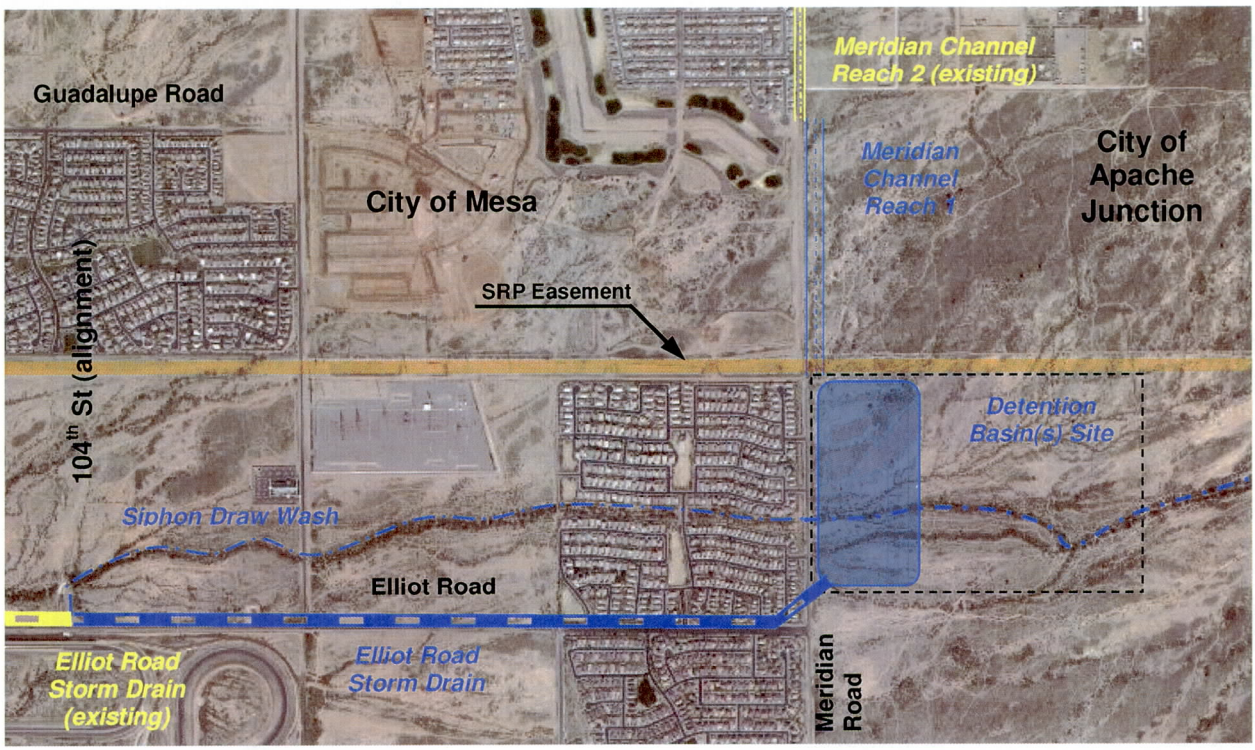
Pre-Design Report

Siphon Draw Wash Drainage Improvements Project

Contract FCD 2007C012

January 2008



Prepared for: **Flood Control District of Maricopa County**
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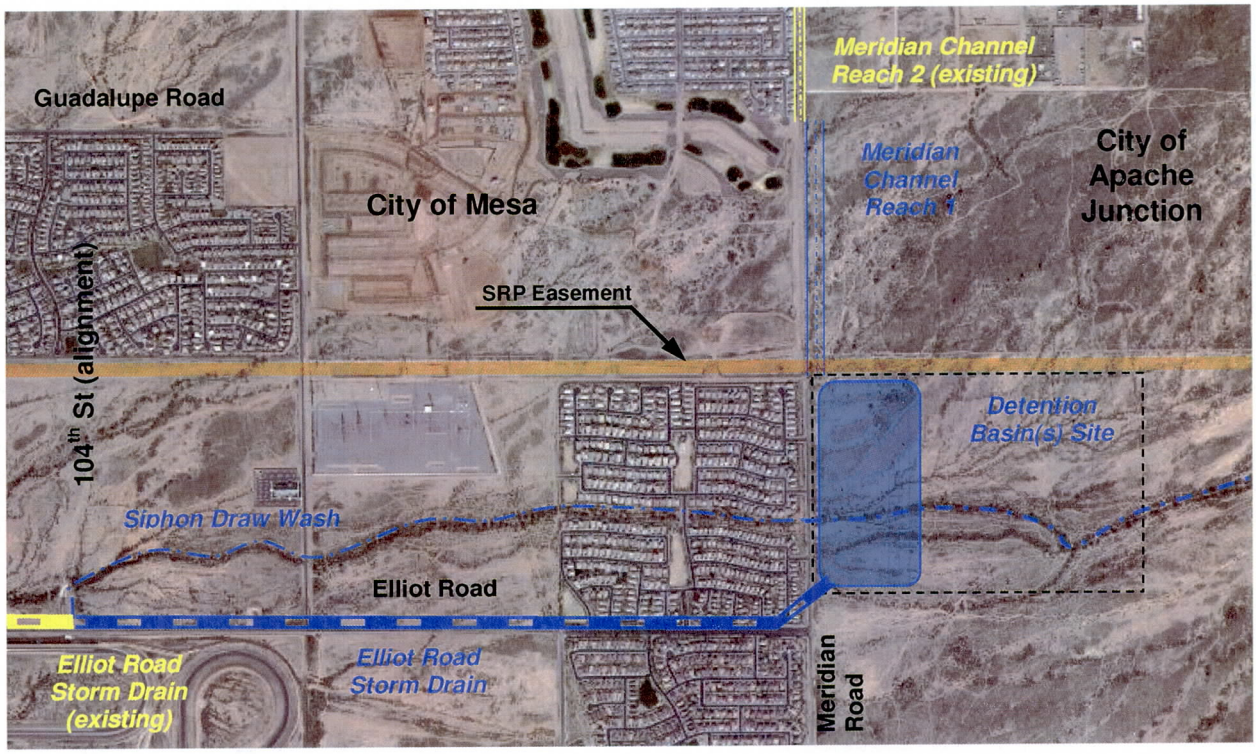

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1 INTRODUCTION

The Siphon Draw Wash Drainage Improvements project area is located in Eastern Maricopa County and Northwestern Pinal County, in the general vicinity of Elliot Road and Meridian Road (see Figure 1-1). Project improvements will include an incised channel along Meridian Road from Siphon Draw Wash to approximately the Navarro Avenue alignment (Meridian Road Channel Reach 1), a detention facility comprised of one or more detention basins to be located in a large drainage easement located northeast of the intersection of Elliot Road and Meridian Road, and a new storm drain line from the detention basin facility to the project outfall along Meridian Road and Elliot Road (see Figure 1-1).

The project is being developed in two phases, a pre-design phase and a design phase. This report documents the pre-design effort. The pre-design effort consists of data collection, initial site investigations, the development and evaluation of preliminary project alternatives, alternative analyses, and the preparation of preliminary construction cost estimates. The subsequent design phase will consist of the preparation of construction documents, final design plans, special provisions, and construction cost estimates for the construction of project improvements.

1.1 PROJECT AUTHORIZATION

The Siphon Draw Wash Drainage Improvements Project is administered by the Flood Control District of Maricopa County (FCDMC) but it is a joint effort between the FCDMC and the City of Mesa. The project was authorized by Contract FCD 2007C012 between the FCDMC and Stanley Consultants, Inc. (SCI) on September 12, 2007 with an effective Notice-to-Proceed date of September 20, 2007 and a contract completion date of September 19, 2008.

1.2 PROJECT LOCATION

The project area is located in eastern Maricopa County and western Pinal County in Sections 7, Township 1 South, Range 8 East and Sections 11 and 12 of Township 1 South, Range 7 East, generally in the vicinity of Elliot Road and Meridian Road. Major project elements extend along the east side of Meridian Road from Elliot Road to approximately Navarro Avenue alignment (Meridian Channel - Channel Reach 1) and along Elliot Road from Meridian Road to approximately the 104th Street alignment (Elliot Road Storm Drain). In addition, a detention facility comprised of one or more detention basins will be located in a large parcel/drainage easement located northeast of the intersection of Elliot Road and Meridian Road (see Figure 1-1).

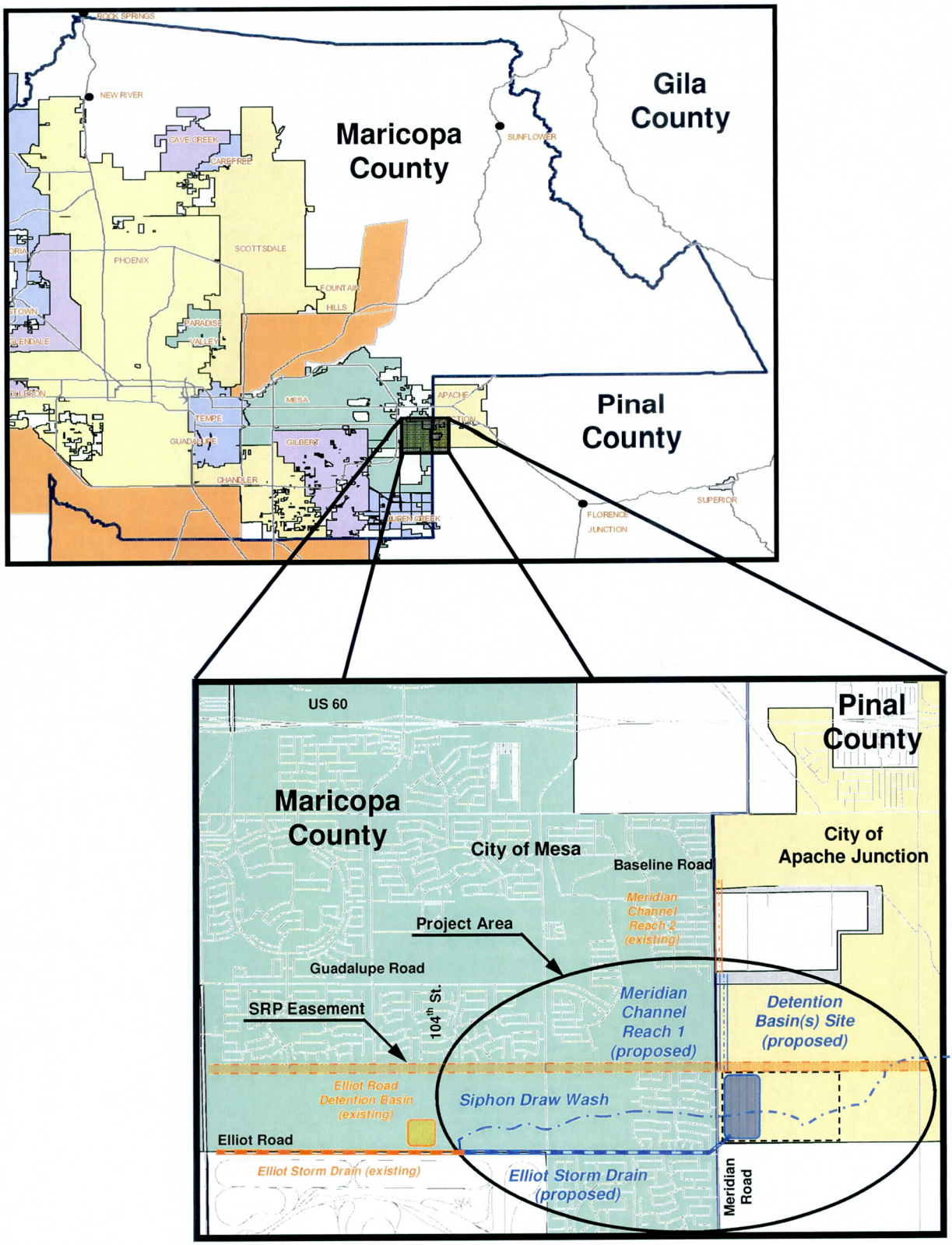


Figure 1-1: Project Location and Vicinity Map

1.3 BACKGROUND

The Siphon Draw Wash Drainage Improvement Project consists of flood control and drainage concepts initially proposed as part of regional improvements in the East Mesa Area Drainage Master Plan (ADMP), the FCDMC's regional planning document for east Mesa and eastern Maricopa County. These concepts were further investigated in subsequent studies and will culminate with the design of regional improvements as part of the Siphon Draw Wash Drainage Improvement Project.

The proposed conceptual improvements included channels/storm drains to route flood water and a detention basin(s) to attenuate of peak discharges from Siphon Draw Wash and channelized flow along Meridian Road. The improvements are to provide local flood protection and attenuate peak flood discharges along Siphon Draw Wash such that existing downstream flood control and drainage facilities are not overwhelmed during the 100-year design event.

1.4 PROJECT DESCRIPTION

The major project improvements include the following: the Meridian Channel, a proposed channel to intercept and divert flood water to a detention basin facility; a detention basin facility that will receive and attenuate flow from the Meridian Channel and Siphon Draw Wash and a new storm drain along Elliot Road to drain the proposed detention basin facility. Additional features associated with the major project improvements such as diversion structures and grade control structures will also be required.

1.5 JURISDITIONAL AGENCIES

While the project will be designed and constructed as a joint effort between the FCDMC and the City of Mesa, the project area falls under the jurisdiction of several different government agencies. West of Meridian Road, the project area falls under the jurisdiction of the City of Mesa and/or Maricopa County. East of Meridian Road the project area is generally located within the jurisdiction of the City of Apache Junction and/or Pinal County.

Other agencies also have authority and/or rights within the project area. Essentially all the undeveloped land within the project area east of Meridian Road is held in trust by the State of Arizona. All this property is administered by the Arizona State Land Department (ASLD). In addition, the Salt River Project has a 260-foot overhead power line easement located along the east-west mid-section line of Section 7, Township 1 South, Range 8 East.

The FCDMC has obtained agreements with ASLD for a 160-ft drainage easement along Meridian Road from approximately Elliot Road to Guadalupe Road (extended) and approximately a 200 acre parcel for a drainage easement in the south half of Section 7, Township 1 South, Range 8 East (See Figure 1-2). The FCDMC has also reached an agreement to cross the SRP easement with a channel provided conditions are met to assure SRP is able to access and maintain their lines and equipment.

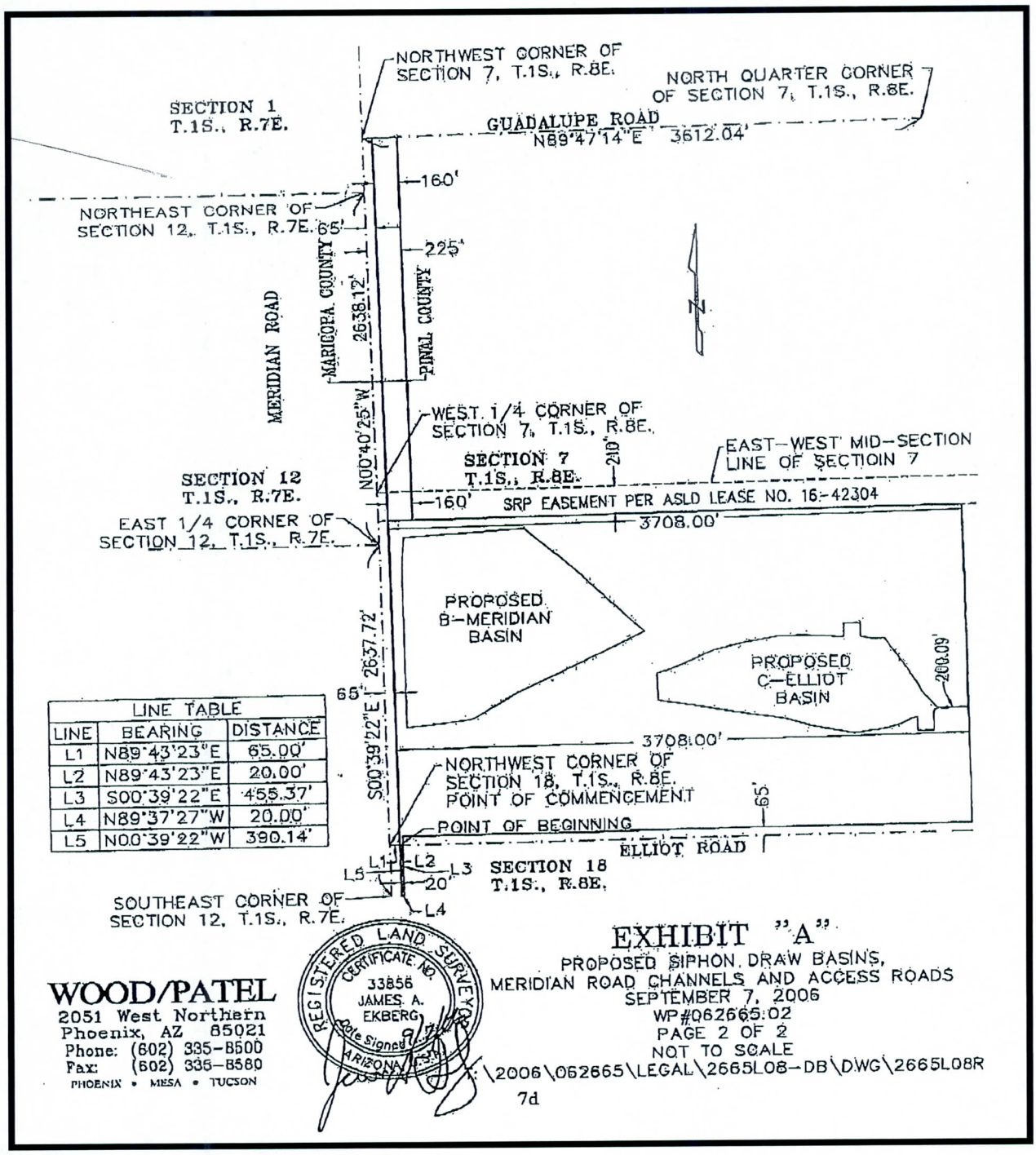


Figure 1-2: Easement exhibit for Meridian Road Channel and Siphon Draw Basins

1.6 FEMA FLOOD HAZARD ZONES

The existing floodplain for Siphon Draw Wash is approximately delineated within Pinal County (see Figure 1-3). The delineated floodplain is designated as a Special Flood Hazard Zone A according to Flood Insurance Rate Map (FIRM) Number 040413C 0200E (Effective Date: April 15, 1988, Revised Date: July 19, 2001).

A Special Flood Hazard Zone A is defined as:

> *Areas of 100-year flood; No base flood elevations determined.*

Areas outside of the delineated floodplain limits are designated as Special Flood Hazard Zone X. A Zone X is defined as:

> *Areas of 500-year flood; areas of 100-year flood with average depths of less than 1 foot or with drainage areas less than 1 square mile' and areas protected by levees from 100-year flood.*

While hydraulic analyses will be performed to assess the hydraulic capacity of Siphon Draw Wash downstream of Meridian Road and to identify potential flow breakout locations, the analyses will not establish base flood elevations, delineate new floodplains or re-delineate existing floodplains.

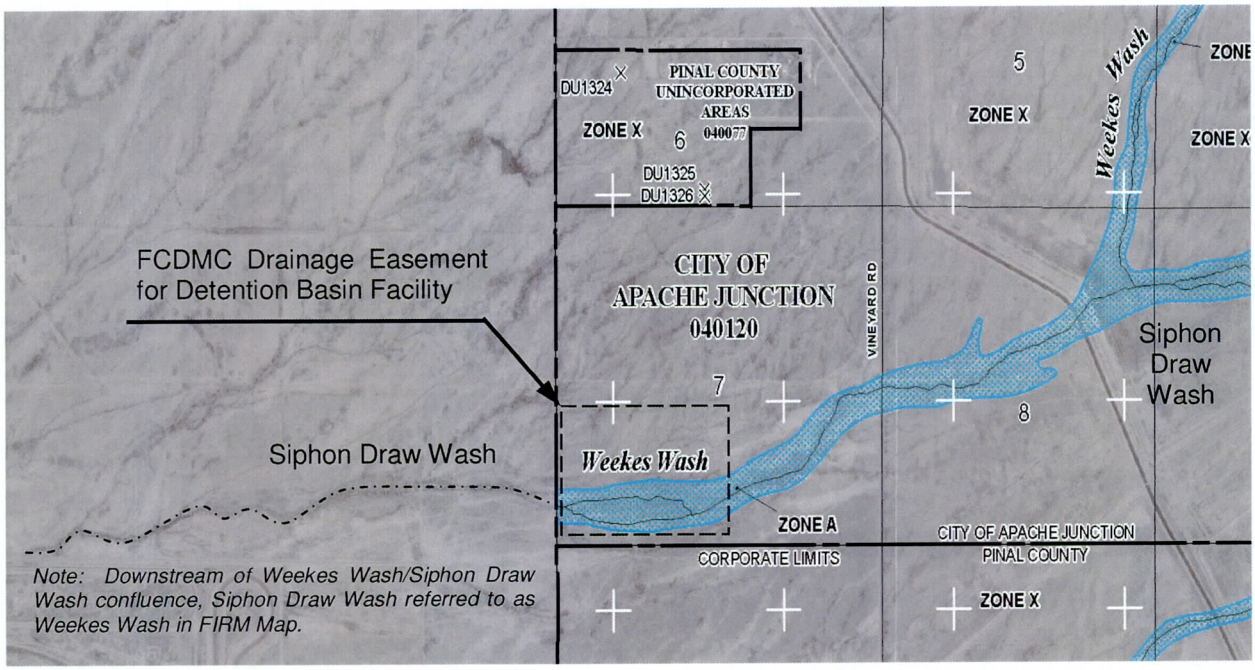


Figure 1-3: FIRM Map for Siphon Draw Wash

1.7 SIGNIFICANT WATERSHED FEATURES AND ISSUES

This section describes significant features located within the watershed and significant issues within the project area which impact area hydrology and/or the development or the design of project alternatives.

1.7.1 General

Prior to development, Siphon Draw Wash and adjacent wide overbank areas served as the primary conveyance corridor through the project area. While it remains the primary conveyance, the construction of the CAP canal and the development of adjacent land altered historic drainage patterns by generally concentrating and redirecting runoff. The CAP canal intercepts all watershed flow east of the CAP canal and limits flow across the canal to two overchute locations (each 2-72" steel pipes). Along the eastern boundary of the Sunland Springs Village development (northwest of the intersection of Guadalupe and the Meridian Road alignment) an earthen channel was constructed to capture offsite flows and redirects flow south and discharges into a series of large shallow detention basins located within a Salt River Project (SRP) Overhead Powerline (OHP) easement located just south of Guadalupe Road and west of Meridian Road.

Regional flood control and drainage improvements have also altered drainage patterns. Siphon Draw Wash now terminates at the project outfall located at the intersection of Elliot Road and the 104th Street alignment. Flow is diverted into an inlet for an existing Elliot Road Detention Basin or an orifice into an existing large diameter storm drain Elliot Road Storm Drain.

1.7.2 Watershed Area

The natural fall of the watershed for Siphon Draw Wash is generally to the east and south. Historically, the watershed extended to the northeast into the Superstition Mountains. The construction of a Central Arizona Project (CAP) canal, however, interrupted the natural drainage patterns and while the wash within the project limits maintains a hydrologic connection to the area east of the CAP canal via two CAP overchutes, for practical purposes, the CAP is generally referred to as the upstream boundary of the project drainage area impacting project improvements.

East of Meridian Road, the area is comprised principally of undeveloped desert land with the exception of an existing light industrial area located north of Guadalupe Road and a wastewater treatment facility east of Ironwood Drive. This subbasin area is considered "onsite" since, along with flow passing through two CAP overchutes, runoff from this area directly impacts the size and design of the proposed Meridian Channel (Reach 1) and the proposed detention basin facility.

The subbasin area west of Meridian Road is considered "offsite" since the subbasin runoff only indirectly impacts the design of the Meridian Channel and the detention basin facility by contributing to flow at the project outfall at Elliot Road and 104th Street

and thereby reducing the amount of discharge possible from the proposed upstream facilities. This subbasin area is primarily a mix of undeveloped desert land and medium density residential housing.

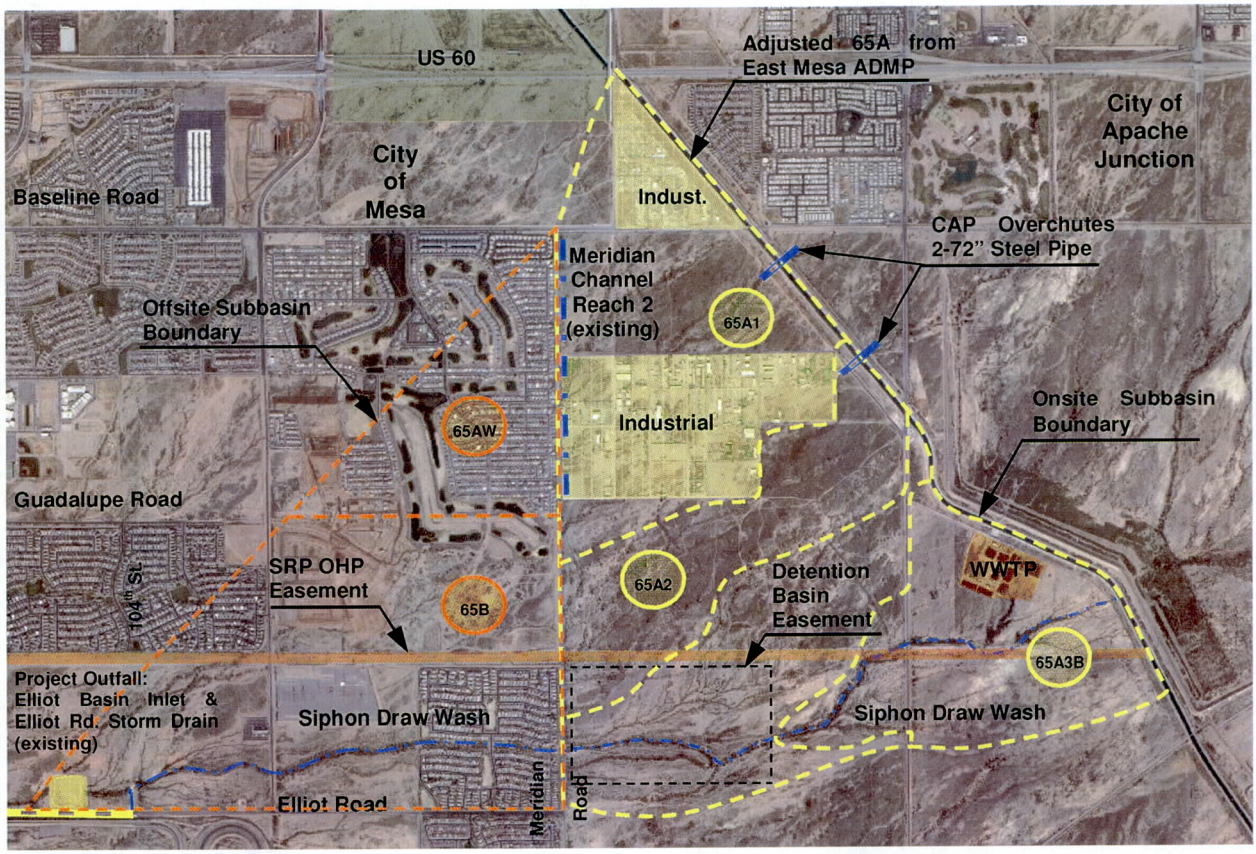


Figure 1-4: Siphon Draw Wash Subbasins and Existing Project Area

1.7.3 Siphon Draw Wash

Siphon Draw Wash is generally a small natural desert wash that drains from east to west through undeveloped desert land. The wash continues through the project area and through the basin easement. The wash tends to be small and shallow between the CAP and Meridian Road and conveys only a small amount of runoff within its natural banks as demonstrated by several flow splits and breakout locations. West of Meridian Road, the wash passes through the Meridian Point Subdivision, a residential development, before returning to a more natural condition. West of the Meridian Point Subdivision the wash is still relatively small and shallow but has more capacity within the channel than upstream (east) of Meridian Road.. Siphon Draw Wash terminates at the project outfall at 104th St. (alignment) and Elliot Road.

1.7.4 Land Subsidence and Earth Fissures

The project area is located in a geotechnical study area known as Hawk Rock. Previous geotechnical studies and investigations in the Hawk Rock study area have

shown the project area is undergoing land subsidence and revealed the presence of existing earth fissures in the vicinity of the proposed Meridian channel and the proposed detention basin facility. The presence of land subsidence and particularly earth fissures will have a significant impact on the potential project alternatives and necessary mitigation measures. As part of the pre-design effort, additional geotechnical field investigations were performed and mitigation alternatives will be developed following the completion of the field investigation. This effort will be documented in a separate geotechnical report provided upon the completion of ongoing field investigations.

Photo 1-1: New surface expression of earth fissure (northeast of basin site).

1.7.5 Project Outfall at 104th Street Alignment and Elliot Road

Siphon Draw Wash terminates at the project outfall at 104th Street (alignment) and Elliot Road. At the project outfall, a concrete lined channel routes flow south towards Elliot Road. Flow is diverted into an inlet for an existing Elliot Road Detention Basin to the west or through an opening in an orifice plate into an existing large diameter storm drain that runs west along Elliot Road. The inlet for the detention basin is a concrete lateral weir with a drop inlet to a reinforced concrete box culvert that discharges into the detention basin to the west. The inlet to the storm drain is through a 24" opening in an orifice plate over a 72" pipe storm drain lateral.

1.7.6 CAP Overchutes

Offsite flow from the northeast is from a significant regional drainage area but controlled to an extent by upstream drainage improvements including the U.S. 60 drainage channels and detention basins and the CAP. There are two overchutes of the CAP Canal located between Baseline and Ironwood Roads, each consisting of twin 72"

diameter steel flange pipes. The flow from these overchutes travels southeasterly to the existing Meridian Road earth channel which protects the Sunland Springs Village residential development in Mesa. The drainage pattern between the CAP and the Meridian channel is shallow flow, somewhat ill-defined and impacted by roadway, fencing and building improvements in the industrial area north of Guadalupe Road.

Photo 1-2: Project outfall with weir (right) and the 24" orifice plate (background)

1.7.7 Elliot Road Storm Drain (Existing)

One of the primary constraints for project alternatives is to limit discharge to a maximum 500 cfs into an existing large storm drain system along Elliot Road. The existing Elliot Road Storm drain discharges to the Elliot Outfall Channel just west of Ellsworth Road and approximately 1/3 of a mile south of Elliot Road. From the storm drain outlet south of Elliot Road on the west side of Ellsworth Road, the storm drain system runs north along the east side of Ellsworth Road (~1/3 mile) and then east along the south side of Elliot Road (~ 2 miles) until it terminates as a 78" pipe at the at the intersection of the alignment of 104th Street and Elliot Road. At the project outfall, a 78" pipe lateral extends north across Elliot Road where a steep sloping concrete inlet allows drainage from Siphon Draw Wash to enter the storm drain though a 24" opening in an orifice plat on the 78" pipe lateral. In addition, a 78" pipe stub also extends a short distance to the east along Elliot Road where a steep sloping concrete inlet allows channel drainage along Elliot Road to enter the storm drain though the open 78" pipe inlet.

1.7.8 Existing Meridian Road Channel (Reach 2)

The existing Meridian Channel is located along the west side of the Meridian Road monument line where future roadway improvements are planned. The Meridian Channel drains south to the SRP transmission line corridor where it turns west and is conveyed within the SRP corridor to Signal Butte Road where it ends. Under existing conditions flows overtop the basins within the SRP corridor and continue flowing to the west or southwest.

1.7.9 SRP Browning – Dinosaur Transmission Line Corridor

The Salt River Project (SRP) Browning – Dinosaur Transmission Line Corridor contains high voltage overhead power transmission lines within a 260-foot easement. The easement runs along the along east-west mid-section line of Section 7 of Township 1 South, Range 8 East (approximately one half mile north of Elliot Road) and is situated such that 50 feet are located north of the mid-section line and 210 feet are located south of the mid-section line. The easement forms the north boundary of the drainage easement for the proposed Siphon Draw Wash detention facility

SRP is currently improving the transmission facilities within the corridor replacing old steel lattice towers with steel poles. When complete there will be two 500KV lines and one 230 KV line within the corridor. A pair of the new steel poles has been placed 75 feet east of the Meridian section line which is 10 feet inside the new Meridian channel's 160 foot wide drainage easement.

The proposed Meridian Channel must cross through this power corridor and underneath high power electric lines as it enters the basin parcel. A permit will be required to cross the SRP corridor. SRP's requirements within the transmission corridor will impact the project design. These requirements include the following:

- Providing all-weather access across the channel with a minimum width of 20 feet;
- Provide a minimum 50-foot clear zone from the face of all power poles including no landscaping;
- Limit the channel depth to no more than 15 feet below existing grade;
- Limit the channel top width to 100 feet or the provide access to the channel invert with 10:1 access ramps with minimum 70-ft turn radius.

1.7.10 Maintaining Flow to Siphon Draw Wash

The flow of Siphon Draw Wash (east of Meridian) will be intercepted and the wash significantly disrupted through the drainage easement of the proposed detention basin facility. However low flows to Siphon Draw Wash west of Meridian Road will still be maintained to preserve the existing vegetation in the wash. For several reasons, it is proposed to maintain flows using the proposed bypass flows from Meridian Channel.

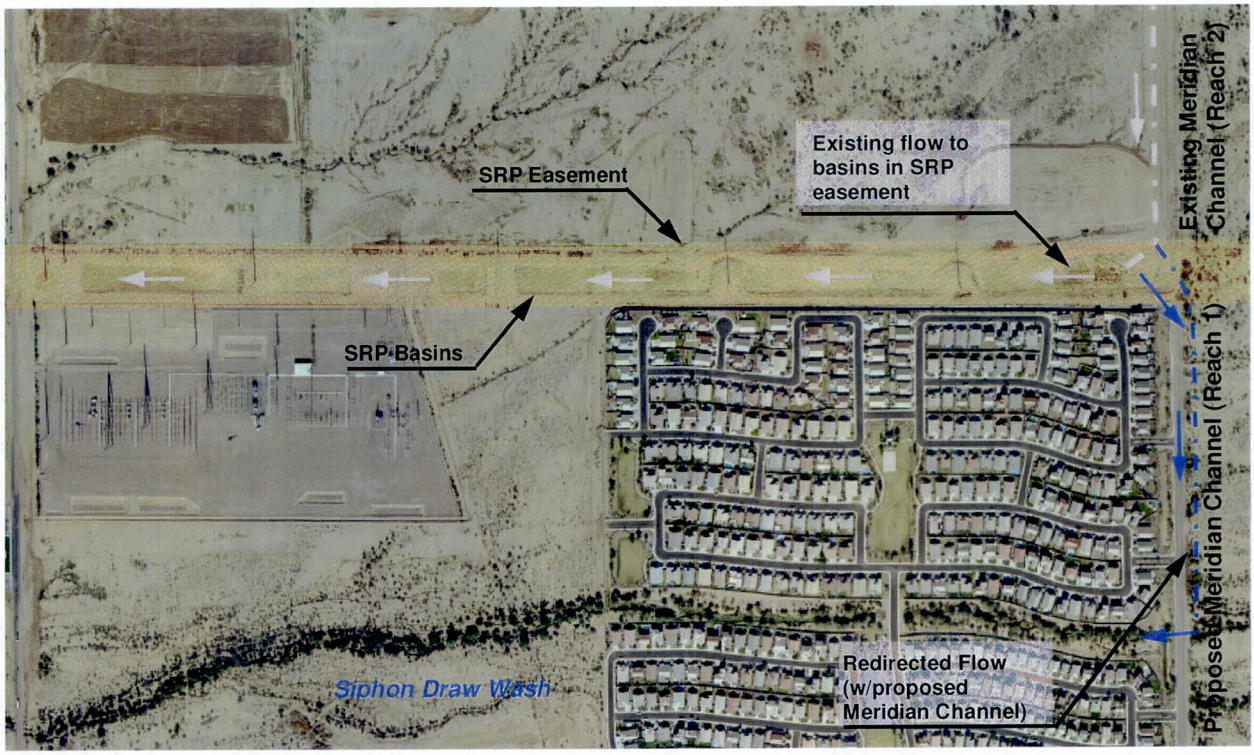


Figure 1-5: Siphon Draw Wash Subbasins and Existing Project Area

1.7.10.1 Larger Discharges from Meridian Channel

Project hydrology indicates that flows from the proposed Meridian Channel will be much larger than from the Siphon Draw Wash ($Q_{100,\ MC}$ = 2230 cfs, $Q_{100,\ SDW}$ = 790 cfs). The Meridian Channel will likely flow more frequently than the Siphon Draw Wash thereby more consistently providing low flows necessary to help sustain downstream vegetation.

1.7.10.2 Maintaining Low Flows Through Siphon Draw Wash

The previous concept study proposed an offline detention basin for Siphon Draw Wash that bypassed 25 cfs (of over 700 cfs) to maintain low flows in Siphon Draw Wash through the drainage easement and downstream of Meridian Road. The basin was located in the eastern portion of the easement keeping Siphon Draw Wash in a more natural condition and proposed engineered levees to provide above ground storage.

The project design criteria have changed since the development of the previous concept such that above ground storage is no longer considered as an acceptable alternative. The concept had an offline basin that diverted 25 cfs from the peak discharge of 700 cfs past the basin. An inline basin that discharges 25 cfs or more through a low flow outlet was considered efficient and practical. Given the outfall elevation of Siphon Draw Wash at Meridian Road, the basin area would be very shallow and relatively large in comparison to a basin incised below the outfall elevation. Incising a basin below the

outfall elevation provides significant economic benefits by providing additional storage without increasing the basin footprint.

1.7.10.3 Flow from Meridian Channel Restore Historic Flows

Prior to residential development of the area, runoff conveyed by the channels drained southwesterly overland or through small natural drainage channels eventually discharging into Siphon Draw Wash further to the west (see Figure 1-4). Following development, the existing Meridian Channel (Reach 2) was constructed diverting flow previously discharged to Siphon Draw Wash into a series of small basins located within the SRP easement west of Meridian Road (see Figure 1-5). Diverting flow from the SRP easement to Siphon Draw Wash at Meridian Road therefore can be considered as returning flow to historic flow conditions.

1.7.11 Future Road Improvements

1.7.11.1 Meridian Road

North of Elliot Road, the west half of Meridian Road is paved with curb and gutter for approximately one-half mile adjacent to the Meridian Point Subdivision. Currently, no road exists along the Meridian Road alignment north of the Meridian Point Subdivision. The east half of Meridian Road is unpaved and will remain so until adjacent properties are developed and/or Maricopa County, Pinal County, the city of Mesa or the city of Apache Junction decides to extend and improve Meridian Road.

A corridor study for Meridian Road was completed in June 2006 for the Maricopa County Department of Transportation (MCDOT). The study identifies a typical right-of-way width of 65 feet on each side of the Meridian Road section line. This width should be confirmed with the City of Apache Junction since the east of half of the Meridian Road extension north of Elliot Road will fall within their jurisdiction. According to the city of Apache Junctions Standard Detail AJ-20.9 (revised October 2006) the City of Apache Junction typically requires a 75 foot right of way for each side of the road.

1.7.11.2 Guadalupe Road

East of Meridian Road, Guadalupe Road is a gravel road located along the north side of the section line. It is anticipated that this road will eventually be paved and extended to the east and intersect Ironwood Road. Guadalupe Road will not likely extend west of Meridian Road along the section line as depicted in MCDOT's corridor study since the development west of Meridian Road, Sunland Springs Village, has been platted, improved and partially constructed. It is likely that any extension of Guadalupe Road from the west will intersection Meridian Road 300-400 feet south of the section line. The exact alignment of Guadalupe road, east of Meridian Road is yet to be determined.

1.7.11.3 Elliot Road

West of Meridian Road, Elliot road is fully improved and paved with curb and gutter. These improvements terminate at Meridian Road. East of Meridian Road, Elliot Road has not been constructed and the future alignment of has not been established. It is anticipated that the alignment will gradually jog to the north to the south section line of Section 7, Township 1 South, Range 8 East.

1.8 PROPOSED FLOOD CONTROL AND DRAINAGE FACILITIES

Major project elements will consist of a new channel along the east side of the Meridian Road alignment, a detention basin facility located northeast of the intersection of Meridian Road and Elliot Road, a storm drain along Elliot Road from the detention basin facility to the project outfall, and a diversion structure to divert flow from the new channel into the detention basin facility. Additional facilities and improvements will also be necessary for final design but are not investigated as part of the pre-design effort.

1.8.1 Meridian Channel (Channel Reach 1)

A new incised channel along the east side of the Meridian Road alignment is proposed from Siphon Draw Wash to approximately the Navarro Avenue alignment (Meridian Road Channel Reach 1). The new channel will connect to an existing offsite flows to the north and east and route flows south to the proposed detention basin facility.

1.8.2 Siphon Draw Detention Facility

A detention facility comprised of one or more detention basins will be located in a large drainage easement located northeast of the intersection of Elliot Road and Meridian Road. The detention basin will receive flow from Siphon Draw Wash (to the east) and from the proposed Meridian Channel (to the north). The purpose of the basin(s) will be to attenuate flow to Siphon Draw Wash downstream of the facility such that the flow does not exceed the design capacity of Siphon Draw Wash through the Meridian Point Subdivision and flow at the project outfall is sufficiently attenuated such that a maximum combined discharge (flow from both Siphon Draw Wash and the detention basin storm drain outlet) to the existing Elliot Road storm drain discharge is less than 500 cfs.

1.8.3 Diversion Structure

A diversion structure is proposed to divert flow from the proposed Meridian Channel into the proposed detention basin facility. The structure will allow low flows within the channel to bypass the detention basin facility unabated and to divert flow into the proposed detention basin facility during large storm events.

1.8.4 Elliot Road Storm Drain

An extension of the existing Elliot Road storm drain is proposed to serve as the outlet to drain basins within the proposed detention basin facility. The storm drain will extend east along Elliot Road from the existing terminus at approximately the 104th Street alignment and then north along Meridian Road to the proposed detention basin facility.

1.8.5 Project Outfall Improvements

To maintain full operation for the existing Elliot Road Detention Basin and to meet the project goal of discharging a maximum of 500 cfs to the existing Elliot Road storm drain, it is anticipated that improvements will be necessary to the structures at the project outfall. These improvements will most certainly consist of modifications to the inlet of the existing Elliot Road storm drain to increase and control inlet capacity, however, modifications or improvements may also be necessary to the existing concrete lined channel and the lateral side weir/Elliot Road Detention Basin inlet. The nature and extent of these improvements will not be investigated during this pre-design phase.

1.8.6 Multiple-Use, Aesthetics and Landscaping Improvements

It is desirable to consider the aesthetic impact and multiple-use of any proposed flood control and drainage improvements to enhance the year round value of the facilities to the local community and provide opportunities to the public for recreational open space. These landscaping, aesthetics and opportunities for multiple-use were considered in the development and assessment of project alternatives. The extent to which these improvements will incorporated into the final designed and can be implemented will be based upon available funding and/or the participation and commitments from other outside agencies or vested parties. The development and assessment of landscape alternatives for proposed flood control and drainage improvements is documented in a separate landscaping report provided in Appendix E.

1.8.7 Miscellaneous Project Improvements

Other improvements including offsite drainage collection channels, channel inlets, spillways, and culvert extensions along with other additional improvements will also be necessary for final design of project improvements. These improvements may result from specific requirements for selected major project improvements or may generally be required for all considered major project improvement alternatives. Regardless, these improvements do not generally require the development and evaluation of multiple alternatives and therefore are not fully investigated as part of the pre-design effort.

2 HYDROLOGY

2.1 GENERAL

The FCDMC provided the most current hydrologic models to be used and updated for the project hydrology. These models were developed as part of the Pre-Design Study Report for Siphon Draw Drainage Improvements (Wood Patel, 2005). The models were updated and revised as necessary to analyze and assess proposed project improvements and assure the proposed alternatives meet one of the primary project design criteria of attenuating flow at the project storm drain outfall to 500 cfs.

2.2 DESIGN CRITERIA AND METHODOLOGY

The general hydrologic design criteria and methodologies are provided in the project Scope of Work and the FCDMC's *Drainage Design Manual for Maricopa County, Arizona, Volume I Hydrology, 4th Edition, September, 2003.* Additional criteria and methodologies were also established by accepting previous hydrologic models (provided by the FCDMC) and in discussions with the FCMDC.

2.2.1 General Design Criteria

The project hydrology is based upon the 100-yr, 24-hr rainfall event under future land use conditions. Future land use conditions include the first flush detention for all planned development areas.

2.2.2 Hydrologic Methodologies

Given that project hydrology is based upon hydrology developed in previous studies and provided by the FCDMC, hydrologic methods and data from previous hydrology models was utilized provided they were not impacted by project improvements (e.g. rainfall data) and did not counter criteria in the project Scope of Work. This maintains a consistency with previous concept studies and the overall regional hydrology.

2.2.2.1 Hydrologic Model

The project hydrology based upon a computer model using the U.S. Army Corps of Engineers Hydrologic Engineering Center HEC-1 software dated June 1998.

2.2.2.2 Precipitation

With the exception of rainfall loss data that is dependent upon subbasin areas, soil and land use, all precipitation data is based upon previous hydrologic efforts.

Precipitation Data

The point rainfall data from previous study hydrology models provided by the FCDMC were used to not only maintain consistency with previous Siphon Draw Wash concept studies but also to be consistent the regional hydrology.

Rainfall Distribution

SCS Type II rainfall distribution as provided in previous hydrology models was utilized.

Depth-Area Reduction Factors

Previous hydrology models reduced the amount of rainfall data based upon contributory drainage areas for each subbasin and/or hydrograph. The same depth-area reduction factors are used for the project hydrology.

Rainfall Losses

Rainfall losses are based upon the Green and Ampt Methodology as in previous hydrology models. The FCDMC's Drainage Design Menu System – Windows, Version 3.3.2 (DDMSW) was utilized to determine subbasin Green and Ampt parameters based upon subbasin soil and land use characteristics estimated from the best available information and soil and land use assumptions discussed in subsequent sections.

2.2.2.3 Unit Hydrograph

As with previous hydrology models, S-graph dimensionless unit hydrographs were used to represent runoff characteristics for watershed subbasins. The FCDMC has developed four S-graphs to be used for different watershed conditions: Phoenix Mountain, Phoenix Valley, Desert/Rangeland, and Agricultural. Within the project area, the Phoenix Valley S-graph is used to characterize watershed runoff.

2.2.2.4 Routing

When modifying channel routing, normal depth routing was applied using idealized channel sections and approximate average roughness values through the routing reach.

2.3 PREVIOUS HYDROLOGY

Project hydrology is based upon previous regional HEC-1 models developed as part of the East Mesa ADMP. Subsequent to the East Mesa ADMP, these models have undergone several updates and revisions. The FCDMC provided the most current updates of the HEC-1 and DDMS hydrology files from the *Siphon Draw Drainage*

Improvements Concept Letter Report (Wood Patel, 2006) for use as the basis for project hydrology.

2.3.1 Drainage Design Menu System Files

The FCDMC provided two sets of DDMS files in separate ZIP files. SiphonF.ZIP provided the DDMS files and hydrologic parameters for previous study modifications to sub-basin 65A which are in the final Wood-Patel HEC-1 model. Siphon.ZIP provided the DDMS files and hydrologic parameters for the modifications which made to sub-basins 52, 56, 58, and an outdated version of 65A. The soil and land use parameters along with the methodologies used in these files were used to modify hydrology for project conditions and alternatives.

2.3.2 HEC-1 Models

The East Mesa ADMP hydrology is comprised of two separate regional HEC-1 hydrology models, a northeast Mesa model (N60EM.DAT) and a southeast Mesa model (S60EMAP1.DAT). Both models are required to properly model project hydrology but only the southeast model (S60EMAP1.DAT) encompasses the project area will be revised for proposed improvements.

The northeast Mesa HEC-1 model (N60EM.DAT) is the upstream model and generally covers an area of Mesa north of US 60, east of the East Maricopa Floodway and east of the CAP canal. This is outside of the project area so it is not necessary to modify the northeast Mesa model. However, the results of the model are necessary in order to export hydrographs (via DSS files) which are subsequently imported by the downstream hydrology model S60EMAP1.DAT. These hydrographs must be imported to properly model project and downstream hydrology. Imported hydrographs include two CAP overchutes (CAP1A and CAP1B) that directly affect the design project improvements. Other hydrographs are also imported (SOSS, SUP2 and ADOT-E) but only affect hydrology downstream of the project outfall.

2.4 BASE HYDROLOGY

The base project hydrology provides an initial hydrologic model from which project alternatives will be developed. It does not represent existing hydrologic conditions nor does it reflect any proposed conditions. It is simply a refinement of the previous concept study hydrology model to subdivide a large subbasin into three smaller subbasins, revise subbasin parameters to agree with new topography and mapping and to revise routing directions and initial routing parameters to better agree with proposed project alternatives.

The base project hydrology is ultimately based upon the southeast Mesa model from the East Mesa ADMP as modified by the previous concept study (S60EMAP1.DAT). The modified and updated model used for as the base hydrology is SDWBASE.DAT.

Changes to the previous hydrology model primarily focused on subdividing Subbasin 65A into three separate subbasins to better model area hydrology and to update subbasin parameters for more current information. Subbasin 65A includes the drainage area contributing to the proposed detention basin facility (excluding contributory areas for overchute hydrographs CAP1A and CAP1B). This subbasin was re-delineated based upon more detailed available mapping and subdivided to better estimate peak discharges for the design of the proposed Meridian Channel, to assess detention basin requirements and to better evaluate project alternatives.

For ease of use, the hydrology model was also edited and truncated to remove superfluous hydrology not relative to the Siphon Draw Wash project. The hydrology, however, is continued downstream beyond the project outfall (at Elliot Road and 104th Street) to approximately the San Tan Freeway Channel. This will readily provide an assessment of the impact of project improvements further downstream of the project outfall.

This section discusses the base project hydrology, pertinent hydrologic data and presents the hydrologic results. Drainage exhibits showing HEC-1 schematics, subbasin areas, flow paths, future land uses, and area soils along with other supporting documentation is provided in Appendix A. Electronic files for the HEC-1 models and the DDMSW files are provided on an enclosed CD.

2.4.1 Hydrologic Parameters

2.4.1.1 Delineation of Subbasins

For this project, revisions and updates to hydrologic subbasins were limited only to the Subbasin 65A located east of Meridian Road (see Subbasin Drainage Exhibit, Appendix A). Subbasin 65A includes the drainage area contributing to the proposed detention basin facility (excluding contributory areas for overchute hydrographs CAP1A and CAP1B). Subbasins west of Meridian Road which contribute runoff to Siphon Draw Wash prior to the project outfall (65AW and 65B) were not modified or updated as part of this project and remain as modeled in previous hydrology.

Previous study hydrology generated a single hydrograph for the entire Subbasin 65A and then simply split the flow based on the percentage of area contributing to Siphon Draw Wash (45%) and to the Meridian Channel (55%). However, for this project, to better estimate peak discharges for the design of the proposed Meridian Channel, assess detention basin requirements and evaluate project alternatives, subbasin 65A was re-delineated (based upon more detailed available mapping) and subdivided into three separate subbasins (65A1, 65A2, and 65A3)

Subbasin 65A1 generally encompasses the area that would be tributary to routed flow from the northernmost CAP overchute (CAP1A) to approximately Guadalupe Road (essentially the beginning of Meridian Channel Reach 1). Similarly, subbasin 65A2 roughly includes the area that would be tributary to routed flow from CAP overchute

CAP1B. While under existing undeveloped conditions, this area may extend south of Guadalupe Road, it is conservatively assumed that this flow would combine with Subbasin 65A1 at Guadalupe Road so that the proposed Meridian Channel improvements would be able to accommodate the flow if proposed development routes flow directly west along Guadalupe Road instead of through the development.

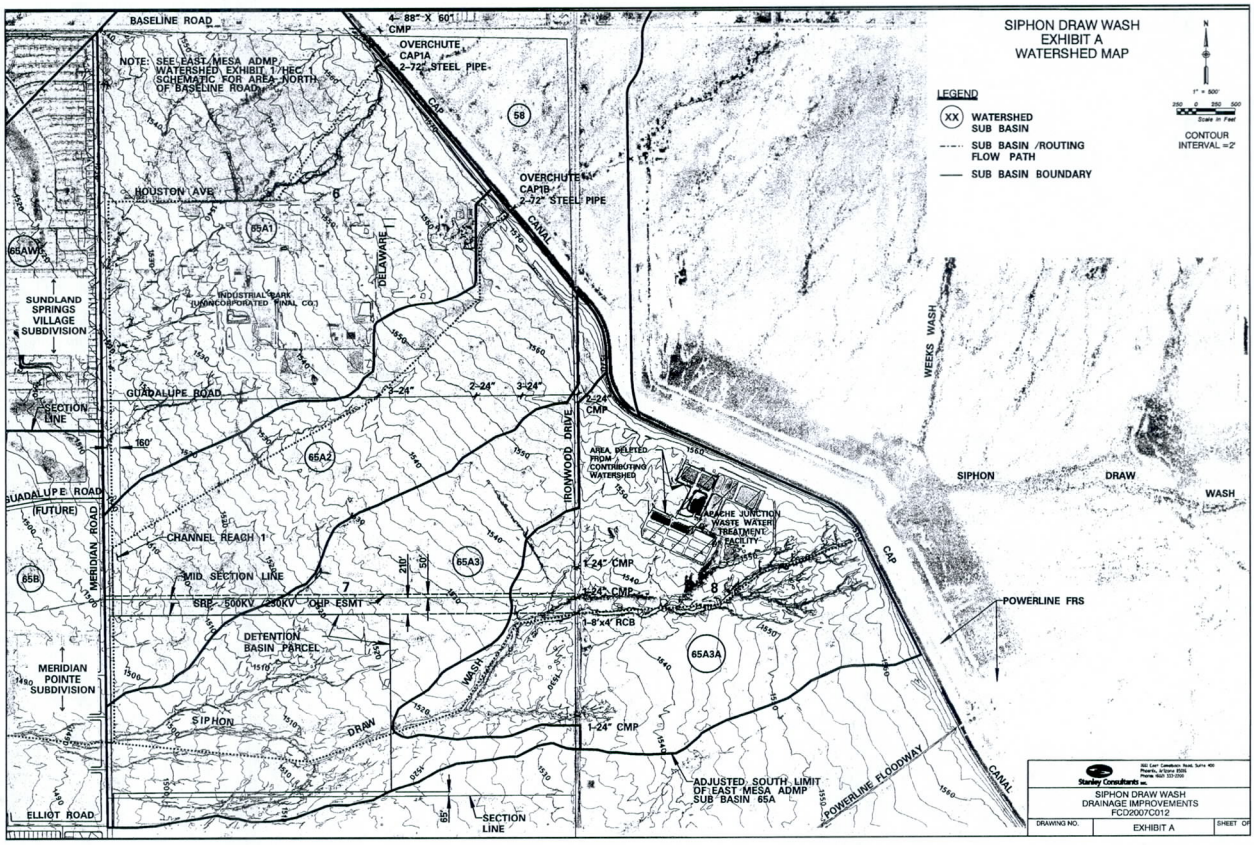


Figure 2-1: Subbasins east of Meridian Road.

Subbasin 65A3 represents the drainage area for Siphon Draw wash upstream of Meridian Road. In a separate, side analysis, Subbasin 65A3 was further subdivided into an upstream basin (65A3A) and a downstream subbasin (65A3B). This was done to estimate flow upstream of a detention basin facility as part of a hydraulic analysis to assess the upstream flow conditions and locate areas where flow breaks out from the main Siphon Draw Wash channel and overbank areas (see Section 3.3.2.3).

As previously mentioned subbasins 65AW and 65B, located west of Meridian Road, were not modified or updated as part of this project. It should be noted, however, the defined subbasins do not appear to reflect existing conditions. The delineation of subbasin 65B extends further west and further downstream of the actual project outfall thereby overestimating the actual area contributing at the project outfall. In addition, a small wash located north of the project outfall and a channel constructed as part the East Elliot Basin appears to divert some flow from subbasin 65AW further to the west and downstream of the project outfall. Therefore, as modeled, the concentration of flow

to the project outfall appears to be overestimated. Whether these conditions should be revised in subsequent design efforts should be taken under consideration.

Land Area Adjustments

The FCDMC provided a GIS shape file and corresponding DDMS files for the project area. Generally, the subbasin area associated with the shape file and the DDMS area did not agree with each other. The drainage area associated with Sub-basin 65AW (0.43 sq mi) appears to have been double counted in the 2.99 square miles associated with original Sub-basin 65A (in model S60EMAP1.DAT). In addition, re-delineating Subbasin 65a using existing mapping resulted in an increase of 0.20 sq. miles in area for the subbasin. Table 2-1 reflects the revised areas of ADMP Subbasin 65A.

Table 2-1 Adjustments to Subbasin Areas

Subbasin	Area (sq mi)
65A1	0.971
65A2	0.544
65A3[1]	1.207
Total (65A)[2]	2.722[2]

1. *0.04 sq. mi. removed for wastewater treatment facility (see Land Use Section)*
2. *Value reflects the adjusted area for Subbasin 65: Original area of 65A less double counted area 65AW, plus area from re-delineating the subbasin less the area of the wastewater treatment facility 2.922 – 0.40 + 0.20 – 0.04 = 2.722 sq. mi.*

2.4.1.2 Land Use

The design hydrology is based upon future land use conditions. A future land use exhibit is provided in Appendix A.

Most of the existing land use within Subbasins 65A1, 65A2 and 65A3 is undeveloped, with the exception of some existing industrial land use in Subbasin 65A1 and an existing wastewater treatment facility in Subbasin 65A3. The undeveloped area is state land and administered by the Arizona State Land Department (ASLD). Presently, ASLD is actively working with a developer to develop the property, however, no conceptually development plans currently available for the area. Based upon discussions with ASLD, it was recommended that for future conditions the area will generally be developed as medium density residential.

The existing Apache Junction Wastewater Treatment Facility adjacent to the CAP Canal south of Guadalupe Road incorporates storage and recharge basins having significant depth and freeboard. Consequently, it is assumed that there would be no runoff and the basin areas (approximately 25 acres or 0.04 sq mi) were deleted from the total drainage area Subbasin 65A3. Land use data for subbasins west of Meridian Road were not changed from the previous study hydrology.

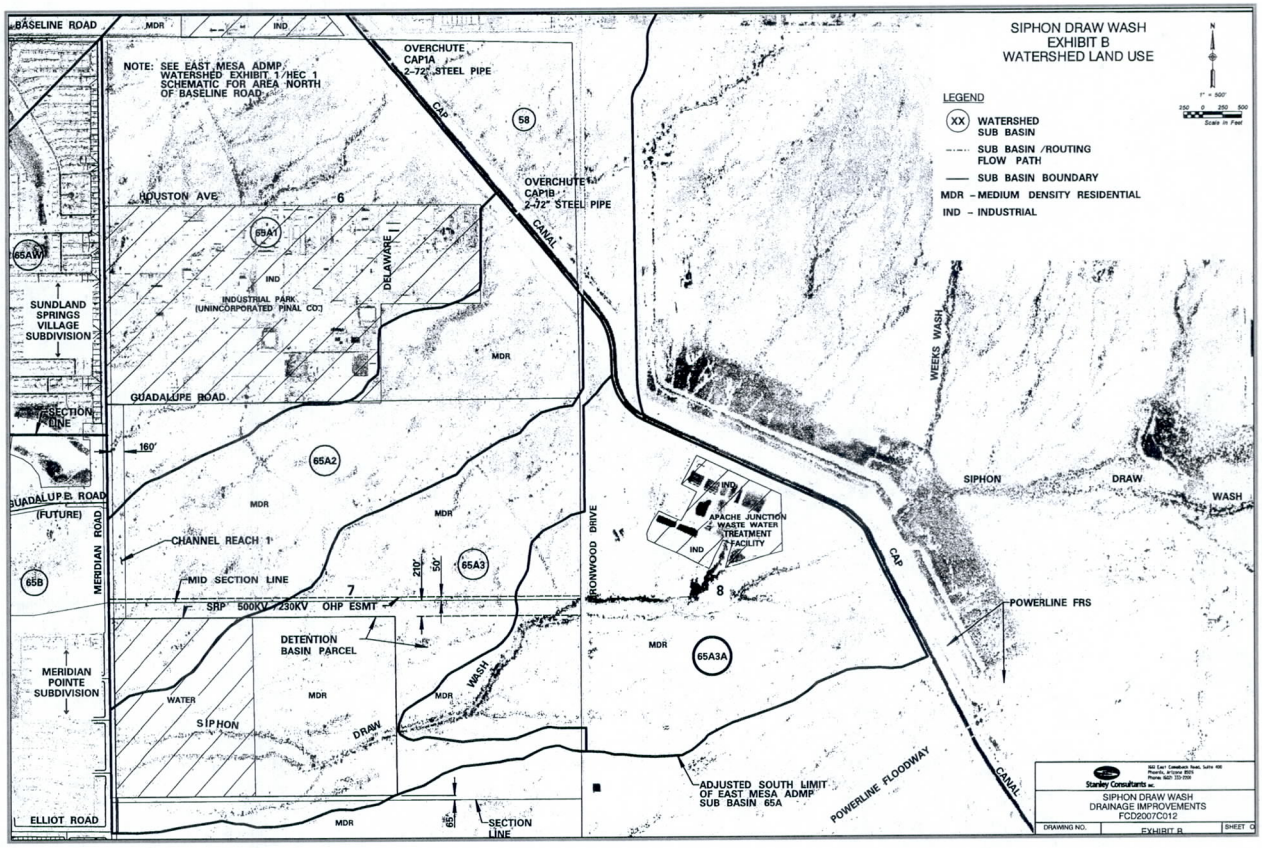


Figure 2-2: Subbasins east of Meridian Road

Retention

Although not specifically provided in the right-of-way agreement between ASLD and the District, it is generally assumed that *first flush water quality retention will be required and provided in all currently undeveloped land from Meridian Road to the CAP*. This assumption is incorporated in a HEC-1 volume-divert record for each of the new sub-basins created from original Sub-basin 65A. First flush volume is estimated based on 80% of the first ½ inch of runoff requirement typically used in Maricopa County.

There is no apparent stormwater retention or retention in the developed industrial area north of Baseline Road so none is reflected in the model. The Guadalupe – Houston industrial park area is about two thirds developed and perhaps one quarter of that development has detention per Pinal County requirements. The remaining approximately one third that is not developed will have detention in the future per Pinal County (or Apache Junction if annexed). For now it is assumed there is no stormwater detention in the Guadalupe - Houston industrial park area, including no first flush detention.

2.4.1.3 Soils

Soil survey information was obtained from the East Mesa ADMP Soils Map provided by the FCDMC and used for the East Mesa ADMP. With the exception of a small area within Subbasin 65A1 classified as Mohall Clay Loam, soil for Subbasins 65A1, 65A2 and 65A3 is classified as Mohall Loam.

2.4.1.4 Precipitation Data

The design hydrology is based upon the 100-yr 24-hr event for future land use conditions. For consistency, rainfall data and area reduction factors are the same as previous studies and model used for the East Mesa ADMP hydrology. Therefore, precipitation data does not reflect recently released NOAA 14 rainfall data.

During subsequent design efforts, hydrology will also be prepared for smaller rainfall events (2-yr, 5-yr, 10-yr, 25-yr, and 50-yr) to evaluate the impact of project improvements on Siphon Draw wash through the Meridian Point subdivision located immediately downstream of proposed detention basin facility.

2.4.1.5 Rainfall Losses

Rainfall losses are based upon the Green and Ampt Methodology as in previous hydrology models. Green and Ampt rainfall loss parameters are based upon subbasin soil and land use characteristics. For the newly defined subbasins (65A1, 65A2 and 65A3), the subbasin characteristics were determined using the FCDMC's DDMSW based upon the best available data and soil and land use assumptions previously discussed.

2.4.1.6 Routing Parameters

The HEC-1 model structure was adjusted as necessary to include the new subbasins revisions to routing reaches (see HEC-1 schematics in Appendix A). East of Meridian Road, routing reaches RCAP1A and RCAP1B reflect anticipated future channelization flow path, geometry and slope with development of State land. An earth channel was assumed for both reaches. The routing reach for the proposed Meridian Channel was changed from concrete to earth.

West of Meridian Road, routing reaches for the proposed Elliot Road storm drain and Siphon Draw Wash surface flows were also modified from the S60EMAP1.DAT model. The Siphon Draw Wash routing is now independent from the Elliot storm drain routing below the Mountain Road alignment and the Siphon Draw Wash routing reach 8-point geometry, longitudinal slope and Manning "n" values were updated. Manning "n" values are documented in the spreadsheet in Appendix B. Level pool routing and diversion steps are used to reflect the project's proposed conceptual regional detention basin(s) east of Meridian Road.

2.4.1.7 K_n Values

Sub-basin hydrographs are particularly sensitive to watershed K_n values. Because of this, the base K_n value for Sub-basin 65A was retained from the S60EMAP1.dat HEC-1 model instead of using DDMS default values. The base K_n value from the S60EMAP1.dat model was used for all new sub-basins created within the ADMP Sub-basin 65A. This will provide continuity with the previous ADMP hydrology models.

2.4.1.8 Routing

The routing of the proposed Meridian Channel east of Meridian Road was revised to roughly approximate the proposed channel conditions. Once channel a preferred channel alternative is identified, routing parameters will be modified accordingly.

2.4.2 Discussion Base Hydrology

The project base hydrology model, SDW-BASE.DAT, produces peak discharges similar in magnitude and timing as the previous concept study hydrology model S60EMAP1.DAT (Wood Patel 2006). The subdivision of subbasin 65A into three smaller sub-basins and the associated adjustments to hydrograph routing does not appear to have significantly affected the original regional model. Hydrograph volumes are reduced slightly due in part to a net reduction in contributing area and the inclusion of first flush detention. However, the inclusion of first flush detention has little or no impact on peak discharges.

The updated model is intended as a base model from which the design concepts will be evaluated. It is not intended to be a comprehensive update of the original ADMP model(s). The established regional ADMP HEC-1 model has been the basis for the Siphon Draw Wash project concept and the basis of design for existing regional flood control projects downstream. Any significant deviations from the past hydrology should be considered carefully. Modifications to the upper HEC-1 model are not included in the Siphon Draw Wash design scope of work.

The following is a summary of observations, assumptions and suggestions regarding the regional hydrology. The Siphon Draw Wash project will move forward using updated ADMP HEC-1 based on the assumptions below.

1. The CAP reach from Baseline Road to Ironwood Drive has a level pool function that is disregarded in the upper HEC-1 ADMP model. According to the original Bureau of Reclamation design, there is approximately 150 acre-ft of storage north of the CAP at a depth equal to 7 feet above the overchute invert(s). Disregarding this storage will result in a conservatively high peak flow downstream. Therefore, this assumption will continue to be observed. Only the locations of the two CAP overchutes are considered relative to the regional flow path. The bridge structures at Baseline Road and Ironwood Drive are not considered as overchutes although they would behave in that manner should the

ponding stage upstream of the CAP rise to the roadway elevation at these two structures.

2. There is no stormwater detention or detention considered in regional Sub-basins 52, 56 or 58 in the upper HEC-1 model. Much of the area encompassed by these sub-basins is developed without any stormwater storage. But there are existing stormwater basins of significance in this area and there are a few hundred acres of vacant land that, when developed, will have stormwater detention per the City of Apache Junction or Pinal County requirements. Not considering the existing and future detention will result in conservatively high peak flows and volumes. Therefore, this assumption will continue to be observed.

3. The upper ADMP model flow path C53 to C54 at Southern Avenue east of Meridian Road and the Weeks Wash / Palm Wash flow split that occurs outside of the upper model near Sub-basin 42 are assumed to not impact Siphon Draw Wash project hydrology.

4. Based on field reconnaissance and review of drainage design for residential subdivisions Mountain Ranch and Nova Vista south of Elliot Road between Meridian and Signal Butte Roads, there is additional contributing area from lower ADMP model Sub-basin 73B (south of Elliot Road) that drains north into the Elliot Road regional drainage corridor. 100-year, 2-hour stormwater detention is provided within these subdivisions and under that design storm scenario this drainage is relatively minor consisting of stormwater detention basin bleed-off in small storm drain pipe 24" diameter and smaller. The bleed-off flow is not significant from a regional perspective and at this point will not be reflected in hydrology. The bleed-off flow will not be brought into the new Elliot Road storm drain which will be constructed with the Siphon Draw Wash project. It may be desirable to review the regional sub-basin boundary between Sub-basins 65B and 73B and make adjustment if necessary in future ADMP updates to reflect the two subdivisions mentioned above.

5. It is assumed that future Elliot Road improvements west of Mountain Road will provide detention or detention for the roadway drainage. Small flow rate bleed-off from those future roadway detention basins could be brought into the new Elliot Road storm drain without any impact to regional hydrology or any significant impact to storm drain hydraulics. The New Elliot Road storm drain may be considered an opportunity outfall for small flow rate bleed-off (on the order of 1 cfs) from future detention basins associated with adjacent presently undeveloped land between Mountain Road and the project outfall. This could perhaps be approved by the City of Mesa on a case-by-case basis if it is determined to not be contrary with ADMP objectives and to not impact the storm drain design.

6. In the ADMP lower HEC-1 model, the routing reach 65AT65 hydrograph is combined with the local Sub-basin 65B hydrograph and routed hydrograph

RSDW2 to form the major component of inflow to the existing East Elliot regional detention basin. The AT65AT hydrograph does not physically combine with the local and routed hydrographs at the outfall location at the present time. The property involved is vacant and the wash associated with the 65AT65 routing reach bypasses the East Elliot Basin inlet. It is assumed that when the surrounding property is developed the regional HEC-1 model structure will be carried out and the flow will be routed to the East Elliot Basin inlet. However, the downstream end of Sub-basin 65B that is west of 104th Street naturally drains southwest and would need to buck grade significantly to be routed to 104th Street. The downstream end of Sub-basin 65B below 104th Street and the 65AT65 flow that currently bypasses the 104th Street inlet would have some interim impact on hydrology and function of downstream regional flood control facilities.

7. The combination of hydrographs described in 6) above results in a single hydrograph with a peak of lesser magnitude than the largest of the individual hydrographs in the combination step. This is contrary to hydrologic intuition and at this point there is no conclusive explanation for it. This occurs in both the S60EMAP1.dat and SDW-BASE.DAT models.

8. Until the contributing area above the project outfall develops, the actual regional hydrology will be different than depicted in the project HEC-1 model even with the Siphon Draw Wash Drainage Improvement Project in place.

2.5 ALTERNATIVE HYDROLOGY

Hydrology models for the proposed detention basin alternatives were prepared to primarily to assure the proposed alternatives can meet project objectives at the project outfall. The models, however, are preliminary and the extent of the pre-design process is not sufficient to fully evaluate or optimize the proposed basin alternatives. This is because project features such as the diversion structures at the project outfall and the diversion structure on the proposed Meridian Channel have not been designed or evaluated to the extent that rating curves can be developed that can be expected to reasonably reflect design conditions. Once the design and operation of these structures are more fully developed, rating curves can be developed and the downstream hydrologic impact of basin alternatives can be more fully assessed.

3 HYDRAULICS

3.1 GENERAL

This section discusses and presents the assumption, methodologies and results of the hydraulics analyses performed for the pre-design phase of the Siphon Draw Drainage Improvements Project. Due to the preliminary nature of the available mapping and the need to develop and investigate multiple project alternatives, hydraulics analyses are preliminary in nature and were conducted only to the extent necessary to evaluate the feasibility of project alternatives and provide an initial assessment of alternative requirements.

3.2 DESIGN CRITERIA AND ASSUMPTIONS

The design criteria and assumptions summarized in this section were applied to the investigation and preliminary analysis of project alternatives. Generally, criteria was obtained from the project scope of work or from the Flood Control District of Maricopa County's *Drainage Design Manual for Maricopa County, Arizona, Volume II Hydraulics, November 1991* (revised January 1996). Assumptions and other criteria were either established through discussions with the FCMDC or made as necessary in order to perform preliminary analyses.

3.2.1 Channels

3.2.1.1 Cross Section

Side Slopes

- Aggregate/unlined channels – 4:1 (H:V) minimum, 6:1 typical, 8:1 maximum
- Concrete lined channels – 2:1 (H:V) maximum; 4:1 (H:V) typical.

Bottom Width

- Channels adjacent to a roadway without barrier protection – 4 ft. absolute minimum, 8 ft. preferred minimum.
- Concrete lined channel – 10 ft. absolute minimum, 12 ft. preferred minimum.

Cross-Slope

- 2% cross-slope to one side across the total channel bottom width with a one-foot maximum drop. The channel profile grade line is defined as the low edge of the channel bottom.

3.2.1.2 Profile

- Earth and grass lined channels - minimum grade of 0.2%
- Concrete/Smooth paved channels - preferred minimum grade of 0.1%.

3.2.1.3 Transitions

- Transitions between channel sections will be developed based on criteria presented in Table 608.3 of the RDG.

3.2.1.4 Hydraulic Analysis

Flow Regime

- Channels are designed to convey flows in the subcritical flow regime with a Froude Numbers less than 0.86.

Manning's "n" value

- Earth channel: 0.035 to 0.050
- Concrete/Hard lined channel: 0.013 to 0.018
- Field investigations were conducted to estimate Manning's n values for the HEC-RAS analyses of Siphon Draw Wash.

Energy Loss Coefficients

- Vertical wall transition at culverts: Expansion - 0.3, Contraction - 0.1
- Gradual channel section transitions: Expansion - 0.3, Contraction - 0.1
- Bridge/Culvert transitions: Expansion - 0.5, Contraction - 0.3

3.2.1.5 Freeboard

- Water-surface elevation below natural ground - Minimum of one foot
- For subcritical regimes (Froude Number<1), the minimum freeboard is:

$$F_b = 0.25(y + \frac{V^2}{2g})$$

Where:

F_b = Required freeboard (feet)
y = normal depth of flow (feet)
V = normal velocity (feet)
g = acceleration of gravity (32.2 feet/s^2)

or one foot, whichever value is greater.

3.2.1.6 Maintenance Access

- As a minimum, one continuous 12-foot wide maintenance access road is required along any proposed channel (excepting small collection channels).

3.2.2 Detention Basins

3.2.2.1 Cross Section

Side Slopes

- Aggregate, grass or unlined slopes – 4:1 (H:V) maximum, 6:1 designed, 8:1 maximum.

Bottom Slope

- A one percent minimum basin bottom slope to provide positive drainage.

3.2.2.2 Low Flow Channel

- Earth or grass lined low flow channels - minimum grade of 0.2%, preferred minimum grade of 0.3%.

3.2.2.3 Freeboard

- The minimum freeboard from the maximum 100-year water-surface elevation to the surrounding natural ground shall be one foot.

3.2.2.4 Maintenance Access

- As a minimum, one continuous 12-foot wide maintenance access road is required along the perimeter of any detention basin.
- An access ramp from the perimeter road to the basin bottom shall be provided at strategic locations, preferably near the basin outlet structure(s).

3.3 HYDRAULIC DESIGN AND ANALYSES

This section discusses and presents the assumption, methodologies and results of the hydraulics analyses performed for the pre-design phase of the Siphon Draw Drainage Improvements Project. Do to the preliminary nature of the available mapping and the need to develop and investigate multiple project alternative, hydraulics analyses are preliminary in nature and were conducted only to the extent necessary to evaluate the feasibility of project alternatives and provide an initial assessment of alternative

requirements. Hydraulic analysis and supporting documentation are provided in Appendix B.

3.3.1 Meridian Channel

Hydraulic analyses for Meridian Channel alternatives are based upon Manning's equation. The analyses were performed using Haestad Method's FlowMaster (Version 7.0) which automates simple hydraulic calculations such as Manning's Equation along with calculations for weirs, orifices, catch basins and pressure pipes.

3.3.2 Siphon Draw Wash

HEC-RAS (Version 4.0.1) steady-state hydraulic models will be used to analyze Siphon Draw Wash.

3.3.2.1 Determination of Manning's n Values

As part of the pre-design field investigations, Manning's n values were estimated for Siphon Draw Wash from approximately Meridian Road to the project outfall at Elliot road and 104th Street. The wash is broken up into three separate sub-reaches based upon wash characteristics. The downstream reach starts at the project outfall and extends to the Meridian Pointe subdivision (Mountain Road Alignment). The middle reach is located through the Meridian Pointe subdivision from Meridian Road to the Mountain Road alignment. The upper reach covers the ASLD land from Meridian Road to Ironwood Drive.

The estimated Manning's n values are used for routing in project hydrology and will be used for hydraulic analyses along Siphon Draw Wash. The field investigations and documentation for determination of Manning's n values along Siphon Draw Wash are provided in Appendix B.

3.3.2.2 West of Meridian Road

The analysis of Siphon Draw Wash downstream of Meridian Road to the project outfall at Elliot Road and 104th Street will be performed during subsequent design efforts when new mapping is available and project alternatives have been determined. Hydraulic analyses through the Meridian Point Subdivision will be performed using the peak discharge from multiple storm events to assure proposed improvements will not adversely impact the Meridian Point Subdivision.

3.3.2.3 East of Meridian Road

Based on preliminary reconnaissance, aerial photos and the original ADMP mapping it appeared that the Siphon Draw Wash 100-year flood limit is not well confined and spreads out as it approaches the detention basin parcel on State land. In the reach between the east (upstream) side of the detention basin parcel and Ironwood Drive, the

wash transitions from a single channel within a well defined valley section to a perched channel that is higher than the overbank areas on either side of it. There was evidence of potential breakout to the south and non-containment that would jeopardize the project's ability to capture all the flow and direct it to the conceptual detention basin(s).

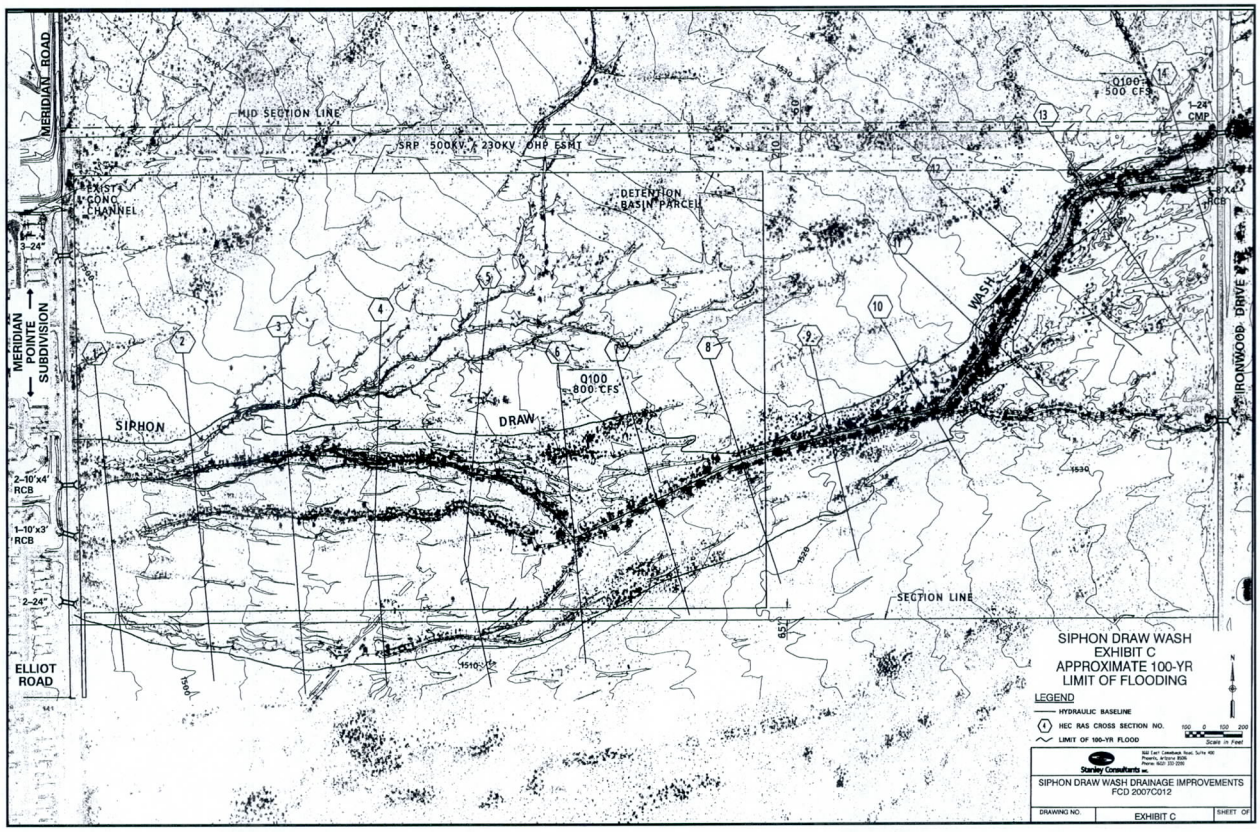


Figure 3-1: Siphon Draw Wash inundation area east of Meridian Road.

A hydraulic analysis of Siphon Draw Wash east of Meridian Road was performed at the request of the FCDMC and ASLD to determine the inundation limits of flooding upstream of the proposed basin site, identify locations where flow may breakout from the main wash and overbank areas, and ultimately to identify areas which could be filled to help contain flow to Siphon Draw Wash and assure flow would reach the proposed basin site. Filling these areas to contain flow would benefit ASLD property outside of the FCDMC easement by eliminating the need of future development to address the inundation of property that results from flow breaking out of main wash and overbank area. The FCMDC would benefit by being able to dispose of material excavated from the proposed detention basin site which otherwise would need to be hauled offsite at an additional expense. It should be noted, however, that the hydraulic analysis is not intended as a floodplain delineation study or flood insurance study nor is it intended for use in floodplain management or as a regulatory tool.

The preliminary HEC RAS analysis and Exhibit C depicting the hydraulic sections and limit of inundation are included in Appendix B. The mapping used for this analysis was provided by ASLD consultant Carter Burgess. The backwater analysis was conducted

with an assumption of normal depth starting condition since there is no survey available yet for Meridian Road and its culverts. Hydrology and cross section geometry reflect pre-project conditions.

The analysis does indicate breakout of flows from the main channel beginning at cross section 10. From about that cross section downstream the overbank flow starts to dominate the main channel flow. Small side channels break away from the main channel in both right and left overbanks. Flow in the right (north) overbank continues west and would be intercepted by the proposed Siphon Draw Wash detention basins. The left (or south) overbank flow and small side channels spread south beyond the detention basin parcel. Much of this flow would return to the Siphon Draw Wash corridor at Meridian Road but a portion of the flow appears to have the potential to break south into the next ADMP Sub-basin 73A.

Based on the above analysis it was apparent that some means of capturing and containing the flow in Siphon Draw Wash would be necessary for the project concept to work and as a practical means of concentrating the flow so that it could be brought into the detention basin with a structure of reasonable size. Two concepts were apparent, one more desirable than the other. The more desirable concept was to place shallow compacted fill along the wash. This fill would extend from a line just outside the main channel (perhaps 50 ft) out to a point beyond the limit of flooding. This concept was illustrated in an exhibit and provided to ASLD for review. It would involve potentially filling outside of the basin parcel.

The other less desirable concept involved channelizing Siphon Draw Wash upstream to a point where the flow is conveyed in a narrower top width. This option is less desirable because it impacts more of the main channel and because it creates more excavation on a project where export of fill is a significant issue.

3.3.3 Culverts

Culvert analyses were performed using Haestad Method's CulvertMaster (Version 3.0). This computer program automates culvert and overtopping weir design methods described in the FHWA publications HDS-5, "Hydraulic Design of Highway Culverts," and HEC-14, "Hydraulic Design of Energy Dissipators for Culverts and Channels".

3.3.4 Storm Drain Design

The Elliot Road storm drain was preliminarily sized and the hydraulic grade line (HGL) calculated using Haestad Method's StormCAD (Version 5.6). The preliminary design of the Elliot Road storm drain extension is based upon storm drain design criteria as established in the City of Mesa's Engineering & Design Standards 2007.

The storm drain design discharges are based upon the maximum expected discharge into the storm drain system for the 100-yr, 24-hr design event from the detention basin

facility (70 cfs) and the project outfall at Elliot Road and the 104th Street alignment (430 cfs).

It was assumed that all storm drains would be reinforced concrete pipe (RCP), and a Manning's roughness coefficient of 0.012 was used. Friction losses along with minor losses at manholes, junctions, and bends are calculated based on the "Standard Method". The tail water elevation used in the StormCad analyses for the Elliot Road storm drain system is based on the maximum 100-yr, 24 hr peak discharge.
The key assumptions and design parameters used for the preliminary storm drain analysis include:

- 70 cfs maximum will be discharged into the storm drain system from the proposed detention basin facility
- 430 cfs maximum will be discharge into the storm drain system at the project outfall location (Elliot Road & 104th Street alignment)
- All pipe is reinforced concrete pipe (RCP) with a Manning's roughness coefficient of 0.012
- Friction losses along with minor losses at manholes, junctions, and bends are calculated based on the "Standard Method".
- The tailwater elevation is based on the maximum 100-yr, 24-hr peak discharge (that includes the 500 cfs project discharge) from the existing Elliot Road storm drain system design analysis.

3.3.5 Meridian Channel Diversion Structure

The hydraulic analyses of the alternative diversion structures are preliminary and based upon culvert analyses and simple weir equations available using Haestad Methods CulvertMaster. More detailed analyses will be required in subsequent design efforts to determine the operational effectiveness and determine the preferred alternative.

3.3.5.1 Flow Split Using RCBC

This alternative utilizes the barrels of the reinforced concrete box culvert required to provide SRP maintenance access across the Meridian Channel to split flow between a detention basin bypass channel and the detention basin. Two approaches were analyzed for this structure. One assumes that all the inlet inverts for the culvert barrels are at the same elevation and flow is simple divided equally between all barrels. Flow from one barrel is diverted to a bypass channel while flow through the other barrels is diverted to the detention basin. The other assumes that the invert of the barrel for the bypass channel is set lower than the other barrels so that more flow would bypass the detention basin during low flow events.

<u>Uniform Invert Elevations</u>

For this approach, the SRP easement culvert will consists of a 6 - 12' x 6' RCB culvert. For approximately 2,300 cfs, each barrel will convey

approximately 383 cfs. While variations of this alternative could be developed to increase low flow bypass through one barrel, for this preliminary analysis it is simply assumed that at all times flow would be equally distributed through the barrels. Therefore, to bypass 25 cfs downstream to Siphon Draw Wash, it is assumed that 150 cfs would need to be flowing in the upstream channel

Varied Invert Elevations

For this approach, the SRP easement RCB culvert will consists of a 12' x 6' barrel for the bypass flow and ten 6' x 5' barrels to divert flow to the detention basin. The bypass flow barrel is set one foot lower than the other barrels. For the design event of approximately 2,300 cfs, the bypass barrel will divert approximately 480 cfs to the bypass channel. It is estimated that approximately 35 cfs will be conveyed by the bypass channel barrel before flow begins to also be diverted into the detention basin.

3.3.5.2 Lateral Weir

Preliminary analysis of the lateral weir diversion structure approach, is based upon a culvert analysis using a 1-6'x6' box culvert with an overtopping broad crested weir. The box culvert would roughly approximate the maximum bypass channel capacity, and the overtopping weir would roughly approximate the lateral weir. For the design discharge of approximately 2,300 cfs, the culvert to the bypass channel conveys 380 cfs. The 1,920 overtopping the culvert is assumed to be diverted into the detention basin. Based upon the analysis, to divert 1920 cfs over a 350 ft weir, a weir head of approximately 1.6 feet is required (2 feet assumed to be maximum allowed).

4 PROJECT ALTERNATIVES

4.1 MERIDIAN CHANNEL ALTERNATIVES (REACH 1)

For the Meridian Channel (Reach 1), the FCDMC obtained a 160-foot drainage easement along the east side of the future Meridian Road alignment. Throughout the course of this pre-design study, however, consideration was given to obtaining additional easement for the consideration of more diverse channel alternatives.

While a number of variations on channel shapes, sizes and slopes were initially investigated, only four are presented as channel alternatives. Considered channel alternatives include the following:

Alternative 1: Concrete Rectangular Channel
Alternative 2: Concrete Trapezoidal Channel
Alternative 3: Earthen Trapezoidal Channel
Alternative 4: Hybrid Channel

Alternative exhibits are provided in Appendix C. Supporting documentation and hydraulic analyses are provided in Appendix B. Preliminary construction cost estimates are provided in Appendix D.

4.1.1 Design Criteria

For purposes of preliminary design, potential channel alternatives were developed and analyzed based upon the following criteria:

- Q_{100} design discharge of 2365 cfs
- Subcritical flow
- Maximum earthen side slope of 4:1
- Provide channel freeboard in accordance with FCDMC policies (25% of energy grade line)
- Grade control structures as necessary to maintain a uniform channel slope along the entire channel length
- Manning's n value of:
  - 0.016 for finished concrete
  - 0.018 for unfinished or pneumatically placed concrete
  - 0.035 for minimally vegetated earthen channel
  - 0.050 for landscaped earthen channel
- Maximum channel velocities of:
  - 8 ft/s (assumed) for concrete lined channels
  - 5 ft/s for earthen unlined channels
- Provide a 12 ft maintenance road and channel maintenance ramps
- Provide a landscape buffer

In addition to these design criteria, other more qualitative issues were taken under consideration in the development of project alternatives including the following:

- Limitation of the existing 160 ft drainage easement;
- Potential availability of additional easement for improved project aesthetics and/or recreational use;
- Compatibility with future land uses

4.1.2 Assumptions

When design considerations are not dictated by design criteria, the preliminary analysis and the design of alternatives were based upon similar design assumptions in an attempt to provide a similar basis for alternative comparison and to eliminate "sub-alternatives" resulting from minor changes in design parameters (e.g. channel slope). The more significant assumptions include:

- All alternatives are based upon a channel slope of 0.001 ft/ft, therefore, all structures require the same amount of grade control
- Drop structures for hard-lined channels are not considered to significantly increase construction costs since they can be readily incorporated into the channel design.
- A 70 ft wide desired buffer for purposes of aesthetics and multi-use.

4.1.3 Channel Alternatives

4.1.3.1 Alternative 1: Concrete Rectangular Channel

Description

This alternative consists of a concrete rectangular channel 55 feet wide, a channel depth varying from 7 ft - 10 ft (assuming 3 foot drop structures) and a channel slope of 0.001 ft/ft.

Analysis

This channel configuration results in a flow depth of approximately 5.4 ft, a channel velocity of 8 ft/s and a required freeboard of 1.6 ft.

Advantages

- Requires no additional easement
- 105 ft of easement available as a landscape buffer (35 ft more than the 70 ft assumed as minimum requirement)
- Smallest conveyance width provides most easement for landscaping/multi-use purposes (within the existing easement)

- Additional measures for erosion protection not required
- Drop structures/grade control can be readily incorporated into the channel design with minimal additional cost
- A hard-lined channel generally requires less maintenance
- A hard-lined channel provides protection against undermining and propagation of potential and/or existing earth fissures.

Disadvantages

- Vertical walls require railing and/or fencing for purposes of safety and to restrict access.
- Considered less aesthetically pleasing and less preferable from a recreational or multi-use perspective
- Highest estimated construction cost of all channel alternatives

Preliminary Cost Estimate

The preliminary estimated construction cost for this alternative is **$5,140,000.** The relative construction cost factor (alternative cost/cost of the lowest cost alternative) is **3.19**.

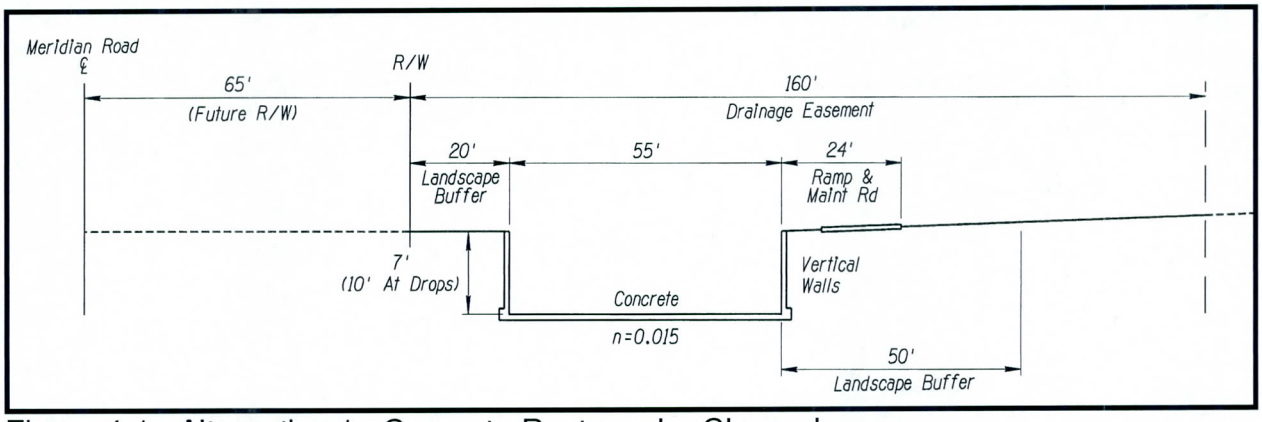


Figure 4-1: Alternative 1: Concrete Rectangular Channel

4.1.3.2 Alternative 2: Concrete Trapezoidal Channel

Description

This alternative consisted of a concrete trapezoidal channel with 2:1 (H:V) side slopes, a bottom width of 45 ft, a depth varying from 7 ft -10 ft (assuming 3 foot drop structures) and a channel slope of 0.001 ft/ft.

Analysis

This channel configuration results in a flow depth of approximately 5.4 ft, a channel velocity of 7.8 ft/s and a required freeboard of 1.6 ft.

Advantages

- Requires no additional easement
- 75 ft of easement provided as a landscape buffer (5 ft more than the 70 ft assumed as minimum requirement)
- Additional measures for erosion protection not required
- Drop structures/grade control can be readily incorporated into the channel design with minimal additional cost
- Hard lined channel generally requires less maintenance.
- A hard-lined channel provides protection against undermining and propagation of potential and/or existing earth fissures.
- Lowest estimated construction cost of all channel alternatives

Disadvantages

- Steep side slopes will likely require railing and/or fencing for purposes of safety and to restrict access.
- Generally considered less aesthetically pleasing and less preferable from a recreational or multi-use perspective

Preliminary Cost Estimate

The preliminary estimated construction cost for this alternative is **$1,611,000.** This alternative is the "lowest cost alternative", therefore, the relative construction cost factor (alternative cost/cost of the lowest cost alternative) is **1.00**.

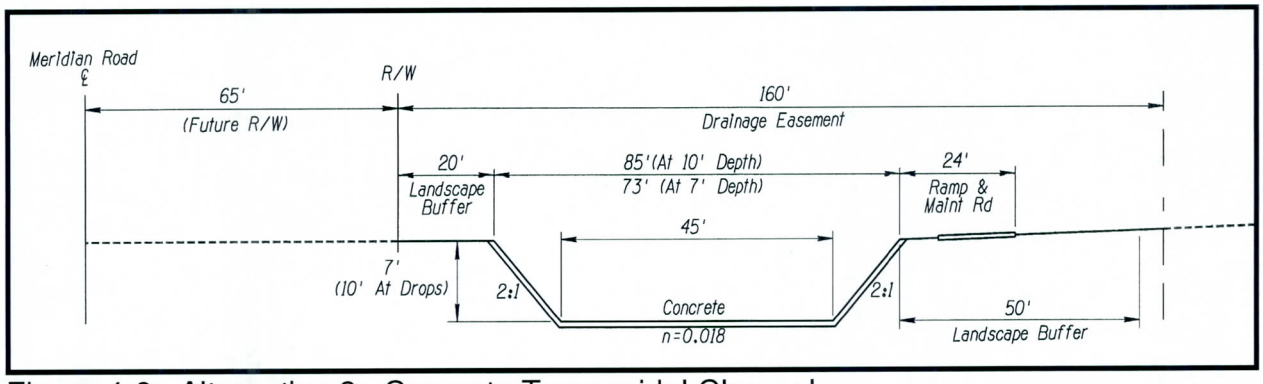


Figure 4-2: Alternative 2: Concrete Trapezoidal Channel

4.1.3.3 Alternative 3: Earthen Trapezoidal Channel

Description

This alternative consisted of a concrete trapezoidal channel with 2:1 (H:V) side slopes, a bottom width of 45 ft, a depth varying from 7 ft -10 ft (assuming 3 foot drop structures) and a channel slope of 0.001 ft/ft.

Analysis

Using a Manning's n-value of 0.030, this channel configuration results in a flow depth of approximately 5.6 ft, a channel velocity of 3.6 ft/s and a required freeboard of 1.4 ft.

Using a Manning's n-value of 0.050, this channel configuration results in a flow depth of approximately 5.6 ft, a channel velocity of 2.6 ft/s and a required freeboard of 1.4 ft.

Advantages

- Generally considered the most preferable from a landscaping and multi-use perspective
- 70 ft of easement available as a landscape buffer (70 ft assumed as minimum requirement) Landscaping potential within and/or along the upper portions of the channel
- Potential for landscaping within and/or along the upper portions of the channel
- A wide channel with gently sloped sides more in character with the expected use of adjacent properties for residential development
- Fencing for purposes of safety not necessary (however, may still be required by the FCDMC to prevent public access prior to adjacent development and/or the establishment of multi-use facilities)
- Among the lowest preliminary estimated costs for construction

Disadvantages

- Requires 115 ft of additional easement. The most of any considered channel alternatives
- The availability of additional easement has not currently been confirmed.
- May require additional measures for channel erosion protection (not included in cost estimate)
- May require additional measures to mitigate potential impact on existing and/or future fissures (extent currently unknown and not included in cost estimate)

Preliminary Cost Estimate

The preliminary estimated construction cost for this alternative is **$2,239,000.** The relative construction cost factor (alternative cost/cost of the lowest cost alternative) is **1.39**.

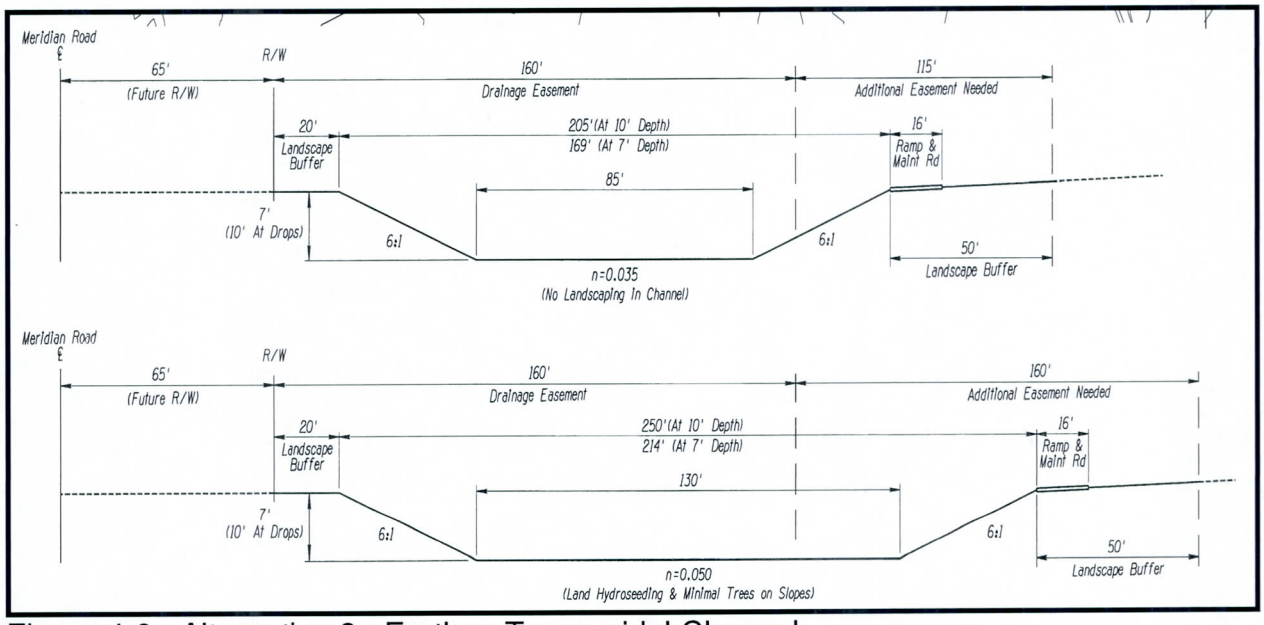


Figure 4-3: Alternative 3: Earthen Trapezoidal Channel

4.1.3.4 Alternative 4: Hybrid Channel

Description

This alternative consisted of a concrete trapezoidal channel with 2:1 (H:V) side slopes, a bottom width of 45 ft, a depth varying from 7 ft -10 ft (assuming 3 foot drop structures) and a channel slope of 0.001 ft/ft.

Analysis

Using a Manning's n-value of 0.030 for earthen portions of the channel, this channel configuration results in a flow depth of approximately 5.6 ft, a channel velocity of 3.8 ft/s and a required freeboard of 1.4 ft.

Using a Manning's n-value of 0.050 for earthen portions of the channel, this channel configuration results in a flow depth of approximately 5.5 ft, a channel velocity of 2.7 ft/s and a required freeboard of 1.4 ft.

Advantages

- Provides a compromise between a more aesthetically pleasing earthen section and more efficient hard-lined channel
- 70 ft of easement available as a landscape buffer (70 ft assumed as minimum requirement)
- Potential for landscaping within and/or along the upper portions of the channel

Disadvantages

- Requires 65 ft of additional easement
- The availability of additional easement has not currently been confirmed.
- May require additional measures for channel erosion protection (not included in cost estimate)
- May require additional measures to mitigate potential impact on existing and/or future fissures (extent currently unknown and not included in cost estimate)
- Vertical wall would physically divides neighborhood
- Vertical wall will require railing and/or fencing for purposes of safety.
- Among the higher construction cost alternatives

Preliminary Cost Estimate

The preliminary estimated construction cost for this alternative is **$3,099,000.** The relative construction cost factor (alternative cost/cost of the lowest cost alternative) is **1.92**.

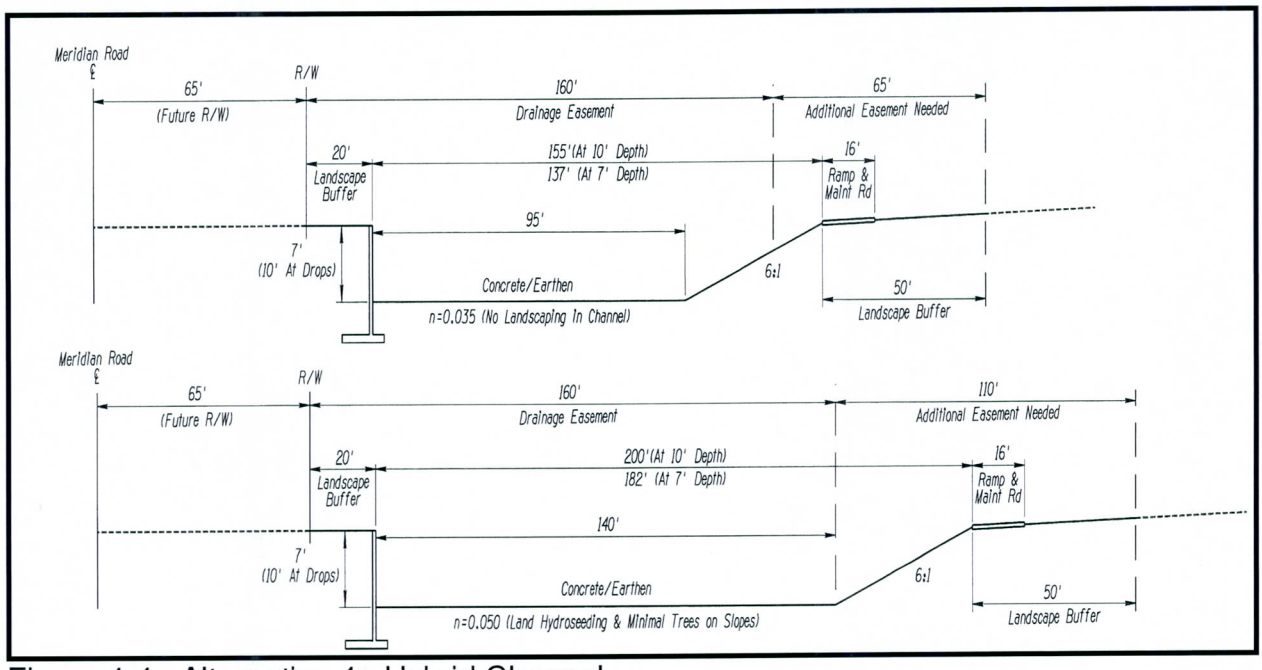


Figure 4-4: Alternative 4: Hybrid Channel

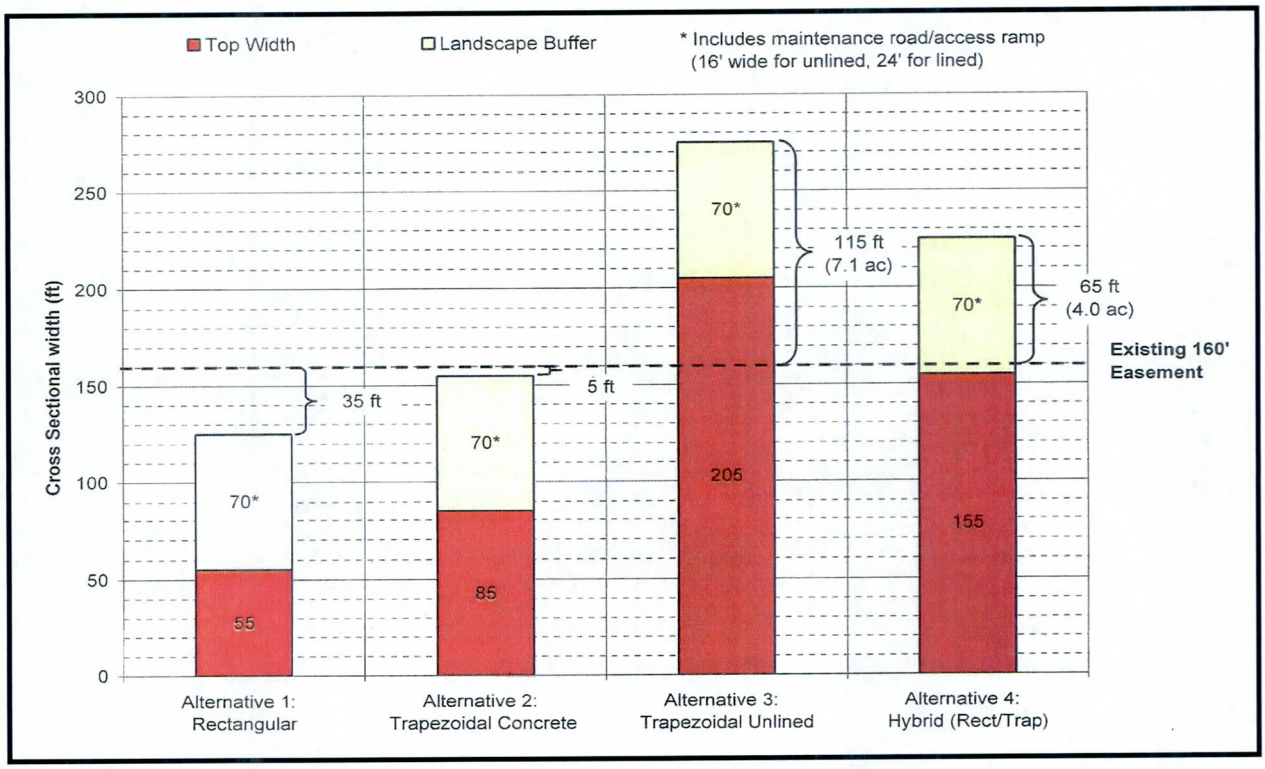


Figure 4-5: Easement requirements for channel alternatives

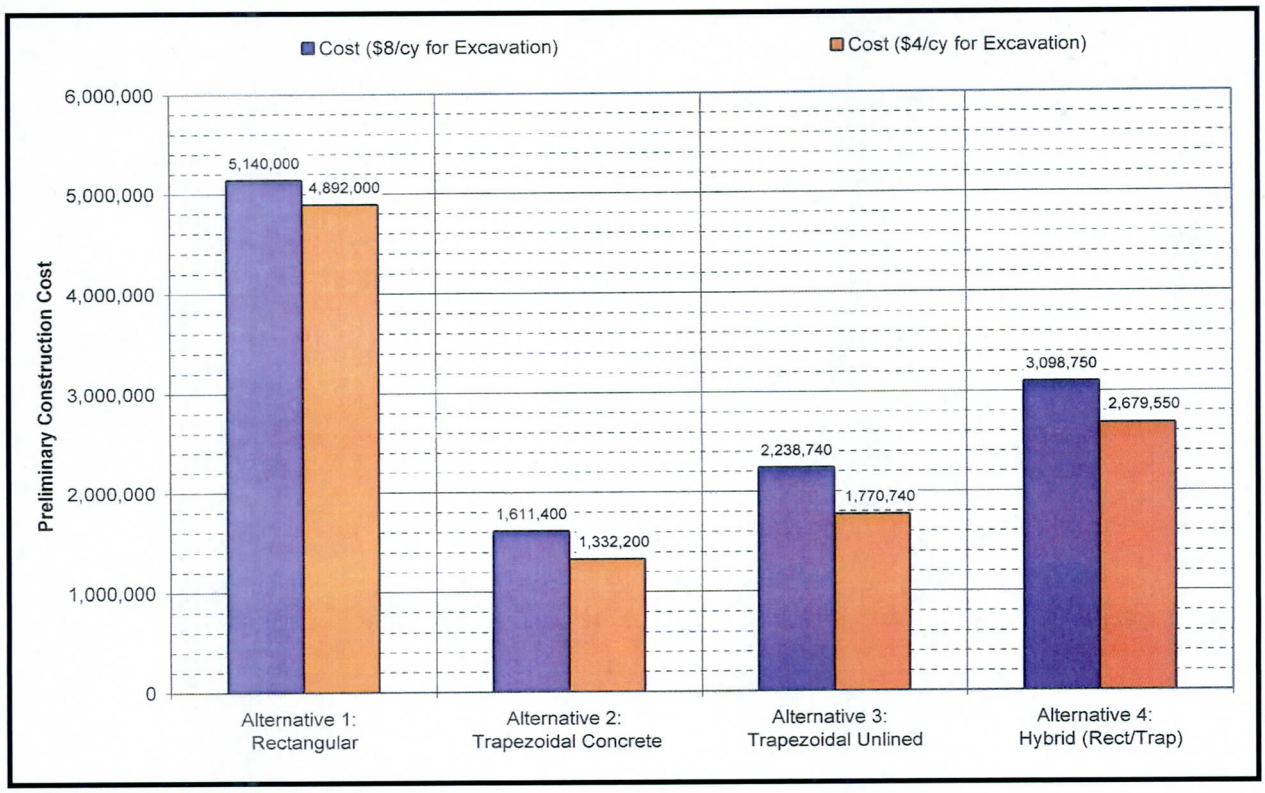


Figure 4-6: Preliminary cost estimate for channel alternatives

4.2 DETENTION BASIN ALTERNATIVES

The FCDMC has obtained a 200 acre drainage easement northeast of the intersection of Meridian Road and Elliot Road. Based upon previous studies efforts, two basin alternatives were to be considered, a single basin alternative and a two basin alternative.

HEC-1 hydrologic analyses and other supporting hydraulic and hydrologic documentation are provided in Appendix A. Preliminary construction cost estimates are provided in Appendix D.

4.2.1 Design Criteria

For purposes of preliminary design, basin alternatives were developed and analyzed based upon the following criteria and assumptions:

- Detention basin are to be incised and all retained water stored below grade
- For preliminary design, basin side slopes are set at 6:1 (H:V)
- Provide a minimum of 1 foot of freeboard within the basin
- Basin bottom to be sloped at a minimum of 1% to basin outlet
- It is assumed that the detention basin(s) are not required to completely drain within a 36 hr time period
- Peak discharge to Siphon Draw Wash through the Meridian Point subdivision are less than the design discharge used in the development's design hydraulic analysis of the wash (~700 cfs) and water surface elevations do not exceed the subdivision design analysis. Since a hydraulic analysis of the wash through the Meridian Point subdivision will not be conducted until after the pre-design phase, for purposes of preliminary analysis, flow was generally limited to less than 400 cfs*
- Peak discharge at the project outfall is attenuated such that total flow to the Elliot Road storm drain is less than 500 cfs*

* *It should be noted that the initial limits placed on peak discharges for preliminary analysis have a significant impact on the design of the detention basin alternatives (particularly required detention volumes). It will be necessary to conduct a detailed hydraulic analysis of Siphon Draw Wash (to be conducted subsequent to the pre-design phase) to better define the allowable discharge through the Meridian Point subdivision and assure no adverse impact through the development. In addition, it will be necessary to work with the FCMDC to better define outfall criteria since the present criteria does not address the diversion of flow to the existing Elliot Road Detention Basin located east of the project outfall. The operation and diversion of flows to the*

existing Elliot Road Detention Basin east of the project outfall has a significant roll in ultimately determining how much flow can be allowed to concentrate just prior to the project outfall. It is expected that upon more detailed analysis and further consideration the initial limits placed on peak discharges can and will be relaxed allowing for an optimization of the final design alternative.

4.2.2 Basin Alternatives

4.2.2.1 Alternative 1: Single Basin Alternative

Description

This alternative consists of a single 75 acre, 263 acre-ft detention basin. The basin is located along the west boundary of the drainage easement and provides offline storage for flow from the proposed Meridian Channel and inline storage for Siphon Draw Wash.

The basin outlet is a single 42 inch outlet pipe which is assumed to uniformly discharge 70 cfs from the basin. A emergency spillway located along Siphon Draw Wash will be sized to discharge the combined peak inflow to the basin from both the Meridian Channel and Siphon Draw Wash.

Advantages

- Provides the smallest footprint for the required storage volume
- Smallest amount of total excavation volume
- Lowest estimated construction cost

Disadvantages

- While elevated area of the basin can be created, it is generally considered that the basin will be wet during any storm event.
- Potential loss of flexibility in optimizing basin effectiveness and/or basin operation

Preliminary Cost Estimate

The preliminary estimated construction cost for this alternative is approximately **$9,700,000.** Approximately $9,000,000 of the estimated cost is for approximately 1,120,000 cubic yards of basin excavation (at $8/cy). This alternative is the "lowest cost alternative", therefore, the relative construction cost factor (alternative cost/cost of the lowest cost alternative) is **1.00**.

4.2.2.2 Alternative 2: Two Detention Basins

Description

This alternative consists of a 165 acre-ft offline detention basin for the Meridian Channel (herein referred to as the North Basin or Meridian Channel) and a separate 138 acre-ft inline detention basin for Siphon Draw Wash (herein referred to as the South Basin or Siphon Draw Wash basin). The total detention basin area is approximately 105 acres located along the west boundary of the drainage easement.

The basin outlets are assumed to be configured to each uniformly discharge 35 cfs to a 42 inch outlet pipe with a capacity of 70 cfs. A emergency spillway located along Siphon Draw Wash will be sized to discharge the combined peak inflow to the basin from both the Meridian Channel and Siphon Draw Wash.

Advantages

- During small storm events, the North Basin could possibly remain "dry"
- Treating flows from the Meridian Channel and Siphon Draw Wash separately may offer some additional flexibility in optimizing the effectiveness and/or operation of the detention basin facility

Disadvantages

- Largest detention area footprint.
- Most costly basin alternative
- Largest basin excavation volume

Preliminary Cost Estimate

The preliminary estimated construction cost for this alternative is approximately **$13,400,000.** Approximately $12,600,000 of the estimated cost is for approximately 1,560,000 cubic yards of basin excavation (at $8/cy). The relative construction cost factor (alternative cost/cost of the lowest cost alternative) is **1.38**.

4.2.3 Diversion Structure Alternatives

While the development and assessment of diversion structure alternatives was not initially part of the pre-design study, alternatives were investigated and are presented for consideration and comment. While these alternatives are presented, it should be noted that the structure design will more likely be dictated by design needs and requirements in subsequent design efforts.

4.2.3.1 Alternative 1: RCBC Flow Split Alternative

Description

This alternative utilizes the reinforced concrete box culvert required to provide SRP maintenance access across the Meridian Channel to split flow between a detention basin bypass channel and the detention basin. The structure could be designed with variations on the following two basic concepts to split flow from Meridian channel:

1.) Directly divert flow from one or more barrels to a bypass channel with the rest being diverted into the detention basin (all flows would conceptually be equally split between the number of barrels in the culvert).

    This approach offers design and operational simplicity and may possibly result in a lower construction cost and/or maintenance needs. However, it sacrifices some of the benefits associated with diverting all low flows to the bypass channel (larger required basin storage, assurance of passing first 25 cfs of low flows to help maintain downstream vegetation in Siphon Draw Wash)

2.) The culvert structure could be designed either by lowering a barrel(s) invert or by constructing a low wall or channel upstream of the culvert to assure low flows are diverted to a barrel(s) to the bypass channel. This would assure low flows to the bypass to maintain downstream low flows and help minimize detention basin storage requirements. However, the structure design my present some issues for maintenance and/or increase construction costs associated with the structure itself.

Advantages

- Simplicity of operation and assurance of some flow split
- Incorporates split into the design of a required structure
- Diversion accomplished in a relatively short distance
- Expected to be the lowest estimated construction cost alternative

Disadvantages

- May result in flow entering the detention basin below the bypass threshold is attained requiring additional storage volume.
- Detained water within the basin will back up into the channel during large events possibly impacting the flow split rating curve.

- The accumulation of debris and sediment at the culvert inlet will directly affect the nature of the flow split through the box culvert.

Preliminary Cost Estimate

A preliminary estimated construction cost for diversion structures is not provided. The structures require more detailed design to develop a reasonable estimate for construction cost. However, the construction cost should be significantly less than the lateral weir alternative since:

- Diversion is accomplished through the use of a required structure
- Diversion accomplished in a short distance
- Discharge to the basin would be comparable to simply discharging a channel directly into a basin
- Required erosion protection should not be significant since the channel invert and the basin invert should differ only be a couple of feet

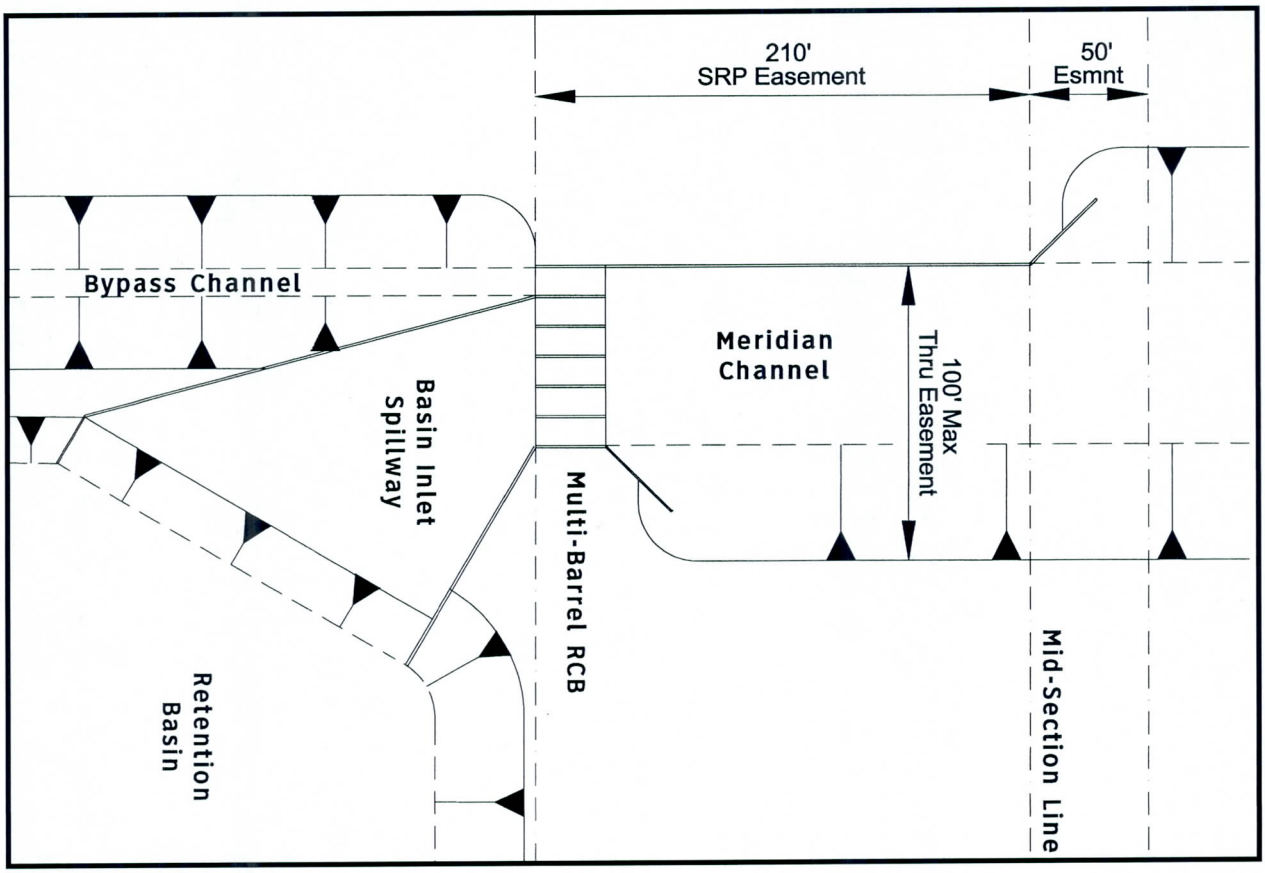


Figure 4-9: RCBC Diversion Alternative

4.2.3.2 Alternative 2: Lateral Weir

Description

This alternative is based upon the construction of an approximately 350 foot long lateral weir along the east side of the Meridian Channel downstream of the RCB culvert in the SRP transmission line easement. Downstream of the culvert, the channel will narrow to reduce channel capacity to approximately the allowable bypass flow. Flow will overtop the lateral weir constructed along the east overbank of the channel and divert flow into the detention basin facility. The lateral weir structure and spillway into the detention basin will be a hard structure to protect against erosion.

Advantages

- Assured that significant flow will bypass the channel
- Assures detention basin storage will be preserved for large flow events
- Water detained in the basin will have no impact on the weir hydraulics.
- The accumulation of debris along the lateral weir is not likely and the operation of the lateral weir should not be significantly impacted by channel debris.
- Accumulation of debris upstream of the SRP easement culvert will not directly impact the operation of the lateral weir.

Disadvantages

- Uncertainty of lateral weir hydraulics
- Flow in excess of the design bypass flow can readily bypass the basins and possibly impact downstream areas
- Diversion accomplished over a lengthy structure
- Expected to be the highest estimated construction cost alternative

Preliminary Cost Estimate

As previously mentioned, a preliminary estimated construction cost for diversion structures is not provided. The structures require more detailed design to develop a reasonable estimate for construction cost. However, the construction cost for this alternative is anticipated to be significantly more than the culvert split alternative since:

- A longer wider channel is required downstream of the culvert. The downstream channel must be sized to accommodate all

channel flow before tapering gradually to a smaller channel sized only for the bypass

- The long lateral weir will need to be a hard structure both on the bypass channel side and the detention basin side.
- The drop into the basin from the weir will require additional erosion protection within the basin along the length of the weir.

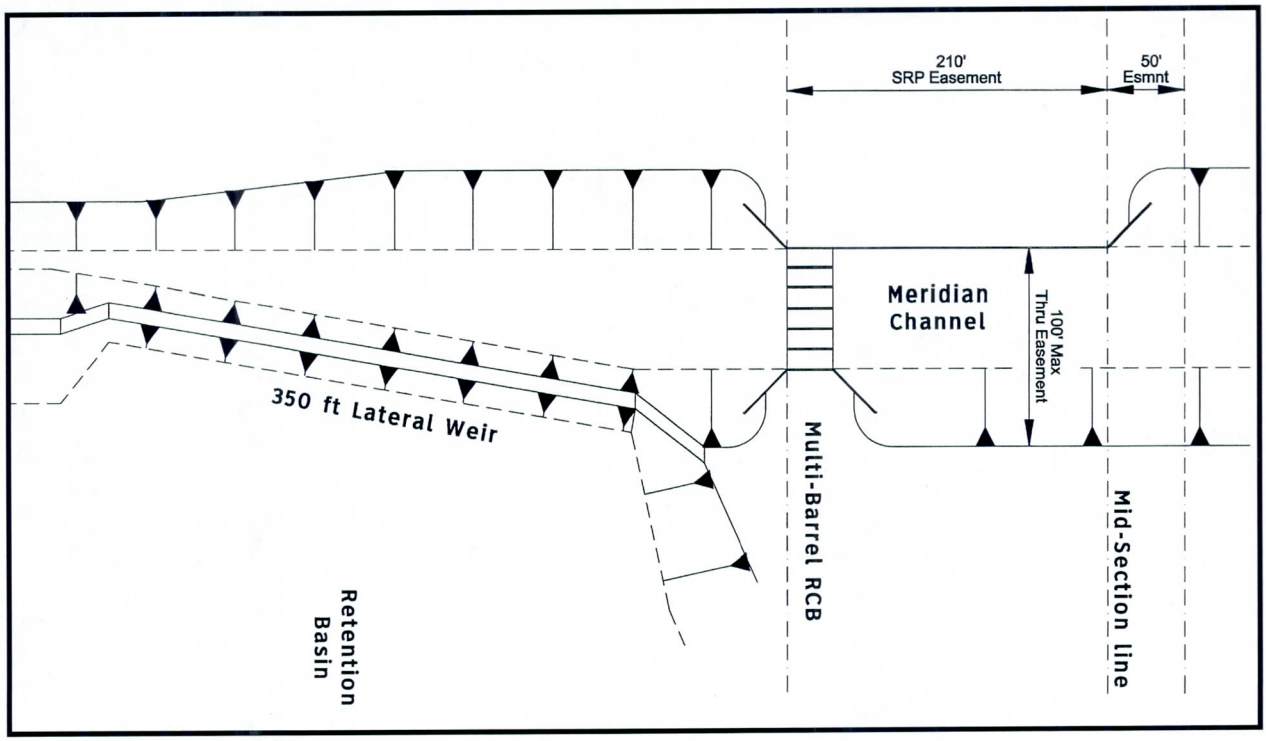


Figure 4-10: Lateral Weir Diversion Alternative

4.3 STORM DRAIN ALTERNATIVES

4.3.1 Design Criteria and Assumptions

For purposes of preliminary design, basin alternatives were developed and analyzed based upon the following criteria and assumptions:

- Uniform pipe size of 42" RCP
- Used maximum manhole spacing of 700 ft (maximum manhole spacing for 42" pipe is 800 ft per COM standards)
- Storm drain only receives flow from project facilities (detention basin and at project outfall). Analyses do not include any flow contributions from any pipe connection or laterals from outside sources.
- Storm drain design with matching crown elevations

- Since project alternative differ only by slight shift in the alignment of the storm drain, only one preliminary hydraulic analysis of the storm drain system is considered necessary to assure the system is properly size to accommodate design flows
- 70 cfs maximum will be discharged into the storm drain system from the proposed detention basin facility
- 430 cfs maximum will be discharge into the storm drain system at the project outfall location (Elliot Road & 104th Street alignment)
- All pipe is reinforced concrete pipe (RCP) with a Manning's roughness coefficient of 0.012
- Friction losses along with minor losses at manholes, junctions, and bends are calculated based on the "Standard Method".
- The tailwater elevation is based on the maximum 100-yr, 24-hr peak discharge (that includes the 500 cfs project discharge) from the existing Elliot Road storm drain system design analysis.

4.3.2 Storm Drain Alternatives

The storm drain alternatives do not differ significantly. The pipe size and length for both alternatives are essentially the same. Both alternatives extend the existing Elliot Road storm drain east down Elliot Road and then north along Meridian Road to the proposed detention basin facility. The difference between the alternative is the placement of the storm drain line to the west of Signal Butte Road. Alternative 1 assumes the storm drain main line will be placed outside the existing right of way thereby requiring new right of way. Alternative 2 assumes the storm drain main line will be placed within the existing right of way.

4.3.2.1 Alternative 1: New Right of Way Alignment

Description

This alternative consists of approximately 8660 ft of 42" RCP that extends from the project outfall to the detention basin facility. West of Signal Butte Road, the alignment of this storm drain alternative is located outside the proposed limits of the future widening of Elliott Road. To do so, additional easement is required (assumed 30 ft of additional easement width).

Advantages

- If Elliot Road, west of Signal Butte is improved prior to the construction of the proposed storm drain, construction cost savings can be realized by preserving the existing pavement and placing the storm drain outside of the pavement limits in it's own easement.

- Maintenance to the storm drain can be readily performed without significantly impacting traffic

Disadvantages

- Slightly higher construction cost
- Requires additional easement (assumed 30 ft).

Preliminary Cost Estimate

The preliminary estimated construction cost for this alternative is approximately **$2,061,000.** The relative construction cost factor (alternative cost/cost of the lowest cost alternative) is **1.04**.

4.3.2.2 Alternative 2: No New Right of Way Alignment

Description

This alternative consists of approximately 8660 ft of 42" RCP that extends from the project outfall to the detention basin facility. West of Signal Butte Road, the alignment of this storm drain alternative is located within the existing right of way limits.

Advantages

- Slightly lower estimated construction costs
- Does not require any additional easement.
- If Elliot Road has not been widened prior to this project, the storm drain could be constructed without having to replace and replace a large amount of pavement.

Disadvantages

- Construction cost would increase if Elliot Road is improved prior to this project.
- Storm drain maintenance would have a more significant impact on local traffic.

Preliminary Cost Estimate

This is the lowest cost alternative with a preliminary estimatated construction cost for this alternative is approximately **$1,982,000.** The relative construction cost factor (alternative cost/cost of the lowest cost alternative) is **1.00**.

5 PREFERRED ALTERNATIVES (TO BE DETERMINED)

5.1 GENERAL

A preferred alternative, has are yet to be determined pending completion of the fissure investigation. Once determined, this section will document the preferred alternative and any subsequent design efforts.

6 DATA COLLECTION AND REFERENCES

6.1 General Reference, Technical, Guidelines, Software

1. Contract for Consultant Services (Contract FCD 2007C012) approved by FCD Board of Directors September 5, 2007; effective starting date September 20, 2007; Siphon Draw Wash Drainage Improvements.

2. Consultant Guidelines Incorporated by Reference for Consultant Services Contracts; Flood Control District of Maricopa County; August 1, 2000.

3. Computer Aided Drafting & Design (CADD) Data Delivery Specifications: Rev.1.0; January 2000.

4. Policy for the Aesthetic Treatment and Landscaping of Flood Control Projects; Flood Control District of Maricopa County; December 16, 1992.

5. Landscape Aesthetics and Multi-Use Consultant Handbook (Flood Control District – April 2003)

6. Scenery and Recreation Resource Assessment for Maricopa County (Flood Control District – ongoing)

7. Policy for the Aesthetic Treatment and Landscaping for Flood Control Projects (Flood Control District – Dec. 16, 1992)

8. Public Involvement and Public Information Guidelines (Flood Control District – July 1, 2004)

9. Estimated Manning's Roughness Coefficients for Stream Channels and Flood Plains in Maricopa County, Arizona; Prepared for the Flood Control District of Maricopa County by the U.S. Geological Survey, Water Resources Division; April 1991.

10. Drainage Design Manual for Maricopa County, Volume 1 – Hydrology; Flood Control District of Maricopa County; June 1992, Updated January 1995.

11. Drainage Design Manual for Maricopa County, Volume II – Hydraulics; Flood Control District of Maricopa County; January, 1996.

12. Flood Insurance Study – Maricopa County, Arizona and Incorporated Areas. Federal Emergency Management Agency / Michael Baker, Jr. Inc.

13. Flood Insurance Rate Map for Maricopa County, Arizona and Incorporated Areas; Map Number *04013C 2705 F, *Panel not printed - - area in Zone D, Effective date September 30, 2005.

14. Flood Insurance Rate Map for Pinal County, Arizona and Incorporated Areas, Map Number 040077 0125 D, Effective Date March 5, 1990.

15. Soil Survey of Eastern Maricopa and Northern Pinal Counties Area, Arizona; United States Department of Agriculture, Soil Conservation Service; Issued November 1974.

16. Soil Survey of Aguila-Carefree Area, Parts of Maricopa and Pinal Counties; Arizona, United States Department of Agriculture, Soil Conservation Service; Issued April 1986.

17. ArcView GIS Version 3.2a; Environmental Systems Research Institute, Inc.

18. HEC-1 Flood Hydrograph Package, Version 4.0 (from NTIS); U.S. Army Corps of Engineers, Hydrologic Engineering Center, Davis, California; September 1990.

19. Drainage Design Management System (DDMSW); Version 1.5, KVL Consultants, Inc. for Flood Control District of Maricopa County.

20. HEC-RAS River Analysis System, Version 2.2; U.S. Army Corps of Engineers, Hydrologic Engineering Center, Davis, California; September 1998.

6.2 Survey and Mapping

1. United States Department of the Interior, Geological Survey; 7.5 Minute Series Topographic Quadrangle Maps; Arizona – Maricopa County; Scale – 1:24,000

2. East Mesa ADMP Topography (provided by FCDMC), contour interval – 2 ft.

3. Arizona State Land Department provided topography, contour interval – 2 ft.

4. Siphon Draw Wash Drainage Improvements project topography, Cooper Aerial Surveys, Inc., flight date October 2007, ground control provided by Stanley Consultants, contour interval – 1 ft, horizontal scale – 40 ft.

6.3 Studies and Improvement Plans by Others

1. East Mesa Area Drainage Master Plan, FCD 95-32, Dibble & Associates / Hoskin Engineering Consultants, Recommended Design Report and Preliminary Design

Plans, 1998, vertical datum NGVD 1929, horizontal datum State Plane Coordinate System 1927.

2. Siphon Draw Drainage Improvements Pre-Design Study Report (Wood, Patel & Associates, Inc., August 2004)

3. Siphon Draw Drainage Improvements Concept Letter Report, Contract FCD 2005C021 (Assignment No. 2), Wood, Patel & Associates, May 2006.

4. Plans for the construction of Elliot Road Detention Basins and Outfall Channel, Phase 1, FCD C2000C010, PCN No. 442 04 31, Wood, Patel & Associates, May 2000 / August 2001, stamped As-Built December 11, 2003, vertical datum NGVD 1929, State Plane Ground Coordinate System NAD83.

5. Elliot Road Detention Basins and Outfall Channel, Phases 1 & 2, Design Documentation Summary, Contract FCD 98-44, PCN No. 442 04 31, Wood, Patel & Associates, May 2, 2000.

6. Preliminary Earth Fissure Risk Zone Investigation Report, Hawk Rock Study Area, Maricopa and Pinal Counties, Arizona, Contract FCD 2006C005 (Work Assignment 2), AMEC Earth and Environmental, September 25, 2006.

7. Final Drainage Report for Ironwood Drive, Ocotillo Road – U.S. 60 – Phase B, Pinal County Project No. ED – 0501, Kimley-Horn and Associates, Inc., November 2006.

8. Final Drainage Report Ironwood Drive / Gantzel Road Improvements, Guadalupe to Delaware Road, Drainage Technical Memorandum, Pinal County Project No. ED – 0501, Kimley-Horn and Associates, Inc., June 2007.

9. Drainage Design Report for Meridian Pointe Subdivision, Coe and Van Loo Consultants, Inc. for Continental Homes, September 16, 1998, Revised January 20, 1999.

10. Meridian Pointe subdivision improvement plans, Coe and Van Loo Consultants, Inc., a) Water line extensions Elliot Road (24") and Meridian Road (12"), sheets 1 – 8 of 8, stamped As-Built June 6, 2003; b) Infrastructure (Elliot and Meridian Roads roadway plans) sheets 1-16 of 19, stamped As-Built July 11, 2003; c) Unit 3 Grading plans (portion of Siphon Draw Wash), various sheets, April 1998, all plans use City of Mesa vertical datum.

11. Drainage Report for Mass Grading of Nova Vista Subdivision, Signal Butte Rd. & Elliot Rd., Mesa, Arizona, CMX, L.L.C. for Standard Pacific of Arizona, November 2005, revised 3Feb06, 22May06 and 28Jun06.

6.4 Utility Plans and Quarter Section Maps

1. T. R. W. Water and Sewer Improvements, 16" water line Elliot Road – Mountain Road to Ellsworth Road, City of Mesa Project No. 90-90, (partial set includes sheets 1,2, 68 – 74 of 82), Standage & Truitt, Engr., Ltd, May 1990, stamped As-Built January 23, 1991, City of Mesa vertical datum.

2. Desert Wells No. 13 Well and Piping, north side of Elliot west of Signal Butte, City of Mesa Project No. 96 – 60.1, (partial set includes sheets 1,2 of 8, stamped As-Built September 9, 1999, arbitrary vertical datum = 100.00.

3. Southeast Mesa Water Lines - 24" water line in Signal Butte north of Elliot (partial set includes sheets 1, 11 of 32), City of Mesa Project No. 96-21, Brown and Caldwell, vertical datum unknown but possibly City of Mesa, stamped As-Built July 21, 1998.

4. Salt River Project Browning to Silverking 500kV plan and profile (FCDMC permit plans) from Meridian Road east approximately 4,500 ft, sheet A-1129-1.07, Black and Veatch, construction issue date November 1, 2006.

5. Salt River Project Browning to SEV 500kV and Browning to Dinosaur 230 kV plan and profile from Meridian Road to CAP (and south along CAP), sheets A-1130-1.07 thru A-1130-1.16, Black and Veatch, construction issue date November 1, 2006.

6. City of Mesa Utility Quarter Section Maps: a) Storm Drain 144C(1-19-07), 144D(3-19-07), 316B(3-28-05), 316C(12-19-06), 316D(8-17-05), 317B(11-13-06), 317C(12-19-06), 317D(1-19-07); b) Sewer 144C(9-14-05), 144D(9-14-05), 316D(8-10-05), 317C(7-16-04), 317D(12-12-06); c) Water 144C(1-22-07), 144D(1-22-07), 316B(10-18-06), 316D(11-13-06), 317B(11-13-06), 317C(11-13-06), 317D(11-13-06).

7. City of Mesa Water Details 316-2 and 316-3, Signal Butte north of Elliot @ LDS Church, both dated 11-13-06.

6.5 Subdivision Plats

1. Meridian Pointe Unit 1 (SW quadrant of subdivision north of Elliot, between Meridian and Mountain), Book 502, Page 31 MCR, Coe and Van Loo, 1999.

2. Meridian Pointe Unit 2 (NE quadrant of subdivision north of Elliot, between Meridian and Mountain), Book 502, Page 32 MCR, Coe and Van Loo, 1999.

3. Meridian Pointe Unit 3 (SE quadrant of subdivision north of Elliot, between Meridian and Mountain), Book 502, Page 33 MCR, Coe and Van Loo, 1999.

4. Meridian Pointe Unit 4 (NW quadrant of subdivision north of Elliot, between Meridian and Mountain), Book 502, Page 34 MCR, Coe and Van Loo, 1999.

5. Mountain Ranch Unit 1 (NW quadrant of subdivision south of Elliot, between Meridian and Mountain), Book 527, Page 19 MCR, DEI Professional Services, 1999.

6. Mountain Ranch Unit 2 (NE quadrant of subdivision south of Elliot between Meridian and Mountain), Book 521, Page 38 MCR, DEI Professional Services, 1999.

7. Nova Vista Unit D, (Parcels 5 and 6 - NE quadrant of subdivision south side of Elliot between Mountain and Signal Butte), Book 521, Page 38 MCR, CMX, 2006.

8. Nova Vista Unit B, (Parcel 2 - NW quadrant of subdivision south side of Elliot between Mountain and Signal Butte), Book 877, Page 32 MCR, CMX, 2006.

6.6 Right of Way

1. Assignment of Right-Of-Way, Arizona State Land Department (ASLD) No. 16-111118 (perpetual), ASLD / Desert Communities, Inc., a Nevada corporation / Flood Control District of Maricopa County, dated February 20, 2007 and including parcel description and Exhibit "A" map by Wood, Patel and Associates, Inc. dated September 7, 2006.

APPENDIX A

HYDROLOGY

APPENDIX A

HYDROLOGY

Hydrology Parameters (DDMSW)

T1N

T1S

SIPHON DRAW WASH
EXHIBIT A
WATERSHED MAP

N

1" = 500'

250 0 250 500

Scale In Feet

CONTOUR INTERVAL =2'

LEGEND

- (XX) WATERSHED SUB BASIN
- -·-·- SUB BASIN /ROUTING FLOW PATH
- —— SUB BASIN BOUNDARY

BASELINE ROAD

4- 88" X 60" CMP

OVERCHUTE CAP1A 2-72" STEEL PIPE

NOTE: SEE EAST MESA ADMP WATERSHED EXHIBIT 1/HEC 1 SCHEMATIC FOR AREA NORTH OF BASELINE ROAD

58

CAP CANAL

OVERCHUTE CAP1B 2-72" STEEL PIPE

HOUSTON AVE

6

65A1

65AW

DELAWARE

INDUSTRIAL PARK (UNINCORPORATED PINAL CO.)

SUNDLAND SPRINGS VILLAGE SUBDIVISION

GUADALUPE ROAD

3-24"

2-24"

3-24"

2-24" CMP

SECTION LINE

160'

65A2

IRONWOOD DRIVE

AREA DELETED FROM CONTRIBUTING WATERSHED

APACHE JUNCTION WASTE WATER TREATMENT FACILITY

WEEKS WASH

SIPHON DRAW WASH

GUADALUPE ROAD (FUTURE)

MERIDIAN ROAD

CHANNEL REACH 1

65B

MID SECTION LINE

7

210'

50'

65A3

1-24" CMP

1-24" CMP

8

SRP 500KV /230KV OHP ESMT

1-8'x4' RCB

POWERLINE FRS

DETENTION BASIN PARCEL

65A3A

MERIDIAN POINTE SUBDIVISION

SIPHON DRAW WASH

1-24" CMP

ADJUSTED SOUTH LIMIT OF EAST MESA ADMP SUB BASIN 65A

POWERLINE FLOODWAY

CAP CANAL

ELLIOT ROAD

65'

SECTION LINE

MARICOPA COUNTY | PINAL COUNTY

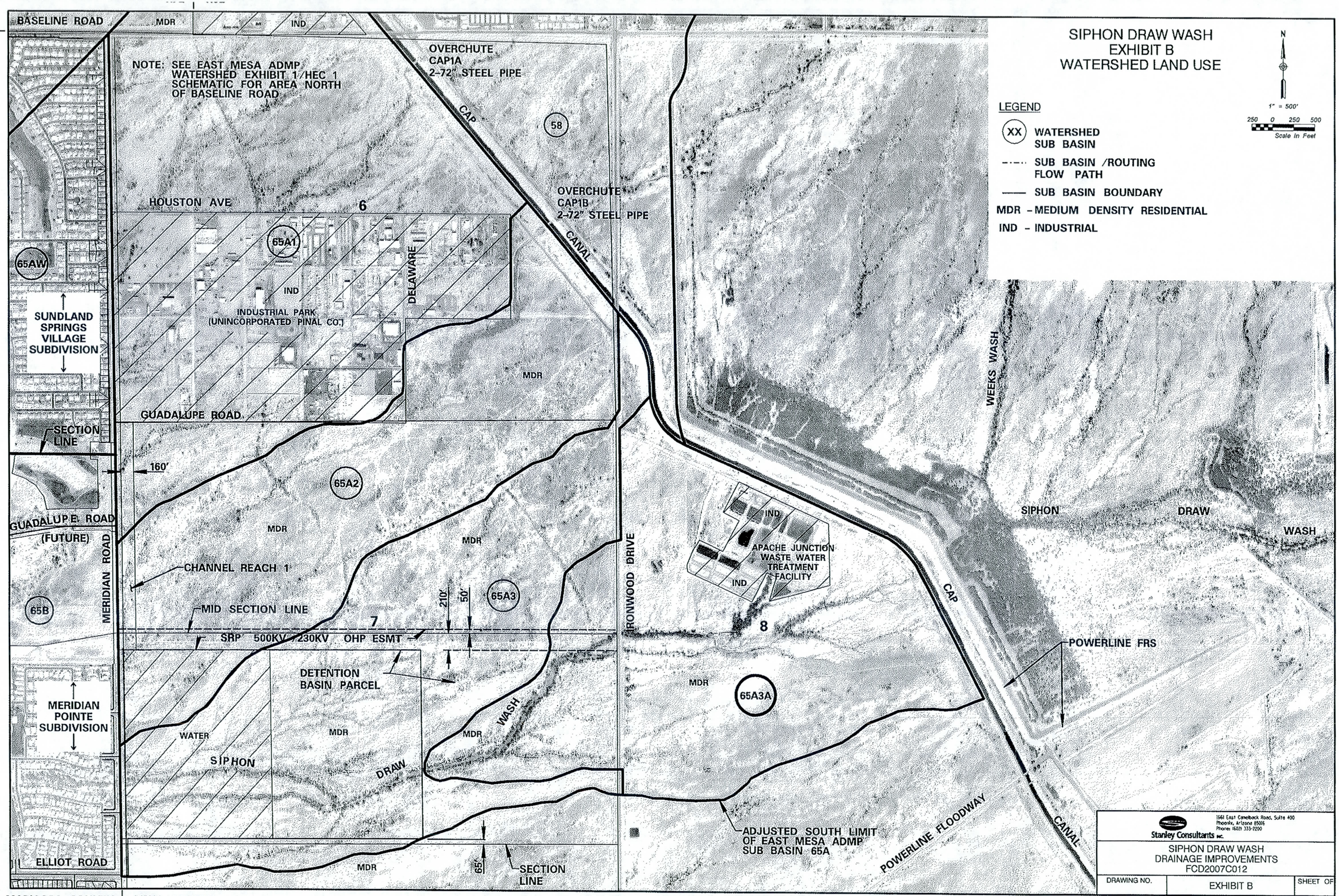
Stanley Consultants INC.

1661 East Camelback Road, Suite 400
Phoenix, Arizona 85016
Phones (602) 333-2200

SIPHON DRAW WASH
DRAINAGE IMPROVEMENTS
FCD2007C012

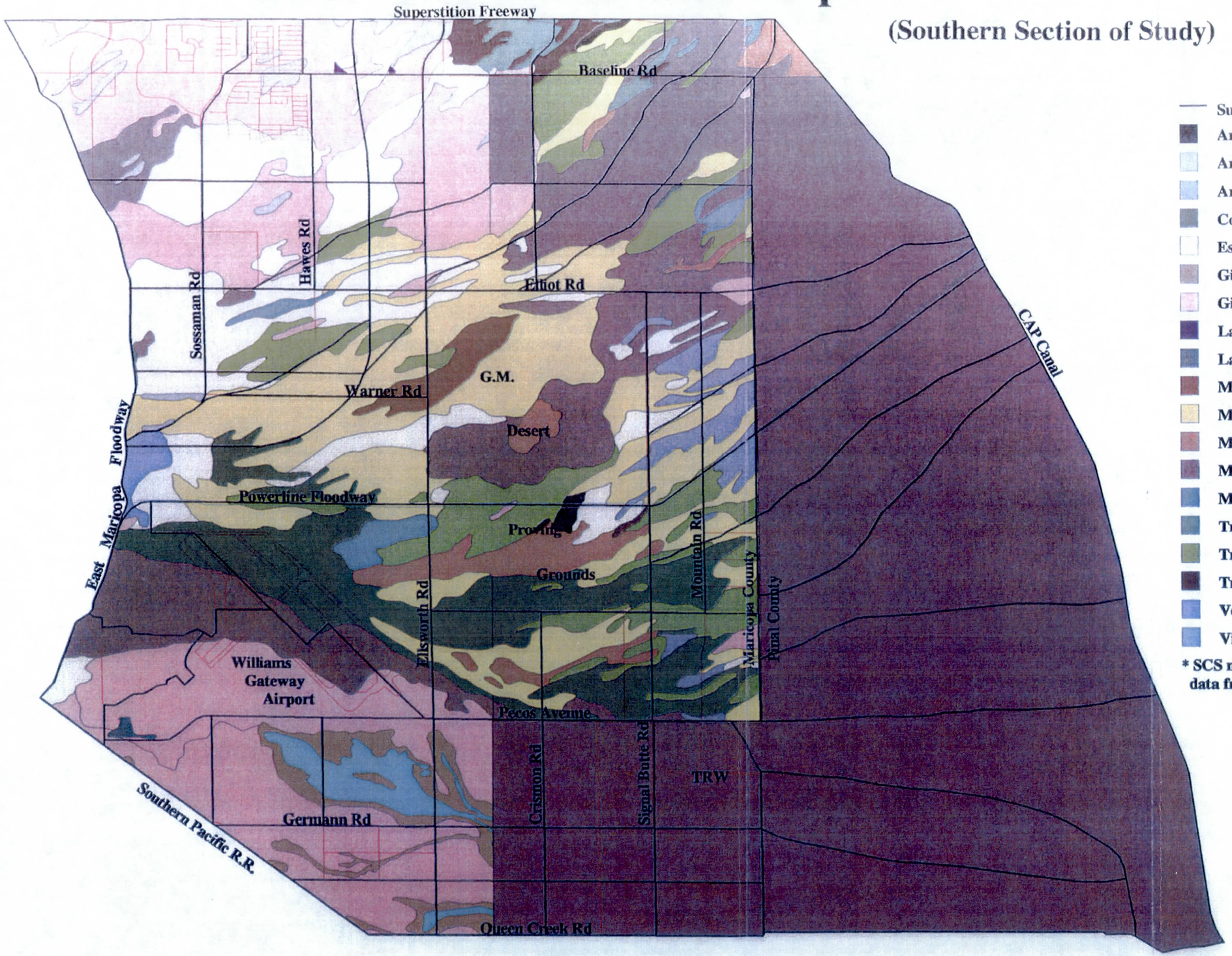
DRAWING NO.	EXHIBIT A	SHEET OF

12/26/2007 2:52:44 PM Q:\20539\06-PreDesign\06-Hunt\09-Display_Exhibit\539_Watershed Map_Exhibit A.dgn


SIPHON DRAW WASH
EXHIBIT B
WATERSHED LAND USE
N
1" = 500'
250 0 250 500
Scale In Feet
LEGEND
XX WATERSHED SUB BASIN
SUB BASIN /ROUTING FLOW PATH
SUB BASIN BOUNDARY
MDR - MEDIUM DENSITY RESIDENTIAL
IND - INDUSTRIAL
T1N
T1S
BASELINE ROAD
MDR
IND
NOTE: SEE EAST MESA ADMP WATERSHED EXHIBIT 1/HEC 1 SCHEMATIC FOR AREA NORTH OF BASELINE ROAD
OVERCHUTE CAP1A 2-72" STEEL PIPE
CAP
58
OVERCHUTE CAP1B 2-72" STEEL PIPE
CANAL
HOUSTON AVE
6
65A1
65AW
IND
INDUSTRIAL PARK (UNINCORPORATED PINAL CO.)
DELAWARE
SUNDLAND SPRINGS VILLAGE SUBDIVISION
MDR
GUADALUPE ROAD
SECTION LINE
160'
65A2
GUADALUPE ROAD (FUTURE)
MERIDIAN ROAD
MDR
MDR
CHANNEL REACH 1
65B
MID SECTION LINE
210'
50'
65A3
7
SRP 500KV/230KV OHP ESMT
DETENTION BASIN PARCEL
MERIDIAN POINTE SUBDIVISION
WATER
SIPHON
DRAW
MDR
MDR
WASH
MDR
ELLIOT ROAD
65'
SECTION LINE
IRONWOOD DRIVE
IND
APACHE JUNCTION WASTE WATER TREATMENT FACILITY
IND
8
MDR
65A3A
ADJUSTED SOUTH LIMIT OF EAST MESA ADMP SUB BASIN 65A
POWERLINE FLOODWAY
WEEKS WASH
SIPHON DRAW WASH
CAP
POWERLINE FRS
CANAL
MARICOPA COUNTY
PINAL COUNTY
Stanley Consultants INC.
1661 East Camelback Road, Suite 400
Phoenix, Arizona 85016
Phone: (602) 333-2200
SIPHON DRAW WASH
DRAINAGE IMPROVEMENTS
FCD2007C012
DRAWING NO.
EXHIBIT B
SHEET OF
12/6/2007 9:07:50 AM Q:\20539\06-PreDesign\06-Muni\09-Display_Exhibit\539_Watershed_Land Use_Exhibit B.dgn

East Mesa ADMP Soils Map

(Southern Section of Study)



Legend

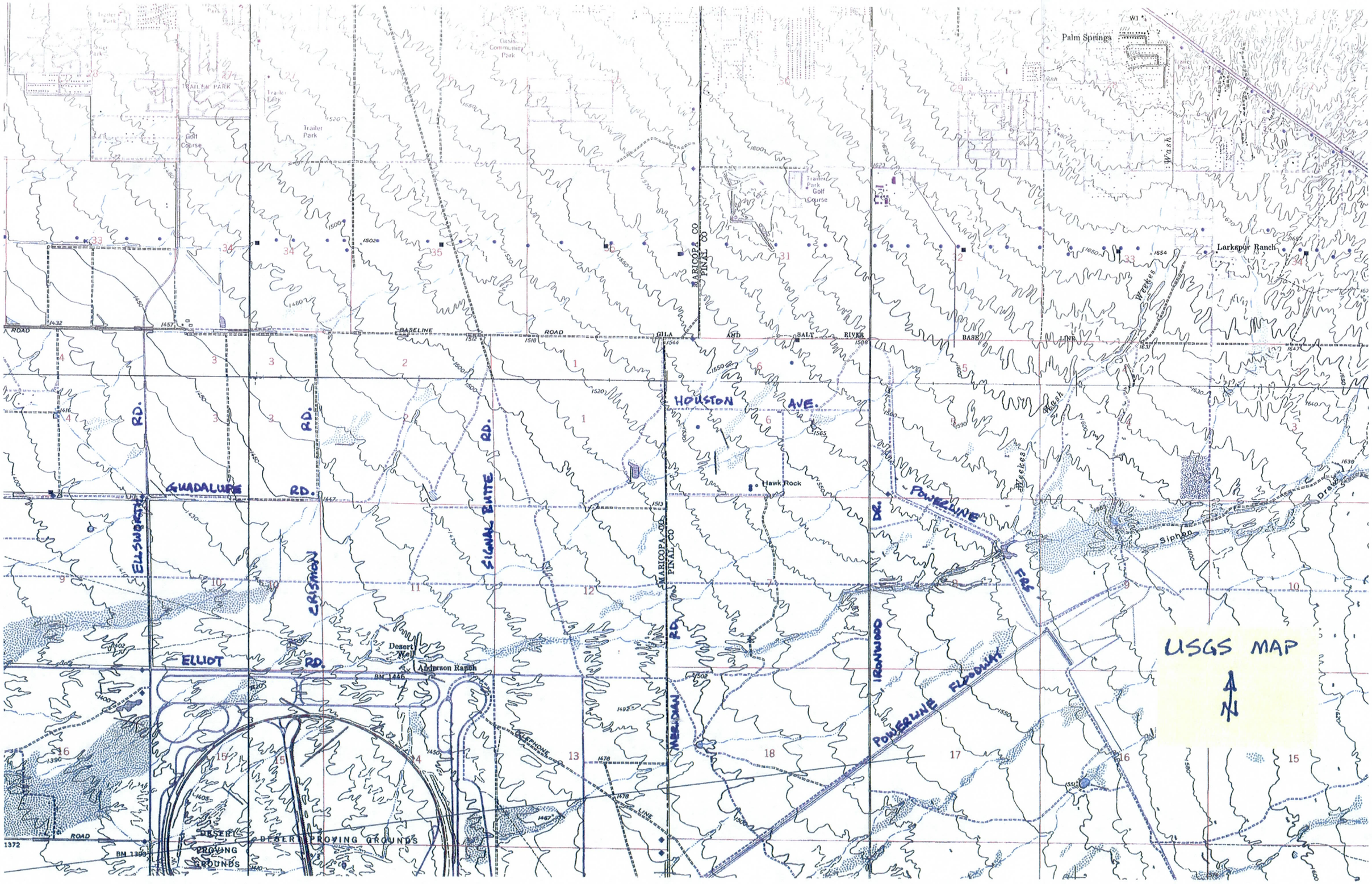
- Subbasin Boundary
- Antho gravelly sandy loams
- Antho sandy loam, 0 to 1 percent
- Antho sandy loams
- Contine clay loam
- Estrella loam
- Gilman fine sandy loam
- Gilman loam
- Lakes, ponds, reservoirs
- Land fill
- Mohall clay
- Mohall clay loam
- Mohall clay loam, calcareous
- Mohall loam
- Mohall loam, calcareous solum
- Tremant gravelly loams
- Tremant gravelly sandy loams
- Tremant-Antho complex, 1 to 5 percent
- Vecont clay
- Vint loamy fine sand

* SCS non-study area in Pinal County, data from general soils map.

N
W E
S

Map Scale
1:55,000
1"=.86miles

Plate 4


USGS MAP
N
Palm Springs
Larkspur Ranch
Hawk Rock
Siphon
Desert Well
Anderson Ranch
DESERT PROVING GROUNDS
HOUSTON AVE.
GUADALUPE RD.
ELLIOT RD.
ELLSWORTH
CRISMON
SIGNAL BUTTE RD.
MERIDIAN RD.
IRONWOOD DR.
POWERLINE
POWERLINE FLOODWAY
FRS
GILA AND SALT RIVER BASE LINE
BASELINE ROAD
MARICOPA CO
PINAL CO
TELEPHONE LINE
Wash
Trailer Park
Golf Course
Oasis Community Park
TRAILER PARK

Siphon Draw
Subbasin Soil and Land Use Parameters

Subbasin	Area[1]		Land Use						Soil				First Flush Volume[2] (acre-ft)
			Industrial		MDR		Water		Mohall CL-L		Mohall L		
	(sq. mi)	(sq. ft)	(sq. mi)	(sq. ft)	(sq. mi)	(sq. ft)	(sq. mi)	(sq. ft)	(sq. mi)	(sq. ft)	(sq. mi)	(sq. ft)	
65A1	0.971	27,078,100	0.506	14,105,200	0.465	12,972,900			0.115	3,216,900	0.856	23,861,200	9.9
65A2	0.544	15,162,800			0.425	11,840,900	0.119	3,321,900			0.544	15,162,800	9.1
65A3	1.207	33,648,400			1.020	28,431,600	0.187	5,216,800			1.207	33,648,400	21.8
65A3A	0.580	16,179,000			0.580	16,179,000					0.580	16,179,000	12.4
65A3B	0.627	17,470,400			0.440	12,253,600	0.187	5,216,800			0.627	17,470,400	9.4
65A	2.722	75,889,300	0.506	14,105,200	1.910	53,245,400	0.306	8,538,700	0.115	3,216,900	2.607	72,672,400	40.7

1. Subbasin areas for 65A3 and 65A3A DO NOT INCLUDE the footprint of the wastewater treatment facility (a 0.059 sq. mi. area)
2. First flush volume based upon 80% of 1/2" falling over the area designated as MDR.

Siphon Draw
Subbasin Physical Parameters

Subbasin	Area			Length of				Elevation		Slope	
				Flow Path		Centroid		Top	Bottom		
	(sq. mi)	(acres)	(sq. ft)	(ft)	(mi)	(ft)	(mi)	(ft)	(ft)	(ft/ft)	(ft/mi)
65A1	0.971	621.6	27,078,100	10,050	1.903	7,610	1.441	1562.00	1502.00	0.006	31.5
65A2	0.544	348.1	15,162,800	8,140	1.542	4,490	0.850	1568.00	1502.00	0.008	42.8
65A3	1.207	772.5	33,648,400	10,970	2.078	6,200	1.174	1548.00	1490.00	0.005	27.9
65A3A	0.580	371.4	16,179,000	7,110	1.347	4,460	0.845	1548.00	1517.00	0.004	23.0
65A3B	0.627	401.1	17,470,400								
65A	2.722	1742.2	75,889,300	11,780	2.231	9,120	1.727	1548.00	1490.00	0.005	26.0

1. Subbasin areas for 65A3 and 65A3A DO NOT INCLUDE the footprint of the wastewater treatment facility (a 0.059 sq. mi. area)

Routing	Length of Flow Path		Elevation		Slope	
	(ft)	(mi)	Top (ft)	Bottom (ft)	(ft/ft)	(ft/mi)
RCAP1A	10,050	1.903	1562.00	1502.00	0.006	31.5
RCAP1B	8,140	1.542	1568.00	1502.00	0.008	42.8
D/S of MRd	8,500	1.610	1490.00	1445.00	0.005	28.0

FCDMC
Drainage Design Management System
SUB BASINS
Project Reference: SIPHON DRAW-FCDMC

Area ID	Sub Basin Parameters									Rainfall Losses				
	Area (sq mi)	Length (mi)	Slope (ft/mi)	S-Graph	Lca (mi)	Lag (min)	Lag Ratio	Velocity (f/s)	Kn	IA (in)	DTHETA	PSIF (in)	XKSAT (in/hr)	RTIMP (%)
Major Basin: 01														
65A1	0.971	1.90	31.5	VALLEY	1.44	73.50	14.70	136.80	0.07	0.20	0.25	5.00	0.35	50
65A2	0.544	1.54	42.8	VALLEY	0.85	52.40	-	155.50	0.07	0.20	0.20	4.60	0.37	35
65A3	1.207	2.08	27.9	VALLEY	1.17	71.80	14.36	152.70	0.07	0.21	0.21	4.60	0.37	38
65A3A	0.580	1.35	23.0	VALLEY	0.84	55.70	11.14	127.60	0.07	0.25	0.25	4.60	0.39	45

* Non default value

Sub Basin	Land Use Code	Area (sq mi)	Area (%)	Initial Loss (IA)	Percent Impervious (RTIMP)	Vegetable Cover (%)	DTHETA	Kn
Major Basin 01								
65A1	170	0.465	47.9	0.25	45	50.0	NORMAL	0.07 *
	320	0.506	52.1	0.15	55	60.0	NORMAL	0.07 *
		0.971	**100.0**					
65A2	170	0.425	78.1	0.25	45	50.0	NORMAL	0.07 *
	740	0.119	21.9	0.00	0	0.0	WET	0.07 *
		0.544	**100.0**					
65A3	170	1.020	84.5	0.25	45	50.0	NORMAL	0.07 *
	740	0.187	15.5	0.00	0	0.0	WET	0.07 *
		1.207	**100.0**					
65A3A	170	0.580	100.0	0.25	45	50.0	NORMAL	0.07 *
		0.580	**100.0**					

* Non default value

FCDMC
Drainage Design Management System
SOILS
Project Reference: SIPHON DRAW-FCDMC

Area ID	Soil ID	Area (sq mi)	Area (%)	XKSAT	Rock Percent (%)	Effective Rock (%)
65A1	64577	0.115	11.80	0.05	-	100
	65345	0.856	88.20	0.28	-	100
65A2	65345	0.544	100.00	0.28	-	100
65A3	65345	1.207	100.00	0.28	-	100
65A3A	65345	0.580	100.00	0.28	-	100

* Non default value

FCDMC
Drainage Design Management System
HYDROLOGY NON DEFAULT OR CALCULATED VALUES
Project Reference: SIPHON DRAW-FCDMC

Sub Basin	Table	Soils or Land Use ID	Field	Value	Default	Comments
65A1	Land Use	170	Hydraulic Efficiency (Kn)	0.067	0.050	
		320				
		320	Hydraulic Efficiency (Kn)	0.067	0.030	
65A2	Land Use	170	Hydraulic Efficiency (Kn)	0.067	0.050	
		740				
		740	Hydraulic Efficiency (Kn)	0.067	1.000	
65A3	Land Use	170	Hydraulic Efficiency (Kn)	0.067	0.050	
		740				
		740	Hydraulic Efficiency (Kn)	0.067	1.000	
65A3A	Land Use	170	Hydraulic Efficiency (Kn)	0.067	0.050	

APPENDIX A

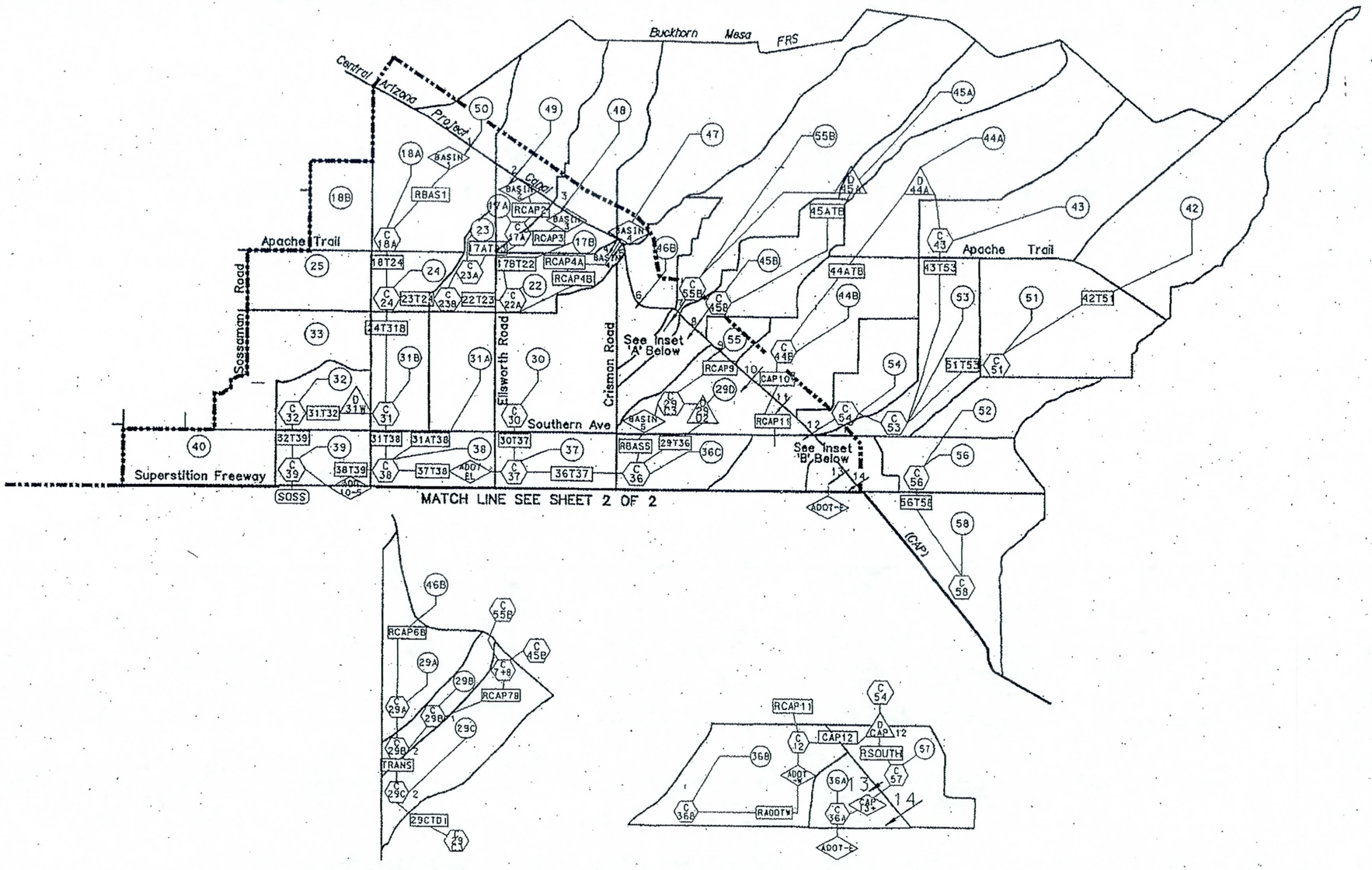
HYDROLOGY

Base 100-yr, 24-hr Hydrology (HEC-1)

FLOOD CONTROL DISTRICT
OF MARICOPA COUNTY

East Mesa Area
Drainage Master Plan

F.C.D. CONTRACT NO. 95-32



LEGEND

STUDY BOUNDARY	
SUB-BASIN BOUNDARY	
DIVERT HYDROGRAPH	DT TRW
SUB-BASIN RUNOFF	90A
ROUTE HYDROGRAPH	6AT78
COMBINE HYDROGRAPH	CP 90A
OUTFLOW FROM STUDY AREA	CAP5
DETENTION BASIN	ADOT 9
CAP OVERCHUTE	5

N

2500 0' 2500 5000
SCALE: 1" = 5000'

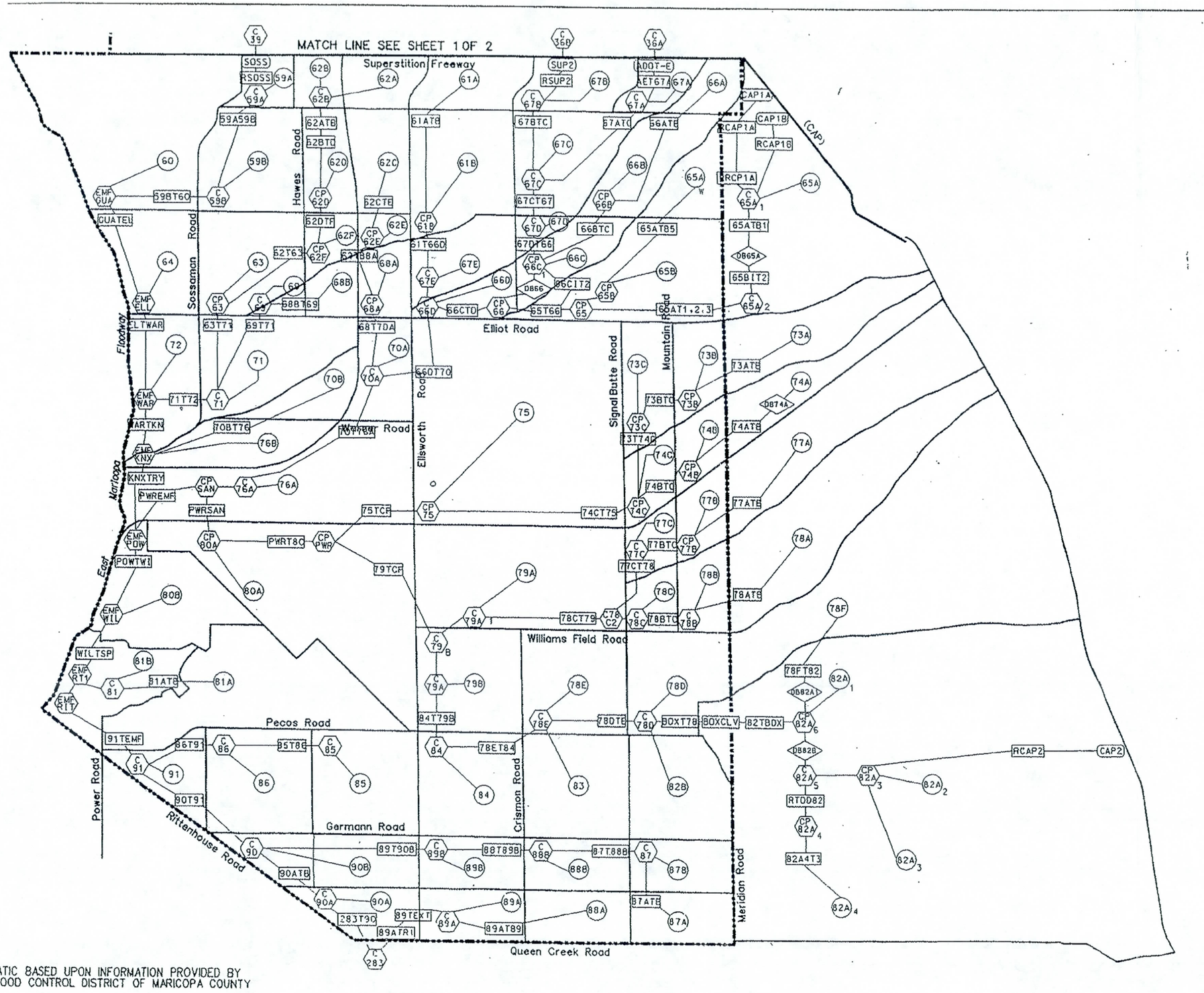
DIBBLE & ASSOCIATES
CONSULTING ENGINEERS

Hoskin Engineering Consultants

HEC-1 SCHEMATIC
NORTH OF
SUPERSTITION FREEWAY

SHEET 1 OF 2

NOTE:
SCHEMATIC BASED UPON INFORMATION PROVIDED BY
THE FLOOD CONTROL DISTRICT OF MARICOPA COUNTY



NOTE:
SCHEMATIC BASED UPON INFORMATION PROVIDED BY THE FLOOD CONTROL DISTRICT OF MARICOPA COUNTY

FLOOD CONTROL DISTRICT
OF MARICOPA COUNTY

East Mesa Area
Drainage Master Plan

F.C.D. CONTRACT NO. 95-32

LEGEND

STUDY BOUNDARY	
SUB-BASIN BOUNDARY	
DIVERT HYDROGRAPH	DT TRW
SUB-BASIN RUNOFF	90A
ROUTE HYDROGRAPH	6AT7B
COMBINE HYDROGRAPH	CP 90A
OUTFLOW FROM STUDY AREA	CAP5
DETENTION BASIN	ADOT-W
CAP OVERCHUTE	5

N

2500 0' 2500 5000
SCALE: 1" = 5000'

DIBBLE & ASSOCIATES
CONSULTING ENGINEERS

Hoskin Engineering Consultants

HEC-1 SCHEMATIC
SOUTH OF
SUPERSTITION FREEWAY

SHEET 2 OF 2

```
1****************************************
*                                      *
*   FLOOD HYDROGRAPH PACKAGE  (HEC-1)  *
*              JUN  1998               *
*           VERSION 4.1                *
*                                      *
*  RUN DATE   03JAN08  TIME  11:28:46  *
*                                      *
****************************************
```

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


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

   1          ID   Project:       Siphon Draw Wash Drainage Improvements
   2          ID   Contract FCD:   2007C012
   3          ID   SCI Project No: 20539
   4          ID
   5          ID   Notes By:       Stanley Consultants, Inc. (SCI)
   6          ID   Revision Date:  October, 2007
   7          ID
   8          ID   Filename:       SDW-BASE.DAT  (Original Model: S60EMAP1.DAT)
   9          ID   Storm Event:    100-Yr, 24 Hrs
  10          ID   Conditions:     Future Conditions
  11          ID
  12          ID   Comments:
  13          ID
  14          ID   This is the initial base model for development and analysis of
  15          ID   Siphon Draw Drainage Improvements.  For purposes of design and analysis
  16          ID   this model is a truncated version of the original hydrologic model
  17          ID   S60EMAP1.DAT provided by the FCDMC.  Any hydrologic elements which do
  18          ID   not contribute to runoff along Elliot Road, just upstream of the
  19          ID   SanTan Freeway Channel(routing reach 66T70C) were removed
  20          ID
  21          ID   To run correctly, this model requires referencing a DSS file created
  22          ID   by the upstream hydrologic model ultimately developed from the
  23          ID   East Mesa ADMP.  For the 100-year, future conditions, this model is
  24          ID   N60EM.DAT (which produces N60EM.DSS).
  25          ID
  26          ID   END SCI INTRODUCTORY COMMENTS
  27          ID
  28          ID   ************************************************************************
  29          ID
  30          ID   MODEL REVISED 9/12/02 TO CHANGE ZW CARD TO ZR CARD AT HYDROGRAPH CAP1B (CWR)
  31          ID
  32          ID   ID  Kirkham Michael:
  33          ID   Last Revised Date:  5/14/02
  34          ID   Filename:  WS4-SEM.DAT
  35          ID
  36          ID   Comments Dated 5/14/02 (CJ)
  37          ID
  38          ID   This model should be used for the Rittenhouse and Chandler Heights Basin
  39          ID   Design Project - 30? Design Analyses.
  40          ID
  41          ID   This model is one of several models that represent the EMF watershed.
  42          ID   This model covers the Southeast Mesa Area and should reference as a DSS
  43          ID   the watershed model for the Northeast Mesa Area (Filename WS2-NEM.DAT).
  44          ID
  45          ID   This model is necessary to determine the input hydrographs for the
  46          ID   Rittenhouse Basin Design HEC-RAS Unsteady State analysis.  To develop
  47          ID   the necessary input hydrographs the following models should be run in order.
  48          ID   Because the files utilize a TAPE21 file to export import hydrographs
  49          ID   between models, prior to running the FIRST model (WS1-NWM.DAT) any existing
  50          ID   TAPE21 file in the directory should be deleted.  The run procedure order is:
  51          ID
  52          ID        1)  WS1-NWM.DAT
  53          ID        2)  WS2-NEM.DAT
  54          ID        3)  WS3-QCSW.DAT
  55          ID        4)  WS4-SEM.DAT (referencing WS2-NEM.DSS for the DSS file)
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LINE          ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10

  56          ID        5)  RT1-BASE.DAT
  57          ID
  58          ID   The necessary input hydrographs for the Rittenhouse Basin analysis
  59          ID   are determined in RT1-BASE.  In that output file, the hydrograph at
  60          ID   RWFLD1 should be exported and used as the input hydrograph at the
  61          ID   EMF Reach 4 Cross Section 17.082.  And the hydrograph at RITTEN should
  62          ID   be exported and used as the input hydrograph for the Rittenhouse Main
  63          ID   Channel at Cross Section 820.00
  64          ID
  65          ID
  66          ID   ***************************************************************************
  67          ID   **** NOTE BY PRIMATECH ENGINEERS:                                     ****
  68          ID   **** DATE: 06/12/2001                                                 ****
  69          ID   **** THE NEW FILE NAME IS: SEBTALT2.DAT                               ****
  70          ID   **** THE FILE WAS RENAMED AS <<RTBTALT2.DAT>> FOR THE EAST MARICOPA   ****
  71          ID   **** FLOODWAY CAPACITY MITIGATION PROJECT, BY FLOOD CONTROL DISTRICT OF ****
  72          ID   **** MARICOPA COUNTY.                                                 ****
  73          ID   **** THE FILE WAS RENAMED <<RTBTALT3.DAT>> AND UPDATED USING GREEN AND ****
  74          ID   **** AMPT FUTURE CONDITIONS FOR BASINS 258 TO 268.                    ****
  75          ID   ***************************************************************************
  76          ID
  77          ID
  78          ID
  79          ID    THIS MODEL WAS ORIGINALLY MIDDOUT.DAT
  80          ID    IT HAS BEEN MODIFIED BY CPE (7/2000)
  81          ID    FOR ALTERNATIVE 2 FOR THE EAST MARICOPA FLOOWAY
  82          ID    CAPACITY MITIGATION AND MULTI-USE CORRIDOR STUDY
  83          ID    TO ROUTE BOTH THE POWERLINE FLOOWAY
  84          ID    AND THE SANTAN FREEWAY CHANNEL INTO THE RAY BASIN PRIOR THEIR OUTFALL
  85          ID    INTO THE EMF
  86          ID
  87          ID   ***************************************************************
  88          ID
  89          ID         Model files changed by Collins/Pina Engineering
  90          ID         to reflect multi-use design concepts (recreation
  91          ID         and environment) proposed throughout the entire
  92          ID         EMF Corridor.    July 2000
  93          ID
  94          ID
  95          ID    VERSION 8.06  CPE 7/31/00
  96          ID
  97          ID  ******************************************************************************
  98          ID
  99          ID
 100          ID  ******************************************************************************
 101          ID   FILENAME: MIDDOUT.DAT
 102          ID
 103          ID   ALL CIP INFRASTRUCTURE IS IN PLACE, FUTURE CONDITIONS LANDUSE IS IN PLACE
 104          ID   FLOW IS ROUTED UP ELLSWORTH ROAD IN A EARTH LINED CHANNEL
 105          ID
 106          ID  ******************************************************************************
 107          ID   PRODUCED BY DIBBLE AND ASSOCIATES AND HOSKIN ENGINEERING CONSULTANTS.
 108          ID   File Name: Final8.Dat
 109          ID   Revised - Jan. 2000 by SZ (Wood/Patel) From Final7.dat - new Z-V & Sideweir
 110          ID   Revised - Jan. 2000 by SZ (Wood/Patel) from Final6.dat - 60% review comments
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LINE          ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10

 111          ID   Revised - Dec. 1999 by SZ (Wood/Patel) from Final5.dat
 112          ID   Revised - Dec. 1999 by SZ (Wood/Patel) from Final4.dat
 113          ID   Revised - Nov. 1999 by SZ (Wood/Patel) from Final3.dat
 114          ID   Revised - June 1999 by SZ (Wood/Patel) for Final Model from Opt1.dat.
 115          ID   Revised - May 1999 by SZ (Wood/Patel) for Option 1, Based on Model SDIB.DAT
 116          ID   REVISED - MAY, 1999 BY VAS TO INCORPORATE INCREASE OF SUBBASIN RETENTION AND
 117          ID             REVISIONS TO THE REGIONAL DETENTION BASIN STORAGE
 118          ID   REVISED - FEB, 1999 BY VALERIE SWICK, FCD OF MARICOPA COUNTY
 119          ID   REVISED - MAY, 1998 BY D&A
 120          ID
 121          ID   REVISED BY VALERIE SWICK, FEB. 26, 1998
 122          ID
 123          ID   FLOWS FROM DETENTION BASIN LOCATED AT NE CORNER OF ELLIOT AND ELLSWORTH ROADS
 124          ID   IS ROUTED TO THE SOUTHWEST BY SIPHON DRAW TO SUBBASIN 70A. FROM THERE THEY
 125          ID   WILL BE ROUTED BY A CHANNEL TO THE EMF. FLOWS FROM SUBBASINS ADJACENT TO
 126          ID   SANTAN FREEWAY ALIGNMENT WILL BE ROUTED SOUTH TO SUBBASIN 70A WHERE THEY WILL
 127          ID   BE COMBINED WITH FLOW IN SIPHON DRAW.
 128          ID
 129          ID   EAST MESA AREA DRAINAGE MASTER PLAN
 130          ID   AREA SOUTH OF SUPERSTITION (U.S. HWY 60)
 131          ID   AUGUST 1997
 132          ID   SOUTHEAST MESA HIGH RESOLUTION MODEL
 133          ID
 134          ID   ***********FUTURE CONDITION MODEL OF THE WATERSHED************************
 135          ID
 136          ID  ************ATTENTION*****************************************************
 137          ID    SUBBASINS 75, 79A, 79B, 78E,  LANDUSES WERE NOT
 138          ID    CHANGED BECAUSE IT WAS FELT THAT THEIR FUTURE CONDITIONS LANDUSES WOULD BE
 139          ID    SIMILAR TO THE EXISTING CONDITIONS LANDUSES.
 140          ID    RETENTION VOLUMES WILL ALSO NOT BE UTILIZED FOR SUBBASINS 75, 79A, 79B, 78E
 141          ID    SOME QUEEN CREEK SUBBASINS WILL ALSO NOT HAVE RETENTION VOLUMES, EITHER
 142          ID    BECAUSE THEY LIE IN PINAL COUNTY AND WE DONT KNOW PINAL COUNTIES PLANS OR
 143          ID    THEY LIE IN THE SANTAN MOUNTAINS AND WON'T GET DEVELOPED
 144          ID    WILLIAMS GATEWAY AIRPORT (SUBBASINS 80A, 80B, 81A, AND 81B) ARE MODELED AS
```

```
145          ID    FUTURE CONDITIONS AND HAVE RETENTION VOLUMES FOR THE 100YR 2HR STORM
146          ID  ****************************************************************************
147          ID   FILENAME:  SDIBB.DAT
148          ID
149          ID   THIS MODEL REPRESENTS THE FUTURE CONDITION OF THE WATERSHED.
150          ID   TOTAL DRAINAGE AREA IS APPROXIMATELY 213 SQ. MI.
151          ID   THIS MODEL USES A Kn VALUE OF 0.09 FOR DESERT LAND USE DUE TO SHEET FLOW
152          ID   CONDITIONS.
153          ID
154          ID   100-YEAR 24-HOUR FREQUENCY
155          ID   AREAL REDUCTIONS FROM FCD HYDROLOGY MANUAL
156          ID   THIS MODEL INCLUDES INFLOW FROM NORTH OF THE SUPERSTITION FREEWAY
157          ID   AND EAST OF THE CAP
158          ID
159          ID   DATA FROM THE QUEEN CREEK ADMS HAS BEEN ADDED TO CALCULATE FLOWS INTO THE
160          ID   EMF.   MUSKINGUM ROUTING NSTEPS WERE ADJUSTED TO BE WITHIN THE SUGGESTED
161          ID   RANGE.
162          ID
163          ID   METHODOLOGY
164          ID   THE US CORPS OF ENGINEERS FLOOD HYDROLOGY MODEL HEC-1 DATED SEP1990 VER 4.0
165          ID   SCS TYPE II RAINFALL DISTRIBUTION
1                                    HEC-1 INPUT                                          PAGE  4

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

166          ID   S-GRAPH HYDROGRAPH
167          ID   GREEN AND AMPT INFILTRATION EQUATION USED FOR CALCULATING LOSSES
168          ID   NORMAL DEPTH STORAGE CHANNEL ROUTING
169          ID   APPROXIMATE DIRECTION, LOCATION, AND LENGTH OF THE WASHES HAVE BEEN
170          ID   EVALUATED BASED ON FIELD INVESTIGATION, USGS MAPS, LANDIS AERIAL SURVEYS
171          ID   DATED 1994
172          ID   THE NOAA TECHNICAL MEMORANDUM NOAA ATLAS 2 DEPTH AREA RATIOS
173          ID
174          ID   ORIGINAL STUDY PERFORMED BY LISA C. YOUNG AND AFSHIN AHOURAIYAN, UPDATED BY
175          ID   DAVID DEGERNESS (OCT-DEC, 1996). REVIEWED BY VALERIE A. SWICK
176          ID   AND AMIR MOTAMEDI OF THE FLOOD CONTROL DISTRICT
177          ID   HYDROLOGY BRANCH ENGINEERING DIVISION, FLOOD CONTROL
178          ID   DISTRICT OF MARICOPA COUNTY, DECEMBER - JULY 1995.
179          ID
180          ID   ASSUMED VELOCITY OF 1 FT/SEC FOR SHEET FLOW, 2-3 FT/SEC FOR WASH/NATURAL
181          ID   CHANNEL, 3 FT/SEC FOR ROAD AND GRASS CHANNEL, 10FT/SEC FOR CONCRETE CHANNEL
182          ID
183          ID   VELOCITIES FOR ADMP IMPROVEMENT CHANNELS FROM DIBBLE AND ASSOCIATES
184          ID   SUGGESTED ALTERNATIVES (JULY 1, 1997)
185          ID
186          ID   ***********************************************************************
187          ID   **** THE FOLLOWING NOTE WAS ADDED BY PRIMATECH ENGINEERS ON 06-12-2001 ****
188          ID   ***********************************************************************
189          ID   NOTE: MUST USE NEBUILD.DSS AS THE DSS FILE TO IMPORT FLOWS ACROSS THE
190          ID         SUPERSTITION FREEWAY.
191          ID   ***********************************************************************
192          ID
193          ID
194          ID   NOTE: MUST USE NDIBF.DSS AS THE DSS FILE TO IMPORT FLOWS ACROSS THE
195          ID         SUPERSTITION FREEWAY.
196          ID
197          ID   DDM MCUHP2 SOUTH EAST MESA ADMP - SOUTH OF SUPERSTITION FREEWAY, FUTURE CONDI
             *DIAGRAM
198          IT       5  1APR97    0000    1000
199          IO       5
200          IN      15
201          JD    3.60    0.01
202          PC    .000    .002    .005    .008    .011    .014    .017    .020    .023    .026
203          PC    .029    .032    .035    .038    .041    .044    .048    .052    .056    .060
204          PC    .064    .068    .072    .076    .080    .085    .090    .095    .100    .105
205          PC    .110    .115    .120    .126    .133    .140    .147    .155    .163    .172
206          PC    .181    .191    .203    .218    .236    .257    .283    .387    .663    .707
207          PC    .735    .758    .776    .791    .804    .815    .825    .834    .842    .849
208          PC    .856    .863    .869    .875    .881    .887    .893    .898    .903    .908
209          PC    .913    .918    .922    .926    .930    .934    .938    .942    .946    .950
210          PC    .953    .956    .959    .962    .965    .968    .971    .974    .977    .980
211          PC    .983    .986    .989    .992    .995    .998   1.000
             *
212          JD    3.58     1.0
213          JD    3.49     5.0
214          JD    3.38    10.0
215          JD    3.24    30.0
216          JD    3.10    60.0
217          JD    3.05    90.0
218          JD    3.00   120.0
1                                    HEC-1 INPUT                                          PAGE  5

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

219          JD    2.97   150.0
             *

220          KK    65A1   BASIN
221          KM    THE FOLLOWING PARAMETERS WERE PROVIDED FOR THIS BASIN
222          KM    L=      1.9  Lca=      1.4   S=   31.5  Kn= .067  LAG=  73.5
223          KM    PHOENIX VALLEY S-GRAPH WAS USED FOR THIS BASIN
224          KM    All parameters are revised from the ADMP hydrology and estimated from
225          KM    available mapping except the Kn value.  Due to the significant
226          KM    impact of the Kn value on subbasin discharges, the original ADMP hydrology
227          KM    Kn value was retained for the subbasin.
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228          BA   0.971
229          LG    0.20    0.25    5.00    0.35      50
230          UI      44      45      44     107     162     195     220     249     267     299
231          UI     336     375     466     557     544     466     413     367     339     302
232          UI     271     240     216     184     142     106      78      76      74      58
233          UI      44      45      40      13      14      14      13      14      13      14
234          UI      14      13      14       0       0       0       0       0       0       0
             *

235          KK   R65A1
236          KM   Retain first flush volume (equal to 80% of first ½" of runoff)
237          KM   from MDR areas only.
238          KM   First flush retention is not included for industrial areas at this time.
239          DT  FF65A1     9.9
240          DI       0   10000
241          DQ       0   10000
             *

242          KK   CAP1A
243          KM   INFLOW FROM EAST OF THE CAP ASSOCIATED WITH TWO 72" PIPE OVERCHUTES AT
244          KM   STATION 131+90 SALT-GILA AQUEDUCT REACH 2
245          KM   Overchute consists of two 72" pipes but level pool function
246          KM   at the CAP is disregarded for this location per the upper ADMP
247          KM   hydrology model.
248          KM   Basin area below represents half of the drainage area above CAP (1.93
249          BA   0.965
250          ZR  =QI A=CAP1A B=OVERCHUTE C=FLOW E=5MIN F=100YEAR
             *

251          KK  RCAP1A
252          KM   Route flow from CAP overchute (CAP1A) to confluence with CAP1B overchute
253          KM   at the SRP easement / Meridian Channel.
254          KM   Hypothetical future condition earth channel.
255          RS       5    FLOW      -1
256          RC    .035    .035    .035   10050    .006
257          RX       0       4       8      24      44      60      64      68
258          RY     100      99      98      94      94      98      99     100
             *
```



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

259          KK  CCAP1A
260          KM   Combine routed (RCAP1A) and local hydrographs (65A1).
261          HC       2   1.936
             *

262          KK    65A2   BASIN
263          KM    THE FOLLOWING PARAMETERS WERE PROVIDED FOR THIS BASIN
264          KM    L=     1.5  Lca=       .9   S=    42.8  Kn= .067  LAG=  52.4
265          KM    PHOENIX VALLEY S-GRAPH WAS USED FOR THIS BASIN
266          KM    All parameters are revised from the ADMP hydrology and estimated from
267          KM    available mapping except the Kn value.  Due to the significant
268          KM    impact of the Kn value on subbasin discharges, the original ADMP hydrology
269          KM    Kn value was retained for the subbasin.
270          BA   0.544
271          LG    0.20    0.20    4.60    0.37      35
272          UI      35      35      82     137     172     196     227     262     320     427
273          UI     417     335     291     255     213     184     156     113      68      60
274          UI      58      35      35      21      11      11      11      10      11      11
275          UI      11       0       0       0       0       0       0       0       0       0
276          UI       0       0       0       0       0       0       0       0       0       0
             *

277          KK   R65A2
278          KM   Retain first flush volume (equal to 80% of first ½" of runoff)
279          KM   from MDR areas only.
280          DT  FF65A2     9.1
281          DI       0   10000
282          DQ       0   10000
             *

283          KK   CAP1B
284          KM   INFLOW FROM EAST OF THE CAP THROUGH 2 - 72" PIPE OVERCHUTES
285          KM   STATION 158+00 SALT-GILA AQUEDUCT REACH 2
286          KM   Overchute consists of two 72" pipes but level pool function
287          KM   at the CAP is disregarded for this location per the upper ADMP
288          KM   hydrology model.
289          KM   Basin area below represents half of the drainage area above CAP (1.93)
290          BA   0.965
291          ZR  =QI  A=CAP1B  B=OVERCHUTE  C=FLOW  E=5MIN F=100YEAR
             *

292          KK  RCAP1B
293          KM   Route flow from CAP overchute (CAP1A) to confluence with CAP1B overchute
294          KM   at the SRP easement / Meridian Channel.
295          KM   Hypothetical future condition earth channel.
296          RS       4    FLOW      -1
297          RC    .035    .035    .035    8150    .008
298          RX       0       4       8      24      44      60      64      68
299          RY     100      99      98      94      94      98      99     100
             *
```

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

 300          KK  CCAP1B
 301          KM   Combine routed (RCAP1B) and local hydrographs (65A2).
 302          HC       2   1.509
              *

 303          KK  C65A12
 304          KM   Combine routed (RCAP1A & RCAP1B) and local hydrographs (65A1 & 65A2)
 305          HC       2   3.445
              *

 306          KK  DI-BAS
 307          KM   Divert flow to Siphon Draw Detention Basin per Wood/Patel concept.
 308          KM   However, due to minor changes in hydrologic sequencing, the
 309          KM   diversion is reversed such that basin bypass is diverted
 310          KM   instead of the detention basin inflow.
 311          DT  BYPASO
              * Original Wood/Patel diversion
              * DI      0     100     300     380     600    1000    1500    2000    3000
              * DQ      0       0       0       0     220     620    1120    1620    2620
              *
 312          DI        0     100     300     380     600    1000    1500    2000    3000
 313          DQ        0     100     300     380     380     380     380     380     380
              *

 314          KK  SDDB-N
 315          KM   SIPHON DRAW NORTH BASIN
 316          KM   OFF-LINE DETENTION BASIN LOCATED AT MERIDIAN ROAD AND NORTH SIPHON DRAW WASH
 317          KM   WITH  24" OUTLET PIPE AND 100' WEIR
 318          KM   This is the Wood/Patel concept basin design, May 2006
 319          RS       1    STOR       0
 320          SV       0    21.0    42.0    64.0   86.00   109.0   132.0   156.0   180.0   206.0
 321          SE    87.0    88.0    89.0    90.0    91.0      92      93      94      95      96
 322          SL    88.0   3.140     .62      .5
 323          SS    95.0     100     2.7     1.5
              *

 324          KK    65A3   BASIN
 325          KM    THE FOLLOWING PARAMETERS WERE PROVIDED FOR THIS BASIN
 326          KM    L=       2.1  Lca=      1.2   S=   27.9  Kn= .067  LAG=  71.8
 327          KM    PHOENIX VALLEY S-GRAPH WAS USED FOR THIS BASIN
 328          KM    All parameters are revised from the ADMP hydrology and estimated from
 329          KM    available mapping except the Kn value.  Due to the significant
 330          KM    impact of the Kn value on subbasin discharges, the original ADMP hydrology
 331          KM    Kn value was retained for the subbasin.
 332          KM    Contributing area associated with Siphon Draw Wash at Meridian Rd. adjusted.
 333          KM    South watershed boundary differs from ADMP.  In addition, area of WW
 334          KM    treatment facility adjacent to the CAP is not considered contributing area
 335          KM    and is not included in the total subbasin area.
 336          BA   1.207
 337          LG    0.21    0.21    4.60    0.37      38
 338          UI      56      58      56     146     209     253     289     322     346     387
 339          UI     440     498     627     741     648     563     502     454     409     366
 340          UI     327     284     262     204     159     101      98      92      87      56
 341          UI      57      57      21      18      17      18      17      17      18      17
```



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

 342          UI      17      18       0       0       0       0       0       0       0       0
              *

 343          KK   R65A3
 344          KM   Retain first flush volume (equal to 80% of first ½" of runoff)
 345          KM   from MDR areas only.
 346          DT  FF65A3    21.8
 347          DI       0   10000
 348          DQ       0   10000
              *

 349          KK  SDDB-S
 350          KM   SIPHON DRAW SOUTH BASIN
 351          KM   OFF-LINE DETENTION BASIN LOCATED AT MERIDIAN ROAD AND ELLIOT ROAD
 352          KM   WITH 24" OUTLET PIPE AND 100' WEIR
 353          KM   This is the Wood/Patel concept basin design, May 2006
 354          KM   However, note, Wood Patel 25 cfs bypass step at this basin has been deleted.
 355          RS       1    STOR       0
 356          SV       0    12.5    26.0    39.0   53.00    67.0    81.0    96.0   110.0   128.0
 357          SE    87.0    88.0    89.0    90.0    91.0      92      93      94      95      96
 358          SL    88.0   3.140     .62      .5
 359          SS    95.0     100     2.7     1.5
              *

 360          KK  SDWDBS
 361          KM   Combine outflow from North and South basins
 362          HC       2  4.652
              *

 363          KK  ELLSD1
 364          KM   Routing of SDW DB outlet flow along Elliot Rd. storm drain.
 365          RD    9000  0.0060   0.013            CIRC     3.5
              * ZW  A=ELLSD1 B=ROUTED BASIN PIPE OUTFLOW C=FLOW  E=5MIN F=100YR
              *
```

```
366          KK  BYPASI
367          KM   Return divert of Meridian Channel flow bypassing Siphon Draw Basin
368          DR  BYPASO
             *

369          KK  RBYPAS
370          KM   Route bypass flow from diversion structure to Meridian Rd crossing.
371          KM
372          RS       2    FLOW      -1
373          RC    .035    .035    .035    1700    .001
374          RX       0       4       8      24      44      60      64      68
375          RY     100      99      98      94      94      98      99     100
             *

376          KK   RSDW1
377          KM   Siphon Draw Wash (SDW) Meridian Rd to Mountain Rd
378          KM
379          RS       3    FLOW      -1
380          RC    .055    .045    .055    2700    .005
381          RX     100     125     170     175     185     190     235     260
1                                          HEC-1 INPUT                                                    PAGE  9

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

382          RY     100      98      96      94      94      96      98     100
             *

383          KK   RSDW2
384          KM   Siphon Draw Wash (SDW) Mountain Rd to Signal Butte
385          KM
386          RS      10    FLOW      -1
387          RC    .060    .050    .060    5800    .005
388          RX     100     200     340     345     355     360     500     600
389          RY     100      98      96      94      94      96      98     100
             * ZW  A=RSDW2 B=ROUTED FROM BASINS  C=FLOW  E=5MIN F=100YR
             *

390          KK    65AW
391          KM   BASIN 65AW
392          KM    THE FOLLOWING PARAMETERS WERE PROVIDED FOR THIS BASIN
393          KM    L=       .9  Lca=       .6   S=   54.7  Kn= .049  LAG=  26.1
394          KM    PHOENIX VALLEY S-GRAPH WAS USED FOR THIS BASIN
395          BA     .43
396          LG     .24     .25    5.30     .29   32.00
397          UI     56.    176.    295.    391.    603.    594.    432.    316.    210.    101.
398          UI     73.     43.     17.     17.     17.      0.      0.      0.      0.      0.
399          UI      0.      0.      0.      0.      0.      0.      0.      0.      0.      0.
             *

400          KK   R65AW
401          KM   RETAIN 100 YR 2 HR RUNOFF VOLUME
402          DT   D65AW      31
403          DI       0   10000
404          DQ       0   10000
             *

405          KK  65AT65
406          KM   ROUTE C65A TO BASIN 65B VIA A WASH,(THIS WASH IS NORTH OF SIPHON DRAW)
407          KM   THIS IS THE PART OF 65A WHICH IS WEST OF THE MERIDIAN RD ALIGNMENT
408          RS      11    FLOW      -1
409          RC    .045     .04    .045    9500    .007
410          RX       0     500    1000    1003    1053    1056    1511    2011
411          RY       4     3.5       3       0       0       2     2.5       3
             * ZW  A=65AT65 B=ROUTED 65AW  C=FLOW  E=5MIN F=100YR
             *

412          KK     65B
413          KM   BASIN 65B
414          KM    THE FOLLOWING PARAMETERS WERE PROVIDED FOR THIS BASIN
415          KM    L=      2.0  Lca=      1.2   S=   37.5  Kn= .036  LAG=  36.6
416          KM    PHOENIX VALLEY S-GRAPH WAS USED FOR THIS BASIN
417          BA    1.37
418          LG     .18     .25    6.00     .24   53.00
419          UI    126.    218.    506.    669.    809.   1014.   1468.   1422.   1102.    901.
420          UI    720.    562.    337.    218.    182.    126.     71.     39.     39.     39.
421          UI     39.      0.      0.      0.      0.      0.      0.      0.      0.      0.
422          UI      0.      0.      0.      0.      0.      0.      0.      0.      0.      0.
             *
1                                          HEC-1 INPUT                                                    PAGE 10

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

423          KK    R65B
424          KM   RETAIN 100 YR 2 HR RUNOFF VOLUME
425          DT    D65B     120
426          DI       0   10000
427          DQ       0   10000
             * ZW  A=R65B B=ROUTED 65B  C=FLOW  E=5MIN F=100YR
             *

428          KK   CP65B
429          KM   Combine flow from 65AW, 65B and RDSW2 (Siphon Draw Basin bypass flow)
430          HC       3   6.452
```

```
                * ZW  A=CP65B B= 65AW AND 65B AND RDSW2  C=FLOW  E=5MIN F=100YR
                *

431             KK   DI65B
432             KM        DIVERSION STRUCTURE TO ROUTE PEAK FLOW TO ELLIOT BASIN (EAST)
433             KM        By-pass 30 cfs to Elliot Channel, and Divert Remaining to E Basin
434             DT  DIRS65
435             DI       0    15.0      30   100.0     200   350.0     500     700     900   1500.
436             DQ       0       0       0    70.0     170   320.0     470     670     870   1470.
                *

437             KK   CP65A
438             KM   COMBINE FLOWS FROM ELLIOT STORM DRAIN AND EAST BASIN BYPASS
439             HC       2   6.452
                * ZW  A=CP65A B=CP65B+DI65B  C=FLOW  E=5MIN F=100YR
                *

440             KK  65AT-3
441             KM   ROUTE FROM 104th ST TO E. BASIN OUTLET
442             RD    1500  0.0065   0.012            CIRC     7.0
                *

443             KK   DR65B
444             KM        RETURN DIVERT TO EAST DETENTION BASIN
445             DR  DIRS65
                *

446             KK   RS65A
447             KM   ELLIOT BASIN, EAST
448             RS       1    STOR       0
449             SV       0    5.40    9.30   13.90   18.80   24.00   29.50   35.30   41.40   48.00
450             SE  1429.0  1433.0  1434.0  1435.0  1436.0  1437.0  1438.0  1439.0  1440.0  1441.0
451             SL  1430.0  0.7854     .62      .5
452             SS  1439.0     200     2.5     1.5
                *

453             KK    CP65
454             KM   COMBINE FLOWS FROM EAST ELLIOT BASIN AND ELLIOT STORM DRAIN
455             KM   BEFORE COMBINING WITH FLOWS FROM THE BYPASS CRISMON CHANNEL
456             HC       2
                *
1                                          HEC-1 INPUT                                          PAGE 11

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

457             KK   65T66
458             KM   ROUTE FROM E. BASIN OUTLET TO CRISMON ROAD.
459             RD    1200  0.0065   0.012            CIRC     7.5
                *

460             KK  ADOT-E
461             KM   INFLOW FROM NORTH OF THE SUPERSTITION FREEWAY ENTERING 67A
462             KM   FROM EAST ADOT DETENTION BASIN 4105.
463             BA    0.01
464             ZR  =QI A=ADOT EAST BASIN B=AT SUPERSTITION C=FLOW E=5MIN F=100YR
                *

465             KK  AET67A
466             KM    ROUTE SUPERSTITION FLOW THROUGH 67A TO BASELINE ROAD
467             IN      15
468             RS       6    FLOW      -1
469             RC    .045    .040    .045    5500    .010
470             RX       0     100     110     120     130     140     150     250
471             RY       5       4       3       1       1       3       4       5
                *

472             KK     67A
473             KM   BASIN 67A
474             KM    THE FOLLOWING PARAMETERS WERE PROVIDED FOR THIS BASIN
475             KM    L=      1.0  Lca=       .7   S=   42.9  Kn= .042  LAG=  25.7
476             KM    PHOENIX VALLEY S-GRAPH WAS USED FOR THIS BASIN
477             BA     .30
478             LG     .21     .25    4.70     .39   43.00
479             UI     39.    126.    208.    277.    433.    400.    292.    213.    134.     67.
480             UI     47.     25.     12.     12.     12.      0.      0.      0.      0.      0.
481             UI      0.      0.      0.      0.      0.      0.      0.      0.      0.      0.
                *

482             KK    R67A
483             KM   RETAIN 100 YR 2 HR RUNOFF VOLUME
484             DT    D67A      21
485             DI       0   10000
486             DQ       0   10000
                *

487             KK    C67A
488             KM    COMBINE FLOWS FROM ADOT-E AND SUBBASIN 67A
489             HC       2
                *

490             KK   67ATC
491             KM   ROUTE 67A TO 67C VIA WASH CROSSING BASELINE
492             RS       7    FLOW      -1
493             RC    .055    .045    .055    6300   .0071
```

```
494          RX       0     500     980    1003    1007    1031    1511    2011
495          RY       4     3.5       3       0       0       3     3.5       4
             *
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LINE         ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10

496          KK    SUP2
497          KM   INFLOW FROM NORTH OF SUPERSTITION FREEWAY, DISCHARGING INTO 67B
498          BA    0.01
499          ZR  =QI A=ADOT WEST BASIN B=AT SUPERSTITION C=FLOW E=5MIN F=100YR
             *

500          KK   RSUP2
501          KM   ROUTE SUP2 THROUGH SUBBASIN 67B
502          IN      15
503          RS       5    FLOW      -1
504          RC    .045    .045    .045    4500   .0056
505          RX       0     500    1000    1003    1007    1011    1511    2011
506          RY       4     3.5       3       0       0       2     2.5       3
             *

507          KK     67B
508          KM   BASIN 67B
509          KM    THE FOLLOWING PARAMETERS WERE PROVIDED FOR THIS BASIN
510          KM    L=      1.2  Lca=       .9   S=   28.0  Kn= .034  LAG=  26.4
511          KM    PHOENIX VALLEY S-GRAPH WAS USED FOR THIS BASIN
512          BA     .53
513          LG     .17     .25    4.90     .38   56.00
514          UI     68.    210.    356.    470.    713.    741.    536.    395.    269.    131.
515          UI     94.     59.     21.     21.     21.      0.      0.      0.      0.      0.
516          UI      0.      0.      0.      0.      0.      0.      0.      0.      0.      0.
             *

517          KK    R67B
518          KM   RETAIN 100 YR 2 HR RUNOFF VOLUME
519          DT    D67B      41
520          DI       0   10000
521          DQ       0   10000
             *

522          KK    C67B
523          KM   COMBINE FLOWS FROM SUP2 AND SUBBASIN 67B
524          HC       2
             *

525          KK   67BTC
526          KM   REACH CN-4, CN-5 plus culvert CNC-4.
527          KM   ROUTE FLOW IN THE CRISMON CHANNEL FROM BASELINE ROAD (C67B) TO
528          KM      GUADALUPE ROAD (C67C)
529          RS       2    FLOW      -1
530          RC    .025    .015    .025    5180   .0019
531          RX       0       8      16    24.4    36.4    44.8    52.8    60.8
532          RY     4.0     4.1     4.2       0       0     4.2     4.1     4.0
             *
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LINE         ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10

533          KK     67C
534          KM   BASIN 67C
535          KM    THE FOLLOWING PARAMETERS WERE PROVIDED FOR THIS BASIN
536          KM    L=      1.2  Lca=       .7   S=   40.2  Kn= .049  LAG=  32.3
537          KM    PHOENIX VALLEY S-GRAPH WAS USED FOR THIS BASIN
538          BA     .93
539          LG     .25     .25    5.10     .32   31.00
540          UI     96.    213.    432.    557.    702.   1006.   1133.    842.    667.    518.
541          UI    365.    193.    157.     96.     59.     30.     30.     30.     30.      0.
542          UI      0.      0.      0.      0.      0.      0.      0.      0.      0.      0.
543          UI      0.      0.      0.      0.      0.      0.      0.      0.      0.      0.
             *

544          KK    R67C
545          KM   RETAIN 100 YR 2 HR RUNOFF VOLUME
546          DT    D67C      67
547          DI       0   10000
548          DQ       0   10000
             *

549          KK    C67C
550          KM   COMBINE SUBBASINS 67C AND 67A AND 67B
551          HC       3
             *

552          KK  67CT67
553          KM   REACH CN-3 plus culvert CNC-3
554          KM   ROUTE FLOW IN THE CRISMON CHANNEL FROM C67C (@ GUADALUPE ROAD & CRISMON ROAD)
555          KM    TO C67D (AT APPROX. 1/2 MILE SOUTH OF GUADALUPE ROAD).
             *       Sta. 39+00 to Guadalupe Rd.
556          RS       1    FLOW      -1
557          RC    .025    .015    .025    2420   .0018
558          RX       0       6      12      24      64      76      82      88
559          RY       4       3       2       0       0       2       3       4
```

```
                *
 560            KK     67D
 561            KM   BASIN 67D
 562            KM    THE FOLLOWING PARAMETERS WERE PROVIDED FOR THIS BASIN
 563            KM    L=        .6  Lca=       .4   S=   34.7  Kn= .050  LAG=  20.5
 564            KM    PHOENIX VALLEY S-GRAPH WAS USED FOR THIS BASIN
 565            BA     .13
 566            LG     .25      .25    5.20     .30   30.00
 567            UI     23.      87.    132.    216.    202.    137.     86.     38.     23.      9.
 568            UI      6.       6.      0.      0.      0.      0.      0.      0.      0.      0.
 569            UI      0.       0.      0.      0.      0.      0.      0.      0.      0.      0.
                *

 570            KK    R67D
 571            KM   RETAIN 100 YR 2 HR RUNOFF VOLUME
 572            DT    D67D       9
 573            DI       0   10000
 574            DQ       0   10000
                *
1                                          HEC-1 INPUT                                                PAGE 14

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

 575            KK    C67D
 576            KM    COMBINE HYDROGRAPHS AT CP67D
 577            HC       2
                *

 578            KK  67DT66
 579            KM   REACH CN-2 plus culvert CNC-2
 580            KM   ROUTE FLOW IN THE CRISMON CHANNEL FROM APPROX. 1/2 MILE SOUTH
 581            KM    OF GUADALUPE ROAD TO THE INFLOW SPILLWAY FOR THE ELLIOT DETENTION BASIN.
                *       Sta. 20+00 to Sta. 39+00
 582            RS       1    FLOW      -1
 583            RC    .032    .032    .032    1900  0.0035
 584            RX       0       6      12      24      64      76      82      88
 585            RY       4       3       2       0       0       2       3       4
                *

 586            KK     66A
 587            KM   BASIN 66A
 588            KM    THE FOLLOWING PARAMETERS WERE PROVIDED FOR THIS BASIN
 589            KM    L=        .7  Lca=       .3   S=   55.9  Kn= .047  LAG=  17.1
 590            KM    PHOENIX VALLEY S-GRAPH WAS USED FOR THIS BASIN
 591            BA     .26
 592            LG     .24      .25    6.00     .22   35.00
 593            UI     78.     256.    417.    576.    363.    205.     84.     39.     16.     16.
 594            UI      0.       0.      0.      0.      0.      0.      0.      0.      0.      0.
 595            UI      0.       0.      0.      0.      0.      0.      0.      0.      0.      0.
                *

 596            KK    R66A
 597            KM   RETAIN 100 YR 2 HR RUNOFF VOLUME
 598            DT    D66A      21
 599            DI       0   10000
 600            DQ       0   10000
                *

 601            KK   66ATB
 602            KM   ROUTE S66A TO 66B VIA WASH CROSSING BASELINE
 603            RS       7    FLOW      -1
 604            RC    .045     .04    .045    7500    .0077
 605            RX       0     500     980    1003    1007    1031    1511    2011
 606            RY       4     3.5       3       0       0       3     3.5       4
                *

 607            KK     66B
 608            KM   BASIN 66B
 609            KM    THE FOLLOWING PARAMETERS WERE PROVIDED FOR THIS BASIN
 610            KM    L=       1.6  Lca=      1.0   S=   43.3  Kn= .050  LAG=  42.8
 611            KM    PHOENIX VALLEY S-GRAPH WAS USED FOR THIS BASIN
 612            BA     .67
 613            LG     .25      .25    5.00     .33   30.00
 614            UI     53.      56.    185.    248.    297.    352.    426.    590.    636.    496.
 615            UI    419.     346.    286.    232.    152.     93.     86.     58.     53.     21.
 616            UI     16.      16.     16.     16.     16.      0.      0.      0.      0.      0.
 617            UI      0.       0.      0.      0.      0.      0.      0.      0.      0.      0.
                *
1                                          HEC-1 INPUT                                                PAGE 15

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

 618            KK    R66B
 619            KM   RETAIN 100 YR 2 HR RUNOFF VOLUME
 620            DT    D66B      48
 621            DI       0   10000
 622            DQ       0   10000
                *

 623            KK   CP66B
 624            KM   COMBINE S66A AND S66B
 625            HC       2
```

```
                *
626             KK   66BTC
627             KM   ROUTE 66B TO 66C VIA WASH
628             RS       7    FLOW      -1
629             RC    .045     .04    .045    6000   .0150
630             RX       0     500     995    1003    1007    1016    1511    2011
631             RY       4     3.5       3       0       0       3     3.5       4
                *

632             KK     66C
633             KM   BASIN 66C
634             KM    THE FOLLOWING PARAMETERS WERE PROVIDED FOR THIS BASIN
635             KM    L=      1.1  Lca=       .7   S=   46.5  Kn= .039  LAG=  24.3
636             KM    PHOENIX VALLEY S-GRAPH WAS USED FOR THIS BASIN
637             BA     .50
638             LG     .19     .25    5.40     .29   48.00
639             UI     69.    243.    385.    528.    817.    635.    463.    325.    159.    103.
640             UI     63.     21.     21.     21.      0.      0.      0.      0.      0.      0.
641             UI      0.      0.      0.      0.      0.      0.      0.      0.      0.      0.
                *

642             KK    R66C
643             KM   RETAIN 100 YR 2 HR RUNOFF VOLUME
644             DT    D66C      42
645             DI       0   10000
646             DQ       0   10000
                *

647             KK  CP66C1
648             KM   Split up hydrograph combination in order to separate flows.
649             KM   Combine Hydrographs 66BTC (from Sub. 66A)and R66C (from Sub. 66C)
650             HC       2
                *

651             KK  CP66C2
652             KM   Combine Hydrograph CP66C1 (from Subbasins 66A, 66B and 66C)
653             KM     plus hydrograph 67DT66 ( C67D )
654             HC       2
                *
1                                          HEC-1 INPUT                                          PAGE 16

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

655             KK    DI66
656             KM    DIVERT FLOW TO DETENTION BASIN WA
657             KM    By-pass Flow Reduced to 410 cfs from 458, SZ, 5-17-99
658             DT    DB66
659             DI       0     150     363   411.0   456.0     513     577     643     712    1000
660             DQ       0       0       0    32.0     71.     122     179     239     302     590
                *

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

669             KK   CP66C
670             KM   COMBINE FLOWS FROM ELLIOT CHANNEL AND CRISMON BYPASS CHANNEL
671             HC       2
                *

672             KK   66CTD
673             KM   REACH ET-7
674             KM   ROUTE FLOWS FROM INTERSECTION OF CRISMON AND ELLIOT CHANNELS
675             KM   AT THE INTERSECTION OF ELLIOT ROAD and CRISMON ROAD TO THE ELLIOT BASIN
676             KM   WA Bleed-off Outlet, WHICH IS ABOUT 390 ft WEST OF CRISMON ROAD.
677             RD     500  0.0015   0.012            CIRC     9.5
                *

678             KK    DR66
679             KM         RETURN DIVERT TO DETENTION BASIN FROM DIVERSION STRUCTURE
680             DR    DB66
                *

681             KK  RS66D1
682             KM   ELLIOT BASIN, WEST A
683             KM   TWO PONDS OPERATING IN SERIES.
684             KM        Bottom Elevation Lowered to 1415.0 ft from 1420, and 18" Bleed-off
685             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
686             RS       1    STOR       0
687             SV       0    1.60   10.00   25.50   34.70   44.20   54.10   64.40   75.10   86.00
688             SE  1415.0    1417    1419    1421    1422    1423    1424    1425    1426    1427
689             SL  1416.0  1.7672     .62      .5
690             SS  1423.5      20     3.0     1.5
                *
1                                          HEC-1 INPUT                                          PAGE 17
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LINE          ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10

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

 699          KK    C-WA
 700          KM        Combine Bleed-off Flow from WA with Flow in Elliot Channel
 701          KM        Added by SZ, 5-17-99
 702          HC       2
              *

 703          KK   RC-WA
 704          KM        Route Flow from WA Outlet to WB Outlet in Elliot Channel
 705          KM        Added by SZ, 5-17-99
 706          KM        WA Bleed-off Outlet to WB Bleed-off Outlet.
 707          KM        RD card used for routing (Sta. 48+80 to Sta. 57+35)
 708          RD     855  0.0052   0.012            CIRC     9.5
              *

 709          KK   DR-WA
 710          KM        Return Diverted Flow (Spillway) to WB from WA, SZ 5-7-99
 711          DR    D-WB
              *

 712          KK  RS66D2
 713          KM   ELLIOT BASIN, WEST B
 714          KM   TWO PONDS OPERATING IN SERIES.
 715          KM        Bottom Elevation Lowered to 1413.5 ft from 1414, and 36" Bleed-off
 716          KM        Pipe Reduced to 18" from WB to Elliot Channel
 717          KM        Since the bleed-off pipe length is short, no routing is provided.
 718          KM        Existing SS = 1420.5   80   2.5   1.5, SZ, 5-18-99
 719          RS       1    STOR       0
 720          SV       0    4.40    8.80   14.50   21.00   28.00   35.30   42.90   50.90   59.20
 721          SE  1412.0    1415    1416    1417    1418    1419    1420    1421    1422    1423
 722          SL  1413.0  1.7672     .62      .5
 723          SS  1422.6      50     2.5     1.5
              *

 724          KK   CP66D
 725          KM       COMBINE FLOWS FROM WEST ELLIOT BASIN AND ELLIOT CHANNEL
 726          KM       AT THE OUTLET PIPE.
 727          HC       2
              *
```



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

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

 734          KK  66-66D
 735          KM   REACH ET-6
 736          KM        ROUTE FROM DETENTION BASIN WB OUTLET TO ELLSWORTH RD
 737          KM        2350 -> 3200,  SZ, 5-17-99
 738          KM        Second portion
 739          KM        RD card used for routing (Sta. 12+46 to Sta. 36+44)
 740          RD    2398  0.0040   0.012            CIRC     9.5
              *

 741          KK     66D
 742          KM   BASIN 66D
 743          KM    THE FOLLOWING PARAMETERS WERE PROVIDED FOR THIS BASIN
 744          KM    L=      1.0  Lca=       .7   S=   28.6  Kn= .020  LAG=  13.2
 745          KM    PHOENIX VALLEY S-GRAPH WAS USED FOR THIS BASIN
 746          BA     .31
 747          LG     .10     .17    6.80     .19   80.00
 748          UI    162.    480.    845.    540.    232.     89.     24.      0.      0.      0.
 749          UI      0.      0.      0.      0.      0.      0.      0.      0.      0.      0.
              *

 750          KK    R66D
 751          KM   RETENTION REDUCED BY 77% FROM 31 TO 7 AC-FT
 752          KM   DUE TO DEVELOPMENT USING DETENTION BASIN
 753          KM   The developer does not participate in the basin so the retention volume
 754          KM   increased to 31 A-F
 755          DT    D66D      31
 756          DI       0   10000
 757          DQ       0   10000
              *
```

```
 758          KK     61A
 759          KM   BASIN 61A
 760          KM    THE FOLLOWING PARAMETERS WERE PROVIDED FOR THIS BASIN
 761          KM    L=        .9  Lca=        .4   S=   36.8  Kn= .037  LAG=  19.1
 762          KM    PHOENIX VALLEY S-GRAPH WAS USED FOR THIS BASIN
 763          BA     .52
 764          LG     .19     .25    4.20     .56   52.00
 765          UI    117.    412.    628.   1037.    786.    517.    261.    132.     62.     28.
 766          UI     28.      0.      0.      0.      0.      0.      0.      0.      0.      0.
 767          UI      0.      0.      0.      0.      0.      0.      0.      0.      0.      0.
              *
1                                                HEC-1 INPUT                                                    PAGE 19

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


 768          KK    R61A
 769          KM   RETAIN 100 YR 2 HR RUNOFF VOLUME
 770          DT    D61A      42
 771          DI       0   10000
 772          DQ       0   10000
              *

 773          KK   61ATB
 774          KM   ROUTING 61A TO 61B VIA ELLSWORTH ROAD
 775          RS       6    FLOW      -1
 776          RC    .035    .024    .035    5280    .005
 777          RX       0     500     750     752     802     852    1102    1602
 778          RY       3       2     1.5     1.2     1.2     1.5       2       3
              *

 779          KK     61B
 780          KM   BASIN 61B
 781          KM    THE FOLLOWING PARAMETERS WERE PROVIDED FOR THIS BASIN
 782          KM    L=       1.4  Lca=       .7   S=   39.7  Kn= .047  LAG=  33.6
 783          KM    PHOENIX VALLEY S-GRAPH WAS USED FOR THIS BASIN
 784          BA    1.09
 785          LG     .24     .25    4.80     .37   35.00
 786          UI    109.    223.    475.    615.    765.   1049.   1335.   1025.    822.    643.
 787          UI    495.    288.    187.    143.    109.     36.     34.     34.     34.     34.
 788          UI      0.      0.      0.      0.      0.      0.      0.      0.      0.      0.
 789          UI      0.      0.      0.      0.      0.      0.      0.      0.      0.      0.
              *

 790          KK    R61B
 791          KM   RETAIN 100 YR 2 HR RUNOFF VOLUME
 792          DT    D61B      81
 793          DI       0   10000
 794          DQ       0   10000
              *

 795          KK   CP61B
 796          KM   COMBINE FLOWS FROM S61A AND S61B
 797          HC       2
              *

 798          KK  61T66D
 799          KM   ROUTE CP61B TO SUBBASIN 66D ALONG ELLSWORTH ROAD. ROUTING WILL BE
 800          KM   THE SAME AS WAS GIVEN FOR SUBBASIN 61A
 801          RS       6    FLOW      -1
 802          RC    .035    .024    .035    5280    .008
 803          RX       0     500     750     752     802     852    1102    1602
 804          RY       3       2     1.5     1.2     1.2     1.5       2       3
              *
1                                                HEC-1 INPUT                                                    PAGE 20

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


 805          KK     67E
 806          KM   BASIN 67E
 807          KM    THE FOLLOWING PARAMETERS WERE PROVIDED FOR THIS BASIN
 808          KM    L=       1.2  Lca=       .7   S=   32.3  Kn= .038  LAG=  26.9
 809          KM    PHOENIX VALLEY S-GRAPH WAS USED FOR THIS BASIN
 810          BA     .58
 811          LG     .19     .25    5.40     .30   50.00
 812          UI     73.    219.    378.    496.    732.    830.    597.    443.    315.    157.
 813          UI    110.     73.     24.     22.     22.     22.      0.      0.      0.      0.
 814          UI      0.      0.      0.      0.      0.      0.      0.      0.      0.      0.
              *

 815          KK    R67E
 816          KM   RETAIN 100 YR 2 HR RUNOFF VOLUME
 817          KM   DUE TO DEVELOPMENT USING DETENTION BASIN
 818          DT   D67E       50
 819          DI       0   10000
 820          DQ       0   10000
              *

 821          KK    C67E
 822          KM   COMBINE FLOWS FROM ELLSWORTH ROAD JUST NORTH OF ELLIOT ROAD
 823          HC       2
              *
```

```
824          KK    C66D
825          KM   COMBINE ELLIOT CHANNEL FLOW WITH HYDROGRAPH C67E @ ELLIOT RD & ELLSWORTH RD.
826          HC       3
             *

827          KK  66T70A
828          KM        Pipe Routing, Reach ET-5
829          KM        SE corner curve of Elliot Rd. & Ellsworth Rd.
830          KM        RD card used for routing (Junction Structure to Sta. 12+46)
831          RD     500  0.0004   0.012            CIRC     9.5
             *

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

837          KK   CULVT
838          KM        Pipe Routing, Culvert
839          KM        2-102" pipe culvert crossing Ellsworth Rd.
840          KM        RD card used for routing
841          RD     300  0.0002   0.012            CIRC      12
             *
```



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

842          KK  66T70C
843          KM   REACH ET-4, ET-5( COMPRISED OF ET-5A AND ET-5B).
844          KM   ROUTE FROM ELLSWORTH Culvert TO SANTAN FREEWAY.
845          RS       2    FLOW      -1
846          RC    .032    .032    .032    2490   .0008
847          RX       0      10      20      56      76     112     120     130
848          RY     6.5     6.1     6.0       0       0     6.0     6.1     6.5
             *
849          ZZ
```

1

SCHEMATIC DIAGRAM OF STREAM NETWORK

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

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

  220        65A1
             .
             .
  239        .-------> FF65A1
  235      R65A1
             .
             .
  242        .       CAP1A
             .          V
             .          V
  251        .      RCAP1A
             .          .
             .          .
  259      CCAP1A............
             .
             .
  262        .        65A2
             .          .
             .          .
  280        .          .-------> FF65A2
  277        .       R65A2
             .          .
             .          .
  283        .          .      CAP1B
             .          .         V
             .          .         V
  292        .          .     RCAP1B
             .          .          .
             .          .          .
  300        .      CCAP1B............
             .          .
             .          .
  303      C65A12............
             .
             .
  311        .-------> BYPASO
  306      DI-BAS
             V
             V
  314      SDDB-N
             .
             .
  324        .        65A3
             .          .
             .          .
  346        .          .-------> FF65A3
  343        .       R65A3
             .          V
             .          V
```

```
349          .      SDDB-S
             .          .
             .          .
360     SDWDBS............
            V
            V
363     ELLSD1
             .
             .
368          .          .<-------  BYPASO
366          .      BYPASI
             .          V
             .          V
369          .      RBYPAS
             .          V
             .          V
376          .       RSDW1
             .          V
             .          V
383          .       RSDW2
             .          .
             .          .
390          .          .        65AW
             .          .          .
             .          .          .
402          .          .          .-------->   D65AW
400          .          .      R65AW
             .          .          V
             .          .          V
405          .          .     65AT65
             .          .          .
             .          .          .
412          .          .          .         65B
             .          .          .          .
             .          .          .          .
425          .          .          .          .-------->    D65B
423          .          .          .       R65B
             .          .          .          .
             .          .          .          .
428          .       CP65B......................
             .          .
             .          .
434          .          .-------->  DIRS65
431          .       DI65B
             .          .
             .          .
437     CP65A............
            V
            V
440     65AT-3
             .
             .
445          .          .<-------  DIRS65
443          .      DR65B
             .          V
             .          V
446          .      RS65A
             .          .
             .          .
453     CP65............
            V
            V
457     65T66
             .
             .
460          .      ADOT-E
             .          V
             .          V
465          .     AET67A
             .          .
             .          .
472          .          .         67A
             .          .          .
             .          .          .
484          .          .          .-------->    D67A
482          .          .       R67A
             .          .          .
             .          .          .
487          .       C67A............
             .          V
             .          V
490          .      67ATC
             .          .
             .          .
496          .          .       SUP2
             .          .          V
             .          .          V
500          .          .      RSUP2
             .          .          .
             .          .          .
507          .          .          .         67B
             .          .          .          .
             .          .          .          .
519          .          .          .          .-------->    D67B
517          .          .          .       R67B
```

```
                .          .          .          .
                .          .          .          .
522             .          .       C67B...........
                .          .          V
                .          .          V
525             .          .      67BTC
                .          .          .
                .          .          .
533             .          .          .        67C
                .          .          .          .
                .          .          .          .
546             .          .          .          .-------->    D67C
544             .          .          .       R67C
                .          .          .          .
                .          .          .          .
549             .       C67C........................
                .          V
                .          V
552             .     67CT67
                .          .
                .          .
560             .          .        67D
                .          .          .
                .          .          .
572             .          .          .-------->    D67D
570             .          .       R67D
                .          .          .
                .          .          .
575             .       C67D...........
                .          V
                .          V
578             .     67DT66
                .          .
                .          .
586             .          .        66A
                .          .          .
                .          .          .
598             .          .          .-------->    D66A
596             .          .       R66A
                .          .          V
                .          .          V
601             .          .      66ATB
                .          .          .
                .          .          .
607             .          .          .        66B
                .          .          .          .
                .          .          .          .
620             .          .          .          .-------->    D66B
618             .          .          .       R66B
                .          .          .          .
                .          .          .          .
623             .          .      CP66B...........
                .          .          V
                .          .          V
626             .          .      66BTC
                .          .          .
                .          .          .
632             .          .          .        66C
                .          .          .          .
                .          .          .          .
644             .          .          .          .-------->    D66C
642             .          .          .       R66C
                .          .          .          .
                .          .          .          .
647             .          .     CP66C1...........
                .          .          .
                .          .          .
651             .     CP66C2...........
                .          .
                .          .
658             .          .-------->    DB66
655             .       DI66
                .          V
                .          V
661             .     66C1T2
                .          .
                .          .
669          CP66C...........
                V
                V
672          66CTD
                .
                .
680             .          .<--------    DB66
678             .       DR66
                .          V
                .          V
681             .     RS66D1
                .          .
                .          .
696             .          .-------->    D-WB
691             .       B-WA
                .          .
                .          .
699          C-WA...........
```

```
                V
                V
703          RC-WA
                .
                .
711             .          .<-------    D-WB
709             .       DR-WA
                .          V
                .          V
712             .      RS66D2
                .          .
                .          .
724          CP66D............
                V
                V
728         66T66D
                V
                V
734         66-66D
                .
                .
741             .         66D
                .          .
                .          .
755             .          .------->    D66D
750             .        R66D
                .          .
                .          .
758             .          .         61A
                .          .           .
                .          .           .
770             .          .           .------->    D61A
768             .          .        R61A
                .          .           V
                .          .           V
773             .          .       61ATB
                .          .           .
                .          .           .
779             .          .           .         61B
                .          .           .           .
                .          .           .           .
792             .          .           .           .------->    D61B
790             .          .           .        R61B
                .          .           .           .
                .          .           .           .
795             .          .       CP61B............
                .          .           V
                .          .           V
798             .          .      61T66D
                .          .           .
                .          .           .
805             .          .           .         67E
                .          .           .           .
                .          .           .           .
818             .          .           .           .-------->   D67E
815             .          .           .        R67E
                .          .           .           .
                .          .           .           .
821             .          .        C67E............
                .          .           .
                .          .           .
824          C66D........................
                V
                V
827         66T70A
                V
                V
832         66T70B
                V
                V
837          CULVT
                V
                V
842         66T70C
```

(***) RUNOFF ALSO COMPUTED AT THIS LOCATION

```
1****************************************
*                                      *
*   FLOOD HYDROGRAPH PACKAGE  (HEC-1)  *
*              JUN   1998              *
*            VERSION 4.1               *
*                                      *
*  RUN DATE   03JAN08  TIME  11:28:46  *
*                                      *
****************************************
```

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

Project: Siphon Draw Wash Drainage Improvements
Contract FCD: 2007C012
SCI Project No: 20539

Notes By: Stanley Consultants, Inc. (SCI)

Revision Date: October, 2007

Filename: SDW-BASE.DAT (Original Model: S60EMAP1.DAT)
Storm Event: 100-Yr, 24 Hrs
Conditions: Future Conditions

Comments:

This is the initial base model for development and analysis of Siphon Draw Drainage Improvements. For purposes of design and analysis this model is a truncated version of the original hydrologic model S60EMAP1.DAT provided by the FCDMC. Any hydrologic elements which do not contribute to runoff along Elliot Road, just upstream of the SanTan Freeway Channel(routing reach 66T70C) were removed

To run correctly, this model requires referencing a DSS file created by the upstream hydrologic model ultimately developed from the East Mesa ADMP. For the 100-year, future conditions, this model is N60EM.DAT (which produces N60EM.DSS).

END SCI INTRODUCTORY COMMENTS

****

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.
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DDM MCUHP2 SOUTH EAST MESA ADMP - SOUTH OF SUPERSTITION FREEWAY, FUTURE CONDI

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199 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

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

202 PI             PRECIPITATION PATTERN
                     .00       .00       .00       .00       .00       .00       .00       .00       .00       .00
                     .00       .00       .00       .00       .00       .00       .00       .00       .00       .00
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                     .01       .01       .01       .01       .01       .01       .01       .01       .03       .03
                     .03       .09       .09       .09       .01       .01       .01       .01       .01       .01
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212 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
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                     .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
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213 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
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                .00    .00    .00    .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
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214 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
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                .01    .01    .01    .01    .01    .01    .01    .01    .03    .03
                .03    .09    .09    .09    .01    .01    .01    .01    .01    .01
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215 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
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                .01    .01    .01    .01    .01    .01    .01    .01    .03    .03
                .03    .09    .09    .09    .01    .01    .01    .01    .01    .01
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216 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
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            .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
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217 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
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            .03      .09      .09      .09      .01      .01      .01      .01      .01      .01
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218 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
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                .00       .00       .00       .00       .00       .00       .00       .00       .00       .00
                .00       .00       .00       .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

219 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       .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
  -----DSS---ZOPEN:  Existing File Opened,  File: N60EM.DSS
                     Unit:  71;  DSS Version: 6-JG
      ----- Entering ZRRTSX for unit 71 -----
Pathname: /CAP1A/OVERCHUTE/FLOW//5MIN/100YEAR/
      Time Window set.  Interval:     5  Number of data values:      1
      Starting date and time:  Mar 31, 1997  2400  (  35519 1440)
      Ending   date and time:  Mar 31, 1997  2400  (  35519 1440)
      Input time offset:      0
      After ZRDINF, Record found: T
      Pathname: /CAP1A/OVERCHUTE/FLOW/31MAR1997/5MIN/100YEAR/
      Number of actual data:  288  Header length:   0
      Compression:   0  Quality:   0
-----DSS--- ZREAD Unit  71; Vers.    4:  /CAP1A/OVERCHUTE/FLOW/31MAR1997/5MIN/100YEAR/
     ----DSS---Debug:  Enter ZRRTSB;  Unit:  71
      NSTART:    1   NVALS:    1    JULS:   35519  ISTIME:  1440
      NLDATA:  288   JULSD:   35519
      JULS: 31MAR97       JULSD: 31MAR97
      Quality Read: F,  Quality Requested: F
      ---ZRRTSB Calculations:  NPOS:  288  NDATA:  288  NREAD:    1  ILIM:    1
     ----- Exiting ZRRTS, Number of data values:      1,  Status:  0
      Offset:       0,  Units: CFS      ,  Type:INST-VAL
      ----- Entering ZRRTSX for unit 71 -----
Pathname: /CAP1A/OVERCHUTE/FLOW//5MIN/100YEAR/
      Time Window set.  Interval:     5  Number of data values:    744
      Starting date and time:  Mar 31, 1997  2400  (  35519 1440)
      Ending   date and time:  Apr 3, 1997  1355  (  35522  835)
      Input time offset:      0
      After ZRDINF, Record found: T
      Pathname: /CAP1A/OVERCHUTE/FLOW/31MAR1997/5MIN/100YEAR/
      Number of actual data:  288  Header length:   0
      Compression:   0  Quality:   0
-----DSS--- ZREAD Unit  71; Vers.    4:  /CAP1A/OVERCHUTE/FLOW/31MAR1997/5MIN/100YEAR/
     ----DSS---Debug:  Enter ZRRTSB;  Unit:  71
      NSTART:    1   NVALS:  744    JULS:   35519  ISTIME:  1440
      NLDATA:  288   JULSD:   35519
      JULS: 31MAR97       JULSD: 31MAR97
      Quality Read: F,  Quality Requested: F
```

```
      ---ZRRTSB Calculations:  NPOS:  288  NDATA:  288  NREAD:    1  ILIM:    1
      After ZRDINF, Record found: T
      Pathname: /CAP1A/OVERCHUTE/FLOW/01APR1997/5MIN/100YEAR/
      Number of actual data:  288  Header length:   0
      Compression:   0  Quality:   0
-----DSS--- ZREAD Unit  71; Vers.    4:  /CAP1A/OVERCHUTE/FLOW/01APR1997/5MIN/100YEAR/
     ----DSS---Debug:  Enter ZRRTSB;  Unit:  71
      NSTART:    2   NVALS:  744    JULS:   35519  ISTIME:  1440
      NLDATA:  288   JULSD:   35520
      JULS: 31MAR97       JULSD: 01APR97
      Quality Read: F,  Quality Requested: F
      ---ZRRTSB Calculations:  NPOS:    1  NDATA:  288  NREAD:  288  ILIM:  289
      After ZRDINF, Record found: T
      Pathname: /CAP1A/OVERCHUTE/FLOW/02APR1997/5MIN/100YEAR/
      Number of actual data:  288  Header length:   0
      Compression:   0  Quality:   0
-----DSS--- ZREAD Unit  71; Vers.    4:  /CAP1A/OVERCHUTE/FLOW/02APR1997/5MIN/100YEAR/
     ----DSS---Debug:  Enter ZRRTSB;  Unit:  71
      NSTART:  290   NVALS:  744    JULS:   35519  ISTIME:  1440
      NLDATA:  288   JULSD:   35521
      JULS: 31MAR97       JULSD: 02APR97
      Quality Read: F,  Quality Requested: F
      ---ZRRTSB Calculations:  NPOS:    1  NDATA:  288  NREAD:  288  ILIM:  577
      After ZRDINF, Record found: T
      Pathname: /CAP1A/OVERCHUTE/FLOW/03APR1997/5MIN/100YEAR/
      Number of actual data:  288  Header length:   0
      Compression:   0  Quality:   0
-----DSS--- ZREAD Unit  71; Vers.    4:  /CAP1A/OVERCHUTE/FLOW/03APR1997/5MIN/100YEAR/
     ----DSS---Debug:  Enter ZRRTSB;  Unit:  71
      NSTART:  578   NVALS:  744    JULS:   35519  ISTIME:  1440
      NLDATA:  288   JULSD:   35522
      JULS: 31MAR97       JULSD: 03APR97
      Quality Read: F,  Quality Requested: F
      ---ZRRTSB Calculations:  NPOS:    1  NDATA:  288  NREAD:  167  ILIM:  744
     ----- Exiting ZRRTS, Number of data values:    744,  Status:  0
      Offset:       0,  Units: CFS      ,  Type:INST-VAL
      ----- Entering ZRRTSX for unit 71 -----
Pathname: /CAP1A/OVERCHUTE/FLOW//5MIN/100YEAR/
      Time Window set.  Interval:     5  Number of data values:      1
      Starting date and time:  Apr 3, 1997  1355  (  35522  835)
      Ending   date and time:  Apr 3, 1997  1355  (  35522  835)
      Input time offset:      0
      After ZRDINF, Record found: T
      Pathname: /CAP1A/OVERCHUTE/FLOW/03APR1997/5MIN/100YEAR/
      Number of actual data:  288  Header length:   0
      Compression:   0  Quality:   0
-----DSS--- ZREAD Unit  71; Vers.    4:  /CAP1A/OVERCHUTE/FLOW/03APR1997/5MIN/100YEAR/
     ----DSS---Debug:  Enter ZRRTSB;  Unit:  71
      NSTART:    1   NVALS:    1    JULS:   35522  ISTIME:   835
      NLDATA:  288   JULSD:   35522
      JULS: 03APR97       JULSD: 03APR97
      Quality Read: F,  Quality Requested: F
      ---ZRRTSB Calculations:  NPOS:  167  NDATA:  288  NREAD:    1  ILIM:    1
     ----- Exiting ZRRTS, Number of data values:      1,  Status:  0
      Offset:       0,  Units: CFS      ,  Type:INST-VAL
      ----- Entering ZRRTSX for unit 71 -----
Pathname: /CAP1A/OVERCHUTE/FLOW//5MIN/100YEAR/
      Time Window set.  Interval:     5  Number of data values:    744
      Starting date and time:  Apr 3, 1997  1355  (  35522  835)
      Ending   date and time:  Apr 6, 1997  0350  (  35525  230)
      Input time offset:      0
      After ZRDINF, Record found: T
      Pathname: /CAP1A/OVERCHUTE/FLOW/03APR1997/5MIN/100YEAR/
      Number of actual data:  288  Header length:   0
      Compression:   0  Quality:   0
-----DSS--- ZREAD Unit  71; Vers.    4:  /CAP1A/OVERCHUTE/FLOW/03APR1997/5MIN/100YEAR/
     ----DSS---Debug:  Enter ZRRTSB;  Unit:  71
      NSTART:    1   NVALS:  744    JULS:   35522  ISTIME:   835
      NLDATA:  288   JULSD:   35522
      JULS: 03APR97       JULSD: 03APR97
      Quality Read: F,  Quality Requested: F
      ---ZRRTSB Calculations:  NPOS:  167  NDATA:  288  NREAD:  122  ILIM:  122
      After ZRDINF, Record found: T
      Pathname: /CAP1A/OVERCHUTE/FLOW/04APR1997/5MIN/100YEAR/
      Number of actual data:  288  Header length:   0
      Compression:   0  Quality:   0
-----DSS--- ZREAD Unit  71; Vers.    4:  /CAP1A/OVERCHUTE/FLOW/04APR1997/5MIN/100YEAR/
     ----DSS---Debug:  Enter ZRRTSB;  Unit:  71
      NSTART:  123   NVALS:  744    JULS:   35522  ISTIME:   835
      NLDATA:  288   JULSD:   35523
      JULS: 03APR97       JULSD: 04APR97
      Quality Read: F,  Quality Requested: F
      ---ZRRTSB Calculations:  NPOS:    1  NDATA:  288  NREAD:  288  ILIM:  410
      After ZRDINF, Record found: F
      Pathname: /CAP1A/OVERCHUTE/FLOW/05APR1997/5MIN/100YEAR/
     ----DSS---Debug:  Enter ZRRTSB;  Unit:  71
      NSTART:  411   NVALS:  744    JULS:   35522  ISTIME:   835
      NLDATA:  288   JULSD:   35524
      JULS: 03APR97       JULSD: 05APR97
      Quality Read: F,  Quality Requested: F
      ---ZRRTSB Calculations:  NPOS:    1  NDATA:  288  NREAD:  288  ILIM:  698
-----DSS*** ZRRTS:  CAUTION - Data block not found in file.  Unit:  71
Pathname: /CAP1A/OVERCHUTE/FLOW/05APR1997/5MIN/100YEAR/
      After ZRDINF, Record found: F
      Pathname: /CAP1A/OVERCHUTE/FLOW/06APR1997/5MIN/100YEAR/
```

```
      ----DSS---Debug:  Enter ZRRTSB;  Unit:  71
        NSTART:  699   NVALS:  744    JULS:   35522  ISTIME:   835
        NLDATA:  288   JULSD:   35525
        JULS: 03APR97        JULSD: 06APR97
        Quality Read: F,  Quality Requested: F
        ---ZRRTSB Calculations:  NPOS:    1  NDATA:  288  NREAD:   46  ILIM:  744
      ----- Exiting ZRRTS, Number of data values:    744,  Status:  3
        Offset:        0,  Units: CFS      ,  Type:INST-VAL
        ----- Entering ZRRTSX for unit 71 -----
Pathname: /CAP1B/OVERCHUTE/FLOW//5MIN/100YEAR/
        Time Window set.  Interval:     5  Number of data values:      1
        Starting date and time:  Mar 31, 1997  2400  (  35519 1440)
        Ending   date and time:  Mar 31, 1997  2400  (  35519 1440)
        Input time offset:      0
        After ZRDINF, Record found: T
        Pathname: /CAP1B/OVERCHUTE/FLOW/31MAR1997/5MIN/100YEAR/
        Number of actual data:  288  Header length:   0
        Compression:   0  Quality:   0
-----DSS--- ZREAD Unit  71; Vers.    4:  /CAP1B/OVERCHUTE/FLOW/31MAR1997/5MIN/100YEAR/
      ----DSS---Debug:  Enter ZRRTSB;  Unit:  71
        NSTART:    1   NVALS:    1    JULS:   35519  ISTIME:  1440
        NLDATA:  288   JULSD:   35519
        JULS: 31MAR97        JULSD: 31MAR97
        Quality Read: F,  Quality Requested: F
        ---ZRRTSB Calculations:  NPOS:  288  NDATA:  288  NREAD:    1  ILIM:    1
      ----- Exiting ZRRTS, Number of data values:      1,  Status:  0
        Offset:        0,  Units: CFS      ,  Type:INST-VAL
        ----- Entering ZRRTSX for unit 71 -----
Pathname: /CAP1B/OVERCHUTE/FLOW//5MIN/100YEAR/
        Time Window set.  Interval:     5  Number of data values:    744
        Starting date and time:  Mar 31, 1997  2400  (  35519 1440)
        Ending   date and time:  Apr 3, 1997  1355  (  35522  835)
        Input time offset:      0
        After ZRDINF, Record found: T
        Pathname: /CAP1B/OVERCHUTE/FLOW/31MAR1997/5MIN/100YEAR/
        Number of actual data:  288  Header length:   0
        Compression:   0  Quality:   0
-----DSS--- ZREAD Unit  71; Vers.    4:  /CAP1B/OVERCHUTE/FLOW/31MAR1997/5MIN/100YEAR/
      ----DSS---Debug:  Enter ZRRTSB;  Unit:  71
        NSTART:    1   NVALS:  744    JULS:   35519  ISTIME:  1440
        NLDATA:  288   JULSD:   35519
        JULS: 31MAR97        JULSD: 31MAR97
        Quality Read: F,  Quality Requested: F
        ---ZRRTSB Calculations:  NPOS:  288  NDATA:  288  NREAD:    1  ILIM:    1
        After ZRDINF, Record found: T
        Pathname: /CAP1B/OVERCHUTE/FLOW/01APR1997/5MIN/100YEAR/
        Number of actual data:  288  Header length:   0
        Compression:   0  Quality:   0
-----DSS--- ZREAD Unit  71; Vers.    4:  /CAP1B/OVERCHUTE/FLOW/01APR1997/5MIN/100YEAR/
      ----DSS---Debug:  Enter ZRRTSB;  Unit:  71
        NSTART:    2   NVALS:  744    JULS:   35519  ISTIME:  1440
        NLDATA:  288   JULSD:   35520
        JULS: 31MAR97        JULSD: 01APR97
        Quality Read: F,  Quality Requested: F
        ---ZRRTSB Calculations:  NPOS:    1  NDATA:  288  NREAD:  288  ILIM:  289
        After ZRDINF, Record found: T
        Pathname: /CAP1B/OVERCHUTE/FLOW/02APR1997/5MIN/100YEAR/
        Number of actual data:  288  Header length:   0
        Compression:   0  Quality:   0
-----DSS--- ZREAD Unit  71; Vers.    4:  /CAP1B/OVERCHUTE/FLOW/02APR1997/5MIN/100YEAR/
      ----DSS---Debug:  Enter ZRRTSB;  Unit:  71
        NSTART:  290   NVALS:  744    JULS:   35519  ISTIME:  1440
        NLDATA:  288   JULSD:   35521
        JULS: 31MAR97        JULSD: 02APR97
        Quality Read: F,  Quality Requested: F
        ---ZRRTSB Calculations:  NPOS:    1  NDATA:  288  NREAD:  288  ILIM:  577
        After ZRDINF, Record found: T
        Pathname: /CAP1B/OVERCHUTE/FLOW/03APR1997/5MIN/100YEAR/
        Number of actual data:  288  Header length:   0
        Compression:   0  Quality:   0
-----DSS--- ZREAD Unit  71; Vers.    4:  /CAP1B/OVERCHUTE/FLOW/03APR1997/5MIN/100YEAR/
      ----DSS---Debug:  Enter ZRRTSB;  Unit:  71
        NSTART:  578   NVALS:  744    JULS:   35519  ISTIME:  1440
        NLDATA:  288   JULSD:   35522
        JULS: 31MAR97        JULSD: 03APR97
        Quality Read: F,  Quality Requested: F
        ---ZRRTSB Calculations:  NPOS:    1  NDATA:  288  NREAD:  167  ILIM:  744
      ----- Exiting ZRRTS, Number of data values:    744,  Status:  0
        Offset:        0,  Units: CFS      ,  Type:INST-VAL
        ----- Entering ZRRTSX for unit 71 -----
Pathname: /CAP1B/OVERCHUTE/FLOW//5MIN/100YEAR/
        Time Window set.  Interval:     5  Number of data values:      1
        Starting date and time:  Apr 3, 1997  1355  (  35522  835)
        Ending   date and time:  Apr 3, 1997  1355  (  35522  835)
        Input time offset:      0
        After ZRDINF, Record found: T
        Pathname: /CAP1B/OVERCHUTE/FLOW/03APR1997/5MIN/100YEAR/
        Number of actual data:  288  Header length:   0
        Compression:   0  Quality:   0
-----DSS--- ZREAD Unit  71; Vers.    4:  /CAP1B/OVERCHUTE/FLOW/03APR1997/5MIN/100YEAR/
      ----DSS---Debug:  Enter ZRRTSB;  Unit:  71
        NSTART:    1   NVALS:    1    JULS:   35522  ISTIME:   835
        NLDATA:  288   JULSD:   35522
        JULS: 03APR97        JULSD: 03APR97
        Quality Read: F,  Quality Requested: F
```

```
      ---ZRRTSB Calculations:  NPOS:  167  NDATA:  288  NREAD:    1  ILIM:    1
     ----- Exiting ZRRTS, Number of data values:      1,  Status:  0
      Offset:       0,  Units: CFS     ,  Type:INST-VAL
      ----- Entering ZRRTSX for unit 71 -----
Pathname: /CAP1B/OVERCHUTE/FLOW//5MIN/100YEAR/
      Time Window set.  Interval:     5  Number of data values:    744
      Starting date and time:  Apr 3, 1997  1355  (  35522  835)
      Ending   date and time:  Apr 6, 1997  0350  (  35525  230)
      Input time offset:      0
      After ZRDINF, Record found: T
      Pathname: /CAP1B/OVERCHUTE/FLOW/03APR1997/5MIN/100YEAR/
      Number of actual data:  288  Header length:   0
      Compression:   0  Quality:   0
-----DSS--- ZREAD Unit  71; Vers.    4:  /CAP1B/OVERCHUTE/FLOW/03APR1997/5MIN/100YEAR/
     ----DSS---Debug:  Enter ZRRTSB;  Unit:  71
      NSTART:    1   NVALS:  744    JULS:   35522  ISTIME:   835
      NLDATA:  288   JULSD:   35522
      JULS: 03APR97       JULSD: 03APR97
      Quality Read: F,  Quality Requested: F
      ---ZRRTSB Calculations:  NPOS:  167  NDATA:  288  NREAD:  122  ILIM:  122
      After ZRDINF, Record found: T
      Pathname: /CAP1B/OVERCHUTE/FLOW/04APR1997/5MIN/100YEAR/
      Number of actual data:  288  Header length:   0
      Compression:   0  Quality:   0
-----DSS--- ZREAD Unit  71; Vers.    4:  /CAP1B/OVERCHUTE/FLOW/04APR1997/5MIN/100YEAR/
     ----DSS---Debug:  Enter ZRRTSB;  Unit:  71
      NSTART:  123   NVALS:  744    JULS:   35522  ISTIME:   835
      NLDATA:  288   JULSD:   35523
      JULS: 03APR97       JULSD: 04APR97
      Quality Read: F,  Quality Requested: F
      ---ZRRTSB Calculations:  NPOS:    1  NDATA:  288  NREAD:  288  ILIM:  410
      After ZRDINF, Record found: F
      Pathname: /CAP1B/OVERCHUTE/FLOW/05APR1997/5MIN/100YEAR/
     ----DSS---Debug:  Enter ZRRTSB;  Unit:  71
      NSTART:  411   NVALS:  744    JULS:   35522  ISTIME:   835
      NLDATA:  288   JULSD:   35524
      JULS: 03APR97       JULSD: 05APR97
      Quality Read: F,  Quality Requested: F
      ---ZRRTSB Calculations:  NPOS:    1  NDATA:  288  NREAD:  288  ILIM:  698
-----DSS*** ZRRTS:  CAUTION - Data block not found in file.  Unit:  71
Pathname: /CAP1B/OVERCHUTE/FLOW/05APR1997/5MIN/100YEAR/
      After ZRDINF, Record found: F
      Pathname: /CAP1B/OVERCHUTE/FLOW/06APR1997/5MIN/100YEAR/
     ----DSS---Debug:  Enter ZRRTSB;  Unit:  71
      NSTART:  699   NVALS:  744    JULS:   35522  ISTIME:   835
      NLDATA:  288   JULSD:   35525
      JULS: 03APR97       JULSD: 06APR97
      Quality Read: F,  Quality Requested: F
      ---ZRRTSB Calculations:  NPOS:    1  NDATA:  288  NREAD:   46  ILIM:  744
     ----- Exiting ZRRTS, Number of data values:    744,  Status:  3
      Offset:       0,  Units: CFS     ,  Type:INST-VAL
      ----- Entering ZRRTSX for unit 71 -----
Pathname: /ADOT EAST BASIN/AT SUPERSTITION/FLOW//5MIN/100YR/
      Time Window set.  Interval:     5  Number of data values:      1
      Starting date and time:  Mar 31, 1997  2400  (  35519 1440)
      Ending   date and time:  Mar 31, 1997  2400  (  35519 1440)
      Input time offset:      0
      After ZRDINF, Record found: T
      Pathname: /ADOT EAST BASIN/AT SUPERSTITION/FLOW/31MAR1997/5MIN/100YR/
      Number of actual data:  288  Header length:   0
      Compression:   0  Quality:   0
-----DSS--- ZREAD Unit  71; Vers.    2:  /ADOT EAST BASIN/AT SUPERSTITION/FLOW/31MAR1997/5MIN/100YR/
     ----DSS---Debug:  Enter ZRRTSB;  Unit:  71
      NSTART:    1   NVALS:    1    JULS:   35519  ISTIME:  1440
      NLDATA:  288   JULSD:   35519
      JULS: 31MAR97       JULSD: 31MAR97
      Quality Read: F,  Quality Requested: F
      ---ZRRTSB Calculations:  NPOS:  288  NDATA:  288  NREAD:    1  ILIM:    1
     ----- Exiting ZRRTS, Number of data values:      1,  Status:  0
      Offset:       0,  Units: CFS     ,  Type:INST-VAL
      ----- Entering ZRRTSX for unit 71 -----
Pathname: /ADOT EAST BASIN/AT SUPERSTITION/FLOW//5MIN/100YR/
      Time Window set.  Interval:     5  Number of data values:    744
      Starting date and time:  Mar 31, 1997  2400  (  35519 1440)
      Ending   date and time:  Apr 3, 1997  1355  (  35522  835)
      Input time offset:      0
      After ZRDINF, Record found: T
      Pathname: /ADOT EAST BASIN/AT SUPERSTITION/FLOW/31MAR1997/5MIN/100YR/
      Number of actual data:  288  Header length:   0
      Compression:   0  Quality:   0
-----DSS--- ZREAD Unit  71; Vers.    2:  /ADOT EAST BASIN/AT SUPERSTITION/FLOW/31MAR1997/5MIN/100YR/
     ----DSS---Debug:  Enter ZRRTSB;  Unit:  71
      NSTART:    1   NVALS:  744    JULS:   35519  ISTIME:  1440
      NLDATA:  288   JULSD:   35519
      JULS: 31MAR97       JULSD: 31MAR97
      Quality Read: F,  Quality Requested: F
      ---ZRRTSB Calculations:  NPOS:  288  NDATA:  288  NREAD:    1  ILIM:    1
      After ZRDINF, Record found: T
      Pathname: /ADOT EAST BASIN/AT SUPERSTITION/FLOW/01APR1997/5MIN/100YR/
      Number of actual data:  288  Header length:   0
      Compression:   0  Quality:   0
-----DSS--- ZREAD Unit  71; Vers.    2:  /ADOT EAST BASIN/AT SUPERSTITION/FLOW/01APR1997/5MIN/100YR/
     ----DSS---Debug:  Enter ZRRTSB;  Unit:  71
      NSTART:    2   NVALS:  744    JULS:   35519  ISTIME:  1440
      NLDATA:  288   JULSD:   35520
```

```
        JULS: 31MAR97       JULSD: 01APR97
        Quality Read: F,  Quality Requested: F
        ---ZRRTSB Calculations:  NPOS:    1  NDATA:  288  NREAD:  288  ILIM:  289
        After ZRDINF, Record found: T
        Pathname: /ADOT EAST BASIN/AT SUPERSTITION/FLOW/02APR1997/5MIN/100YR/
        Number of actual data:  288  Header length:   0
        Compression:   0  Quality:   0
-----DSS--- ZREAD Unit  71; Vers.    2:  /ADOT EAST BASIN/AT SUPERSTITION/FLOW/02APR1997/5MIN/100YR/
      ----DSS---Debug:  Enter ZRRTSB;  Unit:  71
        NSTART:  290   NVALS:  744    JULS:   35519  ISTIME:  1440
        NLDATA:  288   JULSD:   35521
        JULS: 31MAR97       JULSD: 02APR97
        Quality Read: F,  Quality Requested: F
        ---ZRRTSB Calculations:  NPOS:    1  NDATA:  288  NREAD:  288  ILIM:  577
        After ZRDINF, Record found: T
        Pathname: /ADOT EAST BASIN/AT SUPERSTITION/FLOW/03APR1997/5MIN/100YR/
        Number of actual data:  288  Header length:   0
        Compression:   0  Quality:   0
-----DSS--- ZREAD Unit  71; Vers.    2:  /ADOT EAST BASIN/AT SUPERSTITION/FLOW/03APR1997/5MIN/100YR/
      ----DSS---Debug:  Enter ZRRTSB;  Unit:  71
        NSTART:  578   NVALS:  744    JULS:   35519  ISTIME:  1440
        NLDATA:  288   JULSD:   35522
        JULS: 31MAR97       JULSD: 03APR97
        Quality Read: F,  Quality Requested: F
        ---ZRRTSB Calculations:  NPOS:    1  NDATA:  288  NREAD:  167  ILIM:  744
      ----- Exiting ZRRTS, Number of data values:    744,  Status:  0
        Offset:       0,  Units: CFS     ,  Type:INST-VAL
        ----- Entering ZRRTSX for unit 71 -----
Pathname: /ADOT EAST BASIN/AT SUPERSTITION/FLOW//5MIN/100YR/
        Time Window set.  Interval:     5  Number of data values:      1
        Starting date and time:  Apr 3, 1997  1355  (  35522  835)
        Ending   date and time:  Apr 3, 1997  1355  (  35522  835)
        Input time offset:      0
        After ZRDINF, Record found: T
        Pathname: /ADOT EAST BASIN/AT SUPERSTITION/FLOW/03APR1997/5MIN/100YR/
        Number of actual data:  288  Header length:   0
        Compression:   0  Quality:   0
-----DSS--- ZREAD Unit  71; Vers.    2:  /ADOT EAST BASIN/AT SUPERSTITION/FLOW/03APR1997/5MIN/100YR/
      ----DSS---Debug:  Enter ZRRTSB;  Unit:  71
        NSTART:    1   NVALS:    1    JULS:   35522  ISTIME:   835
        NLDATA:  288   JULSD:   35522
        JULS: 03APR97       JULSD: 03APR97
        Quality Read: F,  Quality Requested: F
        ---ZRRTSB Calculations:  NPOS:  167  NDATA:  288  NREAD:    1  ILIM:    1
      ----- Exiting ZRRTS, Number of data values:      1,  Status:  0
        Offset:       0,  Units: CFS     ,  Type:INST-VAL
        ----- Entering ZRRTSX for unit 71 -----
Pathname: /ADOT EAST BASIN/AT SUPERSTITION/FLOW//5MIN/100YR/
        Time Window set.  Interval:     5  Number of data values:    744
        Starting date and time:  Apr 3, 1997  1355  (  35522  835)
        Ending   date and time:  Apr 6, 1997  0350  (  35525  230)
        Input time offset:      0
        After ZRDINF, Record found: T
        Pathname: /ADOT EAST BASIN/AT SUPERSTITION/FLOW/03APR1997/5MIN/100YR/
        Number of actual data:  288  Header length:   0
        Compression:   0  Quality:   0
-----DSS--- ZREAD Unit  71; Vers.    2:  /ADOT EAST BASIN/AT SUPERSTITION/FLOW/03APR1997/5MIN/100YR/
      ----DSS---Debug:  Enter ZRRTSB;  Unit:  71
        NSTART:    1   NVALS:  744    JULS:   35522  ISTIME:   835
        NLDATA:  288   JULSD:   35522
        JULS: 03APR97       JULSD: 03APR97
        Quality Read: F,  Quality Requested: F
        ---ZRRTSB Calculations:  NPOS:  167  NDATA:  288  NREAD:  122  ILIM:  122
        After ZRDINF, Record found: T
        Pathname: /ADOT EAST BASIN/AT SUPERSTITION/FLOW/04APR1997/5MIN/100YR/
        Number of actual data:  288  Header length:   0
        Compression:   0  Quality:   0
-----DSS--- ZREAD Unit  71; Vers.    2:  /ADOT EAST BASIN/AT SUPERSTITION/FLOW/04APR1997/5MIN/100YR/
      ----DSS---Debug:  Enter ZRRTSB;  Unit:  71
        NSTART:  123   NVALS:  744    JULS:   35522  ISTIME:   835
        NLDATA:  288   JULSD:   35523
        JULS: 03APR97       JULSD: 04APR97
        Quality Read: F,  Quality Requested: F
        ---ZRRTSB Calculations:  NPOS:    1  NDATA:  288  NREAD:  288  ILIM:  410
        After ZRDINF, Record found: F
        Pathname: /ADOT EAST BASIN/AT SUPERSTITION/FLOW/05APR1997/5MIN/100YR/
      ----DSS---Debug:  Enter ZRRTSB;  Unit:  71
        NSTART:  411   NVALS:  744    JULS:   35522  ISTIME:   835
        NLDATA:  288   JULSD:   35524
        JULS: 03APR97       JULSD: 05APR97
        Quality Read: F,  Quality Requested: F
        ---ZRRTSB Calculations:  NPOS:    1  NDATA:  288  NREAD:  288  ILIM:  698
-----DSS*** ZRRTS:  CAUTION - Data block not found in file.  Unit:  71
Pathname: /ADOT EAST BASIN/AT SUPERSTITION/FLOW/05APR1997/5MIN/100YR/
        After ZRDINF, Record found: F
        Pathname: /ADOT EAST BASIN/AT SUPERSTITION/FLOW/06APR1997/5MIN/100YR/
      ----DSS---Debug:  Enter ZRRTSB;  Unit:  71
        NSTART:  699   NVALS:  744    JULS:   35522  ISTIME:   835
        NLDATA:  288   JULSD:   35525
        JULS: 03APR97       JULSD: 06APR97
        Quality Read: F,  Quality Requested: F
        ---ZRRTSB Calculations:  NPOS:    1  NDATA:  288  NREAD:   46  ILIM:  744
      ----- Exiting ZRRTS, Number of data values:    744,  Status:  3
        Offset:       0,  Units: CFS     ,  Type:INST-VAL
        ----- Entering ZRRTSX for unit 71 -----
```

```
Pathname: /ADOT WEST BASIN/AT SUPERSTITION/FLOW//5MIN/100YR/
        Time Window set.  Interval:     5  Number of data values:      1
        Starting date and time:  Mar 31, 1997  2400  (  35519 1440)
        Ending   date and time:  Mar 31, 1997  2400  (  35519 1440)
        Input time offset:      0
        After ZRDINF, Record found: T
        Pathname: /ADOT WEST BASIN/AT SUPERSTITION/FLOW/31MAR1997/5MIN/100YR/
        Number of actual data:  288  Header length:   0
        Compression:   0  Quality:   0
-----DSS--- ZREAD Unit  71; Vers.    2:  /ADOT WEST BASIN/AT SUPERSTITION/FLOW/31MAR1997/5MIN/100YR/
      ----DSS---Debug:  Enter ZRRTSB;  Unit:  71
        NSTART:    1   NVALS:    1    JULS:   35519  ISTIME:  1440
        NLDATA:  288   JULSD:   35519
        JULS: 31MAR97       JULSD: 31MAR97
        Quality Read: F,  Quality Requested: F
        ---ZRRTSB Calculations:  NPOS:  288  NDATA:  288  NREAD:    1  ILIM:    1
      ----- Exiting ZRRTS, Number of data values:      1,  Status:  0
        Offset:       0,  Units: CFS     ,  Type:INST-VAL
        ----- Entering ZRRTSX for unit 71 -----
Pathname: /ADOT WEST BASIN/AT SUPERSTITION/FLOW//5MIN/100YR/
        Time Window set.  Interval:     5  Number of data values:    744
        Starting date and time:  Mar 31, 1997  2400  (  35519 1440)
        Ending   date and time:  Apr 3, 1997  1355  (  35522  835)
        Input time offset:      0
        After ZRDINF, Record found: T
        Pathname: /ADOT WEST BASIN/AT SUPERSTITION/FLOW/31MAR1997/5MIN/100YR/
        Number of actual data:  288  Header length:   0
        Compression:   0  Quality:   0
-----DSS--- ZREAD Unit  71; Vers.    2:  /ADOT WEST BASIN/AT SUPERSTITION/FLOW/31MAR1997/5MIN/100YR/
      ----DSS---Debug:  Enter ZRRTSB;  Unit:  71
        NSTART:    1   NVALS:  744    JULS:   35519  ISTIME:  1440
        NLDATA:  288   JULSD:   35519
        JULS: 31MAR97       JULSD: 31MAR97
        Quality Read: F,  Quality Requested: F
        ---ZRRTSB Calculations:  NPOS:  288  NDATA:  288  NREAD:    1  ILIM:    1
        After ZRDINF, Record found: T
        Pathname: /ADOT WEST BASIN/AT SUPERSTITION/FLOW/01APR1997/5MIN/100YR/
        Number of actual data:  288  Header length:   0
        Compression:   0  Quality:   0
-----DSS--- ZREAD Unit  71; Vers.    2:  /ADOT WEST BASIN/AT SUPERSTITION/FLOW/01APR1997/5MIN/100YR/
      ----DSS---Debug:  Enter ZRRTSB;  Unit:  71
        NSTART:    2   NVALS:  744    JULS:   35519  ISTIME:  1440
        NLDATA:  288   JULSD:   35520
        JULS: 31MAR97       JULSD: 01APR97
        Quality Read: F,  Quality Requested: F
        ---ZRRTSB Calculations:  NPOS:    1  NDATA:  288  NREAD:  288  ILIM:  289
        After ZRDINF, Record found: T
        Pathname: /ADOT WEST BASIN/AT SUPERSTITION/FLOW/02APR1997/5MIN/100YR/
        Number of actual data:  288  Header length:   0
        Compression:   0  Quality:   0
-----DSS--- ZREAD Unit  71; Vers.    2:  /ADOT WEST BASIN/AT SUPERSTITION/FLOW/02APR1997/5MIN/100YR/
      ----DSS---Debug:  Enter ZRRTSB;  Unit:  71
        NSTART:  290   NVALS:  744    JULS:   35519  ISTIME:  1440
        NLDATA:  288   JULSD:   35521
        JULS: 31MAR97       JULSD: 02APR97
        Quality Read: F,  Quality Requested: F
        ---ZRRTSB Calculations:  NPOS:    1  NDATA:  288  NREAD:  288  ILIM:  577
        After ZRDINF, Record found: T
        Pathname: /ADOT WEST BASIN/AT SUPERSTITION/FLOW/03APR1997/5MIN/100YR/
        Number of actual data:  288  Header length:   0
        Compression:   0  Quality:   0
-----DSS--- ZREAD Unit  71; Vers.    2:  /ADOT WEST BASIN/AT SUPERSTITION/FLOW/03APR1997/5MIN/100YR/
      ----DSS---Debug:  Enter ZRRTSB;  Unit:  71
        NSTART:  578   NVALS:  744    JULS:   35519  ISTIME:  1440
        NLDATA:  288   JULSD:   35522
        JULS: 31MAR97       JULSD: 03APR97
        Quality Read: F,  Quality Requested: F
        ---ZRRTSB Calculations:  NPOS:    1  NDATA:  288  NREAD:  167  ILIM:  744
      ----- Exiting ZRRTS, Number of data values:    744,  Status:  0
        Offset:       0,  Units: CFS     ,  Type:INST-VAL
        ----- Entering ZRRTSX for unit 71 -----
Pathname: /ADOT WEST BASIN/AT SUPERSTITION/FLOW//5MIN/100YR/
        Time Window set.  Interval:     5  Number of data values:      1
        Starting date and time:  Apr 3, 1997  1355  (  35522  835)
        Ending   date and time:  Apr 3, 1997  1355  (  35522  835)
        Input time offset:      0
        After ZRDINF, Record found: T
        Pathname: /ADOT WEST BASIN/AT SUPERSTITION/FLOW/03APR1997/5MIN/100YR/
        Number of actual data:  288  Header length:   0
        Compression:   0  Quality:   0
-----DSS--- ZREAD Unit  71; Vers.    2:  /ADOT WEST BASIN/AT SUPERSTITION/FLOW/03APR1997/5MIN/100YR/
      ----DSS---Debug:  Enter ZRRTSB;  Unit:  71
        NSTART:    1   NVALS:    1    JULS:   35522  ISTIME:   835
        NLDATA:  288   JULSD:   35522
        JULS: 03APR97       JULSD: 03APR97
        Quality Read: F,  Quality Requested: F
        ---ZRRTSB Calculations:  NPOS:  167  NDATA:  288  NREAD:    1  ILIM:    1
      ----- Exiting ZRRTS, Number of data values:      1,  Status:  0
        Offset:       0,  Units: CFS     ,  Type:INST-VAL
        ----- Entering ZRRTSX for unit 71 -----
Pathname: /ADOT WEST BASIN/AT SUPERSTITION/FLOW//5MIN/100YR/
        Time Window set.  Interval:     5  Number of data values:    744
        Starting date and time:  Apr 3, 1997  1355  (  35522  835)
        Ending   date and time:  Apr 6, 1997  0350  (  35525  230)
        Input time offset:      0
```

```
        After ZRDINF, Record found: T
        Pathname: /ADOT WEST BASIN/AT SUPERSTITION/FLOW/03APR1997/5MIN/100YR/
        Number of actual data:  288  Header length:   0
        Compression:   0  Quality:   0
-----DSS--- ZREAD Unit  71; Vers.    2:  /ADOT WEST BASIN/AT SUPERSTITION/FLOW/03APR1997/5MIN/100YR/
      ----DSS---Debug:  Enter ZRRTSB;  Unit:  71
        NSTART:    1   NVALS:  744    JULS:   35522  ISTIME:   835
        NLDATA:  288   JULSD:   35522
        JULS: 03APR97       JULSD: 03APR97
        Quality Read: F,  Quality Requested: F
        ---ZRRTSB Calculations:  NPOS:  167  NDATA:  288  NREAD:  122  ILIM:  122
        After ZRDINF, Record found: T
        Pathname: /ADOT WEST BASIN/AT SUPERSTITION/FLOW/04APR1997/5MIN/100YR/
        Number of actual data:  288  Header length:   0
        Compression:   0  Quality:   0
-----DSS--- ZREAD Unit  71; Vers.    2:  /ADOT WEST BASIN/AT SUPERSTITION/FLOW/04APR1997/5MIN/100YR/
      ----DSS---Debug:  Enter ZRRTSB;  Unit:  71
        NSTART:  123   NVALS:  744    JULS:   35522  ISTIME:   835
        NLDATA:  288   JULSD:   35523
        JULS: 03APR97       JULSD: 04APR97
        Quality Read: F,  Quality Requested: F
        ---ZRRTSB Calculations:  NPOS:    1  NDATA:  288  NREAD:  288  ILIM:  410
        After ZRDINF, Record found: F
        Pathname: /ADOT WEST BASIN/AT SUPERSTITION/FLOW/05APR1997/5MIN/100YR/
      ----DSS---Debug:  Enter ZRRTSB;  Unit:  71
        NSTART:  411   NVALS:  744    JULS:   35522  ISTIME:   835
        NLDATA:  288   JULSD:   35524
        JULS: 03APR97       JULSD: 05APR97
        Quality Read: F,  Quality Requested: F
        ---ZRRTSB Calculations:  NPOS:    1  NDATA:  288  NREAD:  288  ILIM:  698
-----DSS*** ZRRTS:  CAUTION - Data block not found in file.  Unit:  71
Pathname: /ADOT WEST BASIN/AT SUPERSTITION/FLOW/05APR1997/5MIN/100YR/
        After ZRDINF, Record found: F
        Pathname: /ADOT WEST BASIN/AT SUPERSTITION/FLOW/06APR1997/5MIN/100YR/
      ----DSS---Debug:  Enter ZRRTSB;  Unit:  71
        NSTART:  699   NVALS:  744    JULS:   35522  ISTIME:   835
        NLDATA:  288   JULSD:   35525
        JULS: 03APR97       JULSD: 06APR97
        Quality Read: F,  Quality Requested: F
        ---ZRRTSB Calculations:  NPOS:    1  NDATA:  288  NREAD:   46  ILIM:  744
      ----- Exiting ZRRTS, Number of data values:    744,  Status:  3
        Offset:       0,  Units: CFS     ,  Type:INST-VAL
1
                                        RUNOFF SUMMARY
                                   FLOW IN CUBIC FEET PER SECOND
                                TIME IN HOURS,  AREA IN SQUARE MILES

                                PEAK   TIME OF    AVERAGE FLOW FOR MAXIMUM PERIOD     BASIN    MAXIMUM    TIME OF
        OPERATION       STATION FLOW   PEAK                                          AREA     STAGE      MAX STAGE
+                                                 6-HOUR     24-HOUR     72-HOUR

        HYDROGRAPH AT
+                        65A1    655.   13.00      182.        59.         20.       .97

        DIVERSION TO
+                       FF65A1    23.    8.58       17.         5.          2.       .97

        HYDROGRAPH AT
+                       R65A1    655.   13.00      182.        54.         18.       .97

        HYDROGRAPH AT
+                        CAP1A   710.   12.67      132.        36.         12.       .96

        ROUTED TO
+                       RCAP1A   643.   13.08      132.        36.         12.       .96

        2 COMBINED AT
+                       CCAP1A  1283.   13.08      311.        89.         30.      1.94

        HYDROGRAPH AT
+                        65A2    442.   12.67       90.        28.          9.       .54

        DIVERSION TO
+                       FF65A2    61.   11.83       14.         5.          2.       .54

        HYDROGRAPH AT
+                       R65A2    442.   12.67       86.        23.          8.       .54

        HYDROGRAPH AT
+                        CAP1B   710.   12.67      132.        36.         12.       .96

        ROUTED TO
+                       RCAP1B   658.   13.00      132.        36.         12.       .96

        2 COMBINED AT
+                       CCAP1B  1014.   12.83      217.        59.         20.      1.51

        2 COMBINED AT
+                       C65A12  2227.   13.00      522.       147.         49.      3.44

        DIVERSION TO
+                       BYPASO   380.   12.17      210.        69.         23.      3.44

        HYDROGRAPH AT
+                       DI-BAS  1847.   13.00      312.        78.         26.      3.44
```

+	ROUTED TO	SDDB-N	38.	14.17	36.	33.	21.	3.44
+	HYDROGRAPH AT	65A3	789.	13.00	204.	64.	21.	1.21
+	DIVERSION TO	FF65A3	164.	12.00	33.	11.	4.	1.21
+	HYDROGRAPH AT	R65A3	789.	13.00	193.	53.	18.	1.21
+	ROUTED TO	SDDB-S	35.	15.67	35.	31.	15.	1.21
+	2 COMBINED AT	SDWDBS	72.	15.25	71.	63.	36.	4.65
+	ROUTED TO	ELLSD1	72.	15.42	71.	63.	36.	4.65
+	HYDROGRAPH AT	BYPASI	380.	12.17	210.	69.	23.	3.44
+	ROUTED TO	RBYPAS	380.	12.92	210.	69.	23.	3.44
+	ROUTED TO	RSDW1	380.	13.42	210.	69.	23.	3.44
+	ROUTED TO	RSDW2	380.	14.50	210.	69.	23.	3.44
+	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	598.	13.00	295.	97.	33.	6.45
+	DIVERSION TO	DIRS65	568.	13.00	265.	75.	25.	6.45
+	HYDROGRAPH AT	DI65B	30.	10.42	30.	22.	7.	6.45
+	2 COMBINED AT	CP65A	101.	15.42	100.	79.	43.	6.45
+	ROUTED TO	65AT-3	101.	15.50	100.	79.	43.	6.45
+	HYDROGRAPH AT	DR65B	568.	13.00	265.	75.	25.	6.45
+	ROUTED TO	RS65A	461.	14.17	205.	63.	25.	6.45
+	2 COMBINED AT	CP65	560.	14.17	305.	142.	68.	6.45
+	ROUTED TO	65T66	560.	14.17	305.	142.	68.	6.45
+	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	954.	14.33	697.	390.	152.	9.79
+	ROUTED TO	66CTD	954.	14.33	697.	390.	152.	9.79
+	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	958.	14.50	709.	405.	161.	13.13
+	ROUTED TO	RC-WA	958.	14.50	709.	405.	161.	13.13
+	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	958.	14.50	718.	424.	172.	13.13
+	ROUTED TO	66T66D	958.	14.50	718.	424.	172.	13.13
+	ROUTED TO	66-66D	958.	14.50	718.	424.	172.	13.13
+	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

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        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     1082.   14.42       786.       454.      182.     15.63
        ROUTED TO
+                  66T70A     1073.   14.42       785.       454.      182.     15.63
        ROUTED TO
+                  66T70B     1071.   14.50       785.       453.      182.     15.63
        ROUTED TO
+                   CULVT     1065.   14.50       784.       453.      182.     15.63
        ROUTED TO
+                  66T70C     1059.   14.67       783.       453.      182.     15.63
1
                                   SUMMARY OF KINEMATIC WAVE - MUSKINGUM-CUNGE ROUTING
                                       (FLOW IS DIRECT RUNOFF WITHOUT BASE FLOW)
                                                                   INTERPOLATED TO
                                                                COMPUTATION INTERVAL
        ISTAQ    ELEMENT      DT       PEAK    TIME TO     VOLUME      DT       PEAK    TIME TO     VOLUME
                                                  PEAK                                    PEAK

                            (MIN)     (CFS)     (MIN)      (IN)     (MIN)     (CFS)     (MIN)       (IN)

      FOR STORM = 1  STORM AREA (SQ MI) =        .01
        ELLSD1  MANE         5.00     73.02    925.00       .90      5.00     73.02    925.00        .90

CONTINUITY SUMMARY (AC-FT) - INFLOW= .2234E+03 EXCESS= .0000E+00 OUTFLOW= .2232E+03 BASIN STORAGE= .1965E+00 PERCENT ERROR=    .0

      FOR STORM = 2  STORM AREA (SQ MI) =       1.00
        ELLSD1  MANE         5.00     72.77    925.00       .89      5.00     72.77    925.00        .89

CONTINUITY SUMMARY (AC-FT) - INFLOW= .2220E+03 EXCESS= .0000E+00 OUTFLOW= .2218E+03 BASIN STORAGE= .1942E+00 PERCENT ERROR=    .0

      FOR STORM = 3  STORM AREA (SQ MI) =       5.00
        ELLSD1  MANE         5.00     71.59    930.00       .87      5.00     71.59    930.00        .87

CONTINUITY SUMMARY (AC-FT) - INFLOW= .2154E+03 EXCESS= .0000E+00 OUTFLOW= .2152E+03 BASIN STORAGE= .1840E+00 PERCENT ERROR=    .0

      FOR STORM = 4  STORM AREA (SQ MI) =      10.00
        ELLSD1  MANE         5.00     70.07    930.00       .84      5.00     70.07    930.00        .84

CONTINUITY SUMMARY (AC-FT) - INFLOW= .2074E+03 EXCESS= .0000E+00 OUTFLOW= .2072E+03 BASIN STORAGE= .1723E+00 PERCENT ERROR=    .0

      FOR STORM = 5  STORM AREA (SQ MI) =      30.00
        ELLSD1  MANE         5.00     68.08    930.00       .79      5.00     68.08    930.00        .79

CONTINUITY SUMMARY (AC-FT) - INFLOW= .1971E+03 EXCESS= .0000E+00 OUTFLOW= .1969E+03 BASIN STORAGE= .1582E+00 PERCENT ERROR=    .0

      FOR STORM = 6  STORM AREA (SQ MI) =      60.00
        ELLSD1  MANE         5.00     66.04    930.00       .75      5.00     66.04    930.00        .75

CONTINUITY SUMMARY (AC-FT) - INFLOW= .1867E+03 EXCESS= .0000E+00 OUTFLOW= .1866E+03 BASIN STORAGE= .1450E+00 PERCENT ERROR=    .0

      FOR STORM = 7  STORM AREA (SQ MI) =      90.00
        ELLSD1  MANE         5.00     65.27    925.00       .74      5.00     65.27    925.00        .74

CONTINUITY SUMMARY (AC-FT) - INFLOW= .1829E+03 EXCESS= .0000E+00 OUTFLOW= .1828E+03 BASIN STORAGE= .1404E+00 PERCENT ERROR=    .0

      FOR STORM = 8  STORM AREA (SQ MI) =     120.00
        ELLSD1  MANE         5.00     64.49    925.00       .72      5.00     64.49    925.00        .72

CONTINUITY SUMMARY (AC-FT) - INFLOW= .1792E+03 EXCESS= .0000E+00 OUTFLOW= .1791E+03 BASIN STORAGE= .1361E+00 PERCENT ERROR=    .0

      FOR STORM = 9  STORM AREA (SQ MI) =     150.00
        ELLSD1  MANE         5.00     64.01    925.00       .71      5.00     64.01    925.00        .71

CONTINUITY SUMMARY (AC-FT) - INFLOW= .1770E+03 EXCESS= .0000E+00 OUTFLOW= .1769E+03 BASIN STORAGE= .1336E+00 PERCENT ERROR=    .0

      FOR STORM = 1  STORM AREA (SQ MI) =        .01
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65AT-3  MANE        1.82    103.02    927.93       .78      5.00    103.02    925.00        .78

CONTINUITY SUMMARY (AC-FT) - INFLOW= .2680E+03 EXCESS= .0000E+00 OUTFLOW= .2680E+03 BASIN STORAGE= .2737E-01 PERCENT ERROR=    .0

FOR STORM = 2  STORM AREA (SQ MI) =       1.00
65AT-3  MANE        1.82    102.77    926.57       .77      5.00    102.77    925.00        .77

CONTINUITY SUMMARY (AC-FT) - INFLOW= .2665E+03 EXCESS= .0000E+00 OUTFLOW= .2665E+03 BASIN STORAGE= .2707E-01 PERCENT ERROR=    .0

FOR STORM = 3  STORM AREA (SQ MI) =       5.00
65AT-3  MANE        1.82    101.59    928.72       .75      5.00    101.59    930.00        .75

CONTINUITY SUMMARY (AC-FT) - INFLOW= .2596E+03 EXCESS= .0000E+00 OUTFLOW= .2596E+03 BASIN STORAGE= .2565E-01 PERCENT ERROR=    .0

FOR STORM = 4  STORM AREA (SQ MI) =      10.00
65AT-3  MANE        1.83    100.07    929.68       .73      5.00    100.07    930.00        .73

CONTINUITY SUMMARY (AC-FT) - INFLOW= .2513E+03 EXCESS= .0000E+00 OUTFLOW= .2512E+03 BASIN STORAGE= .2401E-01 PERCENT ERROR=    .0

FOR STORM = 5  STORM AREA (SQ MI) =      30.00
65AT-3  MANE        1.84     98.08    929.75       .70      5.00     98.08    930.00        .70

CONTINUITY SUMMARY (AC-FT) - INFLOW= .2405E+03 EXCESS= .0000E+00 OUTFLOW= .2405E+03 BASIN STORAGE= .2205E-01 PERCENT ERROR=    .0

FOR STORM = 6  STORM AREA (SQ MI) =      60.00
65AT-3  MANE        1.85     96.04    931.81       .67      5.00     96.04    930.00        .67

CONTINUITY SUMMARY (AC-FT) - INFLOW= .2296E+03 EXCESS= .0000E+00 OUTFLOW= .2296E+03 BASIN STORAGE= .2020E-01 PERCENT ERROR=    .0

FOR STORM = 7  STORM AREA (SQ MI) =      90.00
65AT-3  MANE        1.85     95.27    927.76       .66      5.00     95.27    930.00        .66

CONTINUITY SUMMARY (AC-FT) - INFLOW= .2257E+03 EXCESS= .0000E+00 OUTFLOW= .2257E+03 BASIN STORAGE= .1959E-01 PERCENT ERROR=    .0

FOR STORM = 8  STORM AREA (SQ MI) =     120.00
65AT-3  MANE        1.85     94.49    927.47       .64      5.00     94.48    930.00        .64

CONTINUITY SUMMARY (AC-FT) - INFLOW= .2218E+03 EXCESS= .0000E+00 OUTFLOW= .2218E+03 BASIN STORAGE= .1897E-01 PERCENT ERROR=    .0

FOR STORM = 9  STORM AREA (SQ MI) =     150.00
65AT-3  MANE        1.85     94.01    928.38       .64      5.00     94.01    930.00        .64

CONTINUITY SUMMARY (AC-FT) - INFLOW= .2194E+03 EXCESS= .0000E+00 OUTFLOW= .2194E+03 BASIN STORAGE= .1862E-01 PERCENT ERROR=    .0

FOR STORM = 1  STORM AREA (SQ MI) =        .01
65T66  MANE        1.01    605.81    826.67      1.25      5.00    604.83    830.00       1.25

CONTINUITY SUMMARY (AC-FT) - INFLOW= .4288E+03 EXCESS= .0000E+00 OUTFLOW= .4288E+03 BASIN STORAGE= .2194E-01 PERCENT ERROR=    .0

FOR STORM = 2  STORM AREA (SQ MI) =       1.00
65T66  MANE        1.01    598.43    830.69      1.24      5.00    598.10    830.00       1.24

CONTINUITY SUMMARY (AC-FT) - INFLOW= .4256E+03 EXCESS= .0000E+00 OUTFLOW= .4255E+03 BASIN STORAGE= .2169E-01 PERCENT ERROR=    .0

FOR STORM = 3  STORM AREA (SQ MI) =       5.00
65T66  MANE        1.02    573.55    841.93      1.19      5.00    572.95    840.00       1.19

CONTINUITY SUMMARY (AC-FT) - INFLOW= .4110E+03 EXCESS= .0000E+00 OUTFLOW= .4109E+03 BASIN STORAGE= .2057E-01 PERCENT ERROR=    .0

FOR STORM = 4  STORM AREA (SQ MI) =      10.00
65T66  MANE        1.03    548.10    856.87      1.14      5.00    547.81    860.00       1.14

CONTINUITY SUMMARY (AC-FT) - INFLOW= .3931E+03 EXCESS= .0000E+00 OUTFLOW= .3931E+03 BASIN STORAGE= .1926E-01 PERCENT ERROR=    .0

FOR STORM = 5  STORM AREA (SQ MI) =      30.00
65T66  MANE        1.05    513.70    870.17      1.08      5.00    513.70    870.00       1.08

CONTINUITY SUMMARY (AC-FT) - INFLOW= .3703E+03 EXCESS= .0000E+00 OUTFLOW= .3703E+03 BASIN STORAGE= .1771E-01 PERCENT ERROR=    .0
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FOR STORM = 6  STORM AREA (SQ MI) =      60.00
   65T66  MANE        1.05    500.63    880.94      1.01      5.00    500.51    880.00        1.01

CONTINUITY SUMMARY (AC-FT) - INFLOW= .3475E+03 EXCESS= .0000E+00 OUTFLOW= .3475E+03 BASIN STORAGE= .1624E-01 PERCENT ERROR=    .0

FOR STORM = 7  STORM AREA (SQ MI) =      90.00
   65T66  MANE        1.05    496.69    885.48       .99      5.00    496.63    885.00         .99

CONTINUITY SUMMARY (AC-FT) - INFLOW= .3394E+03 EXCESS= .0000E+00 OUTFLOW= .3394E+03 BASIN STORAGE= .1574E-01 PERCENT ERROR=    .0

FOR STORM = 8  STORM AREA (SQ MI) =     120.00
   65T66  MANE        1.05    492.44    890.20       .96      5.00    492.42    890.00         .96

CONTINUITY SUMMARY (AC-FT) - INFLOW= .3313E+03 EXCESS= .0000E+00 OUTFLOW= .3312E+03 BASIN STORAGE= .1526E-01 PERCENT ERROR=    .0

FOR STORM = 9  STORM AREA (SQ MI) =     150.00
   65T66  MANE        1.06    489.80    891.13       .95      5.00    489.49    890.00         .95

CONTINUITY SUMMARY (AC-FT) - INFLOW= .3264E+03 EXCESS= .0000E+00 OUTFLOW= .3263E+03 BASIN STORAGE= .1498E-01 PERCENT ERROR=    .0

FOR STORM = 1  STORM AREA (SQ MI) =        .01
  66C1T2  MANE         .75    410.00    886.49      2.94      5.00    410.00    890.00        2.94

CONTINUITY SUMMARY (AC-FT) - INFLOW= .5231E+03 EXCESS= .0000E+00 OUTFLOW= .5231E+03 BASIN STORAGE= .9382E-04 PERCENT ERROR=    .0

FOR STORM = 2  STORM AREA (SQ MI) =       1.00
  66C1T2  MANE         .75    410.00    886.49      2.93      5.00    410.00    890.00        2.93

CONTINUITY SUMMARY (AC-FT) - INFLOW= .5224E+03 EXCESS= .0000E+00 OUTFLOW= .5224E+03 BASIN STORAGE= .9382E-04 PERCENT ERROR=    .0

FOR STORM = 3  STORM AREA (SQ MI) =       5.00
  66C1T2  MANE         .75    410.00    891.72      2.91      5.00    410.00    895.00        2.91

CONTINUITY SUMMARY (AC-FT) - INFLOW= .5186E+03 EXCESS= .0000E+00 OUTFLOW= .5186E+03 BASIN STORAGE= .9382E-04 PERCENT ERROR=    .0

FOR STORM = 4  STORM AREA (SQ MI) =      10.00
  66C1T2  MANE         .75    410.00    896.19      2.87      5.00    410.00    900.00        2.87

CONTINUITY SUMMARY (AC-FT) - INFLOW= .5121E+03 EXCESS= .0000E+00 OUTFLOW= .5121E+03 BASIN STORAGE= .9382E-04 PERCENT ERROR=    .0

FOR STORM = 5  STORM AREA (SQ MI) =      30.00
  66C1T2  MANE         .75    409.96    916.36      2.82      5.00    409.95    915.00        2.82

CONTINUITY SUMMARY (AC-FT) - INFLOW= .5020E+03 EXCESS= .0000E+00 OUTFLOW= .5020E+03 BASIN STORAGE= .9381E-04 PERCENT ERROR=    .0

FOR STORM = 6  STORM AREA (SQ MI) =      60.00
  66C1T2  MANE         .75    406.85    961.09      2.78      5.00    406.84    965.00        2.78

CONTINUITY SUMMARY (AC-FT) - INFLOW= .4948E+03 EXCESS= .0000E+00 OUTFLOW= .4948E+03 BASIN STORAGE= .9375E-04 PERCENT ERROR=    .0

FOR STORM = 7  STORM AREA (SQ MI) =      90.00
  66C1T2  MANE         .75    406.11    930.06      2.76      5.00    406.11    930.00        2.76

CONTINUITY SUMMARY (AC-FT) - INFLOW= .4924E+03 EXCESS= .0000E+00 OUTFLOW= .4924E+03 BASIN STORAGE= .9378E-04 PERCENT ERROR=    .0

FOR STORM = 8  STORM AREA (SQ MI) =     120.00
  66C1T2  MANE         .75    406.05    930.08      2.75      5.00    406.05    930.00        2.75

CONTINUITY SUMMARY (AC-FT) - INFLOW= .4906E+03 EXCESS= .0000E+00 OUTFLOW= .4906E+03 BASIN STORAGE= .9377E-04 PERCENT ERROR=    .0

FOR STORM = 9  STORM AREA (SQ MI) =     150.00
  66C1T2  MANE         .75    406.02    930.08      2.75      5.00    406.02    930.00        2.75

CONTINUITY SUMMARY (AC-FT) - INFLOW= .4895E+03 EXCESS= .0000E+00 OUTFLOW= .4895E+03 BASIN STORAGE= .9377E-04 PERCENT ERROR=    .0

FOR STORM = 1  STORM AREA (SQ MI) =        .01
   66CTD  MANE         .66    998.57    830.59      1.82      5.00    998.57    830.00        1.82
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CONTINUITY SUMMARY (AC-FT) - INFLOW= .9519E+03 EXCESS= .0000E+00 OUTFLOW= .9519E+03 BASIN STORAGE= .1594E-01 PERCENT ERROR=    .0

          FOR STORM = 2  STORM AREA (SQ MI) =       1.00
             66CTD  MANE          .67    992.87    835.01      1.81      5.00    992.87    835.00        1.81

CONTINUITY SUMMARY (AC-FT) - INFLOW= .9479E+03 EXCESS= .0000E+00 OUTFLOW= .9478E+03 BASIN STORAGE= .1576E-01 PERCENT ERROR=    .0

          FOR STORM = 3  STORM AREA (SQ MI) =       5.00
             66CTD  MANE          .67    973.82    845.56      1.78      5.00    973.81    845.00        1.78

CONTINUITY SUMMARY (AC-FT) - INFLOW= .9297E+03 EXCESS= .0000E+00 OUTFLOW= .9296E+03 BASIN STORAGE= .1495E-01 PERCENT ERROR=    .0

          FOR STORM = 4  STORM AREA (SQ MI) =      10.00
             66CTD  MANE          .67    953.20    859.95      1.73      5.00    953.19    860.00        1.73

CONTINUITY SUMMARY (AC-FT) - INFLOW= .9052E+03 EXCESS= .0000E+00 OUTFLOW= .9052E+03 BASIN STORAGE= .1400E-01 PERCENT ERROR=    .0

          FOR STORM = 5  STORM AREA (SQ MI) =      30.00
             66CTD  MANE          .68    919.78    880.35      1.67      5.00    919.78    880.00        1.67

CONTINUITY SUMMARY (AC-FT) - INFLOW= .8723E+03 EXCESS= .0000E+00 OUTFLOW= .8723E+03 BASIN STORAGE= .1287E-01 PERCENT ERROR=    .0

          FOR STORM = 6  STORM AREA (SQ MI) =      60.00
             66CTD  MANE          .68    903.97    884.76      1.61      5.00    903.95    885.00        1.61

CONTINUITY SUMMARY (AC-FT) - INFLOW= .8423E+03 EXCESS= .0000E+00 OUTFLOW= .8423E+03 BASIN STORAGE= .1180E-01 PERCENT ERROR=    .0

          FOR STORM = 7  STORM AREA (SQ MI) =      90.00
             66CTD  MANE          .68    900.33    888.15      1.59      5.00    900.25    890.00        1.59

CONTINUITY SUMMARY (AC-FT) - INFLOW= .8318E+03 EXCESS= .0000E+00 OUTFLOW= .8318E+03 BASIN STORAGE= .1144E-01 PERCENT ERROR=    .0

          FOR STORM = 8  STORM AREA (SQ MI) =     120.00
             66CTD  MANE          .68    896.52    890.22      1.57      5.00    896.45    890.00        1.57

CONTINUITY SUMMARY (AC-FT) - INFLOW= .8219E+03 EXCESS= .0000E+00 OUTFLOW= .8219E+03 BASIN STORAGE= .1109E-01 PERCENT ERROR=    .0

          FOR STORM = 9  STORM AREA (SQ MI) =     150.00
             66CTD  MANE          .68    893.61    894.95      1.56      5.00    893.58    895.00        1.56

CONTINUITY SUMMARY (AC-FT) - INFLOW= .8159E+03 EXCESS= .0000E+00 OUTFLOW= .8159E+03 BASIN STORAGE= .1089E-01 PERCENT ERROR=    .0

          FOR STORM = 1  STORM AREA (SQ MI) =        .01
             RC-WA  MANE          .69   1014.10    830.99      1.45      5.00   1013.43    830.00        1.45

CONTINUITY SUMMARY (AC-FT) - INFLOW= .1017E+04 EXCESS= .0000E+00 OUTFLOW= .1017E+04 BASIN STORAGE= .1659E-01 PERCENT ERROR=    .0

          FOR STORM = 2  STORM AREA (SQ MI) =       1.00
             RC-WA  MANE          .69   1008.37    835.39      1.45      5.00   1008.26    835.00        1.45

CONTINUITY SUMMARY (AC-FT) - INFLOW= .1013E+04 EXCESS= .0000E+00 OUTFLOW= .1013E+04 BASIN STORAGE= .1641E-01 PERCENT ERROR=    .0

          FOR STORM = 3  STORM AREA (SQ MI) =       5.00
             RC-WA  MANE          .69    988.46    849.85      1.42      5.00    988.44    850.00        1.42

CONTINUITY SUMMARY (AC-FT) - INFLOW= .9939E+03 EXCESS= .0000E+00 OUTFLOW= .9939E+03 BASIN STORAGE= .1556E-01 PERCENT ERROR=    .0

          FOR STORM = 4  STORM AREA (SQ MI) =      10.00
             RC-WA  MANE          .70    968.17    865.21      1.38      5.00    968.17    865.00        1.38

CONTINUITY SUMMARY (AC-FT) - INFLOW= .9687E+03 EXCESS= .0000E+00 OUTFLOW= .9687E+03 BASIN STORAGE= .1457E-01 PERCENT ERROR=    .0

          FOR STORM = 5  STORM AREA (SQ MI) =      30.00
             RC-WA  MANE          .70    935.98    885.77      1.34      5.00    935.96    885.00        1.34

CONTINUITY SUMMARY (AC-FT) - INFLOW= .9352E+03 EXCESS= .0000E+00 OUTFLOW= .9352E+03 BASIN STORAGE= .1340E-01 PERCENT ERROR=    .0
```

```
FOR STORM = 6  STORM AREA (SQ MI) =      60.00
   RC-WA  MANE          .70    919.50    886.09      1.29      5.00    919.43    885.00        1.29

CONTINUITY SUMMARY (AC-FT) - INFLOW= .9049E+03 EXCESS= .0000E+00 OUTFLOW= .9049E+03 BASIN STORAGE= .1229E-01 PERCENT ERROR=    .0

FOR STORM = 7  STORM AREA (SQ MI) =      90.00
   RC-WA  MANE          .70    916.20    890.24      1.28      5.00    916.18    890.00        1.28

CONTINUITY SUMMARY (AC-FT) - INFLOW= .8942E+03 EXCESS= .0000E+00 OUTFLOW= .8942E+03 BASIN STORAGE= .1191E-01 PERCENT ERROR=    .0

FOR STORM = 8  STORM AREA (SQ MI) =     120.00
   RC-WA  MANE          .70    912.17    891.75      1.26      5.00    912.00    895.00        1.26

CONTINUITY SUMMARY (AC-FT) - INFLOW= .8841E+03 EXCESS= .0000E+00 OUTFLOW= .8841E+03 BASIN STORAGE= .1155E-01 PERCENT ERROR=    .0

FOR STORM = 9  STORM AREA (SQ MI) =     150.00
   RC-WA  MANE          .70    909.53    895.07      1.25      5.00    909.52    895.00        1.25

CONTINUITY SUMMARY (AC-FT) - INFLOW= .8780E+03 EXCESS= .0000E+00 OUTFLOW= .8780E+03 BASIN STORAGE= .1134E-01 PERCENT ERROR=    .0

FOR STORM = 1  STORM AREA (SQ MI) =        .01
  66T66D  MANE         1.00   1013.36    832.89      1.57      5.00   1013.30    835.00        1.57

CONTINUITY SUMMARY (AC-FT) - INFLOW= .1100E+04 EXCESS= .0000E+00 OUTFLOW= .1100E+04 BASIN STORAGE= .2401E-01 PERCENT ERROR=    .0

FOR STORM = 2  STORM AREA (SQ MI) =       1.00
  66T66D  MANE         1.00   1007.91    835.73      1.56      5.00   1007.53    835.00        1.56

CONTINUITY SUMMARY (AC-FT) - INFLOW= .1094E+04 EXCESS= .0000E+00 OUTFLOW= .1094E+04 BASIN STORAGE= .2375E-01 PERCENT ERROR=    .0

FOR STORM = 3  STORM AREA (SQ MI) =       5.00
  66T66D  MANE         1.00    988.35    850.07      1.53      5.00    988.34    850.00        1.53

CONTINUITY SUMMARY (AC-FT) - INFLOW= .1069E+04 EXCESS= .0000E+00 OUTFLOW= .1069E+04 BASIN STORAGE= .2252E-01 PERCENT ERROR=    .0

FOR STORM = 4  STORM AREA (SQ MI) =      10.00
  66T66D  MANE         1.01    968.08    865.67      1.48      5.00    968.05    865.00        1.48

CONTINUITY SUMMARY (AC-FT) - INFLOW= .1039E+04 EXCESS= .0000E+00 OUTFLOW= .1039E+04 BASIN STORAGE= .2109E-01 PERCENT ERROR=    .0

FOR STORM = 5  STORM AREA (SQ MI) =      30.00
  66T66D  MANE         1.01    935.93    885.71      1.43      5.00    935.88    885.00        1.43

CONTINUITY SUMMARY (AC-FT) - INFLOW= .9995E+03 EXCESS= .0000E+00 OUTFLOW= .9994E+03 BASIN STORAGE= .1939E-01 PERCENT ERROR=    .0

FOR STORM = 6  STORM AREA (SQ MI) =      60.00
  66T66D  MANE         1.02    919.34    886.85      1.37      5.00    919.13    885.00        1.37

CONTINUITY SUMMARY (AC-FT) - INFLOW= .9602E+03 EXCESS= .0000E+00 OUTFLOW= .9602E+03 BASIN STORAGE= .1779E-01 PERCENT ERROR=    .0

FOR STORM = 7  STORM AREA (SQ MI) =      90.00
  66T66D  MANE         1.02    916.05    890.53      1.35      5.00    915.97    890.00        1.35

CONTINUITY SUMMARY (AC-FT) - INFLOW= .9462E+03 EXCESS= .0000E+00 OUTFLOW= .9462E+03 BASIN STORAGE= .1724E-01 PERCENT ERROR=    .0

FOR STORM = 8  STORM AREA (SQ MI) =     120.00
  66T66D  MANE         1.02    911.95    894.39      1.33      5.00    911.93    895.00        1.33

CONTINUITY SUMMARY (AC-FT) - INFLOW= .9323E+03 EXCESS= .0000E+00 OUTFLOW= .9323E+03 BASIN STORAGE= .1671E-01 PERCENT ERROR=    .0

FOR STORM = 9  STORM AREA (SQ MI) =     150.00
  66T66D  MANE         1.02    909.33    895.91      1.32      5.00    909.15    895.00        1.32

CONTINUITY SUMMARY (AC-FT) - INFLOW= .9239E+03 EXCESS= .0000E+00 OUTFLOW= .9238E+03 BASIN STORAGE= .1641E-01 PERCENT ERROR=    .0

FOR STORM = 1  STORM AREA (SQ MI) =        .01
  66-66D  MANE         2.15   1012.77    835.12      1.57      5.00   1012.70    835.00        1.57
```

```
CONTINUITY SUMMARY (AC-FT) - INFLOW= .1100E+04 EXCESS= .0000E+00 OUTFLOW= .1100E+04 BASIN STORAGE= .5191E-01 PERCENT ERROR=    .0

        FOR STORM = 2  STORM AREA (SQ MI) =       1.00
          66-66D  MANE         2.15   1007.13   838.22      1.56      5.00   1007.02    840.00        1.56

CONTINUITY SUMMARY (AC-FT) - INFLOW= .1094E+04 EXCESS= .0000E+00 OUTFLOW= .1094E+04 BASIN STORAGE= .5130E-01 PERCENT ERROR=    .0

        FOR STORM = 3  STORM AREA (SQ MI) =       5.00
          66-66D  MANE         2.16    988.05   852.24      1.53      5.00    987.85    850.00        1.53

CONTINUITY SUMMARY (AC-FT) - INFLOW= .1069E+04 EXCESS= .0000E+00 OUTFLOW= .1069E+04 BASIN STORAGE= .4865E-01 PERCENT ERROR=    .0

        FOR STORM = 4  STORM AREA (SQ MI) =      10.00
          66-66D  MANE         2.17    967.81   866.62      1.48      5.00    967.61    865.00        1.48

CONTINUITY SUMMARY (AC-FT) - INFLOW= .1039E+04 EXCESS= .0000E+00 OUTFLOW= .1039E+04 BASIN STORAGE= .4560E-01 PERCENT ERROR=    .0

        FOR STORM = 5  STORM AREA (SQ MI) =      30.00
          66-66D  MANE         2.18    935.84   889.95      1.43      5.00    935.84    890.00        1.43

CONTINUITY SUMMARY (AC-FT) - INFLOW= .9994E+03 EXCESS= .0000E+00 OUTFLOW= .9994E+03 BASIN STORAGE= .4196E-01 PERCENT ERROR=    .0

        FOR STORM = 6  STORM AREA (SQ MI) =      60.00
          66-66D  MANE         2.19    919.11   888.79      1.37      5.00    919.08    890.00        1.37

CONTINUITY SUMMARY (AC-FT) - INFLOW= .9603E+03 EXCESS= .0000E+00 OUTFLOW= .9602E+03 BASIN STORAGE= .3849E-01 PERCENT ERROR=    .0

        FOR STORM = 7  STORM AREA (SQ MI) =      90.00
          66-66D  MANE         2.19    915.68   893.78      1.35      5.00    915.45    895.00        1.35

CONTINUITY SUMMARY (AC-FT) - INFLOW= .9462E+03 EXCESS= .0000E+00 OUTFLOW= .9462E+03 BASIN STORAGE= .3726E-01 PERCENT ERROR=    .0

        FOR STORM = 8  STORM AREA (SQ MI) =     120.00
          66-66D  MANE         2.19    911.61   896.76      1.33      5.00    911.58    895.00        1.33

CONTINUITY SUMMARY (AC-FT) - INFLOW= .9323E+03 EXCESS= .0000E+00 OUTFLOW= .9323E+03 BASIN STORAGE= .3610E-01 PERCENT ERROR=    .0

        FOR STORM = 9  STORM AREA (SQ MI) =     150.00
          66-66D  MANE         2.19    908.76   897.32      1.32      5.00    908.42    900.00        1.32

CONTINUITY SUMMARY (AC-FT) - INFLOW= .9238E+03 EXCESS= .0000E+00 OUTFLOW= .9238E+03 BASIN STORAGE= .3550E-01 PERCENT ERROR=    .0

        FOR STORM = 1  STORM AREA (SQ MI) =        .01
          66T70A  MANE         1.07   1273.49   829.53      1.43      5.00   1273.45    830.00        1.43

CONTINUITY SUMMARY (AC-FT) - INFLOW= .1191E+04 EXCESS= .0000E+00 OUTFLOW= .1190E+04 BASIN STORAGE= .2726E-01 PERCENT ERROR=    .1

        FOR STORM = 2  STORM AREA (SQ MI) =       1.00
          66T70A  MANE         1.07   1254.47   830.94      1.42      5.00   1254.33    830.00        1.42

CONTINUITY SUMMARY (AC-FT) - INFLOW= .1183E+04 EXCESS= .0000E+00 OUTFLOW= .1183E+04 BASIN STORAGE= .2693E-01 PERCENT ERROR=    .1

        FOR STORM = 3  STORM AREA (SQ MI) =       5.00
          66T70A  MANE         1.09   1181.17   840.10      1.38      5.00   1180.93    840.00        1.38

CONTINUITY SUMMARY (AC-FT) - INFLOW= .1150E+04 EXCESS= .0000E+00 OUTFLOW= .1149E+04 BASIN STORAGE= .2554E-01 PERCENT ERROR=    .0

        FOR STORM = 4  STORM AREA (SQ MI) =      10.00
          66T70A  MANE         1.10   1109.08   855.30      1.33      5.00   1108.85    855.00        1.33

CONTINUITY SUMMARY (AC-FT) - INFLOW= .1109E+04 EXCESS= .0000E+00 OUTFLOW= .1108E+04 BASIN STORAGE= .2395E-01 PERCENT ERROR=    .0

        FOR STORM = 5  STORM AREA (SQ MI) =      30.00
          66T70A  MANE         1.12   1037.04   874.81      1.27      5.00   1037.03    875.00        1.27

CONTINUITY SUMMARY (AC-FT) - INFLOW= .1056E+04 EXCESS= .0000E+00 OUTFLOW= .1056E+04 BASIN STORAGE= .2203E-01 PERCENT ERROR=    .0
```

```
FOR STORM = 6  STORM AREA (SQ MI) =      60.00
  66T70A  MANE        1.14    958.71    899.44      1.20      5.00    958.69    900.00        1.20

CONTINUITY SUMMARY (AC-FT) - INFLOW= .1004E+04 EXCESS= .0000E+00 OUTFLOW= .1003E+04 BASIN STORAGE= .2021E-01 PERCENT ERROR=    .0

FOR STORM = 7  STORM AREA (SQ MI) =      90.00
  66T70A  MANE        1.14    941.27    895.56      1.18      5.00    941.24    895.00        1.18

CONTINUITY SUMMARY (AC-FT) - INFLOW= .9851E+03 EXCESS= .0000E+00 OUTFLOW= .9848E+03 BASIN STORAGE= .1957E-01 PERCENT ERROR=    .0

FOR STORM = 8  STORM AREA (SQ MI) =     120.00
  66T70A  MANE        1.14    934.48    895.51      1.16      5.00    934.31    895.00        1.16

CONTINUITY SUMMARY (AC-FT) - INFLOW= .9665E+03 EXCESS= .0000E+00 OUTFLOW= .9662E+03 BASIN STORAGE= .1896E-01 PERCENT ERROR=    .0

FOR STORM = 9  STORM AREA (SQ MI) =     150.00
  66T70A  MANE        1.14    930.76    899.70      1.15      5.00    930.68    900.00        1.15

CONTINUITY SUMMARY (AC-FT) - INFLOW= .9551E+03 EXCESS= .0000E+00 OUTFLOW= .9549E+03 BASIN STORAGE= .1864E-01 PERCENT ERROR=    .0

FOR STORM = 1  STORM AREA (SQ MI) =        .01
  66T70B  MANE        1.46   1268.41    831.15      1.43      5.00   1267.31    830.00        1.43

CONTINUITY SUMMARY (AC-FT) - INFLOW= .1190E+04 EXCESS= .0000E+00 OUTFLOW= .1190E+04 BASIN STORAGE= .3702E-01 PERCENT ERROR=    .0

FOR STORM = 2  STORM AREA (SQ MI) =       1.00
  66T70B  MANE        1.46   1250.46    835.13      1.42      5.00   1250.44    835.00        1.42

CONTINUITY SUMMARY (AC-FT) - INFLOW= .1183E+04 EXCESS= .0000E+00 OUTFLOW= .1183E+04 BASIN STORAGE= .3659E-01 PERCENT ERROR=    .0

FOR STORM = 3  STORM AREA (SQ MI) =       5.00
  66T70B  MANE        1.48   1178.55    845.26      1.38      5.00   1178.55    845.00        1.38

CONTINUITY SUMMARY (AC-FT) - INFLOW= .1149E+04 EXCESS= .0000E+00 OUTFLOW= .1149E+04 BASIN STORAGE= .3469E-01 PERCENT ERROR=    .0

FOR STORM = 4  STORM AREA (SQ MI) =      10.00
  66T70B  MANE        1.50   1107.83    858.98      1.33      5.00   1107.70    860.00        1.33

CONTINUITY SUMMARY (AC-FT) - INFLOW= .1108E+04 EXCESS= .0000E+00 OUTFLOW= .1108E+04 BASIN STORAGE= .3255E-01 PERCENT ERROR=    .0

FOR STORM = 5  STORM AREA (SQ MI) =      30.00
  66T70B  MANE        1.52   1036.44    878.14      1.27      5.00   1036.29    880.00        1.27

CONTINUITY SUMMARY (AC-FT) - INFLOW= .1056E+04 EXCESS= .0000E+00 OUTFLOW= .1056E+04 BASIN STORAGE= .2992E-01 PERCENT ERROR=    .0

FOR STORM = 6  STORM AREA (SQ MI) =      60.00
  66T70B  MANE        1.54    958.27    901.29      1.20      5.00    958.27    900.00        1.20

CONTINUITY SUMMARY (AC-FT) - INFLOW= .1004E+04 EXCESS= .0000E+00 OUTFLOW= .1003E+04 BASIN STORAGE= .2745E-01 PERCENT ERROR=    .0

FOR STORM = 7  STORM AREA (SQ MI) =      90.00
  66T70B  MANE        1.55    940.88    896.88      1.18      5.00    940.74    900.00        1.18

CONTINUITY SUMMARY (AC-FT) - INFLOW= .9848E+03 EXCESS= .0000E+00 OUTFLOW= .9848E+03 BASIN STORAGE= .2660E-01 PERCENT ERROR=    .0

FOR STORM = 8  STORM AREA (SQ MI) =     120.00
  66T70B  MANE        1.55    934.00    899.75      1.16      5.00    933.94    900.00        1.16

CONTINUITY SUMMARY (AC-FT) - INFLOW= .9662E+03 EXCESS= .0000E+00 OUTFLOW= .9661E+03 BASIN STORAGE= .2577E-01 PERCENT ERROR=    .0

FOR STORM = 9  STORM AREA (SQ MI) =     150.00
  66T70B  MANE        1.55    929.95    900.45      1.15      5.00    929.92    900.00        1.15

CONTINUITY SUMMARY (AC-FT) - INFLOW= .9548E+03 EXCESS= .0000E+00 OUTFLOW= .9548E+03 BASIN STORAGE= .2534E-01 PERCENT ERROR=    .0

FOR STORM = 1  STORM AREA (SQ MI) =        .01
   CULVT  MANE         .83   1258.39    830.09      1.43      5.00   1258.01    830.00        1.43
```

```
CONTINUITY SUMMARY (AC-FT) - INFLOW= .1190E+04 EXCESS= .0000E+00 OUTFLOW= .1189E+04 BASIN STORAGE= .2099E-01 PERCENT ERROR=    .1

          FOR STORM = 2  STORM AREA (SQ MI) =       1.00
             CULVT  MANE          .83   1241.72    834.79      1.42      5.00   1241.50    835.00        1.42

CONTINUITY SUMMARY (AC-FT) - INFLOW= .1183E+04 EXCESS= .0000E+00 OUTFLOW= .1182E+04 BASIN STORAGE= .2075E-01 PERCENT ERROR=    .1

          FOR STORM = 3  STORM AREA (SQ MI) =       5.00
             CULVT  MANE          .84   1170.60    844.75      1.38      5.00   1170.47    845.00        1.38

CONTINUITY SUMMARY (AC-FT) - INFLOW= .1149E+04 EXCESS= .0000E+00 OUTFLOW= .1148E+04 BASIN STORAGE= .1968E-01 PERCENT ERROR=    .1

          FOR STORM = 4  STORM AREA (SQ MI) =      10.00
             CULVT  MANE          .85   1100.57    859.52      1.33      5.00   1100.56    860.00        1.33

CONTINUITY SUMMARY (AC-FT) - INFLOW= .1108E+04 EXCESS= .0000E+00 OUTFLOW= .1108E+04 BASIN STORAGE= .1847E-01 PERCENT ERROR=    .0

          FOR STORM = 5  STORM AREA (SQ MI) =      30.00
             CULVT  MANE          .86   1029.89    879.65      1.27      5.00   1029.85    880.00        1.27

CONTINUITY SUMMARY (AC-FT) - INFLOW= .1056E+04 EXCESS= .0000E+00 OUTFLOW= .1055E+04 BASIN STORAGE= .1697E-01 PERCENT ERROR=    .0

          FOR STORM = 6  STORM AREA (SQ MI) =      60.00
             CULVT  MANE          .87    952.81    900.51      1.20      5.00    952.76    900.00        1.20

CONTINUITY SUMMARY (AC-FT) - INFLOW= .1004E+04 EXCESS= .0000E+00 OUTFLOW= .1003E+04 BASIN STORAGE= .1557E-01 PERCENT ERROR=    .0

          FOR STORM = 7  STORM AREA (SQ MI) =      90.00
             CULVT  MANE          .88    935.07    899.45      1.18      5.00    935.05    900.00        1.18

CONTINUITY SUMMARY (AC-FT) - INFLOW= .9848E+03 EXCESS= .0000E+00 OUTFLOW= .9844E+03 BASIN STORAGE= .1508E-01 PERCENT ERROR=    .0

          FOR STORM = 8  STORM AREA (SQ MI) =     120.00
             CULVT  MANE          .88    928.00    899.89      1.16      5.00    927.97    900.00        1.16

CONTINUITY SUMMARY (AC-FT) - INFLOW= .9662E+03 EXCESS= .0000E+00 OUTFLOW= .9658E+03 BASIN STORAGE= .1462E-01 PERCENT ERROR=    .0

          FOR STORM = 9  STORM AREA (SQ MI) =     150.00
             CULVT  MANE          .88    923.66    900.69      1.14      5.00    923.60    900.00        1.14

CONTINUITY SUMMARY (AC-FT) - INFLOW= .9548E+03 EXCESS= .0000E+00 OUTFLOW= .9544E+03 BASIN STORAGE= .1437E-01 PERCENT ERROR=    .0


*** 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 A

HYDROLOGY

Alternative 1: Single Basin Hydrology (HEC-1)

```
1****************************************
*                                      *
*   FLOOD HYDROGRAPH PACKAGE  (HEC-1)  *
*              JUN   1998              *
*            VERSION 4.1               *
*                                      *
*  RUN DATE   03JAN08  TIME  11:29:12  *
*                                      *
****************************************
```

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


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

   1          ID   Alternative 1:  Single Basin (Offline-Meridian, Online-Siphon Draw Wash)
   2          ID
   3          ID   Project:        Siphon Draw Wash Drainage Improvements
   4          ID   Contract FCD:   2007C012
   5          ID   SCI Project No: 20539
   6          ID
   7          ID   Notes By:       Stanley Consultants, Inc. (SCI)
   8          ID   Revision Date:  December, 2007
   9          ID
  10          ID   Filename:       SDWBALT1.DAT  (Previous Model: SDW-BASE.DAT)
  11          ID   Storm Event:    100-Yr, 24 Hrs
  12          ID   Conditions:     Future Conditions
  13          ID
  14          ID   Comments:
  15          ID
  16          ID   This is the SINGLE RETENTION BASIN ALTERNATIVE model.
  17          ID   The basin is offline to the proposed Meridian Channel and online
  18          ID   to Siphon Draw Wash (east of Meridian Road.
  19          ID
  20          ID   This model was developed from the base hydrology model (SDW-BASE.DAT)
  21          ID   produced as part of this project and developed from previous hydrology
  22          ID   models from previous studies.  For this project SDW-BASE.DAT truncated
  23          ID   the previous hydrologic model S60EMAP1.DAT provided by the FCDMC.
  24          ID   Any hydrologic elements which do not contribute to runoff along
  25          ID   Elliot Road, just upstream of the SanTan Freeway Channel(routing
  26          ID   reach 66T70C) were removed
  27          ID
  28          ID   To run correctly, this model requires referencing a DSS file created
  29          ID   by the upstream hydrologic model ultimately developed from the
  30          ID   East Mesa ADMP.  For the 100-year, future conditions, this model is
  31          ID   N60EM.DAT (which produces N60EM.DSS).
  32          ID
  33          ID   END SCI INTRODUCTORY COMMENTS
  34          ID
  35          ID   ************************************************************************
  36          ID
  37          ID   MODEL REVISED 9/12/02 TO CHANGE ZW CARD TO ZR CARD AT HYDROGRAPH CAP1B (CWR)
  38          ID
  39          ID   ID  Kirkham Michael:
  40          ID   Last Revised Date:  5/14/02
  41          ID   Filename:  WS4-SEM.DAT
  42          ID
  43          ID   Comments Dated 5/14/02 (CJ)
  44          ID
  45          ID   This model should be used for the Rittenhouse and Chandler Heights Basin
  46          ID   Design Project - 30  Design Analyses.
  47          ID
  48          ID   This model is one of several models that represent the EMF watershed.
  49          ID   This model covers the Southeast Mesa Area and should reference as a DSS
  50          ID   the watershed model for the Northeast Mesa Area (Filename WS2-NEM.DAT).
  51          ID
  52          ID   This model is necessary to determine the input hydrographs for the
  53          ID   Rittenhouse Basin Design HEC-RAS Unsteady State analysis.  To develop
  54          ID   the necessary input hydrographs the following models should be run in order.
  55          ID   Because the files utilize a TAPE21 file to export import hydrographs
```

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

  56          ID    between models, prior to running the FIRST model (WS1-NWM.DAT) any existing
  57          ID    TAPE21 file in the directory should be deleted.  The run procedure order is:
  58          ID
  59          ID         1)  WS1-NWM.DAT
  60          ID         2)  WS2-NEM.DAT
  61          ID         3)  WS3-QCSW.DAT
  62          ID         4)  WS4-SEM.DAT (referencing WS2-NEM.DSS for the DSS file)
  63          ID         5)  RT1-BASE.DAT
  64          ID
  65          ID    The necessary input hydrographs for the Rittenhouse Basin analysis
  66          ID    are determined in RT1-BASE.  In that output file, the hydrograph at
  67          ID    RWFLD1 should be exported and used as the input hydrograph at the
  68          ID    EMF Reach 4 Cross Section 17.082.  And the hydrograph at RITTEN should
  69          ID    be exported and used as the input hydrograph for the Rittenhouse Main
  70          ID    Channel at Cross Section 820.00
  71          ID
  72          ID
  73          ID    ***************************************************************************
  74          ID    **** NOTE BY PRIMATECH ENGINEERS:                                      ****
  75          ID    **** DATE: 06/12/2001                                                  ****
  76          ID    **** THE NEW FILE NAME IS: SEBTALT2.DAT                                ****
  77          ID    **** THE FILE WAS RENAMED AS <<RTBTALT2.DAT>> FOR THE EAST MARICOPA    ****
  78          ID    **** FLOODWAY CAPACITY MITIGATION PROJECT, BY FLOOD CONTROL DISTRICT OF ****
  79          ID    **** MARICOPA COUNTY.                                                  ****
  80          ID    **** THE FILE WAS RENAMED <<RTBTALT3.DAT>> AND UPDATED USING GREEN AND ****
  81          ID    **** AMPT FUTURE CONDITIONS FOR BASINS 258 TO 268.                     ****
  82          ID    ***************************************************************************
  83          ID
  84          ID
  85          ID
  86          ID     THIS MODEL WAS ORIGINALLY MIDDOUT.DAT
  87          ID     IT HAS BEEN MODIFIED BY CPE (7/2000)
  88          ID     FOR ALTERNATIVE 2 FOR THE EAST MARICOPA FLOOWAY
  89          ID     CAPACITY MITIGATION AND MULTI-USE CORRIDOR STUDY
  90          ID     TO ROUTE BOTH THE POWERLINE FLOOWAY
  91          ID     AND THE SANTAN FREEWAY CHANNEL INTO THE RAY BASIN PRIOR THEIR OUTFALL
  92          ID     INTO THE EMF
  93          ID
  94          ID    ***************************************************************
  95          ID
  96          ID          Model files changed by Collins/Pina Engineering
  97          ID          to reflect multi-use design concepts (recreation
  98          ID          and environment) proposed throughout the entire
  99          ID          EMF Corridor.    July 2000
 100          ID
 101          ID
 102          ID     VERSION 8.06  CPE 7/31/00
 103          ID
 104          ID  ****************************************************************************
 105          ID
 106          ID
 107          ID  ****************************************************************************
 108          ID   FILENAME: MIDDOUT.DAT
 109          ID
 110          ID   ALL CIP INFRASTRUCTURE IS IN PLACE, FUTURE CONDITIONS LANDUSE IS IN PLACE
1                                        HEC-1 INPUT                                          PAGE  3

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

 111          ID   FLOW IS ROUTED UP ELLSWORTH ROAD IN A EARTH LINED CHANNEL
 112          ID
 113          ID  ****************************************************************************
 114          ID   PRODUCED BY DIBBLE AND ASSOCIATES AND HOSKIN ENGINEERING CONSULTANTS.
 115          ID   File Name: Final8.Dat
 116          ID   Revised - Jan. 2000 by SZ (Wood/Patel) From Final7.dat - new Z-V & Sideweir
 117          ID   Revised - Jan. 2000 by SZ (Wood/Patel) from Final6.dat - 60% review comments
 118          ID   Revised - Dec. 1999 by SZ (Wood/Patel) from Final5.dat
 119          ID   Revised - Dec. 1999 by SZ (Wood/Patel) from Final4.dat
 120          ID   Revised - Nov. 1999 by SZ (Wood/Patel) from Final3.dat
 121          ID   Revised - June 1999 by SZ (Wood/Patel) for Final Model from Opt1.dat.
 122          ID   Revised - May 1999 by SZ (Wood/Patel) for Option 1, Based on Model SDIB.DAT
 123          ID   REVISED - MAY, 1999 BY VAS TO INCORPORATE INCREASE OF SUBBASIN RETENTION AND
 124          ID             REVISIONS TO THE REGIONAL DETENTION BASIN STORAGE
 125          ID   REVISED - FEB, 1999 BY VALERIE SWICK, FCD OF MARICOPA COUNTY
 126          ID   REVISED - MAY, 1998 BY D&A
 127          ID
 128          ID   REVISED BY VALERIE SWICK, FEB. 26, 1998
 129          ID
 130          ID   FLOWS FROM DETENTION BASIN LOCATED AT NE CORNER OF ELLIOT AND ELLSWORTH ROADS
 131          ID   IS ROUTED TO THE SOUTHWEST BY SIPHON DRAW TO SUBBASIN 70A. FROM THERE THEY
 132          ID   WILL BE ROUTED BY A CHANNEL TO THE EMF. FLOWS FROM SUBBASINS ADJACENT TO
 133          ID   SANTAN FREEWAY ALIGNMENT WILL BE ROUTED SOUTH TO SUBBASIN 70A WHERE THEY WILL
 134          ID   BE COMBINED WITH FLOW IN SIPHON DRAW.
 135          ID
 136          ID   EAST MESA AREA DRAINAGE MASTER PLAN
 137          ID   AREA SOUTH OF SUPERSTITION (U.S. HWY 60)
 138          ID   AUGUST 1997
 139          ID   SOUTHEAST MESA HIGH RESOLUTION MODEL
 140          ID
 141          ID   **********FUTURE CONDITION MODEL OF THE WATERSHED************************
 142          ID
 143          ID  ************ATTENTION*****************************************************
 144          ID    SUBBASINS 75, 79A, 79B, 78E,  LANDUSES WERE NOT
```

```
145          ID    CHANGED BECAUSE IT WAS FELT THAT THEIR FUTURE CONDITIONS LANDUSES WOULD BE
146          ID    SIMILAR TO THE EXISTING CONDITIONS LANDUSES.
147          ID    RETENTION VOLUMES WILL ALSO NOT BE UTILIZED FOR SUBBASINS 75, 79A, 79B, 78E
148          ID    SOME QUEEN CREEK SUBBASINS WILL ALSO NOT HAVE RETENTION VOLUMES, EITHER
149          ID    BECAUSE THEY LIE IN PINAL COUNTY AND WE DONT KNOW PINAL COUNTIES PLANS OR
150          ID    THEY LIE IN THE SANTAN MOUNTAINS AND WON'T GET DEVELOPED
151          ID    WILLIAMS GATEWAY AIRPORT (SUBBASINS 80A, 80B, 81A, AND 81B) ARE MODELED AS
152          ID    FUTURE CONDITIONS AND HAVE RETENTION VOLUMES FOR THE 100YR 2HR STORM
153          ID  ****************************************************************************
154          ID   FILENAME:  SDIBB.DAT
155          ID
156          ID   THIS MODEL REPRESENTS THE FUTURE CONDITION OF THE WATERSHED.
157          ID   TOTAL DRAINAGE AREA IS APPROXIMATELY 213 SQ. MI.
158          ID   THIS MODEL USES A Kn VALUE OF 0.09 FOR DESERT LAND USE DUE TO SHEET FLOW
159          ID   CONDITIONS.
160          ID
161          ID   100-YEAR 24-HOUR FREQUENCY
162          ID   AREAL REDUCTIONS FROM FCD HYDROLOGY MANUAL
163          ID   THIS MODEL INCLUDES INFLOW FROM NORTH OF THE SUPERSTITION FREEWAY
164          ID   AND EAST OF THE CAP
165          ID
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LINE         ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10

166          ID   DATA FROM THE QUEEN CREEK ADMS HAS BEEN ADDED TO CALCULATE FLOWS INTO THE
167          ID   EMF.   MUSKINGUM ROUTING NSTEPS WERE ADJUSTED TO BE WITHIN THE SUGGESTED
168          ID   RANGE.
169          ID
170          ID   METHODOLOGY
171          ID   THE US CORPS OF ENGINEERS FLOOD HYDROLOGY MODEL HEC-1 DATED SEP1990 VER 4.0
172          ID   SCS TYPE II RAINFALL DISTRIBUTION
173          ID   S-GRAPH HYDROGRAPH
174          ID   GREEN AND AMPT INFILTRATION EQUATION USED FOR CALCULATING LOSSES
175          ID   NORMAL DEPTH STORAGE CHANNEL ROUTING
176          ID   APPROXIMATE DIRECTION, LOCATION, AND LENGTH OF THE WASHES HAVE BEEN
177          ID   EVALUATED BASED ON FIELD INVESTIGATION, USGS MAPS, LANDIS AERIAL SURVEYS
178          ID   DATED 1994
179          ID   THE NOAA TECHNICAL MEMORANDUM NOAA ATLAS 2 DEPTH AREA RATIOS
180          ID
181          ID   ORIGINAL STUDY PERFORMED BY LISA C. YOUNG AND AFSHIN AHOURAIYAN, UPDATED BY
182          ID   DAVID DEGERNESS (OCT-DEC, 1996). REVIEWED BY VALERIE A. SWICK
183          ID   AND AMIR MOTAMEDI OF THE FLOOD CONTROL DISTRICT
184          ID   HYDROLOGY BRANCH ENGINEERING DIVISION, FLOOD CONTROL
185          ID   DISTRICT OF MARICOPA COUNTY, DECEMBER - JULY 1995.
186          ID
187          ID   ASSUMED VELOCITY OF 1 FT/SEC FOR SHEET FLOW, 2-3 FT/SEC FOR WASH/NATURAL
188          ID   CHANNEL, 3 FT/SEC FOR ROAD AND GRASS CHANNEL, 10FT/SEC FOR CONCRETE CHANNEL
189          ID
190          ID   VELOCITIES FOR ADMP IMPROVEMENT CHANNELS FROM DIBBLE AND ASSOCIATES
191          ID   SUGGESTED ALTERNATIVES (JULY 1, 1997)
192          ID
193          ID   ************************************************************************
194          ID   **** THE FOLLOWING NOTE WAS ADDED BY PRIMATECH ENGINEERS ON 06-12-2001 ****
195          ID   ************************************************************************
196          ID   NOTE: MUST USE NEBUILD.DSS AS THE DSS FILE TO IMPORT FLOWS ACROSS THE
197          ID         SUPERSTITION FREEWAY.
198          ID   ************************************************************************
199          ID
200          ID
201          ID   NOTE: MUST USE NDIBF.DSS AS THE DSS FILE TO IMPORT FLOWS ACROSS THE
202          ID         SUPERSTITION FREEWAY.
203          ID
204          ID   DDM MCUHP2 SOUTH EAST MESA ADMP - SOUTH OF SUPERSTITION FREEWAY, FUTURE CONDI
             *DIAGRAM
205          IT       5  1APR97    0000    1000
206          IO       5
207          IN      15
208          JD    3.60    0.01
209          PC    .000    .002    .005    .008    .011    .014    .017    .020    .023    .026
210          PC    .029    .032    .035    .038    .041    .044    .048    .052    .056    .060
211          PC    .064    .068    .072    .076    .080    .085    .090    .095    .100    .105
212          PC    .110    .115    .120    .126    .133    .140    .147    .155    .163    .172
213          PC    .181    .191    .203    .218    .236    .257    .283    .387    .663    .707
214          PC    .735    .758    .776    .791    .804    .815    .825    .834    .842    .849
215          PC    .856    .863    .869    .875    .881    .887    .893    .898    .903    .908
216          PC    .913    .918    .922    .926    .930    .934    .938    .942    .946    .950
217          PC    .953    .956    .959    .962    .965    .968    .971    .974    .977    .980
218          PC    .983    .986    .989    .992    .995    .998   1.000
             *
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LINE         ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10

219          JD    3.58     1.0
220          JD    3.49     5.0
221          JD    3.38    10.0
222          JD    3.24    30.0
223          JD    3.10    60.0
224          JD    3.05    90.0
225          JD    3.00   120.0
226          JD    2.97   150.0
             *

227          KK    65A1   BASIN
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```
228          KM    THE FOLLOWING PARAMETERS WERE PROVIDED FOR THIS BASIN
229          KM    L=      1.9  Lca=      1.4   S=   31.5  Kn= .067  LAG=  73.5
230          KM    PHOENIX VALLEY S-GRAPH WAS USED FOR THIS BASIN
231          KM    All parameters are revised from the ADMP hydrology and estimated from
232          KM    available mapping except the Kn value.  Due to the significant
233          KM    impact of the Kn value on subbasin discharges, the original ADMP hydrology
234          KM    Kn value was retained for the subbasin.
235          BA   0.971
236          LG    0.20    0.25    5.00    0.35      50
237          UI      44      45      44     107     162     195     220     249     267     299
238          UI     336     375     466     557     544     466     413     367     339     302
239          UI     271     240     216     184     142     106      78      76      74      58
240          UI      44      45      40      13      14      14      13      14      13      14
241          UI      14      13      14       0       0       0       0       0       0       0
             *

242          KK   R65A1
243          KM   Retain first flush volume (equal to 80% of first ½" of runoff)
244          KM   from MDR areas only.
245          KM   First flush retention is not included for industrial areas at this time.
246          DT  FF65A1     9.9
247          DI       0   10000
248          DQ       0   10000
             *

249          KK   CAP1A
250          KM   INFLOW FROM EAST OF THE CAP ASSOCIATED WITH TWO 72" PIPE OVERCHUTES AT
251          KM   STATION 131+90 SALT-GILA AQUEDUCT REACH 2
252          KM   Overchute consists of two 72" pipes but level pool function
253          KM   at the CAP is disregarded for this location per the upper ADMP
254          KM   hydrology model.
255          KM   Basin area below represents half of the drainage area above CAP (1.93
256          BA   0.965
257          ZR  =QI A=CAP1A B=OVERCHUTE C=FLOW E=5MIN F=100YEAR
             *

258          KK  RCAP1A
259          KM   Route flow from CAP overchute (CAP1A) to confluence with CAP1B overchute
260          KM   at the SRP easement / Meridian Channel.
261          KM   Hypothetical future condition earth channel.
262          RS       5    FLOW      -1
263          RC    .035    .035    .035   10050    .006
264          RX       0       4       8      24      44      60      64      68
265          RY     100      99      98      94      94      98      99     100
             *
```



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

266          KK  CCAP1A
267          KM   Combine routed (RCAP1A) and local hydrographs (65A1).
268          HC       2   1.936
             *

269          KK    65A2   BASIN
270          KM    THE FOLLOWING PARAMETERS WERE PROVIDED FOR THIS BASIN
271          KM    L=      1.5  Lca=       .9   S=   42.8  Kn= .067  LAG=  52.4
272          KM    PHOENIX VALLEY S-GRAPH WAS USED FOR THIS BASIN
273          KM    All parameters are revised from the ADMP hydrology and estimated from
274          KM    available mapping except the Kn value.  Due to the significant
275          KM    impact of the Kn value on subbasin discharges, the original ADMP hydrology
276          KM    Kn value was retained for the subbasin.
277          BA   0.544
278          LG    0.20    0.20    4.60    0.37      35
279          UI      35      35      82     137     172     196     227     262     320     427
280          UI     417     335     291     255     213     184     156     113      68      60
281          UI      58      35      35      21      11      11      11      10      11      11
282          UI      11       0       0       0       0       0       0       0       0       0
283          UI       0       0       0       0       0       0       0       0       0       0
             *

284          KK   R65A2
285          KM   Retain first flush volume (equal to 80% of first ½" of runoff)
286          KM   from MDR areas only.
287          DT  FF65A2     9.1
288          DI       0   10000
289          DQ       0   10000
             *

290          KK   CAP1B
291          KM   INFLOW FROM EAST OF THE CAP THROUGH 2 - 72" PIPE OVERCHUTES
292          KM   STATION 158+00 SALT-GILA AQUEDUCT REACH 2
293          KM   Overchute consists of two 72" pipes but level pool function
294          KM   at the CAP is disregarded for this location per the upper ADMP
295          KM   hydrology model.
296          KM   Basin area below represents half of the drainage area above CAP (1.93)
297          BA   0.965
298          ZR  =QI  A=CAP1B  B=OVERCHUTE  C=FLOW  E=5MIN F=100YEAR
             *

299          KK  RCAP1B
300          KM   Route flow from CAP overchute (CAP1A) to confluence with CAP1B overchute
301          KM   at the SRP easement / Meridian Channel.
302          KM   Hypothetical future condition earth channel.
```

```
303          RS       4    FLOW      -1
304          RC    .035    .035    .035    8150    .008
305          RX       0       4       8      24      44      60      64      68
306          RY     100      99      98      94      94      98      99     100
             *
```



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

307          KK  CCAP1B
308          KM   Combine routed (RCAP1B) and local hydrographs (65A2).
309          HC       2   1.509
             *

310          KK  C65A12
311          KM   Combine routed (RCAP1A & RCAP1B) and local hydrographs (65A1 & 65A2)
312          HC       2   3.445
             *

313          KK  DI-BAS
314          KM   Divert flow to Siphon Draw Detention Basin per Wood/Patel concept.
315          KM   However, due to minor changes in hydrologic sequencing, the
316          KM   diversion is reversed such that basin bypass is diverted
317          KM   instead of the detention basin inflow.
318          DT  BYPASO
             * Original Wood/Patel diversion
             * DI      0     100     300     380     600    1000    1500    2000    3000
             * DQ      0       0       0       0     220     620    1120    1620    2620
             *
319          DI       0     100     300     380     600    1000    1500    2000    3000
320          DQ       0     100     300     380     380     380     380     380     380
             *

321          KK    65A3   BASIN
322          KM    THE FOLLOWING PARAMETERS WERE PROVIDED FOR THIS BASIN
323          KM    L=      2.1  Lca=      1.2   S=   27.9  Kn= .067  LAG=  71.8
324          KM    PHOENIX VALLEY S-GRAPH WAS USED FOR THIS BASIN
325          KM    All parameters are revised from the ADMP hydrology and estimated from
326          KM    available mapping except the Kn value.  Due to the significant
327          KM    impact of the Kn value on subbasin discharges, the original ADMP hydrology
328          KM    Kn value was retained for the subbasin.
329          KM    Contributing area associated with Siphon Draw Wash at Meridian Rd. adjusted.
330          KM    South watershed boundary differs from ADMP.  In addition, area of WW
331          KM    treatment facility adjacent to the CAP is not considered contributing area
332          KM    and is not included in the total subbasin area.
333          BA   1.207
334          LG    0.21    0.21    4.60    0.37      38
335          UI      56      58      56     146     209     253     289     322     346     387
336          UI     440     498     627     741     648     563     502     454     409     366
337          UI     327     284     262     204     159     101      98      92      87      56
338          UI      57      57      21      18      17      18      17      17      18      17
339          UI      17      18       0       0       0       0       0       0       0       0
             *

340          KK   R65A3
341          KM   Retain first flush volume (equal to 80% of first ½" of runoff)
342          KM   from MDR areas only.
343          DT  FF65A3    21.8
344          DI       0   10000
345          DQ       0   10000
             *
```



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

346          KK  SDWDBS
347          KM   Combine flow from Meridian Channel and Siphon Draw Wash (SDW)
348          HC       2  4.652
             *

349          KK  LOFLOW
350          KM   This 70 cfs diversion of flow is to represent the retention basin
351          KM   discharge to the retention basin outlet/Elliot Road Storm Drain.
352          KM
353          DT  DILO-O
354          DI       0      70     500    1000    3000
355          DQ       0      70      70      70      70
             *

356          KK   SDWDB
357          KM   SIPHON DRAW WASH BASIN
358          KM   OFF-LINE DETENTION BASIN LOCATED AT MERIDIAN ROAD AND ELLIOT ROAD
359          KM   WITH 24" OUTLET PIPE AND 100' WEIR
             * KM  Outlet CL Elev = 91.5   Area of Outlet        = 3.14 (24" pipe)
             * KM  Orifice Coeff  = 0.62   Exponent (typically)  = 0.50
360          KM    Spillway Crest = 93.0   Spillway Length       = 100 ft
361          KM    Weir Coeff.    =  2.7   Exponent (typically)  = 1.5
362          RS       1    STOR       0
363          SV       0      44      87     130     174     218     263     310     356
364          SE      87      88      89      90      91      92      93      94      95
             * SL  91.5   3.140     .62      .5
365          SS    93.0     100     2.7     1.5
             *
```

```
366          KK  BYPASI
367          KM   Return divert of Meridian Channel flow bypassing Siphon Draw Basin
368          DR  BYPASO
             *

369          KK  CPMRID
370          KM   Combine flow from Meridian Channel Bypass and any flow from discharging
371          KM   from basins over the emergency spillway/outlet to Siphon Draw Wash.
372          HC       2   4.652
             *

373          KK  RBYPAS
374          KM   Route bypass flow from diversion structure to Meridian Rd crossing.
375          KM
376          RS       2    FLOW      -1
377          RC    .035    .035    .035    1700    .001
378          RX       0       4       8      24      44      60      64      68
379          RY     100      99      98      94      94      98      99     100
             *
1                                          HEC-1 INPUT                                          PAGE  9

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

380          KK   RSDW1
381          KM   Siphon Draw Wash (SDW) Meridian Rd to Mountain Rd
382          KM
383          RS       3    FLOW      -1
384          RC    .055    .045    .055    2700    .005
385          RX     100     125     170     175     185     190     235     260
386          RY     100      98      96      94      94      96      98     100
             *

387          KK   RSDW2
388          KM   Siphon Draw Wash (SDW) Mountain Rd to Signal Butte
389          KM
390          RS      10    FLOW      -1
391          RC    .060    .050    .060    5800    .005
392          RX     100     200     340     345     355     360     500     600
393          RY     100      98      96      94      94      96      98     100
             * ZW  A=RSDW2 B=ROUTED FROM BASINS  C=FLOW  E=5MIN F=100YR
             *

394          KK    65AW
395          KM   BASIN 65AW
396          KM    THE FOLLOWING PARAMETERS WERE PROVIDED FOR THIS BASIN
397          KM    L=       .9  Lca=       .6   S=   54.7  Kn= .049  LAG=  26.1
398          KM    PHOENIX VALLEY S-GRAPH WAS USED FOR THIS BASIN
399          BA     .43
400          LG     .24     .25    5.30     .29   32.00
401          UI     56.    176.    295.    391.    603.    594.    432.    316.    210.    101.
402          UI     73.     43.     17.     17.     17.      0.      0.      0.      0.      0.
403          UI      0.      0.      0.      0.      0.      0.      0.      0.      0.      0.
             *

404          KK   R65AW
405          KM   RETAIN 100 YR 2 HR RUNOFF VOLUME
406          DT   D65AW      31
407          DI       0   10000
408          DQ       0   10000
             *

409          KK  65AT65
410          KM   ROUTE C65A TO BASIN 65B VIA A WASH,(THIS WASH IS NORTH OF SIPHON DRAW)
411          KM   THIS IS THE PART OF 65A WHICH IS WEST OF THE MERIDIAN RD ALIGNMENT
412          RS      11    FLOW      -1
413          RC    .045     .04    .045    9500    .007
414          RX       0     500    1000    1003    1053    1056    1511    2011
415          RY       4     3.5       3       0       0       2     2.5       3
             * ZW  A=65AT65 B=ROUTED 65AW  C=FLOW  E=5MIN F=100YR
             *

416          KK     65B
417          KM   BASIN 65B
418          KM    THE FOLLOWING PARAMETERS WERE PROVIDED FOR THIS BASIN
419          KM    L=      2.0  Lca=      1.2   S=   37.5  Kn= .036  LAG=  36.6
420          KM    PHOENIX VALLEY S-GRAPH WAS USED FOR THIS BASIN
421          BA    1.37
1                                          HEC-1 INPUT                                          PAGE 10

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

422          LG     .18     .25    6.00     .24   53.00
423          UI    126.    218.    506.    669.    809.   1014.   1468.   1422.   1102.    901.
424          UI    720.    562.    337.    218.    182.    126.     71.     39.     39.     39.
425          UI     39.      0.      0.      0.      0.      0.      0.      0.      0.      0.
426          UI      0.      0.      0.      0.      0.      0.      0.      0.      0.      0.
             *

427          KK    R65B
428          KM   RETAIN 100 YR 2 HR RUNOFF VOLUME
429          DT    D65B     120
430          DI       0   10000
431          DQ       0   10000
```

```
          * ZW  A=R65B B=ROUTED 65B  C=FLOW  E=5MIN F=100YR
          *

432       KK   CP65B
433       KM   Combine flow from 65AW, 65B and RDSW2 (Siphon Draw Basin bypass flow)
434       HC       3   6.452
          * ZW  A=CP65B B= 65AW AND 65B AND RDSW2  C=FLOW  E=5MIN F=100YR
          *
          * KK DI65B
          * KM      DIVERSION STRUCTURE TO ROUTE PEAK FLOW TO ELLIOT BASIN (EAST)
          * KM      By-pass 30 cfs to Elliot Channel, and Divert Remaining to E Basin
          * DTDIRS65
          * DI     0    15.0      30   100.0     200   350.0     500     700     900 1500.
          * DQ     0       0       0    70.0     170   320.0     470     670     870 1470.
          *

435       KK   DI65B
436       KM       DIVERSION STRUCTURE TO ROUTE PEAK FLOW TO ELLIOT BASIN (EAST)
437       KM       This diversion modified from original analysis to reflect removal of
438       KM       the orifice plate and the diversion of the first 430 cfs to the
439       KM       Elliot Road storm drain (aka Elliot Channel in original analysis)
440       KM       (previous bypass only 30 cfs for 24" orifice plate over large
441       KM       diameter pipe)
442       DT  DIRS65
443       DI       0     230     430     500     600     750     900    1100    1300    1900
444       DQ       0       0       0      70     170     320     470     670     870    1470
          *

445       KK  SD-FLO
446       KM   Return divert of Meridian Channel flow bypassing Siphon Draw Basin
447       DR  DILO-O
          *

448       KK  ELLSD1
449       KM   Routing of SDW DB outlet flow along Elliot Rd. storm drain.
450       RD    9000  0.0060   0.013            CIRC     3.5
          * ZW  A=ELLSD1 B=ROUTED BASIN PIPE OUTFLOW C=FLOW  E=5MIN F=100YR
          *
1                                   HEC-1 INPUT                                          PAGE 11

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

451       KK   CP65A
452       KM   COMBINE FLOWS FROM ELLIOT STORM DRAIN AND EAST BASIN BYPASS
453       HC       2   6.452
          * ZW  A=CP65A B=CP65B+DI65B  C=FLOW  E=5MIN F=100YR
          *

454       KK  65AT-3
455       KM   ROUTE FROM 104th ST TO E. BASIN OUTLET
456       RD    1500  0.0065   0.012            CIRC     7.0
          *

457       KK   DR65B
458       KM       RETURN DIVERT TO EAST DETENTION BASIN
459       DR  DIRS65
          *

460       KK   RS65A
461       KM   ELLIOT BASIN, EAST
462       RS       1    STOR       0
463       SV       0    5.40    9.30   13.90   18.80   24.00   29.50   35.30   41.40   48.00
464       SE  1429.0  1433.0  1434.0  1435.0  1436.0  1437.0  1438.0  1439.0  1440.0  1441.0
465       SL  1430.0  0.7854     .62      .5
466       SS  1439.0     200     2.5     1.5
          *

467       KK    CP65
468       KM   COMBINE FLOWS FROM EAST ELLIOT BASIN AND ELLIOT STORM DRAIN
469       KM   BEFORE COMBINING WITH FLOWS FROM THE BYPASS CRISMON CHANNEL
470       HC       2
          *

471       KK   65T66
472       KM   ROUTE FROM E. BASIN OUTLET TO CRISMON ROAD.
473       RD    1200  0.0065   0.012            CIRC     7.5
          *

474       KK  ADOT-E
475       KM   INFLOW FROM NORTH OF THE SUPERSTITION FREEWAY ENTERING 67A
476       KM   FROM EAST ADOT DETENTION BASIN 4105.
477       BA    0.01
478       ZR  =QI A=ADOT EAST BASIN B=AT SUPERSTITION C=FLOW E=5MIN F=100YR
          *

479       KK  AET67A
480       KM    ROUTE SUPERSTITION FLOW THROUGH 67A TO BASELINE ROAD
481       IN      15
482       RS       6    FLOW      -1
483       RC    .045    .040    .045    5500    .010
484       RX       0     100     110     120     130     140     150     250
485       RY       5       4       3       1       1       3       4       5
          *
1                                   HEC-1 INPUT                                          PAGE 12
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LINE          ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10

 486          KK     67A
 487          KM   BASIN 67A
 488          KM    THE FOLLOWING PARAMETERS WERE PROVIDED FOR THIS BASIN
 489          KM    L=       1.0  Lca=        .7   S=   42.9  Kn= .042  LAG=  25.7
 490          KM    PHOENIX VALLEY S-GRAPH WAS USED FOR THIS BASIN
 491          BA     .30
 492          LG     .21      .25    4.70     .39   43.00
 493          UI     39.     126.    208.    277.    433.    400.    292.    213.    134.     67.
 494          UI     47.      25.     12.     12.     12.      0.      0.      0.      0.      0.
 495          UI      0.       0.      0.      0.      0.      0.      0.      0.      0.      0.
              *

 496          KK    R67A
 497          KM   RETAIN 100 YR 2 HR RUNOFF VOLUME
 498          DT    D67A      21
 499          DI       0   10000
 500          DQ       0   10000
              *

 501          KK    C67A
 502          KM    COMBINE FLOWS FROM ADOT-E AND SUBBASIN 67A
 503          HC       2
              *

 504          KK   67ATC
 505          KM   ROUTE 67A TO 67C VIA WASH CROSSING BASELINE
 506          RS       7    FLOW      -1
 507          RC    .055    .045    .055    6300   .0071
 508          RX       0     500     980    1003    1007    1031    1511    2011
 509          RY       4     3.5       3       0       0       3     3.5       4
              *

 510          KK    SUP2
 511          KM   INFLOW FROM NORTH OF SUPERSTITION FREEWAY, DISCHARGING INTO 67B
 512          BA    0.01
 513          ZR  =QI A=ADOT WEST BASIN B=AT SUPERSTITION C=FLOW E=5MIN F=100YR
              *

 514          KK   RSUP2
 515          KM   ROUTE SUP2 THROUGH SUBBASIN 67B
 516          IN      15
 517          RS       5    FLOW      -1
 518          RC    .045    .045    .045    4500   .0056
 519          RX       0     500    1000    1003    1007    1011    1511    2011
 520          RY       4     3.5       3       0       0       2     2.5       3
              *

 521          KK     67B
 522          KM   BASIN 67B
 523          KM    THE FOLLOWING PARAMETERS WERE PROVIDED FOR THIS BASIN
 524          KM    L=       1.2  Lca=        .9   S=   28.0  Kn= .034  LAG=  26.4
 525          KM    PHOENIX VALLEY S-GRAPH WAS USED FOR THIS BASIN
 526          BA     .53
 527          LG     .17      .25    4.90     .38   56.00
```



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

 528          UI     68.     210.    356.    470.    713.    741.    536.    395.    269.    131.
 529          UI     94.      59.     21.     21.     21.      0.      0.      0.      0.      0.
 530          UI      0.       0.      0.      0.      0.      0.      0.      0.      0.      0.
              *

 531          KK    R67B
 532          KM   RETAIN 100 YR 2 HR RUNOFF VOLUME
 533          DT    D67B      41
 534          DI       0   10000
 535          DQ       0   10000
              *

 536          KK    C67B
 537          KM   COMBINE FLOWS FROM SUP2 AND SUBBASIN 67B
 538          HC       2
              *

 539          KK   67BTC
 540          KM   REACH CN-4, CN-5 plus culvert CNC-4.
 541          KM   ROUTE FLOW IN THE CRISMON CHANNEL FROM BASELINE ROAD (C67B) TO
 542          KM      GUADALUPE ROAD (C67C)
 543          RS       2    FLOW      -1
 544          RC    .025    .015    .025    5180   .0019
 545          RX       0       8      16    24.4    36.4    44.8    52.8    60.8
 546          RY     4.0     4.1     4.2       0       0     4.2     4.1     4.0
              *

 547          KK     67C
 548          KM   BASIN 67C
 549          KM    THE FOLLOWING PARAMETERS WERE PROVIDED FOR THIS BASIN
 550          KM    L=       1.2  Lca=        .7   S=   40.2  Kn= .049  LAG=  32.3
 551          KM    PHOENIX VALLEY S-GRAPH WAS USED FOR THIS BASIN
 552          BA     .93
```

```
553          LG     .25     .25    5.10     .32   31.00
554          UI     96.    213.    432.    557.    702.   1006.   1133.    842.    667.    518.
555          UI    365.    193.    157.     96.     59.     30.     30.     30.     30.      0.
556          UI      0.      0.      0.      0.      0.      0.      0.      0.      0.      0.
557          UI      0.      0.      0.      0.      0.      0.      0.      0.      0.      0.
             *

558          KK    R67C
559          KM   RETAIN 100 YR 2 HR RUNOFF VOLUME
560          DT    D67C      67
561          DI       0   10000
562          DQ       0   10000
             *

563          KK    C67C
564          KM   COMBINE SUBBASINS 67C AND 67A AND 67B
565          HC       3
             *
1                                          HEC-1 INPUT                                          PAGE 14

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

566          KK  67CT67
567          KM   REACH CN-3 plus culvert CNC-3
568          KM   ROUTE FLOW IN THE CRISMON CHANNEL FROM C67C (@ GUADALUPE ROAD & CRISMON ROAD)
569          KM    TO C67D (AT APPROX. 1/2 MILE SOUTH OF GUADALUPE ROAD).
             *       Sta. 39+00 to Guadalupe Rd.
570          RS       1    FLOW      -1
571          RC    .025    .015    .025    2420   .0018
572          RX       0       6      12      24      64      76      82      88
573          RY       4       3       2       0       0       2       3       4
             *

574          KK     67D
575          KM   BASIN 67D
576          KM    THE FOLLOWING PARAMETERS WERE PROVIDED FOR THIS BASIN
577          KM    L=       .6  Lca=       .4   S=   34.7  Kn= .050  LAG=  20.5
578          KM    PHOENIX VALLEY S-GRAPH WAS USED FOR THIS BASIN
579          BA     .13
580          LG     .25     .25    5.20     .30   30.00
581          UI     23.     87.    132.    216.    202.    137.     86.     38.     23.      9.
582          UI      6.      6.      0.      0.      0.      0.      0.      0.      0.      0.
583          UI      0.      0.      0.      0.      0.      0.      0.      0.      0.      0.
             *

584          KK    R67D
585          KM   RETAIN 100 YR 2 HR RUNOFF VOLUME
586          DT    D67D       9
587          DI       0   10000
588          DQ       0   10000
             *

589          KK    C67D
590          KM    COMBINE HYDROGRAPHS AT CP67D
591          HC       2
             *

592          KK  67DT66
593          KM   REACH CN-2 plus culvert CNC-2
594          KM   ROUTE FLOW IN THE CRISMON CHANNEL FROM APPROX. 1/2 MILE SOUTH
595          KM    OF GUADALUPE ROAD TO THE INFLOW SPILLWAY FOR THE ELLIOT DETENTION BASIN.
             *       Sta. 20+00 to Sta. 39+00
596          RS       1    FLOW      -1
597          RC    .032    .032    .032    1900  0.0035
598          RX       0       6      12      24      64      76      82      88
599          RY       4       3       2       0       0       2       3       4
             *

600          KK     66A
601          KM   BASIN 66A
602          KM    THE FOLLOWING PARAMETERS WERE PROVIDED FOR THIS BASIN
603          KM    L=       .7  Lca=       .3   S=   55.9  Kn= .047  LAG=  17.1
604          KM    PHOENIX VALLEY S-GRAPH WAS USED FOR THIS BASIN
605          BA     .26
606          LG     .24     .25    6.00     .22   35.00
607          UI     78.    256.    417.    576.    363.    205.     84.     39.     16.     16.
1                                          HEC-1 INPUT                                          PAGE 15

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

608          UI      0.      0.      0.      0.      0.      0.      0.      0.      0.      0.
609          UI      0.      0.      0.      0.      0.      0.      0.      0.      0.      0.
             *

610          KK    R66A
611          KM   RETAIN 100 YR 2 HR RUNOFF VOLUME
612          DT    D66A      21
613          DI       0   10000
614          DQ       0   10000
             *

615          KK   66ATB
616          KM   ROUTE S66A TO 66B VIA WASH CROSSING BASELINE
617          RS       7    FLOW      -1
```

```
618          RC    .045     .04    .045    7500   .0077
619          RX       0     500     980    1003    1007    1031    1511    2011
620          RY       4     3.5       3       0       0       3     3.5       4
             *

621          KK     66B
622          KM   BASIN 66B
623          KM    THE FOLLOWING PARAMETERS WERE PROVIDED FOR THIS BASIN
624          KM    L=      1.6  Lca=      1.0   S=   43.3  Kn= .050  LAG=  42.8
625          KM    PHOENIX VALLEY S-GRAPH WAS USED FOR THIS BASIN
626          BA     .67
627          LG     .25     .25    5.00     .33   30.00
628          UI     53.     56.    185.    248.    297.    352.    426.    590.    636.    496.
629          UI    419.    346.    286.    232.    152.     93.     86.     58.     53.     21.
630          UI     16.     16.     16.     16.     16.      0.      0.      0.      0.      0.
631          UI      0.      0.      0.      0.      0.      0.      0.      0.      0.      0.
             *

632          KK    R66B
633          KM   RETAIN 100 YR 2 HR RUNOFF VOLUME
634          DT    D66B      48
635          DI       0   10000
636          DQ       0   10000
             *

637          KK   CP66B
638          KM   COMBINE S66A AND S66B
639          HC       2
             *

640          KK   66BTC
641          KM   ROUTE 66B TO 66C VIA WASH
642          RS       7    FLOW      -1
643          RC    .045     .04    .045    6000   .0150
644          RX       0     500     995    1003    1007    1016    1511    2011
645          RY       4     3.5       3       0       0       3     3.5       4
             *
```



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

646          KK     66C
647          KM   BASIN 66C
648          KM    THE FOLLOWING PARAMETERS WERE PROVIDED FOR THIS BASIN
649          KM    L=      1.1  Lca=       .7   S=   46.5  Kn= .039  LAG=  24.3
650          KM    PHOENIX VALLEY S-GRAPH WAS USED FOR THIS BASIN
651          BA     .50
652          LG     .19     .25    5.40     .29   48.00
653          UI     69.    243.    385.    528.    817.    635.    463.    325.    159.    103.
654          UI     63.     21.     21.     21.      0.      0.      0.      0.      0.      0.
655          UI      0.      0.      0.      0.      0.      0.      0.      0.      0.      0.
             *

656          KK    R66C
657          KM   RETAIN 100 YR 2 HR RUNOFF VOLUME
658          DT    D66C      42
659          DI       0   10000
660          DQ       0   10000
             *

661          KK  CP66C1
662          KM   Split up hydrograph combination in order to separate flows.
663          KM   Combine Hydrographs 66BTC (from Sub. 66A)and R66C (from Sub. 66C)
664          HC       2
             *

665          KK  CP66C2
666          KM   Combine Hydrograph CP66C1 (from Subbasins 66A, 66B and 66C)
667          KM     plus hydrograph 67DT66 ( C67D )
668          HC       2
             *

669          KK    DI66
670          KM    DIVERT FLOW TO DETENTION BASIN WA
671          KM    By-pass Flow Reduced to 410 cfs from 458, SZ, 5-17-99
672          DT    DB66
673          DI       0     150     363   411.0   456.0     513     577     643     712    1000
674          DQ       0       0       0    32.0     71.     122     179     239     302     590
             *

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



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LINE         ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10
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```
683          KK   CP66C
684          KM   COMBINE FLOWS FROM ELLIOT CHANNEL AND CRISMON BYPASS CHANNEL
685          HC       2
             *

686          KK   66CTD
687          KM   REACH ET-7
688          KM   ROUTE FLOWS FROM INTERSECTION OF CRISMON AND ELLIOT CHANNELS
689          KM   AT THE INTERSECTION OF ELLIOT ROAD and CRISMON ROAD TO THE ELLIOT BASIN
690          KM   WA Bleed-off Outlet, WHICH IS ABOUT 390 ft WEST OF CRISMON ROAD.
691          RD     500  0.0015   0.012            CIRC     9.5
             *

692          KK    DR66
693          KM         RETURN DIVERT TO DETENTION BASIN FROM DIVERSION STRUCTURE
694          DR    DB66
             *

695          KK  RS66D1
696          KM   ELLIOT BASIN, WEST A
697          KM   TWO PONDS OPERATING IN SERIES.
698          KM        Bottom Elevation Lowered to 1415.0 ft from 1420, and 18" Bleed-off
699          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
700          RS       1    STOR       0
701          SV       0    1.60   10.00   25.50   34.70   44.20   54.10   64.40   75.10   86.00
702          SE  1415.0    1417    1419    1421    1422    1423    1424    1425    1426    1427
703          SL  1416.0  1.7672     .62      .5
704          SS  1423.5      20     3.0     1.5
             *

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

713          KK    C-WA
714          KM        Combine Bleed-off Flow from WA with Flow in Elliot Channel
715          KM        Added by SZ, 5-17-99
716          HC       2
             *

717          KK   RC-WA
718          KM        Route Flow from WA Outlet to WB Outlet in Elliot Channel
719          KM        Added by SZ, 5-17-99
720          KM        WA Bleed-off Outlet to WB Bleed-off Outlet.
721          KM        RD card used for routing (Sta. 48+80 to Sta. 57+35)
722          RD     855  0.0052   0.012            CIRC     9.5
             *
```



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

723          KK   DR-WA
724          KM        Return Diverted Flow (Spillway) to WB from WA, SZ 5-7-99
725          DR    D-WB
             *

726          KK  RS66D2
727          KM   ELLIOT BASIN, WEST B
728          KM   TWO PONDS OPERATING IN SERIES.
729          KM        Bottom Elevation Lowered to 1413.5 ft from 1414, and 36" Bleed-off
730          KM        Pipe Reduced to 18" from WB to Elliot Channel
731          KM        Since the bleed-off pipe length is short, no routing is provided.
732          KM        Existing SS = 1420.5   80   2.5   1.5, SZ, 5-18-99
733          RS       1    STOR       0
734          SV       0    4.40    8.80   14.50   21.00   28.00   35.30   42.90   50.90   59.20
735          SE  1412.0    1415    1416    1417    1418    1419    1420    1421    1422    1423
736          SL  1413.0  1.7672     .62      .5
737          SS  1422.6      50     2.5     1.5
             *

738          KK   CP66D
739          KM       COMBINE FLOWS FROM WEST ELLIOT BASIN AND ELLIOT CHANNEL
740          KM       AT THE OUTLET PIPE.
741          HC       2
             *

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

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

755          KK     66D
756          KM   BASIN 66D
757          KM    THE FOLLOWING PARAMETERS WERE PROVIDED FOR THIS BASIN
758          KM    L=       1.0  Lca=       .7   S=   28.6  Kn= .020  LAG=  13.2
759          KM    PHOENIX VALLEY S-GRAPH WAS USED FOR THIS BASIN
760          BA     .31
761          LG     .10     .17    6.80     .19   80.00
762          UI    162.    480.    845.    540.    232.     89.     24.      0.      0.      0.
763          UI      0.      0.      0.      0.      0.      0.      0.      0.      0.      0.
             *
1                                          HEC-1 INPUT                                          PAGE 19

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

764          KK    R66D
765          KM   RETENTION REDUCED BY 77% FROM 31 TO 7 AC-FT
766          KM   DUE TO DEVELOPMENT USING DETENTION BASIN
767          KM   The developer does not participate in the basin so the retention volume
768          KM   increased to 31 A-F
769          DT    D66D      31
770          DI       0   10000
771          DQ       0   10000
             *

772          KK     61A
773          KM   BASIN 61A
774          KM    THE FOLLOWING PARAMETERS WERE PROVIDED FOR THIS BASIN
775          KM    L=       .9  Lca=       .4   S=   36.8  Kn= .037  LAG=  19.1
776          KM    PHOENIX VALLEY S-GRAPH WAS USED FOR THIS BASIN
777          BA     .52
778          LG     .19     .25    4.20     .56   52.00
779          UI    117.    412.    628.   1037.    786.    517.    261.    132.     62.     28.
780          UI     28.      0.      0.      0.      0.      0.      0.      0.      0.      0.
781          UI      0.      0.      0.      0.      0.      0.      0.      0.      0.      0.
             *

782          KK    R61A
783          KM   RETAIN 100 YR 2 HR RUNOFF VOLUME
784          DT    D61A      42
785          DI       0   10000
786          DQ       0   10000
             *

787          KK   61ATB
788          KM   ROUTING 61A TO 61B VIA ELLSWORTH ROAD
789          RS       6    FLOW      -1
790          RC    .035    .024    .035    5280    .005
791          RX       0     500     750     752     802     852    1102    1602
792          RY       3       2     1.5     1.2     1.2     1.5       2       3
             *

793          KK     61B
794          KM   BASIN 61B
795          KM    THE FOLLOWING PARAMETERS WERE PROVIDED FOR THIS BASIN
796          KM    L=       1.4  Lca=       .7   S=   39.7  Kn= .047  LAG=  33.6
797          KM    PHOENIX VALLEY S-GRAPH WAS USED FOR THIS BASIN
798          BA    1.09
799          LG     .24     .25    4.80     .37   35.00
800          UI    109.    223.    475.    615.    765.   1049.   1335.   1025.    822.    643.
801          UI    495.    288.    187.    143.    109.     36.     34.     34.     34.     34.
802          UI      0.      0.      0.      0.      0.      0.      0.      0.      0.      0.
803          UI      0.      0.      0.      0.      0.      0.      0.      0.      0.      0.
             *
1                                          HEC-1 INPUT                                          PAGE 20

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

804          KK    R61B
805          KM   RETAIN 100 YR 2 HR RUNOFF VOLUME
806          DT    D61B      81
807          DI       0   10000
808          DQ       0   10000
             *

809          KK   CP61B
810          KM   COMBINE FLOWS FROM S61A AND S61B
811          HC       2
             *

812          KK  61T66D
813          KM   ROUTE CP61B TO SUBBASIN 66D ALONG ELLSWORTH ROAD. ROUTING WILL BE
814          KM   THE SAME AS WAS GIVEN FOR SUBBASIN 61A
815          RS       6    FLOW      -1
816          RC    .035    .024    .035    5280    .008
817          RX       0     500     750     752     802     852    1102    1602
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```
818          RY      3      2     1.5     1.2     1.2     1.5      2      3
             *

819          KK     67E
820          KM   BASIN 67E
821          KM    THE FOLLOWING PARAMETERS WERE PROVIDED FOR THIS BASIN
822          KM    L=      1.2  Lca=       .7   S=   32.3  Kn= .038  LAG=  26.9
823          KM    PHOENIX VALLEY S-GRAPH WAS USED FOR THIS BASIN
824          BA     .58
825          LG     .19     .25    5.40     .30   50.00
826          UI     73.    219.    378.    496.    732.    830.    597.    443.    315.    157.
827          UI    110.     73.     24.     22.     22.     22.      0.      0.      0.      0.
828          UI      0.      0.      0.      0.      0.      0.      0.      0.      0.      0.
             *

829          KK    R67E
830          KM   RETAIN 100 YR 2 HR RUNOFF VOLUME
831          KM   DUE TO DEVELOPMENT USING DETENTION BASIN
832          DT   D67E       50
833          DI       0   10000
834          DQ       0   10000
             *

835          KK    C67E
836          KM   COMBINE FLOWS FROM ELLSWORTH ROAD JUST NORTH OF ELLIOT ROAD
837          HC       2
             *

838          KK    C66D
839          KM   COMBINE ELLIOT CHANNEL FLOW WITH HYDROGRAPH C67E @ ELLIOT RD & ELLSWORTH RD.
840          HC       3
             *
1                                          HEC-1 INPUT                                          PAGE 21

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

841          KK  66T70A
842          KM        Pipe Routing, Reach ET-5
843          KM        SE corner curve of Elliot Rd. & Ellsworth Rd.
844          KM        RD card used for routing (Junction Structure to Sta. 12+46)
845          RD     500  0.0004   0.012            CIRC      9.5
             *

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

851          KK   CULVT
852          KM        Pipe Routing, Culvert
853          KM        2-102" pipe culvert crossing Ellsworth Rd.
854          KM        RD card used for routing
855          RD     300  0.0002   0.012            CIRC       12
             *

856          KK  66T70C
857          KM   REACH ET-4, ET-5( COMPRISED OF ET-5A AND ET-5B).
858          KM   ROUTE FROM ELLSWORTH Culvert TO SANTAN FREEWAY.
859          RS       2    FLOW      -1
860          RC    .032    .032    .032    2490   .0008
861          RX       0      10      20      56      76     112     120     130
862          RY     6.5     6.1     6.0       0       0     6.0     6.1     6.5
             *
863          ZZ
1
             SCHEMATIC DIAGRAM OF STREAM NETWORK
INPUT
 LINE      (V) ROUTING          (--->) DIVERSION OR PUMP FLOW

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

  227        65A1
             .
             .
  246        .-------> FF65A1
  242      R65A1
             .
             .
  249        .       CAP1A
             .          V
             .          V
  258        .      RCAP1A
             .          .
             .          .
  266      CCAP1A............
             .
             .
  269        .        65A2
             .          .
             .          .
  287        .          .-------> FF65A2
  284        .       R65A2
```

```
                .           .
                .           .
290             .           .       CAP1B
                .           .          V
                .           .          V
299             .           .      RCAP1B
                .           .           .
                .           .           .
307             .      CCAP1B............
                .           .
                .           .
310       C65A12............
                .
                .
318             .-------> BYPASO
313       DI-BAS
                .
                .
321             .        65A3
                .           .
                .           .
343             .           .-------> FF65A3
340             .       R65A3
                .           .
                .           .
346       SDWDBS............
                .
                .
353             .-------> DILO-O
349       LOFLOW
                V
                V
356        SDWDB
                .
                .
368             .           .<------- BYPASO
366             .      BYPASI
                .           .
                .           .
369       CPMRID............
                V
                V
373       RBYPAS
                V
                V
380        RSDW1
                V
                V
387        RSDW2
                .
                .
394             .        65AW
                .           .
                .           .
406             .           .-------> D65AW
404             .       R65AW
                .           V
                .           V
409             .      65AT65
                .           .
                .           .
416             .           .         65B
                .           .           .
                .           .           .
429             .           .           .-------> D65B
427             .           .       R65B
                .           .           .
                .           .           .
432        CP65B........................
                .
                .
442             .-------> DIRS65
435        DI65B
                .
                .
447             .           .<------- DILO-O
445             .      SD-FLO
                .           V
                .           V
448             .      ELLSD1
                .           .
                .           .
451        CP65A............
                V
                V
454       65AT-3
                .
                .
459             .           .<------- DIRS65
457             .       DR65B
                .           V
                .           V
460             .       RS65A
                .           .
                .           .
```

```
467        CP65............
              V
              V
471       65T66
              .
              .
474           .      ADOT-E
              .          V
              .          V
479           .      AET67A
              .          .
              .          .
486           .          .         67A
              .          .          .
              .          .          .
498           .          .          .-------->    D67A
496           .          .       R67A
              .          .          .
              .          .          .
501           .        C67A............
              .          V
              .          V
504           .       67ATC
              .          .
              .          .
510           .          .       SUP2
              .          .          V
              .          .          V
514           .          .      RSUP2
              .          .          .
              .          .          .
521           .          .          .         67B
              .          .          .          .
              .          .          .          .
533           .          .          .          .-------->    D67B
531           .          .          .       R67B
              .          .          .          .
              .          .          .          .
536           .          .       C67B............
              .          .          V
              .          .          V
539           .          .      67BTC
              .          .          .
              .          .          .
547           .          .          .         67C
              .          .          .          .
              .          .          .          .
560           .          .          .          .-------->    D67C
558           .          .          .       R67C
              .          .          .          .
              .          .          .          .
563           .        C67C........................
              .          V
              .          V
566           .      67CT67
              .          .
              .          .
574           .          .         67D
              .          .          .
              .          .          .
586           .          .          .-------->    D67D
584           .          .       R67D
              .          .          .
              .          .          .
589           .        C67D............
              .          V
              .          V
592           .      67DT66
              .          .
              .          .
600           .          .         66A
              .          .          .
              .          .          .
612           .          .          .-------->    D66A
610           .          .       R66A
              .          .          V
              .          .          V
615           .          .      66ATB
              .          .          .
              .          .          .
621           .          .          .         66B
              .          .          .          .
              .          .          .          .
634           .          .          .          .-------->    D66B
632           .          .          .       R66B
              .          .          .          .
              .          .          .          .
637           .          .      CP66B............
              .          .          V
              .          .          V
640           .          .      66BTC
              .          .          .
              .          .          .
646           .          .          .         66C
              .          .          .          .
```

```
658                                                   .------->    D66C
656                                            R66C
                                                        .
                                                        .
661                                   CP66C1............
                                                        .
                                                        .
665                           CP66C2............
                                                        .
                                                        .
672                                   .------->    DB66
669                             DI66
                                        V
                                        V
675                           66C1T2
                                        .
                                        .
683                     CP66C............
                            V
                            V
686                     66CTD
                                        .
                                        .
694                                   .<-------    DB66
692                             DR66
                                        V
                                        V
695                           RS66D1
                                        .
                                        .
710                                   .------->    D-WB
705                             B-WA
                                        .
                                        .
713                      C-WA............
                            V
                            V
717                     RC-WA
                                        .
                                        .
725                                   .<-------    D-WB
723                           DR-WA
                                        V
                                        V
726                           RS66D2
                                        .
                                        .
738                     CP66D............
                            V
                            V
742                    66T66D
                            V
                            V
748                    66-66D
                                        .
                                        .
755                             66D
                                        .
                                        .
769                                   .------->    D66D
764                             R66D
                                        .
                                        .
772                                           61A
                                                .
                                                .
784                                           .------->    D61A
782                                       R61A
                                                V
                                                V
787                                       61ATB
                                                .
                                                .
793                                           .        61B
                                                        .
                                                        .
806                                           .        .------->    D61B
804                                           .     R61B
                                                        .
                                                        .
809                                       CP61B............
                                                V
                                                V
812                                      61T66D
                                                .
                                                .
819                                           .        67E
                                                        .
                                                        .
832                                           .        .------->    D67E
829                                           .     R67E
                                                        .
                                                        .
835                                       C67E............
```

```
                .          .          .
                .          .          .
  838         C66D.......................
                V
                V
  841       66T70A
                V
                V
  846       66T70B
                V
                V
  851        CULVT
                V
                V
  856       66T70C

 (***) RUNOFF ALSO COMPUTED AT THIS LOCATION
1****************************************
 *                                      *
 *   FLOOD HYDROGRAPH PACKAGE  (HEC-1)  *
 *              JUN   1998              *
 *           VERSION 4.1                *
 *                                      *
 *  RUN DATE   03JAN08  TIME  11:29:12  *
 *                                      *
 ****************************************
```

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

Alternative 1: Single Basin (Offline-Meridian, Online-Siphon Draw Wash)

Project: Siphon Draw Wash Drainage Improvements
Contract FCD: 2007C012
SCI Project No: 20539

Notes By: Stanley Consultants, Inc. (SCI)
Revision Date: December, 2007

Filename: SDWBALT1.DAT (Previous Model: SDW-BASE.DAT)
Storm Event: 100-Yr, 24 Hrs
Conditions: Future Conditions

Comments:

This is the SINGLE RETENTION BASIN ALTERNATIVE model.
The basin is offline to the proposed Meridian Channel and online
to Siphon Draw Wash (east of Meridian Road.

This model was developed from the base hydrology model (SDW-BASE.DAT)
produced as part of this project and developed from previous hydrology
models from previous studies. For this project SDW-BASE.DAT truncated
the previous hydrologic model S60EMAP1.DAT provided by the FCDMC.
Any hydrologic elements which do not contribute to runoff along
Elliot Road, just upstream of the SanTan Freeway Channel(routing
reach 66T70C) were removed

To run correctly, this model requires referencing a DSS file created
by the upstream hydrologic model ultimately developed from the
East Mesa ADMP. For the 100-year, future conditions, this model is
N60EM.DAT (which produces N60EM.DSS).

END SCI INTRODUCTORY COMMENTS

****

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 SOUTH EAST MESA ADMP - SOUTH OF SUPERSTITION FREEWAY, FUTURE CONDI

206 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

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

209 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
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            .00      .00      .00      .00      .00      .00      .00      .00      .00      .00
            .00      .00      .00      .00      .00      .00      .00      .00      .00      .00
            .00      .00      .00      .00      .00      .00      .00      .00      .00      .00
            .00      .00      .00      .00      .00      .00      .00      .00      .00      .00
            .00      .00      .00      .00      .00      .00      .00      .00      .00      .00
            .00      .00      .00      .00      .00      .00      .00      .00      .00      .00
            .00      .00      .00      .00      .00      .00      .00      .00      .00      .00
            .00      .00      .00      .00      .00      .00      .00      .00      .00      .00
            .00      .00      .00      .00      .00      .00      .00      .00      .00      .00
            .00      .00      .00      .00      .00      .00      .00      .00      .00      .00
            .00      .00      .00      .00      .00      .00      .00      .00

219 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      .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

220 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      .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

221 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
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                .00       .00       .00       .00       .00       .00       .00       .00       .00       .00
                .00       .00       .00       .00       .00       .00       .00       .00       .00       .00
                .00       .00       .00       .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
222 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
223 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       .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
224 JD        INDEX STORM NO. 7
                STRM        3.05  PRECIPITATION DEPTH
                TRDA       90.00  TRANSPOSITION DRAINAGE AREA
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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
225 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
226 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       .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
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                    .00       .00       .00       .00       .00       .00       .00       .00       .00       .00
                    .00       .00       .00       .00       .00       .00       .00       .00       .00       .00
                    .00       .00       .00       .00       .00       .00       .00       .00       .00       .00
                    .00       .00       .00       .00       .00       .00       .00       .00       .00       .00
                    .00       .00       .00       .00       .00       .00       .00       .00       .00       .00
                    .00       .00       .00       .00       .00       .00       .00       .00
  -----DSS---ZOPEN:  Existing File Opened,  File: N60EM.DSS
                     Unit:  71;  DSS Version: 6-JG
       ----- Entering ZRRTSX for unit 71 -----
Pathname: /CAP1A/OVERCHUTE/FLOW//5MIN/100YEAR/
       Time Window set.  Interval:     5  Number of data values:      1
       Starting date and time:  Mar 31, 1997  2400  (  35519 1440)
       Ending   date and time:  Mar 31, 1997  2400  (  35519 1440)
       Input time offset:      0
       After ZRDINF, Record found: T
       Pathname: /CAP1A/OVERCHUTE/FLOW/31MAR1997/5MIN/100YEAR/
       Number of actual data:  288  Header length:   0
       Compression:   0  Quality:   0
-----DSS--- ZREAD Unit  71; Vers.    4:  /CAP1A/OVERCHUTE/FLOW/31MAR1997/5MIN/100YEAR/
     ----DSS---Debug:  Enter ZRRTSB;  Unit:  71
       NSTART:    1   NVALS:    1    JULS:   35519  ISTIME:  1440
       NLDATA:  288   JULSD:   35519
       JULS: 31MAR97       JULSD: 31MAR97
       Quality Read: F,  Quality Requested: F
       ---ZRRTSB Calculations:  NPOS:  288  NDATA:  288  NREAD:    1  ILIM:    1
     ----- Exiting ZRRTS, Number of data values:      1,  Status:  0
       Offset:       0,  Units: CFS     ,  Type:INST-VAL
       ----- Entering ZRRTSX for unit 71 -----
Pathname: /CAP1A/OVERCHUTE/FLOW//5MIN/100YEAR/
       Time Window set.  Interval:     5  Number of data values:    744
       Starting date and time:  Mar 31, 1997  2400  (  35519 1440)
       Ending   date and time:  Apr 3, 1997  1355  (  35522  835)
       Input time offset:      0
       After ZRDINF, Record found: T
       Pathname: /CAP1A/OVERCHUTE/FLOW/31MAR1997/5MIN/100YEAR/
       Number of actual data:  288  Header length:   0
       Compression:   0  Quality:   0
-----DSS--- ZREAD Unit  71; Vers.    4:  /CAP1A/OVERCHUTE/FLOW/31MAR1997/5MIN/100YEAR/
     ----DSS---Debug:  Enter ZRRTSB;  Unit:  71
       NSTART:    1   NVALS:  744    JULS:   35519  ISTIME:  1440
       NLDATA:  288   JULSD:   35519
       JULS: 31MAR97       JULSD: 31MAR97
       Quality Read: F,  Quality Requested: F
       ---ZRRTSB Calculations:  NPOS:  288  NDATA:  288  NREAD:    1  ILIM:    1
       After ZRDINF, Record found: T
       Pathname: /CAP1A/OVERCHUTE/FLOW/01APR1997/5MIN/100YEAR/
       Number of actual data:  288  Header length:   0
       Compression:   0  Quality:   0
-----DSS--- ZREAD Unit  71; Vers.    4:  /CAP1A/OVERCHUTE/FLOW/01APR1997/5MIN/100YEAR/
     ----DSS---Debug:  Enter ZRRTSB;  Unit:  71
       NSTART:    2   NVALS:  744    JULS:   35519  ISTIME:  1440
       NLDATA:  288   JULSD:   35520
       JULS: 31MAR97       JULSD: 01APR97
       Quality Read: F,  Quality Requested: F
       ---ZRRTSB Calculations:  NPOS:    1  NDATA:  288  NREAD:  288  ILIM:  289
       After ZRDINF, Record found: T
       Pathname: /CAP1A/OVERCHUTE/FLOW/02APR1997/5MIN/100YEAR/
       Number of actual data:  288  Header length:   0
       Compression:   0  Quality:   0
-----DSS--- ZREAD Unit  71; Vers.    4:  /CAP1A/OVERCHUTE/FLOW/02APR1997/5MIN/100YEAR/
     ----DSS---Debug:  Enter ZRRTSB;  Unit:  71
       NSTART:  290   NVALS:  744    JULS:   35519  ISTIME:  1440
       NLDATA:  288   JULSD:   35521
       JULS: 31MAR97       JULSD: 02APR97
       Quality Read: F,  Quality Requested: F
       ---ZRRTSB Calculations:  NPOS:    1  NDATA:  288  NREAD:  288  ILIM:  577
       After ZRDINF, Record found: T
       Pathname: /CAP1A/OVERCHUTE/FLOW/03APR1997/5MIN/100YEAR/
       Number of actual data:  288  Header length:   0
       Compression:   0  Quality:   0
-----DSS--- ZREAD Unit  71; Vers.    4:  /CAP1A/OVERCHUTE/FLOW/03APR1997/5MIN/100YEAR/
     ----DSS---Debug:  Enter ZRRTSB;  Unit:  71
       NSTART:  578   NVALS:  744    JULS:   35519  ISTIME:  1440
       NLDATA:  288   JULSD:   35522
       JULS: 31MAR97       JULSD: 03APR97
       Quality Read: F,  Quality Requested: F
       ---ZRRTSB Calculations:  NPOS:    1  NDATA:  288  NREAD:  167  ILIM:  744
     ----- Exiting ZRRTS, Number of data values:    744,  Status:  0
       Offset:       0,  Units: CFS     ,  Type:INST-VAL
       ----- Entering ZRRTSX for unit 71 -----
Pathname: /CAP1A/OVERCHUTE/FLOW//5MIN/100YEAR/
       Time Window set.  Interval:     5  Number of data values:      1
       Starting date and time:  Apr 3, 1997  1355  (  35522  835)
       Ending   date and time:  Apr 3, 1997  1355  (  35522  835)
       Input time offset:      0
       After ZRDINF, Record found: T
       Pathname: /CAP1A/OVERCHUTE/FLOW/03APR1997/5MIN/100YEAR/
       Number of actual data:  288  Header length:   0
       Compression:   0  Quality:   0
-----DSS--- ZREAD Unit  71; Vers.    4:  /CAP1A/OVERCHUTE/FLOW/03APR1997/5MIN/100YEAR/
     ----DSS---Debug:  Enter ZRRTSB;  Unit:  71
       NSTART:    1   NVALS:    1    JULS:   35522  ISTIME:   835
       NLDATA:  288   JULSD:   35522
       JULS: 03APR97       JULSD: 03APR97
       Quality Read: F,  Quality Requested: F
```

```
      ---ZRRTSB Calculations:  NPOS:  167  NDATA:  288  NREAD:    1  ILIM:    1
     ----- Exiting ZRRTS, Number of data values:      1,  Status:  0
      Offset:       0,  Units: CFS     ,  Type:INST-VAL
      ----- Entering ZRRTSX for unit 71 -----
Pathname: /CAP1A/OVERCHUTE/FLOW//5MIN/100YEAR/
      Time Window set.  Interval:     5  Number of data values:    744
      Starting date and time:  Apr 3, 1997  1355  (  35522  835)
      Ending   date and time:  Apr 6, 1997  0350  (  35525  230)
      Input time offset:      0
      After ZRDINF, Record found: T
      Pathname: /CAP1A/OVERCHUTE/FLOW/03APR1997/5MIN/100YEAR/
      Number of actual data:  288  Header length:   0
      Compression:   0  Quality:   0
-----DSS--- ZREAD Unit  71; Vers.    4:  /CAP1A/OVERCHUTE/FLOW/03APR1997/5MIN/100YEAR/
     ----DSS---Debug:  Enter ZRRTSB;  Unit:  71
      NSTART:    1   NVALS:  744    JULS:   35522  ISTIME:   835
      NLDATA:  288   JULSD:   35522
      JULS: 03APR97       JULSD: 03APR97
      Quality Read: F,  Quality Requested: F
      ---ZRRTSB Calculations:  NPOS:  167  NDATA:  288  NREAD:  122  ILIM:  122
      After ZRDINF, Record found: T
      Pathname: /CAP1A/OVERCHUTE/FLOW/04APR1997/5MIN/100YEAR/
      Number of actual data:  288  Header length:   0
      Compression:   0  Quality:   0
-----DSS--- ZREAD Unit  71; Vers.    4:  /CAP1A/OVERCHUTE/FLOW/04APR1997/5MIN/100YEAR/
     ----DSS---Debug:  Enter ZRRTSB;  Unit:  71
      NSTART:  123   NVALS:  744    JULS:   35522  ISTIME:   835
      NLDATA:  288   JULSD:   35523
      JULS: 03APR97       JULSD: 04APR97
      Quality Read: F,  Quality Requested: F
      ---ZRRTSB Calculations:  NPOS:    1  NDATA:  288  NREAD:  288  ILIM:  410
      After ZRDINF, Record found: F
      Pathname: /CAP1A/OVERCHUTE/FLOW/05APR1997/5MIN/100YEAR/
     ----DSS---Debug:  Enter ZRRTSB;  Unit:  71
      NSTART:  411   NVALS:  744    JULS:   35522  ISTIME:   835
      NLDATA:  288   JULSD:   35524
      JULS: 03APR97       JULSD: 05APR97
      Quality Read: F,  Quality Requested: F
      ---ZRRTSB Calculations:  NPOS:    1  NDATA:  288  NREAD:  288  ILIM:  698
-----DSS*** ZRRTS:  CAUTION - Data block not found in file.  Unit:  71
Pathname: /CAP1A/OVERCHUTE/FLOW/05APR1997/5MIN/100YEAR/
      After ZRDINF, Record found: F
      Pathname: /CAP1A/OVERCHUTE/FLOW/06APR1997/5MIN/100YEAR/
     ----DSS---Debug:  Enter ZRRTSB;  Unit:  71
      NSTART:  699   NVALS:  744    JULS:   35522  ISTIME:   835
      NLDATA:  288   JULSD:   35525
      JULS: 03APR97       JULSD: 06APR97
      Quality Read: F,  Quality Requested: F
      ---ZRRTSB Calculations:  NPOS:    1  NDATA:  288  NREAD:   46  ILIM:  744
     ----- Exiting ZRRTS, Number of data values:    744,  Status:  3
      Offset:       0,  Units: CFS     ,  Type:INST-VAL
      ----- Entering ZRRTSX for unit 71 -----
Pathname: /CAP1B/OVERCHUTE/FLOW//5MIN/100YEAR/
      Time Window set.  Interval:     5  Number of data values:      1
      Starting date and time:  Mar 31, 1997  2400  (  35519 1440)
      Ending   date and time:  Mar 31, 1997  2400  (  35519 1440)
      Input time offset:      0
      After ZRDINF, Record found: T
      Pathname: /CAP1B/OVERCHUTE/FLOW/31MAR1997/5MIN/100YEAR/
      Number of actual data:  288  Header length:   0
      Compression:   0  Quality:   0
-----DSS--- ZREAD Unit  71; Vers.    4:  /CAP1B/OVERCHUTE/FLOW/31MAR1997/5MIN/100YEAR/
     ----DSS---Debug:  Enter ZRRTSB;  Unit:  71
      NSTART:    1   NVALS:    1    JULS:   35519  ISTIME:  1440
      NLDATA:  288   JULSD:   35519
      JULS: 31MAR97       JULSD: 31MAR97
      Quality Read: F,  Quality Requested: F
      ---ZRRTSB Calculations:  NPOS:  288  NDATA:  288  NREAD:    1  ILIM:    1
     ----- Exiting ZRRTS, Number of data values:      1,  Status:  0
      Offset:       0,  Units: CFS     ,  Type:INST-VAL
      ----- Entering ZRRTSX for unit 71 -----
Pathname: /CAP1B/OVERCHUTE/FLOW//5MIN/100YEAR/
      Time Window set.  Interval:     5  Number of data values:    744
      Starting date and time:  Mar 31, 1997  2400  (  35519 1440)
      Ending   date and time:  Apr 3, 1997  1355  (  35522  835)
      Input time offset:      0
      After ZRDINF, Record found: T
      Pathname: /CAP1B/OVERCHUTE/FLOW/31MAR1997/5MIN/100YEAR/
      Number of actual data:  288  Header length:   0
      Compression:   0  Quality:   0
-----DSS--- ZREAD Unit  71; Vers.    4:  /CAP1B/OVERCHUTE/FLOW/31MAR1997/5MIN/100YEAR/
     ----DSS---Debug:  Enter ZRRTSB;  Unit:  71
      NSTART:    1   NVALS:  744    JULS:   35519  ISTIME:  1440
      NLDATA:  288   JULSD:   35519
      JULS: 31MAR97       JULSD: 31MAR97
      Quality Read: F,  Quality Requested: F
      ---ZRRTSB Calculations:  NPOS:  288  NDATA:  288  NREAD:    1  ILIM:    1
      After ZRDINF, Record found: T
      Pathname: /CAP1B/OVERCHUTE/FLOW/01APR1997/5MIN/100YEAR/
      Number of actual data:  288  Header length:   0
      Compression:   0  Quality:   0
-----DSS--- ZREAD Unit  71; Vers.    4:  /CAP1B/OVERCHUTE/FLOW/01APR1997/5MIN/100YEAR/
     ----DSS---Debug:  Enter ZRRTSB;  Unit:  71
      NSTART:    2   NVALS:  744    JULS:   35519  ISTIME:  1440
      NLDATA:  288   JULSD:   35520
```

```
        JULS: 31MAR97       JULSD: 01APR97
        Quality Read: F,  Quality Requested: F
        ---ZRRTSB Calculations:  NPOS:    1  NDATA:  288  NREAD:  288  ILIM:  289
        After ZRDINF, Record found: T
        Pathname: /CAP1B/OVERCHUTE/FLOW/02APR1997/5MIN/100YEAR/
        Number of actual data:  288  Header length:   0
        Compression:   0  Quality:   0
-----DSS--- ZREAD Unit  71; Vers.    4:  /CAP1B/OVERCHUTE/FLOW/02APR1997/5MIN/100YEAR/
      ----DSS---Debug:  Enter ZRRTSB;  Unit:  71
        NSTART:  290   NVALS:  744    JULS:   35519  ISTIME:  1440
        NLDATA:  288   JULSD:   35521
        JULS: 31MAR97       JULSD: 02APR97
        Quality Read: F,  Quality Requested: F
        ---ZRRTSB Calculations:  NPOS:    1  NDATA:  288  NREAD:  288  ILIM:  577
        After ZRDINF, Record found: T
        Pathname: /CAP1B/OVERCHUTE/FLOW/03APR1997/5MIN/100YEAR/
        Number of actual data:  288  Header length:   0
        Compression:   0  Quality:   0
-----DSS--- ZREAD Unit  71; Vers.    4:  /CAP1B/OVERCHUTE/FLOW/03APR1997/5MIN/100YEAR/
      ----DSS---Debug:  Enter ZRRTSB;  Unit:  71
        NSTART:  578   NVALS:  744    JULS:   35519  ISTIME:  1440
        NLDATA:  288   JULSD:   35522
        JULS: 31MAR97       JULSD: 03APR97
        Quality Read: F,  Quality Requested: F
        ---ZRRTSB Calculations:  NPOS:    1  NDATA:  288  NREAD:  167  ILIM:  744
      ----- Exiting ZRRTS, Number of data values:    744,  Status:  0
        Offset:       0,  Units: CFS     ,  Type:INST-VAL
        ----- Entering ZRRTSX for unit 71 -----
Pathname: /CAP1B/OVERCHUTE/FLOW//5MIN/100YEAR/
        Time Window set.  Interval:     5  Number of data values:      1
        Starting date and time:  Apr 3, 1997  1355  (  35522  835)
        Ending   date and time:  Apr 3, 1997  1355  (  35522  835)
        Input time offset:      0
        After ZRDINF, Record found: T
        Pathname: /CAP1B/OVERCHUTE/FLOW/03APR1997/5MIN/100YEAR/
        Number of actual data:  288  Header length:   0
        Compression:   0  Quality:   0
-----DSS--- ZREAD Unit  71; Vers.    4:  /CAP1B/OVERCHUTE/FLOW/03APR1997/5MIN/100YEAR/
      ----DSS---Debug:  Enter ZRRTSB;  Unit:  71
        NSTART:    1   NVALS:    1    JULS:   35522  ISTIME:   835
        NLDATA:  288   JULSD:   35522
        JULS: 03APR97       JULSD: 03APR97
        Quality Read: F,  Quality Requested: F
        ---ZRRTSB Calculations:  NPOS:  167  NDATA:  288  NREAD:    1  ILIM:    1
      ----- Exiting ZRRTS, Number of data values:      1,  Status:  0
        Offset:       0,  Units: CFS     ,  Type:INST-VAL
        ----- Entering ZRRTSX for unit 71 -----
Pathname: /CAP1B/OVERCHUTE/FLOW//5MIN/100YEAR/
        Time Window set.  Interval:     5  Number of data values:    744
        Starting date and time:  Apr 3, 1997  1355  (  35522  835)
        Ending   date and time:  Apr 6, 1997  0350  (  35525  230)
        Input time offset:      0
        After ZRDINF, Record found: T
        Pathname: /CAP1B/OVERCHUTE/FLOW/03APR1997/5MIN/100YEAR/
        Number of actual data:  288  Header length:   0
        Compression:   0  Quality:   0
-----DSS--- ZREAD Unit  71; Vers.    4:  /CAP1B/OVERCHUTE/FLOW/03APR1997/5MIN/100YEAR/
      ----DSS---Debug:  Enter ZRRTSB;  Unit:  71
        NSTART:    1   NVALS:  744    JULS:   35522  ISTIME:   835
        NLDATA:  288   JULSD:   35522
        JULS: 03APR97       JULSD: 03APR97
        Quality Read: F,  Quality Requested: F
        ---ZRRTSB Calculations:  NPOS:  167  NDATA:  288  NREAD:  122  ILIM:  122
        After ZRDINF, Record found: T
        Pathname: /CAP1B/OVERCHUTE/FLOW/04APR1997/5MIN/100YEAR/
        Number of actual data:  288  Header length:   0
        Compression:   0  Quality:   0
-----DSS--- ZREAD Unit  71; Vers.    4:  /CAP1B/OVERCHUTE/FLOW/04APR1997/5MIN/100YEAR/
      ----DSS---Debug:  Enter ZRRTSB;  Unit:  71
        NSTART:  123   NVALS:  744    JULS:   35522  ISTIME:   835
        NLDATA:  288   JULSD:   35523
        JULS: 03APR97       JULSD: 04APR97
        Quality Read: F,  Quality Requested: F
        ---ZRRTSB Calculations:  NPOS:    1  NDATA:  288  NREAD:  288  ILIM:  410
        After ZRDINF, Record found: F
        Pathname: /CAP1B/OVERCHUTE/FLOW/05APR1997/5MIN/100YEAR/
      ----DSS---Debug:  Enter ZRRTSB;  Unit:  71
        NSTART:  411   NVALS:  744    JULS:   35522  ISTIME:   835
        NLDATA:  288   JULSD:   35524
        JULS: 03APR97       JULSD: 05APR97
        Quality Read: F,  Quality Requested: F
        ---ZRRTSB Calculations:  NPOS:    1  NDATA:  288  NREAD:  288  ILIM:  698
-----DSS*** ZRRTS:  CAUTION - Data block not found in file.  Unit:  71
Pathname: /CAP1B/OVERCHUTE/FLOW/05APR1997/5MIN/100YEAR/
        After ZRDINF, Record found: F
        Pathname: /CAP1B/OVERCHUTE/FLOW/06APR1997/5MIN/100YEAR/
      ----DSS---Debug:  Enter ZRRTSB;  Unit:  71
        NSTART:  699   NVALS:  744    JULS:   35522  ISTIME:   835
        NLDATA:  288   JULSD:   35525
        JULS: 03APR97       JULSD: 06APR97
        Quality Read: F,  Quality Requested: F
        ---ZRRTSB Calculations:  NPOS:    1  NDATA:  288  NREAD:   46  ILIM:  744
      ----- Exiting ZRRTS, Number of data values:    744,  Status:  3
        Offset:       0,  Units: CFS     ,  Type:INST-VAL
        ----- Entering ZRRTSX for unit 71 -----
```

```
Pathname: /ADOT EAST BASIN/AT SUPERSTITION/FLOW//5MIN/100YR/
        Time Window set.  Interval:     5  Number of data values:      1
        Starting date and time:  Mar 31, 1997  2400  (  35519 1440)
        Ending   date and time:  Mar 31, 1997  2400  (  35519 1440)
        Input time offset:      0
        After ZRDINF, Record found: T
        Pathname: /ADOT EAST BASIN/AT SUPERSTITION/FLOW/31MAR1997/5MIN/100YR/
        Number of actual data:  288  Header length:   0
        Compression:   0  Quality:   0
-----DSS--- ZREAD Unit  71; Vers.    2:  /ADOT EAST BASIN/AT SUPERSTITION/FLOW/31MAR1997/5MIN/100YR/
      ----DSS---Debug:  Enter ZRRTSB;  Unit:  71
        NSTART:    1   NVALS:    1    JULS:   35519  ISTIME:  1440
        NLDATA:  288   JULSD:   35519
        JULS: 31MAR97       JULSD: 31MAR97
        Quality Read: F,  Quality Requested: F
        ---ZRRTSB Calculations:  NPOS:  288  NDATA:  288  NREAD:    1  ILIM:    1
      ----- Exiting ZRRTS, Number of data values:      1,  Status:  0
        Offset:       0,  Units: CFS     ,  Type:INST-VAL
        ----- Entering ZRRTSX for unit 71 -----
Pathname: /ADOT EAST BASIN/AT SUPERSTITION/FLOW//5MIN/100YR/
        Time Window set.  Interval:     5  Number of data values:    744
        Starting date and time:  Mar 31, 1997  2400  (  35519 1440)
        Ending   date and time:  Apr 3, 1997  1355  (  35522  835)
        Input time offset:      0
        After ZRDINF, Record found: T
        Pathname: /ADOT EAST BASIN/AT SUPERSTITION/FLOW/31MAR1997/5MIN/100YR/
        Number of actual data:  288  Header length:   0
        Compression:   0  Quality:   0
-----DSS--- ZREAD Unit  71; Vers.    2:  /ADOT EAST BASIN/AT SUPERSTITION/FLOW/31MAR1997/5MIN/100YR/
      ----DSS---Debug:  Enter ZRRTSB;  Unit:  71
        NSTART:    1   NVALS:  744    JULS:   35519  ISTIME:  1440
        NLDATA:  288   JULSD:   35519
        JULS: 31MAR97       JULSD: 31MAR97
        Quality Read: F,  Quality Requested: F
        ---ZRRTSB Calculations:  NPOS:  288  NDATA:  288  NREAD:    1  ILIM:    1
        After ZRDINF, Record found: T
        Pathname: /ADOT EAST BASIN/AT SUPERSTITION/FLOW/01APR1997/5MIN/100YR/
        Number of actual data:  288  Header length:   0
        Compression:   0  Quality:   0
-----DSS--- ZREAD Unit  71; Vers.    2:  /ADOT EAST BASIN/AT SUPERSTITION/FLOW/01APR1997/5MIN/100YR/
      ----DSS---Debug:  Enter ZRRTSB;  Unit:  71
        NSTART:    2   NVALS:  744    JULS:   35519  ISTIME:  1440
        NLDATA:  288   JULSD:   35520
        JULS: 31MAR97       JULSD: 01APR97
        Quality Read: F,  Quality Requested: F
        ---ZRRTSB Calculations:  NPOS:    1  NDATA:  288  NREAD:  288  ILIM:  289
        After ZRDINF, Record found: T
        Pathname: /ADOT EAST BASIN/AT SUPERSTITION/FLOW/02APR1997/5MIN/100YR/
        Number of actual data:  288  Header length:   0
        Compression:   0  Quality:   0
-----DSS--- ZREAD Unit  71; Vers.    2:  /ADOT EAST BASIN/AT SUPERSTITION/FLOW/02APR1997/5MIN/100YR/
      ----DSS---Debug:  Enter ZRRTSB;  Unit:  71
        NSTART:  290   NVALS:  744    JULS:   35519  ISTIME:  1440
        NLDATA:  288   JULSD:   35521
        JULS: 31MAR97       JULSD: 02APR97
        Quality Read: F,  Quality Requested: F
        ---ZRRTSB Calculations:  NPOS:    1  NDATA:  288  NREAD:  288  ILIM:  577
        After ZRDINF, Record found: T
        Pathname: /ADOT EAST BASIN/AT SUPERSTITION/FLOW/03APR1997/5MIN/100YR/
        Number of actual data:  288  Header length:   0
        Compression:   0  Quality:   0
-----DSS--- ZREAD Unit  71; Vers.    2:  /ADOT EAST BASIN/AT SUPERSTITION/FLOW/03APR1997/5MIN/100YR/
      ----DSS---Debug:  Enter ZRRTSB;  Unit:  71
        NSTART:  578   NVALS:  744    JULS:   35519  ISTIME:  1440
        NLDATA:  288   JULSD:   35522
        JULS: 31MAR97       JULSD: 03APR97
        Quality Read: F,  Quality Requested: F
        ---ZRRTSB Calculations:  NPOS:    1  NDATA:  288  NREAD:  167  ILIM:  744
      ----- Exiting ZRRTS, Number of data values:    744,  Status:  0
        Offset:       0,  Units: CFS     ,  Type:INST-VAL
        ----- Entering ZRRTSX for unit 71 -----
Pathname: /ADOT EAST BASIN/AT SUPERSTITION/FLOW//5MIN/100YR/
        Time Window set.  Interval:     5  Number of data values:      1
        Starting date and time:  Apr 3, 1997  1355  (  35522  835)
        Ending   date and time:  Apr 3, 1997  1355  (  35522  835)
        Input time offset:      0
        After ZRDINF, Record found: T
        Pathname: /ADOT EAST BASIN/AT SUPERSTITION/FLOW/03APR1997/5MIN/100YR/
        Number of actual data:  288  Header length:   0
        Compression:   0  Quality:   0
-----DSS--- ZREAD Unit  71; Vers.    2:  /ADOT EAST BASIN/AT SUPERSTITION/FLOW/03APR1997/5MIN/100YR/
      ----DSS---Debug:  Enter ZRRTSB;  Unit:  71
        NSTART:    1   NVALS:    1    JULS:   35522  ISTIME:   835
        NLDATA:  288   JULSD:   35522
        JULS: 03APR97       JULSD: 03APR97
        Quality Read: F,  Quality Requested: F
        ---ZRRTSB Calculations:  NPOS:  167  NDATA:  288  NREAD:    1  ILIM:    1
      ----- Exiting ZRRTS, Number of data values:      1,  Status:  0
        Offset:       0,  Units: CFS     ,  Type:INST-VAL
        ----- Entering ZRRTSX for unit 71 -----
Pathname: /ADOT EAST BASIN/AT SUPERSTITION/FLOW//5MIN/100YR/
        Time Window set.  Interval:     5  Number of data values:    744
        Starting date and time:  Apr 3, 1997  1355  (  35522  835)
        Ending   date and time:  Apr 6, 1997  0350  (  35525  230)
        Input time offset:      0
```

```
       After ZRDINF, Record found: T
       Pathname: /ADOT EAST BASIN/AT SUPERSTITION/FLOW/03APR1997/5MIN/100YR/
       Number of actual data:  288  Header length:   0
       Compression:   0  Quality:   0
-----DSS--- ZREAD Unit  71; Vers.    2:  /ADOT EAST BASIN/AT SUPERSTITION/FLOW/03APR1997/5MIN/100YR/
     ----DSS---Debug:  Enter ZRRTSB;  Unit:  71
       NSTART:    1   NVALS:  744    JULS:   35522  ISTIME:   835
       NLDATA:  288   JULSD:   35522
       JULS: 03APR97       JULSD: 03APR97
       Quality Read: F,  Quality Requested: F
       ---ZRRTSB Calculations:  NPOS:  167  NDATA:  288  NREAD:  122  ILIM:  122
       After ZRDINF, Record found: T
       Pathname: /ADOT EAST BASIN/AT SUPERSTITION/FLOW/04APR1997/5MIN/100YR/
       Number of actual data:  288  Header length:   0
       Compression:   0  Quality:   0
-----DSS--- ZREAD Unit  71; Vers.    2:  /ADOT EAST BASIN/AT SUPERSTITION/FLOW/04APR1997/5MIN/100YR/
     ----DSS---Debug:  Enter ZRRTSB;  Unit:  71
       NSTART:  123   NVALS:  744    JULS:   35522  ISTIME:   835
       NLDATA:  288   JULSD:   35523
       JULS: 03APR97       JULSD: 04APR97
       Quality Read: F,  Quality Requested: F
       ---ZRRTSB Calculations:  NPOS:    1  NDATA:  288  NREAD:  288  ILIM:  410
       After ZRDINF, Record found: F
       Pathname: /ADOT EAST BASIN/AT SUPERSTITION/FLOW/05APR1997/5MIN/100YR/
     ----DSS---Debug:  Enter ZRRTSB;  Unit:  71
       NSTART:  411   NVALS:  744    JULS:   35522  ISTIME:   835
       NLDATA:  288   JULSD:   35524
       JULS: 03APR97       JULSD: 05APR97
       Quality Read: F,  Quality Requested: F
       ---ZRRTSB Calculations:  NPOS:    1  NDATA:  288  NREAD:  288  ILIM:  698
-----DSS*** ZRRTS:  CAUTION - Data block not found in file.  Unit:  71
Pathname: /ADOT EAST BASIN/AT SUPERSTITION/FLOW/05APR1997/5MIN/100YR/
       After ZRDINF, Record found: F
       Pathname: /ADOT EAST BASIN/AT SUPERSTITION/FLOW/06APR1997/5MIN/100YR/
     ----DSS---Debug:  Enter ZRRTSB;  Unit:  71
       NSTART:  699   NVALS:  744    JULS:   35522  ISTIME:   835
       NLDATA:  288   JULSD:   35525
       JULS: 03APR97       JULSD: 06APR97
       Quality Read: F,  Quality Requested: F
       ---ZRRTSB Calculations:  NPOS:    1  NDATA:  288  NREAD:   46  ILIM:  744
     ----- Exiting ZRRTS, Number of data values:    744,  Status:  3
       Offset:        0,  Units: CFS     ,  Type:INST-VAL
       ----- Entering ZRRTSX for unit 71 -----
Pathname: /ADOT WEST BASIN/AT SUPERSTITION/FLOW//5MIN/100YR/
       Time Window set.  Interval:     5  Number of data values:      1
       Starting date and time:  Mar 31, 1997  2400  (  35519 1440)
       Ending   date and time:  Mar 31, 1997  2400  (  35519 1440)
       Input time offset:      0
       After ZRDINF, Record found: T
       Pathname: /ADOT WEST BASIN/AT SUPERSTITION/FLOW/31MAR1997/5MIN/100YR/
       Number of actual data:  288  Header length:   0
       Compression:   0  Quality:   0
-----DSS--- ZREAD Unit  71; Vers.    2:  /ADOT WEST BASIN/AT SUPERSTITION/FLOW/31MAR1997/5MIN/100YR/
     ----DSS---Debug:  Enter ZRRTSB;  Unit:  71
       NSTART:    1   NVALS:    1    JULS:   35519  ISTIME:  1440
       NLDATA:  288   JULSD:   35519
       JULS: 31MAR97       JULSD: 31MAR97
       Quality Read: F,  Quality Requested: F
       ---ZRRTSB Calculations:  NPOS:  288  NDATA:  288  NREAD:    1  ILIM:    1
     ----- Exiting ZRRTS, Number of data values:      1,  Status:  0
       Offset:        0,  Units: CFS     ,  Type:INST-VAL
       ----- Entering ZRRTSX for unit 71 -----
Pathname: /ADOT WEST BASIN/AT SUPERSTITION/FLOW//5MIN/100YR/
       Time Window set.  Interval:     5  Number of data values:    744
       Starting date and time:  Mar 31, 1997  2400  (  35519 1440)
       Ending   date and time:  Apr 3, 1997  1355  (  35522  835)
       Input time offset:      0
       After ZRDINF, Record found: T
       Pathname: /ADOT WEST BASIN/AT SUPERSTITION/FLOW/31MAR1997/5MIN/100YR/
       Number of actual data:  288  Header length:   0
       Compression:   0  Quality:   0
-----DSS--- ZREAD Unit  71; Vers.    2:  /ADOT WEST BASIN/AT SUPERSTITION/FLOW/31MAR1997/5MIN/100YR/
     ----DSS---Debug:  Enter ZRRTSB;  Unit:  71
       NSTART:    1   NVALS:  744    JULS:   35519  ISTIME:  1440
       NLDATA:  288   JULSD:   35519
       JULS: 31MAR97       JULSD: 31MAR97
       Quality Read: F,  Quality Requested: F
       ---ZRRTSB Calculations:  NPOS:  288  NDATA:  288  NREAD:    1  ILIM:    1
       After ZRDINF, Record found: T
       Pathname: /ADOT WEST BASIN/AT SUPERSTITION/FLOW/01APR1997/5MIN/100YR/
       Number of actual data:  288  Header length:   0
       Compression:   0  Quality:   0
-----DSS--- ZREAD Unit  71; Vers.    2:  /ADOT WEST BASIN/AT SUPERSTITION/FLOW/01APR1997/5MIN/100YR/
     ----DSS---Debug:  Enter ZRRTSB;  Unit:  71
       NSTART:    2   NVALS:  744    JULS:   35519  ISTIME:  1440
       NLDATA:  288   JULSD:   35520
       JULS: 31MAR97       JULSD: 01APR97
       Quality Read: F,  Quality Requested: F
       ---ZRRTSB Calculations:  NPOS:    1  NDATA:  288  NREAD:  288  ILIM:  289
       After ZRDINF, Record found: T
       Pathname: /ADOT WEST BASIN/AT SUPERSTITION/FLOW/02APR1997/5MIN/100YR/
       Number of actual data:  288  Header length:   0
       Compression:   0  Quality:   0
-----DSS--- ZREAD Unit  71; Vers.    2:  /ADOT WEST BASIN/AT SUPERSTITION/FLOW/02APR1997/5MIN/100YR/
     ----DSS---Debug:  Enter ZRRTSB;  Unit:  71
```

```
      NSTART:  290   NVALS:  744    JULS:   35519  ISTIME:  1440
      NLDATA:  288   JULSD:   35521
      JULS: 31MAR97       JULSD: 02APR97
      Quality Read: F,  Quality Requested: F
      ---ZRRTSB Calculations:  NPOS:    1  NDATA:  288  NREAD:  288  ILIM:  577
      After ZRDINF, Record found: T
      Pathname: /ADOT WEST BASIN/AT SUPERSTITION/FLOW/03APR1997/5MIN/100YR/
      Number of actual data:  288  Header length:   0
      Compression:   0  Quality:   0
-----DSS--- ZREAD Unit  71; Vers.    2:  /ADOT WEST BASIN/AT SUPERSTITION/FLOW/03APR1997/5MIN/100YR/
     ----DSS---Debug:  Enter ZRRTSB;  Unit:  71
      NSTART:  578   NVALS:  744    JULS:   35519  ISTIME:  1440
      NLDATA:  288   JULSD:   35522
      JULS: 31MAR97       JULSD: 03APR97
      Quality Read: F,  Quality Requested: F
      ---ZRRTSB Calculations:  NPOS:    1  NDATA:  288  NREAD:  167  ILIM:  744
     ----- Exiting ZRRTS, Number of data values:    744,  Status:  0
      Offset:       0,  Units: CFS     ,  Type:INST-VAL
      ----- Entering ZRRTSX for unit 71 -----
Pathname: /ADOT WEST BASIN/AT SUPERSTITION/FLOW//5MIN/100YR/
      Time Window set.  Interval:     5  Number of data values:      1
      Starting date and time:  Apr 3, 1997  1355  (  35522  835)
      Ending   date and time:  Apr 3, 1997  1355  (  35522  835)
      Input time offset:      0
      After ZRDINF, Record found: T
      Pathname: /ADOT WEST BASIN/AT SUPERSTITION/FLOW/03APR1997/5MIN/100YR/
      Number of actual data:  288  Header length:   0
      Compression:   0  Quality:   0
-----DSS--- ZREAD Unit  71; Vers.    2:  /ADOT WEST BASIN/AT SUPERSTITION/FLOW/03APR1997/5MIN/100YR/
     ----DSS---Debug:  Enter ZRRTSB;  Unit:  71
      NSTART:    1   NVALS:    1    JULS:   35522  ISTIME:   835
      NLDATA:  288   JULSD:   35522
      JULS: 03APR97       JULSD: 03APR97
      Quality Read: F,  Quality Requested: F
      ---ZRRTSB Calculations:  NPOS:  167  NDATA:  288  NREAD:    1  ILIM:    1
     ----- Exiting ZRRTS, Number of data values:      1,  Status:  0
      Offset:       0,  Units: CFS     ,  Type:INST-VAL
      ----- Entering ZRRTSX for unit 71 -----
Pathname: /ADOT WEST BASIN/AT SUPERSTITION/FLOW//5MIN/100YR/
      Time Window set.  Interval:     5  Number of data values:    744
      Starting date and time:  Apr 3, 1997  1355  (  35522  835)
      Ending   date and time:  Apr 6, 1997  0350  (  35525  230)
      Input time offset:      0
      After ZRDINF, Record found: T
      Pathname: /ADOT WEST BASIN/AT SUPERSTITION/FLOW/03APR1997/5MIN/100YR/
      Number of actual data:  288  Header length:   0
      Compression:   0  Quality:   0
-----DSS--- ZREAD Unit  71; Vers.    2:  /ADOT WEST BASIN/AT SUPERSTITION/FLOW/03APR1997/5MIN/100YR/
     ----DSS---Debug:  Enter ZRRTSB;  Unit:  71
      NSTART:    1   NVALS:  744    JULS:   35522  ISTIME:   835
      NLDATA:  288   JULSD:   35522
      JULS: 03APR97       JULSD: 03APR97
      Quality Read: F,  Quality Requested: F
      ---ZRRTSB Calculations:  NPOS:  167  NDATA:  288  NREAD:  122  ILIM:  122
      After ZRDINF, Record found: T
      Pathname: /ADOT WEST BASIN/AT SUPERSTITION/FLOW/04APR1997/5MIN/100YR/
      Number of actual data:  288  Header length:   0
      Compression:   0  Quality:   0
-----DSS--- ZREAD Unit  71; Vers.    2:  /ADOT WEST BASIN/AT SUPERSTITION/FLOW/04APR1997/5MIN/100YR/
     ----DSS---Debug:  Enter ZRRTSB;  Unit:  71
      NSTART:  123   NVALS:  744    JULS:   35522  ISTIME:   835
      NLDATA:  288   JULSD:   35523
      JULS: 03APR97       JULSD: 04APR97
      Quality Read: F,  Quality Requested: F
      ---ZRRTSB Calculations:  NPOS:    1  NDATA:  288  NREAD:  288  ILIM:  410
      After ZRDINF, Record found: F
      Pathname: /ADOT WEST BASIN/AT SUPERSTITION/FLOW/05APR1997/5MIN/100YR/
     ----DSS---Debug:  Enter ZRRTSB;  Unit:  71
      NSTART:  411   NVALS:  744    JULS:   35522  ISTIME:   835
      NLDATA:  288   JULSD:   35524
      JULS: 03APR97       JULSD: 05APR97
      Quality Read: F,  Quality Requested: F
      ---ZRRTSB Calculations:  NPOS:    1  NDATA:  288  NREAD:  288  ILIM:  698
-----DSS*** ZRRTS:  CAUTION - Data block not found in file.  Unit:  71
Pathname: /ADOT WEST BASIN/AT SUPERSTITION/FLOW/05APR1997/5MIN/100YR/
      After ZRDINF, Record found: F
      Pathname: /ADOT WEST BASIN/AT SUPERSTITION/FLOW/06APR1997/5MIN/100YR/
     ----DSS---Debug:  Enter ZRRTSB;  Unit:  71
      NSTART:  699   NVALS:  744    JULS:   35522  ISTIME:   835
      NLDATA:  288   JULSD:   35525
      JULS: 03APR97       JULSD: 06APR97
      Quality Read: F,  Quality Requested: F
      ---ZRRTSB Calculations:  NPOS:    1  NDATA:  288  NREAD:   46  ILIM:  744
     ----- Exiting ZRRTS, Number of data values:    744,  Status:  3
      Offset:       0,  Units: CFS     ,  Type:INST-VAL
1
                                        RUNOFF SUMMARY
                                   FLOW IN CUBIC FEET PER SECOND
                                 TIME IN HOURS,  AREA IN SQUARE MILES

                                 PEAK   TIME OF    AVERAGE FLOW FOR MAXIMUM PERIOD      BASIN     MAXIMUM     TIME OF
      OPERATION       STATION    FLOW    PEAK                                          AREA      STAGE     MAX STAGE
+                                                   6-HOUR      24-HOUR      72-HOUR

      HYDROGRAPH AT
```

+		65A1	655.	13.00	182.	59.	20.	.97
+	DIVERSION TO	FF65A1	23.	8.58	17.	5.	2.	.97
+	HYDROGRAPH AT	R65A1	655.	13.00	182.	54.	18.	.97
+	HYDROGRAPH AT	CAP1A	710.	12.67	132.	36.	12.	.96
+	ROUTED TO	RCAP1A	643.	13.08	132.	36.	12.	.96
+	2 COMBINED AT	CCAP1A	1283.	13.08	311.	89.	30.	1.94
+	HYDROGRAPH AT	65A2	442.	12.67	90.	28.	9.	.54
+	DIVERSION TO	FF65A2	61.	11.83	14.	5.	2.	.54
+	HYDROGRAPH AT	R65A2	442.	12.67	86.	23.	8.	.54
+	HYDROGRAPH AT	CAP1B	710.	12.67	132.	36.	12.	.96
+	ROUTED TO	RCAP1B	658.	13.00	132.	36.	12.	.96
+	2 COMBINED AT	CCAP1B	1014.	12.83	217.	59.	20.	1.51
+	2 COMBINED AT	C65A12	2227.	13.00	522.	147.	49.	3.44
+	DIVERSION TO	BYPASO	380.	12.17	210.	69.	23.	3.44
+	HYDROGRAPH AT	DI-BAS	1847.	13.00	312.	78.	26.	3.44
+	HYDROGRAPH AT	65A3	789.	13.00	204.	64.	21.	1.21
+	DIVERSION TO	FF65A3	164.	12.00	33.	11.	4.	1.21
+	HYDROGRAPH AT	R65A3	789.	13.00	193.	53.	18.	1.21
+	2 COMBINED AT	SDWDBS	2609.	13.00	498.	129.	43.	4.65
+	DIVERSION TO	DILO-O	70.	12.17	50.	17.	6.	4.65
+	HYDROGRAPH AT	LOFLOW	2539.	13.00	448.	112.	37.	4.65
+	ROUTED TO	SDWDB	0.	.00	0.	0.	0.	4.65
+	HYDROGRAPH AT	BYPASI	380.	12.17	210.	69.	23.	3.44
+	2 COMBINED AT	CPMRID	380.	12.17	210.	69.	23.	4.65
+	ROUTED TO	RBYPAS	380.	12.92	210.	69.	23.	4.65
+	ROUTED TO	RSDW1	380.	13.42	210.	69.	23.	4.65
+	ROUTED TO	RSDW2	380.	14.50	210.	69.	23.	4.65
+	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	598.	13.00	295.	97.	33.	6.45
+	DIVERSION TO	DIRS65	176.	12.92	26.	6.	2.	6.45
+	HYDROGRAPH AT	DI65B	430.	13.00	270.	91.	30.	6.45
+	HYDROGRAPH AT	SD-FLO	70.	12.17	50.	17.	6.	4.65
+	ROUTED TO	ELLSD1	70.	12.50	50.	17.	6.	4.65
+	2 COMBINED AT	CP65A	500.	13.00	319.	108.	36.	6.45
+	ROUTED TO	65AT-3	500.	13.17	319.	108.	36.	6.45
+	HYDROGRAPH AT	DR65B	176.	12.92	26.	6.	2.	6.45
+	ROUTED TO	RS65A	8.	15.00	8.	6.	2.	6.45
+	2 COMBINED AT	CP65	508.	14.83	326.	113.	38.	6.45
+	ROUTED TO	65T66	508.	14.83	326.	113.	38.	6.45
+	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	918.	14.92	711.	364.	123.	9.79
+	ROUTED TO	66CTD	918.	14.92	710.	364.	123.	9.79
+	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	934.	14.92	719.	376.	132.	13.13
+	ROUTED TO	RC-WA	934.	14.92	719.	376.	132.	13.13
+	HYDROGRAPH AT	DR-WA	179.	18.00	130.	39.	13.	3.34
	ROUTED TO							

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+                    RS66D2      33.   22.67      29.      25.      13.      3.34
+  2 COMBINED AT     CP66D      934.   14.92     724.     394.     144.     13.13
+  ROUTED TO         66T66D     934.   14.92     724.     394.     144.     13.13
+  ROUTED TO         66-66D     934.   14.92     724.     394.     144.     13.13
+  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     1062.   14.25     801.     424.     154.     15.63
+  ROUTED TO         66T70A    1057.   14.25     799.     424.     154.     15.63
+  ROUTED TO         66T70B    1057.   14.33     799.     424.     154.     15.63
+  ROUTED TO         CULVT     1051.   14.33     797.     424.     154.     15.63
+  ROUTED TO         66T70C    1049.   14.50     795.     424.     154.     15.63
1
                          SUMMARY OF KINEMATIC WAVE - MUSKINGUM-CUNGE ROUTING
                              (FLOW IS DIRECT RUNOFF WITHOUT BASE FLOW)
                                                                  INTERPOLATED TO
                                                                  COMPUTATION INTERVAL
   ISTAQ    ELEMENT      DT        PEAK     TIME TO      VOLUME      DT       PEAK     TIME TO      VOLUME
                                             PEAK                                                   PEAK
                        (MIN)      (CFS)     (MIN)       (IN)      (MIN)     (CFS)     (MIN)        (IN)
   FOR STORM = 1  STORM AREA (SQ MI) =        .01
     ELLSD1  MANE        1.75     74.81    740.25        .14       5.00     70.02    740.00         .14

CONTINUITY SUMMARY (AC-FT) - INFLOW= .3430E+02 EXCESS= .0000E+00 OUTFLOW= .3427E+02 BASIN STORAGE= .1278E-02 PERCENT ERROR=    .1

   FOR STORM = 2  STORM AREA (SQ MI) =       1.00
     ELLSD1  MANE        2.00     76.68    742.00        .14       5.00     70.01    755.00         .14

CONTINUITY SUMMARY (AC-FT) - INFLOW= .3419E+02 EXCESS= .0000E+00 OUTFLOW= .3417E+02 BASIN STORAGE= .1270E-02 PERCENT ERROR=    .1
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FOR STORM = 3  STORM AREA (SQ MI) =        5.00
  ELLSD1  MANE          2.25     75.04    742.50       .14       5.00     70.38    750.00          .14

CONTINUITY SUMMARY (AC-FT) - INFLOW= .3364E+02 EXCESS= .0000E+00 OUTFLOW= .3363E+02 BASIN STORAGE= .1351E-02 PERCENT ERROR=    .0

FOR STORM = 4  STORM AREA (SQ MI) =       10.00
  ELLSD1  MANE          1.25     71.03    745.00       .13       5.00     71.03    745.00          .13

CONTINUITY SUMMARY (AC-FT) - INFLOW= .3269E+02 EXCESS= .0000E+00 OUTFLOW= .3265E+02 BASIN STORAGE= .1393E-02 PERCENT ERROR=    .1

FOR STORM = 5  STORM AREA (SQ MI) =       30.00
  ELLSD1  MANE          1.50     73.87    745.50       .13       5.00     70.04    750.00          .13

CONTINUITY SUMMARY (AC-FT) - INFLOW= .3195E+02 EXCESS= .0000E+00 OUTFLOW= .3192E+02 BASIN STORAGE= .1654E-02 PERCENT ERROR=    .1

FOR STORM = 6  STORM AREA (SQ MI) =       60.00
  ELLSD1  MANE          2.00     74.56    750.00       .12       5.00     74.56    750.00          .12

CONTINUITY SUMMARY (AC-FT) - INFLOW= .3078E+02 EXCESS= .0000E+00 OUTFLOW= .3076E+02 BASIN STORAGE= .1546E-02 PERCENT ERROR=    .1

FOR STORM = 7  STORM AREA (SQ MI) =       90.00
  ELLSD1  MANE          2.25     77.88    751.50       .12       5.00     70.09    760.00          .12

CONTINUITY SUMMARY (AC-FT) - INFLOW= .3046E+02 EXCESS= .0000E+00 OUTFLOW= .3044E+02 BASIN STORAGE= .1637E-02 PERCENT ERROR=    .0

FOR STORM = 8  STORM AREA (SQ MI) =      120.00
  ELLSD1  MANE          2.00     76.68    752.00       .12       5.00     70.01    765.00          .12

CONTINUITY SUMMARY (AC-FT) - INFLOW= .3015E+02 EXCESS= .0000E+00 OUTFLOW= .3013E+02 BASIN STORAGE= .1484E-02 PERCENT ERROR=    .1

FOR STORM = 9  STORM AREA (SQ MI) =      150.00
  ELLSD1  MANE          1.75     76.77    750.75       .12       5.00     70.00    765.00          .12

CONTINUITY SUMMARY (AC-FT) - INFLOW= .3000E+02 EXCESS= .0000E+00 OUTFLOW= .2997E+02 BASIN STORAGE= .1418E-02 PERCENT ERROR=    .1

FOR STORM = 1  STORM AREA (SQ MI) =        .01
  65AT-3  MANE          1.33    500.12    773.40       .64       5.00    500.00    785.00          .64

CONTINUITY SUMMARY (AC-FT) - INFLOW= .2212E+03 EXCESS= .0000E+00 OUTFLOW= .2212E+03 BASIN STORAGE= .1768E-03 PERCENT ERROR=    .0

FOR STORM = 2  STORM AREA (SQ MI) =       1.00
  65AT-3  MANE          1.33    500.62    773.40       .64       5.00    500.00    785.00          .64

CONTINUITY SUMMARY (AC-FT) - INFLOW= .2199E+03 EXCESS= .0000E+00 OUTFLOW= .2199E+03 BASIN STORAGE= .1768E-03 PERCENT ERROR=    .0

FOR STORM = 3  STORM AREA (SQ MI) =       5.00
  65AT-3  MANE          1.33    501.35    773.40       .63       5.00    500.00    785.00          .63

CONTINUITY SUMMARY (AC-FT) - INFLOW= .2161E+03 EXCESS= .0000E+00 OUTFLOW= .2161E+03 BASIN STORAGE= .1768E-03 PERCENT ERROR=    .0

FOR STORM = 4  STORM AREA (SQ MI) =      10.00
  65AT-3  MANE          1.33    500.39    782.68       .61       5.00    500.00    795.00          .61

CONTINUITY SUMMARY (AC-FT) - INFLOW= .2105E+03 EXCESS= .0000E+00 OUTFLOW= .2105E+03 BASIN STORAGE= .1768E-03 PERCENT ERROR=    .0

FOR STORM = 5  STORM AREA (SQ MI) =      30.00
  65AT-3  MANE          1.33    500.83    793.30       .59       5.00    500.00    805.00          .59

CONTINUITY SUMMARY (AC-FT) - INFLOW= .2018E+03 EXCESS= .0000E+00 OUTFLOW= .2018E+03 BASIN STORAGE= .1768E-03 PERCENT ERROR=    .0

FOR STORM = 6  STORM AREA (SQ MI) =      60.00
  65AT-3  MANE          1.33    500.84    813.20       .55       5.00    500.00    825.00          .55

CONTINUITY SUMMARY (AC-FT) - INFLOW= .1906E+03 EXCESS= .0000E+00 OUTFLOW= .1906E+03 BASIN STORAGE= .1768E-03 PERCENT ERROR=    .0

FOR STORM = 7  STORM AREA (SQ MI) =      90.00
  65AT-3  MANE          1.33    500.39    827.79       .54       5.00    500.00    840.00          .54
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CONTINUITY SUMMARY (AC-FT) - INFLOW= .1869E+03 EXCESS= .0000E+00 OUTFLOW= .1869E+03 BASIN STORAGE= .1768E-03 PERCENT ERROR=    .0

        FOR STORM = 8  STORM AREA (SQ MI) =     120.00
          65AT-3  MANE         1.33    500.23    847.69       .53      5.00    500.00    860.00         .53

CONTINUITY SUMMARY (AC-FT) - INFLOW= .1831E+03 EXCESS= .0000E+00 OUTFLOW= .1831E+03 BASIN STORAGE= .1768E-03 PERCENT ERROR=    .0

        FOR STORM = 9  STORM AREA (SQ MI) =     150.00
          65AT-3  MANE         1.33    500.03    862.28       .52      5.00    500.00    870.00         .52

CONTINUITY SUMMARY (AC-FT) - INFLOW= .1806E+03 EXCESS= .0000E+00 OUTFLOW= .1806E+03 BASIN STORAGE= .1768E-03 PERCENT ERROR=    .0

        FOR STORM = 1  STORM AREA (SQ MI) =        .01
          65T66  MANE         1.05    509.50    899.88       .70      5.00    509.50    900.00         .70

CONTINUITY SUMMARY (AC-FT) - INFLOW= .2400E+03 EXCESS= .0000E+00 OUTFLOW= .2400E+03 BASIN STORAGE= .1373E-03 PERCENT ERROR=    .0

        FOR STORM = 2  STORM AREA (SQ MI) =       1.00
          65T66  MANE         1.05    509.40    895.74       .69      5.00    509.40    895.00         .69

CONTINUITY SUMMARY (AC-FT) - INFLOW= .2381E+03 EXCESS= .0000E+00 OUTFLOW= .2381E+03 BASIN STORAGE= .1378E-03 PERCENT ERROR=    .0

        FOR STORM = 3  STORM AREA (SQ MI) =       5.00
          65T66  MANE         1.05    508.59    894.98       .67      5.00    508.59    895.00         .67

CONTINUITY SUMMARY (AC-FT) - INFLOW= .2294E+03 EXCESS= .0000E+00 OUTFLOW= .2294E+03 BASIN STORAGE= .1373E-03 PERCENT ERROR=    .0

        FOR STORM = 4  STORM AREA (SQ MI) =      10.00
          65T66  MANE         1.05    507.56    891.13       .64      5.00    507.56    890.00         .64

CONTINUITY SUMMARY (AC-FT) - INFLOW= .2187E+03 EXCESS= .0000E+00 OUTFLOW= .2187E+03 BASIN STORAGE= .1373E-03 PERCENT ERROR=    .0

        FOR STORM = 5  STORM AREA (SQ MI) =      30.00
          65T66  MANE         1.05    505.71    885.49       .60      5.00    505.70    885.00         .60

CONTINUITY SUMMARY (AC-FT) - INFLOW= .2054E+03 EXCESS= .0000E+00 OUTFLOW= .2054E+03 BASIN STORAGE= .1376E-03 PERCENT ERROR=    .0

        FOR STORM = 6  STORM AREA (SQ MI) =      60.00
          65T66  MANE         1.05    503.39    880.01       .56      5.00    503.39    880.00         .56

CONTINUITY SUMMARY (AC-FT) - INFLOW= .1918E+03 EXCESS= .0000E+00 OUTFLOW= .1918E+03 BASIN STORAGE= .1381E-03 PERCENT ERROR=    .0

        FOR STORM = 7  STORM AREA (SQ MI) =      90.00
          65T66  MANE         1.05    500.56    881.00       .54      5.00    500.55    880.00         .54

CONTINUITY SUMMARY (AC-FT) - INFLOW= .1871E+03 EXCESS= .0000E+00 OUTFLOW= .1871E+03 BASIN STORAGE= .1393E-03 PERCENT ERROR=    .0

        FOR STORM = 8  STORM AREA (SQ MI) =     120.00
          65T66  MANE         1.05    500.00    852.82       .53      5.00    500.00    860.00         .53

CONTINUITY SUMMARY (AC-FT) - INFLOW= .1831E+03 EXCESS= .0000E+00 OUTFLOW= .1831E+03 BASIN STORAGE= .1397E-03 PERCENT ERROR=    .0

        FOR STORM = 9  STORM AREA (SQ MI) =     150.00
          65T66  MANE         1.05    500.01    867.54       .52      5.00    500.00    875.00         .53

CONTINUITY SUMMARY (AC-FT) - INFLOW= .1807E+03 EXCESS= .0000E+00 OUTFLOW= .1806E+03 BASIN STORAGE= .1397E-03 PERCENT ERROR=    .0

        FOR STORM = 1  STORM AREA (SQ MI) =        .01
          66C1T2  MANE          .75    410.00    886.49      2.94      5.00    410.00    890.00        2.94

CONTINUITY SUMMARY (AC-FT) - INFLOW= .5231E+03 EXCESS= .0000E+00 OUTFLOW= .5231E+03 BASIN STORAGE= .9382E-04 PERCENT ERROR=    .0

        FOR STORM = 2  STORM AREA (SQ MI) =       1.00
          66C1T2  MANE          .75    410.00    886.49      2.93      5.00    410.00    890.00        2.93

CONTINUITY SUMMARY (AC-FT) - INFLOW= .5224E+03 EXCESS= .0000E+00 OUTFLOW= .5224E+03 BASIN STORAGE= .9382E-04 PERCENT ERROR=    .0
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FOR STORM = 3  STORM AREA (SQ MI) =       5.00
  66C1T2  MANE          .75    410.00    891.72      2.91      5.00    410.00    895.00        2.91

CONTINUITY SUMMARY (AC-FT) - INFLOW= .5186E+03 EXCESS= .0000E+00 OUTFLOW= .5186E+03 BASIN STORAGE= .9382E-04 PERCENT ERROR=    .0

FOR STORM = 4  STORM AREA (SQ MI) =      10.00
  66C1T2  MANE          .75    410.00    896.19      2.87      5.00    410.00    900.00        2.87

CONTINUITY SUMMARY (AC-FT) - INFLOW= .5121E+03 EXCESS= .0000E+00 OUTFLOW= .5121E+03 BASIN STORAGE= .9382E-04 PERCENT ERROR=    .0

FOR STORM = 5  STORM AREA (SQ MI) =      30.00
  66C1T2  MANE          .75    409.96    916.36      2.82      5.00    409.95    915.00        2.82

CONTINUITY SUMMARY (AC-FT) - INFLOW= .5020E+03 EXCESS= .0000E+00 OUTFLOW= .5020E+03 BASIN STORAGE= .9381E-04 PERCENT ERROR=    .0

FOR STORM = 6  STORM AREA (SQ MI) =      60.00
  66C1T2  MANE          .75    406.85    961.09      2.78      5.00    406.84    965.00        2.78

CONTINUITY SUMMARY (AC-FT) - INFLOW= .4948E+03 EXCESS= .0000E+00 OUTFLOW= .4948E+03 BASIN STORAGE= .9375E-04 PERCENT ERROR=    .0

FOR STORM = 7  STORM AREA (SQ MI) =      90.00
  66C1T2  MANE          .75    406.11    930.06      2.76      5.00    406.11    930.00        2.76

CONTINUITY SUMMARY (AC-FT) - INFLOW= .4924E+03 EXCESS= .0000E+00 OUTFLOW= .4924E+03 BASIN STORAGE= .9378E-04 PERCENT ERROR=    .0

FOR STORM = 8  STORM AREA (SQ MI) =     120.00
  66C1T2  MANE          .75    406.05    930.08      2.75      5.00    406.05    930.00        2.75

CONTINUITY SUMMARY (AC-FT) - INFLOW= .4906E+03 EXCESS= .0000E+00 OUTFLOW= .4906E+03 BASIN STORAGE= .9377E-04 PERCENT ERROR=    .0

FOR STORM = 9  STORM AREA (SQ MI) =     150.00
  66C1T2  MANE          .75    406.02    930.08      2.75      5.00    406.02    930.00        2.75

CONTINUITY SUMMARY (AC-FT) - INFLOW= .4895E+03 EXCESS= .0000E+00 OUTFLOW= .4895E+03 BASIN STORAGE= .9377E-04 PERCENT ERROR=    .0

FOR STORM = 1  STORM AREA (SQ MI) =        .01
  66CTD  MANE          .68    919.50    900.03      1.46      5.00    919.50    900.00        1.46

CONTINUITY SUMMARY (AC-FT) - INFLOW= .7631E+03 EXCESS= .0000E+00 OUTFLOW= .7631E+03 BASIN STORAGE= .9972E-04 PERCENT ERROR=    .0

FOR STORM = 2  STORM AREA (SQ MI) =       1.00
  66CTD  MANE          .68    919.40    896.67      1.46      5.00    919.40    895.00        1.46

CONTINUITY SUMMARY (AC-FT) - INFLOW= .7605E+03 EXCESS= .0000E+00 OUTFLOW= .7604E+03 BASIN STORAGE= .9980E-04 PERCENT ERROR=    .0

FOR STORM = 3  STORM AREA (SQ MI) =       5.00
  66CTD  MANE          .68    918.58    894.80      1.43      5.00    918.58    895.00        1.43

CONTINUITY SUMMARY (AC-FT) - INFLOW= .7481E+03 EXCESS= .0000E+00 OUTFLOW= .7481E+03 BASIN STORAGE= .9978E-04 PERCENT ERROR=    .0

FOR STORM = 4  STORM AREA (SQ MI) =      10.00
  66CTD  MANE          .68    917.48    894.99      1.40      5.00    917.48    895.00        1.40

CONTINUITY SUMMARY (AC-FT) - INFLOW= .7308E+03 EXCESS= .0000E+00 OUTFLOW= .7308E+03 BASIN STORAGE= .9972E-04 PERCENT ERROR=    .0

FOR STORM = 5  STORM AREA (SQ MI) =      30.00
  66CTD  MANE          .68    914.58    890.16      1.35      5.00    914.57    890.00        1.35

CONTINUITY SUMMARY (AC-FT) - INFLOW= .7074E+03 EXCESS= .0000E+00 OUTFLOW= .7073E+03 BASIN STORAGE= .9960E-04 PERCENT ERROR=    .0

FOR STORM = 6  STORM AREA (SQ MI) =      60.00
  66CTD  MANE          .68    907.26    884.79      1.31      5.00    907.24    885.00        1.31

CONTINUITY SUMMARY (AC-FT) - INFLOW= .6866E+03 EXCESS= .0000E+00 OUTFLOW= .6866E+03 BASIN STORAGE= .9977E-04 PERCENT ERROR=    .0

FOR STORM = 7  STORM AREA (SQ MI) =      90.00
  66CTD  MANE          .68    904.33    884.69      1.30      5.00    904.30    885.00        1.30
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CONTINUITY SUMMARY (AC-FT) - INFLOW= .6796E+03 EXCESS= .0000E+00 OUTFLOW= .6795E+03 BASIN STORAGE= .9979E-04 PERCENT ERROR=    .0

        FOR STORM = 8  STORM AREA (SQ MI) =     120.00
           66CTD  MANE          .68    903.60    884.84      1.29      5.00    903.55    885.00        1.29

CONTINUITY SUMMARY (AC-FT) - INFLOW= .6737E+03 EXCESS= .0000E+00 OUTFLOW= .6737E+03 BASIN STORAGE= .9964E-04 PERCENT ERROR=    .0

        FOR STORM = 9  STORM AREA (SQ MI) =     150.00
           66CTD  MANE          .68    902.21    885.10      1.28      5.00    902.20    885.00        1.28

CONTINUITY SUMMARY (AC-FT) - INFLOW= .6702E+03 EXCESS= .0000E+00 OUTFLOW= .6702E+03 BASIN STORAGE= .9964E-04 PERCENT ERROR=    .0

        FOR STORM = 1  STORM AREA (SQ MI) =        .01
           RC-WA  MANE          .70    937.45    900.20      1.18      5.00    937.45    900.00        1.18

CONTINUITY SUMMARY (AC-FT) - INFLOW= .8281E+03 EXCESS= .0000E+00 OUTFLOW= .8281E+03 BASIN STORAGE= .1038E-03 PERCENT ERROR=    .0

        FOR STORM = 2  STORM AREA (SQ MI) =       1.00
           RC-WA  MANE          .70    937.32    899.52      1.18      5.00    937.32    900.00        1.18

CONTINUITY SUMMARY (AC-FT) - INFLOW= .8254E+03 EXCESS= .0000E+00 OUTFLOW= .8254E+03 BASIN STORAGE= .1037E-03 PERCENT ERROR=    .0

        FOR STORM = 3  STORM AREA (SQ MI) =       5.00
           RC-WA  MANE          .70    936.37    895.49      1.16      5.00    936.37    895.00        1.16

CONTINUITY SUMMARY (AC-FT) - INFLOW= .8124E+03 EXCESS= .0000E+00 OUTFLOW= .8124E+03 BASIN STORAGE= .1036E-03 PERCENT ERROR=    .0

        FOR STORM = 4  STORM AREA (SQ MI) =      10.00
           RC-WA  MANE          .70    935.16    895.02      1.13      5.00    935.16    895.00        1.13

CONTINUITY SUMMARY (AC-FT) - INFLOW= .7942E+03 EXCESS= .0000E+00 OUTFLOW= .7942E+03 BASIN STORAGE= .1039E-03 PERCENT ERROR=    .0

        FOR STORM = 5  STORM AREA (SQ MI) =      30.00
           RC-WA  MANE          .70    931.77    894.98      1.10      5.00    931.76    895.00        1.10

CONTINUITY SUMMARY (AC-FT) - INFLOW= .7704E+03 EXCESS= .0000E+00 OUTFLOW= .7704E+03 BASIN STORAGE= .1039E-03 PERCENT ERROR=    .0

        FOR STORM = 6  STORM AREA (SQ MI) =      60.00
           RC-WA  MANE          .70    922.79    885.47      1.07      5.00    922.72    885.00        1.07

CONTINUITY SUMMARY (AC-FT) - INFLOW= .7492E+03 EXCESS= .0000E+00 OUTFLOW= .7492E+03 BASIN STORAGE= .1037E-03 PERCENT ERROR=    .0

        FOR STORM = 7  STORM AREA (SQ MI) =      90.00
           RC-WA  MANE          .70    919.74    885.36      1.06      5.00    919.69    885.00        1.06

CONTINUITY SUMMARY (AC-FT) - INFLOW= .7420E+03 EXCESS= .0000E+00 OUTFLOW= .7420E+03 BASIN STORAGE= .1038E-03 PERCENT ERROR=    .0

        FOR STORM = 8  STORM AREA (SQ MI) =     120.00
           RC-WA  MANE          .70    918.73    885.53      1.05      5.00    918.69    885.00        1.05

CONTINUITY SUMMARY (AC-FT) - INFLOW= .7359E+03 EXCESS= .0000E+00 OUTFLOW= .7359E+03 BASIN STORAGE= .1040E-03 PERCENT ERROR=    .0

        FOR STORM = 9  STORM AREA (SQ MI) =     150.00
           RC-WA  MANE          .70    917.20    885.84      1.05      5.00    917.14    885.00        1.05

CONTINUITY SUMMARY (AC-FT) - INFLOW= .7322E+03 EXCESS= .0000E+00 OUTFLOW= .7322E+03 BASIN STORAGE= .1039E-03 PERCENT ERROR=    .0

        FOR STORM = 1  STORM AREA (SQ MI) =        .01
          66T66D  MANE         1.01    937.44    900.61      1.30      5.00    937.44    900.00        1.30

CONTINUITY SUMMARY (AC-FT) - INFLOW= .9112E+03 EXCESS= .0000E+00 OUTFLOW= .9112E+03 BASIN STORAGE= .1505E-03 PERCENT ERROR=    .0

        FOR STORM = 2  STORM AREA (SQ MI) =       1.00
          66T66D  MANE         1.01    937.31    899.64      1.29      5.00    937.31    900.00        1.29

CONTINUITY SUMMARY (AC-FT) - INFLOW= .9070E+03 EXCESS= .0000E+00 OUTFLOW= .9070E+03 BASIN STORAGE= .1507E-03 PERCENT ERROR=    .0
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FOR STORM = 3  STORM AREA (SQ MI) =       5.00
  66T66D  MANE          1.01    936.36    895.77      1.27      5.00    936.35    895.00        1.27

CONTINUITY SUMMARY (AC-FT) - INFLOW= .8878E+03 EXCESS= .0000E+00 OUTFLOW= .8878E+03 BASIN STORAGE= .1507E-03 PERCENT ERROR=    .0

FOR STORM = 4  STORM AREA (SQ MI) =      10.00
  66T66D  MANE          1.01    935.12    896.00      1.23      5.00    935.12    895.00        1.23

CONTINUITY SUMMARY (AC-FT) - INFLOW= .8642E+03 EXCESS= .0000E+00 OUTFLOW= .8642E+03 BASIN STORAGE= .1503E-03 PERCENT ERROR=    .0

FOR STORM = 5  STORM AREA (SQ MI) =      30.00
  66T66D  MANE          1.01    931.68    894.61      1.19      5.00    931.68    895.00        1.19

CONTINUITY SUMMARY (AC-FT) - INFLOW= .8346E+03 EXCESS= .0000E+00 OUTFLOW= .8346E+03 BASIN STORAGE= .1502E-03 PERCENT ERROR=    .0

FOR STORM = 6  STORM AREA (SQ MI) =      60.00
  66T66D  MANE          1.02    922.66    886.20      1.15      5.00    922.50    885.00        1.15

CONTINUITY SUMMARY (AC-FT) - INFLOW= .8046E+03 EXCESS= .0000E+00 OUTFLOW= .8046E+03 BASIN STORAGE= .1503E-03 PERCENT ERROR=    .0

FOR STORM = 7  STORM AREA (SQ MI) =      90.00
  66T66D  MANE          1.02    919.57    885.79      1.13      5.00    919.45    885.00        1.13

CONTINUITY SUMMARY (AC-FT) - INFLOW= .7940E+03 EXCESS= .0000E+00 OUTFLOW= .7940E+03 BASIN STORAGE= .1500E-03 PERCENT ERROR=    .0

FOR STORM = 8  STORM AREA (SQ MI) =     120.00
  66T66D  MANE          1.02    918.54    885.97      1.12      5.00    918.44    885.00        1.12

CONTINUITY SUMMARY (AC-FT) - INFLOW= .7841E+03 EXCESS= .0000E+00 OUTFLOW= .7841E+03 BASIN STORAGE= .1497E-03 PERCENT ERROR=    .0

FOR STORM = 9  STORM AREA (SQ MI) =     150.00
  66T66D  MANE          1.02    916.98    886.27      1.11      5.00    916.83    885.00        1.11

CONTINUITY SUMMARY (AC-FT) - INFLOW= .7781E+03 EXCESS= .0000E+00 OUTFLOW= .7781E+03 BASIN STORAGE= .1503E-03 PERCENT ERROR=    .0

FOR STORM = 1  STORM AREA (SQ MI) =        .01
  66-66D  MANE          2.18    937.42    900.55      1.30      5.00    937.41    900.00        1.30

CONTINUITY SUMMARY (AC-FT) - INFLOW= .9112E+03 EXCESS= .0000E+00 OUTFLOW= .9112E+03 BASIN STORAGE= .3267E-03 PERCENT ERROR=    .0

FOR STORM = 2  STORM AREA (SQ MI) =       1.00
  66-66D  MANE          2.18    937.29    900.58      1.29      5.00    937.29    900.00        1.29

CONTINUITY SUMMARY (AC-FT) - INFLOW= .9070E+03 EXCESS= .0000E+00 OUTFLOW= .9069E+03 BASIN STORAGE= .3278E-03 PERCENT ERROR=    .0

FOR STORM = 3  STORM AREA (SQ MI) =       5.00
  66-66D  MANE          2.18    936.34    898.58      1.27      5.00    936.32    900.00        1.27

CONTINUITY SUMMARY (AC-FT) - INFLOW= .8878E+03 EXCESS= .0000E+00 OUTFLOW= .8878E+03 BASIN STORAGE= .3250E-03 PERCENT ERROR=    .0

FOR STORM = 4  STORM AREA (SQ MI) =      10.00
  66-66D  MANE          2.18    935.05    896.63      1.23      5.00    935.01    895.00        1.23

CONTINUITY SUMMARY (AC-FT) - INFLOW= .8642E+03 EXCESS= .0000E+00 OUTFLOW= .8642E+03 BASIN STORAGE= .3256E-03 PERCENT ERROR=    .0

FOR STORM = 5  STORM AREA (SQ MI) =      30.00
  66-66D  MANE          2.18    931.51    895.11      1.19      5.00    931.50    895.00        1.19

CONTINUITY SUMMARY (AC-FT) - INFLOW= .8346E+03 EXCESS= .0000E+00 OUTFLOW= .8346E+03 BASIN STORAGE= .3250E-03 PERCENT ERROR=    .0

FOR STORM = 6  STORM AREA (SQ MI) =      60.00
  66-66D  MANE          2.19    922.42    888.13      1.15      5.00    922.38    890.00        1.15

CONTINUITY SUMMARY (AC-FT) - INFLOW= .8046E+03 EXCESS= .0000E+00 OUTFLOW= .8046E+03 BASIN STORAGE= .3257E-03 PERCENT ERROR=    .0

FOR STORM = 7  STORM AREA (SQ MI) =      90.00
  66-66D  MANE          2.19    919.21    888.73      1.13      5.00    918.96    890.00        1.13
```

```
CONTINUITY SUMMARY (AC-FT) - INFLOW= .7940E+03 EXCESS= .0000E+00 OUTFLOW= .7940E+03 BASIN STORAGE= .3259E-03 PERCENT ERROR=    .0

        FOR STORM = 8  STORM AREA (SQ MI) =      120.00
          66-66D  MANE          2.19    918.13    886.73      1.12      5.00    917.83    885.00        1.12

CONTINUITY SUMMARY (AC-FT) - INFLOW= .7841E+03 EXCESS= .0000E+00 OUTFLOW= .7841E+03 BASIN STORAGE= .3255E-03 PERCENT ERROR=    .0

        FOR STORM = 9  STORM AREA (SQ MI) =      150.00
          66-66D  MANE          2.19    916.60    887.04      1.11      5.00    916.25    890.00        1.11

CONTINUITY SUMMARY (AC-FT) - INFLOW= .7781E+03 EXCESS= .0000E+00 OUTFLOW= .7781E+03 BASIN STORAGE= .3256E-03 PERCENT ERROR=    .0

        FOR STORM = 1  STORM AREA (SQ MI) =          .01
          66T70A  MANE          1.08   1226.68    814.67      1.20      5.00   1226.50    815.00        1.20

CONTINUITY SUMMARY (AC-FT) - INFLOW= .1002E+04 EXCESS= .0000E+00 OUTFLOW= .1001E+04 BASIN STORAGE= .1701E-03 PERCENT ERROR=    .1

        FOR STORM = 2  STORM AREA (SQ MI) =         1.00
          66T70A  MANE          1.08   1212.51    815.45      1.19      5.00   1212.20    815.00        1.19

CONTINUITY SUMMARY (AC-FT) - INFLOW= .9960E+03 EXCESS= .0000E+00 OUTFLOW= .9953E+03 BASIN STORAGE= .1697E-03 PERCENT ERROR=    .1

        FOR STORM = 3  STORM AREA (SQ MI) =         5.00
          66T70A  MANE          1.09   1152.03    825.18      1.16      5.00   1151.99    825.00        1.16

CONTINUITY SUMMARY (AC-FT) - INFLOW= .9683E+03 EXCESS= .0000E+00 OUTFLOW= .9677E+03 BASIN STORAGE= .1701E-03 PERCENT ERROR=    .1

        FOR STORM = 4  STORM AREA (SQ MI) =        10.00
          66T70A  MANE          1.11   1091.57    839.84      1.12      5.00   1091.55    840.00        1.12

CONTINUITY SUMMARY (AC-FT) - INFLOW= .9343E+03 EXCESS= .0000E+00 OUTFLOW= .9338E+03 BASIN STORAGE= .1702E-03 PERCENT ERROR=    .1

        FOR STORM = 5  STORM AREA (SQ MI) =        30.00
          66T70A  MANE          1.12   1035.14    873.76      1.07      5.00   1035.12    875.00        1.07

CONTINUITY SUMMARY (AC-FT) - INFLOW= .8915E+03 EXCESS= .0000E+00 OUTFLOW= .8910E+03 BASIN STORAGE= .1696E-03 PERCENT ERROR=    .0

        FOR STORM = 6  STORM AREA (SQ MI) =        60.00
          66T70A  MANE          1.14    964.03    894.50      1.02      5.00    963.96    895.00        1.02

CONTINUITY SUMMARY (AC-FT) - INFLOW= .8482E+03 EXCESS= .0000E+00 OUTFLOW= .8479E+03 BASIN STORAGE= .1703E-03 PERCENT ERROR=    .0

        FOR STORM = 7  STORM AREA (SQ MI) =        90.00
          66T70A  MANE          1.14    949.80    885.63      1.00      5.00    949.77    885.00        1.00

CONTINUITY SUMMARY (AC-FT) - INFLOW= .8330E+03 EXCESS= .0000E+00 OUTFLOW= .8326E+03 BASIN STORAGE= .1693E-03 PERCENT ERROR=    .0

        FOR STORM = 8  STORM AREA (SQ MI) =       120.00
          66T70A  MANE          1.14    947.20    884.85       .98      5.00    947.19    885.00         .98

CONTINUITY SUMMARY (AC-FT) - INFLOW= .8183E+03 EXCESS= .0000E+00 OUTFLOW= .8180E+03 BASIN STORAGE= .1706E-03 PERCENT ERROR=    .0

        FOR STORM = 9  STORM AREA (SQ MI) =       150.00
          66T70A  MANE          1.14    944.19    889.98       .97      5.00    944.18    890.00         .97

CONTINUITY SUMMARY (AC-FT) - INFLOW= .8095E+03 EXCESS= .0000E+00 OUTFLOW= .8092E+03 BASIN STORAGE= .1691E-03 PERCENT ERROR=    .0

        FOR STORM = 1  STORM AREA (SQ MI) =          .01
          66T70B  MANE          1.47   1224.32    815.43      1.20      5.00   1223.93    815.00        1.20

CONTINUITY SUMMARY (AC-FT) - INFLOW= .1001E+04 EXCESS= .0000E+00 OUTFLOW= .1001E+04 BASIN STORAGE= .2310E-03 PERCENT ERROR=    .0

        FOR STORM = 2  STORM AREA (SQ MI) =         1.00
          66T70B  MANE          1.47   1209.97    817.34      1.19      5.00   1209.22    820.00        1.19

CONTINUITY SUMMARY (AC-FT) - INFLOW= .9953E+03 EXCESS= .0000E+00 OUTFLOW= .9952E+03 BASIN STORAGE= .2311E-03 PERCENT ERROR=    .0

        FOR STORM = 3  STORM AREA (SQ MI) =         5.00
```

```
          66T70B  MANE        1.49   1150.83    825.71      1.16      5.00   1150.59    825.00        1.16

CONTINUITY SUMMARY (AC-FT) - INFLOW= .9676E+03 EXCESS= .0000E+00 OUTFLOW= .9675E+03 BASIN STORAGE= .2294E-03 PERCENT ERROR=    .0

         FOR STORM = 4  STORM AREA (SQ MI) =      10.00
          66T70B  MANE        1.50   1090.50    842.16      1.12      5.00   1090.14    845.00        1.12

CONTINUITY SUMMARY (AC-FT) - INFLOW= .9338E+03 EXCESS= .0000E+00 OUTFLOW= .9337E+03 BASIN STORAGE= .2293E-03 PERCENT ERROR=    .0

         FOR STORM = 5  STORM AREA (SQ MI) =      30.00
          66T70B  MANE        1.52   1034.99    873.91      1.07      5.00   1034.99    875.00        1.07

CONTINUITY SUMMARY (AC-FT) - INFLOW= .8910E+03 EXCESS= .0000E+00 OUTFLOW= .8910E+03 BASIN STORAGE= .2308E-03 PERCENT ERROR=    .0

         FOR STORM = 6  STORM AREA (SQ MI) =      60.00
          66T70B  MANE        1.54    963.41    895.69      1.02      5.00    963.34    895.00        1.02

CONTINUITY SUMMARY (AC-FT) - INFLOW= .8479E+03 EXCESS= .0000E+00 OUTFLOW= .8478E+03 BASIN STORAGE= .2290E-03 PERCENT ERROR=    .0

         FOR STORM = 7  STORM AREA (SQ MI) =      90.00
          66T70B  MANE        1.54    949.59    887.54      1.00      5.00    949.51    885.00        1.00

CONTINUITY SUMMARY (AC-FT) - INFLOW= .8327E+03 EXCESS= .0000E+00 OUTFLOW= .8326E+03 BASIN STORAGE= .2300E-03 PERCENT ERROR=    .0

         FOR STORM = 8  STORM AREA (SQ MI) =     120.00
          66T70B  MANE        1.54    946.93    884.93       .98      5.00    946.93    885.00         .98

CONTINUITY SUMMARY (AC-FT) - INFLOW= .8180E+03 EXCESS= .0000E+00 OUTFLOW= .8180E+03 BASIN STORAGE= .2315E-03 PERCENT ERROR=    .0

         FOR STORM = 9  STORM AREA (SQ MI) =     150.00
          66T70B  MANE        1.55    941.91    891.68       .97      5.00    941.10    890.00         .97

CONTINUITY SUMMARY (AC-FT) - INFLOW= .8092E+03 EXCESS= .0000E+00 OUTFLOW= .8092E+03 BASIN STORAGE= .2314E-03 PERCENT ERROR=    .0

         FOR STORM = 1  STORM AREA (SQ MI) =        .01
             CULVT  MANE         .83   1215.23    815.12      1.20      5.00   1215.05    815.00        1.20

CONTINUITY SUMMARY (AC-FT) - INFLOW= .1001E+04 EXCESS= .0000E+00 OUTFLOW= .1000E+04 BASIN STORAGE= .1304E-03 PERCENT ERROR=    .1

         FOR STORM = 2  STORM AREA (SQ MI) =       1.00
             CULVT  MANE         .83   1201.00    819.60      1.19      5.00   1200.73    820.00        1.19

CONTINUITY SUMMARY (AC-FT) - INFLOW= .9953E+03 EXCESS= .0000E+00 OUTFLOW= .9945E+03 BASIN STORAGE= .1297E-03 PERCENT ERROR=    .1

         FOR STORM = 3  STORM AREA (SQ MI) =       5.00
             CULVT  MANE         .84   1142.85    825.25      1.16      5.00   1142.68    825.00        1.16

CONTINUITY SUMMARY (AC-FT) - INFLOW= .9676E+03 EXCESS= .0000E+00 OUTFLOW= .9668E+03 BASIN STORAGE= .1301E-03 PERCENT ERROR=    .1

         FOR STORM = 4  STORM AREA (SQ MI) =      10.00
             CULVT  MANE         .85   1083.85    844.42      1.12      5.00   1083.79    845.00        1.12

CONTINUITY SUMMARY (AC-FT) - INFLOW= .9337E+03 EXCESS= .0000E+00 OUTFLOW= .9331E+03 BASIN STORAGE= .1299E-03 PERCENT ERROR=    .1

         FOR STORM = 5  STORM AREA (SQ MI) =      30.00
             CULVT  MANE         .86   1030.22    874.71      1.07      5.00   1030.21    875.00        1.07

CONTINUITY SUMMARY (AC-FT) - INFLOW= .8910E+03 EXCESS= .0000E+00 OUTFLOW= .8904E+03 BASIN STORAGE= .1307E-03 PERCENT ERROR=    .1

         FOR STORM = 6  STORM AREA (SQ MI) =      60.00
             CULVT  MANE         .87    959.50    895.20      1.02      5.00    959.45    895.00        1.02

CONTINUITY SUMMARY (AC-FT) - INFLOW= .8479E+03 EXCESS= .0000E+00 OUTFLOW= .8474E+03 BASIN STORAGE= .1305E-03 PERCENT ERROR=    .1

         FOR STORM = 7  STORM AREA (SQ MI) =      90.00
             CULVT  MANE         .87    945.30    889.91      1.00      5.00    945.28    890.00        1.00

CONTINUITY SUMMARY (AC-FT) - INFLOW= .8326E+03 EXCESS= .0000E+00 OUTFLOW= .8322E+03 BASIN STORAGE= .1305E-03 PERCENT ERROR=    .1
```

```
          FOR STORM = 8  STORM AREA (SQ MI) =     120.00
             CULVT  MANE          .87    942.32    885.17       .98      5.00    942.29    885.00         .98

CONTINUITY SUMMARY (AC-FT) - INFLOW= .8180E+03 EXCESS= .0000E+00 OUTFLOW= .8175E+03 BASIN STORAGE= .1304E-03 PERCENT ERROR=    .1

          FOR STORM = 9  STORM AREA (SQ MI) =     150.00
             CULVT  MANE          .88    936.85    895.00       .97      5.00    936.85    895.00         .97

CONTINUITY SUMMARY (AC-FT) - INFLOW= .8092E+03 EXCESS= .0000E+00 OUTFLOW= .8087E+03 BASIN STORAGE= .1297E-03 PERCENT ERROR=    .1


*** 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 A

HYDROLOGY

Alternative 2: Two Basin Hydrology (HEC-1)

```
1****************************************
*                                      *
*   FLOOD HYDROGRAPH PACKAGE  (HEC-1)  *
*              JUN   1998              *
*            VERSION 4.1               *
*                                      *
*  RUN DATE   03JAN08  TIME  11:29:26  *
*                                      *
****************************************
```

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


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

   1          ID    Alternative 2:  Two Basins (Offline-Meridian, Online-Siphon Draw Wash)
   2          ID
   3          ID    Project:        Siphon Draw Wash Drainage Improvements
   4          ID    Contract FCD:   2007C012
   5          ID    SCI Project No: 20539
   6          ID
   7          ID    Notes By:       Stanley Consultants, Inc. (SCI)
   8          ID    Revision Date:  December, 2007
   9          ID
  10          ID    Filename:       SDWBALT2.DAT  (Previous Model: SDW-BASE.DAT)
  11          ID    Storm Event:    100-Yr, 24 Hrs
  12          ID    Conditions:     Future Conditions
  13          ID
  14          ID    Comments:
  15          ID
  16          ID    This is the DOUBLE RETENTION BASIN ALTERNATIVE model.
  17          ID    The north basin is offline to the proposed Meridian Channel.  The south
  18          ID    basin is inline to Siphon Draw Wash (east of Meridian Road.
  19          ID
  20          ID    This model was developed from the base hydrology model (SDW-BASE.DAT)
  21          ID    produced as part of this project and developed from previous hydrology
  22          ID    models from previous studies.  For this project SDW-BASE.DAT truncated
  23          ID    the previous hydrologic model S60EMAP1.DAT provided by the FCDMC.
  24          ID    Any hydrologic elements which do not contribute to runoff along
  25          ID    Elliot Road, just upstream of the SanTan Freeway Channel(routing
  26          ID    reach 66T70C) were removed
  27          ID
  28          ID    To run correctly, this model requires referencing a DSS file created
  29          ID    by the upstream hydrologic model ultimately developed from the
  30          ID    East Mesa ADMP.  For the 100-year, future conditions, this model is
  31          ID    N60EM.DAT (which produces N60EM.DSS).
  32          ID
  33          ID    END SCI INTRODUCTORY COMMENTS
  34          ID
  35          ID    ***************************************************************************
  36          ID
  37          ID    MODEL REVISED 9/12/02 TO CHANGE ZW CARD TO ZR CARD AT HYDROGRAPH CAP1B (CWR)
  38          ID
  39          ID    ID  Kirkham Michael:
  40          ID    Last Revised Date:  5/14/02
  41          ID    Filename:  WS4-SEM.DAT
  42          ID
  43          ID    Comments Dated 5/14/02 (CJ)
  44          ID
  45          ID    This model should be used for the Rittenhouse and Chandler Heights Basin
  46          ID    Design Project - 30% Design Analyses.
  47          ID
  48          ID    This model is one of several models that represent the EMF watershed.
  49          ID    This model covers the Southeast Mesa Area and should reference as a DSS
  50          ID    the watershed model for the Northeast Mesa Area (Filename WS2-NEM.DAT).
  51          ID
  52          ID    This model is necessary to determine the input hydrographs for the
  53          ID    Rittenhouse Basin Design HEC-RAS Unsteady State analysis.  To develop
  54          ID    the necessary input hydrographs the following models should be run in order.
  55          ID    Because the files utilize a TAPE21 file to export import hydrographs
```

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

  56          ID    between models, prior to running the FIRST model (WS1-NWM.DAT) any existing
  57          ID    TAPE21 file in the directory should be deleted.  The run procedure order is:
  58          ID
  59          ID         1)  WS1-NWM.DAT
  60          ID         2)  WS2-NEM.DAT
  61          ID         3)  WS3-QCSW.DAT
  62          ID         4)  WS4-SEM.DAT (referencing WS2-NEM.DSS for the DSS file)
  63          ID         5)  RT1-BASE.DAT
  64          ID
  65          ID    The necessary input hydrographs for the Rittenhouse Basin analysis
  66          ID    are determined in RT1-BASE.  In that output file, the hydrograph at
  67          ID    RWFLD1 should be exported and used as the input hydrograph at the
  68          ID    EMF Reach 4 Cross Section 17.082.  And the hydrograph at RITTEN should
  69          ID    be exported and used as the input hydrograph for the Rittenhouse Main
  70          ID    Channel at Cross Section 820.00
  71          ID
  72          ID
  73          ID    ***************************************************************************
  74          ID    **** NOTE BY PRIMATECH ENGINEERS:                                      ****
  75          ID    **** DATE: 06/12/2001                                                  ****
  76          ID    **** THE NEW FILE NAME IS: SEBTALT2.DAT                                ****
  77          ID    **** THE FILE WAS RENAMED AS <<RTBTALT2.DAT>> FOR THE EAST MARICOPA    ****
  78          ID    **** FLOODWAY CAPACITY MITIGATION PROJECT, BY FLOOD CONTROL DISTRICT OF ****
  79          ID    **** MARICOPA COUNTY.                                                  ****
  80          ID    **** THE FILE WAS RENAMED <<RTBTALT3.DAT>> AND UPDATED USING GREEN AND ****
  81          ID    **** AMPT FUTURE CONDITIONS FOR BASINS 258 TO 268.                     ****
  82          ID    ***************************************************************************
  83          ID
  84          ID
  85          ID
  86          ID     THIS MODEL WAS ORIGINALLY MIDDOUT.DAT
  87          ID     IT HAS BEEN MODIFIED BY CPE (7/2000)
  88          ID     FOR ALTERNATIVE 2 FOR THE EAST MARICOPA FLOOWAY
  89          ID     CAPACITY MITIGATION AND MULTI-USE CORRIDOR STUDY
  90          ID     TO ROUTE BOTH THE POWERLINE FLOOWAY
  91          ID     AND THE SANTAN FREEWAY CHANNEL INTO THE RAY BASIN PRIOR THEIR OUTFALL
  92          ID     INTO THE EMF
  93          ID
  94          ID    ****************************************************************
  95          ID
  96          ID          Model files changed by Collins/Pina Engineering
  97          ID          to reflect multi-use design concepts (recreation
  98          ID          and environment) proposed throughout the entire
  99          ID          EMF Corridor.    July 2000
 100          ID
 101          ID
 102          ID     VERSION 8.06  CPE 7/31/00
 103          ID
 104          ID  ***************************************************************************
 105          ID
 106          ID
 107          ID  ***************************************************************************
 108          ID   FILENAME: MIDDOUT.DAT
 109          ID
 110          ID   ALL CIP INFRASTRUCTURE IS IN PLACE, FUTURE CONDITIONS LANDUSE IS IN PLACE
1                                        HEC-1 INPUT                                          PAGE  3

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

 111          ID   FLOW IS ROUTED UP ELLSWORTH ROAD IN A EARTH LINED CHANNEL
 112          ID
 113          ID  ***************************************************************************
 114          ID   PRODUCED BY DIBBLE AND ASSOCIATES AND HOSKIN ENGINEERING CONSULTANTS.
 115          ID   File Name: Final8.Dat
 116          ID   Revised - Jan. 2000 by SZ (Wood/Patel) From Final7.dat - new Z-V & Sideweir
 117          ID   Revised - Jan. 2000 by SZ (Wood/Patel) from Final6.dat - 60% review comments
 118          ID   Revised - Dec. 1999 by SZ (Wood/Patel) from Final5.dat
 119          ID   Revised - Dec. 1999 by SZ (Wood/Patel) from Final4.dat
 120          ID   Revised - Nov. 1999 by SZ (Wood/Patel) from Final3.dat
 121          ID   Revised - June 1999 by SZ (Wood/Patel) for Final Model from Opt1.dat.
 122          ID   Revised - May 1999 by SZ (Wood/Patel) for Option 1, Based on Model SDIB.DAT
 123          ID   REVISED - MAY, 1999 BY VAS TO INCORPORATE INCREASE OF SUBBASIN RETENTION AND
 124          ID             REVISIONS TO THE REGIONAL DETENTION BASIN STORAGE
 125          ID   REVISED - FEB, 1999 BY VALERIE SWICK, FCD OF MARICOPA COUNTY
 126          ID   REVISED - MAY, 1998 BY D&A
 127          ID
 128          ID   REVISED BY VALERIE SWICK, FEB. 26, 1998
 129          ID
 130          ID   FLOWS FROM DETENTION BASIN LOCATED AT NE CORNER OF ELLIOT AND ELLSWORTH ROADS
 131          ID   IS ROUTED TO THE SOUTHWEST BY SIPHON DRAW TO SUBBASIN 70A. FROM THERE THEY
 132          ID   WILL BE ROUTED BY A CHANNEL TO THE EMF. FLOWS FROM SUBBASINS ADJACENT TO
 133          ID   SANTAN FREEWAY ALIGNMENT WILL BE ROUTED SOUTH TO SUBBASIN 70A WHERE THEY WILL
 134          ID   BE COMBINED WITH FLOW IN SIPHON DRAW.
 135          ID
 136          ID   EAST MESA AREA DRAINAGE MASTER PLAN
 137          ID   AREA SOUTH OF SUPERSTITION (U.S. HWY 60)
 138          ID   AUGUST 1997
 139          ID   SOUTHEAST MESA HIGH RESOLUTION MODEL
 140          ID
 141          ID   ***********FUTURE CONDITION MODEL OF THE WATERSHED************************
 142          ID
 143          ID  ************ATTENTION*************************************************************
 144          ID    SUBBASINS 75, 79A, 79B, 78E,  LANDUSES WERE NOT
```

```
 145          ID    CHANGED BECAUSE IT WAS FELT THAT THEIR FUTURE CONDITIONS LANDUSES WOULD BE
 146          ID    SIMILAR TO THE EXISTING CONDITIONS LANDUSES.
 147          ID    RETENTION VOLUMES WILL ALSO NOT BE UTILIZED FOR SUBBASINS 75, 79A, 79B, 78E
 148          ID    SOME QUEEN CREEK SUBBASINS WILL ALSO NOT HAVE RETENTION VOLUMES, EITHER
 149          ID    BECAUSE THEY LIE IN PINAL COUNTY AND WE DONT KNOW PINAL COUNTIES PLANS OR
 150          ID    THEY LIE IN THE SANTAN MOUNTAINS AND WON'T GET DEVELOPED
 151          ID    WILLIAMS GATEWAY AIRPORT (SUBBASINS 80A, 80B, 81A, AND 81B) ARE MODELED AS
 152          ID    FUTURE CONDITIONS AND HAVE RETENTION VOLUMES FOR THE 100YR 2HR STORM
 153          ID  ******************************************************************************
 154          ID   FILENAME:  SDIBB.DAT
 155          ID
 156          ID   THIS MODEL REPRESENTS THE FUTURE CONDITION OF THE WATERSHED.
 157          ID   TOTAL DRAINAGE AREA IS APPROXIMATELY 213 SQ. MI.
 158          ID   THIS MODEL USES A Kn VALUE OF 0.09 FOR DESERT LAND USE DUE TO SHEET FLOW
 159          ID   CONDITIONS.
 160          ID
 161          ID   100-YEAR 24-HOUR FREQUENCY
 162          ID   AREAL REDUCTIONS FROM FCD HYDROLOGY MANUAL
 163          ID   THIS MODEL INCLUDES INFLOW FROM NORTH OF THE SUPERSTITION FREEWAY
 164          ID   AND EAST OF THE CAP
 165          ID
1                                        HEC-1 INPUT                                          PAGE  4

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

 166          ID   DATA FROM THE QUEEN CREEK ADMS HAS BEEN ADDED TO CALCULATE FLOWS INTO THE
 167          ID   EMF.   MUSKINGUM ROUTING NSTEPS WERE ADJUSTED TO BE WITHIN THE SUGGESTED
 168          ID   RANGE.
 169          ID
 170          ID   METHODOLOGY
 171          ID   THE US CORPS OF ENGINEERS FLOOD HYDROLOGY MODEL HEC-1 DATED SEP1990 VER 4.0
 172          ID   SCS TYPE II RAINFALL DISTRIBUTION
 173          ID   S-GRAPH HYDROGRAPH
 174          ID   GREEN AND AMPT INFILTRATION EQUATION USED FOR CALCULATING LOSSES
 175          ID   NORMAL DEPTH STORAGE CHANNEL ROUTING
 176          ID   APPROXIMATE DIRECTION, LOCATION, AND LENGTH OF THE WASHES HAVE BEEN
 177          ID   EVALUATED BASED ON FIELD INVESTIGATION, USGS MAPS, LANDIS AERIAL SURVEYS
 178          ID   DATED 1994
 179          ID   THE NOAA TECHNICAL MEMORANDUM NOAA ATLAS 2 DEPTH AREA RATIOS
 180          ID
 181          ID   ORIGINAL STUDY PERFORMED BY LISA C. YOUNG AND AFSHIN AHOURAIYAN, UPDATED BY
 182          ID   DAVID DEGERNESS (OCT-DEC, 1996). REVIEWED BY VALERIE A. SWICK
 183          ID   AND AMIR MOTAMEDI OF THE FLOOD CONTROL DISTRICT
 184          ID   HYDROLOGY BRANCH ENGINEERING DIVISION, FLOOD CONTROL
 185          ID   DISTRICT OF MARICOPA COUNTY, DECEMBER - JULY 1995.
 186          ID
 187          ID   ASSUMED VELOCITY OF 1 FT/SEC FOR SHEET FLOW, 2-3 FT/SEC FOR WASH/NATURAL
 188          ID   CHANNEL, 3 FT/SEC FOR ROAD AND GRASS CHANNEL, 10FT/SEC FOR CONCRETE CHANNEL
 189          ID
 190          ID   VELOCITIES FOR ADMP IMPROVEMENT CHANNELS FROM DIBBLE AND ASSOCIATES
 191          ID   SUGGESTED ALTERNATIVES (JULY 1, 1997)
 192          ID
 193          ID   ***********************************************************************
 194          ID   **** THE FOLLOWING NOTE WAS ADDED BY PRIMATECH ENGINEERS ON 06-12-2001 ****
 195          ID   ***********************************************************************
 196          ID   NOTE: MUST USE NEBUILD.DSS AS THE DSS FILE TO IMPORT FLOWS ACROSS THE
 197          ID         SUPERSTITION FREEWAY.
 198          ID   ***********************************************************************
 199          ID
 200          ID
 201          ID   NOTE: MUST USE NDIBF.DSS AS THE DSS FILE TO IMPORT FLOWS ACROSS THE
 202          ID         SUPERSTITION FREEWAY.
 203          ID
 204          ID   DDM MCUHP2 SOUTH EAST MESA ADMP - SOUTH OF SUPERSTITION FREEWAY, FUTURE CONDI
              *DIAGRAM
 205          IT       5  1APR97    0000    1000
 206          IO       5
 207          IN      15
 208          JD    3.60    0.01
 209          PC    .000    .002    .005    .008    .011    .014    .017    .020    .023    .026
 210          PC    .029    .032    .035    .038    .041    .044    .048    .052    .056    .060
 211          PC    .064    .068    .072    .076    .080    .085    .090    .095    .100    .105
 212          PC    .110    .115    .120    .126    .133    .140    .147    .155    .163    .172
 213          PC    .181    .191    .203    .218    .236    .257    .283    .387    .663    .707
 214          PC    .735    .758    .776    .791    .804    .815    .825    .834    .842    .849
 215          PC    .856    .863    .869    .875    .881    .887    .893    .898    .903    .908
 216          PC    .913    .918    .922    .926    .930    .934    .938    .942    .946    .950
 217          PC    .953    .956    .959    .962    .965    .968    .971    .974    .977    .980
 218          PC    .983    .986    .989    .992    .995    .998   1.000
              *
1                                        HEC-1 INPUT                                          PAGE  5

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

 219          JD    3.58     1.0
 220          JD    3.49     5.0
 221          JD    3.38    10.0
 222          JD    3.24    30.0
 223          JD    3.10    60.0
 224          JD    3.05    90.0
 225          JD    3.00   120.0
 226          JD    2.97   150.0
              *

 227          KK    65A1   BASIN
```

```
228          KM    THE FOLLOWING PARAMETERS WERE PROVIDED FOR THIS BASIN
229          KM    L=      1.9  Lca=      1.4   S=   31.5  Kn= .067  LAG=  73.5
230          KM    PHOENIX VALLEY S-GRAPH WAS USED FOR THIS BASIN
231          KM    All parameters are revised from the ADMP hydrology and estimated from
232          KM    available mapping except the Kn value.  Due to the significant
233          KM    impact of the Kn value on subbasin discharges, the original ADMP hydrology
234          KM    Kn value was retained for the subbasin.
235          BA   0.971
236          LG    0.20    0.25    5.00    0.35      50
237          UI      44      45      44     107     162     195     220     249     267     299
238          UI     336     375     466     557     544     466     413     367     339     302
239          UI     271     240     216     184     142     106      78      76      74      58
240          UI      44      45      40      13      14      14      13      14      13      14
241          UI      14      13      14       0       0       0       0       0       0       0
             *

242          KK   R65A1
243          KM   Retain first flush volume (equal to 80% of first ½" of runoff)
244          KM   from MDR areas only.
245          KM   First flush retention is not included for industrial areas at this time.
246          DT  FF65A1     9.9
247          DI       0   10000
248          DQ       0   10000
             *

249          KK   CAP1A
250          KM   INFLOW FROM EAST OF THE CAP ASSOCIATED WITH TWO 72" PIPE OVERCHUTES AT
251          KM   STATION 131+90 SALT-GILA AQUEDUCT REACH 2
252          KM   Overchute consists of two 72" pipes but level pool function
253          KM   at the CAP is disregarded for this location per the upper ADMP
254          KM   hydrology model.
255          KM   Basin area below represents half of the drainage area above CAP (1.93
256          BA   0.965
257          ZR  =QI A=CAP1A B=OVERCHUTE C=FLOW E=5MIN F=100YEAR
             *

258          KK  RCAP1A
259          KM   Route flow from CAP overchute (CAP1A) to confluence with CAP1B overchute
260          KM   at the SRP easement / Meridian Channel.
261          KM   Hypothetical future condition earth channel.
262          RS       5    FLOW      -1
263          RC    .035    .035    .035   10050    .006
264          RX       0       4       8      24      44      60      64      68
265          RY     100      99      98      94      94      98      99     100
             *
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LINE         ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10

266          KK  CCAP1A
267          KM   Combine routed (RCAP1A) and local hydrographs (65A1).
268          HC       2   1.936
             *

269          KK    65A2   BASIN
270          KM    THE FOLLOWING PARAMETERS WERE PROVIDED FOR THIS BASIN
271          KM    L=      1.5  Lca=       .9   S=   42.8  Kn= .067  LAG=  52.4
272          KM    PHOENIX VALLEY S-GRAPH WAS USED FOR THIS BASIN
273          KM    All parameters are revised from the ADMP hydrology and estimated from
274          KM    available mapping except the Kn value.  Due to the significant
275          KM    impact of the Kn value on subbasin discharges, the original ADMP hydrology
276          KM    Kn value was retained for the subbasin.
277          BA   0.544
278          LG    0.20    0.20    4.60    0.37      35
279          UI      35      35      82     137     172     196     227     262     320     427
280          UI     417     335     291     255     213     184     156     113      68      60
281          UI      58      35      35      21      11      11      11      10      11      11
282          UI      11       0       0       0       0       0       0       0       0       0
283          UI       0       0       0       0       0       0       0       0       0       0
             *

284          KK   R65A2
285          KM   Retain first flush volume (equal to 80% of first ½" of runoff)
286          KM   from MDR areas only.
287          DT  FF65A2     9.1
288          DI       0   10000
289          DQ       0   10000
             *

290          KK   CAP1B
291          KM   INFLOW FROM EAST OF THE CAP THROUGH 2 - 72" PIPE OVERCHUTES
292          KM   STATION 158+00 SALT-GILA AQUEDUCT REACH 2
293          KM   Overchute consists of two 72" pipes but level pool function
294          KM   at the CAP is disregarded for this location per the upper ADMP
295          KM   hydrology model.
296          KM   Basin area below represents half of the drainage area above CAP (1.93)
297          BA   0.965
298          ZR  =QI  A=CAP1B  B=OVERCHUTE  C=FLOW  E=5MIN F=100YEAR
             *

299          KK  RCAP1B
300          KM   Route flow from CAP overchute (CAP1A) to confluence with CAP1B overchute
301          KM   at the SRP easement / Meridian Channel.
302          KM   Hypothetical future condition earth channel.
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```
303          RS       4    FLOW      -1
304          RC    .035    .035    .035    8150    .008
305          RX       0       4       8      24      44      60      64      68
306          RY     100      99      98      94      94      98      99     100
             *
1                                          HEC-1 INPUT                                                          PAGE  7

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

307          KK  CCAP1B
308          KM   Combine routed (RCAP1B) and local hydrographs (65A2).
309          HC       2   1.509
             *

310          KK  C65A12
311          KM   Combine routed (RCAP1A & RCAP1B) and local hydrographs (65A1 & 65A2)
312          HC       2   3.445
             *

313          KK  DI-BAS
314          KM   Divert flow to Siphon Draw Detention Basin per Wood/Patel concept.
315          KM   However, due to minor changes in hydrologic sequencing, the
316          KM   diversion is reversed such that basin bypass is diverted
317          KM   instead of the detention basin inflow.
318          DT  BYPASO
             * Original Wood/Patel diversion
             * DI      0     100     300     380     600    1000    1500    2000    3000
             * DQ      0       0       0       0     220     620    1120    1620    2620
             *
319          DI       0     100     300     380     600    1000    1500    2000    3000
320          DQ       0     100     300     380     380     380     380     380     380
             *

321          KK  LOFLON
322          KM   This 35 cfs diversion of flow is to represent the retention basin
323          KM   discharge to the North retention basin outlet/Elliot Road Storm Drain.
324          KM
325          DT  DLON-O
326          DI       0      35     500    1000    3000
327          DQ       0      35      35      35      35

328          KK  SDDB-N
329          KM   SIPHON DRAW NORTH BASIN
330          KM   OFF-LINE DETENTION BASIN LOCATED AT MERIDIAN ROAD AND NORTH SIPHON DRAW WASH
331          KM   WITH  24" OUTLET PIPE AND 100' WEIR
332          KM    Outlet CL Elev = 91.0   Area of Outlet         = 3.14 (24" pipe)
333          KM    Orifice Coeff  = 0.62   Exponent (typically)   = 0.50
334          KM    Spillway Crest = 95.0   Spillway Length        = 100 ft
335          KM    Weir Coeff.    =  2.7   Exponent (typically)   = 1.5
336          RS       1    STOR       0
337          SV       0      32      64      97     131     165     200     236
338          SE      90      91      92      93      94      95      96      97
             * SL  91.0   3.140     .62      .5
339          SS    95.0     100     2.7     1.5
             *

340          KK    65A3   BASIN
341          KM    THE FOLLOWING PARAMETERS WERE PROVIDED FOR THIS BASIN
342          KM    L=      2.1  Lca=      1.2   S=    27.9  Kn= .067  LAG=  71.8
343          KM    PHOENIX VALLEY S-GRAPH WAS USED FOR THIS BASIN
344          KM    All parameters are revised from the ADMP hydrology and estimated from
345          KM    available mapping except the Kn value.  Due to the significant
346          KM    impact of the Kn value on subbasin discharges, the original ADMP hydrology
1                                          HEC-1 INPUT                                                          PAGE  8

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

347          KM    Kn value was retained for the subbasin.
348          KM    Contributing area associated with Siphon Draw Wash at Meridian Rd. adjusted.
349          KM    South watershed boundary differs from ADMP.  In addition, area of WW
350          KM    treatment facility adjacent to the CAP is not considered contributing area
351          KM    and is not included in the total subbasin area.
352          BA   1.207
353          LG    0.21    0.21    4.60    0.37      38
354          UI      56      58      56     146     209     253     289     322     346     387
355          UI     440     498     627     741     648     563     502     454     409     366
356          UI     327     284     262     204     159     101      98      92      87      56
357          UI      57      57      21      18      17      18      17      17      18      17
358          UI      17      18       0       0       0       0       0       0       0       0
             *

359          KK   R65A3
360          KM   Retain first flush volume (equal to 80% of first ½" of runoff)
361          KM   from MDR areas only.
362          DT  FF65A3    21.8
363          DI       0   10000
364          DQ       0   10000
             *
             *

365          KK  LOFLOS
366          KM   This 35 cfs diversion of flow is to represent the retention basin
367          KM   discharge to the North retention basin outlet/Elliot Road Storm Drain.
368          KM
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```
369          DT  DLOS-O
370          DI       0      35     500    1000    3000
371          DQ       0      35      35      35      35

372          KK  SDDB-S
373          KM   SIPHON DRAW SOUTH BASIN
374          KM   OFF-LINE DETENTION BASIN LOCATED AT MERIDIAN ROAD AND ELLIOT ROAD
375          KM   WITH 24" OUTLET PIPE AND 100' WEIR
376          KM    Outlet CL Elev = 88.0   Area of Outlet        = 3.14 (24" pipe)
377          KM    Orifice Coeff  = 0.62   Exponent (typically)  = 0.50
378          KM    Spillway Crest = 93.0   Spillway Length       = 100 ft
379          KM    Weir Coeff.    =  2.7   Exponent (typically)  = 1.5
380          RS       1    STOR       0
381          SV       0      27      54      82     110     139     169     200     231
382          SE      88      89      90      91      92      93      94      95      96
             * SL  89.0   3.140     .62      .5
383          SS    93.0     100     2.7     1.5
             *

384          KK  SDWDBS
385          KM   Combine outflow from North and South basins
386          HC       2  4.652
             *
1                                        HEC-1 INPUT                                          PAGE  9

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

387          KK  BYPASI
388          KM   Return divert of Meridian Channel flow bypassing Siphon Draw Basin
389          DR  BYPASO
             *

390          KK  RBYPAS
391          KM   Route bypass flow from diversion structure to Meridian Rd crossing.
392          KM
393          RS       2    FLOW      -1
394          RC    .035    .035    .035    1700    .001
395          RX       0       4       8      24      44      60      64      68
396          RY     100      99      98      94      94      98      99     100
             *

397          KK  CPMRID
398          KM   Combine flow from Meridian Channel Bypass and any flow from discharging
399          KM   from basins over the emergency spillway/outlet to Siphon Draw Wash.
400          HC       2   4.652
             *

401          KK   RSDW1
402          KM   Siphon Draw Wash (SDW) Meridian Rd to Mountain Rd
403          KM
404          RS       3    FLOW      -1
405          RC    .055    .045    .055    2700    .005
406          RX     100     125     170     175     185     190     235     260
407          RY     100      98      96      94      94      96      98     100
             *

408          KK   RSDW2
409          KM   Siphon Draw Wash (SDW) Mountain Rd to Signal Butte
410          KM
411          RS      10    FLOW      -1
412          RC    .060    .050    .060    5800    .005
413          RX     100     200     340     345     355     360     500     600
414          RY     100      98      96      94      94      96      98     100
             * ZW  A=RSDW2 B=ROUTED FROM BASINS  C=FLOW  E=5MIN F=100YR
             *

415          KK    65AW
416          KM   BASIN 65AW
417          KM    THE FOLLOWING PARAMETERS WERE PROVIDED FOR THIS BASIN
418          KM    L=       .9  Lca=       .6   S=    54.7  Kn= .049  LAG=  26.1
419          KM    PHOENIX VALLEY S-GRAPH WAS USED FOR THIS BASIN
420          BA     .43
421          LG     .24     .25    5.30     .29   32.00
422          UI     56.    176.    295.    391.    603.    594.    432.    316.    210.    101.
423          UI     73.     43.     17.     17.     17.      0.      0.      0.      0.      0.
424          UI      0.      0.      0.      0.      0.      0.      0.      0.      0.      0.
             *
1                                        HEC-1 INPUT                                          PAGE 10

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

425          KK   R65AW
426          KM   RETAIN 100 YR 2 HR RUNOFF VOLUME
427          DT   D65AW      31
428          DI       0   10000
429          DQ       0   10000
             *

430          KK  65AT65
431          KM   ROUTE C65A TO BASIN 65B VIA A WASH, (THIS WASH IS NORTH OF SIPHON DRAW)
432          KM   THIS IS THE PART OF 65A WHICH IS WEST OF THE MERIDIAN RD ALIGNMENT
433          RS      11    FLOW      -1
434          RC    .045     .04    .045    9500    .007
```

```
435          RX       0     500    1000    1003    1053    1056    1511    2011
436          RY       4     3.5       3       0       0       2     2.5       3
             * ZW  A=65AT65 B=ROUTED 65AW  C=FLOW  E=5MIN F=100YR
             *

437          KK     65B
438          KM   BASIN 65B
439          KM    THE FOLLOWING PARAMETERS WERE PROVIDED FOR THIS BASIN
440          KM    L=      2.0  Lca=      1.2   S=   37.5  Kn= .036  LAG=  36.6
441          KM    PHOENIX VALLEY S-GRAPH WAS USED FOR THIS BASIN
442          BA    1.37
443          LG     .18     .25    6.00     .24   53.00
444          UI    126.    218.    506.    669.    809.   1014.   1468.   1422.   1102.    901.
445          UI    720.    562.    337.    218.    182.    126.     71.     39.     39.     39.
446          UI     39.      0.      0.      0.      0.      0.      0.      0.      0.      0.
447          UI      0.      0.      0.      0.      0.      0.      0.      0.      0.      0.
             *

448          KK    R65B
449          KM   RETAIN 100 YR 2 HR RUNOFF VOLUME
450          DT    D65B     120
451          DI       0   10000
452          DQ       0   10000
             * ZW  A=R65B B=ROUTED 65B  C=FLOW  E=5MIN F=100YR
             *

453          KK   CP65B
454          KM   Combine flow from 65AW, 65B and RDSW2 (Siphon Draw Basin bypass flow)
455          HC       3   6.452
             * ZW  A=CP65B B= 65AW AND 65B AND RDSW2  C=FLOW  E=5MIN F=100YR
             *
             * KK DI65B
             * KM      DIVERSION STRUCTURE TO ROUTE PEAK FLOW TO ELLIOT BASIN (EAST)
             * KM      By-pass 30 cfs to Elliot Channel, and Divert Remaining to E Basin
             * DTDIRS65
             * DI     0    15.0      30   100.0     200   350.0     500     700     900 1500.
             * DQ     0       0       0    70.0     170   320.0     470     670     870 1470.
             *
```



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

456          KK   DI65B
457          KM        DIVERSION STRUCTURE TO ROUTE PEAK FLOW TO ELLIOT BASIN (EAST)
458          KM        This diversion modified from original analysis to reflect removal of
459          KM        the orifice plate and the diversion of the first 430 cfs to the
460          KM        Elliot Road storm drain (aka Elliot Channel in original analysis)
461          KM        (previous bypass only 30 cfs for 24" orifice plate over large
462          KM        diameter pipe)
463          DT  DIRS65
464          DI       0     230     430     500     600     750     900    1100    1300    1900
465          DQ       0       0       0      70     170     320     470     670     870    1470
             *
             *

466          KK  DLON-I
467          KM   Return divert flow of north SDW basin low flow outlet
468          DR  DLON-O
             *
             *

469          KK  DLOS-I
470          KM   Return divert flow of south SDW basin low flow outlet DRDLOS-O
471          DR  DLOS-O
             *

472          KK  CPLFLO
473          KM   Combine basin outlet low flows to route thru Elliot Storm Drain
474          HC       2  4.652
             *

475          KK  ELLSD1
476          KM   Routing of SDW DB outlet flow along Elliot Rd. storm drain.
477          RD    9000  0.0060   0.013            CIRC     3.5
             * ZW  A=ELLSD1 B=ROUTED BASIN PIPE OUTFLOW C=FLOW  E=5MIN F=100YR
             *

478          KK   CP65A
479          KM   COMBINE FLOWS FROM ELLIOT STORM DRAIN AND EAST BASIN BYPASS
480          HC       2   6.452
             * ZW  A=CP65A B=CP65B+DI65B  C=FLOW  E=5MIN F=100YR
             *

481          KK  65AT-3
482          KM   ROUTE FROM 104th ST TO E. BASIN OUTLET
483          RD    1500  0.0065   0.012            CIRC     7.0
             *

484          KK   DR65B
485          KM        RETURN DIVERT TO EAST DETENTION BASIN
486          DR  DIRS65
             *
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LINE          ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10

 487          KK   RS65A
 488          KM   ELLIOT BASIN, EAST
 489          RS       1    STOR       0
 490          SV       0    5.40    9.30   13.90   18.80   24.00   29.50   35.30   41.40   48.00
 491          SE  1429.0  1433.0  1434.0  1435.0  1436.0  1437.0  1438.0  1439.0  1440.0  1441.0
 492          SL  1430.0  0.7854     .62      .5
 493          SS  1439.0     200     2.5     1.5
              *

 494          KK    CP65
 495          KM   COMBINE FLOWS FROM EAST ELLIOT BASIN AND ELLIOT STORM DRAIN
 496          KM   BEFORE COMBINING WITH FLOWS FROM THE BYPASS CRISMON CHANNEL
 497          HC       2
              *

 498          KK   65T66
 499          KM   ROUTE FROM E. BASIN OUTLET TO CRISMON ROAD.
 500          RD    1200  0.0065   0.012          CIRC     7.5
              *

 501          KK  ADOT-E
 502          KM   INFLOW FROM NORTH OF THE SUPERSTITION FREEWAY ENTERING 67A
 503          KM   FROM EAST ADOT DETENTION BASIN 4105.
 504          BA    0.01
 505          ZR  =QI A=ADOT EAST BASIN B=AT SUPERSTITION C=FLOW E=5MIN F=100YR
              *

 506          KK  AET67A
 507          KM    ROUTE SUPERSTITION FLOW THROUGH 67A TO BASELINE ROAD
 508          IN      15
 509          RS       6    FLOW      -1
 510          RC    .045    .040    .045    5500    .010
 511          RX       0     100     110     120     130     140     150     250
 512          RY       5       4       3       1       1       3       4       5
              *

 513          KK     67A
 514          KM   BASIN 67A
 515          KM    THE FOLLOWING PARAMETERS WERE PROVIDED FOR THIS BASIN
 516          KM    L=      1.0  Lca=       .7   S=   42.9  Kn= .042  LAG=  25.7
 517          KM    PHOENIX VALLEY S-GRAPH WAS USED FOR THIS BASIN
 518          BA     .30
 519          LG     .21     .25    4.70     .39   43.00
 520          UI     39.    126.    208.    277.    433.    400.    292.    213.    134.     67.
 521          UI     47.     25.     12.     12.     12.      0.      0.      0.      0.      0.
 522          UI      0.      0.      0.      0.      0.      0.      0.      0.      0.      0.
              *

 523          KK    R67A
 524          KM   RETAIN 100 YR 2 HR RUNOFF VOLUME
 525          DT    D67A      21
 526          DI       0   10000
 527          DQ       0   10000
              *
```



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

 528          KK    C67A
 529          KM    COMBINE FLOWS FROM ADOT-E AND SUBBASIN 67A
 530          HC       2
              *

 531          KK   67ATC
 532          KM   ROUTE 67A TO 67C VIA WASH CROSSING BASELINE
 533          RS       7    FLOW      -1
 534          RC    .055    .045    .055    6300   .0071
 535          RX       0     500     980    1003    1007    1031    1511    2011
 536          RY       4     3.5       3       0       0       3     3.5       4
              *

 537          KK    SUP2
 538          KM   INFLOW FROM NORTH OF SUPERSTITION FREEWAY, DISCHARGING INTO 67B
 539          BA    0.01
 540          ZR  =QI A=ADOT WEST BASIN B=AT SUPERSTITION C=FLOW E=5MIN F=100YR
              *

 541          KK   RSUP2
 542          KM   ROUTE SUP2 THROUGH SUBBASIN 67B
 543          IN      15
 544          RS       5    FLOW      -1
 545          RC    .045    .045    .045    4500   .0056
 546          RX       0     500    1000    1003    1007    1011    1511    2011
 547          RY       4     3.5       3       0       0       2     2.5       3
              *

 548          KK     67B
 549          KM   BASIN 67B
 550          KM    THE FOLLOWING PARAMETERS WERE PROVIDED FOR THIS BASIN
 551          KM    L=      1.2  Lca=       .9   S=   28.0  Kn= .034  LAG=  26.4
 552          KM    PHOENIX VALLEY S-GRAPH WAS USED FOR THIS BASIN
```

```
553          BA      .53
554          LG      .17      .25     4.90      .38    56.00
555          UI      68.     210.     356.     470.     713.     741.     536.     395.     269.     131.
556          UI      94.      59.      21.      21.      21.      0.       0.       0.       0.       0.
557          UI       0.       0.       0.       0.       0.      0.       0.       0.       0.       0.
             *

558          KK    R67B
559          KM   RETAIN 100 YR 2 HR RUNOFF VOLUME
560          DT    D67B      41
561          DI       0   10000
562          DQ       0   10000
             *

563          KK    C67B
564          KM   COMBINE FLOWS FROM SUP2 AND SUBBASIN 67B
565          HC       2
             *
1                                          HEC-1 INPUT                                                    PAGE 14

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

566          KK   67BTC
567          KM   REACH CN-4, CN-5 plus culvert CNC-4.
568          KM   ROUTE FLOW IN THE CRISMON CHANNEL FROM BASELINE ROAD (C67B) TO
569          KM      GUADALUPE ROAD (C67C)
570          RS       2    FLOW      -1
571          RC    .025    .015    .025    5180   .0019
572          RX       0       8      16    24.4    36.4    44.8    52.8    60.8
573          RY     4.0     4.1     4.2       0       0     4.2     4.1     4.0
             *

574          KK     67C
575          KM   BASIN 67C
576          KM    THE FOLLOWING PARAMETERS WERE PROVIDED FOR THIS BASIN
577          KM    L=       1.2  Lca=        .7   S=    40.2  Kn= .049  LAG=  32.3
578          KM    PHOENIX VALLEY S-GRAPH WAS USED FOR THIS BASIN
579          BA     .93
580          LG     .25      .25     5.10      .32    31.00
581          UI     96.     213.     432.     557.     702.    1006.    1133.     842.     667.     518.
582          UI    365.     193.     157.      96.      59.      30.      30.      30.      30.      0.
583          UI      0.       0.       0.       0.       0.      0.       0.       0.       0.       0.
584          UI      0.       0.       0.       0.       0.      0.       0.       0.       0.       0.
             *

585          KK    R67C
586          KM   RETAIN 100 YR 2 HR RUNOFF VOLUME
587          DT    D67C      67
588          DI       0   10000
589          DQ       0   10000
             *

590          KK    C67C
591          KM   COMBINE SUBBASINS 67C AND 67A AND 67B
592          HC       3
             *

593          KK  67CT67
594          KM   REACH CN-3 plus culvert CNC-3
595          KM   ROUTE FLOW IN THE CRISMON CHANNEL FROM C67C (@ GUADALUPE ROAD & CRISMON ROAD)
596          KM    TO C67D (AT APPROX. 1/2 MILE SOUTH OF GUADALUPE ROAD).
             *       Sta. 39+00 to Guadalupe Rd.
597          RS       1    FLOW      -1
598          RC    .025    .015    .025    2420   .0018
599          RX       0       6      12      24      64      76      82      88
600          RY       4       3       2       0       0       2       3       4
             *

601          KK     67D
602          KM   BASIN 67D
603          KM    THE FOLLOWING PARAMETERS WERE PROVIDED FOR THIS BASIN
604          KM    L=        .6  Lca=        .4   S=    34.7  Kn= .050  LAG=  20.5
605          KM    PHOENIX VALLEY S-GRAPH WAS USED FOR THIS BASIN
606          BA     .13
607          LG     .25      .25     5.20      .30    30.00
608          UI     23.      87.     132.     216.     202.     137.      86.      38.      23.      9.
1                                          HEC-1 INPUT                                                    PAGE 15

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

609          UI      6.       6.       0.       0.       0.      0.       0.       0.       0.       0.
610          UI      0.       0.       0.       0.       0.      0.       0.       0.       0.       0.
             *

611          KK    R67D
612          KM   RETAIN 100 YR 2 HR RUNOFF VOLUME
613          DT    D67D       9
614          DI       0   10000
615          DQ       0   10000
             *

616          KK    C67D
617          KM    COMBINE HYDROGRAPHS AT CP67D
618          HC       2
```

```
                *
619             KK  67DT66
620             KM   REACH CN-2 plus culvert CNC-2
621             KM   ROUTE FLOW IN THE CRISMON CHANNEL FROM APPROX. 1/2 MILE SOUTH
622             KM    OF GUADALUPE ROAD TO THE INFLOW SPILLWAY FOR THE ELLIOT DETENTION BASIN.
                *       Sta. 20+00 to Sta. 39+00
623             RS       1    FLOW      -1
624             RC    .032    .032    .032    1900  0.0035
625             RX       0       6      12      24      64      76      82      88
626             RY       4       3       2       0       0       2       3       4
                *

627             KK     66A
628             KM   BASIN 66A
629             KM    THE FOLLOWING PARAMETERS WERE PROVIDED FOR THIS BASIN
630             KM    L=        .7  Lca=       .3   S=   55.9  Kn= .047  LAG=  17.1
631             KM    PHOENIX VALLEY S-GRAPH WAS USED FOR THIS BASIN
632             BA     .26
633             LG     .24     .25    6.00     .22   35.00
634             UI     78.    256.    417.    576.    363.    205.     84.     39.     16.     16.
635             UI      0.      0.      0.      0.      0.      0.      0.      0.      0.      0.
636             UI      0.      0.      0.      0.      0.      0.      0.      0.      0.      0.
                *

637             KK    R66A
638             KM   RETAIN 100 YR 2 HR RUNOFF VOLUME
639             DT    D66A      21
640             DI       0   10000
641             DQ       0   10000
                *

642             KK   66ATB
643             KM   ROUTE S66A TO 66B VIA WASH CROSSING BASELINE
644             RS       7    FLOW      -1
645             RC    .045     .04    .045    7500   .0077
646             RX       0     500     980    1003    1007    1031    1511    2011
647             RY       4     3.5       3       0       0       3     3.5       4
                *
1                                          HEC-1 INPUT                                                    PAGE 16

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

648             KK     66B
649             KM   BASIN 66B
650             KM    THE FOLLOWING PARAMETERS WERE PROVIDED FOR THIS BASIN
651             KM    L=       1.6  Lca=      1.0   S=   43.3  Kn= .050  LAG=  42.8
652             KM    PHOENIX VALLEY S-GRAPH WAS USED FOR THIS BASIN
653             BA     .67
654             LG     .25     .25    5.00     .33   30.00
655             UI     53.     56.    185.    248.    297.    352.    426.    590.    636.    496.
656             UI    419.    346.    286.    232.    152.     93.     86.     58.     53.     21.
657             UI     16.     16.     16.     16.     16.      0.      0.      0.      0.      0.
658             UI      0.      0.      0.      0.      0.      0.      0.      0.      0.      0.
                *

659             KK    R66B
660             KM   RETAIN 100 YR 2 HR RUNOFF VOLUME
661             DT    D66B      48
662             DI       0   10000
663             DQ       0   10000
                *

664             KK   CP66B
665             KM   COMBINE S66A AND S66B
666             HC       2
                *

667             KK   66BTC
668             KM   ROUTE 66B TO 66C VIA WASH
669             RS       7    FLOW      -1
670             RC    .045     .04    .045    6000   .0150
671             RX       0     500     995    1003    1007    1016    1511    2011
672             RY       4     3.5       3       0       0       3     3.5       4
                *

673             KK     66C
674             KM   BASIN 66C
675             KM    THE FOLLOWING PARAMETERS WERE PROVIDED FOR THIS BASIN
676             KM    L=       1.1  Lca=       .7   S=   46.5  Kn= .039  LAG=  24.3
677             KM    PHOENIX VALLEY S-GRAPH WAS USED FOR THIS BASIN
678             BA     .50
679             LG     .19     .25    5.40     .29   48.00
680             UI     69.    243.    385.    528.    817.    635.    463.    325.    159.    103.
681             UI     63.     21.     21.     21.      0.      0.      0.      0.      0.      0.
682             UI      0.      0.      0.      0.      0.      0.      0.      0.      0.      0.
                *

683             KK    R66C
684             KM   RETAIN 100 YR 2 HR RUNOFF VOLUME
685             DT    D66C      42
686             DI       0   10000
687             DQ       0   10000
                *
```

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

 688          KK  CP66C1
 689          KM   Split up hydrograph combination in order to separate flows.
 690          KM   Combine Hydrographs 66BTC (from Sub. 66A)and R66C (from Sub. 66C)
 691          HC       2
              *

 692          KK  CP66C2
 693          KM   Combine Hydrograph CP66C1 (from Subbasins 66A, 66B and 66C)
 694          KM     plus hydrograph 67DT66 ( C67D )
 695          HC       2
              *

 696          KK    DI66
 697          KM    DIVERT FLOW TO DETENTION BASIN WA
 698          KM    By-pass Flow Reduced to 410 cfs from 458, SZ, 5-17-99
 699          DT    DB66
 700          DI       0     150     363   411.0   456.0     513     577     643     712    1000
 701          DQ       0       0       0    32.0     71.     122     179     239     302     590
              *

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

 710          KK   CP66C
 711          KM   COMBINE FLOWS FROM ELLIOT CHANNEL AND CRISMON BYPASS CHANNEL
 712          HC       2
              *

 713          KK   66CTD
 714          KM   REACH ET-7
 715          KM   ROUTE FLOWS FROM INTERSECTION OF CRISMON AND ELLIOT CHANNELS
 716          KM   AT THE INTERSECTION OF ELLIOT ROAD and CRISMON ROAD TO THE ELLIOT BASIN
 717          KM   WA Bleed-off Outlet, WHICH IS ABOUT 390 ft WEST OF CRISMON ROAD.
 718          RD     500  0.0015   0.012            CIRC     9.5
              *

 719          KK    DR66
 720          KM         RETURN DIVERT TO DETENTION BASIN FROM DIVERSION STRUCTURE
 721          DR    DB66
              *

 722          KK  RS66D1
 723          KM   ELLIOT BASIN, WEST A
 724          KM   TWO PONDS OPERATING IN SERIES.
 725          KM        Bottom Elevation Lowered to 1415.0 ft from 1420, and 18" Bleed-off
 726          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

 727          RS       1    STOR       0
 728          SV       0    1.60   10.00   25.50   34.70   44.20   54.10   64.40   75.10   86.00
 729          SE  1415.0    1417    1419    1421    1422    1423    1424    1425    1426    1427
 730          SL  1416.0  1.7672     .62      .5
 731          SS  1423.5      20     3.0     1.5
              *

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

 740          KK    C-WA
 741          KM        Combine Bleed-off Flow from WA with Flow in Elliot Channel
 742          KM        Added by SZ, 5-17-99
 743          HC       2
              *

 744          KK   RC-WA
 745          KM        Route Flow from WA Outlet to WB Outlet in Elliot Channel
 746          KM        Added by SZ, 5-17-99
 747          KM        WA Bleed-off Outlet to WB Bleed-off Outlet.
 748          KM        RD card used for routing (Sta. 48+80 to Sta. 57+35)
 749          RD     855  0.0052   0.012            CIRC     9.5
              *
```

```
750          KK   DR-WA
751          KM        Return Diverted Flow (Spillway) to WB from WA, SZ 5-7-99
752          DR    D-WB
             *

753          KK  RS66D2
754          KM   ELLIOT BASIN, WEST B
755          KM   TWO PONDS OPERATING IN SERIES.
756          KM        Bottom Elevation Lowered to 1413.5 ft from 1414, and 36" Bleed-off
757          KM        Pipe Reduced to 18" from WB to Elliot Channel
758          KM        Since the bleed-off pipe length is short, no routing is provided.
759          KM        Existing SS = 1420.5   80   2.5   1.5, SZ, 5-18-99
760          RS       1    STOR       0
761          SV       0    4.40    8.80   14.50   21.00   28.00   35.30   42.90   50.90   59.20
762          SE  1412.0    1415    1416    1417    1418    1419    1420    1421    1422    1423
763          SL  1413.0  1.7672     .62      .5
764          SS  1422.6      50     2.5     1.5
             *
1                                          HEC-1 INPUT                                          PAGE 19

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


765          KK   CP66D
766          KM       COMBINE FLOWS FROM WEST ELLIOT BASIN AND ELLIOT CHANNEL
767          KM       AT THE OUTLET PIPE.
768          HC       2
             *

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

775          KK  66-66D
776          KM   REACH ET-6
777          KM        ROUTE FROM DETENTION BASIN WB OUTLET TO ELLSWORTH RD
778          KM        2350 -> 3200,  SZ, 5-17-99
779          KM        Second portion
780          KM        RD card used for routing (Sta. 12+46 to Sta. 36+44)
781          RD    2398  0.0040   0.012            CIRC     9.5
             *

782          KK     66D
783          KM   BASIN 66D
784          KM    THE FOLLOWING PARAMETERS WERE PROVIDED FOR THIS BASIN
785          KM    L=      1.0  Lca=       .7   S=   28.6  Kn= .020  LAG=  13.2
786          KM    PHOENIX VALLEY S-GRAPH WAS USED FOR THIS BASIN
787          BA     .31
788          LG     .10     .17    6.80     .19   80.00
789          UI    162.    480.    845.    540.    232.     89.     24.      0.      0.      0.
790          UI      0.      0.      0.      0.      0.      0.      0.      0.      0.      0.
             *

791          KK    R66D
792          KM   RETENTION REDUCED BY 77% FROM 31 TO 7 AC-FT
793          KM   DUE TO DEVELOPMENT USING DETENTION BASIN
794          KM   The developer does not participate in the basin so the retention volume
795          KM   increased to 31 A-F
796          DT    D66D      31
797          DI       0   10000
798          DQ       0   10000
             *

799          KK     61A
800          KM   BASIN 61A
801          KM    THE FOLLOWING PARAMETERS WERE PROVIDED FOR THIS BASIN
802          KM    L=       .9  Lca=       .4   S=   36.8  Kn= .037  LAG=  19.1
803          KM    PHOENIX VALLEY S-GRAPH WAS USED FOR THIS BASIN
804          BA     .52
805          LG     .19     .25    4.20     .56   52.00
806          UI    117.    412.    628.   1037.    786.    517.    261.    132.     62.     28.
807          UI     28.      0.      0.      0.      0.      0.      0.      0.      0.      0.
1                                          HEC-1 INPUT                                          PAGE 20

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

808          UI      0.      0.      0.      0.      0.      0.      0.      0.      0.      0.
             *

809          KK    R61A
810          KM   RETAIN 100 YR 2 HR RUNOFF VOLUME
811          DT    D61A      42
812          DI       0   10000
813          DQ       0   10000
             *

814          KK   61ATB
815          KM   ROUTING 61A TO 61B VIA ELLSWORTH ROAD
816          RS       6    FLOW      -1
817          RC    .035    .024    .035    5280    .005
```

```
818          RX       0     500     750     752     802     852    1102    1602
819          RY       3       2     1.5     1.2     1.2     1.5       2       3
             *

820          KK     61B
821          KM    BASIN 61B
822          KM     THE FOLLOWING PARAMETERS WERE PROVIDED FOR THIS BASIN
823          KM     L=       1.4  Lca=       .7   S=   39.7  Kn= .047  LAG=  33.6
824          KM     PHOENIX VALLEY S-GRAPH WAS USED FOR THIS BASIN
825          BA     1.09
826          LG      .24     .25    4.80     .37   35.00
827          UI     109.    223.    475.    615.    765.   1049.   1335.   1025.    822.    643.
828          UI     495.    288.    187.    143.    109.     36.     34.     34.     34.     34.
829          UI       0.      0.      0.      0.      0.      0.      0.      0.      0.      0.
830          UI       0.      0.      0.      0.      0.      0.      0.      0.      0.      0.
             *

831          KK     R61B
832          KM    RETAIN 100 YR 2 HR RUNOFF VOLUME
833          DT     D61B      81
834          DI        0   10000
835          DQ        0   10000
             *

836          KK    CP61B
837          KM    COMBINE FLOWS FROM S61A AND S61B
838          HC        2
             *

839          KK   61T66D
840          KM    ROUTE CP61B TO SUBBASIN 66D ALONG ELLSWORTH ROAD. ROUTING WILL BE
841          KM    THE SAME AS WAS GIVEN FOR SUBBASIN 61A
842          RS        6    FLOW      -1
843          RC     .035    .024    .035    5280    .008
844          RX        0     500     750     752     802     852    1102    1602
845          RY        3       2     1.5     1.2     1.2     1.5       2       3
             *
```



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

846          KK      67E
847          KM    BASIN 67E
848          KM     THE FOLLOWING PARAMETERS WERE PROVIDED FOR THIS BASIN
849          KM     L=       1.2  Lca=       .7   S=   32.3  Kn= .038  LAG=  26.9
850          KM     PHOENIX VALLEY S-GRAPH WAS USED FOR THIS BASIN
851          BA      .58
852          LG      .19     .25    5.40     .30   50.00
853          UI      73.    219.    378.    496.    732.    830.    597.    443.    315.    157.
854          UI     110.     73.     24.     22.     22.     22.      0.      0.      0.      0.
855          UI       0.      0.      0.      0.      0.      0.      0.      0.      0.      0.
             *

856          KK     R67E
857          KM    RETAIN 100 YR 2 HR RUNOFF VOLUME
858          KM    DUE TO DEVELOPMENT USING DETENTION BASIN
859          DT    D67E       50
860          DI        0   10000
861          DQ        0   10000
             *

862          KK     C67E
863          KM    COMBINE FLOWS FROM ELLSWORTH ROAD JUST NORTH OF ELLIOT ROAD
864          HC        2
             *

865          KK     C66D
866          KM    COMBINE ELLIOT CHANNEL FLOW WITH HYDROGRAPH C67E @ ELLIOT RD & ELLSWORTH RD.
867          HC        3
             *

868          KK   66T70A
869          KM         Pipe Routing, Reach ET-5
870          KM         SE corner curve of Elliot Rd. & Ellsworth Rd.
871          KM         RD card used for routing (Junction Structure to Sta. 12+46)
872          RD      500  0.0004   0.012            CIRC      9.5
             *

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

878          KK    CULVT
879          KM         Pipe Routing, Culvert
880          KM         2-102" pipe culvert crossing Ellsworth Rd.
881          KM         RD card used for routing
882          RD      300  0.0002   0.012            CIRC       12
             *
```



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

```
883          KK  66T70C
884          KM   REACH ET-4, ET-5( COMPRISED OF ET-5A AND ET-5B).
885          KM   ROUTE FROM ELLSWORTH Culvert TO SANTAN FREEWAY.
886          RS       2    FLOW      -1
887          RC    .032    .032    .032    2490   .0008
888          RX       0      10      20      56      76     112     120     130
889          RY     6.5     6.1     6.0       0       0     6.0     6.1     6.5
             *
890          ZZ
1
                SCHEMATIC DIAGRAM OF STREAM NETWORK
INPUT
 LINE      (V) ROUTING          (--->) DIVERSION OR PUMP FLOW

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

 227         65A1
                .
                .
 246            .-------> FF65A1
 242        R65A1
                .
                .
 249            .       CAP1A
                .           V
                .           V
 258            .      RCAP1A
                .           .
                .           .
 266       CCAP1A............
                .
                .
 269            .        65A2
                .           .
                .           .
 287            .           .-------> FF65A2
 284            .       R65A2
                .           .
                .           .
 290            .           .      CAP1B
                .           .          V
                .           .          V
 299            .           .     RCAP1B
                .           .          .
                .           .          .
 307            .      CCAP1B............
                .           .
                .           .
 310       C65A12............
                .
                .
 318            .-------> BYPASO
 313       DI-BAS
                .
                .
 325            .-------> DLON-O
 321       LOFLON
                V
                V
 328       SDDB-N
                .
                .
 340            .        65A3
                .           .
                .           .
 362            .           .-------> FF65A3
 359            .       R65A3
                .           .
                .           .
 369            .           .-------> DLOS-O
 365            .      LOFLOS
                .           V
                .           V
 372            .      SDDB-S
                .           .
                .           .
 384       SDWDBS............
                .
                .
 389            .           .<------- BYPASO
 387            .      BYPASI
                .           V
                .           V
 390            .      RBYPAS
                .           .
                .           .
 397       CPMRID............
                V
                V
 401       RSDW1
                V
                V
 408       RSDW2
```

```
                .
                .
415             .        65AW
                .           .
                .           .
427             .           .-------->   D65AW
425             .      R65AW
                .          V
                .          V
430             .     65AT65
                .           .
                .           .
437             .           .         65B
                .           .           .
                .           .           .
450             .           .           .-------->    D65B
448             .           .       R65B
                .           .           .
                .           .           .
453         CP65B.......................
                .
                .
463             .-------->  DIRS65
456         DI65B
                .
                .
468             .           .<-------  DLON-O
466             .     DLON-I
                .           .
                .           .
471             .           .           .<-------  DLOS-O
469             .           .     DLOS-I
                .           .           .
                .           .           .
472             .     CPLFLO............
                .           .
                .           .
475             .     ELLSD1
                .           .
                .           .
478         CP65A............
                V
                V
481         65AT-3
                .
                .
486             .           .<-------  DIRS65
484             .      DR65B
                .          V
                .          V
487             .      RS65A
                .           .
                .           .
494          CP65............
                V
                V
498         65T66
                .
                .
501             .     ADOT-E
                .          V
                .          V
506             .     AET67A
                .           .
                .           .
513             .           .         67A
                .           .           .
                .           .           .
525             .           .           .-------->    D67A
523             .           .       R67A
                .           .           .
                .           .           .
528             .      C67A............
                .          V
                .          V
531             .     67ATC
                .           .
                .           .
537             .           .       SUP2
                .           .          V
                .           .          V
541             .           .     RSUP2
                .           .           .
                .           .           .
548             .           .           .         67B
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560             .           .           .           .-------->    D67B
558             .           .           .       R67B
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563             .           .       C67B............
                .           .          V
                .           .          V
566             .           .     67BTC
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574             .          .          .        67C
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587             .          .          .         .-------->   D67C
585             .          .          .      R67C
                .          .          .         .
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590             .      C67C.......................
                .        V
                .        V
593             .    67CT67
                .          .
                .          .
601             .          .       67D
                .          .         .
                .          .         .
613             .          .         .-------->   D67D
611             .          .     R67D
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616             .      C67D............
                .        V
                .        V
619             .    67DT66
                .          .
                .          .
627             .          .       66A
                .          .         .
                .          .         .
639             .          .         .-------->   D66A
637             .          .     R66A
                .          .       V
                .          .       V
642             .          .    66ATB
                .          .         .
                .          .         .
648             .          .         .        66B
                .          .         .         .
                .          .         .         .
661             .          .         .         .-------->   D66B
659             .          .         .      R66B
                .          .         .         .
                .          .         .         .
664             .          .    CP66B............
                .          .       V
                .          .       V
667             .          .    66BTC
                .          .         .
                .          .         .
673             .          .         .        66C
                .          .         .         .
                .          .         .         .
685             .          .         .         .-------->   D66C
683             .          .         .      R66C
                .          .         .         .
                .          .         .         .
688             .          .   CP66C1............
                .          .         .
                .          .         .
692             .    CP66C2............
                .          .
                .          .
699             .          .-------->   DB66
696             .      DI66
                .        V
                .        V
702             .    66C1T2
                .          .
                .          .
710       CP66C............
            V
            V
713       66CTD
            .
            .
721             .          .<--------   DB66
719             .      DR66
                .        V
                .        V
722             .    RS66D1
                .          .
                .          .
737             .          .-------->   D-WB
732             .      B-WA
                .          .
                .          .
740        C-WA............
            V
            V
744       RC-WA
            .
            .
752             .          .<--------   D-WB
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750          .      DR-WA
             .          V
             .          V
753          .     RS66D2
             .          .
             .          .
765      CP66D............
             V
             V
769     66T66D
             V
             V
775     66-66D
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782          .        66D
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             .          .
796          .          .-------->    D66D
791          .       R66D
             .          .
             .          .
799          .          .        61A
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811          .          .          .-------->    D61A
809          .          .      R61A
             .          .          V
             .          .          V
814          .          .     61ATB
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820          .          .          .        61B
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833          .          .          .          .-------->    D61B
831          .          .          .       R61B
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836          .          .     CP61B............
             .          .          V
             .          .          V
839          .          .    61T66D
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             .          .          .
846          .          .          .        67E
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             .          .          .          .
859          .          .          .          .-------->   D67E
856          .          .          .       R67E
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862          .          .      C67E............
             .          .          .
             .          .          .
865      C66D........................
             V
             V
868     66T70A
             V
             V
873     66T70B
             V
             V
878      CULVT
             V
             V
883     66T70C
```

(***) RUNOFF ALSO COMPUTED AT THIS LOCATION

```
1****************************************
*                                      *
*   FLOOD HYDROGRAPH PACKAGE  (HEC-1)  *
*              JUN   1998              *
*            VERSION 4.1               *
*                                      *
*  RUN DATE   03JAN08  TIME  11:29:26  *
*                                      *
****************************************
```

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

Alternative 2: Two Basins (Offline-Meridian, Online-Siphon Draw Wash)

Project: Siphon Draw Wash Drainage Improvements
Contract FCD: 2007C012
SCI Project No: 20539

Notes By: Stanley Consultants, Inc. (SCI)
Revision Date: December, 2007

Filename: SDWBALT2.DAT (Previous Model: SDW-BASE.DAT)
Storm Event: 100-Yr, 24 Hrs

Conditions: Future Conditions

Comments:

This is the DOUBLE RETENTION BASIN ALTERNATIVE model.
The north basin is offline to the proposed Meridian Channel. The south basin is inline to Siphon Draw Wash (east of Meridian Road.

This model was developed from the base hydrology model (SDW-BASE.DAT) produced as part of this project and developed from previous hydrology models from previous studies. For this project SDW-BASE.DAT truncated the previous hydrologic model S60EMAP1.DAT provided by the FCDMC. Any hydrologic elements which do not contribute to runoff along Elliot Road, just upstream of the SanTan Freeway Channel(routing reach 66T70C) were removed

To run correctly, this model requires referencing a DSS file created by the upstream hydrologic model ultimately developed from the East Mesa ADMP. For the 100-year, future conditions, this model is N60EM.DAT (which produces N60EM.DSS).

END SCI INTRODUCTORY COMMENTS

****

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 SOUTH EAST MESA ADMP - SOUTH OF SUPERSTITION FREEWAY, FUTURE CONDI

206 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

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

209 PI             PRECIPITATION PATTERN
                        .00      .00      .00      .00      .00      .00      .00      .00      .00      .00
                        .00      .00      .00      .00      .00      .00      .00      .00      .00      .00
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                        .03      .09      .09      .09      .01      .01      .01      .01      .01      .01
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219 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
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                        .03      .09      .09      .09      .01      .01      .01      .01      .01      .01
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220 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
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.03	.09	.09	.09	.01	.01	.01	.01	.01	.01
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.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
.00	.00	.00	.00	.00	.00	.00	.00	.00	.00

221 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	.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

222 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	.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

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                .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

223 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       .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

224 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
                .00       .00       .00       .00       .00       .00       .00       .00       .00       .00
                .00       .00       .00       .00       .00       .00       .00       .00

225 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
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                    .00       .00       .00       .00       .00       .00       .00       .00       .00       .00
                    .00       .00       .00       .00       .00       .00       .00       .00       .00       .00
                    .00       .00       .00       .00       .00       .00       .00       .00       .00       .00
                    .00       .00       .00       .00       .00       .00       .00       .00       .00       .00
                    .00       .00       .00       .00       .00       .00       .00       .00       .00       .00
                    .00       .00       .00       .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
 226 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       .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
   -----DSS---ZOPEN:  Existing File Opened,  File: N60EM.DSS
                      Unit:  71;  DSS Version: 6-JG
        ----- Entering ZRRTSX for unit 71 -----
Pathname: /CAP1A/OVERCHUTE/FLOW//5MIN/100YEAR/
        Time Window set.  Interval:     5  Number of data values:      1
        Starting date and time:  Mar 31, 1997  2400  (  35519 1440)
        Ending   date and time:  Mar 31, 1997  2400  (  35519 1440)
        Input time offset:      0
        After ZRDINF, Record found: T
        Pathname: /CAP1A/OVERCHUTE/FLOW/31MAR1997/5MIN/100YEAR/
        Number of actual data:  288  Header length:   0
        Compression:   0  Quality:   0
-----DSS--- ZREAD Unit  71; Vers.    4:  /CAP1A/OVERCHUTE/FLOW/31MAR1997/5MIN/100YEAR/
      ----DSS---Debug:  Enter ZRRTSB;  Unit:  71
        NSTART:    1   NVALS:    1    JULS:   35519  ISTIME:  1440
        NLDATA:  288   JULSD:   35519
        JULS: 31MAR97       JULSD: 31MAR97
        Quality Read: F,  Quality Requested: F
        ---ZRRTSB Calculations:  NPOS:  288  NDATA:  288  NREAD:    1  ILIM:    1
      ----- Exiting ZRRTS, Number of data values:      1,  Status:  0
        Offset:       0,  Units: CFS      ,  Type:INST-VAL
        ----- Entering ZRRTSX for unit 71 -----
Pathname: /CAP1A/OVERCHUTE/FLOW//5MIN/100YEAR/
        Time Window set.  Interval:     5  Number of data values:    744
        Starting date and time:  Mar 31, 1997  2400  (  35519 1440)
        Ending   date and time:  Apr 3, 1997  1355  (  35522  835)
        Input time offset:      0
        After ZRDINF, Record found: T
        Pathname: /CAP1A/OVERCHUTE/FLOW/31MAR1997/5MIN/100YEAR/
        Number of actual data:  288  Header length:   0
        Compression:   0  Quality:   0
-----DSS--- ZREAD Unit  71; Vers.    4:  /CAP1A/OVERCHUTE/FLOW/31MAR1997/5MIN/100YEAR/
      ----DSS---Debug:  Enter ZRRTSB;  Unit:  71
        NSTART:    1   NVALS:  744    JULS:   35519  ISTIME:  1440
        NLDATA:  288   JULSD:   35519
        JULS: 31MAR97       JULSD: 31MAR97
```

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        Quality Read: F,  Quality Requested: F
        ---ZRRTSB Calculations:  NPOS:  288  NDATA:  288  NREAD:    1  ILIM:    1
        After ZRDINF, Record found: T
        Pathname: /CAP1A/OVERCHUTE/FLOW/01APR1997/5MIN/100YEAR/
        Number of actual data:  288  Header length:   0
        Compression:   0  Quality:   0
-----DSS--- ZREAD Unit  71; Vers.    4:  /CAP1A/OVERCHUTE/FLOW/01APR1997/5MIN/100YEAR/
      ----DSS---Debug:  Enter ZRRTSB;  Unit:  71
        NSTART:    2   NVALS:  744    JULS:   35519  ISTIME:  1440
        NLDATA:  288   JULSD:   35520
        JULS: 31MAR97        JULSD: 01APR97
        Quality Read: F,  Quality Requested: F
        ---ZRRTSB Calculations:  NPOS:    1  NDATA:  288  NREAD:  288  ILIM:  289
        After ZRDINF, Record found: T
        Pathname: /CAP1A/OVERCHUTE/FLOW/02APR1997/5MIN/100YEAR/
        Number of actual data:  288  Header length:   0
        Compression:   0  Quality:   0
-----DSS--- ZREAD Unit  71; Vers.    4:  /CAP1A/OVERCHUTE/FLOW/02APR1997/5MIN/100YEAR/
      ----DSS---Debug:  Enter ZRRTSB;  Unit:  71
        NSTART:  290   NVALS:  744    JULS:   35519  ISTIME:  1440
        NLDATA:  288   JULSD:   35521
        JULS: 31MAR97        JULSD: 02APR97
        Quality Read: F,  Quality Requested: F
        ---ZRRTSB Calculations:  NPOS:    1  NDATA:  288  NREAD:  288  ILIM:  577
        After ZRDINF, Record found: T
        Pathname: /CAP1A/OVERCHUTE/FLOW/03APR1997/5MIN/100YEAR/
        Number of actual data:  288  Header length:   0
        Compression:   0  Quality:   0
-----DSS--- ZREAD Unit  71; Vers.    4:  /CAP1A/OVERCHUTE/FLOW/03APR1997/5MIN/100YEAR/
      ----DSS---Debug:  Enter ZRRTSB;  Unit:  71
        NSTART:  578   NVALS:  744    JULS:   35519  ISTIME:  1440
        NLDATA:  288   JULSD:   35522
        JULS: 31MAR97        JULSD: 03APR97
        Quality Read: F,  Quality Requested: F
        ---ZRRTSB Calculations:  NPOS:    1  NDATA:  288  NREAD:  167  ILIM:  744
      ----- Exiting ZRRTS, Number of data values:    744,  Status:  0
        Offset:        0,  Units: CFS      ,  Type:INST-VAL
        ----- Entering ZRRTSX for unit 71 -----
Pathname: /CAP1A/OVERCHUTE/FLOW//5MIN/100YEAR/
        Time Window set.  Interval:     5  Number of data values:      1
        Starting date and time:  Apr 3, 1997  1355  (  35522  835)
        Ending   date and time:  Apr 3, 1997  1355  (  35522  835)
        Input time offset:      0
        After ZRDINF, Record found: T
        Pathname: /CAP1A/OVERCHUTE/FLOW/03APR1997/5MIN/100YEAR/
        Number of actual data:  288  Header length:   0
        Compression:   0  Quality:   0
-----DSS--- ZREAD Unit  71; Vers.    4:  /CAP1A/OVERCHUTE/FLOW/03APR1997/5MIN/100YEAR/
      ----DSS---Debug:  Enter ZRRTSB;  Unit:  71
        NSTART:    1   NVALS:    1    JULS:   35522  ISTIME:   835
        NLDATA:  288   JULSD:   35522
        JULS: 03APR97        JULSD: 03APR97
        Quality Read: F,  Quality Requested: F
        ---ZRRTSB Calculations:  NPOS:  167  NDATA:  288  NREAD:    1  ILIM:    1
      ----- Exiting ZRRTS, Number of data values:      1,  Status:  0
        Offset:        0,  Units: CFS      ,  Type:INST-VAL
        ----- Entering ZRRTSX for unit 71 -----
Pathname: /CAP1A/OVERCHUTE/FLOW//5MIN/100YEAR/
        Time Window set.  Interval:     5  Number of data values:    744
        Starting date and time:  Apr 3, 1997  1355  (  35522  835)
        Ending   date and time:  Apr 6, 1997  0350  (  35525  230)
        Input time offset:      0
        After ZRDINF, Record found: T
        Pathname: /CAP1A/OVERCHUTE/FLOW/03APR1997/5MIN/100YEAR/
        Number of actual data:  288  Header length:   0
        Compression:   0  Quality:   0
-----DSS--- ZREAD Unit  71; Vers.    4:  /CAP1A/OVERCHUTE/FLOW/03APR1997/5MIN/100YEAR/
      ----DSS---Debug:  Enter ZRRTSB;  Unit:  71
        NSTART:    1   NVALS:  744    JULS:   35522  ISTIME:   835
        NLDATA:  288   JULSD:   35522
        JULS: 03APR97        JULSD: 03APR97
        Quality Read: F,  Quality Requested: F
        ---ZRRTSB Calculations:  NPOS:  167  NDATA:  288  NREAD:  122  ILIM:  122
        After ZRDINF, Record found: T
        Pathname: /CAP1A/OVERCHUTE/FLOW/04APR1997/5MIN/100YEAR/
        Number of actual data:  288  Header length:   0
        Compression:   0  Quality:   0
-----DSS--- ZREAD Unit  71; Vers.    4:  /CAP1A/OVERCHUTE/FLOW/04APR1997/5MIN/100YEAR/
      ----DSS---Debug:  Enter ZRRTSB;  Unit:  71
        NSTART:  123   NVALS:  744    JULS:   35522  ISTIME:   835
        NLDATA:  288   JULSD:   35523
        JULS: 03APR97        JULSD: 04APR97
        Quality Read: F,  Quality Requested: F
        ---ZRRTSB Calculations:  NPOS:    1  NDATA:  288  NREAD:  288  ILIM:  410
        After ZRDINF, Record found: F
        Pathname: /CAP1A/OVERCHUTE/FLOW/05APR1997/5MIN/100YEAR/
      ----DSS---Debug:  Enter ZRRTSB;  Unit:  71
        NSTART:  411   NVALS:  744    JULS:   35522  ISTIME:   835
        NLDATA:  288   JULSD:   35524
        JULS: 03APR97        JULSD: 05APR97
        Quality Read: F,  Quality Requested: F
        ---ZRRTSB Calculations:  NPOS:    1  NDATA:  288  NREAD:  288  ILIM:  698
-----DSS*** ZRRTS:  CAUTION - Data block not found in file.  Unit:  71
Pathname: /CAP1A/OVERCHUTE/FLOW/05APR1997/5MIN/100YEAR/
        After ZRDINF, Record found: F
```

```
        Pathname: /CAP1A/OVERCHUTE/FLOW/06APR1997/5MIN/100YEAR/
      ----DSS---Debug:  Enter ZRRTSB;  Unit:  71
        NSTART:  699   NVALS:  744    JULS:   35522  ISTIME:   835
        NLDATA:  288   JULSD:   35525
        JULS: 03APR97       JULSD: 06APR97
        Quality Read: F,  Quality Requested: F
        ---ZRRTSB Calculations:  NPOS:    1  NDATA:  288  NREAD:   46  ILIM:  744
      ----- Exiting ZRRTS, Number of data values:    744,  Status:  3
        Offset:       0,  Units: CFS      ,  Type:INST-VAL
        ----- Entering ZRRTSX for unit 71 -----
 Pathname: /CAP1B/OVERCHUTE/FLOW//5MIN/100YEAR/
        Time Window set.  Interval:     5  Number of data values:      1
        Starting date and time:  Mar 31, 1997  2400  (  35519 1440)
        Ending   date and time:  Mar 31, 1997  2400  (  35519 1440)
        Input time offset:      0
        After ZRDINF, Record found: T
        Pathname: /CAP1B/OVERCHUTE/FLOW/31MAR1997/5MIN/100YEAR/
        Number of actual data:  288  Header length:   0
        Compression:   0  Quality:   0
 -----DSS--- ZREAD Unit  71; Vers.    4:  /CAP1B/OVERCHUTE/FLOW/31MAR1997/5MIN/100YEAR/
      ----DSS---Debug:  Enter ZRRTSB;  Unit:  71
        NSTART:    1   NVALS:    1    JULS:   35519  ISTIME:  1440
        NLDATA:  288   JULSD:   35519
        JULS: 31MAR97       JULSD: 31MAR97
        Quality Read: F,  Quality Requested: F
        ---ZRRTSB Calculations:  NPOS:  288  NDATA:  288  NREAD:    1  ILIM:    1
      ----- Exiting ZRRTS, Number of data values:      1,  Status:  0
        Offset:       0,  Units: CFS      ,  Type:INST-VAL
        ----- Entering ZRRTSX for unit 71 -----
 Pathname: /CAP1B/OVERCHUTE/FLOW//5MIN/100YEAR/
        Time Window set.  Interval:     5  Number of data values:    744
        Starting date and time:  Mar 31, 1997  2400  (  35519 1440)
        Ending   date and time:  Apr 3, 1997  1355  (  35522  835)
        Input time offset:      0
        After ZRDINF, Record found: T
        Pathname: /CAP1B/OVERCHUTE/FLOW/31MAR1997/5MIN/100YEAR/
        Number of actual data:  288  Header length:   0
        Compression:   0  Quality:   0
 -----DSS--- ZREAD Unit  71; Vers.    4:  /CAP1B/OVERCHUTE/FLOW/31MAR1997/5MIN/100YEAR/
      ----DSS---Debug:  Enter ZRRTSB;  Unit:  71
        NSTART:    1   NVALS:  744    JULS:   35519  ISTIME:  1440
        NLDATA:  288   JULSD:   35519
        JULS: 31MAR97       JULSD: 31MAR97
        Quality Read: F,  Quality Requested: F
        ---ZRRTSB Calculations:  NPOS:  288  NDATA:  288  NREAD:    1  ILIM:    1
        After ZRDINF, Record found: T
        Pathname: /CAP1B/OVERCHUTE/FLOW/01APR1997/5MIN/100YEAR/
        Number of actual data:  288  Header length:   0
        Compression:   0  Quality:   0
 -----DSS--- ZREAD Unit  71; Vers.    4:  /CAP1B/OVERCHUTE/FLOW/01APR1997/5MIN/100YEAR/
      ----DSS---Debug:  Enter ZRRTSB;  Unit:  71
        NSTART:    2   NVALS:  744    JULS:   35519  ISTIME:  1440
        NLDATA:  288   JULSD:   35520
        JULS: 31MAR97       JULSD: 01APR97
        Quality Read: F,  Quality Requested: F
        ---ZRRTSB Calculations:  NPOS:    1  NDATA:  288  NREAD:  288  ILIM:  289
        After ZRDINF, Record found: T
        Pathname: /CAP1B/OVERCHUTE/FLOW/02APR1997/5MIN/100YEAR/
        Number of actual data:  288  Header length:   0
        Compression:   0  Quality:   0
 -----DSS--- ZREAD Unit  71; Vers.    4:  /CAP1B/OVERCHUTE/FLOW/02APR1997/5MIN/100YEAR/
      ----DSS---Debug:  Enter ZRRTSB;  Unit:  71
        NSTART:  290   NVALS:  744    JULS:   35519  ISTIME:  1440
        NLDATA:  288   JULSD:   35521
        JULS: 31MAR97       JULSD: 02APR97
        Quality Read: F,  Quality Requested: F
        ---ZRRTSB Calculations:  NPOS:    1  NDATA:  288  NREAD:  288  ILIM:  577
        After ZRDINF, Record found: T
        Pathname: /CAP1B/OVERCHUTE/FLOW/03APR1997/5MIN/100YEAR/
        Number of actual data:  288  Header length:   0
        Compression:   0  Quality:   0
 -----DSS--- ZREAD Unit  71; Vers.    4:  /CAP1B/OVERCHUTE/FLOW/03APR1997/5MIN/100YEAR/
      ----DSS---Debug:  Enter ZRRTSB;  Unit:  71
        NSTART:  578   NVALS:  744    JULS:   35519  ISTIME:  1440
        NLDATA:  288   JULSD:   35522
        JULS: 31MAR97       JULSD: 03APR97
        Quality Read: F,  Quality Requested: F
        ---ZRRTSB Calculations:  NPOS:    1  NDATA:  288  NREAD:  167  ILIM:  744
      ----- Exiting ZRRTS, Number of data values:    744,  Status:  0
        Offset:       0,  Units: CFS      ,  Type:INST-VAL
        ----- Entering ZRRTSX for unit 71 -----
 Pathname: /CAP1B/OVERCHUTE/FLOW//5MIN/100YEAR/
        Time Window set.  Interval:     5  Number of data values:      1
        Starting date and time:  Apr 3, 1997  1355  (  35522  835)
        Ending   date and time:  Apr 3, 1997  1355  (  35522  835)
        Input time offset:      0
        After ZRDINF, Record found: T
        Pathname: /CAP1B/OVERCHUTE/FLOW/03APR1997/5MIN/100YEAR/
        Number of actual data:  288  Header length:   0
        Compression:   0  Quality:   0
 -----DSS--- ZREAD Unit  71; Vers.    4:  /CAP1B/OVERCHUTE/FLOW/03APR1997/5MIN/100YEAR/
      ----DSS---Debug:  Enter ZRRTSB;  Unit:  71
        NSTART:    1   NVALS:    1    JULS:   35522  ISTIME:   835
        NLDATA:  288   JULSD:   35522
        JULS: 03APR97       JULSD: 03APR97
```

```
        Quality Read: F,  Quality Requested: F
        ---ZRRTSB Calculations:  NPOS:  167  NDATA:  288  NREAD:    1  ILIM:    1
      ----- Exiting ZRRTS, Number of data values:      1,  Status:  0
        Offset:        0,  Units: CFS      ,  Type:INST-VAL
        ----- Entering ZRRTSX for unit 71 -----
 Pathname: /CAP1B/OVERCHUTE/FLOW//5MIN/100YEAR/
        Time Window set.  Interval:     5  Number of data values:    744
        Starting date and time:  Apr 3, 1997  1355  (  35522  835)
        Ending   date and time:  Apr 6, 1997  0350  (  35525  230)
        Input time offset:      0
        After ZRDINF, Record found: T
        Pathname: /CAP1B/OVERCHUTE/FLOW/03APR1997/5MIN/100YEAR/
        Number of actual data:  288  Header length:   0
        Compression:   0  Quality:   0
 -----DSS--- ZREAD Unit  71; Vers.    4:  /CAP1B/OVERCHUTE/FLOW/03APR1997/5MIN/100YEAR/
      ----DSS---Debug:  Enter ZRRTSB;  Unit:  71
        NSTART:    1   NVALS:  744    JULS:   35522  ISTIME:   835
        NLDATA:  288   JULSD:   35522
        JULS: 03APR97       JULSD: 03APR97
        Quality Read: F,  Quality Requested: F
        ---ZRRTSB Calculations:  NPOS:  167  NDATA:  288  NREAD:  122  ILIM:  122
        After ZRDINF, Record found: T
        Pathname: /CAP1B/OVERCHUTE/FLOW/04APR1997/5MIN/100YEAR/
        Number of actual data:  288  Header length:   0
        Compression:   0  Quality:   0
 -----DSS--- ZREAD Unit  71; Vers.    4:  /CAP1B/OVERCHUTE/FLOW/04APR1997/5MIN/100YEAR/
      ----DSS---Debug:  Enter ZRRTSB;  Unit:  71
        NSTART:  123   NVALS:  744    JULS:   35522  ISTIME:   835
        NLDATA:  288   JULSD:   35523
        JULS: 03APR97       JULSD: 04APR97
        Quality Read: F,  Quality Requested: F
        ---ZRRTSB Calculations:  NPOS:    1  NDATA:  288  NREAD:  288  ILIM:  410
        After ZRDINF, Record found: F
        Pathname: /CAP1B/OVERCHUTE/FLOW/05APR1997/5MIN/100YEAR/
      ----DSS---Debug:  Enter ZRRTSB;  Unit:  71
        NSTART:  411   NVALS:  744    JULS:   35522  ISTIME:   835
        NLDATA:  288   JULSD:   35524
        JULS: 03APR97       JULSD: 05APR97
        Quality Read: F,  Quality Requested: F
        ---ZRRTSB Calculations:  NPOS:    1  NDATA:  288  NREAD:  288  ILIM:  698
 -----DSS*** ZRRTS:  CAUTION - Data block not found in file.  Unit:  71
 Pathname: /CAP1B/OVERCHUTE/FLOW/05APR1997/5MIN/100YEAR/
        After ZRDINF, Record found: F
        Pathname: /CAP1B/OVERCHUTE/FLOW/06APR1997/5MIN/100YEAR/
      ----DSS---Debug:  Enter ZRRTSB;  Unit:  71
        NSTART:  699   NVALS:  744    JULS:   35522  ISTIME:   835
        NLDATA:  288   JULSD:   35525
        JULS: 03APR97       JULSD: 06APR97
        Quality Read: F,  Quality Requested: F
        ---ZRRTSB Calculations:  NPOS:    1  NDATA:  288  NREAD:   46  ILIM:  744
      ----- Exiting ZRRTS, Number of data values:    744,  Status:  3
        Offset:        0,  Units: CFS      ,  Type:INST-VAL
        ----- Entering ZRRTSX for unit 71 -----
 Pathname: /ADOT EAST BASIN/AT SUPERSTITION/FLOW//5MIN/100YR/
        Time Window set.  Interval:     5  Number of data values:      1
        Starting date and time:  Mar 31, 1997  2400  (  35519 1440)
        Ending   date and time:  Mar 31, 1997  2400  (  35519 1440)
        Input time offset:      0
        After ZRDINF, Record found: T
        Pathname: /ADOT EAST BASIN/AT SUPERSTITION/FLOW/31MAR1997/5MIN/100YR/
        Number of actual data:  288  Header length:   0
        Compression:   0  Quality:   0
 -----DSS--- ZREAD Unit  71; Vers.    2:  /ADOT EAST BASIN/AT SUPERSTITION/FLOW/31MAR1997/5MIN/100YR/
      ----DSS---Debug:  Enter ZRRTSB;  Unit:  71
        NSTART:    1   NVALS:    1    JULS:   35519  ISTIME:  1440
        NLDATA:  288   JULSD:   35519
        JULS: 31MAR97       JULSD: 31MAR97
        Quality Read: F,  Quality Requested: F
        ---ZRRTSB Calculations:  NPOS:  288  NDATA:  288  NREAD:    1  ILIM:    1
      ----- Exiting ZRRTS, Number of data values:      1,  Status:  0
        Offset:        0,  Units: CFS      ,  Type:INST-VAL
        ----- Entering ZRRTSX for unit 71 -----
 Pathname: /ADOT EAST BASIN/AT SUPERSTITION/FLOW//5MIN/100YR/
        Time Window set.  Interval:     5  Number of data values:    744
        Starting date and time:  Mar 31, 1997  2400  (  35519 1440)
        Ending   date and time:  Apr 3, 1997  1355  (  35522  835)
        Input time offset:      0
        After ZRDINF, Record found: T
        Pathname: /ADOT EAST BASIN/AT SUPERSTITION/FLOW/31MAR1997/5MIN/100YR/
        Number of actual data:  288  Header length:   0
        Compression:   0  Quality:   0
 -----DSS--- ZREAD Unit  71; Vers.    2:  /ADOT EAST BASIN/AT SUPERSTITION/FLOW/31MAR1997/5MIN/100YR/
      ----DSS---Debug:  Enter ZRRTSB;  Unit:  71
        NSTART:    1   NVALS:  744    JULS:   35519  ISTIME:  1440
        NLDATA:  288   JULSD:   35519
        JULS: 31MAR97       JULSD: 31MAR97
        Quality Read: F,  Quality Requested: F
        ---ZRRTSB Calculations:  NPOS:  288  NDATA:  288  NREAD:    1  ILIM:    1
        After ZRDINF, Record found: T
        Pathname: /ADOT EAST BASIN/AT SUPERSTITION/FLOW/01APR1997/5MIN/100YR/
        Number of actual data:  288  Header length:   0
        Compression:   0  Quality:   0
 -----DSS--- ZREAD Unit  71; Vers.    2:  /ADOT EAST BASIN/AT SUPERSTITION/FLOW/01APR1997/5MIN/100YR/
      ----DSS---Debug:  Enter ZRRTSB;  Unit:  71
        NSTART:    2   NVALS:  744    JULS:   35519  ISTIME:  1440
```

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        NLDATA:  288   JULSD:   35520
        JULS: 31MAR97       JULSD: 01APR97
        Quality Read: F,  Quality Requested: F
        ---ZRRTSB Calculations:  NPOS:    1  NDATA:  288  NREAD:  288  ILIM:  289
        After ZRDINF, Record found: T
        Pathname: /ADOT EAST BASIN/AT SUPERSTITION/FLOW/02APR1997/5MIN/100YR/
        Number of actual data:  288  Header length:   0
        Compression:   0  Quality:   0
-----DSS--- ZREAD Unit  71; Vers.    2:  /ADOT EAST BASIN/AT SUPERSTITION/FLOW/02APR1997/5MIN/100YR/
      ----DSS---Debug:  Enter ZRRTSB;  Unit:  71
        NSTART:  290   NVALS:  744    JULS:   35519  ISTIME:  1440
        NLDATA:  288   JULSD:   35521
        JULS: 31MAR97       JULSD: 02APR97
        Quality Read: F,  Quality Requested: F
        ---ZRRTSB Calculations:  NPOS:    1  NDATA:  288  NREAD:  288  ILIM:  577
        After ZRDINF, Record found: T
        Pathname: /ADOT EAST BASIN/AT SUPERSTITION/FLOW/03APR1997/5MIN/100YR/
        Number of actual data:  288  Header length:   0
        Compression:   0  Quality:   0
-----DSS--- ZREAD Unit  71; Vers.    2:  /ADOT EAST BASIN/AT SUPERSTITION/FLOW/03APR1997/5MIN/100YR/
      ----DSS---Debug:  Enter ZRRTSB;  Unit:  71
        NSTART:  578   NVALS:  744    JULS:   35519  ISTIME:  1440
        NLDATA:  288   JULSD:   35522
        JULS: 31MAR97       JULSD: 03APR97
        Quality Read: F,  Quality Requested: F
        ---ZRRTSB Calculations:  NPOS:    1  NDATA:  288  NREAD:  167  ILIM:  744
      ----- Exiting ZRRTS, Number of data values:    744,  Status:  0
        Offset:       0,  Units: CFS     ,  Type:INST-VAL
        ----- Entering ZRRTSX for unit 71 -----
Pathname: /ADOT EAST BASIN/AT SUPERSTITION/FLOW//5MIN/100YR/
        Time Window set.  Interval:     5  Number of data values:      1
        Starting date and time:  Apr 3, 1997  1355  (  35522  835)
        Ending   date and time:  Apr 3, 1997  1355  (  35522  835)
        Input time offset:      0
        After ZRDINF, Record found: T
        Pathname: /ADOT EAST BASIN/AT SUPERSTITION/FLOW/03APR1997/5MIN/100YR/
        Number of actual data:  288  Header length:   0
        Compression:   0  Quality:   0
-----DSS--- ZREAD Unit  71; Vers.    2:  /ADOT EAST BASIN/AT SUPERSTITION/FLOW/03APR1997/5MIN/100YR/
      ----DSS---Debug:  Enter ZRRTSB;  Unit:  71
        NSTART:    1   NVALS:    1    JULS:   35522  ISTIME:   835
        NLDATA:  288   JULSD:   35522
        JULS: 03APR97       JULSD: 03APR97
        Quality Read: F,  Quality Requested: F
        ---ZRRTSB Calculations:  NPOS:  167  NDATA:  288  NREAD:    1  ILIM:    1
      ----- Exiting ZRRTS, Number of data values:      1,  Status:  0
        Offset:       0,  Units: CFS     ,  Type:INST-VAL
        ----- Entering ZRRTSX for unit 71 -----
Pathname: /ADOT EAST BASIN/AT SUPERSTITION/FLOW//5MIN/100YR/
        Time Window set.  Interval:     5  Number of data values:    744
        Starting date and time:  Apr 3, 1997  1355  (  35522  835)
        Ending   date and time:  Apr 6, 1997  0350  (  35525  230)
        Input time offset:      0
        After ZRDINF, Record found: T
        Pathname: /ADOT EAST BASIN/AT SUPERSTITION/FLOW/03APR1997/5MIN/100YR/
        Number of actual data:  288  Header length:   0
        Compression:   0  Quality:   0
-----DSS--- ZREAD Unit  71; Vers.    2:  /ADOT EAST BASIN/AT SUPERSTITION/FLOW/03APR1997/5MIN/100YR/
      ----DSS---Debug:  Enter ZRRTSB;  Unit:  71
        NSTART:    1   NVALS:  744    JULS:   35522  ISTIME:   835
        NLDATA:  288   JULSD:   35522
        JULS: 03APR97       JULSD: 03APR97
        Quality Read: F,  Quality Requested: F
        ---ZRRTSB Calculations:  NPOS:  167  NDATA:  288  NREAD:  122  ILIM:  122
        After ZRDINF, Record found: T
        Pathname: /ADOT EAST BASIN/AT SUPERSTITION/FLOW/04APR1997/5MIN/100YR/
        Number of actual data:  288  Header length:   0
        Compression:   0  Quality:   0
-----DSS--- ZREAD Unit  71; Vers.    2:  /ADOT EAST BASIN/AT SUPERSTITION/FLOW/04APR1997/5MIN/100YR/
      ----DSS---Debug:  Enter ZRRTSB;  Unit:  71
        NSTART:  123   NVALS:  744    JULS:   35522  ISTIME:   835
        NLDATA:  288   JULSD:   35523
        JULS: 03APR97       JULSD: 04APR97
        Quality Read: F,  Quality Requested: F
        ---ZRRTSB Calculations:  NPOS:    1  NDATA:  288  NREAD:  288  ILIM:  410
        After ZRDINF, Record found: F
        Pathname: /ADOT EAST BASIN/AT SUPERSTITION/FLOW/05APR1997/5MIN/100YR/
      ----DSS---Debug:  Enter ZRRTSB;  Unit:  71
        NSTART:  411   NVALS:  744    JULS:   35522  ISTIME:   835
        NLDATA:  288   JULSD:   35524
        JULS: 03APR97       JULSD: 05APR97
        Quality Read: F,  Quality Requested: F
        ---ZRRTSB Calculations:  NPOS:    1  NDATA:  288  NREAD:  288  ILIM:  698
-----DSS*** ZRRTS:  CAUTION - Data block not found in file.  Unit:  71
Pathname: /ADOT EAST BASIN/AT SUPERSTITION/FLOW/05APR1997/5MIN/100YR/
        After ZRDINF, Record found: F
        Pathname: /ADOT EAST BASIN/AT SUPERSTITION/FLOW/06APR1997/5MIN/100YR/
      ----DSS---Debug:  Enter ZRRTSB;  Unit:  71
        NSTART:  699   NVALS:  744    JULS:   35522  ISTIME:   835
        NLDATA:  288   JULSD:   35525
        JULS: 03APR97       JULSD: 06APR97
        Quality Read: F,  Quality Requested: F
        ---ZRRTSB Calculations:  NPOS:    1  NDATA:  288  NREAD:   46  ILIM:  744
      ----- Exiting ZRRTS, Number of data values:    744,  Status:  3
        Offset:       0,  Units: CFS     ,  Type:INST-VAL
```

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        ----- Entering ZRRTSX for unit 71 -----
 Pathname: /ADOT WEST BASIN/AT SUPERSTITION/FLOW//5MIN/100YR/
        Time Window set.  Interval:     5  Number of data values:      1
        Starting date and time:  Mar 31, 1997  2400  (  35519 1440)
        Ending   date and time:  Mar 31, 1997  2400  (  35519 1440)
        Input time offset:      0
        After ZRDINF, Record found: T
        Pathname: /ADOT WEST BASIN/AT SUPERSTITION/FLOW/31MAR1997/5MIN/100YR/
        Number of actual data:  288  Header length:   0
        Compression:   0  Quality:   0
 -----DSS--- ZREAD Unit  71; Vers.    2:  /ADOT WEST BASIN/AT SUPERSTITION/FLOW/31MAR1997/5MIN/100YR/
      ----DSS---Debug:  Enter ZRRTSB;  Unit:  71
        NSTART:    1   NVALS:    1    JULS:   35519  ISTIME:  1440
        NLDATA:  288   JULSD:   35519
        JULS: 31MAR97        JULSD: 31MAR97
        Quality Read: F,  Quality Requested: F
        ---ZRRTSB Calculations:  NPOS:  288  NDATA:  288  NREAD:    1  ILIM:    1
      ----- Exiting ZRRTS, Number of data values:      1,  Status:  0
        Offset:        0,  Units: CFS      ,  Type:INST-VAL
        ----- Entering ZRRTSX for unit 71 -----
 Pathname: /ADOT WEST BASIN/AT SUPERSTITION/FLOW//5MIN/100YR/
        Time Window set.  Interval:     5  Number of data values:    744
        Starting date and time:  Mar 31, 1997  2400  (  35519 1440)
        Ending   date and time:  Apr 3, 1997  1355  (  35522  835)
        Input time offset:      0
        After ZRDINF, Record found: T
        Pathname: /ADOT WEST BASIN/AT SUPERSTITION/FLOW/31MAR1997/5MIN/100YR/
        Number of actual data:  288  Header length:   0
        Compression:   0  Quality:   0
 -----DSS--- ZREAD Unit  71; Vers.    2:  /ADOT WEST BASIN/AT SUPERSTITION/FLOW/31MAR1997/5MIN/100YR/
      ----DSS---Debug:  Enter ZRRTSB;  Unit:  71
        NSTART:    1   NVALS:  744    JULS:   35519  ISTIME:  1440
        NLDATA:  288   JULSD:   35519
        JULS: 31MAR97        JULSD: 31MAR97
        Quality Read: F,  Quality Requested: F
        ---ZRRTSB Calculations:  NPOS:  288  NDATA:  288  NREAD:    1  ILIM:    1
        After ZRDINF, Record found: T
        Pathname: /ADOT WEST BASIN/AT SUPERSTITION/FLOW/01APR1997/5MIN/100YR/
        Number of actual data:  288  Header length:   0
        Compression:   0  Quality:   0
 -----DSS--- ZREAD Unit  71; Vers.    2:  /ADOT WEST BASIN/AT SUPERSTITION/FLOW/01APR1997/5MIN/100YR/
      ----DSS---Debug:  Enter ZRRTSB;  Unit:  71
        NSTART:    2   NVALS:  744    JULS:   35519  ISTIME:  1440
        NLDATA:  288   JULSD:   35520
        JULS: 31MAR97        JULSD: 01APR97
        Quality Read: F,  Quality Requested: F
        ---ZRRTSB Calculations:  NPOS:    1  NDATA:  288  NREAD:  288  ILIM:  289
        After ZRDINF, Record found: T
        Pathname: /ADOT WEST BASIN/AT SUPERSTITION/FLOW/02APR1997/5MIN/100YR/
        Number of actual data:  288  Header length:   0
        Compression:   0  Quality:   0
 -----DSS--- ZREAD Unit  71; Vers.    2:  /ADOT WEST BASIN/AT SUPERSTITION/FLOW/02APR1997/5MIN/100YR/
      ----DSS---Debug:  Enter ZRRTSB;  Unit:  71
        NSTART:  290   NVALS:  744    JULS:   35519  ISTIME:  1440
        NLDATA:  288   JULSD:   35521
        JULS: 31MAR97        JULSD: 02APR97
        Quality Read: F,  Quality Requested: F
        ---ZRRTSB Calculations:  NPOS:    1  NDATA:  288  NREAD:  288  ILIM:  577
        After ZRDINF, Record found: T
        Pathname: /ADOT WEST BASIN/AT SUPERSTITION/FLOW/03APR1997/5MIN/100YR/
        Number of actual data:  288  Header length:   0
        Compression:   0  Quality:   0
 -----DSS--- ZREAD Unit  71; Vers.    2:  /ADOT WEST BASIN/AT SUPERSTITION/FLOW/03APR1997/5MIN/100YR/
      ----DSS---Debug:  Enter ZRRTSB;  Unit:  71
        NSTART:  578   NVALS:  744    JULS:   35519  ISTIME:  1440
        NLDATA:  288   JULSD:   35522
        JULS: 31MAR97        JULSD: 03APR97
        Quality Read: F,  Quality Requested: F
        ---ZRRTSB Calculations:  NPOS:    1  NDATA:  288  NREAD:  167  ILIM:  744
      ----- Exiting ZRRTS, Number of data values:    744,  Status:  0
        Offset:        0,  Units: CFS      ,  Type:INST-VAL
        ----- Entering ZRRTSX for unit 71 -----
 Pathname: /ADOT WEST BASIN/AT SUPERSTITION/FLOW//5MIN/100YR/
        Time Window set.  Interval:     5  Number of data values:      1
        Starting date and time:  Apr 3, 1997  1355  (  35522  835)
        Ending   date and time:  Apr 3, 1997  1355  (  35522  835)
        Input time offset:      0
        After ZRDINF, Record found: T
        Pathname: /ADOT WEST BASIN/AT SUPERSTITION/FLOW/03APR1997/5MIN/100YR/
        Number of actual data:  288  Header length:   0
        Compression:   0  Quality:   0
 -----DSS--- ZREAD Unit  71; Vers.    2:  /ADOT WEST BASIN/AT SUPERSTITION/FLOW/03APR1997/5MIN/100YR/
      ----DSS---Debug:  Enter ZRRTSB;  Unit:  71
        NSTART:    1   NVALS:    1    JULS:   35522  ISTIME:   835
        NLDATA:  288   JULSD:   35522
        JULS: 03APR97        JULSD: 03APR97
        Quality Read: F,  Quality Requested: F
        ---ZRRTSB Calculations:  NPOS:  167  NDATA:  288  NREAD:    1  ILIM:    1
      ----- Exiting ZRRTS, Number of data values:      1,  Status:  0
        Offset:        0,  Units: CFS      ,  Type:INST-VAL
        ----- Entering ZRRTSX for unit 71 -----
 Pathname: /ADOT WEST BASIN/AT SUPERSTITION/FLOW//5MIN/100YR/
        Time Window set.  Interval:     5  Number of data values:    744
        Starting date and time:  Apr 3, 1997  1355  (  35522  835)
        Ending   date and time:  Apr 6, 1997  0350  (  35525  230)
```

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        Input time offset:      0
        After ZRDINF, Record found: T
        Pathname: /ADOT WEST BASIN/AT SUPERSTITION/FLOW/03APR1997/5MIN/100YR/
        Number of actual data:  288  Header length:   0
        Compression:   0  Quality:   0
 -----DSS--- ZREAD Unit  71; Vers.    2:  /ADOT WEST BASIN/AT SUPERSTITION/FLOW/03APR1997/5MIN/100YR/
      ----DSS---Debug:  Enter ZRRTSB;  Unit:  71
        NSTART:    1   NVALS:  744    JULS:   35522  ISTIME:   835
        NLDATA:  288   JULSD:   35522
        JULS: 03APR97       JULSD: 03APR97
        Quality Read: F,  Quality Requested: F
        ---ZRRTSB Calculations:  NPOS:  167  NDATA:  288  NREAD:  122  ILIM:  122
        After ZRDINF, Record found: T
        Pathname: /ADOT WEST BASIN/AT SUPERSTITION/FLOW/04APR1997/5MIN/100YR/
        Number of actual data:  288  Header length:   0
        Compression:   0  Quality:   0
 -----DSS--- ZREAD Unit  71; Vers.    2:  /ADOT WEST BASIN/AT SUPERSTITION/FLOW/04APR1997/5MIN/100YR/
      ----DSS---Debug:  Enter ZRRTSB;  Unit:  71
        NSTART:  123   NVALS:  744    JULS:   35522  ISTIME:   835
        NLDATA:  288   JULSD:   35523
        JULS: 03APR97       JULSD: 04APR97
        Quality Read: F,  Quality Requested: F
        ---ZRRTSB Calculations:  NPOS:    1  NDATA:  288  NREAD:  288  ILIM:  410
        After ZRDINF, Record found: F
        Pathname: /ADOT WEST BASIN/AT SUPERSTITION/FLOW/05APR1997/5MIN/100YR/
      ----DSS---Debug:  Enter ZRRTSB;  Unit:  71
        NSTART:  411   NVALS:  744    JULS:   35522  ISTIME:   835
        NLDATA:  288   JULSD:   35524
        JULS: 03APR97       JULSD: 05APR97
        Quality Read: F,  Quality Requested: F
        ---ZRRTSB Calculations:  NPOS:    1  NDATA:  288  NREAD:  288  ILIM:  698
 -----DSS*** ZRRTS:  CAUTION - Data block not found in file.  Unit:  71
 Pathname: /ADOT WEST BASIN/AT SUPERSTITION/FLOW/05APR1997/5MIN/100YR/
        After ZRDINF, Record found: F
        Pathname: /ADOT WEST BASIN/AT SUPERSTITION/FLOW/06APR1997/5MIN/100YR/
      ----DSS---Debug:  Enter ZRRTSB;  Unit:  71
        NSTART:  699   NVALS:  744    JULS:   35522  ISTIME:   835
        NLDATA:  288   JULSD:   35525
        JULS: 03APR97       JULSD: 06APR97
        Quality Read: F,  Quality Requested: F
        ---ZRRTSB Calculations:  NPOS:    1  NDATA:  288  NREAD:   46  ILIM:  744
      ----- Exiting ZRRTS, Number of data values:    744,  Status:  3
        Offset:       0,  Units: CFS      ,  Type:INST-VAL
1
```

RUNOFF SUMMARY
FLOW IN CUBIC FEET PER SECOND
TIME IN HOURS, AREA IN SQUARE MILES

+	OPERATION	STATION	PEAK FLOW	TIME OF PEAK	AVERAGE FLOW FOR MAXIMUM PERIOD 6-HOUR	24-HOUR	72-HOUR	BASIN AREA	MAXIMUM STAGE	TIME OF MAX STAGE
+	HYDROGRAPH AT	65A1	655.	13.00	182.	59.	20.	.97		
+	DIVERSION TO	FF65A1	23.	8.58	17.	5.	2.	.97		
+	HYDROGRAPH AT	R65A1	655.	13.00	182.	54.	18.	.97		
+	HYDROGRAPH AT	CAP1A	710.	12.67	132.	36.	12.	.96		
+	ROUTED TO	RCAP1A	643.	13.08	132.	36.	12.	.96		
+	2 COMBINED AT	CCAP1A	1283.	13.08	311.	89.	30.	1.94		
+	HYDROGRAPH AT	65A2	442.	12.67	90.	28.	9.	.54		
+	DIVERSION TO	FF65A2	61.	11.83	14.	5.	2.	.54		
+	HYDROGRAPH AT	R65A2	442.	12.67	86.	23.	8.	.54		
+	HYDROGRAPH AT	CAP1B	710.	12.67	132.	36.	12.	.96		
+	ROUTED TO	RCAP1B	658.	13.00	132.	36.	12.	.96		
+	2 COMBINED AT	CCAP1B	1014.	12.83	217.	59.	20.	1.51		
+	2 COMBINED AT	C65A12	2227.	13.00	522.	147.	49.	3.44		
+	DIVERSION TO	BYPASO	380.	12.17	210.	69.	23.	3.44		
	HYDROGRAPH AT									

+		DI-BAS	1847.	13.00	312.	78.	26.	3.44
+	DIVERSION TO	DLON-O	35.	12.17	12.	3.	1.	3.44
+	HYDROGRAPH AT	LOFLON	1812.	13.00	300.	75.	25.	3.44
+	ROUTED TO	SDDB-N	0.	.00	0.	0.	0.	3.44
+	HYDROGRAPH AT	65A3	789.	13.00	204.	64.	21.	1.21
+	DIVERSION TO	FF65A3	164.	12.00	33.	11.	4.	1.21
+	HYDROGRAPH AT	R65A3	789.	13.00	193.	53.	18.	1.21
+	DIVERSION TO	DLOS-O	35.	12.08	32.	12.	4.	1.21
+	HYDROGRAPH AT	LOFLOS	754.	13.00	161.	40.	13.	1.21
+	ROUTED TO	SDDB-S	0.	.00	0.	0.	0.	1.21
+	2 COMBINED AT	SDWDBS	0.	.00	0.	0.	0.	4.65
+	HYDROGRAPH AT	BYPASI	380.	12.17	210.	69.	23.	3.44
+	ROUTED TO	RBYPAS	380.	12.92	210.	69.	23.	3.44
+	2 COMBINED AT	CPMRID	380.	12.92	210.	69.	23.	4.65
+	ROUTED TO	RSDW1	380.	13.42	210.	69.	23.	4.65
+	ROUTED TO	RSDW2	380.	14.50	210.	69.	23.	4.65
+	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	598.	13.00	295.	97.	33.	6.45
+	DIVERSION TO	DIRS65	176.	12.92	26.	6.	2.	6.45
+	HYDROGRAPH AT	DI65B	430.	13.00	270.	91.	30.	6.45
+	HYDROGRAPH AT	DLON-I	35.	12.17	12.	3.	1.	3.44
+	HYDROGRAPH AT	DLOS-I	35.	12.08	32.	12.	4.	1.21
+	2 COMBINED AT	CPLFLO	70.	12.17	44.	15.	5.	4.65
+	ROUTED TO	ELLSD1	71.	12.42	44.	15.	5.	4.65
+	2 COMBINED AT	CP65A	500.	13.00	313.	106.	35.	6.45
+	ROUTED TO	65AT-3	500.	13.17	313.	106.	35.	6.45

+	HYDROGRAPH AT	DR65B	176.	12.92	26.	6.	2.	6.45
+	ROUTED TO	RS65A	8.	15.00	8.	6.	2.	6.45
+	2 COMBINED AT	CP65	508.	14.25	320.	111.	37.	6.45
+	ROUTED TO	65T66	508.	14.25	320.	111.	37.	6.45
+	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	912.	14.33	705.	363.	122.	9.79
+	ROUTED TO	66CTD	912.	14.33	704.	363.	122.	9.79
+	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	925.	14.33	713.	375.	132.	13.13
+	ROUTED TO	RC-WA	924.	14.33	713.	375.	132.	13.13
+	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	924.	14.33	719.	392.	144.	13.13
+	ROUTED TO	66T66D	924.	14.33	718.	392.	144.	13.13
+	ROUTED TO	66-66D	923.	14.33	718.	392.	144.	13.13
+	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							

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+                    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     1062.  14.25       795.       423.      154.     15.63
        ROUTED TO
+                  66T70A     1057.  14.25       793.       423.      154.     15.63
        ROUTED TO
+                  66T70B     1056.  14.25       793.       423.      154.     15.63
        ROUTED TO
+                   CULVT     1051.  14.25       791.       422.      153.     15.63
        ROUTED TO
+                  66T70C     1047.  14.42       789.       422.      153.     15.63
1
                    SUMMARY OF KINEMATIC WAVE - MUSKINGUM-CUNGE ROUTING
                        (FLOW IS DIRECT RUNOFF WITHOUT BASE FLOW)
                                                                  INTERPOLATED TO
                                                                COMPUTATION INTERVAL
     ISTAQ    ELEMENT      DT       PEAK    TIME TO     VOLUME      DT      PEAK   TIME TO     VOLUME
                                             PEAK                                     PEAK
                          (MIN)     (CFS)    (MIN)      (IN)     (MIN)    (CFS)    (MIN)       (IN)
     FOR STORM = 1  STORM AREA (SQ MI) =       .01
       ELLSD1  MANE        2.00     70.95   744.00       .12      5.00    70.27   745.00        .12

CONTINUITY SUMMARY (AC-FT) - INFLOW= .3091E+02 EXCESS= .0000E+00 OUTFLOW= .3089E+02 BASIN STORAGE= .1274E-02 PERCENT ERROR=    .1

     FOR STORM = 2  STORM AREA (SQ MI) =      1.00
       ELLSD1  MANE        2.25     70.82   749.25       .12      5.00    70.54   745.00        .12

CONTINUITY SUMMARY (AC-FT) - INFLOW= .3081E+02 EXCESS= .0000E+00 OUTFLOW= .3080E+02 BASIN STORAGE= .1414E-02 PERCENT ERROR=    .0

     FOR STORM = 3  STORM AREA (SQ MI) =      5.00
       ELLSD1  MANE        2.25     70.82   749.25       .12      5.00    70.54   745.00        .12

CONTINUITY SUMMARY (AC-FT) - INFLOW= .3042E+02 EXCESS= .0000E+00 OUTFLOW= .3040E+02 BASIN STORAGE= .1351E-02 PERCENT ERROR=    .0

     FOR STORM = 4  STORM AREA (SQ MI) =     10.00
       ELLSD1  MANE        1.25     71.03   745.00       .12      5.00    71.03   745.00        .12

CONTINUITY SUMMARY (AC-FT) - INFLOW= .2975E+02 EXCESS= .0000E+00 OUTFLOW= .2970E+02 BASIN STORAGE= .1393E-02 PERCENT ERROR=    .2

     FOR STORM = 5  STORM AREA (SQ MI) =     30.00
       ELLSD1  MANE        1.75     74.93   745.50       .12      5.00    70.00   760.00        .12

CONTINUITY SUMMARY (AC-FT) - INFLOW= .2917E+02 EXCESS= .0000E+00 OUTFLOW= .2914E+02 BASIN STORAGE= .1576E-02 PERCENT ERROR=    .1

     FOR STORM = 6  STORM AREA (SQ MI) =     60.00
       ELLSD1  MANE        2.00     74.56   750.00       .11      5.00    74.56   750.00        .11
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CONTINUITY SUMMARY (AC-FT) - INFLOW= .2814E+02 EXCESS= .0000E+00 OUTFLOW= .2812E+02 BASIN STORAGE= .1546E-02 PERCENT ERROR=    .1

        FOR STORM = 7  STORM AREA (SQ MI) =      90.00
          ELLSD1  MANE         2.25     77.88    751.50       .11      5.00     70.09    760.00         .11

CONTINUITY SUMMARY (AC-FT) - INFLOW= .2786E+02 EXCESS= .0000E+00 OUTFLOW= .2784E+02 BASIN STORAGE= .1637E-02 PERCENT ERROR=    .1

        FOR STORM = 8  STORM AREA (SQ MI) =     120.00
          ELLSD1  MANE         2.00     76.68    752.00       .11      5.00     70.01    765.00         .11

CONTINUITY SUMMARY (AC-FT) - INFLOW= .2760E+02 EXCESS= .0000E+00 OUTFLOW= .2757E+02 BASIN STORAGE= .1484E-02 PERCENT ERROR=    .1

        FOR STORM = 9  STORM AREA (SQ MI) =     150.00
          ELLSD1  MANE         2.00     70.87    758.00       .11      5.00     70.17    755.00         .11

CONTINUITY SUMMARY (AC-FT) - INFLOW= .2723E+02 EXCESS= .0000E+00 OUTFLOW= .2722E+02 BASIN STORAGE= .1474E-02 PERCENT ERROR=    .1

        FOR STORM = 1  STORM AREA (SQ MI) =        .01
          65AT-3  MANE         1.33    500.12    773.40       .63      5.00    500.00    785.00         .63

CONTINUITY SUMMARY (AC-FT) - INFLOW= .2178E+03 EXCESS= .0000E+00 OUTFLOW= .2177E+03 BASIN STORAGE= .1768E-03 PERCENT ERROR=    .0

        FOR STORM = 2  STORM AREA (SQ MI) =       1.00
          65AT-3  MANE         1.33    500.62    773.40       .63      5.00    500.00    785.00         .63

CONTINUITY SUMMARY (AC-FT) - INFLOW= .2165E+03 EXCESS= .0000E+00 OUTFLOW= .2165E+03 BASIN STORAGE= .1768E-03 PERCENT ERROR=    .0

        FOR STORM = 3  STORM AREA (SQ MI) =       5.00
          65AT-3  MANE         1.33    501.35    773.40       .62      5.00    500.00    785.00         .62

CONTINUITY SUMMARY (AC-FT) - INFLOW= .2129E+03 EXCESS= .0000E+00 OUTFLOW= .2129E+03 BASIN STORAGE= .1768E-03 PERCENT ERROR=    .0

        FOR STORM = 4  STORM AREA (SQ MI) =      10.00
          65AT-3  MANE         1.33    500.39    782.68       .60      5.00    500.00    795.00         .60

CONTINUITY SUMMARY (AC-FT) - INFLOW= .2075E+03 EXCESS= .0000E+00 OUTFLOW= .2075E+03 BASIN STORAGE= .1768E-03 PERCENT ERROR=    .0

        FOR STORM = 5  STORM AREA (SQ MI) =      30.00
          65AT-3  MANE         1.33    500.83    793.30       .58      5.00    500.00    805.00         .58

CONTINUITY SUMMARY (AC-FT) - INFLOW= .1990E+03 EXCESS= .0000E+00 OUTFLOW= .1990E+03 BASIN STORAGE= .1768E-03 PERCENT ERROR=    .0

        FOR STORM = 6  STORM AREA (SQ MI) =      60.00
          65AT-3  MANE         1.33    500.84    813.20       .55      5.00    500.00    825.00         .55

CONTINUITY SUMMARY (AC-FT) - INFLOW= .1879E+03 EXCESS= .0000E+00 OUTFLOW= .1879E+03 BASIN STORAGE= .1768E-03 PERCENT ERROR=    .0

        FOR STORM = 7  STORM AREA (SQ MI) =      90.00
          65AT-3  MANE         1.33    500.39    827.79       .54      5.00    500.00    840.00         .54

CONTINUITY SUMMARY (AC-FT) - INFLOW= .1843E+03 EXCESS= .0000E+00 OUTFLOW= .1843E+03 BASIN STORAGE= .1768E-03 PERCENT ERROR=    .0

        FOR STORM = 8  STORM AREA (SQ MI) =     120.00
          65AT-3  MANE         1.33    500.23    847.69       .52      5.00    499.98    850.00         .52

CONTINUITY SUMMARY (AC-FT) - INFLOW= .1806E+03 EXCESS= .0000E+00 OUTFLOW= .1806E+03 BASIN STORAGE= .1768E-03 PERCENT ERROR=    .0

        FOR STORM = 9  STORM AREA (SQ MI) =     150.00
          65AT-3  MANE         1.33    491.36    860.86       .52      5.00    490.75    860.00         .52

CONTINUITY SUMMARY (AC-FT) - INFLOW= .1778E+03 EXCESS= .0000E+00 OUTFLOW= .1778E+03 BASIN STORAGE= .1779E-03 PERCENT ERROR=    .0

        FOR STORM = 1  STORM AREA (SQ MI) =        .01
          65T66  MANE         1.05    509.16    854.95       .69      5.00    509.16    855.00         .69

CONTINUITY SUMMARY (AC-FT) - INFLOW= .2365E+03 EXCESS= .0000E+00 OUTFLOW= .2365E+03 BASIN STORAGE= .1378E-03 PERCENT ERROR=    .0

        FOR STORM = 2  STORM AREA (SQ MI) =       1.00
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65T66  MANE        1.05    509.06    854.99       .68      5.00    509.06    855.00         .68

CONTINUITY SUMMARY (AC-FT) - INFLOW= .2346E+03 EXCESS= .0000E+00 OUTFLOW= .2346E+03 BASIN STORAGE= .1377E-03 PERCENT ERROR=    .0

FOR STORM = 3  STORM AREA (SQ MI) =       5.00
65T66  MANE        1.05    508.21    854.22       .66      5.00    508.20    855.00         .66

CONTINUITY SUMMARY (AC-FT) - INFLOW= .2262E+03 EXCESS= .0000E+00 OUTFLOW= .2262E+03 BASIN STORAGE= .1376E-03 PERCENT ERROR=    .0

FOR STORM = 4  STORM AREA (SQ MI) =      10.00
65T66  MANE        1.05    507.16    854.58       .63      5.00    507.15    855.00         .63

CONTINUITY SUMMARY (AC-FT) - INFLOW= .2158E+03 EXCESS= .0000E+00 OUTFLOW= .2158E+03 BASIN STORAGE= .1378E-03 PERCENT ERROR=    .0

FOR STORM = 5  STORM AREA (SQ MI) =      30.00
65T66  MANE        1.05    505.21    855.22       .59      5.00    505.21    855.00         .59

CONTINUITY SUMMARY (AC-FT) - INFLOW= .2026E+03 EXCESS= .0000E+00 OUTFLOW= .2026E+03 BASIN STORAGE= .1373E-03 PERCENT ERROR=    .0

FOR STORM = 6  STORM AREA (SQ MI) =      60.00
65T66  MANE        1.05    502.63    851.92       .55      5.00    502.56    855.00         .55

CONTINUITY SUMMARY (AC-FT) - INFLOW= .1892E+03 EXCESS= .0000E+00 OUTFLOW= .1892E+03 BASIN STORAGE= .1389E-03 PERCENT ERROR=    .0

FOR STORM = 7  STORM AREA (SQ MI) =      90.00
65T66  MANE        1.05    500.00    837.04       .54      5.00    500.00    840.00         .54

CONTINUITY SUMMARY (AC-FT) - INFLOW= .1845E+03 EXCESS= .0000E+00 OUTFLOW= .1845E+03 BASIN STORAGE= .1373E-03 PERCENT ERROR=    .0

FOR STORM = 8  STORM AREA (SQ MI) =     120.00
65T66  MANE        1.05    499.85    851.77       .52      5.00    499.42    855.00         .52

CONTINUITY SUMMARY (AC-FT) - INFLOW= .1806E+03 EXCESS= .0000E+00 OUTFLOW= .1806E+03 BASIN STORAGE= .1397E-03 PERCENT ERROR=    .0

FOR STORM = 9  STORM AREA (SQ MI) =     150.00
65T66  MANE        1.06    489.67    861.28       .52      5.00    488.04    860.00         .52

CONTINUITY SUMMARY (AC-FT) - INFLOW= .1778E+03 EXCESS= .0000E+00 OUTFLOW= .1778E+03 BASIN STORAGE= .1376E-03 PERCENT ERROR=    .0

FOR STORM = 1  STORM AREA (SQ MI) =        .01
66C1T2  MANE        .75    410.00    886.49      2.94      5.00    410.00    890.00        2.94

CONTINUITY SUMMARY (AC-FT) - INFLOW= .5231E+03 EXCESS= .0000E+00 OUTFLOW= .5231E+03 BASIN STORAGE= .9382E-04 PERCENT ERROR=    .0

FOR STORM = 2  STORM AREA (SQ MI) =       1.00
66C1T2  MANE        .75    410.00    886.49      2.93      5.00    410.00    890.00        2.93

CONTINUITY SUMMARY (AC-FT) - INFLOW= .5224E+03 EXCESS= .0000E+00 OUTFLOW= .5224E+03 BASIN STORAGE= .9382E-04 PERCENT ERROR=    .0

FOR STORM = 3  STORM AREA (SQ MI) =       5.00
66C1T2  MANE        .75    410.00    891.72      2.91      5.00    410.00    895.00        2.91

CONTINUITY SUMMARY (AC-FT) - INFLOW= .5186E+03 EXCESS= .0000E+00 OUTFLOW= .5186E+03 BASIN STORAGE= .9382E-04 PERCENT ERROR=    .0

FOR STORM = 4  STORM AREA (SQ MI) =      10.00
66C1T2  MANE        .75    410.00    896.19      2.87      5.00    410.00    900.00        2.87

CONTINUITY SUMMARY (AC-FT) - INFLOW= .5121E+03 EXCESS= .0000E+00 OUTFLOW= .5121E+03 BASIN STORAGE= .9382E-04 PERCENT ERROR=    .0

FOR STORM = 5  STORM AREA (SQ MI) =      30.00
66C1T2  MANE        .75    409.96    916.36      2.82      5.00    409.95    915.00        2.82

CONTINUITY SUMMARY (AC-FT) - INFLOW= .5020E+03 EXCESS= .0000E+00 OUTFLOW= .5020E+03 BASIN STORAGE= .9381E-04 PERCENT ERROR=    .0

FOR STORM = 6  STORM AREA (SQ MI) =      60.00
66C1T2  MANE        .75    406.85    961.09      2.78      5.00    406.84    965.00        2.78

CONTINUITY SUMMARY (AC-FT) - INFLOW= .4948E+03 EXCESS= .0000E+00 OUTFLOW= .4948E+03 BASIN STORAGE= .9375E-04 PERCENT ERROR=    .0
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FOR STORM = 7  STORM AREA (SQ MI) =      90.00
  66C1T2  MANE          .75    406.11    930.06      2.76      5.00    406.11    930.00        2.76

CONTINUITY SUMMARY (AC-FT) - INFLOW= .4924E+03 EXCESS= .0000E+00 OUTFLOW= .4924E+03 BASIN STORAGE= .9378E-04 PERCENT ERROR=    .0

FOR STORM = 8  STORM AREA (SQ MI) =     120.00
  66C1T2  MANE          .75    406.05    930.08      2.75      5.00    406.05    930.00        2.75

CONTINUITY SUMMARY (AC-FT) - INFLOW= .4906E+03 EXCESS= .0000E+00 OUTFLOW= .4906E+03 BASIN STORAGE= .9377E-04 PERCENT ERROR=    .0

FOR STORM = 9  STORM AREA (SQ MI) =     150.00
  66C1T2  MANE          .75    406.02    930.08      2.75      5.00    406.02    930.00        2.75

CONTINUITY SUMMARY (AC-FT) - INFLOW= .4895E+03 EXCESS= .0000E+00 OUTFLOW= .4895E+03 BASIN STORAGE= .9377E-04 PERCENT ERROR=    .0

FOR STORM = 1  STORM AREA (SQ MI) =        .01
  66CTD  MANE          .68    914.86    859.66      1.45      5.00    914.71    860.00        1.45

CONTINUITY SUMMARY (AC-FT) - INFLOW= .7597E+03 EXCESS= .0000E+00 OUTFLOW= .7596E+03 BASIN STORAGE= .9972E-04 PERCENT ERROR=    .0

FOR STORM = 2  STORM AREA (SQ MI) =       1.00
  66CTD  MANE          .68    914.40    859.75      1.45      5.00    914.25    855.00        1.45

CONTINUITY SUMMARY (AC-FT) - INFLOW= .7570E+03 EXCESS= .0000E+00 OUTFLOW= .7570E+03 BASIN STORAGE= .9970E-04 PERCENT ERROR=    .0

FOR STORM = 3  STORM AREA (SQ MI) =       5.00
  66CTD  MANE          .68    913.07    857.96      1.43      5.00    913.02    860.00        1.43

CONTINUITY SUMMARY (AC-FT) - INFLOW= .7449E+03 EXCESS= .0000E+00 OUTFLOW= .7448E+03 BASIN STORAGE= .9966E-04 PERCENT ERROR=    .0

FOR STORM = 4  STORM AREA (SQ MI) =      10.00
  66CTD  MANE          .68    911.95    859.50      1.39      5.00    911.83    860.00        1.39

CONTINUITY SUMMARY (AC-FT) - INFLOW= .7279E+03 EXCESS= .0000E+00 OUTFLOW= .7278E+03 BASIN STORAGE= .9960E-04 PERCENT ERROR=    .0

FOR STORM = 5  STORM AREA (SQ MI) =      30.00
  66CTD  MANE          .68    905.48    860.05      1.35      5.00    905.47    860.00        1.35

CONTINUITY SUMMARY (AC-FT) - INFLOW= .7046E+03 EXCESS= .0000E+00 OUTFLOW= .7046E+03 BASIN STORAGE= .9964E-04 PERCENT ERROR=    .0

FOR STORM = 6  STORM AREA (SQ MI) =      60.00
  66CTD  MANE          .68    898.30    858.00      1.31      5.00    898.24    860.00        1.31

CONTINUITY SUMMARY (AC-FT) - INFLOW= .6840E+03 EXCESS= .0000E+00 OUTFLOW= .6840E+03 BASIN STORAGE= .9980E-04 PERCENT ERROR=    .0

FOR STORM = 7  STORM AREA (SQ MI) =      90.00
  66CTD  MANE          .68    895.08    855.23      1.30      5.00    895.02    855.00        1.30

CONTINUITY SUMMARY (AC-FT) - INFLOW= .6769E+03 EXCESS= .0000E+00 OUTFLOW= .6769E+03 BASIN STORAGE= .9973E-04 PERCENT ERROR=    .0

FOR STORM = 8  STORM AREA (SQ MI) =     120.00
  66CTD  MANE          .68    892.45    854.99      1.29      5.00    892.45    855.00        1.29

CONTINUITY SUMMARY (AC-FT) - INFLOW= .6712E+03 EXCESS= .0000E+00 OUTFLOW= .6711E+03 BASIN STORAGE= .9979E-04 PERCENT ERROR=    .0

FOR STORM = 9  STORM AREA (SQ MI) =     150.00
  66CTD  MANE          .68    882.09    861.47      1.28      5.00    881.49    860.00        1.28

CONTINUITY SUMMARY (AC-FT) - INFLOW= .6674E+03 EXCESS= .0000E+00 OUTFLOW= .6674E+03 BASIN STORAGE= .9961E-04 PERCENT ERROR=    .0

FOR STORM = 1  STORM AREA (SQ MI) =        .01
  RC-WA  MANE          .70    932.31    859.84      1.18      5.00    932.27    860.00        1.18

CONTINUITY SUMMARY (AC-FT) - INFLOW= .8247E+03 EXCESS= .0000E+00 OUTFLOW= .8247E+03 BASIN STORAGE= .1038E-03 PERCENT ERROR=    .0

FOR STORM = 2  STORM AREA (SQ MI) =       1.00
  RC-WA  MANE          .70    931.84    859.93      1.17      5.00    931.81    860.00        1.17
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CONTINUITY SUMMARY (AC-FT) - INFLOW= .8219E+03 EXCESS= .0000E+00 OUTFLOW= .8219E+03 BASIN STORAGE= .1036E-03 PERCENT ERROR=    .0

        FOR STORM = 3  STORM AREA (SQ MI) =       5.00
           RC-WA  MANE          .70    929.26    859.70      1.16      5.00    929.21    860.00        1.16

CONTINUITY SUMMARY (AC-FT) - INFLOW= .8091E+03 EXCESS= .0000E+00 OUTFLOW= .8091E+03 BASIN STORAGE= .1039E-03 PERCENT ERROR=    .0

        FOR STORM = 4  STORM AREA (SQ MI) =      10.00
           RC-WA  MANE          .70    926.44    860.19      1.13      5.00    926.41    860.00        1.13

CONTINUITY SUMMARY (AC-FT) - INFLOW= .7913E+03 EXCESS= .0000E+00 OUTFLOW= .7913E+03 BASIN STORAGE= .1038E-03 PERCENT ERROR=    .0

        FOR STORM = 5  STORM AREA (SQ MI) =      30.00
           RC-WA  MANE          .70    917.64    860.41      1.10      5.00    917.60    860.00        1.10

CONTINUITY SUMMARY (AC-FT) - INFLOW= .7675E+03 EXCESS= .0000E+00 OUTFLOW= .7675E+03 BASIN STORAGE= .1038E-03 PERCENT ERROR=    .0

        FOR STORM = 6  STORM AREA (SQ MI) =      60.00
           RC-WA  MANE          .70    909.38    859.87      1.07      5.00    909.36    860.00        1.07

CONTINUITY SUMMARY (AC-FT) - INFLOW= .7465E+03 EXCESS= .0000E+00 OUTFLOW= .7465E+03 BASIN STORAGE= .1040E-03 PERCENT ERROR=    .0

        FOR STORM = 7  STORM AREA (SQ MI) =      90.00
           RC-WA  MANE          .70    905.34    859.96      1.06      5.00    905.33    860.00        1.06

CONTINUITY SUMMARY (AC-FT) - INFLOW= .7393E+03 EXCESS= .0000E+00 OUTFLOW= .7393E+03 BASIN STORAGE= .1036E-03 PERCENT ERROR=    .0

        FOR STORM = 8  STORM AREA (SQ MI) =     120.00
           RC-WA  MANE          .71    902.05    857.07      1.05      5.00    901.95    860.00        1.05

CONTINUITY SUMMARY (AC-FT) - INFLOW= .7334E+03 EXCESS= .0000E+00 OUTFLOW= .7334E+03 BASIN STORAGE= .1039E-03 PERCENT ERROR=    .0

        FOR STORM = 9  STORM AREA (SQ MI) =     150.00
           RC-WA  MANE          .71    892.52    864.52      1.04      5.00    892.50    865.00        1.04

CONTINUITY SUMMARY (AC-FT) - INFLOW= .7294E+03 EXCESS= .0000E+00 OUTFLOW= .7294E+03 BASIN STORAGE= .1040E-03 PERCENT ERROR=    .0

        FOR STORM = 1  STORM AREA (SQ MI) =        .01
          66T66D  MANE         1.01    932.17    860.07      1.30      5.00    932.17    860.00        1.30

CONTINUITY SUMMARY (AC-FT) - INFLOW= .9078E+03 EXCESS= .0000E+00 OUTFLOW= .9078E+03 BASIN STORAGE= .1500E-03 PERCENT ERROR=    .0

        FOR STORM = 2  STORM AREA (SQ MI) =       1.00
          66T66D  MANE         1.01    931.70    860.17      1.29      5.00    931.70    860.00        1.29

CONTINUITY SUMMARY (AC-FT) - INFLOW= .9036E+03 EXCESS= .0000E+00 OUTFLOW= .9036E+03 BASIN STORAGE= .1500E-03 PERCENT ERROR=    .0

        FOR STORM = 3  STORM AREA (SQ MI) =       5.00
          66T66D  MANE         1.01    929.05    859.63      1.26      5.00    929.02    860.00        1.26

CONTINUITY SUMMARY (AC-FT) - INFLOW= .8846E+03 EXCESS= .0000E+00 OUTFLOW= .8846E+03 BASIN STORAGE= .1502E-03 PERCENT ERROR=    .0

        FOR STORM = 4  STORM AREA (SQ MI) =      10.00
          66T66D  MANE         1.01    926.11    860.15      1.23      5.00    926.07    860.00        1.23

CONTINUITY SUMMARY (AC-FT) - INFLOW= .8613E+03 EXCESS= .0000E+00 OUTFLOW= .8613E+03 BASIN STORAGE= .1507E-03 PERCENT ERROR=    .0

        FOR STORM = 5  STORM AREA (SQ MI) =      30.00
          66T66D  MANE         1.02    917.28    860.78      1.19      5.00    917.17    860.00        1.19

CONTINUITY SUMMARY (AC-FT) - INFLOW= .8318E+03 EXCESS= .0000E+00 OUTFLOW= .8318E+03 BASIN STORAGE= .1502E-03 PERCENT ERROR=    .0

        FOR STORM = 6  STORM AREA (SQ MI) =      60.00
          66T66D  MANE         1.02    909.09    860.29      1.15      5.00    909.04    860.00        1.15

CONTINUITY SUMMARY (AC-FT) - INFLOW= .8019E+03 EXCESS= .0000E+00 OUTFLOW= .8019E+03 BASIN STORAGE= .1505E-03 PERCENT ERROR=    .0
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FOR STORM = 7  STORM AREA (SQ MI) =      90.00
  66T66D  MANE          1.02    905.22    860.04      1.13      5.00    905.21    860.00        1.13

CONTINUITY SUMMARY (AC-FT) - INFLOW= .7913E+03 EXCESS= .0000E+00 OUTFLOW= .7913E+03 BASIN STORAGE= .1505E-03 PERCENT ERROR=    .0

FOR STORM = 8  STORM AREA (SQ MI) =     120.00
  66T66D  MANE          1.02    901.83    859.67      1.12      5.00    901.79    860.00        1.12

CONTINUITY SUMMARY (AC-FT) - INFLOW= .7816E+03 EXCESS= .0000E+00 OUTFLOW= .7816E+03 BASIN STORAGE= .1497E-03 PERCENT ERROR=    .0

FOR STORM = 9  STORM AREA (SQ MI) =     150.00
  66T66D  MANE          1.02    891.99    865.57      1.11      5.00    891.80    865.00        1.11

CONTINUITY SUMMARY (AC-FT) - INFLOW= .7754E+03 EXCESS= .0000E+00 OUTFLOW= .7754E+03 BASIN STORAGE= .1498E-03 PERCENT ERROR=    .0

FOR STORM = 1  STORM AREA (SQ MI) =        .01
  66-66D  MANE          2.18    931.90    860.09      1.30      5.00    931.89    860.00        1.30

CONTINUITY SUMMARY (AC-FT) - INFLOW= .9078E+03 EXCESS= .0000E+00 OUTFLOW= .9078E+03 BASIN STORAGE= .3259E-03 PERCENT ERROR=    .0

FOR STORM = 2  STORM AREA (SQ MI) =       1.00
  66-66D  MANE          2.18    931.44    860.18      1.29      5.00    931.42    860.00        1.29

CONTINUITY SUMMARY (AC-FT) - INFLOW= .9036E+03 EXCESS= .0000E+00 OUTFLOW= .9036E+03 BASIN STORAGE= .3269E-03 PERCENT ERROR=    .0

FOR STORM = 3  STORM AREA (SQ MI) =       5.00
  66-66D  MANE          2.18    928.63    860.67      1.26      5.00    928.57    860.00        1.26

CONTINUITY SUMMARY (AC-FT) - INFLOW= .8846E+03 EXCESS= .0000E+00 OUTFLOW= .8846E+03 BASIN STORAGE= .3247E-03 PERCENT ERROR=    .0

FOR STORM = 4  STORM AREA (SQ MI) =      10.00
  66-66D  MANE          2.19    925.44    861.22      1.23      5.00    925.21    860.00        1.23

CONTINUITY SUMMARY (AC-FT) - INFLOW= .8613E+03 EXCESS= .0000E+00 OUTFLOW= .8613E+03 BASIN STORAGE= .3270E-03 PERCENT ERROR=    .0

FOR STORM = 5  STORM AREA (SQ MI) =      30.00
  66-66D  MANE          2.19    916.42    860.69      1.19      5.00    916.16    860.00        1.19

CONTINUITY SUMMARY (AC-FT) - INFLOW= .8318E+03 EXCESS= .0000E+00 OUTFLOW= .8318E+03 BASIN STORAGE= .3259E-03 PERCENT ERROR=    .0

FOR STORM = 6  STORM AREA (SQ MI) =      60.00
  66-66D  MANE          2.19    908.43    862.23      1.14      5.00    908.37    860.00        1.14

CONTINUITY SUMMARY (AC-FT) - INFLOW= .8019E+03 EXCESS= .0000E+00 OUTFLOW= .8019E+03 BASIN STORAGE= .3279E-03 PERCENT ERROR=    .0

FOR STORM = 7  STORM AREA (SQ MI) =      90.00
  66-66D  MANE          2.20    904.72    860.76      1.13      5.00    904.60    860.00        1.13

CONTINUITY SUMMARY (AC-FT) - INFLOW= .7913E+03 EXCESS= .0000E+00 OUTFLOW= .7913E+03 BASIN STORAGE= .3273E-03 PERCENT ERROR=    .0

FOR STORM = 8  STORM AREA (SQ MI) =     120.00
  66-66D  MANE          2.20    901.17    861.41      1.12      5.00    901.03    860.00        1.12

CONTINUITY SUMMARY (AC-FT) - INFLOW= .7816E+03 EXCESS= .0000E+00 OUTFLOW= .7816E+03 BASIN STORAGE= .3227E-03 PERCENT ERROR=    .0

FOR STORM = 9  STORM AREA (SQ MI) =     150.00
  66-66D  MANE          2.20    890.52    867.74      1.11      5.00    889.15    865.00        1.11

CONTINUITY SUMMARY (AC-FT) - INFLOW= .7754E+03 EXCESS= .0000E+00 OUTFLOW= .7754E+03 BASIN STORAGE= .3275E-03 PERCENT ERROR=    .0

FOR STORM = 1  STORM AREA (SQ MI) =        .01
  66T70A  MANE          1.08   1226.60    814.67      1.20      5.00   1226.43    815.00        1.20

CONTINUITY SUMMARY (AC-FT) - INFLOW= .9987E+03 EXCESS= .0000E+00 OUTFLOW= .9980E+03 BASIN STORAGE= .1690E-03 PERCENT ERROR=    .1

FOR STORM = 2  STORM AREA (SQ MI) =       1.00
  66T70A  MANE          1.08   1212.46    815.45      1.19      5.00   1212.16    815.00        1.19
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CONTINUITY SUMMARY (AC-FT) - INFLOW= .9926E+03 EXCESS= .0000E+00 OUTFLOW= .9919E+03 BASIN STORAGE= .1703E-03 PERCENT ERROR=    .1

        FOR STORM = 3  STORM AREA (SQ MI) =      5.00
          66T70A  MANE        1.09   1152.01    825.18      1.16      5.00   1151.96    825.00        1.16

CONTINUITY SUMMARY (AC-FT) - INFLOW= .9651E+03 EXCESS= .0000E+00 OUTFLOW= .9645E+03 BASIN STORAGE= .1702E-03 PERCENT ERROR=    .1

        FOR STORM = 4  STORM AREA (SQ MI) =     10.00
          66T70A  MANE        1.11   1091.57    839.84      1.12      5.00   1091.55    840.00        1.12

CONTINUITY SUMMARY (AC-FT) - INFLOW= .9315E+03 EXCESS= .0000E+00 OUTFLOW= .9309E+03 BASIN STORAGE= .1702E-03 PERCENT ERROR=    .1

        FOR STORM = 5  STORM AREA (SQ MI) =     30.00
          66T70A  MANE        1.12   1029.67    861.02      1.07      5.00   1029.56    860.00        1.07

CONTINUITY SUMMARY (AC-FT) - INFLOW= .8887E+03 EXCESS= .0000E+00 OUTFLOW= .8882E+03 BASIN STORAGE= .1701E-03 PERCENT ERROR=    .0

        FOR STORM = 6  STORM AREA (SQ MI) =     60.00
          66T70A  MANE        1.14    944.44    859.93      1.01      5.00    944.41    860.00        1.01

CONTINUITY SUMMARY (AC-FT) - INFLOW= .8456E+03 EXCESS= .0000E+00 OUTFLOW= .8452E+03 BASIN STORAGE= .1699E-03 PERCENT ERROR=    .0

        FOR STORM = 7  STORM AREA (SQ MI) =     90.00
          66T70A  MANE        1.14    938.75    859.64      1.00      5.00    938.68    860.00        1.00

CONTINUITY SUMMARY (AC-FT) - INFLOW= .8302E+03 EXCESS= .0000E+00 OUTFLOW= .8299E+03 BASIN STORAGE= .1697E-03 PERCENT ERROR=    .0

        FOR STORM = 8  STORM AREA (SQ MI) =    120.00
          66T70A  MANE        1.14    924.57    869.33       .98      5.00    924.35    870.00         .98

CONTINUITY SUMMARY (AC-FT) - INFLOW= .8157E+03 EXCESS= .0000E+00 OUTFLOW= .8154E+03 BASIN STORAGE= .1707E-03 PERCENT ERROR=    .0

        FOR STORM = 9  STORM AREA (SQ MI) =    150.00
          66T70A  MANE        1.15    910.67    890.77       .97      5.00    910.22    890.00         .97

CONTINUITY SUMMARY (AC-FT) - INFLOW= .8067E+03 EXCESS= .0000E+00 OUTFLOW= .8064E+03 BASIN STORAGE= .1696E-03 PERCENT ERROR=    .0

        FOR STORM = 1  STORM AREA (SQ MI) =       .01
          66T70B  MANE        1.47   1224.25    815.43      1.20      5.00   1223.86    815.00        1.20

CONTINUITY SUMMARY (AC-FT) - INFLOW= .9979E+03 EXCESS= .0000E+00 OUTFLOW= .9978E+03 BASIN STORAGE= .2314E-03 PERCENT ERROR=    .0

        FOR STORM = 2  STORM AREA (SQ MI) =      1.00
          66T70B  MANE        1.47   1209.93    817.35      1.19      5.00   1209.17    820.00        1.19

CONTINUITY SUMMARY (AC-FT) - INFLOW= .9920E+03 EXCESS= .0000E+00 OUTFLOW= .9918E+03 BASIN STORAGE= .2319E-03 PERCENT ERROR=    .0

        FOR STORM = 3  STORM AREA (SQ MI) =      5.00
          66T70B  MANE        1.49   1150.79    825.71      1.16      5.00   1150.56    825.00        1.16

CONTINUITY SUMMARY (AC-FT) - INFLOW= .9644E+03 EXCESS= .0000E+00 OUTFLOW= .9642E+03 BASIN STORAGE= .2292E-03 PERCENT ERROR=    .0

        FOR STORM = 4  STORM AREA (SQ MI) =     10.00
          66T70B  MANE        1.50   1090.51    842.16      1.12      5.00   1090.15    845.00        1.12

CONTINUITY SUMMARY (AC-FT) - INFLOW= .9310E+03 EXCESS= .0000E+00 OUTFLOW= .9309E+03 BASIN STORAGE= .2292E-03 PERCENT ERROR=    .0

        FOR STORM = 5  STORM AREA (SQ MI) =     30.00
          66T70B  MANE        1.52   1028.85    864.22      1.07      5.00   1028.54    865.00        1.07

CONTINUITY SUMMARY (AC-FT) - INFLOW= .8883E+03 EXCESS= .0000E+00 OUTFLOW= .8882E+03 BASIN STORAGE= .2316E-03 PERCENT ERROR=    .0

        FOR STORM = 6  STORM AREA (SQ MI) =     60.00
          66T70B  MANE        1.55    943.57    860.73      1.01      5.00    943.35    860.00        1.01

CONTINUITY SUMMARY (AC-FT) - INFLOW= .8452E+03 EXCESS= .0000E+00 OUTFLOW= .8452E+03 BASIN STORAGE= .2293E-03 PERCENT ERROR=    .0
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```
FOR STORM = 7  STORM AREA (SQ MI) =      90.00
  66T70B  MANE        1.55    937.95    860.23      1.00      5.00    937.86    860.00        1.00

CONTINUITY SUMMARY (AC-FT) - INFLOW= .8299E+03 EXCESS= .0000E+00 OUTFLOW= .8299E+03 BASIN STORAGE= .2318E-03 PERCENT ERROR=    .0

FOR STORM = 8  STORM AREA (SQ MI) =     120.00
  66T70B  MANE        1.55    923.19    870.64       .98      5.00    923.12    870.00         .98

CONTINUITY SUMMARY (AC-FT) - INFLOW= .8154E+03 EXCESS= .0000E+00 OUTFLOW= .8154E+03 BASIN STORAGE= .2307E-03 PERCENT ERROR=    .0

FOR STORM = 9  STORM AREA (SQ MI) =     150.00
  66T70B  MANE        1.56    909.03    895.12       .97      5.00    909.03    895.00         .97

CONTINUITY SUMMARY (AC-FT) - INFLOW= .8064E+03 EXCESS= .0000E+00 OUTFLOW= .8064E+03 BASIN STORAGE= .2298E-03 PERCENT ERROR=    .0

FOR STORM = 1  STORM AREA (SQ MI) =        .01
   CULVT  MANE         .83   1215.12    815.13      1.20      5.00   1214.93    815.00        1.20

CONTINUITY SUMMARY (AC-FT) - INFLOW= .9979E+03 EXCESS= .0000E+00 OUTFLOW= .9971E+03 BASIN STORAGE= .1306E-03 PERCENT ERROR=    .1

FOR STORM = 2  STORM AREA (SQ MI) =       1.00
   CULVT  MANE         .83   1200.94    819.60      1.19      5.00   1200.67    820.00        1.19

CONTINUITY SUMMARY (AC-FT) - INFLOW= .9919E+03 EXCESS= .0000E+00 OUTFLOW= .9912E+03 BASIN STORAGE= .1302E-03 PERCENT ERROR=    .1

FOR STORM = 3  STORM AREA (SQ MI) =       5.00
   CULVT  MANE         .84   1142.80    825.27      1.16      5.00   1142.63    825.00        1.16

CONTINUITY SUMMARY (AC-FT) - INFLOW= .9643E+03 EXCESS= .0000E+00 OUTFLOW= .9636E+03 BASIN STORAGE= .1300E-03 PERCENT ERROR=    .1

FOR STORM = 4  STORM AREA (SQ MI) =      10.00
   CULVT  MANE         .85   1083.87    844.42      1.12      5.00   1083.81    845.00        1.12

CONTINUITY SUMMARY (AC-FT) - INFLOW= .9309E+03 EXCESS= .0000E+00 OUTFLOW= .9302E+03 BASIN STORAGE= .1299E-03 PERCENT ERROR=    .1

FOR STORM = 5  STORM AREA (SQ MI) =      30.00
   CULVT  MANE         .86   1023.12    864.61      1.06      5.00   1022.96    865.00        1.06

CONTINUITY SUMMARY (AC-FT) - INFLOW= .8883E+03 EXCESS= .0000E+00 OUTFLOW= .8877E+03 BASIN STORAGE= .1305E-03 PERCENT ERROR=    .1

FOR STORM = 6  STORM AREA (SQ MI) =      60.00
   CULVT  MANE         .88    937.56    860.44      1.01      5.00    937.43    860.00        1.01

CONTINUITY SUMMARY (AC-FT) - INFLOW= .8452E+03 EXCESS= .0000E+00 OUTFLOW= .8448E+03 BASIN STORAGE= .1299E-03 PERCENT ERROR=    .1

FOR STORM = 7  STORM AREA (SQ MI) =      90.00
   CULVT  MANE         .88    931.76    860.58       .99      5.00    931.70    860.00         .99

CONTINUITY SUMMARY (AC-FT) - INFLOW= .8299E+03 EXCESS= .0000E+00 OUTFLOW= .8295E+03 BASIN STORAGE= .1300E-03 PERCENT ERROR=    .1

FOR STORM = 8  STORM AREA (SQ MI) =     120.00
   CULVT  MANE         .88    917.55    870.33       .98      5.00    917.46    870.00         .98

CONTINUITY SUMMARY (AC-FT) - INFLOW= .8154E+03 EXCESS= .0000E+00 OUTFLOW= .8150E+03 BASIN STORAGE= .1302E-03 PERCENT ERROR=    .1

FOR STORM = 9  STORM AREA (SQ MI) =     150.00
   CULVT  MANE         .88    905.12    895.06       .97      5.00    905.10    895.00         .97

CONTINUITY SUMMARY (AC-FT) - INFLOW= .8063E+03 EXCESS= .0000E+00 OUTFLOW= .8059E+03 BASIN STORAGE= .1306E-03 PERCENT ERROR=    .1


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

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          Pointer Utilization:   .30
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APPENDIX B

HYDRAULICS

APPENDIX B

HYDRAULICS

Channel Alternatives

Summary of Meidian Channel Configuration

Description	Material	Channel Slope (ft/ft)	Mannings n		Bottom Width (ft)	Sideslopes		Flow		Required Freeboard (ft)	Channel Depth (ft)
			n_1	n_2		Left (H:1)	Right (H:1)	Depth (ft)	Velocity (ft/s)		
Rectangular	Concrete	0.001	0.016	-	55	-	-	5.37	8.00	1.6	7.0
Trapezoidal	Concrete	0.001	0.016	-	45	2	2	5.41	7.84	1.6	7.0
Trapezoidal	Unlined	0.001	0.035	-	85	6	6	5.59	3.57	1.4	7.0
Trapezoidal	Unlined	0.001	0.050	-	130	6	6	5.57	2.60	1.4	7.0
Rec/Trap	Conc/Unlined	0.001	0.016	0.035	95	6	-	5.57	3.80	1.4	7.0
Rec/Trap	Conc/Unlined	0.001	0.016	0.050	140	6	-	5.53	2.73	1.4	6.9

Worksheet
Worksheet for Rectangular Channel

Project Description	
Worksheet	Concrete Rectangular Channel (BW=55) (n=0.016) (S=0.00
Flow Element	Rectangular Channel
Method	Manning's Formula
Solve For	Channel Depth

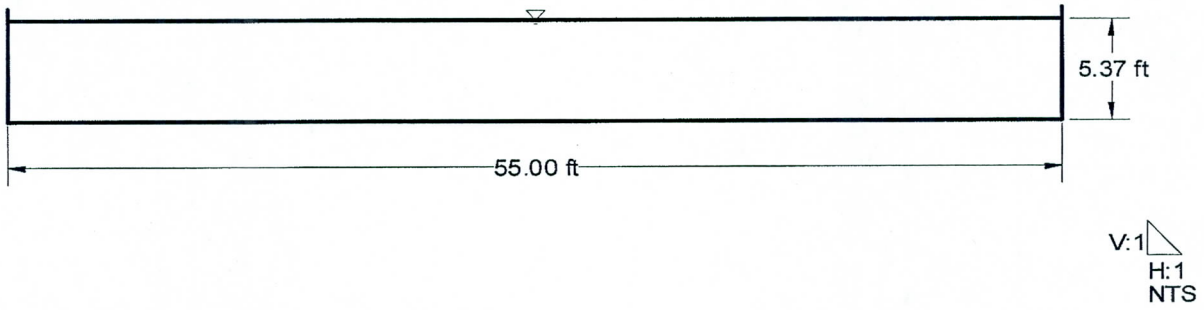
Input Data		
Mannings Coefficient	0.016	
Channel Slope	0.001000	ft/ft
Bottom Width	55.00	ft
Discharge	2,365.00	cfs

Results		
Depth	5.37	ft
Flow Area	295.6	ft²
Wetted Perimeter	65.75	ft
Top Width	55.00	ft
Critical Depth	3.86	ft
Critical Slope	0.002833	ft/ft
Velocity	8.00	ft/s
Velocity Head	0.99	ft
Specific Energy	6.37	ft
Froude Number	0.61	
Flow Type	Subcritical	

Cross Section
Cross Section for Rectangular Channel

Project Description	
Worksheet	Concrete Rectangular Channel (BW=55) (n=0.016) (S=0.00
Flow Element	Rectangular Channel
Method	Manning's Formula
Solve For	Channel Depth

Section Data		
Mannings Coefficient	0.016	
Channel Slope	0.001000	ft/ft
Depth	5.37	ft
Bottom Width	55.00	ft
Discharge	2,365.00	cfs



Trapezoidal Channel (Concrete)(2:1)
Worksheet for Trapezoidal Channel

Project Description	
Worksheet	Concrete Trapezoidal Channel (BW=45) (2:1) (n=0.016) (S=0.001)
Flow Element	Trapezoidal Channel
Method	Manning's Formula
Solve For	Channel Depth

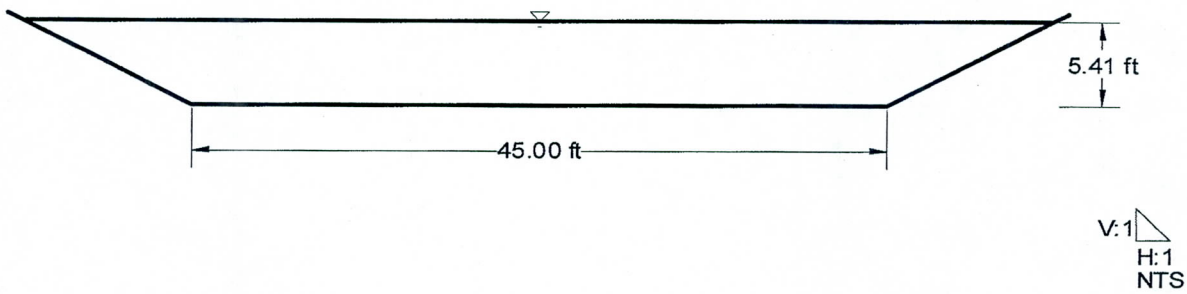
Input Data		
Mannings Coefficient	0.016	
Channel Slope	0.001000	ft/ft
Left Side Slope	2.00	H : V
Right Side Slope	2.00	H : V
Bottom Width	45.00	ft
Discharge	2,365.00	cfs

Results		
Depth	5.41	ft
Flow Area	301.7	ft²
Wetted Perimeter	69.17	ft
Top Width	66.62	ft
Critical Depth	4.14	ft
Critical Slope	0.002542	ft/ft
Velocity	7.84	ft/s
Velocity Head	0.96	ft
Specific Energy	6.36	ft
Froude Number	0.65	
Flow Type	Subcritical	

Cross Section
Cross Section for Trapezoidal Channel

Project Description	
Worksheet	Concrete Trapezoidal Channel (BW=45) (2:1) (n=0.016) (S=0.001)
Flow Element	Trapezoidal Channel
Method	Manning's Formula
Solve For	Channel Depth

Section Data		
Mannings Coefficient	0.016	
Channel Slope	0.001000	ft/ft
Depth	5.41	ft
Left Side Slope	2.00	H : V
Right Side Slope	2.00	H : V
Bottom Width	45.00	ft
Discharge	2,365.00	cfs



Worksheet
Worksheet for Trapezoidal Channel

Project Description	
Worksheet	Unlined Trapezoidal Channel (BW=85) (6:1) (n=0.035) (S=0.001)
Flow Element	Trapezoidal Channel
Method	Manning's Formula
Solve For	Channel Depth

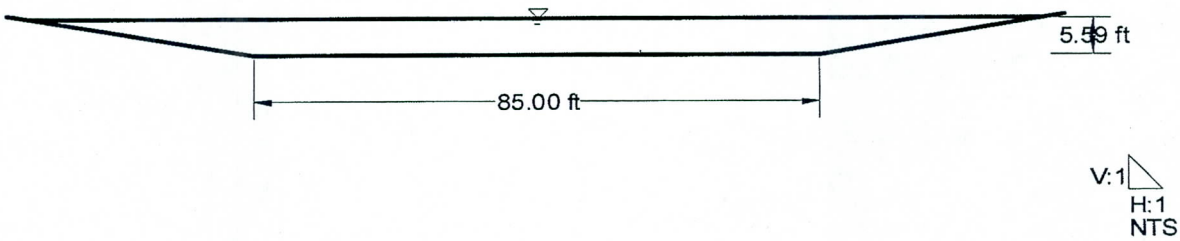
Input Data		
Mannings Coefficient	0.035	
Channel Slope	0.001000	ft/ft
Left Side Slope	6.00	H : V
Right Side Slope	6.00	H : V
Bottom Width	85.00	ft
Discharge	2,365.00	cfs

Results		
Depth	5.59	ft
Flow Area	662.9	ft²
Wetted Perimeter	153.03	ft
Top Width	152.10	ft
Critical Depth	2.70	ft
Critical Slope	0.013542	ft/ft
Velocity	3.57	ft/s
Velocity Head	0.20	ft
Specific Energy	5.79	ft
Froude Number	0.30	
Flow Type	Subcritical	

Cross Section
Cross Section for Trapezoidal Channel

Project Description	
Worksheet	Unlined Trapezoidal Channel (BW=85) (6:1) (n=0.035) (S=0.001)
Flow Element	Trapezoidal Channel
Method	Manning's Formula
Solve For	Channel Depth

Section Data		
Mannings Coefficient	0.035	
Channel Slope	0.001000	ft/ft
Depth	5.59	ft
Left Side Slope	6.00	H : V
Right Side Slope	6.00	H : V
Bottom Width	85.00	ft
Discharge	2,365.00	cfs



Worksheet
Worksheet for Trapezoidal Channel

Project Description	
Worksheet	Unlined Trapezoidal Channel (BW=130) (6:1) (n=0.050) (S=0.001)
Flow Element	Trapezoidal Channel
Method	Manning's Formula
Solve For	Channel Depth

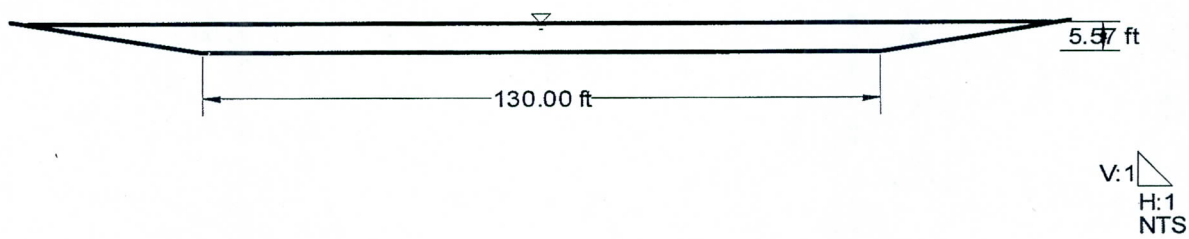
Input Data		
Mannings Coefficient	0.050	
Channel Slope	0.001000	ft/ft
Left Side Slope	6.00	H : V
Right Side Slope	6.00	H : V
Bottom Width	130.00	ft
Discharge	2,365.00	cfs

Results		
Depth	5.57	ft
Flow Area	909.7	ft²
Wetted Perimeter	197.73	ft
Top Width	196.81	ft
Critical Depth	2.10	ft
Critical Slope	0.029336	ft/ft
Velocity	2.60	ft/s
Velocity Head	0.11	ft
Specific Energy	5.67	ft
Froude Number	0.21	
Flow Type	Subcritical	

Cross Section
Cross Section for Trapezoidal Channel

Project Description	
Worksheet	Unlined Trapezoidal Channel (BW=130) (6:1) (n=0.050) (S=0.001)
Flow Element	Trapezoidal Channel
Method	Manning's Formula
Solve For	Channel Depth

Section Data		
Mannings Coefficient	0.050	
Channel Slope	0.001000	ft/ft
Depth	5.57	ft
Left Side Slope	6.00	H : V
Right Side Slope	6.00	H : V
Bottom Width	130.00	ft
Discharge	2,365.00	cfs



Worksheet
Worksheet for Irregular Channel

Project Description	
Worksheet	Hybrid: Rectangular/Trapezoidal (BW=95) (6:1) (n=0.016/n=0.035) (S=0.001)
Flow Element	Irregular Channel
Method	Manning's Formula
Solve For	Channel Depth

Input Data		
Channel Slope	0.001000	ft/ft
Discharge	2,365.00	cfs

Options	
Current Roughness Method	Improved Lotter's Method
Open Channel Weighting Method	Improved Lotter's Method
Closed Channel Weighting Metho	Horton's Method

Results		
Mannings Coefficient	0.034	
Water Surface Elevation	105.57	ft
Elevation Range	100.00 to 120.00	
Flow Area	622.2	ft²
Wetted Perimeter	134.44	ft
Top Width	128.41	ft
Actual Depth	5.57	ft
Critical Elevation	102.61	ft
Critical Slope	0.013225	ft/ft
Velocity	3.80	ft/s
Velocity Head	0.22	ft
Specific Energy	105.79	ft
Froude Number	0.30	
Flow Type	Subcritical	

Roughness Segments

Start Station	End Station	Mannings Coefficient
0+00	0+00	0.016
0+00	2+15	0.035

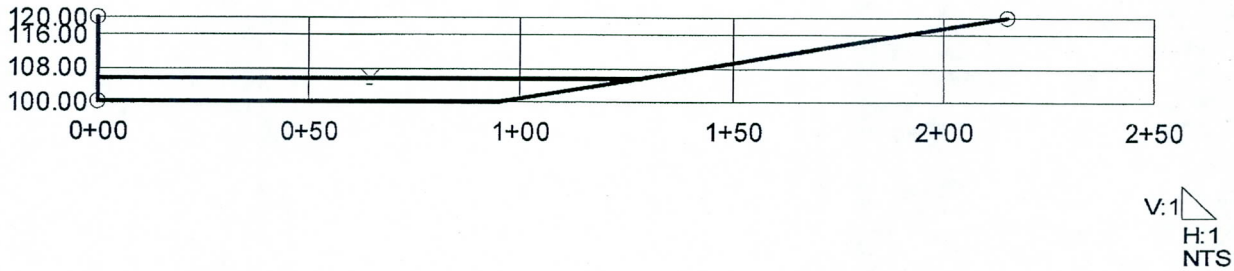
Natural Channel Points

Station (ft)	Elevation (ft)
0+00	120.00
0+00	100.00
0+95	100.00
2+15	120.00

Cross Section
Cross Section for Irregular Channel

Project Description	
Worksheet	Hybrid: Rectangular/Trapezoidal (BW=95) (6:1) (n=0.016/n=0.035) (S=0.001)
Flow Element	Irregular Channel
Method	Manning's Formula
Solve For	Channel Depth

Section Data		
Mannings Coefficient	0.034	
Channel Slope	0.001000	ft/ft
Water Surface Elevation	105.57	ft
Elevation Range	100.00 to 120.00	
Discharge	2,365.00	cfs



Worksheet
Worksheet for Irregular Channel

Project Description	
Worksheet	Hybrid: Rectangular/Trapezoidal (BW=140) (6:1) (n=0.016/n=0.050) (S=0.001)
Flow Element	Irregular Channel
Method	Manning's Formula
Solve For	Channel Depth

Input Data		
Channel Slope	0.001000	ft/ft
Discharge	2,365.00	cfs

Options	
Current Roughness Method	Improved Lotter's Method
Open Channel Weighting Method	Improved Lotter's Method
Closed Channel Weighting Metho	Horton's Method

Results		
Mannings Coefficient	0.049	
Water Surface Elevation	105.53	ft
Elevation Range	100.00 to 120.00	
Flow Area	865.6	ft²
Wetted Perimeter	179.15	ft
Top Width	173.16	ft
Actual Depth	5.53	ft
Critical Elevation	102.04	ft
Critical Slope	0.028697	ft/ft
Velocity	2.73	ft/s
Velocity Head	0.12	ft
Specific Energy	105.64	ft
Froude Number	0.22	
Flow Type	Subcritical	

Roughness Segments

Start Station	End Station	Mannings Coefficient
0+00	0+00	0.016
0+00	2+60	0.050

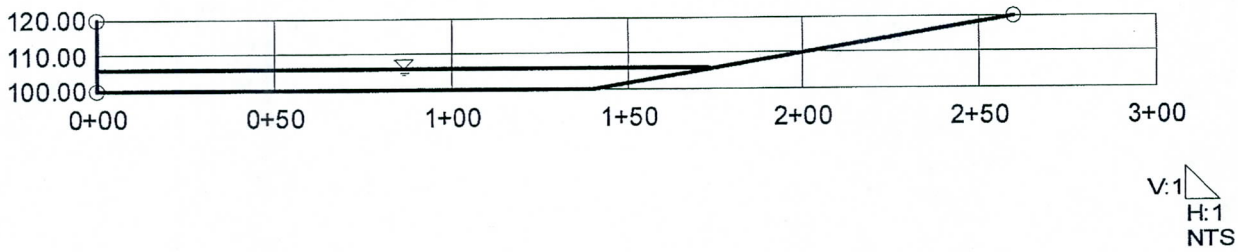
Natural Channel Points

Station (ft)	Elevation (ft)
0+00	120.00
0+00	100.00
1+40	100.00
2+60	120.00

Cross Section
Cross Section for Irregular Channel

Project Description	
Worksheet	Hybrid: Rectangular/Trapezoidal (BW=140) (6:1) (n=0.016/n=0.050) (S=0.001)
Flow Element	Irregular Channel
Method	Manning's Formula
Solve For	Channel Depth

Section Data		
Mannings Coefficient	0.049	
Channel Slope	0.001000	ft/ft
Water Surface Elevation	105.53	ft
Elevation Range	100.00 to 120.00	
Discharge	2,365.00	cfs



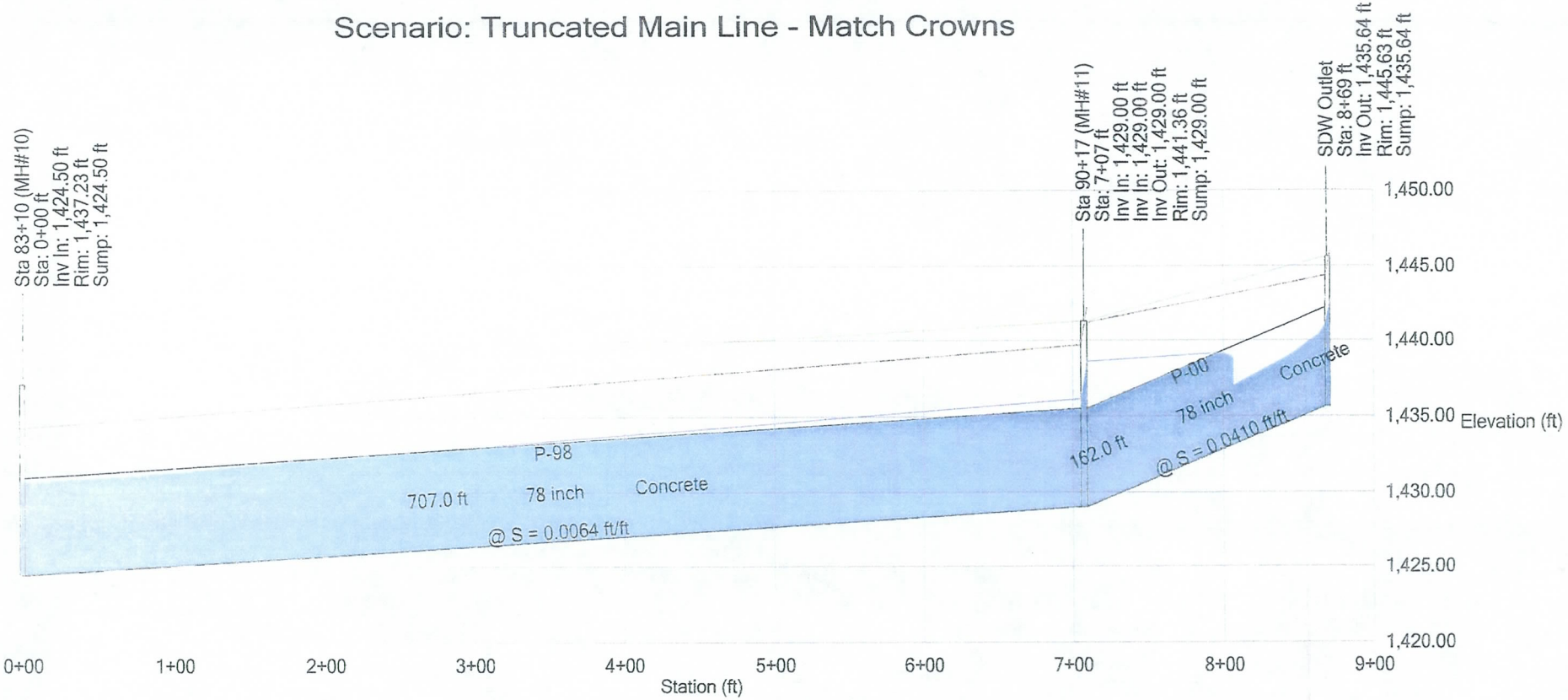
APPENDIX B

HYDRAULICS

Elliot Road Storm Drain

Profile: SDW Lateral w/Part of Downstream Storm Drain

Scenario: Truncated Main Line - Match Crowns



Scenario: Truncated [illegible] Line - Match Crowns

Pipe Report

Label	Downstream Node	Upstream Node	Length (ft)	Constructed Slope (ft/ft)	Section Size	Mannings n	Downstream Invert Elevation (ft)	Upstream Invert Elevation (ft)	Set Invert to Downstream Structure?	Set Invert to Upstream Structure?	Section Shape	Material	Hydraulic Grade Line Out (ft)	Hydraulic Grade Line In (ft)
P-98	Sta 83+10 (MH#10)	Sta 90+17 (MH#11)	707.0	0.0064	78 inch	0.012	1,424.50	1,429.00	true	true	Circula	Concrete	1,430.77	1,436.17
P-00	Sta 90+17 (MH#11)	SDW Outlet	162.0	0.0410	78 inch	0.012	1,429.00	1,435.64	true	true	Circula	Concrete	1,438.64	1,441.14
P-99	Sta 90+17 (MH#11)	Inlet to Exist SD	33.0	0.0061	78 inch	0.012	1,429.00	1,429.20	true	true	Circula	Concrete	1,438.64	1,438.64
P-1	Inlet to Exist SD	J-1	688.0	0.0063	42 inch	0.012	1,432.20	1,436.53	false	true	Circula	Concrete	1,438.68	1,441.51
P-2	J-1	J-2	688.0	0.0063	42 inch	0.012	1,436.53	1,440.87	true	true	Circula	Concrete	1,441.93	1,444.76
P-3	J-2	J-3	688.0	0.0063	42 inch	0.012	1,440.87	1,445.20	true	true	Circula	Concrete	1,445.17	1,447.82
P-4	J-3	J-4	688.0	0.0063	42 inch	0.012	1,445.20	1,449.54	true	true	Circula	Concrete	1,448.46	1,452.16
P-5	J-4	J-5	81.0	0.0063	42 inch	0.012	1,449.54	1,450.05	true	true	Circula	Concrete	1,452.93	1,453.09
P-6	J-5	J-6	707.0	0.0063	42 inch	0.012	1,450.05	1,454.50	true	true	Circula	Concrete	1,453.67	1,457.12
P-7	J-6	J-7	715.0	0.0063	42 inch	0.012	1,454.50	1,459.00	true	true	Circula	Concrete	1,457.76	1,461.62
P-8	J-7	J-8	711.0	0.0063	42 inch	0.012	1,459.00	1,463.48	true	true	Circula	Concrete	1,462.26	1,466.10
P-9	J-8	J-9	711.0	0.0063	42 inch	0.012	1,463.48	1,467.96	true	true	Circula	Concrete	1,466.74	1,470.58
P-10	J-9	J-10	711.0	0.0063	42 inch	0.012	1,467.96	1,472.44	true	true	Circula	Concrete	1,471.22	1,475.06
P-11	J-10	J-11	711.0	0.0063	42 inch	0.012	1,472.44	1,476.92	true	true	Circula	Concrete	1,475.70	1,479.54
P-12	J-11	J-12	711.0	0.0063	42 inch	0.012	1,476.92	1,481.40	true	true	Circula	Concrete	1,480.18	1,484.02
P-13	J-12	J-13	341.0	0.0063	42 inch	0.012	1,481.40	1,483.55	true	true	Circula	Concrete	1,485.04	1,486.17
P-14	J-13	Basin Outlet	475.0	0.0089	42 inch	0.012	1,483.55	1,487.80	true	true	Circula	Concrete	1,486.94	1,490.42

Scenario: Truncated Main Line - Match Crowns

Junction Report

Label	Calculated Station (ft)	Sump Elevation (ft)	Rim Elevation (ft)	Ground Elevation (ft)	Set Rim Equal to Ground Elevation?	Structure Diameter (ft)	Headloss Method	Headloss Coefficient
J-1	14+28	1,436.53	1,450.00	1,450.00	true	4.0	Standard	0.50
J-2	21+16	1,440.87	1,454.30	1,454.30	true	4.0	Standard	0.50
J-3	28+04	1,445.20	1,458.50	1,458.50	true	4.0	Standard	0.50
J-4	34+92	1,449.54	1,463.05	1,463.05	true	4.0	Standard	0.60
J-5	35+73	1,450.05	1,462.94	1,462.94	true	4.0	Standard	0.60
J-6	42+80	1,454.50	1,467.66	1,467.66	true	4.0	Standard	0.50
J-7	49+95	1,459.00	1,472.21	1,472.21	true	4.0	Standard	0.50
J-8	57+06	1,463.48	1,477.06	1,477.06	true	4.0	Standard	0.50
J-9	64+17	1,467.96	1,479.77	1,479.77	true	4.0	Standard	0.50
J-10	71+28	1,472.44	1,485.54	1,485.54	true	4.0	Standard	0.50
J-11	78+39	1,476.92	1,491.26	1,491.26	true	4.0	Standard	0.50
J-12	85+50	1,481.40	1,495.54	1,495.54	true	4.0	Standard	0.80
J-13	88+91	1,483.55	1,495.14	1,495.14	true	4.0	Standard	0.60
Sta 90+17 (MH#11)	7+07	1,429.00	1,441.36	1,441.36	true	4.0	Standard	0.70

Scenario: Truncated Main Line - Match Crowns

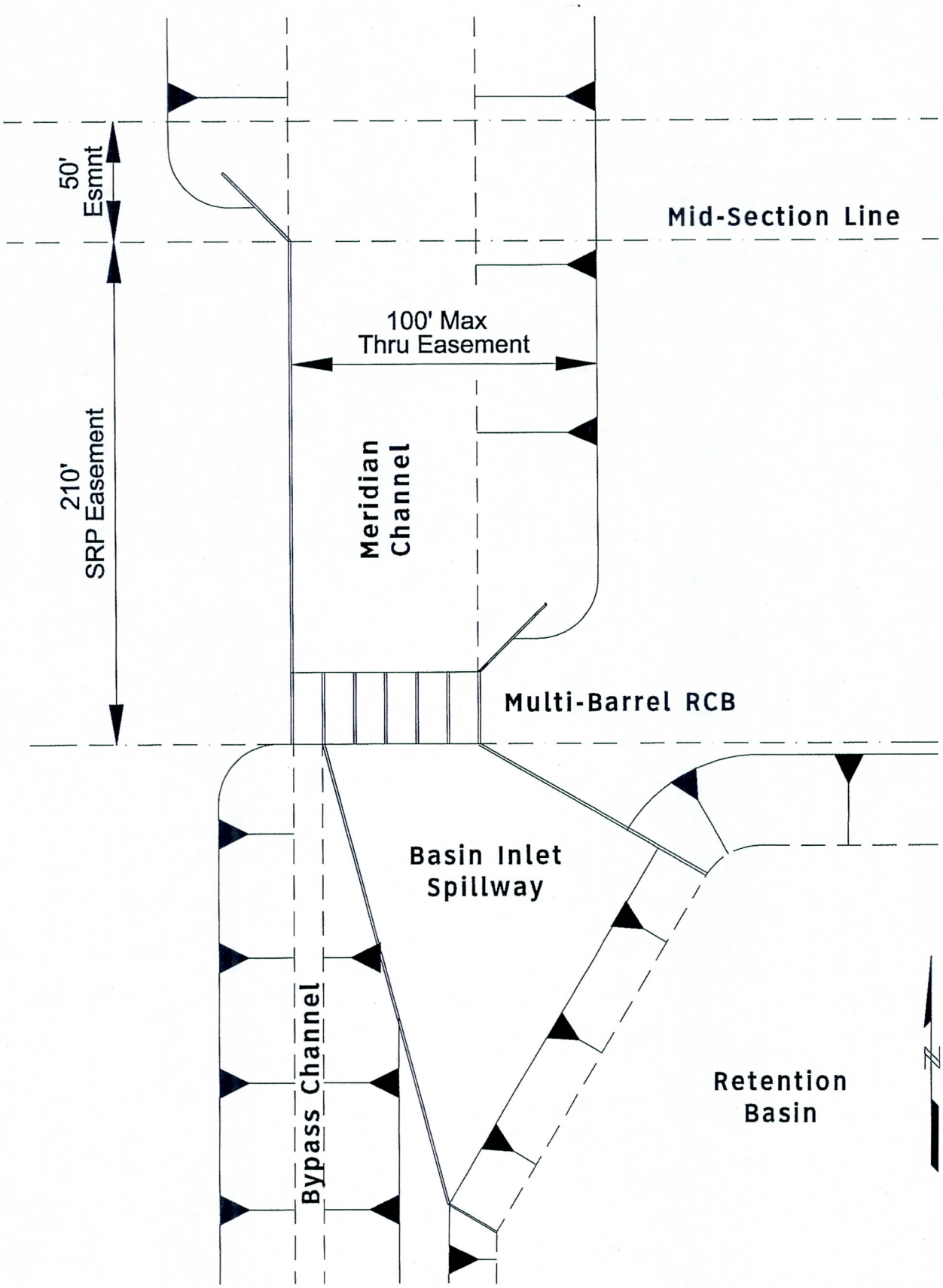
Junction Report

Label	Calculated Station (ft)	Sump Elevation (ft)	Rim Elevation (ft)	Ground Elevation (ft)	Set Rim Equal to Ground Elevation?	Structure Diameter (ft)	Headloss Method	Headloss Coefficient
J-1	14+28	1,436.53	1,450.00	1,450.00	true	4.0	Standard	0.50
J-2	21+16	1,440.87	1,454.30	1,454.30	true	4.0	Standard	0.50
J-3	28+04	1,445.20	1,458.50	1,458.50	true	4.0	Standard	0.50
J-4	34+92	1,449.54	1,463.05	1,463.05	true	4.0	Standard	0.60
J-5	35+73	1,450.05	1,462.94	1,462.94	true	4.0	Standard	0.60
J-6	42+80	1,454.50	1,467.66	1,467.66	true	4.0	Standard	0.50
J-7	49+95	1,459.00	1,472.21	1,472.21	true	4.0	Standard	0.50
J-8	57+06	1,463.48	1,477.06	1,477.06	true	4.0	Standard	0.50
J-9	64+17	1,467.96	1,479.77	1,479.77	true	4.0	Standard	0.50
J-10	71+28	1,472.44	1,485.54	1,485.54	true	4.0	Standard	0.50
J-11	78+39	1,476.92	1,491.26	1,491.26	true	4.0	Standard	0.50
J-12	85+50	1,481.40	1,495.54	1,495.54	true	4.0	Standard	0.80
J-13	88+91	1,483.55	1,495.14	1,495.14	true	4.0	Standard	0.60
Sta 90+17 (MH#11)	7+07	1,429.00	1,441.36	1,441.36	true	4.0	Standard	0.70

APPENDIX B

HYDRAULICS

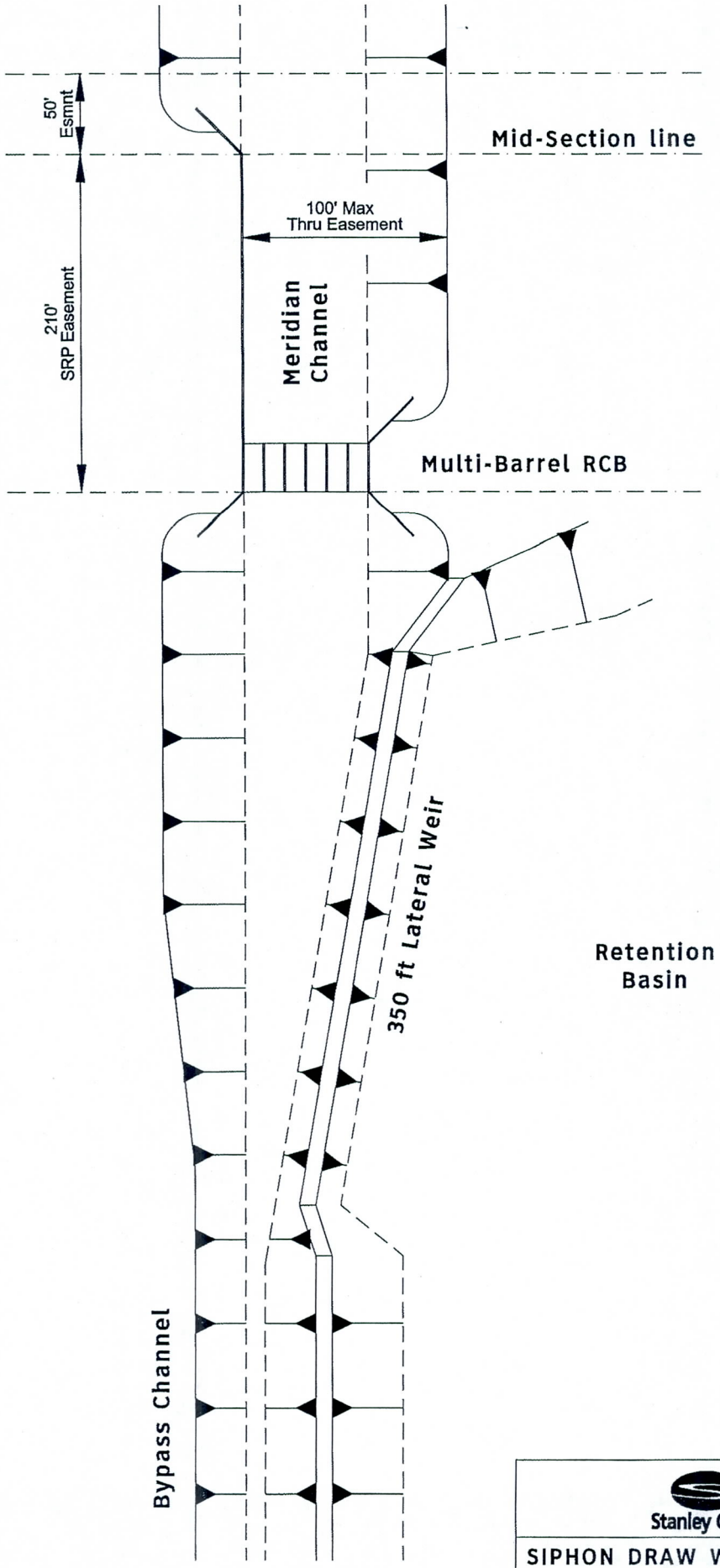
Diversion Structures



Stanley Consultants INC.
1661 East Camelback Road, Suite 400
Phoenix, Arizona 85016
Phone: (602) 333-2200

SIPHON DRAW WASH DRAINAGE IMPROVEMENTS
FCD 2007C012
Diversion Alternative

DRAWING NO.	EXHIBIT 1	SHEET OF
.		. .



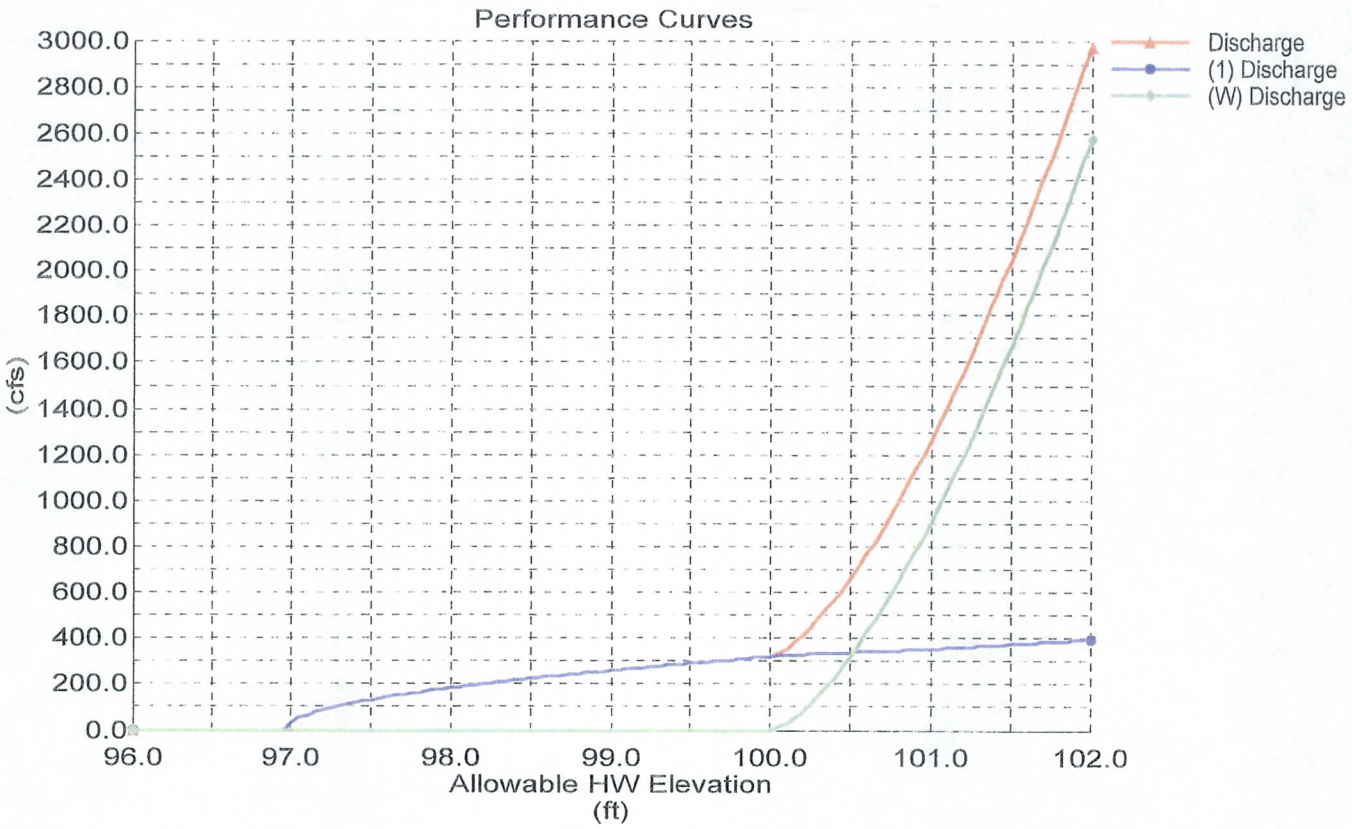
Stanley Consultants INC.
1661 East Camelback Road, Suite 400
Phoenix, Arizona 85016
Phone: (602) 333-2200

SIPHON DRAW WASH DRAINAGE IMPROVEMENTS
FCD 2007C012
Diversion Alternative

DRAWING NO.	EXHIBIT 2	SHEET OF
.		. .

Performance Curves Report
Meridian Channel Lateral Weir

Range Data:			
	Minimum	Maximum	Increment
Allowable HW E	96.00	102.00	0.05 ft



Culvert Designer/Analyzer Report
Meridian Channel Lateral Weir

Comments:
Conceptual analysis for a Meridian Channel diversion structure with a box culvert to control bypass flow and a lateral weir that diverts flow into a retention basin.

Target diversion is 380 cfs (TW based on 500 considered close enough for conceptual analysis as analysis provided to be under inlet contol anyway. in both instances)

Tailwater based upon a trapezoidal channel with the following values:

Q = 500 cfs S = 0.001 ft/ft
B = 15 ft D = 5 ft SS = 4:1

Analysis Component			
Storm Event	Design	Discharge	2,300.00 cfs

Peak Discharge Method: User-Specified			
Design Discharge	2,300.00 cfs	Check Discharge	2,300.00 cfs

Tailwater Conditions: Constant Tailwater	
Tailwater Elevation	96.97 ft

Name	Description	Discharge	HW Elev.	Velocity
Culvert-1	1-6 x 6 ft Box	380.58 cfs	101.64 ft	12.68 ft/s
Weir	Broad Crested	1,919.15 cfs	101.64 ft	N/A
Total	----------	2,299.74 cfs	101.64 ft	N/A

Culvert Designer/Analyzer Report
Meridian Channel Lateral Weir

Component:Culvert-1

Culvert Summary					
Computed Headwater Elev:	101.64	ft	Discharge	380.58	cfs
Inlet Control HW Elev.	101.64	ft	Tailwater Elevation	96.97	ft
Outlet Control HW Elev.	100.98	ft	Control Type	Inlet Control	
Headwater Depth/Height	1.61				

Grades					
Upstream Invert	92.00	ft	Downstream Invert	91.97	ft
Length	30.00	ft	Constructed Slope	0.001000	ft/ft

Hydraulic Profile					
Profile	M2		Depth, Downstream	5.00	ft
Slope Type	Mild		Normal Depth	N/A	ft
Flow Regime	Subcritical		Critical Depth	5.00	ft
Velocity Downstream	12.68	ft/s	Critical Slope	0.005326	ft/ft

Section					
Section Shape	Box		Mannings Coefficient	0.013	
Section Material	Concrete		Span	6.00	ft
Section Size	6 x 6 ft		Rise	6.00	ft
Number Sections	1				

Outlet Control Properties					
Outlet Control HW Elev.	100.98	ft	Upstream Velocity Head	1.97	ft
Ke	0.70		Entrance Loss	1.38	ft

Inlet Control Properties					
Inlet Control HW Elev.	101.64	ft	Flow Control	Submerged	
Inlet Type	0° wingwall flares		Area Full	36.0	ft^2
K	0.06100		HDS 5 Chart	8	
M	0.75000		HDS 5 Scale	3	
C	0.04230		Equation Form	1	
Y	0.82000				

Culvert Designer/Analyzer Report
Meridian Channel Lateral Weir

Component:Weir

Hydraulic Component(s): Broad Crested					
Discharge	1,919.15	cfs	Allowable HW Elevation	101.64	ft
Weir Coefficient	2.60	US	Length	350.00	ft
Crest Elevation	100.00	ft	Headwater Elevation	101.64	ft

Meridian Bypass Channel - Tailwater for Diversion Structure
Worksheet for Trapezoidal Channel

Project Description	
Worksheet	Bypass Channel
Flow Element	Trapezoidal Channel
Method	Manning's Formula
Solve For	Discharge

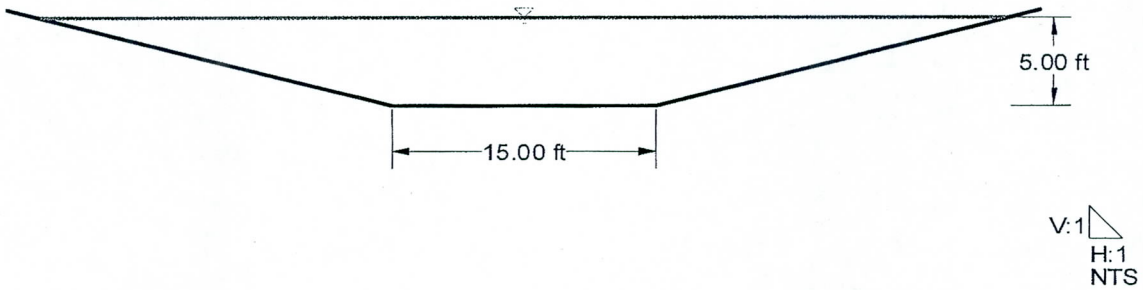
Input Data		
Mannings Coefficient	0.035	
Channel Slope	0.001000	ft/ft
Depth	5.00	ft
Left Side Slope	4.00	H : V
Right Side Slope	4.00	H : V
Bottom Width	15.00	ft

Results		
Discharge	499.99	cfs
Flow Area	174.8	ft²
Wetted Perimeter	56.20	ft
Top Width	54.97	ft
Critical Depth	2.58	ft
Critical Slope	0.014942	ft/ft
Velocity	2.86	ft/s
Velocity Head	0.13	ft
Specific Energy	5.12	ft
Froude Number	0.28	
Flow Type	Subcritical	

Cross Section
Cross Section for Trapezoidal Channel

Project Description	
Worksheet	Bypass Channel
Flow Element	Trapezoidal Channel
Method	Manning's Formula
Solve For	Discharge

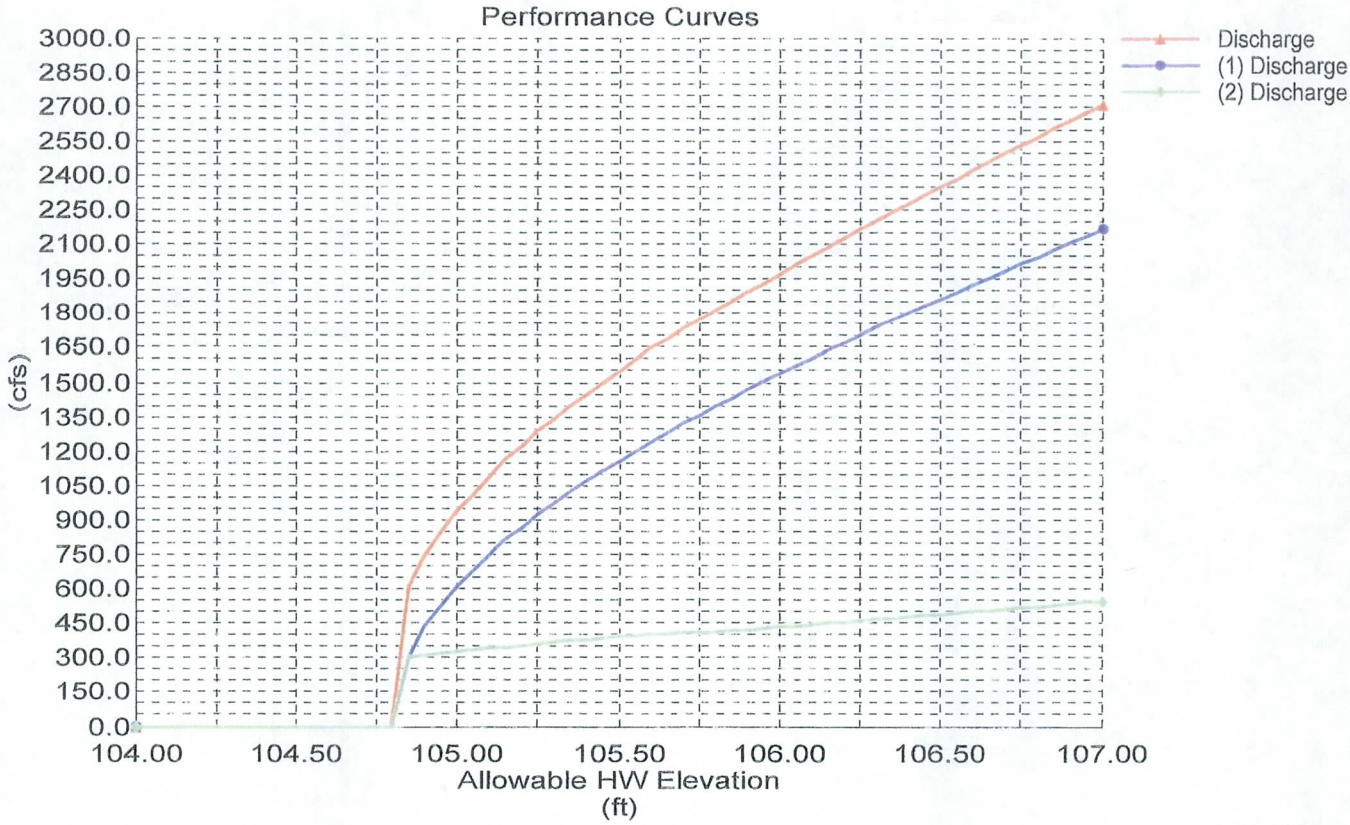
Section Data		
Mannings Coefficient	0.035	
Channel Slope	0.001000	ft/ft
Depth	5.00	ft
Left Side Slope	4.00	H : V
Right Side Slope	4.00	H : V
Bottom Width	15.00	ft
Discharge	499.99	cfs



Performance Curves Report
Meridian Channel Splitter at Varied Inverts

Range Data:

	Minimum	Maximum	Increment
Allowable HW E	104.00	107.00	0.05 ft



Culvert Designer/Analyzer Report
Meridian Channel Splitter at Varied Inverts

Comments:
Conceptual analysis for a Meridian Channel diversion structure using a multi-barrel box culvert to split flow. Invert of one barrel is lower than other barrels for low flow bypass.

Target diversion to bypass channel is 380 cfs (TW based on 500 considered close enough for conceptual analysis and is used as tailwater for all barrels. (necessarily because it is not possible to set more than one TW elevation)

Tailwater based upon a trapezoidal channel with the following values:

Q = 500 cfs S = 0.001 ft/ft
B = 15 ft D = 5 ft SS = 4:1

Analysis Component			
Storm Event	Design	Discharge	2,300.00 cfs

Peak Discharge Method: User-Specified			
Design Discharge	2,300.00 cfs	Check Discharge	2,300.00 cfs

Tailwater Conditions: Constant Tailwater	
Tailwater Elevation	104.80 ft

Name	Description	Discharge	HW Elev.	Velocity
Culvert-1	10-6 x 5 ft Box	1,820.31 cfs	106.43 ft	7.58 ft/s
Culvert-2	1-12 x 6 ft Box	479.61 cfs	106.43 ft	7.99 ft/s
Weir	Not Considered	N/A	N/A	N/A
Total	----------	2,299.92 cfs	106.43 ft	N/A

Culvert Designer/Analyzer Report
Meridian Channel Splitter at Varied Inverts

Component:Culvert-1

Culvert Summary					
Computed Headwater Elev	106.43	ft	Discharge	1,820.31	cfs
Inlet Control HW Elev.	105.94	ft	Tailwater Elevation	104.80	ft
Outlet Control HW Elev.	106.43	ft	Control Type	Outlet Control	
Headwater Depth/Height	1.09				

Grades					
Upstream Invert	101.00	ft	Downstream Invert	100.80	ft
Length	200.00	ft	Constructed Slope	0.001000	ft/ft

Hydraulic Profile					
Profile	M2		Depth, Downstream	4.00	ft
Slope Type	Mild		Normal Depth	N/A	ft
Flow Regime	Subcritical		Critical Depth	3.06	ft
Velocity Downstream	7.58	ft/s	Critical Slope	0.003690	ft/ft

Section					
Section Shape	Box		Mannings Coefficient	0.012	
Section Material	Concrete		Span	6.00	ft
Section Size	6 x 5 ft		Rise	5.00	ft
Number Sections	10				

Outlet Control Properties					
Outlet Control HW Elev.	106.43	ft	Upstream Velocity Head	0.80	ft
Ke	0.50		Entrance Loss	0.40	ft

Inlet Control Properties					
Inlet Control HW Elev.	105.94	ft	Flow Control	Unsubmerged	
Inlet Type	30 to 75° wingwall flares		Area Full	300.0	ft²
K	0.02600		HDS 5 Chart	8	
M	1.00000		HDS 5 Scale	1	
C	0.03470		Equation Form	1	
Y	0.86000				

Culvert Designer/Analyzer Report
Meridian Channel Splitter at Varied Inverts

Component:Culvert-2

Culvert Summary					
Computed Headwater Elev	106.43	ft	Discharge	479.61	cfs
Inlet Control HW Elev.	105.92	ft	Tailwater Elevation	104.80	ft
Outlet Control HW Elev.	106.43	ft	Control Type	Entrance Control	
Headwater Depth/Height	1.07				

Grades					
Upstream Invert	100.00	ft	Downstream Invert	99.80	ft
Length	200.00	ft	Constructed Slope	0.005000	ft/ft

Hydraulic Profile					
Profile	CompositeS1S2		Depth, Downstream	5.00	ft
Slope Type	Steep		Normal Depth	2.91	ft
Flow Regime	N/A		Critical Depth	3.68	ft
Velocity Downstream	7.99	ft/s	Critical Slope	0.002571	ft/ft

Section					
Section Shape	Box		Mannings Coefficient	0.012	
Section Material	Concrete		Span	12.00	ft
Section Size	12 x 6 ft		Rise	6.00	ft
Number Sections	1				

Outlet Control Properties					
Outlet Control HW Elev.	106.43	ft	Upstream Velocity Head	1.84	ft
Ke	0.50		Entrance Loss	0.92	ft

Inlet Control Properties					
Inlet Control HW Elev.	105.92	ft	Flow Control	Unsubmerged	
Inlet Type	30 to 75° wingwall flares		Area Full	72.0	ft²
K	0.02600		HDS 5 Chart	8	
M	1.00000		HDS 5 Scale	1	
C	0.03470		Equation Form	1	
Y	0.86000				

Meridian Bypass Channel - Tailwater for Diversion Structure
Worksheet for Trapezoidal Channel

Project Description	
Worksheet	Bypass Channel
Flow Element	Trapezoidal Channel
Method	Manning's Formula
Solve For	Discharge

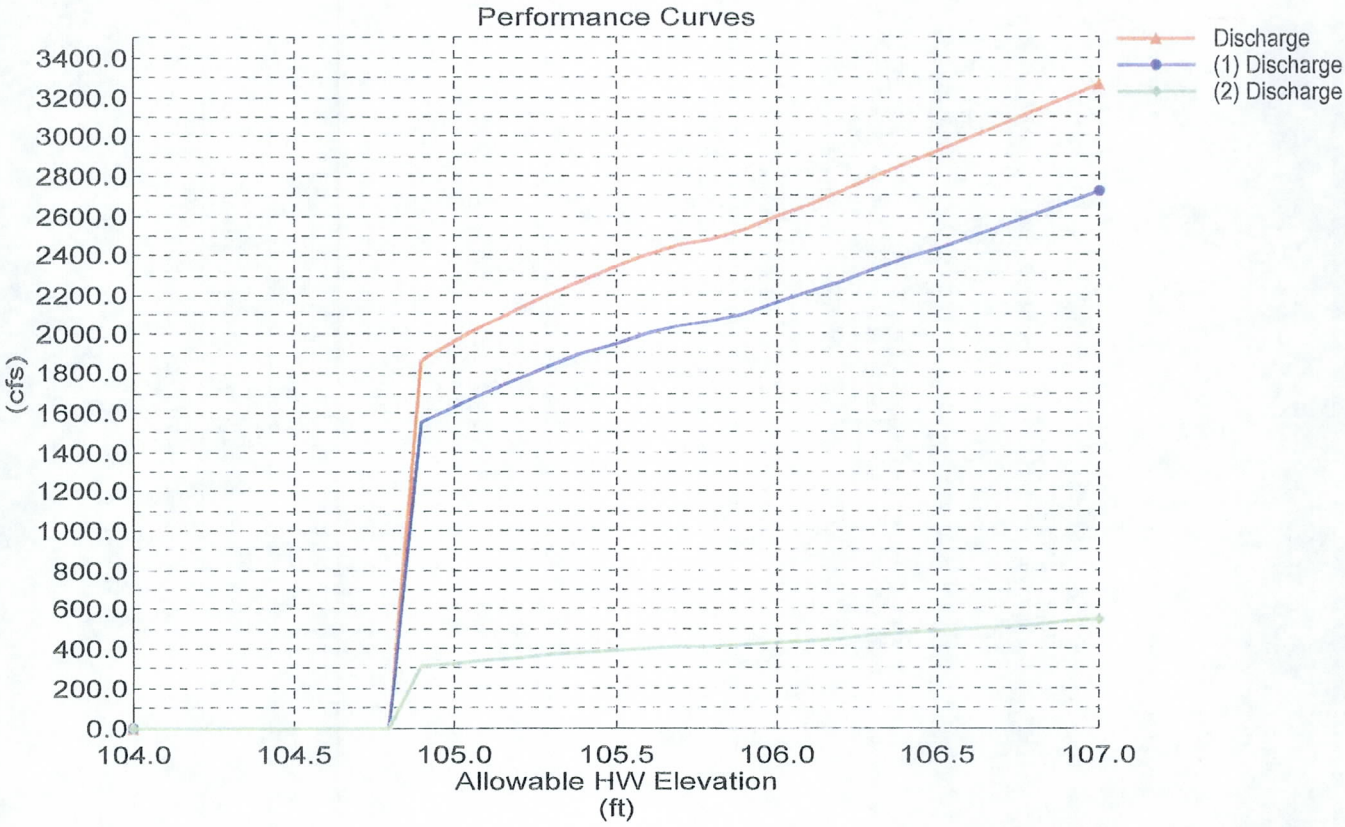
Input Data		
Mannings Coefficient	0.035	
Channel Slope	0.001000	ft/ft
Depth	5.00	ft
Left Side Slope	4.00	H : V
Right Side Slope	4.00	H : V
Bottom Width	15.00	ft

Results		
Discharge	499.99	cfs
Flow Area	174.8	ft²
Wetted Perimeter	56.20	ft
Top Width	54.97	ft
Critical Depth	2.58	ft
Critical Slope	0.014942	ft/ft
Velocity	2.86	ft/s
Velocity Head	0.13	ft
Specific Energy	5.12	ft
Froude Number	0.28	
Flow Type	Subcritical	

Performance Curves Report
Meridian Channel Splitter at Uniform Inverts

Range Data:

	Minimum	Maximum	Increment
Allowable HW E	104.00	107.00	0.10 ft



Culvert Designer/Analyzer Report
Meridian Channel Splitter at Uniform Inverts

Comments:
Conceptual analysis for a Meridian Channel diversion structure using a multi-barrel box culvert to split flow. All barrels are the same size and set at the same invert elevation.

Target diversion to bypass channel is 380 cfs (TW based on 500 considered close enough for conceptual analysis and is used as tailwater for all barrels. (necessarily because it is not possible to set more than one TW elevation)

Tailwater based upon a trapezoidal channel with the following values:

Q = 500 cfs S = 0.001 ft/ft
B = 15 ft D = 5 ft SS = 4:1

Analysis Component			
Storm Event	Design	Discharge	2,300.00 cfs

Peak Discharge Method: User-Specified			
Design Discharge	2,300.00 cfs	Check Discharge	2,300.00 cfs

Tailwater Conditions: Constant Tailwater	
Tailwater Elevation	104.80 ft

Name	Description	Discharge	HW Elev.	Velocity
Culvert-1	5-12 x 6 ft Box	1,916.40 cfs	105.44 ft	6.39 ft/s
Culvert-2	1-12 x 6 ft Box	383.28 cfs	105.44 ft	6.39 ft/s
Weir	Not Considered	N/A	N/A	N/A
Total	----------	2,299.68 cfs	105.44 ft	N/A

Culvert Designer/Analyzer Report
Meridian Channel Splitter at Uniform Inverts

Component:Culvert-1

Culvert Summary			
Computed Headwater Elev	105.44 ft	Discharge	1,916.40 cfs
Inlet Control HW Elev.	105.07 ft	Tailwater Elevation	104.80 ft
Outlet Control HW Elev.	105.44 ft	Control Type	Outlet Control
Headwater Depth/Height	0.91		

Grades			
Upstream Invert	100.00 ft	Downstream Invert	99.80 ft
Length	200.00 ft	Constructed Slope	0.005000 ft/ft

Hydraulic Profile			
Profile	S1	Depth, Downstream	5.00 ft
Slope Type	Steep	Normal Depth	2.50 ft
Flow Regime	Subcritical	Critical Depth	3.17 ft
Velocity Downstream	6.39 ft/s	Critical Slope	0.002514 ft/ft

Section			
Section Shape	Box	Mannings Coefficient	0.012
Section Material	Concrete	Span	12.00 ft
Section Size	12 x 6 ft	Rise	6.00 ft
Number Sections	5		

Outlet Control Properties			
Outlet Control HW Elev.	105.44 ft	Upstream Velocity Head	1.18 ft
Ke	0.50	Entrance Loss	0.59 ft

Inlet Control Properties			
Inlet Control HW Elev.	105.07 ft	Flow Control	Unsubmerged
Inlet Type	30 to 75° wingwall flares	Area Full	360.0 ft²
K	0.02600	HDS 5 Chart	8
M	1.00000	HDS 5 Scale	1
C	0.03470	Equation Form	1
Y	0.86000		

Culvert Designer/Analyzer Report
Meridian Channel Splitter at Uniform Inverts

Component:Culvert-2

Culvert Summary			
Computed Headwater Elev:	105.44 ft	Discharge	383.28 cfs
Inlet Control HW Elev.	105.07 ft	Tailwater Elevation	104.80 ft
Outlet Control HW Elev.	105.44 ft	Control Type	Outlet Control
Headwater Depth/Height	0.91		

Grades			
Upstream Invert	100.00 ft	Downstream Invert	99.80 ft
Length	200.00 ft	Constructed Slope	0.005000 ft/ft

Hydraulic Profile			
Profile	S1	Depth, Downstream	5.00 ft
Slope Type	Steep	Normal Depth	2.50 ft
Flow Regime	Subcritical	Critical Depth	3.17 ft
Velocity Downstream	6.39 ft/s	Critical Slope	0.002514 ft/ft

Section			
Section Shape	Box	Mannings Coefficient	0.012
Section Material	Concrete	Span	12.00 ft
Section Size	12 x 6 ft	Rise	6.00 ft
Number Sections	1		

Outlet Control Properties			
Outlet Control HW Elev.	105.44 ft	Upstream Velocity Head	1.18 ft
Ke	0.50	Entrance Loss	0.59 ft

Inlet Control Properties			
Inlet Control HW Elev.	105.07 ft	Flow Control	Unsubmerged
Inlet Type	30 to 75° wingwall flares	Area Full	72.0 ft²
K	0.02600	HDS 5 Chart	8
M	1.00000	HDS 5 Scale	1
C	0.03470	Equation Form	1
Y	0.86000		

Meridian Bypass Channel - Tailwater for Diversion Structure
Worksheet for Trapezoidal Channel

Project Description	
Worksheet	Bypass Channel
Flow Element	Trapezoidal Channel
Method	Manning's Formula
Solve For	Discharge

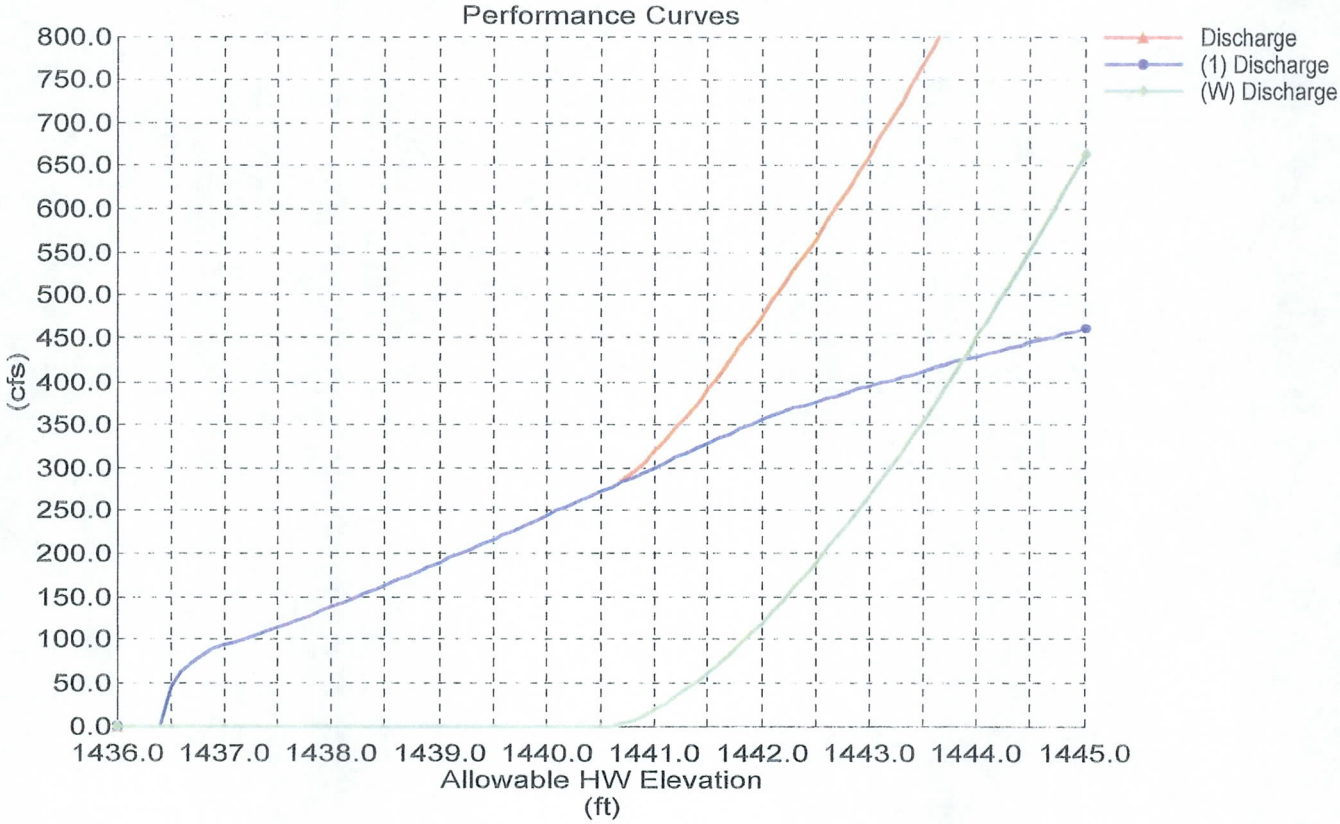
Input Data		
Mannings Coefficient	0.035	
Channel Slope	0.001000	ft/ft
Depth	5.00	ft
Left Side Slope	4.00	H : V
Right Side Slope	4.00	H : V
Bottom Width	15.00	ft

Results		
Discharge	499.99	cfs
Flow Area	174.8	ft²
Wetted Perimeter	56.20	ft
Top Width	54.97	ft
Critical Depth	2.58	ft
Critical Slope	0.014942	ft/ft
Velocity	2.86	ft/s
Velocity Head	0.13	ft
Specific Energy	5.12	ft
Froude Number	0.28	
Flow Type	Subcritical	

Performance Curves Report
Elliot Road / Elliot Basin Split

Range Data:

	Minimum	Maximum	Increment
Allowable HW E	1,436.00	1,445.00	0.10 ft



- Top of Channel = 1445.63
- Original design of weir & basin based upon Q_{weir} = 385 cfs with the El_{crest} = 1439.6*

* W-P design calculations for weir with Q = 385 cfs uses a weir crest of 1440.6 (w/max WSEL = 1443.7)

Culvert Designer/Analyzer Report
Elliot Road / Elliot Basin Split

Analysis Component			
Storm Event	Design	Discharge	580.00 cfs

Peak Discharge Method: User-Specified			
Design Discharge	580.00 cfs	Check Discharge	580.00 cfs

Tailwater Conditions: Constant Tailwater	
Tailwater Elevation	1,436.40 ft

Name	Description	Discharge	HW Elev.	Velocity
Culvert-1	1-78 inch Circular	379.95 cfs	1,442.58 ft	21.33 ft/s
Weir	Broad Crested	200.14 cfs	1,442.58 ft	N/A
Total	----------	580.09 cfs	1,442.58 ft	N/A

Culvert Designer/Analyzer Report
Elliot Road / Elliot Basin Split

Component:Culvert-1

Culvert Summary					
Computed Headwater Elev	1,442.58	ft	Discharge	379.95	cfs
Inlet Control HW Elev.	1,442.58	ft	Tailwater Elevation	1,436.40	ft
Outlet Control HW Elev.	1,442.44	ft	Control Type	Inlet Control	
Headwater Depth/Height	1.46				

Grades					
Upstream Invert	1,433.09	ft	Downstream Invert	1,428.84	ft
Length	160.50	ft	Constructed Slope	0.026480	ft/ft

Hydraulic Profile					
Profile	CompositePressureProfileS1S2		Depth, Downstream	3.44	ft
Slope Type	N/A		Normal Depth	2.90	ft
Flow Regime	N/A		Critical Depth	5.21	ft
Velocity Downstream	21.33	ft/s	Critical Slope	0.004658	ft/ft

Section					
Section Shape	Circular		Mannings Coefficient	0.012	
Section Material	Concrete		Span	6.50	ft
Section Size	78 inch		Rise	6.50	ft
Number Sections	1				

Outlet Control Properties					
Outlet Control HW Elev.	1,442.44	ft	Upstream Velocity Head	2.76	ft
Ke	0.50		Entrance Loss	1.38	ft

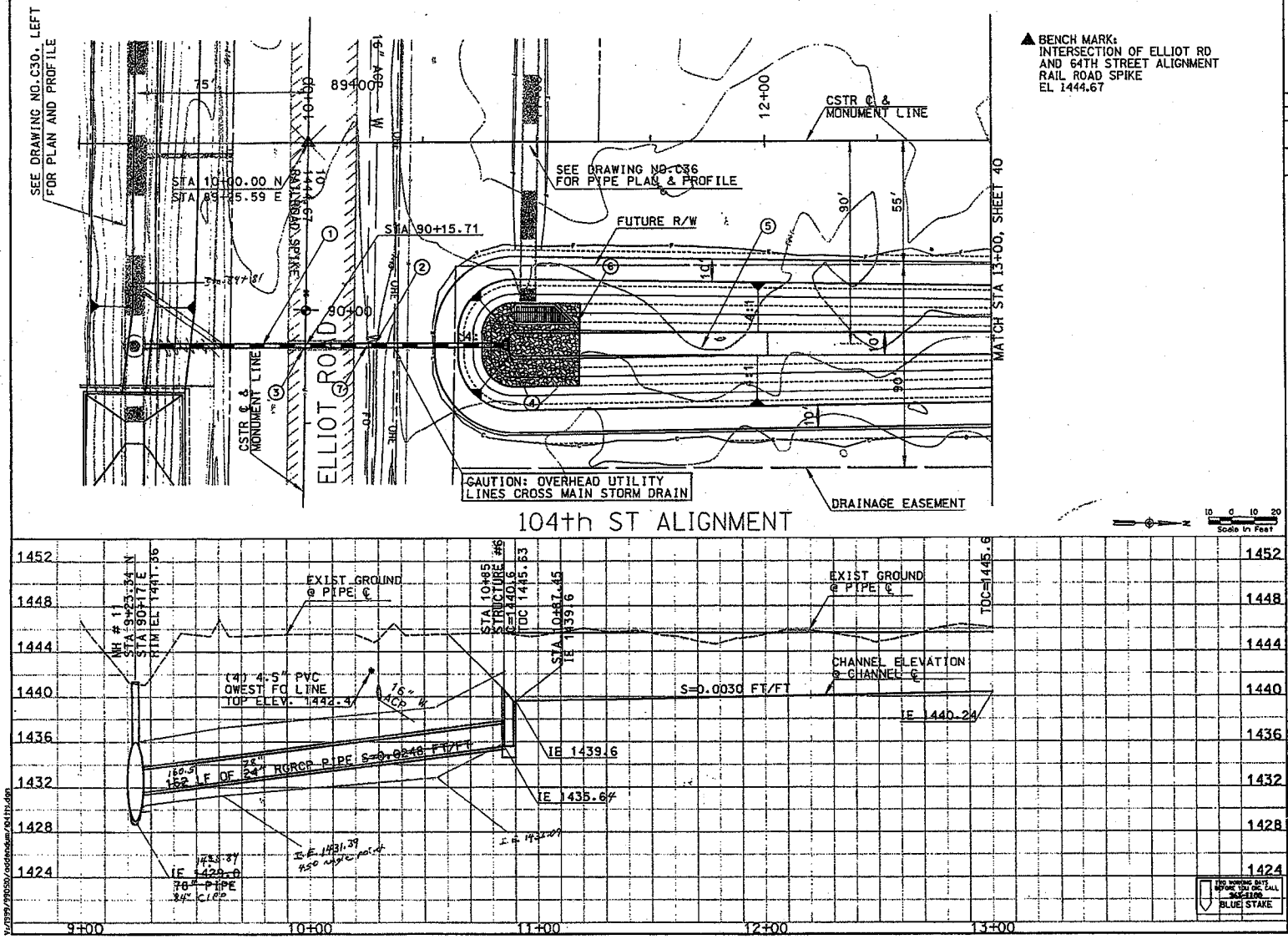
Inlet Control Properties					
Inlet Control HW Elev.	1,442.58	ft	Flow Control	Submerged	
Inlet Type	Square edge w/headwall		Area Full	33.2	ft^2
K	0.00980		HDS 5 Chart	1	
M	2.00000		HDS 5 Scale	1	
C	0.03980		Equation Form	1	
Y	0.67000				

Culvert Designer/Analyzer Report
Elliot Road / Elliot Basin Split

Component:Weir

Hydraulic Component(s): Broad Crested					
Discharge	200.14	cfs	Allowable HW Elevation	1,442.58	ft
Weir Coefficient	3.00	US	Length	24.00	ft *
Crest Elevation	1,440.60	ft	Headwater Elevation	1,442.58	ft

* W-P design calculations have a weir crest length = 23.5 (~ 24 so O.K.)



▲ BENCH MARK:
INTERSECTION OF ELLIOT RD AND 64TH STREET ALIGNMENT
RAIL ROAD SPIKE
EL 1444.67

☐ REMOVE ☐

○ CONSTRUCT ○

INSTALL NEW STORM DRAIN PIPE

NO.	STATION TO STATION	DIAMETER INCHES	LENGTH FEET
1	9+23.34 TO 10+85	24	162

2. REMOVE 16" ACP WATERLINE AND REPLACE WITH 16" DIP PER MAG STD DET 403-3 (1 EA)
3. SAWCUT REMOVE AND REPLACE AC PAVEMENT PER MAG STD DET 200, 'T' TOP (19 SY)
4. CONSTRUCT DROP INLET STRUCTURE #6 PER MAG STD DET 501-5 WITH TRASH RACK PER MAG STD DET 502-2 WITH GUARDRAIL PER DETAIL 1, DRAWING NO.D1 (1 EA)
5. CONSTRUCT TRAPEZOIDAL EARTHEN CHANNEL PER TYPICAL SECTION ON DRAWING NO.D2 (1410 CY)
6. INSTALL TYPE I RIPRAP WITH MIRAFI 140NL FILTER FABRIC OR APPROVED EQUAL D_{50}= 1' DEPTH = 2' (52 CY)
7. CONTRACTOR TO PROTECT EXISTING UTILITY IN PLACE (NPI)

NO.	REVISION	BY	DATE
3			
2			
1	ADD F.O. DUCT AND NOTE	JGT	08/01

FLOOD CONTROL DISTRICT OF MARICOPA COUNTY
ENGINEERING DIVISION

ELLIOT ROAD DETENTION BASINS AND OUTFALL CHANNEL
PCN NO. 442 64 31

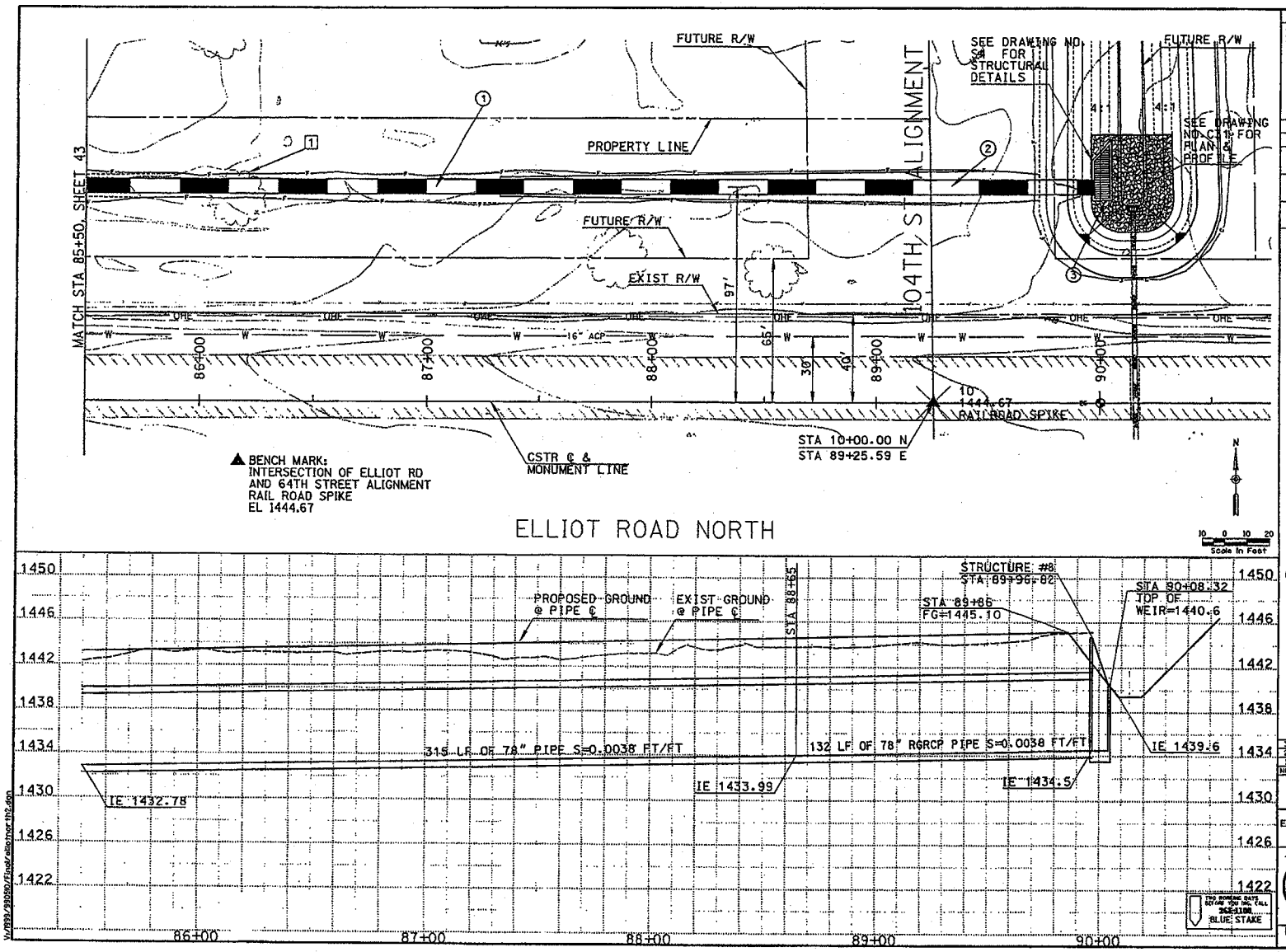
	BY	DATE
DESIGNED	J. TAYLOR	08/01
DRAWN	S. RASMUSSEN	08/01
CHECKED	A. PATEL	08/01

WOOD, PATEL & ASSOCIATES, INC.
1550 EAST MISSOURI, SUITE 203
PHOENIX, ARIZONA (602) 234-1344

DRAWING NO. C31

104th ST ALIGN
STA 9+18.34 TO 13+00

SHEET 39 OF 91



☐ REMOVE ☐

1 EXIST TREE TO BE REMOVED (NPI)

○ CONSTRUCT ○

INSTALL NEW STORM SEWER PIPE

NO.	STATION TO STATION	DIAMETER INCHES	LENGTH FEET
1	85+50 TO 88+65	78	315
2	88+65 TO 89+96.82	78	132

3 CONSTRUCT INLET SPILLWAY STRUCTURE #8, GUARDRAIL AND GRATE PER STRUCTURAL DETAILS DRAWING NO. S4 (1 EA)

NO.	REVISION	BY	DATE
3			
2			
1			

FLOOD CONTROL DISTRICT OF MARICOPA COUNTY
ENGINEERING DIVISION

ELLIOT ROAD DETENTION BASINS AND OUTFALL CHANNEL
PCN NO. 442 04 31

	BY	DATE
DESIGNED	J. TAILLON	05/00
DRAWN	S. RASMUSSEN	05/00
CHECKED	A. PATEL	05/00

WOOD, PATEL & ASSOCIATES, INC.
1550 EAST MISSOURI, SUITE 203
PHOENIX, ARIZONA (602) 234-1344

DRAWING NO. C36

ELLIOT ROAD NORTH
STA 85+50 TO 89+96.82

SHEET 44 OF 91

V:/199/199050/Flood/elliotnor-th2.dgn

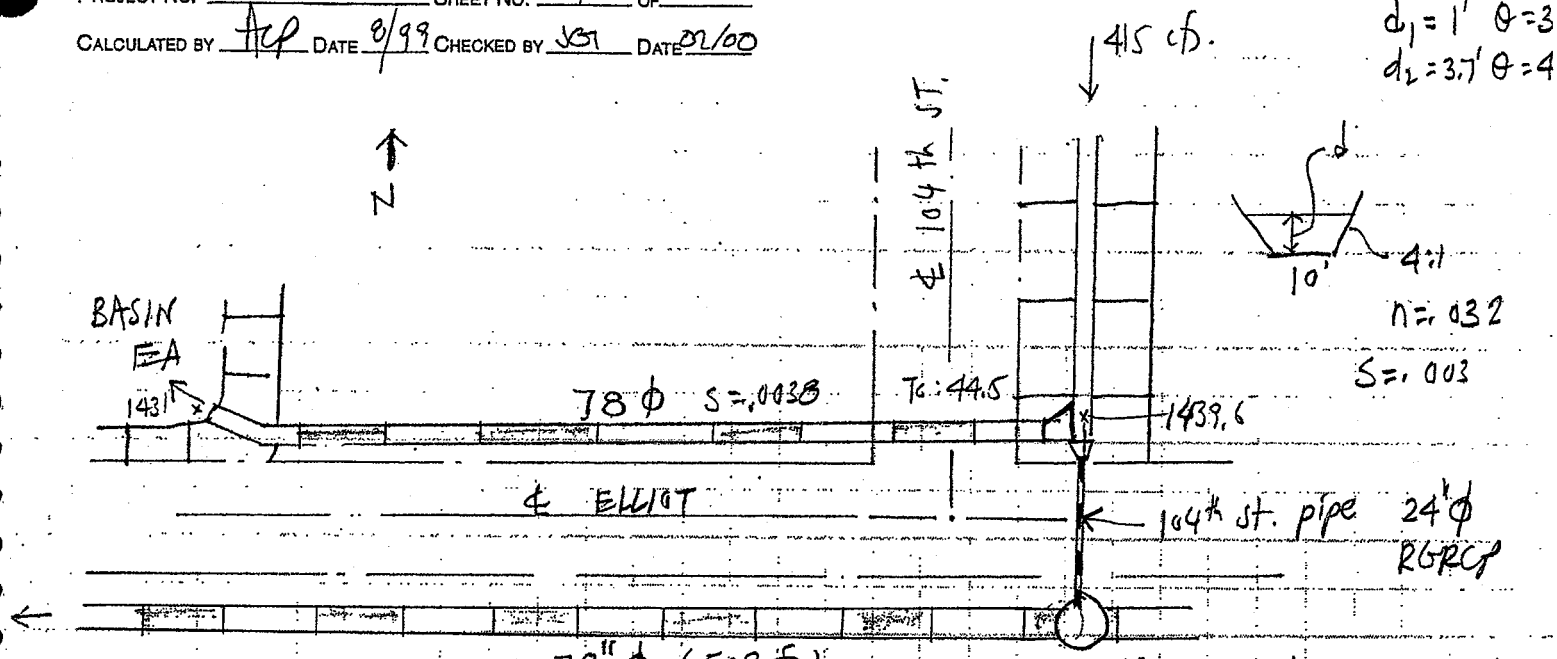
WOOD/PATEL

CIVIL ENGINEERS • HYDROLOGISTS • LAND SURVEYORS

PROJECT Elliot Basin - 104th ST. channel - Basin "EA"

PROJECT No. 99891.00 SHEET No. 1 OF

CALCULATED BY ACP DATE 8/99 CHECKED BY JGT DATE 02/00



PLAN VIEW
NTS

HYDRAULICS (for 90% plans)

1. 104th st. channel (including backwater)
2. 104th st pipe across Elliot (initial 30 cfs diversion)
3. Pipe betn Basin EA & 104th st. channel (Excess Q_{100} = 395 cfs)

TRAPEZOIDAL CHANNEL ANALYSIS
RATING CURVE COMPUTATION

February 1, 2000

PROGRAM INPUT DATA

DESCRIPTION	VALUE
Channel Bottom Slope (ft/ft)	0.003
Manning's Roughness Coefficient (n-value)	0.03
Channel Left Side Slope (horizontal/vertical)	4.0
Channel Right Side Slope (horizontal/vertical)	4.0
Channel Bottom Width (ft)	10.0
Minimum Flow Depth (ft)	1.0
Maximum Flow Depth (ft)	5.0
Incremental Head (ft)	1.0

COMPUTATION RESULTS

Flow Depth (ft)	Flow Rate (cfs)	Flow Velocity (fps)	Froude Number	Velocity Head (ft)	Energy Head (ft)	Flow Area (sq ft)	Top Width (ft)
1.0	31.83	2.27	0.455	0.08	1.08	14.0	18.0
2.0	119.82	3.33	0.499	0.172	2.172	36.0	26.0
3.0	274.66	4.16	0.527	0.269	3.269	66.0	34.0
4.0	508.49	4.89	0.548	0.371	4.371	104.0	42.0
5.0	832.85	5.55	0.565	0.479	5.479	150.0	50.0

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
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TRAPEZOIDAL CHANNEL ANALYSIS
STANDARD STEP WATER SURFACE PROFILE

August 31, 1999
104th Street Channel (Q100=415cfs)
Starting Water Surface from Culvert Inlet Condition
Dirt Channel with some landscaping

==========

PROGRAM INPUT DATA:

DESCRIPTION	VALU
Flow Rate (cubic feet per second)	415.0
Channel Bottom Slope (feet per foot)	0.003
Manning's Roughness Coefficient (n-value)	0.030
Channel Side Slope - Left Side (horizontal/vertical)	4.00
Channel Side Slope - Right Side (horizontal/vertical)	4.00
Channel Bottom Width (feet)	10.0
Channel Flow-Line Elevation at Starting Station (feet)	1439.60
Water Surface Elevation at Starting Station (feet)	1443.70
Starting Channel Station (feet)	0.00

==========

PROGRAM RESULTS:

DESCRIPTION	VALU
Normal Depth (feet)	3.64
Critical Depth (feet)	2.67

Station (ft)	Flowline (ft)	WS Elev. (ft)	Depth (ft)	Flow Area (sq ft)	Vel (fps)	Velocity Head(ft)	EGL Slop (ft/ft
0.0	1439.60	1443.70	4.10	108.24	3.83	0.228	0.00179
100.0	1439.90	1443.87	3.97	102.65	4.04	0.254	0.00207
200.0	1440.20	1444.06	3.86	98.40	4.22	0.276	0.00232
300.0	1440.50	1444.29	3.79	95.33	4.35	0.294	0.00252
400.0	1440.80	1444.54	3.74	93.21	4.45	0.308	0.00268
450.0	1440.95	1444.67	3.72	92.45	4.49	0.313	0.00274

==========

TRAPEZOIDAL CHANNEL ANALYSIS COMPUTER PROGRAM, Version 1.3 (c) 198
Dodson & Associates, Inc., 5629 FM 1960 W., #314, Houston, TX 7706
(713) 440-3787. A manual with equations & flow chart is available.

WOOD/PATEL

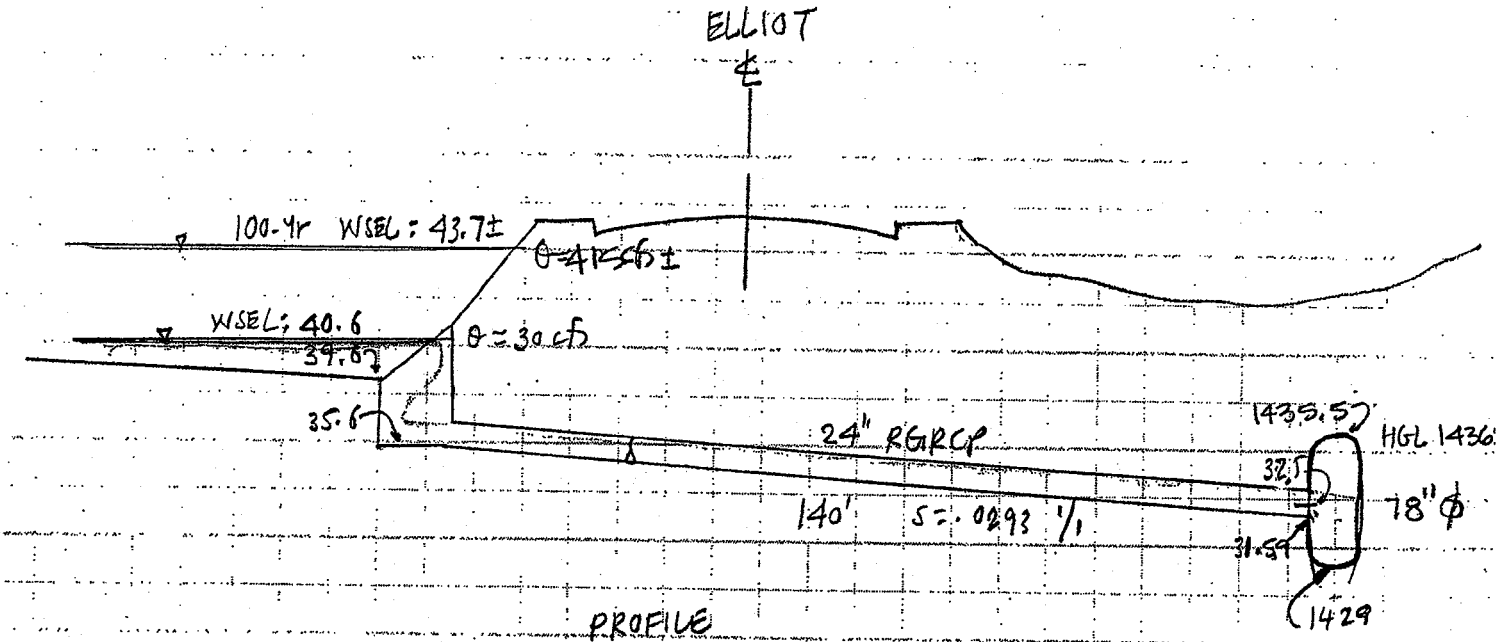
CIVIL ENGINEERS • HYDROLOGISTS • LAND SURVEYORS

PROJECT Elliot Basin 104th st channel

PROJECT No. 99891 SHEET No. _____ OF _____

CALCULATED BY _____ DATE _____ CHECKED BY KG DATE 12/00

(2) 104th st. Pipe across Elliot



PROFILE

LOOKING EAST

NTS

PIPE CULVERT ANALYSIS
COMPUTATION OF CULVERT PERFORMANCE CURVE

February 1, 2000

PROGRAM INPUT DATA

DESCRIPTION	VALUE
Culvert Diameter (ft)	2.0
FHWA Chart Number	1
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)	162.0
Invert Elevation at Downstream end of Culvert (ft)	1,431.59
Invert Elevation at Upstream end of Culvert (ft)	1,435.6
Culvert Slope (ft/ft)	0.0248
Starting Flow Rate (cfs)	10.0
Incremental Flow Rate (cfs)	10.0
Ending Flow Rate (cfs)	50.0
Starting Tailwater Depth (ft)	1.0
Incremental Tailwater Depth (ft)	1.0
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)
10.0	1.0	1.67	0.0	0.7	1.13	0.7	10.3
20.0	2.0	2.93	0.01	1.02	1.61	1.02	12.4
30.0	3.0	4.94	3.54	1.33	1.86	1.33	13.57
40.0	4.0	7.77	8.08	1.72	1.95	2.0	12.73
50.0	5.0	11.4	13.64	2.0	1.98	2.0	15.92

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WOOD/PATEL

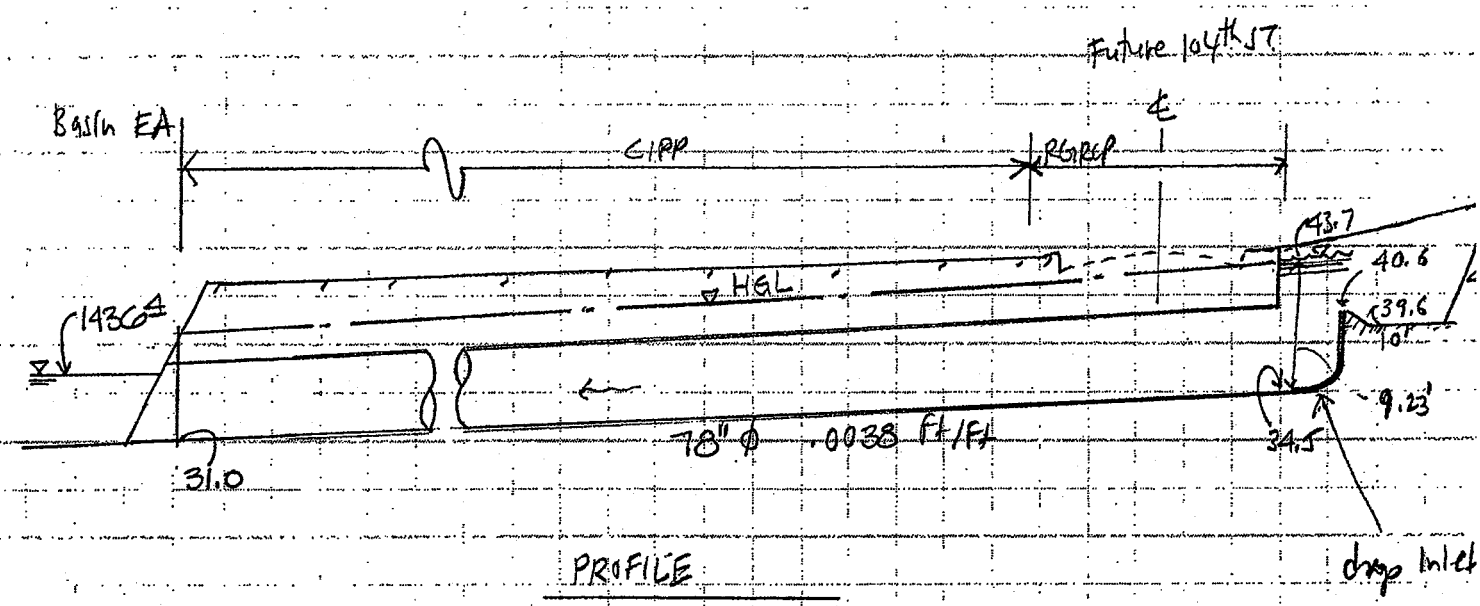
CIVIL ENGINEERS • HYDROLOGISTS • LAND SURVEYORS

PROJECT Elliot Road Detention Basin

PROJECT NO. _____ SHEET NO. _____ OF _____

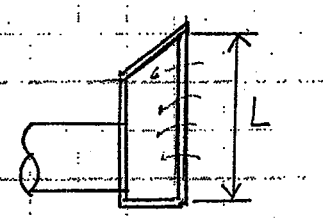
CALCULATED BY JGT DATE 12/4/99 CHECKED BY _____ DATE _____

③ Pipe between Basin EA & 104th st. channel



PROFILE

LOOKING NORTH
NTS



DROP PLAN VIEW

Drop Inlet: $Q_{100} = 395$ cfs

Weir length check:

$$Q = CLH^{3/2}$$

$$395 = 3 \times L \times (43.7 - 40.6)^{3/2}$$

$$\therefore L = 23.5'$$

Assume Tailwater = 1436.4 (but pipe flowing full @ outlet)

100-yr WSEL = 1439.00

APPENDIX B

HYDRAULICS

Siphon Draw Wash – Manning's n Value Assessment

MANNING'S ROUGHNESS COEFFICIENT / ROUTING REACH

Project: Siphon Draw Wash Drainage Improvements FCD 2007C012
Stream: Siphon Draw Wash
Location: SDW reach within detention basin parcel

Photo looking downstream about 1/4 mile east of Meridian Road
Note: This reach has more than one channel. This photo is of main channel.

HEC-1 Routing Reach:
N / A

RX	RY
100	100
200	98
335	96
345	92
355	92
365	96
500	98
600	100

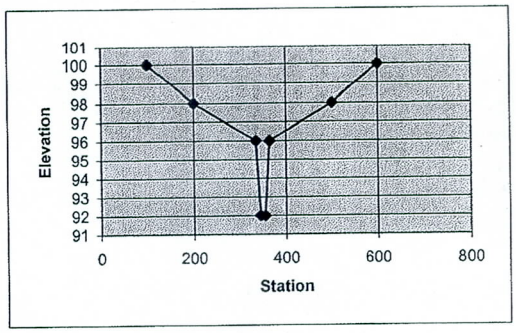
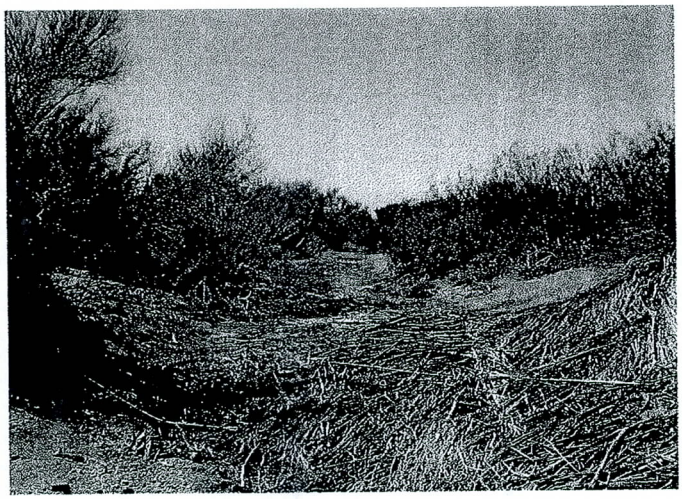


Photo looking west at secondary channel and overbank north of main channel.

Channel / Overbank Conditions		Manning's n-value Adjustment		Left Overbank	Main Channel	Right Overbank
Bed Material / Base 'n'	Concrete	n_b	.012 - .018			
	Firm Soil		.025 - .032	0.027		0.027
	Coarse Sand		.026 - .035		0.029	
	Gravel		.028 - .035			
	Cobble		.030 - .050			
	Boulder		.040 - .070			
Degree of Irregularity	Smooth	n_1	0			
	Minor		.001 - .005			
	Moderate		.006 - .010	0.01	0.006	0.01
	Severe		.011 - .020			
Effects of Obstruction	Negligible	n_2	.000 - .004			
	Minor		.005 - .015	0.01	0.005	0.01
	Appreciable		.020 - .030			
	Severe		.040 - .060			
Vegetation	Small	n_3	.002 - .010			
	Medium		.010 - .025	0.013	0.01	0.013
	Large		.025 - .050			
	Very Large		.050 - .100			
Total Roughness n = (nb + n1 + n2 + n3)				0.060	0.050	0.060

MANNING'S ROUGHNESS COEFFICIENT / ROUTING REACH

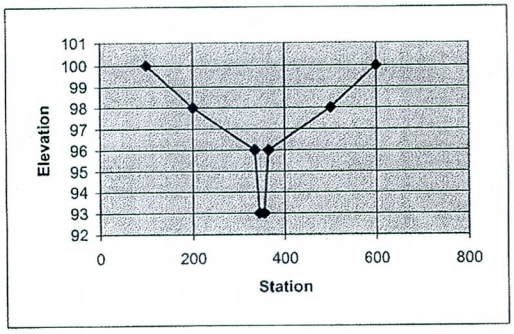
Project: Siphon Draw Wash Drainage Improvements FCD 2007C012
Stream: Siphon Draw Wash
Location: SDW reach within detention basin parcel



Siphon Draw Wash looking upstream near east limit of detention basin parcel

HEC-1 Routing Reach:
N / A

RX	RY
100	100
200	98
335	96
345	93
355	93
365	96
500	98
600	100



Channel / Overbank Conditions		Manning's n-value Adjustment		Left Overbank	Main Channel	Right Overbank
Bed Material / Base 'n'	Concrete	n_b	.012 - .018			
	Firm Soil		.025 - .032	0.027		0.027
	Coarse Sand		.026 - .035		0.029	
	Gravel		.028 - .035			
	Cobble		.030 - .050			
	Boulder		.040 - .070			
Degree of Irregularity	Smooth	n_1	0			
	Minor		.001 - .005			
	Moderate		.006 - .010	0.01	0.006	0.01
	Severe		.011 - .020			
Effects of Obstruction	Negligible	n_2	.000 - .004			
	Minor		.005 - .015	0.01	0.005	0.01
	Appreciable		.020 - .030			
	Severe		.040 - .060			
Vegetation	Small	n_3	.002 - .010			
	Medium		.010 - .025	0.013	0.01	0.013
	Large		.025 - .050			
	Very Large		.050 - .100			
Total Roughness n = (nb + n1 + n2 + n3)				0.060	0.050	0.060

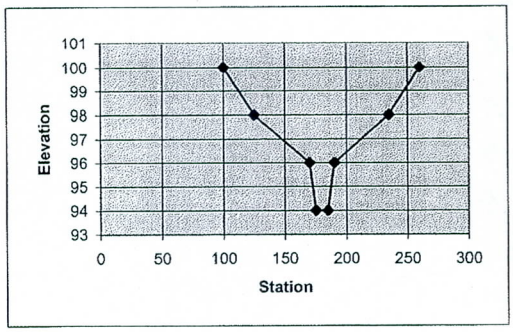
MANNING'S ROUGHNESS COEFFICIENT / ROUTING REACH

Project: Siphon Draw Wash Drainage Improvements FCD 2007C012
Stream: Siphon Draw Wash
Location: SDW reach within Meridian Pointe Subdivision
Meridian Road to South Clancy

Photo looking upstream from South Clancy

HEC-1 Routing Reach:
N / A

RX	RY
100	100
125	98
170	96
175	94
185	94
190	96
235	98
260	100



Channel / Overbank Conditions		Manning's n-value Adjustment		Left Overbank	Main Channel	Right Overbank
Bed Material / Base 'n'	Concrete	n_b	.012 - .018			
	Firm Soil		.025 - .032	0.027		0.027
	Coarse Sand		.026 - .035		0.029	
	Gravel		.028 - .035			
	Cobble		.030 - .050			
	Boulder		.040 - .070			
Degree of Irregularity	Smooth	n_1	0			
	Minor		.001 - .005			
	Moderate		.006 - .010	0.01	0.006	0.01
	Severe		.011 - .020			
Effects of Obstruction	Negligible	n_2	.000 - .004			
	Minor		.005 - .015	0.01	0.005	0.01
	Appreciable		.020 - .030			
	Severe		.040 - .060			
Vegetation	Small	n_3	.002 - .010			
	Medium		.010 - .025	0.013	0.01	0.013
	Large		.025 - .050			
	Very Large		.050 - .100			
Total Roughness n = (nb + n1 + n2 + n3)				0.060	0.050	0.060

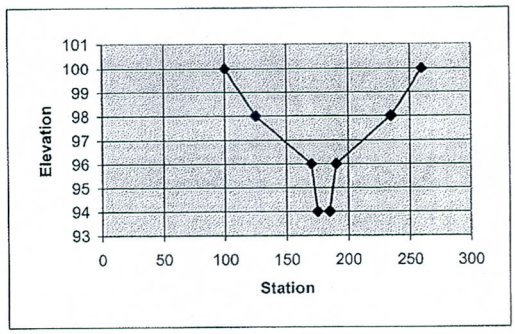
MANNING'S ROUGHNESS COEFFICIENT / ROUTING REACH

Project: Siphon Draw Wash Drainage Improvements FCD 2007C012
Stream: Siphon Draw Wash
Location: SDW reach within Meridian Pointe Subdivision
South Clancy to Mountain (alignment)

Photo looking downstream about 200' west of South Clancy

HEC-1 Routing Reach: RSDW1

RX	RY
100	100
125	98
170	96
175	94
185	94
190	96
235	98
260	100



Channel / Overbank Conditions		Manning's n-value Adjustment		Left Overbank	Main Channel	Right Overbank
Bed Material / Base 'n'	Concrete	n_b	.012 - .018			
	Firm Soil		.025 - .032	0.027		0.027
	Coarse Sand		.026 - .035		0.029	
	Gravel		.028 - .035			
	Cobble		.030 - .050			
	Boulder		.040 - .070			
Degree of Irregularity	Smooth	n_1	0			
	Minor		.001 - .005		0.004	
	Moderate		.006 - .010	0.008		0.008
	Severe		.011 - .020			
Effects of Obstruction	Negligible	n_2	.000 - .004		0.004	
	Minor		.005 - .015	0.009		0.009
	Appreciable		.020 - .030			
	Severe		.040 - .060			
Vegetation	Small	n_3	.002 - .010		0.008	
	Medium		.010 - .025	0.011		0.011
	Large		.025 - .050			
	Very Large		.050 - .100			
Total Roughness n = (nb + n1 + n2 + n3)				0.055	0.045	0.055

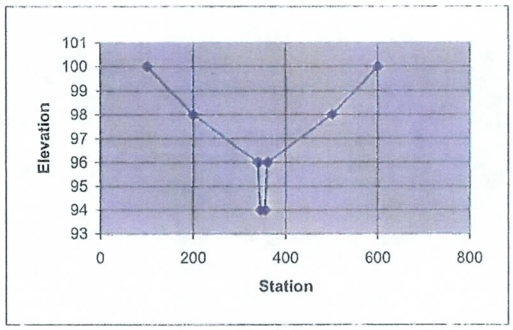
MANNING'S ROUGHNESS COEFFICIENT / ROUTING REACH

Project: Siphon Draw Wash Drainage Improvements FCD 2007C012
Stream: Siphon Draw Wash
Location: SDW downstream from Meridian Pointe Subdivision
Mountain Road (alignment) to project outfall

Siphon Draw Wash looking west from Signal Butte Road

HEC-1 Routing Reach: RSDW2

RX	RY
100	100
200	98
340	96
345	94
355	94
360	96
500	98
600	100

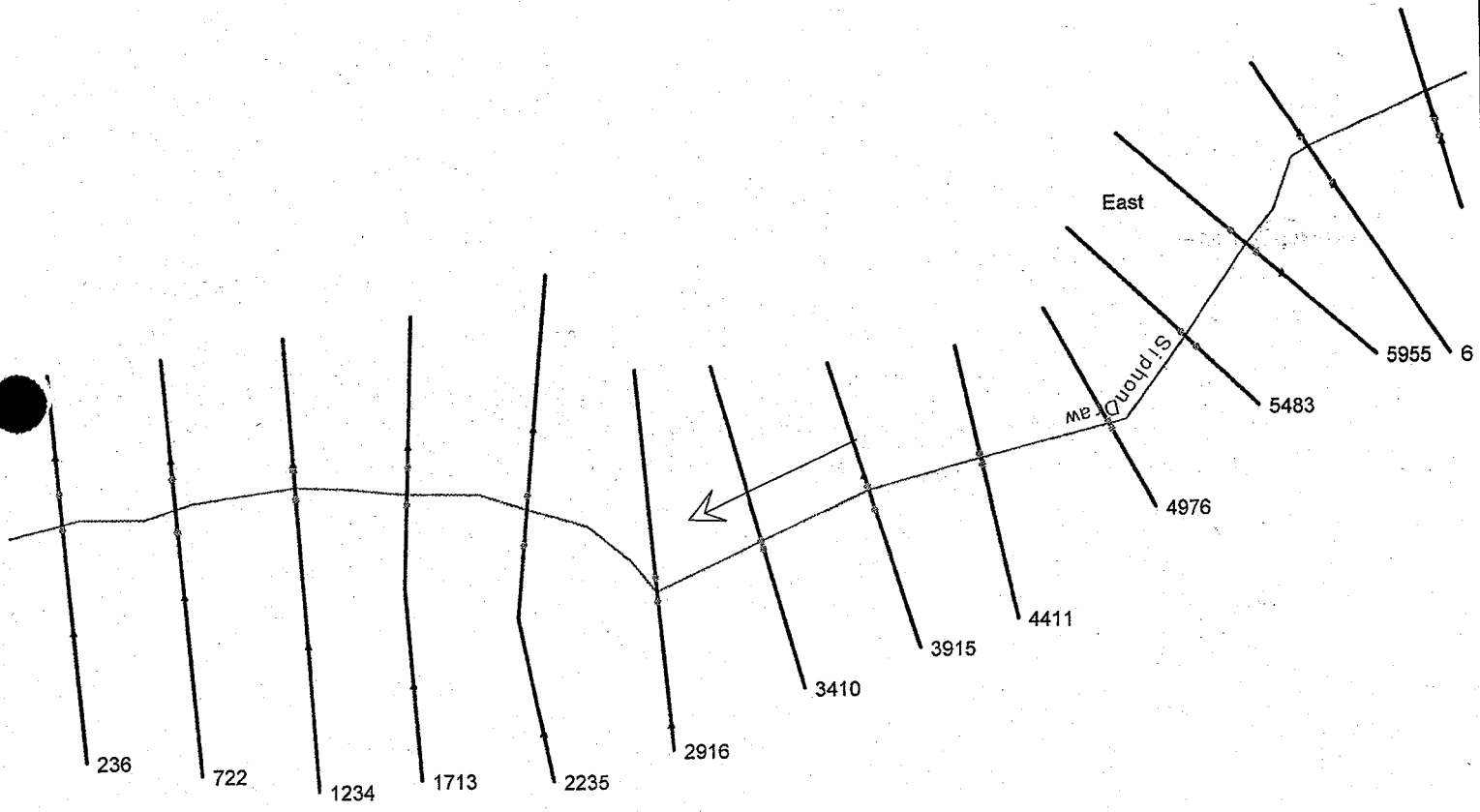


Channel / Overbank Conditions		Manning's n-value Adjustment		Left Overbank	Main Channel	Right Overbank
Bed Material / Base 'n'	Concrete	n_b	.012 - .018			
	Firm Soil		.025 - .032	0.027		0.027
	Coarse Sand		.026 - .035		0.029	
	Gravel		.028 - .035			
	Cobble		.030 - .050			
	Boulder		.040 - .070			
Degree of Irregularity	Smooth	n_1	0			
	Minor		.001 - .005			
	Moderate		.006 - .010	0.01	0.006	0.01
	Severe		.011 - .020			
Effects of Obstruction	Negligible	n_2	.000 - .004			
	Minor		.005 - .015	0.01	0.005	0.01
	Appreciable		.020 - .030			
	Severe		.040 - .060			
Vegetation	Small	n_3	.002 - .010			
	Medium		.010 - .025	0.013	0.01	0.013
	Large		.025 - .050			
	Very Large		.050 - .100			
Total Roughness n = (nb + n1 + n2 + n3)				0.060	0.050	0.060

APPENDIX B

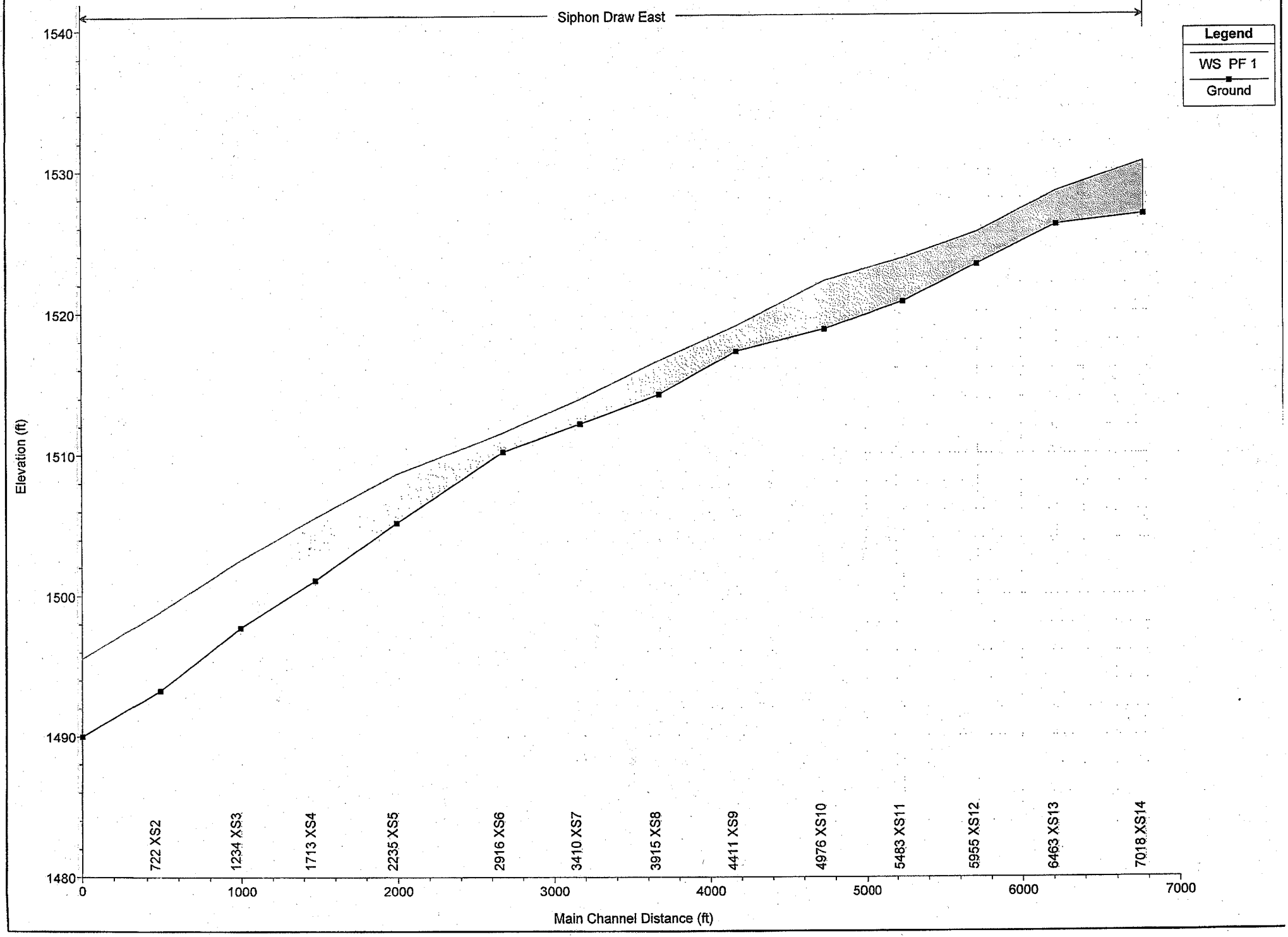
HYDRAULICS

Siphon Draw Wash – East of Meridian Road


East
Siphon Draw
236
722
1234
1713
2235
2916
3410
3915
4411
4976
5483
5955
6

Siphon Draw - East of Meridian Plan: Siphon Draw (East) - Existing Conditions 11/19/2007

Flow: Siphon Draw

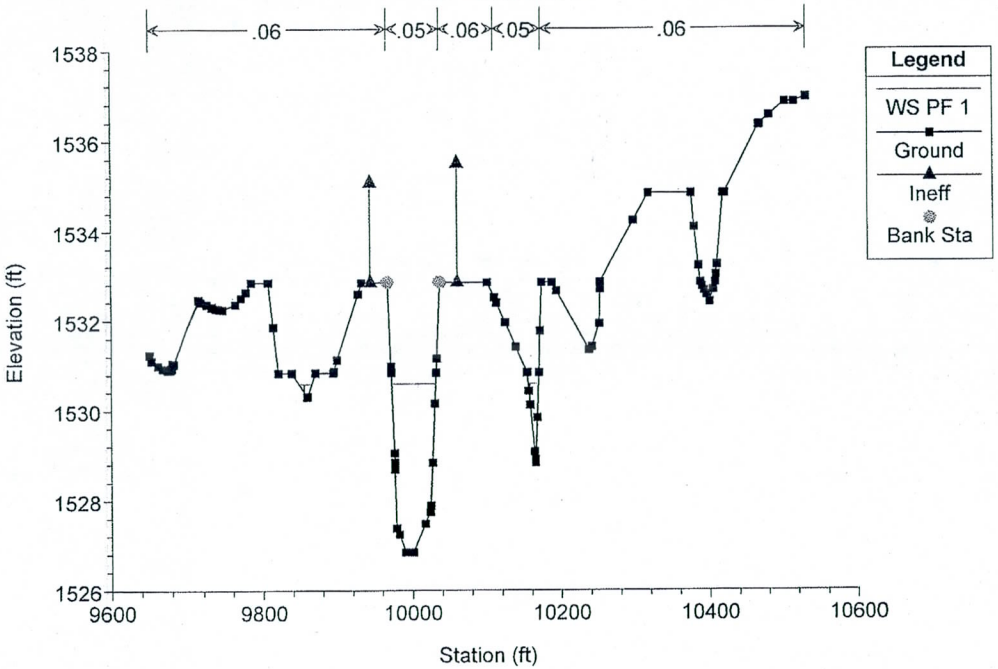


HEC-RAS Plan: S[illegible] River: Siphon Draw Reach: East Profile: PF 1

Reach	River	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. [illegible]	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
			(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
East	7018	PF 1	500.00	1526.84	1530.59	1528.70	1530.72	0.002191	2.84	175.85	89.60	0.29
East	6463	PF 1	500.00	1526.13	1528.46	1527.83	1528.62	0.008033	3.15	158.50	124.43	0.49
East	5955	PF 1	500.00	1523.32	1525.59	1524.62	1525.71	0.004275	2.71	184.23	149.61	0.37
East	5483	PF 1	500.00	1520.70	1523.75		1523.84	0.003647	2.58	255.24	270.22	0.35
East	4976	PF 1	500.00	1518.75	1522.17		1522.27	0.002621	3.09	304.31	401.44	0.32
East	4411	PF 1	500.00	1517.20	1519.00		1519.24	0.016381	4.87	198.52	536.69	0.71
East	3915	PF 1	500.00	1514.21	1516.58	1515.87	1516.61	0.002512	1.84	406.09	565.40	0.28
East	3410	PF 1	800.00	1512.14	1513.89		1513.99	0.009758	3.29	353.64	530.83	0.53
East	2916	PF 1	800.00	1510.15	1511.53	1510.81	1511.56	0.002912	1.46	568.07	729.47	0.27
East	2235	PF 1	800.00	1505.16	1508.61	1508.19	1508.65	0.006908	1.48	496.97	1045.79	0.38
East	1713	PF 1	800.00	1501.06	1505.54	1505.17	1505.58	0.005073	2.21	536.02	1658.82	0.37
East	1234	PF 1	800.00	1497.73	1502.52	1502.04	1502.59	0.007926	2.73	438.31	1325.63	0.46
East	722	PF 1	800.00	1493.25	1498.86	1497.54	1498.95	0.006410	2.54	363.22	765.56	0.42
East	236	PF 1	800.00	1489.99	1495.55	1494.33	1495.69	0.007012	3.39	330.62	555.71	0.46

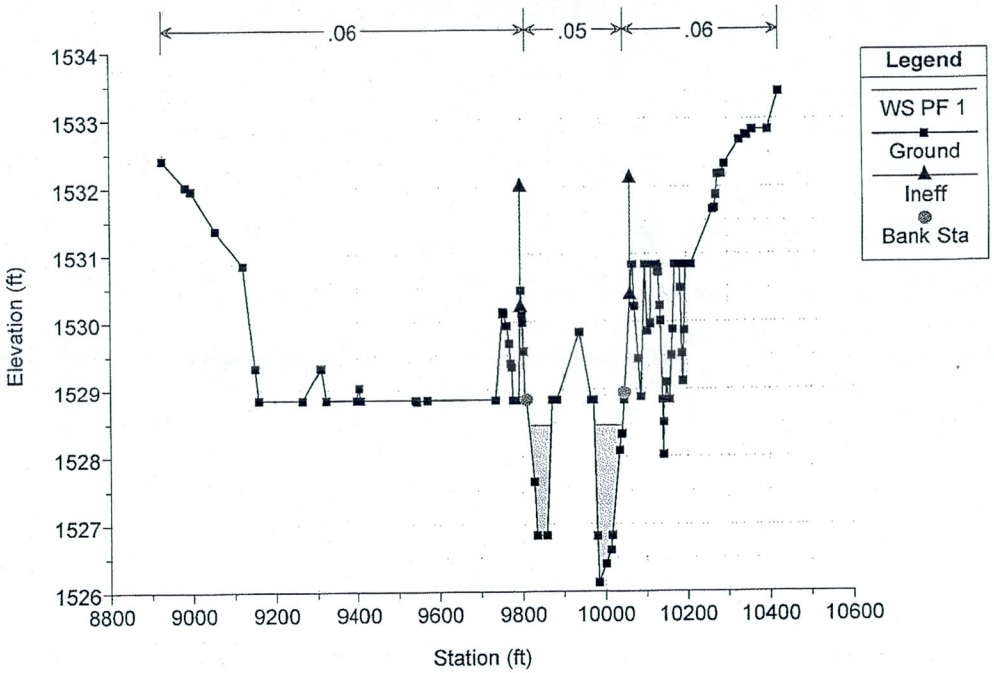
Siph East of Meridian Plan: Siphon Draw (East) - Existing Conditions 11/19/2007

Flow: Siphon Draw
RS = 7018 XS14



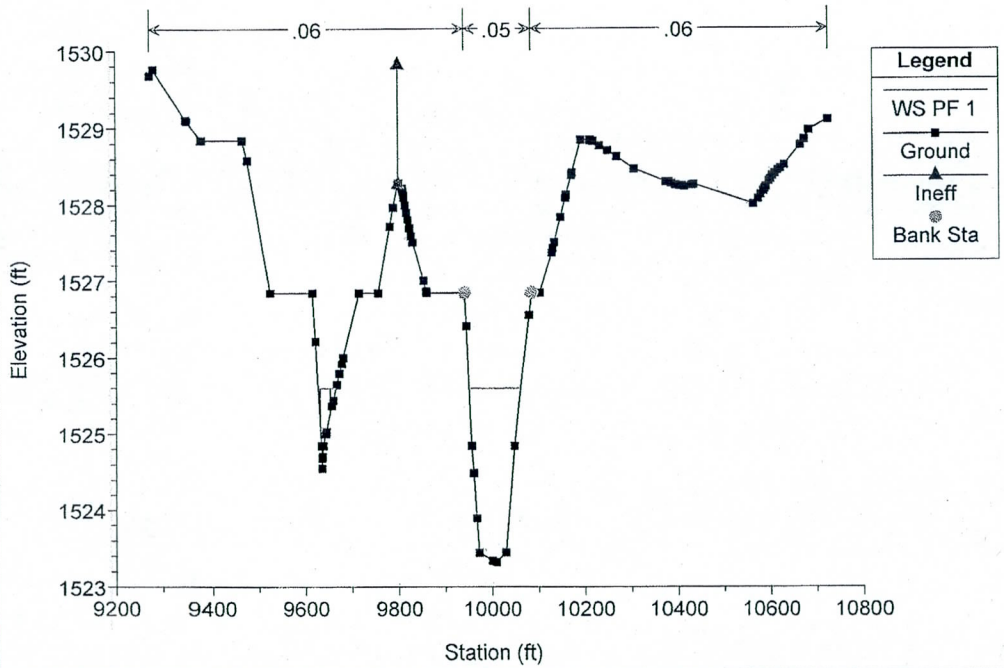
Siphon Draw - East of Meridian Plan: Siphon Draw (East) - Existing Conditions

Flow: Siphon Draw
RS = 6463 XS13



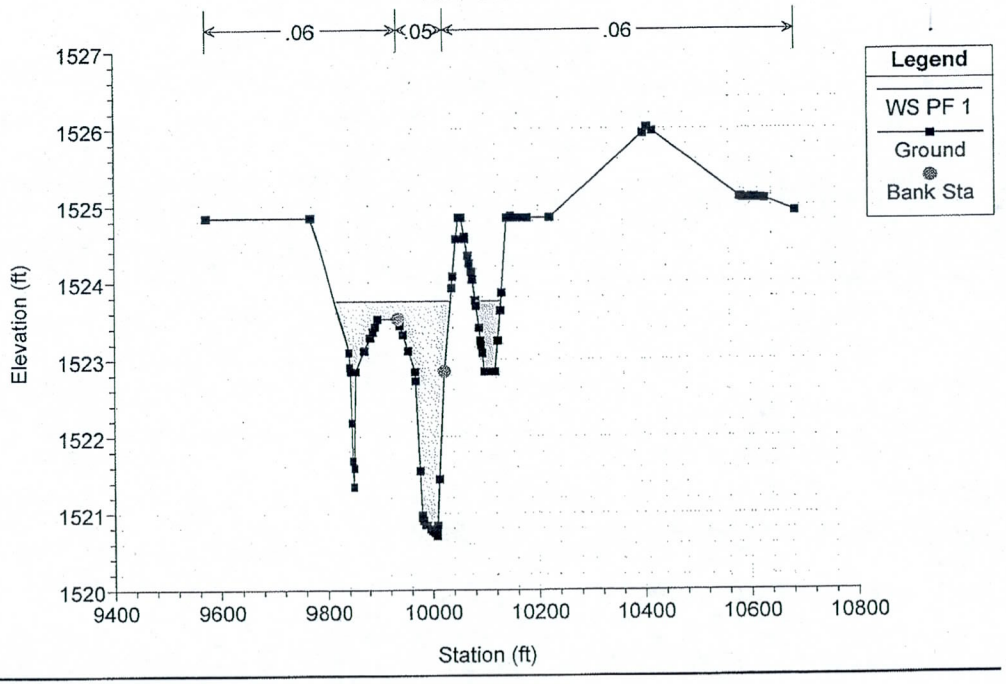
Siphon Draw - East of Meridian Plan: Siphon Draw (East) - Existing Conditions 11/19/2007

Flow: Siphon Draw
RS = 5955 XS12



Siphon Draw - East of Meridian Plan: Siphon Draw (East) - Existing Conditions 11/19/2007

Flow: Siphon Draw
RS = 5483 XS11



Siph - East of Meridian Plan: Siphon Draw (East) - Existing Conditions 11/19/2007

Flow: Siphon Draw
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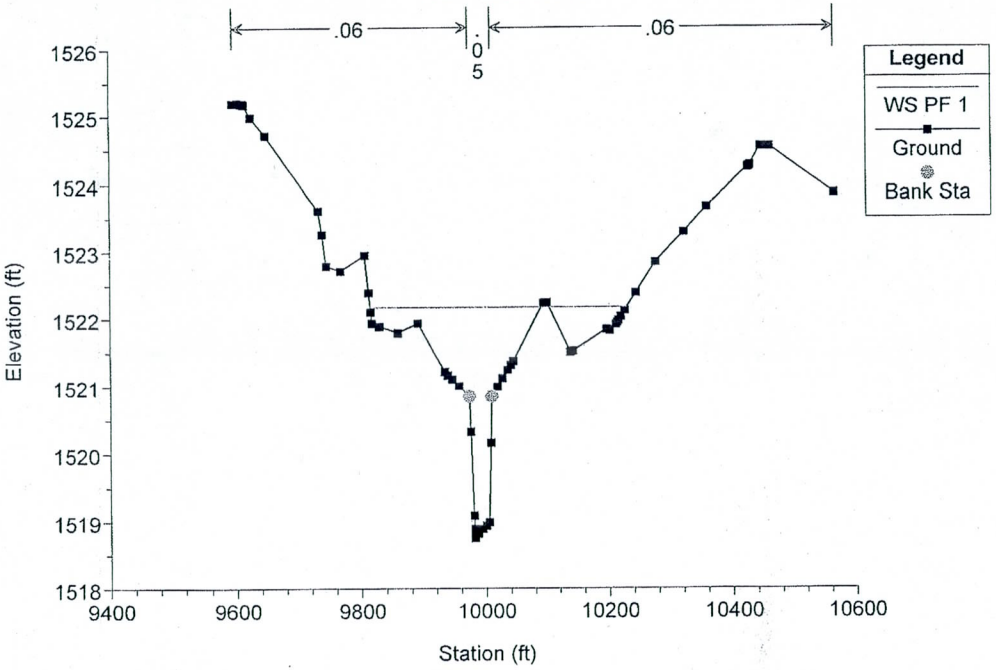
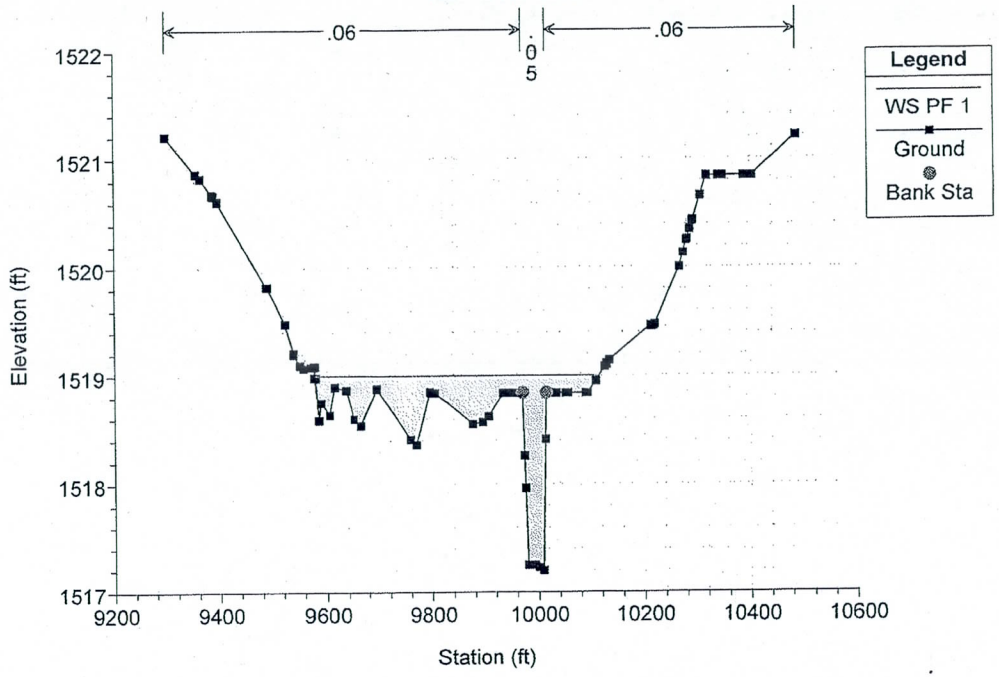


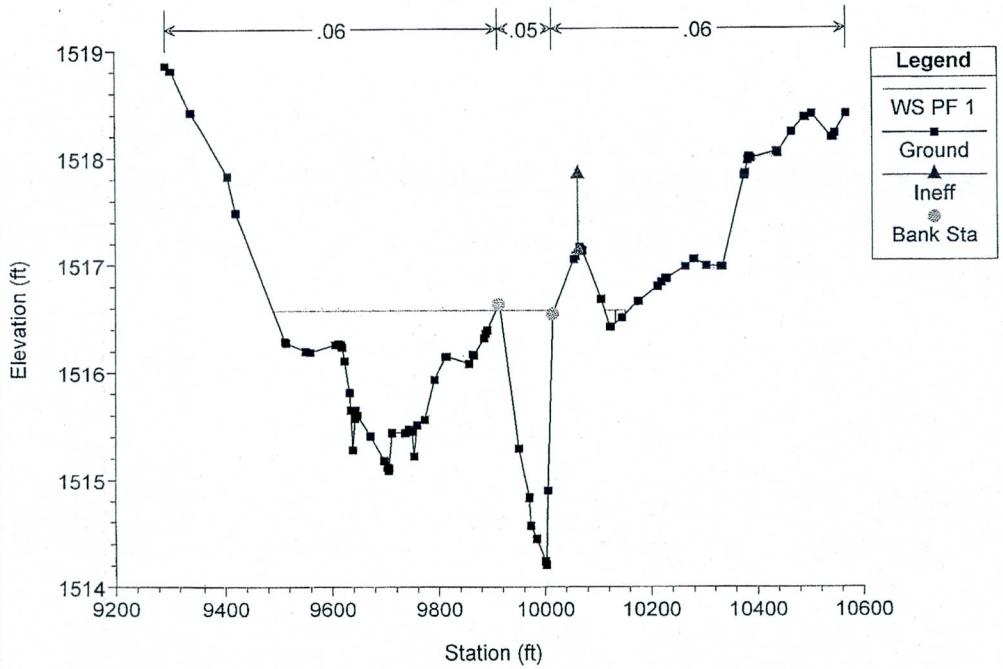
Siphon Draw - East of Meridian Plan: Siphon Draw (East) - Existing Conditions

Flow: Siphon Draw
RS = 4411 XS9



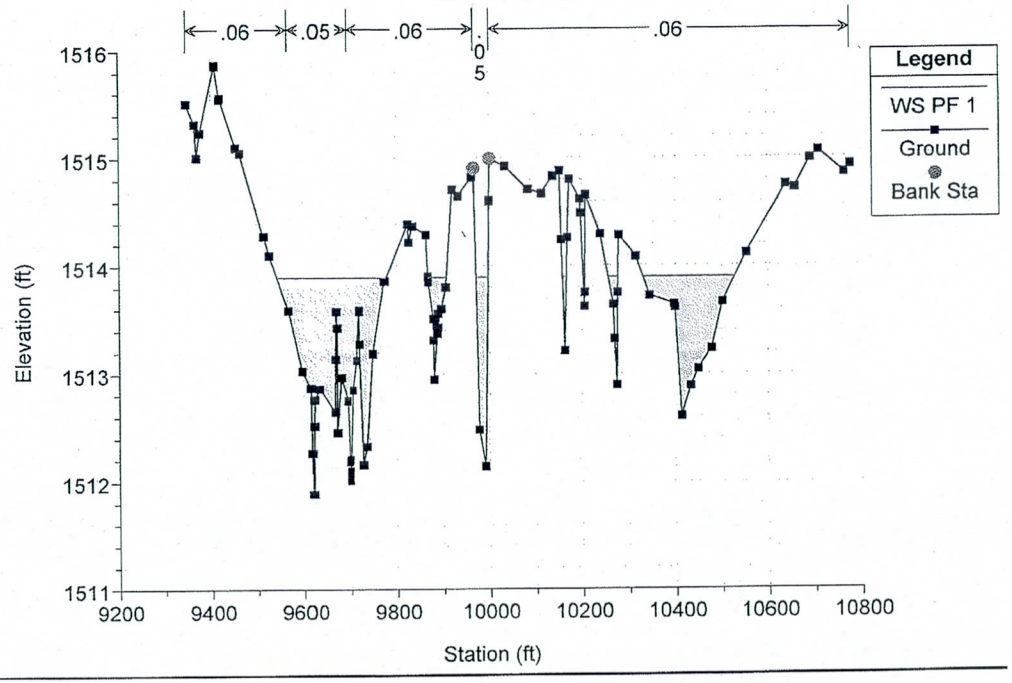
Siphon Draw - East of Meridian Plan: Siphon Draw (East) - Existing Conditions 11/19/2007

Flow: Siphon Draw
RS = 3915 XS8



Siphon Draw - East of Meridian Plan: Siphon Draw (East) - Existing Conditions 11/19/2007

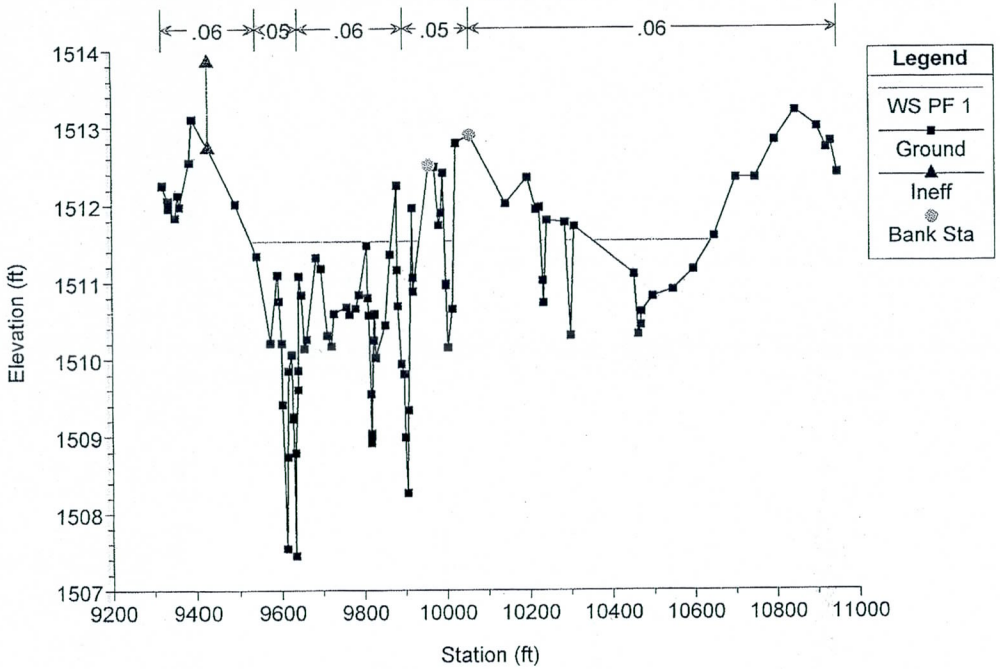
Flow: Siphon Draw
RS = 3410 XS7



Siphon Draw - East of Meridian Plan: Siphon Draw (East) - Existing Conditions 11/19/2007

Flow: Siphon Draw

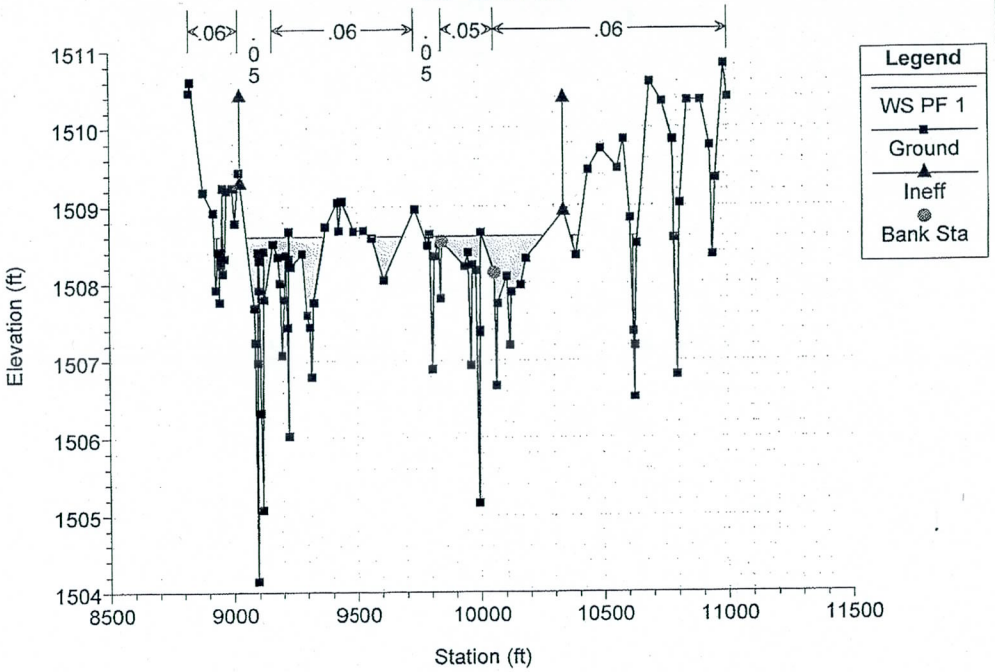
RS = 2916 XS6



Siphon Draw - East of Meridian Plan: Siphon Draw (East) - Existing Conditions

Flow: Siphon Draw

RS = 2235 XS5



Siphon Draw - East of Meridian Plan: Siphon Draw (East) - Existing Conditions 11/19/2007

Flow: Siphon Draw

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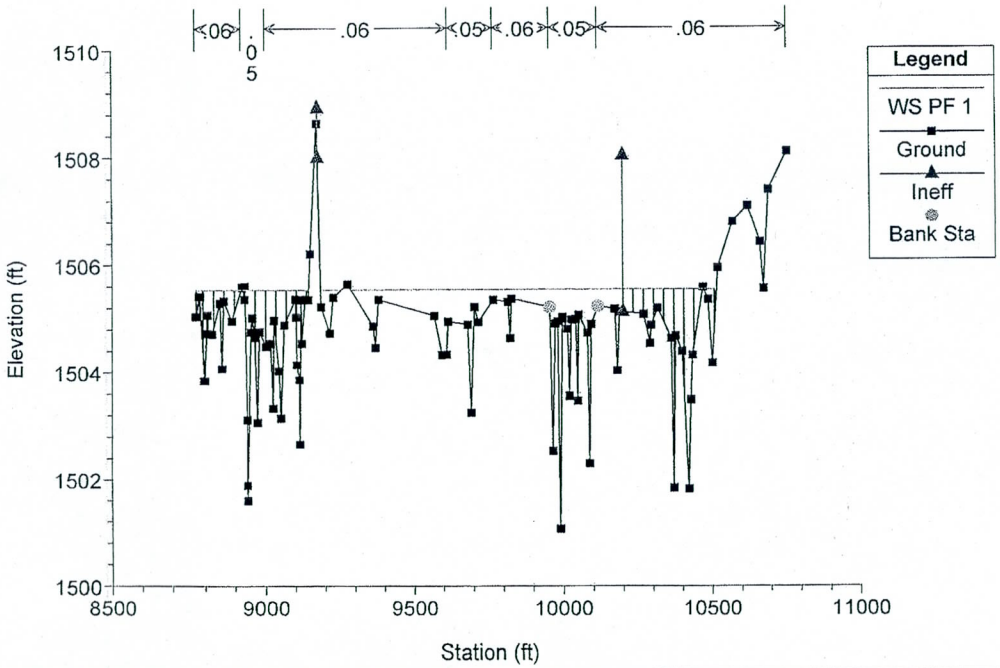

Siphon Draw - East of Meridian Plan: Siphon Draw (East) - Existing Conditions 11/19/2007

Flow: Siphon Draw

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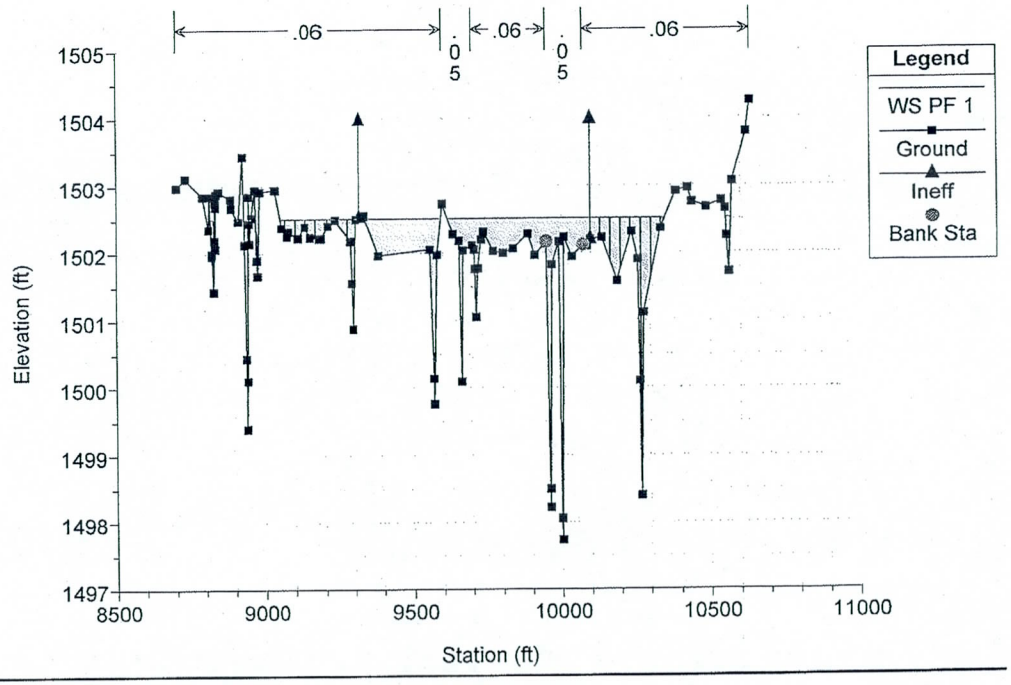

Flow: Siphon Draw
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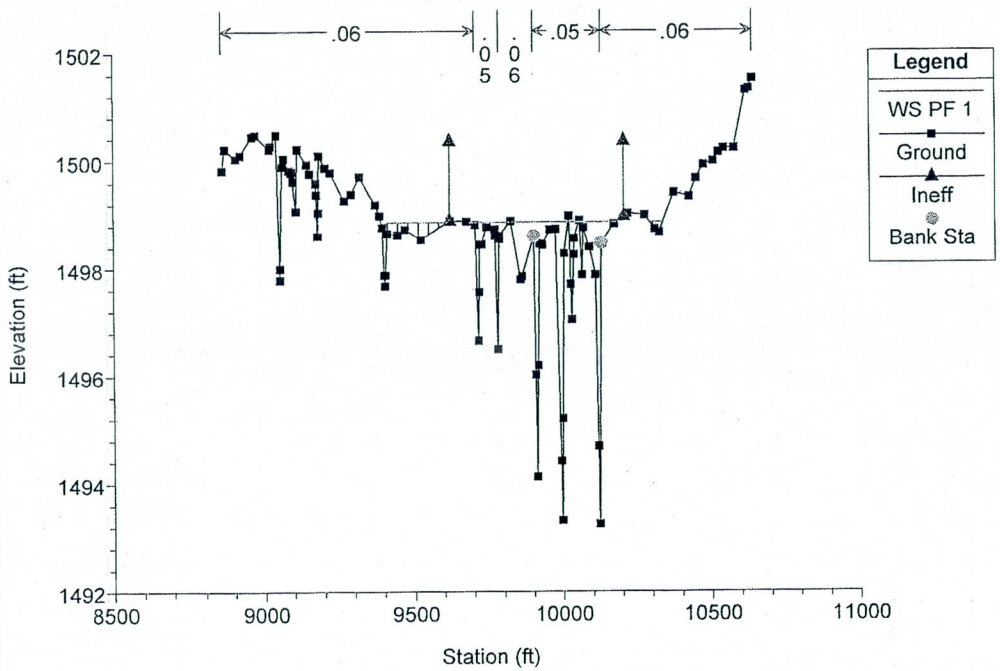

Flow: Siphon Draw
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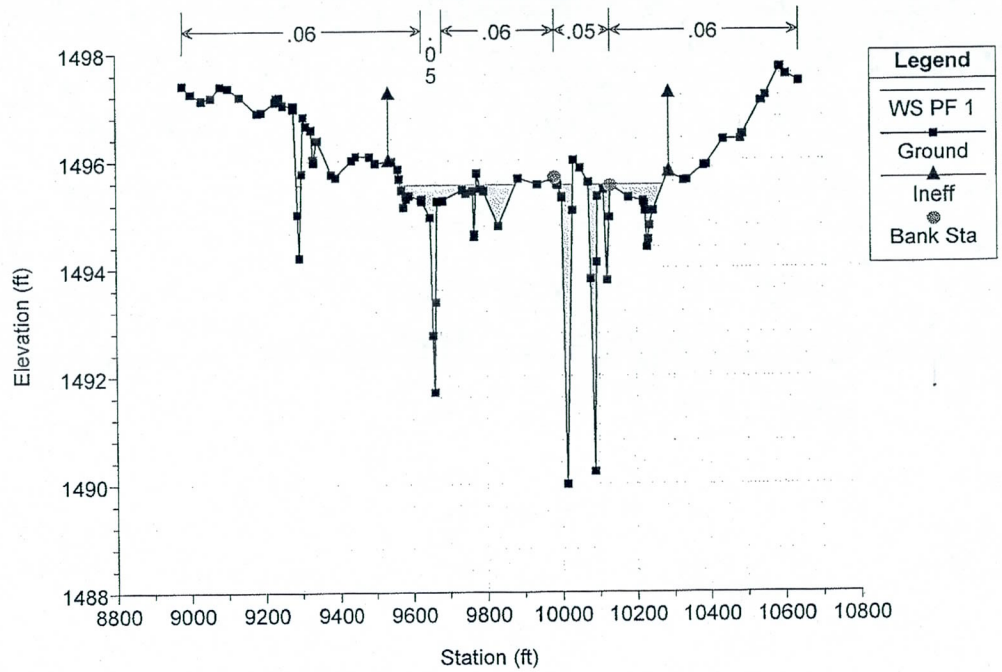


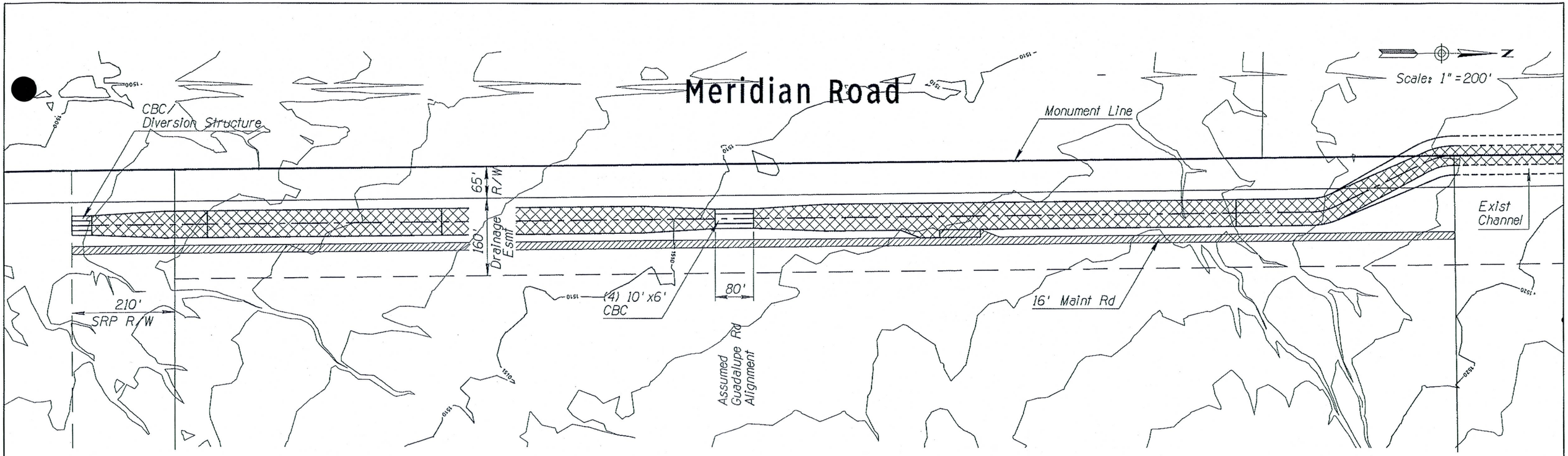
APPENDIX C

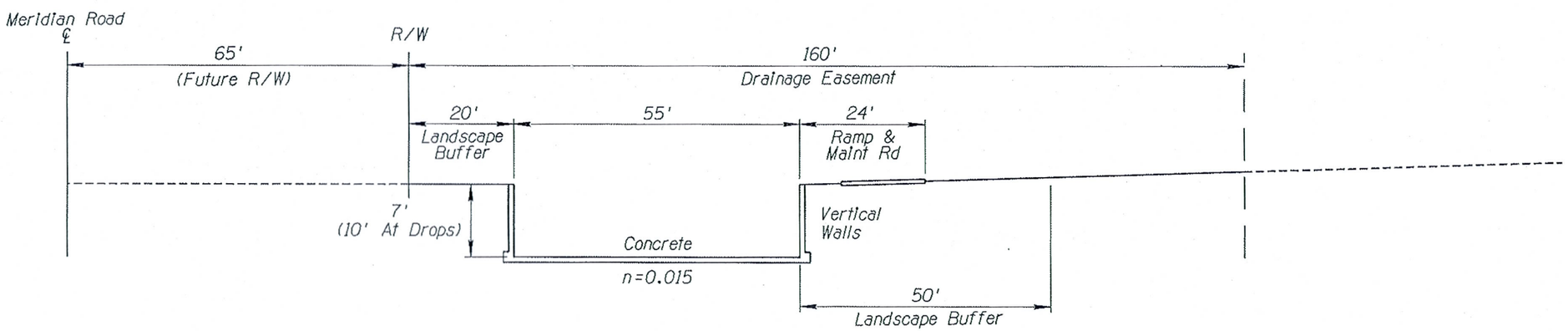
PROJECT ALTERNATIVES

APPENDIX C

PROJECT ALTERNATIVES

Meridian Channel (Reach 1) Alternatives



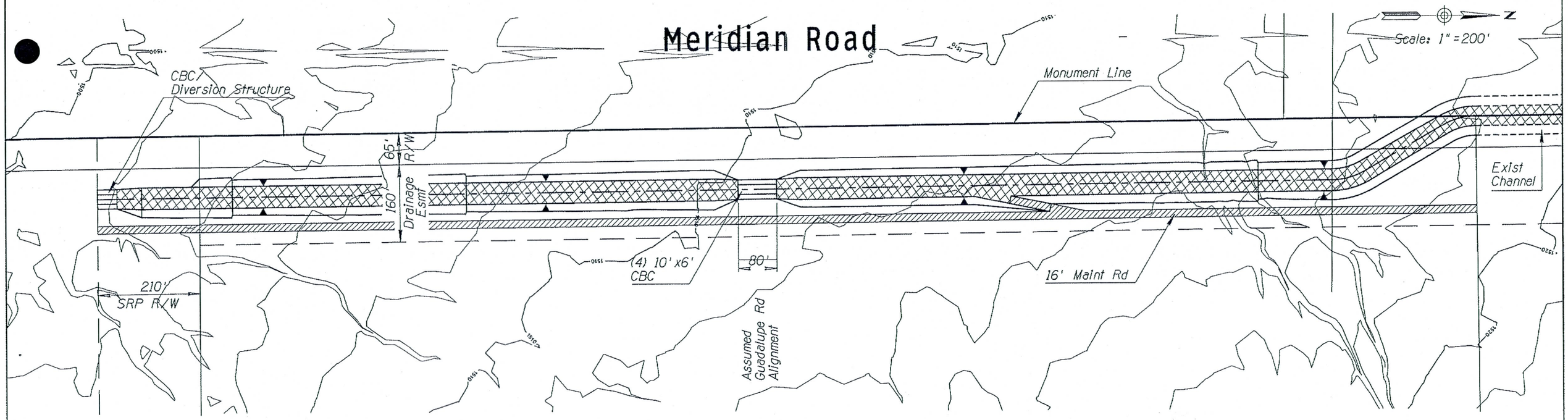


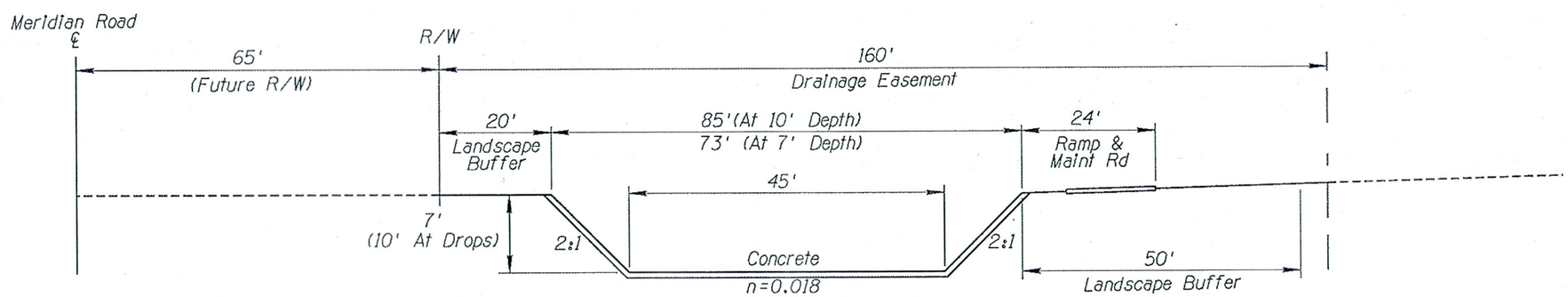
Typical Section

Alternative 1	Concrete Rectangular Channel

Stanley Consultants INC.
1661 East Camelback Road, Suite 400
Phoenix, Arizona 85016
Phone: (602) 333-2200

Meridian Road



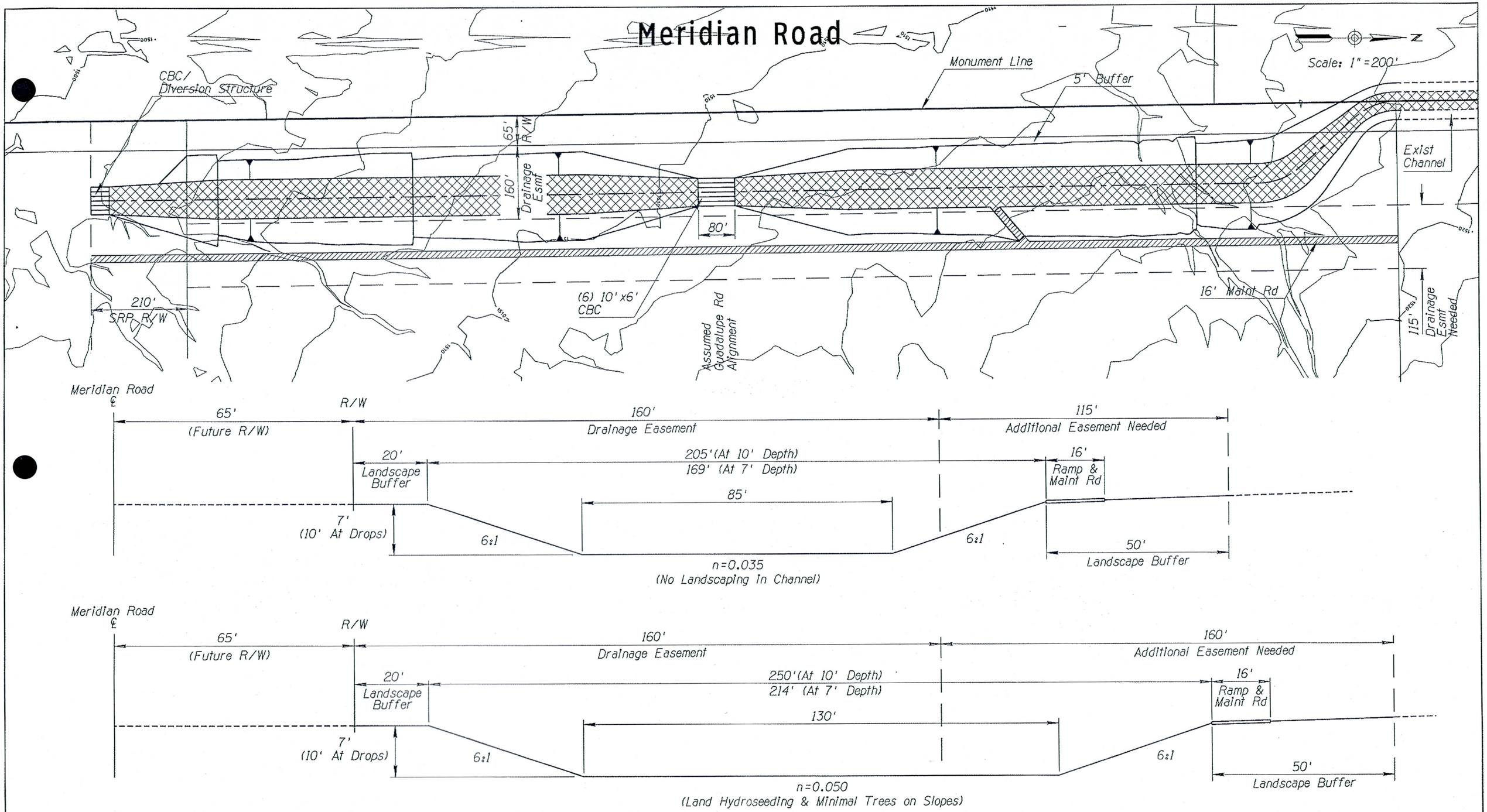


Typical Section

Stanley Consultants INC.
1661 East Camelback Road, Suite 400
Phoenix, Arizona 85016
Phone: (602) 333-2200

Alternative 2	Concrete Trapezoidal Channel

Meridian Road

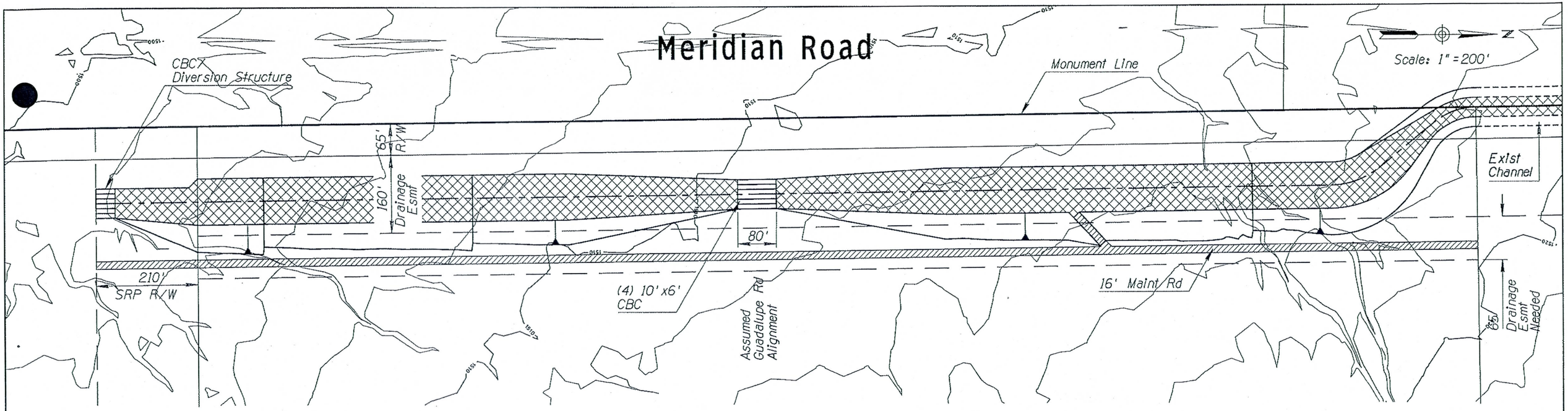


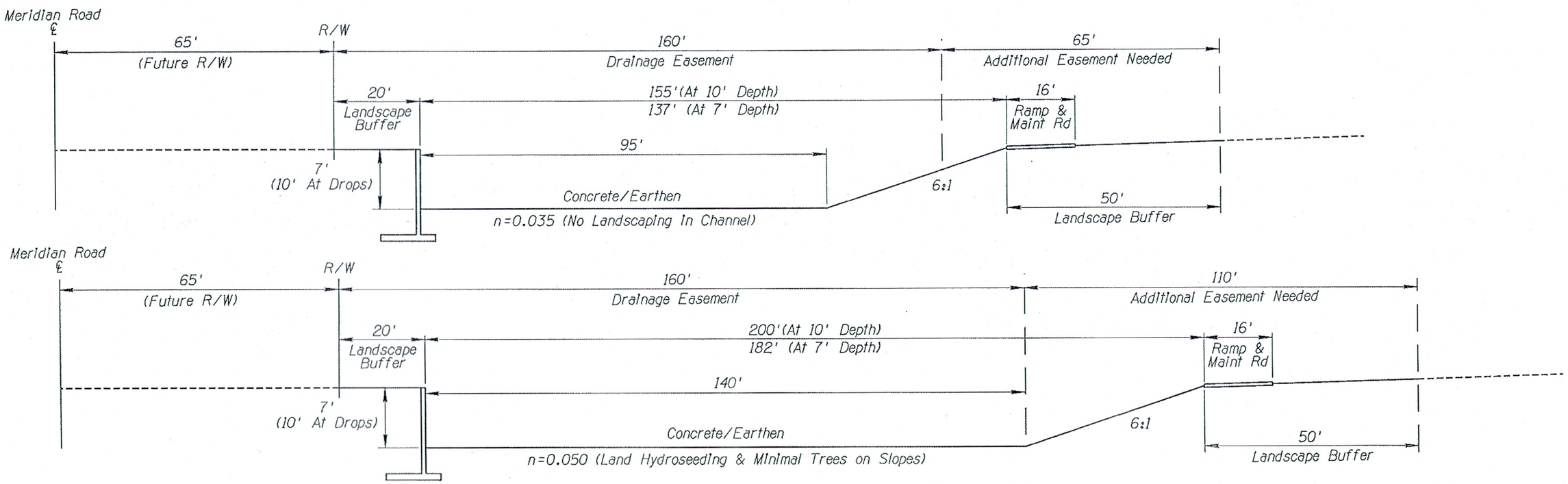
Typical Sections

Stanley Consultants INC.
1661 East Camelback Road, Suite 400
Phoenix, Arizona 85016
Phone: (602) 333-2200

Alternative 3	Earthen Trapezoidal Channel

Meridian Road





Typical Sections

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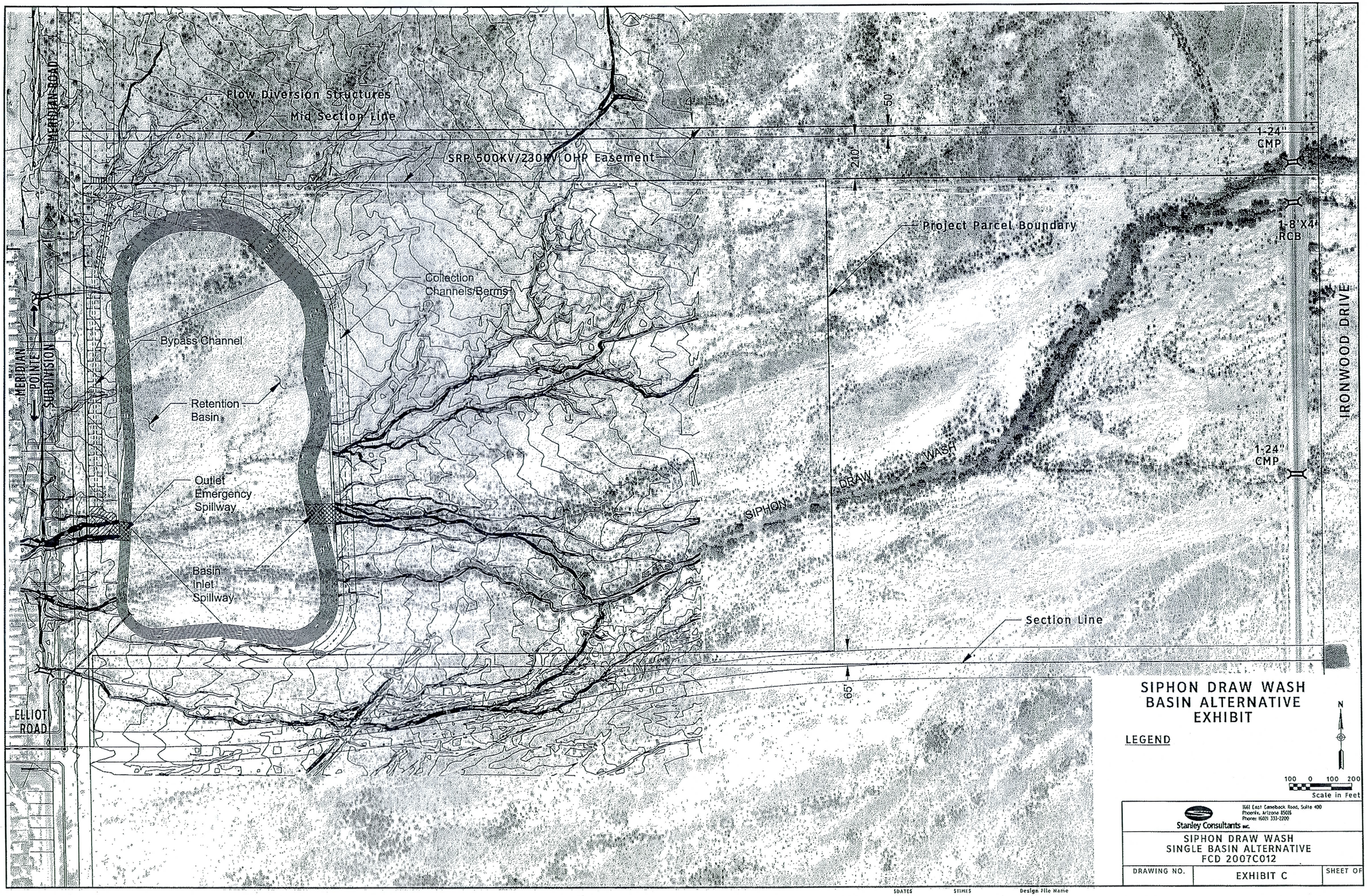
Phoenix, Arizona 85016
Phone: (602) 333-2200

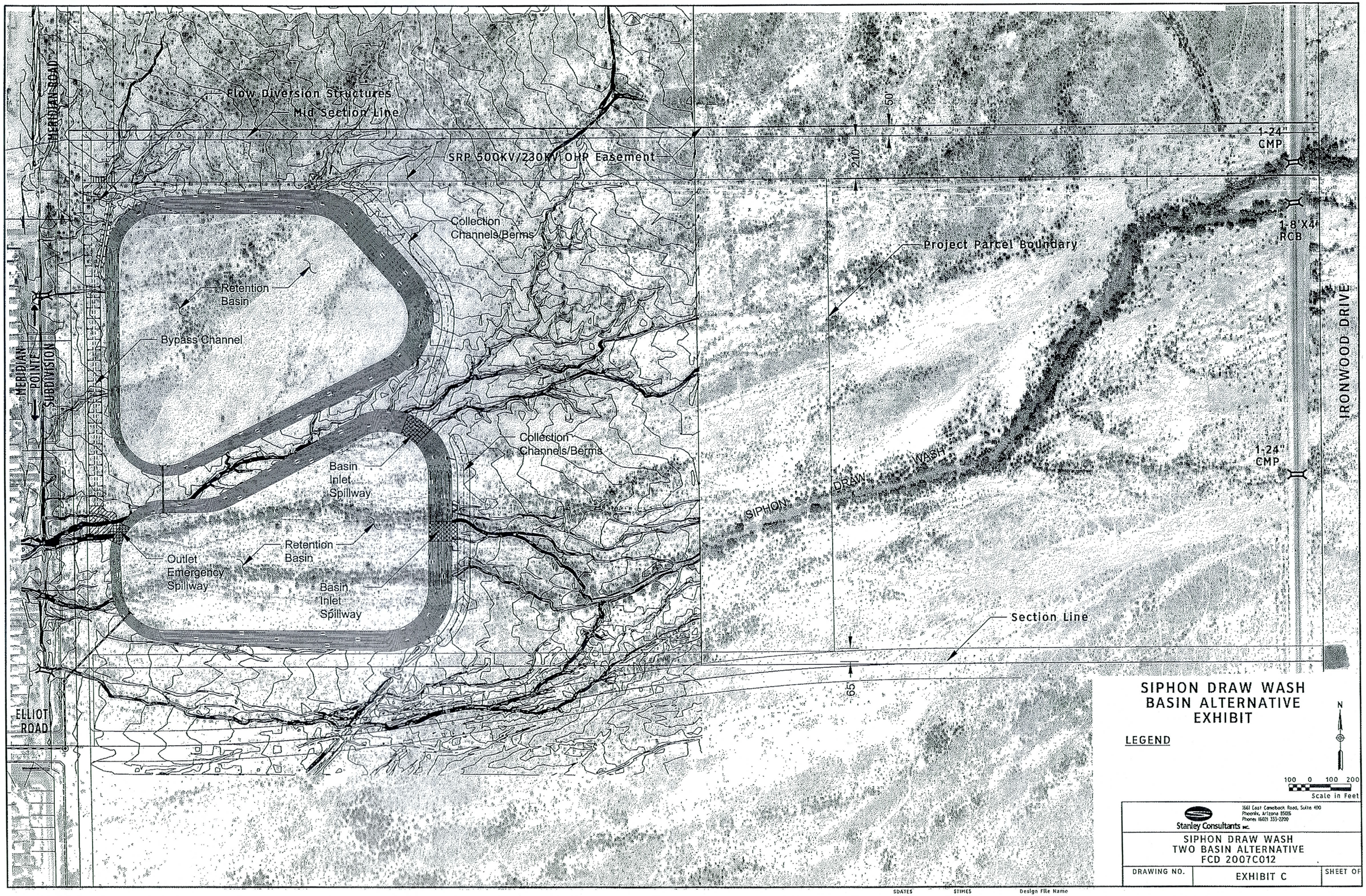
Alternative 4	Hybrid Channel

APPENDIX C

PROJECT ALTERNATIVES

Retention Basin Alternatives


Flow Diversion Structures
Mid Section Line
MERIDIAN ROAD
SRP 500KV/230KV OHP Easement
1-24" CMP
1-8'X4' RCB
Project Parcel Boundary
Collection Channels/Berms
Bypass Channel
Retention Basin
Outlet Emergency Spillway
Basin Inlet Spillway
MERIDIAN POINTE SUBDIVISION
ELLIOT ROAD
SIPHON DRAW WASH
IRONWOOD DRIVE
1-24" CMP
Section Line
50'
210'
65'
SIPHON DRAW WASH
BASIN ALTERNATIVE
EXHIBIT
LEGEND
N
100 0 100 200
Scale in Feet
Stanley Consultants INC.
1661 East Camelback Road, Suite 400
Phoenix, Arizona 85016
Phone: (602) 333-2200
SIPHON DRAW WASH
SINGLE BASIN ALTERNATIVE
FCD 2007C012
DRAWING NO.
EXHIBIT C
SHEET OF
$DATES
$TIMES
Design File Name


Flow Diversion Structures
Mid Section Line
SRP 500KV/230KV OHP Easement
Collection Channels/Berms
Retention Basin
Bypass Channel
Basin Inlet Spillway
Collection Channels/Berms
Retention Basin
Outlet Emergency Spillway
Basin Inlet Spillway
Project Parcel Boundary
1-24" CMP
1-8 X 4' RCB
1-24" CMP
SIPHON DRAW WASH
Section Line
50'
210'
65'
MERIDIAN POINTE
SUBDIVISION
ELLIOT ROAD
IRONWOOD DRIVE
SIPHON DRAW WASH
BASIN ALTERNATIVE
EXHIBIT
LEGEND
N
100 0 100 200
Scale in Feet
Stanley Consultants INC.
1661 East Camelback Road, Suite 400
Phoenix, Arizona 85016
Phone: (602) 331-2200
SIPHON DRAW WASH
TWO BASIN ALTERNATIVE
FCD 2007C012
DRAWING NO.
EXHIBIT C
SHEET OF
$DATE$
$TIME$
Design File Name

Summary of Preliminary Volumes for Basin Alternatives

Description	Elevation (ft)	Area (sq ft)	Area (acres)	From InRoads: Incremental (cu ft)	Incremental (acre-ft)	Cumulative (acre-ft)	Target (acre-ft)	Alternative Cumulative (acre-ft)	Comment
Single Basin Alt	1495.0	2,059,080	47.3	2,042,010	47	356		356	~lowest EG elev.
	1494.0	2,024,980	46.5	2,008,020	46	310		310	
	1493.0	1,991,110	45.7	1,974,270	45	263	250	263	ES weir crest
	1492.0	1,957,460	44.9	1,940,730	45	218		218	
	1491.0	1,924,040	44.2	1,907,430	44	174		174	
	1490.0	1,890,850	43.4	1,874,350	43	130		130	
	1489.0	1,857,880	42.7	1,841,490	42	87		87	
	1488.0	1,825,140	41.9	1,938,120	44	44		44	~lowest basin elev.
Two Basin Alt									
(North Basin)	1497.0	1,550,270	35.6	1,550,270	36	236			~lowest EG elev.
	1496.0	1,522,000	34.9	1,522,000	35	200			
	1495.0	1,493,930	34.3	1,493,930	34	165	150		ES weir crest
	1494.0	1,466,100	33.7	1,466,100	34	131			
	1493.0	1,438,500	33.0	1,438,500	33	97			
	1492.0	1,411,120	32.4	1,411,120	32	64			
	1491.0	1,383,970	31.8	1,383,970	32	32			~lowest basin elev.
(South Basin)	1497.0	0	0.0	0	0	228		464	
	1496.0	1,337,940	30.7	1,337,940	31	228		464	~lowest EG elev.
	1495.0	1,310,170	30.1	1,310,170	30	197		433	~lowest EG elev.
	1494.0	1,282,610	29.4	1,282,610	29	167		367	
	1493.0	1,255,270	28.8	1,255,270	29	138	100 / 250	303	ES weir crest
	1492.0	1,228,150	28.2	1,228,150	28	109		240	
	1491.0	1,201,260	27.6	1,201,260	28	81		178	
	1490.0	1,174,600	27.0	1,174,600	27	53		117	
	1489.0	1,148,160	26.4	1,148,160	26	26		58	~lowest basin elev.

Reference Data:

Existing 2-10'x4' CBC Invert =	*1490.2*	*ft*	*Basin Pipe Outlet Invert =*	*1486.0*	*ft*
Approx. Lowest Grade at Meridian Rd CL =	*1496.1*	*ft*	*Max. Basin Elev. =*	*1495(S) or 1497(N)*	*ft*
Basin CBC Outlet Invert =	*1490.5*	*ft*	*Basin Sideslopes =*	*6:1*	
Single Basin Area =	*75*	*acres*	*Two Basin Area =*	*105*	*acres*

Single Basin Alternative

Filename 1Basin+EG.txt

	Elevation		Incremental Volume	Cumulative Volume	Acre-Feet	Surface Area
			cu ft	cu ft		sq ft
	1488.00	Storage	1938116.9	1938116.9	44.5	1825139.7
	1489.00		1841491.5	3779608.4	86.8	1857880.9
	1490.00		1874345.7	5653954.1	129.8	1890848.2
	1491.00		1907426.1	7561380.2	173.6	1924041.6
	1492.00		1940732.6	9502112.7	218.1	1957461.1
weir Crest	1493.00	FB	1974265.1	11476377.8	263.5	1991106.7
	1494.00		2008023.7	13484401.6	309.6	2024978.3
lowest EG	1495.00		2042008.1	15526409.6	356.4	2059075.3
	1496.00		0.0	15526409.6	0.0	0.0
	1497.00		0.0	15526409.6	0.0	0.0
	1498.00		0.0	15526409.6	0.0	0.0
	1499.00		0.0	15526409.6	0.0	0.0
	1500.00		0.0	15526409.6	0.0	0.0

Dable Basin Alternate
(South Basin)

Filename 2BasinS.txt

	Elevation		Incremental Volume	Cumulative Volume	Acre-Feet	Surface Area
			cu ft	cu ft		sq ft
	1489.00		1148161.5	1148161.5	26.4	1161342.8
	1490.00		1174599.5	2322761.0	53.3	1187893.9
	1491.00	Storage	1201263.7	3524024.7	80.9	1214671.2
	1492.00		1228154.0	4752178.6	109.1	1241674.5
Weir Crest	1493.00		1255270.1	6007448.8	137.9	1268903.3
	1494.00	FB	1282611.7	7290060.4	167.4	1296357.1
Lowest EG	1495.00		1310174.3	8600234.7	197.4	1324026.1
	1496.00		1337941.6	9938176.4	228.1	1351880.6
	1497.00		0.0	9938176.4	0.0	0.0
	1498.00		0.0	9938176.4	0.0	0.0
	1499.00		0.0	9938176.4	0.0	0.0
	1500.00		0.0	9938176.4	0.0	0.0

Double Basin Alternative.
(North Basin)

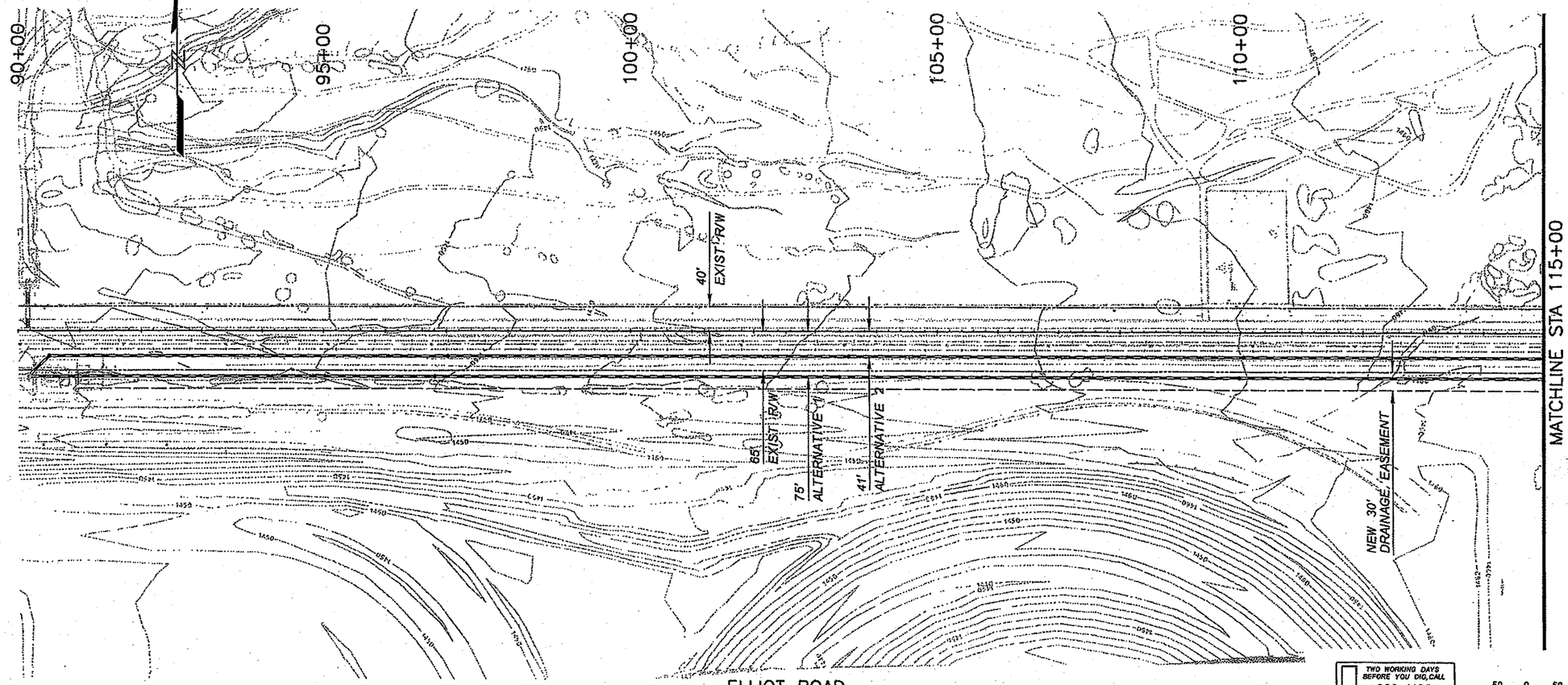
Filename 2BasinN.txt

	Elevation		Incremental Volume	Cumulative Volume	Acre-Feet	Surface Area
			cu ft	cu ft		sq ft
	1491.00		1370485.3	1370485.3	31.5	1383966.7
	1492.00		1397523.5	2768008.9	63.5	1411118.0
	1493.00	Storage	1424787.9	4192796.7	96.3	1438495.4
	1494.00		1452278.3	5645075.0	129.6	1466098.9
weir Crest	1495.00		1479994.7	7125069.7	163.6	1493928.5
	1496.00	FB	1507937.6	8633007.3	198.2	1521984.1
~lowest EG	1497.00		1536106.2	10169113.5	233.5	1550265.9
	1498.00		0.0	10169113.5	0.0	0.0
	1499.00		0.0	10169113.5	0.0	0.0
	1500.00		0.0	10169113.5	0.0	0.0

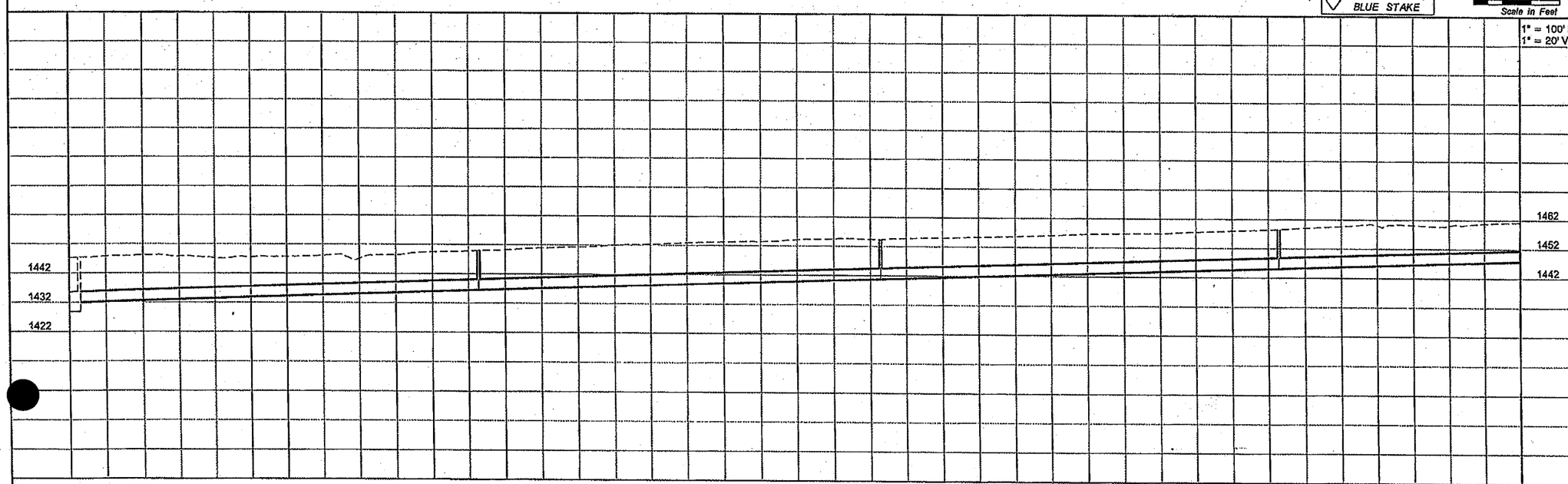
APPENDIX C

PROJECT ALTERNATIVES

Elliot Road Storm Drain Alternatives



1" = 100' H
1" = 20' V



☐ REMOVE ☐

○ CONSTRUCT ○

NO.	REVISION	BY	DATE
3			
2			
1			

FLOOD CONTROL DISTRICT OF MARICOPA COUNTY
ENGINEERING DIVISION

PROJECT NAME
PROJECT NUMBER
CONTRACT NUMBER

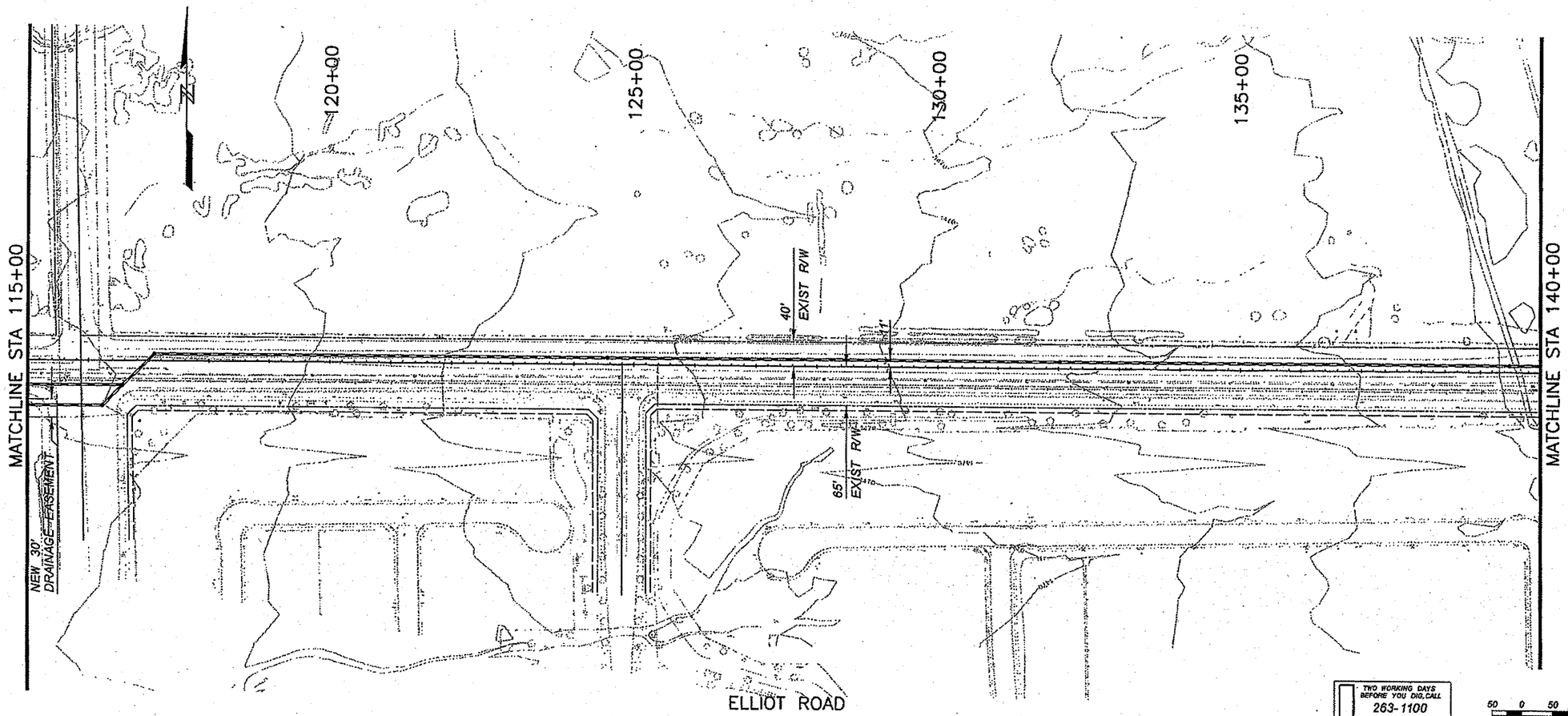
PRELIMINARY NOT FOR CONSTRUCTION

	BY	DATE
DESIGNED		
DRAWN		
CHECKED		

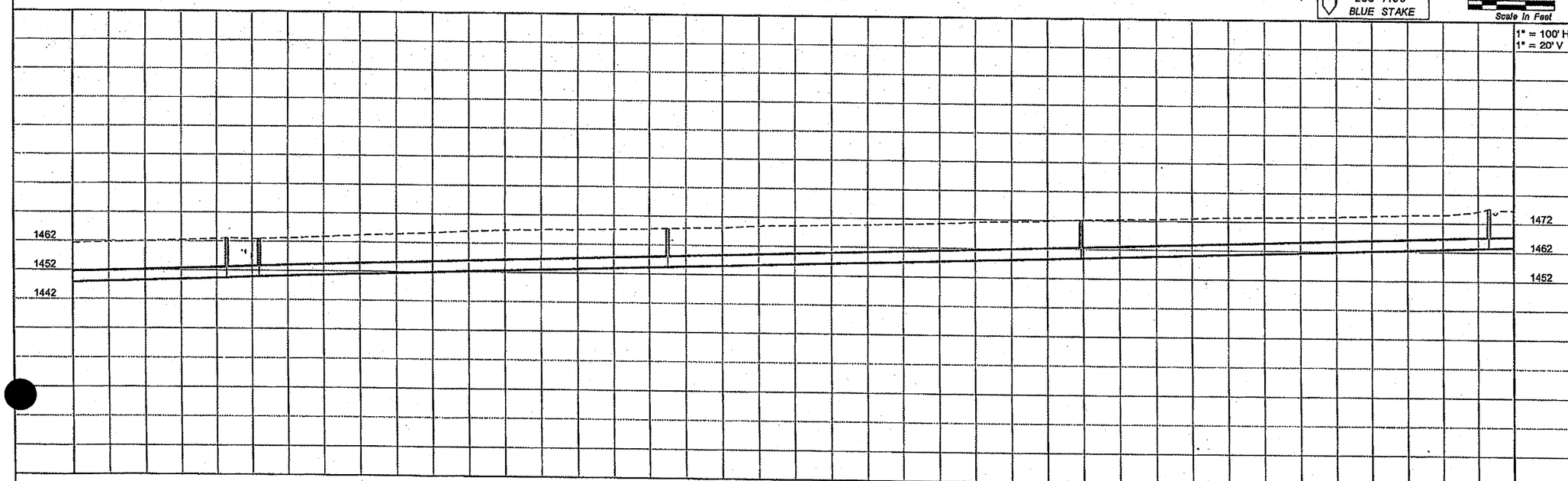
Stanley Consultants INC.
3443 East Camelback Road, Suite 100
Phoenix, Arizona 85018
Phone: (602) 333-2200

DRAWING NO. | PLAN AND PROFILE | SHEET OF

1/3/2008 Q:\20539\11-CADD\04-Drn\PreDesign\539_pp_01_100.dgn



1" = 100' H
1" = 20' V



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FLOOD CONTROL DISTRICT OF MARICOPA COUNTY
ENGINEERING DIVISION

PROJECT NAME
PROJECT NUMBER
CONTRACT NUMBER

PRELIMINARY NOT FOR CONSTRUCTION

	BY	DATE
DESIGNED		
DRAWN		
CHECKED		

Stanley Consultants INC.
8681 East Camelback Road, Suite 100
Phoenix, Arizona 85006
Phone: (602) 331-2000

DRAWING NO. | PLAN AND PROFILE | SHEET OF

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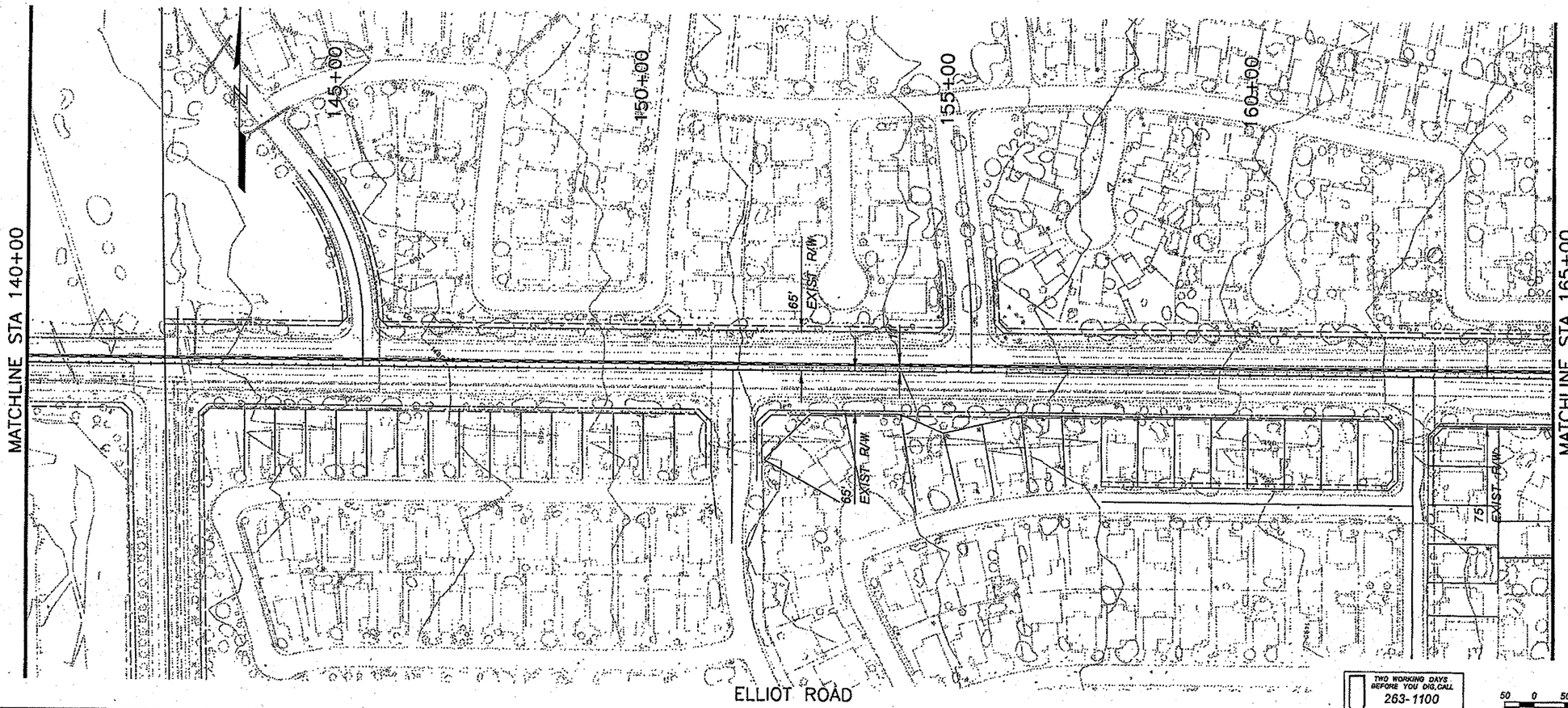

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Stanley Consultants INC.
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Phoenix, Arizona 85016
Phone: (602) 333-2000

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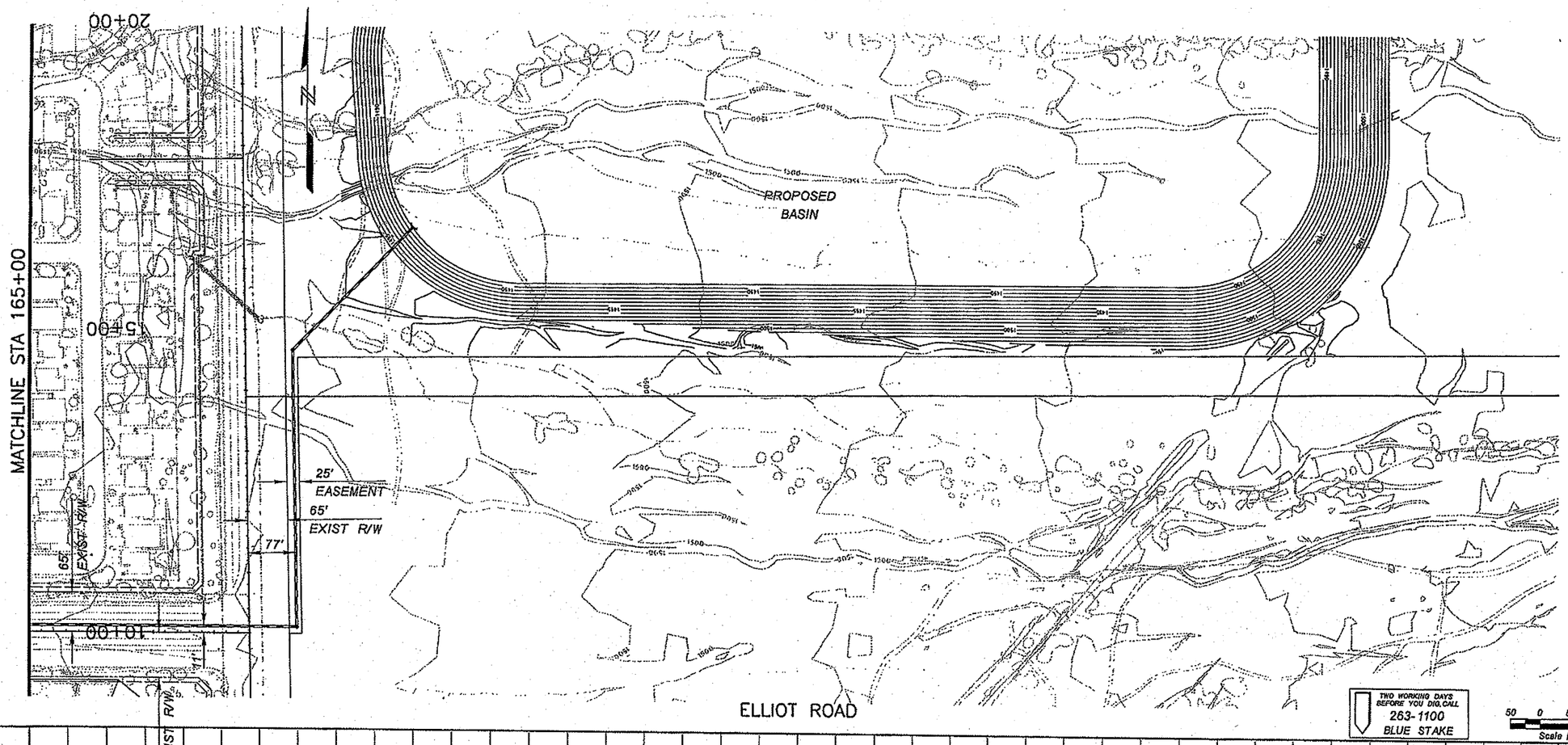

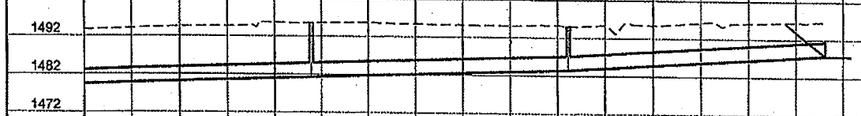

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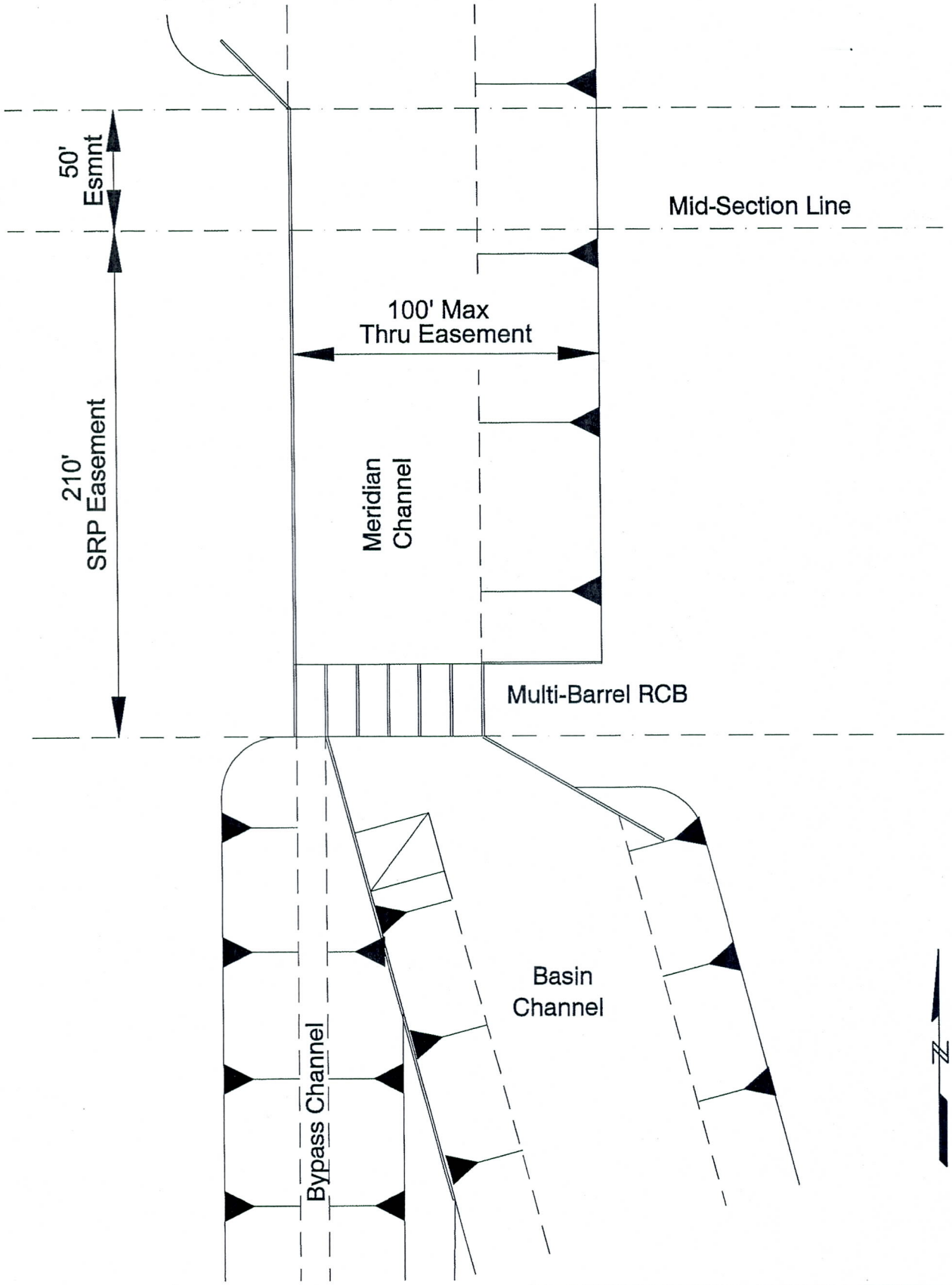
APPENDIX C

PROJECT ALTERNATIVES

Diversion Structure Alternatives



Stanley Consultants INC.
1661 East Camelback Road, Suite 400
Phoenix, Arizona 85016
Phone: (602) 333-2200

SIPHON DRAW WASH DRAINAGE IMPROVEMENTS
FCD 2007C012
Diversion Alternative

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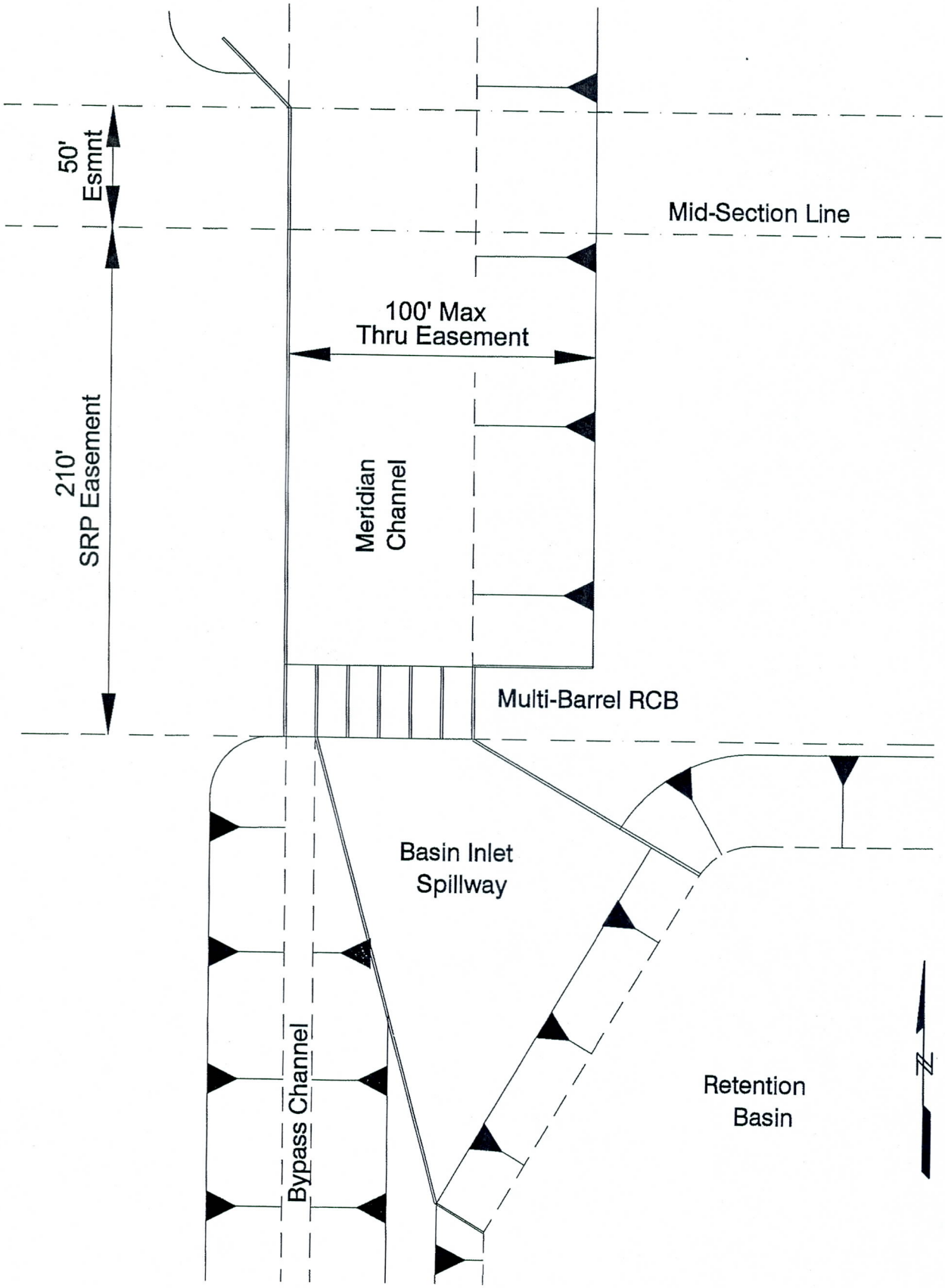

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1661 East Camelback Road, Suite 400
Phoenix, Arizona 85016
Phone: (602) 333-2200

SIPHON DRAW WASH DRAINAGE IMPROVEMENTS
FCD 2007C012
Diversion Alternative

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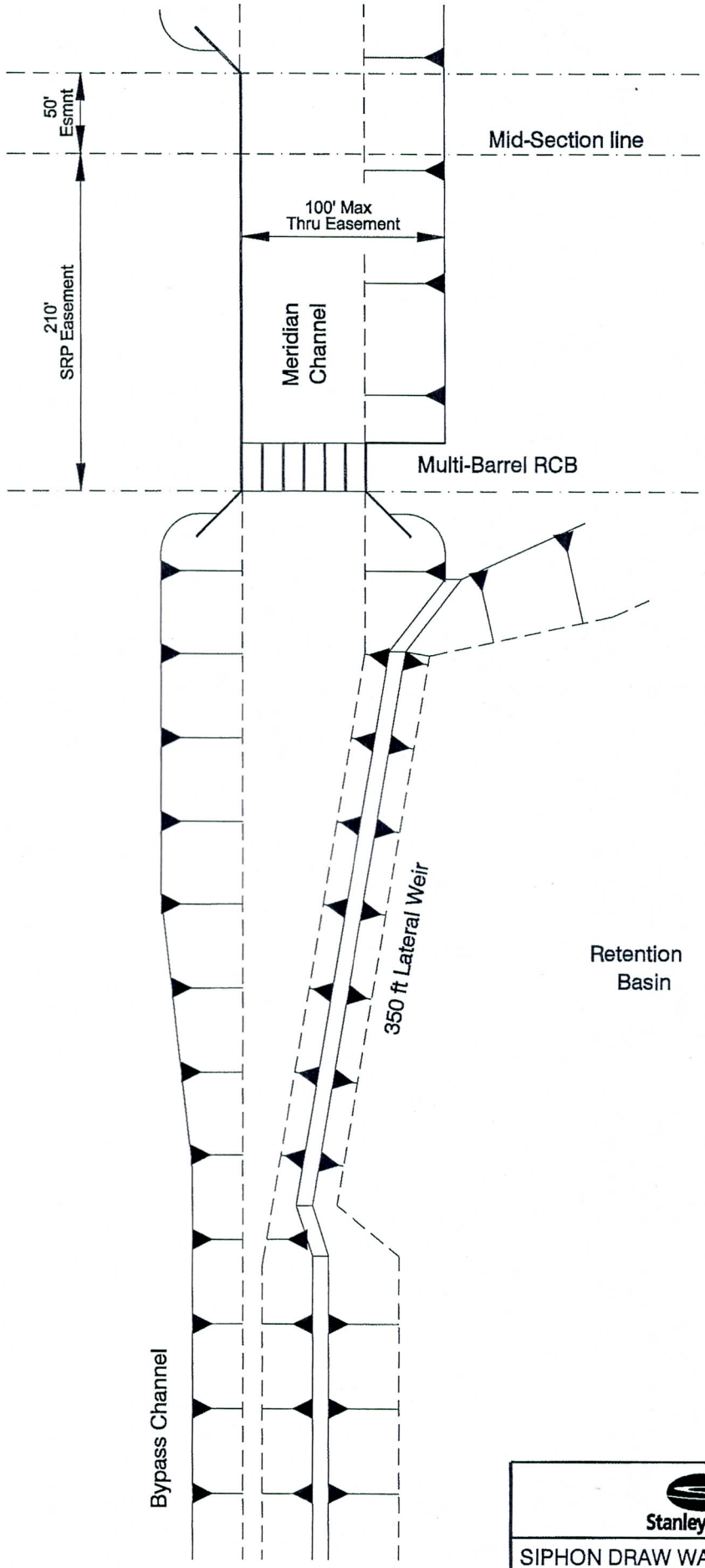


Stanley Consultants INC.
1661 East Camelback Road, Suite 400
Phoenix, Arizona 85016
Phone: (602) 333-2200

SIPHON DRAW WASH DRAINAGE IMPROVEMENTS
FCD 2007C012
Diversion Alternative

DRAWING NO.	EXHIBIT 2	SHEET OF
.		. .

APPENDIX D

COST ESTIMATE

APPENDIX D

COST ESTIMATE

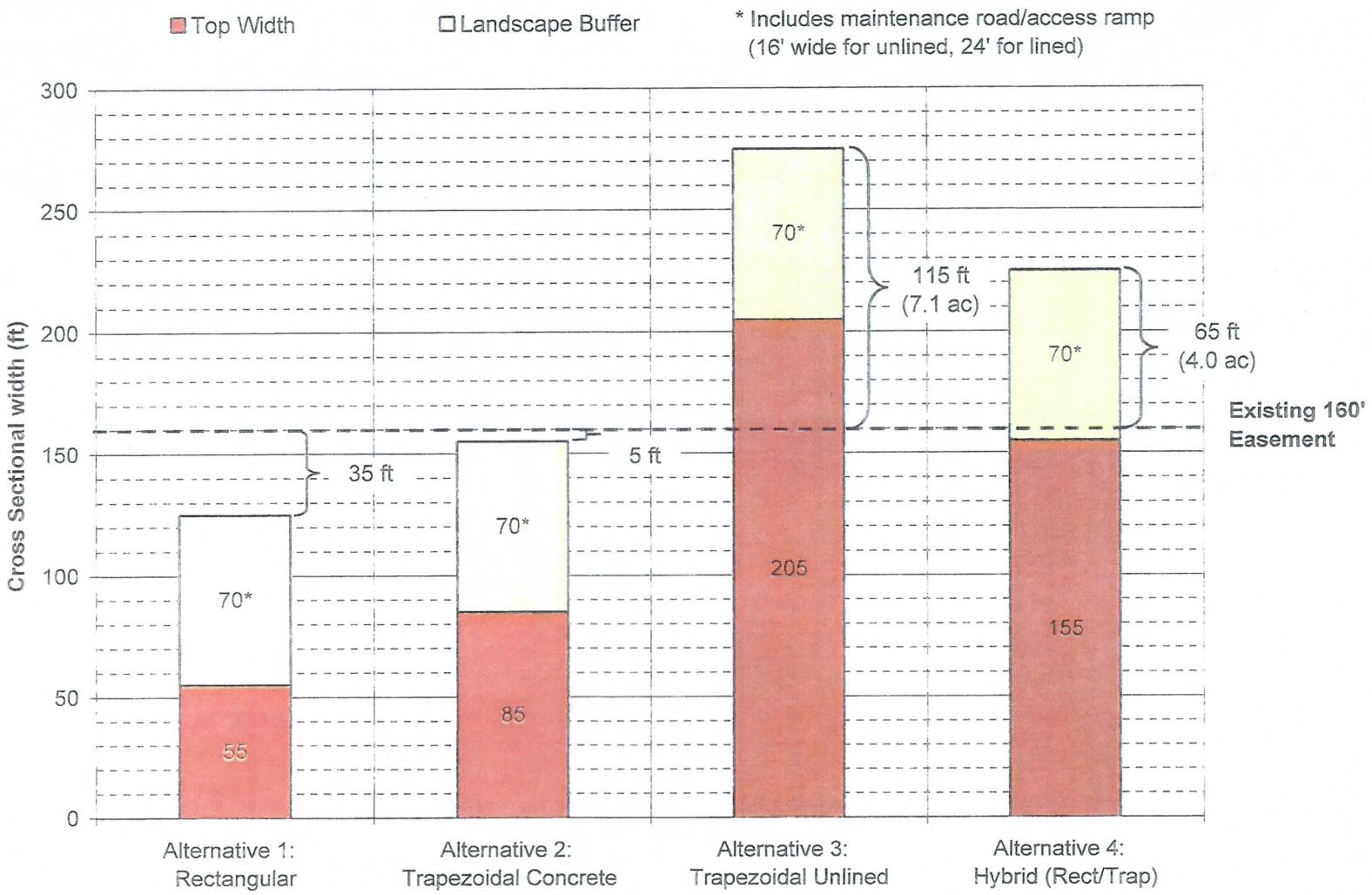
Channel Alternatives

Preliminary Cost Estimate for Channel Alternatives

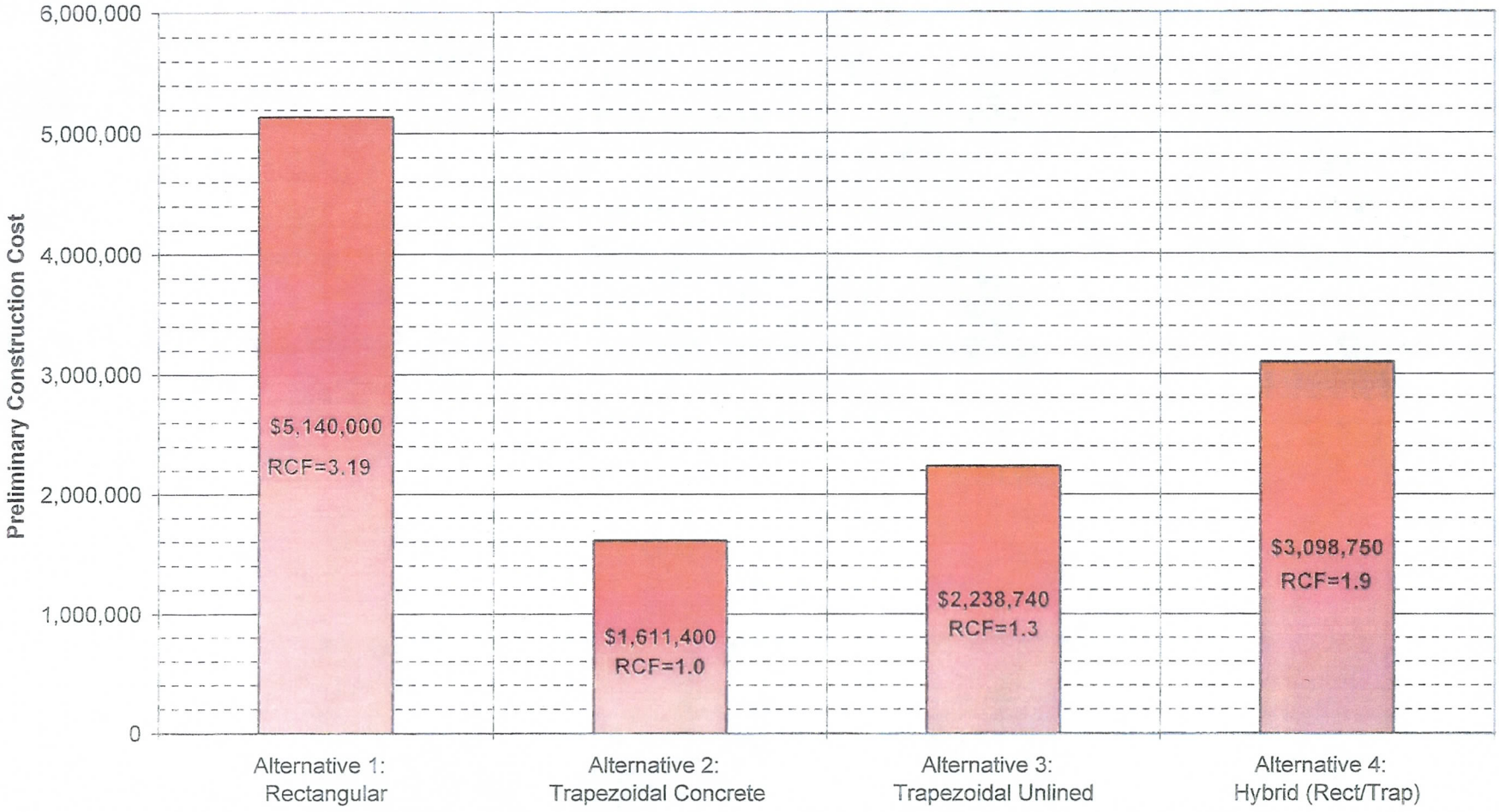
Description	SS (H:1)	Bottom Width (ft)	Top Width (ft)	Landscape Buffer (ft)	Additional Easement (ft)	Unit	Quantity	Unit Price	Total Cost (2700 ft)	Relative Cost Factor
Alt 1: Rectangular	-	55	55	70	-35					
Channel Excavation						cu yd	62,000	$8.00	$496,000	
Chain Link Fence (72")						ft	5,400	$10.00	$54,000	
Structural Concrete						cu yd	9,180	$500.00	$4,590,000	
Drop Structures						each	0	$0.00	$0	
Additional Easement						acre	0.00	$50,000.00	$0	
Total Cost Estimate									**$5,140,000**	**3.19**
Alt 2: Trapezoidal Concrete	2	45	85	70	-5					
Channel Excavation						cu yd	69,800	$8.00	$558,400	
Chain Link Fence (72")						ft	5,400	$10.00	$54,000	
Concrete Lining (6")						sq yd	24,975	$40.00	$999,000	
Drop Structures						each	0	$0.00	$0	
Additional Easement						acre	0.00	$50,000.00	$0	
Total Cost Estimate									**$1,611,400**	**1.00**
Alt 3: Trapezoidal Unlined	6	85	205	70	115					
Channel Excavation						cu yd	117,000	$8.00	$936,000	
Seeding						acre	11.68	$3,000.00	$35,040	
Drop Structures						each	4	$127,500.00	$510,000	
Additional Easement						acre	7.13	$50,000.00	$356,500	
Channel Protection (3" D_{50})						cu yd	4720	$85.00	$401,200	
Total Cost Estimate									**$2,238,740**	**1.39**
Alt 4: Hybrid (Rect. / Trap)	6	85	155	70	65					
Channel Excavation						cu yd	104,800	$8.00	$838,400	
Seeding						acre	9.10	$3,000.00	$27,300	
Chain Link Fence (72")						ft	2,700	$10.00	$27,000	
Retaining Wall						ft	2,700	$438.00	$1,182,600	
Drop Structures						each	4	$127,500.00	$510,000	
Additional Easement						acre	4.03	$50,000.00	$201,500	
Channel Protection (3" D_{50})						cu yd	3,670	$85.00	$311,950	
Total Cost Estimate									**$3,098,750**	**1.92**

Note: This preliminary estimate does not include all construction costs or channel structures.
Estimate does not include long term maintenance costs or costs common to all alternatives (e.g. side inlets, transition structures, culverts, etc…)
Additional costs for drop structures assumed to be not necessary and/or minor for concrete structures
Drop structures for non-concrete channels estimated based upon typical grouted riprap 3' drop used for 60' bottom width, ~6:1 SS Sonoqui Wash channel.
Relative Cost Factor based upon estimated cost relative to lowest cost alternative. Two RCF are provided one including channel protection, the other without.

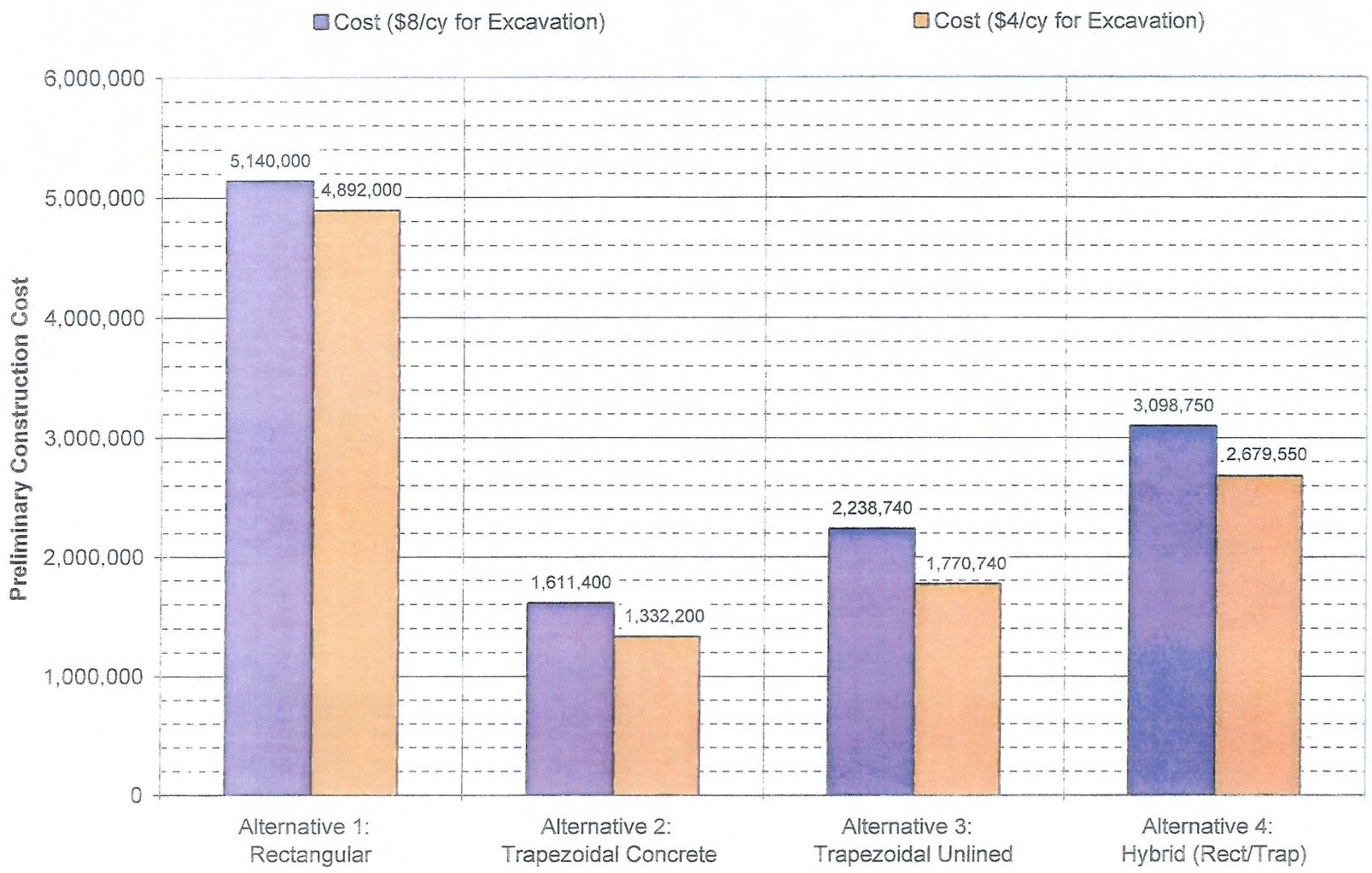
Cross Sectional Land Use of Channel Alternatives



Preliminary Cost of Channel Alternatives



Preliminary Cost of Channel Alternatives



APPENDIX D

COST ESTIMATE

Retention Basin Alternatives

Preliminary Cost Estimate for Basin Alternatives

Description	Unit	Quantity	Unit Price	Total Cost (2700 ft)	Relative Cost Factor
Alternative 1: Single Basin					
Basin Excavation	cu yd	1,119,300	$8.00	$8,954,400	
Bypass Channel Excavation	cu yd	42,500	$8.00	$340,000	
Meridian Channel Diversion Structure	each	1	$135,000.00	$135,000	
Spillway Inlet/Lateral Weir	each	1	$105,000.00	$105,000	
Spillway Inlets (Offsite)	each	1	$20,000.00	$20,000	
Emergency Spillway	each	1	$15,000.00	$15,000	
Grading for Collection Channels/Berms	ft	2650	$43.00	$113,950	
Total Cost Estimate				**$9,683,350**	**1.00**
Alternative 2: Two Basin					
Basin Excavation	cu yd	1,569,600	$8.00	$12,556,800	
Bypass Channel Excavation	cu yd	42,500	$8.00	$340,000	
Meridian Channel Diversion Structure	each	1	$135,000.00	$135,000	
Spillway Inlet/Lateral Weir	each	1	$105,000.00	$105,000	
Spillway Inlets (Offsite)	each	2	$20,000.00	$40,000	
Emergency Spillway	each	2	$15,000.00	$30,000	
Grading for Collection Channels/Berms	ft	2,500	$43.00	$107,500	
Basin Outlet Pipe (24")	ft	250	$125.00	$31,250	
Basin Outlet Headwall	each	2	$5,000.00	$10,000	
Total Cost Estimate				**$13,355,550**	**1.38**

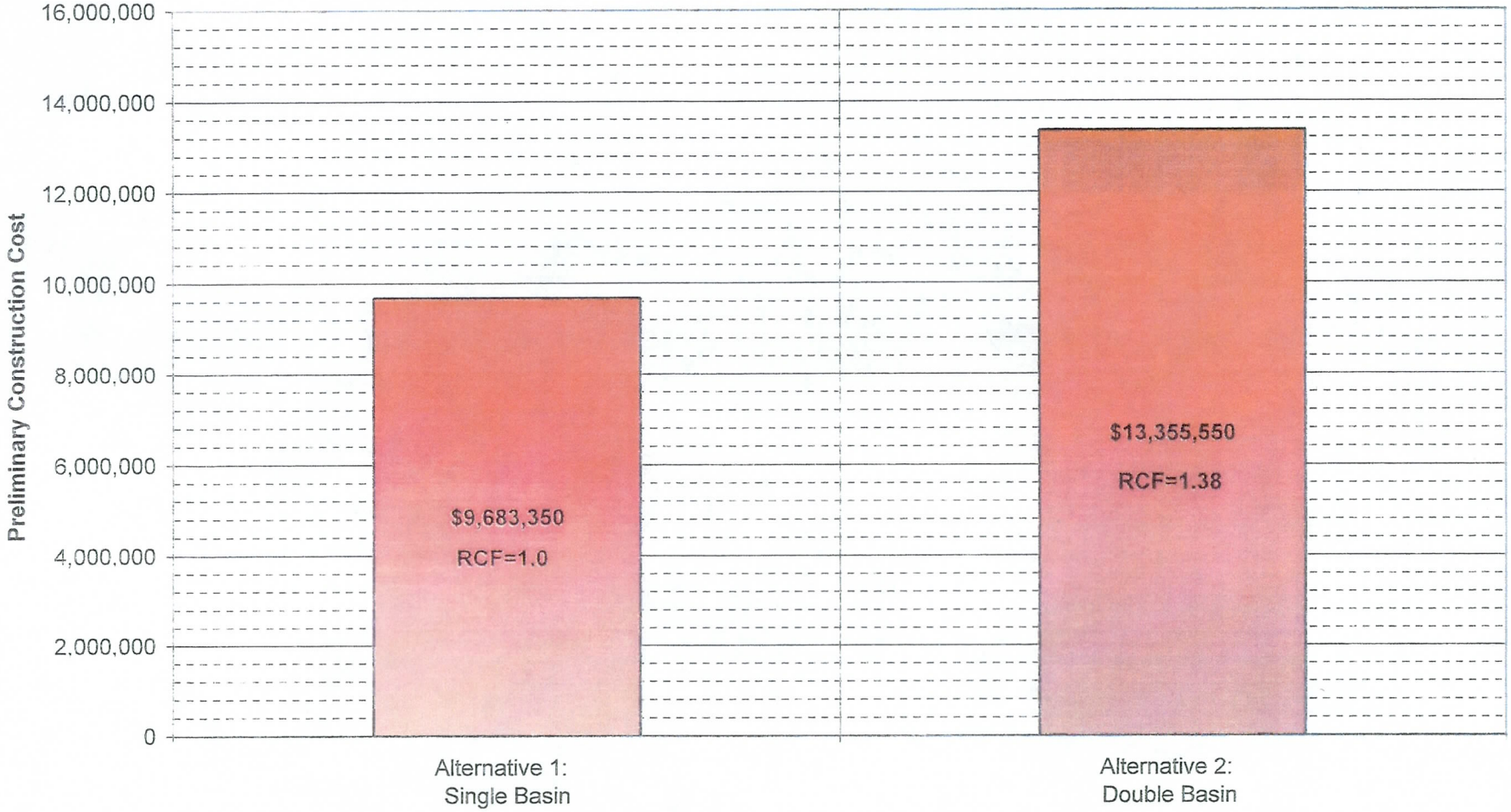
Note: This preliminary estimate does not include all construction costs or basin structures.

Basin excavation includes excavation above the detention basin storage elevation (Necessary to provide storage and for freeboard)

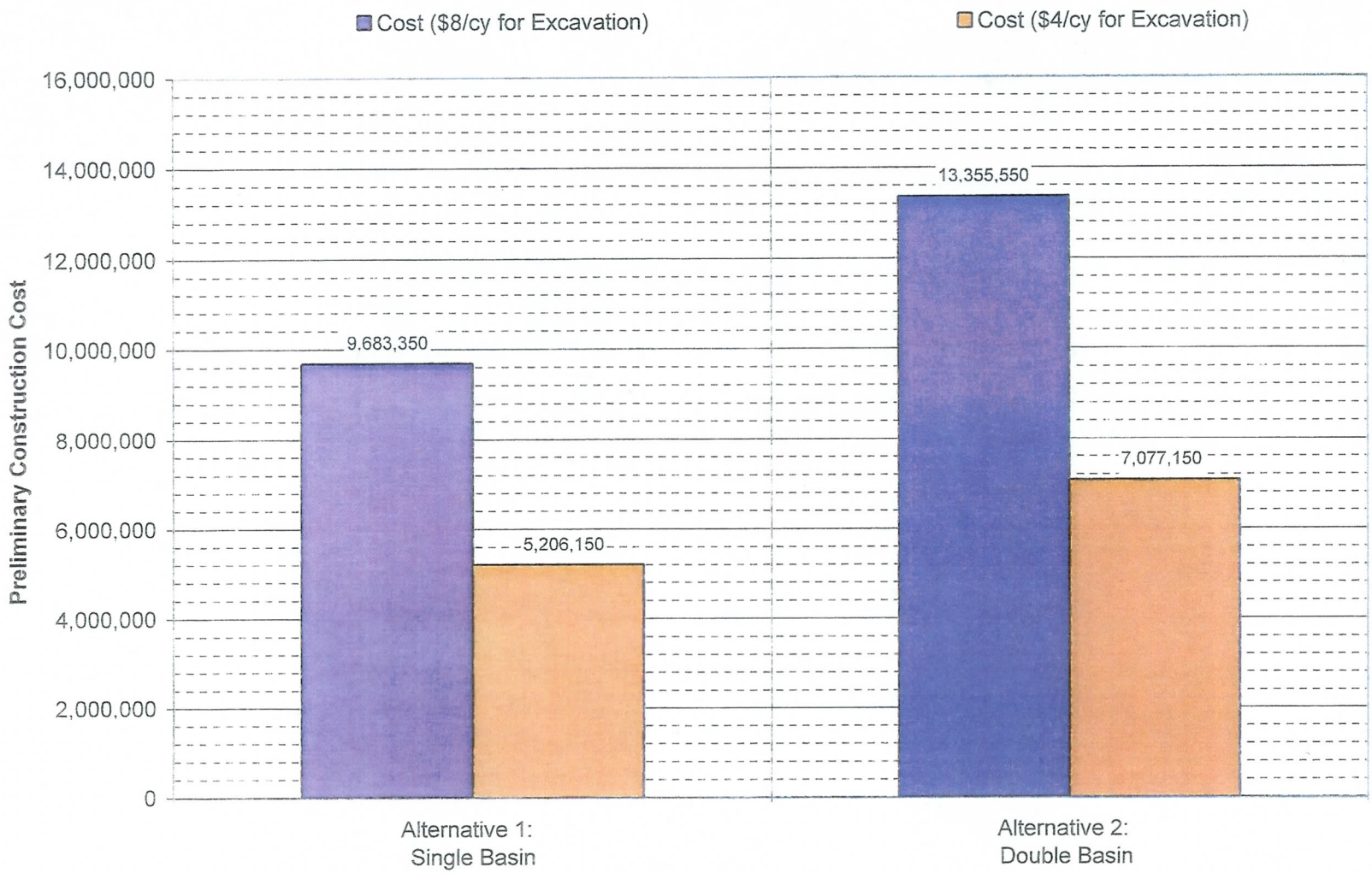
Estimate does not include long term maintenance costs or costs that generally might be common and similar in cost to all alternatives

Relative Cost Factor based upon estimated cost relative to lowest cost alternative.

Preliminary Cost of Basin Alternatives



Preliminary Cost of Basin Alternatives



Triangle Volume Report

Excavation Volume
Single Basin Alternative

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Time: 10:50am

Mode: Entire Surface
Input Grid Factor: 1.000000

Original Surface: **EG-trimmed**
Design Surface: **1B Small + EG**
Cut Factor: 1.00
Fill Factor: 1.00

Cut: 30221124.9 cu ft
Fill: 10224.8 cu ft
Net: 30210900.1 cu ft

Cut: 1119300.9 cu yd
Fill: 378.7 cu yd
Net: 1118922.2 cu yd

Triangle Volume Report

Excavation Volume
Double Basin Alternative

Report Created: 12/19/2007
Time: 10:48am

Mode: Entire Surface
Input Grid Factor: 1.000000

Original Surface: EG-trimmed
Design Surface: 2BNS + EG
Cut Factor: 1.00
Fill Factor: 1.00

Cut: 42379028.1 cu ft
Fill: 15189.4 cu ft
Net: 42363838.7 cu ft

Cut: 1569593.6 cu yd
Fill: 562.6 cu yd
Net: 1569031.1 cu yd

APPENDIX D

COST ESTIMATE

Storm Drain Alternatives

Preliminary Cost Estimate for Storm Drain Alternatives

Description	Unit	Quantity	Unit Price	Total Cost (2700 ft)	Relative Cost Factor
Alternative 1: New ROW Alignment					
Storm Drain (42" RCP)	ft	8,631	$200.00	$1,726,146	
Manhole	each	13	$6,000.00	$78,000	
Basin Outlet Headwall	each	1	$6,000.00	$6,000	
Pavement Replacement (complete)	sy	3,016	$55.00	$165,855	
Additional R/W or Easement	acres	1.69	$50,000.00	$84,447	
Total Cost Estimate				**$2,060,448**	**1.04**
Alternative 2: No ROW Alignment					
Storm Drain (42" RCP)	ft	8,630	$200.00	$1,726,030	
Manhole	each	14	$6,000.00	$84,000	
Basin Outlet Headwall	each	1	$6,000.00	$6,000	
Pavement Replacement (complete)	sy	3,010	$55.00	$165,536	
Additional R/W or Easement	acres	0	$50,000.00	$0	
Total Cost Estimate				**$1,981,566**	**1.00**

Note: This preliminary estimate does not include all construction costs or storm drain structures.

Estimate does not include long term maintenance or costs considered common to all alternatives (e.g. Siphon Draw Wash inlet improvements)

Relative Cost Factor based upon estimated cost relative to lowest cost alternative.

Pavement replacment quantity based upon a vertical trench at a minimum 6 ft in width as prescribed in 2007 M.A.G. Specs. Table 601-1

R/W or Easement quantity based upon a width of 30 ft

APPENDIX E

Environmental Planning Group

Landscape Planning and Design
Detailed Site Analysis and Additional Data Collection and Preliminary Alternative Development Report

Siphon Draw Wash
Drainage Improvements Project

Contract FCD 2007C012
SCI Project No. 20539
January 2007

Prepared for: **Flood Control District of Maricopa County**
2801 West Durango Street
Phoenix, AZ 85009

City of Mesa
2801 West Durango Street
Phoenix, AZ 85009

Prepared by: **Environmental Planning Group**
4141 North 32nd Street, Suite 102
Phoenix, AZ 85018

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2.4 LANDSCAPE CHARACTER 10
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1 PROJECT BACKGROUND

Project Overview

The Siphon Draw Wash Drainage Improvements Project (Project) is a multi-purpose flood control project that is a partnership between the Flood Control District of Maricopa County (District) and the City of Mesa (City), and includes one or more detention basins, maintenance access roads to and around the basin(s), an approximately two thirds (2/3) mile long channel with maintenance road(s), 1.75 miles of storm drain, and associated structures.

Located within western Pinal County and eastern Maricopa County, the Project begins at Meridian Road approximately one (1) mile north of the Elliot Road alignment, and ends at Elliot Road and 104th Street. The basin(s) is to be located on the State Land parcel east of Meridian Road just north of the Elliot Road alignment.

The purpose of the Project is to prepare a pre-design report, final design plans, special provisions, and engineer's cost estimates for the construction of the Project; and to collect data for a drainage easement to capture the 100-year flood from the Central Arizona Project (CAP) over chutes, upstream watershed, and some of the Siphon Draw Wash flows for approximately a 3-square mile area bounded by Meridian Road, Elliot Road (Pinal County), and the CAP; and convey this floodwater to the detention basin(s). The outlet storm drain from the detention basin(s) is to convey flows to the existing Elliot Road storm drain system, and cannot exceed the capacity of that system, combined with the Siphon Draw Wash flows that are not diverted. The primary goal of the Project is to intercept flood water at Meridian Road to protect properties to the west of Meridian Road; and detain the floodwater such that the existing Project outlet capacity of 500 cfs is not exceeded. Land subsidence is a known issue within the study area. An analysis for potential land subsidence and fissures, and recommendations for their mitigation will be integrated into the final design for the project.

Landscaping, trails, and other multi-use facilities may be provided along the channel alignment and within the basin(s). The landscape architectural design concepts will be integrated into the design of the structural components of the flood control solutions to enable the Project to become context sensitive with the character of the surrounding natural Sonoran Desert landscape, to help protect the character of the local communities within the Project area, and to provide multi-use recreational and open space, and other use opportunities associated with the flood control facilities.

Landscape Aesthetics and Multi-Use Recreation Goals and Objectives

District goals and performance objectives for scenery, recreation, and open space resources for the Project derive from the District's Mission and Vision Statements, and the District's Board approved *Policy for the Aesthetic Treatment and Landscaping of Flood Control Projects*. The initial goals and objectives for the Project are identified in the *Siphon Draw Drainage Improvements Project, Level 1 Scenery and Recreation Resources Assessment Summary Report* prepared by the District. These goals, as they relate specifically to the Siphon Draw basin(s) and channel, are summarized below.

Scenery Resource Project Goals and Objectives

The District's goals and objectives for the landscaping and aesthetic treatment of flood control projects are to preserve and complement the visual beauty and other aesthetic qualities of their setting, and specifically as it relates to the Project, and preserve and compliment the visual beauty and other aesthetic qualities of the Natural Valley Plain and Natural Valley Washes of the basin and channel site. The channel and basin design alternatives which meet this goal will:

- be compatible to the Natural Valley Plain and Natural Valley Wash character of the basin and channel site (e.g., apply a Class 3 Flood Protection Method and either the Natural Lower Sonoran Desert, Natural Lower Sonoran Desert Riparian, or Semi-Natural Sonoran Desert Themes)
- retain and preserve the distinct natural and cultural landscape features of Siphon Draw
- maintain and enhance the views toward the northeast of the Usery Mountains
- improve and restore visually discordant features of the basin and channel site that create visual disturbances to a condition that is complementary to the valued character of the surrounding Natural and Suburban Valley Plain

Recreation Resources Project Goals and Objectives

The District's recreational goals are to promote recreational multiple-uses of its properties, to promote partnerships with the Parks and Recreation Department of Maricopa County and local communities, and to assist in meeting the public needs for parks and recreation in Maricopa County, to the extent that such uses do not compromise the flood control facility function, operation or maintenance of those facilities. Channel and basin design alternatives for the Project which meet this goal will:

- preserve and complement the desired character and recreational experience of existing and planned recreational areas within and surrounding the Project area, including the Maricopa Trail and the Powerline Trail
- Maximize opportunities to provide regional and local community needs for passive and active recreation, including a trail system connection along Siphon

Draw, connectivity to the Powerline Multi-Use Trail corridor, and a community park facility for the City of Apache Junction within the basin site

Open Space Project Goals and Objectives

The District's open space goal is to promote the use of its properties to assist in meeting public and local community needs for open space preservation in Maricopa County. Project objectives related to the achievement of this goal include planning and designing the flood control solutions to:

- assist in the implementation of the Maricopa Association of Government's (MAG) Desert Spaces Plan
- achieve consistency with the goals and objectives of the City of Apache Junction's and Pinal County's general plan open space elements

In addition to guiding the development of basin(s) and channel alternatives for the Project, these goals will be used to define the criteria by which the basin and channel alternatives will be evaluated and selected.

Purpose of the Detailed Site Analysis and Additional Data Collection and Preliminary Alternative Development

Detailed Site Analysis and Additional Data Collection

Utilizing the information provided in the *Siphon Draw Drainage Improvements Project, Level 1 Scenery and Recreation Resources Assessment Summary Report* prepared by the District, a detailed site assessment and additional data collection of the landscape planning and design opportunities associated with the Project was performed. The purpose of this detailed assessment is to help with the development of channel and basin alternatives that meet the project scenery resource, recreation, and open space goals and objectives, and to develop and define the criteria by which the basin and channel alternatives will be evaluated and selected. This assessment included visits to the project site to verify the accuracy of the existing data, recording of new observations of the physical environment, and photo-documentation of these observations. The detailed site analysis also included an assessment of topography, drainage features, existing vegetation, distinct features, public and private recreational facilities, trail systems, existing and future land uses, zoning, pedestrian and vehicular circulation around the site, traffic control, street crossings, adjacent parking, utilities, and water and electrical sources. Section 2 - Detailed Site Assessment and Additional Data Collection summarizes the findings of this assessment.

A detailed field inventory of native plants for the basin site has not been completed. Once a preferred basin alternative has been selected and the boundaries for the basin site have been determined, a detailed inventory of the native plants for the basin site will

be prepared in accordance with the State of Arizona Native Plant Law and Department of Agriculture guidelines, suitable for Arizona State Land Department right-of-way application requirements.

Preliminary Alternative Development

Preliminary alternatives that incorporate the Project scenery, recreation, and open space goals have been developed for the basin and channel. Section 3 – Basin Alternatives provides a description of the landscape aesthetic and recreational multi-use features of the basin alternatives, their costs, and an evaluation of how each basin alternative meets the scenery, recreation, and open space goals and objectives of the Project. Section 4 – Channel Alternatives provides a brief description of the channel alternatives, a description of the landscape aesthetic and recreational multi-use concept to be applied to the channel alternatives, their costs, and an evaluation of how each channel alternative meets the scenery, recreation, and open space goals and objectives of the Project.

2 DETAILED SITE ANALYSIS AND ADDITIONAL DATA COLLECTION

This section summarizes the site conditions identified during the landscape planning and design detailed site assessment and additional data collection. This assessment includes:

- Hydrology
- Landform and Topography
- Vegetation and Ecology
- Landscape Character
- Recreation and Open Space

Following is a description of each of these site features as they relate to the landscape and planning design for the basin and channel. Additionally, recommendations are provided for designing the basin and channel in response to each of these site features in order to meet the scenery, recreation, and open space goals and objectives of the Project. Figure 1-1 provides an aerial photograph of the project site with key viewpoints identified and photographs taken at these locations.

2.1 HYDROLOGY

The Siphon Draw Drainage Improvements channel and basin site drains from the northeast to the southwest. Siphon Draw, the primary wash, flows east to west from the CAP through the proposed drainage basin site to a drainage corridor running through the adjacent residential community west of Meridian Road. Additional secondary and minor dendritic washes are found throughout the site. The majority of these washes flow into Siphon Draw. The character of these drainages should be incorporated into the design of the basin and channel to the greatest degree possible. Fissures throughout the site also provide a collection point for drainage and function as washes. These fissures typically run perpendicular to the washes and tend to cut off flows into the natural drainages of the site (see Figure 1-2).

2.2 LANDFORM AND TOPOGRAPHY

The Siphon Draw Drainage Improvements channel and basin site consists of large, open, flat areas that are carved into and dissected by the jagged edged, v-shaped, incised drainages. These drainages create narrow finger-like patterns overlaying the flat surface of the ground plane. The drainages create a rolling landform where several secondary drainages come together. In addition, fissures on the site create straight linear slits in the ground plane that cut across the natural features of the site, nearly

Siphon Draw Drainage Improvements Project

Site Analysis - Visual Characteristics

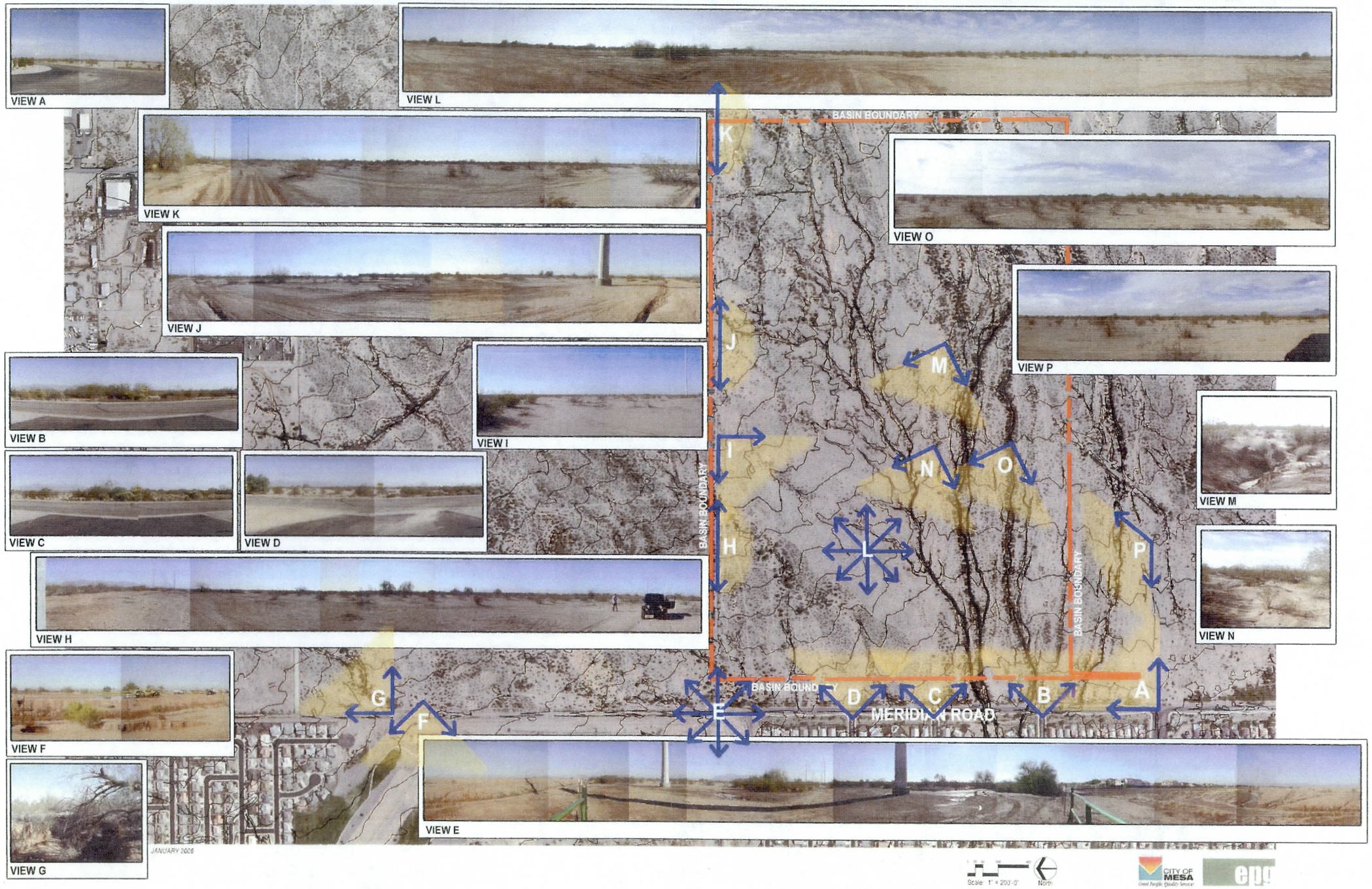


FIGURE 1-1

Siphon Draw Drainage Improvements Project

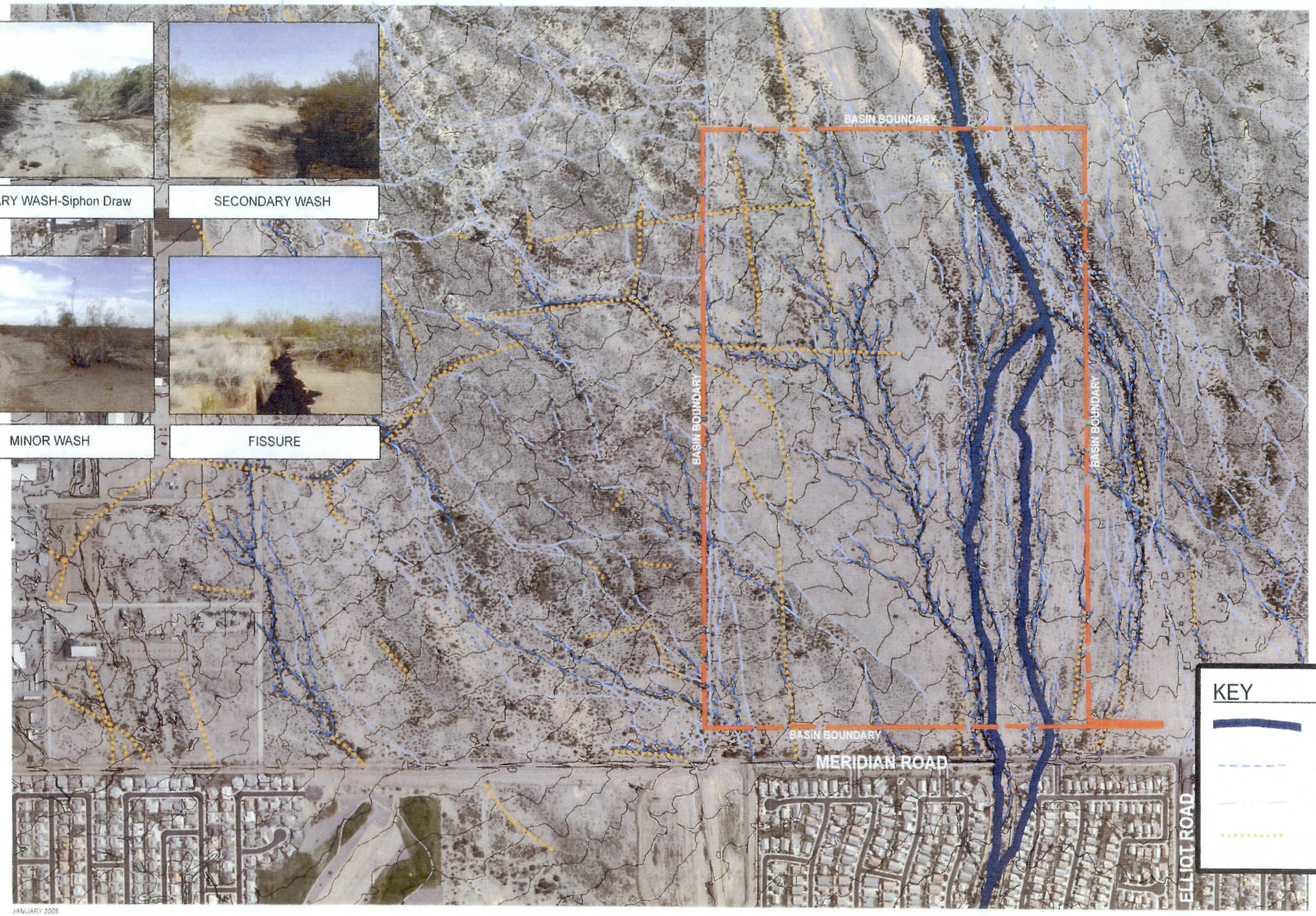
Site Analysis- Hydrology

PRIMARY WASH-Siphon Draw

SECONDARY WASH

MINOR WASH

FISSURE



JANUARY 2006

FIGURE 1-2

perpendicular to the washes. The basin(s) should be designed to follow the natural contouring of the site, and carry the landform character of Siphon Draw and the other major drainages through the bottom of the basin as a low-flow channel to the basin outfall. Additionally, the basin(s) should be oriented to run north and south in order to minimize unnecessary grading and additional rehabilitation of the site (see Figure 1-3).

2.3 VEGETATION AND ECOLOGY

Three types of vegetative groups are found on the channel and basin site, Xeroriparian Class A, Xeroriparian Class C, and Creosote Flats. The Xeroriparian areas are associated with the washes and fissures on the site. Xeroriparian Class A areas envelope Siphon Draw and have the highest density of plant material, including tree species, found on the site. Ironwood is the primary tree species found along Siphon Draw, with a few scattered palo verde, mesquite, and desert hackberry. Xeroriparian Class A and Class C areas are similar in specie type, however, Xeroriparian Class A areas have a much higher density of vegetation than Class C areas. The Xeroriparian Class C areas of the site are associated with the secondary and minor washes that traverse the site. Class C areas rarely include tree species but include shrub species such as creosote, desert broom and bursage. The Creosote Flats make up the remainder of the site and include sparse and scattered vegetation consisting mostly of creosote. Because an irrigation system is not planned for the Project, water and electrical services are not required on the site for landscaping. Revegetation of the site will be limited to hydroseeding and tall pot plantings that can survive on the natural precipitation that falls on the site. It is recommended that only native vegetation found on the site be utilized for revegetation. Additionally, every effort should be made to continue the vegetative form of Siphon Draw and the major washes associated with the basin(s) and channel sites along a low-flow channel in the bottom of the basin(s) to the basin outfall (see Figure 1-4).

Siphon Draw Drainage Improvements Project

Site Analysis- Landform & Topography

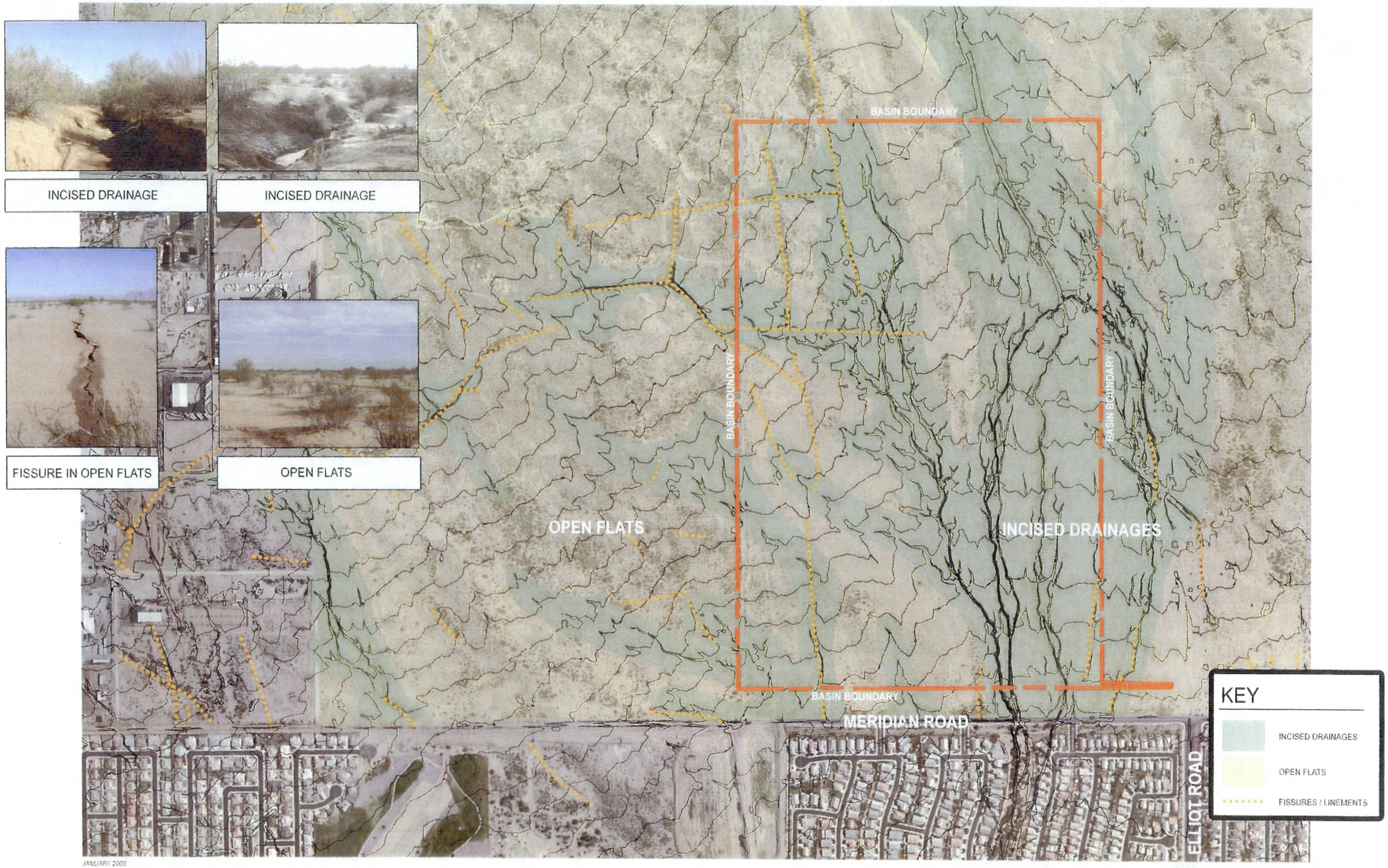


FIGURE 1-3

2.4 LANDSCAPE CHARACTER

The Siphon Draw Drainage Improvements Site is located in Pinal County and borders Maricopa County at its eastern edge. The site falls within the Sonoran Desert Character Type and Sonoran Valley Lands Subtype. Both Natural Valley Washes and Valley Plains Landscape Character Units are found on the site. The Valley Plains consists of flat, open terrain. Vegetation within the Valley Plains is scattered and sparse and consists primarily of creosote. The Valley Plains are dissected by two types of Natural Valley Washes, the Primary Natural Valley Wash and the Secondary Natural Valley Washes. The Primary Natural Valley Wash is defined by Siphon Draw and is a Variety Class A feature. It is distinct in character with its deeply incised drainages and dense xeroriparian vegetation. The diversity of plant species and higher concentration of trees make the Primary Natural Valley Wash visually dominant in the landscape. The Secondary Natural Valley Washes that stretch across the site are not as visually prominent as the Primary Natural Valley Wash. They are usually characterized by gentle, rolling terrain or shallow-cut channels. Vegetation in the Secondary Natural Valley Washes is also less dense than in the Primary Natural Valley Wash.

The Primary Natural Valley Wash should be protected to the extent possible in order to protect the Class A features of the site. Additionally, the basin and channel sites are compatible with Class 3 Flood Protection Methods (e.g., non-structural, soft-structural, and semi-soft structural). The basin and channel should be designed with one of these three structural methods in order to be compatible with the existing and future planned character of the project area. Three Landscape Design Themes are compatible with the character of the basin(s) and channel site, the Natural Lower Sonoran Desert Theme, the Natural Lower Sonoran Desert Riparian Theme, and the Semi-Natural Sonoran Desert Theme. It is recommended that the primary theme for the Project be the Natural Sonoran Desert Theme with the Natural Lower Desert Riparian theme incorporated along the low-flow channels within the basin and, where possible, along the channels (see Figure 1-5).

2.5 RECREATION AND OPEN SPACE

The channel and basin site provides multiple opportunities for recreation, including trails that connect to existing and future trail systems, and open space for future passive and active recreation. The City of Apache Junction has identified the basin site as a potential, future, active recreation and open space area. The city has also identified that the basin site can provide a passive recreational area with a potential trailhead, trails, ramadas, and picnic areas until the site is developed into an active park area with turf, ballfields, and associated amenities. It will be important for the design of the basin(s) to accommodate the interim passive recreational uses and long-term active recreational uses desired by the City of Apache Junction.

Siphon Draw Drainage Improvements Project

Site Analysis - Vegetation & Ecology

FIGURE 1-4

Siphon Draw Drainage Improvements Project

Site Analysis - Landscape Character

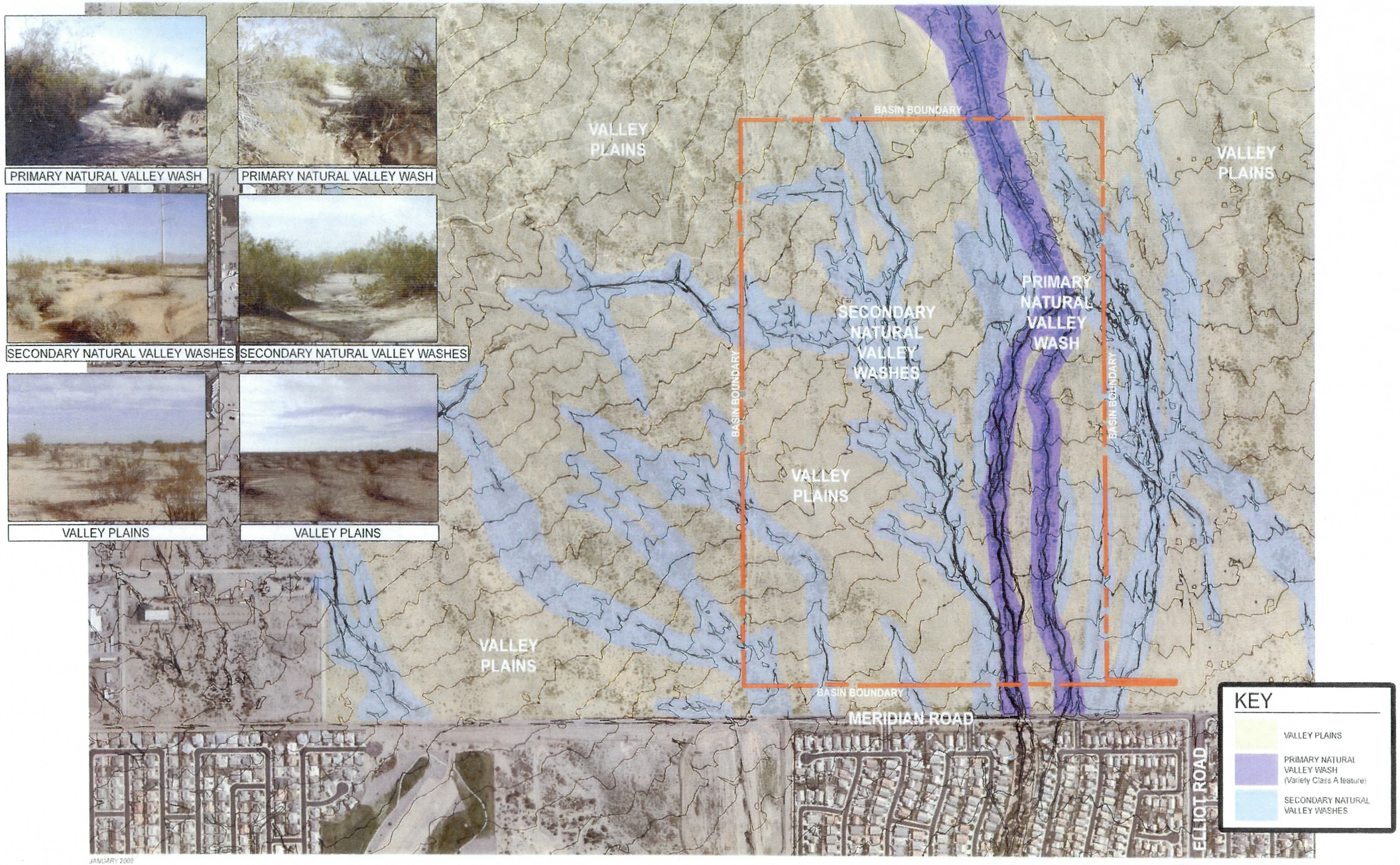
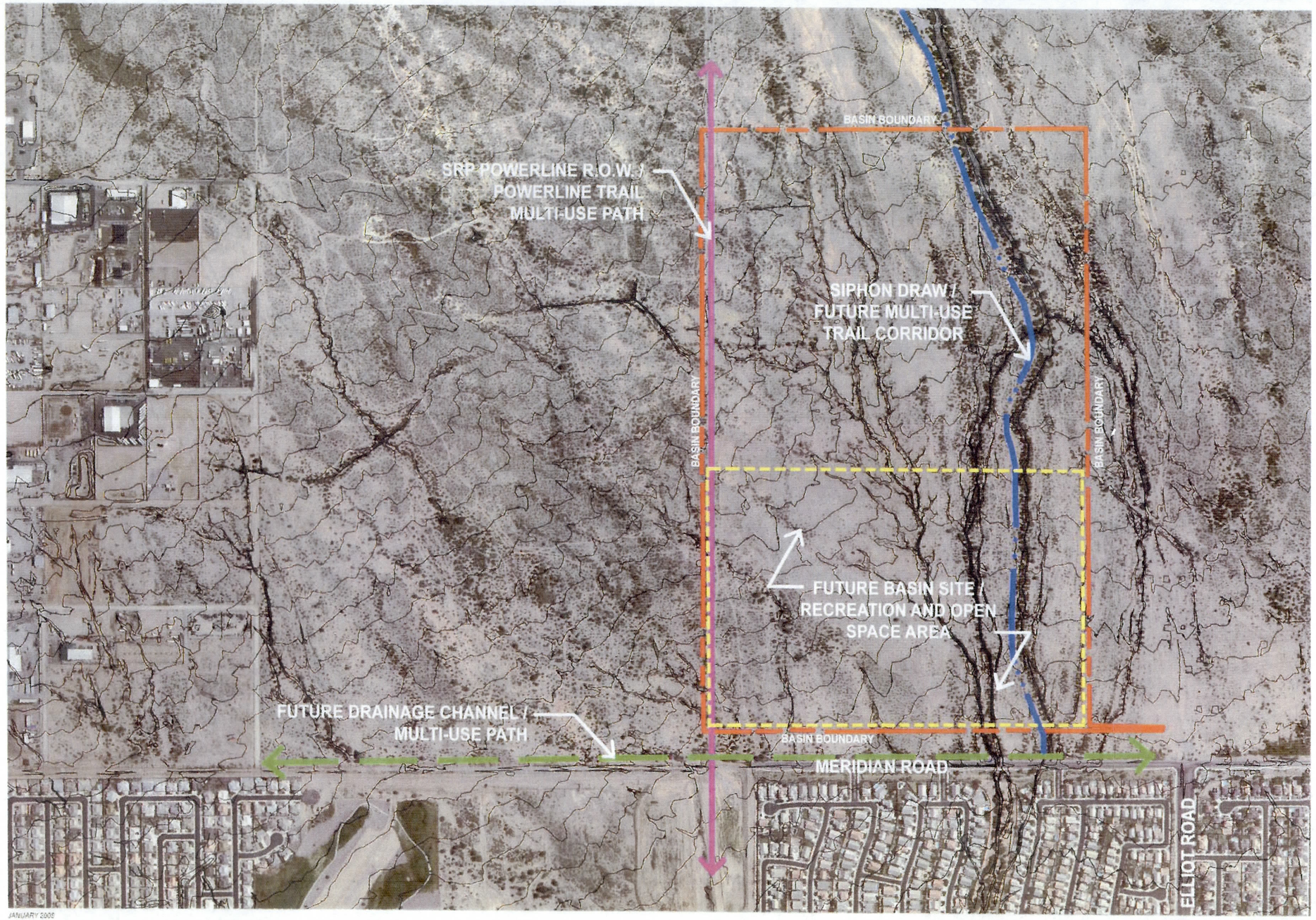


FIGURE 1-5

In addition to recreational uses associated with the basin site, the City of Apache Junction has identified the proposed drainage channel along Meridian Road as a potential, multi-use, trail corridor that will connect to the surrounding developing areas. Developing the operation and maintenance road to also serve as a multi-use trail will help to achieve this goal of the City and create an opportunity for shared maintenance of the basin site in the future. Additionally, the SRP transmission line corridor along the northern side of the basin site is also planned for the future Powerline Trail Multi-Use Path. This corridor will connect the communities to the west (Mesa, Gilbert, Chandler, Tempe, and Phoenix) and the future residential area to the east and north with the basin site, as well as to the Maricopa Trail to the east. The City of Apache Junction is also planning a recreational trail to follow Siphon Draw that will provide another connection to the adjacent communities and the Maricopa Trail. The operation and maintenance roads for the basin site also should be designed as multi-use trails and to facilitate connectivity to these future regional trail corridors (see Figure 1-6).

Siphon Draw Drainage Improvements Project

Site Analysis - Recreation and Open Space



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Scale: 1" = 200'-0" North

CITY OF MESA

FIGURE 1-6

3 BASIN ALTERNATIVES

3.1 DESCRIPTION OF BASIN ALTERNATIVES

Two basin alternatives have been developed for the Project, Option 1 – a single basin alternative, and Option 2 – a double basin alternative. Both basin alternatives function as on-line basins for Siphon Draw and off-line basins for Meridian Channel. Initial flows from Meridian Channel bypass the basin through a drainage channel along Meridian Road that directs flows into the existing drainage corridor running through the subdivision west of the basin site and into the storm drain. Once the capacity of the channel and/or storm drain is met, additional flows will be diverted into the basin until they can be discharged into the storm drain or drainage corridor.

Although the two basin alternatives vary in form, both have been designed to fully integrate landscape aesthetics and multiple-use recreational opportunities to meet the project scenery, recreation, and open space goals and objectives to the greatest degree possible. These include designing the basin(s) to be a Class 3, Semi-Soft Structure, whose form mimics the natural landforms of the site. A planting scheme should be developed that simulates the natural drainage patterns that flow through the site utilizing native vegetation, and developing the basin(s) design to incorporate potential phasing for future passive and/or active recreational opportunities.

Following is a summary of specific design guidelines identified for the basin alternatives, project phasing, and costs associated with the landscape and aesthetic features of the alternatives (see Figures 2-1, 2-2, 2-3, and 2-4).

3.1.1 Design Guidelines and Features

Basin Surface Treatment:

- The basin shall be a soft-lined, earthen structure with native desert pavement salvaged from the site and hydroseeded with native seed indigenous to the area.

Basin Configuration and Shape:

- The basin(s) site is characterized as Natural Valley Plain with Natural Valley Washes landscape character units which are compatible with a Class 3 Flood Protection Structural Method (non-structural, soft-structural and semi-soft structural flood protection methods). As such, the basin(s) shall be designed to be semi-soft in character.
- Basin configuration and layout will follow the "natural" contouring and drainage patterns of the site.

Siphon Draw Drainage Improvements Project

Basin Option 1, Phase 1

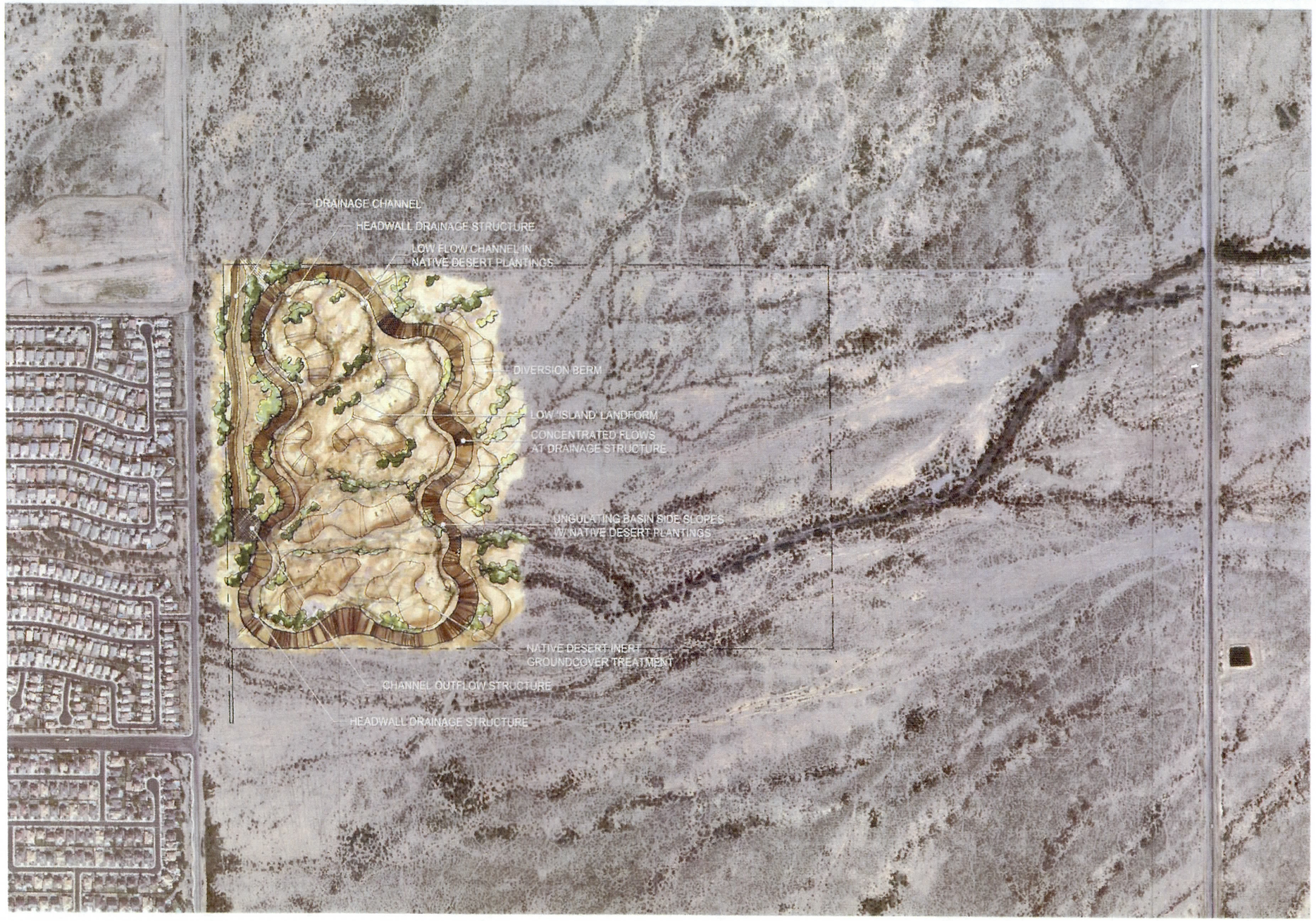


FIGURE 2-1

Siphon Draw Drainage Improvements Project

Basin Option 1, Phase 2

FIGURE 2-2

Siphon Draw Drainage Improvements Project

Basin Option 2, Phase 1

FIGURE 2-3

Siphon Draw Drainage Improvements Project

Basin Option 2, Phase 2

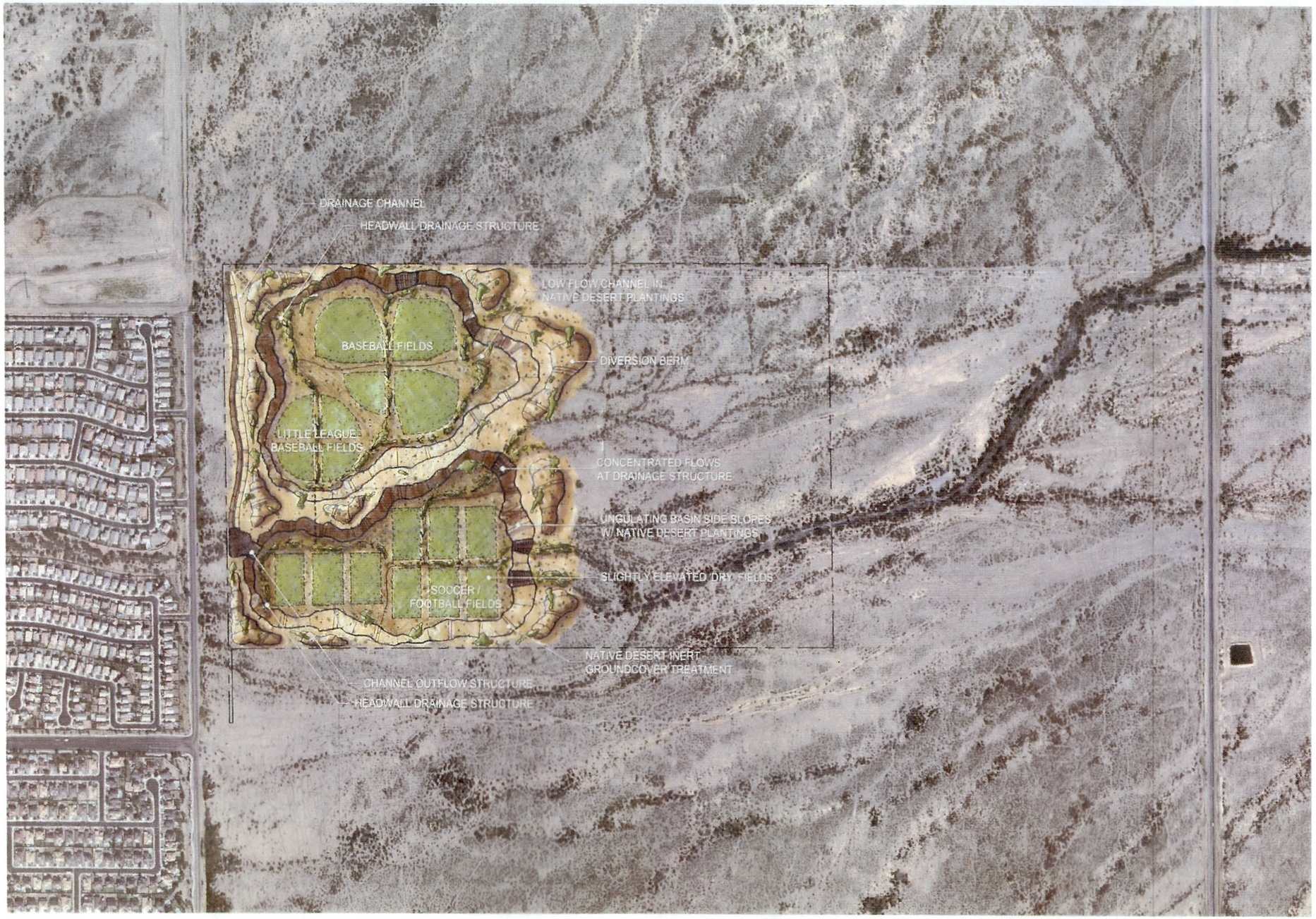


FIGURE 2-4

- The top and toe of the basin side slopes will be freeform, irregular and undulating in order to create ridges and bays to reduce the appearance of the overall size of the basin.
- Square corners, straight lines, and geometric shapes within the basin shall be avoided.
- The overall basin shape shall be rounded and curvilinear to create diversity in the basin form.

Basin Perimeter Set-back Buffer Zone:

- A 50- to 100-foot-wide, open space, set-back, buffer zone shall be provided between the top of the basin and all property lines to provide a visual transition with the surrounding streetscapes and neighboring properties.
- The set-back shall include an area for an Operation and Maintenance (O&M) road with a meandering alignment related to the contours and placement of the landscape planting and landform treatment.
- Landscape berms and diversion berms with variable heights, widths and slope gradients within the set-back, shall be incorporated to break-up any sight lines, reduce the visual size of the basin, assist in directing drainage flows, and create a more human scale landscape buffer treatment.
- The height of the berms located adjacent to streets shall not exceed 3 feet in vertical height and shall be designed to create lines of sight or "view windows" from the adjacent streets for policing and to preserve views of the mountains.
- The O&M road shall be designed to provide trail connectivity to the Maricopa Regional Trail through the future SRP power line corridor/Powerline Trail Multi-use Path and Siphon Draw Trail systems.
- Access shall be provided to recreational multi-use opportunities along the perimeter of the basin.

Basin Side Slopes:

- The O&M road shall be located on the side slopes and have a meandering alignment.
- Semi-soft structural components such as inlets, outlets, spillways, and dissipaters shall be designed to blend with and integrate into the topographic undulations and form of the side slopes of the basin.
- Structural components shall be located within the perimeter area of the basin and will be designed with minimal visual impact and be consistent with the overall landscape setting and theme for the basin.
- Structural components can be integrated into the topographic form of the side slopes and create opportunities for recreational, multiple-use functions.

Basin Bottom Areas:

- Bottom basin areas shall be designed to create island landforms that have the appearance of rolling topography with relief that varies a minimum of 3 to 5 feet vertically to create undulation, topographic variety and visual interest.
- Terraces should be freeform in shape and variable in size and vertical elevation.
- Terrace elevations shall be designed higher than 2-year nuisance flows and short term storms (5 to 10 year storms) to provide and incorporate recreational opportunities.
- Initial terrace mounding shall be designed to accommodate future terracing for ballfields.
- Low-flow channels within the basin shall have variable widths that meander away from the toe of side slopes and may be located through the central areas of the basin.
- Low-flow channels shall be separated by the island landforms to create spatial variety, break-up the overall size of the bottom area and delineate recreational multi-use opportunities.
- Low-flow channels shall be designed to accommodate the future layout of ballfields in order to preserve vegetation at the time of ball field construction.
- The O&M road shall provide accessibility to the bottom of the basin with a longitudinal slope not to exceed 4.5 percent.

Basin Structural Components:

- Drop structures for the low-flow channels shall be designed to create natural water features during storm events.
- The form, color, scale and texture of aesthetic materials and fenestration used shall incorporate: existing on-site materials (if applicable), native crushed rock treated with natural stain applications or simulated desert patina, soil cement and/or other environmentally sensitive semi-soft structural construction materials for all existing and future planned structural components.

Vegetation Planting and Surface Treatment:

- Landscape planting and surface treatment of the entire site shall be designed with native plant species utilizing tall pot planting techniques and native seed mixes.
- Existing native vegetation shall be protected in-place throughout the project site (where possible).
- Relocation of salvaged plant material is not available on site due to the lack of an irrigation system. Salvaged plant material shall be sold at auction to any registered native plant wholesalers. Plant materials not sold at auction will be mulched and redistributed on site.
- Stockpiles of existing desert pavement throughout the project site shall be redistributed over the entire site.

- Tall pot planting shall be strategically located throughout the basin site, along low-flow channels extending from Siphon Draw and the adjacent wash corridors.
- The basin low-flow channels shall be planted with tall pot planting and seed mix varieties.
- The low-flow channel alignment, in conjunction with the Siphon Draw, shall be rehabilitated to restore the "visual connection" and character and provide a wildlife linkage to the basin.
- The planting arrangement and composition of different native species shall be designed to create spatial variety, frame views and landscape focal points, break-up the visual size of the basin, reduce slope uniformity, and provide an aesthetic screen along the perimeter areas adjacent to the property boundaries.
- Multiple seed mixes shall be developed for hydroseeding applications for site revegetation, dust abatement, slope erosion control, and revegetation of basin bottom and perimeter areas.
- Hydroseeded mixes shall incorporate ironwood and palo verde trees and creosote bush seeds. The creosote bush seed will be the primary plant specie in the hydroseeding seed mix for the Valley Plain/Creosote Flats areas of the site. Ironwood and palo verde will be principally be used along the washes and low-flow channels.
- The planting palette shall consist of native plant species with low maintenance and water requirements. An automatic irrigation system will not be available on site. Alternative methods of irrigation may be considered, such as application of DriWater.

3.1.2 Phasing

The City of Apache Junction has expressed an interest in the basin ultimately being developed as an active recreational park with ballfields and other recreational amenities. However, the City is not prepared to contribute funding to the Project at this time, and because no other project partner has been identified that can contribute to the development and operations and maintenance of these facilities at the anticipated time of initial construction, each of the alternatives has been developed to be phased. Phase 1 will consist of natural open space areas with the potential for O&M roads to serve as multi-use trails, and future opportunities for parking areas, ramadas, and picnic areas and other similar passive recreational activities. This initial phase would incorporate gentle, rolling mounds to break up the bottom of the basin(s) and could be re-graded to provide terracing for the ballfields at the time the site is redeveloped for active recreation with ballfields. The Phase 2 alternatives illustrate a potential layout of ballfields within the basin(s).

3.1.3 Costs

The overall basin costs will need to be within the District's cost ceiling requirements for landscaping and aesthetic treatment. The following tables illustrate the project costs associated with tall pot planting and hydroseeding for the first phase of each of the two alternatives.

Siphon Draw - Basin Option 1 (Single Basin)
Itemized Cost Estimate
1/7/08

Basin Aesthetic and Landscape Treatment	*APPROX. QTY. (95 total acres) Basin Site*	*Unit*	*Cost per Unit*	*Total Cost*
Landscape Planting				
Tall pot trees in flats (5 trees/acre at 80 acres)	400	EA	$ 100.00	$ 40,000.00
Tall pot trees in xeroriparian areas (20 trees/acre at 15 acres)	300	EA	$ 100.00	$ 30,000.00
Hydroseeding				
Native seed mix	4,138,200	SF	$ 0.07	$ 289,674.00
This estimate does not include the purchase of land				
This estimate does not include the placement of berm materials or earth formation				
			Aesthetic and Landscape Treatment sub-total	***$ 359,674.00***
			15% Contingency	***$ 53,951.10***
			Aesthetic and Landscape Treatment total	***$ 413,625.10***

Siphon Draw - Basin Option 2 (Double Basin)
Itemized Cost Estimate
1/7/08

Basin Aesthetic and Landscape Treatment	*APPROX. QTY. (120 total acres) Basin Site*	*Unit*	*Cost per Unit*	*Total Cost*
Landscape Planting				
Tall pot trees in flats (5 trees/acre at 105 acres)	525	EA	$ 100.00	$ 52,500.00
Tall pot trees in xeroriparian areas (20 trees/acre at 15 acres)	300	EA	$ 100.00	$ 30,000.00
Hydroseeding				
Native seed mix	5,227,200	SF	$ 0.07	$ 365,904.00
This estimate does not include the purchase of land				
This estimate does not include the placement of berm materials or earth formation				
			Aesthetic and Landscape Treatment sub-total	***$ 448,404.00***
			15% Contingency	***$ 67,260.60***
			Aesthetic and Landscape Treatment total	***$ 515,664.60***

The costs for landscaping Basin Option 1 are less than those for Basin Option 2. This is primarily due to the additional area required to be landscaped in Option 2. Additional costs to consider include aesthetic treatment of structural components (likely to be higher with Option 2 because there are more structures).

3.2 EVALUATION OF BASIN ALTERNATIVES

Each basin alternative contributes differently to the project scenery resource, recreation, and open space goals and objectives. The following is an analysis of how each alternative meets these goals and objectives and fits within the design evaluation criteria.

3.2.1 Scenery Resources

It is the District's goal to preserve and complement the visual beauty and aesthetic quality of the natural setting of the site. This can be evaluated by how well each alternative fits within its setting.

Both basin alternatives are designed to be Semi-Soft structures and are compatible with the existing landscape character of the basin(s) site. They are both designed to preserve the natural character of the site, maintain and enhance the views of the Usery Mountains, improve visually discordant features, establish a visual transition between adjacent streetscapes and property boundaries, and incorporate a planting scheme that utilizes native vegetation and simulates the natural drainage patterns of the site. Because Alternative 1 is one basin, it will disturb less of the existing conditions of the site and require less revegetation. However, because Alternative 1 is one basin, the entire scale of the basin will be more readily visible. The two basin option with Alternative 2 breaks up the scale of the basins on the site, minimizes their visual impact, and provides viewing opportunities from the ridge between the two basins. Alternative 1 has fewer structural elements requiring less aesthetic treatment. Additionally, Alternative 2 will have a greater upstream cut that will require visual mitigation.

3.2.2 Recreational Opportunities

The District's recreational goals are to promote and create multiple uses of its properties and assist in meeting the public's desire for parks and recreation opportunities in Maricopa County.

Both of the basin alternatives provide opportunities for passive and active, recreational multi-use opportunities as identified by the City of Apache Junction. Both configurations will accommodate multiple turf sport fields and areas for passive viewing of the surrounding landscape and Usery Mountains. Additionally, both will incorporate O&M roads that can also be used as multi-use trails that are linked to the surrounding community through the Powerline Multi-use trail and Maricopa Regional Trail systems. In this regard, the alternatives preserve and complement the recreational experience of existing and planned recreational areas, maximize passive and active recreational opportunities to meet regional and community needs, provide connectivity to the Maricopa Regional Trail and the Powerline Multi-use Trail corridors, and provide valuable open space and implementation of the principles within the MAG Desert

Spaces Plan. They also are consistent with the goals and objectives of the City of Apache Junction's and Pinal County's general plan open space elements, and provide opportunities for the District to partner with Apache Junction to manage the basin site. Because of the single basin configuration of Alternative 1, sports field lighting may be more efficient with this alternative. Conversely, Alternative 2 provides the opportunity to separate sports fields and programmed uses into the different basins, as well as design the site to maintain a few dry fields during wet periods by maximizing initial inundation of one basin to keep the second basin dry.

4 CHANNEL ALTERNATIVES

4.1 DESCRIPTION OF CHANNEL ALTERNATIVES

Four alternatives have been developed for the Meridian Road Channel: a rectangular concrete channel, a trapezoidal concrete channel, a trapezoidal earthen channel with a .035 runoff coefficient, and a hybrid alternative consisting of a trapezoidal earthen channel with a .035 runoff coefficient and a vertical concrete wall on one side. The concrete channel alternatives and the selection of the low, .035 runoff coefficient for the two earthen channels were selected to reduce the channel width in order to fit the alternative within the limited 160-foot channel easement with minimal to no acquisition of additional land (it is unknown if additional land may be acquired). Given the concrete and the low runoff coefficients (a .035 "n" value = no shrubs or trees within the channel itself) used for these alternatives, none of these alternatives allow for landscaping within the channel itself. However, in order to evaluate the effect of landscaping within the channel, both of the earthen channel alternatives have been developed with options to utilize a .050 runoff coefficient (a .050 "n" value = limited shrubs and trees within the channel itself). It should be noted that the primary existing and planned future landscape character unit for the channel area is Natural Valley Plain. Non-structural, soft-structural, and semi-soft structural flood protection methods are compatible with the Natural Valley Plain Landscape Character Unit, while Class 4 – Hard Structural with Aesthetic Treatment, Class 5 - Semi-Hard Structural, and Class 6 – Hard Structural flood protection methods are not. Following is a brief summary of the channel alternatives, and their associated compatibility with the character of the area and landscaping.

Alternative 1: Rectangular Concrete Channel

- Class 6 - Hard Structural Flood Protection Method (incompatible with the character of existing and planned future landscape character of the project site)
- 55-foot-wide concrete channel bottom with concrete vertical walls on each side
- 20-foot-wide landscape easement on west side of channel
- 85-foot-wide landscape easement on east side with 16-foot-wide O&M road / Multi-Use Path
- Fits entirely within the existing 160'-wide channel easement.
- No channel landscaping

Alternative 2: Trapezoidal Concrete

- Class 6 - Hard Structural Flood Protection Method (incompatible with character of existing or planned landscape character of the project site)
- 45-foot-wide concrete channel bottom
- 2:1 concrete embankments on both sides
- 20-foot-wide landscape easement on west side of channel

- 55-foot-wide landscape easement on east side with 16-foot-wide O&M road/Multi-Use Path
- Fits entirely within the existing 160-foot-wide channel easement.
- No channel landscaping

Alternative 3: Trapezoidal Earthen Channel

- Class 5 - Semi-Hard Structural Method (incompatible with character of existing and planned landscape character of the project site)
- Earthen channel bottom
- 6:1 earthen embankments
- 20-foot-wide landscape easement on west side of channel
- 50-foot-wide landscape easement on east side with 16' O&M road / Multi-Use Path
- Channel landscaping opportunity
    1. 205-foot-wide channel (n = .035)
        - Additional 115-foot width (7.1 acres) needed for channel easement
        - Hydroseed only (no tall pot trees) in channel
    2. 250-foot-wide channel (n = .050)
        - Additional 160-foot width (9.9 acres) needed for channel easement
        - Hydroseed and tall pot planting in channel

Alternative 4: Hybrid-Trapezoidal Earthen Channel with Vertical Wall on One Side

- Class 5 - Semi-Soft Structural Method - (incompatible with character of existing and planned landscape character of the project site)
- Earthen channel bottom
- concrete wall on west side and a 6:1 earthen embankment on the east side
- 20' wide landscape easement on west side of channel
- 50' wide landscape easement on east side with 16' O&M road / Multi-Use Path
- Channel landscaping opportunity
    1. 155' wide channel (n = .035)
        - Additional 65' width (4.0 acres) needed for channel easement
        - Hydroseed only (no tall pot trees) in channel
    2. 200' wide channel (n = .050)
        - Additional 110' width (6.8 acres) needed for channel easement
        - Hydroseed and tall pot planting in channel

4.2 DESCRIPTION OF LANDSCAPE CONCEPT FOR CHANNEL

Given the limited easement for the channel, that the theme for the project will be a Natural Lower Sonoran Desert, the decision by the District and the City of Mesa that an irrigation system will not be installed as a part of the project, that revegetation and

landscaping will be limited to hydroseeding and tall pot planting, and that landscaping is limited within the channel itself, one landscape concept has been developed for all four channel alternatives. This alternative includes a 20-foot-wide landscape easement between the western boundary of the channel easement/future Meridian Road right-of-way and the top of the channel; and a 50-foot landscape easement on the east side of the channel with a 16-foot meandering O&M road that will also function as a future multi-use path. Both landscape easements will be planted with native tall pot trees (primarily Ironwood and Palo Verde) and hydroseeded with a native seed mix indigenous to the project area. The channel's landscape design concept will be designed to emulate as much of the natural setting and visual characteristics found around the channel site. It will include berms and other topographic features within the landscape easement to visually screen the apparent size of the channel and provide a buffer for the future Meridian Road corridor. Figure 3-1 illustrates this landscape concept as applied to Alternative 4. Should either alternative 3 or alternative 4 be selected utilizing the higher .050 runoff coefficient, additional trees and shrubs (although limited) would be added to the channel side slope.

4.3 EVALUATION OF CHANNEL ALTERNATIVES

Each channel alternative contributes differently to the project scenery resource, recreation, and open space goals and objectives. The following is an analysis of how each alternative meets these goals and objectives and fits within the design evaluation criteria.

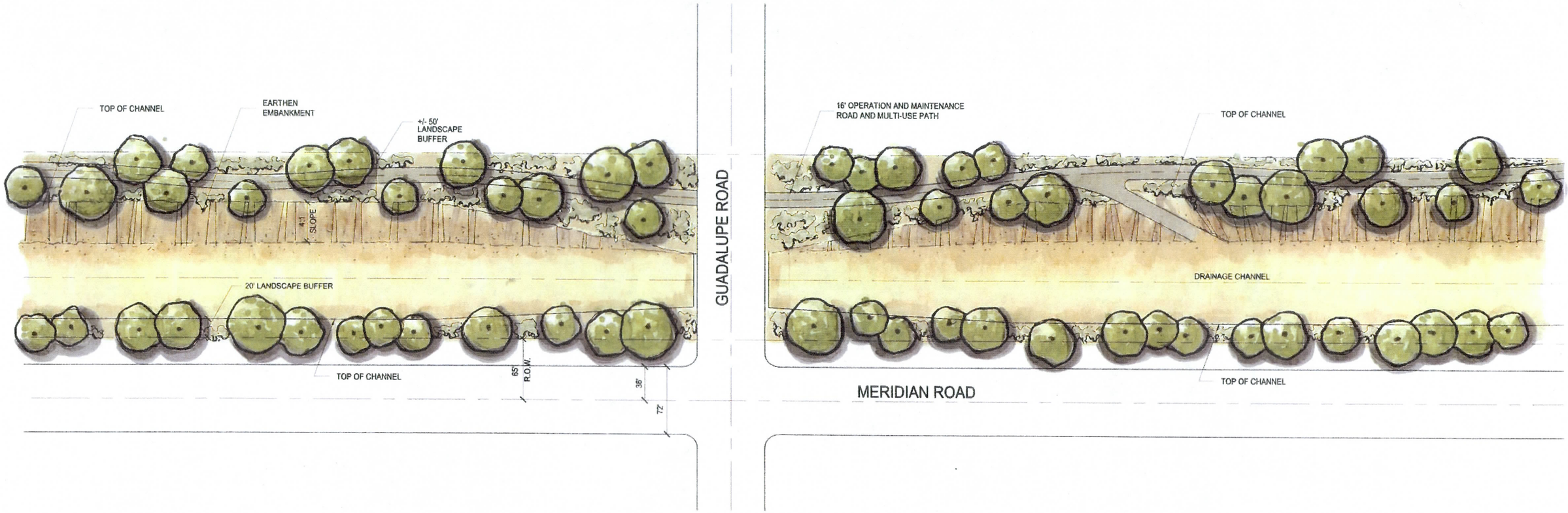
4.3.1 Scenery Resources

It is the District's goal to preserve and complement the visual beauty and aesthetic quality of the natural setting of the site. This can be evaluated by how well each alternative fits within its setting.

The Hard Structural flood protection methods of Alternatives 1 and 2 are incompatible with the existing and planned future landscape character of the project area. These concrete structures do not complement or enhance the aesthetic quality of this Natural Valley Plan, and do not offer landscape opportunities, which could otherwise enhance the quality of the natural setting.

Siphon Draw Drainage Improvements Project

Conceptual Landscape Plan



0 25 50 100

FIGURE 3-1

The Semi-Hard flood protection methods of Alternatives 3 and 4 are also incompatible with the existing and planned future landscape character of the project area, however they are closer to the Semi-Soft flood protection method that would be compatible than the Hard Structural methods of Alternatives 1 and 2. Both Alternatives 3 and 4 offer landscape opportunities which could enhance the quality of the sites natural setting if the higher .050 runoff coefficient were to be selected.

All four alternatives incorporate a Natural Lower Sonoran Desert theme within the landscape easements that contribute to the compatibility of the project with its setting. Additionally, the landscape easement on the west side of the channel could eventually be developed with the landscaping of the Meridian Road right-of-way to enhance the visual character of the project area.

4.3.2 Recreational Opportunities

One of the District's goals is to provide recreational multi-use opportunities with their facilities. Alternatives 1 and 2 were evaluated based on this criteria.

Alternatives 1 and 2 provide an O&M road along the east side of the channel. This road could double as a multi-use path and serve as a recreational trail to link the adjacent communities with each other and the basin site. Alternatives 3 and 4 also offer the same opportunities as Alternatives 1 and 2, however, because of the earthen channel bottom, they also create the additional opportunity for an equestrian trail through the bottom of the channel. In order for the channel to provide this opportunity, the channel drop structures must be designed to accommodate equestrian access along across them. Additionally, The District's agreement with Arizona State Land Department (ASLD) for the channel easement only allows for flood control use of the easement. Apache Junction or another entity must enter into a separate agreement with ASLD for the channel corridor to be used as a recreational easement.

4.3.3 Costs

The estimated cost of landscaping the channel is minor in comparison to the over-all cost of the channel. Landscape costs alone for Alternative 3 (the alternative with the highest estimated landscape costs) contribute to less than 18 percent of the total estimated construction cost of the channel. (see Table below).

Preliminary Cost Estimate for Channel Alternatives Landscape and Aesthetic Treatment

CHANNEL ALTERNATIVES	Additional Easement Required	70' Landscape Buffer	Channel Hydroseeding	Channel Tall Pot Planting (100 total)	TOTAL LANDSCAPE COST	TOTAL CHANNEL COST	LANDSCAPE PLUS CHANNEL COSTS	% OF LANDSCAPE COST TO TOTAL COST
ALTERNATIVE 1	$0	$24,222	$0	$0	$24,222	$5,140,000	$5,164,222	0.5%
ALTERNATIVE 2	$0	$24,222	$0	$0	$24,222	$1,611,400	$1,635,622	1.5%
ALTERNATIVE 3, N=.035	$356,500	$24,222	$21,655	$0	$402,377	$1,882,240	$2,284,617	17.6%
ALTERNATIVE 3, N=.050	$495,000	$24,222	$30,195	$10,000	$559,417			
ALTERNATIVE 4, N=.035	$201,500	$24,222	$12,200	$0	$237,922	$2,897,250	$3,135,172	7.6%
ALTERNATIVE 4, N=.050	$340,000	$24,222	$20,740	$10,000	$394,962			

The estimated landscaping costs for Alternatives 1 and 2 are lowest, at 0.5 percent and 1.5 percent of the total cost (landscape costs plus channel costs) respectively. This is due primarily because there is no landscape within the channel. The estimated landscaping costs of Alternatives 3 and 4 are higher due to the landscape treatment within the channel. Landscape treatment for Alternative 3 is most costly (at 17.6 percent of total cost) due to landscape treatments on both embankments. Landscape treatment for Alternative 4 is at 7.6 percent of the Project's total cost. The landscape treatment is covering only the eastern embankment and the channel bottom. The following table illustrates the estimated landscape costs associated with each alternative.

Preliminary Cost Estimate for Channel Alternatives Landscape and Aesthetic Treatment

CHANNEL ALTERNATIVES	Additional Easement Required	70' Landscape Buffer	Channel Hydroseeding	Channel Tall Pot Planting (100 total)	TOTAL LANDSCAPE COST
ALTERNATIVE 1	$0	$24,222	$0	$0	**$24,222**
ALTERNATIVE 2	$0	$24,222	$0	$0	**$24,222**
ALTERNATIVE 3 (N=.035)	$356,500	$24,222	$21,655	$0	**$402,377**
ALTERNATIVE 3 (N=.050)	$495,000	$24,222	$30,195	$10,000	**$559,417**
ALTERNATIVE 4 (N=.035)	$201,500	$24,222	$12,200	$0	**$237,922**
ALTERNATIVE 4 (N=.050)	$340,000	$24,222	$20,740	$10,000	**$394,962**

APPENDIX F

AMEC Earth & Environmental