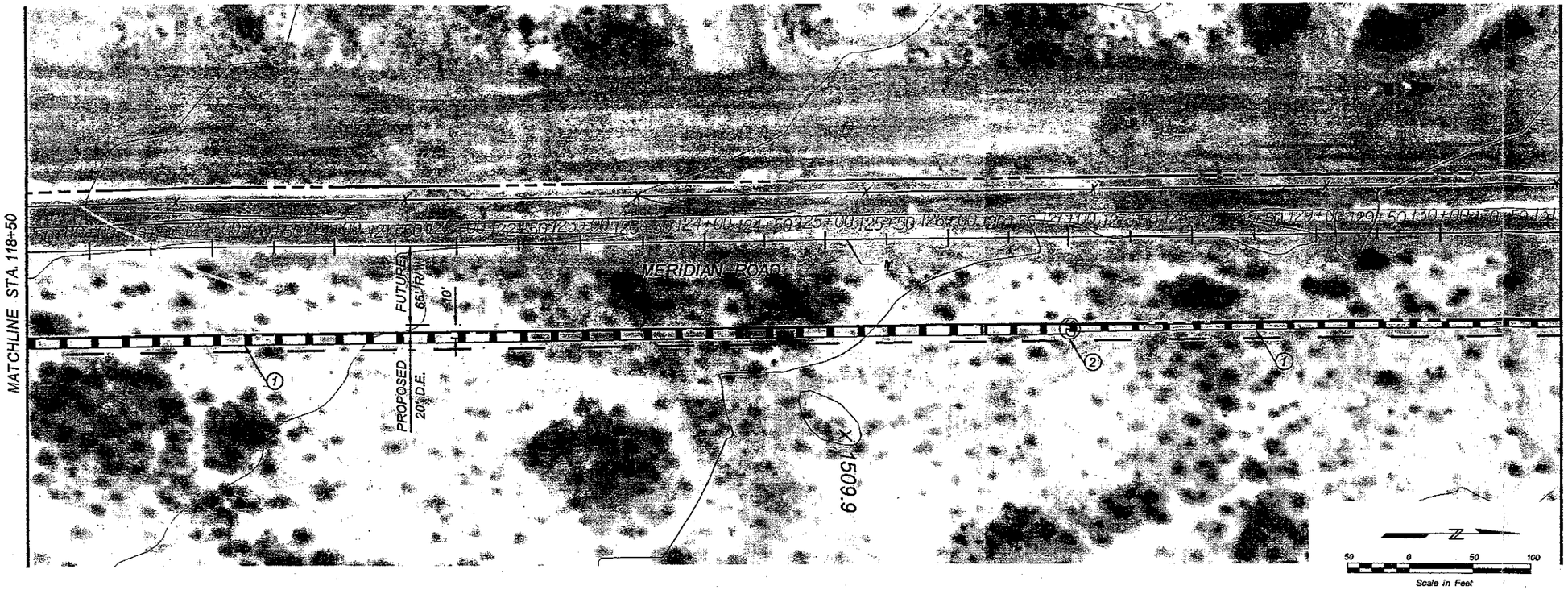
FLOOD CONTROL DISTRICT OF MARICOPA COUNTY
ENGINEERING DIVISION

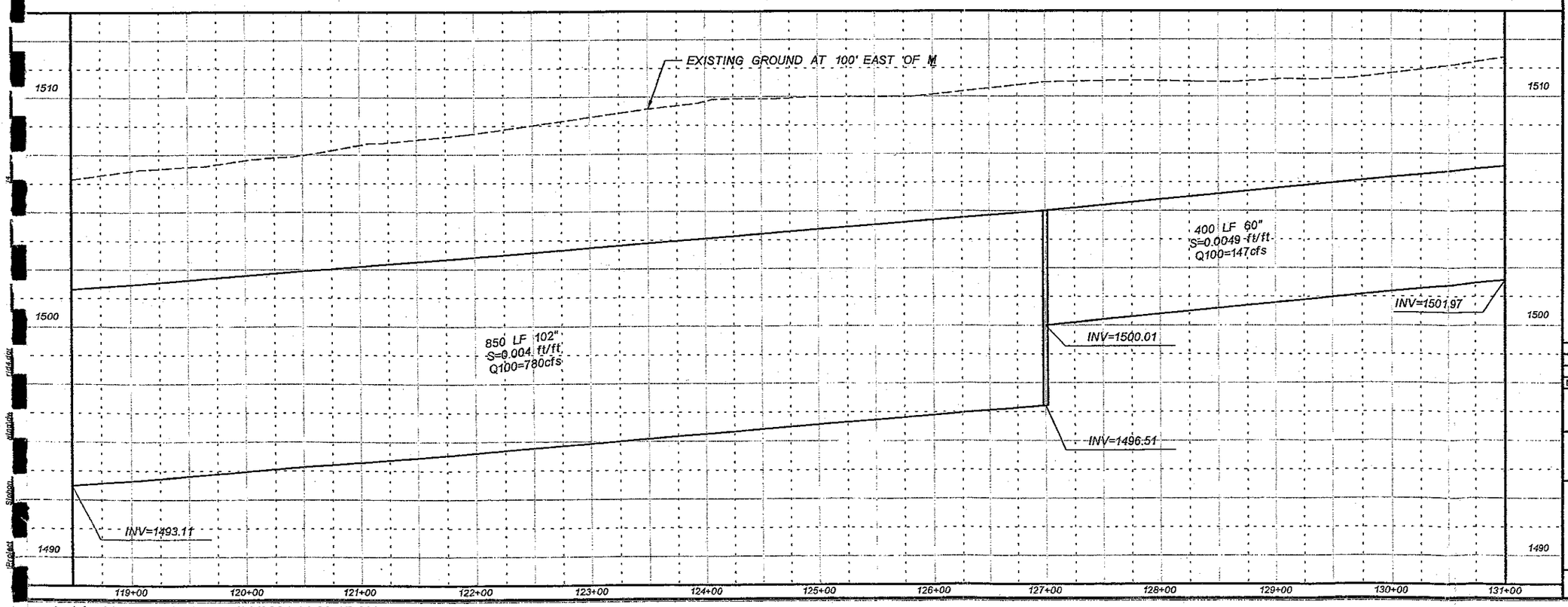
SIPHON DRAW
DRAINAGE IMPROVEMENTS
PREFERRED ALTERNATIVE

PRELIMINARY NOT FOR CONSTRUCTION OR RECORDING

	BY	DATE
DESIGNED	S. ZOU/ J. TAILLON	07/04
DRAWN	D. HADGES	07/04
CHECKED	A. PATEL/ J. TAILLON	07/04

DRAWING NO. P10 | PLAN AND PROFILE | SHEET OF





☐ REMOVE

◯ CONSTRUCT ◯

1. PROPOSED STORM DRAIN PIPE.
2. PROPOSED STORM DRAIN MANHOLE.

NO.	REVISION	BY	DATE
3			
2			
1			

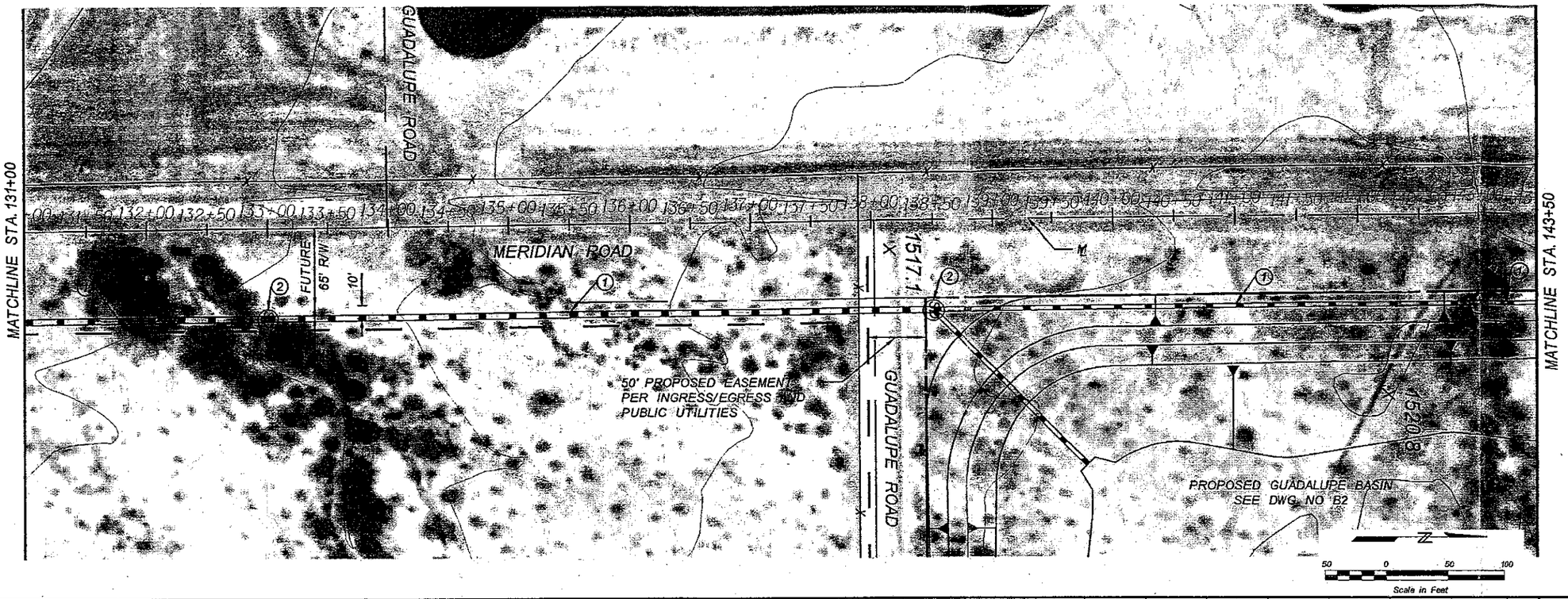
FLOOD CONTROL DISTRICT OF MARICOPA COUNTY
ENGINEERING DIVISION

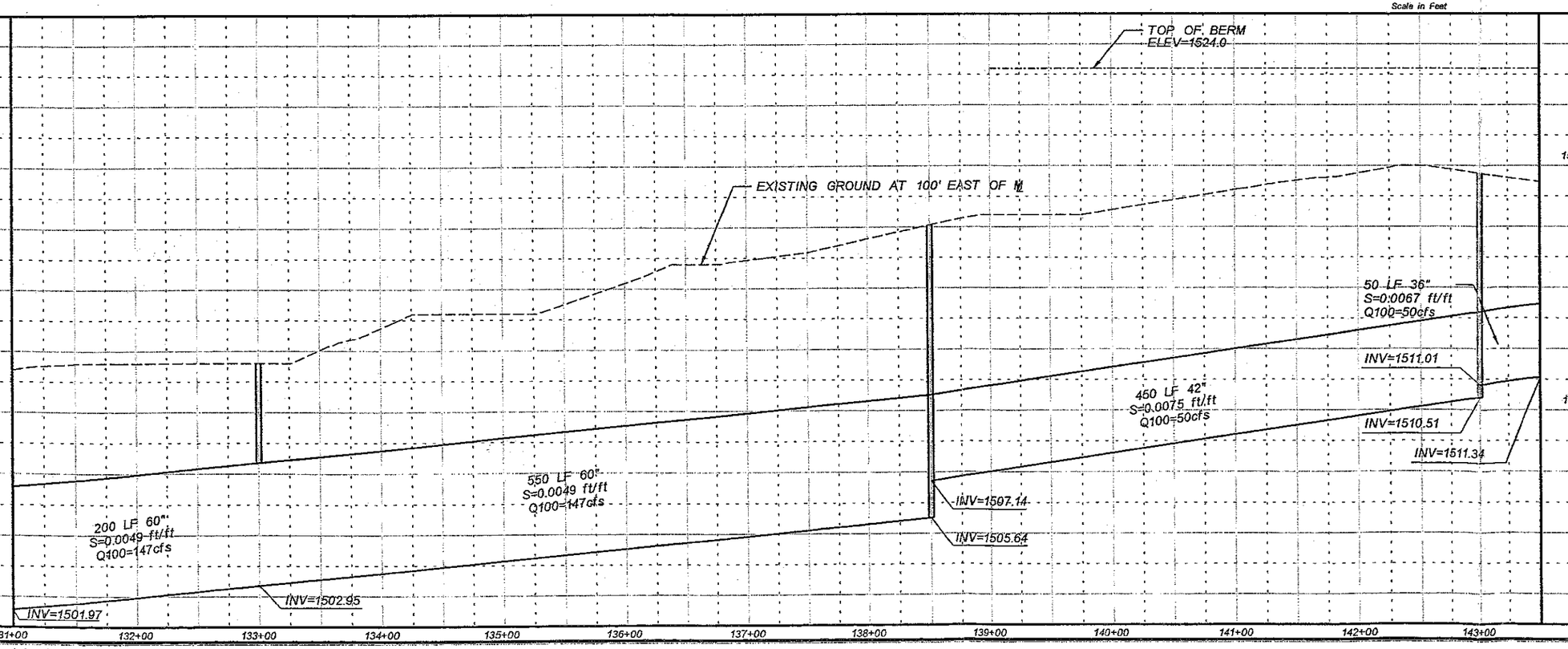
SIPHON DRAW
DRAINAGE IMPROVEMENTS
PREFERRED ALTERNATIVE

PRELIMINARY NOT FOR CONSTRUCTION OR RECORDING

	BY	DATE
DESIGNED	S. ZOU/ J. TAILLON	07/04
DRAWN	D. HADGES	07/04
CHECKED	A. PATEL/ J. TAILLON	07/04

DRAWING NO. P11 | PLAN AND PROFILE | SHEET OF





☐ REMOVE

◯ CONSTRUCT

(1) PROPOSED STORM DRAIN PIPE.

(2) PROPOSED STORM DRAIN MANHOLE.

NO.	REVISION	BY	DATE
3			
2			
1			

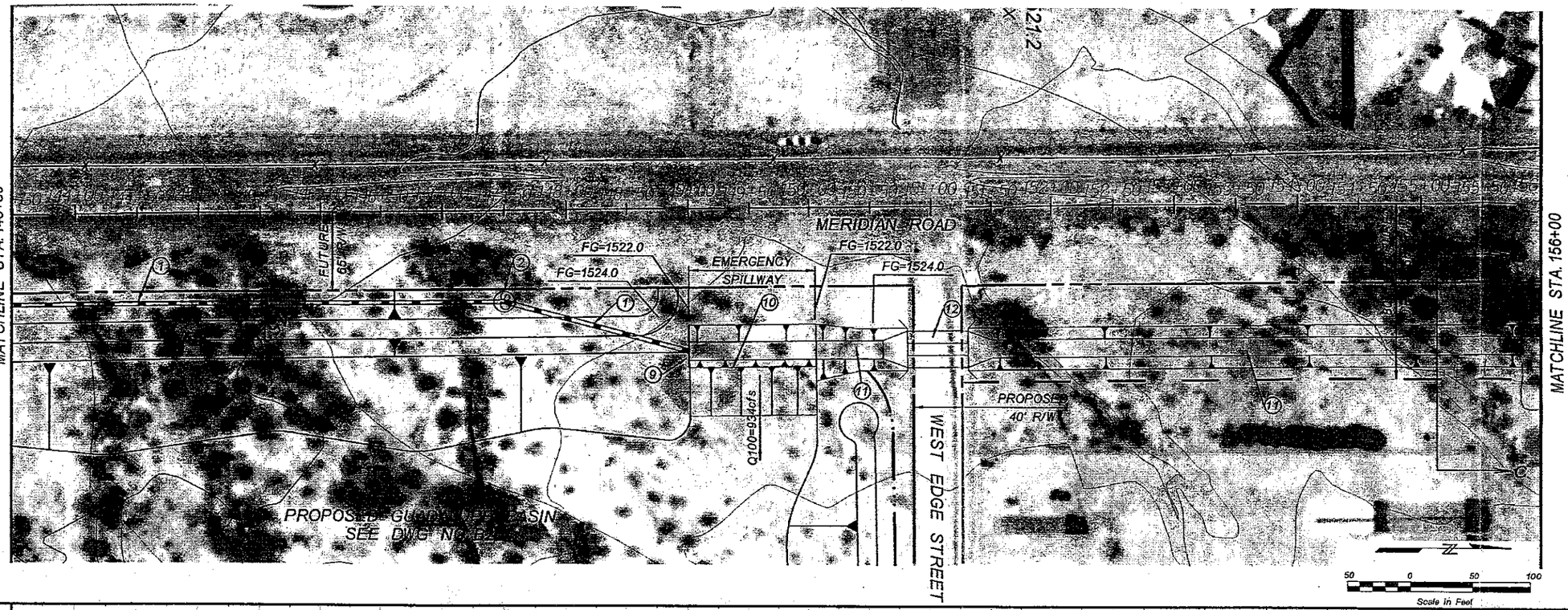
FLOOD CONTROL DISTRICT OF MARICOPA COUNTY
ENGINEERING DIVISION

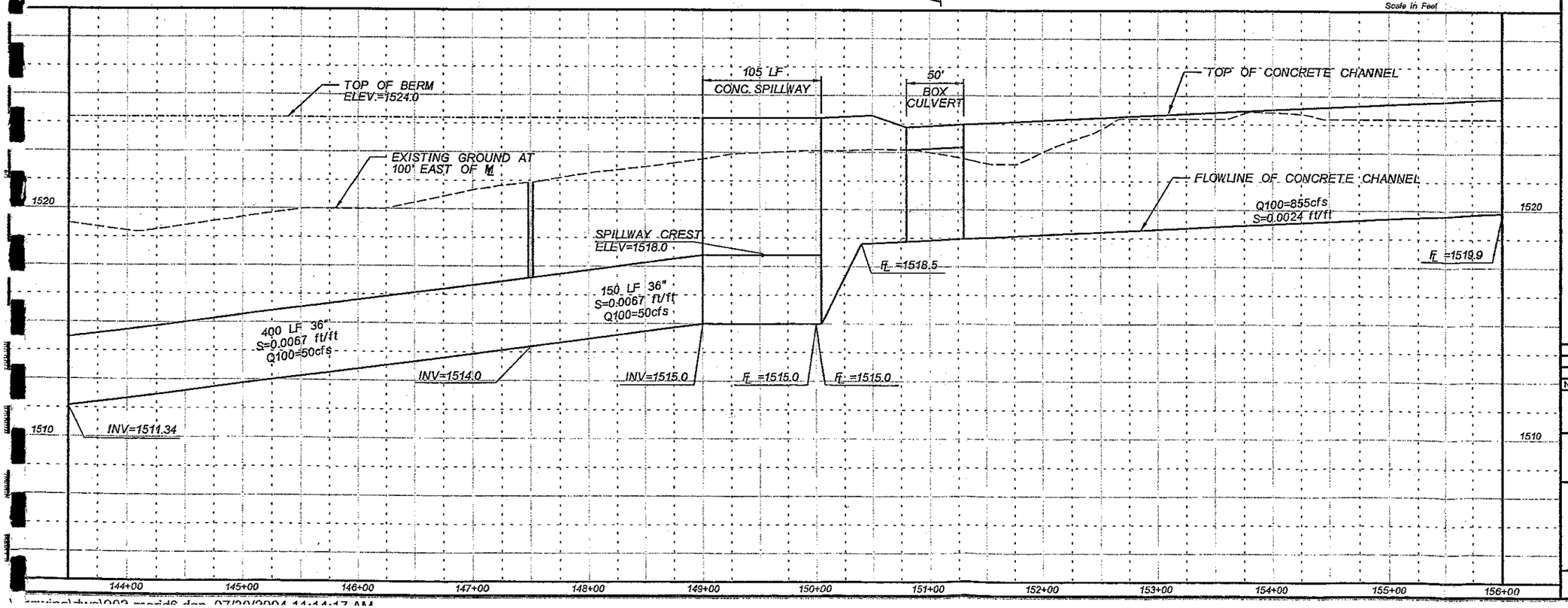
SIPHON DRAW
DRAINAGE IMPROVEMENTS
PREFERRED ALTERNATIVE

PRELIMINARY NOT FOR CONSTRUCTION OR RECORDING

	BY	DATE
DESIGNED	S. ZOU/ J. TAILLON	07/04
DRAWN	D. HADGES	07/04
CHECKED	A. PATEL / J. TAILLON	07/04

DRAWING NO. P12 | PLAN AND PROFILE | SHEET OF

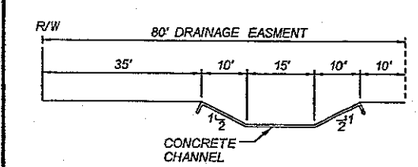




☐ REMOVE ☐

◯ CONSTRUCT ◯

1. PROPOSED STORM DRAIN PIPE.
2. PROPOSED STORM DRAIN MANHOLE.
9. PROPOSED CONCRETE HEADWALL.
10. PROPOSED 105' CONCRETE SPILLWAY.
11. PROPOSED CONCRETE TRAPEZOIDAL CHANNEL PER SECTION C-C.
12. PROPOSED 3-10'X4'X50' BOX CULVERT.



TRAPEZOIDAL CONCRETE CHANNEL SECTION C-C

NO.	REVISION	BY	DATE
3			
2			
1			

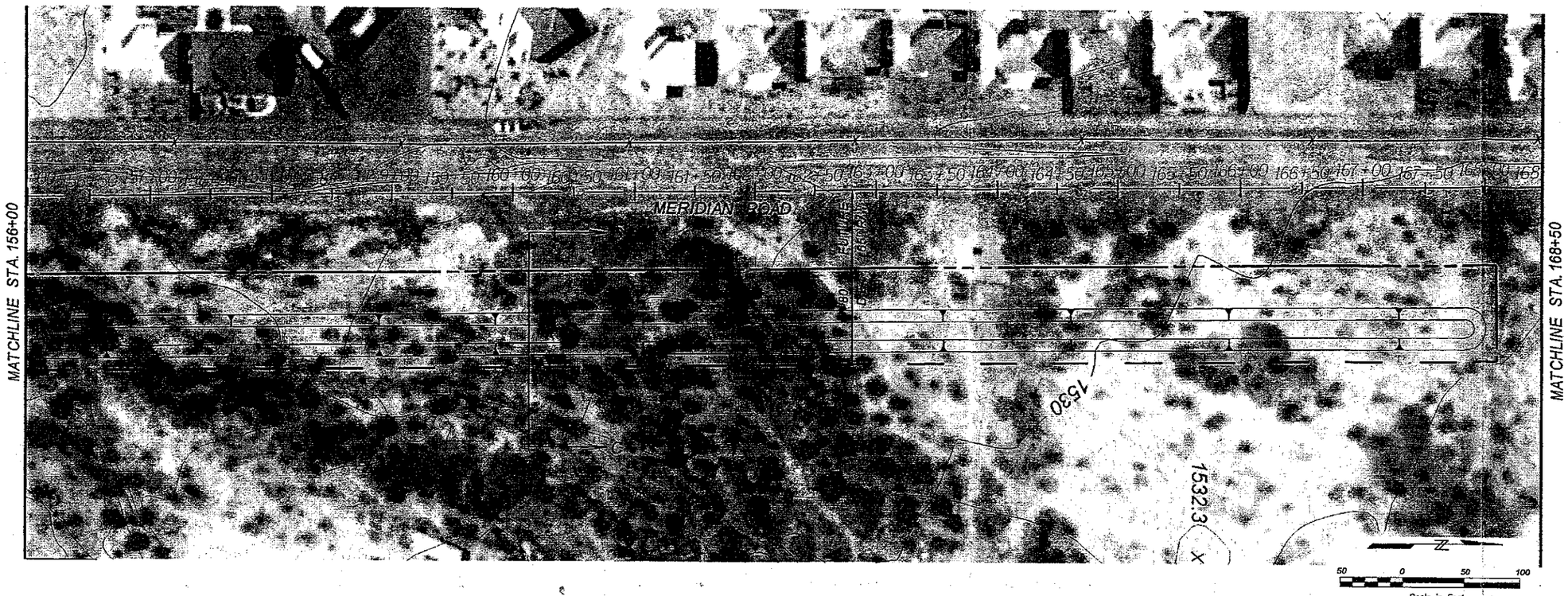
FLOOD CONTROL DISTRICT OF MARICOPA COUNTY
ENGINEERING DIVISION

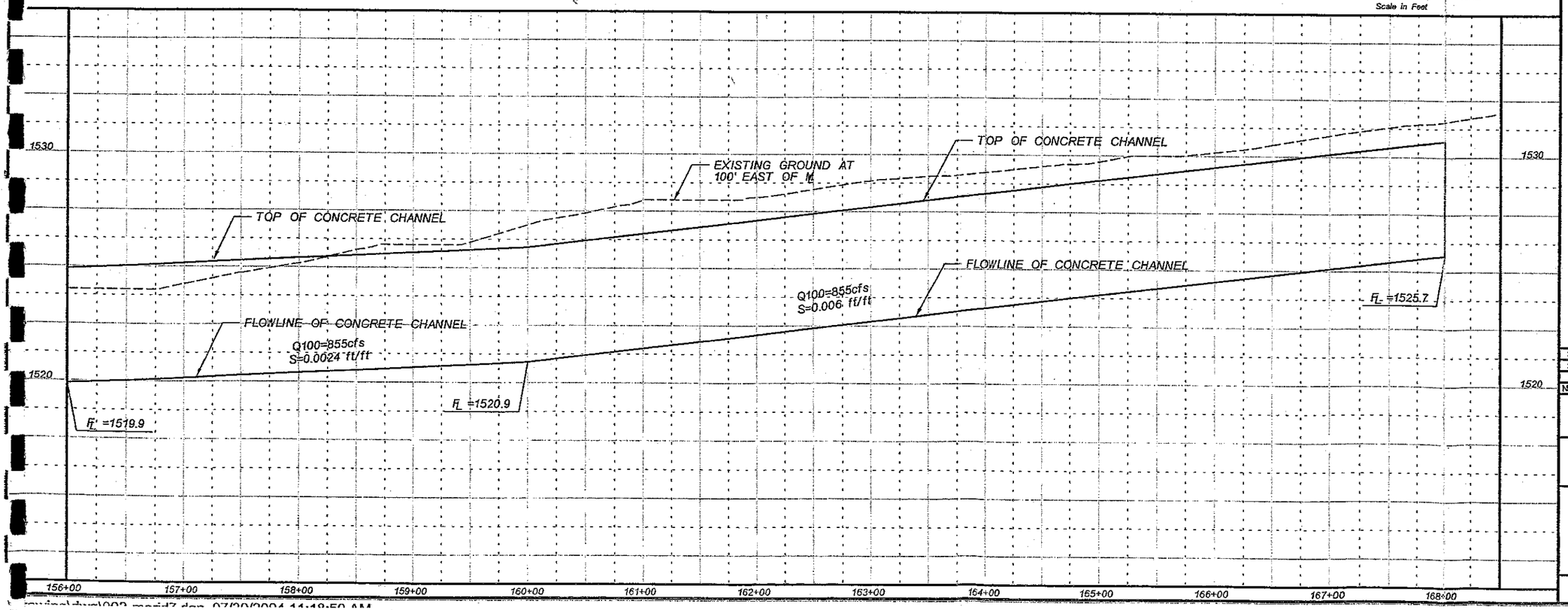
SIPHON DRAW
DRAINAGE IMPROVEMENTS
PREFERRED ALTERNATIVE

PRELIMINARY NOT FOR CONSTRUCTION OR RECORDING

	BY	DATE
DESIGNED	S. ZOU/ J. TAILLON	07/04
DRAWN	D. HADGES	07/04
CHECKED	A. PATEL/ J. TAILLON	07/04

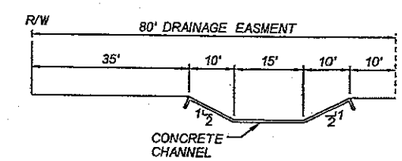
DRAWING NO. P13 | PLAN AND PROFILE | SHEET OF





REMOVE

CONSTRUCT



TRAPEZOIDAL CONCRETE CHANNEL
SECTION C-C

NO.	REVISION	BY	DATE
3			
2			
1			

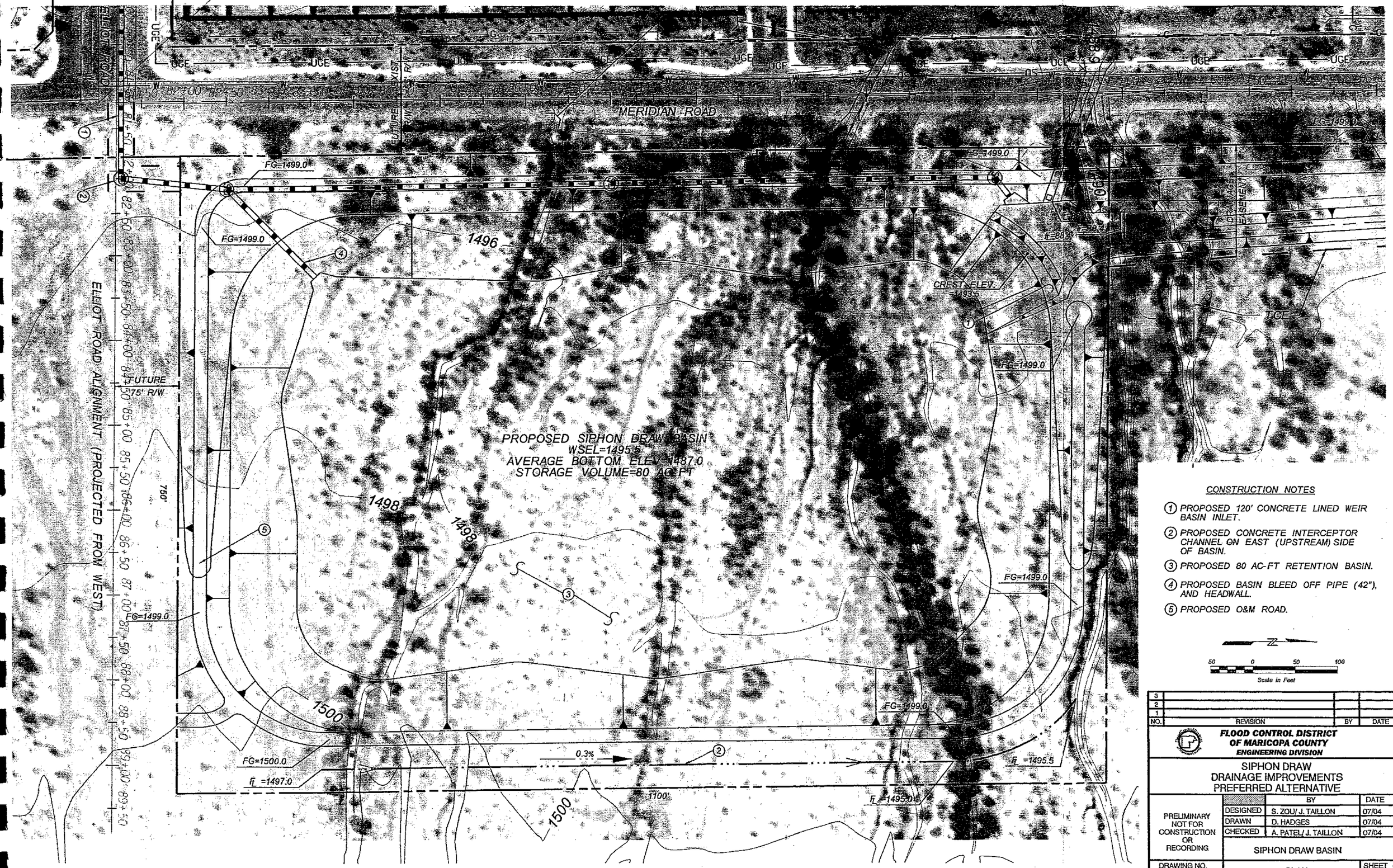
FLOOD CONTROL DISTRICT OF MARICOPA COUNTY
ENGINEERING DIVISION

SIPHON DRAW
DRAINAGE IMPROVEMENTS
PREFERRED ALTERNATIVE

PRELIMINARY NOT FOR CONSTRUCTION OR RECORDING

	BY	DATE
DESIGNED	S. ZOU/ J. TAILLON	07/04
DRAWN	D. HADGES	07/04
CHECKED	A. PATEL/ J. TAILLON	07/04

DRAWING NO. P14 | PLAN AND PROFILE | SHEET OF



NO.	REVISION	BY	DATE
3			
2			
1			

FLOOD CONTROL DISTRICT OF MARICOPA COUNTY
ENGINEERING DIVISION

SIPHON DRAW
DRAINAGE IMPROVEMENTS
PREFERRED ALTERNATIVE

PRELIMINARY NOT FOR CONSTRUCTION OR RECORDING

	BY	DATE
DESIGNED	S. ZOU/ J. TAILLON	07/04
DRAWN	D. HADGES	07/04
CHECKED	A. PATEL/ J. TAILLON	07/04

SIPHON DRAW BASIN

DRAWING NO. B1 | PLAN | SHEET OF