MASTER DRAINAGE REPORT
FOR
DEVELOPMENT UNIT 5 EAST
AT
EASTMARK

April 24, 2014
WP# 144173

REVIEWED BY
CITY STAFF
BY
5/1/14 DATE

WOOD/PATEL
MISSION: CLIENT SERVICE™

MASTER DRAINAGE REPORT
FOR
DEVELOPMENT UNIT 5 EAST
AT
EASTMARK

April 24, 2014
WP# 144173

DMB® Master Developer Approval EASTMARK.

_____ Date _____

_____

_____

Submitted to:

City of Mesa
55 North Center Street
P.O. Box 1466
Mesa, Arizona 85211-1466
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Prepared for:

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Registered Professional Engineer (Civil)
CERTIFICATE NO.
53408
DANIEL W.
MATTHEWS
Date Signed 04-24-14
ARIZONA, U.S.A.

EXPIRES 06-30-2015

WOOD/PATEL
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EXPIRES 06-30-2015

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EXPIRES 06-30-2015

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1.0 INTRODUCTION

1.1 General Background and Project Location

The proposed Development Unit 5 East (DU 5E) is anticipated to be an approximate 82-acre Development Unit (DU) within the 3,151-acre Eastmark master planned community in the City of Mesa, Arizona (City). It is a Planned Community District (PCD) which is a mixed-use development that will include single-family residential, multi-family residential, urban mixed-use, commercial mixed-use, industrial, office, hotel, resort, golf, various community uses, and open spaces.

This Master Drainage Report has been prepared in accordance with Wood, Patel & Associates, Inc.'s (Wood/Patel's) understanding of the City and the Flood Control District of Maricopa County (FCDMC) drainage requirements.

The Site is located within a portion of Section 14 of Township 1 South, Range 7 East, of the Gila and Salt River Meridian. The Site is bounded by Elliot Road to the north, future Development Unit 6 North on the east, and future Development Unit 5 on the south and west (refer to Plate 1 – *Vicinity Map*).

The Site consists of multiple automotive test tracks and undisturbed desert. The Site was previously used by General Motors as a desert automobile testing facility. The majority of the Site is surrounded by automotive test tracks and/or undisturbed desert along the eastern, western, and southern boundaries. The northern boundary is bordered by Elliot Road, an existing detention basin, and undeveloped desert. The Powerline Floodway is a major FCDMC facility that provides conveyance of discharge from the Powerline Flood Retarding Structures, approximately three miles east of the Site, and drainage conveyance for stormwater runoff for areas adjacent to the channel. Ultimately, the flow is conveyed to the East Maricopa Floodway (EMF) west of the Site.

1.2 Scope of the DU 5E Master Drainage Report

The DU 5E Master Drainage Report was prepared to support the development of approximately 82 acres of industrial land use. The drainage analysis is consistent with procedures and standards of the City of Mesa and the Flood Control District of Maricopa County. The proposed drainage plan provides an outline for the required major drainage

facilities for storage and conveyance of storm water runoff for the development of DU 5E at Eastmark. Updates to the Master Drainage Report may be required if significant changes are made to the land uses and assumptions utilized to prepare this report.

1.3 Construction Phasing

It is anticipated that construction of the DU 5E drainage infrastructure will be constructed simultaneously; therefore, there are no individual phases.

2.0 DESCRIPTION OF STUDY AREA

2.1 Existing Soil Conditions

According to the Natural Resources Conservation Service's Soil Survey, Eastmark is located within the Aguila-Carefree soil survey area. The majority of the surface soils onsite are classified as sandy loam, clay loam, or loam. Refer to Plate 2 – *Soils Map* and Appendix A – *Proposed Condition Data and Hydrology* for information pertaining to existing soil conditions.

2.2 Rainfall Seasons

There are two distinct rainfall seasons associated with the desert southwest corresponding to the project area. The first season occurs during the winter months, from November to March, when the area is subjected to occasional storms from the Pacific Ocean. While classified as a rainfall season, there can be long periods where there can be little or no precipitation. Generally, storms occurring during the winter rainfall season are classified as being long-duration, low-intensity storms.

The second rainfall period occurs during the summer months, from June through August, and is commonly referred to as the Monsoon Season. During this season, Arizona is subjected to widespread thunderstorm activity, whose moisture supply originates both in the Gulf of Mexico and along Mexico's west coast. These thunderstorms are typically classified as being short-duration, high-intensity storms, with extreme variability per location.

2.3 FEMA Flood Insurance Rate Map (FIRM)

The Maricopa County, Arizona and Incorporated Areas Flood Insurance Rate Map (FIRM) Panel Number 04013C2760L indicates area beyond the eastern map boundary is within Zone "D". The FEMA website indicates this area is within the Maricopa County, Arizona and Incorporated Areas Flood Insurance Rate Map (FIRM) Panel Number 04013C2780L. The FEMA website shows the panel as not printed and does not indicate a flood zone designation. Based on the Zone "D" markings on Panel Number 04013C2760L, and previously-mapped Panel Number 04013CIND0A, dated September 30, 2005, DU 5E lies within Panel Number 04013C2780L, and is believed to be within a FEMA Zone "D".

Zone "D" is defined by FEMA as follows:

"Areas in which flood hazards are undetermined."

Refer to Plate 3 – *Flood Insurance Rate Map* for an illustration.

2.4 Section 404 Jurisdictional Areas

A Jurisdictional Delineation has been completed by the U.S. Army Corps of Engineers (Corps) for Eastmark. A portion of the Powerline Floodway Channel and a small wash have been designated as Jurisdictional, and lie south of the DU 5E boundary. Refer to Plate 4 – *Section 404 Jurisdictional Delineation Map* for the locations of Jurisdictional areas. There are no proposed disturbances within DU 5E.

2.5 Master Drainage Report Update for Eastmark

The *Master Drainage Report Update for Eastmark*, prepared by Wood/Patel and dated December 16, 2013, was approved by the City of Mesa. The *Master Drainage Report Update for Eastmark*, prepared by Wood/Patel and dated April 15, 2014 was submitted to the City of Mesa for review and re-approval to incorporate development changes for DU 3/4. Additionally, the *Master Drainage Report Update for Eastmark*, prepared by Wood/Patel and dated April 24, 2014, was submitted to the City of Mesa for review and re-approval to incorporate development changes for DU 5E, and has set the drainage criteria for the Site. The report includes a pre-developed condition HEC-1 model (MGPEX.DAT), as well as a full build-out model (EMDU5E.DAT), which are modified versions of the current flood control district area drainage master plan models. The East Mesa Area Drainage Master Plan (ADMP), prepared in 1998 by Dibble & Associates, Inc. and Hoskin Ryan Consultants, Inc., is a regional drainage study prepared for the FCDMC.

Eastmark is located in the eastern portion of the study, which is bound by the Flood Retarding Structure (FRS) in Pinal County to the east and the EMF to the west. In general, the area drains northeast to southwest, and outlets into the EMF. The ADMP sets the regional drainage constraints for facilities within the study area of Eastmark. The full build-out model was utilized to verify the development of Eastmark does not negatively impact any drainage infrastructure downstream.

3.0 EXISTING DRAINAGE CONDITION

3.1 Existing Drainage Plan

The Site generally slopes in a southwesterly direction at approximately 0.5 to 1 percent. The peak elevation within the Site is 1,447 feet mean sea level (MSL), located at the northeast corner of the Site. The lowest elevation within the Site is approximately 1,432 feet MSL, located at the southwest corner of the Site. The Site is covered with typical Sonoran Desert vegetation, including mesquite trees, saguaro cactus, creosote, etc.

The pre-developed Eastmark hydrology was made up of one sub-basin which drains west to southwest into Ellsworth Road and the Powerline Floodway. This has been modeled accordingly within the current 100-year, 24-hour FCDMC model and the Master Drainage Report model. DU 5E is made up of one sub-basin which drains west to southwest to another portion of DU 5, which is currently undeveloped. Proposed 100-year, 24-hour retention for DU 5E will decrease the runoff volume and peak flow produced on the Site.

3.1.1 Northern Boundary

Currently, runoff along the northern boundary is collected within a large diameter storm drain system south of Elliot Road. The storm drain begins approximately 250 feet east of DU 5E. The storm drain is the outlet for two (2) existing drainage channels. The first channel extends north to an existing wash from Elliot Road. The channel collects runoff from the wash and a portion discharges into the Elliot Road storm drain. The second channel extends east from an existing depressed drainage catchment at the beginning of the storm drain to the existing industrial building site west of Signal Butte Road, and collects roadway storm water runoff. It is Wood/Patel's understanding the industrial building site retains Elliot Road half-street runoff adjacent to that property.

The Elliot Storm Drain has existing 18-inch plugged laterals extending north toward Elliot Road. These storm drain laterals were installed to convey future storm water runoff from Elliot Road when full-street improvements are constructed. The existing large-diameter storm drain does not allow for future storm drain crossings from Elliot Road to Eastmark; therefore, retention for the

south half-street of Elliot Road is not required for the adjacent portions of Eastmark, including DU 5E, since flow was accounted for with the design and sizing of the storm drain. Additionally, an existing detention basin, located north of Elliot Road, detains runoff from offsite washes.

3.1.2 Eastern Boundary

An existing industrial site at the southwest corner of Signal Butte Road and Elliot Road self-retains for the 100-year, 2-hour storm event. During the 100-year, 24-hour storm event, flow in excess of the existing retention capacity will overtop to the undeveloped land to the west, and east of DU 5E. The undeveloped land includes raised berms and depressions that self-retain a portion of the storm water runoff. Storm water that is not retained drains west and impacts the eastern boundary of DU 5E. A temporary berm and/or swale is required to collect the offsite flow and divert it south and then west around DU 5E, until the area to the east is developed with retention.

A large depressed area on the north end of DU 5E is bisected by the eastern boundary. The depression shall be filled with the development of DU 5E to allow the area to drain within 36 hours for vector control, to meet Maricopa County and City of Mesa drainage requirements.

3.1.3 Western Boundary

The western boundary is not impacted by any offsite flows entering the Site.

3.1.4 Southern Boundary

A portion of the southern boundary is impacted by offsite flow southeast of DU 5E. A temporary berm and/or swale is required to collect the offsite flow and divert it west around DU 5E until the area to the south and east is developed with retention.

4.0 PROPOSED DRAINAGE CONDITION

4.1 Proposed Drainage Plan

The drainage concept for DU 5E is to route offsite flows around the Site and direct onsite storm water runoff to retention basins for storage. Offsite runoff impacting the eastern and southern boundaries will be collected and conveyed with proposed temporary berms and/or swales to the west and discharged to the existing undeveloped land within Eastmark, southwest of DU 5E. Onsite retention basins shall be sized to store runoff from the 100-year, 24-hour storm event utilizing a precipitation depth equal to 3.51 inches or greater, in accordance with NOAA Atlas 14 to maintain peak flows and runoff volumes leaving the Eastmark at or below pre-development levels.

Onsite runoff will be collected in roadways for overland flow conveyance to localized retention basins. Where street capacities are exceeded, vertical curb and/or underground storm drain systems or roadside channels may be utilized to convey the excess runoff. Refer to Plate 5 – *Interim Condition HEC-1 Schematic* for watershed delineations and locations.

Emergency overflow routes must be provided in the event that retention basin capacities are exceeded due to a storm larger than the design event or back-to-back storms. Retention basins shall be designed to drain retained runoff within 36 hours after a storm event. Land uses depicted in the hydrologic models are conceptual and subject to change, based on the allowable criteria for a PCD.

In all locations, lowest floor elevations shall be set a minimum of 1 foot above the emergency overflow elevation, or any 100-year water surface elevation adjacent the Site, whichever is greater.

4.2 Proposed Condition Hydrology

An interim condition HEC-1 model (DU5EINT.DAT) was created to assess the impact of the developed DU 5E to the downstream drainage infrastructure. The model was created based upon the most current post developed condition model. The undeveloped watersheds within Eastmark and outside DU 5E were modeled with a low-density employment land use to represent an automotive proving ground, per the FCDMC's

DDMSW program, with exception to DU 5E and previously master planned DUs that have been developed, are under construction, or in the permitting process. Those areas, including a portion of DU 6N, DU 7, DU 3S, DU 3/4, DU 8, and DU 9, were modeled with post-developed land uses. Retention from these developed areas was included within the model.

EXISTING CONDITION		INTERIM CONDITION		FULL BUILD-OUT CONDITION	
Location ID	Discharge	Location ID	Discharge	Location ID	Discharge
CP 75	661cfs	CP75	633 cfs	CP75	631 cfs
79A1	90 cfs	RET17	0 cfs	RET17	0 cfs
79A2	225 cfs	CP19A	61 cfs	CP19A	61 cfs
79A3	156 cfs	RET19	81 cfs	RET19	81 cfs
C79B1	1,090 cfs	78CT79	935 cfs	78CT79	935 cfs

4.3 Proposed Hydraulics

4.3.1 Street Hydraulics

Arterials and major collectors shall be designed to convey the peak flows generated by a 10-year peak storm within the roadway infrastructure, with a spread limited to 1 traffic lane in each direction. All other public roadways shall be designed to convey the peak flows generated by a 10-year peak storm between the curbs. All roadways shall be designed to convey the 100-year storm within the right-of-way and adjacent parkway. Where the peak flows exceed the capacity of the public street to convey the peak flows, storm drains or other drainage facilities shall be installed and sized to carry the excess flows (i.e. when the 10-year peak exceeds the spread criteria or exceeds the curb capacity of the public street, or when the right-of-way cannot convey the 100-year peak flow). Storm drain and/or channel systems will convey storm water runoff to retention basins located throughout the Site.

4.4 Retention

4.4.1 Retention Storage

The 100-year, 24-hour required retention volume for DU 5E is estimated to be 23 acre-feet, based on conceptual land use. The retention volume has been included in the HEC-1 model. If actual land uses and required retention volumes vary from this report, updates to this report may be required to analyze impacts to downstream drainage infrastructure.

Refer to *Table 5 – Interim Condition Onsite Retention Volume Summary* within Appendix A for a detailed summary of required retention volumes. The proposed retention volumes are based on a 100-year, 24-hour precipitation depth of 3.51 inches obtained from NOAA Atlas 14 Precipitation Frequency Data. Retention basins will be required to dissipate storm water within 36 hours.

4.4.2 Stormwater Quality

The required retention storage volume for the Site exceeds the first flush requirement of storing the first one-half inch of runoff. All runoff will have settlement time within retention basins prior to draining by percolation, drywells, release into natural watercourses, and/or release into existing storm drain systems.

4.5 Maintenance

Ongoing maintenance of the designed or recommended drainage systems will be required to preserve the design integrity and purpose of the drainage system. Failure to provide maintenance can prevent the drainage system from performing to its intended design purpose, and can result in reduced performance. Maintenance is the responsibility of private developers and owners associations for facilities on private property within all easements and private streets, except for drainage structures within public rights-of-way accepted by the City of Mesa for maintenance. Ownership and maintenance responsibilities will be associated with developments discharging to retention facilities and will be managed by the owners associations established for the Site. A regular maintenance program is required to have drainage systems perform to the level of protection or service as presented in this report.

5.0 CONCLUSIONS

Based on the analysis of the *Master Drainage Report for Development Unit 5E at Eastmark*, the following conclusions can be made:

1. This *Master Drainage Report for Development Unit 5E at Eastmark* is prepared in accordance with Wood, Patel & Associates, Inc.'s understanding of the drainage parameters set by the Flood Control District of Maricopa County, the City of Mesa, and the *Master Drainage Report for Eastmark*.

2. Offsite flows shall be conveyed around the Site adequately, per jurisdictional requirements. FCDMC may require a review of this *DU 5E Master Drainage Report*.

3. Peak flows and runoff volumes for the proposed condition 100-year, 24-hour storm shall not negatively impact downstream drainage infrastructure.

4. Temporary offsite collection and conveyance shall be provided for runoff generated by the 100-year, 24-hour storm event for tributary areas along the eastern and southern boundaries.

5. Onsite retention shall be provided to retain runoff generated by the 100-year, 24-hour storm event for developed areas within DU 5E.

6. Flow in excess of onsite storage capacity shall outfall to emergency overflow routes.

7. Lowest floor elevations shall be set a minimum of 1 foot above the adjacent 100-year water surface elevation or emergency outfall water surface elevation, whichever is greater.

8. Drainage infrastructure will be designed in accordance with the appropriate criteria, per the City of Mesa and/or Flood Control District of Maricopa County.

9. Ongoing maintenance is required for all drainage systems in order to assure design performance.

6.0 REFERENCES

1. *Master Drainage Report Update for Eastmark*, Wood, Patel and Associates, Inc., December 13, 2013.

2. *Master Drainage Report Update for Eastmark*, Wood, Patel and Associates, Inc., February 2, 2013.

3. *Drainage Design Manual for Maricopa, County, Arizona, Volumes 1 Hydrology*, Flood Control District of Maricopa County, August 15, 2013.

4. *Drainage Design Manual for Maricopa County, Arizona, Volume 2 Hydraulics*, Flood Control District of Maricopa County, August 15, 2013.

5. *Drainage Policies and Standards for Maricopa County*, Arizona, Flood Control District of Maricopa County, Draft January 2013.

6. *2012 Engineering & Design Standards*, City of Mesa, 2012.

7. *Flood Insurance Rate Map 04013C2760L*, Federal Emergency Management Agency (FEMA), October 16, 2013.

8. *HEC-1 Flood Hydrograph Package*, U.S. Army Corps of Engineers, June 1998.

9. *Master Drainage Report Update for Eastmark*, Wood, Patel and Associates, Inc., April 15, 2014.

10. *Master Drainage Report Update for Eastmark*, Wood, Patel and Associates, Inc., April 24, 2014.

APPENDIX A

Interim Condition Data and Hydrology

Hydrology Interim Condition

100-Year, 24-Hour HEC-1 Output

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*          VERSION 4.1              *
*                                   *
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*                                *
*   U.S. ARMY CORPS OF ENGINEERS *
*   HYDROLOGIC ENGINEERING CENTER*
*        609 SECOND STREET       *
*      DAVIS, CALIFORNIA 95616   *
*          (916) 756-1104        *
*                                *
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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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108          ID       DANIEL MATTHEWS, P.E.
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145          ID       PROJECT: MESA PROVING GROUNDS
146          ID
147          ID       THIS MODEL SHOULD REPLACE WS4-SEM.DAT IN THE HEC-1 RUN SEQUENCE SPECIFIE
148          ID       BELOW.  REFERENCING WS2-NEM.DSS IS STILL REQUIRED.
149          ID
150          ID       THIS IS A POST DEVELOPED MODEL REVISION TO REFLECT UPDATED PLANNING
151          ID       FOR DEVELOPMENT UNIT 7 (DU7)PROVIDED BY ARIZONA LAND DESIGN ON 09/02/201
152          ID       09/02/2011.
153          ID
154          ID       MODEL REVISION DESCRIPTION:
155          ID
156          ID       THIS MODEL IS AN EXERPT OF THE MODEL PROVIDED BY THE FLOOD CONTROL
157          ID       DISTRICT OF MARICOPA COUNTY (WS4-SEM.DAT).  ONSITE WATERSHEDS WERE
158          ID       UPDATED TO REFLECT A GRADING PLAN PROVIDED BY LD TEAM ON 8/30/2011.
159          ID       MODELING OF THE POWERLINE FLOODWAY HAS BEEN UPDATED TO REFLECT THE
160          ID       EXISTING SECTIONS AND SLOPE PER AS-BUILT DRAWINGS ACROSS THE MPG
161          ID       SITE.
162          ID
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 163          ID        MODEL REVISED BY:
 164          ID        WOOD, PATEL & ASSOCIATES, INC.
 165          ID        DANIEL W. MATTHEWS, E.I.T.
1                                    HEC-1 INPUT                                    PAGE  4

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

 166          ID
 167          ID        FILE PATH:
 168          ID        R:\MESA PROVING GROUNDS\2011\113697\PROJECT SUPPORT\REPORTS\
 169          ID        DRAINAGE\HYDROLOGY\MPGDU7.DAT
 170          ID
 171          ID
 172          ID   **************************************************************************
 173          ID
 174          ID        FILE: MPG20RT2.DAT
 175          ID
 176          ID        MODEL REVISED: 04-25-2011
 177          ID
 178          ID        PROJECT: MESA PROVING GROUNDS
 179          ID
 180          ID        THIS MODEL SHOULD REPLACE WS4-SEM.DAT IN THE HEC-1 RUN SEQUENCE SPECIFIE
 181          ID        BELOW.  REFERENCING WS2-NEM.DSS IS STILL REQUIRED.
 182          ID
 183          ID        THIS IS A 100-YEAR, 2-HOUR RETENTION SCENARIO MODEL USING
 184          ID        THE 20MSF COMMERCIAL SPACE AND 15K DU LAND PLAN PROVIDED
 185          ID        BY SWABACK PARTNERS ON 12/12/07.
 186          ID
 187          ID        MODEL REVISION DESCRIPTION:
 188          ID
 189          ID        THIS MODEL IS AN EXERPT OF THE MODEL PROVIDED BY THE FLOOD CONTROL
 190          ID        DISTRICT OF MARICOPA COUNTY (WS4-SEM.DAT).  ONSITE WATERSHEDS 01 AND
 191          ID        20 WERE UPDATED TO REFLECT THE INCORPORATION OF THE FIRST SOLAR SITE
 192          ID        IN THE NORTHEAST CORNER OF DU-6.  WATERSHED 02 WAS SPLIT INTO 02A AND
 193          ID        02B.  LAND USE WAS CHANGED TO INDUSTRIAL FOR 02B AND ENTIRELEY
 194          ID        RESIDENTIAL FOR 02A.
 195          ID        THE FIRST SOLAR SITE RUNOFF WILL NOW BE RETAINED ENTIRELY ONSITE.
 196          ID
 197          ID        MODEL REVISED BY:
 198          ID        WOOD, PATEL & ASSOCIATES, INC.
 199          ID        STEPHEN M. SCINTO, P.E.
 200          ID
 201          ID        FILE PATH:
 202          ID        R:\MESA PROVING GROUNDS\2010\103564.04\PROJECT SUPPORT\REPORTS\
 203          ID        DRAINAGE\HYDROLOGY\POST-DEVELOPED 100YR2HR RETENTION MODEL\
 204          ID        MPG20RT2.DAT
 205          ID
 206          ID   **************************************************************************
 207          ID
 208          ID        FILE: MPG20RT2.DAT
 209          ID
 210          ID        MODEL REVISED: 09-16-08
 211          ID
 212          ID        PROJECT: MESA PROVING GROUNDS
 213          ID
 214          ID        THIS MODEL SHOULD REPLACE WS4-SEM.DAT IN THE HEC-1 RUN SEQUENCE SPECIFIE
 215          ID        BELOW.  REFERENCING WS2-NEM.DSS IS STILL REQUIRED.
 216          ID
 217          ID        THIS IS A 100-YEAR, 2-HOUR RETENTION SCENARIO MODEL USING
 218          ID        THE 20MSF COMMERCIAL SPACE AND 15K DU LAND PLAN PROVIDED
 219          ID        BY SWABACK PARTNERS ON 12/12/07.
 220          ID
1                                    HEC-1 INPUT                                    PAGE  5

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

 221          ID        MODEL REVISION DESCRIPTION:
 222          ID
 223          ID        THIS MODEL IS AN EXERPT OF THE MODEL PROVIDED BY THE FLOOD CONTROL
 224          ID        DISTRICT OF MARICOPA COUNTY (WS4-SEM.DAT).  ONSITE WATERSHEDS 01, 02,
 225          ID        03, AND 06 WERE UPDATED TO REFLECT THE CURRENT GOLF COURSE
 226          ID        CONFIGURATION.
 227          ID
 228          ID        MODEL REVISED BY:
 229          ID        WOOD, PATEL & ASSOCIATES, INC.
 230          ID        DANIEL W. MATTHEWS, E.I.T.
 231          ID
 232          ID        FILE PATH:
 233          ID        R:\MESA PROVING GROUNDS\2006\062753\PROJECT SUPPORT\HYDRO\MDR-20-15 LAND
 234          ID        PLAN\2ND SUBMITTAL(COM)\HYDROLOGY\MPG20RT2.DAT
 235          ID
 236          ID   **************************************************************************
 237          ID
 238          ID        FILE: MPG20RT2.DAT
 239          ID
 240          ID        MODEL REVISED: 05-15-08
 241          ID
 242          ID        PROJECT: MESA PROVING GROUNDS
 243          ID
 244          ID        MODEL REVISION DESCRIPTION:
 245          ID
 246          ID        THIS MODEL SHOULD REPLACE WS4-SEM.DAT IN THE HEC-1 RUN SEQUENCE SPECIFIE
 247          ID        BELOW.  REFERENCING WS2-NEM.DSS IS STILL REQUIRED.
 248          ID
 249          ID
 250          ID        THIS IS A 100-YEAR, 2-HOUR RETENTION SCENARIO MODEL USING
 251          ID        THE 20MSF COMMERCIAL SPACE AND 15K DU LAND PLAN PROVIDED
 252          ID        BY SWABACK PARTNERS ON 12/12/07.
 253          ID
 254          ID
 255          ID        THIS MODEL IS AN EXERPT OF THE MODEL PROVIDED BY THE FLOOD CONTROL
 256          ID        DISTRICT OF MARICOPA COUNTY (WS4-SEM.DAT).  WATERSHED 79A WAS UPDATED
 257          ID        AS REQUESTED BY FLOOD CONTROL DISTRICT OF MARICOPA COUNTY TO REDUCE THE
 258          ID        PERCENT IMPERVIOUS VALUE FROM 80% TO 0% TO MATCH THE LAND USE AS MODELED
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          259          ID        WITHIN THE EAST MESA ADMP.
          260          ID
          261          ID        MODEL REVISED BY:
          262          ID        WOOD, PATEL & ASSOCIATES, INC.
          263          ID        DANIEL W. MATTHEWS, E.I.T.
          264          ID
          265          ID        FILE PATH:
          266          ID        R:\MESA PROVING GROUNDS\2006\062753\PROJECT SUPPORT\HYDRO\MDR-20-15 LAND
          267          ID        PLAN\2ND SUBMITTAL\POST-DEVELOPED 100YR2HR RETENTION MODEL (MPG20RT2)\
          268          ID        MPG20RT2.DAT
          269          ID
          270          ID   **********************************************************************
          271          ID
          272          ID        FILE: MPG20RT2.DAT
          273          ID
          274          ID        MODEL REVISED: 01-08-08
          275          ID
1                                                  HEC-1 INPUT                                  PAGE  6

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

          276          ID        PROJECT: MESA PROVING GROUNDS
          277          ID
          278          ID        MODEL REVISION DESCRIPTION:
          279          ID
          280          ID        THIS MODEL SHOULD REPLACE WS4-SEM.DAT IN THE HEC-1 RUN SEQUENCE SPECIFIE
          281          ID        BELOW.  REFERENCING WS2-NEM.DSS IS STILL REQUIRED.
          282          ID
          283          ID
          284          ID        THIS IS A 100-YEAR, 2-HOUR RETENTION SCENARIO MODEL USING
          285          ID        THE 20MSF COMMERCIAL SPACE AND 15K DU LAND PLAN PROVIDED
          286          ID        BY SWABACK PARTNERS ON 12/12/07.
          287          ID
          288          ID
          289          ID        THIS MODEL IS AN EXERPT OF THE MODEL PROVIDED BY THE FLOOD CONTROL
          290          ID        DISTRICT OF MARICOPA COUNTY (WS4-SEM.DAT).  WATERSHEDS 68A, 68B,
          291          ID        70A, 70B, 71, 73B, 73C, 74B, 74C, 75, 77B, 77C, 78B, 78C, AND 79A
          292          ID        HAVE ALL BEEN UPDATED TO REFLECT CURRENT WATERSHED DELINEATIONS,
          293          ID        NEW DEVELOPMENT, CURRENT RETENTION,AND FLOOD ROUTING.  BASIN 75
          294          ID        HAS BEEN UPDATED TO REFLECT PLANNED DEVELOPEMENT FOR THE MESA
          295          ID        PROVING GROUNDS SITE.
          296          ID
          297          ID        MODEL REVISED BY:
          298          ID        WOOD, PATEL & ASSOCIATES, INC.
          299          ID        DANIEL W. MATTHEWS, E.I.T.
          300          ID
          301          ID        FILE PATH:
          302          ID        R:\MESA PROVING GROUNDS\2006\062753\PROJECT SUPPORT\HYDRO\MDR-20-15 LAND
          303          ID        PLAN\HYDROLOGY\POST-DEVELOPED 100YR2HR RETENTION MODEL (MPG20RT2)\
          304          ID        MPG20RT2.DAT
          305          ID
          306          ID   **********************************************************************
          307          ID
          308          ID
          309          ID    ID  Kirkham Michael:
          310          ID    Last Revised Date:  1/22/03
          311          ID    Filename:  WS4-SEM.DAT
          312          ID
          313          ID    Comments Dated 1/22/03 (CJ)
          314          ID
          315          ID    This model should be used ONLY for the Rittenhouse and Chandler Heights
          316          ID    Basin Design Project - Final Design Analyses.
          317          ID
          318          ID    This model is one of several models that represent the EMF watershed.
          319          ID    This model covers the Southeast Mesa Area and should reference as a DSS
          320          ID    the watershed model for the Northeast Mesa Area (Filename WS2-NEM.DAT).
          321          ID
          322          ID    This model is necessary to determine the input hydrographs for the
          323          ID    Rittenhouse Basin Design HEC-RAS Unsteady State analysis.  To develop
          324          ID    the necessary input hydrographs the following models should be run in order.
          325          ID    Because the files utilize a TAPE21 file to export import hydrographs
          326          ID    between models, prior to running the FIRST model (WS1-NWM.DAT) any existing
          327          ID    TAPE21 file in the directory should be deleted.  The run procedure order is:
          328          ID
          329          ID         1)  WS1-NWM.DAT
          330          ID         2)  WS2-NEM.DAT
1                                                  HEC-1 INPUT                                  PAGE  7

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

          331          ID         3)  WS3-QCSW.DAT
          332          ID         4)  WS4-SEM.DAT (referencing WS2-NEM.DSS for the DSS file)
          333          ID         5)  RT1-BASE.DAT
          334          ID
          335          ID    The necessary input hydrographs for the Rittenhouse Basin analysis
          336          ID    are determined in RT1-BASE.  In that output file, the hydrograph at
          337          ID    RWFLD1 should be exported and used as the input hydrograph at the
          338          ID    EMF Reach 4 Cross Section 17.082.  And the hydrograph at RITTEN should
          339          ID    be exported and used as the input hydrograph for the Rittenhouse Main
          340          ID    Channel at Cross Section 820.00
          341          ID
          342          ID
          343          ID    **********************************************************************
          344          ID    **** NOTE BY PRIMATECH ENGINEERS:                                 ****
          345          ID    **** DATE: 06/12/2001                                             ****
          346          ID    **** THE NEW FILE NAME IS: SEBTALT2.DAT                           ****
          347          ID    **** THE FILE WAS RENAMED AS <<RTBTALT2.DAT>> FOR THE EAST MARICOPA ****
          348          ID    **** FLOODWAY CAPACITY MITIGATION PROJECT, BY FLOOD CONTROL DISTRICT OF ****
          349          ID    **** MARICOPA COUNTY.                                             ****
          350          ID    **** THE FILE WAS RENAMED <<RTBTALT3.DAT>> AND UPDATED USING GREEN AND ****
          351          ID    **** AMPT FUTURE CONDITIONS FOR BASINS 250 TO 268.                ****
          352          ID    **********************************************************************
          353          ID
          354          ID
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                ID
                ID     THIS MODEL WAS ORIGINALLY MIDDOUT.DAT
                ID     IT HAS BEEN MODIFIED BY CPE (7/2000)
                ID     FOR ALTERNATIVE 2 FOR THE EAST MARICOPA FLOODWAY
                ID     CAPACITY MITIGATION AND MULTI-USE CORRIDOR STUDY
                ID     TO ROUTE BOTH THE POWERLINE FLOODWAY
                ID     AND THE SANTAN FREEWAY CHANNEL INTO THE RAY BASIN PRIOR THEIR OUTFALL
                ID     INTO THE EMF
                ID
                ID    ***************************************************************
                ID
                ID          Model files changed by Collins/Pina Engineering
                ID          to reflect multi-use design concepts (recreation
                ID          and environment) proposed throughout the entire
                ID          EMF Corridor.    July 2000
                ID
                ID
                ID     VERSION 8.06  CPE 7/31/00
                ID
                ID    ********************************************************************************
                ID
                ID
                ID    ********************************************************************************
                ID     FILENAME: MIDDOUT.DAT
                ID
                ID     ALL CIP INFRASTRUCTURE IS IN PLACE, FUTURE CONDITIONS LANDUSE IS IN PLACE
                ID     FLOW IS ROUTED UP ELLSWORTH ROAD IN A EARTH LINED CHANNEL
                ID
                ID    ********************************************************************************
                ID     PRODUCED BY DIBBLE AND ASSOCIATES AND HOSKIN ENGINEERING CONSULTANTS.
                ID     File Name: Final8.Dat
1                                        HEC-1 INPUT                                        PAGE  8

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

                ID     Revised - Jan. 2000 by SZ (Wood/Patel) From Final7.dat - new 2-V & Sideweir
                ID     Revised - Jan. 2000 by SZ (Wood/Patel) from Final6.dat - 60% review comments
                ID     Revised - Dec. 1999 by SZ (Wood/Patel) from Final5.dat
                ID     Revised - Dec. 1999 by SZ (Wood/Patel) from Final4.dat
                ID     Revised - Nov. 1999 by SZ (Wood/Patel) from Final3.dat
                ID     Revised - June 1999 by SZ (Wood/Patel) for Final Model from Opt1.dat.
                ID     Revised - May 1999 by SZ (Wood/Patel) for Option 1, Based on Model SDIB.DAT
                ID     REVISED - MAY, 1999 BY VAS TO INCORPORATE INCREASE OF SUBBASIN RETENTION AND
                ID               REVISIONS TO THE REGIONAL DETENTION BASIN STORAGE
                ID     REVISED - FEB, 1999 BY VALERIE SWICK, FCD OF MARICOPA COUNTY
                ID     REVISED - MAY, 1998 BY D&A
                ID
                ID     REVISED BY VALERIE SWICK, FEB. 26, 1998
                ID
                ID     FLOWS FROM DETENTION BASIN LOCATED AT NE CORNER OF ELLIOT AND ELLSWORTH ROADS
                ID     IS ROUTED TO THE SOUTHWEST BY SIPHON DRAW TO SUBBASIN 70A. FROM THERE THEY
                ID     WILL BE ROUTED BY A CHANNEL TO THE EMF. FLOWS FROM SUBBASINS ADJACENT TO
                ID     SANTAN FREEWAY ALIGNMENT WILL BE ROUTED SOUTH TO SUBBASIN 70A WHERE THEY WILL
                ID     BE COMBINED WITH FLOW IN SIPHON DRAW.
                ID
                ID     EAST MESA AREA DRAINAGE MASTER PLAN
                ID     AREA SOUTH OF SUPERSTITION (U.S. HWY 60)
                ID     AUGUST 1997
                ID     SOUTHEAST MESA HIGH RESOLUTION MODEL
                ID
                ID     **********FUTURE CONDITION MODEL OF THE WATERSHED**********************
                ID
                ID    ***********ATTENTION*************************************************
                ID      SUBBASINS 75, 79A, 79B, 78E,  LANDUSES WERE NOT
                ID      CHANGED BECAUSE IT WAS FELT THAT THEIR FUTURE CONDITIONS LANDUSES WOULD BE
                ID      SIMILAR TO THE EXISTING CONDITIONS LANDUSES.
                ID      RETENTION VOLUMES WILL ALSO NOT BE UTILIZED FOR SUBBASINS 75, 79A, 79B, 78E
                ID      SOME QUEEN CREEK SUBBASINS WILL ALSO NOT HAVE RETENTION VOLUMES, EITHER
                ID      BECAUSE THEY LIE IN PINAL COUNTY AND WE DONT KNOW PINAL COUNTIES PLANS OR
                ID      THEY LIE IN THE SANTAN MOUNTAINS AND WON'T GET DEVELOPED
                ID      WILLIAMS GATEWAY AIRPORT (SUBBASINS 80A, 80B, 81A, AND 81B) ARE MODELED AS
                ID      FUTURE CONDITIONS AND HAVE RETENTION VOLUMES FOR THE 100YR 2HR STORM
                ID    ********************************************************************
                ID     FILENAME:  SDIBB.DAT
                ID
                ID     THIS MODEL REPRESENTS THE FUTURE CONDITION OF THE WATERSHED.
                ID     TOTAL DRAINAGE AREA IS APPROXIMATELY 213 SQ. MI.
                ID     THIS MODEL USES A Kn VALUE OF 0.09 FOR DESERT LAND USE DUE TO SHEET FLOW
                ID     CONDITIONS.
                ID
                ID     100-YEAR 24-HOUR FREQUENCY
                ID     AREAL REDUCTIONS FROM FCD HYDROLOGY MANUAL
                ID     THIS MODEL INCLUDES INFLOW FROM NORTH OF THE SUPERSTITION FREEWAY
                ID     AND EAST OF THE CAP
                ID
                ID     DATA FROM THE QUEEN CREEK ADMS HAS BEEN ADDED TO CALCULATE FLOWS INTO THE
                ID     EMF.    MUSKINGUM ROUTING NSTEPS WERE ADJUSTED TO BE WITHIN THE SUGGESTED
                ID     RANGE.
                ID
                ID     METHODOLOGY
1                                        HEC-1 INPUT                                        PAGE  9

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

                ID     THE US CORPS OF ENGINEERS FLOOD HYDROLOGY MODEL HEC-1 DATED SEP1990 VER 4.0
                ID     SCS TYPE II RAINFALL DISTRIBUTION
                ID     S-GRAPH HYDROGRAPH
                ID     GREEN AND AMPT INFILTRATION EQUATION USED FOR CALCULATING LOSSES
                ID     NORMAL DEPTH STORAGE CHANNEL ROUTING
                ID     APPROXIMATE DIRECTION, LOCATION, AND LENGTH OF THE WASHES HAVE BEEN
                ID     EVALUATED BASED ON FIELD INVESTIGATION, USGS MAPS, LANDIS AERIAL SURVEYS
                ID     DATED 1994
                ID     THE NOAA TECHNICAL MEMORANDUM NOAA ATLAS 2 DEPTH AREA RATIOS
                ID
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451          ID   ORIGINAL STUDY PERFORMED BY LISA C. YOUNG AND AFSHIN AHOURAIYAN, UPDATED BY
452          ID   DAVID DEGERNESS (OCT-DEC, 1996). REVIEWED BY VALERIE A. SWICK
453          ID   AND AMIR MOTAMEDI OF THE FLOOD CONTROL DISTRICT
454          ID   HYDROLOGY BRANCH ENGINEERING DIVISION, FLOOD CONTROL
455          ID   DISTRICT OF MARICOPA COUNTY, DECEMBER - JULY 1995.
456          ID
457          ID   ASSUMED VELOCITY OF 1 FT/SEC FOR SHEET FLOW, 2-3 FT/SEC FOR WASH/NATURAL
458          ID   CHANNEL, 3 FT/SEC FOR ROAD AND GRASS CHANNEL, 10FT/SEC FOR CONCRETE CHANNEL
459          ID
460          ID   VELOCITIES FOR ADMP IMPROVEMENT CHANNELS FROM DIBBLE AND ASSOCIATES
461          ID   SUGGESTED ALTERNATIVES (JULY 1, 1997)
462          ID
463          ID   ********************************************************************
464          ID   **** THE FOLLOWING NOTE WAS ADDED BY PRIMATECH ENGINEERS ON 06-12-2001 ****
465          ID   ********************************************************************
466          ID   NOTE: MUST USE NEBUILD.DSS AS THE DSS FILE TO IMPORT FLOWS ACROSS THE
467          ID         SUPERSTITION FREEWAY.
468          ID   ********************************************************************
469          ID
470          ID
471          ID   NOTE: MUST USE NDIBF.DSS AS THE DSS FILE TO IMPORT FLOWS ACROSS THE
472          ID         SUPERSTITION FREEWAY.
473          ID
474          ID   DDM MCUHF2 SE MESA ADMP - SOUTH OF SUPERSTITION FWY, FUTURE CONDITIONS
             *DIAGRAM
475          IT       5  1APR97    0000     600
476          IO       5
477          IN      15
478          JD    3.60    0.01
479          PC    .000    .002    .005    .008    .011    .014    .017    .020    .023    .026
480          PC    .029    .032    .035    .038    .041    .044    .048    .052    .056    .060
481          PC    .064    .068    .072    .076    .080    .085    .090    .095    .100    .105
482          PC    .110    .115    .120    .126    .133    .140    .147    .155    .163    .172
483          PC    .181    .191    .203    .218    .236    .257    .283    .387    .663    .707
484          PC    .735    .758    .776    .791    .804    .815    .825    .834    .842    .849
485          PC    .856    .863    .869    .875    .881    .887    .893    .898    .903    .908
486          PC    .913    .918    .922    .926    .930    .934    .938    .942    .946    .950
487          PC    .953    .956    .959    .962    .965    .968    .971    .974    .977    .980
488          PC    .983    .986    .989    .992    .995    .998   1.000
489          JD    3.58     1.0
490          JD    3.49     5.0
491          JD    3.38    10.0
492          JD    3.24    30.0
493          JD    3.10    60.0
494          JD    3.05    90.0

1                                        HEC-1 INPUT                                        PAGE 10

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

495          JD    3.00   120.0
496          JD    2.97   150.0
             * ********************************************************************
             *
             *
497          KK     73A
498          KM   BASIN 73A
499          KM    THE FOLLOWING PARAMETERS WERE PROVIDED FOR THIS BASIN
500          KM    L=     2.3  Lca=     1.0   S=    34.9  Kn= .093  LAG=  94.5
501          KM    PHOENIX VALLEY S-GRAPH WAS USED FOR THIS BASIN
502          BA     .95
503          LG     .35     .36    5.00     .27     .00
504          UI    34.     34.     34.     34.     84.    117.    134.    158.    171.    185.
505          UI   197.    214.    232.    254.    274.    317.    381.    429.    424.    369.
506          UI   332.    303.    282.    263.    240.    220.    202.    185.    169.    157.
507          UI   134.    107.     90.     60.     60.     57.     55.     54.     34.     34.
508          UI    34.     34.     16.     10.     10.     10.     10.     10.     10.     10.
509          UI    10.     10.     10.     10.     10.     10.      0.      0.      0.      0.
510          UI     0.      0.      0.      0.      0.      0.      0.      0.      0.      0.
             *
             *
511          KK   73ATB   ROUTE
512          KM   ROUTE FLOW FROM BASIN 73A THROUGH THE MOUNTAIN HEIGHTS DEVELOPEMENT FROM
513          KM   MERIDIAN ROAD TO MOUNTAIN ROAD.
514          RS       2    FLOW      -1
515          RC   0.045   0.040   0.045    2830  0.0050    0.00
516          RX    0.00    5.00   10.00   20.00  120.00  130.00  135.00  140.00
517          RY    4.00    3.00    2.50    0.00    0.00    2.50    3.00    4.00
             *
             *
518          KK     73B   BASIN
519          KM   BASIN 73B
520          KM    THE FOLLOWING PARAMETERS WERE PROVIDED FOR THIS BASIN
521          KM    L=0.56  Lca=0.28  S=30.4  Kn=0.040  LAG=14.9
522          KM    PHOENIX VALLEY S-GRAPH WAS USED FOR THIS BASIN
523          BA   0.425
524          LG    0.25    0.25    5.40    0.27      30
525          UI     169     530     973     829     481     180      73      30       0       0
526          UI       0       0       0       0       0       0       0       0       0       0
             *
             *
527          KK  RET73B  DIVERT
528          KM   RETAIN 80% OF THE 100 YR 2 HR RUNOFF VOLUME
529          DT  73BRET    39.5     0.0
530          DI       0   10000
531          DQ       0   10000
             *
             *

1                                        HEC-1 INPUT                                        PAGE 11

LINE         ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10
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532          KK   CP73B COMBINE
533          KM   COMBINE HYDROGRAPHS 73ATB AND BASIN 73B
534          HC       2
             *
             *
535          KK   73BTC   ROUTE
536          KM   ROUTE FLOW THROUGH THE NOVA VISTA DEVELOPEMENT FROM MOUNTAIN ROAD TO
537          KM   SIGNAL BUTTE ROAD.
538          RS     4    FLOW     -1
539          RC  0.045   0.040   0.045    4500  0.0050    0.00
540          RX   0.00    5.00   10.00   22.00  122.00  134.00  139.00  144.00
541          RY   4.00    3.50    3.00    0.00    0.00    3.00    3.50    4.00
             *
             *
542          KK    73C   BASIN
543          KM   BASIN 73C
544          KM    THE FOLLOWING PARAMETERS WERE PROVIDED FOR THIS BASIN
545          KM    L=1.33  Lca=0.30  S=22.6  Kn=0.040  LAG=22.5
546          KM    PHOENIX VALLEY S-GRAPH WAS USED FOR THIS BASIN
547          BA   0.585
548          LG    0.25    0.25    5.40    0.27      30
549          UI      88     344     512     764    1019     695     488     287     149      88
550          UI      31      27      26       0       0       0       0       0       0       0
551          UI       0       0       0       0       0       0       0       0       0       0
             *
             *
552          KK  RET73C  DIVERT
553          KM   RETAIN 80% OF THE 100 YR 2 HR RUNOFF VOLUME
554          DT  73CRET    37.2      0.0
555          DI       0   10000
556          DQ       0   10000
             *
             *
557          KK   CP73C COMBINE
558          KM   COMBINE HYDROGRAPHS 73BTC AND BASIN 73C
559          HC       2
             *
             *
560          KK  73T74C   ROUTE
561          KM   ROUTE FLOW SOUTH ALONG THE WEST SIDE OF SIGNAL BUTTE ROAD IN AN
562          KM   ENGINEERED CHANNEL FROM WARNER ROAD TO THE POWERLINE FLOODWAY.
563          RS      20    FLOW     -1
564          RC   0.032   0.032   0.032    4670   .0024
565          RX       0       5      10      31      69    79.5    84.5    89.5
566          RY     3.5     3.5     3.5       0       0     3.5     3.5     3.5
             *
             * ************************************************************************
             *
1                                          HEC-1 INPUT                                    PAGE 12

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

567          KK     74A
568          KM   BASIN 74A
569          KM    THE FOLLOWING PARAMETERS WERE PROVIDED FOR THIS BASIN
570          KM    L=     2.4  Lca=     1.0   S=    42.2  Kn= .095  LAG=  92.8
571          KM    PHOENIX VALLEY S-GRAPH WAS USED FOR THIS BASIN
             * KO     2       2
572          BA     .75
573          LG     .35     .36    5.00     .27     .00
574          UI     27.     27.     27.     27.     73.     96.    111.    129.    140.    151.
575          UI    163.    175.    193.    208.    228.    268.    317.    362.    327.    287.
576          UI    260.    239.    222.    206.    187.    171.    160.    142.    132.    118.
577          UI     99.     79.     56.     48.     47.     45.     45.     32.     27.     27.
578          UI     27.     19.      8.      8.      8.      8.      8.      8.      8.      8.
579          UI      8.      8.      8.      8.      8.      0.      0.      0.      0.      0.
580          UI      0.      0.      0.      0.      0.      0.      0.      0.      0.      0.
             *
             *
581          KK   74ATB   ROUTE
582          KM   ROUTE FLOW FROM BASIN 74A VIA THE POWERLINE FLOODWAY FROM MERIDIAN ROAD TO
583          KM   MOUNTAIN ROAD. FLOW ENTERS THE POWERLINE FLOODWAY VIA A 75FT WEIR ON THE
584          KM   NORTHWEST CORNER OF THE MERIDIAN ROAD AND POWERLINE FLOODWAY INTERSECTION.
585          RS       1    FLOW     -1
586          RC   0.013   0.013   0.013    3200  0.0060    0.00
587          RX    0.00    7.00   21.50   30.00   36.00   44.50   59.00   66.00
588          RY    6.00    5.50    5.50    0.00    0.00    5.50    5.50    6.00
             *
             *
589          KK    74B   BASIN
590          KM   BASIN 74B
591          KM    THE FOLLOWING PARAMETERS WERE PROVIDED FOR THIS BASIN
592          KM    L=1.31  Lca=0.41  S=23.7  Kn=0.040  LAG=24.9
593          KM    PHOENIX VALLEY S-GRAPH WAS USED FOR THIS BASIN
594          BA   0.333
595          LG    0.25    0.25    5.80    0.22      30
596          UI      45     154     245     330     528     430     318     229     122      76
597          UI      96      18      14      14       0       0       0       0       0       0
598          UI       0       0       0       0       0       0       0       0       0       0
             *
             *
599          KK  RET74B  DIVERT
600          KM   RETAIN 80% OF THE 100 YR 2 HR RUNOFF VOLUME
```

```
 601          DT  74BRET    17.8      0.0
 602          DI        0   10000
 603          DQ        0   10000
              *
              *
1                                        HEC-1 INPUT                                        PAGE 13

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

 604          KK   CP74B COMBINE
 605          KM   COMBINE HYDROGRAPHS 74ATB AND BASIN 74B
 606          HC        2
              *
              *

 607          KK   74BTC   ROUTE
 608          KM   ROUTE FLOW VIA THE POWERLINE FLOODWAY FROM MOUNTAIN ROAD TO SIGNAL BUTTE
 609          KM   ROAD.
 610          RS        1    FLOW      -1
 611          RC    0.013   0.013   0.013    3100  0.0055    0.00
 612          RX     0.00    7.00   21.50   30.00   38.00   44.50   59.00   66.00
 613          RY     6.00    5.50    5.50    0.00    0.00    5.50    5.50    6.00
              *
              *

 614          KK    74C   BASIN
 615          KM   BASIN 74C
 616          KM    THE FOLLOWING PARAMETERS WERE PROVIDED FOR THIS BASIN
 617          KM    L=1.22  Lca=0.40  S=25.4  Kn=0.040  LAG=23.7
 618          KM    PHOENIX VALLEY S-GRAPH WAS USED FOR THIS BASIN
 619          BA   0.345
 620          LG    0.25    0.17    6.80    0.15      30
 621          UI      48     180     276     386     588     428     310     211      97      65
 622          UI      35      15      15      16       0       0       0       0       0       0
 623          UI       0       0       0       0       0       0       0       0       0       0
              *
              *

 624          KK  RET74C  DIVERT
 625          KM   RETAIN 80% OF THE 100 YR 2 HR RUNOFF VOLUME
 626          DT  74CRET    22.6      0.0
 627          DI        0   10000
 628          DQ        0   10000
              *
              *

 629          KK   CP74C COMBINE
 630          KM   COMBINE HYDROGRAPHS 73T74C, 74BTC, AND BASIN 74C
              * KO       2
 631          HC        3
              *
              *

 632          KK  74CT75
 633          KM  ROUTE FLOW FROM IN THE POWERLINE FLOODWAY FROM CP74C TO CP75
 634          RS        3    FLOW      -1
 635          RC   0.030   0.013   0.030   10500   .0038
 636          RX       0      15    16.5      25      33    41.5      43      58
 637          RY     6.6     6.6     5.6       0       0     5.6     6.6     6.6
              *
              *
1                                        HEC-1 INPUT                                        PAGE 14

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

 638          KK    10   BASIN
 639          KM    BASIN 10
 640          KM    THE FOLLOWING PARAMETERS WERE PROVIDED FOR THIS BASIN
 641          KM    L=1.11  Lca=0.56  S=18.9  Kn=0.045  LAG=30.9
 642          KM    PHOENIX VALLEY S-GRAPH WAS USED FOR THIS BASIN
 643          BA   0.171
 644          LG    0.25    0.19    6.60    0.17      31
 645          UI       0      19      45      87     111     143     216     198     151     117
 646          UI      88      52      32      23      16       6       6       6       6       0
 647          UI       0       0       0       0       0       0       0       0       0       0
 648          UI       0       0       0       0       0       0       0       0       0       0
 649          UI       0       0       0       0       0       0       0       0       0       0
              *
              *

 650          KK   RET10  DIVERT
 651          KM   RETAIN 100 YR 2 HR RUNOFF VOLUME
 652          DT   10RET   18.32      0.0
 653          DI        0   10000
 654          DQ        0   10000
              *
              *

 655          KK   10T75
 656          KM  ROUTE FLOW FROM NORTH SIDE RAY FROM CP10 TO CP75 WITHIN RAY ROAD
 657          RS        1    FLOW      -1
 658          RC   0.030   0.015   0.030    6320   .0060
 659          RX       0    17.5      18      57      73     112   112.5     130
 660          RY     1.0     0.5     0.0     0.8     0.8     0.0     0.5     1.0
              *
              *

 661          KK    02B   BASIN
 662          KM    BASIN 02B
 663          KM    THE FOLLOWING PARAMETERS WERE PROVIDED FOR THIS BASIN
 664          KM    L=0.58  Lca=0.26  S=17.2  Kn=0.040  LAG=26
 665          KM    PHOENIX VALLEY S-GRAPH WAS USED FOR THIS BASIN
```

```
666          BA   0.146
667          LG    0.25    0.25    4.80    0.39      55
668          UI       0      48     154     262     314     189      92      41      15       9
669          UI       0       0       0       0       0       0       0       0       0       0
670          UI       0       0       0       0       0       0       0       0       0       0
671          UI       0       0       0       0       0       0       0       0       0       0
672          UI       0       0       0       0       0       0       0       0       0       0
             *
             *

673          KK  RET02B  DIVERT
674          KM  RETAIN 100 YR 2 HR RUNOFF VOLUME
675          DT  02BRET   15.40       0
676          DI       0   10000
677          DQ       0   10000
             *
             *
```

1 HEC-1 INPUT PAGE 15

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

678          KK    2BT1   ROUTE
679          KM  ROUTE FLOW IN EXCESS OF THE 100-YEAR, 2-HR STORM OVERLAND TO
680          KM  SUB-BASIN 75
681          RS       5    FLOW      -1
682          RC   0.035   0.035   0.035    4250  0.0045
683          RX    0.00       5      10      15    1015    1020    1025    1030
684          RY    2.00    1.50    1.00    0.00    0.00    1.00    1.50    2.00
             *
             *

685          KK     01A   BASIN
686          KM    BASIN 01A
687          KM    THE FOLLOWING PARAMETERS WERE PROVIDED FOR THIS BASIN
688          KM    L=0.48  Lca=0.16  S=22.9  Kn=0.035  LAG=11.7
689          KM    PHOENIX VALLEY S-GRAPH WAS USED FOR THIS BASIN
690          BA   0.137
691          LG    0.25    0.15    7.30    0.14      57
692          UI       0      93     273     403     200      62      18       0       0       0
693          UI       0       0       0       0       0       0       0       0       0       0
694          UI       0       0       0       0       0       0       0       0       0       0
695          UI       0       0       0       0       0       0       0       0       0       0
696          UI       0       0       0       0       0       0       0       0       0       0
             *
             *

697          KK  RET01A  DIVERT
698          KM   RETAIN 100 YR 24 HR RUNOFF VOLUME
699          DT  01ARET    23.0     0.0
700          DI       0   10000
701          DQ       0   10000
             *
             *

702          KK     CP1
703          KM    COMBINE HYDROGRAPHS 2BT1 AND RET01A
704          HC       2
             *
             *

705          KK    1T12   ROUTE
706          KM  ROUTE FLOW FROM BASIN 1 TO CP12
707          RS      10    FLOW      -1
708          RC   0.035   0.035   0.035    8055   .0045
709          RX    0.00       5      10      15    1015    1020    1025    1030
710          RY    2.00    1.50    1.00    0.00    0.00    1.00    1.50    2.00
             *
             *

711          KK      75   BASIN
712          KM    BASIN 75
713          KM    THE FOLLOWING PARAMETERS WERE PROVIDED FOR THIS BASIN
714          KM    L=2.42  Lca=1.22  S=22.7  Kn=0.060  LAG=72.0
715          KM    PHOENIX VALLEY S-GRAPH WAS USED FOR THIS BASIN
716          BA   1.833              .15
```

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

717          LG    0.10    0.15    8.00    0.12       3
718          UI       0      86      86      86     221     314     385     436     482     527
719          UI     589     656     755     946    1108     999     856     761     693     624
720          UI     553     500     436     400     316     246     152     150     141     135
721          UI      86      86      86      38      26      26      26      26      26      26
722          UI      26      26      26       0       0       0       0       0       0       0
             *
             *

723          KK      7A   BASIN
724          KM    BASIN 7A
725          KM    THE FOLLOWING PARAMETERS WERE PROVIDED FOR THIS BASIN
726          KM    L=0.59  Lca=0.27  S=20.3  Kn=0.047  LAG=19.0
727          KM    PHOENIX VALLEY S-GRAPH WAS USED FOR THIS BASIN
728          BA   0.085
729          LG    0.25    0.15    8.80    0.09      33
730          UI       0      19      68     104     171     128      84      42      21      10
731          UI       5       5       0       0       0       0       0       0       0       0
732          UI       0       0       0       0       0       0       0       0       0       0
733          UI       0       0       0       0       0       0       0       0       0       0
734          UI       0       0       0       0       0       0       0       0       0       0
             *
             *
```

```
 735          KK  RET07A  DIVERT
 736          KM  RETAIN 100 YR 24 HR RUNOFF VOLUME
 737          DT  07ARET    17.2       0.0
 738          DI       0   10000
 739          DQ       0   10000
              *
              *
              * KK   CP7
              * KM  COMBINE HYDROGRAPHS 6T7A AND RET07A
              * HC     2
              *
              *

 740          KK   7AT12
 741          KM   ROUTE FLOW FROM BASIN 7A TO BASIN 12
 742          RS       4    FLOW      -1
 743          RC   0.030   0.015   0.030    1920   .0042
 744          RX       0    17.5      18      57      73     112   112.5     130
 745          RY     1.0     0.5     0.0     0.8     0.8     0.0     0.5     1.0
              *
              *

 746          KK      07   BASIN
 747          KM    BASIN 07
 748          KM    THE FOLLOWING PARAMETERS WERE PROVIDED FOR THIS BASIN
 749          KM    L=0.46  Lca=0.21  S=30.4  Kn=0.040  LAG=12.4
 750          KM    PHOENIX VALLEY S-GRAPH WAS USED FOR THIS BASIN
 751          BA   0.116
 752          LG    0.24    0.19    6.60    0.20      47
 753          UI       0      69     203     334     189      68      22      10       0       0
 754          UI       0       0       0       0       0       0       0       0       0       0

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

 755          UI       0       0       0       0       0       0       0       0       0       0
 756          UI       0       0       0       0       0       0       0       0       0       0
 757          UI       0       0       0       0       0       0       0       0       0       0
              *
              *

 758          KK   RET07  DIVERT
 759          KM   RETAIN 100 YR 24 HR RUNOFF VOLUME
 760          DT   07RET    17.2      0.0
 761          DI       0   10000
 762          DQ       0   10000
              *
              *

 763          KK    7T12
 764          KM   ROUTE FLOW FROM BASIN 5 TO BASIN 12
 765          RS       1    FLOW      -1
 766          RC   0.030   0.015   0.003    3160   .0036
 767          RX       0     7.5       8      38      43      73    73.5      81
 768          RY     0.8     0.5       0     0.6     0.6       0     0.5     0.8
              *
              *

 769          KK      12   BASIN
 770          KM    BASIN 12
 771          KM    THE FOLLOWING PARAMETERS WERE PROVIDED FOR THIS BASIN
 772          KM    L=0.63  Lca=0.21  S=25.4  Kn=0.042  LAG=15.2
 773          KM    PHOENIX VALLEY S-GRAPH WAS USED FOR THIS BASIN
 774          BA   0.157
 775          LG    0.26    0.25    6.00    0.25      57
 776          UI       0      60     187     344     315     184      72      32      11      11
 777          UI       0       0       0       0       0       0       0       0       0       0
 778          UI       0       0       0       0       0       0       0       0       0       0
 779          UI       0       0       0       0       0       0       0       0       0       0
 780          UI       0       0       0       0       0       0       0       0       0       0
              *
              *

 781          KK   RET12  DIVERT
 782          KM   RETAIN 100 YR 2 HR RUNOFF VOLUME
 783          DT   12RET   14.20     0.0
 784          DI       0   10000
 785          DQ       0   10000
              *
              *

 786          KK    CP12
 787          KM    COMBINE HYDROGRAPHS 1T12, BASIN 75, 7AT12, 7T12, AND RET12
 788          HC       5
              *
              *

1                                        HEC-1 INPUT                                        PAGE 18

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

 789          KK   12T13
 790          KM  ROUTE FLOW FROM BASIN 12 TO BASIN 13
 791          RS       3    FLOW      -1
 792          RC   0.030   0.015   0.030    2600   .0014
 793          RX       0    17.5      18      57      73     112   112.5     130
 794          RY     2.0     1.0     0.5     0.0     0.0     0.5     1.0     2.0
              *
              *

 795          KK      08   BASIN
 796          KM    BASIN 08
 797          KM    THE FOLLOWING PARAMETERS WERE PROVIDED FOR THIS BASIN
 798          KM    L=1.51  Lca=0.94  S=19.2  Kn=0.043  LAG=40.3
```

```
 799          KM    PHOENIX VALLEY S-GRAPH WAS USED FOR THIS BASIN
 800          BA   0.617
 801          LG    0.25    0.25    5.80    0.23      34
 802          UI       0      52      69     190     255     304     368     468     647     541
 803          UI     438     364     297     240     165      91      85      57      52      17
 804          UI      16      16      16      16      16       0       0       0       0       0
 805          UI       0       0       0       0       0       0       0       0       0       0
 806          UI       0       0       0       0       0       0       0       0       0       0
              *
              *

 807          KK   RET08  DIVERT
 808          KM   RETAIN 100 YR 2 HR RUNOFF VOLUME
 809          DT   08RET    55.69     0.0
 810          DI       0   10000
 811          DQ       0   10000
              *
              *

 812          KK     8T9
 813          KM   ROUTE FLOW FROM BASIN 8 TO BASIN 9
 814          RS       2    FLOW      -1
 815          RC   0.030   0.015   0.030    1410   .0053
 816          RX       0    17.5      18      57      73     112   112.5     130
 817          RY     1.0    0.50     0.0     0.8     0.8     0.0     0.5     1.0
              *
              *

 818          KK      09   BASIN
 819          KM    BASIN 09
 820          KM    THE FOLLOWING PARAMETERS WERE PROVIDED FOR THIS BASIN
 821          KM    L=0.73  Lca=0.35  S=21.9  Kn=0.042  LAG=20.0
 822          KM    PHOENIX VALLEY S-GRAPH WAS USED FOR THIS BASIN
 823          BA   0.126
 824          LG    0.26    0.25    5.60    0.30      38
 825          UI       0      25      92     139     231     198     134      80      36      21
 826          UI       7       7       0       0       0       0       0       0       0       0
 827          UI       0       0       0       0       0       0       0       0       0       0
 828          UI       0       0       0       0       0       0       0       0       0       0
 829          UI       0       0       0       0       0       0       0       0       0       0
              *
              *
```



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

 830          KK   RET09  DIVERT
 831          KM   RETAIN 100 YR 2 HR RUNOFF VOLUME
 832          DT   09RET    11.0     0.0
 833          DI       0   10000
 834          DQ       0   10000
              *
              *

 835          KK     CP9
 836          KM    COMBINE HYDROGRAPHS 8T9 AND RET09
 837          HC       2
              *
              *

 838          KK    9T13
 839          KM   ROUTE FLOW FROM BASIN 9 TO BASIN 13
 840          RS       4    FLOW      -1
 841          RC   0.030   0.015   0.030    4020   .0045
 842          RX       0    17.5      18      57      73     112   112.5     130
 843          RY     1.0    0.50     0.0     0.8     0.8     0.0     0.5     1.0
              *
              *

 844          KK    13   BASIN
 845          KM    BASIN 13
 846          KM    THE FOLLOWING PARAMETERS WERE PROVIDED FOR THIS BASIN
 847          KM    L=0.70  Lca=0.42  S=30.0  Kn=0.053  LAG=25.1
 848          KM    PHOENIX VALLEY S-GRAPH WAS USED FOR THIS BASIN
 849          BA   0.200
 850          LG    0.29    0.25    5.00    0.41      49
 851          UI       0      27      90     146     196     309     262     192     139      77
 852          UI      45      28      12       8       8       0       0       0       0       0
 853          UI       0       0       0       0       0       0       0       0       0       0
 854          UI       0       0       0       0       0       0       0       0       0       0
 855          UI       0       0       0       0       0       0       0       0       0       0
              *
              *

 856          KK   RET13  DIVERT
 857          KM   RETAIN 100 YR 2 HR RUNOFF VOLUME
 858          DT   13RET    16.00     0.0
 859          DI       0   10000
 860          DQ       0   10000
              *
              *

 861          KK    11   BASIN
 862          KM    BASIN 11
 863          KM    THE FOLLOWING PARAMETERS WERE PROVIDED FOR THIS BASIN
 864          KM    L=1.27  Lca=0.63  S=22.0  Kn=0.026  LAG=19.1
 865          KM    PHOENIX VALLEY S-GRAPH WAS USED FOR THIS BASIN
 866          BA   0.308
 867          LG    0.24    0.25    5.70    0.25      57
 868          UI       0      69     244     372     615     466     307     155      78      37
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LINE          ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10
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```
869          UI      17      17       0       0       0       0       0       0       0       0
870          UI       0       0       0       0       0       0       0       0       0       0
871          UI       0       0       0       0       0       0       0       0       0       0
872          UI       0       0       0       0       0       0       0       0       0       0
             *
             *

873          KK   RET11  DIVERT
874          KM   RETAIN 100 YR 2 HR RUNOFF VOLUME
875          DT   11RET    32.92     0.0
876          DI       0   10000
877          DQ       0   10000
             *
             *

878          KK   11T13
879          KM  ROUTE FLOW FROM RET11 TO CP13
880          RS       2    FLOW      -1
881          RC   0.030   0.015   0.030    1410   .0050
882          RX       0    17.5      18      57      73     112   112.5     130
883          RY     1.0    0.50     0.0     0.8     0.8     0.0     0.5     1.0
             *
             *

884          KK    CP13
885          KM    COMBINE HYDROGRAPHS 12T13, 9T13, 11T13, AND RET13
886          HC       4
             *
             *

887          KK   13T75
888          KM  ROUTE FLOW FROM BASIN 13 TO BASIN CP75
889          RS       2    FLOW      -1
890          RC   0.030   0.015   0.030    1230   .0016
891          RX       0    17.5      18      57      73     112   112.5     130
892          RY     2.0     1.0     0.5     0.0     0.0     0.5     1.0     2.0
             *
             *

893          KK      14   BASIN
894          KM    BASIN 14
895          KM    THE FOLLOWING PARAMETERS WERE PROVIDED FOR THIS BASIN
896          KM    L=0.35  Lca=0.12  S=25.7  Kn=0.034  LAG=07.9
897          KM    PHOENIX VALLEY S-GRAPH WAS USED FOR THIS BASIN
898          BA   0.093
899          LG    0.20    0.25    5.20    0.34      80
900          UI       0     136     378     166      31       0       0       0       0       0
901          UI       0       0       0       0       0       0       0       0       0       0
902          UI       0       0       0       0       0       0       0       0       0       0
903          UI       0       0       0       0       0       0       0       0       0       0
904          UI       0       0       0       0       0       0       0       0       0       0
             *
             *
```



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

905          KK   RET14  DIVERT
906          KM   RETAIN 100 YR 2 HR RUNOFF VOLUME
907          DT   14RET     9.80     0.0
908          DI       0   10000
909          DQ       0   10000
             *
             *

910          KK    CP75 COMBINE
911          KM  COMBINE HYDROGRAPHS 10T75, 13T75, 11T13 AND RET14
             * KO      2
912          HC       4
             *
             * ************************************************************************
             *

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

929          KK   77ATB   ROUTE
930          KM  ROUTE BASIN 77A THROUGH THE KEIGHLEY PLACE SUBDIVISION FROM MERIDIAN ROAD TO
931          KM  TO MOUNTAIN ROAD.
932          RS       1    FLOW      -1
933          RC   0.045   0.040   0.045    3000  0.0050    0.00
934          RX    0.00    5.00   10.00   37.00   47.00   74.00   79.00   84.00
935          RY    5.50    5.00    4.50    0.00    0.00    4.50    5.00    5.50
             *
             *
```

```
936          KK     77B   BASIN
937          KM  BASIN 77B
938          KM  THE FOLLOWING PARAMETERS WERE PROVIDED FOR THIS BASIN
939          KM  L=0.56  Lca=0.26  S=28.6  Kn=0.047  LAG=17.2
940          KM  PHOENIX VALLEY S-GRAPH WAS USED FOR THIS BASIN
941          BA   0.349
942          LG    0.19    0.25    5.40    0.30      18
943          UI     100     337     536     757     486     273     113      54      20      21
944          UI       0       0       0       0       0       0       0       0       0       0
             *
             *
```



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

945          KK  RET77B  DIVERT
946          KM  RETAIN 80% OF THE 100 YR 2 HR RUNOFF VOLUME
947          DT  77BRET    16.5     0.0
948          DI        0   10000
949          DQ        0   10000
             *
             *

950          KK  CP77B COMBINE
951          KM  COMBINE HYDROGRAPHS 77ATB AND 77B.
952          HC        2
             *
             *

953          KK  77BTC   ROUTE
954          KM  ROUTE FLOW THROUGH THE MOUNTAIN HORIZONS (SOUTH) DEVELOPEMENT FROM MOUNTAIN
955          KM  ROAD TO SIGNAL BUTTE ROAD.
956          RS        3    FLOW      -1
957          RC    0.045   0.040   0.045    4750  0.0042    0.00
958          RX     0.00    5.00   10.00   20.00   85.00  105.00  110.00  115.00
959          RY     5.00    4.00    3.00    0.00    0.00    3.00    4.00    5.00
             *
             *

960          KK     77C   BASIN
961          KM  BASIN 77C
962          KM  THE FOLLOWING PARAMETERS WERE PROVIDED FOR THIS BASIN
963          KM  L=0.76  Lca=0.51  S=23.7  Kn=0.040  LAG=22.0
964          KM  PHOENIX VALLEY S-GRAPH WAS USED FOR THIS BASIN
965          BA   0.279
966          LG    0.25    0.25    6.00    0.21      30
967          UI      42     172     257     388     485     324     228     119      66      38
968          UI      14      13      13       0       0       0       0       0       0       0
             *
             *

969          KK  RET77C  DIVERT
970          KM  RETAIN 80% OF THE 100 YR 2 HR RUNOFF VOLUME
971          DT  77CRET    16.8     0.0
972          DI        0   10000
973          DQ        0   10000
             *
             *

974          KK   C77C COMBINE
975          KM  COMBINE HYDROGRAPHS 77BTC AND 77C
976          HC        2
             *
             *
```



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

977          KK  77CT78   ROUTE
978          KM  ROUTE FLOW SOUTH ALONG THE WEST SIDE OF SIGNAL BUTTE ROAD IN AN ENGINEERED
979          KM  CHANNEL FROM RAY ROAD TO WILLIAMS FIELD ROAD.
980          RS        4    FLOW      -1
981          RC    0.032   0.032   0.032    4435  0.0020    0.00
982          RX     0.00    5.00   10.00   24.00  124.00  138.00  143.00  148.00
983          RY     4.50    4.00    3.50    0.00    0.00    3.50    4.00    4.50
             *
             *

984          KK     78A
985          KM  BASIN 78A
986          KM  THE FOLLOWING PARAMETERS WERE PROVIDED FOR THIS BASIN
987          KM  L=      3.3  Lca=      1.3   S=   30.2  Kn= .090  LAG= 118.0
988          KM  PHOENIX VALLEY S-GRAPH WAS USED FOR THIS BASIN
989          BA    1.88
990          LG     .35     .36    5.00     .27     .00
991          UI     54.     54.     54.     54.     54.    124.    176.    209.    227.    252.
992          UI    268.    290.    305.    322.    342.    366.    396.    417.    451.    515.
993          UI    612.    641.    716.    643.    579.    531.    494.    464.    437.    417.
994          UI    385.    356.    334.    315.    290.    270.    255.    233.    206.    189.
995          UI    153.     95.     95.     95.     88.     88.     88.     65.     54.     54.
996          UI     54.     54.     45.     16.     16.     16.     16.     16.     16.     16.
997          UI     16.     16.     16.     16.     16.     16.     16.     16.     16.     16.
998          UI      0.      0.      0.      0.      0.      0.      0.      0.      0.      0.
999          UI      0.      0.      0.      0.      0.      0.      0.      0.      0.      0.
             *
             *

1000         KK   78ATB   ROUTE
1001         KM  ROUTE FLOW FROM 78A TO 78B VIA WASH CROSSING COUNTY LINE
1002         RS        7    FLOW      -1
1003         RC    0.045   0.040   0.045    3500  0.0042    0.00
1004         RX     0.00  500.00  980.00 1003.00 1007.00 1031.00 1511.00 2011.00
```

```
1005          RY    4.50    3.50    3.00    0.00    0.00    3.00    3.50    4.50
                    *
                    *

1006          KK     78B   BASIN
1007          KM  BASIN 78B
1008          KM  THE FOLLOWING PARAMETERS WERE PROVIDED FOR THIS BASIN
1009          KM  L=0.60  Lca=0.40  S=31.7  Kn=0.050  LAG=21.7
1010          KM  PHOENIX VALLEY S-GRAPH WAS USED FOR THIS BASIN
1011          BA   0.396
1012          LG    0.30    0.17    6.80    0.15      15
1013          UI      61     254     371     576     682     457     315     156      90      48
1014          UI      20      19       0       0       0       0       0       0       0       0
                    *
                    * CURRENTLY THERE IS NO EXISTING RETENTION OR PLANNED RETENTION FOR BASIN 78B
                    * DUE TO THE CURRENT LAND USE OF LARGE LOT RESIDENTIAL.
                    *

1                                          HEC-1 INPUT                                          PAGE 24

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


1015          KK    C78B COMBINE
1016          KM  COMBINE HYDROGRAPHS 78AIB AND 78B
1017          HC       2
                    *
                    *

1018          KK   78BTC   ROUTE
1019          KM  ROUTE 78B TO 78C VIA WASH CROSSING MOUNTAIN ROAD, THEN SOUTH ALONG
1020          KM  WESTERN EDGE OF 78C.
1021          RS       3    FLOW      -1
1022          RC   0.035   0.022   0.035    4500  0.0033    0.00
1023          RX    0.00  100.00  110.00  115.00  120.00  125.00  130.00  135.00
1024          RY    5.00    4.00    3.50    0.00    0.00    3.50    8.00    9.00
                    *
                    *

1025          KK     78C   BASIN
1026          KM  BASIN 78C
1027          KM  THE FOLLOWING PARAMETERS WERE PROVIDED FOR THIS BASIN
1028          KM  L=0.50  Lca=0.30  S=31.8  Kn=0.048  LAG=17.4
1029          KM  PHOENIX VALLEY S-GRAPH WAS USED FOR THIS BASIN
1030          BA   0.288
1031          LG    0.18    0.15    7.60    0.14       6
1032          UI      80     273     428     624     405     236      96      48      17      16
1033          UI       0       0       0       0       0       0       0       0       0       0
                    *
                    *

1034          KK  RET78C  DIVERT
1035          KM  RETAIN 80% OF THE 100 YR 2 HR RUNOFF VOLUME
1036          DT  78CRET     2.2     0.0
1037          DI       0   10000
1038          DQ       0   10000
                    *
                    *

1039          KK    C78C COMBINE
1040          KM  COMBINE HYDROGRAPHS 78BTC AND 78C.
1041          HC       2
                    *
                    *

1042          KK   C78C2 COMBINE
1043          KM  COMBINE HYDROGRAPHS 77CT78 AND C78C.
                    * KO      2
1044          HC       2
                    *
                    *

1                                          HEC-1 INPUT                                          PAGE 25

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

1045          KK  78CT79   ROUTE
1046          KM  ROUTE 78C TO 79A FROM SIGNAL BUTTE ROAD TO THE PROPERTY BOUNDARY APPROXIMATEL
1047          KM  1/4 MILE TO THE WEST OF SIGNAL BUTTE ROAD VIA ENGINEERED CHANNEL.
1048          RS       2    FLOW      -1
1049          RC   0.032   0.032   0.032    4215  0.0033    0.00
1050          RX    0.00    5.00   10.00   26.00   81.00   97.00  102.00  107.00
1051          RY    5.00    4.50    4.00    0.00    0.00    4.00    4.50    5.00
                    *
                    * ***************************************************************************
                    *

1052          KK      20   BASIN
1053          KM    BASIN 20
1054          KM    THE FOLLOWING PARAMETERS WERE PROVIDED FOR THIS BASIN
1055          KM    L=1.02  Lca=0.45  S=17.6  Kn=0.044  LAG=27.3
1056          KM    PHOENIX VALLEY S-GRAPH WAS USED FOR THIS BASIN
1057          BA   0.306
1058          LG    0.25    0.15    8.00    0.10      32
1059          UI       0      38     110     194     253     365     440     317     238     173
1060          UI      88      62      38      17      12      12      12       0       0       0
1061          UI       0       0       0       0       0       0       0       0       0       0
1062          UI       0       0       0       0       0       0       0       0       0       0
1063          UI       0       0       0       0       0       0       0       0       0       0
                    *
                    *

1064          KK   RET20  DIVERT
1065          KM   RETAIN 100 YR 2 HR RUNOFF VOLUME
1066          DT   20RET   23.90     0.0
```

```
1067          DI        0   10000
1068          DQ        0   10000
              *
              *

1069          KK       16   BASIN
1070          KM    BASIN 16
1071          KM    THE FOLLOWING PARAMETERS WERE PROVIDED FOR THIS BASIN
1072          KM    L=0.44  Lca=0.21  S=34.1  Kn=0.044  LAG=13.4
1073          KM    PHOENIX VALLEY S-GRAPH WAS USED FOR THIS BASIN
1074          BA   0.106
1075          LG    0.25    0.17    6.80    0.16      31
1076          UI       0      54     160     285     188      84      33       8       8       0
1077          UI       0       0       0       0       0       0       0       0       0       0
1078          UI       0       0       0       0       0       0       0       0       0       0
1079          UI       0       0       0       0       0       0       0       0       0       0
1080          UI       0       0       0       0       0       0       0       0       0       0
              *
              *
```



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

1081          KK   RET16  DIVERT
1082          KM   RETAIN 100 YR 2 HR RUNOFF VOLUME
1083          DT   16RET    8.20     0.0
1084          DI       0   10000
1085          DQ       0   10000
              *
              *

1086          KK       18   BASIN
1087          KM    BASIN 18
1088          KM    THE FOLLOWING PARAMETERS WERE PROVIDED FOR THIS BASIN
1089          KM    L=0.72  Lca=0.33  S=25.0  Kn=0.045  LAG=20.4
1090          KM    PHOENIX VALLEY S-GRAPH WAS USED FOR THIS BASIN
1091          BA   0.320
1092          LG    0.25    0.25    5.80    0.24      27
1093          UI       0      60     226     341     561     514     348     218      96      59
1094          UI      21      16      16       0       0       0       0       0       0       0
1095          UI       0       0       0       0       0       0       0       0       0       0
1096          UI       0       0       0       0       0       0       0       0       0       0
1097          UI       0       0       0       0       0       0       0       0       0       0
              *
              *

1098          KK   RET18  DIVERT
1099          KM   RETAIN 100 YR 2 HR RUNOFF VOLUME
1100          DT   18RET   24.70     0.0
1101          DI       0   10000
1102          DQ       0   10000
              *
              *

1103          KK   18T19   ROUTE
1104          KM   ROUTE FLOW FROM BASIN 18 TO BASIN 19
1105          RS       1     FLOW      -1
1106          RC   0.030   0.015   0.003    1040   .0040
1107          RX       0     7.5       8      38      43      73    73.5      81
1108          RY     0.8     0.5       0     0.6     0.6       0     0.5     0.8
              *
              *

1109          KK   CP19A COMBINE
1110          KM   COMBINE HYDROGRAPHS RET16 AND 18T19
              * KO      2
1111          HC       2
              *
              *

1112          KK       19   BASIN
1113          KM    BASIN 19
1114          KM    THE FOLLOWING PARAMETERS WERE PROVIDED FOR THIS BASIN
1115          KM    L=0.50  Lca=0.20  S=20.0  Kn=0.044  LAG=14.9
1116          KM    PHOENIX VALLEY S-GRAPH WAS USED FOR THIS BASIN
1117          BA   0.102
1118          LG    0.24    0.15    8.40    0.09      40
```



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

1119          UI       0      41     126     233     201     114      44      18       7       0
1120          UI       0       0       0       0       0       0       0       0       0       0
1121          UI       0       0       0       0       0       0       0       0       0       0
1122          UI       0       0       0       0       0       0       0       0       0       0
1123          UI       0       0       0       0       0       0       0       0       0       0
              *
              *

1124          KK   RET19  DIVERT
1125          KM   RETAIN 100 YR 2 HR RUNOFF VOLUME
              * KO      2
1126          DT   19RET    8.40     0.0
1127          DI       0   10000
1128          DQ       0   10000
              *
              *

1129          KK       17   BASIN
1130          KM    BASIN 17
1131          KM    THE FOLLOWING PARAMETERS WERE PROVIDED FOR THIS BASIN
1132          KM    L=0.92  Lca=0.47  S=19.6  Kn=0.045  LAG=26.8
1133          KM    PHOENIX VALLEY S-GRAPH WAS USED FOR THIS BASIN
```

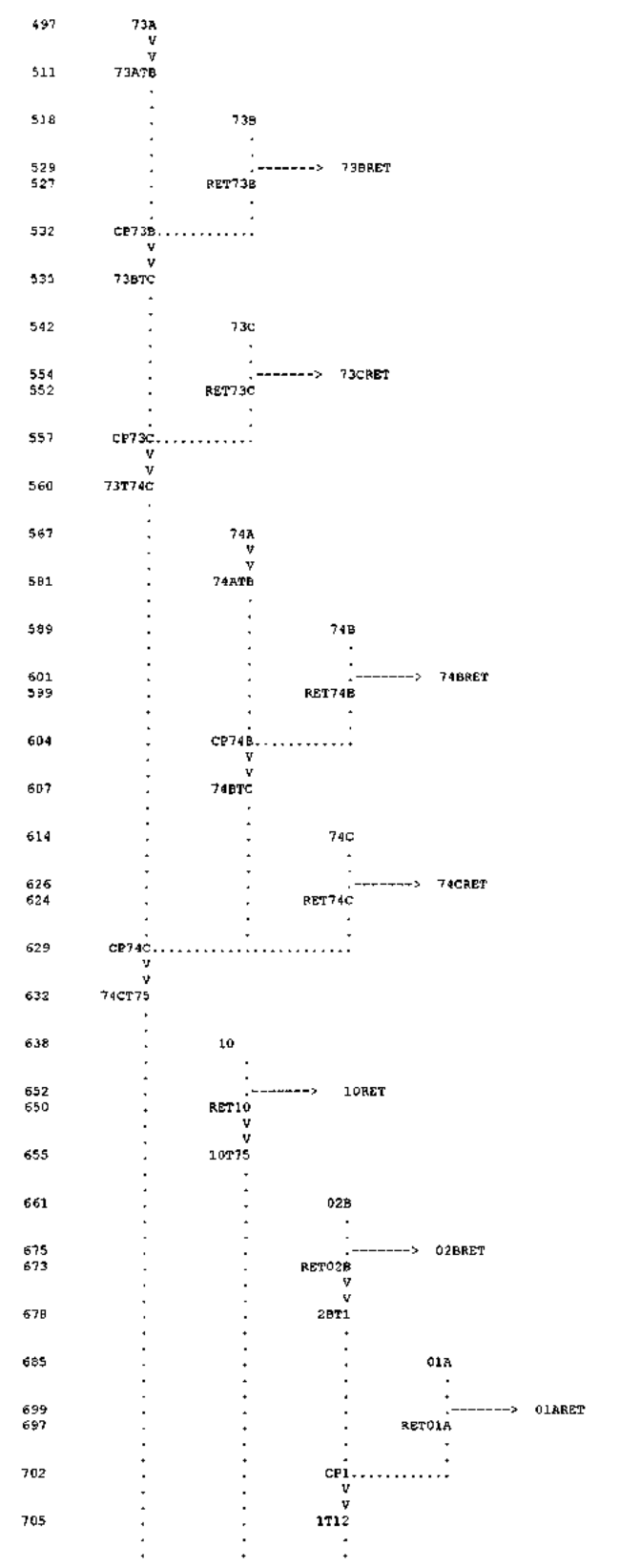
```
1134            BA   0.135
1135            LG    0.25    0.25    4.10    0.55      30
1136            UI       0      17      51      88     116     172     191     138     102      72
1137            UI      36      25      17       5       5       5       5       0       0       0
1138            UI       0       0       0       0       0       0       0       0       0       0
1139            UI       0       0       0       0       0       0       0       0       0       0
1140            UI       0       0       0       0       0       0       0       0       0       0
                *
                *

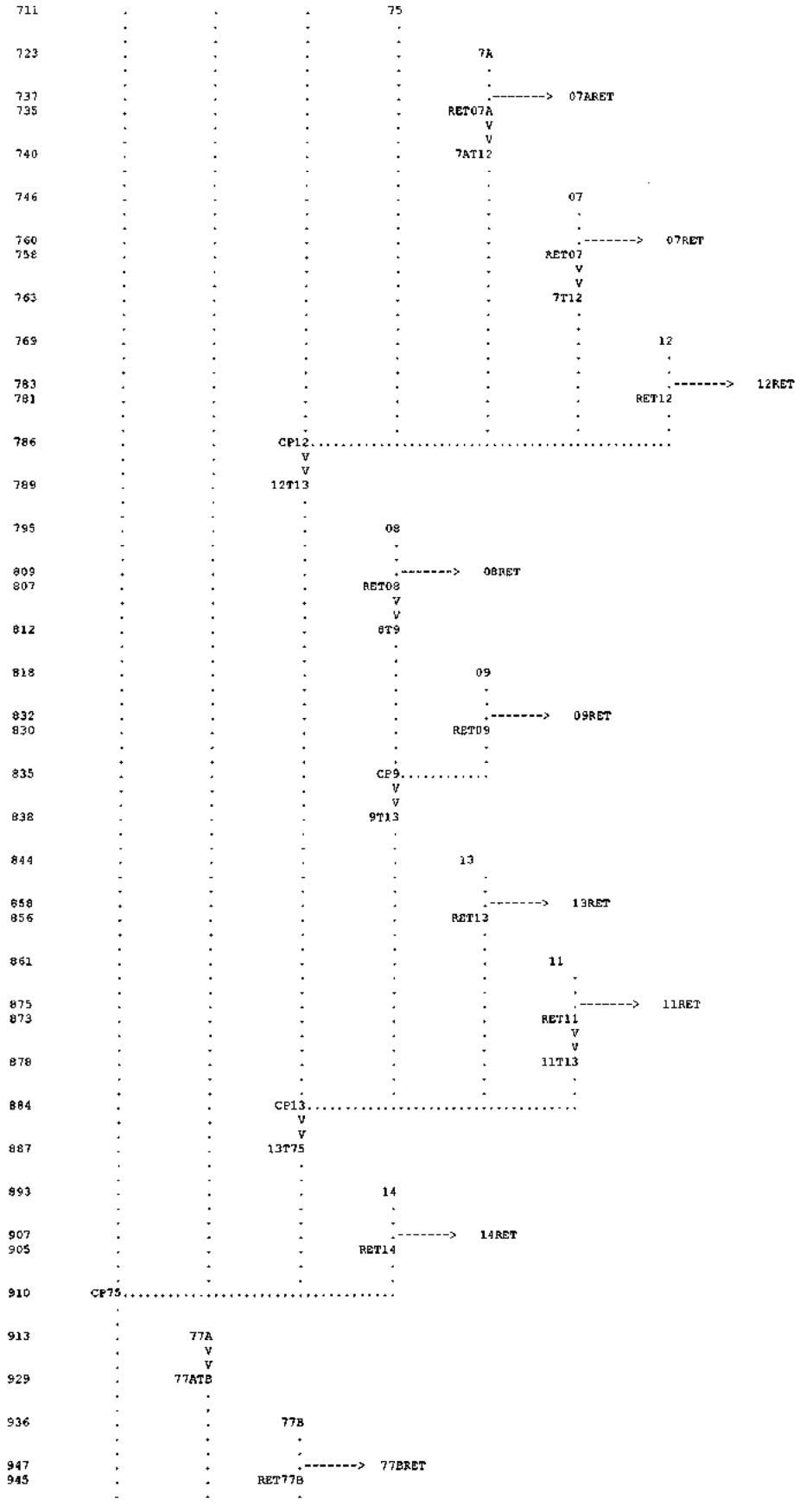
1141            KK   RET17  DIVERT
1142            KM   RETAIN 100 YR 2 HR RUNOFF VOLUME
                * KO       2
1143            DT   17RET    12.47     0.0
1144            DI       0   10000
1145            DQ       0   10000
                *
1146            ZZ
```

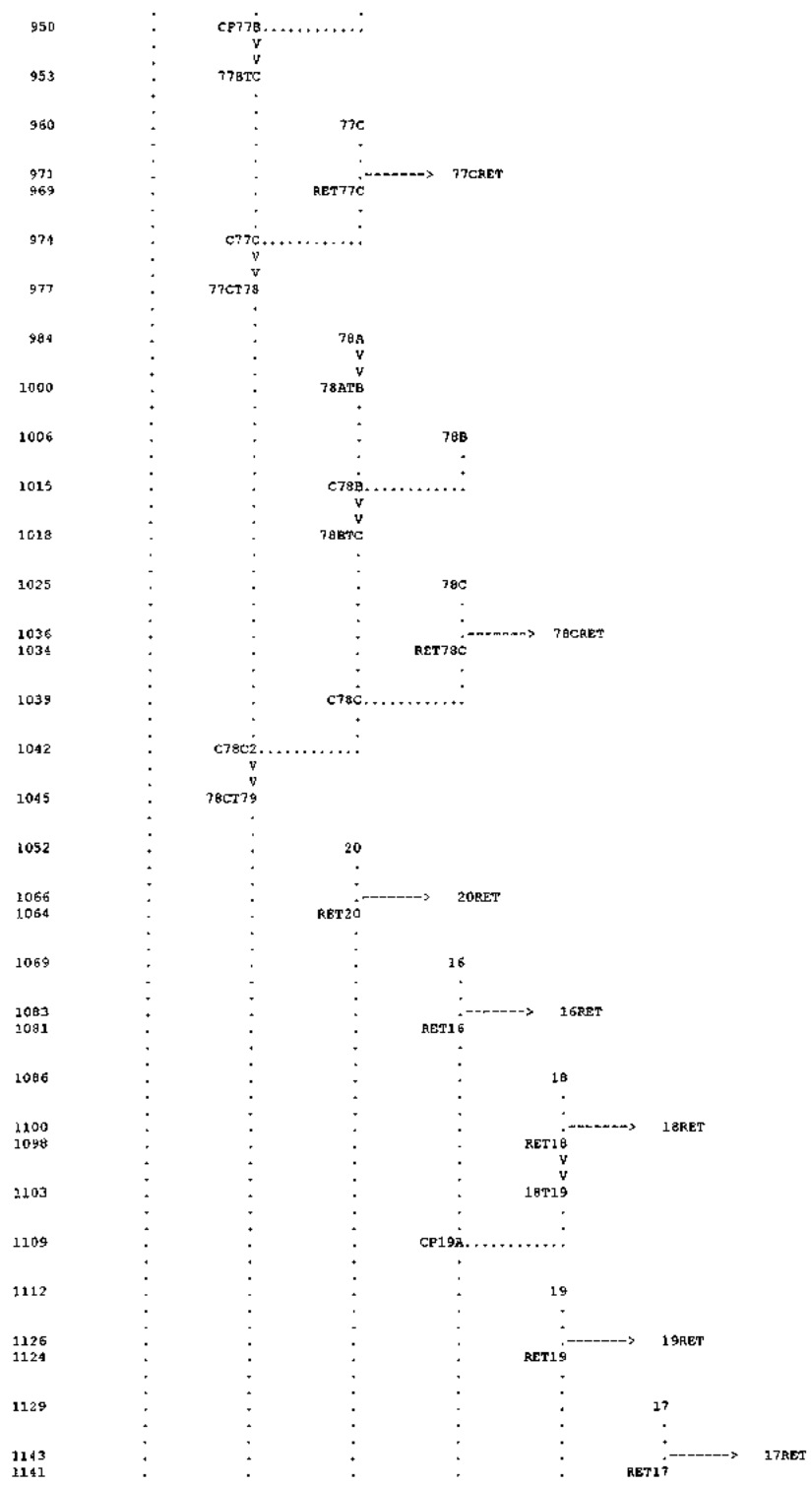
SCHEMATIC DIAGRAM OF STREAM NETWORK

INPUT LINE NO.

(V) ROUTING (.) CONNECTOR (---->) DIVERSION OR PUMP FLOW (<----) RETURN OF DIVERTED OR PUMPED FLOW




711
75
723
7A
737
07ARET
735
RET07A
740
7AT12
746
07
760
07RET
758
RET07
763
7T12
769
12
783
12RET
781
RET12
786
CP12
789
12T13
795
08
809
08RET
807
RET08
812
8T9
818
09
832
09RET
830
RET09
835
CP9
838
9T13
844
13
858
13RET
856
RET13
861
11
875
11RET
873
RET11
878
11T13
884
CP13
887
13T75
893
14
907
14RET
905
RET14
910
CP75
913
77A
929
77ATB
936
77B
947
77BRET
945
RET77B



(***) RUNOFF ALSO COMPUTED AT THIS LOCATION

```
1**************************************
*                                    *
*   FLOOD HYDROGRAPH PACKAGE  (HEC-1)  *
*              JUN  1998             *
*            VERSION 4.1             *
*                                    *
*  RUN DATE   21APR14  TIME  17:12:43  *
*                                    *
**************************************
```

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

FILE: DU5EINT.DAT

MODEL REVISED: 04-21-2014

PROJECT: MASTER DRAINAGE REPORT FOR DU 5 EAST AT EASTMARK

THIS MODEL IS AN EXERPT OF THE FULL BUILD OUT MODEL. NO REFERENCE TO OTHER MODELS IS REQUIRED TO RUN THIS MODEL.

MODEL REVISION DESCRIPTION:

THIS MODEL IS AN EXERPT OF THE MODEL PROVIDED BY THE FLOOD CONTROL DISTRICT OF MARICOPA COUNTY (WS4-SEM.DAT). LAND USE FOR DU 5E HAS CHANGED FROM GOLF TO INDUSTRIAL. AREAS THAT PREVIOUSLY DRAINED TO GOLF WHERE 100-YEAR, 24-HOUR RETENTION WAS PROVIDED WILL NOW BE REQUIRED TO SELF RETAIN RETENTION VOLUME FROM THEIR SITE FOR THE 100-YEAR, 24-HOUR STORM PEAK FLORS HAVE REMAINED THE SAME. THIS IS AN INTERIM CONDITION MODEL WHICH INCLUDES ONSITE MODELING FOR AREAS THAT HAVE HAD DETAILED MASTER PLANS PREPARED AND THE REMAINING ONSITE IS CONTEMPLATED AS EXISTING LAND USE.

MODEL REVISED BY:
WOOD, PATEL & ASSOCIATES, INC.
DANIEL MATTHEWS, P.E.

FILE PATH:
R:\MESA PROVING GROUNDS\2014\144173\PROJECT SUPPORT\REPORTS\DRAINAGE\
DU 5E DRAINAGE MASTER PLAN\HYDROLOGY\DU5EINT.DAT

****

FILE: EMDU5E.DAT

MODEL REVISED: 04-18-2014

PROJECT: EASTMARK MASTER DRAINAGE UPDATE (FOR DEVELOPMENT UNIT 5 EAST)

THIS IS A POST DEVELOPED MODEL REVISION TO REFLECT PLANNED LAND USES FOR DEVELOPMENT UNIT 5 EAST (DU 5E).

MODEL REVISION DESCRIPTION:

THIS MODEL IS AN EXERPT OF THE MODEL PROVIDED BY THE FLOOD CONTROL DISTRICT OF MARICOPA COUNTY (WS4-SEM.DAT). LAND USE FOR DU 5E HAS CHANGED FROM GOLF TO INDUSTRIAL. AREAS THAT PREVIOUSLY DRAINED TO GOLF WHERE 100-YEAR, 24-HOUR RETENTION WAS PROVIDED WILL NOW BE REQUIRED TO SELF RETAIN RETENTION VOLUME FROM THEIR SITE FOR THE 100-YEAR, 24-HOUR STORM PEAK FLOWS HAVE REMAINED THE SAME. THE REMAINING PORTION OF LAND THAT WAS ASSOCIATED WITH GOLF HAS BEEN REVISED TO RESIDENTIAL USE.

MODEL REVISED BY:
WOOD, PATEL & ASSOCIATES, INC.
DANIEL MATTHEWS, P.E.

FILE PATH:
R:\MESA PROVING GROUNDS\2014\144173\PROJECT SUPPORT\REPORTS\DRAINAGE\
EASTMARK OVERALL MASTER DRAINAGE UPDATE\HYDROLOGY\PROPOSED\EMDU5E.DAT

****

FILE: EMDU34.DAT

MODEL REVISED: 04-14-2014

PROJECT: EASTMARK MASTER DRAINAGE UPDATE FOR DEVELOPMENT UNIT 3/4

THIS IS A POST DEVELOPED MODEL REVISION TO REFLECT PLANNED LAND USES FOR DEVELOPMENT UNIT 3/4 (DU 3/4).

MODEL REVISION DESCRIPTION:

THIS MODEL IS AN EXERPT OF THE MODEL PROVIDED BY THE FLOOD CONTROL DISTRICT OF MARICOPA COUNTY (WS4-SEM.DAT). LAND USE FOR DU 3/4 HAS BEEN REVISED TO REFLECT MORE DETAILED PLANNING. MINOR ADJUSTMENTS TO LAND USES OUTSIDE OF DU 3/4 HAVE BEEN MADE. ADDITIONALLY WATERSHED BOUNDARIES HAVE BEEN REVISED TO REFLECT A CONCEPTUAL MASS GRADE PLAN PROVIDED TO WOOD/PATEL BY A CONSULTANT OF THE DEVELOPER DMB MESA PROVING GROUNDS LLC.

MODEL REVISED BY:
WOOD, PATEL & ASSOCIATES, INC.
DANIEL MATTHEWS, P.E.

FILE PATH:
R:\MESA PROVING GROUNDS\2011\113697.09\PROJECT SUPPORT\REPORTS\
EASTMARK OVERALL DRAINAGE MASTER UPDATE\HYDROLOGY\PROPOSED\EMDU34.DAT

****

FILE: EMDU3S.DAT

MODEL REVISED: 12-11-2013

PROJECT: EASTMARK MASTER DRAINAGE UPDATE FOR DEVELOPMENT UNIT 3 SOUTH

THIS IS A POST DEVELOPED MODEL REVISION TO REFLECT PLANNED LAND USES
FOR DEVELOPMENT UNIT 3 SOUTH (DU-3S).

MODEL REVISION DESCRIPTION:

THIS MODEL IS AN EXERPT OF THE MODEL PROVIDED BY THE FLOOD CONTROL
DISTRICT OF MARICOPA COUNTY (WS4-SEM.DAT). LAND USES FOR DU-3S ARE
CONSISTENT WITH THE PREVIOUS MODEL (EMDU89.DAT) THEREFORE RESULTING
PEAK FLOWS HAVE REMAINED THE SAME.

MODEL REVISED BY:
WOOD, PATEL & ASSOCIATES, INC.
DANIEL MATTHEWS, P.E.

FILE PATH:
R:\MESA PROVING GROUNDS\2011\113697.08\PROJECT SUPPORT\REPORTS\
EASTMARK OVERALL DRAINAGE MASTER UPDATE\HYDROLOGY\PROPOSED\EMDU3S.DAT

****

FILE: EMDU89.DAT

MODEL REVISED: 1-22-2013

PROJECT: EASTMARK 646

THIS IS A POST DEVELOPED MODEL REVISION TO REFLECT UPDATED PLANNING
FOR DEVELOPMENT UNITS 8&9 (DU 8&9).

MODEL REVISION DESCRIPTION:

THIS MODEL IS AN EXERPT OF THE MODEL PROVIDED BY THE FLOOD CONTROL
DISTRICT OF MARICOPA COUNTY (WS4-SEM.DAT). ONSITE WATERSHEDS WERE
UPDATED TO REFLECT CURRENT PLAN FOR DEVELOPMENT UNITS 8 & 9.

MODEL REVISED BY:
WOOD, PATEL & ASSOCIATES, INC.
DARREN E. SMITH, P.E.

FILE PATH:
R:\MESA PROVING GROUNDS\2012\123835\PROJECT SUPPORT\REPORTS\
DRAINAGE\HYDROLOGY\PROPOSED\EMDU89.DAT

****

FILE: MPGDU7.DAT

MODEL REVISED: 09-07-2011

PROJECT: MESA PROVING GROUNDS

THIS MODEL SHOULD REPLACE WS4-SEM.DAT IN THE HEC-1 RUN SEQUENCE SPECIFIE
BELOW. REFERENCING WS2-NEM.DSS IS STILL REQUIRED.

THIS IS A POST DEVELOPED MODEL REVISION TO REFLECT UPDATED PLANNING
FOR DEVELOPMENT UNIT 7 (DU7)PROVIDED BY ARIZONA LAND DESIGN ON 09/02/201
09/02/2011.

MODEL REVISION DESCRIPTION:

THIS MODEL IS AN EXERPT OF THE MODEL PROVIDED BY THE FLOOD CONTROL
DISTRICT OF MARICOPA COUNTY (WS4-SEM.DAT). ONSITE WATERSHEDS WERE
UPDATED TO REFLECT A GRADING PLAN PROVIDED BY LD TEAM ON 8/30/2011.
MODELING OF THE POWERLINE FLOODWAY HAS BEEN UPDATED TO REFLECT THE
EXISTING SECTIONS AND SLOPE PER AS-BUILT DRAWINGS ACROSS THE MPG
SITE.

MODEL REVISED BY:
WOOD, PATEL & ASSOCIATES, INC.
DANIEL W. MATTHEWS, E.I.T.

FILE PATH:
R:\MESA PROVING GROUNDS\2011\113697\PROJECT SUPPORT\REPORTS\
DRAINAGE\HYDROLOGY\MPGDU7.DAT

****

FILE: MPG20RT2.DAT

MODEL REVISED: 04-25-2011

PROJECT: MESA PROVING GROUNDS

THIS MODEL SHOULD REPLACE WS4-SEM.DAT IN THE HEC-1 RUN SEQUENCE SPECIFIE
BELOW. REFERENCING WS2-NEM.DSS IS STILL REQUIRED.

THIS IS A 100-YEAR, 2-HOUR RETENTION SCENARIO MODEL USING
THE 20MSF COMMERCIAL SPACE AND 15K DU LAND PLAN PROVIDED
BY SNABACK PARTNERS ON 12/12/07.

MODEL REVISION DESCRIPTION:

THIS MODEL IS AN EXERPT OF THE MODEL PROVIDED BY THE FLOOD CONTROL
DISTRICT OF MARICOPA COUNTY (WS4-SEM.DAT). ONSITE WATERSHEDS 01 AND
20 WERE UPDATED TO REFLECT THE INCORPORATION OF THE FIRST SOLAR SITE
IN THE NORTHEAST CORNER OF DU-6. WATERSHED 02 WAS SPLIT INTO 02A AND
02B. LAND USE WAS CHANGED TO INDUSTRIAL FOR 02B AND ENTIRELY
RESIDENTIAL FOR 02A.

THE FIRST SOLAR SITE RUNOFF WILL NOW BE RETAINED ENTIRELY ONSITE.

MODEL REVISED BY:
WOOD, PATEL & ASSOCIATES, INC.
STEPHEN M. SCINTO, P.E.

FILE PATH:
R:\MESA PROVING GROUNDS\2010\103564.04\PROJECT SUPPORT\REPORTS\
DRAINAGE\HYDROLOGY\POST-DEVELOPED 100YR2HR RETENTION MODEL\
MPG20RT2.DAT

****

FILE: MPG20RT2.DAT

MODEL REVISED: 09-16-08

PROJECT: MESA PROVING GROUNDS

THIS MODEL SHOULD REPLACE WS4-SEM.DAT IN THE HEC-1 RUN SEQUENCE SPECIFIE
BELOW. REFERENCING WS2-NEM.DSS IS STILL REQUIRED.

THIS IS A 100-YEAR, 2-HOUR RETENTION SCENARIO MODEL USING
THE 20MSF COMMERCIAL SPACE AND 15K DU LAND PLAN PROVIDED
BY SWABACK PARTNERS ON 12/12/07.

MODEL REVISION DESCRIPTION:

THIS MODEL IS AN EXERPT OF THE MODEL PROVIDED BY THE FLOOD CONTROL
DISTRICT OF MARICOPA COUNTY (WS4-SEM.DAT). ONSITE WATERSHEDS 01, 02,
03, AND 06 WERE UPDATED TO REFLECT THE CURRENT GOLF COURSE
CONFIGURATION.

MODEL REVISED BY:
WOOD, PATEL & ASSOCIATES, INC.
DANIEL W. MATTHEWS, E.I.T.

FILE PATH:
R:\MESA PROVING GROUNDS\2006\062753\PROJECT SUPPORT\HYDRO\MDR-20-15 LAND
PLAN\2ND SUBMITTAL(COM)\HYDROLOGY\MPG20RT2.DAT

****

FILE: MPG20RT2.DAT

MODEL REVISED: 05-15-08

PROJECT: MESA PROVING GROUNDS

MODEL REVISION DESCRIPTION:

THIS MODEL SHOULD REPLACE WS4-SEM.DAT IN THE HEC-1 RUN SEQUENCE SPECIFIE
BELOW. REFERENCING WS2-NEM.DSS IS STILL REQUIRED.

THIS IS A 100-YEAR, 2-HOUR RETENTION SCENARIO MODEL USING
THE 20MSF COMMERCIAL SPACE AND 15K DU LAND PLAN PROVIDED
BY SWABACK PARTNERS ON 12/12/07.

THIS MODEL IS AN EXERPT OF THE MODEL PROVIDED BY THE FLOOD CONTROL
DISTRICT OF MARICOPA COUNTY (WS4-SEM.DAT). WATERSHED 79A WAS UPDATED
AS REQUESTED BY FLOOD CONTROL DISTRICT OF MARICOPA COUNTY TO REDUCE THE
PERCENT IMPERVIOUS VALUE FROM 80% TO 0% TO MATCH THE LAND USE AS MODELED
WITHIN THE EAST MESA ADMP.

MODEL REVISED BY:
WOOD, PATEL & ASSOCIATES, INC.
DANIEL W. MATTHEWS, E.I.T.

FILE PATH:
R:\MESA PROVING GROUNDS\2006\062753\PROJECT SUPPORT\HYDRO\MDR-20-15 LAND
PLAN\2ND SUBMITTAL\POST-DEVELOPED 100YR2HR RETENTION MODEL (MPG20RT2)\
MPG20RT2.DAT

****

FILE: MPG20RT2.DAT

MODEL REVISED: 01-08-08

PROJECT: MESA PROVING GROUNDS

MODEL REVISION DESCRIPTION:

THIS MODEL SHOULD REPLACE WS4-SEM.DAT IN THE HEC-1 RUN SEQUENCE SPECIFIE
BELOW. REFERENCING WS2-NEM.DSS IS STILL REQUIRED.

THIS IS A 100-YEAR, 2-HOUR RETENTION SCENARIO MODEL USING
THE 20MSF COMMERCIAL SPACE AND 15K DU LAND PLAN PROVIDED
BY SWABACK PARTNERS ON 12/12/07.

THIS MODEL IS AN EXERPT OF THE MODEL PROVIDED BY THE FLOOD CONTROL
DISTRICT OF MARICOPA COUNTY (WS4-SEM.DAT). WATERSHEDS 68A, 68B,
70A, 70B, 71, 73B, 73C, 74B, 74C, 75, 77B, 77C, 78B, 78C, AND 79A
HAVE ALL BEEN UPDATED TO REFLECT CURRENT WATERSHED DELINEATIONS,
NEW DEVELOPMENT, CURRENT RETENTION,AND FLOOD ROUTING. BASIN 79
HAS BEEN UPDATED TO REFLECT PLANNED DEVELOPEMENT FOR THE MESA
PROVING GROUNDS SITE.

MODEL REVISED BY:
WOOD, PATEL & ASSOCIATES, INC.

```
     DANIEL W. MATTHEWS, E.I.T.

     FILE PATH:
     R:\MESA PROVING GROUNDS\2006\062753\PROJECT SUPPORT\HYDRO\MDR-20-15 LAND
     PLAN\HYDROLOGY\POST-DEVELOPED 100YR2HR RETENTION MODEL (MPG20RT2)\
     MPG20RT2.DAT

*************************************************************************


  ID  Kirkham Michael:
  Last Revised Date:  1/22/03
  Filename:  WS4-SEM.DAT

  Comments Dated 1/22/03 (CJ)

  This model should be used ONLY for the Rittenhouse and Chandler Heights
  Basin Design Project - final 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 FLOODWAY
  CAPACITY MITIGATION AND MULTI-USE CORRIDOR STUDY
  TO ROUTE BOTH THE POWERLINE FLOODWAY
  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 & Sidewair
 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
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                    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 NSBUILD.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 MCOH#2 SE MESA ADMP - SOUTH OF SUPERSTITION FWY, FUTURE CONDITIONS

476 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        600  NUMBER OF HYDROGRAPH ORDINATES
                      NDDATE    3APR97  ENDING DATE
                      NDTIME       0155  ENDING TIME
                      ICENT         19  CENTURY MARK

                    COMPUTATION INTERVAL      .08 HOURS
                        TOTAL TIME BASE   49.92 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

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

479 PI         PRECIPITATION PATTERN
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.03	.09	.09	.09	.01	.01	.01	.01	.01	.01
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489 JD INDEX STORM NO. 2

STRM	3.58	PRECIPITATION DEPTH
TRDA	1.00	TRANSPOSITION DRAINAGE AREA

0 PI PRECIPITATION PATTERN

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490 JD INDEX STORM NO. 3

STRM	3.49	PRECIPITATION DEPTH
TRDA	5.00	TRANSPOSITION DRAINAGE AREA

0 PI PRECIPITATION PATTERN

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491 JD INDEX STORM NO. 4

STRM	3.38	PRECIPITATION DEPTH
TRDA	10.00	TRANSPOSITION DRAINAGE AREA

0 PI PRECIPITATION PATTERN

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.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		

492 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
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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
.01	.01	.01	.01	.01	.01	.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		

493 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
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.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
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.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
.00	.00	.00	.00	.00	.00	.00	.00		

494 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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.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
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.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
.00	.00	.00	.00	.00	.00	.00	.00		

495 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
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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
.01	.01	.01	.01	.01	.01	.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		

496 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
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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
.01	.01	.01	.01	.01	.01	.00	.00	.00	.00
.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
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HYDROGRAPH MULTIPLIED BY .15

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WARNING EXCESS AT PONDING LESS THAN ZERO FOR PERIOD. EXCESS SET TO ZERO

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	73A	378.	13.33	96.	24.	12.	.95		
+	ROUTED TO	73ATB	355.	13.50	96.	24.	12.	.95		
+	HYDROGRAPH AT	73B	748.	12.08	68.	20.	10.	.43		
+	DIVERSION TO	73BRET	748.	12.08	68.	20.	10.	.43		
+	HYDROGRAPH AT	RET73B	4.	20.75	2.	1.	0.	.43		
+	2 COMBINED AT	CP73B	355.	13.50	96.	25.	12.	1.38		
+	ROUTED TO	73BTC	332.	13.83	95.	24.	12.	1.38		
+	HYDROGRAPH AT	73C	822.	12.25	94.	28.	14.	.58		
+	DIVERSION TO	73CRET	822.	12.25	70.	19.	9.	.58		
+	HYDROGRAPH AT	RET73C	501.	12.42	33.	10.	5.	.58		
+	2 COMBINED AT	CP73C	441.	12.42	124.	33.	16.	1.96		
+	ROUTED TO	73T74C	347.	14.08	122.	33.	16.	1.96		
+	HYDROGRAPH AT	74A	306.	13.33	77.	19.	9.	.75		
+	ROUTED TO	74ATB	300.	13.42	77.	19.	9.	.75		
+	HYDROGRAPH AT	74B	455.	12.25	55.	16.	8.	.33		
+	DIVERSION TO	74BRET	455.	12.25	33.	9.	4.	.33		
+	HYDROGRAPH AT	RET74B	382.	12.33	27.	8.	4.	.33		
+	2 COMBINED AT	CP74B	445.	12.33	103.	27.	13.	1.08		
+	ROUTED TO	74BTC	410.	12.42	103.	27.	13.	1.08		
+	HYDROGRAPH AT	74C	516.	12.25	62.	18.	9.	.34		
+	DIVERSION TO	74CRET	516.	12.25	42.	11.	5.	.34		
+	HYDROGRAPH AT	RET74C	360.	12.42	25.	7.	3.	.34		
+	3 COMBINED AT	CP74C	713.	12.42	239.	64.	31.	3.39		
+	ROUTED TO	74CT75	523.	14.17	238.	64.	31.	3.39		
+	HYDROGRAPH AT	10	216.	12.42	30.	9.	4.	.17		
+	DIVERSION TO	10RET	216.	12.42	30.	9.	4.	.17		
+	HYDROGRAPH AT	RET10	0.	.00	0.	0.	0.	.17		
+	ROUTED TO	10T75	0.	.00	0.	0.	0.	.17		
+	HYDROGRAPH AT	02B	249.	12.17	28.	9.	4.	.15		
+	DIVERSION TO	02BRET	249.	12.17	28.	8.	4.	.15		
+	HYDROGRAPH AT	RET02B	9.	13.83	4.	2.	1.	.15		
+	ROUTED TO	2ST1	5.	16.50	4.	2.	1.	.15		

+	HYDROGRAPH AT	01A	292.	12.17	29.	10.	5.	.14
+	DIVERSION TO	01ARET	292.	12.17	29.	10.	5.	.14
+	HYDROGRAPH AT	RET01A	0.	.00	0.	0.	0.	.14
+	2 COMBINED AT	CP1	5.	16.50	4.	2.	1.	.28
+	ROUTED TO	1T12	4.	20.75	4.	2.	1.	.28
+	HYDROGRAPH AT	7B	190.	13.08	42.	11.	5.	1.83
+	HYDROGRAPH AT	7A	148.	12.25	17.	5.	2.	.09
+	DIVERSION TO	07ARET	148.	12.25	17.	5.	2.	.09
+	HYDROGRAPH AT	RET07A	0.	.00	0.	0.	0.	.09
+	ROUTED TO	7AT12	0.	.00	0.	0.	0.	.09
+	HYDROGRAPH AT	07	237.	12.17	23.	7.	3.	.12
+	DIVERSION TO	07RET	237.	12.17	23.	7.	3.	.12
+	HYDROGRAPH AT	RET07	0.	.00	0.	0.	0.	.12
+	ROUTED TO	7T12	0.	.00	0.	0.	0.	.12
+	HYDROGRAPH AT	12	291.	12.17	32.	11.	5.	.16
+	DIVERSION TO	12RET	291.	12.17	26.	7.	3.	.16
+	HYDROGRAPH AT	RET12	117.	12.42	11.	3.	2.	.16
+	5 COMBINED AT	CP12	206.	13.08	51.	15.	7.	2.47
+	ROUTED TO	12T13	199.	13.25	51.	15.	7.	2.47
+	HYDROGRAPH AT	08	626.	12.58	105.	32.	15.	.62
+	DIVERSION TO	08RET	626.	12.58	103.	28.	13.	.62
+	HYDROGRAPH AT	RET08	24.	14.33	12.	4.	2.	.62
+	ROUTED TO	8T9	21.	14.58	12.	4.	2.	.62
+	HYDROGRAPH AT	09	191.	12.25	21.	7.	3.	.13
+	DIVERSION TO	09RET	191.	12.25	20.	6.	3.	.13
+	HYDROGRAPH AT	RET09	8.	13.33	3.	1.	1.	.13
+	2 COMBINED AT	CP9	25.	14.58	14.	5.	2.	.74
+	ROUTED TO	9T13	23.	15.08	14.	5.	2.	.74
+	HYDROGRAPH AT	13	266.	12.33	36.	12.	6.	.20
+	DIVERSION TO	13RET	266.	12.33	29.	8.	4.	.20
+	HYDROGRAPH AT	RET13	108.	12.67	12.	4.	2.	.20
+	HYDROGRAPH AT	11	514.	12.25	63.	21.	10.	.31
+	DIVERSION TO	11RET	514.	12.25	60.	17.	8.	.31
+	HYDROGRAPH AT	RET11	29.	13.33	12.	4.	2.	.31
	ROUTED TO							

+		11T13	26.	13.50	12.	4.	2.	.31
+	4 COMBINED AT	CP13	219.	12.75	77.	26.	13.	3.72
+	ROUTED TO	13T75	218.	12.83	77.	26.	13.	3.72
+	HYDROGRAPH AT	14	220.	12.08	22.	8.	4.	.09
+	DIVERSION TO	14RET	220.	12.08	17.	5.	2.	.09
+	HYDROGRAPH AT	RET14	84.	12.25	8.	3.	1.	.09
+	4 COMBINED AT	CP75	631.	13.08	297.	86.	41.	7.38
+	HYDROGRAPH AT	77A	556.	13.75	174.	43.	21.	1.74
+	ROUTED TO	77ATB	525.	13.83	173.	43.	21.	1.74
+	HYDROGRAPH AT	77B	542.	12.17	48.	14.	7.	.35
+	DIVERSION TO	77BRET	529.	12.08	31.	8.	4.	.35
+	HYDROGRAPH AT	RET77B	455.	12.25	20.	5.	3.	.35
+	2 COMBINED AT	CP77B	529.	13.83	191.	49.	23.	2.09
+	ROUTED TO	77BTC	503.	14.08	188.	49.	23.	2.09
+	HYDROGRAPH AT	77C	407.	12.25	46.	14.	7.	.28
+	DIVERSION TO	77CRET	407.	12.25	31.	8.	4.	.28
+	HYDROGRAPH AT	RET77C	280.	12.33	19.	5.	3.	.28
+	2 COMBINED AT	C77C	510.	14.08	206.	54.	26.	2.37
+	ROUTED TO	77CT78	493.	14.42	202.	54.	26.	2.37
+	HYDROGRAPH AT	78A	601.	13.75	188.	47.	23.	1.88
+	ROUTED TO	78ATB	520.	14.42	187.	47.	23.	1.88
+	HYDROGRAPH AT	78B	598.	12.25	62.	17.	8.	.40
+	2 COMBINED AT	C78B	608.	12.25	245.	64.	31.	2.28
+	ROUTED TO	78BTC	501.	14.75	245	64.	31.	2.28
+	HYDROGRAPH AT	78C	494.	12.17	44.	11.	5.	.29
+	DIVERSION TO	78CRET	83.	11.75	4.	1.	1.	.29
+	HYDROGRAPH AT	RET78C	494.	12.17	40.	10.	5.	.29
+	2 COMBINED AT	C78C	821.	12.17	283.	73.	35.	2.56
+	2 COMBINED AT	C78C2	946.	14.58	470.	124.	60.	4.93
+	ROUTED TO	78CT79	935.	14.75	466.	124.	60.	4.93
+	HYDROGRAPH AT	20	434.	12.42	59.	18.	8.	.31
+	DIVERSION TO	20RET	434.	12.42	45.	12.	6.	.31
+	HYDROGRAPH AT	RET20	227.	12.67	19.	5.	3.	.31
+	HYDROGRAPH AT	16	210.	12.17	19.	6.	3.	.11
+	DIVERSION TO	16RET	210.	12.17	15.	4.	2.	.11

+	HYDROGRAPH AT	RET16	61.	12.42	5.	2.	1.	.11
+	HYDROGRAPH AT	18	479.	12.25	51.	15.	7.	.32
+	DIVERSION TO	18RET	479.	12.25	47.	12.	6.	.32
+	HYDROGRAPH AT	RET18	40.	12.83	8.	3.	1.	.32
+	ROUTED TO	18T19	32.	12.92	8.	3.	1.	.32
+	2 COMBINED AT	CP19A	61.	12.42	13.	4.	2.	.43
+	HYDROGRAPH AT	19	200.	12.17	21.	6.	3.	.10
+	DIVERSION TO	19RET	200.	12.17	16.	4.	2.	.10
+	HYDROGRAPH AT	RET19	81.	12.42	7.	2.	1.	.10
+	HYDROGRAPH AT	17	152.	12.42	19.	6.	3.	.14
+	DIVERSION TO	17RET	152.	12.42	19.	6.	3.	.14
+	HYDROGRAPH AT	RET17	0.	.00	0.	0.	0.	.14

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

NOAA Atlas Precipitation Data

POINT PRECIPITATION FREQUENCY ESTIMATES FROM NOAA ATLAS 14

Arizona 33.3325 N 111.62 W 1420 feet

from "Precipitation-Frequency Atlas of the United States" NOAA Atlas 14, Volume 1, Version 4
G.M. Bonnin, D. Martin, B. Lin, T. Parzybok, M. Yekta, and D. Riley
NOAA, National Weather Service, Silver Spring, Maryland, 2006

Extracted: Mon Oct 22 2007

Confidence Limits | Seasonality | Location Maps | Other Info. | GIS data | Maps | Help | D

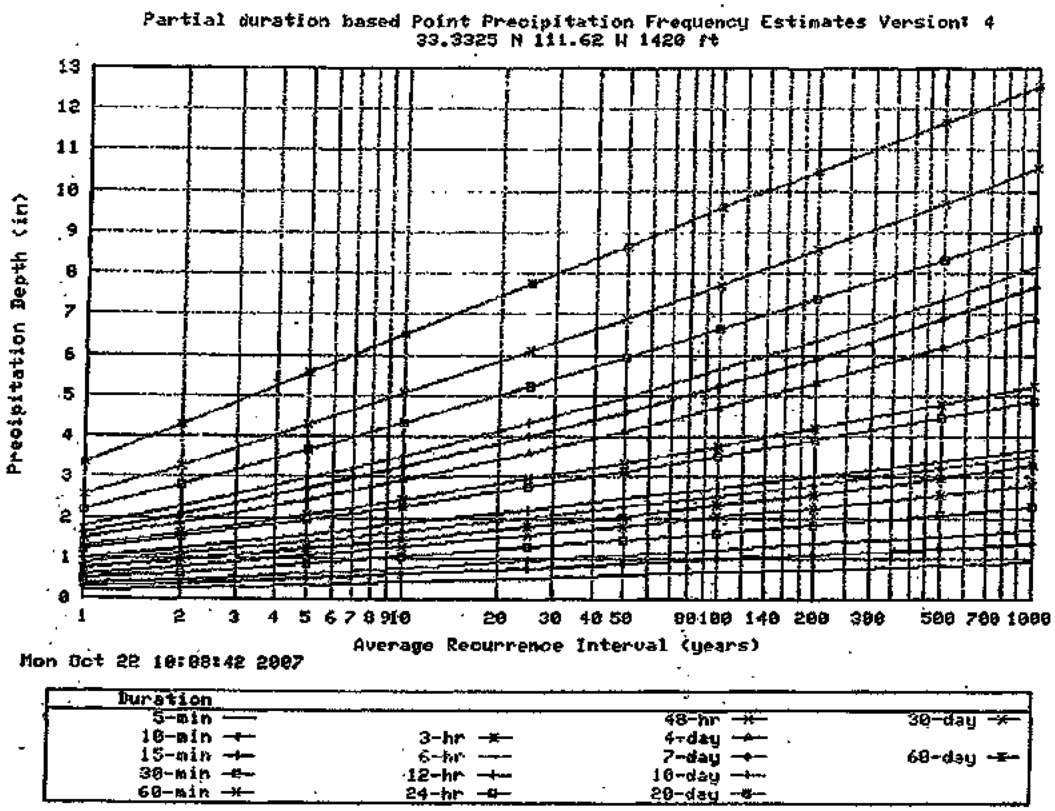
Precipitation Frequency Estimates (inches)

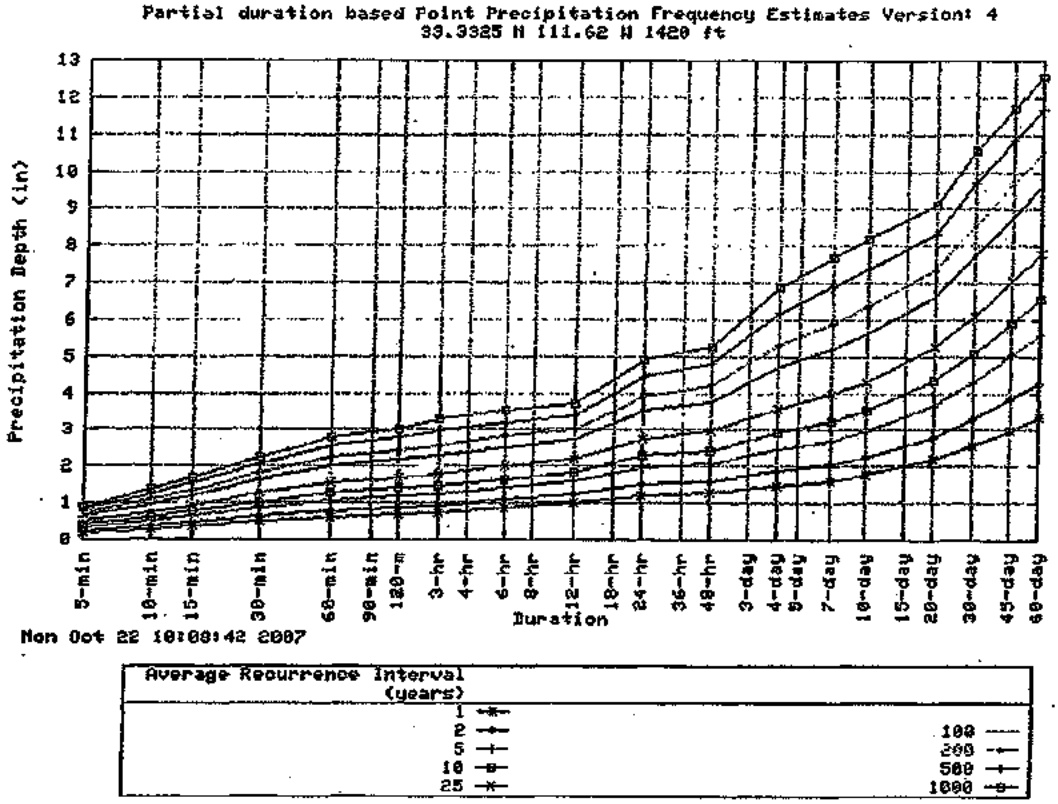
ARI* (years)	5 min	10 min	15 min	30 min	60 min	120 min	3 hr	6 hr	12 hr	24 hr	48 hr	4 day	7 day	10 day	20 day	30 day	45 day	60 day
1	0.19	0.29	0.36	0.48	0.60	0.68	0.73	0.88	0.99	1.21	1.27	1.47	1.62	1.77	2.19	2.56	2.99	3.33
2	0.25	0.38	0.47	0.63	0.78	0.89	0.93	1.11	1.26	1.52	1.61	1.87	2.07	2.25	2.81	3.28	3.84	4.28
5	0.34	0.51	0.64	0.85	1.06	1.18	1.22	1.42	1.58	1.95	2.08	2.45	2.71	2.96	3.68	4.29	5.02	5.58
10	0.40	0.61	0.76	1.03	1.27	1.40	1.45	1.66	1.84	2.29	2.44	2.92	3.24	3.52	4.35	5.06	5.90	6.53
25	0.50	0.76	0.94	1.26	1.56	1.71	1.77	2.00	2.19	2.75	2.95	3.59	3.98	4.32	5.25	6.10	7.05	7.76
50	0.57	0.86	1.07	1.44	1.78	1.95	2.03	2.26	2.46	3.12	3.35	4.13	4.59	4.96	5.94	6.91	7.93	8.68
100	0.64	0.97	1.21	1.63	2.01	2.19	2.30	2.54	2.74	3.51	3.77	4.70	5.24	5.64	6.65	7.73	8.81	9.60
200	0.71	1.09	1.35	1.81	2.24	2.44	2.58	2.82	3.02	3.90	4.20	5.31	5.92	6.36	7.37	8.57	9.69	10.49
500	0.81	1.24	1.53	2.06	2.56	2.78	2.97	3.21	3.40	4.45	4.79	6.17	6.89	7.36	8.35	9.70	10.84	11.66
1000	0.89	1.35	1.68	2.26	2.79	3.04	3.28	3.52	3.69	4.88	5.25	6.87	7.68	8.17	9.10	10.57	11.71	12.53

Text version of table

*These precipitation frequency estimates are based on a partial duration series. ARI is the Average Recurrence Interval. Please refer to the documentation for more information. NOTE: Formatting forces estimates near zero to appear as zero.

MESA PROVING GROUNDS ONSITE PRECIPITATION DEPTHS


Partial duration based Point Precipitation Frequency Estimates Version: 4
33.3325 N 111.62 W 1420 ft
Precipitation Depth (in)
Average Recurrence Interval (years)
Mon Oct 22 10:08:42 2007
Duration
5-min
10-min
15-min
30-min
60-min
3-hr
6-hr
12-hr
24-hr
48-hr
4-day
7-day
10-day
20-day
30-day
60-day



Confidence Limits -

*** Upper bound of the 90% confidence interval**
Precipitation Frequency Estimates (inches)

ARI** (years)	5 min	10 min	15 min	30 min	60 min	120 min	3 hr	6 hr	12 hr	24 hr	48 hr	4 day	7 day	10 day	20 day	30 day	45 day	60 day
1	0.23	0.35	0.44	0.59	0.73	0.82	0.89	1.03	1.14	1.36	1.42	1.62	1.79	1.95	2.42	2.81	3.29	3.65
2	0.30	0.46	0.57	0.77	0.96	1.06	1.14	1.31	1.44	1.72	1.81	2.07	2.28	2.48	3.10	3.60	4.22	4.70
5	0.41	0.62	0.77	1.04	1.29	1.41	1.49	1.67	1.81	2.19	2.33	2.70	2.99	3.25	4.05	4.70	5.51	6.12
10	0.49	0.75	0.93	1.25	1.54	1.68	1.76	1.95	2.10	2.57	2.74	3.22	3.57	3.86	4.79	5.54	6.48	7.16
25	0.60	0.91	1.13	1.52	1.88	2.04	2.14	2.33	2.49	3.09	3.30	3.94	4.38	4.73	5.77	6.68	7.75	8.52
50	0.68	1.04	1.29	1.74	2.15	2.32	2.44	2.63	2.79	3.50	3.75	4.54	5.05	5.43	6.54	7.56	8.71	9.53
100	0.77	1.17	1.45	1.95	2.42	2.61	2.76	2.95	3.11	3.93	4.22	5.18	5.76	6.18	7.33	8.48	9.69	10.55
200	0.86	1.30	1.61	2.17	2.69	2.90	3.09	3.28	3.43	4.38	4.71	5.86	6.53	6.97	8.13	9.41	10.67	11.55
500	0.98	1.49	1.84	2.48	3.07	3.30	3.56	3.74	3.88	5.01	5.40	6.83	7.62	8.11	9.24	10.69	11.98	12.88
1000	1.07	1.63	2.02	2.72	3.36	3.63	3.94	4.11	4.24	5.53	5.95	7.63	8.53	9.02	10.11	11.71	12.99	13.88

* The upper bound of the confidence interval at 90% confidence level is the value which 5% of the simulated quantile values for a given frequency are greater than.
** These precipitation frequency estimates are based on a partial duration series. ARI is the Average Recurrence Interval.
Please refer to the documentation for more information. NOTE: Formatting prevents estimates near zero to appear as zero.

*** Lower bound of the 90% confidence interval**

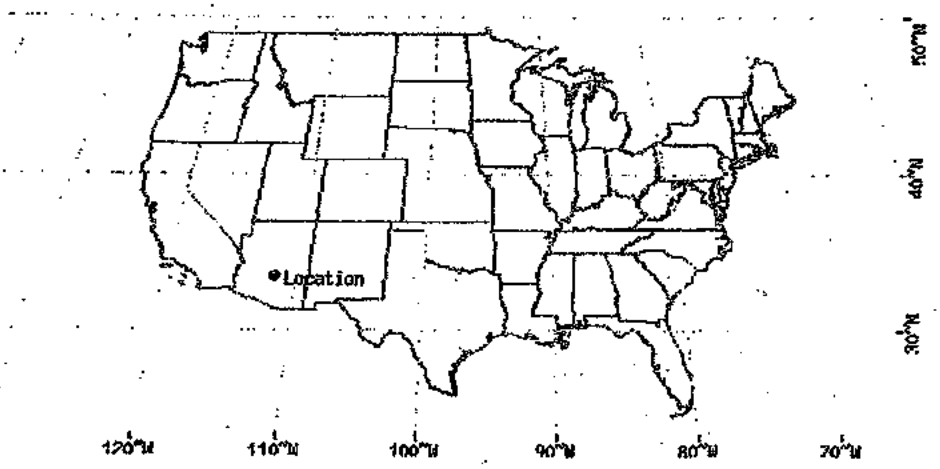
Precipitation Frequency Estimates (inches)

ARI** (years)	5 min	10 min	15 min	30 min	60 min	120 min	3 hr	6 hr	12 hr	24 hr	48 hr	4 day	7 day	10 day	20 day	30 day	45 day	60 day
1	0.16	0.24	0.30	0.41	0.50	0.58	0.61	0.76	0.87	1.08	1.14	1.34	1.48	1.61	1.99	2.33	2.72	3.04
2	0.21	0.32	0.40	0.53	0.66	0.75	0.79	0.96	1.10	1.37	1.44	1.70	1.88	2.06	2.55	2.98	3.49	3.90
5	0.28	0.43	0.53	0.71	0.88	0.99	1.03	1.22	1.39	1.74	1.86	2.22	2.46	2.69	3.34	3.90	4.56	5.08
10	0.34	0.51	0.63	0.85	1.05	1.17	1.21	1.42	1.60	2.04	2.18	2.64	2.93	3.19	3.93	4.60	5.35	5.93
25	0.41	0.62	0.76	1.03	1.27	1.41	1.46	1.69	1.88	2.43	2.61	3.23	3.58	3.90	4.73	5.52	6.38	7.03
50	0.46	0.70	0.86	1.16	1.44	1.58	1.64	1.88	2.09	2.73	2.94	3.69	4.10	4.44	5.33	6.22	7.14	7.83
100	0.51	0.77	0.96	1.29	1.59	1.75	1.82	2.07	2.29	3.04	3.27	4.17	4.64	5.01	5.94	6.93	7.90	8.62
200	0.56	0.84	1.05	1.41	1.75	1.91	2.01	2.26	2.49	3.34	3.60	4.66	5.20	5.60	6.54	7.63	8.63	9.38
500	0.62	0.94	1.16	1.57	1.94	2.12	2.25	2.51	2.73	3.74	4.03	5.34	5.96	6.40	7.33	8.55	9.58	10.35
1000	0.66	1.00	1.25	1.68	2.08	2.27	2.42	2.68	2.92	4.04	4.35	5.88	6.57	7.03	7.92	9.23	10.28	11.05

* The lower bound of the confidence interval at 90% confidence level is the value which 5% of the simulated quantile values for a given frequency are less than.
** These precipitation frequency estimates are based on a partial duration maxima series. ARI is the Average Recurrence Interval.

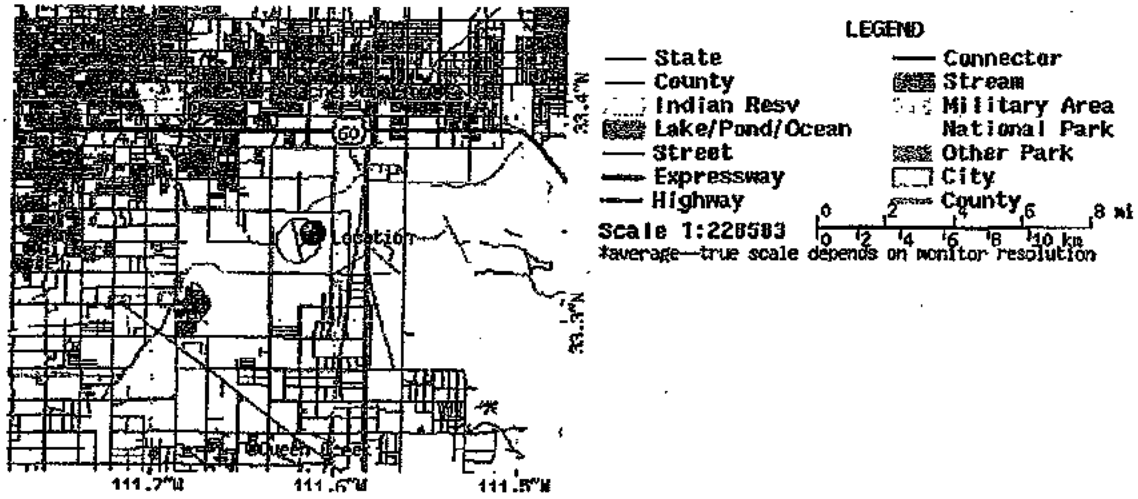
Please refer to the documentation for more information. NOTE: Formatting prevents estimates near zero to appear as zero.

Maps -



These maps were produced using a direct map request from the U.S. Census Bureau Mapping and Cartographic Resources Tiger Map Server.

Please read disclaimer for more information.



Other Maps/Photographs -

View USGS digital orthophoto quadrangle (DOQ) covering this location from TerraServer; USGS Aerial Photograph may also be available
from this site. A DOQ is a computer-generated image of an aerial photograph in which image displacement caused by terrain relief and camera tilts has been removed. It combines the image characteristics of a photograph with the geometric qualities of a map. Visit the USGS for more information.

Watershed/Stream Flow Information -

Find the Watershed for this location using the U.S. Environmental Protection Agency's site.

Climate Data Sources -

Precipitation frequency results are based on data from a variety of sources, but largely NCDC. The following links provide general information
about observing sites in the area, regardless of if their data was used in this study. For detailed information about the stations used in this study,
please refer to our documentation.

Using the National Climatic Data Center's (NCDC) station search engine, locate other climate stations within:

+/-30 minutes ...OR... +/-1 degree of this location (33.3325/-111.62). Digital ASCII data can be obtained directly from NCDC.

Find Natural Resources Conservation Service (NRCS) SNOTEL (SNOwpack TELemetry) stations by visiting the Western Regional Climate Center's state-specific SNOTEL station maps.

Hydrometeorological Design Studies Center
DOC/NOAA/National Weather Service
1325 East-West Highway
Silver Spring, MD 20910
(301) 713-1669
Questions?: HDSC.Questions@noaa.gov

Disclaimer

Interim Condition HEC-1 Sub-Basin Data

Table 1 - Interim Condition HEC-1 Sub-Basin Data

Description: Sub-basin data based on aerial photo and proposed topography

Location Eastmark - East Mesa, Arizona

Reference: DDMSW Version 4.6.0

ONSITE BASINS										
Sub-Basin ID	Basin Area (sq. ft.)	Basin Area (acres)	Basin Area (sq. mi)	Length (ft)	Length (mi)	Length +10% (mi)[1]	USGE (ft)	DSGE (ft)	Lca (ft)	Lca (mi)
75	51,100,467	1,173.11	1.833	12800	2.42	2.66	1450.0	1395.0	6430	1.22
1A	3,813,413	87.54	0.137	2340	0.44	0.48	1443.0	1432.0	820	0.16
2B	4,082,708	93.73	0.146	2780	0.53	0.58	1460.0	1450.0	1390	0.26
7	3,242,052	74.43	0.116	2230	0.42	0.46	1418.0	1404.0	1129	0.21
7A	2,361,171	54.21	0.085	2870	0.54	0.59	1415.0	1403.0	1450	0.27
8	17,189,557	394.62	0.617	7230	1.37	1.51	1444.0	1415.0	4980	0.94
9	3,508,834	80.55	0.126	3470	0.66	0.73	1424.0	1408.0	1848	0.35
10	4,769,777	109.50	0.171	5320	1.01	1.11	1444.0	1423.0	2970	0.56
11	8,574,374	196.84	0.308	6080	1.15	1.27	1425.0	1397.0	3352	0.63
12	4,362,893	100.16	0.157	3002	0.57	0.63	1409.0	1393.0	1087	0.21
13	5,584,406	128.20	0.200	3701	0.70	0.77	1411.0	1390.0	2218	0.42
14	2,596,893	59.62	0.093	1670	0.32	0.35	1397.0	1388.0	634	0.12
16	2,949,384	67.71	0.106	2134	0.40	0.44	1425.0	1410.0	1100	0.21
17	3,772,296	86.60	0.135	4430	0.84	0.92	1412.0	1394.0	2485	0.47
18	8,921,616	204.81	0.320	3445	0.65	0.72	1435.0	1420.0	1761	0.33
19	2,856,235	65.57	0.102	2394	0.45	0.50	1420.0	1410.0	1082	0.20
20	8,518,170	195.55	0.306	4890	0.93	1.02	1430.0	1412.0	2361	0.45
Totals	**138,204,246**	**3172.75**	**4.958**							

OFFSITE BASINS (EAST OF SIGNAL BUTTE ROAD)								
Sub-Basin ID	Basin Area (sq. ft.)	Basin Area (acres)	Basin Area (sq. mi)	Length (ft)	Length (mi)	USGE (ft)	DSGE (ft)	Lca (mi)
73A	26,400,845	606.08	0.947	12144	2.30	1567.3	1487.0	1.00
73B	11,854,970	272.15	0.425	2957	0.56	1487.0	1470.0	0.28
73C	16,310,497	374.44	0.585	7022	1.33	1480.0	1450.0	0.30
74A	21,020,314	482.56	0.754	12672	2.40	1563.0	1461.7	1.00
74B	9,278,312	213.00	0.333	6917	1.31	1490.0	1459.0	0.41
74C	9,606,165	220.53	0.345	6442	1.22	1471.0	1440.0	0.40
77A	48,480,538	1,112.96	1.739	15312	2.90	1559.0	1468.8	1.50
77B	9,740,171	223.60	0.349	2957	0.56	1469.0	1453.0	0.26
77C	7,769,721	178.37	0.279	4013	0.76	1457.0	1439.0	0.51
78A	52,467,149	1,204.48	1.882	19536	3.70	1558.0	1452.6	2.10
78B	11,047,090	253.61	0.396	3168	0.60	1460.0	1441.0	0.40
78C	8,018,731	184.08	0.288	2640	0.50	1448.0	1432.1	0.30
Totals	**231,994,503**	**5325.86**	**8.322**					

Notes:
1) 10% was added to onsite watercourse lengths to account for future roadway curvature.

Interim Condition HEC-1 Soil Data

Table 2 - Interim Condition HEC-1 - Soils Data

Description: Post Developed Soil Data

Location Eastmark - East Mesa, Arizona

Reference: NRCS Web Soil Survey
Aguila-Carefree Area Soil Survey

Sub-Basin ID	Soil Id	Soil Type	Area (acres)	Area (sq. mi.)
75	1	Antho Sandy Loams	3.43	0.005
	50	Estrella Loams	51.68	0.081
	75	Mohall Loam	258.52	0.404
	77	Mohall Clay Loam	617.31	0.965
	78	Mohall Clay Loam, Calcareous Solum	50.02	0.078
	79	Mohall Clay	170.24	0.266
	112	Tremant Gravelly Sandy Loams	21.91	0.034
		TOTAL	**1173.11**	**1.833**
1A	50	Estrella Loams	20.29	0.032
	75	Mohall Loam	13.49	0.021
	77	Mohall Clay Loam	53.76	0.084
		TOTAL	**87.54**	**0.137**
2B	1	Antho Sandy Loams	10.33	0.016
	50	Estrella Loams	1.89	0.003
	75	Mohall Loam	81.51	0.127
		TOTAL	**93.73**	**0.146**
7	50	Estrella Loams	13.60	0.021
	75	Mohall Loam	25.70	0.040
	77	Mohall Clay Loam	22.20	0.035
	78	Mohall Clay Loam, Calcareous Solum	12.93	0.020
		TOTAL	**74.43**	**0.116**
7A	50	Estrella Loams	0.57	0.001
	77	Mohall Clay Loam	53.64	0.084
		TOTAL	**54.21**	**0.085**
8	1	Antho Sandy Loams	10.69	0.017
	50	Estrella Loams	45.04	0.070
	75	Mohall Loam	168.75	0.264
	77	Mohall Clay Loam	114.36	0.179
	78	Mohall Clay Loam, Calcareous Solum	7.12	0.011
	112	Tremant Gravelly Sandy Loams	48.66	0.076
		TOTAL	**394.62**	**0.617**
9	75	Mohall Loam	44.57	0.070
	78	Mohall Clay Loam, Calcareous Solum	19.95	0.031
	112	Tremant Gravelly Sandy Loams	16.03	0.025
		TOTAL	**80.55**	**0.126**
10	1	Antho Sandy Loams	6.50	0.010
	2	Antho Gravelly Sandy Loams	11.32	0.018
	50	Estrella Loams	27.71	0.043
	77	Mohall Clay Loam	59.78	0.093
	112	Tremant Gravelly Sandy Loams	3.99	0.006
	115	Tremant Gravelly Sandy Loams	0.20	0.000
		TOTAL	**109.50**	**0.170**
11	55	Gilman Loams	2.04	0.003
	77	Mohall Clay Loam	77.25	0.121
	112	Tremant Gravelly Sandy Loams	117.55	0.184
		TOTAL	**196.84**	**0.308**
12	50	Estrella Loams	51.61	0.081
	75	Mohall Loam	17.90	0.028
	77	Mohall Clay Loam	25.98	0.041
	79	Mohall Clay	4.67	0.007
		TOTAL	**100.16**	**0.157**
13	50	Estrella Loams	1.01	0.002
	75	Mohall Loam	127.18	0.199
		TOTAL	**128.19**	**0.201**
14	50	Estrella Loams	10.93	0.017
	75	Mohall Loam	19.99	0.031
	77	Mohall Clay Loam	10.25	0.016
	112	Tremant Gravelly Sandy Loams	18.43	0.029
		TOTAL	**59.60**	**0.093**
73A	N/A	No Data Available	606.08	0.947
		TOTAL	**606.08**	**0.947**
73B	1	Antho Sandy Loams	73.75	0.115
	50	Estrella Loams	10.61	0.017
	55	Gilman Loams	15.78	0.025
	75	Mohall Loam	62.59	0.098
	77	Mohall Clay Loam	80.28	0.125
	112	Tremant Gravelly Sandy Loams	29.14	0.046
		TOTAL	**272.15**	**0.426**

Sub-Basin ID	Soil Id	Soil Type	Area (acres)	Area (sq. mi.)
73C	1	Antho Sandy Loams	76.01	0.119
	50	Estrella Loams	85.37	0.133
	75	Mohall Loam	128.81	0.201
	77	Mohall Clay Loam	84.25	0.132
		TOTAL	**374.44**	**0.585**
74A	N/A	No Data Available	482.56	0.754
		TOTAL	**482.56**	**0.754**
74B	1	Antho Sandy Loams	112.04	0.175
	77	Mohall Clay Loam	97.34	0.152
	112	Tremant Gravelly Sandy Loams	3.62	0.006
		TOTAL	**213.00**	**0.333**
74C	1	Antho Sandy Loams	55.57	0.087
	50	Estrella Loams	11.47	0.018
	77	Mohall Clay Loam	136.29	0.213
	112	Tremant Gravelly Sandy Loams	16.76	0.026
	115	Tremant-Antho Complex, 1-5 %Slopes	0.44	0.001
		TOTAL	**220.53**	**0.345**
16	2	Antho Gravelly Sandy Loams	11.70	0.018
	78	Mohall Clay Loam, Calcareous Solum	40.70	0.064
	112	Tremant Gravelly Sandy Loams	15.31	0.024
		TOTAL	**67.71**	**0.106**
17	2	Antho Gravelly Sandy Loams	1.46	0.002
	55	Gilman Loams	7.33	0.011
	112	Tremant Gravelly Sandy Loams	77.81	0.122
		TOTAL	**86.60**	**0.135**
18	1	Antho Sandy Loams	4.81	0.008
	2	Antho Gravelly Sandy Loams	20.60	0.032
	50	Estrella Loams	79.40	0.124
	77	Mohall Clay Loam	28.50	0.045
	78	Mohall Clay Loam, Calcareous Solum	47.25	0.074
	112	Tremant Gravelly Sandy Loams	13.37	0.021
	115	Tremant-Antho Complex, 1-5 %Slopes	10.88	0.017
		TOTAL	**204.81**	**0.321**
19	50	Estrella Loams	4.37	0.007
	77	Mohall Clay Loam	22.72	0.036
	78	Mohall Clay Loam, Calcareous Solum	38.48	0.060
		TOTAL	**65.57**	**0.103**
20	22	Contine Clay Loam	118.34	0.185
	77	Mohall Clay Loam	27.87	0.044
	112	Tremant Gravelly Sandy Loams	49.34	0.077
		TOTAL	**195.55**	**0.306**
77A	N/A	No Data Available	1112.96	1.739
		TOTAL	**1112.96**	**1.739**
77B	1	Antho Sandy Loams	76.92	0.120
	77	Mohall Clay Loam	81.39	0.127
	112	Tremant Gravelly Sandy Loams	65.29	0.102
		TOTAL	**223.60**	**0.349**
77C	1	Antho Sandy Loams	4.82	0.008
	77	Mohall Clay Loam	74.56	0.117
	78	Mohall Clay Loam, Calcareous Solum	9.10	0.014
	112	Tremant Gravelly Sandy Loams	89.54	0.140
	115	Tremant-Antho Complex, 1-5 %Slopes	0.35	0.001
		TOTAL	**178.37**	**0.280**
78A	N/A	No Data Available	1204.48	1.882
		TOTAL	**1204.48**	**1.882**
78B	22	Contine Clay Loam	66.95	0.105
	77	Mohall Clay Loam	79.63	0.124
	112	Tremant Gravelly Sandy Loams	107.03	0.167
		TOTAL	**253.61**	**0.396**
78C	22	Contine Clay Loam	128.67	0.201
	77	Mohall Clay Loam	2.76	0.004
	112	Tremant Gravelly Sandy Loams	52.65	0.082
		TOTAL	**184.08**	**0.287**

Interim Condition HEC-1 Land Use Data

Table 3 - Interim Condition HEC-1 Land Use Data

Description: Land use data based on proposed development

Location Eastmark - East Mesa, Arizona

Reference: DDMSW Version 4.6.0

Sub-Basin ID	Basin Area (sq. ft.)	Basin Area (acres)	Basin Area (sq. mi)	DU	DU Area (ac)	Land Use	Land Use Area (sq. ft.)	Land Use Area (acres)	Land Use Area (sq. mi.)	Kn
75	51100467	1173.1	1.8330	DU 1, DU 2, DU 5, DU 6N, DU	1173.1	Proving Ground	51100467	1173.1	1.833	0.060
1A	3813413	87.5	0.1367	DU5E	82.0	Industrial	3571920	82.0	0.128	0.040
				—	5.5	General Transportation	239580	5.5	0.009	0.030
2B	4082708	93.7	0.1464	DU6N	93.7	Industrial	4082708	93.7	0.146	0.040
7	3242052	74.4	0.1163	DU3/4	74.4	Very High Density Residential (>15 DU/Acre)	940896	21.6	0.034	0.030
						Educational	217800	5.0	0.008	0.055
						Institutional	1058508	24.3	0.038	0.040
						Active Open Space	1023660	23.5	0.037	0.050
7A	2361171	54.2	0.0847	DU3/4	54.2	Educational	435600	10.0	0.016	0.055
						Institutional	291852	6.7	0.010	0.040
						Active Open Space	1285020	29.5	0.046	0.050
						General Transportation	348480	8.0	0.013	0.030
8	17189557	394.6	0.6166	DU7	387.9	Medium Lot Residential (2-4 DU/Acre)	9243432	212.2	0.332	0.045
						Small Lot Residential (4-10 DU/Acre)	7217892	165.7	0.259	0.040
						Institutional	304920	7.0	0.011	0.040
						Active Open Space	130680	3.0	0.005	0.050
				—	7.3	General Transportation	317988	7.3	0.011	0.030
9	3508834	80.6	0.1259	DU3/4	10.4	Very High Density Residential (>15 DU/Acre)	453024	10.4	0.016	0.030
				DU7	70.2	High Density Residential (10-15 DU/Acre)	871200	20.0	0.031	0.030
						Educational	871200	20.0	0.031	0.055
						Institutional	283140	6.5	0.010	0.040
						Active Open Space	1032372	23.7	0.037	0.050
10	4769777	109.5	0.1711	DU7	106.8	Medium Lot Residential (2-4 DU/Acre)	4652208	106.8	0.167	0.045
				—	2.7	General Transportation	119210	2.7	0.004	0.030
11	8574374	196.8	0.3075	DU7	10.6	Active Open Space	113256	2.6	0.004	0.050
						General Commercial	239580	5.5	0.009	0.035
						Institutional	108900	2.5	0.004	0.040
				DU3/4	173.0	Very High Density Residential (>15 DU/Acre)	7535880	173.0	0.270	0.025
				—	13.2	General Transportation	574992	13.2	0.021	0.030
12	4362893	100.2	0.1566	DU3/4	99.3	Educational	2090880	48.0	0.075	0.055
						Office General	1232748	28.3	0.044	0.035
						Very High Density Residential (>15 DU/Acre)	1001880	23.0	0.036	0.025
				—	0.9	General Transportation	39204	0.9	0.001	0.035
13	5584405	128.2	0.2003	DU3/4	126.2	Educational	4922280	113.0	0.177	0.055
						Office General	574992	13.2	0.021	0.035
				—	2.0	General Transportation	87120	2.0	0.003	0.035
14	2596893	59.6	0.0931	DU3/4	59.6	Office General	326700	7.5	0.012	0.035
						General Commercial	1742400	40.0	0.063	0.035
						Tourist and Visitor Accomodations	108900	2.5	0.004	0.030
						General Transportation	418176	9.6	0.015	0.030
73A	26400845	606.1	0.9470	—	—	Passive Open Space	26400845	606.1	0.947	0.093
73B	11854970	272.2	0.4253	—	—	Small Lot Residential (4-10 DU/Acre)	11854970	272.2	0.425	0.040
73C	16310497	374.4	0.5850	—	—	Small Lot Residential (4-10 DU/Acre)	16310497	374.4	0.585	0.040
74A	21020314	482.6	0.7541	—	—	Passive Open Space	21020314	482.6	0.754	0.095
74B	9278312	213.0	0.3328	—	—	Small Lot Residential (4-10 DU/Acre)	9278312	213.0	0.333	0.040
74C	9606165	220.5	0.3445	—	—	Small Lot Residential (4-10 DU/Acre)	9606165	220.5	0.345	0.040
16	2949384	67.7	0.1058	DU3S	5.7	Medium Lot Residential (2-4 DU/Acre)	248292	5.7	0.009	0.045
				DU9	62.0	Medium Lot Residential (2-4 DU/Acre)	2456784	56.4	0.088	0.045
						Active Open Space	121968	2.8	0.004	0.050
						General Transportation	121968	2.8	0.004	0.030
17	3772296	86.6	0.1353	DU3S	86.6	Medium Lot Residential (2-4 DU/Acre)	3737448	85.8	0.134	0.045
						Active Open Space	34848	0.8	0.001	0.050
18	8921616	204.8	0.3200	DU8	204.8	Medium Lot Residential (2-4 DU/Acre)	6904260	158.5	0.248	0.045
						Large Lot Residential (1-2 DU/Acre)	871200	20.0	0.031	0.045
						Active Open Space	927828	21.3	0.033	0.050
						General Transportation	217800	5.0	0.008	0.030
19	2856235	65.6	0.1025	DU9	65.6	Medium Lot Residential (2-4 DU/Acre)	2121372	48.7	0.076	0.045
						Institutional	540144	12.4	0.019	0.040
						Active Open Space	100188	2.3	0.004	0.050
						General Transportation	95832	2.2	0.003	0.030
20	8518170	195.6	0.3056	DU8	18.5	Medium Lot Residential (2-4 DU/Acre)	588060	13.5	0.021	0.045
						Active Open Space	108900	2.5	0.004	0.050
						General Transportation	108900	2.5	0.004	0.030
				DU9	164.2	Medium Lot Residential (2-4 DU/Acre)	6664680	153.0	0.239	0.045
						Active Open Space	487872	11.2	0.018	0.050
				—	12.9	General Transportation	561924	12.9	0.020	0.030
77A	48480538	1113.0	1.7391	—	—	Passive Open Space	48480538	1113.0	1.739	0.092
77B	9740171	223.6	0.3494	—	—	Passive Open Space	3985740	91.5	0.143	0.050
						Medium Lot Residential (2-4 DU/Acre)	5771700	132.5	0.207	0.045
77C	7759721	178.4	0.2786	—	—	Small Lot Residential (4-10 DU/Acre)	7779816	178.6	0.279	0.040
78A	52467149	1204.5	1.8820	—	—	Passive Open Space	52467149	1204.5	1.882	0.090
78B	11047090	253.6	0.3963	—	—	Large Lot Residential (1-2 DU/Acre)	11038104	253.4	0.396	0.050
78C	9018731	184.1	0.2877	—	—	Passive Open Space	4991976	114.6	0.179	0.050
						Large Lot Residential (1-2 DU/Acre)	3009996	69.1	0.108	0.045

Interim Condition HEC-1 Routing Data

Table 4 - Interim Condition HEC-1 Routing Data

Description: Routing parameters based on proposed channels and drainage corridors

Location Eastmark - East Mesa, Arizona

Reference. DDMSW Version 4.6.0

Routing ID	N-Steps	Routing Method	LOB N	CHAN N	ROB N	Length (ft)	Slope (ft/ft)	RX1	RX2	LB	RX4	RX5	RB	RX7	RX8	RY1	RY2	LB	RY4	RY5	RB	RY7	RY8
74CT75	3	Normal Depth	0.030	0.013	0.030	10500	0.0038	0.0	15.0	16.5	25.0	33.0	41.5	43.0	58.0	6.60	6.60	5.60	0.00	0.00	5.60	6.60	6.60
10T75	1	Normal Depth	0.030	0.015	0.030	6320	0.0060	0.0	17.5	18.0	57.0	73.0	112.0	112.5	130.0	1.00	0.50	0.00	0.80	0.80	0.00	0.50	1.00
2BT1	5	Normal Depth	0.035	0.035	0.035	4250	0.0045	0.0	5.0	10.0	15.0	1015.0	1020.0	1025.0	1030.0	2.00	1.50	1.00	0.00	0.00	1.00	1.50	2.00
1T12	10	Normal Depth	0.035	0.035	0.035	8055	0.0045	0.0	5.0	10.0	15.0	1015.0	1020.0	1025.0	1030.0	2.00	1.50	1.00	0.00	0.00	1.00	1.50	2.00
7AT12	4	Normal Depth	0.030	0.015	0.030	1920	0.0042	0.0	17.5	18.0	57.0	73.0	112.0	112.5	130.0	1.00	0.50	0.00	0.80	0.80	0.00	0.50	1.00
7T12	1	Normal Depth	0.030	0.015	0.030	3160	0.0036	0.0	7.5	8.0	38.0	43.0	73.0	73.5	81.0	0.80	0.50	0.00	0.60	0.60	0.00	0.50	0.80
12T13	3	Normal Depth	0.030	0.015	0.030	2600	0.0014	0.0	17.5	18.0	57.0	73.0	112.0	112.5	130.0	2.00	1.00	0.50	0.00	0.00	0.50	1.00	2.00
8T9	2	Normal Depth	0.030	0.015	0.030	1410	0.0053	0.0	17.5	18.0	57.0	73.0	112.0	112.5	130.0	1.00	0.50	0.00	0.80	0.80	0.00	0.50	1.00
9T13	4	Normal Depth	0.030	0.015	0.030	4020	0.0045	0.0	17.5	18.0	57.0	73.0	112.0	112.5	130.0	1.00	0.50	0.00	0.80	0.80	0.00	0.50	1.00
11T13	2	Normal Depth	0.030	0.015	0.030	1410	0.0050	0.0	17.5	18.0	57.0	73.0	112.0	112.5	130.0	1.00	0.50	0.00	0.80	0.80	0.00	0.50	1.00
13T75	2	Normal Depth	0.030	0.015	0.030	1230	0.0016	0.0	17.5	18.0	57.0	73.0	112.0	112.5	130.0	2.00	1.00	0.50	0.00	0.00	0.50	1.00	2.00
18T19	1	Normal Depth	0.030	0.015	0.030	1040	0.0040	0.0	7.5	8.0	38.0	43.0	73.0	73.5	81.0	0.80	0.50	0.00	0.60	0.60	0.00	0.50	0.80
77CT78	4	Normal Depth	0.032	0.032	0.032	4435	0.0020	0.0	5.0	10.0	24.0	124.0	138.0	143.0	148.0	4.50	4.00	3.50	0.00	0.00	3.50	4.00	4.50
78CT79	2	Normal Depth	0.032	0.032	0.032	4215	0.0033	0.0	5.0	10.0	26.0	81.0	97.0	102.0	107.0	5.00	4.50	4.00	0.00	0.00	4.00	4.50	5.00

Interim Condition Onsite Retention Volume Summary

Table 5 - Interim Condition Onsite Retention Volume Summary

Description: Calculation of Required Retention Volume Using the Rational Method

Location: Eastmark

Reference: Drainage Design Manual for Maricopa County, Vol. 1, Hydrology

Known Values: Design storm: 100-yr, 2-hr 100-yr, 24-hr
Rainfall, D: 2.19 inches 3.51 inches

Calc. Values: V = DAC
Where: V = Retention Volume Required
D = Depth of Rainfall (ft)
A = Area of Watershed Contributing
C = Runoff Coefficient

Retention - 100YR, 2HR Volumes (North of the Powerline Floodway)

Retention Basin	Retention Location	Sub-basin		Development Unit		Weighted "C_{100}"	Required Storm Event Retention	Volume Required (acre-feet)	Total Volume Required (acre-feet)	Volume Provided (acre-feet)	Total Volume Provided (acre-feet)	Modeled HEC-1 Retention Volume (acre-feet)
		Contributing Sub-basin	Contributing Sub-basin Area (acres)	Contributing DUs	DU Area Within Sub-basin (acres)							
RET01A[1]	DU 5E	1A	87.5	DU5E	82.0	0.90	100-Year, 24-Hour	23.0	23.0	--	--	23.00
				---	5.5					--		
RET02B[2]	DU 6N	2B	93.7	DU6N	93.7	0.90	100-Year, 2-Hour	15.4	15.4	14.50	14.50	15.40
RET07[1]	DU 3/4	7	74.4	DU3/4	74.4	0.79	100-Year, 24-Hour	17.2	17.2	--	--	17.20
RET07A[1]	DU 2 DU 3/4	7A	54.2	UTUREDU 2	22.6	0.90	100-Year, 24-Hour	5.9	17.2	--	--	17.20
				DU3/4	54.2	0.71		11.3		--		
RET08[3]	DU 6S DU 7	8	394.6	FUTURE DU6S	63.6	0.79	100-Year, 2-Hour	9.2	59.9	--	45.29	55.69
				DU7	387.9	0.70		49.5		45.29		
				---	7.3	0.90		1.2		--		
RET09	DU 3/4 DU 7	9	80.6	DU3/4	10.4	0.90	100-Year, 2-Hour	1.7	11.0	--	.59	11.00
				DU7	70.2	0.73		9.3		.59		
RET10[3]	DU 7	10	109.5	DU7	106.8	0.66	100-Year, 2-Hour	13.2	13.2	10.55	18.32	18.32
				---	2.7					7.77		
RET11	DU 3/4 DU 7	11	196.8	DU7	10.6	0.83	100-Year, 2-Hour	1.6	32.2	2.32	2.32	32.92
				DU3/4	173.0	0.90		28.4		--		
				---	13.2	0.90		2.2		--		
RET12	DU 3/4	12	100.2	DU3/4	99.3	0.78	100-Year, 2-Hour	14.1	14.2	--	--	14.20
				---	0.9	0.90		0.1		--		
RET13	DU 3/4	13	128.2	DU3/4	126.2	0.66	100-Year, 2-Hour	15.7	16.0	--	--	16.00
				---	2.0	0.90		0.3		--		
RET14	DU 3/4	14	69.6	DU3/4	59.6	0.90	100-Year, 2-Hour	9.8	9.8	--	--	9.80
							Total	229.1	229.1	61.02	81.02	230.73 ac-ft

1. Sub-basin self retains 100-year, 24-hour to reduce the total Site runoff volume to the pre-developed level.
2. Retention provided volume for RET02B was taken from the First Solar Final Drainage Report, where only approximately half of 2B is developed.
3. Retention provided volumes for RET08 and RET10 were taken from DU7 and Ray Road Final Drainage Reports and Improvement plans.

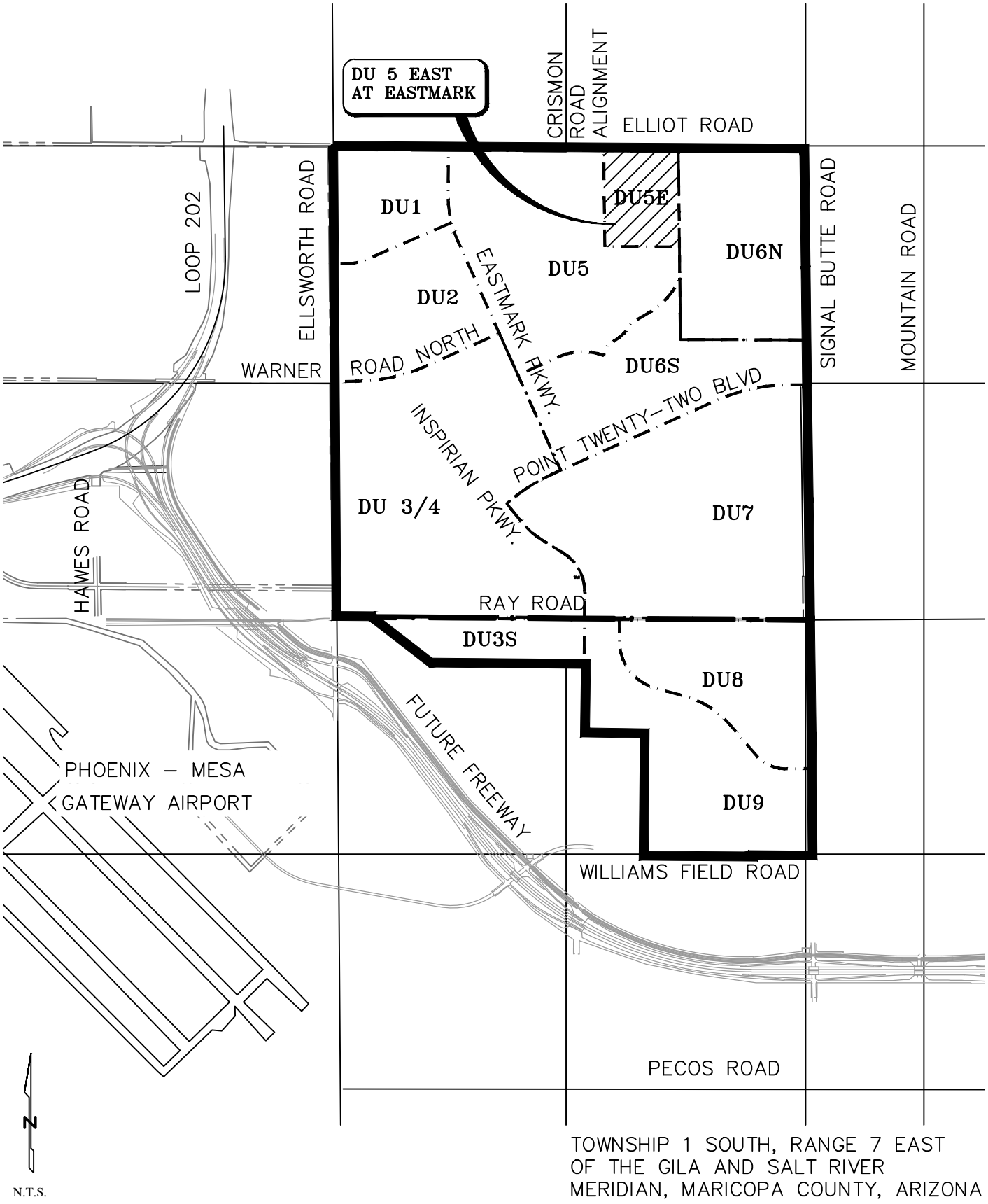
Retention 100YR, 2HR Volumes (South of the Powerline Floodway)

Retention Basin	Retention Location	Sub-basin		Development Unit		Weighted "C_{100}"	Required Storm Event Retention	Volume Required (acre-feet)	Total Volume Required (acre-feet)	Volume Provided (acre-feet)	Total Volume Provided (acre-feet)	Modeled HEC-1 Retention Volume (acre-feet)
		Contributing Sub-basin	Contributing Sub-basin Area (acres)	Contributing DUs	DU Area Within Sub-basin (acres)							
RET16	DU 3S DU 9	16	67.7	DU3S	5.7	0.65	100-Year, 2-Hour	0.7	8.2	--	--	8.20
				DU9	62.0	0.66		7.5		--		
RET17	DU 3S	17	86.6	DU3S	86.6	0.65	100-Year, 2-Hour	10.3	10.3	12.47	12.47	12.47
RET18	DU 8	18	204.8	DU8	204.8	0.66	100-Year, 2-Hour	24.7	24.7	--	--	24.70
RET19	DU 9	19	65.6	DU9	65.6	0.70	100-Year, 2-Hour	8.4	8.4	--	--	8.40
RET20	DU 8 DU 9	20	195.6	DU8	18.5	0.68	100-Year, 2-Hour	2.3	23.9	--	--	23.90
				DU9	164.2	0.65		19.5		--		
				---	12.9	0.90		2.1		--		
							Total	75.5	75.5	12.47	12.47	77.67 ac-ft

Eastmark Required Retention Total = 304.6 ac-ft
Current Eastmark Provided Retention Total = 93.5 ac-ft
Current Eastmark Modeled Retention Total = 308.4 ac-ft

PLATE 1

Vicinity Map



TOWNSHIP 1 SOUTH, RANGE 7 EAST
OF THE GILA AND SALT RIVER
MERIDIAN, MARICOPA COUNTY, ARIZONA

R:\Mesa Proving Grounds\2014\1441TB\Project Support\Reports\Drainage\DU 5E Drainage Master Plan\Exhibits\ 1TB-DU 5E Plate 1 - Vicinity Map.dwg - Apr 15,2014 3:36pm

NOT FOR CONSTRUCTION
OR RECORDING

PLATE 1: VICINITY MAP

EASTMARK
MESA, ARIZONA

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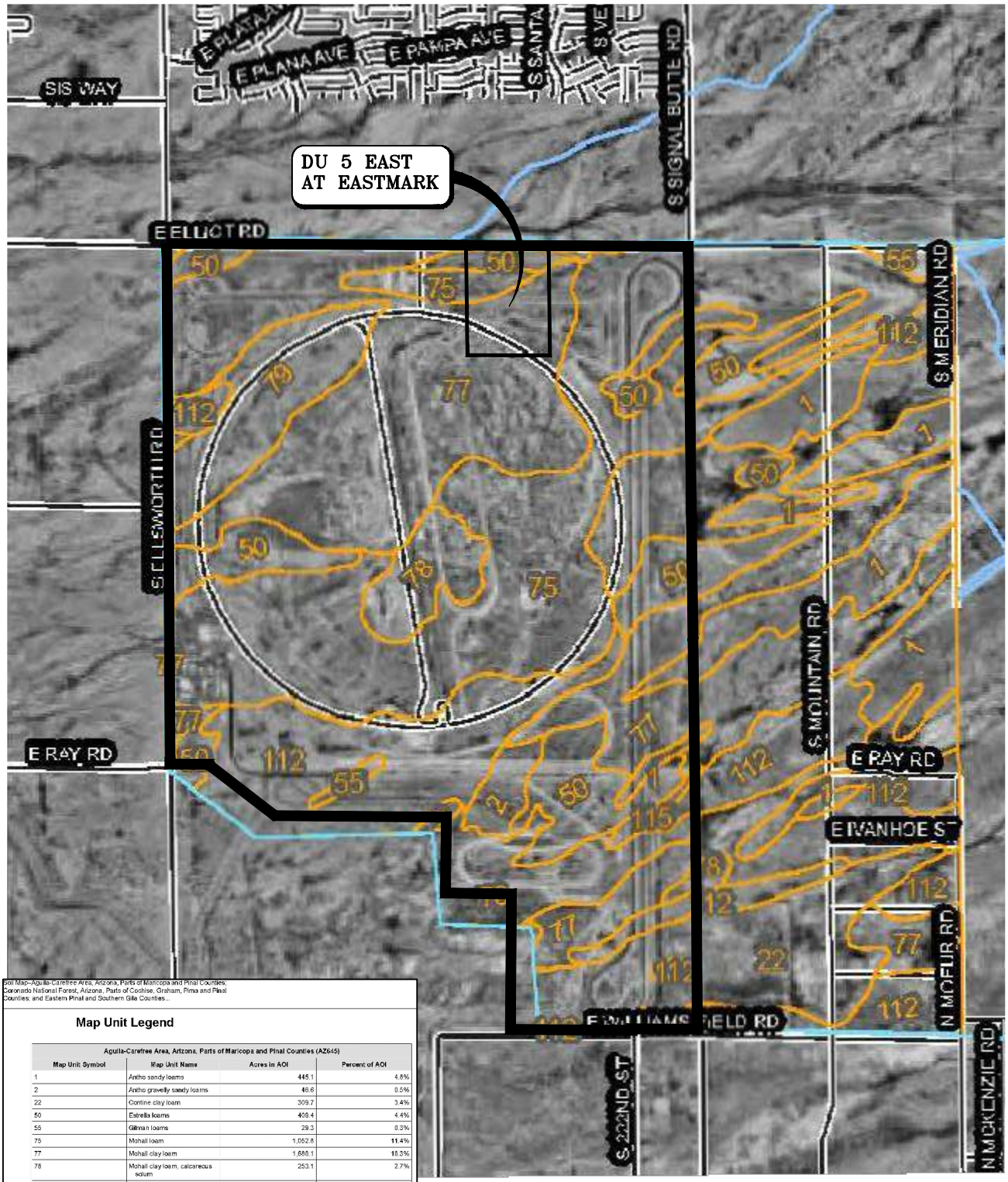
PLATE 2

Soils Map



Soil Map--Agulla-Carefree Area, Arizona, Parts of Maricopa and Pinal Counties; Coronado National Forest, Arizona, Parts of Cochise, Graham, Pima and Pinal Counties; and Eastern Pinal and Southern Gila Counties..

Map Unit Legend

Agulla-Carefree Area, Arizona, Parts of Maricopa and Pinal Counties (AZ645)			
Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
1	Antho sandy loams	445.1	4.8%
2	Antho gravelly sandy loams	46.6	0.5%
22	Contine clay loam	309.7	3.4%
50	Estrella loams	409.4	4.4%
55	Gilman loams	29.3	0.3%
75	Mohall loam	1,052.8	11.4%
77	Mohall clay loam	1,686.1	18.3%
78	Mohall clay loam, calcareous solum	253.1	2.7%
79	Mohall clay	179.4	1.9%
112	Tremant gravelly sandy loams	771.5	8.4%
115	Tremant-Antho complex, 1 to 5 percent slopes	13.2	0.1%
Coronado National Forest, Arizona, Parts of Cochise, Graham, Pima and Pinal Counties (AZ723)			
No soil data available for this soil survey area.			
Eastern Pinal and Southern Gila Counties, Arizona (AZ661)			
No map units selected for this soil survey area.			
Totals for Area of Interest (AOI)		9,214.9	100.0%

3000 0 1500 3000

1 inch = 3000 ft.

N

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PLATE 2: SOILS MAP

EASTMARK
MESA, ARIZONA

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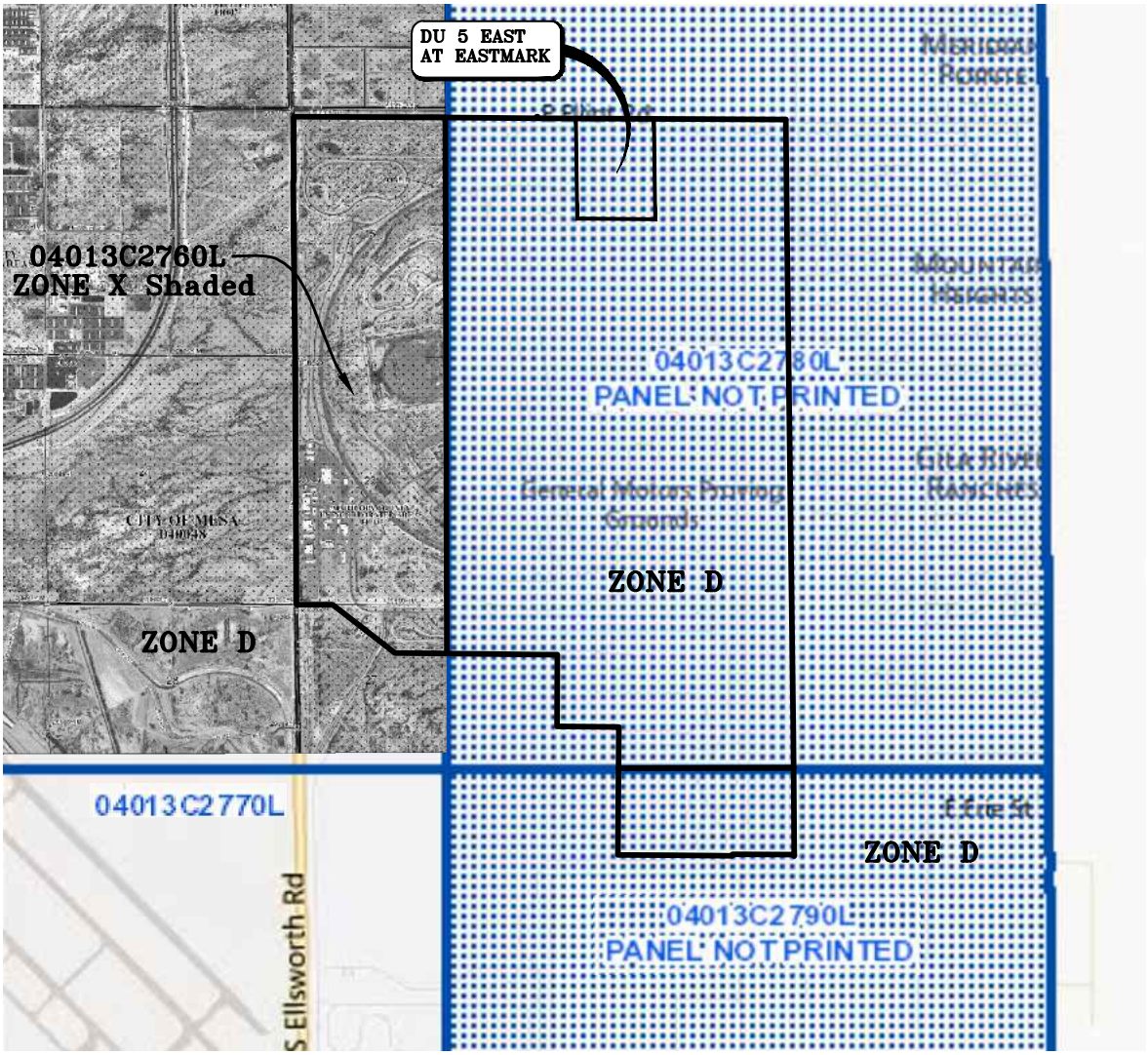
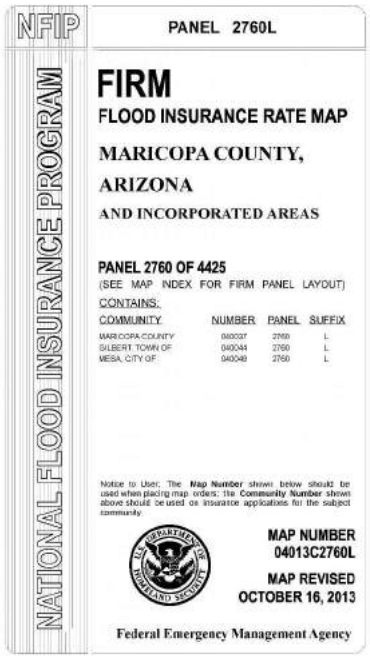
PLATE 3

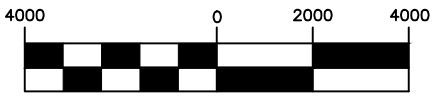
Flood Insurance Rate Map





Zone "X" Shaded is defined by FEMA as follows:
Areas of 0.2% annual chance flood: areas of 1% annual chance flood with average depths of less than 1 foot or with drainage areas less than 1 square mile; and areas protected by levees from 1% annual chance flood.

Zone "D" is defined by FEMA as follows:
Areas in which flood hazards are undetermined.



1 inch = 4000ft.

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PLATE 3: FEMA FIRM MAP

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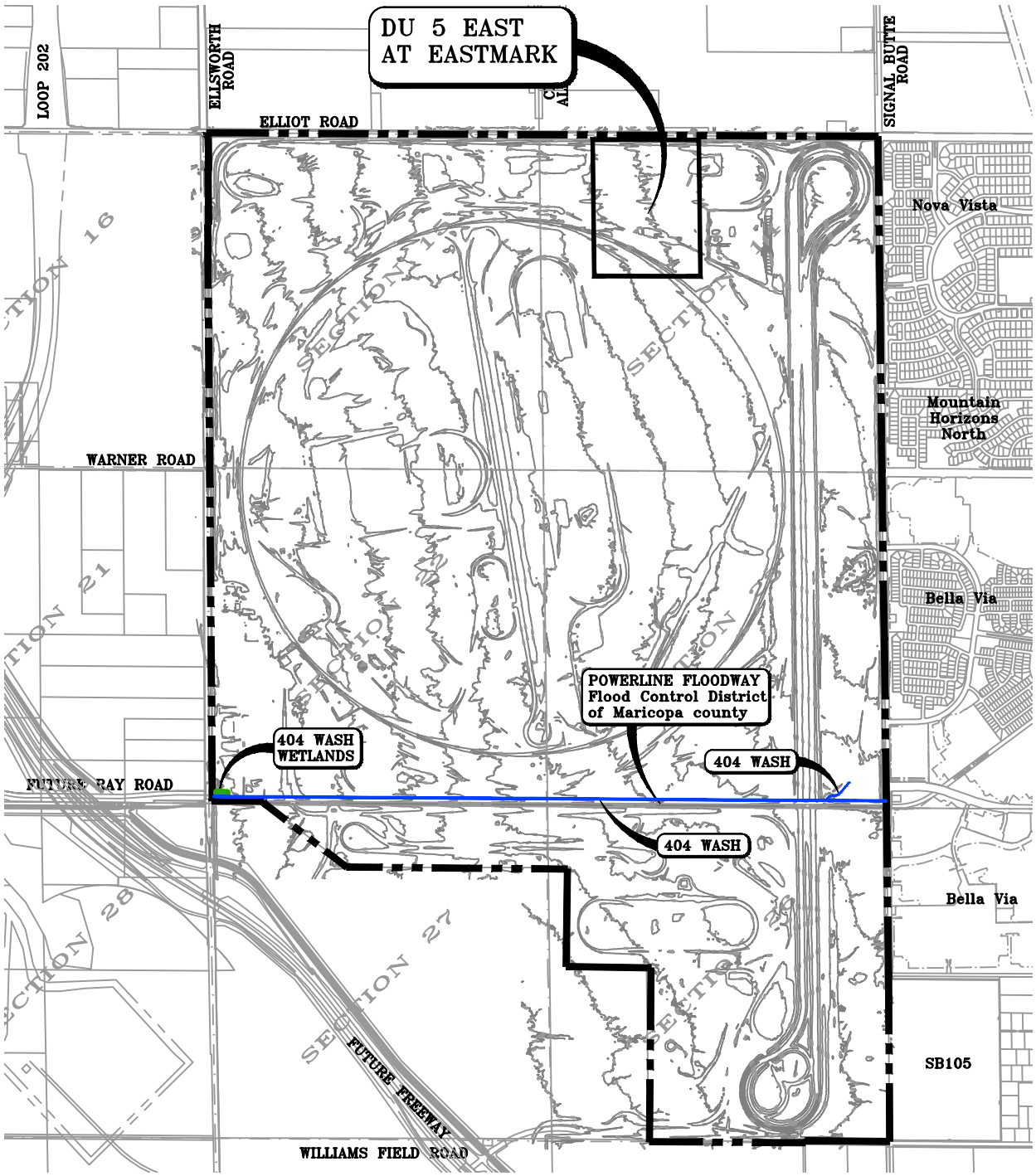
PLATE 4

Section 404 Jurisdictional Delineation Map



LEGEND

- 404 WASH
- 404 WASH WETLANDS
- PROPERTY BOUNDARY
- 5 FT. CONTOUR 1430

N

N.T.S.

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PLATE 4: 404 JURISDICTIONAL DELINEATION MAP

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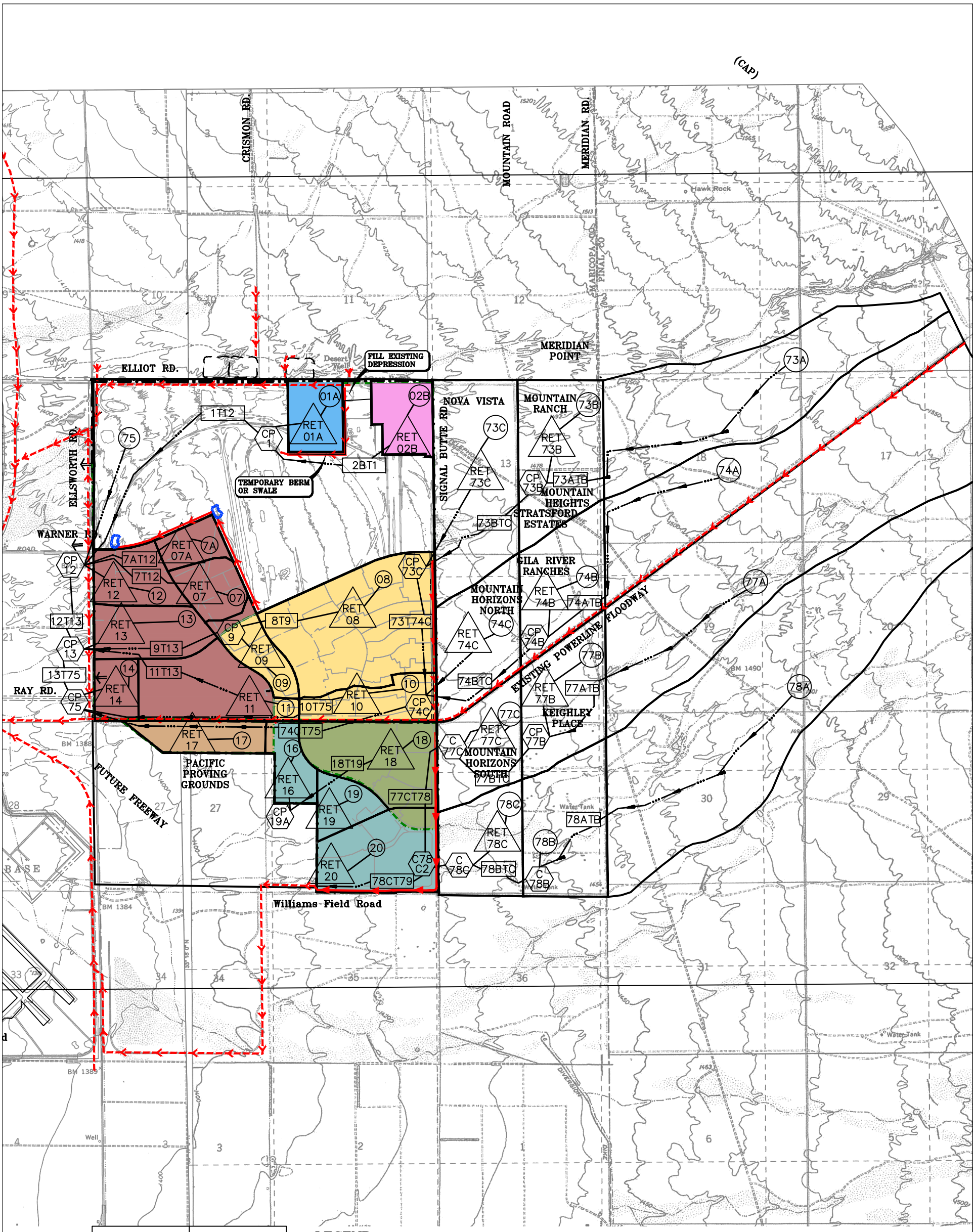
PLATE 5

Interim Condition HEC-1 Schematic



LOCATION ID	DISCHARGE (CFS)
CP75	633
RET17	0
CP19A	61
RET19	81
78CT79	935

3000 0 1500 3000

Horz. 1 in. = 3000 ft.

LEGEND

- SUB-BASIN BOUNDARY
- EXISTING STORM DRAIN
- PROPOSED TEMPORARY BERM OR SWALE
- EXISTING CHANNEL OR STORM DRAIN
- ROUTING
- 5 FT. CONTOUR
- FLOW DIRECTION ARROW
- TEMPORARY RETENTION
- 77C — WATERSHED ID
- 77BTC — ROUTING ID
- C 77C — CONCENTRATION POINT ID
- RET 73B — RETENTION ID
- DU 3/4
- DU 3S
- DU 6N
- DU 7
- DU 8
- DU 9

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PLATE 5: INTERIM CONDITION HEC-1 SCHEMATIC

DU 5E AT EASTMARK
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