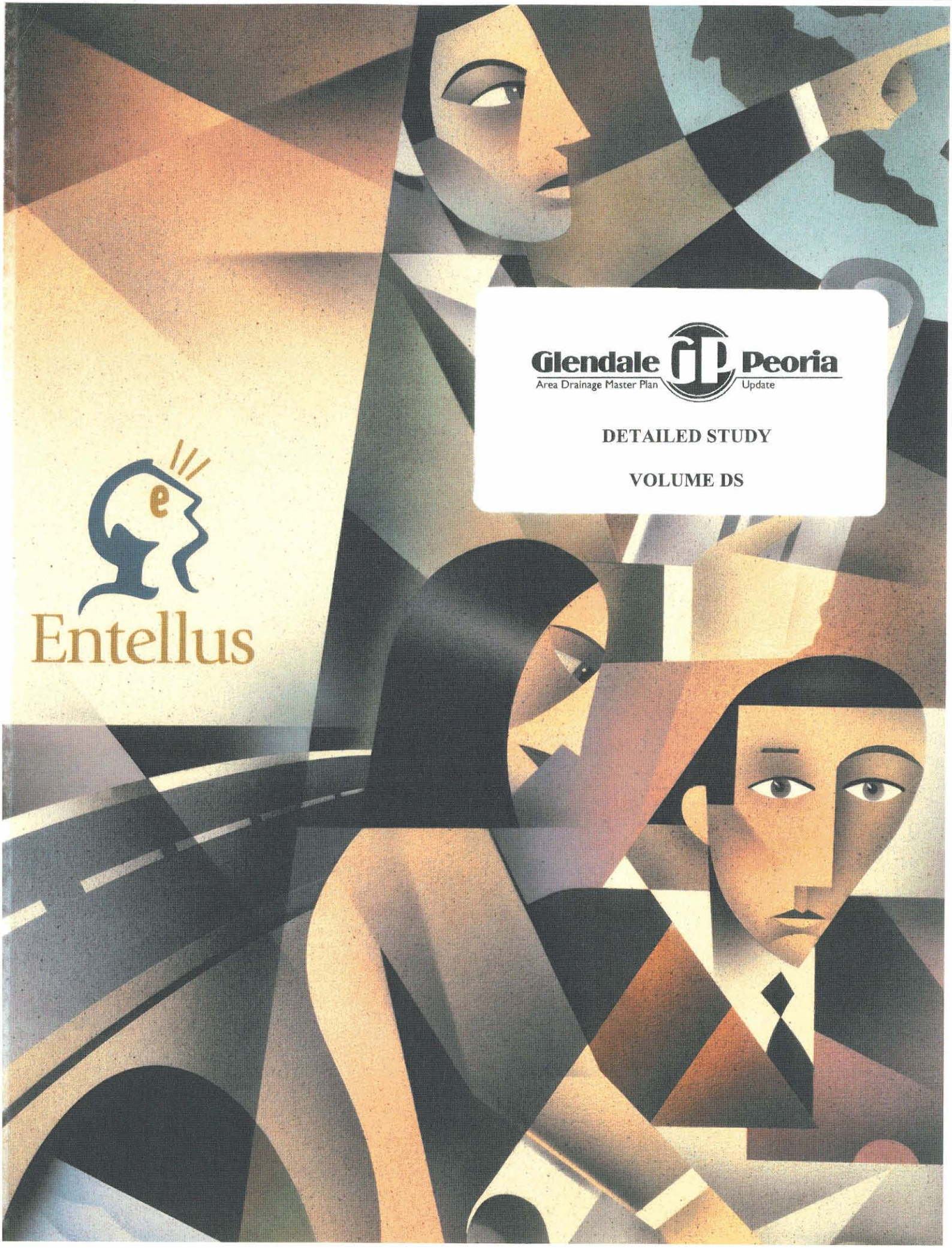

Glendale Peoria
Area Drainage Master Plan Update

DETAILED STUDY

VOLUME DS

Entellus

Flood Control District of Maricopa County

GLENDALE

CITY OF PEORIA

Glendale Peoria
Area Drainage Master Plan Update

DETAILED STUDY

VOLUME DS

Contract FCD 99-44

August 30, 2001

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January 29, 2001

VOLUME DESIGNATION

VOLUME ID	Volume Name	Number
DC	Data Collection	1
HY	Hydrology	2
PA	Potential Alternatives	3
AA	Alternative Analysis (Level II)	4
RA	Recommended Alternatives (Level III)	5
ZA	Zone A Floodplain Delineation	6
DS	Detailed (Section 15)	7
AL	Arrowhead Lakes Hydrology	8
AR	Administrative Report (Correspondence)	9

Note: Volume ID will be used for Section, Plate, Figure, and Table identifiers.

Glendale/Peoria Area Drainage Master Plan Update

FCD 99-44

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Glendale/Peoria Area Drainage Master Plan Update
FCD No. 99-44

DETAILED STUDY (SECTION 15)
VOLUME DS

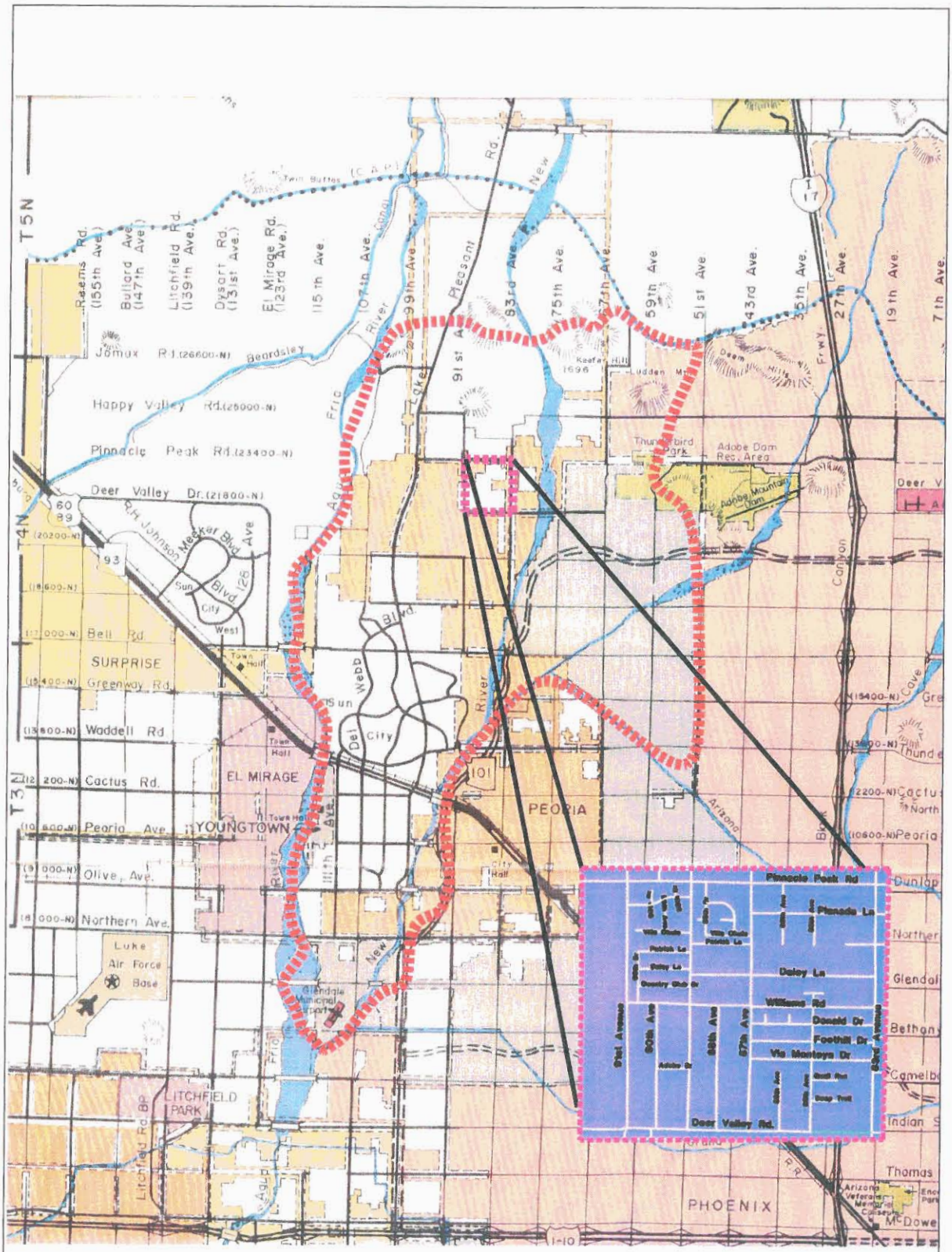
SECTION DS-1: INTRODUCTION

The information and analysis presented in this report is a part of the scope of work performed by Entellus, Inc. for the Flood Control District of Maricopa County (District) under *Contract FCD No. 99-44, Change Order No. 1,* Detailed Study (Section 15).

The purpose of this study is to provide a more detailed analysis by quantifying the extent of flooding problems and developing alternative solutions for the area located within Section 15, Township 4 North, Range 1 East.

The area is bounded by Pinnacle Peak Road on the north, Deer Valley Road on the south and 83rd and 91st Avenues on the east and west, respectively (see **Figure DS-1**). The area does not contain any significant drainage structures or infrastructure. Storm runoff in this area flows southerly along roadways or as sheet flow through the parcels.

The study area consists of several areas in different stages of development. Most of the study area consists of low-density residential or undeveloped parcels. However, there are three higher density developments; two in the northwest corner and one in the east portion of the study area. Also, there are several subdivisions and commercial developments in the planning stage within the study area.



LEGEND

- PROJECT AREA BOUNDARY
- SECTION 15 DETAILED STUDY AREA BOUNDARY

IN ASSOCIATION WITH:

PENTACORE ARIZONA

LTM Engineering, Inc.

Entellus

GLENDALE/PEORIA ADMP UPDATE
FLOOD CONTROL DISTRICT OF MARICOPA COUNTY
FCD PROJECT NO. 98-44

VICINITY MAP

FIGURE DS-1

SECTION DS-2: ADWR/FEMA FORMS (NOT REQUIRED)

This section does not apply to this report.

SECTION DS-3: MAPPING AND SURVEY INFORMATION

3.1 Field Survey Information

The District conducted field survey for this detailed study. The surveys included profiles of selected east-west roads, cross-sections of north-south roads and additional topographic information throughout the study area to supplement aerial topographic mapping. Results of the field survey are documented in the *Glendale/Peoria ADMP Update Survey Report*, which is included in *Glendale/Peoria ADMP Update - Volume DC, Appendix D*. Databased Terrain Mapping, Inc. (DTM) performed vertical and horizontal controls for aerial mapping as well as mapping verification for the District under contract FCD 1999C065 **(Reference 3)**.

3.2 Mapping

Mapping for this study was provided by the District from several sources including: previous studies, USGS DEM models and the mapping developed for this project by DTM **(Reference 3)**.

3.2.1 Watershed Map

Watershed boundaries and hydrologic parameters were obtained primarily from the 200-scale, 2-foot contour mapping generated by DTM **(Reference 3)**. This mapping covers the entire study area except for the tributary area north of Pinnacle Peak Road. The mapping developed as part of the *Arizona Canal Diversion Channel Area Drainage Master Study* (ACDC ADMS) **(Reference 2)** was used to develop the hydrologic parameters for the missing area north of Pinnacle Peak Road.

3.2.2 Soils Maps

Electronic soils maps were furnished by the District's GIS Department. This mapping is a digital version of the NRCS (formerly SCS) *Soil Survey of Aguila-Carefree Area, Parts of Maricopa and Pinal Counties, Arizona* (**Reference 4**) and *Soil Survey of Central Maricopa County, Arizona* (**Reference 5**).

3.2.3 Alternative Analysis Mapping

The 200-scale, 2-foot contour interval mapping developed by DTM (**Reference 3**) was used for the alternative analysis.

3.2.4 Land Use Map (Existing Conditions)

The existing land use information was obtained from the 1999 aerial photos provided by the District (**Reference 6**) and *The Aerial Photo Book – The Real Estate Atlas – Phoenix, First Quarter 1999* (**Reference 7**). The existing land use map is included on **Plate DS-3**.

3.2.5 Land Use Map (Ultimate Development)

The ultimate land use information was obtained from the zoning maps furnished by the City of Peoria (**References 8**).

SECTION DS-4: HYDROLOGY

4.1 Method Description

The peak flows in this study area were obtained through precipitation/runoff modeling. The hydrologic modeling was performed by means of the 1991 version of the HEC-1 computer program as developed by the U.S. Army Corps of Engineers (**Reference 10**). The models were developed using Green and Ampt methodology to estimate the rainfall losses. Excess rainfall was then routed to the concentration points using the Clark Unit Hydrograph. The estimation procedures for model parameters and components were based on the *Drainage Design Manual for Maricopa County – Volume I – Hydrology* (hereinafter referred to as *The Drainage Manual*) (**Reference 11**).

Schematic flow routing diagrams for runoff modeling are presented on **Plate DS-1.** A 6-hour duration was used as the base model for this study because it produced higher peak flows than the 24-hour storm. The Normal-Depth routing method was predominantly utilized for routing hydrographs from one concentration point to the next.

4.2 Parameter Estimation

4.2.1 Drainage Area Boundary

The scope of modeling within the Detailed Neighborhood Study was primarily focused on refining the general hydrology presented in the *Glendale/Peoria ADMP Update – Hydrology Report - Volume HY.* The sub-basins within the study area were further divided and additional flow-split locations were identified in an attempt to more precisely track the movement of storm runoff through the area. The basins upstream from the study area were also modified

to provide more detailed information on flows entering the study area. Sub-basin delineation is shown on **Plate DS-2**.

4.2.2 Watershed Work Map

The work map for this study was developed mainly from the mapping developed by DTM (**Reference 3**). For areas not covered by this mapping, the mapping developed by Kaminski-Hubbard as part of the ACDC ADMS **(Reference 2)** was used.

4.2.3 Gage Data

Gaging data is available for some of the main watercourses downstream of the study area. However, the model developed for this area focuses on the overland flow through streets and parcels. Therefore, the gage data may not show good correlation for the needs of this project. The District recently installed a gage in the 91st Avenue channel, but the period of record is too short for this gage to develop any data with statistical significance.

4.2.4 Statistical Parameters

Precipitation/runoff models were used for developing the hydrology for this area. Therefore, statistical data were not developed as part of this study, but the results of the runoff models were compared with gage data collected by the District for the entire county (**Reference 14**). The results appear to be within the range of expectation for this type of terrain. The comparison is presented in Subsection 4.5.2.

4.2.5 Precipitation

Precipitation data was obtained from the isopluvial maps contained in the NOAA Atlas of Arizona (**Reference 15**). Selected isopluvial maps used for Maricopa County are also encountered in *The Drainage Manual (Figures 2.1 through 2.13)* (**Reference 11**). Copies of these figures, as well as the precipitation frequency (PreFre) output, are included in **Appendix C**.

4.2.6 Physical Parameters

4.2.6.1 Basin Parameters

Soils and land use percentages were estimated using the District's Geographic Information System (GIS) database. This information, as well as other physical parameters estimated from the work maps, was entered into the *Drainage Design Menu System* (DDMS) to obtain the Green and Ampt rainfall loss parameters. The Clark Unit Hydrograph was used in the computation of peak discharges in this study because all the sub-basins are less than five square miles. Clark Unit Hydrograph parameters were calculated using the MCUHP1 module of the DDMS software. Supporting documentation and DDMS reports are included in **Appendix C**.

4.2.6.2 Reach Routing Parameters

The Normal-Depth routing method was predominantly used to route flows from one concentration point to the next. The time steps used in the Normal-Depth equation were calculated using the velocity from the Manning's formula for the cross-section. The channel cross-section geometry used for the routings was extracted from the work map and from field observation. For similar

configured reaches, typical cross sections were developed to simplify the modeling procedure.

There were a few routing reaches in the HEC-1 models that used the Muskingum-Cunge routing method because the Normal-Depth method resulted in unstable flows.

Slopes and n-values for the routing reaches were estimated based on the topographic mapping, aerial photographs and field observation. The typical cross-section sketches and tabulated reach routing parameters are included in **Appendix C.3.** The times of concentration and routing reaches for the project area are shown on **Plate DS-2**.

4.2.6.3 Storage Routing Parameters

Storm runoff will pond at several locations throughout the Detailed Study Area. The ponding effect was analyzed using a stage/discharge/storage relationships developed based on the survey and topographic information. Details of how the storage parameters were calculated are discussed in Subsection 5.2.

4.2.6.4 Subdivision Required Storage

The existing development within the Detailed Neighborhood Study does not provide onsite storage to reduce the downstream peak flows. This area was developed before the regulation requiring the 100-year, 2-hour storm volume to be retained within any subdivision development. The subdivision in the southeast portion of the study area, which is currently in the process of being developed, will provide onsite storage for the 100-year, 2-hour flow.

4.2.6.5 Flow Splits and Diversions

A portion of the study area has very mild slopes, which may cause flow splits at many man-made structures, in particular, at roadway intersections. These flow splits were estimated based on the relative ratio of slopes, flow cross-sectional areas and roughness of the different flow paths. Detailed calculations of the flow splits are included in **Appendix C.5**.

4.3 Problems Encountered During the Study

4.3.1 Special Problems and Solutions

The following are the problems encountered and how they were solved during the study.

4.3.1.1 Area Reduction

The models used a multiple storm utility (JD card) to calculate area reductions. The program kept tracking the cumulative area and calculated the reduction automatically. However, when flow splits were encountered, the main hydrograph kept the contributing area, but the split flow hydrograph did not. In order to calculate the area reduction correctly on the split flow hydrograph, the area was hard-coded at the return point of the split and also wherever the main and the split reconnected to avoid doubling of the area.

4.3.2 Modeling Warning and Error Messages

There were no ERROR messages in the HEC-1 models. Warning messages generated by the HEC-1 were examined to ensure that the models were not adversely affected.

The warning message encountered for the 10-year 6-hour HEC-1 model is as follows:

- WARNING --- MODIFIED PULS ROUTING MAY BE NUMERICALLY UNSTABLE FOR FLOWS BETWEEN (*Value*) TO (*Value*).

This warning specified a range of flows at which routing may be numerically unstable. The warning occurred in one routing reach and the hydrograph at that reach was examined. Since it showed no signs of instability, the warning was ignored.

The warning messages encountered for the 100-year 6-hour HEC-1 model are as follows:

- WARNING --- MODIFIED PULS ROUTING MAY BE NUMERICALLY UNSTABLE FOR FLOWS BETWEEN (*Value*) TO (*Value*).
- WARNING --- EXCESS AT PONDING LESS THAN ZERO FOR PERIOD. EXCESS SET TO ZERO.

The first warning occurred in one routing reach and the hydrograph at that reach was examined. Since it showed no signs of instability, the warning was ignored.

The second warning message referred to the rainfall loss calculations performed by HEC-1 using the Green and Ampt methodology. For any particular time period, it was possible to have the rainfall intensity value smaller than the estimated infiltration rate. If this case was encountered in modeling, the HEC-1 program would automatically set the rainfall loss as zero

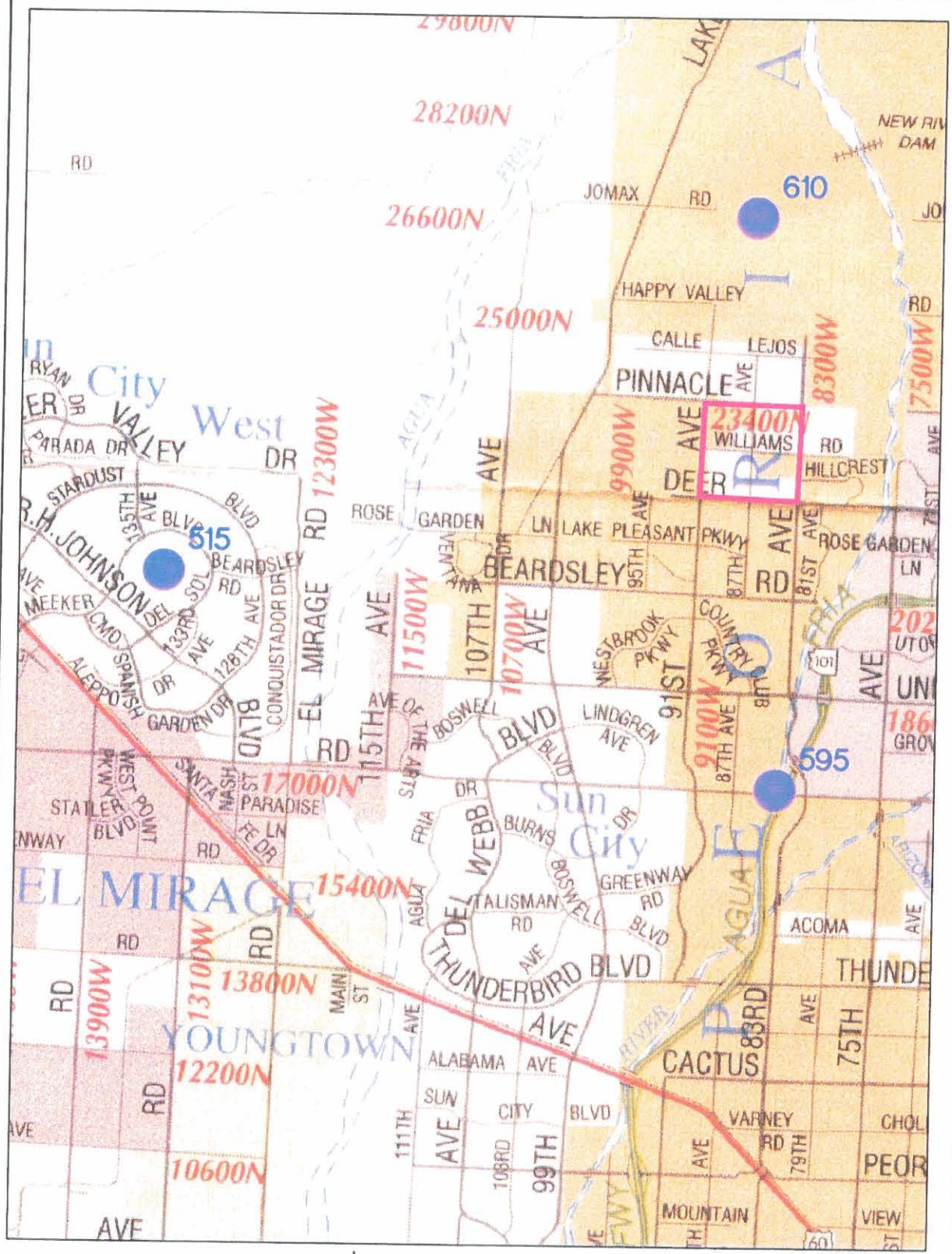
and print out a warning message. This message is not an indication of modeling problems and was disregarded.

4.4 Calibration

A calibration model was developed using the October 21st, 2000 storm precipitation data. There are no rain gages within the detailed study area, but the District operates several gages in the general area of the study. The closest gages were selected and the precipitation for the study area was developed using weighted average based on relative distances to the site. **Figure DS-2** shows the location of the gages used. The calibration model as well as rain gage data are included in **Appendix H.**

In order to model the saturated soil conditions that existed when the October 2000 rainfall occurred, a rainfall event was added to the rainfall data prior to the actual storm. These rainfalls simulated a sequence of small storms that occurred before the storm on October 21st. These storms saturated the soils enough to significantly reduce the soil infiltration rate. Furthermore, in some areas water was still ponded from the previous rain events. When the storm occurred on October 21st, water was quickly conveyed over saturated soils to low spots where water had already ponded. The inundation area at these low spots increased until the water found a route to a lower location.

The calibration storm yielded flows that seemed quite low. However the storage parameters of the model indicated that significant ponding took place at various locations along Williams, Via Montoya and Deer Valley Road. Many residents reported ponding and flooding at the same locations during the October 2000 storms.



LEGEND

515 Rain Gage Location and Number

Detailed Study Area Boundary

Not To Scale

Glendale Peoria
Area Drainage Master Plan

Entellus

FIGURE DS-2
RAIN GAUGE LOCATION
DETAILED NEIGHBORHOOD STUDY

4.5 Final Results

4.5.1 Hydrologic Analysis

Results of the hydrologic analysis including the HEC-1 input files are presented in **Appendices F, G, and H.** The summary of flows for each model is contained in **Table DS-1,** which is presented in **Appendix C.6.**

4.5.2 Verification of Results

As mentioned previously, historical gaging records are not available for the study area. However the results from the calibration model show that there is a good correlation between the estimated routing and storage parameters and the results observed in the field.

The District has established a chart to describe the general relationship between peak discharges and watershed size for Maricopa County **(Reference 14**). In this study, the estimated peak discharges at key locations were plotted on the District's chart for comparison purposes. As presented in **Figure DS-3**, the estimated values of peak discharges are in general agreement with the correlation curves developed by the District based on gaging information.

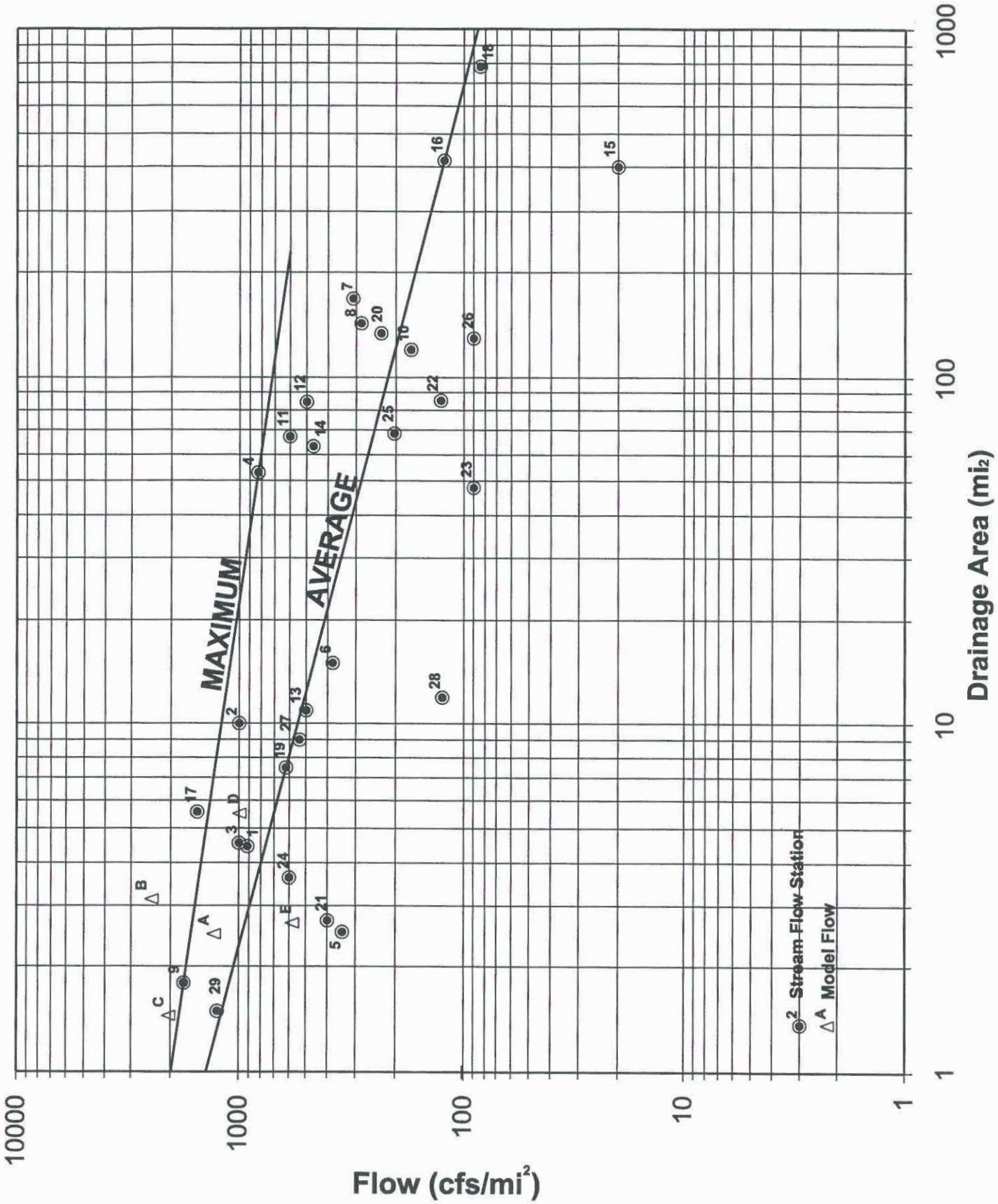


FIGURE DS-3
VERIFICATION OF RESULTS

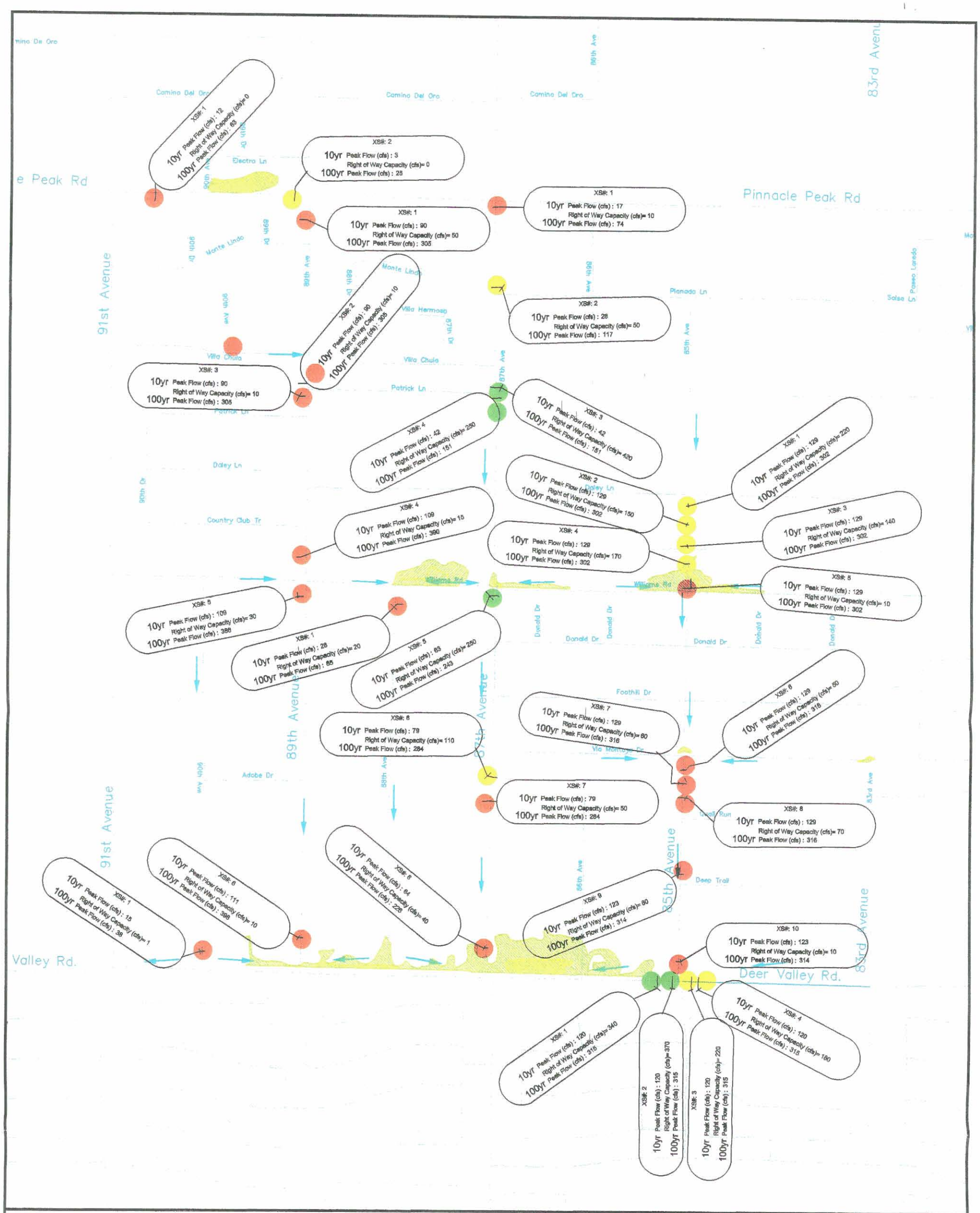
SECTION DS-5: HYDRAULICS

5.1 Conveyance Analysis

The purpose of the conveyance analysis is to determine the capacity of the north-south streets for runoff conveyance between Pinnacle Peak Road and Deer Valley Road. Flows tend to concentrate at the low points of the residential lots along the north-south streets. However, drainage requirements enforced by the District maintain that all fences shall contain weep-holes to allow storm runoff to flow through. The concentration and routing of these flows were previously determined as part of the hydrology portion of this study (Section DS-4).

Most of the north-south roadways are at below grade. Therefore, they can potentially carry some or all the expected runoff within the right-of-way, but preliminary analysis indicated that the roadways might not have sufficient capacity to carry the flow generated by any substantial storm event. In order to verify this observation, survey cross-sections were obtained at several representative locations along the roadways and hydraulic analysis was performed to determinate their capacities. The hydraulic analysis was accomplished using the Manning's formula as implemented by Boss RMS, version 4.1 (**Reference 17**). The cross-sections and hydraulic analysis are included in **Appendix D**. A summary of the existing roadways conveyance capacities is shown in **Table DS-6**, located in **Appendix D.2**.

Results of the capacity analysis were compared to the estimated flows from a 100-year and a 10-year storm in order to determine if drainage improvements were required. The results of this comparison are summarized in **Figures DS-4 and DS-5**. These figures are basically identical except the flows used in **Figure DS-5** assumed that the channel proposed by the Level III analysis along Pinnacle Peak Road was in place while the flows used in **Figure DS-4** assumed this channel was not in place and



NOTE:
The section capacity was estimated using the Manning's formula. The capacity is defined as the maximum flow that does not appear to overtop the banks of the surveyed cross section.

Not To Scale

LEGEND

- APPROXIMATE 100YR PONDING
- APPROXIMATE 10YR PONDING
- ROADWAY CENTER LINE
- CAPACITY > 100 YR Q
- CAPACITY > 10 YR Q
- CAPACITY < 10 YR Q
- DIRECTION OF FLOW
- SURVEYED CROSS SECTION

XS#: 1
10yr Peak Flow (cfs) : 100
Right of Way Capacity (cfs)= 10
100yr Peak Flow (cfs) : 100

Glendale Peoria
Area Drainage Master Plan

Flood Control District of Maricopa County

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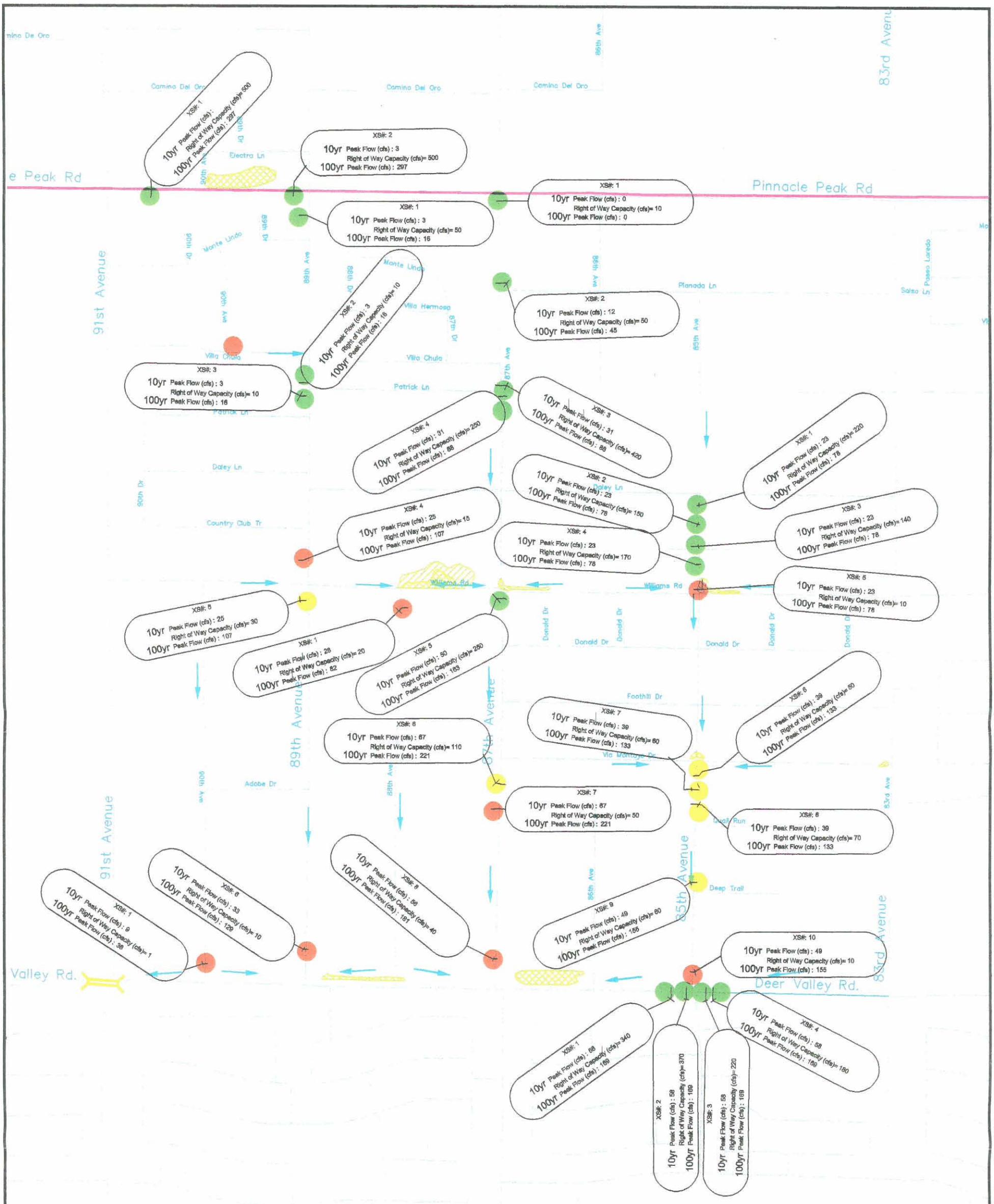
Detailed Study Section 15
Flow Summary/ Existing Capacity
FIGURE DS-4
Without Pinnacle Peak Road Channel



NOTE:
The section capacity was estimated using the Manning's formula. The capacity is defined as the maximum flow that does not appear to overtop the banks of the surveyed cross section.

Not To Scale

LEGEND

- APPROXIMATE 100YR PONDING
- APPROXIMATE 10YR PONDING
- ROADWAY CENTER LINE
- CAPACITY > 100 YR Q
- CAPACITY > 10 YR Q
- CAPACITY < 10 YR Q
- DIRECTION OF FLOW
- SURVEYED CROSS SECTION

XS#: 1
10yr Peak Flow (cfs) : 100
Right of Way Capacity (cfs)= 10
100yr Peak Flow (cfs) : 100

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Area Drainage Master Plan

Flood Control District of Maricopa County

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Detailed Study Section 15
Flow Summary/ Existing Capacity
FIGURE DS-5
With Pinnacle Peak Road Channel

From Williams Road to Via Montoya Drive, flow is conveyed through a normal crown residential street. The capacity of this section is sufficient to convey the 10-year flow, but not enough to convey the 100-year flow. Flooding is likely to occur along this segment during substantial storm events.

85th Avenue south of Via Montoya Drive is an unimproved dirt road. Cross sections of this segment show a small ditch running along the east side of the roadway and a small berm protecting the houses along the west side. The estimated capacity of the ditch varies from 10 cfs to 60 cfs.

5.1.2 86th Avenue Hydraulic Conveyance Analysis

Almost the entire length of 86th Avenue from Pinnacle Peak Road to Daley Lane is an unimproved roadway at grade, and is not likely to convey any significant flow. From Daley Lane to south of Via Montoya Drive, the area is mostly developed and there is no roadway along the alignment. In this area the east-west roadways intercept the flow and convey it to either 85th or 87th Avenues.

86th Avenue is a paved, normal crown roadway south of Via Montoya Drive to Deer Valley Road. Most of the upstream runoff is not likely to get to this location since it would be directed to 85th and 87th Avenues north of this location. Therefore, only local flows are carried in this section of 86th Avenue, and the roadway section would most likely have enough capacity to convey the flows.

5.1.3 87th Avenue Hydraulic Conveyance Analysis

The hydrology model indicated that significant storm runoff would flow along the 87th Avenue alignment. This alignment consists of improved roadway with curb and gutter and unimproved dirt road.

Between Pinnacle Peak Road and Patrick Lane, the 87th Avenue alignment features a paved roadway with a normal crown and roll curbs. Results of the hydraulic analysis indicated that the conveyance capacity in this segment of roadway is between 10 cfs and 50 cfs. Ponding and sheet flow outside the roadway right-of-way would likely occur even during minor storm events.

87th Avenue is below grade dirt road between Patrick Lane and Williams Road. Hydraulic analysis estimated that the capacity in this segment of roadway is between 250 cfs and 420 cfs. However, Williams Road creates an obstruction and flow tends to pond on the north side of Williams Road. From Williams Road to Via Montoya Drive, the paved section of 87th Avenue also appears to have enough capacity to convey flows from a significant storm event.

Between Via Montoya Drive and Deer Valley Road, the 87th Avenue alignment does not have a constant configuration and its conveyance capacity varies from 40 cfs to 110 cfs. A portion of this roadway segment does not have enough capacity to convey runoff even for a minor storm event, and significant ponding and flooding may occur.

5.1.4 88th Avenue Hydraulic Conveyance Analysis

Within the Detailed Neighborhood study limits, the 88th Avenue alignment is likely to convey flow between Williams Road and Deer Valley Road. This segment of roadway is a flat dirt road, slightly below grade with a conveyance capacity of approximately 20 cfs. This conveyance capacity would be marginal for a 10-year storm and significant ponding and flooding would likely occur during a larger storm.

5.1.5 89th Avenue Hydraulic Conveyance Analysis

The hydrology model displays that significant runoff would be conveyed along the 89th Avenue alignment between Pinnacle Peak Road and Deer Valley Road. Within these limits, the 89th Avenue alignment varies from an improved roadway with a normal crown and roll curbs to an unimproved dirt roadway. The roadway appeared to have insufficient capacity to convey the runoff from even minor storm events and significant ponding and flooding would be expected along the entire reach.

5.1.6 90th Avenue Hydraulic Conveyance Analysis

90th Avenue does not exist north of Williams Road. Runoff in this area is intercepted by the east-west streets and conveyed to either 89th or 91st Avenues. A small portion of 90th Avenue exists between Monte Lindo and Villa Chula. This portion of roadway conveys flows southerly to Villa Chula where it ends. Villa Chula does not have enough capacity to convey the flow to 89th Avenue and this flow will pond at the 90th Avenue alignment. A separate analysis was performed for this location and is discussed in Subsection 5.1.7.

The 90th Avenue alignment between Williams Road and Deer Valley Road is an unimproved dirt road at grade or slightly above grade. The runoff conveyance capacity is negligible and runoff is mostly conveyed as sheet flow along both sides of the roadway. Most of the properties within this area have weep-holes on their perimeter fences to allow the runoff to sheet flow through.

5.1.7 Hydraulic analysis at 90th Avenue and Villa Chula

This section contains an excerpt of a memo developed exclusively to address reported flooding at the intersection of 90th Avenue and Villa Chula. The complete memo, along with exhibits is presented in **Appendix D.3**.

5.1.7.1 Modified Hydrology

The Detailed Neighborhood Study hydrology models were slightly modified in order to obtain the flows at the intersection of Villa Chula and 90th Avenue. The model originally represented the area bound by 91st Avenue, 89th Avenue, Villa Chula and Pinnacle Peak Road as one sub-basin. The runoff from this sub-basin was routed to a concentration point on 89th Avenue. For this analysis, a concentration point was needed at the intersection of Villa Chula and 90th Avenue. The original sub-basin was divided into two smaller basins that were joined at the new concentration point. This flow was then routed to the original concentration point at 89th Avenue. The original assumptions of the HEC-1 models did not change and are the same as before.

Estimate flows in this area are summarized in **Table DS-2** below.

TABLE DS-2

Capacity of the intersection of Villa Chula and 90th Avenue

Location	10-year flow (cfs)	100-year flow (cfs)
Villa Chula (west of 90th Ave)	3	14
Villa Chula (east of 90th Ave)	7	36
90th Ave (north of Villa Chula)	4	22

When compared to other flows in areas within the Detailed Neighborhood Study, these flows did not seem excessive, but given that the typical roadway flow capacity in the area is below 10 cfs, these flows would cause problems. These problems are likely to occur where the flow is not contained within the roadway, and then spills into areas where the runoff has no outlet. This is the condition observed at the lot located on the south side of the intersection of Villa Chula and 90th Avenue.

5.1.7.2 Topographic Considerations for Hydraulic Calculations

The profile of Villa Chula is generally graded down towards 89th Avenue. The slope is between 0.4% and 0.2%, but between Stations 3+00 and 5+00, the profile is virtually flat. This is the location where flooding has been reported. The contours show that 90th Avenue slopes down towards Villa Chula and that most of the location runoff tends to follow 90th Avenue south to Villa Chula.

The contours north and south of Villa Chula suggested that water has a natural tendency to flow south towards Patrick Lane. The low points of the contours demonstrated that the flow is routed directly through the location of the reported flooding. A fence obstructs this direction of flow and the resident has reported that the water ponds behind this fence, within his backyard. By interpolating between contours it was estimated that the lowest point of the backyard is at an elevation of about 1304.5. This elevation is approximately one foot lower than the centerline elevation at the intersection of Villa Chula and 90th Avenue. The finished floor elevation of the house is unknown, but is most likely at an elevation around 1306.

The roadway cross-sections of Villa Chula and 90th Avenue were not surveyed. The roadway cross-section geometry was estimated using field observation data and similar looking roads within the Detailed Neighborhood Study. The cross section geometry was used to approximate the roadway capacity. Villa Chula and 90th Avenue were estimated to be 30 feet wide, normal crown, four inch roll curbs on both sides, and a roadway with 2% cross slope. The results of the capacity estimations are outlined in the next section.

5.1.7.3 Hydraulic Analysis

The hydrology and topography information above was used to perform hydraulic calculations. These hydraulic calculations include capacity estimations, normal depth approximations and an analysis that estimated the increase in water surface elevation caused by the water flowing south from 90th Avenue. Detailed calculations are included in **Appendix D**.

5.1.7.4 Capacity Estimations

The estimated flow that may be conveyed within Villa Chula, before the intersection with 90th Avenue is 9 cfs. The estimated flow that may be conveyed within Villa Chula, after the intersection with 90th Avenue is 3.5 cfs. This significant reduction in capacity is due to the flat roadway grade in this location. The estimated flow that may be conveyed within 90th Avenue, before it intersects Villa Chula is 11 cfs.

5.1.7.5 Water Depth Estimations

The water depths at various cross sections were estimated using Manning's formula. The approximated cross sections analyzed represent Villa Chula west of the 90th Avenue intersection, Villa Chula east of the 90th Avenue intersection and 90th Avenue north of Villa Chula. Manning's formula was performed for both the 100-year and the 10-year rainfall event. As expected, both rainfall events appeared to exceed the capacity of the roadway, in particular, at the intersection of 90th Avenue and Villa Chula. At this location, flow would spill out of the roadway and flow south along the natural drainage path. As mentioned before, this natural drainage path takes the water directly through the property located directly south. The fence in the property's backyard prevents the flow from continuing southerly and causes ponding in the property's backyard.

5.1.7.6 Increase of Water Surface Elevation Due to Direction Change

In order for the resident at 8935 West Villa Chula to not be flooded, all of the water flowing south from 90th Avenue would have to change directions and flow east along Villa Chula. Changing the flow direction may be accomplished by applying a force to the water. The force may be supplied by an increase in pressure head. The increase in pressure head means the water surface elevation would increase where the direction change was occurring. The normal depth calculations at the intersection tended to under-estimate the water surface elevation. Using the conservation of momentum theory, the change in water surface elevation required to redirect the flow from 90th Avenue was approximated. The peak water surface elevation at the intersection

of 90th Avenue and Villa Chula during the 100-year 6-hour storm event increases by a third of a foot and was estimated to be 1306.25. The peak water surface elevation at the intersection of 90th Avenue and Villa Chula during the 10-year 6-hour storm event appears to increase by 1.5 inches and was estimated to be around 1305.75. Both of these water surface elevations exceed the existing grade of the property south of the intersection. The property's finish floor elevation appears to be high enough to prevent flooding of the structure, but significant ponding is likely along the south perimeter fence.

5.2 Inundation Limits

During recent storm events, residents within the Detailed Neighborhood Study area have reported many instances of ponding. In most cases, this ponding results from storm runoff being obstructed by an elevated structure such as a roadway or wall. During even minor storm events, water begins to pond behind these obstructions. The water surface elevation increases as the storm continues, until the obstruction is overtopped. The inundation limits were approximated using the reservoir routing routine, included in the HEC-1 program **(Reference 10)**, to obtain maximum storage elevation. Since the study area is quite flat, small increases in the water surface elevation would result in large increases of the inundated area.

The original hydrology models were modified to reflect ponding. In general, ponding had negligible effects on peak flow. That is, the volume of water stored in low areas behind elevated roadways and walls was not large enough to significantly change the peak flows.

The inundation limits were approximated using the 2-foot contour interval mapping developed by DTM (**Reference 3**). The vertical accuracy of this mapping is approximately ± 1 foot, but inundation limits were estimated by interpolating

elevations between contours to a 1/10 of a foot. This interpolation exceeded the accuracy of the mapping and the exact location of inundation limits was unable to be determined based on the topographic information. Any structure within or near the estimated inundation limits may or may not be subject to flooding resulting from a 10-year or larger storm event. More detailed topographic information would be required to estimate flooding potential of a particular location. The approximated inundation limits are included in **Figure DS-4 and Figure DS-5**.

Most of the obstructions that cause ponding within the Detailed Study Area are elevated roadways that cut across the north-to-south direction of natural flow. Each of these roads that cause significant ponding was analyzed in terms of the 10-year and the 100-year storms. The inundation limits were delineated on the basis of the current conditions, as well as the future conditions when the proposed improvements at Pinnacle Peak Road were in place (*Glendale/Peoria Area Drainage Master Plan – Recommended Alternative – Volume RA*).

5.2.1 Inundation Limits at Deer Valley Road

Residents have reported that water has ponded north of Deer Valley Road during recent storm events. Deer Valley Road is slightly elevated above grade, and has a normal crown section. The profile of Deer Valley Road is semi-flat, with a slight sag between 85th Avenue and 87th Avenue. During a storm, water would be collected at these low points of the roadway and begin to pond. As these ponds increase in size, they would eventually combine with adjacent ponds forming a larger ponding area. The analysis yielded one large inundated area between 85th Avenue and 89th Avenue. Other areas may be inundated, but were not included because of limited mapping accuracy.

5.2.2 Inundation Limits at Williams Road

The existing condition of Williams Road causes excessive ponding during storm events. The roadway profile has two distinct low points where storm runoff concentrates. These sags are located at 85th Avenue and 87th Avenue. Furthermore, storm runoff is obstructed by the remains of an elevated irrigation ditch on the south side of the roadway. Water will pond behind the irrigation ditch, which will increase the inundation area on the north side of the roadway. During even minor storm events, large inundation areas are likely to occur at 85th Avenue and 87th Avenue. The proposed improvements along Pinnacle Peak Road will significantly reduce the ponding at these locations. Once the recommended infrastructure at Pinnacle Peak Road is in place, flooding conditions in this area will be significantly improved. The flooding produced by a 100-year storm event with the improvements at Pinnacle Peak will be very similar to flooding produced by a 10-year storm under current conditions.

5.2.3 Inundation Limits at Pinnacle Peak Road

Pinnacle Peak Road is a normal crown roadway. The profile of Pinnacle Peak Road within the Detailed Study Area is generally sloping westerly with a few low points at roadway intersections. These low points do not appear to collect much storm runoff before overflowing and draining towards the south. The roadway crown acts as the only obstruction for southbound flow. The analysis showed that significant ponding was likely to occur at Pinnacle Peak Road between 90th Avenue and 91st Avenue. Storm runoff tended to be collected at a low area in this span, and would pond until it started flowing south along 90th and 91st Avenues. This ponding would be eliminated with the construction of the proposed improvements along Pinnacle Peak Road.

5.2.4 Inundation Limits at Via Montoya Drive

Via Montoya Drive also has a normal crown cross-section. The profile of Via Montoya Drive within the Detailed Study Area slopes slightly toward the east, with low points at 83rd, 85th and 87th Avenues. Since the only obstruction to flow being conveyed south is the roadway crown, the ponding during storm events is mild. The inundation limits are generally within the right-of-way. It should be noted that the existing capacity of 85th Avenue and 87th Avenue does not appear to be adequate to convey flows resulting from significant storm events. Therefore, it is likely that shallow flooding during larger storm events will inundate areas outside of the right-of-way.

SECTION DS-6: DEVELOPMENT OF POTENTIAL ALTERNATIVES

6.1 Alternative Formulation

The hydraulic and hydrologic analysis of this Detailed Study Area confirmed reports from the community of localized flooding during storm events. Alternatives that would reduce or eliminated these flooding events were developed through collaborative efforts with the City of Peoria, the District, Maricopa Department of Transportation (MCDOT) and input from residents within the Detailed Study Area. It was agreed by this group that these alternatives would be developed primarily to address drainage problems resulting from the 10-year, 6-hour storm.

6.2 Brainstorming and Screening of Alternatives

The preliminary development of alternatives began with the listing of any and all ideas associated with the drainage of the Detailed Study Area. These ideas ranged from doing nothing and letting existing conditions prevail, to constructing significant drainage improvements (grading all of the roads and installing storm drains). After communicating with the associated parties, it became apparent that many of the extreme alternatives listed during the brainstorming session would not be feasible. The alternatives retained for further evaluation displayed a significant benefit to cost potential. Most of the underground storm drains were eliminated because the output channels downstream are too shallow to convey any significant flow. Inverted crown streets were also eliminated because maintenance problems associated with frequent flow in the roadway.

6.3 Development of Alternative Solutions

Many factors influenced the formulation of alternatives. A channel along Pinnacle Peak Road has been proposed as part of the ADMP Update Level III Improvements.

Since it was not known when this channel would be built, the alternatives developed for the Detailed Study Area reflected existing flow conditions. Several roads within the study area are targeted for improvements as part of MCDOT's PM-10 program. This program paves dirt roads to reduce the amount of dust per the Environmental Protection Agency's requirements. Alternatives were developed assuming that 85th, 86th, 88th, 89th and 90th Avenues would be paved surfaces with a normal crown and two twelve foot travel lanes within a fifty feet total right-of-way width. 87th Avenue was assumed to have a similar cross section as the other roadways, but since it was the half-mile street, it would have a paved shoulder of five feet on each side and a total right-of-way of eighty feet. A channel has already been proposed along 85th Avenue between Via Montoya Drive and Deer Valley Road. This channel will be designed and constructed by the new development to the east of 85th Avenue south of Via Montoya Drive.

6.3.1 Alternatives for Storm Runoff Conveyance North of Williams Road

For areas north of Williams Road, alternatives were not developed that specifically targeted existing right-of-way sections lacking the capacity to convey runoff from significant storm events. Many of the right-of-way sections in this area seemed to already have enough capacity for at least the 10-year storm. Furthermore, after the Pinnacle Peak Road improvement was constructed, flows throughout this area were significantly reduced. Almost all of the roadways north of Williams Road appeared to have enough capacity to handle the 10-year storm runoff once the Pinnacle Peak Road improvements were in place.

6.3.2 Alternatives for Storm Runoff Conveyance South of Williams Road

Even with the proposed improvements at Pinnacle Peak Road, the 10-year flows appeared to exceed the capacity of most right-of-way sections south of Williams Road. Alternatives that were developed beyond the preliminary

screening process had potential to feasibly address the lack of conveyance capacity throughout the southern portion of the study area. Features of the alternatives considered are shown on **Plate DS-5**.

All of the alternatives developed share several common features. These features are colored yellow on **Plate DS-5**. For each of these alternatives, a series of lateral ditches and or channels would be necessary along Williams Road and Deer Valley Road. Ditches along Williams Road would convey runoff from the Detailed Study Area north of Williams Road, into the new drainage structures. Channels and or ditches along Deer Valley Road would convey the flow from the entire Detailed Study Area to crossing points along the roadway where culverts would be constructed to convey the flow to the existing infrastructure on the south side of Deer Valley Road. The proposed channel along the 85th Avenue alignment between Via Montoya Drive and Deer Valley Road was also included as part of all developed alternatives. This channel will be constructed by the development to the east of 85th Avenue. The installation of a storm drain along the 85th Avenue alignment, between Williams Road and Via Montoya was common to all alternatives as well, but the storm drain would be sized differently for each alternative so the storm drain was not colored yellow on **Plate DS-5**. Instead, the appropriate color for each alternative is used to differentiate between the different sizes required.

The drainage ditches along Williams Road and Deer Valley Road as well as the channel on the east side of 85th Avenue are common elements to all alternatives. The unique features of the alternatives are listed below, with a brief description. The evaluation of each alternative is discussed in Subsection 7.3.

1. The features of Alternative 1 are colored red on **Plate DS-5**. Construct single channels along the 87th Avenue and 89th Avenue alignments and a storm drain or roadway improvement along 85th Avenue.

2. The features of Alternative 2 are colored blue on **Plate DS-5**. Construct a single channel along the 89th Avenue alignment and storm drain or roadway improvements for 85th Avenue.

3. The features of Alternative 3 are colored green on **Plate DS-5**. Install a basin north of Williams Road near either 87th Avenue or 89th Avenue, in addition to the improvements suggested by Alternative 1.

4. The features of Alternative 4 are colored magenta on **Plate DS-5**. Construct ditches along both sides of the existing roadways within the right-of-way between Williams Road and Deer Valley Road. These roadways are 87th, 88th, 89th and 90th Avenues as well as storm drains or roadway improvements for 85th Avenue.

6.3.3 Alternatives for Reported Flooding at Villa Chula and 90th Avenue

Alternatives were developed that specifically addressed the reported flooding of the resident at 8935 West Villa Chula. A memo containing a description and analysis of the existing drainage conditions at this site has been included in **Appendix D.3**. The memo also explores the alternatives listed below.

1. Install a drainage ditch along Villa Chula, between 89th and 90th Avenues.

2. Install weep-holes in the wall where storm runoff has been reported to concentrate.

3. Reconfigure the cross section of Villa Chula Road between 89th and 90th Avenues so the south edge of the right-of-way is elevated enough to prevent flow from spilling into the resident's property.

4. Install drainage easements between Villa Chula and Patrick Lane to allow storm runoff to follow its natural course.

SECTION DS-7: ALTERNATIVE ANALYSIS

The alternatives discussed in this section relate to drainage concerns within the Detailed Study Area, south of Williams Road. A separate alternative analysis that addresses the drainage concerns at Villa Chula and 90th Avenue has been included as in **Appendix D.3**.

7.1 Evaluation Criteria

The criteria used to evaluate each alternative were developed through a collaborative effort between the City of Peoria, the District, MCDOT and Entellus. The criteria included quantitative factors such as cost and hydraulic performance and qualitative factors such as aesthetics and public opinion. The criteria were listed in **Table DS-3**, and a weight factor was assigned to each in order to represent the relative importance of each. Each alternative was evaluated by ranking it compared to the other alternatives being considered.

7.2 Cost Estimates

7.2.1 Comparative Alternative Cost

A general cost estimate for each alternative was developed using the approximate design features shown on **Plate DS-5**. These cost estimates included major costs that varied between each alternative. The cost shown does not necessarily reflect the actual cost for constructing the particular alternative. Instead, the approximate cost was only used to rank each alternative from most expensive too least expensive. A set of tables that detail the cost estimate data for each alternative is included in **Appendix E.1.** This data is summarized in **Table DS-4.**

TABLE DS-3

Detailed Study Alternative Selection

Alternative	Alternative	Quantitative Measures		Public Opinion (Weight 10)		Aesthetics (Weight 4)		Ease of Implementation (Weight 4)		Maintenance Costs (Weight 6)		
#	Description	Cost Score	Hydraulic Effectiveness Score	Score	Weighted Score	Score	Weighted Score	Score	Weighted Score	Score	Weighted Score	Total Score
1	Storm drain along the 85th Ave alignment between Williams and Via Montoya and channels along 87th Ave and 89th Ave.	98	100	6	60	4	16	5	20	3	18	**71**
2	Storm drain along the 85th Ave alignment between Williams and Via Montoya and channel along 89th Ave.	91	100	5	50	5	20	6	24	2	12	**68**
3	Storm drain along the 85th Ave alignment between Williams and Via Montoya, basins north of Williams at 87th and 89th Ave, and channels along 87th and 89th Ave.	76	100	2	20	3	12	5	20	1	6	**53**
4	Drainage ditches along both sides of roadways along 87th, 88th, 89th and 90th Ave.	100	95	7	70	7	28	7	28	7	42	**83**

Notes: The recommended alternative was determined using a weighted matrix. The qualitative measures were each given a relative importance using a scale from 1 to 10. A qualitative measure such as public opinion was given a very high relative importance of 10, while aesthetics was only given an importance of 4. Each alternative was then given a raw score of 1 to 10 that represented how well the alternative satisfied that particular criteria. The total score for each alternative was determined by the product of the criteria importance score and the alternative satisfaction score. The cost score was referenced from the cost estimates for each alternative and the hydraulic effectiveness score was determined by finding the percentage of the 10-year storm that could be conveyed in the alternative.

TABLE DS-4

Comparative Alternative Year 2001 Cost

Alternative Number	Alternative Description	Comparative Cost
1	Storm drain along the 85th Ave alignment between Williams and Via Montoya and channels along 87th Ave and 89th Ave.	$1,884,200
2	Storm drain along the 85th Ave alignment between Williams and Via Montoya and channel along 89th Avenue.	$2,032,900
3	Storm drain along the 85th Ave alignment between Williams and Via Montoya, basins north of Williams at 87th and 89th Ave, and channels along 87th and 89th Ave.	$2,424,674
4	Drainage ditches along both side of roadways along 87th, 88th, 89th and 90th Ave.	$1,852,095

7.2.2 Preferred Alternative Cost

A set of tables that detail the cost estimate data for the recommended alternative is included in **Appendix E.2.** The results for the recommended alternative cost estimate are summarized in **Table DS-5**. The cost mentioned in the previous section was refined more accurately to reflect the cost of implementation of the preferred alternative.

7.3 Evaluation of Alternatives

This section summarizes how each alternative satisfies the criteria outlined in Subsection 7.1. In order to select the alternative that most satisfies the criteria, a weighted matrix was developed. Each alternative was awarded points for satisfying the criteria.

TABLE DS-5

Year 2001 Cost Estimate for the Preferred Alternative

Description	Units	Quantity	Unit Cost ($)/unit	Cost
Excavation	Yd^3	40709	3	$122,130
Compaction	Yd^2	26853	1	$26,850
Structural Concrete	Yd^3	1321	800	$1,056,800
Concrete Driveway Crossings	Ft^2	39580	5	$197,900
Concrete Roadway Crossings	Ft^2	7500	5	$37,500
Graded Ditch Crossings (Across Roadway)	Unit	7	5,000	$35,000
Right-of-Way	Ac^2	3	100,000	$308,140
Total Alternative Year 2001 Cost $1,784,320				

7.3.1 Qualitative Evaluation

Several criteria such as safety, environmental, and cultural resources were considered equal for all the alternatives, therefore they were not considered for the evaluation of the preferred alternative. However, public opinion, aesthetics, and ease of implementation were considered. Each criterion was weighted according to importance. Points were given to alternatives according to how well they satisfied the particular criteria. The number of points that each alternative earned was decided using input from the District, the City of Peoria, MCDOT and local residents. The points awarded to the alternative for the criteria were multiplied by the weight. The weighted score for each qualitative criterion was included in the summation of the total score shown in **Table DS-3**.

7.3.2 Quantitative Evaluation

The quantitative criterion included implementation costs, hydraulic effectiveness, and maintenance cost.

7.3.2.1 Cost

The implementation cost associated with each alternative included factors such as right-of-way purchases and excavation expenses. For each alternative, a general cost estimate was prepared. These cost estimates were primarily prepared for comparison purposes. **Appendix E.1** includes the tables showing the general cost estimates for each alternative. The comparative cost estimates for each alternative is included in this appendix as well. A score was assigned to each alternative that was used in the weighted selection matrix. Each alternative could earn up to 100 points for cost effectiveness. The alternative with the lowest implementation cost was awarded all 100 points. The number of points earned by the other alternatives was calculated by finding the percent by which each cost was greater than the lowest cost. This percentage was subtracted from the 100 points possible in order to obtain the cost score.

The costs of Alternatives 1 to 3 were slightly higher than those of Alternative 4. The driveway and roadway crossings of Alternative 4 were less expensive than those of Alternatives 1 to 3 as well. This was because it is less expensive to cross the ditches proposed by Alternative 4 than the channels proposed by Alternatives 1 to 3. Comparing the costs associated with Alternative 3 against those of Alternatives 1 and 2 revealed that the detention basins are not cost effective. The detention basins of Alternative 3 reduced the peak flows along 87th and 89th Avenues, which allowed for smaller channels to be constructed. The lower implementation costs associated with smaller channels did not offset the additional costs related to purchasing the land for the detention basin.

7.3.2.2 Hydraulic Effectiveness

The hydraulic effectiveness of each alternative was evaluated by comparing the 10-year storm peak flows to the conveyance and or storage capacities of the alternative's features. The hydraulic effectiveness score shown in **Table DS-3** is the estimated percentage of total storm runoff within the southern portion of the Detailed Study Area that would be addressed by that alternative. Alternatives 1 to 3 were developed using the peak 10-year flows as the design constraint. Therefore, Alternatives 1 to 3 each scored 100 points for hydraulic effectiveness. Alternative 4 was developed using right-of-way limitations and cost considerations as design constraints. In about 1 out of 10 locations, the features of Alternative 4 did not appear to completely convey the 10-year peak flow and Alternative 4 scored 95 points for hydraulic effectiveness.

7.4 Recommended Alternative

Alternative 4 appeared to be the most desirable drainage option for the southern portion of the Detailed Study Area. The features of this alternative have been recommended for further development and design. These features would include a channel along 85th Avenue between Via Montoya Drive and Deer Valley Road, which would cross under Deer Valley Road through a culvert. At the time of preparation of this study, the channel and culvert have been designed by a private developer and are pending review by the District.

Along Deer Valley Road, a series of channels and ditches have been included as part of the recommended alternative. These structures would be intended to collect sheet flow from the north and convey it to one of three culverts that would cross under Deer Valley Road. These structures would ease or eliminate ponding on the north side of Deer Valley Road. The culverts under Deer Valley Road would convey the storm

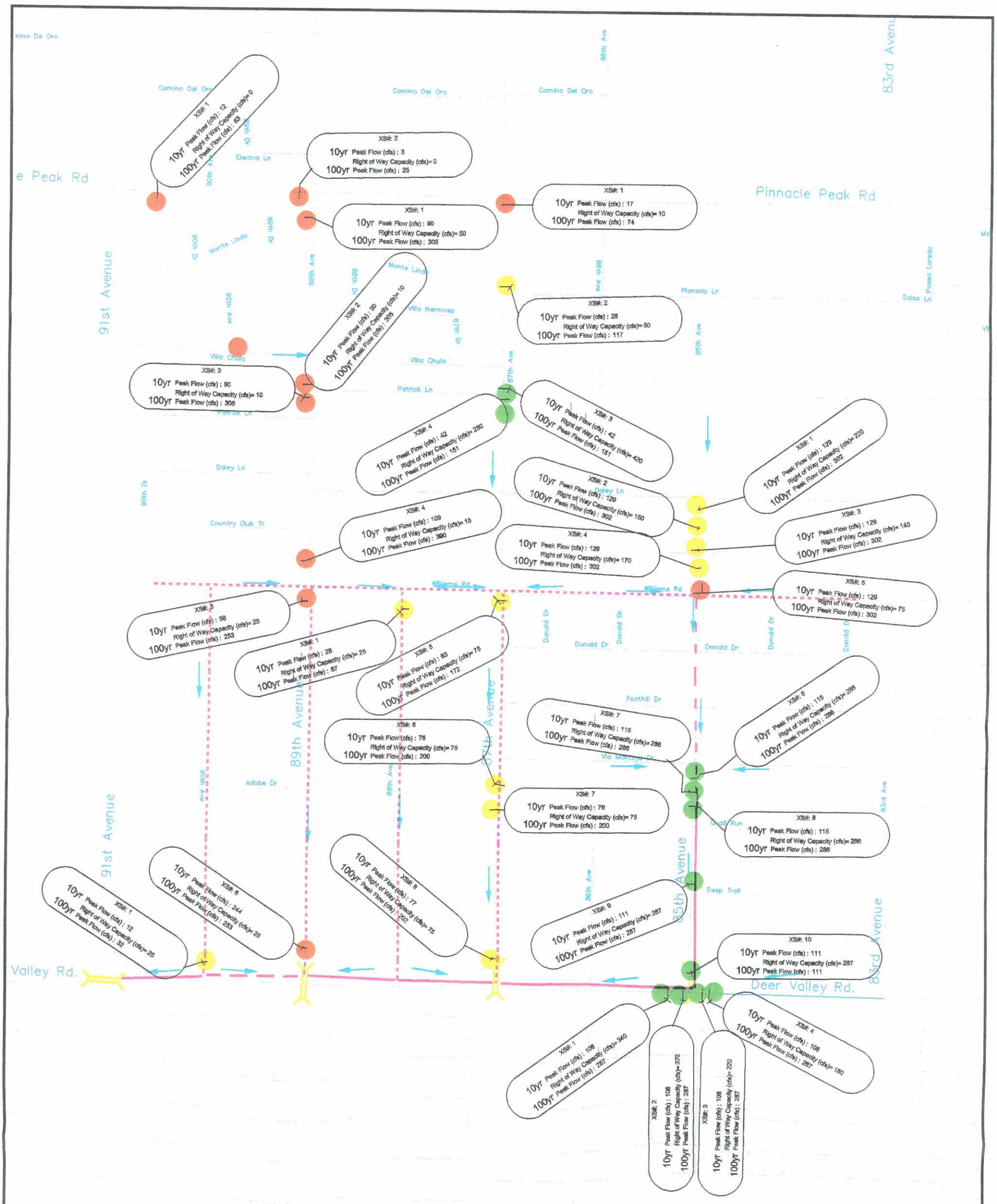
runoff from the Detailed Study Area to existing infrastructure on the south side of Deer Valley Road.

The most common feature of the recommended alternative was the use of dual roadside ditches to convey storm runoff. These ditches have been proposed as lateral connectors along Williams Road between 83rd Avenue and 91st Avenue. They were also included as main conveyance routes along 87th, 88th, 89th and 90th Avenues between Williams Road and Deer Valley Road. The dual roadside ditches would be constructed on both sides of the roadway when they are improved. The ditch bank nearest to the roadway would also be the roadway shoulder. The maximum slope would be 4.0%. The ditches would be triangular shaped with the invert not being more than 11 inches below the roadway crown. The ditch bank farthest from the roadway would extend from the invert to the same elevation as the roadway crown. This slope would not be more than 12.0%.

The MCDOT right-of-ways along 87th Avenue and Williams Road are approximately 80 feet wide. Assuming there would be two 12-foot lanes, the ditches would each be approximately 28 feet wide. The combined flow capacity of these two ditches, assuming inundation up to the outer bank, appeared to be 75cfs. The MCDOT right-of-ways along 88th, 89th and 90th Avenues are approximately 50 feet wide. The standard cross section for minor collector includes two 12-foot lanes and a 5-foot paved shoulder on each side. The ditches would each be approximately 13 feet wide (including the 5-foot shoulder). The combined flow capacity of the ditches, assuming inundation up to the roadway crown, appeared to be 25 cfs. The right-of-way along 88th, 89th and 90th Avenues varies from 35 to 50 feet. The proposed alternative was based on two 12-foot lanes and a 5-foot graded shoulder on each side. The ditches would each be approximately 13-feet wide (including shoulder). The standard cross-section for a neighborhood roadway includes a right-of-way of 50-feet. However, cost for additional right-of-way was not included in the cost estimate since this cost is associated with the roadway improvements and the drainage will be accommodated

within the standard roadway right-of-way. The combined flow capacity of the ditches, assuming inundation up to the roadway crown, appeared to be 25 cfs.

The proposed geometry of the dual ditches would allow for driveway and roadway crossings to be easily constructed without significant changes to the channel. Where a ditch crossed a driveway, the ditch banks would be lined with concrete. Concrete driveways were proposed in order to allow vehicles access to driveways, without damaging the ditch. Concrete sections were also proposed where a ditch crossed a roadway. These skirt shaped sections would be shaped so the flow was contained through the crossing. The depth of water at driveway and roadway crossings appeared to be less than one foot. No culverts would be necessary, which greatly increased the hydraulic capacity of the ditches and reduced the implementation costs as well. The 85th Avenue improvements featured a storm drain between Williams Road and Via Montoya Drive that would drain into the downstream ditch that would be built by the development west of 85th Avenue. As an alternative to the storm drain, the roadway could be re-graded and the cross section modified to increase the hydraulic capacity of the roadway. A check to see how well the recommended alternative would perform was done. The hydrology models were modified in order to reflect the improvements discussed above using the model with the proposed Pinnacle Peak Road channel and the model without the channel. **Figures DS-6 and DS-7** shows the new flows and conveyance capacities. In general, the series of channels and ditches recommended would significantly improve the current drainage conditions. This can be seen by comparing the number of red and yellow markers in **Figure DS-4** (Existing Conditions) to the number of yellow and green markers in **Figure DS-6 and DS-7** (Future Conditions with and without the Pinnacle Peak Road channel). The implementation cost of the recommended alternative has been estimated with more detail. The tables associated with the detailed cost estimate of the recommended alternative are located in **Appendix E.2**.



NOTE:
The section capacity was estimated using the Manning's formula. The capacity is defined as the maximum flow that does not appear to overtop the banks of the surveyed cross section.

Not To Scale

LEGEND

- Single Trapezoidal Channel
- Double Triangular Ditch
- Single Triangular Ditch
- Culvert/ Storm Drain
- Proposed Culvert
- ROADWAY CENTER LINE
- CAPACITY > 100 YR Q
- CAPACITY > 10 YR Q
- CAPACITY < 10 YR Q
- DIRECTION OF FLOW
- SURVEYED CROSS SECTION

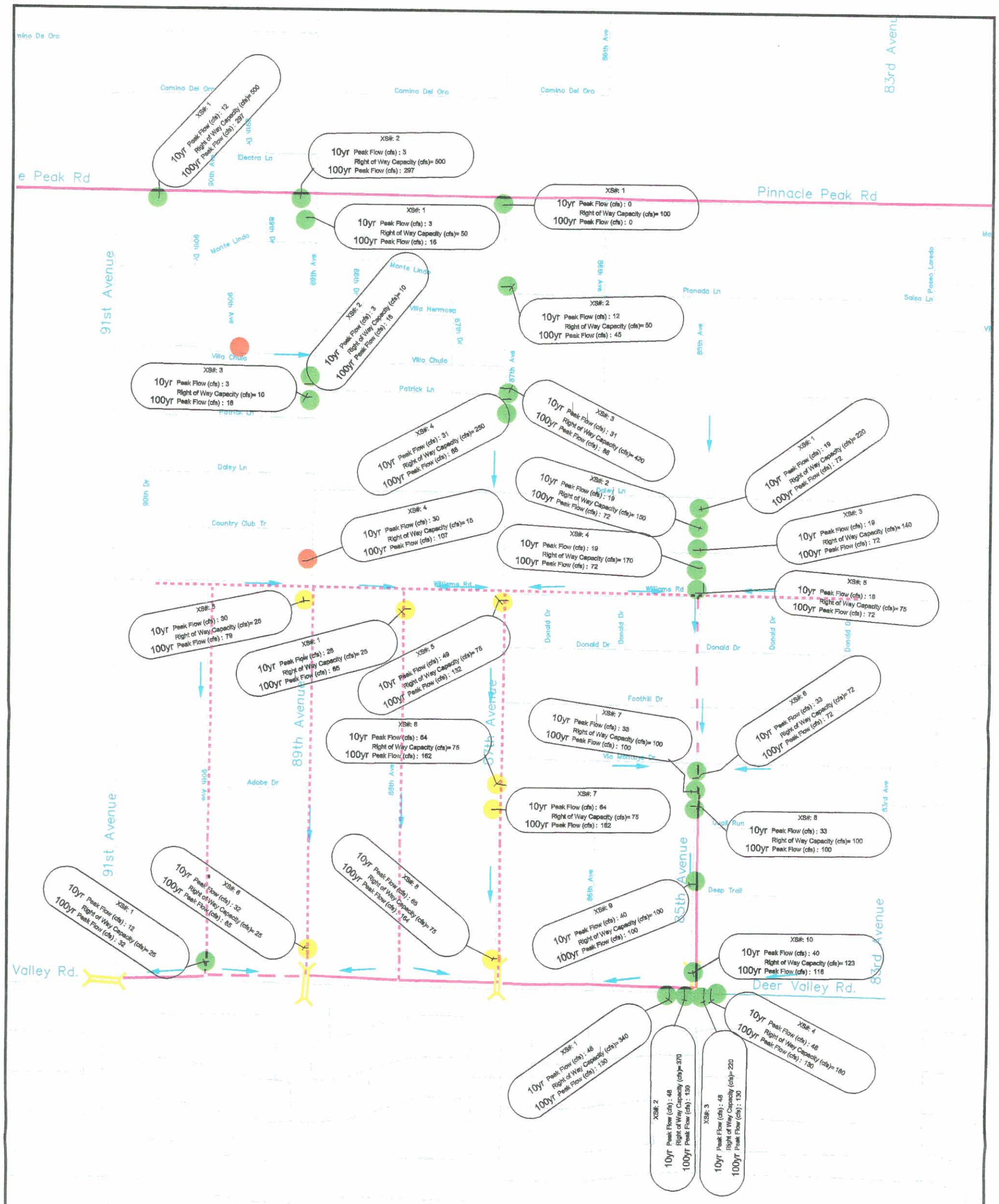
XS#: 1
10yr Peak Flow (cfs) : 100
Right of Way Capacity (cfs)= 10
100yr Peak Flow (cfs) : 100

Glendale Peoria
Area Drainage Master Plan

Flood Control District of Maricopa County

Entellus
2255 N. 44th Street Suite 125
Phoenix, AZ 85008.3279
Tel 602.244.2566
Fax 602.244.8947

Detailed Study Section 15
Flow Summary/ Capacity
FIGURE DS-6
Without Pinnacle Peak Road Channel
Recommended Alternative Hydraulics



NOTE:
The section capacity was estimated using the Manning's formula. The capacity is defined as the maximum flow that does not appear to overtop the banks of the surveyed cross section.

Not To Scale

LEGEND

- Single Trapezoidal Channel
- Double Triangular Ditch
- Single Triangular Ditch
- Culvert/ Storm Drain
- Proposed Culvert
- ROADWAY CENTER LINE
- CAPACITY > 100 YR Q
- CAPACITY > 10 YR Q
- CAPACITY < 10 YR Q
- DIRECTION OF FLOW
- SURVEYED CROSS SECTION

XS#: 1
10yr Peak Flow (cfs) : 100
Right of Way Capacity (cfs)= 10
100yr Peak Flow (cfs) : 100

Glendale Peoria
Area Drainage Master Plan

Flood Control District of Maricopa County

Entellus
2255 N. 44th Street Suite 125
Phoenix, AZ 85008.3279
Tel 602.244.2566
Fax 602.244.8947

Detailed Study Section 15
Flow Summary/ Capacity
FIGURE DS-7
With Pinnacle Peak Road Channel
Recommended Alternative Hydraulics

7.5 Implementation Plan

This study was coordinated with the Maricopa County Department of Transportation (MCDOT). A meeting was held with representatives of MCDOT, the District, and the Design Team to discuss implementation of the recommended drainage improvements.

The general approach to the implementation of the recommended alternatives was to divide and conquer. Both MCDOT and the District agreed to pursue funding for implementing the improvements. MCDOT already has 88th and 89th Avenues under design as part of a PM-10 project. 87th Avenue is scheduled to be a Transportation Improvement Project (TIP) for MCDOT within 2 to 3 years. The District agreed to pursue funding for the remaining work to install culvert crossings of and channels along Deer Valley Road, regrading of the intersections at Williams Drive, and other miscellaneous improvements. There did not appear to be funding for 90th Avenue regrading and it was considered a low priority.

APPENDIX A. REFERENCES

A.1. Data Collection Summary

Table DS-7, located at the end of **Appendix A**, summarizes the data collected as part of this study.

A.2. Reference Documents

1 CDM INC. and JM Montgomery Inc., *Glendale - Peoria Area Drainage Master Plan*, May 1987.

2 Kaminski-Hubbard Engineering, Inc. *Arizona Canal Diversion Channel Area Drainage Master Study*, Volumes 1.2, 1.3 & 1.5, May 1995

3 Databased Terrain Mapping, Inc. *Glendale/Peoria ADMP Update Aerial Mapping*, January 2000.

4 U.S. Department of Agriculture, Soil Conservation Service, *Soil Survey of Aguila-Carefree Area*, April 1986.

5 U.S. Department of Agriculture, Soil Conservation Service, *Soil Survey of Maricopa County, Arizona-Central Part*, April 1986.

6 Flood Control District of Maricopa County, *Aerial Photographs*, First Quarter 1999.

7 Rupp Aerial, *The Aerial Photo Book- The Real Estate Atlas - Phoenix.* Third Quarter, 1999.

8 Glendale Planning Department, *City of Glendale Zoning Map*, Current.

9 City of Peoria, *Peoria Zoning Map*, City of Peoria, Arizona, 1991.

10 U.S Department of Army, Corps of Engineers, Hydrologic Engineering Center, *Generalized Computer Program 723-X6-L2010, HEC-1 Flood Hydrograph Package*, Davis California, February 1981, Revised May 1991.

11 Flood Control District of Maricopa County, *Hydrology Design Manual for Maricopa County, Arizona, Volume 1- Hydrology*, January 1995.

12 U.S. Department of Interior, Geological Survey, 7.5 Minutes Series Topographic Maps, Scale 1:24,000.

13 Aerial Mapping Company, *Agua Fria River Study*, February 1995.

14 Flood Control District of Maricopa County, Internal Memorandum. "Flood Frequency Analysis of Stream Flow Stations", Russ Cruff, FCDMC, April 1996.

15 U.S. Department of Commerce, National Oceanic and Atmospheric Administration, National Weather Service, *Precipitation-Frequency Atlas of the Western United States, Volume VIII – Arizona*, 1993.

16 Wood, Patel & Associates Inc., *Desert Amethyst Drainage Project Design Documentation Summary for the City of Peoria*, Arizona, September 1999.

17 Boss International, Inc., *River Modeling System (RMS) Version 4.1.*

A.3. General Documentation and Correspondence

The General Documentation and Correspondence for the Hydrology Report can be found in the *Glendale/Peoria Area Drainage Master Plan – Administrative Report – Volume AR.*

A.4. Survey Field Notes

The Survey Field Notes can be found in the *Glendale/Peoria Area Drainage Master Plan - Data Collection – Volume DC.*

TABLE DS-7
DATA COLLECTION SUMMARY

Data Number	Data Description	Prepared by	Date
1	Hydrology Update on Glendale-Peoria Area Drainage Master Study	Maxima R. De Vera	Jan. 1993
2	Master Grading and Drainage Plan	Carter Associates ,INC.	May 1989
3	Glendale-Peoria Area Drainage Master Plan	CDM INC. and JM Montgomery Inc.	May 1987
4	Concept/Routing study	Wood, Patel and Assoc. Inc.	March 1996
5	Orangewood Storm Drain Location Study	Wood, Patel and Assoc. Inc.	March 1996
6	Preliminary Drainage Report	Coe and Van Loo Consultants Inc.	April 1994
7	Glendale-Peoria-Sun City Drainage Area no.1	Hydrology Branch Engineering Div.	Jan. 1995
8	Drainage Report on Union Hills Dr.	Erikson and Salmon, Inc.	August 1987
9	Flood Damage Report on storm and flood of Aug. 16-17 1963	U.S. Army Corps of Engineers	June 1964
10	Cactus Road Storm Drain	Stanley Franzoy Corey	Nov. 1992
11	Westbrook Village East Drainage Study	Goldman, Toy and Assoc. Inc.	Oct. 1998
12	91st Ave. Drain Hydrology Update	Maxima R. De Vera	Oct. 1994
13	Desert Amethyst Drainage Project - 60% Plans	Wood, Patel and Assoc. Inc.	May 1999
14	Glendale-Peoria-Sun City Drainage Area no. 2	Hydrology Branch Engineering Div.	Jan. 1995
15	Arrowhead Ranch - Specific Area Plan and Storm Drainage Plan	Dibble and Associates	April 1992
16	Storm Water Master Plan - City of Peoria	JM Montgomery Inc.	April 1985
17	Desert Amethyst Drainage Master Plan	Montgomery Watson	July 1997
18	Preliminary Drainage Report for Intersection Improvements	Hendrich, Eberhart and Assoc., Inc	August 1995
19	500' Swath/Intersection Drainage Plan	Kaminski Hubbard Engineering Co.	July 1993
20	Storm Water Management Plan	Camp Dresser and McKee Inc.	Jan. 1986
21	Glendale General Plan	City of Glendale	Sept. 1987
22	City of Peoria Master Plan of Storm Drainage - Executive Summary	J.M. Montgomery Inc.	April 1988
23	Storm Water Management Plan Capitol Improvement Sum.	Camp Dresser and McKee Inc.	Jan. 1986
24	Storm Drain along Cactus Road - Proposal	Steve Corrales Engineering Co.	Sept. 1990
25	Concept/Routing study	Wood, Patel and Assoc. Inc.	March 1996
26	Final Drainage Report for Eagle Canyon	American Engineering Co.	Jan. 1998
27	Lake Pleasant Road Corridor Study	Kirkham Michael Engineers	May 1999
28	Glendale-Peoria area Drainage Master Plan	CDM INC. and JM Montgomery Inc.	May 1987
29	Revisions to Final Drainage Report Deer Village Unit 1	Coe and Van Loo Consultants Inc.	March 1997
30	Silverton Beazer Homes HEC-RAS and HEC-FDA summary	Sage Engineering Corporation	August 1997
31	Fletcher Heights - Final Drainage Plan	CMX Group Inc.	June 1996
32	Deer Village Units 5&6 - Final Drainage Report	CVL Consultants, Inc	Dec. 1996
33	Dove Valley Ranch - Final Drainage Report Parcels 2,3,5	Neil/McGill Consultants,Inc.	Oct. 1998
34	Deer Village Final Drainage Report Units 1,2,3,4	CVL Consultants, Inc	Dec. 1996
35	Alta Vista Estates - Drainage Report, Units 3 and 4	CMX Group Inc.	Jan. 1998
36	Orangewood Alignment Concept/Routing Study	Wood, Patel and Assoc. Inc.	Nov. 1995
37	Addendum to Glendale-Peoria area Drainage Master Plan	CDM INC. and JM Montgomery Inc.	May 1987
38	Marinette heading canal Floodplain Removal	Coe and Van Loo Consultants Inc.	Sept. 1995
39	Gila River Basin New River and Phoenix City Streams	U.S. Army Corps of Engineers	1982
40	Final Drainage Report for Parkridge at 95th Ave and Beardsley	Coe and Van Loo Consultants Inc.	Jan. 1994
41	Marinette Heading Canal floodplain removal Request for revision	Coe and Van Loo Consultants Inc.	March 1995
42	Drainage Report For Alta Vista Estates, Units 1 and 2	CMX Group Inc.	June 1995
43	Ironwood Final Drainage Plan	CMX Group Inc.	Oct. 1998
44	Peoria Desert Lands Conservation Master Plan	Dames & Moore	Aug 1999
45	City of Peoria Parks Master Plan	Planners Ink	Feb 1996
46	Rivers Master Plan - Executive Summary	Cella Barr Associates Inc.	March 1999
47	Rivers Master Plan	Cella Barr Associates Inc.	Jan 1999
48	Trails Master Plan - Executive Summary	Cella Barr Associates Inc.	March 1999
49	Trails Master Plan	Cella Barr Associates Inc.	Jan 1999
50	Sun City Hydrologic Study	FCDMC	Nov. 1997
51	Silverton Drainage Report	Sage Engineering Corporation	Aug. 1997
52	Fletcher Heights - Preliminary Drainage Plan, Phase III	CMX Group Inc.	June 1996
53	Deer Valley Estates Drainage Plan	CMX Group Inc.	Aug. 1996
54	Fletcher Heights - Preliminary Drainage Plan, Phase II	CMX Group Inc.	July 1996
55	Fletcher Heights - Preliminary Drainage Plan Concept Overview	CMX Group Inc.	June 1993
56	Drainage Report for Calbrisa	CVL Consultants, Inc	July 1993
57	Drainage Report for Calle Lejos Estates	CMX Group Inc.	Nov. 1994
58	Drainage Report for Parcel XI at Arizona Traditions	CVL Consultants, Inc	Oct. 1998
59	Drainage Report for Parcel VIII, IX, and X at Arizona Traditions	CVL Consultants, Inc	June 1998
60	Fletcher Heights - Preliminary Drainage Plan, Phase I Volume I of 2	CMX Group Inc.	June 1996
61	Fletcher Heights - Phase III - Evaluation of Offsite Drainage	CMX Group Inc.	Sept. 1996
62	Drainage Report for La Caille	CMX Group Inc.	Dec 1994
63	Boardwalk/Peoria Units 1&2 Preliminary Drainage Report	Erie and Associates	April 1994

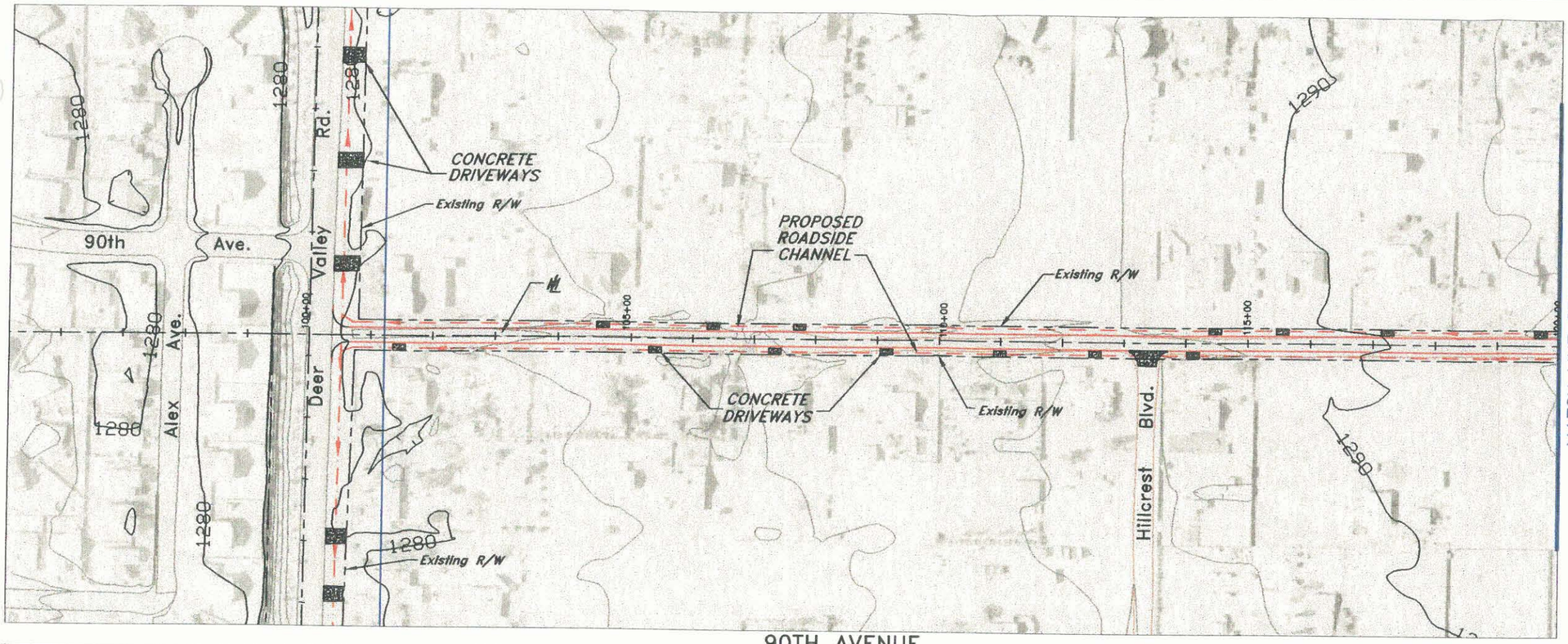
TABLE DS-7
DATA COLLECTION SUMMARY

Data Number	Data Description	Prepared by	Date
64	Deer Village Final Drainage Report Units 1,2,3,4 PLATE	CVL Consultants, Inc	Dec. 1996
65	Deer Village Final Drainage Report Units 1 Revisions to Final Drainage Report	CVL Consultants, Inc	Dec. 1996
66	Final Drainage Report for Pinnacle Ranch	American Engineering Co.	Oct. 1994
68	Arrowhead Cove & Arrowhead Business Park Preliminary Drainage Report	Erie and Associates	July 1993
69	Ventana Lakes Final Drainage Report	Collar, Williams & White Engineering	
70	Bell Road Project Drainage Study Volume IV	Greiner Engineering Sciences	Oct 1987
73	New River Watercourse Master Plan-Report & Tech. Notebook	Stantech (draft)	June, 1999
74	Patrick Ranch - Final Drainage Report	Sage Engineering Corporation	March, 1994
75	Hillcrest Ranch - Master Drainage Report	Wood Patel & Associates, Inc.	August, 1991
76	Hillcrest Ranch - Phase 2 Drainage Improvements	Wood Patel & Associates, Inc.	August, 1992
77	Final Drainage for Fletcher Hts Phase 2a	CMX Group Inc.	Dec. 1997
78	Drainage Report for Arrowhead Horizons	DEA	May 1995
79	Drainage Report for Boardwalk	DEA	June, 1995
80	91st Channel plans	Dibble and Associates	Dec. 1998
81	Union Hills paving plans	Carter Associates ,INC.	1990
82	Walgreen Plans	Pasterneck	
83	Bell Rd Plans		
84	Desert Amethyst Drainage Project - 95% Plans	Wood, Patel and Assoc. Inc.	May 1999
85	Westbrook Village East Drainage Study	IMC Consultants	May 1993
86	Smith's Drainage Report	CBA	March 1998
87	Drainage Report for Hunter Ridge	DEA	Aug 1995
90	Hydrologic Analysis of Beardsley Channel extension project	FCDMC	Dec. 1990
91	Master Drainage Report for Terramar	CVL Consultants, Inc	Oct, 1996
93	West Valley Recreation Corridor Pasajes Del Rio Design Concept Report	Carter -Burgess	June, 1999
94	City of Glendale - Existing Structures Map	Unknown	**Current**
95	City of Glendale - General Plan	Glendale Planning Department	**Current**
96	87th Avenue Design Concept Report	Kimley-Horn and Assoc.	Oct 1999
97	Preliminary Drainage Report for Intersection Improvements		
98	Skunk Creek Channel Improvements - FEMA forms	FCDMC	Aug 1993
99	Final Design Report for Skunk Creek Channel Improvements	Simons, Li & Associates	June, 1998
100	ACDC / ADMS PHASE I - VOLUME 1.2	Kaminski Hubbard Engineering Co.	May 1995
101	ACDC / ADMS PHASE I - VOLUME 1.3	Kaminski Hubbard Engineering Co.	Feb. 1995
102	ACDC / ADMS PHASE I - VOLUME 1.5	Kaminski Hubbard Engineering Co.	March 1995
103	Hydrology Worksheets for Area between Skunk Creek and the ACDC	Kaminski Hubbard Engineering Co.	March 1995
104	Skunk Creek Hydrology Report	Coe and Van Loo Consultants Inc.	Nov. 1990
105	Drainage Infrastructure Report for Terramar	Coe and Van Loo Consultants Inc.	Nov. 1996
106	Area Drainage Master Study Little Deer Valley	Collar, Williams & White Engineering	July 1990
107	Policy for the Aesthetic Treatment and Landscaping of Flood Control Projects	FCDMC	Dec. 1992
108	Final Drainage Report for Hunter Field Estates	Tobar	Feb 2000
109	Preliminary Drainage Report for Summit at Sunrise Mountain	American Engineering Co.	5-2000
110	Durango ADMP -Potential Alternatives Submittal	Dibble and Associates	3-31-2000
111	Lake Pleasant Parkway Detention Basin	Goldman, Toy and Assoc. Inc.	1-2000
112	Lake Pleasant Parkway Detention Basin - Plans and bid Documents	Goldman, Toy and Assoc. Inc.	1-2000
113	Lake Pleasant Parkway Detention Basin - Addendum #5	Goldman, Toy and Assoc. Inc.	1-2000
114	Floodplain and Floodway Delineation for Rock Springs Creek	Stantec Consulting	March 2000
115	Camino A Lago Specific Plan	Urban Lands Development	Feb 1997
116	87th Avenue Final Canidate Assesment Report	DMJM	Feb 1998
117	Pinnacle Peak Road Final Canidate Assesment Report	Entranco	Oct 1999
150	101 As-Built Information	Franzoy-Corey	1991
200	Kaminski Hubbard Drainage Basins	Kaminski Hubbard Engineering Co.	
201	MAG Landuse	FCDMC	
202	SOILS	FCDMC	
203	USGS Mapping	USGS	
204	1999 Aerials	FCDMC	
300	Peoria Zoning Map	City of Peoria	12-06-99
400	Proposed Hydraulic modifications to Lake 7 - Arrowhead Lakes	Pace	May-00
401	Hydrology & Hydraulics Report for Camelot Views at Arrowhead Ranch	Clouse Emgineering Inc.	January-93
402	Drainage Report for Tierra Verde Infrastructure	Clouse Emgineering Inc.	April-95
403	Hydrology & Hydraulics Report for Arrowhead Lakes Unit 8	Clouse Emgineering Inc.	May-93
404	Drainage Report for Sierra Verde Phase II South Half	Clouse Emgineering Inc.	June-96
405	Hydrology & Hydraulics Report for Top of the Ranch One	Clouse Emgineering Inc.	September-90
406	Arrowhead Ranch Parcel I - Drainage Supplement 1	CMX	May-96
407	Drainage Report for Fulton Homes at Arrowhead Ranch Phase 1	American Engineering Company	June-92

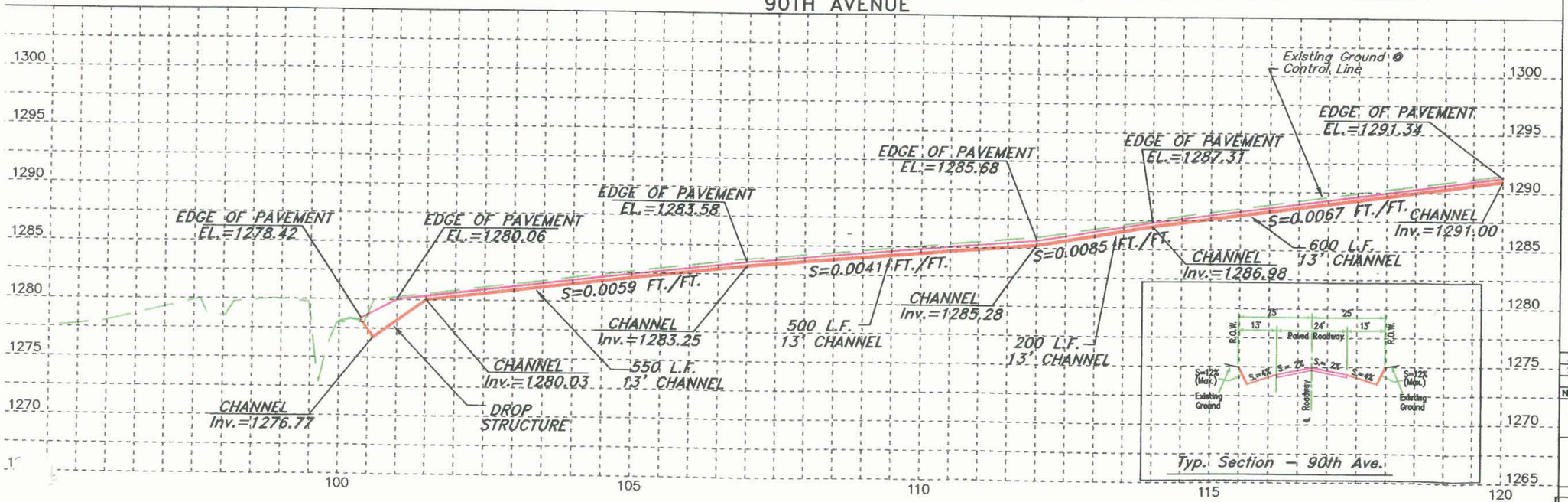
TABLE DS-7
DATA COLLECTION SUMMARY

Data Number	Data Description	Prepared by	Date
408	Hydrology & Hydraulics Report for Arrowhead Ranch Parcel 6	Clouse Emgineering Inc.	June-93
409	Hydrology & Hydraulics Report for Arrowhead Ranch Parcels 3 & 4	Clouse Emgineering Inc.	September-93
410	Hydrology & Hydraulics Report for Tanoan & Top of the Ranch Three	Clouse Emgineering Inc.	September-93
411	Hydrology & Hydraulics Report for Arrowhead Lakes Units 5A & 5B	Clouse Emgineering Inc.	March-93
412	Drainage Report for Tierra Verde Parcel E	CVL	January-96
413	Drainage Report for Tierra Verde Parcel G	CVL	January-96
414	Drainage Report for Tierra Verde Parcel D	CVL	January-96
415	Arrowhead Enclave - Final Drainage Report	CMX	March-97
416	Final Drainage Report for Arrowhead Lakes Unit 6	Sage Engineering	May-93
417	Drainage Report for Country Club Estates at Arrowhead Ranch	CVL	February-92
418	Master Drainage Study for Continental at Arrowhead Ranch	Clouse Emgineering Inc.	December-93
419	Hydrology & Hydraulics Report for Arrowhead Ranch Parcel 2	Clouse Emgineering Inc.	February-93
420	Hydrology & Hydraulics Report for Tuscany Point	Clouse Emgineering Inc.	February-93
421	Drainage Report for Fulton Homes at Arrowhead Ranch Phase 2	American Engineering Company	October-92
422	Final Drainage Report for Arrowhead Heights	Wood/Patel	January-94
423	Addendum to Final Drainage Report for Estates at Arrowhead - Phase 1	Harrison Group	January-95
424	Hydrology & Hydraulics Report for Hillcrest Ranch Infrastructure	Clouse Emgineering Inc.	December-91
425	Drainage Report for Tierra Verde Parcel B	CVL	January-96
426	Drainage Report for Arrowhead Ranch Parcel 10	Clouse Emgineering Inc.	September-95
427	Hydrology & Hydraulics Report for Arrowhead Ranch Parcel 5	Clouse Emgineering Inc.	February-94
428	Master Drainage Study for Tierra Verde	Clouse Emgineering Inc.	November-95
429	Drainage Report for Tierra Verde Parcel N	CVL	March-96
430	Drainage Report for Tierra Verde Parcel R	CVL	March-96
431	Supplemental Drainage Report for 67th Avenue Drainage	Pivotal Companies	August-92
432	Final Drainage Report for Arrowhead Lakes Unit 7	Sage Engineering	May-93

APPENDIX B. PLATES



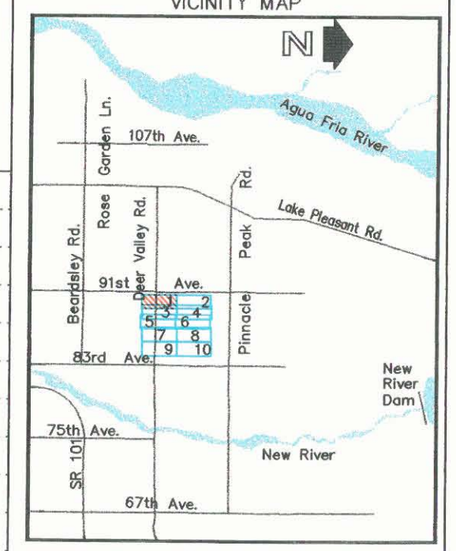
90TH AVENUE



LEGEND

- EXISTING RIGHT-OF-WAY
- EXISTING TELEPHONE LINE
- EXISTING SEWER LINE
- EXISTING GAS LINE
- EXISTING WATER LINE
- EXISTING ELECTRIC LINE
- EXISTING CABLE TV LINE
- PROPOSED RIGHT-OF-WAY
- PROPOSED BASIN
- ALTERNATE FACILITIES
- PROPOSED STORM DRAIN
- Q_{100} = 40 cfs — DIRECTION AND QUANTITY OF FLOW
- CHANNEL
- 1290 — INDEX CONTOUR
- INTERMEDIATE CONTOUR

VICINITY MAP



100' 0' 100' 200'
SCALE: 1"= 100'

NO.	REVISION	BY	DATE
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2			
1			

FLOOD CONTROL DISTRICT OF MARICOPA COUNTY

GLENDALE / PEORIA
AREA DRAINAGE MASTER PLAN UPDATE

F.C.D. CONTRACT NO. 99-44

	BY	DATE
DESIGNED	HAA	08/01
DRAWN	GLT/KAB	08/01
CHECKED	MJB	08/01

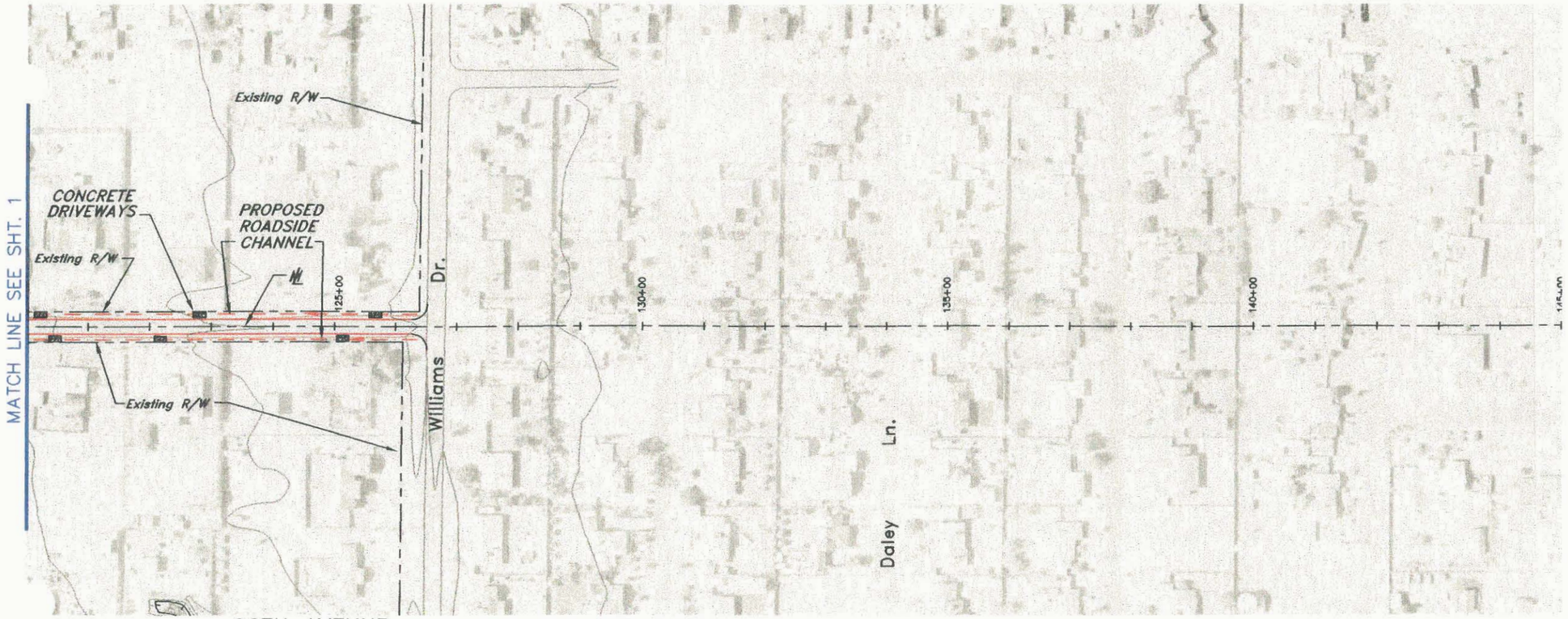
29757 HERNAN A. ARISTIZABAL ARIZONA U.S.A.

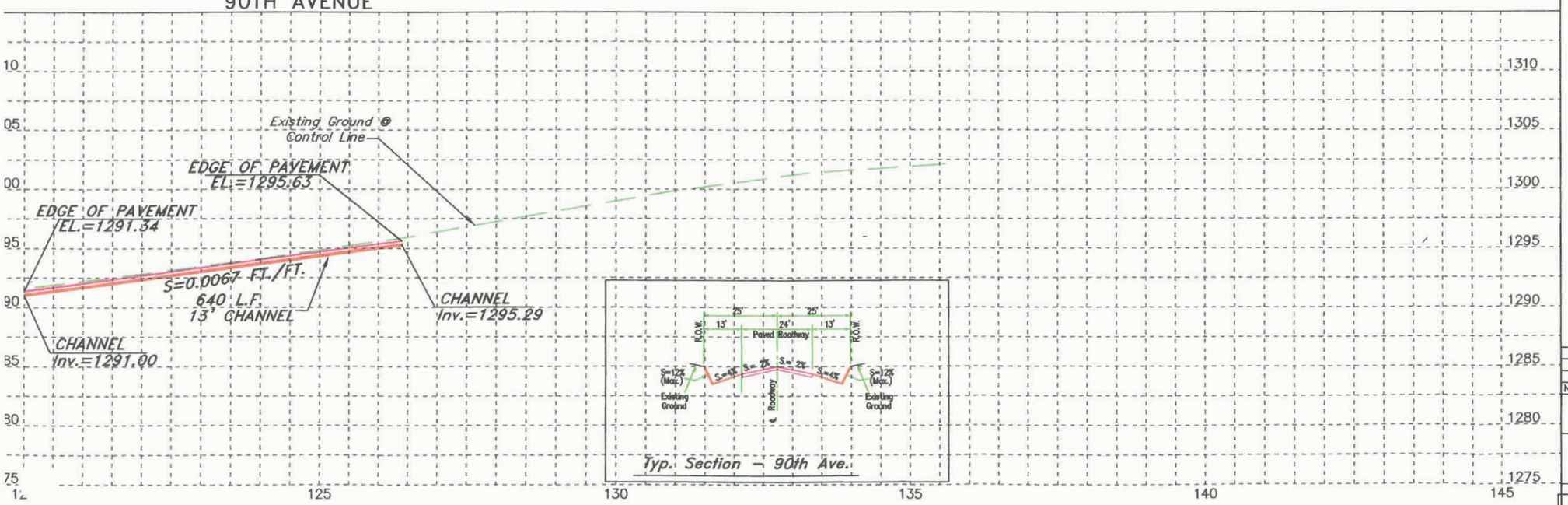
Entellus
2255 N. 44th Street Suite 125
Phoenix, AZ 85008-3279
Tel 602.244.2566
Fax 602.244.8947
E-mail www.entellus.com

90TH AVENUE

Plate DS-6

NOTE:
THESE PLANS ARE PRELIMINARY AND ARE PREPARED FOR PLANNING PURPOSES ONLY. THE LOCATIONS OF ALL STRUCTURES, UTILITIES AND RIGHT-OF-WAY ARE APPROXIMATE AND ARE BASED UPON RECORD DOCUMENTS. AERIAL TOPOGRAPHY WAS PRODUCED AT A SCALE OF, ONE INCH = 200 FEET WITH 2 FOOT CONTOUR INTERVAL. MAPPING WAS PREPARED BY DATABASE TERRAIN MAPPING AND IS BASED ON GROUND CONTROL SURVEY DATA PROVIDED BY PENTACORE ARIZONA, INC.





LEGEND

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- EXISTING SEWER LINE
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- PROPOSED STORM DRAIN
- Q_{100} = 40 cfs — DIRECTION AND QUANTITY OF FLOW
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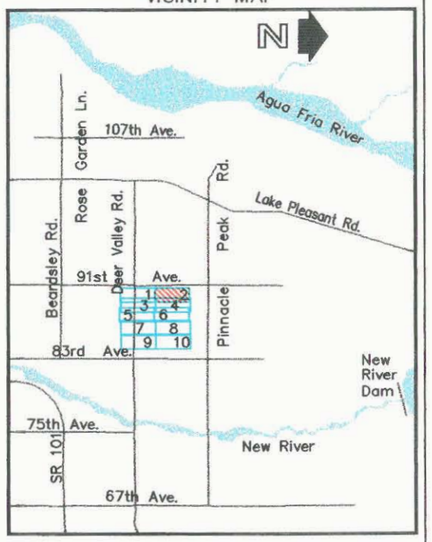
- INTERMEDIATE CONTOUR

VICINITY MAP



100' 0' 100' 200'

SCALE: 1" = 100'

NO.	REVISION	BY	DATE
3			
2			
1			

FLOOD CONTROL DISTRICT OF MARICOPA COUNTY

GLENDALE / PEORIA
AREA DRAINAGE MASTER PLAN UPDATE

F.C.D. CONTRACT NO. 99-44

	BY	DATE
DESIGNED	HAA	08/01
DRAWN	GLT/KAB	08/01
CHECKED	MJB	08/01

HERNAN A. ARISTIZABAL

Entellus
2255 N. 44th Street Suite 125
Phoenix, AZ 85008.3279
Tel 602.244.2566
Fax 602.244.8947
E-mail www.entellus.com

90TH AVENUE

SHEET OF

Plate DS-6

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LOCATIONS OF ALL STRUCTURES, UTILITIES AND RIGHT-OF-WAY ARE APPROXIMATE
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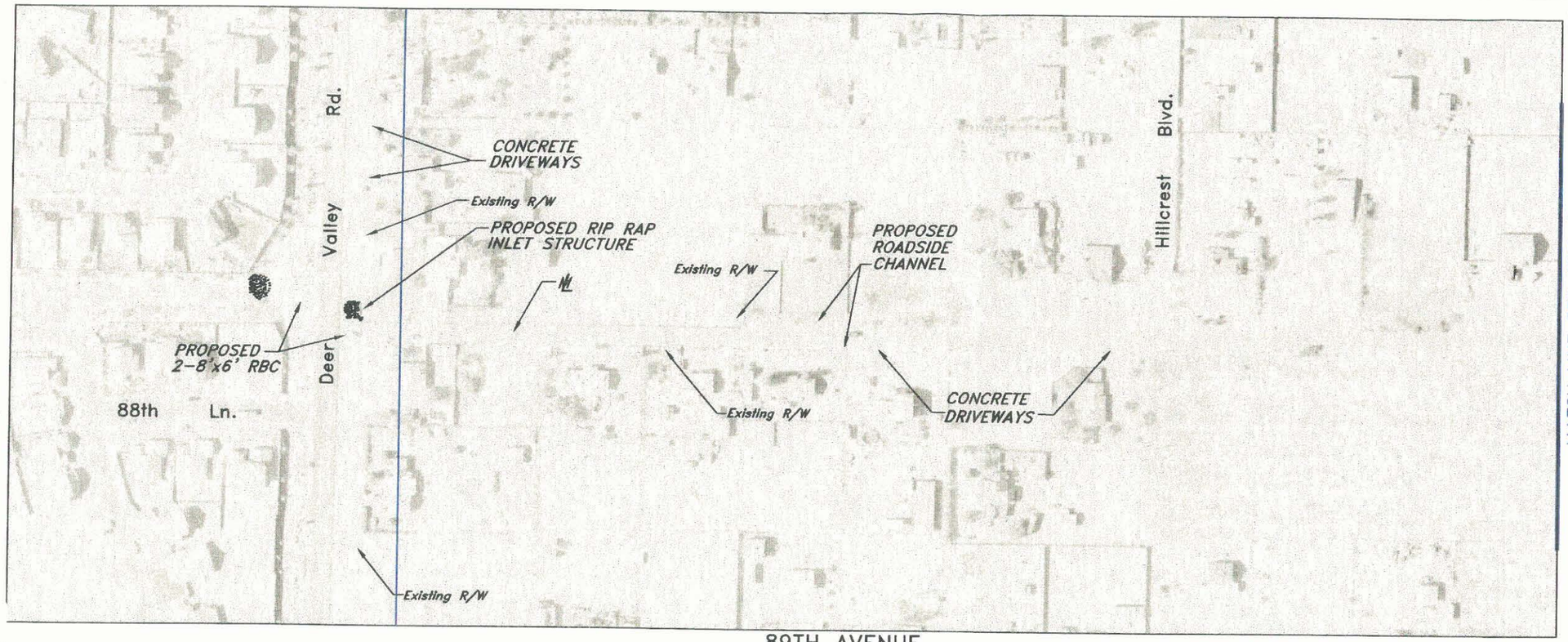

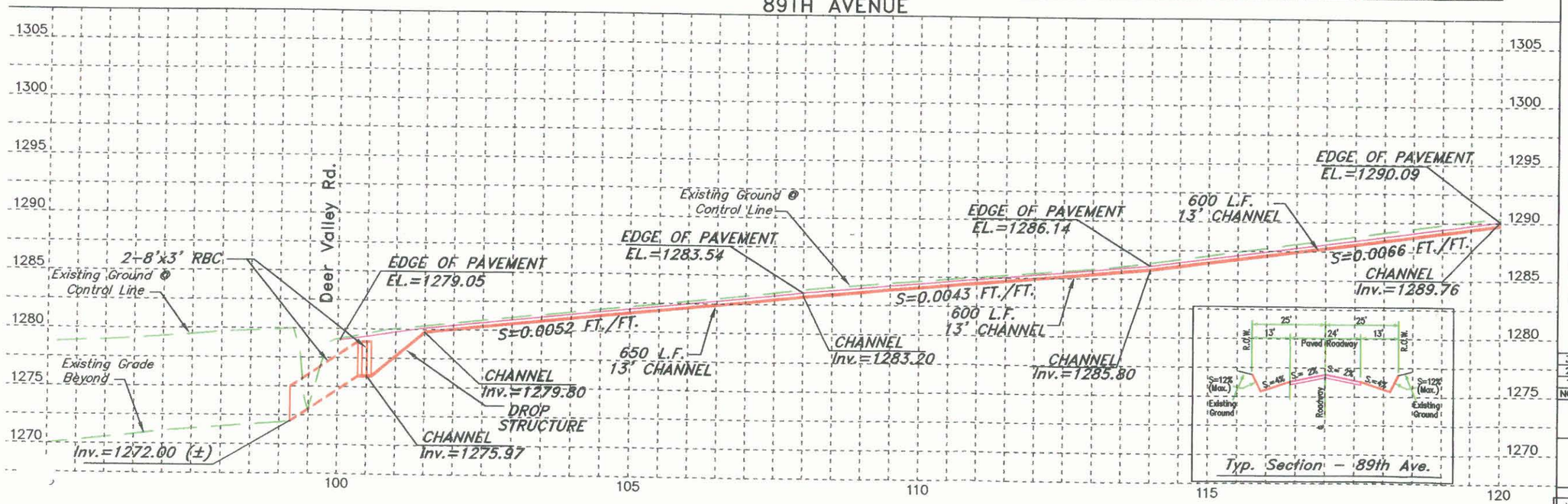

LEGEND

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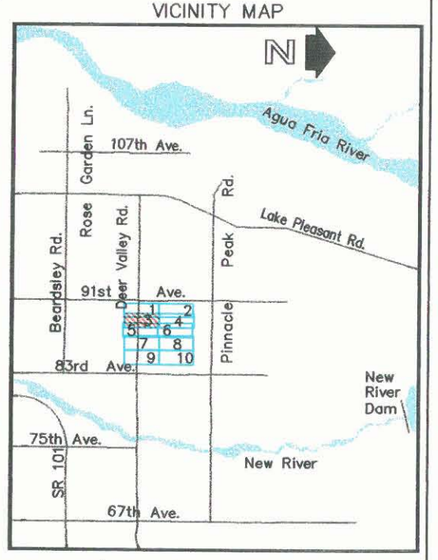

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SCALE: 1"= 100'

NO.	REVISION	BY	DATE
3			
2			
1			

FLOOD CONTROL DISTRICT OF MARICOPA COUNTY

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	BY	DATE
DESIGNED	HAA	08/01
DRAWN	GLT/KAB	08/01
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HERNAN A. ARISTIZABAL 28737 REGISTERED PROFESSIONAL ENGINEER ARIZONA, U.S.A.

Entellus
2255 N. 44th Street Suite 125
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Tel 602.244.2566
Fax 602.244.8947
E-mail www.entellus.com

Plate DS-6

89TH AVENUE

SHEET OF

TE:
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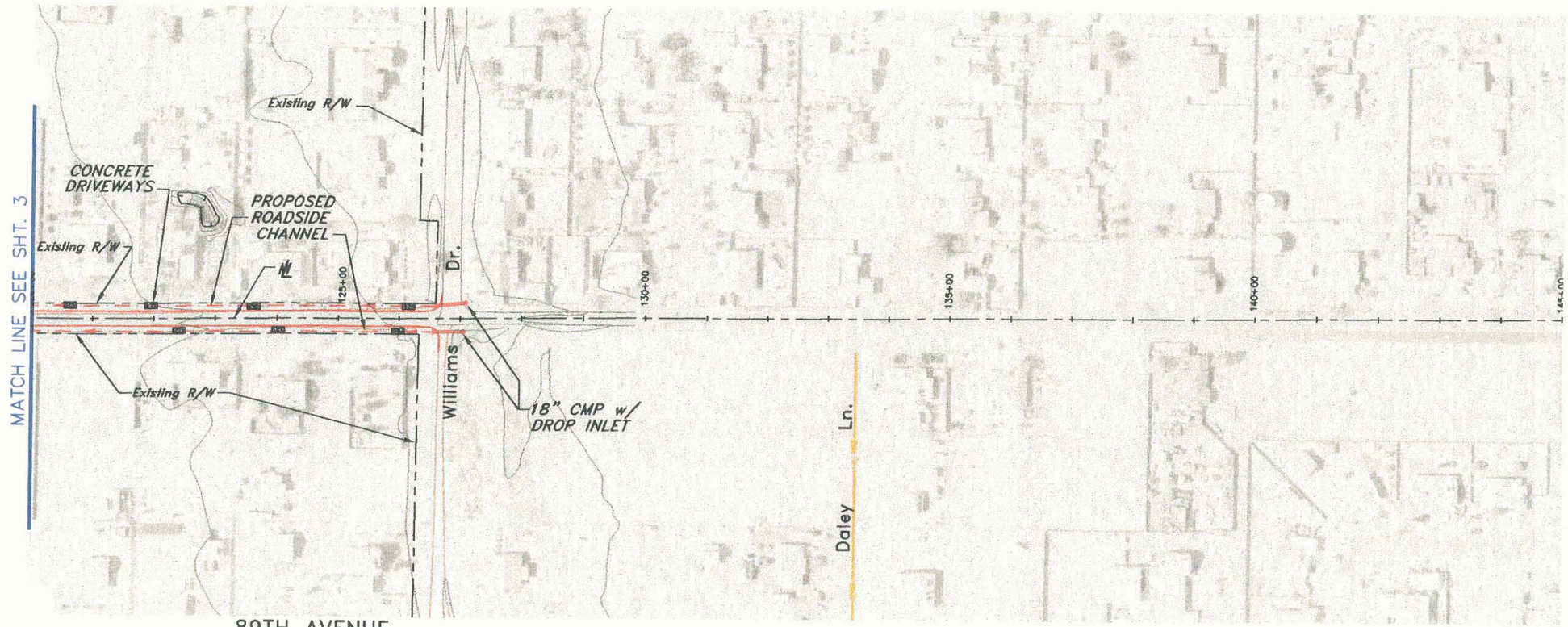
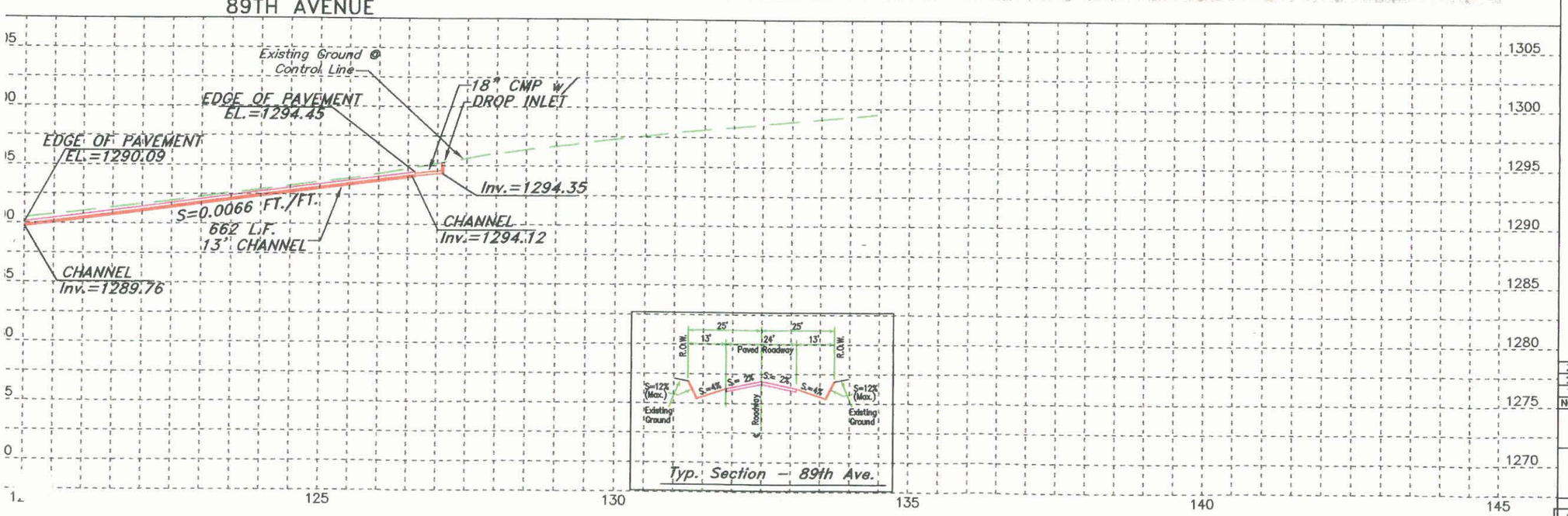
F PENTACORE ARIZONA, INC.

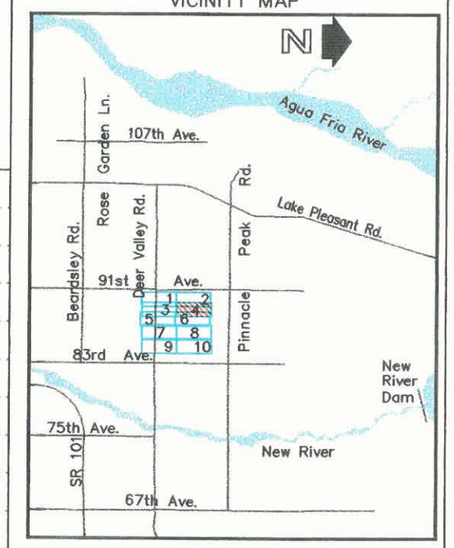




LEGEND

- EXISTING RIGHT-OF-WAY
- EXISTING TELEPHONE LINE
- EXISTING SEWER LINE
- EXISTING GAS LINE
- EXISTING WATER LINE
- EXISTING ELECTRIC LINE
- EXISTING CABLE TV LINE
- PROPOSED RIGHT-OF-WAY
- PROPOSED BASIN
- ALTERNATE FACILITIES
- PROPOSED STORM DRAIN
- Q_{100} = 40 cfs — DIRECTION AND QUANTITY OF FLOW
- CHANNEL
- 1290 — INDEX CONTOUR
- INTERMEDIATE CONTOUR

VICINITY MAP



100' 0' 100' 200'
SCALE: 1"= 100'

NO.	REVISION	BY	DATE
3			
2			
1			

FLOOD CONTROL DISTRICT OF MARICOPA COUNTY

GLENDALE / PEORIA
AREA DRAINAGE MASTER PLAN UPDATE

F.C.D. CONTRACT NO. 99-44

	BY	DATE
DESIGNED	HAA	08/01
DRAWN	GLT/KAB	08/01
CHECKED	MJB	08/01

Registered Professional Engineer (Civil) CERTIFICATE NO. 28737 HERNAN A. ARISTIZABAL Date Signed 8/1/01 ARIZONA, U.S.A.

Entellus
2255 N. 44th Street Suite 125
Phoenix, AZ 85008.3279
Tel 602.244.2566
Fax 602.244.8947
E-mail www.entellus.com

89TH AVENUE

SHEET OF

Plate DS-6

PLANS ARE PRELIMINARY AND ARE PREPARED FOR PLANNING PURPOSES ONLY
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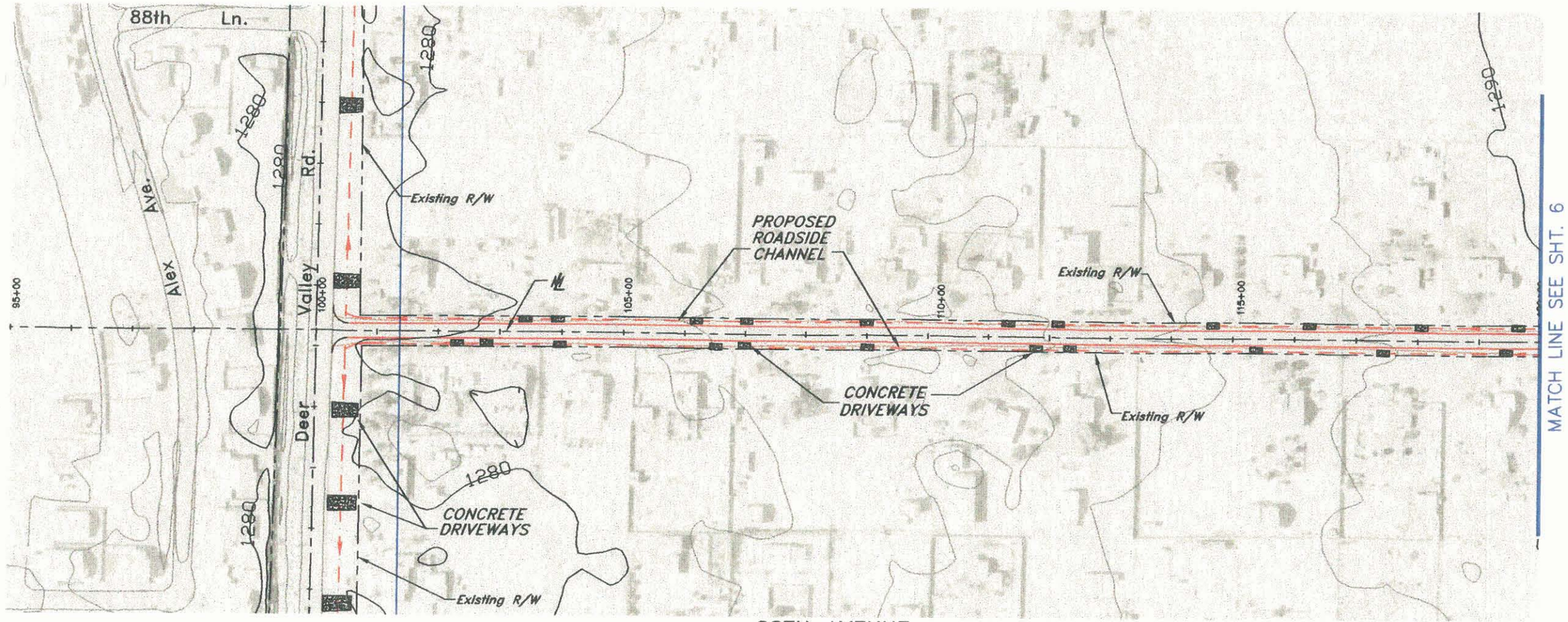

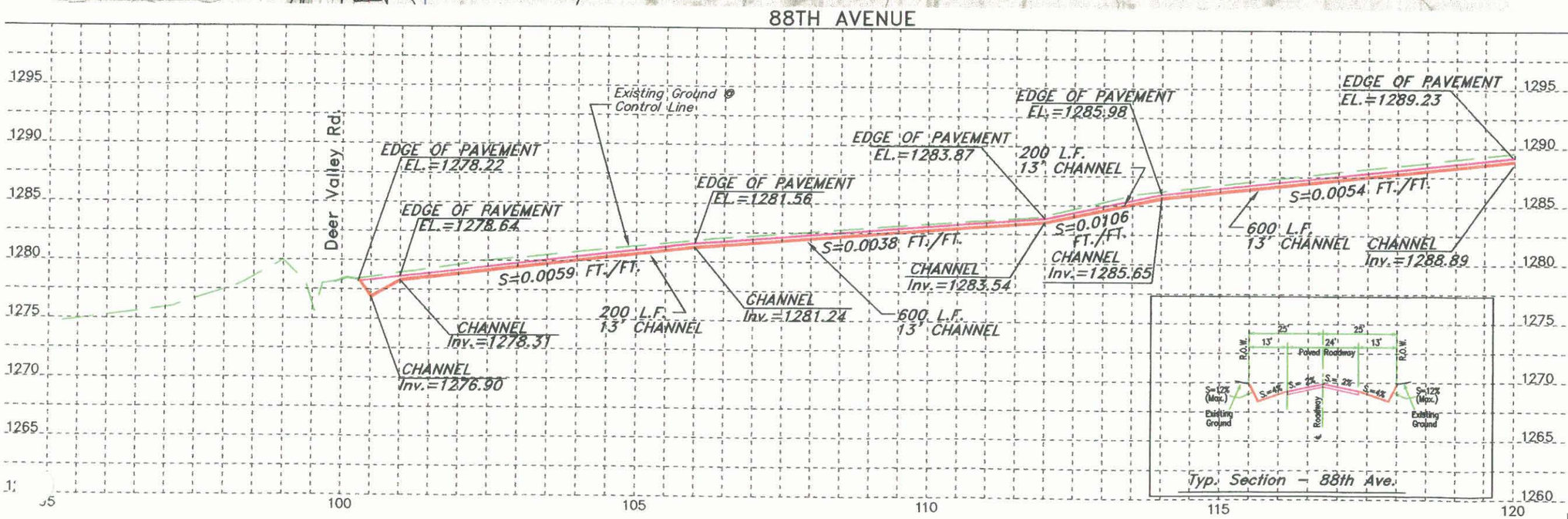

LEGEND

- EXISTING RIGHT-OF-WAY
- EXISTING TELEPHONE LINE
- EXISTING SEWER LINE
- EXISTING GAS LINE
- EXISTING WATER LINE
- EXISTING ELECTRIC LINE
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- CHANNEL
- 1290 — INDEX CONTOUR
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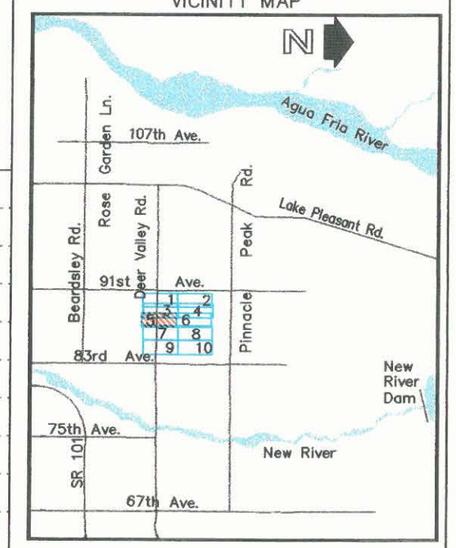
VICINITY MAP



100' 0' 100' 200'
SCALE: 1"= 100'

NO.	REVISION	BY	DATE
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1			

FLOOD CONTROL DISTRICT OF MARICOPA COUNTY

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88TH AVENUE

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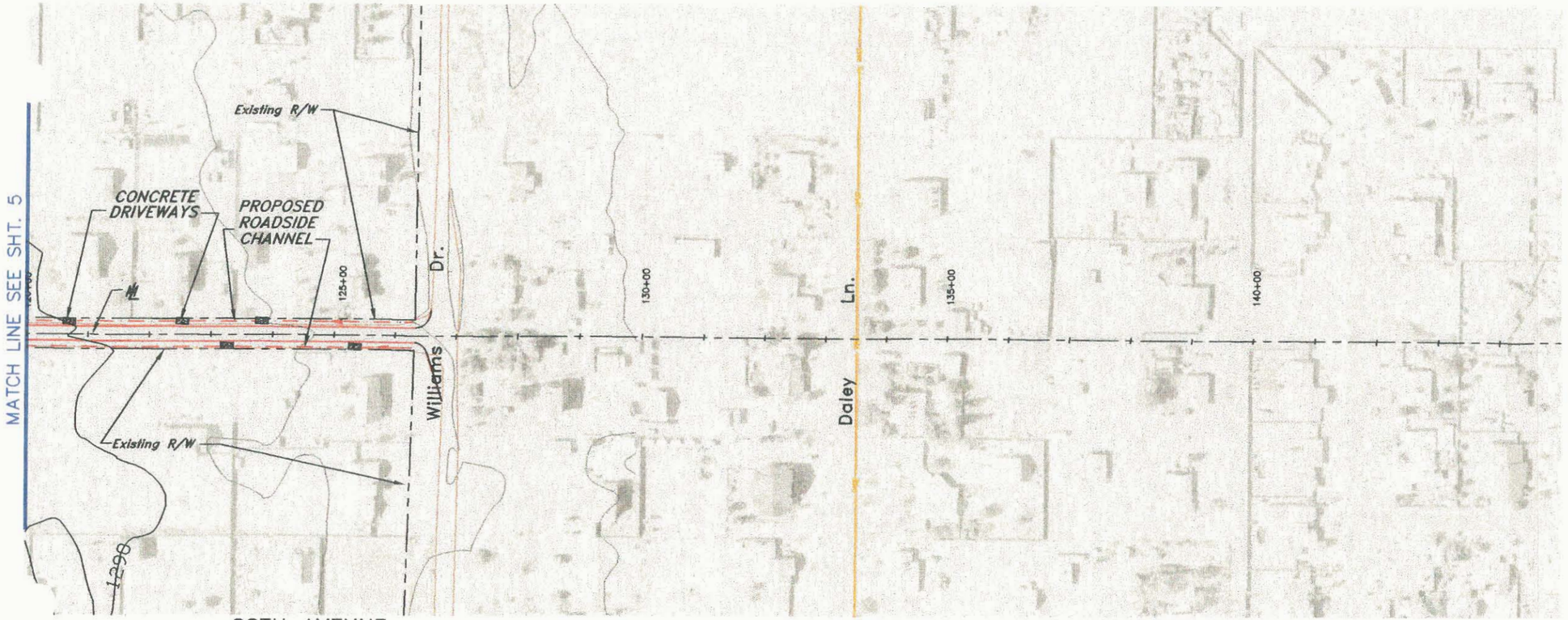

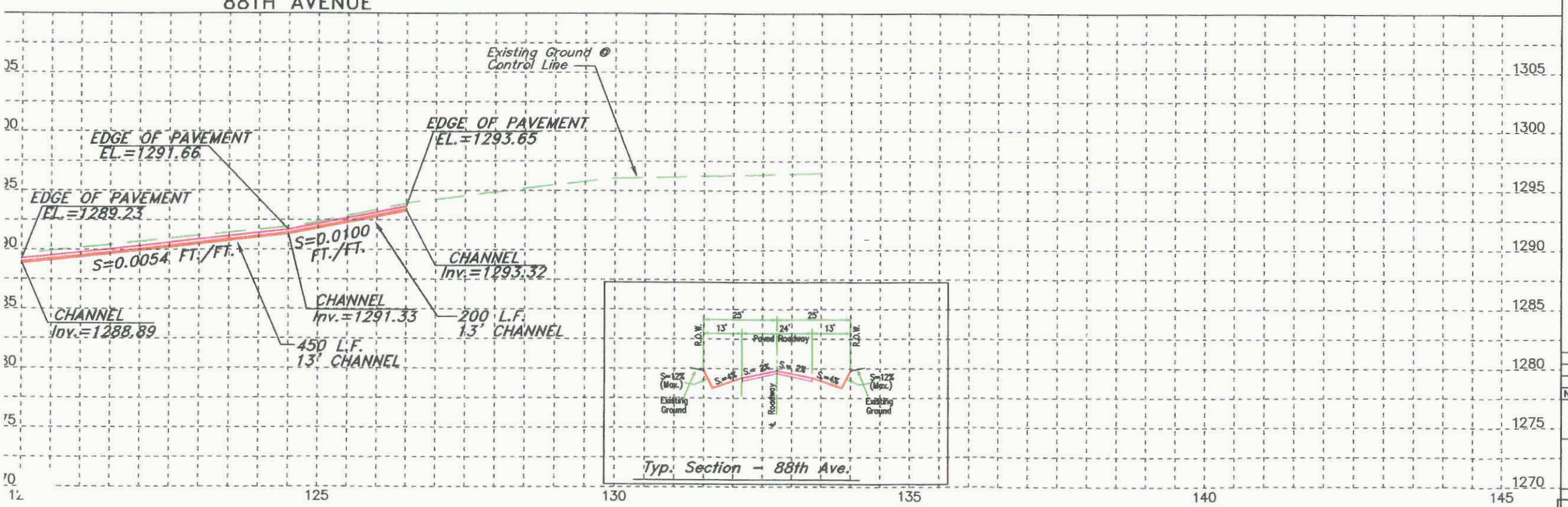

LEGEND

- EXISTING RIGHT-OF-WAY
- EXISTING TELEPHONE LINE
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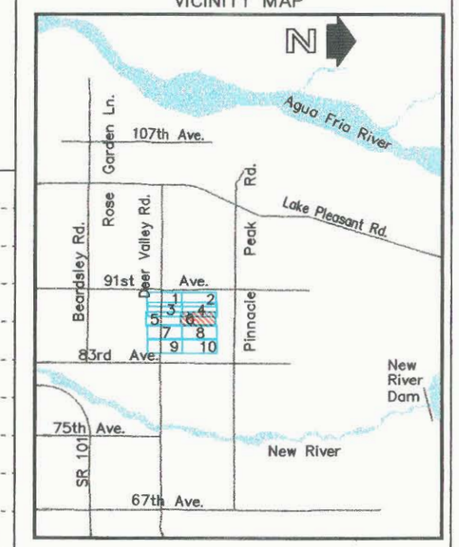

100' 0' 100' 200'
SCALE: 1"= 100'

NO.	REVISION	BY	DATE
3			
2			
1			

FLOOD CONTROL DISTRICT OF MARICOPA COUNTY

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88TH AVENUE
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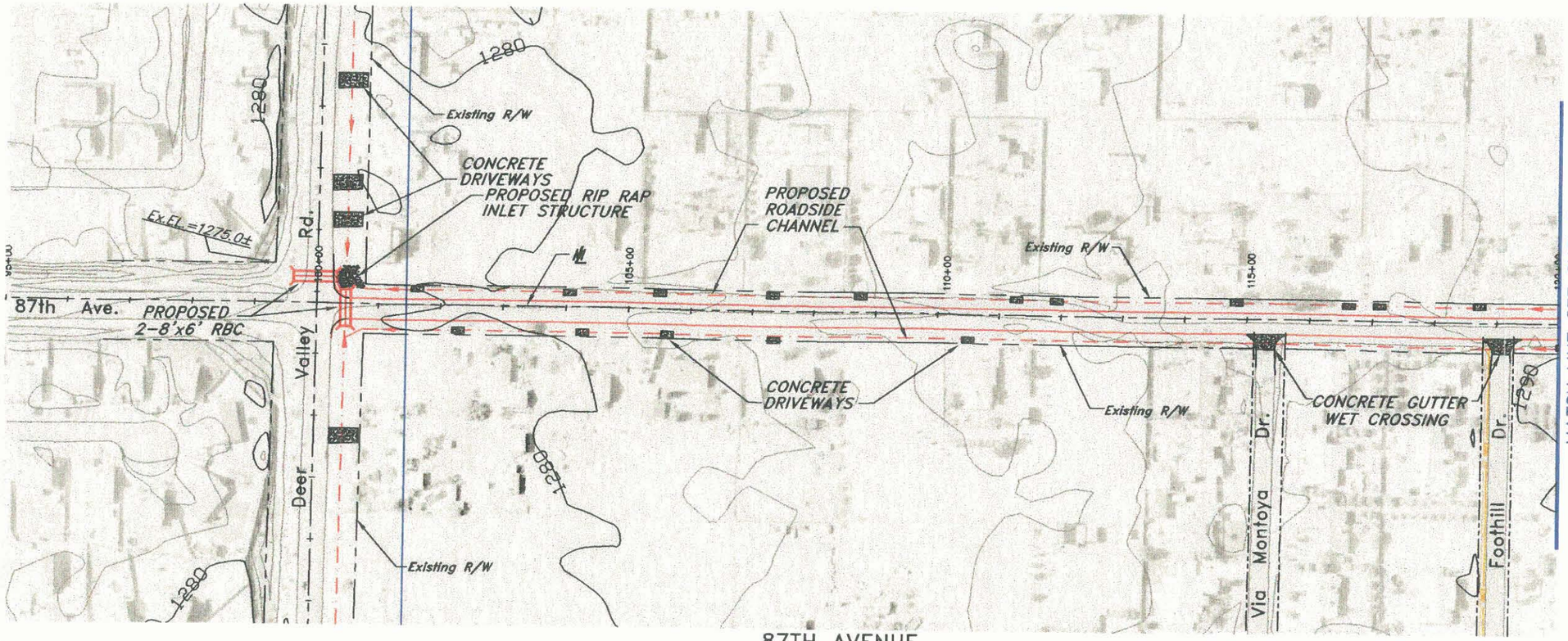
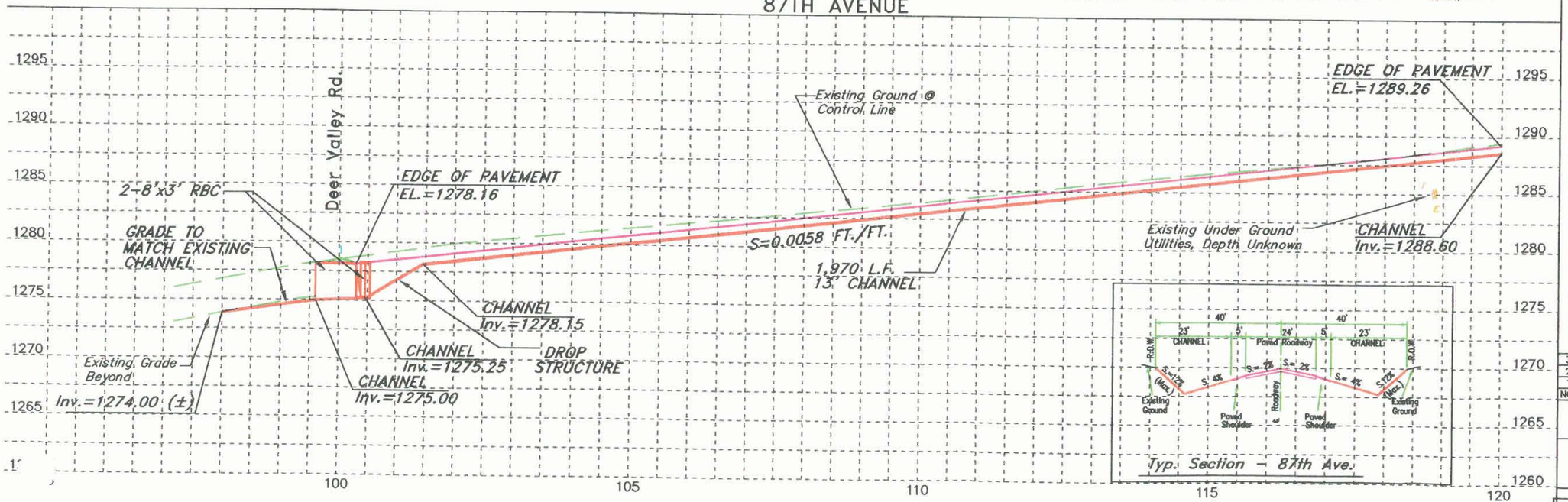
Plate DS-6



87TH AVENUE



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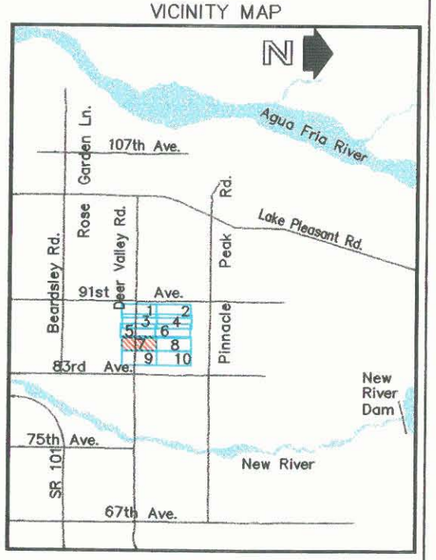

100' 0' 100' 200'
SCALE: 1"= 100'

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Registered Professional Engineer (Civil) 23737 HERNAN A. ARISTIZABAL Date Signed 8/1/01 ARIZONA, U.S.A.

Entellus
2255 N. 44th Street Suite 125
Phoenix, AZ 85008-3279
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Fax 602.244.8947
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87TH AVENUE SHEET 9 OF

Plate DS-6

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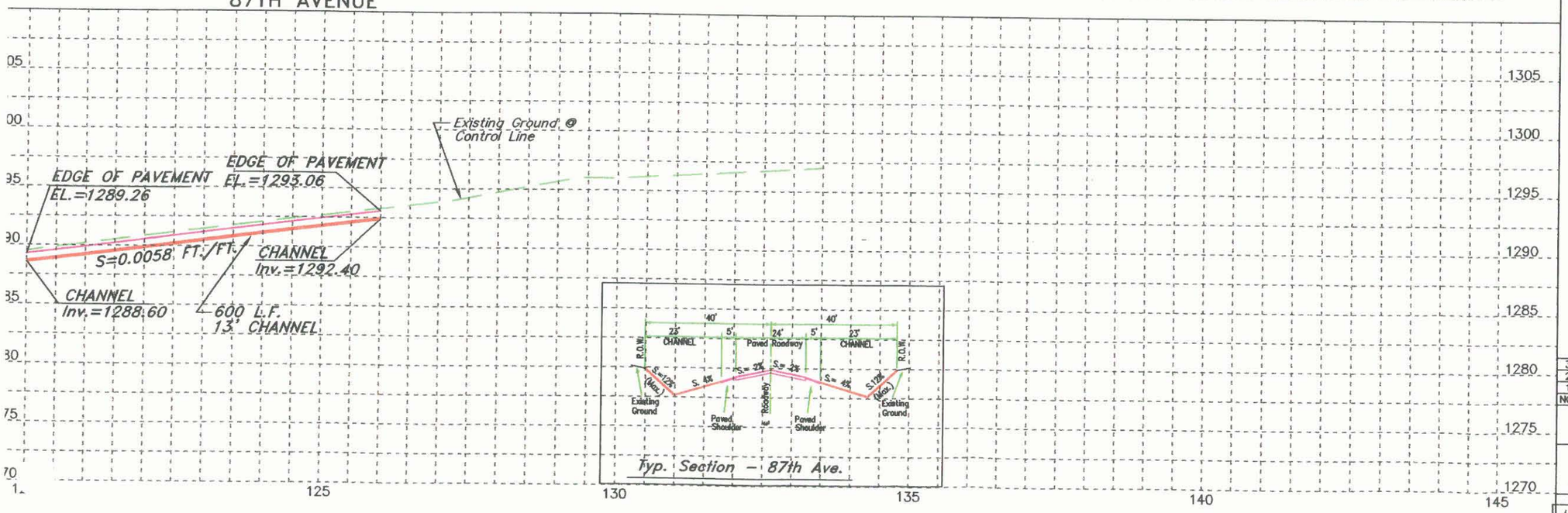

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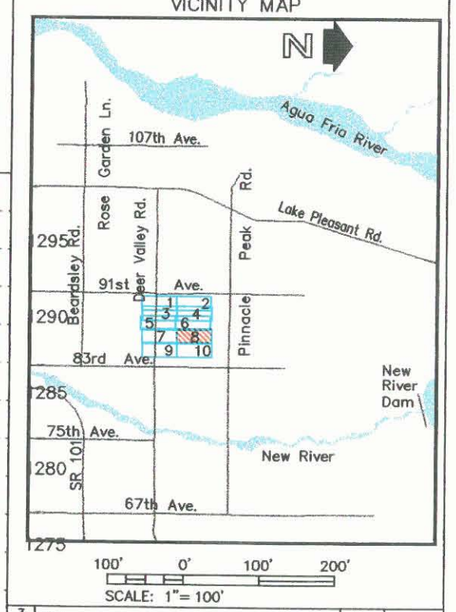

NO.	REVISION	BY	DATE
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FLOOD CONTROL DISTRICT OF MARICOPA COUNTY

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87TH AVENUE SHEET OF

Plate DS-6

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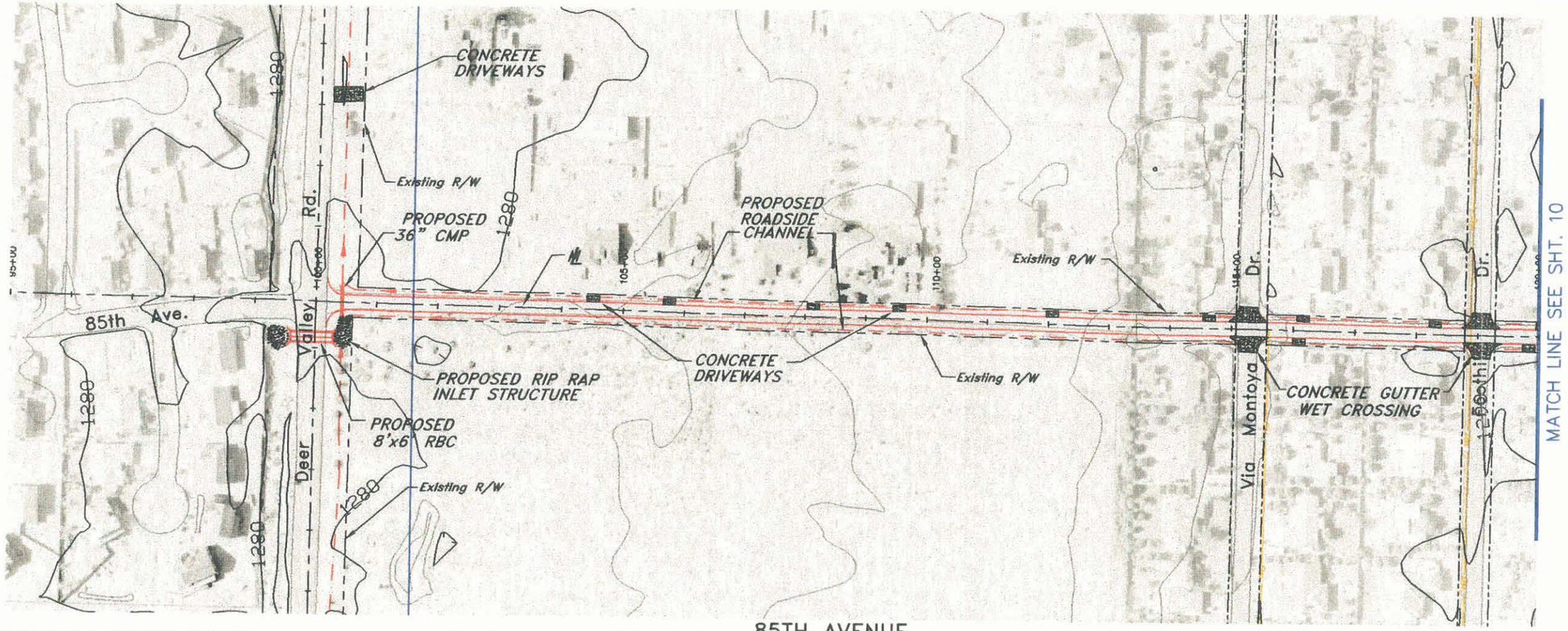
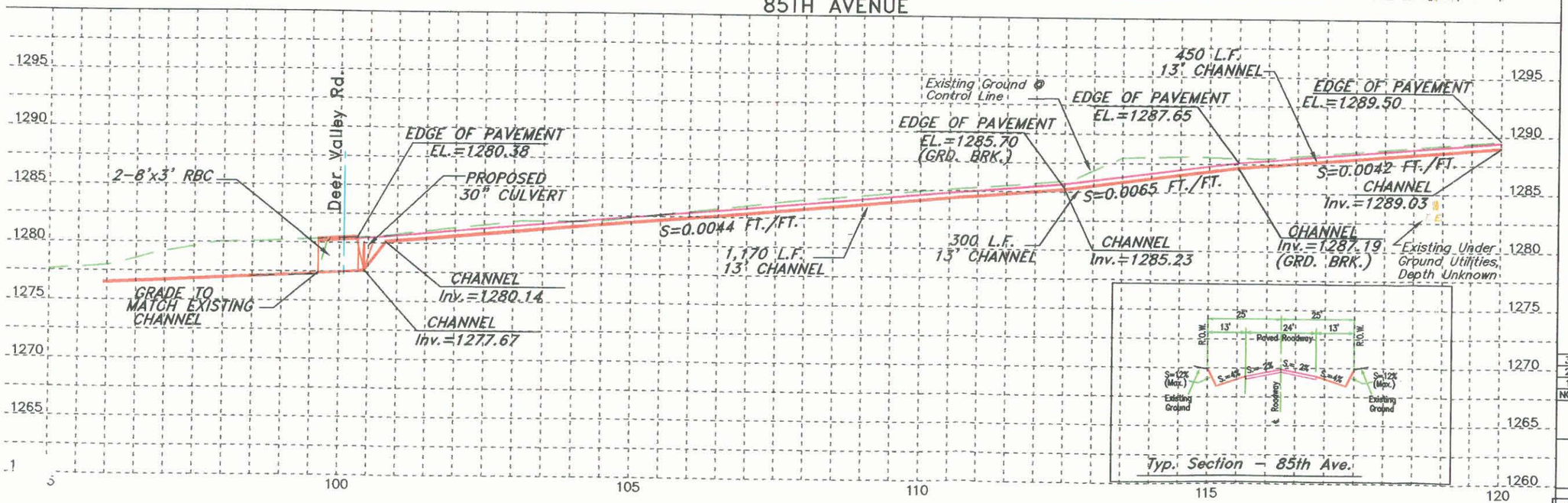


85TH AVENUE



LEGEND

- EXISTING RIGHT-OF-WAY
- EXISTING TELEPHONE LINE
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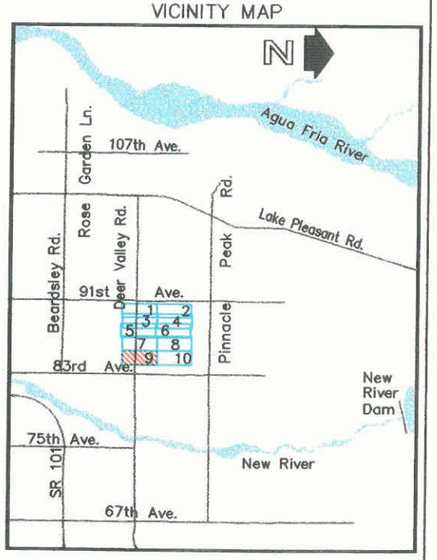
VICINITY MAP



NO.	REVISION	BY	DATE
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FLOOD CONTROL DISTRICT OF MARICOPA COUNTY

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29737 HERNAN A. ARISTIZABAL ARIZONA, U.S.A.

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Plate DS-6

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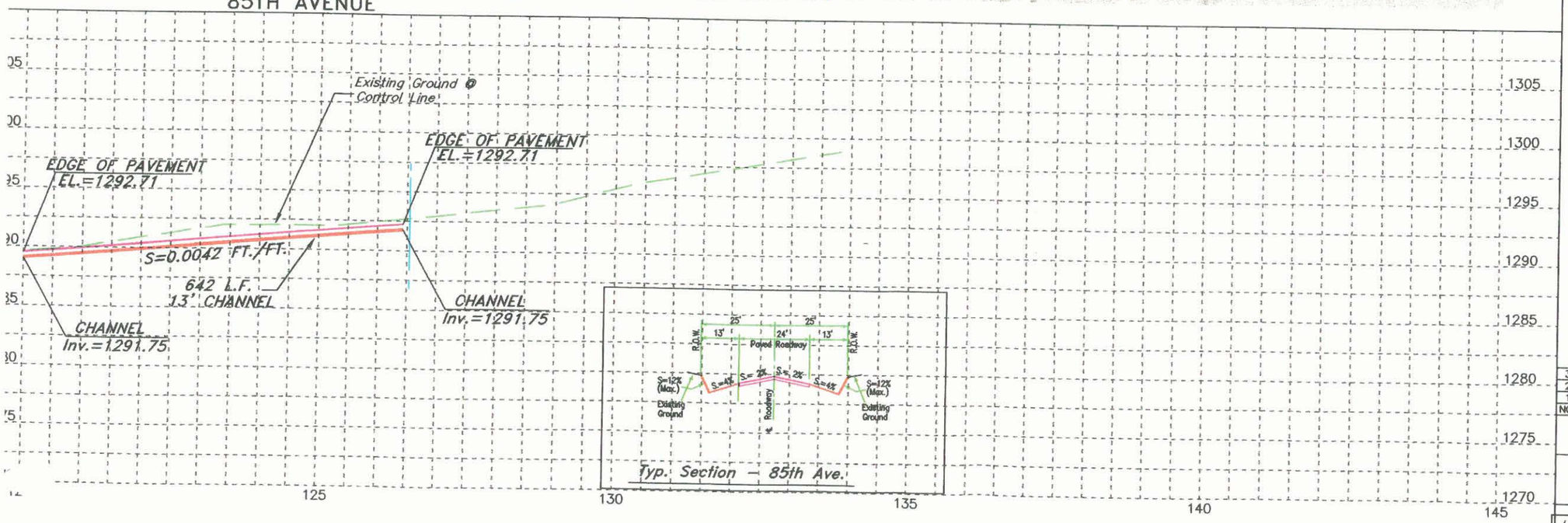

LEGEND

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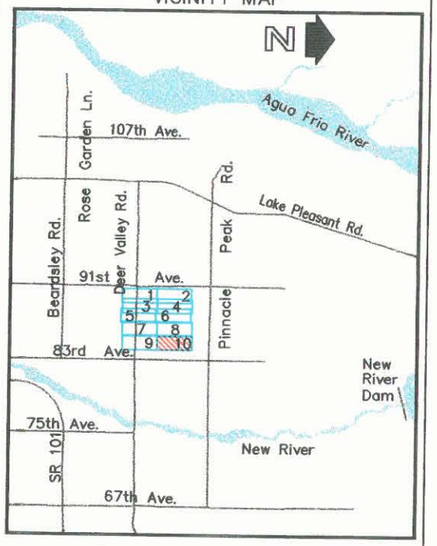

100' 0' 100' 200'
SCALE: 1" = 100'

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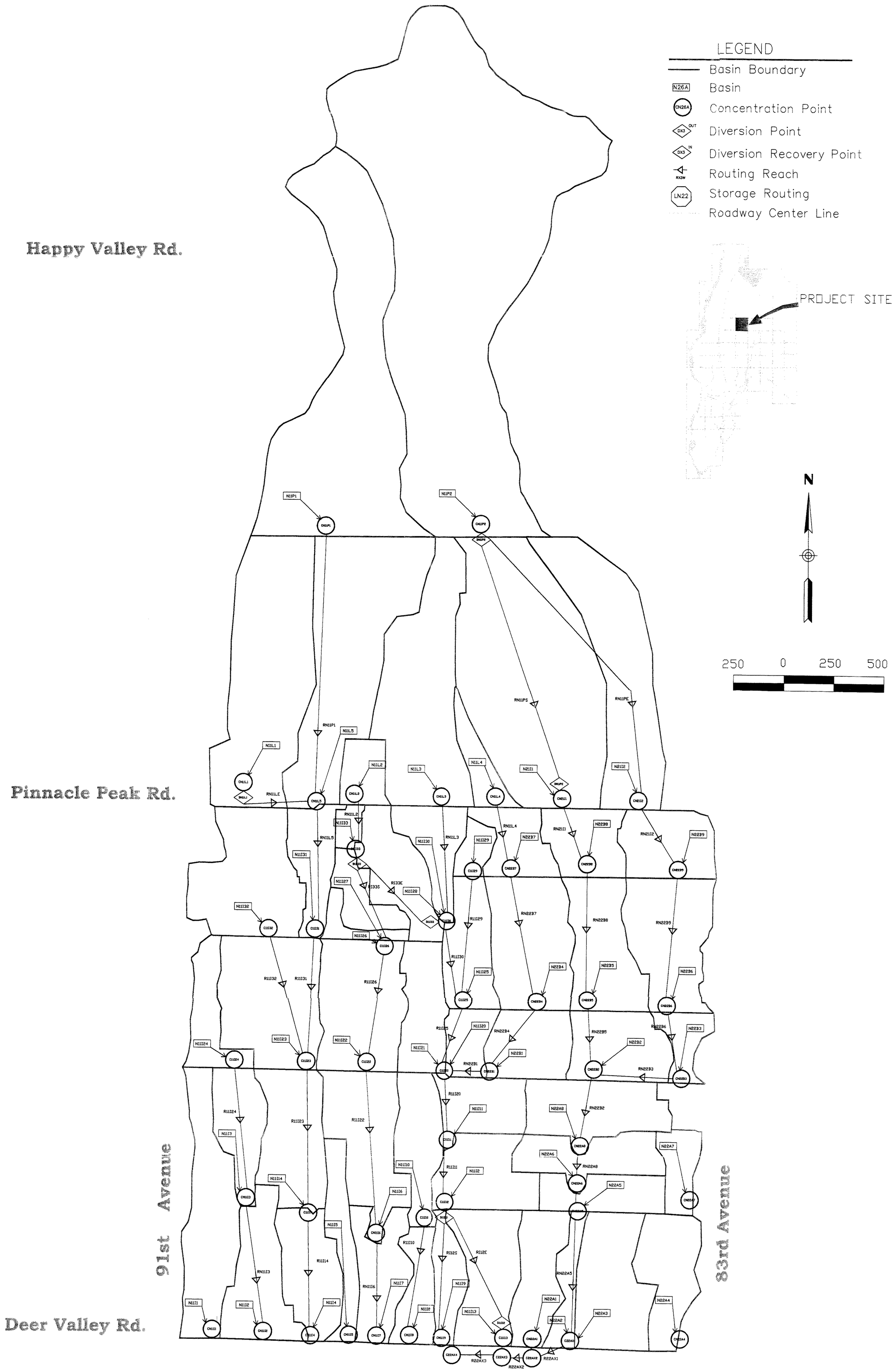
Plate DS-6



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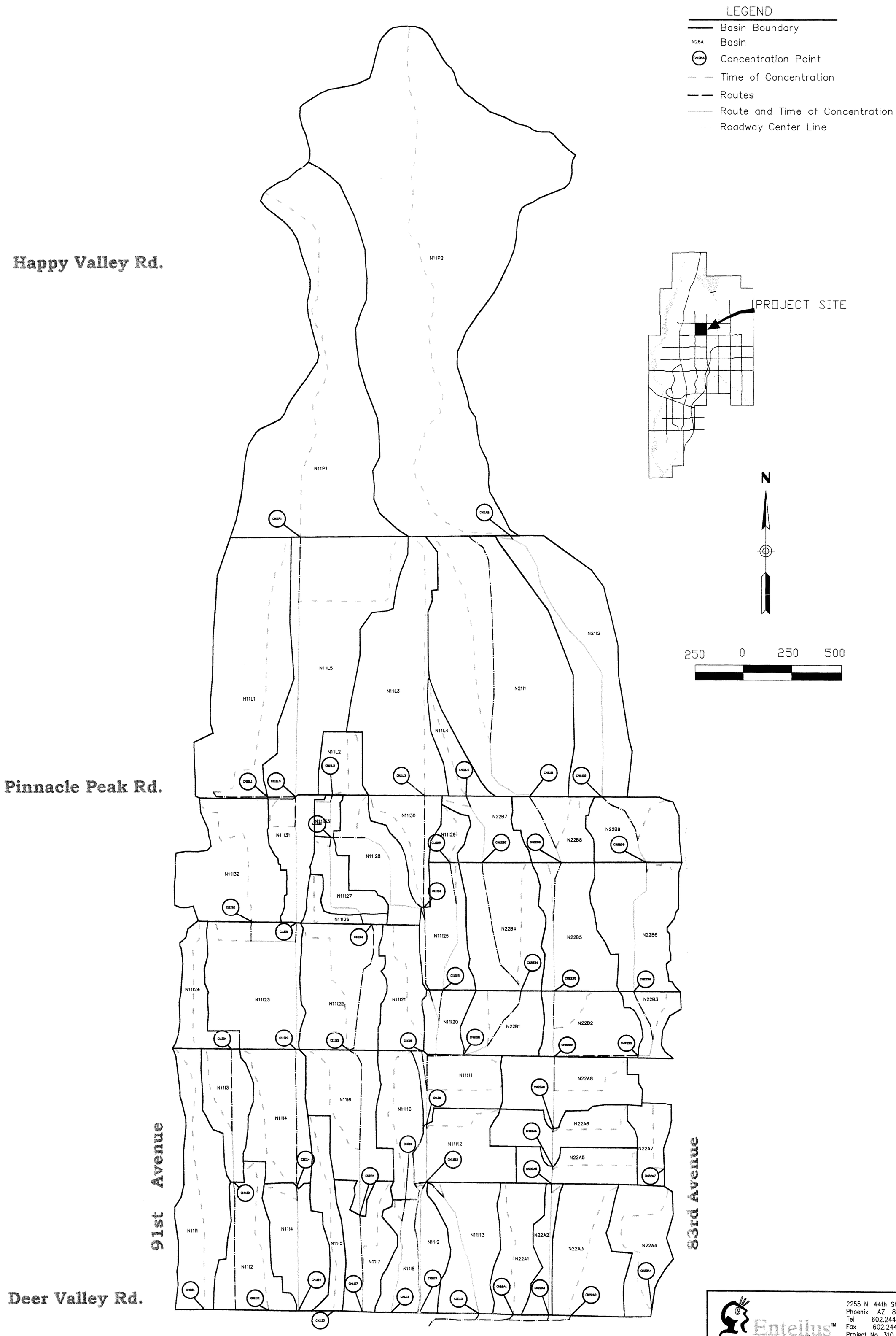
Phoenix, AZ 85008.3279
Tel 602.244.2566
Fax 602.244.8947
Project No. 310.017

GLENDALE/PEORIA ADMP UPDATE
FLOOD CONTROL DISTRICT OF MARICOPA COUNTY
FCD PROJECT NO. 99-44

PLATE DS-1

DETAILED STUDY
HEC-1 SCHEMATIC DRAWING



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GLENDALE/PEORIA ADMP UPDATE
FLOOD CONTROL DISTRICT OF MARICOPA COUNTY
FCD PROJECT NO. 99-44

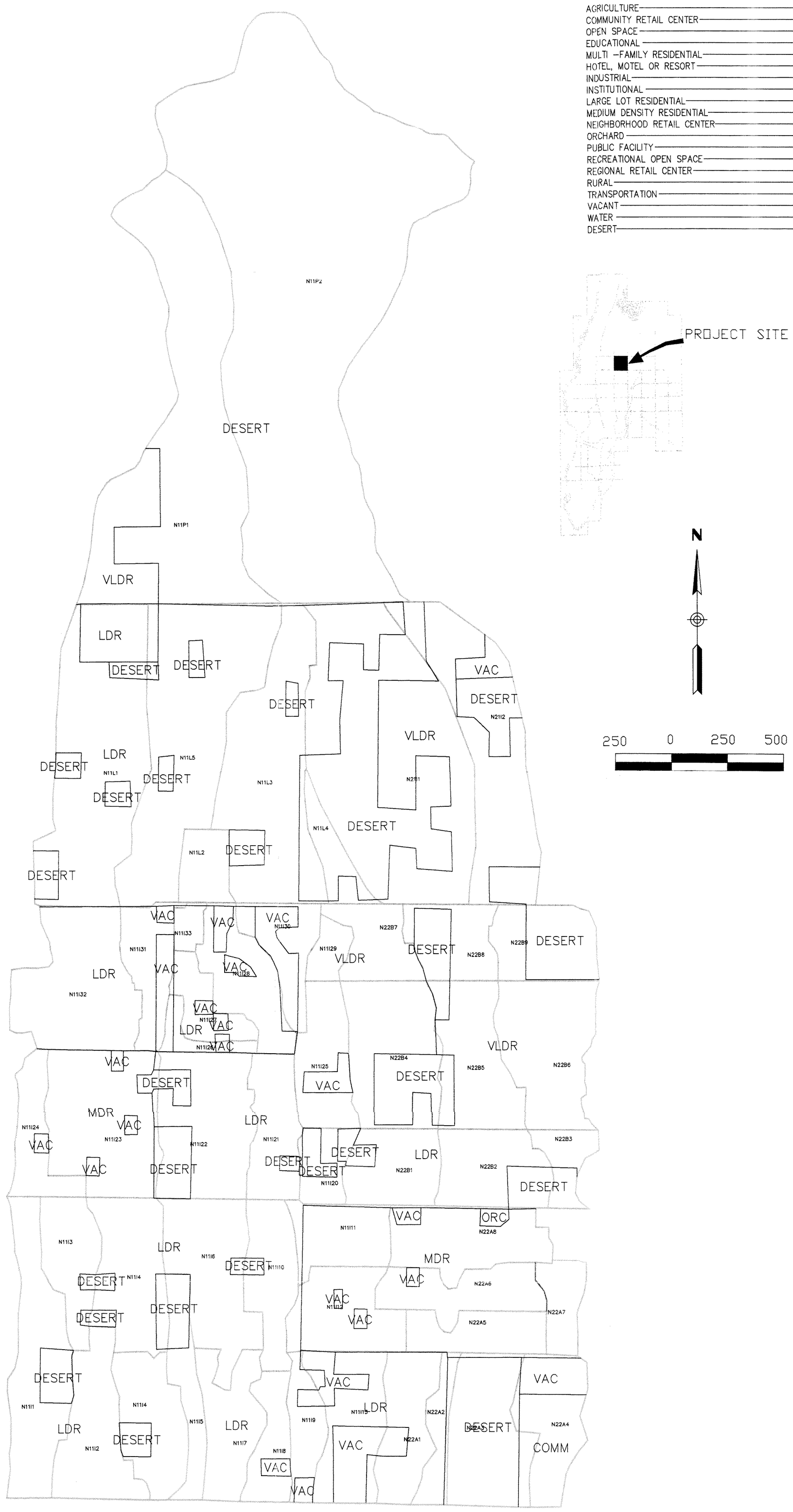
PLATE DS-2

DETAILED STUDY
HYDROLOGY DRAWING

LEGEND

BASIN BOUNDARIES
BASIN ID

AGRICULTURE	AGR
COMMUNITY RETAIL CENTER	COM
OPEN SPACE	OPEN
EDUCATIONAL	INS
MULTI -FAMILY RESIDENTIAL	MFR
HOTEL, MOTEL OR RESORT	COM
INDUSTRIAL	IND
INSTITUTIONAL	INS
LARGE LOT RESIDENTIAL	LDR
MEDIUM DENSITY RESIDENTIAL	MDR
NEIGHBORHOOD RETAIL CENTER	COM
ORCHARD	ORC
PUBLIC FACILITY	INS
RECREATIONAL OPEN SPACE	OPEN
REGIONAL RETAIL CENTER	COM
RURAL	VLDR
TRANSPORTATION	FWY
VACANT	VAC
WATER	WATER
DESERT	DESERT



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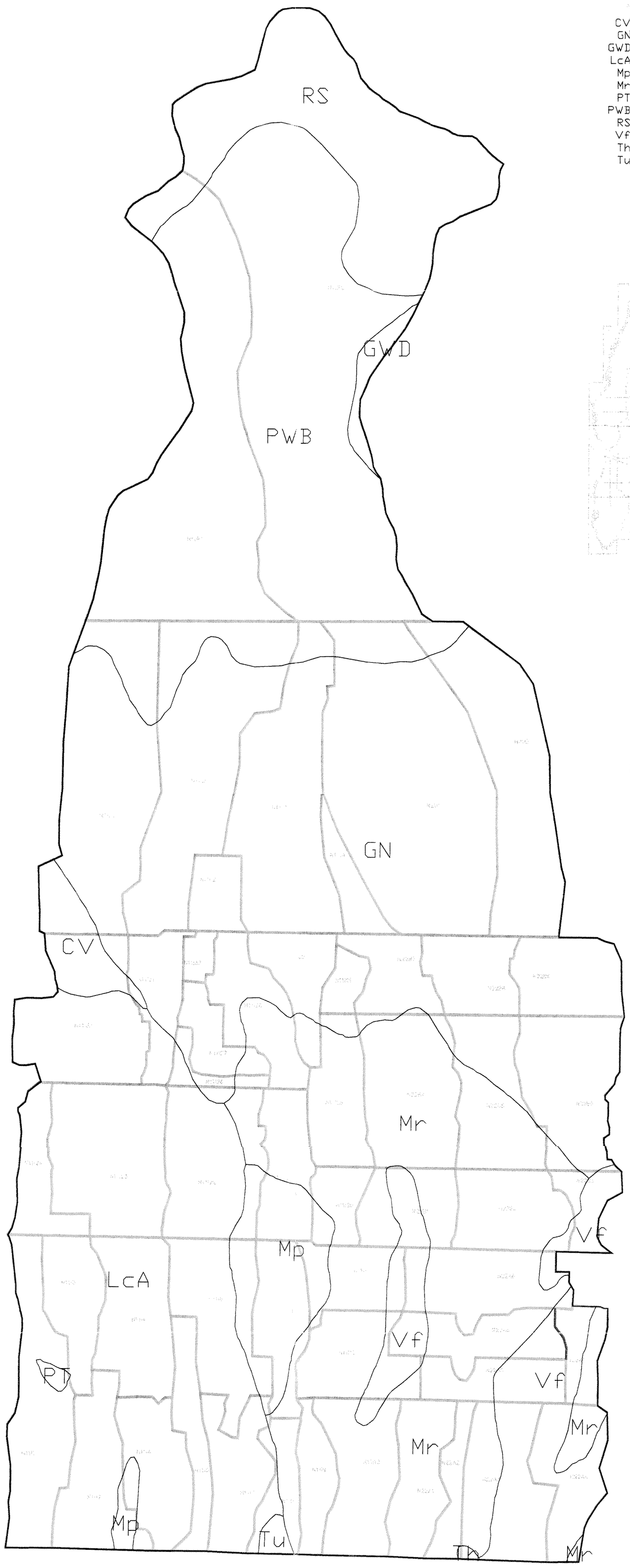
Project No. 310.017

GLENDALE/PEORIA ADMP UPDATE
FLOOD CONTROL DISTRICT OF MARICOPA COUNTY
FCD PROJECT NO. 99-44

PLATE DS-3

DETAILED STUDY

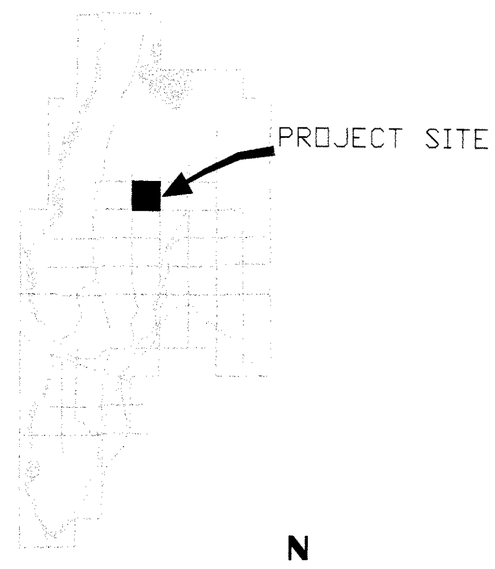
LANDUSE



LEGEND

BASIN BOUNDARY
BASIN ID

CV — Coolidge-Laveen association
GN — Gilman-Laveen association
GWD — Gunsight-Pinal complex
LcA — Laveen loam
Mp — Mohall loam
Mr — Mohall clay loam
PT — Pinal gravelly loam
PWB — Pinal-Suncity complex
RS — Rock outcrop-Cherioni complex
Vf — Vecont Clay
Th — Tremant gravelly clay loam
Tu — Tuscon loam



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GLENDALE/PEORIA ADMP UPDATE
FLOOD CONTROL DISTRICT OF MARICOPA COUNTY
FCD PROJECT NO. 99-44

PLATE DS-4

DETAILED STUDY
SOILS

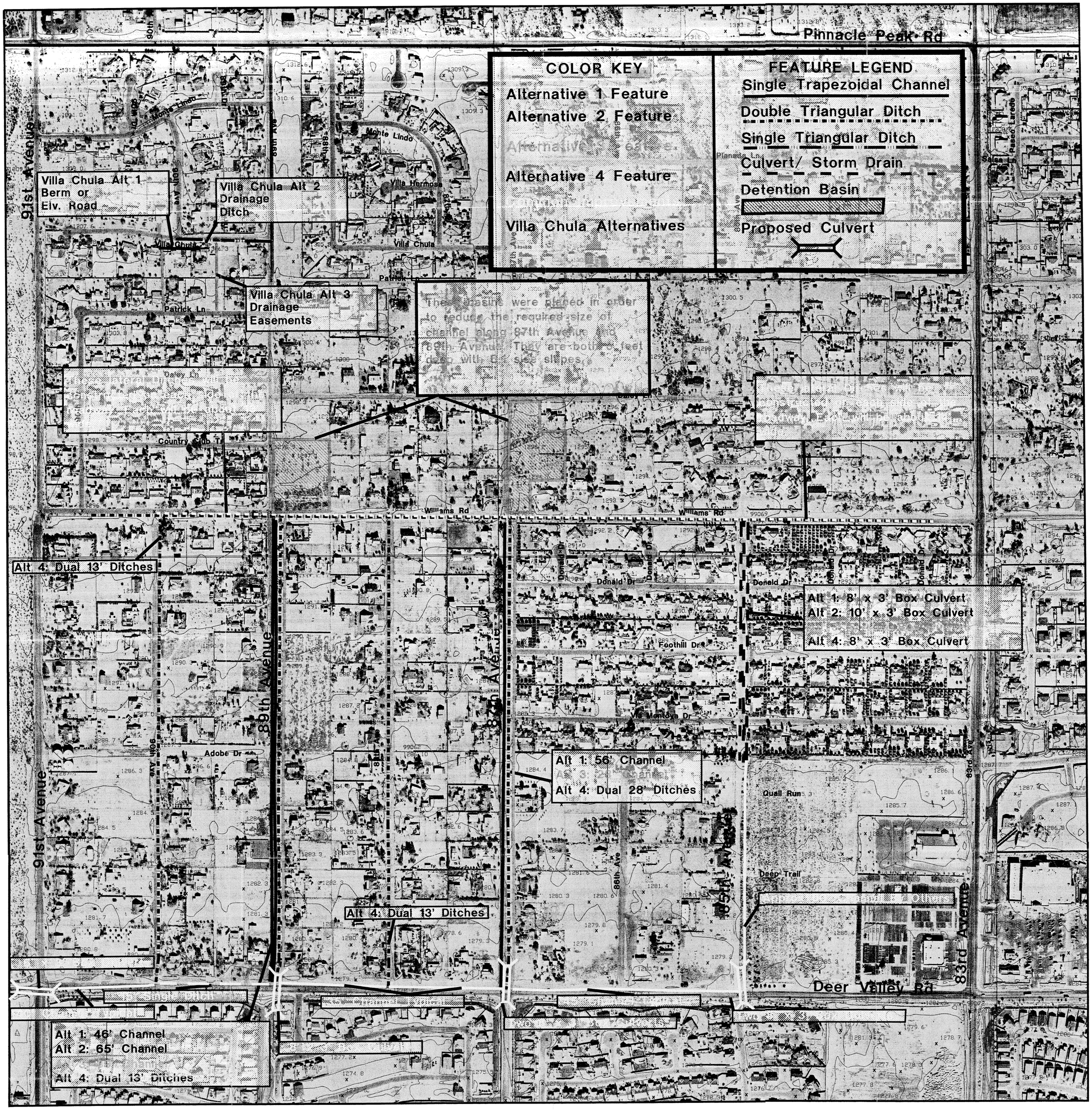


PLATE DS-5

FEATURES OF POTENTIAL ALTERNATIVES

Glendale Peoria
Area Drainage Master Plan

GLENDALE

CITY OF PEORIA

Flood Control District of Maricopa County

Entellus™

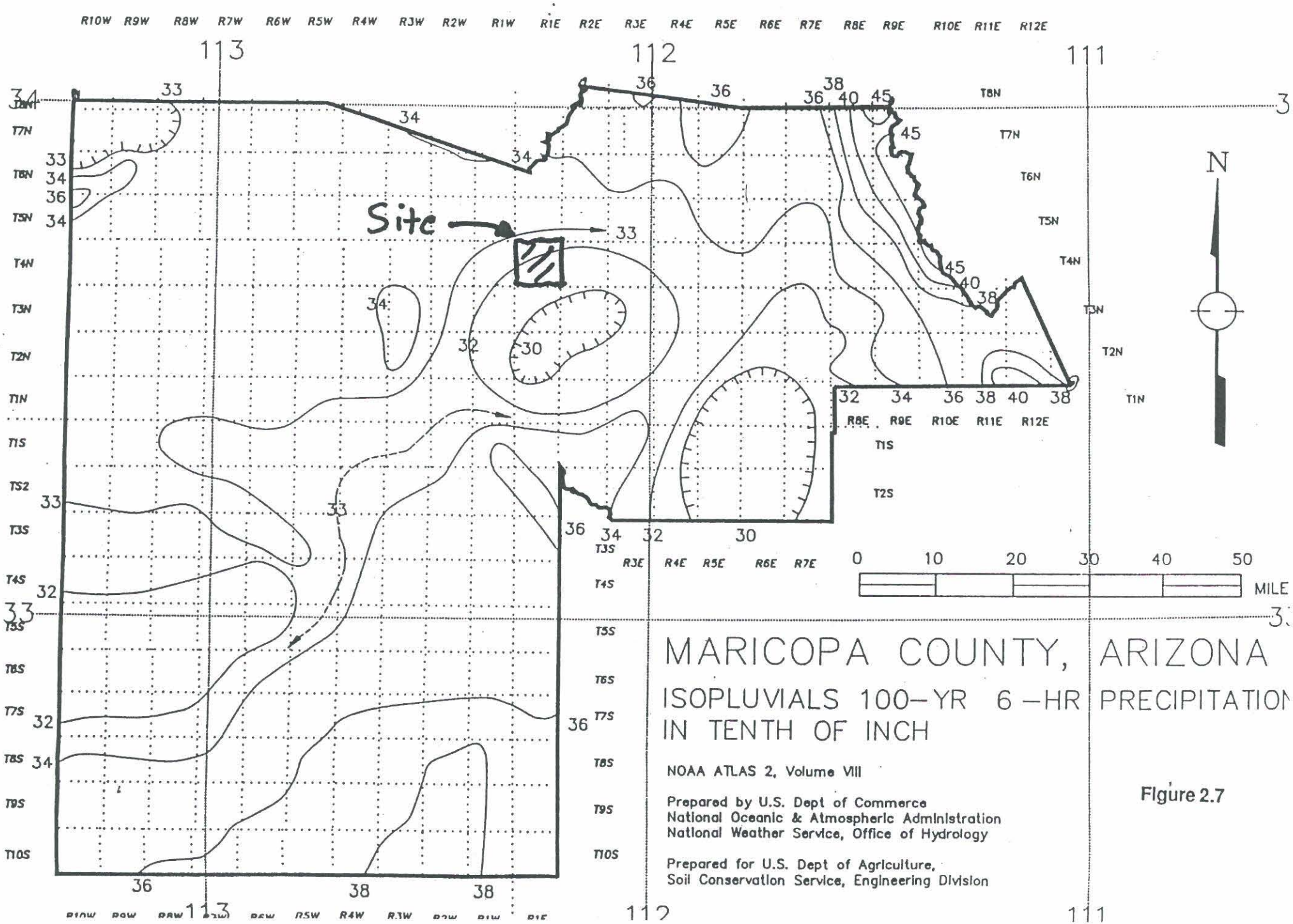
PENTACORE ARIZONA

LTM Engineering, Inc.
3923 East Thunderbird Road Suite 26-121
Phoenix, Arizona 85032

LOGAN SIMPSON DESIGN INC.

APPENDIX C. HYDROLOGIC ANALYSIS SUPPORTING DOCUMENTATION

C.1. Precipitation Data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0 10 20 30 40 50
MILE
MARICOPA COUNTY, ARIZONA
ISOPLUVIALS 100-YR 6-HR PRECIPITATION
IN TENTH OF INCH
NOAA ATLAS 2, Volume VIII
Prepared by U.S. Dept of Commerce
National Oceanic & Atmospheric Administration
National Weather Service, Office of Hydrology
Prepared for U.S. Dept of Agriculture,
Soil Conservation Service, Engineering Division

Figure 2.7

Flood Control District of Maricopa County
SECTION 15 - ADMP UPDATE SECTION 15 DETAILED STUDY

Rainfall Data

Primary Zone Number: **7** Latitude: **0.0** Elevation: **0**

Short Duration Zone Number: **8** Longitude: **0.0**

	Point Values (in)					
Duration	2-Yr	5-Yr	10-Yr	25-Yr	50-Yr	100-Yr
5 MIN	0.33	0.42	0.49	0.58	0.66	0.73
10 MIN	0.49	0.64	0.74	0.89	1.00	1.12
15 MIN	0.59	0.80	0.94	1.13	1.28	1.43
30 MIN	0.79	1.07	1.26	1.53	1.74	1.94
1 HOUR	0.96	1.32	1.57	1.90	2.17	2.43
2 HOUR	1.04	1.45	1.73	2.10	2.40	2.69
3 HOUR	1.10	1.54	1.83	2.24	2.55	2.87
6 HOUR	1.20	1.70	2.03	2.49	2.85	3.20
12 HOUR	1.30	1.88	2.26	2.79	3.20	3.60
24 HOUR	1.40	2.06	2.49	3.09	3.54	4.00

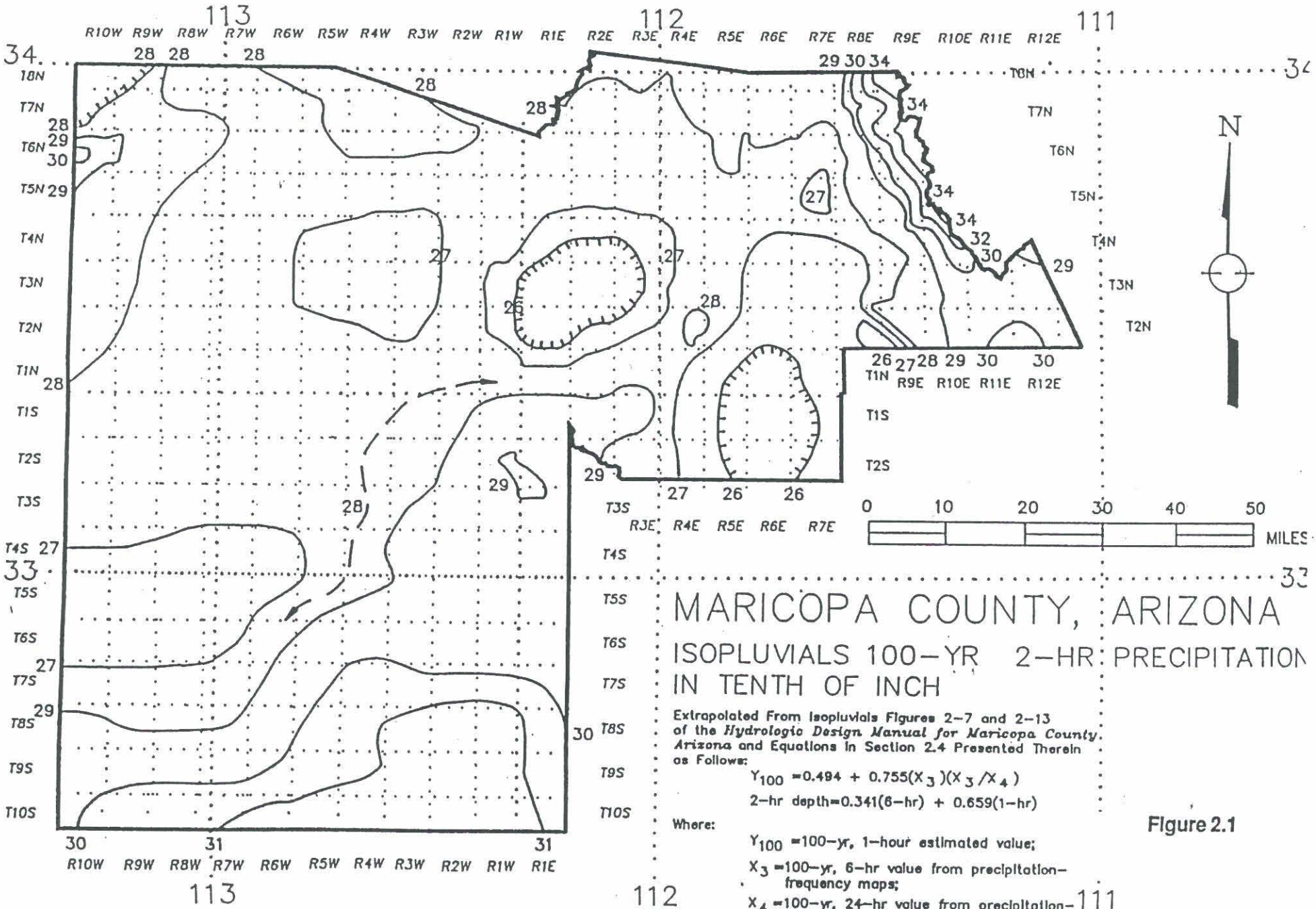
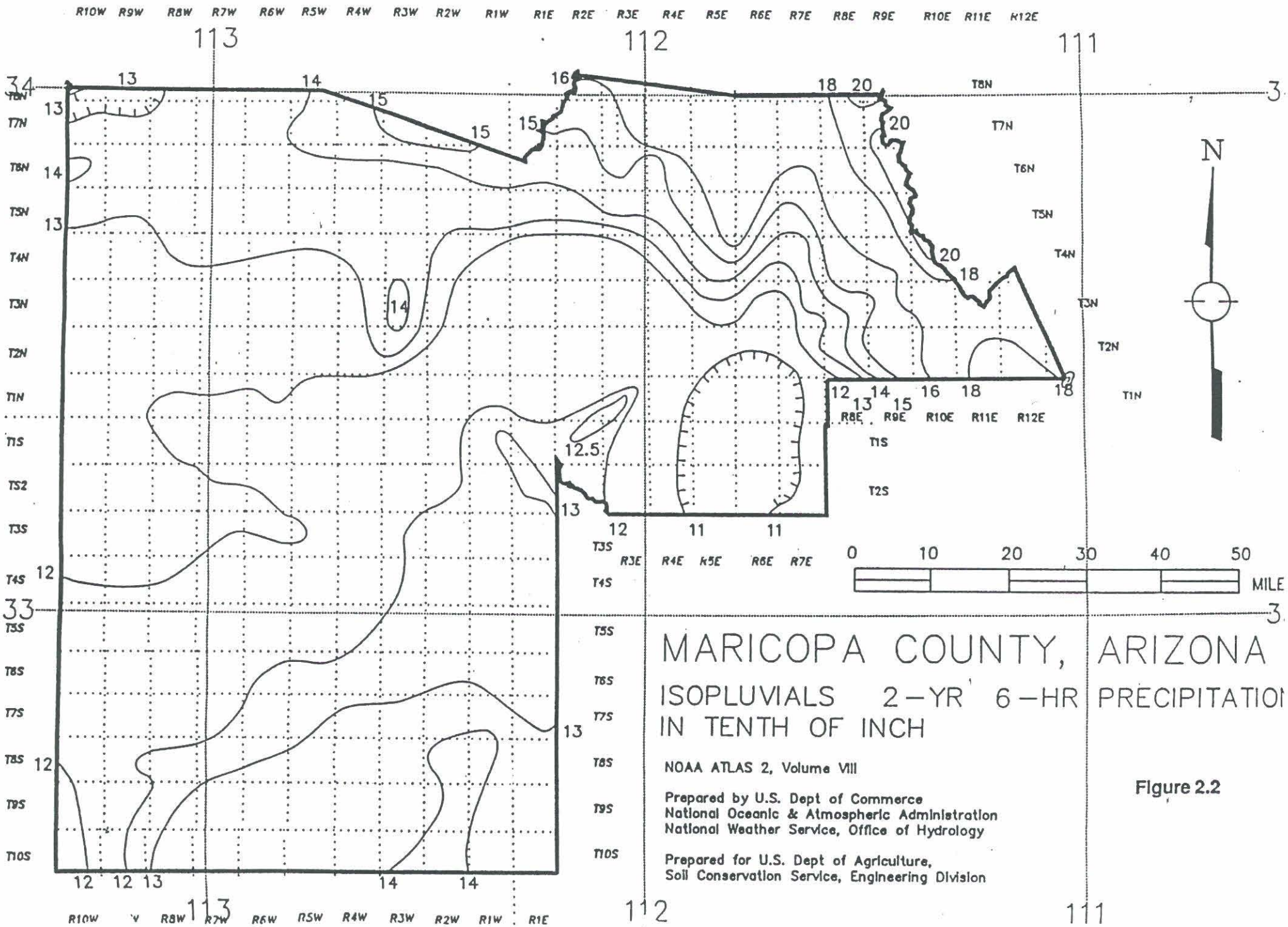

MARICOPA COUNTY, ARIZONA
ISOPLUVIALS 100-YR 2-HR PRECIPITATION
IN TENTH OF INCH
Extrapolated From Isopluvials Figures 2-7 and 2-13 of the Hydrologic Design Manual for Maricopa County, Arizona and Equations in Section 2.4 Presented Therein as Follows:
$Y_{100} = 0.494 + 0.755(X_3)(X_3/X_4)$
2-hr depth=0.341(6-hr) + 0.659(1-hr)
Where:
Y_{100} =100-yr, 1-hour estimated value;
X_3 =100-yr, 6-hr value from precipitation-frequency maps;
X_4 =100-yr, 24-hr value from precipitation-frequency maps;
6-hr=Isopluvial values from figure 2.7;
N
0 10 20 30 40 50
MILES
R10W R9W R8W R7W R6W R5W R4W R3W R2W R1W R1E R2E R3E R4E R5E R6E R7E R8E R9E R10E R11E R12E
T8N T7N T6N T5N T4N T3N T2N T1N T1S T2S T3S T4S T5S T6S T7S T8S T9S T10S
113 112 111
34 33

Figure 2.1


MARICOPA COUNTY, ARIZONA
ISOPLUVIALS 2-YR 6-HR PRECIPITATION
IN TENTH OF INCH
NOAA ATLAS 2, Volume VIII
Prepared by U.S. Dept of Commerce
National Oceanic & Atmospheric Administration
National Weather Service, Office of Hydrology
Prepared for U.S. Dept of Agriculture,
Soil Conservation Service, Engineering Division
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R10W R9W R8W R7W R6W R5W R4W R3W R2W R1W R1E R2E R3E R4E R5E R6E R7E R8E R9E R10E R11E R12E
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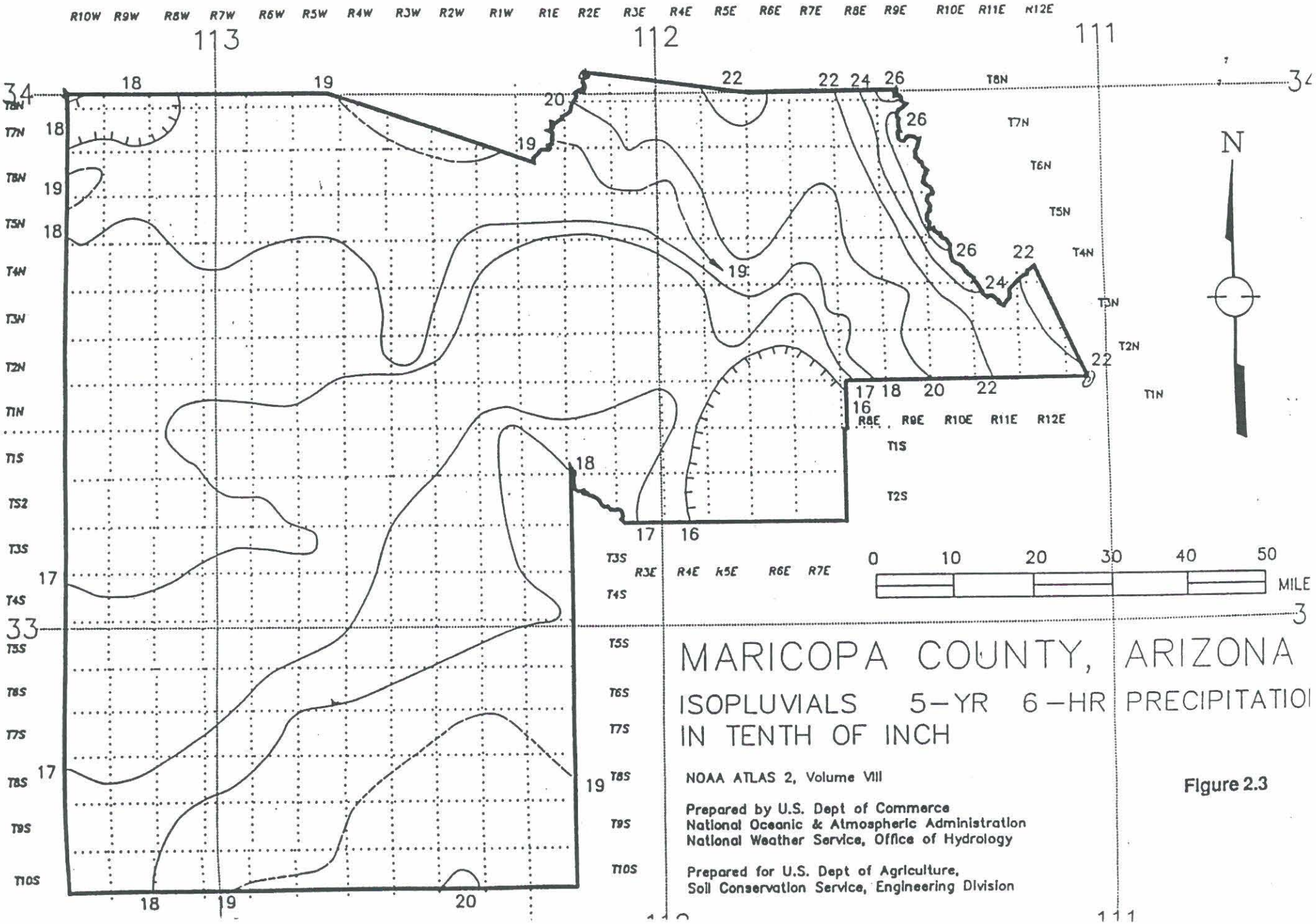
Figure 2.2


MARICOPA COUNTY, ARIZONA
ISOPLUVIALS 5-YR 6-HR PRECIPITATIO
IN TENTH OF INCH
NOAA ATLAS 2, Volume VIII
Prepared by U.S. Dept of Commerce
National Oceanic & Atmospheric Administration
National Weather Service, Office of Hydrology
Prepared for U.S. Dept of Agriculture,
Soil Conservation Service, Engineering Division
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MILE
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Figure 2.3

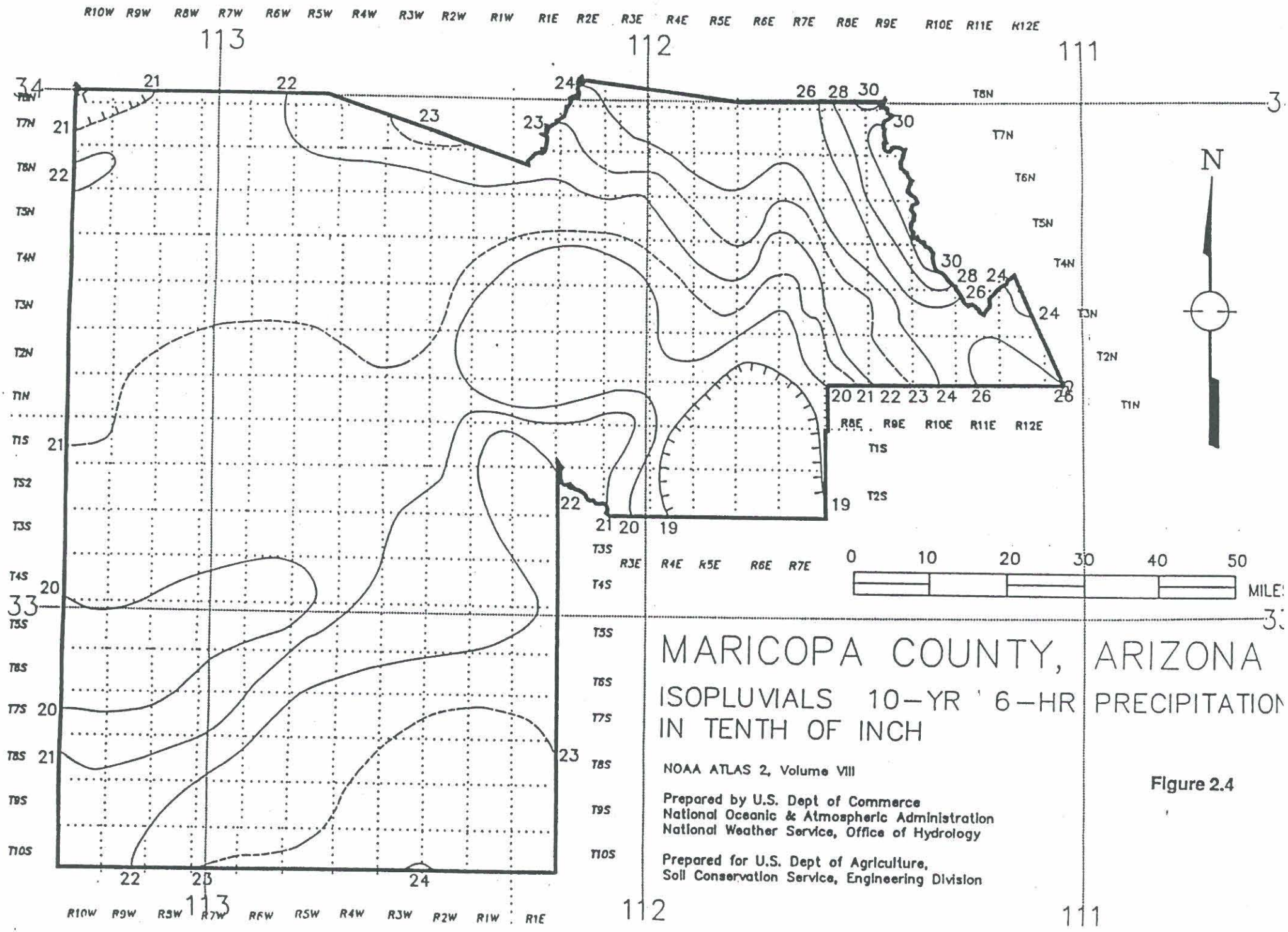
MARICOPA COUNTY, ARIZONA
ISOPLUVIALS 10-YR 6-HR PRECIPITATION
IN TENTH OF INCH
NOAA ATLAS 2, Volume VIII
Prepared by U.S. Dept of Commerce
National Oceanic & Atmospheric Administration
National Weather Service, Office of Hydrology
Prepared for U.S. Dept of Agriculture,
Soil Conservation Service, Engineering Division
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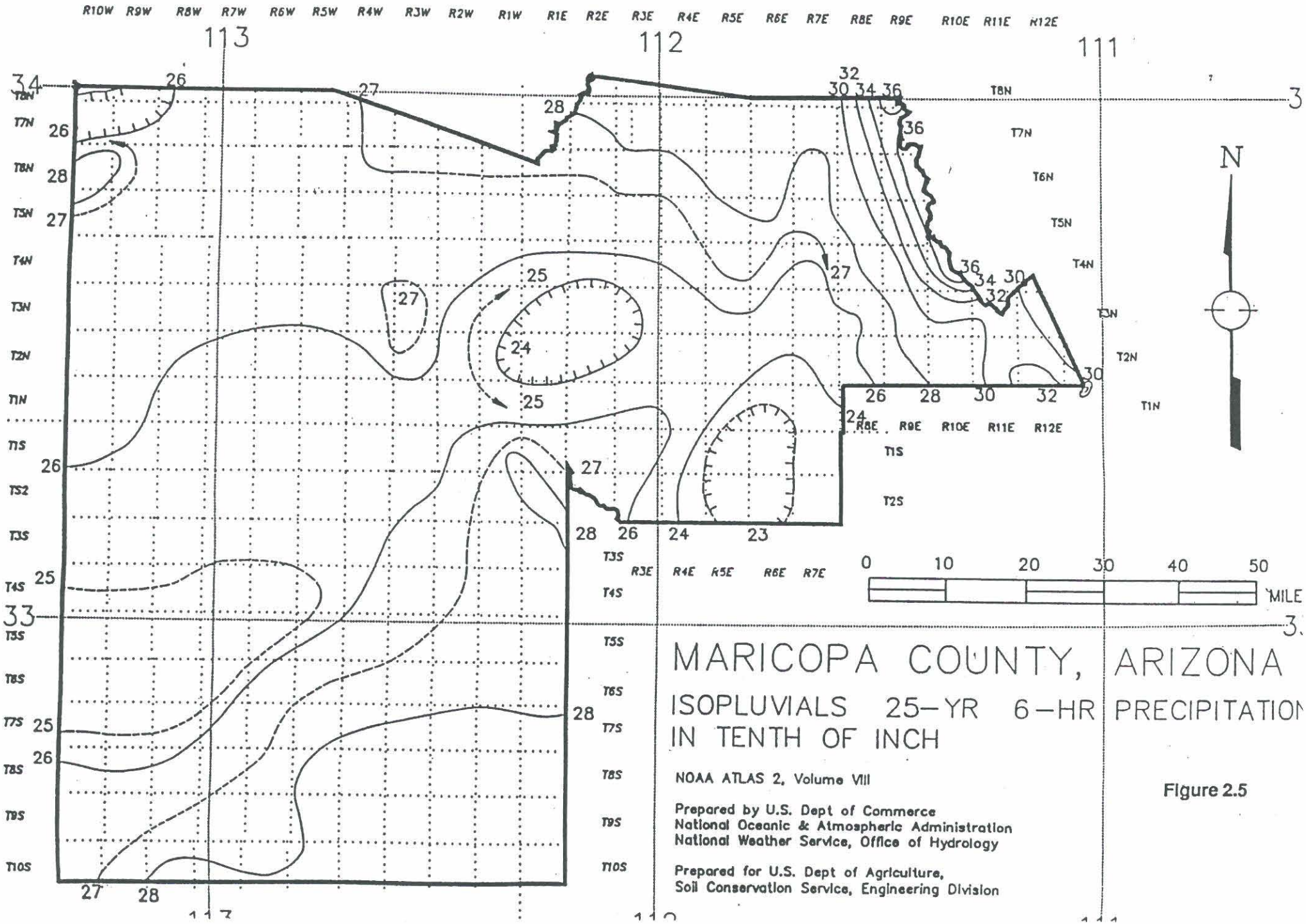
Figure 2.4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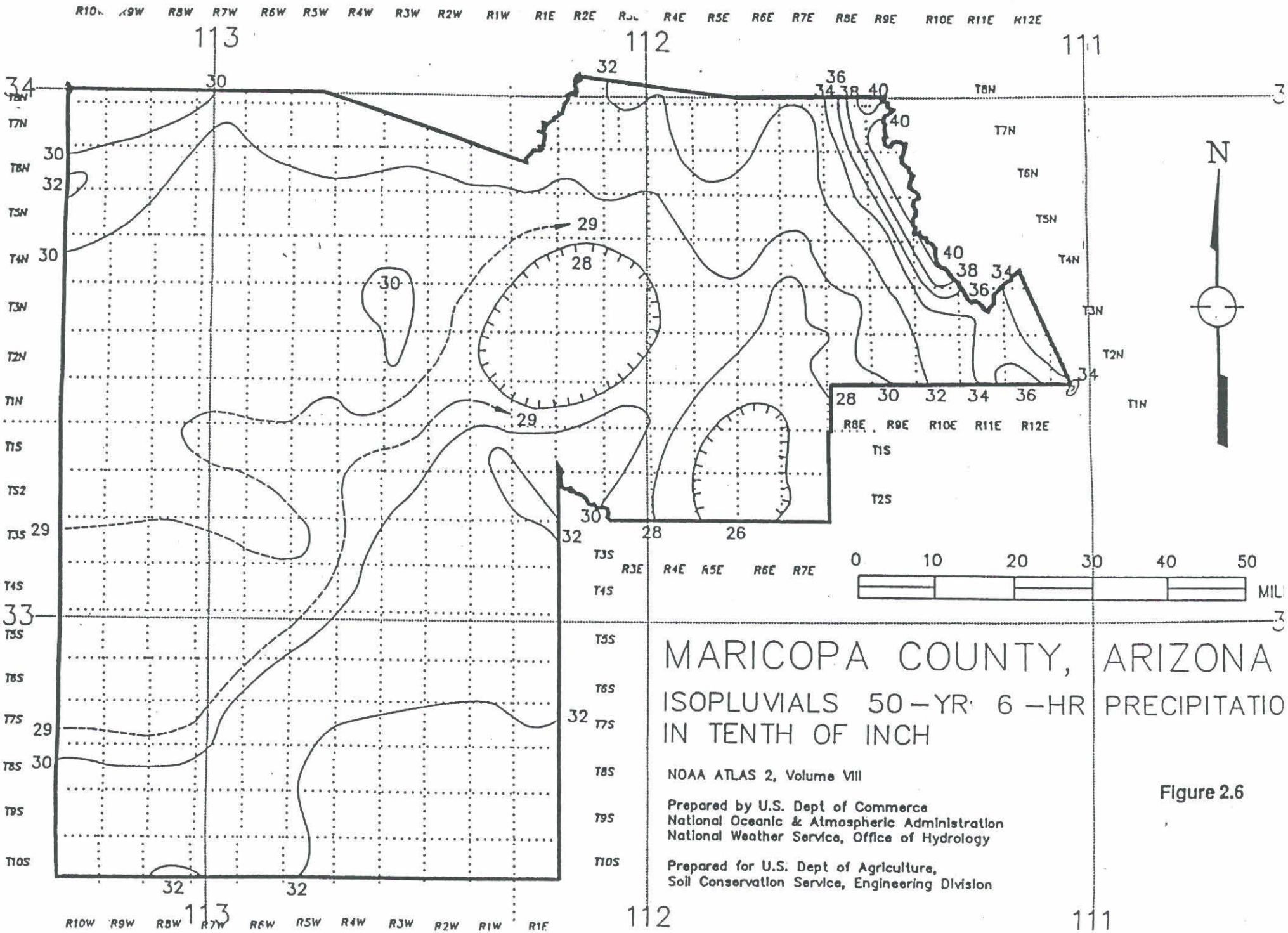
MILE
MARICOPA COUNTY, ARIZONA
ISOPLUVIALS 25-YR 6-HR PRECIPITATION
IN TENTH OF INCH
NOAA ATLAS 2, Volume VIII
Prepared by U.S. Dept of Commerce
National Oceanic & Atmospheric Administration
National Weather Service, Office of Hydrology
Prepared for U.S. Dept of Agriculture,
Soil Conservation Service, Engineering Division

Figure 2.5


MARICOPA COUNTY, ARIZONA
ISOPLUVIALS 50-YR 6-HR PRECIPITATIO
IN TENTH OF INCH
NOAA ATLAS 2, Volume VIII
Prepared by U.S. Dept of Commerce
National Oceanic & Atmospheric Administration
National Weather Service, Office of Hydrology
Prepared for U.S. Dept of Agriculture,
Soil Conservation Service, Engineering Division
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T8N T7N T6N T5N T4N T3N T2N T1N T1S T2S T3S T4S T5S T6S T7S T8S T9S T10S
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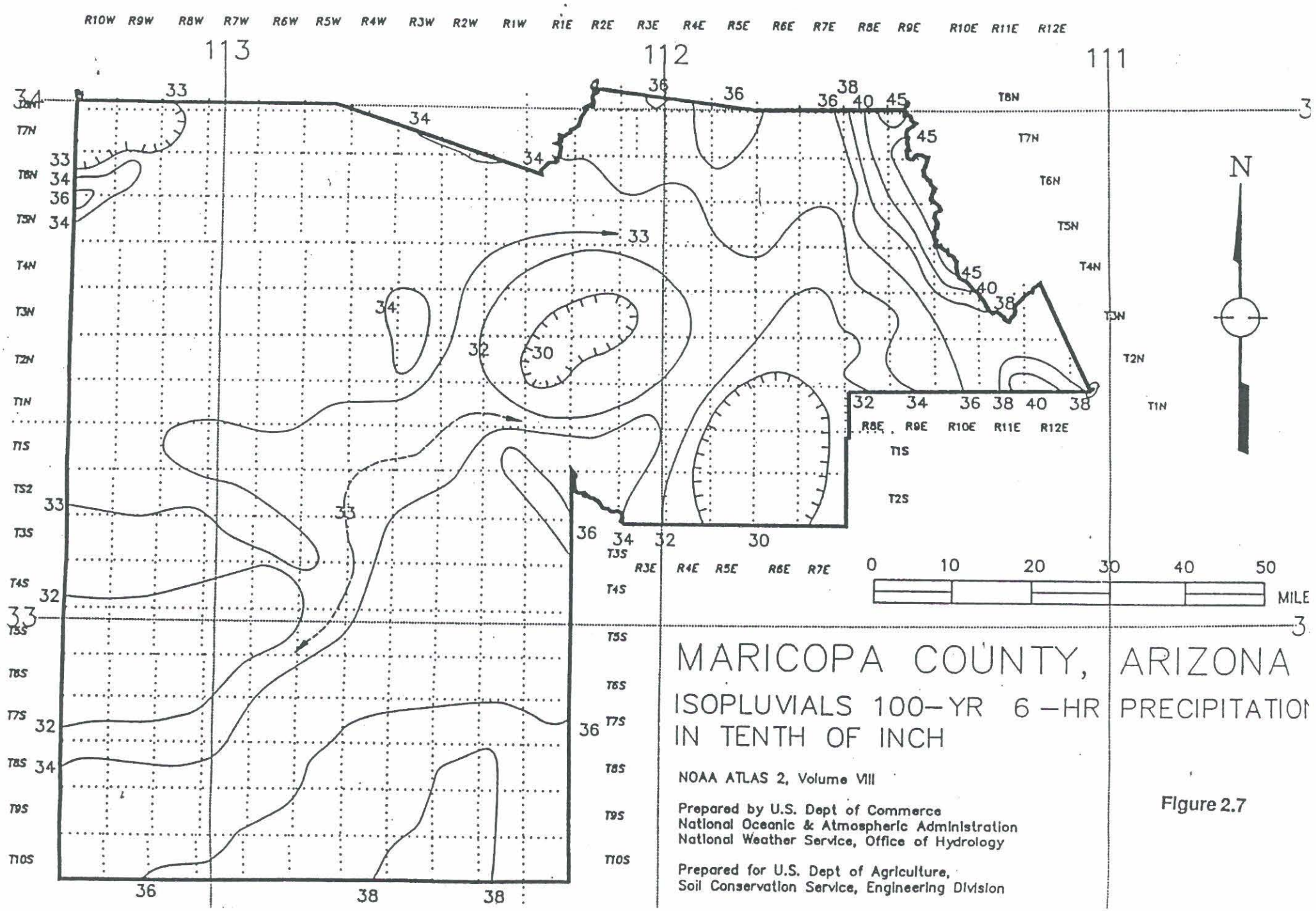
Figure 2.6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MILE
MARICOPA COUNTY, ARIZONA
ISOPLUVIALS 100-YR 6-HR PRECIPITATION
IN TENTH OF INCH
NOAA ATLAS 2, Volume VIII
Prepared by U.S. Dept of Commerce
National Oceanic & Atmospheric Administration
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Prepared for U.S. Dept of Agriculture,
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Figure 2.7

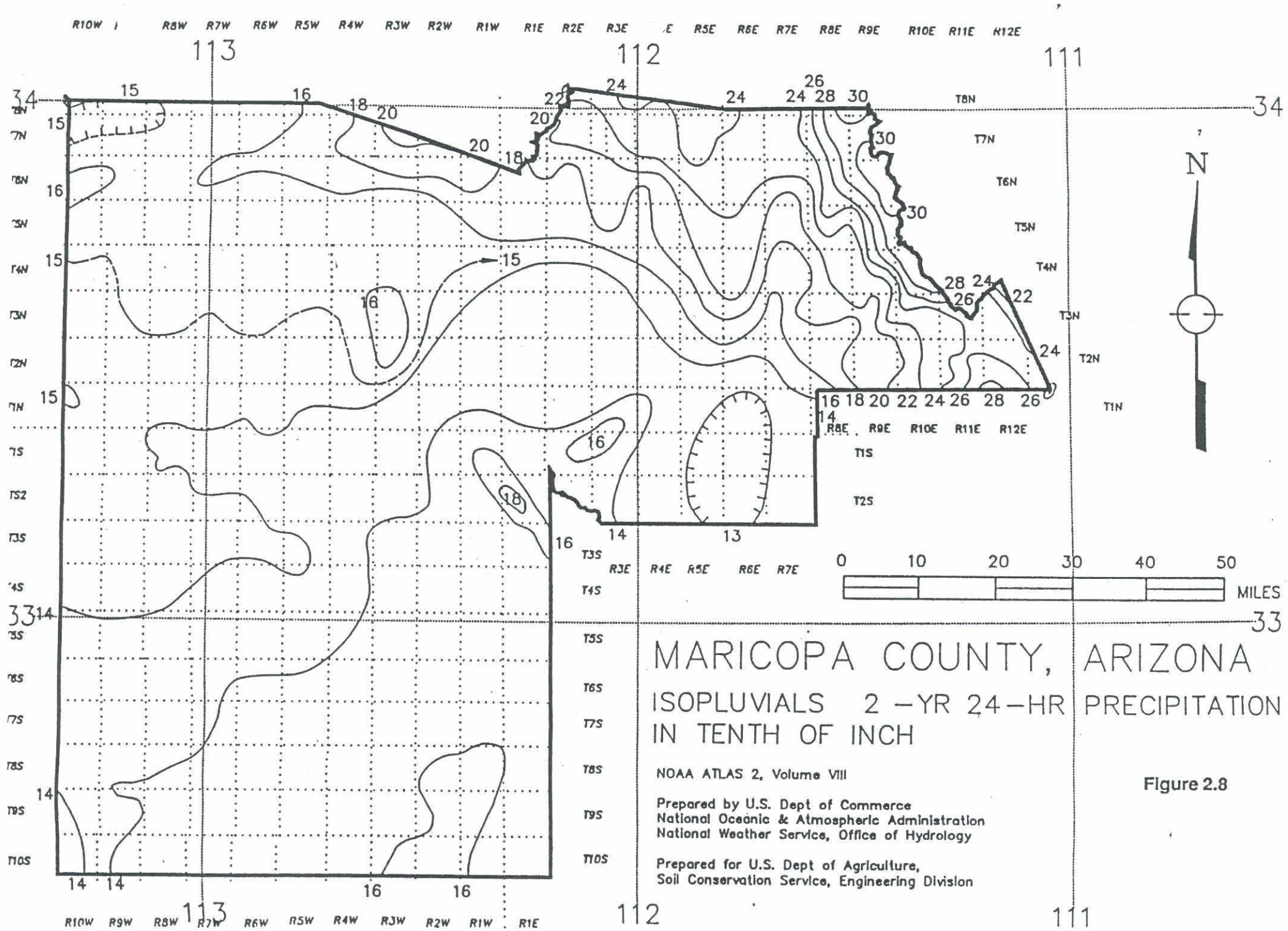
MARICOPA COUNTY, ARIZONA
ISOPLUVIALS 2 -YR 24-HR PRECIPITATION
IN TENTH OF INCH
NOAA ATLAS 2, Volume VIII
Prepared by U.S. Dept of Commerce
National Oceanic & Atmospheric Administration
National Weather Service, Office of Hydrology
Prepared for U.S. Dept of Agriculture,
Soil Conservation Service, Engineering Division
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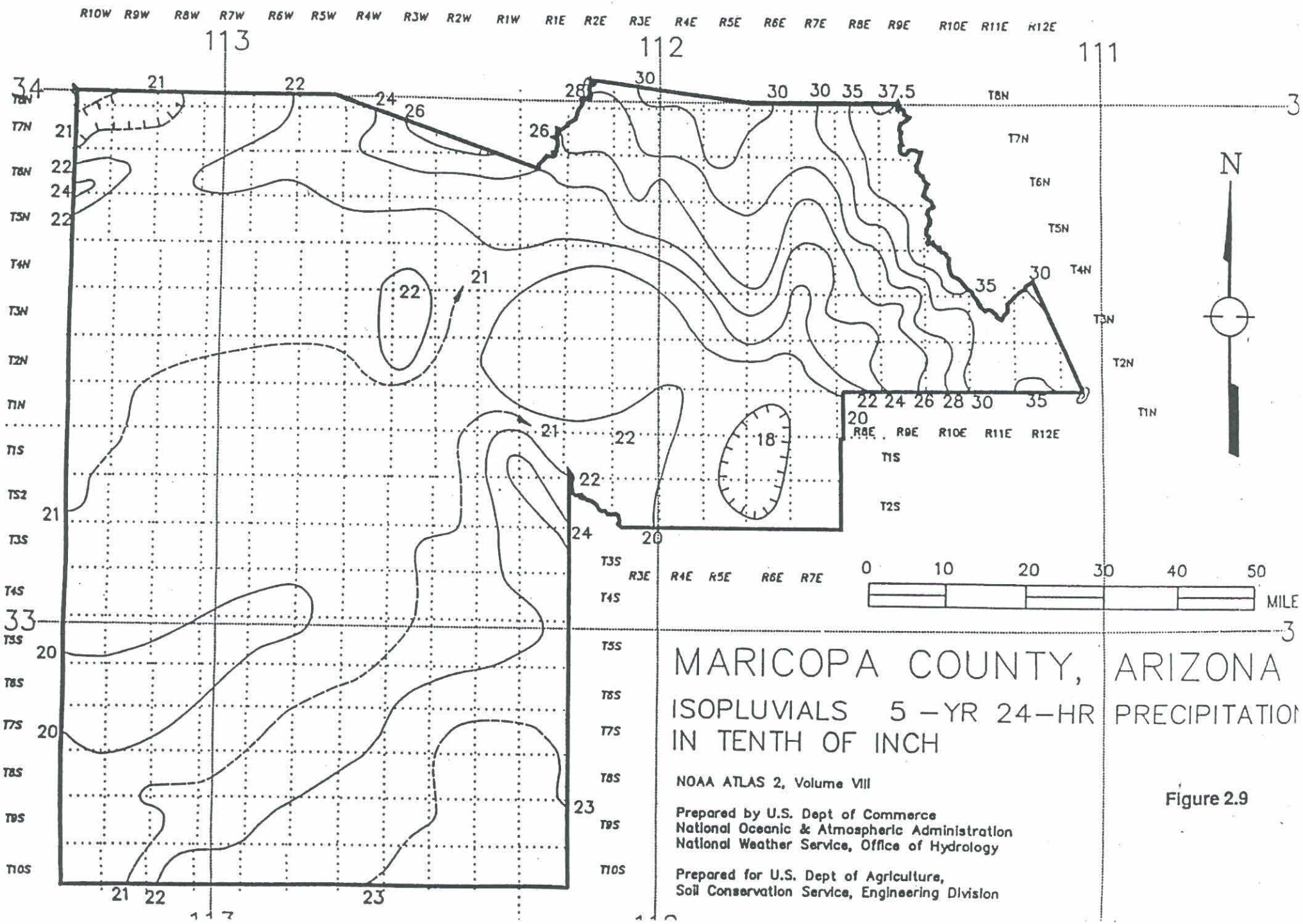
Figure 2.8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MARICOPA COUNTY, ARIZONA
ISOPLUVIALS 5 -YR 24-HR PRECIPITATION
IN TENTH OF INCH
NOAA ATLAS 2, Volume VIII
Prepared by U.S. Dept of Commerce
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Figure 2.9

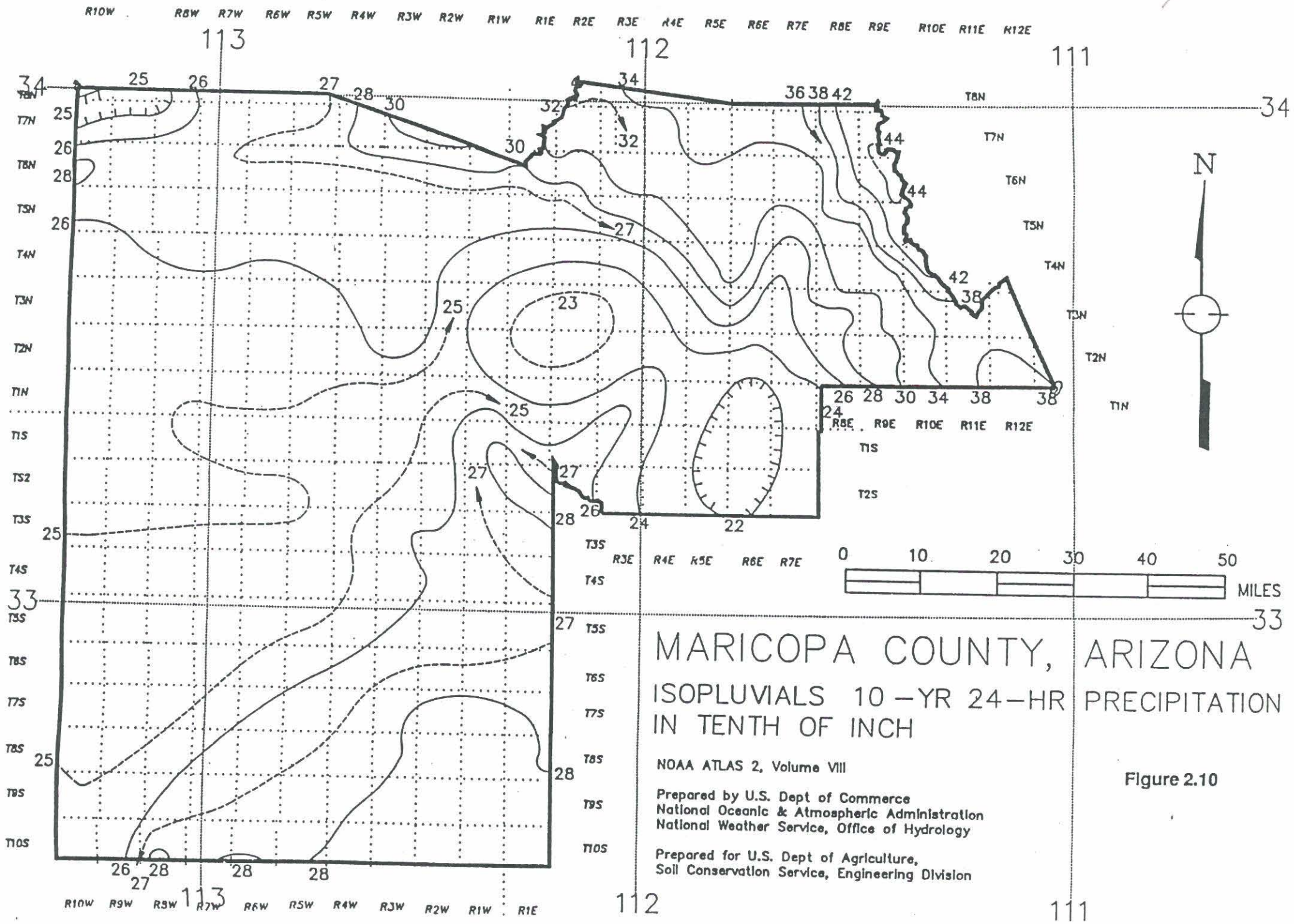
MARICOPA COUNTY, ARIZONA
ISOPLUVIALS 10-YR 24-HR PRECIPITATION
IN TENTH OF INCH
NOAA ATLAS 2, Volume VIII
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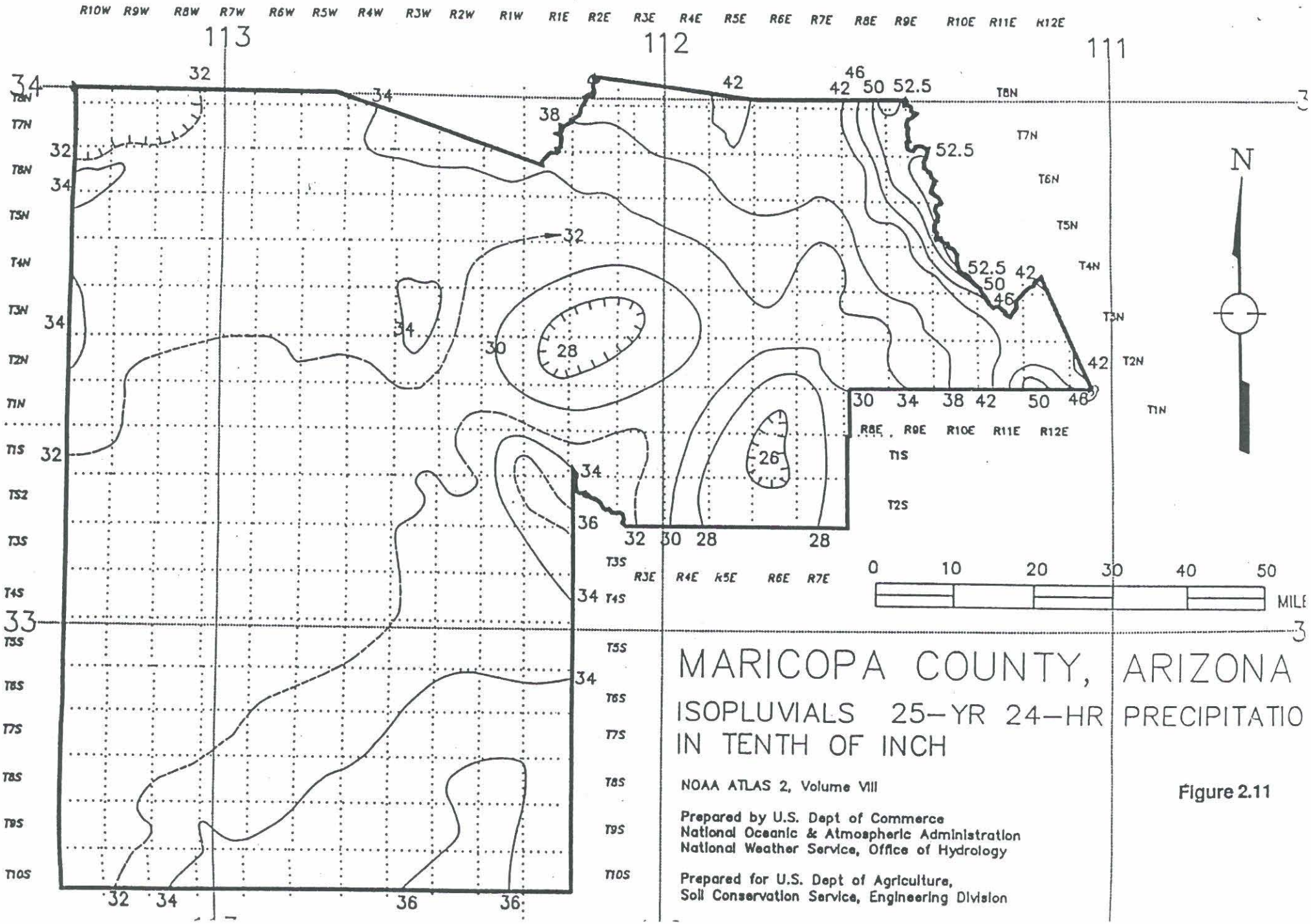
Figure 2.10



MARICOPA COUNTY, ARIZONA

ISOPLUVIALS 25-YR 24-HR PRECIPITATIO
IN TENTH OF INCH

NOAA ATLAS 2, Volume VIII

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

Prepared for U.S. Dept of Agriculture,
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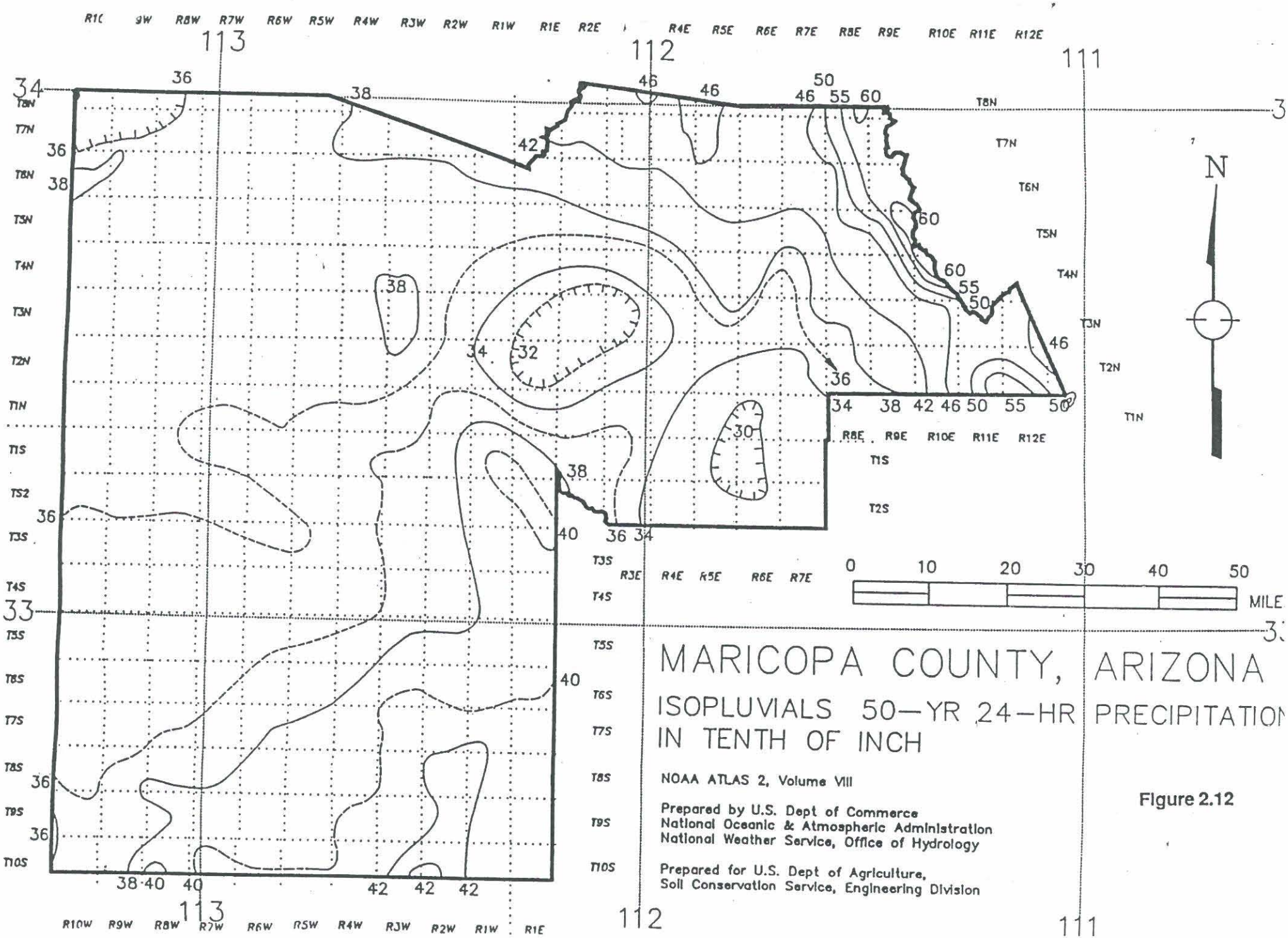
Figure 2.11


MARICOPA COUNTY, ARIZONA
ISOPLUVIALS 50—YR 24—HR PRECIPITATION
IN TENTH OF INCH
NOAA ATLAS 2, Volume VIII
Prepared by U.S. Dept of Commerce
National Oceanic & Atmospheric Administration
National Weather Service, Office of Hydrology
Prepared for U.S. Dept of Agriculture,
Soil Conservation Service, Engineering Division
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MILE
R10W R9W R8W R7W R6W R5W R4W R3W R2W R1W R1E R2E R3E R4E R5E R6E R7E R8E R9E R10E R11E R12E
T8N T7N T6N T5N T4N T3N T2N T1N T1S T2S T3S T4S T5S T6S T7S T8S T9S T10S
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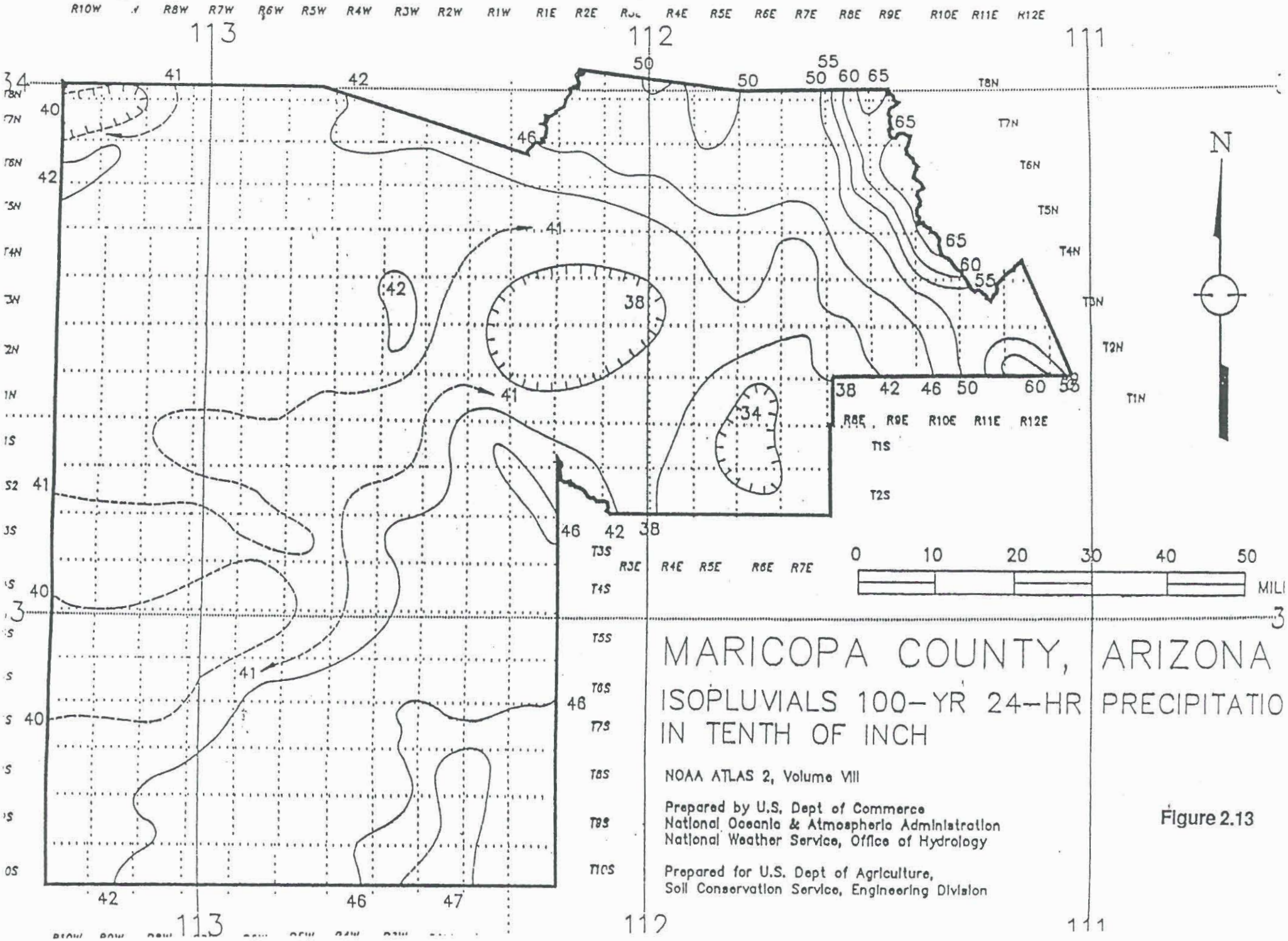
Figure 2.12


MARICOPA COUNTY, ARIZONA
ISOPLUVIALS 100-YR 24-HR PRECIPITATIO
IN TENTH OF INCH
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Prepared by U.S. Dept of Commerce
National Oceanic & Atmospheric Administration
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Prepared for U.S. Dept of Agriculture,
Soil Conservation Service, Engineering Division
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T1S T2S T3S T4S T5S T6S T7S T8S T9S T10S
113 112 111

Figure 2.13

C.2. Physical Parameter Calculations

Sub Basin Data

 6/27/2001

Basin: 01 Storms: Multiple Duration: 6 Hour Loss Method: Green-Ampt Unit Hydrograph: Clark

	Sub Basin Parameters						Rainfall Losses						Return Period (Years)					
Area ID	Area (sq mi)	Length (mi)	Slope (ft/mi)	Adj Slope	Time-Area	Kb	IA (in)	DTHETA	PSIF (in)	XKSAT (in/hr)	RTIMP (%)		2	5	10	25	50	100
N11I1	0.04	0.52	31.8	31.8	Urban	0.063	0.31	0.35	2.65	1.37	13	Tc (hrs)	1.50	1.35	0.97	0.70	0.59	0.52
												R (hrs)	2.20	1.97	1.35	0.95	0.78	0.68
N11I2	0.03	0.31	31.3	31.3	Urban	0.063	0.30	0.35	2.65	1.40	15	Tc (hrs)	1.15	0.88	0.65	0.47	0.40	0.35
												R (hrs)	1.35	1.00	0.72	0.50	0.42	0.36
N11I3	0.02	0.27	33.2	33.2	Urban	0.067	0.30	0.35	2.65	1.39	14	Tc (hrs)	1.10	0.84	0.61	0.44	0.37	0.33
												R (hrs)	1.40	1.04	0.73	0.51	0.42	0.36
N11I4	0.02	0.28	27.6	27.6	Urban	0.066	0.31	0.30	2.65	1.38	13	Tc (hrs)	1.27	0.90	0.65	0.47	0.40	0.35
												R (hrs)	1.49	1.02	0.70	0.50	0.41	0.36
N11I5	0.01	0.38	29.9	29.9	Urban	0.070	0.32	0.35	2.65	1.33	10	Tc (hrs)	1.50	1.32	0.90	0.63	0.53	0.46
												R (hrs)	3.08	2.67	1.74	1.17	0.97	0.83
N11I6	0.03	0.36	28.5	28.5	Urban	0.062	0.30	0.35	2.65	1.40	15	Tc (hrs)	1.33	1.01	0.75	0.54	0.46	0.41
												R (hrs)	1.56	1.16	0.83	0.58	0.48	0.42
N11I7	0.02	0.28	26.3	26.3	Urban	0.065	0.30	0.35	2.65	1.40	15	Tc (hrs)	1.18	0.91	0.67	0.48	0.41	0.36
												R (hrs)	1.46	1.09	0.78	0.54	0.45	0.39
N11I8	0.01	0.22	27.8	27.8	Urban	0.065	0.28	0.35	2.65	1.37	14	Tc (hrs)	1.00	0.76	0.54	0.39	0.33	0.29
												R (hrs)	1.27	0.93	0.64	0.45	0.38	0.32
N11I9	0.01	0.26	30.4	30.4	Urban	0.063	0.26	0.35	2.65	1.34	13	Tc (hrs)	1.11	0.80	0.57	0.42	0.35	0.31
												R (hrs)	1.76	1.23	0.84	0.59	0.49	0.42
N11I10	0.02	0.31	30.3	30.3	Urban	0.066	0.30	0.35	2.65	1.39	14	Tc (hrs)	1.26	0.95	0.70	0.50	0.42	0.37
												R (hrs)	1.71	1.25	0.89	0.61	0.51	0.44
N11I11	0.02	0.28	22.3	22.3	Urban	0.066	0.25	0.35	2.65	1.40	30	Tc (hrs)	1.55	0.71	0.58	0.46	0.41	0.37
												R (hrs)	2.14	0.90	0.72	0.56	0.49	0.43
N11I12	0.02	0.27	15.3	15.3	Urban	0.064	0.25	0.35	4.10	0.53	28	Tc (hrs)	0.96	0.65	0.54	0.45	0.41	0.37
												R (hrs)	1.04	0.67	0.55	0.45	0.40	0.36
N11I13	0.03	0.27	25.3	25.3	Urban	0.067	0.32	0.35	2.65	1.31	8	Tc (hrs)	1.50	1.15	0.75	0.51	0.43	0.38
												R (hrs)	1.57	1.17	0.73	0.48	0.39	0.34

Sub Basin Data

6/27/2001

Basin: 01 Storms: Multiple Duration: 6 Hour Loss Method: Green-Ampt Unit Hydrograph: Clark

	Sub Basin Parameters						Rainfall Losses						Return Period (Years)					
Area ID	Area (sq mi)	Length (mi)	Slope (ft/mi)	Adj Slope	Time-Area	Kb	IA (in)	DTHETA	PSIF (in)	XKSAT (in/hr)	RTIMP (%)		2	5	10	25	50	100
N11I14	0.03	0.30	33.6	33.6	Natural	0.066	0.31	0.35	2.65	1.37	13	Tc (hrs)	1.22	0.91	0.65	0.47	0.39	0.35
												R (hrs)	1.32	0.96	0.66	0.45	0.37	0.33
N11I20	0.01	0.13	39.1	39.1	Urban	0.073	0.32	0.35	3.01	1.01	8	Tc (hrs)	0.88	0.48	0.32	0.24	0.21	0.20
												R (hrs)	0.86	0.43	0.28	0.20	0.18	0.17
N11I21	0.02	0.27	33.3	33.3	Urban	0.066	0.30	0.35	2.65	1.39	14	Tc (hrs)	1.09	0.83	0.60	0.43	0.36	0.32
												R (hrs)	1.32	0.99	0.69	0.47	0.39	0.34
N11I22	0.04	0.29	31.5	31.5	Urban	0.064	0.31	0.35	4.20	0.49	11	Tc (hrs)	1.54	0.58	0.45	0.36	0.32	0.29
												R (hrs)	1.41	0.47	0.37	0.29	0.25	0.22
N11I23	0.04	0.39	25.4	25.4	Urban	0.060	0.24	0.35	2.65	1.37	27	Tc (hrs)	1.03	0.82	0.66	0.52	0.46	0.41
												R (hrs)	1.08	0.84	0.66	0.50	0.44	0.39
N11I24	0.02	0.32	26.7	26.7	Urban	0.066	0.24	0.29	2.65	1.38	29	Tc (hrs)	0.91	0.70	0.57	0.46	0.40	0.37
												R (hrs)	1.47	1.10	0.86	0.68	0.59	0.53
N11I25	0.02	0.25	36.3	36.3	Urban	0.061	0.27	0.30	8.00	0.09	13	Tc (hrs)	0.47	0.33	0.29	0.26	0.24	0.23
												R (hrs)	0.48	0.32	0.28	0.24	0.23	0.21
N11I26	0.01	0.20	24.8	24.8	Urban	0.063	0.23	0.35	2.65	1.30	12	Tc (hrs)	1.05	0.72	0.50	0.37	0.31	0.28
												R (hrs)	2.22	1.47	0.99	0.69	0.58	0.50
N11I27	0.01	0.21	32.1	32.1	Urban	0.065	0.27	0.35	2.65	1.36	14	Tc (hrs)	0.92	0.68	0.49	0.35	0.30	0.26
												R (hrs)	1.26	0.91	0.62	0.44	0.36	0.31
N11I28	0.02	0.31	35.5	35.5	Urban	0.061	0.27	0.35	2.65	1.35	13	Tc (hrs)	1.15	0.84	0.60	0.43	0.36	0.32
												R (hrs)	1.45	1.03	0.70	0.49	0.40	0.35
N11I29	0.01	0.12	34.2	34.2	Urban	0.072	0.30	0.35	2.65	1.20	5	Tc (hrs)	1.12	0.58	0.35	0.25	0.22	0.20
												R (hrs)	1.39	0.68	0.39	0.26	0.23	0.21
N11I30	0.02	0.26	43.1	43.1	Urban	0.043	0.14	0.35	2.65	1.12	5	Tc (hrs)	1.20	0.48	0.33	0.25	0.23	0.21
												R (hrs)	1.55	0.56	0.37	0.27	0.24	0.22
N11I31	0.02	0.29	30.0	30.0	Urban	0.058	0.24	0.35	2.65	1.31	12	Tc (hrs)	1.19	0.83	0.58	0.42	0.36	0.32
												R (hrs)	1.76	1.17	0.79	0.56	0.46	0.41

* Non default value

Sub Basin Data

6/27/2001

Basin: 01 | Storms: Multiple | Duration: 6 Hour | Loss Method: Green-Ampt | Unit Hydrograph: Clark

	Sub Basin Parameters						Rainfall Losses						Return Period (Years)					
Area ID	Area (sq mi)	Length (mi)	Slope (ft/mi)	Adj Slope	Time-Area	Kb	IA (in)	DTHETA	PSIF (in)	XKSAT (in/hr)	RTIMP (%)		2	5	10	25	50	100
N11I32	0.04	0.31	28.7	28.7	Urban	0.061	0.30	0.35	2.74	1.13	5	Tc (hrs)	1.50	1.07	0.68	0.48	0.40	0.35
												R (hrs)	1.42	0.97	0.59	0.40	0.33	0.29
N11I33	0.00	0.10	15.6	15.6	Urban	0.075	0.30	0.35	2.65	1.40	15	Tc (hrs)	0.80	0.62	0.45	0.32	0.27	0.24
												R (hrs)	1.04	0.78	0.54	0.37	0.31	0.27
N22A1	0.02	0.26	26.4	26.4	Urban	0.063	0.28	0.27	8.80	0.07	14	Tc (hrs)	0.55	0.40	0.35	0.30	0.28	0.27
												R (hrs)	0.60	0.42	0.36	0.31	0.29	0.27
N22A2	0.01	0.26	24.1	24.1	Urban	0.074	0.33	0.35	2.65	1.28	6	Tc (hrs)	1.50	1.34	0.83	0.56	0.46	1.58
												R (hrs)	2.87	2.54	1.49	0.97	0.78	3.03
N22A3	0.03	0.27	23.4	23.4	Urban	0.062	0.35	0.35	4.35	0.40		Tc (hrs)	1.50	0.66	0.50	0.39	0.34	0.31
												R (hrs)	1.47	0.59	0.43	0.33	0.28	0.25
N22A4	0.02	0.33	30.1	30.1	Urban	0.035	0.10	0.35	2.65	1.50	55	Tc (hrs)	0.42	0.34	0.30	0.25	0.23	0.22
												R (hrs)	0.50	0.40	0.34	0.29	0.26	0.25
N22A5	0.02	0.21	8.1	8.1	Urban	0.066	0.25	0.35	2.65	1.40	30	Tc (hrs)	1.13	0.90	0.74	0.59	0.52	0.47
												R (hrs)	1.28	1.00	0.80	0.63	0.54	0.48
N22A6	0.02	0.25	17.1	17.1	Urban	0.064	0.24	0.35	2.65	1.39	29	Tc (hrs)	0.91	0.73	0.59	0.47	0.41	0.37
												R (hrs)	1.01	0.79	0.63	0.48	0.42	0.37
N22A7	0.01	0.14	21.3	21.3	Urban	0.069	0.25	0.32	7.60	0.11	30	Tc (hrs)	0.40	0.30	0.27	0.24	0.23	0.22
												R (hrs)	0.39	0.28	0.25	0.22	0.20	0.20
N22A8	0.02	0.25	20.7	20.7	Urban	0.069	0.26	0.35	2.65	1.41	27	Tc (hrs)	0.92	0.74	0.60	0.47	0.41	0.37
												R (hrs)	0.96	0.76	0.59	0.45	0.39	0.35
N22B1	0.02	0.16	28.7	28.7	Urban	0.066	0.30	0.35	2.65	1.38	14	Tc (hrs)	0.81	0.61	0.44	0.31	0.26	0.24
												R (hrs)	0.64	0.47	0.32	0.22	0.18	0.16
N22B2	0.02	0.17	30.1	30.1	Urban	0.067	0.31	0.35	2.61	1.41	12	Tc (hrs)	0.90	0.69	0.48	0.33	0.28	0.25
												R (hrs)	0.67	0.50	0.33	0.22	0.18	0.16
N22B3	0.01	0.15	30.2	30.2	Urban	0.074	0.32	0.35	2.65	1.34	10	Tc (hrs)	0.97	0.70	0.47	0.33	0.27	0.24
												R (hrs)	1.15	0.80	0.51	0.34	0.28	0.25

* Non default value

Sub Basin Data

6/27/2001

Basin: 01 | Storms: Multiple | Duration: 6 Hour | Loss Method: Green-Ampt | Unit Hydrograph: Clark

Area ID	Sub Basin Parameters: Area (sq mi)	Length (mi)	Slope (ft/mi)	Adj Slope	Time-Area	Kb	Rainfall Losses: IA (in)	DTHETA	PSIF (in)	XKSAT (in/hr)	RTIMP (%)		Return Period (Years): 2	5	10	25	50	100
N22B4	0.04	0.25	31.7	31.7	Urban	0.065	0.32	0.35	2.76	1.24	10	Tc (hrs)	1.25	0.85	0.58	0.41	0.35	0.30
												R (hrs)	1.05	0.69	0.45	0.30	0.25	0.22
N22B5	0.03	0.25	32.4	32.4	Urban	0.065	0.31	0.35	2.65	1.20	4	Tc (hrs)	1.50	1.01	0.61	0.42	0.35	0.30
												R (hrs)	1.43	0.92	0.52	0.34	0.28	0.24
N22B6	0.04	0.31	26.1	26.1	Urban	0.061	0.30	0.35	2.65	1.20	5	Tc (hrs)	1.50	1.18	0.74	0.51	0.43	0.38
												R (hrs)	1.52	1.17	0.69	0.46	0.38	0.33
N22B7	0.02	0.17	36.1	36.1	Urban	0.067	0.30	0.35	2.65	1.20	5	Tc (hrs)	1.52	0.70	0.43	0.29	0.25	0.23
												R (hrs)	1.53	0.64	0.38	0.25	0.21	0.19
N22B8	0.02	0.16	30.9	30.9	Urban	0.069	0.32	0.35	2.65	1.20	3	Tc (hrs)	1.50	0.83	0.48	0.32	0.26	0.24
												R (hrs)	1.34	0.69	0.37	0.24	0.19	0.17
N22B9	0.02	0.15	40.8	40.8	Urban	0.068	0.34	0.35	2.65	1.20	1	Tc (hrs)	1.50	0.80	0.41	0.26	0.23	0.21
												R (hrs)	1.10	0.55	0.26	0.16	0.14	0.12
N21I1	0.11	0.57	53.6	53.6	Urban	0.058	0.32	0.32	2.65	1.20	3	Tc (hrs)	1.00	1.37	0.82	0.56	0.47	0.41
												R (hrs)	0.83	1.17	0.66	0.44	0.36	0.31
N21I2	0.06	0.59	44.4	44.4	Urban	0.062	0.32	0.29	4.65	0.32	3	Tc (hrs)	1.51	0.75	0.61	0.49	0.43	0.39
												R (hrs)	1.95	0.90	0.71	0.56	0.48	0.44
N11L1	0.07	0.56	43.8	43.8	Urban	0.062	0.31	0.35	2.65	1.35	12	Tc (hrs)	1.50	1.25	0.88	0.63	0.53	0.47
												R (hrs)	1.61	1.32	0.89	0.62	0.51	0.44
N11L2	0.01	0.17	36.1	36.1	Urban	0.069	0.30	0.35	2.65	1.40	15	Tc (hrs)	0.76	0.59	0.43	0.30	0.25	0.23
												R (hrs)	0.90	0.67	0.47	0.32	0.27	0.24
N11L3	0.06	0.50	61.8	61.8	Urban	0.059	0.30	0.29	2.65	1.38	14	Tc (hrs)	1.18	0.84	0.61	0.45	0.38	0.34
												R (hrs)	1.24	0.85	0.59	0.43	0.36	0.31
N11L4	0.01	0.22	49.3	49.3	Natural	0.058	0.30	0.35	2.65	1.39	14	Tc (hrs)	0.73	0.55	0.40	0.28	0.24	0.22
												R (hrs)	1.08	0.80	0.55	0.37	0.31	0.29
N11L5	0.07	0.67	44.2	44.2	Urban	0.058	0.32	0.32	2.65	1.20	3	Tc (hrs)	1.50	1.50	1.02	0.70	0.59	0.52
												R (hrs)	1.85	1.85	1.20	0.80	0.65	0.57

* Non default value

Sub Basin Data

6/27/2001

Basin: 01 | Storms: Multiple | Duration: 6 Hour | Loss Method: Green-Ampt | Unit Hydrograph: Clark

	Sub Basin Parameters						Rainfall Losses						Return Period (Years)					
Area ID	Area (sq mi)	Length (mi)	Slope (ft/mi)	Adj Slope	Time-Area	Kb	IA (in)	DTHETA	PSIF (in)	XKSAT (in/hr)	RTIMP (%)		2	5	10	25	50	100
N11P1	0.12	0.74	580.2	313.0	Natural	0.057	0.34	0.35	3.95	0.48	1	**Tc (hrs)**	1.20	0.40	0.29	0.24	0.22	0.21
												R (hrs)	1.21	0.35	0.25	0.20	0.19	0.17
N11P2	0.27	1.16	396.9	295.0	Natural	0.049	0.35	0.35	3.45	0.67		**Tc (hrs)**	1.00	0.64	0.44	0.33	0.28	0.25
												R (hrs)	0.89	0.55	0.36	0.26	0.22	0.19

Soil Data

Area Id	Soil Survey	Map Unit	Area	Area Pct (%)	XKSAT	Rock Outcrop (%)	Effective (%)
N11I1	Central County	LCA	0.036	96.0	*		
	Central County	PT	0.002	4.0	*		
N11I2	Central County	MP	0.003	10.3	*		
	Central County	LCA	0.024	89.7	*		
N11I3	Central County	LCA	0.018	100.0	*		
N11I4	Central County	LCA	0.022	92.3	*		
	Central County	MP	0.002	7.7	*		
N11I5	Central County	LCA	0.015	100.0	*		
N11I6	Central County	LCA	0.025	75.3	*		
	Central County	MP	0.008	24.7	*		
N11I7	Central County	MP	0.000	1.9	*		
	Central County	MR	0.000	0.5	*		
	Central County	LCA	0.020	97.6	*		
N11I8	Central County	TU	0.003	19.1	*		
	Central County	MR	0.007	54.4	*		
	Central County	LCA	0.004	26.5	*		
N11I9	Central County	MR	0.012	100.0	*		
N11I10	Central County	MR	0.003	15.5	*		
	Central County	MP	0.018	84.5	*		
N11I11	Central County	MR	0.011	60.2	*		
	Central County	MP	0.004	24.4	*		
	Central County	VF	0.003	15.3	*		
N11I12	Central County	VF	0.005	21.2	0.01		
	Central County	MR	0.019	78.8	*		
N11I13	Central County	VF	0.001	5.1	*		
	Central County	MR	0.026	94.9	*		
N11I14	Central County	LCA	0.029	100.0	*		
N22A1	Central County	MR	0.020	100.0	0.05		
N22A2	Central County	TH	0.000	1.1	*		
	Central County	MR	0.009	98.9	*		
N22A3	Central County	TH	0.001	1.6	*		
	Central County	MR	0.012	37.6	0.05		
	Central County	VF	0.019	60.8	*		
N22A4	Central County	VF	0.018	76.1	*		
	Central County	MR	0.006	23.9	*		
N22A5	Central County	VF	0.008	51.9	*		
	Central County	MR	0.008	48.1	*		
N22A6	Central County	VF	0.008	37.9	*		
	Central County	MR	0.013	62.1	*		
N22A7	Central County	VF	0.005	54.0	0.01		

Soil Data

Area Id	Soil Survey	Map Unit	Area	Area Pct (%)	XKSAT	Rock Outcrop (%)	Effective (%)
N22A7	Central County	MR	0.005	46.0	*		
N22A8	Central County	MR	0.021	90.0	*		
	Central County	VF	0.002	10.0	*		
N11I20	Central County	MP	0.002	19.2	0.25		
	Central County	MR	0.008	80.8	*		
N11I21	Central County	MP	0.008	41.8	*		
	Central County	MR	0.012	58.2	*		
N11I22	Central County	MR	0.006	14.9	*		
	Central County	MP	0.004	9.1	*		
	Central County	LCA	0.028	73.1	0.25		
	Central County	GN	0.001	2.9	*		
N11I23	Central County	LCA	0.044	100.0	*		
N11I24	Central County	LCA	0.015	100.0	*		
N11I25	Central County	GN	0.002	9.1	*		
	Central County	MR	0.019	90.9	0.05		
N11I26	Central County	MR	0.001	21.1	*		
	Central County	LCA	0.002	31.6	*		
	Central County	GN	0.003	47.4	*		
N11I27	Central County	MR	0.002	16.8	*		
	Central County	GN	0.009	83.2	*		
N11I28	Central County	MR	0.010	45.1	1.00*		
	Central County	GN	0.012	54.9	*		
N11I29	Central County	GN	0.006	100.0	*		
N11I30	Central County	MR	0.003	18.7	*		
	Central County	GN	0.014	81.3	*		
N11I31	Central County	CV	0.001	3.6	*		
	Central County	LCA	0.004	26.1	*		
	Central County	GN	0.012	70.3	*		
N11I32	Central County	CV	0.010	24.3	*		
	Central County	LCA	0.029	70.8	*		
	Central County	GN	0.002	4.9	0.25		
N11I33	Central County	GN	0.004	100.0	*		
N22B1	Central County	VF	0.006	29.0	*		
	Central County	MR	0.014	71.0	*		
N22B2	Central County	MR	0.022	94.8	*		
	Central County	VF	0.001	5.2	2.00*		
N22B3	Central County	GN	0.000	2.2	*		
	Central County	MR	0.003	28.1	*		
	Central County	VF	0.006	69.7	*		
N22B4	Central County	GN	0.002	5.5	0.25		
	Central County	MR	0.034	94.5	*		

* Custom Value (not default value)

Soil Data

Area Id	Soil Survey	Map Unit	Area	Area Pct (%)	XKSAT	Rock Outcrop (%)	Effective (%)
N22B5	Central County	GN	0.011	38.3	*		
	Central County	MR	0.018	61.7	*		
N22B6	Central County	GN	0.033	93.7	*		
	Central County	MR	0.002	4.6	*		
	Central County	VF	0.001	1.7	*		
N22B7	Central County	MR	0.000	2.0	*		
	Central County	GN	0.015	98.0	*		
N22B8	Central County	GN	0.018	100.0	*		
N22B9	Central County	GN	0.021	98.6	*		
	Central County	VF	0.000	1.4	*		
N11L1	Central County	CV	0.007	9.9	*		
	Central County	PWB	0.012	16.6	*		
	Central County	GN	0.054	73.5	*		
N11L2	Central County	GN	0.010	100.0	*		
N11L3	Central County	PWB	0.004	5.5	*		
	Central County	GN	0.060	94.5	*		
N21I1	Central County	PWB	0.009	8.0	*		
	Central County	GN	0.102	92.0	*		
N21I2	Central County	PWB	0.004	6.4	*		
	Central County	GN	0.053	93.6	0.25		
N11P1	Central County	RS	0.006	5.4	*	65.0	100
	Central County	PWB	0.111	94.6	0.38		
N11P2	Central County	GWD	0.007	2.6	*		
	Central County	RS	0.099	37.3	*	65.0	100
	Central County	PWB	0.159	60.1	0.38		
N11L4	Central County	PWB	0.010	100.0	*		
N11L5	Central County	PWB	0.016	22.0	*		
	Central County	GN	0.058	78.0	*		

* Custom Value (not default value)

Land Use Data

Area Id	Land Use Code	Area	Area Pct (%)	DTHETA Condition	Vegetation Cover (%)	RTIMP (%)	IA (in)	Kn	Kb Type	Kb
N11I1	Desert	0.005	13.0	*	25.0		0.35	0.030	Low	0.073
	LDR	0.033	87.0	*	50.0	15	0.30	0.050	Low	0.062
N11I2	LDR	0.026	100.0	*	50.0	15	0.30	0.050	Low	0.063
N11I3	Desert	0.001	5.5	Dry	25.0		0.35	0.030	Low	0.083
	LDR	0.017	94.5	*	50.0	15	0.30	0.050	Low	0.066
N11I4	Desert	0.003	12.4	*	25.0		0.35	0.030	Low	0.076
	LDR	0.021	87.6	Normal	50.0	15	0.30	0.050	Low	0.065
N11I5	Desert	0.005	33.8	*	25.0		0.35	0.030	Low	0.073
	LDR	0.010	66.2	*	50.0	15	0.30	0.050	Low	0.069
N11I6	Desert	0.001	1.8	*	25.0		0.35	0.030	Low	0.086
	LDR	0.033	98.2	*	50.0	15	0.30	0.050	Low	0.062
N11I7	LDR	0.021	100.0	*	50.0	15	0.30	0.050	Low	0.065
N11I8	VACANT	0.002	10.9	*	15.0	5	0.10	0.030	Min	0.040
	LDR	0.012	89.1	*	50.0	15	0.30	0.050	Low	0.068
N11I9	VACANT	0.002	20.2	*	15.0	5	0.10	0.030	Min	0.039
	LDR	0.010	79.8	*	50.0	15	0.30	0.050	Low	0.069
N11I10	Desert	0.001	4.8	Dry	25.0		0.35	0.030	Low	0.083
	LDR	0.020	95.2	*	50.0	15	0.30	0.050	Low	0.065
N11I11	MDR	0.018	100.0	*	50.0	30	0.25	0.050	Low	0.066
N11I12	VACANT	0.001	5.0	*	15.0	5	0.10	0.030	Min	0.041
	MDR	0.021	88.7	*	50.0	30	0.25	0.050	Low	0.064
	LDR	0.002	6.3	*	50.0	15	0.30	0.050	Low	0.080
N11I13	Desert	0.012	44.2	*	25.0		0.35	0.030	Low	0.068
	LDR	0.015	55.8	*	50.0	15	0.30	0.050	Low	0.066
N11I14	Desert	0.005	15.8	*	25.0		0.35	0.030	Low	0.074
	LDR	0.025	84.2	*	50.0	15	0.30	0.050	Low	0.064
N22A1	VACANT	0.002	9.5	*	15.0	5	0.10	0.030	Min	0.039
	LDR	0.018	90.5	*	50.0	15	0.30	0.050	Low	0.065
N22A2	Desert	0.005	58.9	*	25.0		0.35	0.030	Low	0.073

* Custom Value (not default value)

Land Use Data

Area Id	Land Use Code	Area	Area Pct (%)	DTHETA Condition	Vegetation Cover (%)	RTIMP (%)	IA (in)	Kn	Kb Type	Kb
	LDR	0.004	41.1	*	50.0	15	0.30	0.050	Low	0.075
N22A3	Desert	0.032	100.0	*	25.0		0.35	0.030	Low	0.062
N22A4	VACANT	0.008	33.5	*	15.0	5	0.10	0.030	Min	0.036
	Com-2	0.015	66.5	*	75.0	80	0.10	0.020	Min	0.034
N22A5	MDR	0.016	100.0	*	50.0	30	0.25	0.050	Low	0.066
N22A6	VACANT	0.001	3.4	*	15.0	5	0.10	0.030	Min	0.042
	MDR	0.020	96.6	*	50.0	30	0.25	0.050	Low	0.065
N22A7	MDR	0.010	100.0	*	50.0	30	0.25	0.050	Low	0.069
N22A8	VACANT	0.001	5.2	*	15.0	5	0.10	0.030	Min	0.041
	ORC	0.001	5.7	*	85.0		0.50	0.100	Hi	0.152
	MDR	0.021	89.1	*	50.0	30	0.25	0.050	Low	0.065
N11I20	Desert	0.005	43.7	*	25.0		0.35	0.030	Low	0.074
	LDR	0.006	56.3	*	50.0	15	0.30	0.050	Low	0.072
N11I21	Desert	0.001	4.5	*	25.0		0.35	0.030	Low	0.083
	LDR	0.019	95.5	*	50.0	15	0.30	0.050	Low	0.065
N11I22	Desert	0.009	24.0	*	25.0		0.35	0.030	Low	0.069
	LDR	0.029	76.0	*	50.0	15	0.30	0.050	Low	0.063
N11I23	VACANT	0.003	6.4	*	15.0	5	0.10	0.030	Min	0.038
	Desert	0.002	3.7	*	25.0		0.35	0.030	Low	0.080
	MDR	0.039	89.9	*	50.0	30	0.25	0.050	Low	0.061
N11I24	VACANT	0.001	5.4	*	15.0	5	0.10	0.030	Min	0.042
	MDR	0.014	94.6	Normal	50.0	30	0.25	0.050	Low	0.067
N11I25	VACANT	0.003	16.3	*	15.0	5	0.10	0.030	Min	0.038
	LDR	0.018	83.7	*	50.0	15	0.30	0.050	Low	0.066
N11I26	VACANT	0.002	33.3	*	15.0	5	0.10	0.030	Min	0.040
	LDR	0.004	66.7	*	50.0	15	0.30	0.050	Low	0.075
N11I27	VACANT	0.002	15.0	*	15.0	5	0.10	0.030	Min	0.040
	LDR	0.010	85.0	*	50.0	15	0.30	0.050	Low	0.069
N11I28	VACANT	0.004	15.6	*	15.0	5	0.10	0.030	Min	0.038

* Custom Value (not default value)

Land Use Data

Area Id	Land Use Code	Area	Area Pct (%)	DTHETA Condition	Vegetation Cover (%)	RTIMP (%)	IA (in)	Kn	Kb Type	Kb
	LDR	0.019	84.4	*	50.0	15	0.30	0.050	Low	0.065
N11I29	VLDR	0.006	100.0	*	30.0	5	0.30	0.050	Low	0.072
N11I30	VLDR	0.004	21.7	*	30.0	5	0.30	0.050	Low	0.075
	VACANT	0.013	78.3	Dry	15.0	5	0.10	0.030	Min	0.034
N11I31	VACANT	0.005	31.1	*	15.0	5	0.10	0.030	Min	0.037
	LDR	0.011	68.9	*	50.0	15	0.30	0.050	Low	0.068
N11I32	VLDR	0.041	100.0	*	30.0	5	0.30	0.050	Low	0.061
N11I33	LDR	0.004	100.0	*	50.0	15	0.30	0.050	Low	0.075
N22B1	Desert	0.002	7.8	*	25.0		0.35	0.030	Low	0.080
	LDR	0.018	92.2	*	50.0	15	0.30	0.050	Low	0.065
N22B2	Desert	0.005	20.6	*	25.0		0.35	0.030	Low	0.073
	LDR	0.019	79.4	*	50.0	15	0.30	0.050	Low	0.065
N22B3	Desert	0.003	31.5	*	25.0		0.35	0.030	Low	0.077
	LDR	0.006	68.5	*	50.0	15	0.30	0.050	Low	0.072
N22B4	Desert	0.011	31.0	*	25.0		0.35	0.030	Low	0.068
	LDR	0.025	69.0	*	50.0	15	0.30	0.050	Low	0.063
N22B5	Desert	0.005	15.9	*	25.0		0.35	0.030	Low	0.073
	VLDR	0.025	84.1	*	30.0	5	0.30	0.050	Low	0.063
N22B6	VLDR	0.035	100.0	*	30.0	5	0.30	0.050	Low	0.061
N22B7	VLDR	0.015	100.0	*	30.0	5	0.30	0.050	Low	0.067
N22B8	Desert	0.007	37.2	*	25.0		0.35	0.030	Low	0.071
	VLDR	0.011	62.8	*	30.0	5	0.30	0.050	Low	0.068
N22B9	Desert	0.017	78.1	*	25.0		0.35	0.030	Low	0.066
	VLDR	0.005	21.9	*	30.0	5	0.30	0.050	Low	0.073
N11L1	Desert	0.009	11.7	Dry	25.0		0.35	0.030	Low	0.070
	VLDR	0.011	14.3	*	30.0	5	0.30	0.050	Low	0.069
	LDR	0.055	74.0	*	50.0	15	0.30	0.050	Low	0.059
N11L2	LDR	0.010	100.0	*	50.0	15	0.30	0.050	Low	0.069

* Custom Value (not default value)

Land Use Data

Area Id	Land Use Code	Area	Area Pct (%)	DTHETA Condition	Vegetation Cover (%)	RTIMP (%)	IA (in)	Kn	Kb Type	Kb
N11L3	Desert	0.005	7.6	*	25.0		0.35	0.030	Low	0.073
	LDR	0.059	92.4	Normal	50.0	15	0.30	0.050	Low	0.058
N21I1	Desert	0.051	45.7	*	25.0		0.35	0.030	Low	0.059
	VLDR	0.060	54.3	Normal	30.0	5	0.30	0.050	Low	0.058
N21I2	Desert	0.022	38.2	*	25.0		0.35	0.030	Low	0.064
	VLDR	0.035	61.8	Normal	30.0	5	0.30	0.050	Low	0.061
N11P1	VLDR	0.020	17.1	*	30.0	5	0.30	0.050	Low	0.065
	Desert	0.097	82.9	*	25.0		0.35	0.030	Low	0.055
N11P2	Desert	0.265	100.0	*	25.0		0.35	0.030	Low	0.049
N11L4	Desert	0.004	4.9	*	25.0		0.35	0.030	Low	0.075
	LDR	0.070	95.1	*	50.0	15	0.30	0.050	Low	0.057
N11L5	Desert	0.051	45.7	*	25.0		0.35	0.030	Low	0.059
	VLDR	0.060	54.3	Normal	30.0	5	0.30	0.050	Low	0.058

* Custom Value (not default value)

C.3. Hydrograph Routing Data

GLENDALE/PEORIA ADMP UPDATE
DETAILED STUDY AREA
Routing Data

Route ID	Length (ft)	Upstream Elevation (ft)	Upstream Conc. Pt	Downstream Elevation (ft)	Downstream Conc. Pt	Slope (ft/ft)	Cross Section Type (1)
R11I10	1180	1285	C11I10	1280	CN11I8	0.0042	SHALLOW CONCENTRATED FLOW
R11I11	598	1288	C11I11	1286	C11I12	0.0033	MEASURED
R11I14	1275	1286	C11I14	1279	CN11I4	0.0055	SUBDIVISION ROAD
R11I20	699	1294	C11I20	1290	C11I11	0.0057	SUBDIVISION ROAD
R11I22	1750	1294	C11I22	1284	CN11I6	0.0057	SUBDIVISION ROAD
R11I23	1405	1296	C11I23	1286	C11I14	0.0071	SUBDIVISION ROAD
R11I24	1365	1297	C11I24	1289	CN11I3	0.0059	SUBDIVISION ROAD
R11I25	689	1298	C11I25	1294	C11I20	0.0058	SHALLOW CONCENTRATED FLOW
R11I26	1382	1303	C11I26	1294	C11I22	0.0065	SHALLOW CONCENTRATED FLOW
R11I29	1350	1307	C11I29	1298	C11I25	0.0067	SHALLOW CONCENTRATED FLOW
R11I30	860	1303	C11I30	1298.5	C11I25	0.0052	SUBDIVISION ROAD
R11I31	1307	1304	C11I32	1296	C11I31	0.0061	SUBDIVISION ROAD
R11I32	1759	1304	C11I32	1296	C11I23	0.0045	SUBDIVISION ROAD
R11PE	3010	1342	CN11P2	1312	CN21I2	0.0100	SHALLOW CONCENTRATED FLOW
R22AX1	464	1280	C22AX1	1277.6	C22AX2	0.0052	CHANNEL ON SOUTH SIDE
R22AX2	283	1277.6	C22AX2	1276.9	C22AX3	0.0025	CHANNEL ON SOUTH SIDE
R22AX3	512	1280	C22AX3	1278	C22AX4	0.0039	CHANNEL ON SOUTH SIDE
RI12E	1505	1286	C11I12	1280	C11I13	0.0040	SHALLOW CONCENTRATED FLOW
RI12S	1347	1286	C11I12	1279	CN11I9	0.0052	SUBDIVISION ROAD
RI33E	1497	1310	C11I33	1303	C11I30	0.0047	SUBDIVISION ROAD
RI33S	1156	1310	C11I33	1303	C11I26	0.0061	SUBDIVISION ROAD
RN11I3	1310	1289	CN11I3	1280	CN11I2	0.0069	SUBDIVISION ROAD
RN11I6	990	1284	CN11I6	1279	CN11I7	0.0051	SUBDIVISION ROAD
RN11L2	442	1313	CN11L2	1310	C11I33	0.0068	SUBDIVISION ROAD
RN11L3	1145	1313	CN11L3	1304	C11I30	0.0079	SUBDIVISION ROAD
RN11L4	737	1312	CN11L4	1306	CN22B7	0.0081	SHALLOW CONCENTRATED FLOW
RN11L5	1300	1313	CN11L5	1305	C11I31	0.0062	SUBDIVISION ROAD
RN11LE	879	1313	CN11L1	1312	CN11L5	0.0011	MEASURED
RN11P1	2675	1340	CN11P1	1313	CN11L5	0.0101	RURAL ROAD
RN11PS	3032	1342	CN11P2	1312	CN21I1	0.0099	SHALLOW CONCENTRATED FLOW
RN21I1	754	1312	CN21I1	1306	CN22B8	0.0080	SHALLOW CONCENTRATED FLOW
RN21I2	866	1312	CN21I2	1307	CN22B9	0.0058	SHALLOW CONCENTRATED FLOW
RN22A5	1348	1286	CN22A5	1280	C22AX1	0.0045	RURAL ROAD
RN22A8	388	1290	CN22A8	1288	CN22A6	0.0052	SUBDIVISION ROAD
RN22B1	373	1295	CN22B1	1293	C11I20	0.0054	WALL ON WEST SIDE
RN22B2	737	1294	CN22B2	1290	CN22A8	0.0054	SUBDIVISION ROAD
RN22B3	853	1295	CN22B3	1294	CN22B2	0.0012	WALL ON WEST SIDE
RN22B4	953	1298	CN22B4	1294	CN22B1	0.0042	SHALLOW CONCENTRATED FLOW
RN22B5	684	1298	CN22B5	1294	CN22B2	0.0058	SUBDIVISION ROAD
RN22B6	834	1299	CN22B6	1295	CN22B3	0.0048	SHALLOW CONCENTRATED FLOW
RN22B7	1415	1306	CN22B7	1298	CN22B4	0.0057	SHALLOW CONCENTRATED FLOW
RN22B8	1332	1306	CN22B8	1298	CN22B5	0.0060	SUBDIVISION ROAD
RN22B9	1387	1307	CN22B9	1299	CN22B6	0.0058	SHALLOW CONCENTRATED FLOW

Note: (1) The sketches for the cross section types are attached, the measured cross section type refers to cross sections that were measured from the field or topography.

Entellus™

SHEET 1 OF 3

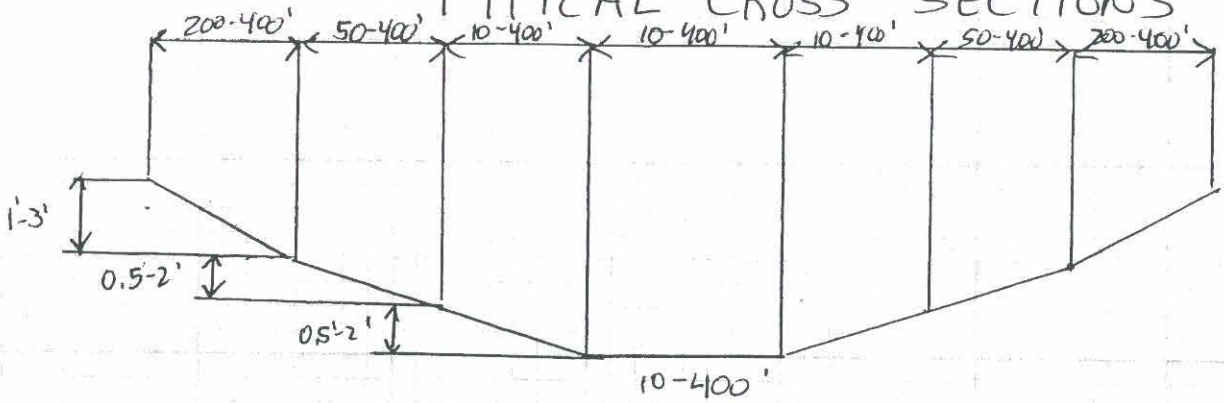
BY _____ DATE _____

CHECK _____ DATE _____

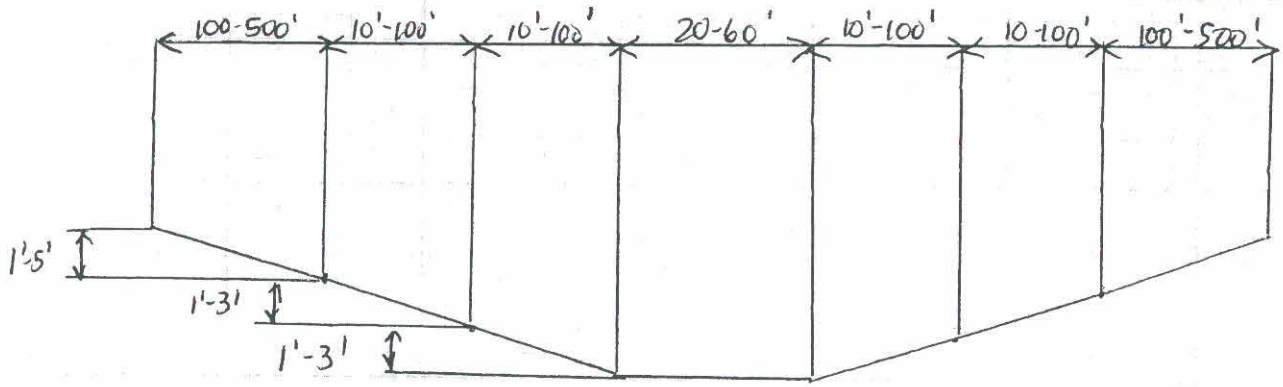
CLIENT FCDMC

JOB NAME G/P ADMP UPDATE- DETAILED STUDY JOB NO. FCD 99-44

TYPICAL CROSS SECTIONS



SHALLOW CONCENTRATED FLOW



RURAL ROAD

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SHEET 2 OF 3

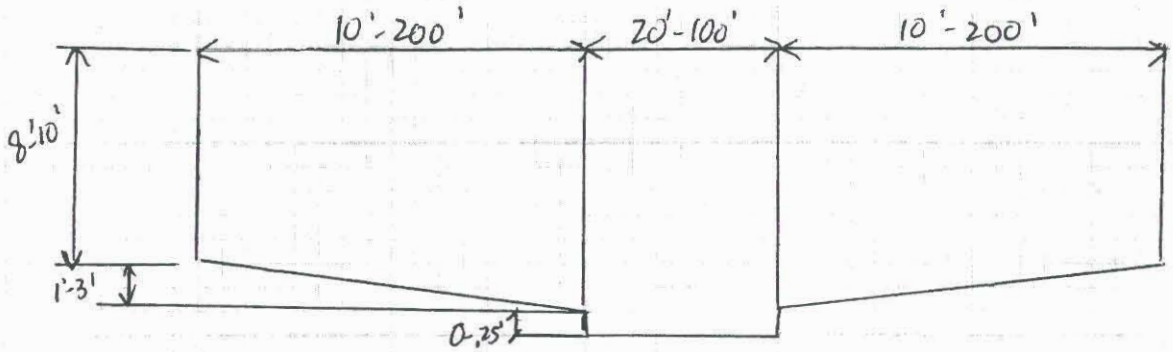
BY _____ DATE _____

CHECK _____ DATE _____

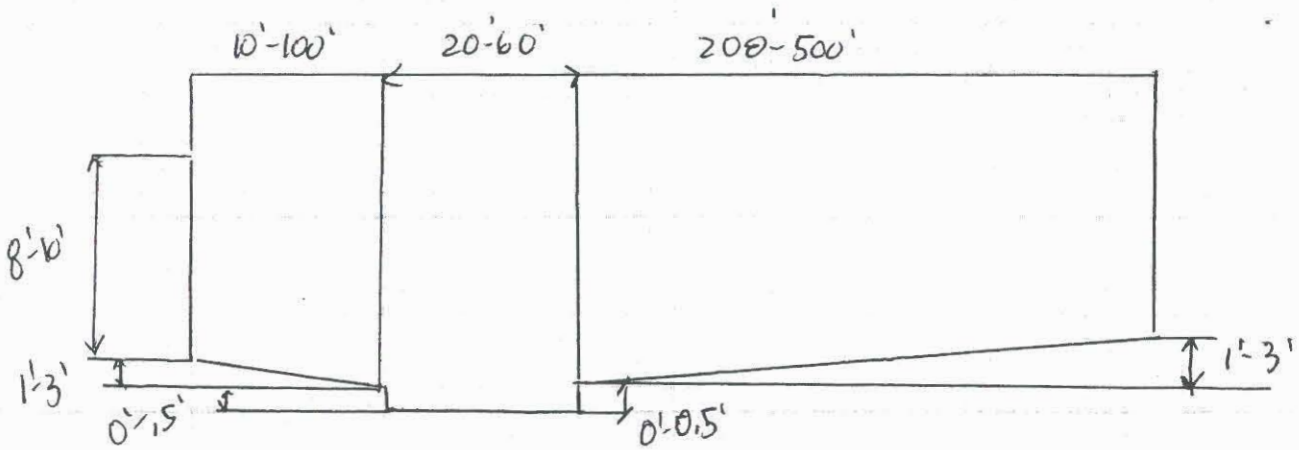
CLIENT FCDMC

JOB NAME G/P ADMP UPDATE - DETAILED STUDY JOB NO. FCD-99-44

TYPICAL CROSS SECTIONS



SUBDIVISION ROAD



WALL ON WEST SIDE

Entellus™

SHEET 3 OF 3

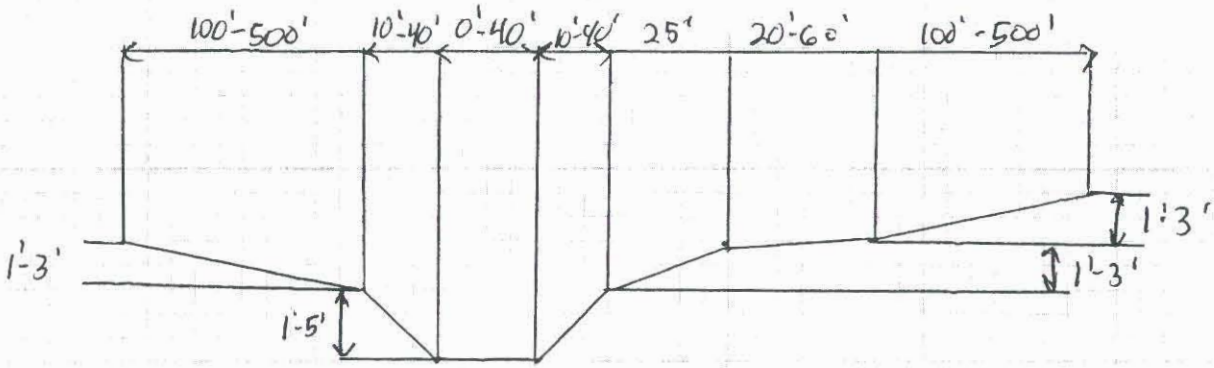
BY _____ DATE _____

CHECK _____ DATE _____

CLIENT FCDMC

JOB NAME 6/P ADMP UPDATE - DETAILED STUDY JOB NO. _____

TYPICAL CROSS SECTIONS



CHANNEL ON SOUTH SIDE

C.4. Storage Routing Data

There is no storage routings in the Detailed Study Area.

C.5. Flow Splits and Diversions Data

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SHEET 1 OF 4

BY _____ DATE _____

CHECK _____ DATE _____

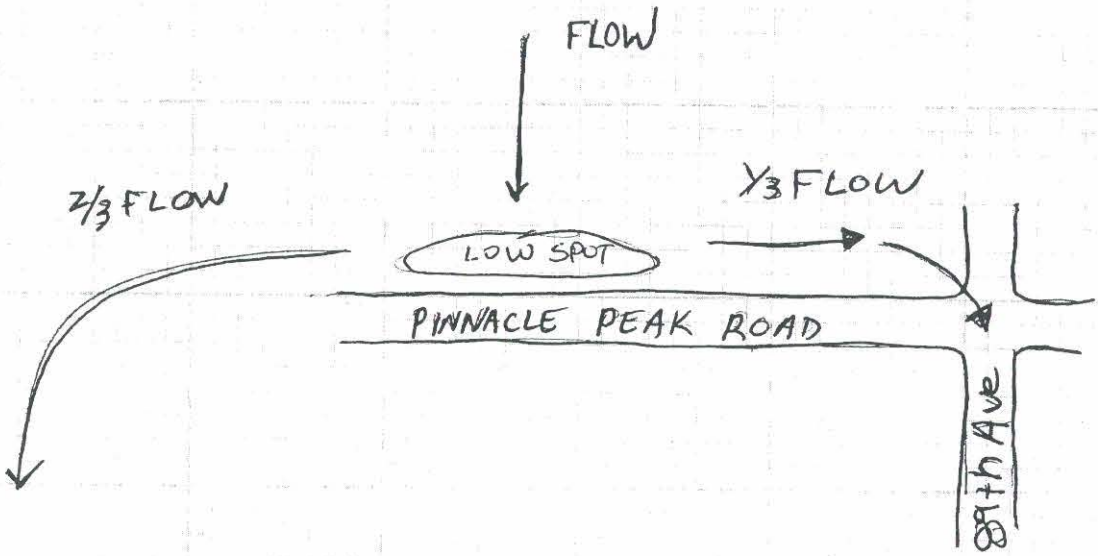
CLIENT FCDMC

JOB NAME G/P ADMP UPDATE - DETAILED STUDY

JOB NO. FCD 99-44

DIVERSIONS

DIVERSION DN11L1



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SHEET 2 OF 4

BY _____ DATE _____

CHECK _____ DATE _____

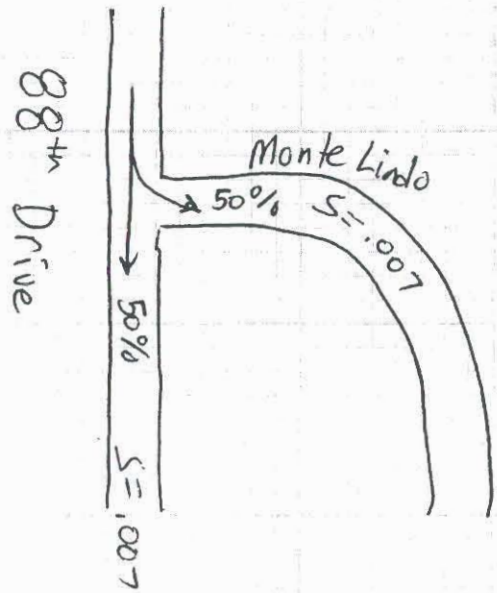
CLIENT FCDMC

JOB NAME S/P ADMP UPDATE - DETAILED STUDY

JOB NO. FCD 99-44

DIVERSIONS

DIVERSION D11I33



Split is 50% South, 50% East

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BY _____ DATE _____

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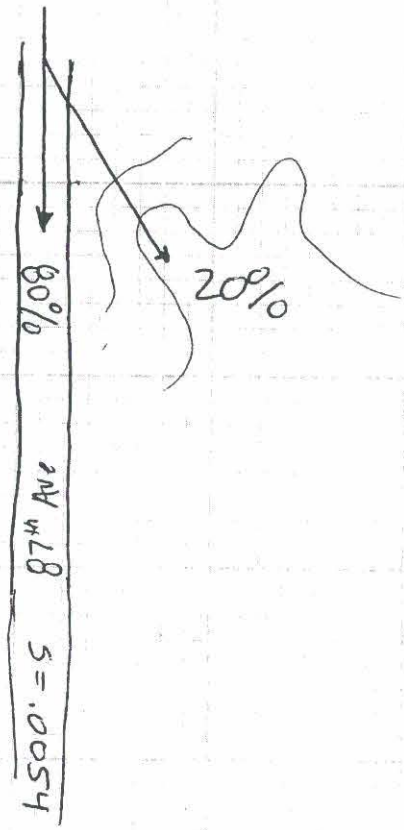
CLIENT FCDMC

JOB NAME S/P ADMP UPDATE - DETAILED STUDY JOB NO. FCD 99-44

DIVERSION D11F12



20% Spills over ROAD AND INTO EMPTY LOT.

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BY _____ DATE _____

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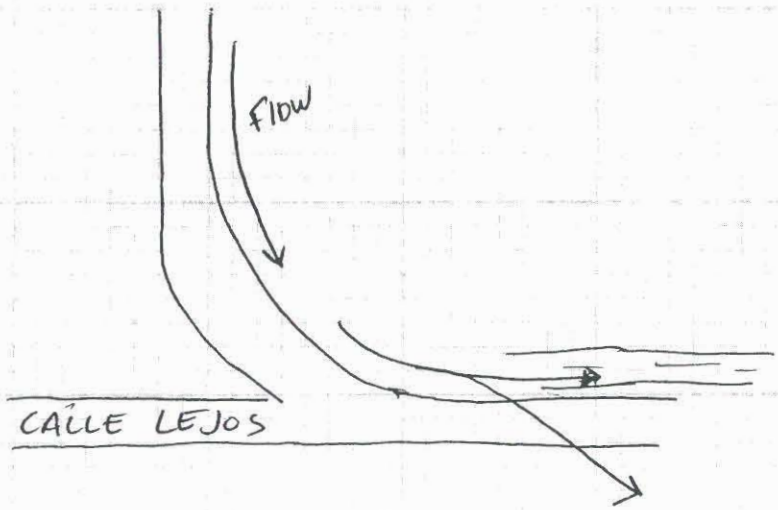
CLIENT FCDMC

JOB NAME S/P ADMP UPDATE - DETAILED STUDY JOB NO. FCD 99-44

DIVERSIONS

DIVERSION DN11P2



Channel max. capacity is 80cfs. Excess spills southeasterly

C.6 Summary Output Table

TABLE DS-1
SUMMARY OF HEC-1 PEAK FLOWS

Route ID	100yr-6hr Flow (cfs)	100yr-6hr (w/ Level 3) Flow (cfs)	100yr-6hr (w/ Alt 4) Flow (cfs)	100yr-6hr (w/ Level 3 and Alt 4) Flow (cfs)	Future 100yr-6hr Flow (cfs)	Future 100yr-6hr (w/ Level 3) Flow (cfs)	Total Area (sq mi)
N11P1	243	243	248	248	255	255	0.12
RN11P1	222	222	229	229	233	233	0.12
SRN11P	* (2)	* (2)	229	229	* (2)	* (2)	0.12
N11L5	52	52	52	52	56	56	0.07
N11L1	63	63	65	65	65	65	0.07
N11L1I	40	40	41	41	41	41	0.07
DN11L1	24	24	24	24	24	24	0.07
RN11LE	24	24	24	24	25	25	0.07
CN11L5	297	297	303	303	313	313	0.26
N11L5I	0	297	0	303	0	313	0.26
DN11L5	297	0	303	0	313	0	0.26
RN11L5	291	0	295	0	306	0	0.26
N11I31	16	16	16	16	14	14	0.02
C11I31	305	16	309	16	319	14	0.28
R11I31	303	15	302	15	316	13	0.28
N11I32	49	49	50	50	49	49	0.04
R11I32	46	46	46	46	46	46	0.04
N11I23	50	50	50	50	48	48	0.04
C11I23	386	107	386	107	399	104	0.37
WILL1	* (2)	* (2)	54	25	* (2)	* (2)	0.37
WILL1	* (2)	* (2)	332	82	* (2)	* (2)	0.37
R11I23	377	102	279	70	389	99	0.37
N11I14	20	20	34	34	33	33	0.03
C11I14	396	118	296	91	411	127	0.39
R11I14	385	115	269	85	405	126	0.39
N11I4	14	14	25	25	25	25	0.02
CN11I4	398	128	276	95	420	141	0.42
N11I24	10	10	15	15	15	15	0.01
WILL1	* (2)	* (2)	54	25	* (2)	* (2)	0.37
RWILL1	* (2)	* (2)	52	24	* (2)	* (2)	0.37
CWILL1	* (2)	* (2)	62	36	* (2)	* (2)	0.01
R11I24	10	10	61	35	14	14	0.01
N11I3	19	19	19	19	19	19	0.02
CN11I3	23	23	66	43	29	29	0.03
RN11I3	23	23	65	42	28	28	0.03
N11I2	16	16	28	28	28	28	0.03
CN11I2	38	38	70	51	48	48	0.06
N11L2	9	9	14	14	14	14	0.01
N11L2I	0	9	0	14	0	14	0.01
DN11L2	9	0	14	0	14	0	0.01
RN11L2	9	0	14	0	13	0	0.01
N11I33	5	5	5	5	5	5	0
C11I33	13	5	19	5	18	5	0.01
11I33I	6	3	10	3	9	3	0.01

Notes: (1) Retention based on future development.
(2) Alternative Four Improvements

TABLE DS-1
SUMMARY OF HEC-1 PEAK FLOWS

Route ID	100yr-6hr Flow (cfs)	100yr-6hr (w/ Level 3) Flow (cfs)	100yr-6hr (w/ Alt 4) Flow (cfs)	100yr-6hr (w/ Level 3 and Alt 4) Flow (cfs)	Future 100yr-6hr Flow (cfs)	Future 100yr-6hr (w/ Level 3) Flow (cfs)	Total Area (sq mi)
D11I33	6	3	10	3	9	3	0.01
RI33S	6	2	9	3	9	2	0.01
N11I27	13	13	14	14	2	2	0.01
N11I26	5	5	5	5	4	4	0
C11I26	22	20	26	20	14	7	0.03
R11I26	22	20	25	19	14	7	0.03
N11I22	48	48	70	70	70	70	0.04
C11I22	65	63	75	73	71	71	0.07
S11I22	* (2)	* (2)	72	69	* (2)	* (2)	0.07
R11I22	63	60	68	65	71	70	0.07
N11I6	31	31	31	31	31	31	0.03
C11I16	85	82	90	89	100	99	0.1
RN11I6	83	81	88	86	97	96	0.1
N11I7	12	12	21	21	21	21	0.02
CN11I7	95	93	99	97	116	115	0.12
N11L3	74	74	76	76	75	75	0.06
N11L3I	0	74	0	76	0	75	0.06
DN11L3	74	0	76	0	75	0	0.06
RN11L3	69	0	71	0	70	0	0.06
N11I30	18	18	27	27	20	20	0.02
N11I28	25	25	25	25	23	23	0.02
D11I33	6	3	10	3	9	3	0.01
RI33E	6	3	9	3	9	3	0.01
C11I30	117	45	124	52	120	46	0.1
R11I30	117	45	122	51	121	46	0.1
N11I29	6	6	9	9	9	9	0.01
R11I29	5	5	8	8	8	8	0.01
N11I25	49	49	51	51	47	47	0.02
C11I25	151	87	163	98	159	90	0.13
R11I25	148	83	159	94	155	86	0.13
N11L4	8	8	13	13	13	13	0.01
N11L4I	0	8	0	13	0	13	0.01
DN11L4	8	0	13	0	13	0	0.01
RN11L4	8	0	13	0	13	0	0.01
N22B7	14	14	24	24	23	23	0.01
CN22B7	18	14	30	24	29	23	0.02
RN22B7	18	15	29	22	29	21	0.02
N22B4	51	51	53	53	52	52	0.04
CN22B4	52	52	64	61	64	60	0.06
RN22B4	51	51	62	58	63	59	0.06
N22B1	20	20	33	33	31	31	0.02
CN22B1	70	70	74	72	76	74	0.08
RN22B1	70	70	73	71	76	74	0.08
N11I20	13	13	19	19	18	18	0.01

Notes: (1) Retention based on future development.
(2) Alternative Four Improvements

TABLE DS-1

SUMMARY OF HEC-1 PEAK FLOWS

Route ID	100yr-6hr Flow (cfs)	100yr-6hr (w/ Level 3) Flow (cfs)	100yr-6hr (w/ Alt 4) Flow (cfs)	100yr-6hr (w/ Level 3 and Alt 4) Flow (cfs)	Future 100yr-6hr Flow (cfs)	Future 100yr-6hr (w/ Level 3) Flow (cfs)	Total Area (sq mi)
N11I21	22	22	22	22	22	22	0.02
C11I20	245	182	256	193	253	187	0.24
S11I20	* (2)	* (2)	256	193	* (2)	* (2)	0.24
R11I20	241	178	245	182	253	187	0.24
N11I11	20	20	20	20	20	20	0.02
C11I11	258	197	261	199	269	205	0.26
R11I11	257	192	260	199	268	200	0.26
N11I12	35	35	36	36	35	35	0.02
C11I12	284	220	285	227	295	232	0.28
11I12I	64	49	* (2)	* (2)	67	52	0.28
D11I12	220	171	* (2)	* (2)	228	180	0.28
RI12S	219	172	276	219	227	179	0.28
N11I9	12	12	12	12	11	11	0.01
CN11I9	228	180	282	226	235	188	0.29
N11I10	11	11	19	19	20	20	0.02
R11I10	11	11	19	19	19	19	0.02
N11I8	10	10	17	17	15	15	0.01
CN11I8	19	19	29	29	30	30	0.04
DUMMY	613	358	560	392	663	403	0.93
SDUMMY	* (2)	* (2)	560	392	* (2)	* (2)	0.93
N11P2	306	306	485	485	490	490	0.26
LN11PD	* (1)	* (1)	* (1)	* (1)	306	306	0.26
LN11P2	* (1)	* (1)	* (1)	* (1)	490	490	0.26
N11P2I	190	190	277	277	279	279	0.26
DN11P2	116	116	208	208	211	211	0.26
RN11PS	113	113	193	193	214	214	0.26
N21I1	120	120	121	121	124	124	0.11
CN21I1	183	183	303	303	305	305	0.38
N21I1I	0	183	0	303	0	305	0.38
DN21I1	183	0	303	0	305	0	0.38
RN21I1	175	0	295	0	276	0	0.38
N22B8	16	16	29	29	29	29	0.02
CN22B8	185	16	306	29	284	29	0.39
RN22B8	177	15	292	23	272	23	0.39
N22B5	38	38	39	39	38	38	0.03
CN22B5	185	44	309	57	287	57	0.42
RN22B5	184	43	307	56	285	58	0.42
N22B2	37	37	39	39	38	38	0.02
DN11P	190	190	277	277	279	279	0.26
R11PE	181	181	244	244	249	249	0.26
N21I2	74	74	75	75	76	76	0.06
CN21I2	217	217	298	298	293	293	0.32
N21I2I	0	217	0	298	0	293	0.32
DN21I2	217	0	298	0	293	0	0.32

Notes: (1) Retention based on future development.
(2) Alternative Four Improvements

TABLE DS-1

SUMMARY OF HEC-1 PEAK FLOWS

Route ID	100yr-6hr Flow (cfs)	100yr-6hr (w/ Level 3) Flow (cfs)	100yr-6hr (w/ Alt 4) Flow (cfs)	100yr-6hr (w/ Level 3 and Alt 4) Flow (cfs)	Future 100yr-6hr Flow (cfs)	Future 100yr-6hr (w/ Level 3) Flow (cfs)	Total Area (sq mi)
RN21I2	213	0	288	0	282	0	0.32
N22B9	25	25	41	41	40	40	0.02
CN22B9	218	24	290	40	283	39	0.34
RN22B9	214	22	277	35	267	36	0.34
N22B6	20	20	38	38	38	38	0.04
CN22B6	227	42	288	71	274	70	0.38
RN22B6	224	42	280	66	262	68	0.38
N22B3	7	7	12	12	12	12	0.01
CN22B3	226	47	281	73	263	74	0.39
RN22B3	224	45	253	60	261	73	0.39
CN22B2	302	73	364	93	392	118	0.57
S22B2	* (2)	* (2)	363	93	* (2)	* (2)	0.57
RN22B2	302	73	335	92	391	116	0.57
N22A8	28	28	28	28	28	28	0.02
CN22A8	307	98	343	109	398	131	0.59
RN22A8	306	95	341	108	394	131	0.59
N22A6	24	24	24	24	24	24	0.02
N22A5	11	11	16	16	16	16	0.02
CN22A5	316	122	356	139	408	160	0.63
S22A6	* (2)	* (2)	355	140	* (2)	* (2)	0.63
RN22A5	310	115	349	138	391	154	0.63
N22A2	1	1	1	1	6	6	0.01
LN22D2	* (1)	* (1)	* (1)	* (1)	6	6	0.01
LN22A2	* (1)	* (1)	* (1)	* (1)	0	0	0.01
N22A3	36	36	55	55	61	61	0.03
LN22AD	* (1)	* (1)	* (1)	* (1)	61	61	0.03
LN22A3	* (1)	* (1)	* (1)	* (1)	46	46	0.03
C22AX1	314	139	351	161	391	169	0.67
R22AX1	314	138	349	160	380	169	0.67
N22A1	43	43	44	44	42	42	0.02
C22AX2	315	152	355	183	384	184	0.69
R22AX2	314	153	353	182	389	185	0.69
N11I12	64	49	* (2)	* (2)	67	52	0.28
RI12E	61	48	* (2)	* (2)	64	50	0.28
N11I13	28	28	28	28	30	30	0.03
C22AX3	342	205	354	197	441	239	0.72
S22AX3	* (2)	* (2)	356	197	* (2)	* (2)	0.72
R22AX3	341	202	345	195	433	238	0.72
N22A4	44	44	45	45	42	42	0.02
N11I1	13	13	24	24	25	25	0.04
N11I5	8	8	8	8	8	8	0.01
N22A7	22	22	25	25	24	24	0.01
SN22A7	* (2)	* (2)	26	26	* (2)	* (2)	0.01
DUMMY3	76	76	94	94	91	91	0.09

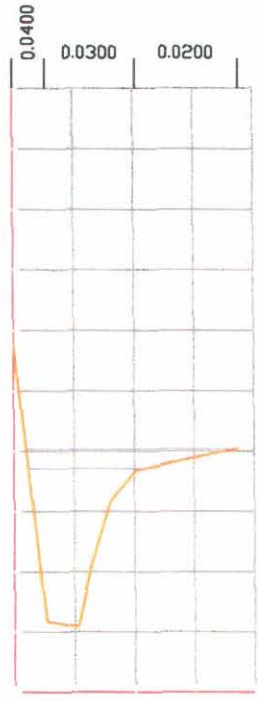
Notes: (1) Retention based on future development.
(2) Alternative Four Improvements

D.1. Figure DS-7 Existing Cross Sections and Hydraulic Calculations

D.1.1 Deer Valley Road Existing Cross Sections

Normal Depth Results

Cross-Section:	1	
Elevation:	1278.72	ft MSL
Depth:	2.63	ft
Discharge:	240.00	cfs
Energy Gradient:	0.0033	ft/ft
Froude Number:	0.3903	
Flow Regime:	Subcritical	
Flow Area:	66.83	sq ft
Average Velocity:	3.59	ft/s
Maximum Velocity:	3.79	ft/s
Composite n:	0.031	
Hydraulic Radius:	1.37	ft
Wetted Perimeter:	48.92	ft
Wetted Top Width:	48.32	ft
Critical Slope:	0.0242	ft/ft



Metajob 1, Section1

Normal Depth Results

Cross-Section:	1	
Elevation:	1279.04	ft MSL
Depth:	2.95	ft
Discharge:	340.00	cfs
Energy Gradient:	0.0033	ft/ft
Froude Number:	0.3928	
Flow Regime:	Subcritical	
Flow Area:	88.76	sq ft
Average Velocity:	3.83	ft/s
Maximum Velocity:	4.30	ft/s
Composite n:	0.0267	
Hydraulic Radius:	1.01	ft
Wetted Perimeter:	87.59	ft
Wetted Top Width:	86.93	ft
Critical Slope:	0.03	ft/ft

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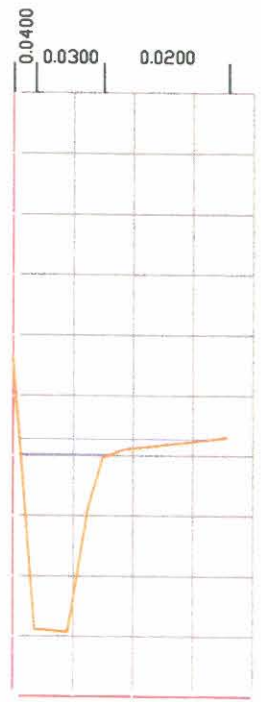
Normal Depth Results

Cross-Section:	2	
Elevation:	1279.03	ft MSL
Depth:	2.95	ft
Discharge:	300.00	cfs
Energy Gradient:	0.0033	ft/ft
Froude Number:	0.4519	
Flow Regime:	Subcritical	
Flow Area:	68.19	sq ft
Average Velocity:	4.38	ft/s
Maximum Velocity:	4.64	ft/s
Composite n:	0.031	
Hydraulic Radius:	1.78	ft
Wetted Perimeter:	38.30	ft
Wetted Top Width:	37.31	ft
Critical Slope:	0.0191	ft/ft



Metajob 1, Section 2

Normal Depth Results

Cross-Section:	2	
Elevation:	1279.28	ft MSL
Depth:	3.20	ft
Discharge:	370.00	cfs
Energy Gradient:	0.0033	ft/ft
Froude Number:	0.4433	
Flow Regime:	Subcritical	
Flow Area:	82.21	sq ft
Average Velocity:	4.48	ft/s
Maximum Velocity:	5.02	ft/s
Composite n:	0.0257	
Hydraulic Radius:	1.02	ft
Wetted Perimeter:	80.51	ft
Wetted Top Width:	79.46	ft
Critical Slope:	0.0298	ft/ft

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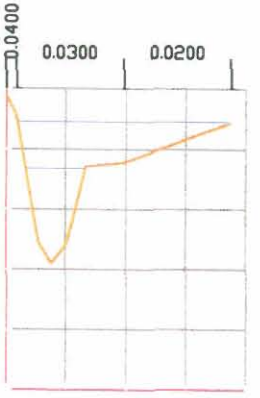
Normal Depth Results

Cross-Section:	3	
Elevation:	1278.68	ft MSL
Depth:	1.57	ft
Discharge:	70.00	cfs
Energy Gradient:	0.0033	ft/ft
Froude Number:	0.4006	
Flow Regime:	Subcritical	
Flow Area:	24.60	sq ft
Average Velocity:	2.82	ft/s
Maximum Velocity:	2.82	ft/s
Composite n:	0.03	
Hydraulic Radius:	0.98	ft
Wetted Perimeter:	25.05	ft
Wetted Top Width:	24.79	ft
Critical Slope:	0.0209	ft/ft



Metajob 1, Section 3

Normal Depth Results

Cross-Section:	3	
Elevation:	1279.46	ft MSL
Depth:	2.35	ft
Discharge:	220.00	cfs
Energy Gradient:	0.0033	ft/ft
Froude Number:	0.353	
Flow Regime:	Subcritical	
Flow Area:	71.74	sq ft
Average Velocity:	3.07	ft/s
Maximum Velocity:	3.34	ft/s
Composite n:	0.0252	
Hydraulic Radius:	0.8	ft
Wetted Perimeter:	89.51	ft
Wetted Top Width:	89.15	ft
Critical Slope:	0.029	ft/ft

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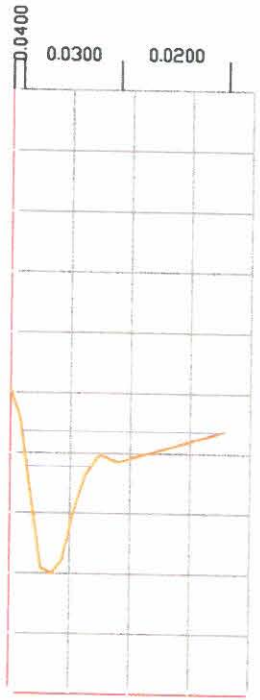
Normal Depth Results

Cross-Section:	4	
Elevation:	1278.78	ft MSL
Depth:	1.76	ft
Discharge:	80.00	cfs
Energy Gradient:	0.0033	ft/ft
Froude Number:	0.3827	
Flow Regime:	Subcritical	
Flow Area:	27.74	sq ft
Average Velocity:	2.89	ft/s
Maximum Velocity:	2.89	ft/s
Composite n:	0.03	
Hydraulic Radius:	1.02	ft
Wetted Perimeter:	27.16	ft
Wetted Top Width:	26.81	ft
Critical Slope:	0.0223	ft/ft



Metajob 1, Section 4

Normal Depth Results

Cross-Section:	4	
Elevation:	1279.38	ft MSL
Depth:	2.36	ft
Discharge:	180.00	cfs
Energy Gradient:	0.0033	ft/ft
Froude Number:	0.3404	
Flow Regime:	Subcritical	
Flow Area:	60.71	sq ft
Average Velocity:	2.98	ft/s
Maximum Velocity:	3.27	ft/s
Composite n:	0.025	
Hydraulic Radius:	0.72	ft
Wetted Perimeter:	84.05	ft
Wetted Top Width:	83.61	ft
Critical Slope:	0.033	ft/ft

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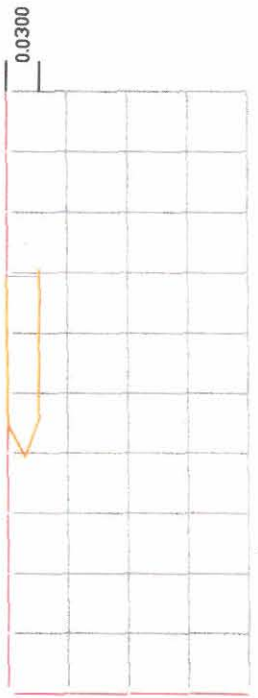
D.1.2 85th Avenue Existing Cross Sections



Normal Depth Results

Cross-Section:	1	
Elevation:	1296.94	ft MSL
Depth:	3.00	ft
Discharge:	220.00	cfs
Energy Gradient:	0.006	ft/ft
Froude Number:	0.6233	
Flow Regime:	Subcritical	
Flow Area:	35.92	sq ft
Average Velocity:	6.13	ft/s
Maximum Velocity:	6.13	ft/s
Composite n:	0.03	
Hydraulic Radius:	2.01	ft
Wetted Perimeter:	17.86	ft
Wetted Top Width:	13.69	ft
Critical Slope:	0.0154	ft/ft

Metajob 2, Section 1

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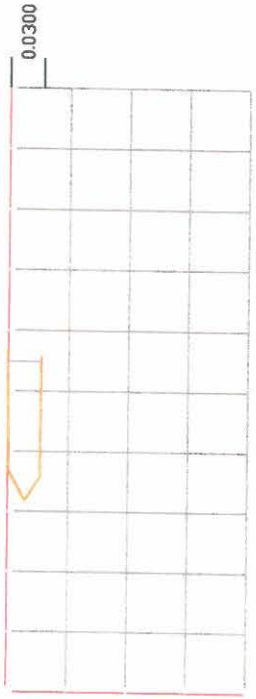

Metajob 2, Section 2

Normal Depth Results

Cross-Section:	2	
Elevation:	1295.50	ft MSL
Depth:	2.31	ft
Discharge:	150.00	cfs
Energy Gradient:	0.006	ft/ft
Froude Number:	0.6228	
Flow Regime:	Subcritical	
Flow Area:	27.96	sq ft
Average Velocity:	5.37	ft/s
Maximum Velocity:	5.37	ft/s
Composite n:	0.03	
Hydraulic Radius:	1.65	ft
Wetted Perimeter:	16.93	ft
Wetted Top Width:	13.85	ft
Critical Slope:	0.0154	ft/ft

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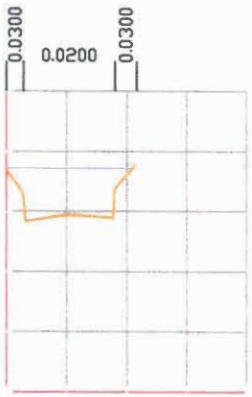

Metajob 2, Section 3

Normal Depth Results

Cross-Section:	3	
Elevation:	1293.72	ft MSL
Depth:	0.87	ft
Discharge:	140.00	cfs
Energy Gradient:	0.005	ft/ft
Froude Number:	0.8053	
Flow Regime:	Subcritical	
Flow Area:	32.83	sq ft
Average Velocity:	4.22	ft/s
Maximum Velocity:	4.49	ft/s
Composite n:	0.0229	
Hydraulic Radius:	0.62	ft
Wetted Perimeter:	52.71	ft
Wetted Top Width:	52.40	ft
Critical Slope:	0.0125	ft/ft

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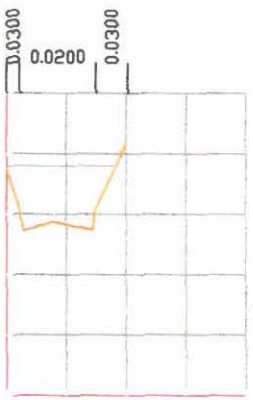

Metajob 2, Section 4

Normal Depth Results

Cross-Section:	4	
Elevation:	1293.80	ft MSL
Depth:	1.06	ft
Discharge:	170.00	cfs
Energy Gradient:	0.005	ft/ft
Froude Number:	0.8025	
Flow Regime:	Subcritical	
Flow Area:	36.20	sq ft
Average Velocity:	4.70	ft/s
Maximum Velocity:	5.18	ft/s
Composite n:	0.0232	
Hydraulic Radius:	0.79	ft
Wetted Perimeter:	46.00	ft
Wetted Top Width:	45.85	ft
Critical Slope:	0.0114	ft/ft

GLENDALE PEORIA AREA DRAINAGE MASTER PLAN UPDATE
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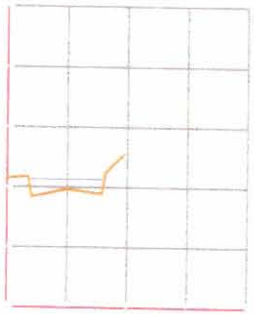

Metajob 2, Section 5

Normal Depth Results

Cross-Section:	5	
Elevation:	1292.14	ft MSL
Depth:	0.29	ft
Discharge:	10.00	cfs
Energy Gradient:	0.004	ft/ft
Froude Number:	0.5195	
Flow Regime:	Subcritical	
Flow Area:	6.35	sq ft
Average Velocity:	1.62	ft/s
Maximum Velocity:	1.62	ft/s
Composite n:	0.02	
Hydraulic Radius:	0.2	ft
Wetted Perimeter:	31.44	ft
Wetted Top Width:	31.38	ft
Critical Slope:	0.0139	ft/ft

GLENDALE PEORIA AREA DRAINAGE MASTER PLAN UPDATE
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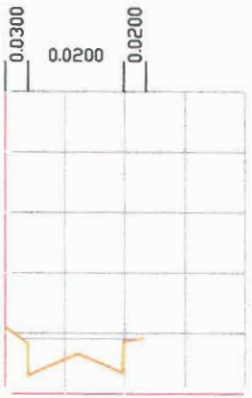

Metajob 2, Section 6

Normal Depth Results

Cross-Section:	6	
Elevation:	1285.91	ft MSL
Depth:	0.60	ft
Discharge:	50.00	cfs
Energy Gradient:	0.006	ft/ft
Froude Number:	0.6988	
Flow Regime:	Subcritical	
Flow Area:	16.35	sq ft
Average Velocity:	3.09	ft/s
Maximum Velocity:	3.12	ft/s
Composite n:	0.0205	
Hydraulic Radius:	0.33	ft
Wetted Perimeter:	49.34	ft
Wetted Top Width:	48.78	ft
Critical Slope:	0.0158	ft/ft

GLENDALE PEORIA AREA DRAINAGE MASTER PLAN UPDATE
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FIGURE DS-8: ROADWAY CROSS SECTIONS AND CAPACITY CALCULATIONS

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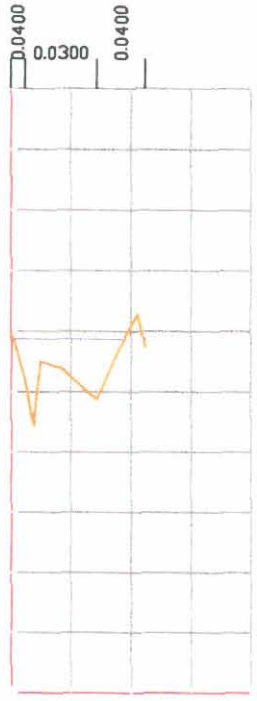

Metajob 2, Section 7

Normal Depth Results

Cross-Section:	7	
Elevation:	1285.88	ft MSL
Depth:	1.44	ft
Discharge:	60.00	cfs
Energy Gradient:	0.004	ft/ft
Froude Number:	0.3168	
Flow Regime:	Subcritical	
Flow Area:	27.85	sq ft
Average Velocity:	2.17	ft/s
Maximum Velocity:	2.45	ft/s
Composite n:	0.0337	
Hydraulic Radius:	0.59	ft
Wetted Perimeter:	47.16	ft
Wetted Top Width:	46.76	ft
Critical Slope:	0.0478	ft/ft

GLENDALE PEORIA AREA DRAINAGE MASTER PLAN UPDATE
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FIGURE DS-8: ROADWAY CROSS SECTIONS AND CAPACITY CALCULATIONS

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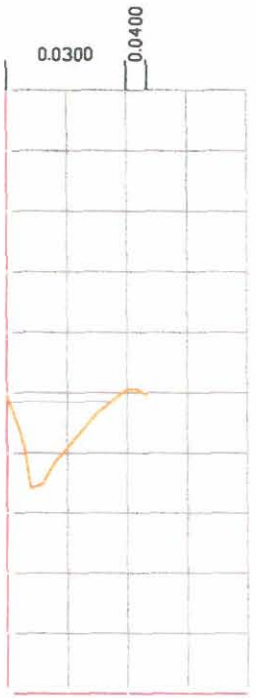

Metajob 2, Section 8

Normal Depth Results

Cross-Section:	8	
Elevation:	1284.85	ft MSL
Depth:	1.43	ft
Discharge:	70.00	cfs
Energy Gradient:	0.004	ft/ft
Froude Number:	0.3588	
Flow Regime:	Subcritical	
Flow Area:	28.74	sq ft
Average Velocity:	2.42	ft/s
Maximum Velocity:	2.42	ft/s
Composite n:	0.03	
Hydraulic Radius:	0.68	ft
Wetted Perimeter:	42.38	ft
Wetted Top Width:	42.21	ft
Critical Slope:	0.0313	ft/ft

GLENDALE PEORIA AREA DRAINAGE MASTER PLAN UPDATE
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FIGURE DS-8: ROADWAY CROSS SECTIONS AND CAPACITY CALCULATIONS

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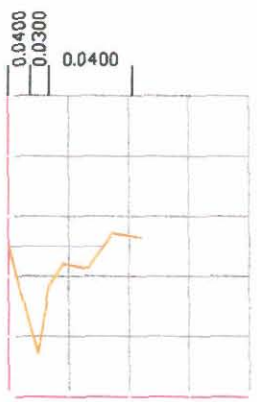


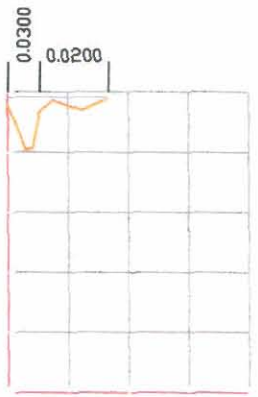
Metajob 2, Section 9

Normal Depth Results

Cross-Section:	9	
Elevation:	1282.51	ft MSL
Depth:	1.80	ft
Discharge:	60.00	cfs
Energy Gradient:	0.004	ft/ft
Froude Number:	0.3265	
Flow Regime:	Subcritical	
Flow Area:	24.16	sq ft
Average Velocity:	2.49	ft/s
Maximum Velocity:	3.84	ft/s
Composite n:	0.0381	
Hydraulic Radius:	0.61	ft
Wetted Perimeter:	39.66	ft
Wetted Top Width:	39.36	ft
Critical Slope:	0.0732	ft/ft

GLENDALE PEORIA AREA DRAINAGE MASTER PLAN UPDATE
Section 15 Detailed Study
FIGURE DS-8: ROADWAY CROSS SECTIONS AND CAPACITY CALCULATIONS

Entellus™



Metajob 2, Section 10

Normal Depth Results

Cross-Section:	10	
Elevation:	1279.91	ft MSL
Depth:	0.86	ft
Discharge:	20.00	cfs
Energy Gradient:	0.004	ft/ft
Froude Number:	0.3462	
Flow Regime:	Subcritical	
Flow Area:	11.01	sq ft
Average Velocity:	1.83	ft/s
Maximum Velocity:	2.14	ft/s
Composite n:	0.0234	
Hydraulic Radius:	0.26	ft
Wetted Perimeter:	41.74	ft
Wetted Top Width:	41.63	ft
Critical Slope:	0.0402	ft/ft

GLENDALE PEORIA AREA DRAINAGE MASTER PLAN UPDATE
Section 15 Detailed Study
FIGURE DS-8: ROADWAY CROSS SECTIONS AND CAPACITY CALCULATIONS

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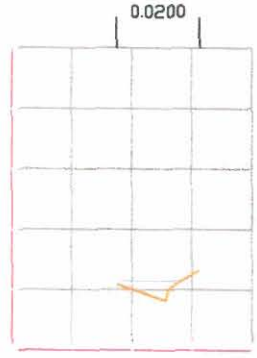
D.1.3 87th Avenue Existing Cross Sections



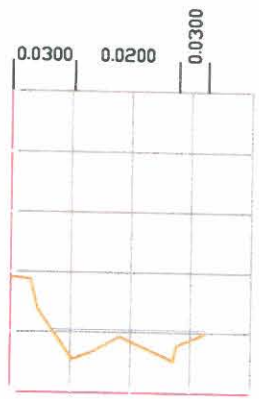
Metajob 3, Section 1

Normal Depth Results

Cross-Section:	1	
Elevation:	1311.15	ft MSL
Depth:	0.33	ft
Discharge:	10.00	cfs
Energy Gradient:	0.0085	ft/ft
Froude Number:	0.6563	
Flow Regime:	Subcritical	
Flow Area:	4.65	sq ft
Average Velocity:	2.12	ft/s
Maximum Velocity:	2.12	ft/s
Composite n:	0.02	
Hydraulic Radius:	0.17	ft
Wetted Perimeter:	27.16	ft
Wetted Top Width:	27.14	ft
Critical Slope:	0.0204	ft/ft

GLENDALE PEORIA AREA DRAINAGE MASTER PLAN UPDATE
Section 15 Detailed Study
FIGURE DS-8: ROADWAY CROSS SECTIONS AND CAPACITY CALCULATIONS

Entellus™



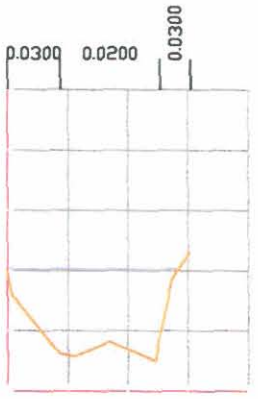
Metajob 3, Section 2

Normal Depth Results

Cross-Section:	2	
Elevation:	1306.05	ft MSL
Depth:	0.51	ft
Discharge:	50.00	cfs
Energy Gradient:	0.0085	ft/ft
Froude Number:	0.6996	
Flow Regime:	Subcritical	
Flow Area:	17.65	sq ft
Average Velocity:	2.82	ft/s
Maximum Velocity:	3.18	ft/s
Composite n:	0.0234	
Hydraulic Radius:	0.28	ft
Wetted Perimeter:	64.14	ft
Wetted Top Width:	64.09	ft
Critical Slope:	0.0226	ft/ft

GLENDALE PEORIA AREA DRAINAGE MASTER PLAN UPDATE
Section 15 Detailed Study
FIGURE DS-8: ROADWAY CROSS SECTIONS AND CAPACITY CALCULATIONS

Entellus™



Metajob 3, Section 3

Normal Depth Results

Cross-Section:	3	
Elevation:	1302.04	ft MSL
Depth:	1.53	ft
Discharge:	420.00	cfs
Energy Gradient:	0.0047	ft/ft
Froude Number:	0.753	
Flow Regime:	Subcritical	
Flow Area:	79.49	sq ft
Average Velocity:	5.33	ft/s
Maximum Velocity:	6.30	ft/s
Composite n:	0.0244	
Hydraulic Radius:	1.11	ft
Wetted Perimeter:	71.57	ft
Wetted Top Width:	71.36	ft
Critical Slope:	0.0115	ft/ft

GLENDALE PEORIA AREA DRAINAGE MASTER PLAN UPDATE
Section 15 Detailed Study
FIGURE DS-8: ROADWAY CROSS SECTIONS AND CAPACITY CALCULATIONS

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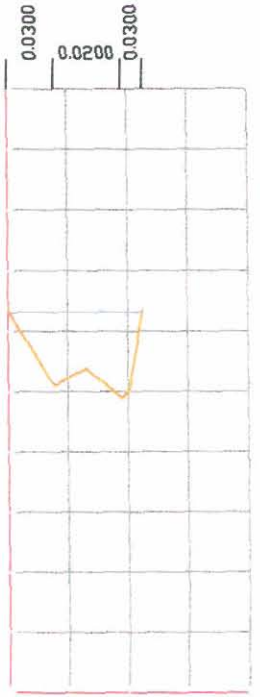


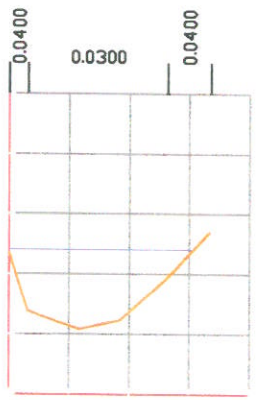
Metajob 3, Section 4

Normal Depth Results

Cross-Section:	4	
Elevation:	1301.32	ft MSL
Depth:	1.43	ft
Discharge:	250.00	cfs
Energy Gradient:	0.0056	ft/ft
Froude Number:	0.7268	
Flow Regime:	Subcritical	
Flow Area:	50.78	sq ft
Average Velocity:	4.88	ft/s
Maximum Velocity:	6.02	ft/s
Composite n:	0.0251	
Hydraulic Radius:	0.92	ft
Wetted Perimeter:	55.45	ft
Wetted Top Width:	55.25	ft
Critical Slope:	0.0147	ft/ft

GLENDALE PEORIA AREA DRAINAGE MASTER PLAN UPDATE
Section 15 Detailed Study
FIGURE DS-8: ROADWAY CROSS SECTIONS AND CAPACITY CALCULATIONS

Entellus



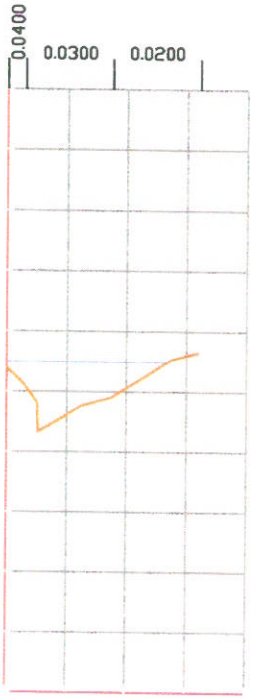
Metajob 3, Section 5

Normal Depth Results

Cross-Section:	5	
Elevation:	1292.41	ft MSL
Depth:	1.32	ft
Discharge:	250.00	cfs
Energy Gradient:	0.0056	ft/ft
Froude Number:	0.5558	
Flow Regime:	Subcritical	
Flow Area:	68.99	sq ft
Average Velocity:	3.67	ft/s
Maximum Velocity:	3.90	ft/s
Composite n:	0.0326	
Hydraulic Radius:	0.9	ft
Wetted Perimeter:	76.88	ft
Wetted Top Width:	76.79	ft
Critical Slope:	0.0235	ft/ft

GLENDALE PEORIA AREA DRAINAGE MASTER PLAN UPDATE
Section 15 Detailed Study
FIGURE DS-8: ROADWAY CROSS SECTIONS AND CAPACITY CALCULATIONS

Entellus™



Normal Depth Results

Cross-Section:	6	
Elevation:	1285.50	ft MSL
Depth:	1.16	ft
Discharge:	110.00	cfs
Energy Gradient:	0.0056	ft/ft
Froude Number:	0.4861	
Flow Regime:	Subcritical	
Flow Area:	37.05	sq ft
Average Velocity:	2.92	ft/s
Maximum Velocity:	3.15	ft/s
Composite n:	0.028	
Hydraulic Radius:	0.55	ft
Wetted Perimeter:	67.25	ft
Wetted Top Width:	67.00	ft
Critical Slope:	0.0292	ft/ft

Metajob 3, Section 6

GLENDALE PEORIA AREA DRAINAGE MASTER PLAN UPDATE
Section 15 Detailed Study
FIGURE DS-8: ROADWAY CROSS SECTIONS AND CAPACITY CALCULATIONS

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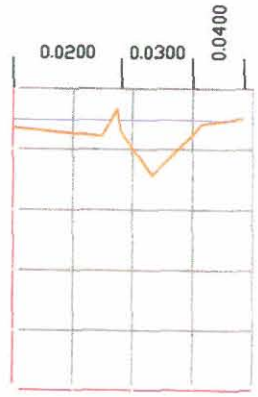

Metajob 3, Section 7

Normal Depth Results

Cross-Section:	7	
Elevation:	1284.49	ft MSL
Depth:	0.91	ft
Discharge:	50.00	cfs
Energy Gradient:	0.0045	ft/ft
Froude Number:	0.3619	
Flow Regime:	Subcritical	
Flow Area:	25.56	sq ft
Average Velocity:	2.00	ft/s
Maximum Velocity:	2.28	ft/s
Composite n:	0.0275	
Hydraulic Radius:	0.29	ft
Wetted Perimeter:	87.51	ft
Wetted Top Width:	87.44	ft
Critical Slope:	0.0513	ft/ft

GLENDALE PEORIA AREA DRAINAGE MASTER PLAN UPDATE
Section 15 Detailed Study
FIGURE DS-8: ROADWAY CROSS SECTIONS AND CAPACITY CALCULATIONS

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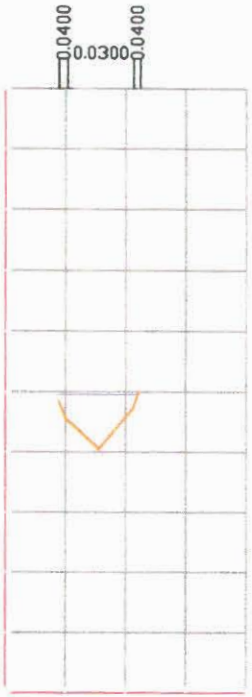

Metajob 3, Section 8

Normal Depth Results

Cross-Section:	8	
Elevation:	1279.96	ft MSL
Depth:	0.90	ft
Discharge:	40.00	cfs
Energy Gradient:	0.0045	ft/ft
Froude Number:	0.4206	
Flow Regime:	Subcritical	
Flow Area:	17.69	sq ft
Average Velocity:	2.29	ft/s
Maximum Velocity:	2.38	ft/s
Composite n:	0.0318	
Hydraulic Radius:	0.53	ft
Wetted Perimeter:	33.12	ft
Wetted Top Width:	33.07	ft
Critical Slope:	0.0303	ft/ft

GLENDALE PEORIA AREA DRAINAGE MASTER PLAN UPDATE
Section 15 Detailed Study
FIGURE DS-8: ROADWAY CROSS SECTIONS AND CAPACITY CALCULATIONS

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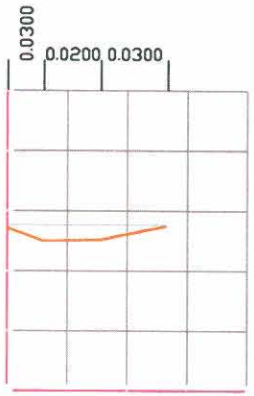
D.1.4 88th Avenue Existing Cross Sections



Metajob 4, Section 1

Normal Depth Results

Cross-Section:	1	
Elevation:	1292.78	ft MSL
Depth:	0.27	ft
Discharge:	20.00	cfs
Energy Gradient:	0.006	ft/ft
Froude Number:	0.5658	
Flow Regime:	Subcritical	
Flow Area:	12.08	sq ft
Average Velocity:	1.69	ft/s
Maximum Velocity:	2.33	ft/s
Composite n:	0.0266	
Hydraulic Radius:	0.18	ft
Wetted Perimeter:	66.62	ft
Wetted Top Width:	66.62	ft
Critical Slope:	0.0266	ft/ft

GLENDALE PEORIA AREA DRAINAGE MASTER PLAN UPDATE
Section 15 Detailed Study
FIGURE DS-8: ROADWAY CROSS SECTIONS AND CAPACITY CALCULATIONS

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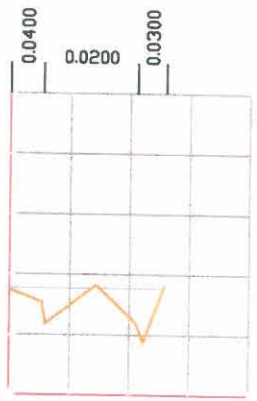
D.1.5 89th Avenue Existing Cross Sections



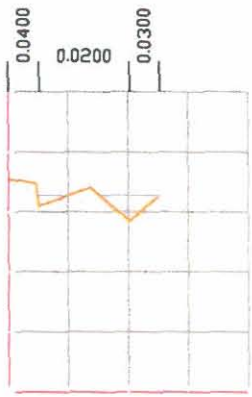
Metajob 5, Section 1

Normal Depth Results

Cross-Section:	1	
Elevation:	1311.78	ft MSL
Depth:	0.90	ft
Discharge:	50.00	cfs
Energy Gradient:	0.008	ft/ft
Froude Number:	0.5088	
Flow Regime:	Subcritical	
Flow Area:	18.26	sq ft
Average Velocity:	2.73	ft/s
Maximum Velocity:	2.95	ft/s
Composite n:	0.0269	
Hydraulic Radius:	0.3	ft
Wetted Perimeter:	61.01	ft
Wetted Top Width:	60.87	ft
Critical Slope:	0.0474	ft/ft

GLENDALE PEORIA AREA DRAINAGE MASTER PLAN UPDATE
Section 15 Detailed Study
FIGURE DS-8: ROADWAY CROSS SECTIONS AND CAPACITY CALCULATIONS

Entellus™



Metajob 5, Section 2

Normal Depth Results

Cross-Section:	2	
Elevation:	1303.28	ft MSL
Depth:	0.42	ft
Discharge:	10.00	cfs
Energy Gradient:	0.0064	ft/ft
Froude Number:	0.4349	
Flow Regime:	Subcritical	
Flow Area:	6.28	sq ft
Average Velocity:	1.55	ft/s
Maximum Velocity:	1.67	ft/s
Composite n:	0.0239	
Hydraulic Radius:	0.17	ft
Wetted Perimeter:	37.55	ft
Wetted Top Width:	37.51	ft
Critical Slope:	0.0375	ft/ft

GLENDALE PEORIA AREA DRAINAGE MASTER PLAN UPDATE
Section 15 Detailed Study
FIGURE DS-8: ROADWAY CROSS SECTIONS AND CAPACITY CALCULATIONS

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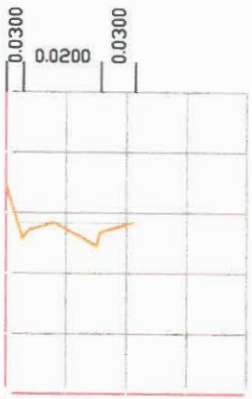

Metajob 5, Section 3

Normal Depth Results

Cross-Section:	3	
Elevation:	1302.84	ft MSL
Depth:	0.37	ft
Discharge:	10.00	cfs
Energy Gradient:	0.008	ft/ft
Froude Number:	0.4981	
Flow Regime:	Subcritical	
Flow Area:	5.81	sq ft
Average Velocity:	1.66	ft/s
Maximum Velocity:	1.86	ft/s
Composite n:	0.0233	
Hydraulic Radius:	0.13	ft
Wetted Perimeter:	45.75	ft
Wetted Top Width:	45.71	ft
Critical Slope:	0.046	ft/ft

GLENDALE PEORIA AREA DRAINAGE MASTER PLAN UPDATE
Section 15 Detailed Study
FIGURE DS-8: ROADWAY CROSS SECTIONS AND CAPACITY CALCULATIONS

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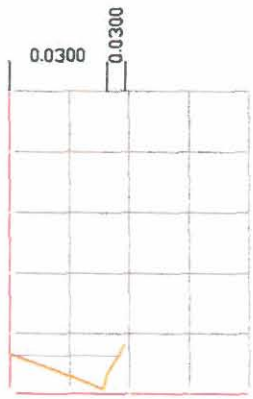

Metajob 5, Section 4

Normal Depth Results

Cross-Section:	4	
Elevation:	1295.63	ft MSL
Depth:	0.55	ft
Discharge:	15.00	cfs
Energy Gradient:	0.0042	ft/ft
Froude Number:	0.3152	
Flow Regime:	Subcritical	
Flow Area:	11.28	sq ft
Average Velocity:	1.33	ft/s
Maximum Velocity:	1.36	ft/s
Composite n:	0.03	
Hydraulic Radius:	0.26	ft
Wetted Perimeter:	43.33	ft
Wetted Top Width:	43.29	ft
Critical Slope:	0.0433	ft/ft

GLENDALE PEORIA AREA DRAINAGE MASTER PLAN UPDATE
Section 15 Detailed Study
FIGURE DS-8: ROADWAY CROSS SECTIONS AND CAPACITY CALCULATIONS

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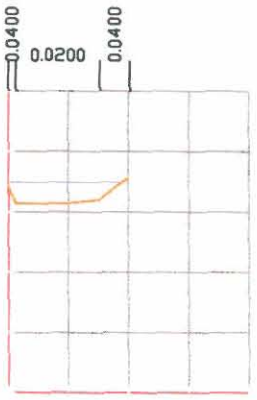

Metajob 5, Section 5

Normal Depth Results

Cross-Section:	5	
Elevation:	1293.49	ft MSL
Depth:	0.34	ft
Discharge:	30.00	cfs
Energy Gradient:	0.0052	ft/ft
Froude Number:	0.6709	
Flow Regime:	Subcritical	
Flow Area:	13.42	sq ft
Average Velocity:	2.32	ft/s
Maximum Velocity:	2.57	ft/s
Composite n:	0.0259	
Hydraulic Radius:	0.28	ft
Wetted Perimeter:	47.49	ft
Wetted Top Width:	47.47	ft
Critical Slope:	0.0181	ft/ft

GLENDALE PEORIA AREA DRAINAGE MASTER PLAN UPDATE
Section 15 Detailed Study
FIGURE DS-8: ROADWAY CROSS SECTIONS AND CAPACITY CALCULATIONS

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Normal Depth Results

Cross-Section:	6	
Elevation:	1279.81	ft MSL
Depth:	0.58	ft
Discharge:	10.00	cfs
Energy Gradient:	0.0063	ft/ft
Froude Number:	0.407	
Flow Regime:	Subcritical	
Flow Area:	5.70	sq ft
Average Velocity:	1.74	ft/s
Maximum Velocity:	1.74	ft/s
Composite n:	0.0301	
Hydraulic Radius:	0.29	ft
Wetted Perimeter:	19.69	ft
Wetted Top Width:	19.65	ft
Critical Slope:	0.0397	ft/ft

Metajob 5, Section 6

GLENDALE PEORIA AREA DRAINAGE MASTER PLAN UPDATE
Section 15 Detailed Study
FIGURE DS-8: ROADWAY CROSS SECTIONS AND CAPACITY CALCULATIONS

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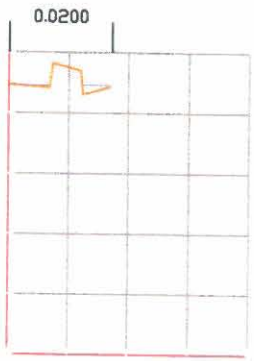
D.1.6 90th Avenue Existing Cross Sections



Metajob 6, Section 1

Normal Depth Results

Cross-Section:	1	
Elevation:	1279.47	ft MSL
Depth:	0.16	ft
Discharge:	1.00	cfs
Energy Gradient:	0.006	ft/ft
Froude Number:	0.33	
Flow Regime:	Subcritical	
Flow Area:	1.34	sq ft
Average Velocity:	0.81	ft/s
Maximum Velocity:	0.81	ft/s
Composite n:	0.02	
Hydraulic Radius:	0.05	ft
Wetted Perimeter:	25.67	ft
Wetted Top Width:	25.63	ft
Critical Slope:	0.0472	ft/ft

GLENDALE PEORIA AREA DRAINAGE MASTER PLAN UPDATE
Section 15 Detailed Study
FIGURE DS-8: ROADWAY CROSS SECTIONS AND CAPACITY CALCULATIONS

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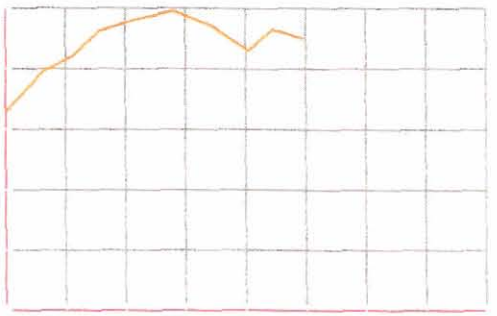
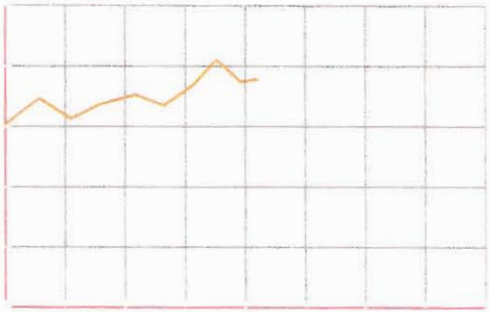
D.1.7 Pinnacle Peak Road Existing Cross Sections



Metajob 7, Section 1

GLENDALE PEORIA AREA DRAINAGE MASTER PLAN UPDATE
Section 15 Detailed Study
FIGURE DS-8: ROADWAY CROSS SECTIONS AND CAPACITY CALCULATIONS

Entellus™



Metajob 7, Section 2

GLENDALE PEORIA AREA DRAINAGE MASTER PLAN UPDATE
Section 15 Detailed Study
FIGURE DS-7: ROADWAY CROSS SECTIONS AND CAPACITY CALCULATIONS

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D.2. Existing Capacity Summary

Glendale Peoria Area Drainage Master Plan Update
Capacity Analysis Summary for Section 15
TABLE DS-6

RMS Metajob#	RMS Cross Section#	Street Name	Location	Estimated Slope	Existing Ditch/ Channel + Roadway Capacity (overbanks) [cfs]
2	1	85th Ave.	390 ft N. of Williams Rd.	0.006	220
2	2	85th Ave.	325 ft N. of Williams Rd.	0.006	150
2	3	85th Ave.	280 ft N. of Williams Rd.	0.005	140
2	4	85th Ave.	265 ft N. of Williams Rd.	0.005	170
2	5	85th Ave.	70 ft N. of Williams Rd.	0.004	10
2	6	85th Ave.	170 ft S. of Via Montoya Dr.	0.006	50
2	7	85th Ave.	195 ft S. of Via Montoya Dr.	0.004	60
2	8	85th Ave.	290 ft S. of Via Montoya Dr.	0.004	70
2	9	85th Ave.	725 ft N. of Deer Valley Rd.	0.004	60
2	10	85th Ave.	130 ft N. of Deer Valley Rd.	0.004	20
1	1	Deer Valley Rd.	155 ft E. of 85th Ave.	0.0033	340
1	2	Deer Valley Rd.	45 ft E. of 85th Ave.	0.0033	370
1	3	Deer Valley Rd.	90 ft W. of 85th Ave.	0.0033	220
1	4	Deer Valley Rd.	140 ft W. of 85th Ave.	0.0033	180
3	1	87th Ave.	Pinnacle Peak Rd.	0.0085	10
3	2	87th Ave.	590 ft S. of Pinnacle Peak Rd.	0.0085	50
3	3	87th Ave.	1280 ft S. of Pinnacle Peak Rd. (North of Patrick Ln.)	0.0047	420
3	4	87th Ave.	1335 ft S. of Pinnacle Peak Rd. (South of Patrick Ln.)	0.0056	250
3	5	87th Ave.	Williams Rd.	0.0056	250
3	6	87th Ave.	180 ft S. of Via Montoya Dr.	0.0056	110
3	7	87th Ave.	340 ft S. of Via Montoya Dr.	0.0044	50
3	8	87th Ave.	180 ft N. of Deer Valley Rd.	0.0044	40
4	1	88th Ave.	155 ft S. of Williams Rd.	0.006	20
5	1	89th Ave.	160 ft S. of Pinnacle Peak Rd.	0.008	50
5	2	89th Ave.	North of Patrick Ln.	0.0064	10
5	3	89th Ave.	South of Patrick Ln.	0.008	10
5	4	89th Ave.	165 ft N. of Williams Rd.	0.0042	15
5	5	89th Ave.	105 ft S. of Williams Rd.	0.0053	30
5	6	89th Ave.	225 ft N. of Deer Valley Rd.	0.0063	10
6	1	90th Ave.	130 ft N. of Deer Valley Rd.	0.006	1
7	1	Pinnacle Peak Rd.	320 ft E. of 91st Ave.	0.00001	0
7	2	Pinnacle Peak Rd.	1250 ft E. of 91st Ave.	0.00001	0

D.3. Memo Regarding Flooding at Villa Chula and 90th Avenue

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TO	City of Peoria
FROM:	Jacob Sweeting, Entellus
JOB NO:	310.017
DATE:	March 27, 2001

JOB: Glendale/Peoria ADMP Update: Section 15 Detailed Study

MEMORANDUM

Re: Flooding of Resident William Johnson at 8935 West Villa Chula

As requested, Entellus has completed a preliminary analysis of the flooding reported at 8935 West Villa Chula, which is at the corner of Villa Chula and 90th Avenue. This memo summarizes the findings of the analysis, and presents possible alternatives for the existing conditions.

REPORTED PROBLEM

It was communicated to Entellus that the property at 8935 West Villa Chula has experienced flooding during recent storm events. The extent of the flooding is unknown. However, it has been reported that the properties entire back yard has been inundated with water. The attached exhibit shows the location of the reported flooding.

SITE EXISTING CONDITIONS

The existing site information was used to determine what caused the observed flooding. This data was compiled from various sources. The topography was supplied by DTM, in the form of 2 foot contours and aerial photos. The centerline roadway profile of Villa Chula was provided by the District. Both the 10- year/6- hour, and the 100- year/6- hour HEC-1 models, developed by Entellus, were used to obtain the pertinent hydrology information.

HYDROLOGY

The Section 15 HEC-1 models were slightly modified in order to obtain the flows at the intersection of Villa Chula and 90th Avenue. The model originally represented the area bound by 91st Avenue, 89th Avenue, Villa Chula and Pinnacle Peak Road, as one subbasin. The runoff from this subbasin was routed to a concentration point on 89th Avenue. For this analysis a concentration point was needed at the intersection of Villa Chula and 90th Avenue. The original subbasin was divided into two smaller basins that were joined at the new concentration point. This flow was then routed to the original concentration point at 89th Avenue. The original assumptions of the HEC-1 models did not change and they are essentially the same as before.

The estimated flows are shown on the attached exhibit. The estimated 10-year/6-hour flow along Villa Chula, just before the intersection with 90th Avenue, is approximately 3 cfs. The estimated 100- year/6- hour flow along Villa Chula, just before the intersection with 90th Avenue, is approximately 14 cfs. The estimated 10- year/6- hour flow along Villa Chula, just after the

intersection with 90th Avenue, is approximately 7 cfs. The estimated 100-year/6- hour flow along Villa Chula, just after the intersection with 90th Avenue, is approximately 36 cfs. The estimated 10- year/6- hour flow along 90th Avenue, just before the intersection with Villa Chula, is approximately 4 cfs. The estimated 100- year/6- hour flow along 90th Avenue, just before the intersection with Villa Chula, is approximately 22 cfs. When compared to other flows in areas within Section 15, these flows do not seem excessive. However, given that the typical roadway flow capacity in the area is below 10 cfs, these flows can still cause problems. These problems are likely to occur where the flow is not contained within the roadway, and then spills into places where the water has no outlet. The existing topography of this area shows that the backyard of the resident at 8935 West Villa Chula is likely to be one of these places.

TOPOGRAPHY

The attached exhibit shows the profile of Villa Chula, with stationing set from 89th Avenue. The profile of Villa Chula is generally graded down towards 89th Avenue. The slope is between 0.4% and 0.2%. However, between stations 3+00 and 5+00, the profile is essentially flat. This is the location where flooding has been reported. The profile of 90th Avenue was not available. The contours show that the roadway is sloping down towards Villa Chula and the flow tends to follow 90th Avenue south to Villa Chula.

The contours north and south of Villa Chula suggest that water has a natural tendency to flow southwest towards Patrick Lane. The low points of the contours show that the flow is routed directly through the location of the reported flooding. A fence obstructs this direction of flow and the resident has reported that the water ponds behind this fence, which is his backyard. Interpolating between contours, it was estimated that the lowest point of the backyard is at an elevation of about 1304.5. This elevation is approximately a foot lower than the center line elevation at the intersection of Villa Chula and 90th Avenue. The finished floor elevation of the house is not known, but is most likely at an elevation of 1306.

The roadway cross sections of Villa Chula and 90th Avenue were not surveyed. Using field observation data and similar looking roads within Section 15, the roadway cross section geometry was estimated. The cross section geometry was used to estimate the roadway capacity. Villa Chula and 90th Avenue were estimated to be 30 feet wide. Both roads were assumed to have a 2% normal crown, with 4 inch roll curbs on both sides. The results of the capacity estimations are outlined in the next section.

RESULTS

The hydrology and topography information above was used to perform hydraulic calculations. These hydraulic calculations include capacity estimations, normal depth approximations, and an analysis that estimated the increase in water surface elevation produced by the water flowing south from 90th Avenue.

CAPACITY

The attached cross section plot numbers 7, 8 and 9 show the estimated roadway capacities. The estimated flow that may be conveyed within Villa Chula, before the intersection with 90th Avenue, is 9 cfs. The estimated flow that may be conveyed within Villa Chula, after the intersection with 90th Avenue, is 3.5 cfs. This significant reduction in capacity is because the roadway is essentially flat in this location. The estimated flow that may be conveyed within 90th Avenue, before it intersects Villa Chula is 11 cfs. The cross section plots have been attached.

NORMAL DEPTH CALCULATIONS

The normal depths at various cross sections were estimated using Manning's formula. The approximated cross sections analyzed represent Villa Chula upstream of the 90th Avenue intersection, Villa Chula downstream of the 90th Avenue intersection and 90th Avenue upstream of the Villa Chula intersection. The 100- year/6- hour storm conditions were used to estimate the normal depth in cross sections 1 through 3 (see attached). The existing roadways are not adequate to carry the 100 year flow. However, the resident being flooded has observed flooding during non-severe storm events. Therefore, the 10- year/6- hour storm conditions may better reflect what the resident has experienced. The results of the normal depth approximations using the 10-hour storm are shown in cross sections 4 through 6 (see attached). As suspected, the flow appears to spill out of Villa Chula, at the 90th Avenue intersection due to the reduced capacity of the roadway. The flow will spill out of the roadway and be conveyed along the natural drainage path. As mentioned before, this natural drainage path takes the water directly through the property. The fence in his backyard prevents the flow from continuing southeasterly and the flow ponds in his backyard.

WATER SURFACE ELEVATION INCREASE DUE TO FLOW DIRECTION CHANGE

In order for the resident at 8935 West Villa Chula to not be flooded, all of the water flowing south from 90th Avenue would have to change directions and flow east along Villa Chula. Changing the flow direction may be accomplished by applying a force to the water. The force may be supplied by an increase in pressure head. The increase in pressure head means the water surface elevation will increase where the direction change is occurring. The normal depth

calculations at the intersection tend to under-estimate the water surface elevation. Using the momentum conservation theory, the change in water surface elevation required to redirect the flow from 90th Avenue was approximated. These results are shown in cross sections 10 and 11. The peak water surface elevation at the intersection of 90th Avenue and Villa Chula during the 100- year/6- hour storm event increases by a third of a foot and is estimated to be 1306.25. The peak water surface elevation at the intersection of 90th Avenue and Villa Chula during the 10-year/6- hour storm event appears to increase by 1.5 inches and is estimated to be around 1305.75. Both of these water surface elevations produce significant flooding of the resident on the south side of the intersection.

CONCEPTUAL ALTERNATIVES

DITCH AT INTERSECTION

It seems feasible that the construction of a small ditch on the south side of Villa Chula would reduce the threat of flooding to 8935 West Villa Chula. This ditch would begin just upstream of the intersection, and continue for a couple hundred feet downstream of the intersection. The ditch needs to be sized so that the combined flow from Villa Chula and 90th Avenue is contained throughout the flat stretch of Villa Chula. The attached exhibit shows a profile and layout of the ditch. The estimated geometry of a ditch required to convey the 10- year flow within the right of way is triangular, 1.5 feet deep with 3:1 side slopes. The estimated geometry of a ditch required to convey the 100- year flow within the right of way is triangular, 3 feet deep with 3:1 side slopes. The factors that need to be considered for this alternative include: maintenance and upkeep responsibilities or liabilities, sediment transport into Villa Chula where the ditch ends, driveway crossings along the ditch and driving safety concerns.

WEEP HOLES IN WALL

Another alternative to the current drainage conditions is to place weep holes in the wall that separates the residents on the south side of Villa Chula, from the residents on the north side of Patrick Lane. These holes would reduce the collection of water behind the wall, and allow the water to flow south towards Patrick Lane. As indicated on the attached exhibit, the flow has a natural tendency to travel southeast across the wall in its natural direction. Since flows that contribute to the ponding behind the fence are small, the flow crossing through the properties on the north side of Patrick Lane will be small as well. The factors that should be considered for this alternative are: maintenance and upkeep responsibilities, liabilities, sediment transport into properties downstream and political issues or debates between property owners.

BUILD BERM AT INTERSECTION

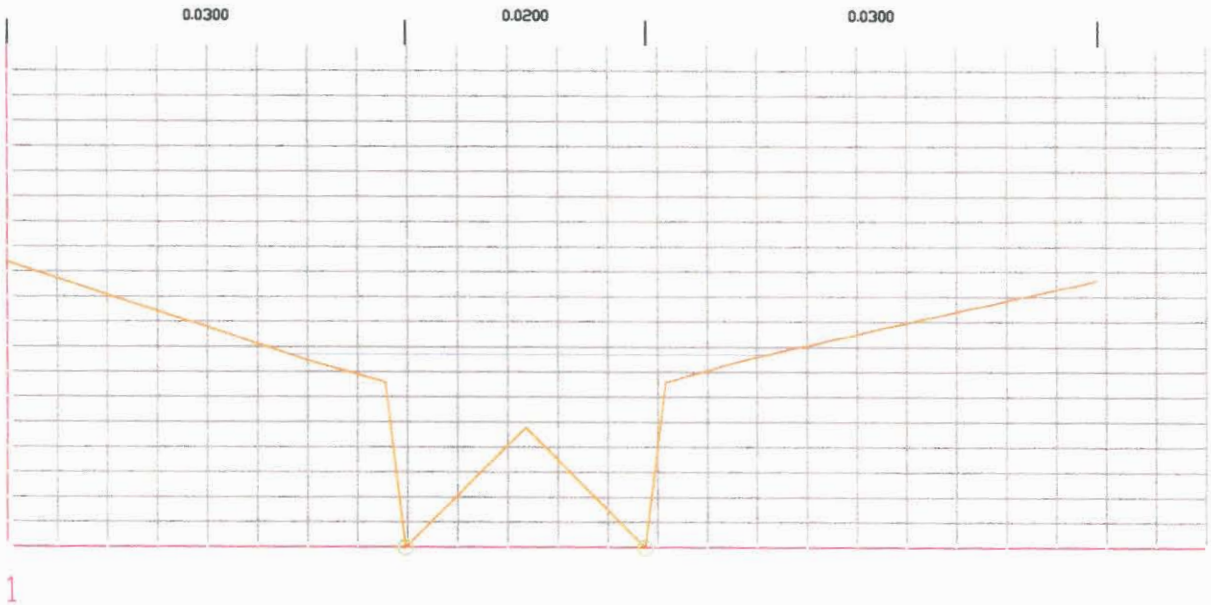
It seems feasible that elevating the ground or roadway on the south side of the 90th Avenue and Villa Chula intersection would deter water from spilling into the property and ponding behind the wall. This elevated section would serve to redirect the water flowing south from 90th Avenue, from continuing into the property on the south side of the intersection. As mentioned before, a preliminary analysis using the momentum principle estimates the required elevation increase at about 1 ½ inch for the 10- year flows, and about 4 inches for the 100- year flows. Elevating the south side of the roadway to form a one way crown at the intersection, and building a small berm on the south side of the roadway seem to be feasible alternatives. It should be noted that the cross sections used in the momentum analysis showed that the normal depth water surface elevations were above the roadway banks. Therefore, even with the berm or elevated roadway section it is probable that the flow will spill out of the roadway. If this is the case, then it is possible that the berm or elevated roadway will make the ponding problem even worse. As the water surface elevation at the wall increases, the water will be trapped behind the elevated surface. If a berm or elevated roadway is to be considered, Villa Chula should be designed so that the normal depth of the combined flows from Villa Chula and 90th Avenue do not spill out of the right of way. This task seems particularly difficult because Villa Chula is almost flat in this section. The other factors that should be considered for this alternative include: maintenance and upkeep responsibilities, liabilities, backwater effects on areas upstream of the intersection, aesthetics of the berm and the ponding potential created within the roadway intersections of 90th Avenue and Villa Chula.

BUY DRAINAGE EASEMENTS

The possibility of buying drainage easements should be considered. The storm water flows in the southwest direction as shown on the attached exhibit. It is possible that land could be purchased between Villa Chula and Patrick Lane, which could be used to convey these flows. Since the 10- year and 100- year storms do not produce very high flows, the amount of land required would be minimal. Obstructions along the drainage pathway would be minimized. The wall that separates the residents would be removed or shifted where the easement was purchased. Furthermore, the easement would need to be landscaped so that excessive sediments were not deposited where the storm water flows onto Patrick Lane. The possible drainage easement locations have been marked on the attached exhibit. The pathways were selected that appeared to allow flow at the intersection of 90th Avenue and Villa Chula to drain through without requiring grade adjustments. These easements are not likely to be accepted by the residents because they require the sacrifice of private property and possibly structures.

CONCLUSION

This memo was intended to describe the conditions that may be causing the flooding at 8935 Villa Chula. Furthermore, a preliminary discussion of feasible alternatives that appear to reduce or prevent this flooding was presented. All information in this memo is only preliminary. A more detailed and accurate exploration of this particular subject will be presented as part of the *Glendale Peoria Area Drainage Master Plan Update- Section 15 Detailed Study.*



Normal Depth Results

Cross-Section:	1	
Elevation:	0.39	ft MSL
Depth:	0.39	ft
Discharge:	14.00	cfs
Energy Gradient:	0.0047	ft/ft
Froude Number:	0.5093	
Flow Regime:	Subcritical	
Flow Area:	7.80	sq ft
Average Velocity:	1.82	ft/s
Maximum Velocity:	2.11	ft/s
Composite n:	0.0252	
Hydraulic Radius:	0.16	ft
Wetted Perimeter:	47.73	ft
Wetted Top Width:	47.67	ft
Critical Slope:	0.0397	ft/ft

Glendale Peoria ADMP: Section 15 Detailed Study

Approximate Roadway Geometry with Normal Depth Calculations

Villa Chula upstream of intersection with 90th Ave, 100yr

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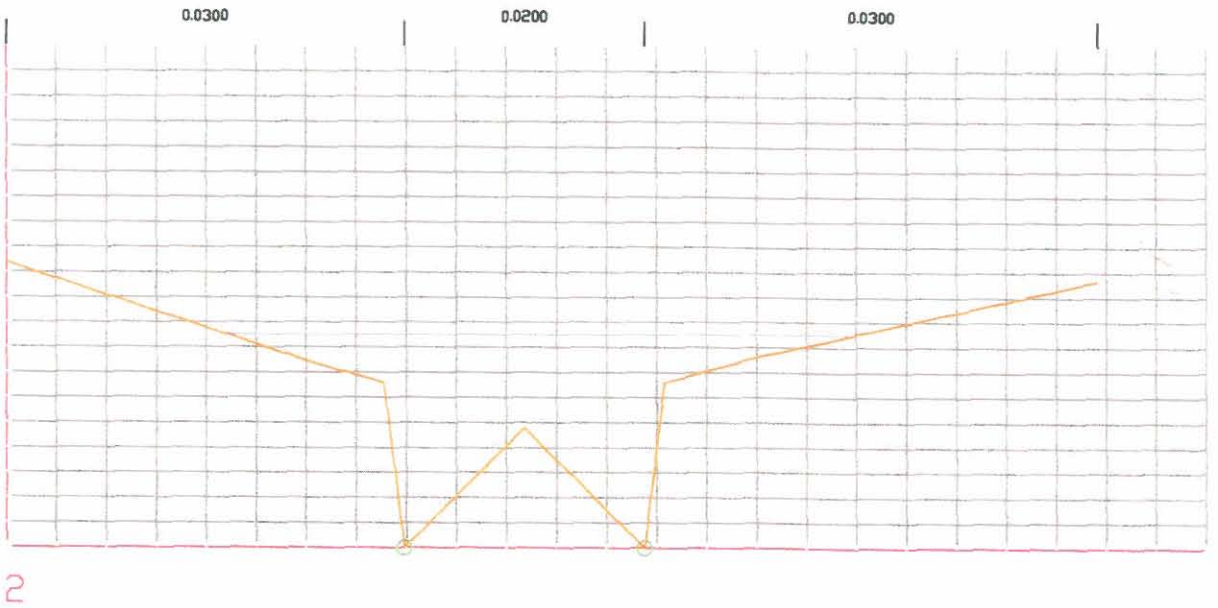


Normal Depth Results

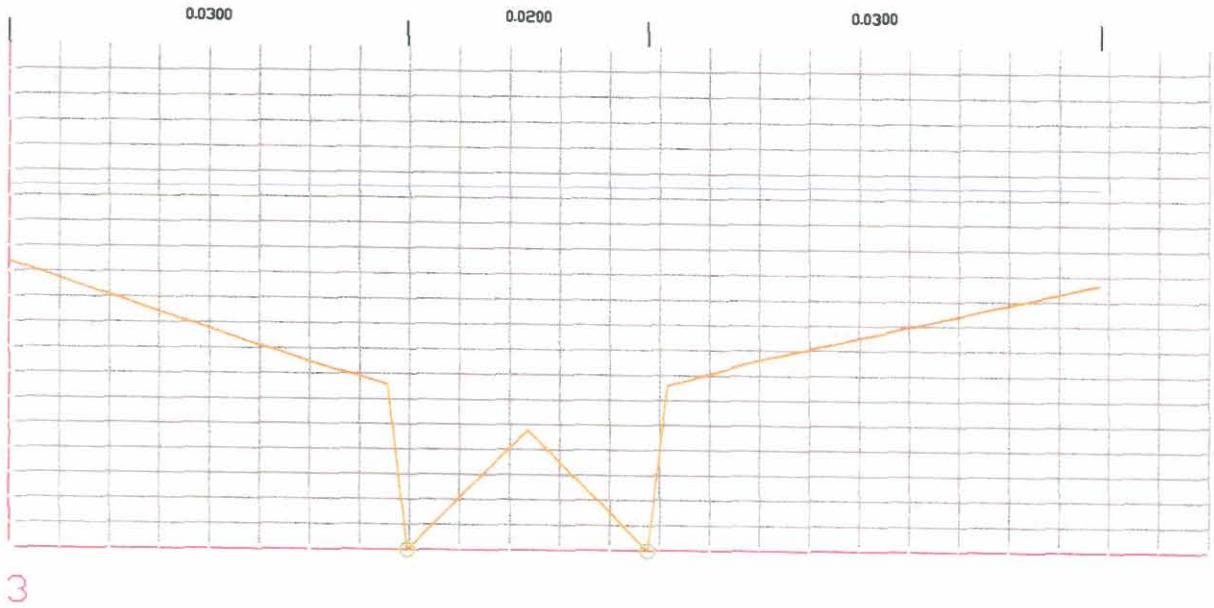
Cross-Section:	2	
Elevation:	0.43	ft MSL
Depth:	0.43	ft
Discharge:	22.00	cfs
Energy Gradient:	0.0065	ft/ft
Froude Number:	0.5958	
Flow Regime:	Subcritical	
Flow Area:	9.98	sq ft
Average Velocity:	2.18	ft/s
Maximum Velocity:	2.72	ft/s
Composite n:	0.0264	
Hydraulic Radius:	0.16	ft
Wetted Perimeter:	62.63	ft
Wetted Top Width:	62.57	ft
Critical Slope:	0.0496	ft/ft

Glendale Peoria ADMP: Section 15 Detailed Study

Approximate Roadway Geometry with Normal Depth Calculations

90th Ave North of intersection with Villa Chula, 100yr

Entellus™

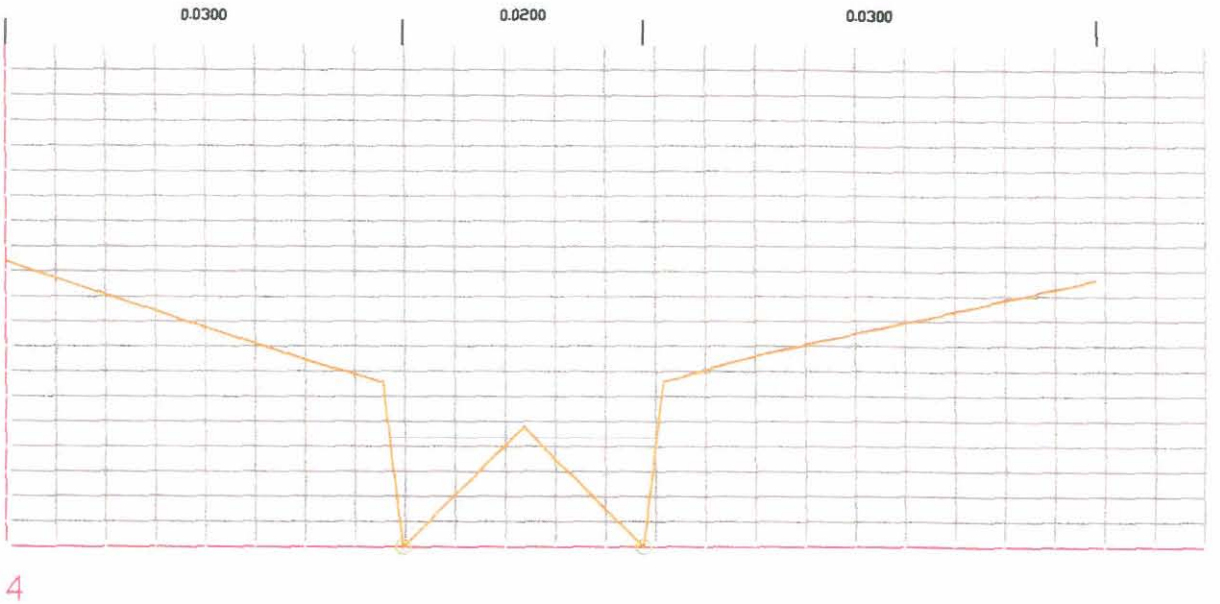


Normal Depth Results

Cross-Section:	3	
Elevation:	0.72	ft MSL
Depth:	0.72	ft
Discharge:	36.00	cfs
Energy Gradient:	0.0007	ft/ft
Froude Number:	0.1891	
Flow Regime:	Subcritical	
Flow Area:	39.48	sq ft
Average Velocity:	0.88	ft/s
Maximum Velocity:	1.41	ft/s
Composite n:	0.0279	
Hydraulic Radius:	0.36	ft
Wetted Perimeter:	109.23	ft
Wetted Top Width:	109.17	ft
Critical Slope:	0.0317	ft/ft

Glendale Peoria ADMP: Section 15 Detailed Study
Approximate Roadway Geometry with Normal Depth Calculations
Villa Chula downstream of intersection with 90th Ave, 100yr

Entellus™

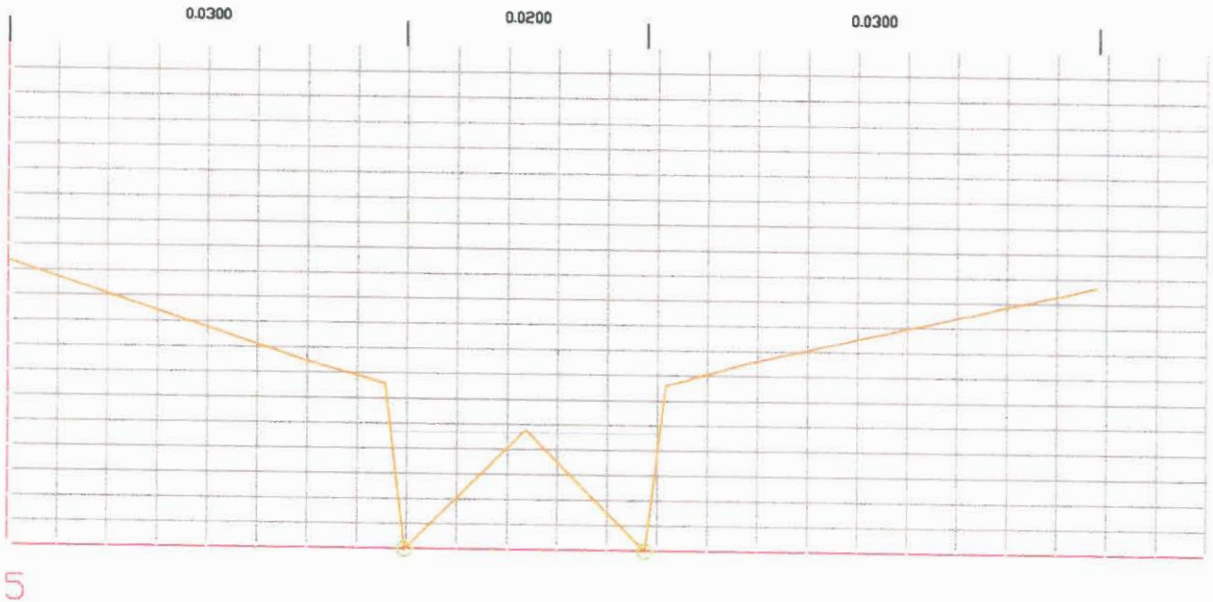


Normal Depth Results

Cross-Section:	4	
Elevation:	0.22	ft MSL
Depth:	0.22	ft
Discharge:	3.00	cfs
Energy Gradient:	0.0047	ft/ft
Froude Number:	0.4232	
Flow Regime:	Subcritical	
Flow Area:	2.67	sq ft
Average Velocity:	1.12	ft/s
Maximum Velocity:	1.17	ft/s
Composite n:	0.0212	
Hydraulic Radius:	0.11	ft
Wetted Perimeter:	24.53	ft
Wetted Top Width:	24.49	ft
Critical Slope:	0.0273	ft/ft

Glendale Peoria ADMP: Section 15 Detailed Study
Approximate Roadway Geometry with Normal Depth Calculations
Villa Chula upstream of intersection with 90th Ave, 10yr

Entellus™

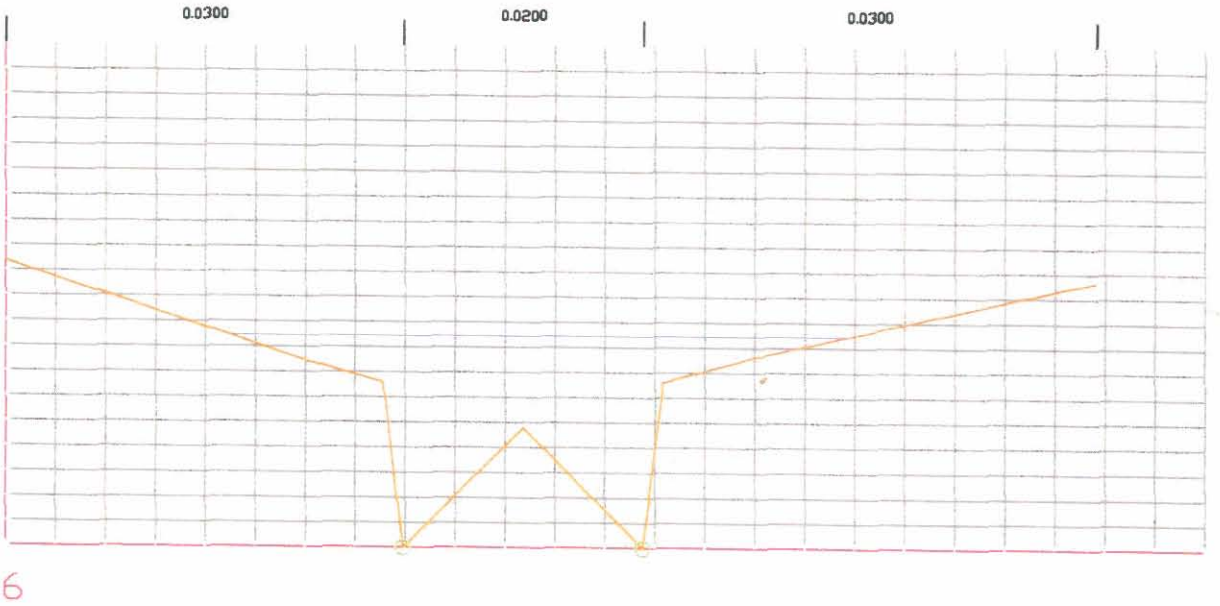


Normal Depth Results

Cross-Section:	5	
Elevation:	0.23	ft MSL
Depth:	0.23	ft
Discharge:	4.00	cfs
Energy Gradient:	0.0065	ft/ft
Froude Number:	0.4768	
Flow Regime:	Subcritical	
Flow Area:	3.06	sq ft
Average Velocity:	1.38	ft/s
Maximum Velocity:	1.44	ft/s
Composite n:	0.0212	
Hydraulic Radius:	0.12	ft
Wetted Perimeter:	26.24	ft
Wetted Top Width:	26.19	ft
Critical Slope:	0.0267	ft/ft

Glendale Peoria ADMP: Section 15 Detailed Study
Approximate Roadway Geometry with Normal Depth Calculations
90th Ave north of intersection with Villa Chula, 10yr

Entellus™



Normal Depth Results

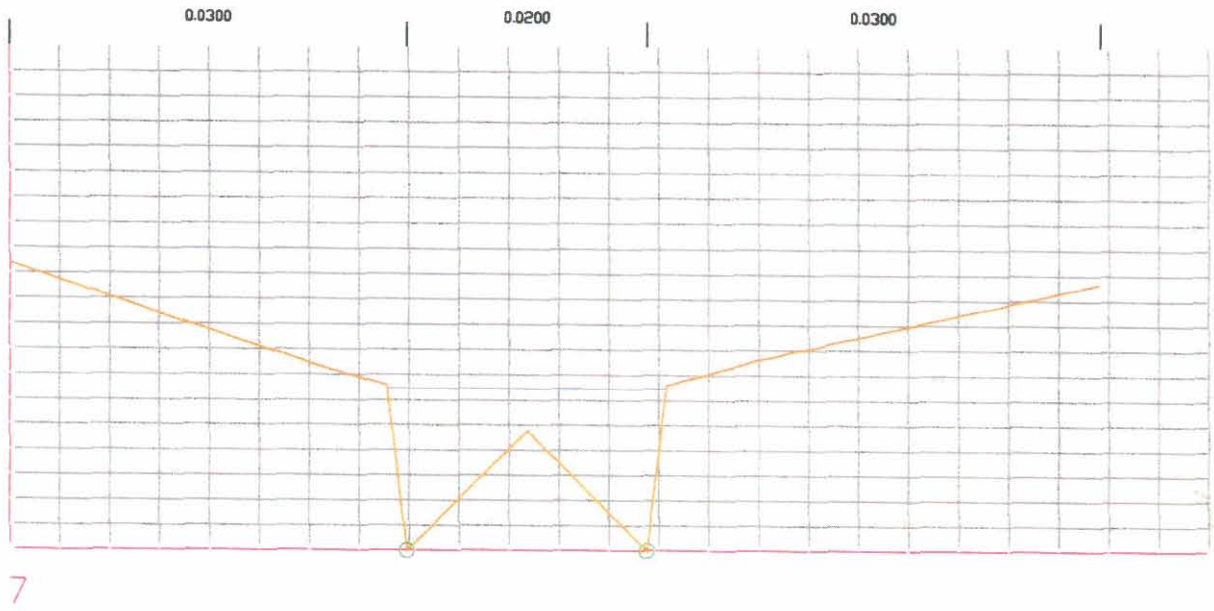
Cross-Section:	6	
Elevation:	0.42	ft MSL
Depth:	0.42	ft
Discharge:	7.00	cfs
Energy Gradient:	0.0007	ft/ft
Froude Number:	0.1931	
Flow Regime:	Subcritical	
Flow Area:	9.83	sq ft
Average Velocity:	0.71	ft/s
Maximum Velocity:	0.89	ft/s
Composite n:	0.0263	
Hydraulic Radius:	0.16	ft
Wetted Perimeter:	61.69	ft
Wetted Top Width:	61.63	ft
Critical Slope:	0.0492	ft/ft

Glendale Peoria ADMP: Section 15 Detailed Study

Approximate Roadway Geometry with Normal Depth Calculations

Villa Chula downstream of intersection with 90th Ave, 10yr

Entellus



Normal Depth Results

Cross-Section:	7	
Elevation:	0.32	ft MSL
Depth:	0.32	ft
Discharge:	9.00	cfs
Energy Gradient:	0.0047	ft/ft
Froude Number:	0.5067	
Flow Regime:	Subcritical	
Flow Area:	5.51	sq ft
Average Velocity:	1.68	ft/s
Maximum Velocity:	1.76	ft/s
Composite n:	0.0215	
Hydraulic Radius:	0.2	ft
Wetted Perimeter:	27.97	ft
Wetted Top Width:	27.92	ft
Critical Slope:	0.0189	ft/ft

Capacity of Villa Chula before 90th Ave. = 9.0 cfs

Glendale Peoria ADMP: Section 15 Detailed Study
Approximate Roadway Geometry with Normal Depth Calculations
Villa Chula upstream of intersection with 90th Ave.

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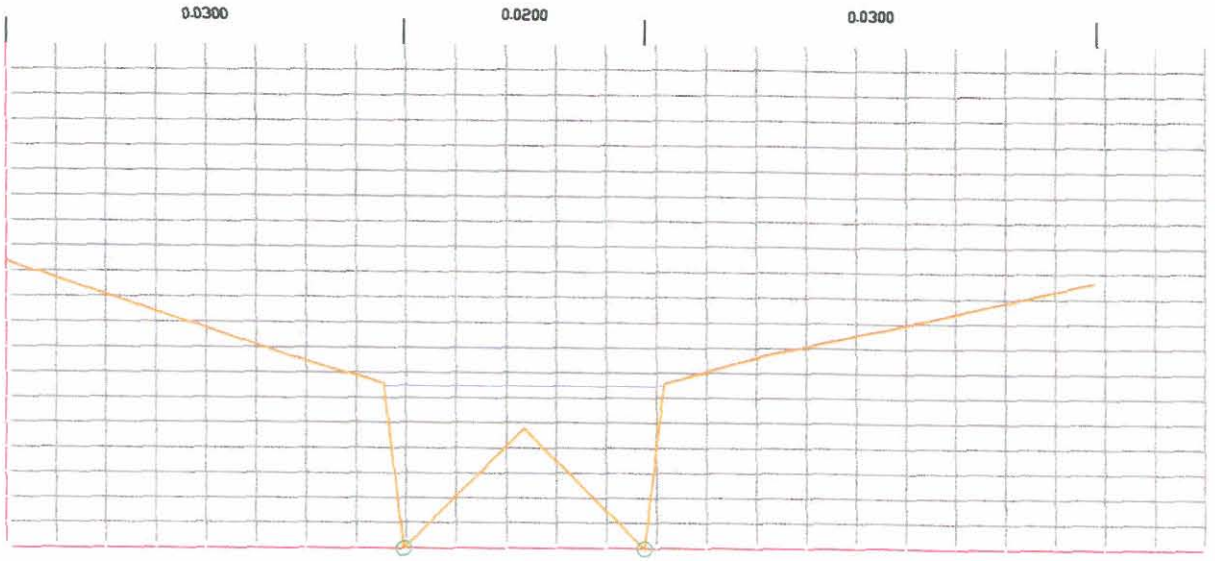

Normal Depth Results

Cross-Section:	8	
Elevation:	0.32	ft MSL
Depth:	0.32	ft
Discharge:	3.50	cfs
Energy Gradient:	0.0007	ft/ft
Froude Number:	0.1956	
Flow Regime:	Subcritical	
Flow Area:	5.54	sq ft
Average Velocity:	0.65	ft/s
Maximum Velocity:	0.68	ft/s
Composite n:	0.0215	
Hydraulic Radius:	0.2	ft
Wetted Perimeter:	27.99	ft
Wetted Top Width:	27.93	ft
Critical Slope:	0.0189	ft/ft

Capacity of Villa Chula after 90th Ave. = 3.5 cfs

Glendale Peoria ADMP: Section 15 Detailed Study
Approximate Roadway Geometry with Normal Depth Calculations
Villa Chula downstream of intersection with 90th Ave.

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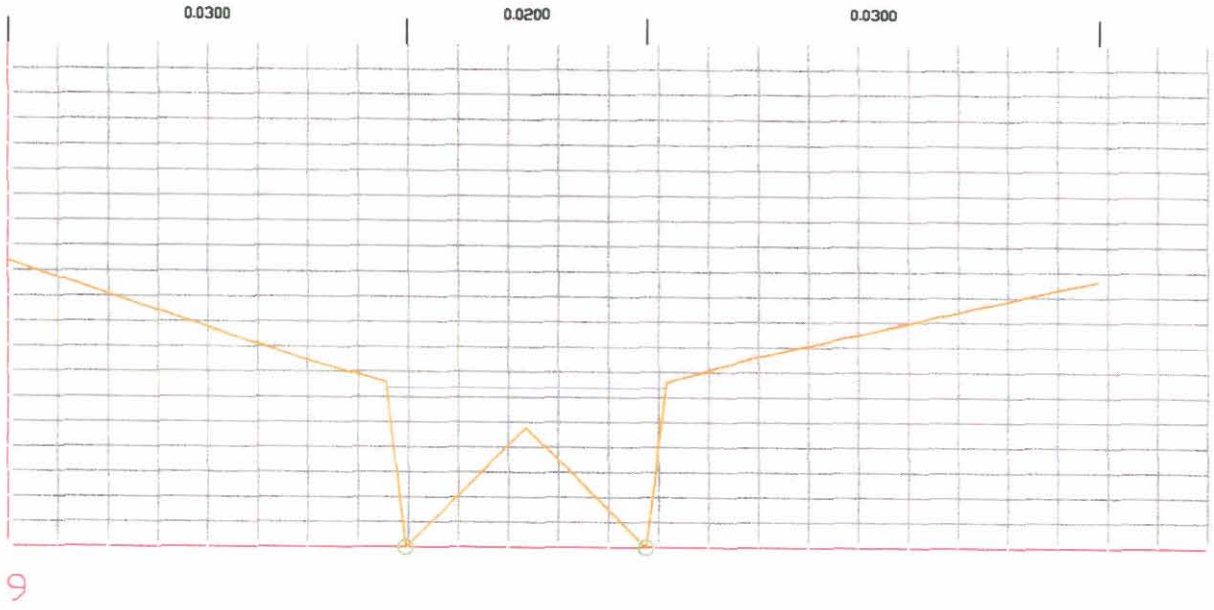

Normal Depth Results

Cross-Section:	9	
Elevation:	0.32	ft MSL
Depth:	0.32	ft
Discharge:	11.00	cfs
Energy Gradient:	0.0065	ft/ft
Froude Number:	0.6396	
Flow Regime:	Subcritical	
Flow Area:	5.37	sq ft
Average Velocity:	1.94	ft/s
Maximum Velocity:	2.04	ft/s
Composite n:	0.0215	
Hydraulic Radius:	0.19	ft
Wetted Perimeter:	27.92	ft
Wetted Top Width:	27.86	ft
Critical Slope:	0.0192	ft/ft

Capacity of 90th Ave., north of Villa Chula= 11.0 cfs

Glendale Peoria ADMP: Section 15 Detailed Study
Approximate Roadway Geometry with Normal Depth Calculations
90th Ave. upstream of intersection with Villa Chula

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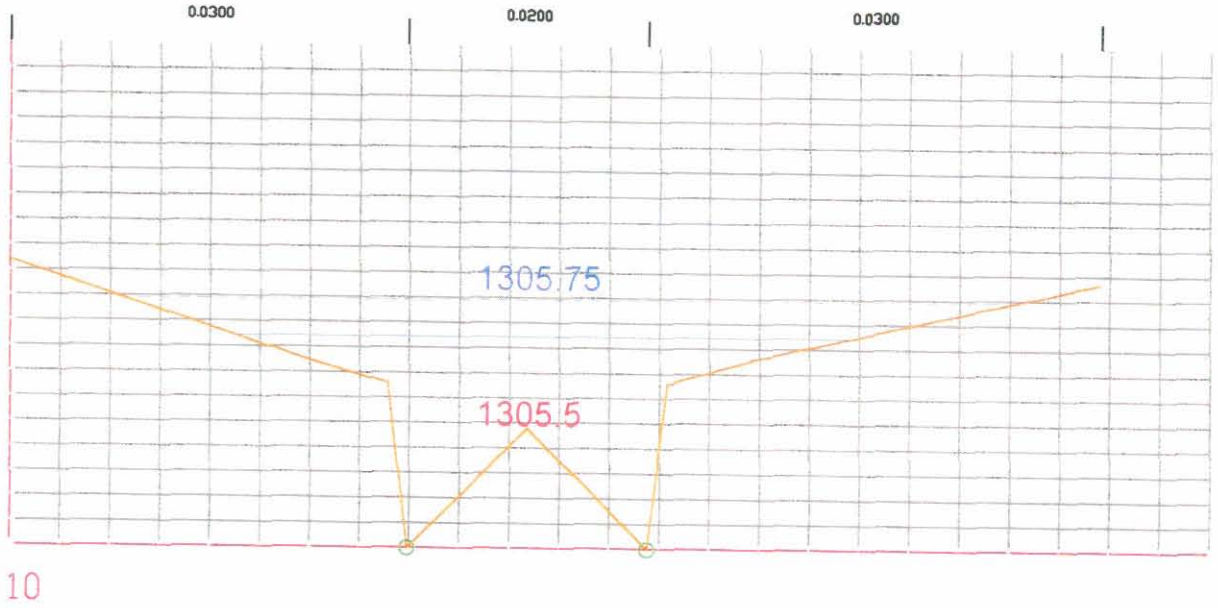

Normal Depth Results

Cross-Section:	10	
Elevation:	0.42	ft MSL
Depth:	0.42	ft
Discharge:	7.00	cfs
Energy Gradient:	0.0007	ft/ft
Froude Number:	0.1931	
Flow Regime:	Subcritical	
Flow Area:	9.83	sq ft
Average Velocity:	0.71	ft/s
Maximum Velocity:	0.89	ft/s
Composite n:	0.0263	
Hydraulic Radius:	0.16	ft
Wetted Perimeter:	61.69	ft
Wetted Top Width:	61.63	ft
Critical Slope:	0.0492	ft/ft

Intersection of 90th Ave., and Villa Chula w/ elevation increase due to direction change (10yr), W.S.E.= 1305.75

Glendale Peoria ADMP: Section 15 Detailed Study

Approximate Roadway Geometry with Normal Depth Calculations

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Normal Depth Results

Cross-Section:	11	
Elevation:	0.72	ft MSL
Depth:	0.72	ft
Discharge:	36.00	cfs
Energy Gradient:	0.0007	ft/ft
Froude Number:	0.1891	
Flow Regime:	Subcritical	
Flow Area:	39.48	sq ft
Average Velocity:	0.88	ft/s
Maximum Velocity:	1.41	ft/s
Composite n:	0.0279	
Hydraulic Radius:	0.36	ft
Wetted Perimeter:	109.23	ft
Wetted Top Width:	109.17	ft
Critical Slope:	0.0317	ft/ft

Intersection of 90th Ave., and Villa Chula w/ elevation increase due to direction change (100yr), W.S.E.= 1306.25

Glendale Peoria ADMP: Section 15 Detailed Study

Approximate Roadway Geometry with Normal Depth Calculations

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APPENDIX E. COST ESTIMATE DATA

E.1. General Cost Estimate Tables For Potential Alternatives

Part 1: Costs Associated With All Alternatives

Part 2: Alternative 1
Part 3: Alternative 2
Part 4: Alternative 3a, 3b
Part 5: Alternative 4
Part 6: Summary and Overview/ Rankings

Typical Costs: Construct lateral channels on Deer Valley Road between 85th and 91st Ave. Box cullverts installed along Deer valley Road at 87th, 89th and 91st Avenues. Dual ditch constructed along Williams Road between 83rd and 90th Avenues. Construction of the previously proposed channel along 85th Avenue between Via Montoya and Deer Valley Road is not included in this cost comparison.

ROADWAY/ DITCH SECTIONS

Location	Description	Total Width [feet]	Cross Slope [percent]	Length [feet]	Compaction Allowance [inches]	Left Ditch Invert Depth [ft]	Left Ditch Shoulder Slope [percent]	Left Ditch Bank Slope [percent]	Right Ditch Invert Depth [ft]	Right Ditch Shoulder Slope [percent]	Right Ditch Shoulder Slope [percent]	Area [sqft]	EXCAVATION VOLUME [cubic feet]	EXCAVATION VOLUME [cubic yards]
Lateral along Williams Road between 83rd and 90th Avenues	Dual ditch, 14' wide	50	2	4300	6	0.6	4	12	0.6	4	12	51	218225	8082

SUMMARY

Item	Quantity	Unit Cost	Cost
Excavation [cubic yards]	19169	3	$57,507
Compaction and Grading [sq yards]	38542	1	$38,542
Special Crossings/ Culverts	---	---	$199,200
Right of Way Purchase [sq acres]	3	100,000	$308,138
Other Expenses			$0
COMMON COSTS			**$603,388**

CHANNEL SECTIONS

Location	Compaction Allowance [inches]	Description	Length [ft]	Top Width [ft]	Bottom Width [ft]	Depth [ft]	Area [sqft]	EXCAVATION VOLUME [cubic feet]	EXCAVATION VOLUME [cubic yards]
85th Avenue between Via Montoya and Deer Valley Road	6	47' Channel designed and constructed by others, 6:1 slopes, earthen	1300	47	32	2	79	131625	4875
Deer Valley Road between 85th and 87th Avenues	6	45' Lateral channel, trapezoidal, earthen	1300	45	30	1	37.5	75075	2781
Deer Valley Road between 87th and 88th Avenues	6	35' Lateral channel, trapezoidal, earthen	640	35	20	1	27.5	27360	1013
Deer Valley Road between 88th and 89th Avenues	6	35' Lateral channel, trapezoidal, earthen	640	35	20	1	27.5	27360	1013
Deer Valley Road between 90th and 89th Avenues	6	15' Triangular lateral ditch	640	15	0	1	7.5	8160	302
Deer Valley Road between 90th and 91st Avenues	6	40' Lateral channel, trapezoidal, earthen	640	40	20	1	30	29760	1102

Total Excavation [cubic yards] 19169

NOTES

COMPACTION AND GRADING

Location	Description	Total Width [ft]	Length [ft]	Area [sqft]
85th Avenue between Via Montoya and Deer Valley Road, Deer Valley Road between 90 and 91st	47' Channel	47	1940	91180
Deer Valley Road between 85th and 87th Avenues	45' Channel	45	1300	58500
Deer Valley Road between 87th and 89th Avenues, and 90th to 91st Avenues	35' Channels	35	1920	67200
Deer Valley Road between 90th and 89th Avenues	15' Ditches	15	640	9600
Lateral along Williams Road between 83rd and 90th Avenues	Dual 14' Ditches	28	4300	120400

Total Compaction Surface Area [sqft] 346880

SPECIAL CROSSINGS/ CULVERTS

Description	Quantity	Unit Cost
6' X 3' Box culvert at Deer Valley Road and 91st Ave	1	$20,000
8' X 3' Box culvert at 89th Ave and Deer Valley Road	1	$27,200
Two 8' X 3' Box culverts at 87th Ave and Deer Valley Road	1	$53,600
6' X 3' Box culvert at Deer Valley Road and 85th Ave by others	1	$20,000
Driveway crossings along Deer Valley Road (concrete, sqft)	7280	$5
Driveway crossings along Williams Road (Concrete, sqft)	8400	$5

Special Crossings Estimated Cost $199,200

RIGHT OF WAY PURCHASE

Location	Description	Width [ft]	Length [ft]	Area [sqft]
Deer Valley Road between 90 and 91st	Trapezoidal channel	40	630	25200
Deer Valley Road between 89th and 90th	Triangular ditch	15	475	7125
Deer Valley Road between 89th and 87th	Trapezoidal channel	35	1240	43400
Deer Valley Road between 87th and 85th	Trapezoidal channel	45	1300	58500

TOTAL RIGHT OF WAY PURCHASE [SQ ACRE] 3

OTHER EXPENSES

Description	Quantity	Unit Cost

TOTAL OTHER EXPENSES $0

Glendale Peoria Area Drainage Master Plan Update

Detailed Study of Section 15: General Cost Estimate of Alternatives for Storm Runoff Conveyance South of Williams Road

Entellus

Part 1: Costs Associated With All Alternatives

Part 2: Alternative 1

Part 3: Alternative 2
Part 4: Alternative 3a, 3b
Part 5: Alternative 4
Part 6: Summary and Overview/ Rankings

Alternative 1: Install a storm drain along the 85th Avenue alignment between Williams Road and Via Montoya. Construct single channels along 87th and 89th Avenues. Lateral channels and ditches constructed along Williams Road and Deer Valley Road. Construction of the previously proposed channel along 85th Avenue between Via Montoya and Deer Valley Road is not included in this cost comparison.

ROADWAY/ DITCH SECTIONS

Location	Description	Total Width [feet]	Cross Slope [percent]	Length [feet]	Compaction Allowance [inches]	Left Ditch Invert Depth [ft]	Left Ditch Shoulder Slope [percent]	Left Ditch Bank Slope [percent]	Right Ditch Invert Depth [ft]	Right Ditch Shoulder Slope [percent]	Right Ditch Shoulder Slope [percent]	Area [sqft]	EXCAVATION VOLUME [cubic feet]	EXCAVATION VOLUME [cubic yards]

SUMMARY

Item	Quantity	Unit Cost	Cost
Excavation [cubic yards]	14023	3	$42.069
Compaction and Grading [sq yards]	29467	1	$29.467
Special Crossings/ Culverts	---	---	$1,089,824
Right of Way Purchase [sq acres]	1.19	100000	$119,376
Other Expenses	---	---	$0
Costs for Features Typical of All Alternatives (See Part 1)			$603,388

TOTAL ESTIMATED COST, ALT 1 $1,884,123

NOTES

The channels along 87th and 89th Avenues would cross many driveways. These driveways would need to be accommodated with concrete aprons or culverts. These costs have not been included in this preliminary cost comparison.

CHANNEL SECTIONS

Location	Compaction Allowance [inches]	Description	Length [ft]	Top Width [ft]	Bottom Width [ft]	Depth [ft]	Area [sqft]	EXCAVATION VOLUME [cubic feet]	EXCAVATION VOLUME [cubic yards]
87th Avenue between Williams Road and Deer Valley Road	6	Trapezoidal channel, 80 cfs capacity, 0.5 ft flow depth	2600	56	44	1	50	198900	7367
89th Avenue between Williams Road and Deer Valley Road	6	Trapezoidal channel, 115 cfs capacity, 0.75 ft flow depth	2600	46	31	1.25	48.125	179725	6656
							Total Excavation [cubic yards]		**14023**

COMPACTION AND GRADING

Location	Description	Total Width [ft]	Length [ft]	Area [sqft]
87th Avenue between Williams Road and Deer Valley Road	Trapezoidal channel, 80 cfs capacity, 0.5 ft flow depth	56	2600	145600
89th Avenue between Williams Road and Deer Valley Road	Trapezoidal channel, 130 cfs capacity, 1 ft flow depth	46	2600	119600
			Total Compaction Surface Area [sqft]	**265200**

SPECIAL CROSSINGS/ CULVERTS

Description	Quantity	Unit Cost
1 8' X 3' Box culvert storm drain between Williams Road and Via Montoya along 85th Avenue (130cfs)	1	$894,824
Channel/ ditch crossings along 87th Ave	19	$5,000
Channel/ ditch crossings along 89th Ave	8	$5,000
Roadway crossings along 87th Ave	3	$15,000
Roadway crossings along 89th Ave	1	$15,000
	Special Crossings Estimated Cost	**$1,089,824**

RIGHT OF WAY PURCHASE

Location	Description	Width [ft]	Length [ft]	Area [sqft]
ROW needed along 89th Avenue between Williams Road and Deer Valley Road	Extra ROW needed to accommodate earthen channel	20	2600	52000
			TOTAL RIGHT OF WAY PURCHASE [SQ ACRE]	**1.19**

OTHER EXPENSES

Description	Quantity	Unit Cost
	TOTAL OTHER EXPENSES	**$0**

Glendale Peoria Area Drainage Master Plan Update

Detailed Study of Section 15: General Cost Estimate of Alternatives for Storm Runoff Conveyance South of Williams Road

Entellus

Part 1: Costs Associated With All Alternatives
Part 2: Alternative 1

Part 3: Alternative 2

Part 4: Alternative 3a, 3b
Part 5: Alternative 4
Part 6: Summary and Overview/ Rankings

Alternative 2: Install a storm drain along the 85th Avenue alignment between Williams Road and Via Montoya. Construct a single channel along 89th Avenue. Lateral channels and ditches constructed along Williams Road and Deer Valley Road. Construction of the previously proposed channel along 85th Avenue between Via Montoya and Deer Valley Road is not included in this cost comparison.

ROADWAY/ DITCH SECTIONS

Location	Description	Total Width [feet]	Cross Slope [percent]	Length [feet]	Compaction Allowance [inches]	Left Ditch Invert Depth [ft]	Left Ditch Shoulder Slope [percent]	Left Ditch Bank Slope [percent]	Right Ditch Invert Depth [ft]	Right Ditch Shoulder Slope [percent]	Right Ditch Shoulder Slope [percent]	Area [sqft]	EXCAVATION VOLUME [cubic feet]	EXCAVATION VOLUME [cubic yards]

SUMMARY

Item	Quantity	Unit Cost	Cost
Excavation [cubic yards]	9858	3	$29.575
Compaction and Grading [sq yards]	18778	1	$18.778
Special Crossings/ Culverts	---	---	$1,142,408
Right of Way Purchase [sq acres]	2.39	$100,000	$238.751
Other Expenses	---	---	$0
Costs for Features Typical of All Alternatives (See Part 1)			$603,388

TOTAL ESTIMATED COST, ALT2 $2,032,900

NOTES

CHANNEL SECTIONS

Location	Compaction Allowance [inches]	Description	Length [ft]	Top Width [ft]	Bottom Width [ft]	Depth [ft]	Area [sqft]	EXCAVATION VOLUME [cubic feet]	EXCAVATION VOLUME [cubic yards]
89th Avenue between Williams Road and Deer Valley Road	6	Trapezoidal channel, 180 cfs capacity, 1 ft flow depth	2600	65	50	1.25	71.875	266175	9858
							Total Excavation [cubic yards]		**9858**

COMPACTION AND GRADING

Location	Description	Total Width [ft]	Length [ft]	Area [sqft]
89th Avenue between Williams Road and Deer Valley Road	Trapezoidal channel, 180 cfs capacity, 1 ft flow depth	65	2600	169000
			Total Compaction Surface Area [sqft]	**169000**

SPECIAL CROSSINGS/ CULVERTS

Description	Quantity	Unit Cost
1 10' X 3' Box culvert storm drain between Williams Road and Via Montoya along 85th Avenue (175cfs)	1	$1,087,408
Channel/ ditch crossings along 89th Ave	8	$5,000
Roadway crossings along 89th	1	$15,000
	Special Crossings Estimated Cost	**$1,142,408**

RIGHT OF WAY PURCHASE

Location	Description	Width [ft]	Length [ft]	Area [sqft]
89th Avenue between Williams Road and Deer Valley Road	ROW needed for earthen channel	40	2600	104000
			TOTAL RIGHT OF WAY PURCHASE [SQ ACRE]	**2.39**

OTHER EXPENSES

Description	Quantity	Unit Cost
	TOTAL OTHER EXPENSES	**$0**

Part 1: Costs Associated With All Alternatives
Part 2: Alternative 1
Part 3: Alternative 2

Part 4: Alternative 3

Part 5: Alternative 4
Part 6: Summary and Overview/ Rankings

Alternative 3: Construct a basin north of Williams Road at either 87th Avenue or 89th Avenues, in addition to the improvements of alternative 1 or alternative 2.

ROADWAY/ DITCH SECTIONS

Location	Description	Total Width [feet]	Cross Slope [percent]	Length [feet]	Compaction Allowance [inches]	Left Ditch Invert Depth [ft]	Left Ditch Shoulder Slope [percent]	Left Ditch Bank Slope [percent]	Right Ditch Invert Depth [ft]	Right Ditch Shoulder Slope [percent]	Right Ditch Shoulder Slope [percent]	Area [sqft]	EXCAVATION VOLUME [cubic feet]	EXCAVATION VOLUME [cubic yards]

SUMMARY

Item	Quantity	Unit Cost	Cost
Excavation [cubic yards]	8799	3	$26.397
Compaction and Grading [sq yards]	19356	1	$19.356
Special Crossings/ Culverts	---	---	$1,089,824
Right of Way Purchase [sq acres]	6.86	$100,000	$685,709
Other Expenses	---	---	$0
Costs For Features Typical of All Alternatives (See Part 1)			$603,388
TOTAL ESTIMATED COST			**$2,424,674**

NOTES

CHANNEL SECTIONS

Location	Compaction Allowance [inches]	Description	Length [ft]	Top Width [ft]	Bottom Width [ft]	Depth [ft]	Area [sqft]	EXCAVATION VOLUME [cubic feet]	EXCAVATION VOLUME [cubic yards]
89th Avenue between Williams Road and Deer Valley Road	6	Trapezoidal channel, 90 cfs capacity, 1 ft flow depth	2600	39	24	1.25	39.375	147875	5477
87th Avenue between Williams Road and Deer Valley Road	6	Trapezoidal channel, 35 cfs capacity, 0.5 ft flow depth	2600	28	16	1	22	89700	3322
							Total Excavation [cubic yards]		**8799**

COMPACTION AND GRADING

Location	Description	Total Width [ft]	Length [ft]	Area [sqft]
89th Avenue between Williams Road and Deer Valley Road	Trapezoidal channel, 90 cfs capacity, 1 ft flow depth	39	2600	101400
87th Avenue between Williams Road and Deer Valley Road	Trapezoidal channel, 35 cfs capacity, 0.5 ft flow depth	28	2600	72800
			Total Compaction Surface Area [sqft]	**174200**

SPECIAL CROSSINGS/ CULVERTS

Description	Quantity	Unit Cost
1 8' X 3' Box culvert storm drain between Williams Road and Via Montoya along 85th Avenue (130cfs)	1	$894,824
Channel/ ditch crossings along 87th Ave	19	$5,000
Channel/ ditch crossings along 89th Ave	8	$5,000
Roadway crossings along 87th Ave	3	$15,000
Roadway crossings along 89th Ave	1	$15,000
	Special Crossings Estimated Cost	**$1,089,824**

RIGHT OF WAY PURCHASE

Location	Description	Width [ft]	Length [ft]	Area [sqft]
Land for detention basin at Williams Road and 89th Avenue	Detention basin reduces flow along 89th Avenue by 30%			128149
Land for detention basin at Williams Road and 87th Avenue	Detention basin reduces flow along 87th Avenue by 60%			136746
Extra ROW for 89th Avenue channel	ROW for earthen channel	13	2600	33800
	TOTAL RIGHT OF WAY PURCHASE [SQ ACRE]			**6.86**

OTHER EXPENSES

Description	Quantity	Unit Cost
	TOTAL OTHER EXPENSES	**$0**

Part 1: Costs Associated With All Alternatives
Part 2: Alternative 1
Part 3: Alternative 2
Part 4: Alternative 3a, 3b

Part 5: Alternative 4

Part 6: Summary and Overview/ Rankings

Alternative 4: Install a storm drain along the 85th Avenue alignment between Williams Road and Via Montoya. Construct ditches on both sides of the existing roadways within the right of ways of 85th, 87th, 88th, 89th, and 90th Avenues, between Williams Road and Deer Valley Road. Construction of the previously proposed channel along 85th Avenue between Via Montoya and Deer Valley Roads is not included with this cost comparison.

ROADWAY/ DITCH SECTIONS

Location	Description	Total Width [feet]	Cross Slope [percent]	Length [feet]	Compaction Allowance [inches]	Left Ditch Invert Depth [ft]	Left Ditch Shoulder Slope [percent]	Left Ditch Bank Slope [percent]	Right Ditch Invert Depth [ft]	Right Ditch Shoulder Slope [percent]	Right Ditch Shoulder Slope [percent]	Area [sqft]	EXCAVATION VOLUME [cubic feet]	EXCAVATION VOLUME [cubic yards]
90th Ave between Williams Road and Deer Valley Road	Dual 13' triangular ditches	50	2	2600	6	0.6	4	12	0.6	4	12	51	131950	4887
89th Ave between Williams Road and Deer Valley Road	Dual 13' triangular ditches	50	2	2600	6	0.6	4	12	0.6	4	12	51	131950	4887
88th Ave between Williams Road and Deer Valley Road	Dual 13' triangular ditches	50	2	2600	6	0.6	4	12	0.6	4	12	51	131950	4887
87th Ave between Williams Road and Deer Valley Road	Dual 28' triangular ditches	80	2	2600	6	0.9	4	12	0.9	4	12	93	241800	8956
													0	0

SUMMARY

Item	Quantity	Unit Cost	Cost
Excavation [cubic yards]	23617	3	$70.850
Compaction and Grading [sq yards]	48533	1	$48.533
Special Crossings/ Culverts	---	---	$1,129.324
Right of Way Purchase [sq acres]	0		$0
Other Expenses	---	---	$0
Costs For Features Typical of All Alternatives (See Part 1)			$603.388
TOTAL ESTIMATED COST, ALT 4			**$1,852,095**

NOTES

CHANNEL SECTIONS

Location	Compaction Allowance [inches]	Description	Length [ft]	Top Width [ft]	Bottom Width [ft]	Depth [ft]	Area [sqft]
						Total Excavation [cubic yards]	**23617**

COMPACTION AND GRADING

Location	Description	Total Width [ft]	Length [ft]	Area [sqft]
Ditches along 87th Ave	Triangular ditch	56	2600	145600
Ditches along 85th, 88th, 89th, and 90th Avenues	Triangular ditch	28	10400	291200
			Total Compaction Surface Area [sqft]	**436800**

SPECIAL CROSSINGS/ CULVERTS

Description	Quantity	Unit Cost
1 8' X 3' Box culvert storm drain between Williams Road and Via Montoya along 85th Avenue (130cfs)	1	$894,824
Channel/ ditch crossings along 87th Ave	19	$1,900
Channel/ ditch crossings along 90th, 89th, 88th and 85th Avenues	61	$1,900
Roadway crossings along 87th	3	$7,500
Roadway crossings along 90th, 89th, 88th and 85th Avenues	8	$7,500
	Special Crossings Estimated Cost	**$1,129,324**

RIGHT OF WAY PURCHASE

Location	Description	Width [ft]	Length [ft]	Area [sqft]
	TOTAL RIGHT OF WAY PURCHASE [SQ ACRE]			**0**

OTHER EXPENSES

Description	Quantity	Unit Cost
	TOTAL OTHER EXPENSES	**$0**

Glendale Peoria Area Drainage Master Plan Update
TABLE DS-4
Detailed Study of Section 15: Cost Estimate Summary For Potential Alternatives

Part 1: Costs Associated With All Alternatives
Part 2: Alternative 1
Part 3: Alternative 2
Part 4: Alternative 3a, 3b
Part 5: Alternative 4

Part 6: Summary and Overview/ Rankings

This spreadsheets shows the comparison of costs between each alternative. The weighted score was calculated using the alternative with the lowest associated cost estimate. The percent by which each alternative costs more than the this value was subtracted from 100 to get the score.

		Weighted Score (out of 100)
Alternative 1: Channels Along 89th and 87th Avenues with a Storm Drain Along 85th Avenue	**$1,884,123**	**98**
Alternative 2: Channels Along 89th Avenue with a Storm Drain Along 85th Avenue	**$2,032,900**	**91**
Alternative 3: Channels Along 89th and 87th Avenues with a Storm Drain Along 85th Avenue and Detention Basins north of Williams Road	**$2,424,674**	**76**
Alternative 4: Channels Along 89th and 87th Avenues with a Storm Drain Along 85th Avenue	**$1,852,095**	**100**

E.2 Detailed Cost Estimate For Recommended Alternative

Part 1: Excavation Quantities

Part 2: Compaction and Grading Quantities
Part 3: Special Crossings
Part 4: Miscellaneous
Part 5: Summary and Overview

This spreadsheet is used to approximate the excavation volume required for the construction of roadway, ditch and channel sections. The existing ground is assumed to be at the highest point of the section (usually the banks or crown).

ROADWAY SECTIONS

Location	Description	Road Width [feet]	Cross Slope [percent]	Length [feet]	Compaction Allowance [inches]	Left Ditch Invert Depth [ft]	Left Ditch Shoulder Slope [percent]	Left Ditch Bank Slope [percent]	Right Ditch Invert Depth [ft]	Right Ditch Shoulder Slope [percent]	Right Ditch Shoulder Slope [percent]	Area [sqft]	EXCAVATION VOLUME [cubic feet]	EXCAVATION VOLUME [cubic yards]
87th Avenue between Williams and Deer Valley	Normal Crown ROW varies between 75 - 85 feet	24	2	2700	6	0.9	4	12	0.9	4	12	64	173988	6444
88th Avenue between Williams and Deer Valley	Normal Crown ROW approx. 50 feet	24	2	2700	6	0.6	4	12	0.6	4	12	39	106488	3944
89th Avenue between Williams and Deer Valley	Normal Crown ROW approx. 50 feet	24	2	2700	6	0.6	4	12	0.6	4	12	39	106488	3944
90th Avenue between Williams and Deer Valley	Normal Crown ROW approx. 50 feet	24	2	2700	6	0.6	4	12	0.6	4	12	39	106488	3944
Williams Road between 90th and 84th	Normal Crown ROW varies between 75 - 85 feet	24	2	3800	6	0.9	4	12	0.9	4	12	64	244872	9069

NOTES

A channel is planned for construction on 85th Avenue between Via Montoya and Deer Valley Road.

CHANNEL SECTIONS

Location	Compaction Allowance [inches]	Description	Length [ft]	Top Width [ft]	Bottom Width [ft]	Depth [ft]	Area [sqft]		
Deer Valley Road between 90th and 91st	6	Trapezoidal Earthen/ 35 cfs	630	40	25	1	32.5	31658	1173
Deer Valley Road between 90th and 89th	6	Earth Triangular Ditch	475	15	0	1	7.5	6056	224
Deer Valley Road between 89th and 88th	6	Trapezoidal Earthen/ 30 cfs	620	32	20	1	26	25110	930
Deer Valley Road between 88th and 87th	6	Trapezoidal Earthen/ 30 cfs	620	35	20	1	27.5	26505	982
Deer Valley Road between 85th and 87th	6	Trapezoidal Earthen/ 40 cfs	1300	45	30	1	37.5	75075	2781
85th Avenue between Via Montoya and Deer Valley	6	Trapezoidal Earthen, 100cfs	1940	47	32	2	79	196425	7275

TOTAL EXCAVATION [Cubic Yards] 40709

Glendale Peoria Area Drainage Master Plan Update

Detailed Study of Section 15: Cost Estimate

Entellus

Part 1: Excavation Quantities
Part 2: Compaction and Grading Quantities
Part 3: Special Crossings
Part 4: Miscellaneous
Part 5: Summary and Overview

This spreadsheet is used to estimate the amount of surface area required for compaction. Areas that are to be paved were not included in these calculations.

Location	Description	Total Width [ft]	Length [ft]	Area [sqft]
87th Avenue Between Williams and Deer Valley	80' ROW, 2- 12' Travel Ways, 2 28' Ditches	56	2700	151200
88th Avenue Between Williams and Deer Valley	50' ROW, 2- 12' Travel Ways, 2 13' Ditches	28	2700	75600
89th Avenue Between Williams and Deer Valley	50' ROW, 2- 12' Travel Ways, 2 13' Ditches	28	2700	75600
90th Avenue Between Williams and Deer Valley	50' ROW, 2- 12' Travel Ways, 2 13' Ditches	28	2700	75600
Deer Valley Road Between 90th and 91st	Trapezoidal Earthen	40	630	25200
Deer Valley Road Between 90th and 89th	Triangular Earthen	15	475	7125
Deer Valley Road Between 89th and 88th	Trapezoidal Earthen	35	620	21700
Deer Valley Road Between 88th and 87th	Trapezoidal Earthen	35	620	21700
Deer Valley Road Between 85th and 87th	Trapezoidal Earthen	45	1300	58500
Williams Road Between 84th and 90th	80' ROW, 2- 12' Travel Ways, 2 28' Ditches	56	3800	212800

TOTAL COMPACTION SURFACE AREA [SQFT] 725025

Glendale Peoria Area Drainage Master Plan Update

Detailed Study of Section 15: Cost Estimate

Entellus

Part 1: Excavation Quantities
Part 2: Compaction and Grading Quantities
Part 3: Special Crossings
Part 4: Miscellaneous
Part 5: Summary and Overview

This spreadsheet is used to tally the number of special crossings within the project area. These crossings included culverts, concrete skirts, and others.

NOTES

Culvert calculations assumed inlet control, and that HW/D=1. The capacity estimations for the culverts also reflect a 2 foot height for all culverts, in order to account for fill.

CULVERTS

Location	Description	Size [ft x ft]	Length [ft]	Capacity Before Overtopping [cfs]	Concrete [cubic yard]
91st Avenue and Deer Valley	Concrete Box Culvert	6 x 3	40	48	25
89th Avenue and Deer Valley	Concrete Box Culvert	8 x 3	40	64	34
85th Avenue and Deer Valley	Concrete Box Culvert	(2) 8 x 3	40	120	67
85th Avenue Storm Drain between Williams and Via Montoya	Concrete Box Culvert	8 x 3	1340	110	1127
87th Avenue and Deer Valley	Concrete Box Culvert	(2) 8 x 3	40	128	67

TOTAL STRUCTURAL CONCRETE REQUIRED FOR CULVERTS [Cubic Yard] 1321

DRIVEWAY CROSSING, CONCRETE SKIRTS

Location	Description	Quantity	Concrete Area [sqft]	Total Concrete Area [sqft]
87th Avenue	20 foot driveway	19	560	10640
88th Avenue	20 foot driveway	27	260	7020
89th Avenue	20 foot driveway	8	260	2080
90th Avenue	20 foot driveway	16	260	4160
Deer Valley Road	20 foot driveway	14	520	7280
Williams Road	20 foot driveway	15	560	8400

TOTAL DRIVEWAY CROSSING CONCRETE APRONS [SQFT] 39580

ROADWAY CROSSING, CONCRETE SKIRTS

Location	Description	Quantity	Concrete Area [sqft]	Total Concrete Area [sqft]
87th Avenue	24 foot crossing	3	1500	4500
88th Avenue	24 foot crossing	0	1500	0
89th Avenue	24 foot crossing	1	1500	1500
90th Avenue	24 foot crossing	1	1500	1500
Deer Valley Road	24 foot crossing	0	1500	0
Williams Road	24 foot crossing	0	1500	0

TOTAL ROADWAY CROSSING CONCRETE SKIRTS [SQFT] 7500

DITCH CROSSINGS

Location	Description	Quantity
87th Avenue and Deer Valley	Cut Section in roadway, with grated cover. Conveys flow from ditch on one side of roadway to the other- before a culvert	1
89th Avenue and Deer Valley	Cut Section in roadway, with grated cover. Conveys flow from ditch on one side of roadway to the other- before a culvert	1
Williams Road	Cut Section in roadway, with grated cover. Conveys flow from ditch on one side of roadway to the other	5

TOTAL NUMBER OF DITCH CROSSINGS 7

Part 1: Excavation Quantities
Part 2: Compaction and Grading Quantities
Part 3: Special Crossings
Part 4: Miscellaneous
Part 5: Summary and Overview

RIGHT OF WAY PURCHASES

Location	Description	Width [ft]	Length [ft]	Area [sqft]
Deer Valley Road between 90th and 91st	North of Deer Valley, Channel	40	630	25200
Deer Valley Road between 89th and 90th	North of Deer Valley, Channel	15	475	7125
Deer Valley Road between 87th and 89th	North of Deer Valley, Channel	35	1240	43400
Deer Valley Road between 87th and 85th	North of Deer Valley, Channel	45	1300	58500

TOTAL RIGHT OF WAY PURCHASE [SQ ACRE] 3

Glendale Peoria Area Drainage Master Plan Update

Detailed Study of Section 15: Cost Estimate For Recommended Alternative

Entellus

Part 1: Excavation Quantities
Part 2: Compaction and Grading Quantities
Part 3: Special Crossings
Part 4: Miscellaneous
Part 5: Summary and Overview

This spreadsheet summarizes the total quantities found from parts 1-4, and allows for a total cost to be estimated by inserting a unit cost.

Description	Quantity [units]	Unit Cost [dollars/unit]	Total Cost [dollars]
Excavation, Cubic Yards	40709	3	$122,128
Compaction, Square Yards	26853	1	$26,853
Structural Concrete For Culverts, Cubic Yarc	1320.54	800	$1,056,432
Concrete Driveway Crossings, Square Feet	39580	5	$197,900
Concrete Roadway Crossings, Square Feet	7500	5	$37,500
Grated Ditch Crossings Across Roadway	7	5000	$35,000
Right of Way Purchase, Square Acre	3	100000	$308,138

TOTAL UNIT COST $1,783,951

APPENDIX F. 10-YR 6-HR EXISTING CONDITIONS HEC-1 OUTPUT

```
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*                                   *
*   FLOOD HYDROGRAPH PACKAGE  (HEC-1)  *
*            MAY   1991             *
*          VERSION 4.0.1E           *
*    Lahey F77L-EM/32 version 5.01  *
*      Dodson & Associates, Inc.    *
*     DATE  06/28/01  TIME  11:04:23  *
*************************************
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*************************************
*                                   *
*    U.S. ARMY CORPS OF ENGINEERS   *
*    HYDROLOGIC ENGINEERING CENTER  *
*          609 SECOND STREET        *
*       DAVIS, CALIFORNIA 95616     *
*           (916) 551-1748          *
*                                   *
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X     X  XXXXXXX   XXXXX          X
X     X  X        X     X        XX
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XXXXXXX  XXXX     X       XXXXX  X
X     X  X        X              X
X     X  X        X     X        X
X     X  XXXXXXX   XXXXX        XXX
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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

HEC-1 INPUT


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

  1           ID   Project ID: SECTION 15 - Major Basin: 01 - Return Period: 10 Years
  2           ID   ****************************************************************************
  3           ID   **                                                                        **
  4           ID   **                    Glendale/Peoria ADMP Update                         **
  5           ID   **                                                                        **
  6           ID   ****************************************************************************
  7           ID   ****************************************************************************
  8           ID   PROJECT:                 Glendale Peoria ADMP Update
  9           ID   CLIENT:                  Flood Control District of Maricopa County
 10           ID   PREPARED BY:             Entellus, Inc.
 11           ID   PROJECT No:              FCD 99-44 (C.O.)            Entellus 310.017
 12           ID   FILE NAME: SECT1510.DAT                     CREATED DATE: MAR. 15, 2001
 13           ID   MODIFIED:
 14           ID   STORM:                   10-year 6-hour Storm
 15           ID   DEVELOPMENT CONDITIONS: Existing Conditions
 16           ID
 17           ID      THIS IS THE DETAILED NEIGHBORHOOD STUDY AREA (SECTION 15) AND BASINS
 18           ID      FLOWING INTO THIS AREA ONLY.
 19           ID
 20           ID   DDM MCUHP1
              *
              *
              *
              * ****************************************************************************
 21           IT       2                    1000
 22           IO       5
              *
              *DIAGRAM
              *
              *
              *
 23           IN      15
 24           JD    2.03     0.01
 25           PC   0.000    0.008    0.016    0.025    0.033    0.041    0.050    0.058    0.066    0.074
 26           PC   0.087    0.099    0.118    0.138    0.216    0.377    0.834    0.911    0.931    0.950
 27           PC   0.962    0.972    0.983    0.991    1.000
 28           JD   2.017     0.50
 29           JD   1.979     2.80
 30           PC   0.000    0.009    0.016    0.025    0.034    0.042    0.051    0.059    0.067    0.076
 31           PC   0.087    0.100    0.120    0.163    0.252    0.451    0.694    0.837    0.900    0.938
 32           PC   0.950    0.963    0.975    0.988    1.000
 33           JD   1.872     16.0
 34           PC   0.000    0.009    0.020    0.030    0.048    0.063    0.076    0.090    0.105    0.119
 35           PC   0.135    0.152    0.175    0.222    0.304    0.472    0.670    0.796    0.868    0.912
 36           PC   0.946    0.960    0.973    0.987    1.000
 37           JD   1.648     90.0
 38           PC   0.000    0.021    0.035    0.051    0.071    0.087    0.105    0.125    0.143    0.160
 39           PC   0.179    0.201    0.232    0.281    0.364    0.500    0.658    0.773    0.841    0.888
 40           PC   0.927    0.945    0.964    0.982    1.000
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 41          JD   1.157   500.0
 42          PC   0.000   0.024   0.043   0.059   0.078   0.098   0.119   0.141   0.162   0.186
 43          PC   0.212   0.239   0.271   0.321   0.408   0.515   0.627   0.735   0.814   0.864
 44          PC   0.907   0.930   0.954   0.977   1.000
             *
                                          HEC-1 INPUT                                          PAGE  2

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


 45          KK   N11P1   BASIN
 46          BA    .117
 47          LG    0.34    0.35    3.95    0.48       1
 48          UC   0.292   0.252
 49          UA       0     3.0     5.0     8.0    12.0    20.0    43.0    75.0    90.0    96.0
 50          UA     100
             *
             *
             * *** ROUTE RN11P1  ***********************************************************
             * ROUTE RN11P1 IS 2675 FT WITH A SLOPE OF 0.0103
             * CROSS SECTION IS A RURAL ROAD
             *
             * DDM   ***** Preserved *****

 51          KK  RN11P1
 52          RS       5   FLOW       0
 53          RC    0.04    0.03    0.04    2675  0.0103
 54          RX       0       1      70      75      95     100     136     137
 55          RY       8       3       1       0       0       1       3       8
             *
             *

 56          KK   N11L5   BASIN
 57          BA    .074
 58          LG    0.32    0.32    2.65    1.20       3
 59          UC   1.017   1.204
 60          UA       0     5.0    16.0    30.0    65.0    77.0    84.0    90.0    94.0    97.0
 61          UA     100
             *
             *

 62          KK   N11L1   BASIN
 63          BA    .074
 64          LG    0.31    0.35    2.65    1.35      12
 65          UC   0.883   0.894
 66          UA       0     5.0    16.0    30.0    65.0    77.0    84.0    90.0    94.0    97.0
 67          UA     100
             *
             *
             * *** DIVERSION DN11L1 ***********************************************************
             * SPLIT FLOW IS CALCULATED BASED ON EXISTING TOPOGRAPHY
             *
             * DDM   ***** Preserved *****

 68          KK  DN11L1
 69          DT  N11L1I
 70          DI       0      18      36      55      73      91     109     127     145
 71          DQ       0      13      23      34      46      57      69      80      91
             *
             *
             * *** ROUTE RN11LE ****************************************************************
             * ROUTE RN11LE IS 879 FT WITH A SLOPE OF 0.0011
             * CROSS SECTION IS PINNACLE PEAK ROAD (MEASURED)
             *
             * DDM   ***** Preserved *****
                                          HEC-1 INPUT                                          PAGE  3

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


 72          KK  RN11LE
 73          RS       7   FLOW       0
 74          RC    0.04    0.03    0.04     879   0.011
 75          RX       0       1      43      48      73      78     120     121
 76          RY       8       3       1       0       0       1       3       8
             *
             *
             * DDM   ***** Preserved *****

 77          KK  CN11L5
 78          HC       3
```

```
*
*
* *** DIVERSION DN11L5 ************************************************************
* THIS SPLIT IS BASED ON THE LEVEL 3 IMPROVEMENTS
*
* DDM    ***** Preserved *****

KK  DN11L5
DT  N11L5I
DI       0      18      36      55      73      91     109     127     145
DQ       0       0       0       0       0       0       0       0       0
*
*
* *** ROUTE RN11L5 ****************************************************************
* ROUTE RN11L5 IS 1300 FT WITH A SLOPE OF 0.0062
* CROSS SECTION IS A SUBDIVISION ROAD
*
* DDM    ***** Preserved *****

KK  RN11L5
RS       2   FLOW       0
RC    0.03    0.02    0.03    1300  0.0062
RX       0       1      50      55      77      82     149     150
RY       8       3       1       0       0       1       3       8
*
*

KK  N11I31   BASIN
BA    .016
LG    0.24    0.35    2.65    1.31      12
UC   0.579   0.791
UA       0     5.0    16.0    30.0    65.0    77.0    84.0    90.0    94.0    97.0
UA     100
*
*
* DDM    ***** Preserved *****

KK  C11I31
HC       2
*
*
* *** ROUTE R11I31 ****************************************************************
* ROUTE R11I31 IS 1307 FT WITH A SLOPE OF 0.0061
* CROSS SECTION IS A SUBDIVISION ROAD
*
* DDM    ***** Preserved *****
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LINE          ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10

KK  R11I31
RS       2   FLOW       0
RC    0.03    0.02    0.03    1307  0.0061
RX       0       1      70      75      97     102     139     140
RY       8       3       1       0       0       1       3       8
*
*

KK  N11I32   BASIN
BA    .041
LG    0.30    0.35    2.74    1.13       5
UC   0.679   0.589
UA       0     5.0    16.0    30.0    65.0    77.0    84.0    90.0    94.0    97.0
UA     100
*
*
* *** ROUTE R11I32 ****************************************************************
* ROUTE R11I32 IS 1759 FT WITH A SLOPE OF 0.0045
* CROSS SECTION IS A SUBDIVISION ROAD
*
* DDM    ***** Preserved *****

KK  R11I32
RS       3   FLOW       0
RC    0.03    0.02    0.03    1759  0.0045
RX       0       1      48      53      83      88     131     132
RY       8       3       2       0       0       2       3       8
*
*
```

```
 112          KK  N11I23   BASIN
 113          BA    .044
 114          LG    0.24    0.35    2.65    1.37      27
 115          UC   0.663   0.659
 116          UA       0     5.0    16.0    30.0    65.0    77.0    84.0    90.0    94.0    97.0
 117          UA     100
              *
              *
              * DDM   ***** Preserved *****

 118          KK  C11I23
 119          HC       3
              *
              *
              * *** ROUTE R11I23 ************************************************************
              * ROUTE R11I23 IS 1405 FT WITH A SLOPE OF 0.0071
              * CROSS SECTION IS A SMALLER SUBDIVISION ROAD
              *
              * DDM   ***** Preserved *****
                                          HEC-1 INPUT                                          PAGE  5

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

 120          KK  R11I23
 121          RS       3   FLOW       0
 122          RC    0.04    0.03    0.04    1405  0.0071
 123          RX       0       1      73      78     113     118     161     162
 124          RY       8       3       1       0       0       1       3       8
              *
              *

 125          KK  N11I14   BASIN
 126          BA    .029
 127          LG    0.31    0.35    2.65    1.37      13
 128          UC   0.654   0.660
 129          UA       0     3.0     5.0     8.0    12.0    20.0    43.0    75.0    90.0    96.0
 130          UA     100
              *
              *
              * DDM   ***** Preserved *****

 131          KK  C11I14
 132          HC       2
              *
              *
              * *** ROUTE R11I14 ************************************************************
              * ROUTE R11I14 IS 1275 FT WITH A SLOPE OF 0.0055
              * CROSS SECTION IS A SMALLER SUBDIVISION ROAD
              *
              * DDM   ***** Preserved *****

 133          KK  R11I14
 134          RS       3   FLOW       0
 135          RC    0.04    0.03    0.04    1275  0.0055
 136          RX       0       1      56      61     101     106     190     191
 137          RY       8       3       1       0       0       1       3       8
              *
              *

 138          KK   N11I4   BASIN
 139          BA    .023
 140          LG    0.31    0.30    2.65    1.38      13
 141          UC   0.646   0.704
 142          UA       0     5.0    16.0    30.0    65.0    77.0    84.0    90.0    94.0    97.0
 143          UA     100
              *
              *
              *
              * DDM   ***** Preserved *****

 144          KK  CN11I4
 145          HC       2
              *
              *
              *
                                          HEC-1 INPUT                                          PAGE  6

LINE          ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10
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```
146          KK  N11I24   BASIN
147          BA    .015
148          LG    0.24    0.29    2.65    1.38      29
149          UC   0.567   0.863
150          UA       0     5.0    16.0    30.0    65.0    77.0    84.0    90.0    94.0    97.0
151          UA     100
             *
             *
             * *** ROUTE R11I24 ************************************************************
             * ROUTE R11I24 IS 1365 FT WITH A SLOPE OF 0.0059
             * CROSS SECTION IS A SMALLER SUBDIVISION ROAD
             *
             * DDM   ***** Preserved *****

152          KK  R11I24
153          RS      10   FLOW       0
154          RC    0.04    0.03    0.04    1365  0.0059
155          RX       0       1      50      55      95     100     160     161
156          RY       8       3       2       0       0       2       3       8
             *
             *

157          KK   N11I3   BASIN
158          BA    .018
159          LG    0.30    0.35    2.65    1.39      14
160          UC   0.608   0.727
161          UA       0     5.0    16.0    30.0    65.0    77.0    84.0    90.0    94.0    97.0
162          UA     100
             *
             *
             * DDM   ***** Preserved *****

163          KK  CN11I3
164          HC       2
             *
             *
             * *** ROUTE RN11I3 *************************************************************
             * ROUTE RN11I3 IS 1310 FT WITH A SLOPE OF 0.0069
             * CROSS SECTION IS A SMALLER SUBDIVISION ROAD
             *
             * DDM   ***** Preserved *****

165          KK  RN11I3
166          RS       7   FLOW       0
167          RC    0.04    0.03    0.04    1310  0.0069
168          RX       0       1      54      59      90      95     135     136
169          RY       8       3       1       0       0       1       3       8
             *
             *
```



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

170          KK   N11I2   BASIN
171          BA    .026
172          LG    0.30    0.35    2.65    1.40      15
173          UC   0.654   0.719
174          UA       0     5.0    16.0    30.0    65.0    77.0    84.0    90.0    94.0    97.0
175          UA     100
             *
             *
             *
             * DDM   ***** Preserved *****

176          KK  CN11I2
177          HC       2
             *
             *

178          KK   N11L2   BASIN
179          BA    .010
180          LG    0.30    0.35    2.65    1.40      15
181          UC   0.425   0.470
182          UA       0     5.0    16.0    30.0    65.0    77.0    84.0    90.0    94.0    97.0
183          UA     100
             *
             *
             * *** DIVERSION DN11L2 *********************************************************
             * THIS DIVERSION IS IN PLACE TO ACCOUNT FOR THE LEVEL 3 IMPROVEMENTS
             *
```

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

 184        KK  DN11L2
 185        DT  N11L2I
 186        DI       0      18      36      55      73      91     109     127     500
 187        DQ       0       0       0       0       0       0       0       0       0
            *
            *
            * *** ROUTE RN11L2 ***********************************************************
            * ROUTE RN11L2 IS 442 FT WITH A SLOPE OF 0.0063
            * CROSS SECTION IS A SUBDIVISION ROAD
            *
            * DDM   ***** Preserved *****

 188        KK  RN11L2
 189        RS       2   FLOW       0
 190        RC    0.03    0.02    0.03     442  0.0063
 191        RX       0       1      32      37      69      74     112     113
 192        RY       8       3       2       0       0       2       3       8
            *
            *
                                          HEC-1 INPUT                                                    PAGE  8
LINE        ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10

 193        KK  N11I33   BASIN
 194        BA    .004
 195        LG    0.30    0.35    2.65    1.40      15
 196        UC   0.446   0.539
 197        UA       0     5.0    16.0    30.0    65.0    77.0    84.0    90.0    94.0    97.0
 198        UA     100
            *
            *
            * DDM   ***** Preserved *****

 199        KK  C11I33
 200        HC       2
            *
            *
            *
            * *** DIVERSION D11I33 ********************************************************
            * 50% DIVERTED EAST
            *
            * DDM   ***** Preserved *****

 201        KK  D11I33
 202        DT  11I33I
 203        DI       0       2      10      20     100     200     400
 204        DQ       0       1       5      10      50     100     200
            *
            *
            *
            * *** ROUTE R133S *************************************************************
            * ROUTE RI33S IS 1156 FT WITH A SLOPE OF 0.0063
            * CROSS SECTION IS A SUBDIVISION ROAD
            *
            * DDM   ***** Preserved *****

 205        KK   RI33S
 206        RS       7   FLOW       0
 207        RC    0.03    0.02    0.03    1156  0.0063
 208        RX       0       1      42      47      77      82     117     118
 209        RY       8       3       2       0       0       2       3       8
            *
            *
            *

 210        KK  N11I27   BASIN
 211        BA    .011
 212        LG    0.27    0.35    2.65    1.36      14
 213        UC   0.488   0.624
 214        UA       0     5.0    16.0    30.0    65.0    77.0    84.0    90.0    94.0    97.0
 215        UA     100
            *
            *
                                          HEC-1 INPUT                                                    PAGE  9
LINE        ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10
```

```
216          KK  N11I26   BASIN
217          BA    .005
218          LG    0.23    0.35    2.65    1.30      12
219          UC   0.504   0.986
220          UA       0     5.0    16.0    30.0    65.0    77.0    84.0    90.0    94.0    97.0
221          UA     100
             *
             *
             * DDM   ***** Preserved *****

222          KK  C11I26
223          HC       3
             *
             *
             * *** ROUTE R11I26 ************************************************************
             * ROUTE R11I26 IS 1382 FT WITH A SLOPE OF 0.0065
             * CROSS SECTION IS OVERLAND FLOW
             *
             * DDM   ***** Preserved *****

224          KK  R11I26
225          RS      12   FLOW       0
226          RC    0.05    0.05    0.05    1382  0.0065
227          RX       0     200     250     260     270     280     330     530
228          RY       3       2       1       0       0       1       2       8
             *
             *

229          KK  N11I22   BASIN
230          BA    .038
231          LG    0.31    0.35    4.20    0.49      11
232          UC   0.454   0.365
233          UA       0     5.0    16.0    30.0    65.0    77.0    84.0    90.0    94.0    97.0
234          UA     100
             *
             *
             * DDM   ***** Preserved *****

235          KK  C11I22
236          HC       2
             *
             *
             * *** ROUTE R11I22 ************************************************************
             * ROUTE R11I22 IS 1750 FT WITH A SLOPE OF 0.0057
             * CROSS SECTION IS A SUBDIVISION ROAD
             *
             * DDM   ***** Preserved *****

237          KK  R11I22
238          RS       6   FLOW       0
239          RC    0.03    0.02    0.03    1750  0.0057
240          RX       0       1      43      48      94      99     137     138
241          RY       8       2       1       0       0       1       2       8
             *
             *
```



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

242          KK   N11I6   BASIN
243          BA    .033
244          LG    0.30    0.35    2.65    1.40      15
245          UC   0.750   0.832
246          UA       0     5.0    16.0    30.0    65.0    77.0    84.0    90.0    94.0    97.0
247          UA     100
             *
             *
             * DDM   ***** Preserved *****

248          KK  C11I16
249          HC       2
             *
             *
             * *** ROUTE RN11I6 ************************************************************
             * ROUTE RN11I6 IS 990 FT WITH A SLOPE OF 0.0051
             * CROSS SECTION IS A SUBDIVISION ROAD
             *
             * DDM   ***** Preserved *****

250          KK  RN11I6
```

```
251          RS       3   FLOW       0
252          RC    0.03    0.02    0.03     990  0.0051
253          RX       0       1      45      50      90      95     143     144
254          RY       8       3       1       0       0       1       3       8
             *
             *

255          KK   N11I7   BASIN
256          BA    .021
257          LG    0.30    0.35    2.65    1.40      15
258          UC   0.671   0.778
259          UA       0     5.0    16.0    30.0    65.0    77.0    84.0    90.0    94.0    97.0
260          UA     100
             *
             *
             *
             * DDM   ***** Preserved *****

261          KK  CN11I7
262          HC       2
             *
             *

263          KK   N11L3   BASIN
264          BA    .063
265          LG    0.30    0.29    2.65    1.38      14
266          UC   0.608   0.593
267          UA       0     5.0    16.0    30.0    65.0    77.0    84.0    90.0    94.0    97.0
268          UA     100
             *
             *
             *
             *
             * *** DIVERSION DN11L3 ********************************************************
             * THIS DIVERSION IS IN PLACE TO ACCOUNT FOR THE LEVEL 3 IMPROVEMENTS
             *
             * DDM   ***** Preserved *****
```



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

269          KK  DN11L3
270          DT  N11L3I
271          DI       0      18      36      55      73      91     109     127     500
272          DQ       0       0       0       0       0       0       0       0       0
             *
             * *** ROUTE RN11L3 ************************************************************
             * ROUTE RN11L3 IS 1145 FT WITH A SLOPE OF 0.0079
             * CROSS SECTION IS A SUBDIVISION ROAD
             *
             * DDM   ***** Preserved *****

273          KK  RN11L3
274          RS       1   FLOW      -1
275          RC    0.03    0.02    0.03    1145  0.0079
276          RX       0       1      50      55      90      95     145     146
277          RY       8       3       1       0       0       1       3       8
             *
             *

278          KK  N11I30   BASIN
279          BA    .017
280          LG    0.14    0.35    2.65    1.12       5
281          UC   0.329   0.368
282          UA       0     5.0    16.0    30.0    65.0    77.0    84.0    90.0    94.0    97.0
283          UA     100
             *
             *

284          KK  N11I28   BASIN
285          BA    .023
286          LG    0.27    0.35    2.65    1.35      13
287          UC   0.596   0.701
288          UA       0     5.0    16.0    30.0    65.0    77.0    84.0    90.0    94.0    97.0
289          UA     100
             *
             *
             *
             * *** DIVERSION RECOVER D11I33  ********************************************
             * RECOVER FLOWS FROM D11I33
```

```
 290          KK  D11I33
 291          DR  11I33I
              *
              *
              *
              * *** ROUTE RI33E ************************************************************
              * ROUTE RI33E IS 1497 FT WITH A SLOPE OF 0.0048
              * CROSS SECTION IS A SUBVISION ROAD
              *
              * DDM   ***** Preserved *****
                                          HEC-1 INPUT                                          PAGE 12

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


 292          KK   RI33E
 293          RS      11   FLOW       0
 294          RC    0.03    0.02    0.03    1497  0.0048
 295          RX       0       1      50      55      90      95     145     146
 296          RY       8       3       1       0       0       1       3       8
              *
              *
              * DDM   ***** Preserved *****

 297          KK  C11I30
 298          HC       4
              *
              *
              * *** ROUTE R11I30 ***********************************************************
              * ROUTE R11I30 IS 860 FT WITH A SLOPE OF 0.0052
              * CROSS SECTION IS A SMALLER SUBDIVISION ROAD
              *
              * DDM   ***** Preserved *****

 299          KK  R11I30
 300          RS       3   FLOW       0
 301          RC    0.04    0.03    0.04     860  0.0052
 302          RX       0       1      42      47      77      82     131     132
 303          RY       8       3       2       0       0       2       3       8
              *
              *

 304          KK  N11I29   BASIN
 305          BA    .006
 306          LG    0.30    0.35    2.65    1.20       5
 307          UC   0.354   0.388
 308          UA       0     5.0    16.0    30.0    65.0    77.0    84.0    90.0    94.0    97.0
 309          UA     100
              *
              *
              * *** ROUTE R11I29 ************************************************************
              * ROUTE R11I29 IS 1350 FT WITH A SLOPE OF 0.0067
              * CROSS SECTION IS OVERLAND FLOW
              *
              * DDM   ***** Preserved *****

 310          KK  R11I29
 311          RS      14   FLOW       0
 312          RC    0.05    0.05    0.05    1350  0.0067
 313          RX       0     200     250     260     270     280     330     530
 314          RY       3       2       1       0       0       1       2       8
              *
              *
                                          HEC-1 INPUT                                          PAGE 13

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


 315          KK  N11I25   BASIN
 316          BA    .021
 317          LG    0.27    0.30    8.00    0.09      13
 318          UC   0.292   0.280
 319          UA       0     5.0    16.0    30.0    65.0    77.0    84.0    90.0    94.0    97.0
 320          UA     100
              *
              *
              * DDM   ***** Preserved *****

 321          KK  C11I25
 322          HC       3
```

```
*
*
* *** ROUTE R11I25 ************************************************************
* ROUTE R11I25 IS 689 FT WITH A SLOPE OF 0.0065
* CROSS SECTION IS OVERLAND FLOW
*
* DDM   ***** Preserved *****

KK  R11I25
RS       3   FLOW       0
RC    0.05    0.05    0.05     689  0.0065
RX       0     200     250     260     270     280     330     530
RY       3       2       1       0       0       1       2       8
*
*

KK   N11L4   BASIN
BA    .010
LG    0.30    0.35    2.65    1.39      14
UC   0.396   0.550
UA       0     3.0     5.0     8.0    12.0    20.0    43.0    75.0    90.0    96.0
UA     100
*
*
* *** DIVERSION DN11L4 ********************************************************
* THIS DIVERSION IS IN PLACE TO ACCOUNT FOR THE LEVEL 3 IMPROVEMENTS
*
* DDM   ***** Preserved *****

KK  DN11L4
DT  N11L4I
DI       0      18      36      55      73      91     109     127     500
DQ       0       0       0       0       0       0       0       0       0
*
*
* *** ROUTE RN11L4 ************************************************************
* ROUTE RN11L4 IS 737 FT WITH A SLOPE OF 0.0075
* CROSS SECTION IS OVERLAND FLOW
*
* DDM   ***** Preserved *****
```



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

KK  RN11L4
RS       7   FLOW       0
RC    0.05    0.05    0.05     737  0.0075
RX       0     200     250     260     270     280     330     530
RY       3       2       1       0       0       1       2       8
*
*

KK   N22B7   BASIN
BA    .015
LG    0.30    0.35    2.65    1.20       5
UC   0.429   0.377
UA       0     5.0    16.0    30.0    65.0    77.0    84.0    90.0    94.0    97.0
UA     100
*
*
* DDM   ***** Preserved *****

KK  CN22B7
HC       2
*
*
* *** ROUTE RN22B7 ************************************************************
* ROUTE RN22B7 IS 1415 FT WITH A SLOPE OF 0.006
* CROSS SECTION IS OVERLAND FLOW
*
* DDM   ***** Preserved *****

KK  RN22B7
RS      12   FLOW       0
RC    0.05    0.05    0.05    1415   0.006
RX       0     200     250     260     270     280     330     530
RY       3       2       1       0       0       1       2       8
*
*
```

```
 356          KK   N22B4   BASIN
 357          BA    .036
 358          LG    0.32    0.35    2.76    1.24      10
 359          UC   0.579   0.445
 360          UA       0     5.0    16.0    30.0    65.0    77.0    84.0    90.0    94.0    97.0
 361          UA     100
              *
              *
              * DDM   ***** Preserved *****

 362          KK  CN22B4
 363          HC       2
              *
              *
              * *** ROUTE RN22B4 ************************************************************
              * ROUTE RN22B4 IS 953 FT WITH A SLOPE OF 0.0042
              * CROSS SECTION IS OVERLAND FLOW
              *
              * DDM   ***** Preserved *****
                                          HEC-1 INPUT                                          PAGE 15

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

 364          KK  RN22B4
 365          RS       7   FLOW       0
 366          RC    0.05    0.05    0.05     953  0.0042
 367          RX       0     200     250     260     270     280     330     530
 368          RY       3       2       1       0       0       1       2       8
              *
              *

 369          KK   N22B1   BASIN
 370          BA    .019
 371          LG    0.30    0.35    2.65    1.38      14
 372          UC   0.438   0.322
 373          UA       0     5.0    16.0    30.0    65.0    77.0    84.0    90.0    94.0    97.0
 374          UA     100
              *
              *
              * DDM   ***** Preserved *****

 375          KK  CN22B1
 376          HC       2
              *
              *
              * *** ROUTE RN22B1 ************************************************************
              * ROUTE RN22B1 IS 373 FT WITH A SLOPE OF 0.0054
              * CROSS SECTION IS A SUBDIVISION ROAD WITH A WALL ON THE WEST SIDE
              *
              * DDM   ***** Preserved *****

 377          KK  RN22B1
 378          RS       1   FLOW       0
 379          RC    0.03    0.02    0.03     373  0.0054
 380          RX       0       1      11      21      27      52     132     133
 381          RY       8       2       0       2       3       3       4       8
              *
              *

 382          KK  N11I20   BASIN
 383          BA    .010
 384          LG    0.32    0.35    3.01    1.01       8
 385          UC   0.321   0.279
 386          UA       0     5.0    16.0    30.0    65.0    77.0    84.0    90.0    94.0    97.0
 387          UA     100
              *
              *
              *

 388          KK  N11I21   BASIN
 389          BA    .020
 390          LG    0.30    0.35    2.65    1.39      14
 391          UC   0.600   0.685
 392          UA       0     5.0    16.0    30.0    65.0    77.0    84.0    90.0    94.0    97.0
 393          UA     100
              *
              *
              * DDM   ***** Preserved *****
                                          HEC-1 INPUT                                          PAGE 16
```

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

 394          KK  C11I20
 395          HC       4
              *
              *
              *
              * *** ROUTE R11I20 ************************************************************
              * ROUTE R11I20 IS 699 FT WITH A SLOPE OF 0.0057
              * CROSS SECTION IS A SUBDIVISION ROAD
              *
              * DDM   ***** Preserved *****

 396          KK  R11I20
 397          RS       1   FLOW       0
 398          RC    0.03    0.02    0.03     699  0.0057
 399          RX       0       1      24      29      69      74     148     149
 400          RY       8       2       1       0       0       1       3       8
              *
              *

 401          KK  N11I11   BASIN
 402          BA    .018
 403          LG    0.25    0.35    2.65    1.40      30
 404          UC   0.579   0.715
 405          UA       0     5.0    16.0    30.0    65.0    77.0    84.0    90.0    94.0    97.0
 406          UA     100
              *
              *
              * DDM   ***** Preserved *****

 407          KK  C11I11
 408          HC       2
              *
              *
              *
              * *** ROUTE R11I11 ************************************************************
              * ROUTE R11I11 IS 598 FT WITH A SLOPE OF 0.0033
              * CROSS SECTION IS A SUBDIVISION ROAD (MEASURE)
              *
              * DDM   ***** Preserved *****

 409          KK  R11I11
 410          RD
 411          RC    0.03    0.02    0.03     598  0.0033
 412          RX       0       1      20      30      60      70     175     176
 413          RY       8       4       3       0       0       3       4       8
              *
              *

 414          KK  N11I12   BASIN
 415          BA    .024
 416          LG    0.25    0.35    4.10    0.53      28
 417          UC   0.542   0.548
 418          UA       0     5.0    16.0    30.0    65.0    77.0    84.0    90.0    94.0    97.0
 419          UA     100
              *
              *
              *
              * DDM   ***** Preserved *****
                                        HEC-1 INPUT                                          PAGE 17
LINE          ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10

 420          KK  C11I12
 421          HC       2
              *
              *
              * *** DIVERSION D11I12 ********************************************
              * SPLIT WAS CALCULATED USING EXISTING TOPOGRAPHY
              *
              * DDM   ***** Preserved *****

 422          KK  D11I12
 423          DT  11I12I
 424          DI       0      36      73     109     145     182     218     291     327
 425          DQ       0       0      15      24      31      36      49      66      74
              *
              *
```

```
                *
                * *** ROUTE RI12S ************************************************************
                * ROUTE RI12S IS 1347 FT WITH A SLOPE OF 0.0052
                * CROSS SECTION IS A SUBDIVISION ROAD
                *
                * DDM    ***** Preserved *****

 426            KK   RI12S
 427            RS       3   FLOW       0
 428            RC    0.03    0.02    0.03    1347  0.0052
 429            RX       0       1      75      80     120     125     190     191
 430            RY       8       3       1       0       0       1       3       8
                *
                *

 431            KK   N11I9   BASIN
 432            BA    .012
 433            LG    0.26    0.35    2.65    1.34      13
 434            UC   0.571   0.841
 435            UA       0     5.0    16.0    30.0    65.0    77.0    84.0    90.0    94.0    97.0
 436            UA     100
                *
                *
                * DDM    ***** Preserved *****

 437            KK  CN11I9
 438            HC       2
                *
                *

 439            KK  N11I10   BASIN
 440            BA    .021
 441            LG    0.30    0.35    2.65    1.39      14
 442            UC   0.696   0.886
 443            UA       0     5.0    16.0    30.0    65.0    77.0    84.0    90.0    94.0    97.0
 444            UA     100
                *
                *
                * *** ROUTE R11I10 ********************************************************
                * ROUTE R11I10 IS 1180 FT WITH A SLOPE OF 0.0044
                * CROSS SECTION IS OVERLAND FLOW
                *
                * DDM    ***** Preserved *****
                                          HEC-1 INPUT                                          PAGE 18

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

 445            KK  R11I10
 446            RS      12   FLOW       0
 447            RC    0.05    0.05    0.05    1180  0.0044
 448            RX       0     200     250     260     270     280     330     530
 449            RY       3       2       1       0       0       1       2       8
                *
                *

 450            KK   N11I8   BASIN
 451            BA    .014
 452            LG    0.28    0.35    2.65    1.37      14
 453            UC   0.542   0.643
 454            UA       0     5.0    16.0    30.0    65.0    77.0    84.0    90.0    94.0    97.0
 455            UA     100
                *
                *
                *
                * DDM    ***** Preserved *****

 456            KK  CN11I8
 457            HC       2
                *
                *
                *
                * DDM    ***** Preserved *****

 458            KK   DUMMY
 459            HC       5
                *
                *

 460            KK   N11P2   BASIN
 461            BA    .265
```

```
462          LG    0.35    0.35    3.45    0.67       0
463          UC   0.438   0.356
464          UA       0     3.0     5.0     8.0    12.0    20.0    43.0    75.0    90.0    96.0
465          UA     100
             *
             *
             * *** DIVERSION DN11P2 ********************************************************
             * THE DITCH ON THE NORTH SIDE OF CALLE LEJOS WAS ESTIMATED
             * TO CARRY 80 CFS. THE SPLIT WAS DETERMINED OVER AND ABOVE THIS FLOW.
             *
             * DDM   ***** Preserved *****

466          KK  DN11P2
467          DT  N11P2I
468          DI       0      10      50      80     116     189     298     407
469          DQ       0      10      50      80      97     133     186     239
             *
             *
             *
             * *** ROUTE RN11PS *************************************************************
             * ROUTE RN11PS IS 3032 FT WITH A SLOPE OF 0.0099
             * CROSS SECTION IS SHALLOW CONCENTRATED FLOW
             *
             * DDM   ***** Preserved *****
                                          HEC-1 INPUT                                          PAGE 19

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

470          KK  RN11PS
471          RS       7   FLOW       0
472          RC    0.03    0.02    0.03    3032  0.0099
473          RX       0     200     250     260     300     320     370     570
474          RY       3       2       1       0       0       1       2       8
             *
             *

475          KK   N21I1   BASIN
476          BA    .111
477          LG    0.32    0.32    2.65    1.20       3
478          UC   0.817   0.659
479          UA       0     5.0    16.0    30.0    65.0    77.0    84.0    90.0    94.0    97.0
480          UA     100
             *
             * COMBINE THE ROUTED DIVERTED FLOW WITH THIS SUBBASIN
             *
             * DDM   ***** Preserved *****

481          KK  CN21I1
482          HC       2
             *
             *
             * *** DIVERSION DN21I1 *********************************************************
             * THIS DIVERSION IS IN PLACE TO ACCOUNT FOR THE LEVEL 3 IMPROVEMENTS
             *
             * DDM   ***** Preserved *****

483          KK  DN21I1
484          DT  N21I1I
485          DI       0      18      36      55      73      91     109     127     500
486          DQ       0       0       0       0       0       0       0       0       0
             *
             *
             * *** ROUTE RN21I1 *************************************************************
             * ROUTE RN21I1 IS 754 FT WITH A SLOPE OF 0.008
             * CROSS SECTION IS SHALLOW CONCENTRATED FLOW
             *
             * DDM   ***** Preserved *****

487          KK  RN21I1
488          RS       3   FLOW       0
489          RC    0.05    0.05    0.05     754   0.008
490          RX       0     200     250     260     300     320     370     570
491          RY       3       2       1       0       0       1       2       8
             *
             *

492          KK   N22B8   BASIN
493          BA    .018
494          LG    0.32    0.35    2.65    1.20       3
495          UC   0.475   0.373
```

```
496          UA        0     5.0    16.0    30.0    65.0    77.0    84.0    90.0    94.0    97.0
497          UA      100
             *
             *
             * DDM   ***** Preserved *****
                                          HEC-1 INPUT                                          PAGE 20
LINE         ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10

498          KK  CN22B8
499          HC        2
             *
             *
             * *** ROUTE RN22B8 ************************************************************
             * ROUTE RN22B8 IS 1332 FT WITH A SLOPE OF 0.006
             * CROSS SECTION IS A SMALLER SUBDIVISION ROAD
             *
             * DDM   ***** Preserved *****

500          KK  RN22B8
501          RS        3   FLOW        0
502          RC     0.04     0.03    0.04    1332   0.006
503          RX        0        1      43      48      78      83     168     169
504          RY        8        3       1       0       0       1       3       8
             *
             *

505          KK   N22B5   BASIN
506          BA     .029
507          LG     0.31     0.35    2.65    1.20       4
508          UC    0.608    0.524
509          UA        0      5.0    16.0    30.0    65.0    77.0    84.0    90.0    94.0    97.0
510          UA      100
             *
             *
             * DDM   ***** Preserved *****

511          KK  CN22B5
512          HC        2
             *
             *
             * *** ROUTE RN22B5 ************************************************************
             * ROUTE RN22B5 IS 684 FT WITH A SLOPE OF 0.0058
             * CROSS SECTION IS SUBDIVISION ROAD
             *
             * DDM   ***** Preserved *****

513          KK  RN22B5
514          RS        2   FLOW        0
515          RC     0.03     0.02    0.03     684  0.0058
516          RX        0        1      50      55      85      95     145     146
517          RY        8        3       1       0       0       1       3       8
             *
             *

518          KK   N22B2   BASIN
519          BA     .023
520          LG     0.31     0.35    2.61    1.41      12
521          UC    0.475    0.331
522          UA        0      5.0    16.0    30.0    65.0    77.0    84.0    90.0    94.0    97.0
523          UA      100
             *
             *
             *
             * *** DIVERSION RECOVER DN11P2  ******************************************
             * RECOVER FLOWS FROM DN11P2
                                          HEC-1 INPUT                                          PAGE 21
LINE         ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10

524          KK   DN11P
525          DR  N11P2I
             *
             *
             * *** ROUTE R11PE *************************************************************
             * ROUTE R11PE IS 3010 FT WITH A SLOPE OF 0.009
             * CROSS SECTION IS SHALLOW CONCENTRATED FLOW
             *
             * DDM   ***** Preserved *****
```

```
526          KK   R11PE
527          RS      12    FLOW       0
528          RC    0.05    0.05    0.05    3010   0.009
529          RX       0     200     250     260     270     280     330     530
530          RY       3       2       1       0       0       1       2       8
             *
             *

531          KK   N21I2   BASIN
532          BA    .057
533          LG    0.32    0.29    4.65    0.32       3
534          UC   0.608   0.710
535          UA       0     5.0    16.0    30.0    65.0    77.0    84.0    90.0    94.0    97.0
536          UA     100
             *
             *
             * DDM   ***** Preserved *****

537          KK  CN21I2
538          HC       2    0.32
             *
             *
             * *** DIVERSION DN21I2 ***********************************************************
             * THIS DIVERSION IS IN PLACE TO ACCOUNT FOR THE LEVEL 3 IMPROVEMENTS
             *
             * DDM   ***** Preserved *****

539          KK  DN21I2
540          DT  N21I2I
541          DI       0      18      36      55      73      91     109     127     500
542          DQ       0       0       0       0       0       0       0       0       0
             *
             *
             * *** ROUTE RN21I2 ***************************************************************
             * ROUTE RN21I2 IS 866 FT WITH A SLOPE OF 0.0058
             * CROSS SECTION IS SHALLOW CONCENTRATED FLOW
             *
             * DDM   ***** Preserved *****
```



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

543          KK  RN21I2
544          RS       4   FLOW       0
545          RC    0.05    0.05    0.05     866  0.0058
546          RX       0     200     250     260     270     280     330     530
547          RY       3       2       1       0       0       1       2       8
             *
             *

548          KK   N22B9   BASIN
549          BA    .022
550          LG    0.34    0.35    2.65    1.20       1
551          UC   0.412   0.263
552          UA       0     5.0    16.0    30.0    65.0    77.0    84.0    90.0    94.0    97.0
553          UA     100
             *
             *
             * DDM   ***** Preserved *****

554          KK  CN22B9
555          HC       2
             *
             *
             * *** ROUTE RN22B9 ***************************************************************
             * ROUTE RN22B9 IS 1387 FT WITH A SLOPE OF 0.0058
             * CROSS SECTION IS OVERLAND FLOW
             *
             * DDM   ***** Preserved *****

556          KK  RN22B9
557          RS       7   FLOW       0
558          RC    0.05    0.05    0.05    1387  0.0058
559          RX       0     200     250     260     270     280     330     530
560          RY       3       2       1       0       0       1       2       8
             *
             *

561          KK   N22B6   BASIN
```

```
562          BA    .035
563          LG    0.30    0.35    2.65    1.20       5
564          UC   0.738   0.692
565          UA       0     5.0    16.0    30.0    65.0    77.0    84.0    90.0    94.0    97.0
566          UA     100
             *
             *
             * DDM   ***** Preserved *****

567          KK  CN22B6
568          HC       2
             *
             *
             * *** ROUTE RN22B6 ************************************************************
             * ROUTE RN22B6 IS 834 FT WITH A SLOPE OF 0.0048
             * CROSS SECTION IS OVERLAND FLOW
             *
             * DDM   ***** Preserved *****
                                          HEC-1 INPUT                                          PAGE 23

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

569          KK  RN22B6
570          RS       4   FLOW       0
571          RC    0.05    0.05    0.05     834  0.0048
572          RX       0     200     250     260     270     280     330     530
573          RY       3       2       1       0       0       1       2       8
             *
             *

574          KK   N22B3   BASIN
575          BA    .009
576          LG    0.32    0.35    2.65    1.34      10
577          UC   0.471   0.513
578          UA       0     5.0    16.0    30.0    65.0    77.0    84.0    90.0    94.0    97.0
579          UA     100
             *
             *
             * DDM   ***** Preserved *****

580          KK  CN22B3
581          HC       2
             *
             *
             * *** ROUTE RN22B3 ************************************************************
             * ROUTE RN22B3 IS 853 FT WITH A SLOPE OF 0.0012
             * CROSS SECTION IS A SUBDIVISION ROAD WITH A WALL ON THE WEST SIDE
             *
             * DDM   ***** Preserved *****

582          KK  RN22B3
583          RS       3   FLOW       0
584          RC    0.03    0.02    0.03     853  0.0012
585          RX       0       1      11      21      51      56     141     142
586          RY       8       2       0       2       2       3       4       8
             *
             *
             * DDM   ***** Preserved *****

587          KK  CN22B2
588          HC       3     .57
             *
             *
             * *** ROUTE RN22B2 ************************************************************
             * ROUTE RN22B2 IS 737 FT WITH A SLOPE OF 0.0054
             * CROSS SECTION IS A SUBDIVISION ROAD
             *
             * DDM   ***** Preserved *****

589          KK  RN22B2
590          RS       1   FLOW       0
591          RC    0.03    0.02    0.03     737  0.0054
592          RX       0       1      34      39      79      84     114     115
593          RY       8       3       2       0       0       2       3       8
             *
             *
                                          HEC-1 INPUT                                          PAGE 24

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

```
KK   N22A8   BASIN
BA    .023
LG    0.26    0.35    2.65    1.41      27
UC   0.596   0.592
UA       0     5.0    16.0    30.0    65.0    77.0    84.0    90.0    94.0    97.0
UA     100
*
*
* DDM   ***** Preserved *****

KK  CN22A8
HC       2
*
*
* *** ROUTE RN22A8 ************************************************************
* ROUTE RN22A8 IS 388 FT WITH A SLOPE OF 0.0052
* CROSS SECTION IS A SUBDIVISION ROAD
*
* DDM   ***** Preserved *****

KK  RN22A8
RD
RC    0.03    0.02    0.03     388  0.0052
RX       0       1      34      39      79      84     114     115
RY       8       4       3       0       0       3       4       8
*
*

KK   N22A6   BASIN
BA    .020
LG    0.24    0.35    2.65    1.39      29
UC   0.592   0.626
UA       0     5.0    16.0    30.0    65.0    77.0    84.0    90.0    94.0    97.0
UA     100
*
*

KK   N22A5   BASIN
BA    .016
LG    0.25    0.35    2.65    1.40      30
UC   0.738   0.803
UA       0     5.0    16.0    30.0    65.0    77.0    84.0    90.0    94.0    97.0
UA     100
*
*
* DDM   ***** Preserved *****

KK  CN22A5
HC       3
*
*
* *** ROUTE RN22A5 ************************************************************
* ROUTE RN22A5 IS 1348 FT WITH A SLOPE OF 0.0045
* CROSS SECTION IS A RURAL ROAD
*
* DDM   ***** Preserved *****
```



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

KK  RN22A5
RS       5   FLOW       0
RC    0.04    0.03    0.04    1348  0.0045
RX       0     300     310     320     340     345     415     416
RY       4       3       1       3       3       4       5       8
*
*

KK   N22A2   BASIN
BA    .009
LG    0.33    0.35    2.65    1.28       6
UC   0.833   1.493
UA       0     5.0    16.0    30.0    65.0    77.0    84.0    90.0    94.0    97.0
UA     100
*
*

KK   N22A3   BASIN
BA    .032
```

```
634          LG    0.35    0.35    4.35    0.40       0
635          UC   0.500   0.433
636          UA       0     5.0    16.0    30.0    65.0    77.0    84.0    90.0    94.0    97.0
637          UA     100
             *
             *
             *
             *
             * DDM   ***** Preserved *****

638          KK  C22AX1
639          HC       3
             *
             *
             * *** ROUTE R22AX1 ************************************************************
             * ROUTE R22AX1 IS 464 FT WITH A SLOPE OF 0.0037
             * CROSS SECTION IS THE CHANNEL ON THE SOUTH SIDE OF DEER VALLEY ROAD
             *
             * DDM   ***** Preserved *****

640          KK  R22AX1
641          RS       1   FLOW       0
642          RC    0.04    0.03    0.04     464  0.0037
643          RX       0       1      27      36      62     100     150     500
644          RY       8       4       1       1       4       4       5       6
             *
             *
             *

645          KK   N22A1   BASIN
646          BA    .020
647          LG    0.28    0.27    8.80    0.07      14
648          UC   0.346   0.358
649          UA       0     5.0    16.0    30.0    65.0    77.0    84.0    90.0    94.0    97.0
650          UA     100
             *
             *
             * DDM   ***** Preserved *****
                                          HEC-1 INPUT                                          PAGE 26

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

651          KK  C22AX2
652          HC       2
             *
             *
             * *** ROUTE R22AX2 ************************************************************
             * ROUTE R22AX2 IS 283 FT WITH A SLOPE OF 0.0025
             * CROSS SECTION IS THE CHANNEL ON THE SOUTH SIDE OF DEER VALLEY ROAD
             *
             * DDM   ***** Preserved *****

653          KK  R22AX2
654          RS       1   FLOW      -1
655          RC    0.04    0.03    0.04     283  0.0025
656          RX       0       1      27      36      62     100     150     500
657          RY       8       4       1       1       4       4       5       6
             *
             *
             * *** DIVERSION RECOVER D11I12  ******************************************
             * RECOVER FLOWS FROM D11I12

658          KK  N11I12
659          DR  11I12I
             *
             *
             * *** ROUTE RI12E *************************************************************
             * ROUTE RI12E IS 1505 FT WITH A SLOPE OF 0.004
             * CROSS SECTION IS OVERLAND FLOW
             *
             * DDM   ***** Preserved *****

660          KK   RI12E
661          RS      10   FLOW       0
662          RC    0.05    0.05    0.05    1505   0.004
663          RX       0     200     250     260     270     280     330     530
664          RY       3       2       1       0       0       1       2       8
             *
             *
```

```
665          KK  N11I13   BASIN
666          BA    .027
667          LG    0.32    0.35    2.65    1.31       8
668          UC   0.750   0.728
669          UA       0     5.0    16.0    30.0    65.0    77.0    84.0    90.0    94.0    97.0
670          UA     100
             *
             *
             * DDM   ***** Preserved *****

671          KK  C22AX3
672          HC       3
             *
             *
             * *** ROUTE R22AX3 ************************************************************
             * ROUTE R22AX3 IS 512 FT WITH A SLOPE OF 0.0025
             * CROSS SECTION IS THE CHANNEL ON THE SOUTH SIDE OF DEER VALLEY ROAD
             *
             * DDM   ***** Preserved *****
                                          HEC-1 INPUT                                          PAGE 27

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

673          KK  R22AX3
674          RS       1   FLOW       0
675          RC    0.04    0.03    0.04     512  0.0025
676          RX       0       1      27      36      62     100     150     500
677          RY       8       4       1       1       4       4       5       6
             *
             *

678          KK   N22A4   BASIN
679          BA    .023
680          LG    0.10    0.35    2.65    1.50      55
681          UC   0.296   0.340
682          UA       0     5.0    16.0    30.0    65.0    77.0    84.0    90.0    94.0    97.0
683          UA     100
             *
             *
             *

684          KK   N11I1   BASIN
685          BA    .038
686          LG    0.31    0.35    2.65    1.37      13
687          UC   0.967   1.352
688          UA       0     5.0    16.0    30.0    65.0    77.0    84.0    90.0    94.0    97.0
689          UA     100
             *
             *
             *

690          KK   N11I5   BASIN
691          BA    .014
692          LG    0.32    0.35    2.65    1.33      10
693          UC   0.896   1.736
694          UA       0     5.0    16.0    30.0    65.0    77.0    84.0    90.0    94.0    97.0
695          UA     100
             *
             *

696          KK   N22A7   BASIN
697          BA    .010
698          LG    0.25    0.32    7.60    0.11      30
699          UC   0.267   0.246
700          UA       0     5.0    16.0    30.0    65.0    77.0    84.0    90.0    94.0    97.0
701          UA     100
             *
             *
             * DDM   ***** Preserved *****

702          KK  DUMMY3
703          HC       4
             *
704          ZZ
```

SCHEMATIC DIAGRAM OF STREAM NETWORK

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

           (.) CONNECTOR        (<---) RETURN OF DIVERTED OR PUMPED FLOW

  45        N11P1
                V
                V
  51       RN11P1
                .
                .
  56            .       N11L5
                .           .
                .           .
  62            .           .       N11L1
                .           .           .
                .           .           .
  69            .           .           .-------> N11L1I
  68            .           .      DN11L1
                .           .           V
                .           .           V
  72            .           .      RN11LE
                .           .           .
                .           .           .
  77       CN11L5.......................
                .
                .
  80            .-------> N11L5I
  79       DN11L5
                V
                V
  83       RN11L5
                .
                .
  88            .      N11I31
                .           .
                .           .
  94       C11I31............
                V
                V
           R11I31
                .
                .
 101            .      N11I32
                .           V
                .           V
 107            .      R11I32
                .           .
                .           .
 112            .           .      N11I23
                .           .           .
                .           .           .
 118       C11I23......................
                V
                V
 120       R11I23
                .
                .
 125            .      N11I14
                .           .
                .           .
 131       C11I14............
                V
                V
 133       R11I14
                .
                .
 138            .       N11I4
                .           .
                .           .
 144       CN11I4............
                .
                .
 146            .      N11I24
                .           V
                .           V
                .      R11I24
                .           .
                .           .
```

```
157          .           .       N11I3
             .           .           .
             .           .           .
163          .      CN11I3............
             .           V
             .           V
             .      RN11I3
             .           .
             .           .
170          .           .       N11I2
             .           .           .
             .           .           .
176          .      CN11I2............
             .           .
             .           .
178          .           .       N11L2
             .           .           .
             .           .           .
185          .           .           .-------> N11L2I
184          .           .      DN11L2
             .           .           V
             .           .           V
188          .           .      RN11L2
             .           .           .
             .           .           .
193          .           .           .      N11I33
             .           .           .           .
             .           .           .           .
199          .           .      C11I33............
             .           .           .
             .           .           .
202          .           .           .-------> 11I33I
201          .           .      D11I33
             .           .           V
             .           .           V
205          .           .       RI33S
             .           .           .
             .           .           .
210          .           .           .      N11I27
             .           .           .           .
             .           .           .           .
             .           .           .           .      N11I26
             .           .           .           .           .
             .           .           .           .           .
222          .           .      C11I26........................
             .           .           V
             .           .           V
224          .           .      R11I26
             .           .           .
             .           .           .
229          .           .           .      N11I22
             .           .           .           .
             .           .           .           .
235          .           .      C11I22............
             .           .           V
             .           .           V
237          .           .      R11I22
             .           .           .
             .           .           .
242          .           .           .       N11I6
             .           .           .           .
             .           .           .           .
248          .           .      C11I16............
             .           .           V
             .           .           V
250          .           .      RN11I6
             .           .           .
             .           .           .
255          .           .           .       N11I7
             .           .           .           .
             .           .           .           .
261          .           .      CN11I7............
             .           .           .
             .           .           .
263          .           .           .       N11L3
             .           .           .           .
             .           .           .           .
70           .           .           .           .-------> N11L3I
             .           .           .      DN11L3
             .           .           .           V
             .           .           .           V
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273                 .           .           .     RN11L3
                    .           .           .         .
                    .           .           .         .
278                 .           .           .         .     N11I30
                    .           .           .         .         .
                    .           .           .         .         .
                    .           .           .         .         .     N11I28
                    .           .           .         .         .           .
                    .           .           .         .         .           .
291                 .           .           .         .         .           .           .<-------  11I33I
290                 .           .           .         .         .           .     D11I33
                    .           .           .         .         .           .           V
                    .           .           .         .         .           .           V
292                 .           .           .         .         .           .      RI33E
                    .           .           .         .         .           .           .
                    .           .           .         .         .           .           .
297                 .           .           .     C11I30.....................................
                    .           .           .         V
                    .           .           .         V
299                 .           .           .     R11I30
                    .           .           .         .
                    .           .           .         .
304                 .           .           .         .     N11I29
                    .           .           .         .         V
                    .           .           .         .         V
310                 .           .           .         .     R11I29
                    .           .           .         .         .
                    .           .           .         .         .
315                 .           .           .         .         .     N11I25
                    .           .           .         .         .           .
                    .           .           .         .         .           .
321                 .           .           .     C11I25........................
                    .           .           .         V
                    .           .           .         V
323                 .           .           .     R11I25
                    .           .           .         .
                    .           .           .         .
328                 .           .           .         .      N11L4
                    .           .           .         .         .
                    .           .           .         .         .
335                 .           .           .         .         .-------> N11L4I
                    .           .           .         .     DN11L4
                    .           .           .         .         V
                    .           .           .         .         V
338                 .           .           .         .     RN11L4
                    .           .           .         .         .
                    .           .           .         .         .
343                 .           .           .         .         .     N22B7
                    .           .           .         .         .           .
                    .           .           .         .         .           .
349                 .           .           .         .     CN22B7............
                    .           .           .         .         V
                    .           .           .         .         V
351                 .           .           .         .     RN22B7
                    .           .           .         .         .
                    .           .           .         .         .
356                 .           .           .         .         .     N22B4
                    .           .           .         .         .           .
                    .           .           .         .         .           .
362                 .           .           .         .     CN22B4............
                    .           .           .         .         V
                    .           .           .         .         V
364                 .           .           .         .     RN22B4
                    .           .           .         .         .
                    .           .           .         .         .
369                 .           .           .         .         .     N22B1
                    .           .           .         .         .           .
                    .           .           .         .         .           .
375                 .           .           .         .     CN22B1............
                    .           .           .         .         V
                    .           .           .         .         V
377                 .           .           .         .     RN22B1
                    .           .           .         .         .
                    .           .           .         .         .
382                 .           .           .         .         .     N11I20
                    .           .           .         .         .           .
                    .           .           .         .         .           .
8                   .           .           .         .         .           .     N11I21
                    .           .           .         .         .           .           .
                    .           .           .         .         .           .           .
394                 .           .           .     C11I20.....................................
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                .          .          .          V
                .          .          .          V
396             .          .          .     R11I20
                .          .          .          .
                .          .          .          .
                .          .          .          .      N11I11
                .          .          .          .           .
                .          .          .          .           .
407             .          .          .     C11I11............
                .          .          .          V
                .          .          .          V
409             .          .          .     R11I11
                .          .          .          .
                .          .          .          .
414             .          .          .          .      N11I12
                .          .          .          .           .
                .          .          .          .           .
420             .          .          .     C11I12............
                .          .          .          .
                .          .          .          .
423             .          .          .          .-------> 11I12I
422             .          .          .     D11I12
                .          .          .          V
                .          .          .          V
426             .          .          .      RI12S
                .          .          .          .
                .          .          .          .
431             .          .          .          .       N11I9
                .          .          .          .           .
                .          .          .          .           .
437             .          .          .     CN11I9............
                .          .          .          .
                .          .          .          .
439             .          .          .          .      N11I10
                .          .          .          .           V
                .          .          .          .           V
445             .          .          .          .      R11I10
                .          .          .          .           .
                .          .          .          .           .
450             .          .          .          .           .       N11I8
                .          .          .          .           .           .
                .          .          .          .           .           .
                .          .          .          .      CN11I8............
                .          .          .          .           .
                .          .          .          .           .
458        DUMMY.............................................
                .
                .
460             .       N11P2
                .          .
                .          .
467             .          .-------> N11P2I
466             .      DN11P2
                .          V
                .          V
470             .      RN11PS
                .          .
                .          .
475             .          .       N21I1
                .          .           .
                .          .           .
481             .      CN21I1............
                .          .
                .          .
484             .          .-------> N21I1I
483             .      DN21I1
                .          V
                .          V
487             .      RN21I1
                .          .
                .          .
492             .          .       N22B8
                .          .           .
                .          .           .
498             .      CN22B8............
                .          V
                .          V
500             .      RN22B8
                .          .
                .          .
505             .          .       N22B5
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                .           .           .
                .           .           .
511             .      CN22B5............
                .           V
                .           V
                .      RN22B5
                .           .
                .           .
518             .           .       N22B2
                .           .           .
                .           .           .
525             .           .           .          .<-------  N11P2I
524             .           .           .      DN11P
                .           .           .          V
                .           .           .          V
526             .           .           .      R11PE
                .           .           .          .
                .           .           .          .
531             .           .           .          .       N21I2
                .           .           .          .           .
                .           .           .          .           .
537             .           .           .     CN21I2............
                .           .           .          .
                .           .           .          .
540             .           .           .          .------->  N21I2I
539             .           .           .     DN21I2
                .           .           .          V
                .           .           .          V
543             .           .           .     RN21I2
                .           .           .          .
                .           .           .          .
548             .           .           .          .       N22B9
                .           .           .          .           .
                .           .           .          .           .
554             .           .           .     CN22B9............
                .           .           .          V
                .           .           .          V
556             .           .           .     RN22B9
                .           .           .          .
                .           .           .          .
561             .           .           .          .       N22B6
                .           .           .          .           .
                .           .           .          .           .
567             .           .           .     CN22B6............
                .           .           .          V
                .           .           .          V
569             .           .           .     RN22B6
                .           .           .          .
                .           .           .          .
574             .           .           .          .       N22B3
                .           .           .          .           .
                .           .           .          .           .
580             .           .           .     CN22B3............
                .           .           .          V
                .           .           .          V
582             .           .           .     RN22B3
                .           .           .          .
                .           .           .          .
587             .      CN22B2........................
                .           V
                .           V
589             .      RN22B2
                .           .
                .           .
594             .           .       N22A8
                .           .           .
                .           .           .
600             .      CN22A8............
                .           V
                .           V
602             .      RN22A8
                .           .
                .           .
607             .           .       N22A6
                .           .           .
                .           .           .
613             .           .           .      N22A5
                .           .           .          .
                .           .           .          .
                .      CN22A5........................
                .           V
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                .          V
621             .      RN22A5
                .          .
                .          .
626             .          .       N22A2
                .          .          .
                .          .          .
632             .          .          .       N22A3
                .          .          .          .
                .          .          .          .
638             .      C22AX1.......................
                .          V
                .          V
640             .      R22AX1
                .          .
                .          .
645             .          .       N22A1
                .          .          .
                .          .          .
651             .      C22AX2............
                .          V
                .          V
653             .      R22AX2
                .          .
                .          .
659             .          .          .<-------  11I12I
658             .          .      N11I12
                .          .          V
                .          .          V
660             .          .       RI12E
                .          .          .
                .          .          .
665             .          .          .      N11I13
                .          .          .          .
                .          .          .          .
671             .      C22AX3.......................
                .          V
                .          V
673             .      R22AX3
                .          .
                .          .
                .          .       N22A4
                .          .          .
                .          .          .
684             .          .          .       N11I1
                .          .          .          .
                .          .          .          .
690             .          .          .          .       N11I5
                .          .          .          .          .
                .          .          .          .          .
696             .          .          .          .          .       N22A7
                .          .          .          .          .          .
                .          .          .          .          .          .
702             .          .      DUMMY3.................................
```

(***) RUNOFF ALSO COMPUTED AT THIS LOCATION

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
HYDROGRAPH AT	N11P1	89.	4.17	7.	2.	1.	0.12
ROUTED TO	RN11P1	81.	4.33	7.	2.	1.	0.12
HYDROGRAPH AT	N11L5	8.	4.57	3.	1.	0.	0.07
HYDROGRAPH AT	N11L1	12.	4.47	3.	1.	1.	0.07
DIVERSION TO	N11L1I	9.	4.47	2.	1.	0.	0.07
HYDROGRAPH AT	DN11L1	3.	4.43	1.	0.	0.	0.07
ROUTED TO	RN11LE	3.	4.53	1.	0.	0.	0.07
3 COMBINED AT	CN11L5	90.	4.33	10.	3.	2.	0.26
DIVERSION TO	N11L5I	0.	0.03	0.	0.	0.	0.26
HYDROGRAPH AT	DN11L5	90.	4.33	10.	3.	2.	0.26
ROUTED TO	RN11L5	87.	4.40	10.	3.	2.	0.26
HYDROGRAPH AT	N11I31	3.	4.30	1.	0.	0.	0.02
2 COMBINED AT	C11I31	90.	4.40	11.	3.	2.	0.28
ROUTED TO	R11I31	87.	4.47	11.	3.	2.	0.28
HYDROGRAPH AT	N11I32	9.	4.30	2.	0.	0.	0.04
ROUTED TO	R11I32	9.	4.53	2.	0.	0.	0.04
HYDROGRAPH AT	N11I23	14.	4.30	3.	1.	1.	0.04
3 COMBINED AT	C11I23	109.	4.47	16.	4.	3.	0.37
ROUTED TO	R11I23	105.	4.57	16.	4.	3.	0.37
HYDROGRAPH AT	N11I14	7.	4.47	1.	0.	0.	0.03
2 COMBINED AT	C11I14	111.	4.57	17.	4.	3.	0.39
ROUTED TO	R11I14	107.	4.67	17.	4.	3.	0.39
HYDROGRAPH AT	N11I4	5.	4.30	1.	0.	0.	0.02
2 COMBINED AT	CN11I4	111.	4.67	18.	5.	3.	0.42

OPERATION	STATION	PEAK FLOW	TIME OF PEAK	AVERAGE FLOW FOR MAXIMUM PERIOD 6-HOUR	24-HOUR	72-HOUR	BASIN AREA
HYDROGRAPH AT	N11I24	5.	4.30	1.	0.	0.	0.01
ROUTED TO	R11I24	5.	4.50	1.	0.	0.	0.01
HYDROGRAPH AT	N11I3	4.	4.30	1.	0.	0.	0.02
2 COMBINED AT	CN11I3	8.	4.43	2.	1.	0.	0.03
ROUTED TO	RN11I3	8.	4.63	2.	1.	0.	0.03
HYDROGRAPH AT	N11I2	6.	4.33	1.	0.	0.	0.03
2 COMBINED AT	CN11I2	13.	4.57	3.	1.	1.	0.06
HYDROGRAPH AT	N11L2	3.	4.20	0.	0.	0.	0.01
DIVERSION TO	N11L2I	0.	0.03	0.	0.	0.	0.01
HYDROGRAPH AT	DN11L2	3.	4.20	0.	0.	0.	0.01
ROUTED TO	RN11L2	3.	4.23	0.	0.	0.	0.01
HYDROGRAPH AT	N11I33	1.	4.20	0.	0.	0.	0.00
2 COMBINED AT	C11I33	4.	4.23	1.	0.	0.	0.01
DIVERSION TO	11I33I	2.	4.23	0.	0.	0.	0.01
HYDROGRAPH AT	D11I33	2.	4.23	0.	0.	0.	0.01
ROUTED TO	RI33S	2.	4.33	0.	0.	0.	0.01
HYDROGRAPH AT	N11I27	3.	4.23	1.	0.	0.	0.01
HYDROGRAPH AT	N11I26	1.	4.30	0.	0.	0.	0.00
3 COMBINED AT	C11I26	6.	4.30	1.	0.	0.	0.03
ROUTED TO	R11I26	5.	4.67	1.	0.	0.	0.03
HYDROGRAPH AT	N11I22	23.	4.17	3.	1.	1.	0.04
2 COMBINED AT	C11I22	24.	4.20	4.	1.	1.	0.07
ROUTED TO	R11I22	23.	4.37	4.	1.	1.	0.07
HYDROGRAPH AT	N11I6	6.	4.40	2.	0.	0.	0.03
2 COMBINED AT	C11I16	29.	4.37	5.	1.	1.	0.10
ROUTED TO							

OPERATION	STATION	PEAK FLOW	TIME OF PEAK	AVERAGE FLOW FOR MAXIMUM PERIOD 6-HOUR	24-HOUR	72-HOUR	BASIN AREA
	RN11I6	29.	4.50	5.	1.	1.	0.10
HYDROGRAPH AT	N11I7	4.	4.33	1.	0.	0.	0.02
2 COMBINED AT	CN11I7	33.	4.47	6.	2.	1.	0.12
HYDROGRAPH AT	N11L3	17.	4.27	3.	1.	1.	0.06
DIVERSION TO	N11L3I	0.	0.03	0.	0.	0.	0.06
HYDROGRAPH AT	DN11L3	17.	4.27	3.	1.	1.	0.06
ROUTED TO	RN11L3	16.	4.40	3.	1.	1.	0.06
HYDROGRAPH AT	N11I30	7.	4.13	1.	0.	0.	0.02
HYDROGRAPH AT	N11I28	5.	4.30	1.	0.	0.	0.02
HYDROGRAPH AT	D11I33	2.	4.23	0.	0.	0.	0.01
ROUTED TO	RI33E	2.	4.40	0.	0.	0.	0.01
4 COMBINED AT	C11I30	28.	4.33	5.	1.	1.	0.10
ROUTED TO	R11I30	28.	4.40	5.	1.	1.	0.10
HYDROGRAPH AT	N11I29	2.	4.17	0.	0.	0.	0.01
ROUTED TO	R11I29	2.	4.50	0.	0.	0.	0.01
HYDROGRAPH AT	N11I25	24.	4.10	2.	1.	0.	0.02
3 COMBINED AT	C11I25	42.	4.37	8.	2.	1.	0.13
ROUTED TO	R11I25	41.	4.43	8.	2.	1.	0.13
HYDROGRAPH AT	N11L4	3.	4.27	0.	0.	0.	0.01
DIVERSION TO	N11L4I	0.	0.03	0.	0.	0.	0.01
HYDROGRAPH AT	DN11L4	3.	4.27	0.	0.	0.	0.01
ROUTED TO	RN11L4	3.	4.47	0.	0.	0.	0.01
HYDROGRAPH AT	N22B7	5.	4.17	1.	0.	0.	0.01
2 COMBINED AT	CN22B7	6.	4.33	1.	0.	0.	0.02
ROUTED TO	RN22B7	6.	4.70	1.	0.	0.	0.02
HYDROGRAPH AT	N22B4	10.	4.23	2.	0.	0.	0.04

OPERATION	STATION	PEAK FLOW	TIME OF PEAK	AVERAGE FLOW FOR MAXIMUM PERIOD 6-HOUR	24-HOUR	72-HOUR	BASIN AREA
2 COMBINED AT	CN22B4	13.	4.47	3.	1.	0.	0.06
ROUTED TO	RN22B4	13.	4.63	3.	1.	0.	0.06
HYDROGRAPH AT	N22B1	7.	4.17	1.	0.	0.	0.02
2 COMBINED AT	CN22B1	16.	4.43	3.	1.	1.	0.08
ROUTED TO	RN22B1	16.	4.47	3.	1.	1.	0.08
HYDROGRAPH AT	N11I20	5.	4.13	0.	0.	0.	0.01
HYDROGRAPH AT	N11I21	4.	4.30	1.	0.	0.	0.02
4 COMBINED AT	C11I20	63.	4.43	13.	3.	2.	0.24
ROUTED TO	R11I20	63.	4.47	13.	3.	2.	0.24
HYDROGRAPH AT	N11I11	6.	4.30	1.	0.	0.	0.02
2 COMBINED AT	C11I11	68.	4.43	14.	4.	3.	0.26
ROUTED TO	R11I11	68.	4.50	14.	4.	3.	0.26
HYDROGRAPH AT	N11I12	13.	4.23	2.	1.	0.	0.02
2 COMBINED AT	C11I12	79.	4.47	17.	4.	3.	0.28
DIVERSION TO	11I12I	17.	4.47	2.	0.	0.	0.28
HYDROGRAPH AT	D11I12	63.	4.47	15.	4.	3.	0.28
ROUTED TO	RI12S	62.	4.53	15.	4.	3.	0.28
HYDROGRAPH AT	N11I9	2.	4.30	1.	0.	0.	0.01
2 COMBINED AT	CN11I9	64.	4.53	15.	4.	3.	0.29
HYDROGRAPH AT	N11I10	4.	4.37	1.	0.	0.	0.02
ROUTED TO	R11I10	4.	4.77	1.	0.	0.	0.02
HYDROGRAPH AT	N11I8	3.	4.27	1.	0.	0.	0.01
2 COMBINED AT	CN11I8	6.	4.63	2.	0.	0.	0.04
5 COMBINED AT	DUMMY	170.	4.63	37.	10.	7.	0.93
HYDROGRAPH AT	N11P2	127.	4.30	12.	3.	2.	0.26
DIVERSION TO							

OPERATION	STATION	PEAK FLOW	TIME OF PEAK	AVERAGE FLOW FOR MAXIMUM PERIOD 6-HOUR	24-HOUR	72-HOUR	BASIN AREA
	N11P2I	102.	4.30	11.	3.	2.	0.26
HYDROGRAPH AT	DN11P2	24.	4.30	1.	0.	0.	0.26
ROUTED TO	RN11PS	18.	4.53	1.	0.	0.	0.26
HYDROGRAPH AT	N21I1	20.	4.37	4.	1.	1.	0.11
2 COMBINED AT	CN21I1	37.	4.50	5.	1.	1.	0.38
DIVERSION TO	N21I1I	0.	0.03	0.	0.	0.	0.38
HYDROGRAPH AT	DN21I1	37.	4.50	5.	1.	1.	0.38
ROUTED TO	RN21I1	35.	4.60	5.	1.	1.	0.38
HYDROGRAPH AT	N22B8	5.	4.20	1.	0.	0.	0.02
2 COMBINED AT	CN22B8	38.	4.60	5.	1.	1.	0.39
ROUTED TO	RN22B8	35.	4.70	5.	1.	1.	0.39
HYDROGRAPH AT	N22B5	7.	4.27	1.	0.	0.	0.03
2 COMBINED AT	CN22B5	39.	4.70	6.	2.	1.	0.42
ROUTED TO	RN22B5	37.	4.77	6.	2.	1.	0.42
HYDROGRAPH AT	N22B2	7.	4.20	1.	0.	0.	0.02
HYDROGRAPH AT	DN11P	102.	4.30	11.	3.	2.	0.26
ROUTED TO	R11PE	95.	4.60	11.	3.	2.	0.26
HYDROGRAPH AT	N21I2	23.	4.30	4.	1.	1.	0.06
2 COMBINED AT	CN21I2	113.	4.60	16.	4.	3.	0.32
DIVERSION TO	N21I2I	0.	0.03	0.	0.	0.	0.32
HYDROGRAPH AT	DN21I2	113.	4.60	16.	4.	3.	0.32
ROUTED TO	RN21I2	111.	4.70	16.	4.	3.	0.32
HYDROGRAPH AT	N22B9	7.	4.17	1.	0.	0.	0.02
2 COMBINED AT	CN22B9	112.	4.70	16.	4.	3.	0.34
ROUTED TO	RN22B9	109.	4.87	16.	4.	3.	0.34
HYDROGRAPH AT	N22B6	7.	4.33	1.	0.	0.	0.04

OPERATION	STATION	PEAK FLOW	TIME OF PEAK	AVERAGE FLOW FOR MAXIMUM PERIOD 6-HOUR	24-HOUR	72-HOUR	BASIN AREA
2 COMBINED AT	CN22B6	113.	4.87	17.	4.	3.	0.38
ROUTED TO	RN22B6	111.	5.00	17.	4.	3.	0.38
HYDROGRAPH AT	N22B3	2.	4.20	0.	0.	0.	0.01
2 COMBINED AT	CN22B3	111.	5.00	18.	4.	3.	0.39
ROUTED TO	RN22B3	110.	5.03	18.	4.	3.	0.39
3 COMBINED AT	CN22B2	129.	5.03	23.	6.	4.	0.57
ROUTED TO	RN22B2	128.	5.07	23.	6.	4.	0.57
HYDROGRAPH AT	N22A8	8.	4.27	2.	0.	0.	0.02
2 COMBINED AT	CN22A8	128.	5.07	25.	6.	4.	0.59
ROUTED TO	RN22A8	128.	5.07	25.	6.	4.	0.59
HYDROGRAPH AT	N22A6	7.	4.27	2.	0.	0.	0.02
HYDROGRAPH AT	N22A5	5.	4.37	1.	0.	0.	0.02
3 COMBINED AT	CN22A5	129.	5.07	27.	7.	5.	0.63
ROUTED TO	RN22A5	124.	5.27	27.	7.	5.	0.63
HYDROGRAPH AT	N22A2	1.	4.53	0.	0.	0.	0.01
HYDROGRAPH AT	N22A3	16.	4.20	2.	0.	0.	0.03
3 COMBINED AT	C22AX1	124.	5.27	28.	7.	5.	0.67
ROUTED TO	R22AX1	121.	5.30	28.	7.	5.	0.67
HYDROGRAPH AT	N22A1	21.	4.13	2.	1.	0.	0.02
2 COMBINED AT	C22AX2	120.	5.30	30.	8.	5.	0.69
ROUTED TO	R22AX2	120.	5.33	30.	8.	5.	0.69
HYDROGRAPH AT	N11I12	17.	4.47	2.	0.	0.	0.28
ROUTED TO	RI12E	16.	4.77	2.	0.	0.	0.28
HYDROGRAPH AT	N11I13	5.	4.37	1.	0.	0.	0.03
3 COMBINED AT	C22AX3	123.	5.33	32.	8.	6.	0.72
ROUTED TO							

OPERATION	STATION	PEAK FLOW	TIME OF PEAK	AVERAGE FLOW FOR MAXIMUM PERIOD			BASIN AREA
				6-HOUR	24-HOUR	72-HOUR	
	R22AX3	122.	5.37	32.	8.	6.	0.72
HYDROGRAPH AT	N22A4	20.	4.10	3.	1.	1.	0.02
HYDROGRAPH AT	N11I1	5.	4.57	2.	0.	0.	0.04
HYDROGRAPH AT	N11I5	1.	4.60	1.	0.	0.	0.01
HYDROGRAPH AT	N22A7	13.	4.10	1.	0.	0.	0.01
4 COMBINED AT	DUMMY3	35.	4.10	6.	2.	1.	0.09

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

APPENDIX G. 100-YR 6-HR EXISTING CONDITIONS HEC-1 OUTPUT

```
****************************************
*                                      *
*   FLOOD HYDROGRAPH PACKAGE  (HEC-1)  *
*            MAY  1991                 *
*          VERSION 4.0.1E              *
*     Lahey F77L-EM/32 version 5.01    *
*       Dodson & Associates, Inc.      *
*     DATE  06/28/01  TIME  11:04:03   *
****************************************
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****************************************
*                                      *
*    U.S. ARMY CORPS OF ENGINEERS      *
*    HYDROLOGIC ENGINEERING CENTER     *
*          609 SECOND STREET           *
*       DAVIS, CALIFORNIA 95616        *
*           (916) 551-1748             *
*                                      *
****************************************
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```
X     X  XXXXXXX   XXXXX          X
X     X  X        X     X        XX
X     X  X        X               X
XXXXXXX  XXXX     X        XXXXX  X
X     X  X        X               X
X     X  X        X     X         X
X     X  XXXXXXX   XXXXX         XXX
```

THIS PROGRAM REPLACES ALL PREVIOUS VERSIONS OF HEC-1 KNOWN AS HEC1 (JAN 73), HEC1GS, HEC1DB, AND HEC1KW.

THE DEFINITIONS OF VARIABLES -RTIMP- AND -RTIOR- HAVE CHANGED FROM THOSE USED WITH THE 1973-STYLE INPUT STRUCTURE.
THE DEFINITION OF -AMSKK- ON RM-CARD WAS CHANGED WITH REVISIONS DATED 28 SEP 81. THIS IS THE FORTRAN77 VERSION
NEW OPTIONS: DAMBREAK OUTFLOW SUBMERGENCE , SINGLE EVENT DAMAGE CALCULATION, DSS:WRITE STAGE FREQUENCY,
DSS:READ TIME SERIES AT DESIRED CALCULATION INTERVAL LOSS RATE:GREEN AND AMPT INFILTRATION
KINEMATIC WAVE: NEW FINITE DIFFERENCE ALGORITHM

HEC-1 INPUT PAGE 1

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

  1           ID
  2           ID   ****************************************************************************
  3           ID   **                                                                        **
  4           ID   **                    Glendale/Peoria ADMP Update                         **
  5           ID   **                                                                        **
  6           ID   ****************************************************************************
  7           ID   ****************************************************************************
  8           ID   PROJECT:                Glendale Peoria ADMP Update
  9           ID   CLIENT:                 Flood Control District of Maricopa County
 10           ID   PREPARED BY:            Entellus, Inc.
 11           ID   PROJECT No:             FCD 99-44 (C.O.)            Entellus 310.017
 12           ID   FILE NAME: SECT15.DAT                     CREATED DATE: MAR. 15, 2001
 13           ID   MODIFIED:
 14           ID   STORM:                  100-year 6-hour Storm
 15           ID   DEVELOPMENT CONDITIONS: Existing Conditions
 16           ID
 17           ID      THIS IS THE DETAILED NEIGHBORHOOD STUDY AREA (SECTION 15) AND BASINS
 18           ID      FLOWING INTO THIS AREA ONLY.
 19           ID
 20           ID   DDM MCUHP1
              *
              *
              *
              * ****************************************************************************
 21           IT       5                    1000
 22           IO       5
              *
              *DIAGRAM
              *
              *
              *
 23           IN      15
 24           JD    3.20    0.01
 25           PC   0.000   0.008   0.016   0.025   0.033   0.041   0.050   0.058   0.066   0.074
 26           PC   0.087   0.099   0.118   0.138   0.216   0.377   0.834   0.911   0.931   0.950
 27           PC   0.962   0.972   0.983   0.991   1.000
 28           JD   3.179    0.50
 29           JD   3.120    2.80
 30           PC   0.000   0.009   0.016   0.025   0.034   0.042   0.051   0.059   0.067   0.076
 31           PC   0.087   0.100   0.120   0.163   0.252   0.451   0.694   0.837   0.900   0.938
 32           PC   0.950   0.963   0.975   0.988   1.000
 33           JD   2.950    16.0
 34           PC   0.000   0.009   0.020   0.030   0.048   0.063   0.076   0.090   0.105   0.119
 35           PC   0.135   0.152   0.175   0.222   0.304   0.472   0.670   0.796   0.868   0.912
 36           PC   0.946   0.960   0.973   0.987   1.000
 37           JD   2.598    90.0
 38           PC   0.000   0.021   0.035   0.051   0.071   0.087   0.105   0.125   0.143   0.160
 39           PC   0.179   0.201   0.232   0.281   0.364   0.500   0.658   0.773   0.841   0.888
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 40          PC   0.927   0.945   0.964   0.982   1.000
 41          JD   1.824   500.0
 42          PC   0.000   0.024   0.043   0.059   0.078   0.098   0.119   0.141   0.162   0.186
 43          PC   0.212   0.239   0.271   0.321   0.408   0.515   0.627   0.735   0.814   0.864
 44          PC   0.907   0.930   0.954   0.977   1.000
             *
                                   HEC-1 INPUT                                                    PAGE  2

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


 45          KK   N11P1   BASIN
 46          BA    .117
 47          LG    0.34    0.35    3.95    0.48       1
 48          UC   0.208   0.173
 49          UA       0     3.0     5.0     8.0    12.0    20.0    43.0    75.0    90.0    96.0
 50          UA     100
             *
             *
             * *** ROUTE RN11P1  ***********************************************************
             * ROUTE RN11P1 IS 2675 FT WITH A SLOPE OF 0.0103
             * CROSS SECTION IS A RURAL ROAD
             *
             * DDM   ***** Preserved *****

 51          KK  RN11P1
 52          RS       5   FLOW       0
 53          RC    0.04    0.03    0.04    2675  0.0103
 54          RX       0       1      70      75      95     100     136     137
 55          RY       8       3       1       0       0       1       3       8
             *
             *

 56          KK   N11L5   BASIN
 57          BA    .074
 58          LG    0.32    0.32    2.65    1.20       3
 59          UC   0.517   0.568
 60          UA       0     5.0    16.0    30.0    65.0    77.0    84.0    90.0    94.0    97.0
 61          UA     100
             *
             *

 62          KK   N11L1   BASIN
 63          BA    .074
 64          LG    0.31    0.35    2.65    1.35      12
 65          UC   0.467   0.441
 66          UA       0     5.0    16.0    30.0    65.0    77.0    84.0    90.0    94.0    97.0
 67          UA     100
             *
             *
             * *** DIVERSION DN11L1 ***********************************************************
             * SPLIT FLOW IS CALCULATED BASED ON EXISTING TOPOGRAPHY
             *
             * DDM   ***** Preserved *****

 68          KK  DN11L1
 69          DT  N11L1I
 70          DI       0      18      36      55      73      91     109     127     145
 71          DQ       0      13      23      34      46      57      69      80      91
             *
             *
             * *** ROUTE RN11LE ***********************************************************
             * ROUTE RN11LE IS 879 FT WITH A SLOPE OF 0.0011
             * CROSS SECTION IS PINNACLE PEAK ROAD (MEASURED)
             *
             * DDM   ***** Preserved *****
                                   HEC-1 INPUT                                                    PAGE  3

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


 72          KK  RN11LE
 73          RS       7   FLOW       0
 74          RC    0.04    0.03    0.04     879   0.011
 75          RX       0       1      43      48      73      78     120     121
 76          RY       8       3       1       0       0       1       3       8
             *
             *
             * DDM   ***** Preserved *****

 77          KK  CN11L5
```

```
 78          HC       3
             *
             *
             * *** DIVERSION DN11L5 ************************************************************
             * THIS SPLIT IS BASED ON THE LEVEL 3 IMPROVEMENTS
             *
             * DDM   ***** Preserved *****

 79          KK  DN11L5
 80          DT  N11L5I
 81          DI       0      18      36      55      73      91     109     127     145
 82          DQ       0       0       0       0       0       0       0       0       0
             *
             *
             * *** ROUTE RN11L5 ****************************************************************
             * ROUTE RN11L5 IS 1300 FT WITH A SLOPE OF 0.0062
             * CROSS SECTION IS A SUBDIVISION ROAD
             *
             * DDM   ***** Preserved *****

 83          KK  RN11L5
 84          RS       2   FLOW       0
 85          RC    0.03    0.02    0.03    1300  0.0062
 86          RX       0       1      50      55      77      82     149     150
 87          RY       8       3       1       0       0       1       3       8
             *
             *

 88          KK  N11I31   BASIN
 89          BA    .016
 90          LG    0.24    0.35    2.65    1.31      12
 91          UC   0.317   0.405
 92          UA       0     5.0    16.0    30.0    65.0    77.0    84.0    90.0    94.0    97.0
 93          UA     100
             *
             *
             * DDM   ***** Preserved *****

 94          KK  C11I31
 95          HC       2
             *
             *
             * *** ROUTE R11I31 ****************************************************************
             * ROUTE R11I31 IS 1307 FT WITH A SLOPE OF 0.0061
             * CROSS SECTION IS A SUBDIVISION ROAD
             *
             * DDM   ***** Preserved *****
                                        HEC-1 INPUT                                          PAGE  4

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

 96          KK  R11I31
 97          RS       2   FLOW       0
 98          RC    0.03    0.02    0.03    1307  0.0061
 99          RX       0       1      70      75      97     102     139     140
100          RY       8       3       1       0       0       1       3       8
             *
             *

101          KK  N11I32   BASIN
102          BA    .041
103          LG    0.30    0.35    2.74    1.13       5
104          UC   0.354   0.286
105          UA       0     5.0    16.0    30.0    65.0    77.0    84.0    90.0    94.0    97.0
106          UA     100
             *
             *
             * *** ROUTE R11I32 ****************************************************************
             * ROUTE R11I32 IS 1759 FT WITH A SLOPE OF 0.0045
             * CROSS SECTION IS A SUBDIVISION ROAD
             *
             * DDM   ***** Preserved *****

107          KK  R11I32
108          RS       3   FLOW       0
109          RC    0.03    0.02    0.03    1759  0.0045
110          RX       0       1      48      53      83      88     131     132
111          RY       8       3       2       0       0       2       3       8
             *
             *
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 112          KK  N11I23   BASIN
 113          BA    .044
 114          LG    0.24    0.35    2.65    1.37      27
 115          UC   0.412   0.389
 116          UA       0     5.0    16.0    30.0    65.0    77.0    84.0    90.0    94.0    97.0
 117          UA     100
              *
              *
              * DDM   ***** Preserved *****

 118          KK  C11I23
 119          HC       3
              *
              *
              * *** ROUTE R11I23 ************************************************************
              * ROUTE R11I23 IS 1405 FT WITH A SLOPE OF 0.0071
              * CROSS SECTION IS A SMALLER SUBDIVISION ROAD
              *
              * DDM   ***** Preserved *****
                                          HEC-1 INPUT                                          PAGE  5

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

 120          KK  R11I23
 121          RS       3   FLOW       0
 122          RC    0.04    0.03    0.04    1405  0.0071
 123          RX       0       1      73      78     113     118     161     162
 124          RY       8       3       1       0       0       1       3       8
              *
              *

 125          KK  N11I14   BASIN
 126          BA    .029
 127          LG    .310    .350   2.650   1.370  13.000
 128          UC    .654    .663
 129          UA       0       3       5       8      12      20      43      75      90      96
 130          UA     100
              *
              *
              * DDM   ***** Preserved *****

 131          KK  C11I14
 132          HC       2
              *
              *
              * *** ROUTE R11I14 ************************************************************
              * ROUTE R11I14 IS 1275 FT WITH A SLOPE OF 0.0055
              * CROSS SECTION IS A SMALLER SUBDIVISION ROAD
              *
              * DDM   ***** Preserved *****

 133          KK  R11I14
 134          RS       3   FLOW       0
 135          RC    0.04    0.03    0.04    1275  0.0055
 136          RX       0       1      56      61     101     106     190     191
 137          RY       8       3       1       0       0       1       3       8
              *
              *

 138          KK   N11I4   BASIN
 139          BA    .023
 140          LG    .310    .300   2.650   1.380  13.000
 141          UC    .646    .706
 142          UA       0       5      16      30      65      77      84      90      94      97
 143          UA     100
              *
              *
              *
              * DDM   ***** Preserved *****

 144          KK  CN11I4
 145          HC       2
              *
              *
              *
                                          HEC-1 INPUT                                          PAGE  6

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

```
146          KK  N11I24   BASIN
147          BA    .015
148          LG    .240    .290   2.650   1.380  29.000
149          UC    .567    .867
150          UA       0       5      16      30      65      77      84      90      94      97
151          UA     100
             *
             *
             * *** ROUTE R11I24 ************************************************************
             * ROUTE R11I24 IS 1365 FT WITH A SLOPE OF 0.0059
             * CROSS SECTION IS A SMALLER SUBDIVISION ROAD
             *
             * DDM   ***** Preserved *****

152          KK  R11I24
153          RS      10   FLOW       0
154          RC    0.04    0.03    0.04    1365  0.0059
155          RX       0       1      50      55      95     100     160     161
156          RY       8       3       2       0       0       2       3       8
             *
             *

157          KK   N11I3   BASIN
158          BA    .018
159          LG    0.30    0.35    2.65    1.39      14
160          UC   0.325   0.363
161          UA       0     5.0    16.0    30.0    65.0    77.0    84.0    90.0    94.0    97.0
162          UA     100
             *
             *
             * DDM   ***** Preserved *****

163          KK  CN11I3
164          HC       2
             *
             *
             * *** ROUTE RN11I3 *************************************************************
             * ROUTE RN11I3 IS 1310 FT WITH A SLOPE OF 0.0069
             * CROSS SECTION IS A SMALLER SUBDIVISION ROAD
             *
             * DDM   ***** Preserved *****

165          KK  RN11I3
166          RS       7   FLOW       0
167          RC    0.04    0.03    0.04    1310  0.0069
168          RX       0       1      54      59      90      95     135     136
169          RY       8       3       1       0       0       1       3       8
             *
             *
```



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

170          KK   N11I2   BASIN
171          BA    .026
172          LG    .300    .350   2.650   1.400  15.000
173          UC    .654    .725
174          UA       0       5      16      30      65      77      84      90      94      97
175          UA     100
             *
             *
             *
             * DDM   ***** Preserved *****

176          KK  CN11I2
177          HC       2
             *
             *

178          KK   N11L2   BASIN
179          BA    .010
180          LG    .300    .350   2.650   1.400  15.000
181          UC    .425    .479
182          UA       0       5      16      30      65      77      84      90      94      97
183          UA     100
             *
             *
             * *** DIVERSION DN11L2 *********************************************************
             * THIS DIVERSION IS IN PLACE TO ACCOUNT FOR THE LEVEL 3 IMPROVEMENTS
```

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

 184            KK  DN11L2
 185            DT  N11L2I
 186            DI       0      18      36      55      73      91     109     127     500
 187            DQ       0       0       0       0       0       0       0       0       0
                *
                *
                * *** ROUTE RN11L2 ***********************************************************
                * ROUTE RN11L2 IS 442 FT WITH A SLOPE OF 0.0063
                * CROSS SECTION IS A SUBDIVISION ROAD
                *
                * DDM   ***** Preserved *****

 188            KK  RN11L2
 189            RS       2   FLOW       0
 190            RC    0.03    0.02    0.03     442  0.0063
 191            RX       0       1      32      37      69      74     112     113
 192            RY       8       3       2       0       0       2       3       8
                *
                *
                                          HEC-1 INPUT                                          PAGE  8

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


 193            KK  N11I33   BASIN
 194            BA    .004
 195            LG    0.30    0.35    2.65    1.40      15
 196            UC   0.242   0.273
 197            UA       0     5.0    16.0    30.0    65.0    77.0    84.0    90.0    94.0    97.0
 198            UA     100
                *
                *
                * DDM   ***** Preserved *****

 199            KK  C11I33
 200            HC       2
                *
                *
                *
                * *** DIVERSION D11I33 ********************************************************
                * 50% DIVERTED EAST
                *
                * DDM   ***** Preserved *****

 201            KK  D11I33
 202            DT  11I33I
 203            DI       0       2      10      20     100     200     400
 204            DQ       0       1       5      10      50     100     200
                *
                *
                *
                * *** ROUTE R133S *************************************************************
                * ROUTE RI33S IS 1156 FT WITH A SLOPE OF 0.0063
                * CROSS SECTION IS A SUBDIVISION ROAD
                *
                * DDM   ***** Preserved *****

 205            KK   RI33S
 206            RS       7   FLOW       0
 207            RC    0.03    0.02    0.03    1156  0.0063
 208            RX       0       1      42      47      77      82     117     118
 209            RY       8       3       2       0       0       2       3       8
                *
                *
                *

 210            KK  N11I27   BASIN
 211            BA    .011
 212            LG    0.27    0.35    2.65    1.36      14
 213            UC   0.262   0.313
 214            UA       0     5.0    16.0    30.0    65.0    77.0    84.0    90.0    94.0    97.0
 215            UA     100
                *
                *
                                          HEC-1 INPUT                                          PAGE  9

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

```
216          KK  N11I26   BASIN
217          BA    .005
218          LG    0.23    0.35    2.65    1.30      12
219          UC   0.275   0.503
220          UA       0     5.0    16.0    30.0    65.0    77.0    84.0    90.0    94.0    97.0
221          UA     100
             *
             *
             * DDM   ***** Preserved *****

222          KK  C11I26
223          HC       3
             *
             *
             * *** ROUTE R11I26 ************************************************************
             * ROUTE R11I26 IS 1382 FT WITH A SLOPE OF 0.0065
             * CROSS SECTION IS OVERLAND FLOW
             *
             * DDM   ***** Preserved *****

224          KK  R11I26
225          RS      12   FLOW       0
226          RC    0.05    0.05    0.05    1382  0.0065
227          RX       0     200     250     260     270     280     330     530
228          RY       3       2       1       0       0       1       2       8
             *
             *

229          KK  N11I22   BASIN
230          BA    .038
231          LG    .310    .350   4.200    .490  11.000
232          UC    .454    .369
233          UA       0       5      16      30      65      77      84      90      94      97
234          UA     100
             *
             *
             * DDM   ***** Preserved *****

235          KK  C11I22
236          HC       2
             *
             *
             * *** ROUTE R11I22 ************************************************************
             * ROUTE R11I22 IS 1750 FT WITH A SLOPE OF 0.0057
             * CROSS SECTION IS A SUBDIVISION ROAD
             *
             * DDM   ***** Preserved *****

237          KK  R11I22
238          RS       6   FLOW       0
239          RC    0.03    0.02    0.03    1750  0.0057
240          RX       0       1      43      48      94      99     137     138
241          RY       8       2       1       0       0       1       2       8
             *
             *
```



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

242          KK   N11I6   BASIN
243          BA    .033
244          LG    0.30    0.35    2.65    1.40      15
245          UC   0.408   0.423
246          UA       0     5.0    16.0    30.0    65.0    77.0    84.0    90.0    94.0    97.0
247          UA     100
             *
             *
             * DDM   ***** Preserved *****

248          KK  C11I6
249          HC       2
             *
             *
             * *** ROUTE RN11I6 ************************************************************
             * ROUTE RN11I6 IS 990 FT WITH A SLOPE OF 0.0051
             * CROSS SECTION IS A SUBDIVISION ROAD
             *
             * DDM   ***** Preserved *****
```

```
250          KK  RN11I6
251          RS       3   FLOW       0
252          RC    0.03    0.02    0.03     990  0.0051
253          RX       0       1      45      50      90      95     143     144
254          RY       8       3       1       0       0       1       3       8
             *
             *

255          KK   N11I7   BASIN
256          BA    .021
257          LG    .300    .350   2.650   1.400  15.000
258          UC    .671    .776
259          UA       0       5      16      30      65      77      84      90      94      97
260          UA     100
             *
             *
             *
             * DDM   ***** Preserved *****

261          KK  CN11I7
262          HC       2
             *
             *

263          KK   N11L3   BASIN
264          BA    .063
265          LG    0.30    0.29    2.65    1.38      14
266          UC   0.342   0.313
267          UA       0     5.0    16.0    30.0    65.0    77.0    84.0    90.0    94.0    97.0
268          UA     100
             *
             *
             *
             *
             * *** DIVERSION DN11L3 ***********************************************************
             * THIS DIVERSION IS IN PLACE TO ACCOUNT FOR THE LEVEL 3 IMPROVEMENTS
             *
             * DDM   ***** Preserved *****
                                          HEC-1 INPUT                                          PAGE 11
LINE         ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10

269          KK  DN11L3
270          DT  N11L3I
271          DI       0      18      36      55      73      91     109     127     500
272          DQ       0       0       0       0       0       0       0       0       0
             *
             * *** ROUTE RN11L3 ***************************************************************
             * ROUTE RN11L3 IS 1145 FT WITH A SLOPE OF 0.0079
             * CROSS SECTION IS A SUBDIVISION ROAD
             *
             * DDM   ***** Preserved *****

273          KK  RN11L3
274          RS       1   FLOW      -1
275          RC    0.03    0.02    0.03    1145  0.0079
276          RX       0       1      50      55      90      95     145     146
277          RY       8       3       1       0       0       1       3       8
             *
             *

278          KK  N11I30   BASIN
279          BA    .017
280          LG    .140    .350   2.650   1.120   5.000
281          UC    .329    .374
282          UA       0       5      16      30      65      77      84      90      94      97
283          UA     100
             *
             *

284          KK  N11I28   BASIN
285          BA    .023
286          LG    0.27    0.35    2.65    1.35      13
287          UC   0.321   0.353
288          UA       0     5.0    16.0    30.0    65.0    77.0    84.0    90.0    94.0    97.0
289          UA     100
             *
             *
             *
             * *** DIVERSION RECOVER D11I33 ******************************************
```

```
            * RECOVER FLOWS FROM D11I33

290         KK  D11I33
291         DR  11I33I
            *
            *
            *
            * *** ROUTE RI33E ***********************************************************
            * ROUTE RI33E IS 1497 FT WITH A SLOPE OF 0.0048
            * CROSS SECTION IS A SUBVISION ROAD
            *
            * DDM   ***** Preserved *****
                                        HEC-1 INPUT                                          PAGE 12

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

292         KK   RI33E
293         RS      11   FLOW       0
294         RC    0.03    0.02    0.03    1497  0.0048
295         RX       0       1      50      55      90      95     145     146
296         RY       8       3       1       0       0       1       3       8
            *
            *
            * DDM   ***** Preserved *****

297         KK  C11I30
298         HC       4
            *
            *
            * *** ROUTE R11I30 **********************************************************
            * ROUTE R11I30 IS 860 FT WITH A SLOPE OF 0.0052
            * CROSS SECTION IS A SMALLER SUBDIVISION ROAD
            *
            * DDM   ***** Preserved *****

299         KK  R11I30
300         RS       3   FLOW       0
301         RC    0.04    0.03    0.04     860  0.0052
302         RX       0       1      42      47      77      82     131     132
303         RY       8       3       2       0       0       2       3       8
            *
            *

304         KK  N11I29   BASIN
305         BA    .006
306         LG    .300    .350   2.650   1.200   5.000
307         UC    .354    .396
308         UA       0       5      16      30      65      77      84      90      94      97
309         UA     100
            *
            *
            * *** ROUTE R11I29 **********************************************************
            * ROUTE R11I29 IS 1350 FT WITH A SLOPE OF 0.0067
            * CROSS SECTION IS OVERLAND FLOW
            *
            * DDM   ***** Preserved *****

310         KK  R11I29
311         RS      14   FLOW       0
312         RC    0.05    0.05    0.05    1350  0.0067
313         RX       0     200     250     260     270     280     330     530
314         RY       3       2       1       0       0       1       2       8
            *
            *
                                        HEC-1 INPUT                                          PAGE 13

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

315         KK  N11I25   BASIN
316         BA    .021
317         LG    0.27    0.30    8.00    0.09      13
318         UC   0.229   0.214
319         UA       0     5.0    16.0    30.0    65.0    77.0    84.0    90.0    94.0    97.0
320         UA     100
            *
            *
            * DDM   ***** Preserved *****

321         KK  C11I25
```

```
322          HC       3
             *
             *
             * *** ROUTE R11I25 ************************************************************
             * ROUTE R11I25 IS 689 FT WITH A SLOPE OF 0.0065
             * CROSS SECTION IS OVERLAND FLOW
             *
             * DDM   ***** Preserved *****

323          KK  R11I25
324          RS       3   FLOW       0
325          RC    0.05    0.05    0.05     689  0.0065
326          RX       0     200     250     260     270     280     330     530
327          RY       3       2       1       0       0       1       2       8
             *
             *

328          KK   N11L4   BASIN
329          BA    .010
330          LG    .300    .350   2.650   1.390  14.000
331          UC    .396    .544
332          UA       0       3       5       8      12      20      43      75      90      96
333          UA     100
             *
             *
             * *** DIVERSION DN11L4 ********************************************************
             * THIS DIVERSION IS IN PLACE TO ACCOUNT FOR THE LEVEL 3 IMPROVEMENTS
             *
             * DDM   ***** Preserved *****

334          KK  DN11L4
335          DT  N11L4I
336          DI       0      18      36      55      73      91     109     127     500
337          DQ       0       0       0       0       0       0       0       0       0
             *
             *
             * *** ROUTE RN11L4 ************************************************************
             * ROUTE RN11L4 IS 737 FT WITH A SLOPE OF 0.0075
             * CROSS SECTION IS OVERLAND FLOW
             *
             * DDM   ***** Preserved *****
                                          HEC-1 INPUT                                          PAGE 14
LINE         ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10

338          KK  RN11L4
339          RS       7   FLOW       0
340          RC    0.05    0.05    0.05     737  0.0075
341          RX       0     200     250     260     270     280     330     530
342          RY       3       2       1       0       0       1       2       8
             *
             *

343          KK   N22B7   BASIN
344          BA    .015
345          LG    .300    .350   2.650   1.200   5.000
346          UC    .429    .384
347          UA       0       5      16      30      65      77      84      90      94      97
348          UA     100
             *
             *
             * DDM   ***** Preserved *****

349          KK  CN22B7
350          HC       2
             *
             *
             * *** ROUTE RN22B7 ************************************************************
             * ROUTE RN22B7 IS 1415 FT WITH A SLOPE OF 0.006
             * CROSS SECTION IS OVERLAND FLOW
             *
             * DDM   ***** Preserved *****

351          KK  RN22B7
352          RS      12   FLOW       0
353          RC    0.05    0.05    0.05    1415   0.006
354          RX       0     200     250     260     270     280     330     530
355          RY       3       2       1       0       0       1       2       8
             *
             *
```

```
356          KK   N22B4   BASIN
357          BA    .036
358          LG    0.32    0.35    2.76    1.24      10
359          UC   0.300   0.215
360          UA       0     5.0    16.0    30.0    65.0    77.0    84.0    90.0    94.0    97.0
361          UA     100
             *
             *
             * DDM   ***** Preserved *****

362          KK  CN22B4
363          HC       2
             *
             *
             * *** ROUTE RN22B4 ************************************************************
             * ROUTE RN22B4 IS 953 FT WITH A SLOPE OF 0.0042
             * CROSS SECTION IS OVERLAND FLOW
             *
             * DDM   ***** Preserved *****
                                        HEC-1 INPUT                                          PAGE 15

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

364          KK  RN22B4
365          RS       7   FLOW       0
366          RC    0.05    0.05    0.05     953  0.0042
367          RX       0     200     250     260     270     280     330     530
368          RY       3       2       1       0       0       1       2       8
             *
             *

369          KK   N22B1   BASIN
370          BA    .019
371          LG    .300    .350   2.650   1.380  14.000
372          UC    .438    .327
373          UA       0       5      16      30      65      77      84      90      94      97
374          UA     100
             *
             *
             * DDM   ***** Preserved *****

375          KK  CN22B1
376          HC       2
             *
             *
             * *** ROUTE RN22B1 ************************************************************
             * ROUTE RN22B1 IS 373 FT WITH A SLOPE OF 0.0054
             * CROSS SECTION IS A SUBDIVISION ROAD WITH A WALL ON THE WEST SIDE
             *
             * DDM   ***** Preserved *****

377          KK  RN22B1
378          RS       1   FLOW       0
379          RC    0.03    0.02    0.03     373  0.0054
380          RX       0       1      11      21      27      52     132     133
381          RY       8       2       0       2       3       3       4       8
             *
             *

382          KK  N11I20   BASIN
383          BA    .010
384          LG    .320    .350   3.010   1.010   8.000
385          UC    .321    .283
386          UA       0       5      16      30      65      77      84      90      94      97
387          UA     100
             *
             *
             *

388          KK  N11I21   BASIN
389          BA    .020
390          LG    0.30    0.35    2.65    1.39      14
391          UC   0.321   0.342
392          UA       0     5.0    16.0    30.0    65.0    77.0    84.0    90.0    94.0    97.0
393          UA     100
             *
             *
             * DDM   ***** Preserved *****
                                        HEC-1 INPUT                                          PAGE 16
```

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

 394          KK  C11I20
 395          HC       4
              *
              *
              *
              * *** ROUTE R11I20 ************************************************************
              * ROUTE R11I20 IS 699 FT WITH A SLOPE OF 0.0057
              * CROSS SECTION IS A SUBDIVISION ROAD
              *
              * DDM   ***** Preserved *****

 396          KK  R11I20
 397          RS       1   FLOW       0
 398          RC    0.03    0.02    0.03     699  0.0057
 399          RX       0       1      24      29      69      74     148     149
 400          RY       8       2       1       0       0       1       3       8
              *
              *

 401          KK  N11I11   BASIN
 402          BA    .018
 403          LG    0.25    0.35    2.65    1.40      30
 404          UC   0.367   0.431
 405          UA       0     5.0    16.0    30.0    65.0    77.0    84.0    90.0    94.0    97.0
 406          UA     100
              *
              *
              * DDM   ***** Preserved *****

 407          KK  C11I11
 408          HC       2
              *
              *
              *
              * *** ROUTE R11I11 ************************************************************
              * ROUTE R11I11 IS 598 FT WITH A SLOPE OF 0.0033
              * CROSS SECTION IS A SUBDIVISION ROAD (MEASURE)
              *
              * DDM   ***** Preserved *****

 409          KK  R11I11
 410          RD
 411          RC    0.03    0.02    0.03     598  0.0033
 412          RX       0       1      20      30      60      70     175     176
 413          RY       8       4       3       0       0       3       4       8
              *
              *

 414          KK  N11I12   BASIN
 415          BA    .024
 416          LG    0.25    0.35    4.10    0.53      28
 417          UC   0.371   0.360
 418          UA       0     5.0    16.0    30.0    65.0    77.0    84.0    90.0    94.0    97.0
 419          UA     100
              *
              *
              *
              * DDM   ***** Preserved *****
                                        HEC-1 INPUT                                          PAGE 17
LINE          ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10

 420          KK  C11I12
 421          HC       2
              *
              *
              * *** DIVERSION D11I12 ***********************************************
              * SPLIT WAS CALCULATED USING EXISTING TOPOGRAPHY
              *
              * DDM   ***** Preserved *****

 422          KK  D11I12
 423          DT  11I12I
 424          DI       0      36      73     109     145     182     218     291     327
 425          DQ       0       0      15      24      31      36      49      66      74
              *
              *
```

```
                *
                * *** ROUTE RI12S ************************************************************
                * ROUTE RI12S IS 1347 FT WITH A SLOPE OF 0.0052
                * CROSS SECTION IS A SUBDIVISION ROAD
                *
                * DDM   ***** Preserved *****

 426            KK   RI12S
 427            RS       3   FLOW       0
 428            RC    0.03    0.02    0.03    1347  0.0052
 429            RX       0       1      75      80     120     125     190     191
 430            RY       8       3       1       0       0       1       3       8
                *
                *

 431            KK   N11I9   BASIN
 432            BA    .012
 433            LG    0.26    0.35    2.65    1.34      13
 434            UC   0.308   0.424
 435            UA       0     5.0    16.0    30.0    65.0    77.0    84.0    90.0    94.0    97.0
 436            UA     100
                *
                *
                * DDM   ***** Preserved *****

 437            KK  CN11I9
 438            HC       2
                *
                *

 439            KK  N11I10   BASIN
 440            BA    .021
 441            LG    .300    .350   2.650   1.390  14.000
 442            UC    .696    .877
 443            UA       0       5      16      30      65      77      84      90      94      97
 444            UA     100
                *
                *
                * *** ROUTE R11I10 ***********************************************************
                * ROUTE R11I10 IS 1180 FT WITH A SLOPE OF 0.0044
                * CROSS SECTION IS OVERLAND FLOW
                *
                * DDM   ***** Preserved *****
                                          HEC-1 INPUT                                          PAGE 18

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

 445            KK  R11I10
 446            RS      12   FLOW       0
 447            RC    0.05    0.05    0.05    1180  0.0044
 448            RX       0     200     250     260     270     280     330     530
 449            RY       3       2       1       0       0       1       2       8
                *
                *

 450            KK   N11I8   BASIN
 451            BA    .014
 452            LG    .280    .350   2.650   1.370  14.000
 453            UC    .542    .636
 454            UA       0       5      16      30      65      77      84      90      94      97
 455            UA     100
                *
                *
                *
                * DDM   ***** Preserved *****

 456            KK  CN11I8
 457            HC       2
                *
                *
                *
                * DDM   ***** Preserved *****

 458            KK   DUMMY
 459            HC       5
                *
                *

 460            KK   N11P2   BASIN
 461            BA    .265
```

```
462          LG    .350    .350   3.450    .670    .000
463          UC    .438    .355
464          UA       0       3       5       8      12      20      43      75      90      96
465          UA     100
             *
             *
             * *** DIVERSION DN11P2 ***********************************************************
             * THE DITCH ON THE NORTH SIDE OF CALLE LEJOS WAS ESTIMATED
             * TO CARRY 80 CFS. THE SPLIT WAS DETERMINED OVER AND ABOVE THIS FLOW.
             *
             * DDM   ***** Preserved *****

466          KK  DN11P2
467          DT  N11P2I
468          DI       0      10      50      80     116     189     298     407
469          DQ       0      10      50      80      97     133     186     239
             *
             *
             *
             * *** ROUTE RN11PS ****************************************************************
             * ROUTE RN11PS IS 3032 FT WITH A SLOPE OF 0.0099
             * CROSS SECTION IS SHALLOW CONCENTRATED FLOW
             *
             * DDM   ***** Preserved *****
                                          HEC-1 INPUT                                          PAGE 19

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

470          KK  RN11PS
471          RS       7   FLOW       0
472          RC    0.03    0.02    0.03    3032  0.0099
473          RX       0     200     250     260     300     320     370     570
474          RY       3       2       1       0       0       1       2       8
             *
             *

475          KK   N21I1   BASIN
476          BA    .111
477          LG    0.32    0.32    2.65    1.20       3
478          UC   0.412   0.308
479          UA       0     5.0    16.0    30.0    65.0    77.0    84.0    90.0    94.0    97.0
480          UA     100
             *
             * COMBINE THE ROUTED DIVERTED FLOW WITH THIS SUBBASIN
             *
             * DDM   ***** Preserved *****

481          KK  CN21I1
482          HC       2
             *
             *
             * *** DIVERSION DN21I1 ************************************************************
             * THIS DIVERSION IS IN PLACE TO ACCOUNT FOR THE LEVEL 3 IMPROVEMENTS
             *
             * DDM   ***** Preserved *****

483          KK  DN21I1
484          DT  N21I1I
485          DI       0      18      36      55      73      91     109     127     500
486          DQ       0       0       0       0       0       0       0       0       0
             *
             *
             * *** ROUTE RN21I1 ****************************************************************
             * ROUTE RN21I1 IS 754 FT WITH A SLOPE OF 0.008
             * CROSS SECTION IS SHALLOW CONCENTRATED FLOW
             *
             * DDM   ***** Preserved *****

487          KK  RN21I1
488          RS       3   FLOW       0
489          RC    0.05    0.05    0.05     754   0.008
490          RX       0     200     250     260     300     320     370     570
491          RY       3       2       1       0       0       1       2       8
             *
             *

492          KK   N22B8   BASIN
493          BA    .018
494          LG    .320    .350   2.650   1.200   3.000
495          UC    .475    .369
```

```
496          UA       0       5      16      30      65      77      84      90      94      97
497          UA     100
             *
             *
             * DDM   ***** Preserved *****
                                          HEC-1 INPUT                                                PAGE 20

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

498          KK  CN22B8
499          HC       2
             *
             *
             * *** ROUTE RN22B8 ************************************************************
             * ROUTE RN22B8 IS 1332 FT WITH A SLOPE OF 0.006
             * CROSS SECTION IS A SMALLER SUBDIVISION ROAD
             *
             * DDM   ***** Preserved *****

500          KK  RN22B8
501          RS       3   FLOW       0
502          RC    0.04    0.03    0.04    1332   0.006
503          RX       0       1      43      48      78      83     168     169
504          RY       8       3       1       0       0       1       3       8
             *
             *

505          KK   N22B5   BASIN
506          BA    .029
507          LG    0.31    0.35    2.65    1.20       4
508          UC   0.300   0.239
509          UA       0     5.0    16.0    30.0    65.0    77.0    84.0    90.0    94.0    97.0
510          UA     100
             *
             *
             * DDM   ***** Preserved *****

511          KK  CN22B5
512          HC       2
             *
             *
             * *** ROUTE RN22B5 ************************************************************
             * ROUTE RN22B5 IS 684 FT WITH A SLOPE OF 0.0058
             * CROSS SECTION IS SUBDIVISION ROAD
             *
             * DDM   ***** Preserved *****

513          KK  RN22B5
514          RS       2   FLOW       0
515          RC    0.03    0.02    0.03     684  0.0058
516          RX       0       1      50      55      85      95     145     146
517          RY       8       3       1       0       0       1       3       8
             *
             *

518          KK   N22B2   BASIN
519          BA    .023
520          LG    0.31    0.35    2.61    1.41      12
521          UC   0.246   0.159
522          UA       0     5.0    16.0    30.0    65.0    77.0    84.0    90.0    94.0    97.0
523          UA     100
             *
             *
             *
             * *** DIVERSION RECOVER DN11P2  ********************************************
             * RECOVER FLOWS FROM DN11P2
                                          HEC-1 INPUT                                                PAGE 21

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

524          KK   DN11P
525          DR  N11P2I
             *
             *
             * *** ROUTE R11PE *************************************************************
             * ROUTE R11PE IS 3010 FT WITH A SLOPE OF 0.009
             * CROSS SECTION IS SHALLOW CONCENTRATED FLOW
             *
             * DDM   ***** Preserved *****
```

```
526          KK   R11PE
527          RS      12    FLOW       0
528          RC    0.05    0.05    0.05    3010   0.009
529          RX       0     200     250     260     270     280     330     530
530          RY       3       2       1       0       0       1       2       8
             *
             *

531          KK   N21I2   BASIN
532          BA    .057
533          LG    0.32    0.29    4.65    0.32       3
534          UC   0.392   0.436
535          UA       0     5.0    16.0    30.0    65.0    77.0    84.0    90.0    94.0    97.0
536          UA     100
             *
             *
             * DDM   ***** Preserved *****

537          KK  CN21I2
538          HC       2    0.32
             *
             *
             * *** DIVERSION DN21I2 ***********************************************************
             * THIS DIVERSION IS IN PLACE TO ACCOUNT FOR THE LEVEL 3 IMPROVEMENTS
             *
             * DDM   ***** Preserved *****

539          KK  DN21I2
540          DT  N21I2I
541          DI       0      18      36      55      73      91     109     127     500
542          DQ       0       0       0       0       0       0       0       0       0
             *
             *
             * *** ROUTE RN21I2 ***************************************************************
             * ROUTE RN21I2 IS 866 FT WITH A SLOPE OF 0.0058
             * CROSS SECTION IS SHALLOW CONCENTRATED FLOW
             *
             * DDM   ***** Preserved *****
```



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

543          KK  RN21I2
544          RS       4   FLOW       0
545          RC    0.05    0.05    0.05     866  0.0058
546          RX       0     200     250     260     270     280     330     530
547          RY       3       2       1       0       0       1       2       8
             *
             *

548          KK   N22B9   BASIN
549          BA    .022
550          LG    .340    .350   2.650   1.200   1.000
551          UC    .412    .267
552          UA       0       5      16      30      65      77      84      90      94      97
553          UA     100
             *
             *
             * DDM   ***** Preserved *****

554          KK  CN22B9
555          HC       2
             *
             *
             * *** ROUTE RN22B9 ***************************************************************
             * ROUTE RN22B9 IS 1387 FT WITH A SLOPE OF 0.0058
             * CROSS SECTION IS OVERLAND FLOW
             *
             * DDM   ***** Preserved *****

556          KK  RN22B9
557          RS       7   FLOW       0
558          RC    0.05    0.05    0.05    1387  0.0058
559          RX       0     200     250     260     270     280     330     530
560          RY       3       2       1       0       0       1       2       8
             *
             *

561          KK   N22B6   BASIN
```

```
562          BA    .035
563          LG    .300    .350   2.650   1.200   5.000
564          UC    .738    .699
565          UA       0       5      16      30      65      77      84      90      94      97
566          UA     100
             *
             *
             * DDM   ***** Preserved *****

567          KK  CN22B6
568          HC       2
             *
             *
             * *** ROUTE RN22B6 ************************************************************
             * ROUTE RN22B6 IS 834 FT WITH A SLOPE OF 0.0048
             * CROSS SECTION IS OVERLAND FLOW
             *
             * DDM   ***** Preserved *****
                                        HEC-1 INPUT                                          PAGE 23

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

569          KK  RN22B6
570          RS       4   FLOW       0
571          RC    0.05    0.05    0.05     834  0.0048
572          RX       0     200     250     260     270     280     330     530
573          RY       3       2       1       0       0       1       2       8
             *
             *

574          KK   N22B3   BASIN
575          BA    .009
576          LG    .320    .350   2.650   1.340  10.000
577          UC    .471    .515
578          UA       0       5      16      30      65      77      84      90      94      97
579          UA     100
             *
             *
             * DDM   ***** Preserved *****

580          KK  CN22B3
581          HC       2
             *
             *
             * *** ROUTE RN22B3 ************************************************************
             * ROUTE RN22B3 IS 853 FT WITH A SLOPE OF 0.0012
             * CROSS SECTION IS A SUBDIVISION ROAD WITH A WALL ON THE WEST SIDE
             *
             * DDM   ***** Preserved *****

582          KK  RN22B3
583          RS       3   FLOW       0
584          RC    0.03    0.02    0.03     853  0.0012
585          RX       0       1      11      21      51      56     141     142
586          RY       8       2       0       2       2       3       4       8
             *
             *
             * DDM   ***** Preserved *****

587          KK  CN22B2
588          HC       3     .57
             *
             *
             * *** ROUTE RN22B2 ************************************************************
             * ROUTE RN22B2 IS 737 FT WITH A SLOPE OF 0.0054
             * CROSS SECTION IS A SUBDIVISION ROAD
             *
             * DDM   ***** Preserved *****

589          KK  RN22B2
590          RS       1   FLOW       0
591          RC    0.03    0.02    0.03     737  0.0054
592          RX       0       1      34      39      79      84     114     115
593          RY       8       3       2       0       0       2       3       8
             *
             *
                                        HEC-1 INPUT                                          PAGE 24

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

```
594          KK   N22A8   BASIN
595          BA    .023
596          LG    0.26    0.35    2.65    1.41      27
597          UC   0.367   0.346
598          UA       0     5.0    16.0    30.0    65.0    77.0    84.0    90.0    94.0    97.0
599          UA     100
             *
             *
             * DDM   ***** Preserved *****

600          KK  CN22A8
601          HC       2
             *
             *
             * *** ROUTE RN22A8 ************************************************************
             * ROUTE RN22A8 IS 388 FT WITH A SLOPE OF 0.0052
             * CROSS SECTION IS A SUBDIVISION ROAD
             *
             * DDM   ***** Preserved *****

602          KK  RN22A8
603          RD
604          RC    0.03    0.02    0.03     388  0.0052
605          RX       0       1      34      39      79      84     114     115
606          RY       8       4       3       0       0       3       4       8
             *
             *

607          KK   N22A6   BASIN
608          BA    .020
609          LG    0.24    0.35    2.65    1.39      29
610          UC   0.371   0.373
611          UA       0     5.0    16.0    30.0    65.0    77.0    84.0    90.0    94.0    97.0
612          UA     100
             *
             *

613          KK   N22A5   BASIN
614          BA    .016
615          LG    .250    .350   2.650   1.400  30.000
616          UC    .738    .800
617          UA       0       5      16      30      65      77      84      90      94      97
618          UA     100
             *
             *
             * DDM   ***** Preserved *****

619          KK  CN22A5
620          HC       3
             *
             *
             * *** ROUTE RN22A5 ************************************************************
             * ROUTE RN22A5 IS 1348 FT WITH A SLOPE OF 0.0045
             * CROSS SECTION IS A RURAL ROAD
             *
             * DDM   ***** Preserved *****
```



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

621          KK  RN22A5
622          RS       5   FLOW       0
623          RC    0.04    0.03    0.04    1348  0.0045
624          RX       0     300     310     320     340     345     415     416
625          RY       4       3       1       3       3       4       5       8
             *
             *

626          KK   N22A2   BASIN
627          BA    .009
628          LG    0.33    0.35    2.65    1.28       6
629          UC   1.575   3.028
630          UA       0     5.0    16.0    30.0    65.0    77.0    84.0    90.0    94.0    97.0
631          UA     100
             *
             *

632          KK   N22A3   BASIN
633          BA    .032
```

```
634          LG    .350    .350   4.350    .400    .000
635          UC    .500    .428
636          UA       0       5      16      30      65      77      84      90      94      97
637          UA     100
             *
             *
             *
             *
             * DDM   ***** Preserved *****

638          KK  C22AX1
639          HC       3
             *
             *
             * *** ROUTE R22AX1 ************************************************************
             * ROUTE R22AX1 IS 464 FT WITH A SLOPE OF 0.0037
             * CROSS SECTION IS THE CHANNEL ON THE SOUTH SIDE OF DEER VALLEY ROAD
             *
             * DDM   ***** Preserved *****

640          KK  R22AX1
641          RS       1   FLOW       0
642          RC    0.04    0.03    0.04     464  0.0037
643          RX       0       1      27      36      62     100     150     500
644          RY       8       4       1       1       4       4       5       6
             *
             *
             *

645          KK   N22A1   BASIN
646          BA    .020
647          LG    0.28    0.27    8.80    0.07      14
648          UC   0.267   0.269
649          UA       0     5.0    16.0    30.0    65.0    77.0    84.0    90.0    94.0    97.0
650          UA     100
             *
             *
             * DDM   ***** Preserved *****
```



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

651          KK  C22AX2
652          HC       2
             *
             *
             * *** ROUTE R22AX2 ************************************************************
             * ROUTE R22AX2 IS 283 FT WITH A SLOPE OF 0.0025
             * CROSS SECTION IS THE CHANNEL ON THE SOUTH SIDE OF DEER VALLEY ROAD
             *
             * DDM   ***** Preserved *****

653          KK  R22AX2
654          RS       1   FLOW      -1
655          RC    0.04    0.03    0.04     283  0.0025
656          RX       0       1      27      36      62     100     150     500
657          RY       8       4       1       1       4       4       5       6
             *
             *
             * *** DIVERSION RECOVER D11I12  ***********************************************
             * RECOVER FLOWS FROM D11I12

658          KK  N11I12
659          DR  11I12I
             *
             *
             * *** ROUTE RI12E *************************************************************
             * ROUTE RI12E IS 1505 FT WITH A SLOPE OF 0.004
             * CROSS SECTION IS OVERLAND FLOW
             *
             * DDM   ***** Preserved *****

660          KK   RI12E
661          RS      10   FLOW       0
662          RC    0.05    0.05    0.05    1505   0.004
663          RX       0     200     250     260     270     280     330     530
664          RY       3       2       1       0       0       1       2       8
             *
             *
```

```
665          KK  N11I13   BASIN
666          BA    .027
667          LG    0.32    0.35    2.65    1.31       8
668          UC   0.375   0.337
669          UA       0     5.0    16.0    30.0    65.0    77.0    84.0    90.0    94.0    97.0
670          UA     100
             *
             *
             * DDM   ***** Preserved *****

671          KK  C22AX3
672          HC       3
             *
             *
             * *** ROUTE R22AX3 ************************************************************
             * ROUTE R22AX3 IS 512 FT WITH A SLOPE OF 0.0025
             * CROSS SECTION IS THE CHANNEL ON THE SOUTH SIDE OF DEER VALLEY ROAD
             *
             * DDM   ***** Preserved *****
                                          HEC-1 INPUT                                          PAGE 27

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

673          KK  R22AX3
674          RS       1   FLOW       0
675          RC    0.04    0.03    0.04     512  0.0025
676          RX       0       1      27      36      62     100     150     500
677          RY       8       4       1       1       4       4       5       6
             *
             *

678          KK   N22A4   BASIN
679          BA    .023
680          LG    0.10    0.35    2.65    1.50      55
681          UC   0.221   0.246
682          UA       0     5.0    16.0    30.0    65.0    77.0    84.0    90.0    94.0    97.0
683          UA     100
             *
             *
             *

684          KK   N11I1   BASIN
685          BA    .038
686          LG    .310    .350   2.650   1.370  13.000
687          UC    .967   1.362
688          UA       0       5      16      30      65      77      84      90      94      97
689          UA     100
             *
             *
             *

690          KK   N11I5   BASIN
691          BA    .014
692          LG    0.32    0.35    2.65    1.33      10
693          UC   0.463   0.834
694          UA       0     5.0    16.0    30.0    65.0    77.0    84.0    90.0    94.0    97.0
695          UA     100
             *
             *

696          KK   N22A7   BASIN
697          BA    .010
698          LG    .250    .320   7.600    .110  30.000
699          UC    .267    .244
700          UA       0       5      16      30      65      77      84      90      94      97
701          UA     100
             *
             *
             * DDM   ***** Preserved *****

702          KK  DUMMY3
703          HC       4
             *
704          ZZ
```

SCHEMATIC DIAGRAM OF STREAM NETWORK

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

           (.) CONNECTOR        (<---) RETURN OF DIVERTED OR PUMPED FLOW

  45        N11P1
                V
                V
  51       RN11P1
                .
                .
  56            .       N11L5
                .           .
                .           .
  62            .           .       N11L1
                .           .           .
                .           .           .
  69            .           .           .-------> N11L1I
  68            .           .      DN11L1
                .           .           V
                .           .           V
  72            .           .      RN11LE
                .           .           .
                .           .           .
  77       CN11L5.......................
                .
                .
  80            .-------> N11L5I
  79       DN11L5
                V
                V
  83       RN11L5
                .
                .
  88            .      N11I31
                .           .
                .           .
  94       C11I31............
                V
                V
           R11I31
                .
                .
 101            .      N11I32
                .           V
                .           V
 107            .      R11I32
                .           .
                .           .
 112            .           .      N11I23
                .           .           .
                .           .           .
 118       C11I23........................
                V
                V
 120       R11I23
                .
                .
 125            .      N11I14
                .           .
                .           .
 131       C11I14............
                V
                V
 133       R11I14
                .
                .
 138            .       N11I4
                .           .
                .           .
 144       CN11I4............
                .
                .
 146            .      N11I24
                .           V
                .           V
                .      R11I24
                .           .
                .           .
```

```
157          .           .       N11I3
             .           .           .
             .           .           .
163          .      CN11I3............
             .           V
             .           V
             .      RN11I3
             .           .
             .           .
170          .           .       N11I2
             .           .           .
             .           .           .
176          .      CN11I2............
             .           .
             .           .
178          .           .       N11L2
             .           .           .
             .           .           .
185          .           .           .-------> N11L2I
184          .           .      DN11L2
             .           .           V
             .           .           V
188          .           .      RN11L2
             .           .           .
             .           .           .
193          .           .           .      N11I33
             .           .           .           .
             .           .           .           .
199          .           .      C11I33............
             .           .           .
             .           .           .
202          .           .           .-------> 11I33I
201          .           .      D11I33
             .           .           V
             .           .           V
205          .           .       RI33S
             .           .           .
             .           .           .
210          .           .           .      N11I27
             .           .           .           .
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             .           .           .           .      N11I26
             .           .           .           .           .
             .           .           .           .           .
22           .           .      C11I26........................
             .           .           V
             .           .           V
224          .           .      R11I26
             .           .           .
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229          .           .           .      N11I22
             .           .           .           .
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235          .           .      C11I22............
             .           .           V
             .           .           V
237          .           .      R11I22
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242          .           .           .       N11I6
             .           .           .           .
             .           .           .           .
248          .           .      C11I16............
             .           .           V
             .           .           V
250          .           .      RN11I6
             .           .           .
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255          .           .           .       N11I7
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             .           .           .           .
261          .           .      CN11I7............
             .           .           .
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263          .           .           .       N11L3
             .           .           .           .
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-70          .           .           .           .-------> N11L3I
             .           .           .      DN11L3
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273          .          .          .      RN11L3
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278          .          .          .          .      N11I30
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             .          .          .          .          .      N11I28
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             .          .          .          .          .          .
291          .          .          .          .          .          .          .<-------  11I33I
290          .          .          .          .          .          .      D11I33
             .          .          .          .          .          .          V
             .          .          .          .          .          .          V
292          .          .          .          .          .          .      RI33E
             .          .          .          .          .          .          .
             .          .          .          .          .          .          .
297          .          .          .      C11I30.................................
             .          .          .          V
             .          .          .          V
299          .          .          .      R11I30
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             .          .          .          .
304          .          .          .          .      N11I29
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             .          .          .          .          V
310          .          .          .          .      R11I29
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315          .          .          .          .          .      N11I25
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321          .          .          .      C11I25......................
             .          .          .          V
             .          .          .          V
323          .          .          .      R11I25
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328          .          .          .          .       N11L4
             .          .          .          .          .
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335          .          .          .          .          .-------> N11L4I
             .          .          .          .      DN11L4
             .          .          .          .          V
             .          .          .          .          V
 38          .          .          .          .      RN11L4
             .          .          .          .          .
             .          .          .          .          .
343          .          .          .          .          .       N22B7
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             .          .          .          .          .          .
349          .          .          .          .      CN22B7............
             .          .          .          .          V
             .          .          .          .          V
351          .          .          .          .      RN22B7
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             .          .          .          .          .
356          .          .          .          .          .       N22B4
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             .          .          .          .          .          .
362          .          .          .          .      CN22B4............
             .          .          .          .          V
             .          .          .          .          V
364          .          .          .          .      RN22B4
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             .          .          .          .          .
369          .          .          .          .          .       N22B1
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375          .          .          .          .      CN22B1............
             .          .          .          .          V
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377          .          .          .          .      RN22B1
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382          .          .          .          .          .      N11I20
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[illegible]  .          .          .          .          .          .      N11I21
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394          .          .          .      C11I20.................................
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396             .          .          .     R11I20
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407             .          .          .     C11I11............
                .          .          .          V
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409             .          .          .     R11I11
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414             .          .          .          .     N11I12
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420             .          .          .     C11I12............
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423             .          .          .          .-------> 11I12I
422             .          .          .     D11I12
                .          .          .          V
                .          .          .          V
426             .          .          .      RI12S
                .          .          .          .
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431             .          .          .          .      N11I9
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437             .          .          .     CN11I9............
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439             .          .          .          .     N11I10
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445             .          .          .          .     R11I10
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450             .          .          .          .          .      N11I8
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                .          .          .          .     CN11I8............
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458        DUMMY.............................................
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460             .      N11P2
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467             .          .-------> N11P2I
466             .     DN11P2
                .          V
                .          V
470             .     RN11PS
                .          .
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475             .          .      N21I1
                .          .          .
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481             .     CN21I1............
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                .          .
484             .          .-------> N21I1I
483             .     DN21I1
                .          V
                .          V
487             .     RN21I1
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492             .          .      N22B8
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498             .     CN22B8............
                .          V
                .          V
                .     RN22B8
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505             .          .      N22B5
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511             .     CN22B5...........
                .          V
                .          V
                .     RN22B5
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518             .          .     N22B2
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525             .          .          .          .<-------  N11P2I
524             .          .          .     DN11P
                .          .          .          V
                .          .          .          V
526             .          .          .     R11PE
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531             .          .          .          .       N21I2
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537             .          .          .    CN21I2...........
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540             .          .          .          .-------> N21I2I
539             .          .          .    DN21I2
                .          .          .          V
                .          .          .          V
543             .          .          .    RN21I2
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548             .          .          .          .       N22B9
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554             .          .          .    CN22B9...........
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                .          .          .          V
556             .          .          .    RN22B9
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561             .          .          .          .       N22B6
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567             .          .          .    CN22B6...........
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                .          .          .          V
569             .          .          .    RN22B6
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574             .          .          .          .       N22B3
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580             .          .          .    CN22B3...........
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                .          .          .          V
582             .          .          .    RN22B3
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587             .     CN22B2......................
                .          V
                .          V
589             .     RN22B2
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594             .          .     N22A8
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600             .     CN22A8...........
                .          V
                .          V
602             .     RN22A8
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607             .          .     N22A6
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613             .          .          .     N22A5
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[illegible]     .     CN22A5......................
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621             .      RN22A5
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 32             .          .           .       N22A3
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638             .      C22AX1.......................
                .          V
                .          V
640             .      R22AX1
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                .          .
645             .          .       N22A1
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651             .      C22AX2............
                .          V
                .          V
653             .      R22AX2
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659             .          .           .<-------  11I12I
658             .          .      N11I12
                .          .           V
                .          .           V
660             .          .       RI12E
                .          .           .
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665             .          .           .      N11I13
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671             .      C22AX3.......................
                .          V
                .          V
673             .      R22AX3
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                .          .       N22A4
                .          .           .
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684             .          .           .       N11I1
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690             .          .           .           .       N11I5
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696             .          .           .           .           .       N22A7
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                .          .           .           .           .           .
702             .          .      DUMMY3.................................
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(***) RUNOFF ALSO COMPUTED AT THIS LOCATION

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
HYDROGRAPH AT	N11P1	243.	4.08	16.	4.	1.	0.12
ROUTED TO	RN11P1	222.	4.25	16.	4.	1.	0.12
HYDROGRAPH AT	N11L5	52.	4.25	8.	2.	1.	0.07
HYDROGRAPH AT	N11L1	63.	4.25	9.	2.	1.	0.07
DIVERSION TO	N11L1I	40.	4.25	6.	1.	0.	0.07
HYDROGRAPH AT	DN11L1	24.	4.25	3.	1.	0.	0.07
ROUTED TO	RN11LE	24.	4.33	3.	1.	0.	0.07
3 COMBINED AT	CN11L5	297.	4.25	27.	7.	2.	0.26
DIVERSION TO	N11L5I	0.	0.08	0.	0.	0.	0.26
HYDROGRAPH AT	DN11L5	297.	4.25	27.	7.	2.	0.26
ROUTED TO	RN11L5	291.	4.25	27.	7.	2.	0.26
HYDROGRAPH AT	N11I31	16.	4.17	2.	0.	0.	0.02
2 COMBINED AT	C11I31	305.	4.25	29.	7.	2.	0.28
ROUTED TO	R11I31	303.	4.33	29.	7.	2.	0.28
HYDROGRAPH AT	N11I32	49.	4.17	5.	1.	0.	0.04
ROUTED TO	R11I32	46.	4.25	5.	1.	0.	0.04
HYDROGRAPH AT	N11I23	50.	4.17	7.	2.	1.	0.04
3 COMBINED AT	C11I23	386.	4.33	40.	10.	3.	0.37
ROUTED TO	R11I23	377.	4.42	40.	10.	3.	0.37
HYDROGRAPH AT	N11I14	20.	4.50	4.	1.	0.	0.03
2 COMBINED AT	C11I14	396.	4.42	44.	11.	4.	0.39
ROUTED TO	R11I14	385.	4.50	44.	11.	4.	0.39
HYDROGRAPH AT	N11I4	14.	4.33	3.	1.	0.	0.02
2 COMBINED AT	CN11I4	398.	4.50	47.	12.	4.	0.42
HYDROGRAPH AT							

OPERATION	STATION	PEAK FLOW	TIME OF PEAK	AVERAGE FLOW FOR MAXIMUM PERIOD 6-HOUR	24-HOUR	72-HOUR	BASIN AREA
	N11I24	10.	4.33	2.	1.	0.	0.01
ROUTED TO	R11I24	10.	4.50	2.	1.	0.	0.01
HYDROGRAPH AT	N1I3	19.	4.17	2.	1.	0.	0.02
2 COMBINED AT	CN11I3	23.	4.17	5.	1.	0.	0.03
ROUTED TO	RN11I3	23.	4.42	5.	1.	0.	0.03
HYDROGRAPH AT	N11I2	16.	4.33	3.	1.	0.	0.03
2 COMBINED AT	CN11I2	38.	4.33	8.	2.	1.	0.06
HYDROGRAPH AT	N11L2	9.	4.17	1.	0.	0.	0.01
DIVERSION TO	N11L2I	0.	0.08	0.	0.	0.	0.01
HYDROGRAPH AT	DN11L2	9.	4.17	1.	0.	0.	0.01
ROUTED TO	RN11L2	9.	4.25	1.	0.	0.	0.01
HYDROGRAPH AT	N11I33	5.	4.08	1.	0.	0.	0.00
2 COMBINED AT	C11I33	13.	4.17	2.	0.	0.	0.01
DIVERSION TO	11I33I	6.	4.17	1.	0.	0.	0.01
HYDROGRAPH AT	D11I33	6.	4.17	1.	0.	0.	0.01
ROUTED TO	RI33S	6.	4.25	1.	0.	0.	0.01
HYDROGRAPH AT	N11I27	13.	4.08	1.	0.	0.	0.01
HYDROGRAPH AT	N11I26	5.	4.17	1.	0.	0.	0.00
3 COMBINED AT	C11I26	22.	4.17	3.	1.	0.	0.03
ROUTED TO	R11I26	22.	4.33	3.	1.	0.	0.03
HYDROGRAPH AT	N11I22	48.	4.17	6.	1.	0.	0.04
2 COMBINED AT	C11I22	65.	4.25	9.	2.	1.	0.07
ROUTED TO	R11I22	63.	4.42	9.	2.	1.	0.07
HYDROGRAPH AT	N11I6	31.	4.17	4.	1.	0.	0.03
2 COMBINED AT	C11I16	85.	4.42	13.	3.	1.	0.10
ROUTED TO	RN11I6	83.	4.50	13.	3.	1.	0.10

OPERATION	STATION	PEAK FLOW	TIME OF PEAK	AVERAGE FLOW FOR MAXIMUM PERIOD 6-HOUR	24-HOUR	72-HOUR	BASIN AREA
HYDROGRAPH AT	N11I7	12.	4.33	3.	1.	0.	0.02
2 COMBINED AT	CN11I7	95.	4.42	16.	4.	1.	0.12
HYDROGRAPH AT	N11L3	74.	4.17	8.	2.	1.	0.06
DIVERSION TO	N11L3I	0.	0.08	0.	0.	0.	0.06
HYDROGRAPH AT	DN11L3	74.	4.17	8.	2.	1.	0.06
ROUTED TO	RN11L3	69.	4.17	8.	2.	1.	0.06
HYDROGRAPH AT	N11I30	18.	4.17	2.	0.	0.	0.02
HYDROGRAPH AT	N11I28	25.	4.17	3.	1.	0.	0.02
HYDROGRAPH AT	D11I33	6.	4.17	1.	0.	0.	0.01
ROUTED TO	RI33E	6.	4.33	1.	0.	0.	0.01
4 COMBINED AT	C11I30	117.	4.17	14.	3.	1.	0.10
ROUTED TO	R11I30	117.	4.25	14.	3.	1.	0.10
HYDROGRAPH AT	N11I29	6.	4.17	1.	0.	0.	0.01
ROUTED TO	R11I29	5.	4.50	1.	0.	0.	0.01
HYDROGRAPH AT	N11I25	49.	4.08	5.	1.	0.	0.02
3 COMBINED AT	C11I25	151.	4.25	19.	5.	2.	0.13
ROUTED TO	R11I25	148.	4.33	19.	5.	2.	0.13
HYDROGRAPH AT	N11L4	8.	4.25	1.	0.	0.	0.01
DIVERSION TO	N11L4I	0.	0.08	0.	0.	0.	0.01
HYDROGRAPH AT	DN11L4	8.	4.25	1.	0.	0.	0.01
ROUTED TO	RN11L4	8.	4.42	1.	0.	0.	0.01
HYDROGRAPH AT	N22B7	14.	4.17	2.	0.	0.	0.01
2 COMBINED AT	CN22B7	18.	4.33	3.	1.	0.	0.02
ROUTED TO	RN22B7	18.	4.42	3.	1.	0.	0.02
HYDROGRAPH AT	N22B4	51.	4.08	4.	1.	0.	0.04
2 COMBINED AT							

OPERATION	STATION	PEAK FLOW	TIME OF PEAK	AVERAGE FLOW FOR MAXIMUM PERIOD 6-HOUR	24-HOUR	72-HOUR	BASIN AREA
	CN22B4	52.	4.08	7.	2.	1.	0.06
ROUTED TO	RN22B4	51.	4.25	7.	2.	1.	0.06
HYDROGRAPH AT	N22B1	20.	4.17	2.	1.	0.	0.02
2 COMBINED AT	CN22B1	70.	4.25	10.	2.	1.	0.08
ROUTED TO	RN22B1	70.	4.25	10.	2.	1.	0.08
HYDROGRAPH AT	N11I20	13.	4.17	1.	0.	0.	0.01
HYDROGRAPH AT	N11I21	22.	4.17	3.	1.	0.	0.02
4 COMBINED AT	C11I20	245.	4.25	32.	8.	3.	0.24
ROUTED TO	R11I20	241.	4.33	32.	8.	3.	0.24
HYDROGRAPH AT	N11I11	20.	4.17	3.	1.	0.	0.02
2 COMBINED AT	C11I11	258.	4.33	35.	9.	3.	0.26
ROUTED TO	R11I11	257.	4.33	35.	9.	3.	0.26
HYDROGRAPH AT	N11I12	35.	4.17	5.	1.	0.	0.02
2 COMBINED AT	C11I12	284.	4.33	40.	10.	3.	0.28
DIVERSION TO	11I12I	64.	4.33	7.	2.	1.	0.28
HYDROGRAPH AT	D11I12	220.	4.33	33.	8.	3.	0.28
ROUTED TO	RI12S	219.	4.33	33.	8.	3.	0.28
HYDROGRAPH AT	N11I9	12.	4.17	2.	0.	0.	0.01
2 COMBINED AT	CN11I9	228.	4.33	34.	9.	3.	0.29
HYDROGRAPH AT	N11I10	11.	4.33	3.	1.	0.	0.02
ROUTED TO	R11I10	11.	4.50	3.	1.	0.	0.02
HYDROGRAPH AT	N11I8	10.	4.25	2.	0.	0.	0.01
2 COMBINED AT	CN11I8	19.	4.50	4.	1.	0.	0.04
5 COMBINED AT	DUMMY	613.	4.42	92.	23.	8.	0.93
HYDROGRAPH AT	N11P2	306.	4.25	32.	8.	3.	0.26
DIVERSION TO	N11P2I	190.	4.25	24.	6.	2.	0.26

OPERATION	STATION	PEAK FLOW	TIME OF PEAK	AVERAGE FLOW FOR MAXIMUM PERIOD 6-HOUR	24-HOUR	72-HOUR	BASIN AREA
HYDROGRAPH AT	DN11P2	116.	4.25	8.	2.	1.	0.26
ROUTED TO	RN11PS	113.	4.42	8.	2.	1.	0.26
HYDROGRAPH AT	N21I1	120.	4.17	12.	3.	1.	0.11
2 COMBINED AT	CN21I1	183.	4.42	20.	5.	2.	0.38
DIVERSION TO	N21I1I	0.	0.08	0.	0.	0.	0.38
HYDROGRAPH AT	DN21I1	183.	4.42	20.	5.	2.	0.38
ROUTED TO	RN21I1	175.	4.50	20.	5.	2.	0.38
HYDROGRAPH AT	N22B8	16.	4.17	2.	0.	0.	0.02
2 COMBINED AT	CN22B8	185.	4.50	22.	5.	2.	0.39
ROUTED TO	RN22B8	177.	4.58	22.	5.	2.	0.39
HYDROGRAPH AT	N22B5	38.	4.08	3.	1.	0.	0.03
2 COMBINED AT	CN22B5	185.	4.58	25.	6.	2.	0.42
ROUTED TO	RN22B5	184.	4.58	25.	6.	2.	0.42
HYDROGRAPH AT	N22B2	37.	4.08	3.	1.	0.	0.02
HYDROGRAPH AT	DN11P	190.	4.25	24.	6.	2.	0.26
ROUTED TO	R11PE	181.	4.58	24.	6.	2.	0.26
HYDROGRAPH AT	N21I2	74.	4.17	10.	2.	1.	0.06
2 COMBINED AT	CN21I2	217.	4.58	33.	8.	3.	0.32
DIVERSION TO	N21I2I	0.	0.08	0.	0.	0.	0.32
HYDROGRAPH AT	DN21I2	217.	4.58	33.	8.	3.	0.32
ROUTED TO	RN21I2	213.	4.67	33.	8.	3.	0.32
HYDROGRAPH AT	N22B9	25.	4.17	2.	1.	0.	0.02
2 COMBINED AT	CN22B9	218.	4.67	35.	9.	3.	0.34
ROUTED TO	RN22B9	214.	4.83	35.	9.	3.	0.34
HYDROGRAPH AT	N22B6	20.	4.33	4.	1.	0.	0.04
2 COMBINED AT							

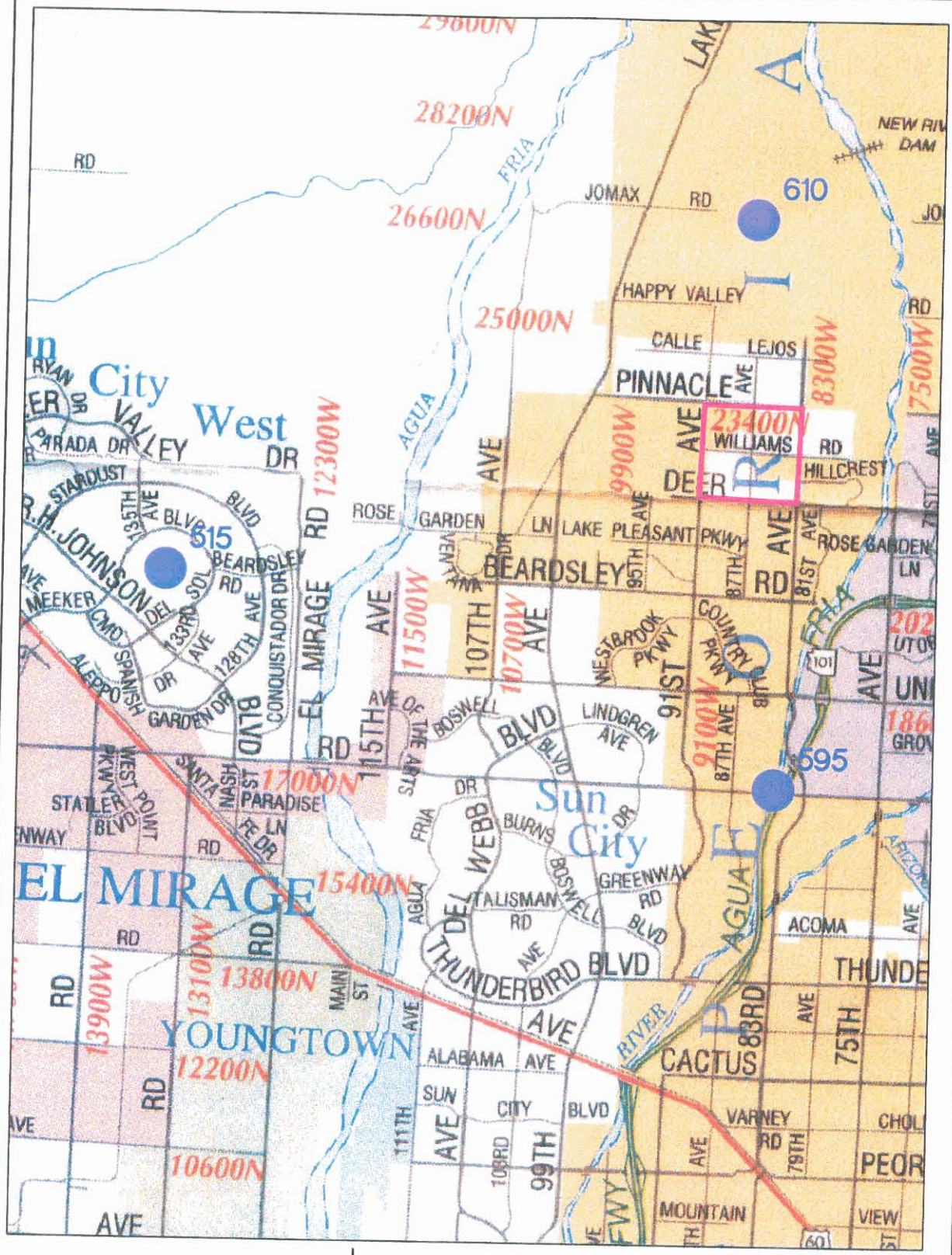
OPERATION	STATION	PEAK FLOW	TIME OF PEAK	AVERAGE FLOW FOR MAXIMUM PERIOD 6-HOUR	24-HOUR	72-HOUR	BASIN AREA
	CN22B6	227.	4.83	39.	10.	3.	0.38
ROUTED TO	RN22B6	224.	4.92	39.	10.	3.	0.38
HYDROGRAPH AT	N22B3	7.	4.25	1.	0.	0.	0.01
2 COMBINED AT	CN22B3	226.	4.92	40.	10.	3.	0.39
ROUTED TO	RN22B3	224.	5.00	40.	10.	3.	0.39
3 COMBINED AT	CN22B2	302.	4.67	65.	16.	5.	0.57
ROUTED TO	RN22B2	302.	4.67	65.	16.	5.	0.57
HYDROGRAPH AT	N22A8	28.	4.17	4.	1.	0.	0.02
2 COMBINED AT	CN22A8	307.	4.67	68.	17.	6.	0.59
ROUTED TO	RN22A8	306.	4.67	68.	17.	6.	0.59
HYDROGRAPH AT	N22A6	24.	4.17	3.	1.	0.	0.02
HYDROGRAPH AT	N22A5	11.	4.33	3.	1.	0.	0.02
3 COMBINED AT	CN22A5	316.	4.67	72.	18.	6.	0.63
ROUTED TO	RN22A5	310.	4.83	72.	18.	6.	0.63
HYDROGRAPH AT	N22A2	1.	5.08	1.	0.	0.	0.01
HYDROGRAPH AT	N22A3	36.	4.25	5.	1.	0.	0.03
3 COMBINED AT	C22AX1	314.	4.83	76.	19.	6.	0.67
ROUTED TO	R22AX1	314.	4.92	76.	19.	6.	0.67
HYDROGRAPH AT	N22A1	43.	4.08	5.	1.	0.	0.02
2 COMBINED AT	C22AX2	315.	4.92	80.	20.	7.	0.69
ROUTED TO	R22AX2	314.	4.92	80.	20.	7.	0.69
HYDROGRAPH AT	N11I12	64.	4.33	7.	2.	1.	0.28
ROUTED TO	RI12E	61.	4.58	7.	2.	1.	0.28
HYDROGRAPH AT	N11I13	28.	4.17	3.	1.	0.	0.03
3 COMBINED AT	C22AX3	342.	4.92	88.	22.	7.	0.72
ROUTED TO	R22AX3	341.	5.00	88.	22.	7.	0.72

OPERATION	STATION	PEAK FLOW	TIME OF PEAK	AVERAGE FLOW FOR MAXIMUM PERIOD 6-HOUR	24-HOUR	72-HOUR	BASIN AREA
HYDROGRAPH AT	N22A4	44.	4.08	5.	1.	0.	0.02
HYDROGRAPH AT	N11I1	13.	4.58	4.	1.	0.	0.04
HYDROGRAPH AT	N11I5	8.	4.25	2.	0.	0.	0.01
HYDROGRAPH AT	N22A7	22.	4.08	2.	1.	0.	0.01
4 COMBINED AT	DUMMY3	76.	4.08	13.	3.	1.	0.09

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

APPENDIX H. CALIBRATION HEC-1

H.1. Rain Gage Locations



LEGEND

515 Rain Gage Location and Number

Detailed Study Area Boundary

Not To Scale

Glendale Peoria Area Drainage Master Plan

Entellus

FIGURE DS-2
RAIN GAUGE LOCATION
DETAILED NEIGHBORHOOD STUDY

H.2. Rain Gage Data

Key:

Raingage Number	Raingage Name	Raingage Location
5515	Sun City West	1/4 mi. SE of the Beardsley Rd. & Litchfield Rd. alignments
5595	New River @ Bell Rd.	New River @ Bell Rd.
5610	New River Dam	1/2 mi. NE of Jomax Rd. and 83rd Ave.

	distance from area (units)	6.5		12		4.5	
	Weight	0.334884		0.181395		0.483721	
		Raingage # 5515		Raingage # 5595		Raingage # 5610	
Date	Time (increments of 15 minu	Current	Total	Current	Total	Current	Total
10/21/2000	15	0.00	0.00	0.00	0.00	0.00	0.00
10/21/2000	30	0.00	0.00	0.00	0.00	0.00	0.00
10/21/2000	45	0.00	0.00	0.00	0.00	0.00	0.00
10/21/2000	100	0.00	0.00	0.00	0.00	0.00	0.00
10/21/2000	115	0.00	0.00	0.00	0.00	0.00	0.00
10/21/2000	130	0.00	0.00	0.00	0.00	0.00	0.00
10/21/2000	145	0.00	0.00	0.00	0.00	0.00	0.00
10/21/2000	200	0.00	0.00	0.00	0.00	0.00	0.00
10/21/2000	215	0.00	0.00	0.00	0.00	0.00	0.00
10/21/2000	230	0.00	0.00	0.00	0.00	0.00	0.00
10/21/2000	245	0.00	0.00	0.00	0.00	0.00	0.00
10/21/2000	300	0.00	0.00	0.00	0.00	0.00	0.00
10/21/2000	315	0.00	0.00	0.00	0.00	0.00	0.00
10/21/2000	330	0.00	0.00	0.00	0.00	0.00	0.00
10/21/2000	345	0.00	0.00	0.00	0.00	0.00	0.00
10/21/2000	400	0.00	0.00	0.00	0.00	0.00	0.00
10/21/2000	415	0.00	0.00	0.00	0.00	0.00	0.00
10/21/2000	430	0.00	0.00	0.00	0.00	0.00	0.00
10/21/2000	445	0.00	0.00	0.00	0.00	0.00	0.00
10/21/2000	500	0.00	0.00	0.00	0.00	0.00	0.00
10/21/2000	515	0.00	0.00	0.00	0.00	0.00	0.00
10/21/2000	530	0.00	0.00	0.00	0.00	0.00	0.00
10/21/2000	545	0.00	0.00	0.00	0.00	0.00	0.00
10/21/2000	600	0.00	0.00	0.00	0.00	0.00	0.00
10/21/2000	615	0.00	0.00	0.00	0.00	0.00	0.00
10/21/2000	630	0.00	0.00	0.00	0.00	0.00	0.00
10/21/2000	645	0.00	0.00	0.00	0.00	0.00	0.00
10/21/2000	700	0.00	0.00	0.00	0.00	0.00	0.00
10/21/2000	715	0.00	0.00	0.00	0.00	0.00	0.00
10/21/2000	730	0.00	0.00	0.00	0.00	0.00	0.00
10/21/2000	745	0.00	0.00	0.00	0.00	0.00	0.00
10/21/2000	800	0.00	0.00	0.00	0.00	0.00	0.00
10/21/2000	815	0.00	0.00	0.00	0.00	0.00	0.00
10/21/2000	830	0.00	0.00	0.00	0.00	0.00	0.00
10/21/2000	845	0.00	0.00	0.00	0.00	0.00	0.00
10/21/2000	900	0.00	0.00	0.00	0.00	0.00	0.00
10/21/2000	915	0.00	0.00	0.00	0.00	0.00	0.00
10/21/2000	930	0.00	0.00	0.00	0.00	0.00	0.00
10/21/2000	945	0.00	0.00	0.00	0.00	0.00	0.00
10/21/2000	1000	0.00	0.00	0.00	0.00	0.00	0.00
10/21/2000	1015	0.00	0.00	0.00	0.00	0.00	0.00
10/21/2000	1030	0.00	0.00	0.00	0.00	0.00	0.00
10/21/2000	1045	0.00	0.00	0.00	0.00	0.00	0.00
10/21/2000	1100	0.00	0.00	0.00	0.00	0.00	0.00
10/21/2000	1115	0.00	0.00	0.00	0.00	0.00	0.00
10/21/2000	1130	0.00	0.00	0.00	0.00	0.00	0.00
10/21/2000	1145	0.00	0.00	0.00	0.00	0.00	0.00
10/21/2000	1200	0.00	0.00	0.00	0.00	0.00	0.00
10/21/2000	1215	0.00	0.00	0.00	0.00	0.00	0.00
10/21/2000	1230	0.00	0.00	0.00	0.00	0.00	0.00
10/21/2000	1245	0.00	0.00	0.00	0.00	0.00	0.00
10/21/2000	1300	0.00	0.00	0.00	0.00	0.00	0.00
10/21/2000	1315	0.00	0.00	0.00	0.00	0.00	0.00

Date	Time (increments of 15 minu	Raingage # 5515 Current	Raingage # 5515 Total	Raingage # 5595 Current	Raingage # 5595 Total	Raingage # 5610 Current	Raingage # 5610 Total
10/21/2000	1330	0.00	0.00	0.00	0.00	0.00	0.00
10/21/2000	1345	0.00	0.00	0.00	0.00	0.00	0.00
10/21/2000	1400	0.00	0.00	0.00	0.00	0.00	0.00
10/21/2000	1415	0.00	0.00	0.00	0.00	0.00	0.00
10/21/2000	1430	0.00	0.00	0.00	0.00	0.00	0.00
10/21/2000	1445	0.00	0.00	0.00	0.00	0.00	0.00
10/21/2000	1500	0.00	0.00	0.00	0.00	0.00	0.00
10/21/2000	1515	0.00	0.00	0.00	0.00	0.00	0.00
10/21/2000	1530	0.00	0.00	0.00	0.00	0.00	0.00
10/21/2000	1545	0.00	0.00	0.00	0.00	0.00	0.00
10/21/2000	1600	0.00	0.00	0.00	0.00	0.00	0.00
10/21/2000	1615	0.00	0.00	0.00	0.00	0.00	0.00
10/21/2000	1630	0.00	0.00	0.00	0.00	0.00	0.00
10/21/2000	1645	0.00	0.00	0.00	0.00	0.00	0.00
10/21/2000	1700	0.00	0.00	0.00	0.00	0.00	0.00
10/21/2000	1715	0.00	0.00	0.00	0.00	0.00	0.00
10/21/2000	1730	0.00	0.00	0.00	0.00	0.00	0.00
10/21/2000	1745	0.00	0.00	0.00	0.00	0.00	0.00
10/21/2000	1800	0.00	0.00	0.00	0.00	0.00	0.00
10/21/2000	1815	0.00	0.00	0.00	0.00	0.00	0.00
10/21/2000	1830	0.00	0.00	0.00	0.00	0.00	0.00
10/21/2000	1845	0.00	0.00	0.00	0.00	0.00	0.00
10/21/2000	1900	0.00	0.00	0.00	0.00	0.00	0.00
10/21/2000	1915	0.00	0.00	0.00	0.00	0.00	0.00
10/21/2000	1930	0.00	0.00	0.00	0.00	0.00	0.00
10/21/2000	1945	0.00	0.00	0.00	0.00	0.00	0.00
10/21/2000	2000	0.00	0.00	0.00	0.00	0.00	0.00
10/21/2000	2015	0.00	0.00	0.00	0.00	0.00	0.00
10/21/2000	2030	0.00	0.00	0.04	0.04	0.00	0.00
10/21/2000	2045	0.00	0.00	0.04	0.08	0.00	0.00
10/21/2000	2100	0.08	0.08	0.00	0.08	0.00	0.00
10/21/2000	2115	0.12	0.20	0.00	0.08	0.00	0.00
10/21/2000	2130	0.04	0.24	0.04	0.12	0.00	0.00
10/21/2000	2145	0.04	0.28	0.00	0.12	0.20	0.20
10/21/2000	2200	0.04	0.32	0.00	0.12	0.12	0.32
10/21/2000	2215	0.00	0.32	0.00	0.12	0.04	0.36
10/21/2000	2230	0.00	0.32	0.00	0.12	0.04	0.40
10/21/2000	2245	0.00	0.32	0.00	0.12	0.00	0.40
10/21/2000	2300	0.00	0.32	0.00	0.12	0.00	0.40
10/21/2000	2315	0.00	0.32	0.00	0.12	0.00	0.40
10/21/2000	2330	0.00	0.32	0.00	0.12	0.00	0.40
10/21/2000	2345	0.00	0.32	0.00	0.12	0.08	0.48
10/21/2000	2400	0.00	0.32	0.12	0.24	0.31	0.79
10/22/2000	15	0.00	0.32	0.04	0.28	0.12	0.91
10/22/2000	30	0.00	0.32	0.04	0.32	0.04	0.95
10/22/2000	45	0.00	0.32	0.12	0.44	0.00	0.95
10/22/2000	100	0.00	0.32	0.12	0.56	0.04	0.99
10/22/2000	115	0.00	0.32	0.04	0.60	0.08	1.07
10/22/2000	130	0.04	0.36	0.12	0.72	0.04	1.11
10/22/2000	145	0.00	0.36	0.16	0.88	0.00	1.11
10/22/2000	200	0.28	0.64	0.00	0.88	0.04	1.15
10/22/2000	215	0.12	0.76	0.00	0.88	0.00	1.15
10/22/2000	230	0.24	1.00	0.04	0.92	0.00	1.15
10/22/2000	245	0.12	1.12	0.04	0.96	0.04	1.19
10/22/2000	300	0.12	1.24	0.00	0.96	0.00	1.19
10/22/2000	315	0.00	1.24	0.00	0.96	0.04	1.23
10/22/2000	330	0.00	1.24	0.00	0.96	0.00	1.23
10/22/2000	345	0.12	1.36	0.00	0.96	0.00	1.23
10/22/2000	400	0.04	1.40	0.00	0.96	0.00	1.23
10/22/2000	415	0.00	1.40	0.20	1.16	0.00	1.23
10/22/2000	430	0.00	1.40	0.04	1.20	0.04	1.27

Date	Time (increments of 15 minu	Raingage # 5515 Current	Raingage # 5515 Total	Raingage # 5595 Current	Raingage # 5595 Total	Raingage # 5610 Current	Raingage # 5610 Total
10/22/2000	445	0.00	1.40	0.04	1.24	0.04	1.31
10/22/2000	500	0.28	1.68	0.00	1.24	0.00	1.31
10/22/2000	515	0.00	1.68	0.00	1.24	0.00	1.31
10/22/2000	530	0.00	1.68	0.00	1.24	0.00	1.31
10/22/2000	545	0.00	1.68	0.04	1.28	0.04	1.35
10/22/2000	600	0.00	1.68	0.00	1.28	0.00	1.35
10/22/2000	615	0.00	1.68	0.00	1.28	0.00	1.35
10/22/2000	630	0.00	1.68	0.00	1.28	0.04	1.39
10/22/2000	645	0.00	1.68	0.00	1.28	0.00	1.39
10/22/2000	700	0.00	1.68	0.00	1.28	0.00	1.39
10/22/2000	715	0.00	1.68	0.00	1.28	0.00	1.39
10/22/2000	730	0.00	1.68	0.00	1.28	0.00	1.39
10/22/2000	745	0.00	1.68	0.00	1.28	0.00	1.39
10/22/2000	800	0.00	1.68	0.00	1.28	0.00	1.39
10/22/2000	815	0.00	1.68	0.00	1.28	0.00	1.39
10/22/2000	830	0.00	1.68	0.04	1.32	0.00	1.39
10/22/2000	845	0.00	1.68	0.00	1.32	0.00	1.39
10/22/2000	900	0.00	1.68	0.00	1.32	0.00	1.39
10/22/2000	915	0.00	1.68	0.04	1.36	0.00	1.39
10/22/2000	930	0.00	1.68	0.00	1.36	0.00	1.39
10/22/2000	945	0.00	1.68	0.00	1.36	0.04	1.43
10/22/2000	1000	0.00	1.68	0.00	1.36	0.00	1.43
10/22/2000	1015	0.00	1.68	0.00	1.36	0.00	1.43
10/22/2000	1030	0.00	1.68	0.00	1.36	0.00	1.43
10/22/2000	1045	0.00	1.68	0.00	1.36	0.00	1.43
10/22/2000	1100	0.00	1.68	0.00	1.36	0.00	1.43
10/22/2000	1115	0.00	1.68	0.00	1.36	0.00	1.43
10/22/2000	1130	0.00	1.68	0.00	1.36	0.00	1.43
10/22/2000	1145	0.00	1.68	0.00	1.36	0.00	1.43
10/22/2000	1200	0.00	1.68	0.00	1.36	0.00	1.43
10/22/2000	1215	0.00	1.68	0.00	1.36	0.00	1.43
10/22/2000	1230	0.00	1.68	0.00	1.36	0.00	1.43
10/22/2000	1245	0.00	1.68	0.00	1.36	0.00	1.43
10/22/2000	1300	0.00	1.68	0.00	1.36	0.00	1.43
10/22/2000	1315	0.00	1.68	0.00	1.36	0.00	1.43
10/22/2000	1330	0.00	1.68	0.00	1.36	0.00	1.43
10/22/2000	1345	0.00	1.68	0.00	1.36	0.00	1.43
10/22/2000	1400	0.00	1.68	0.00	1.36	0.00	1.43
10/22/2000	1415	0.00	1.68	0.00	1.36	0.00	1.43
10/22/2000	1430	0.00	1.68	0.00	1.36	0.00	1.43
10/22/2000	1445	0.00	1.68	0.00	1.36	0.00	1.43
10/22/2000	1500	0.00	1.68	0.00	1.36	0.00	1.43
10/22/2000	1515	0.00	1.68	0.00	1.36	0.00	1.43
10/22/2000	1530	0.00	1.68	0.00	1.36	0.00	1.43
10/22/2000	1545	0.00	1.68	0.00	1.36	0.00	1.43
10/22/2000	1600	0.00	1.68	0.00	1.36	0.00	1.43
10/22/2000	1615	0.00	1.68	0.00	1.36	0.00	1.43
10/22/2000	1630	0.00	1.68	0.00	1.36	0.00	1.43
10/22/2000	1645	0.00	1.68	0.00	1.36	0.00	1.43
10/22/2000	1700	0.00	1.68	0.00	1.36	0.00	1.43
10/22/2000	1715	0.00	1.68	0.00	1.36	0.00	1.43
10/22/2000	1730	0.00	1.68	0.00	1.36	0.00	1.43
10/22/2000	1745	0.00	1.68	0.00	1.36	0.00	1.43
10/22/2000	1800	0.00	1.68	0.00	1.36	0.00	1.43
10/22/2000	1815	0.00	1.68	0.00	1.36	0.00	1.43
10/22/2000	1830	0.00	1.68	0.00	1.36	0.00	1.43
10/22/2000	1845	0.00	1.68	0.00	1.36	0.00	1.43
10/22/2000	1900	0.00	1.68	0.00	1.36	0.00	1.43
10/22/2000	1915	0.00	1.68	0.00	1.36	0.00	1.43
10/22/2000	1930	0.00	1.68	0.00	1.36	0.00	1.43
10/22/2000	1945	0.00	1.68	0.00	1.36	0.00	1.43

Date	Time (increments of 15 minu	Raingage # 5515 Current	Raingage # 5515 Total	Raingage # 5595 Current	Raingage # 5595 Total	Raingage # 5610 Current	Raingage # 5610 Total
10/22/2000	2000	0.00	1.68	0.00	1.36	0.00	1.43
10/22/2000	2015	0.00	1.68	0.00	1.36	0.00	1.43
10/22/2000	2030	0.00	1.68	0.00	1.36	0.00	1.43
10/22/2000	2045	0.00	1.68	0.00	1.36	0.00	1.43
10/22/2000	2100	0.00	1.68	0.00	1.36	0.00	1.43
10/22/2000	2115	0.00	1.68	0.00	1.36	0.00	1.43
10/22/2000	2130	0.00	1.68	0.00	1.36	0.00	1.43
10/22/2000	2145	0.00	1.68	0.00	1.36	0.00	1.43
10/22/2000	2200	0.00	1.68	0.00	1.36	0.00	1.43
10/22/2000	2215	0.00	1.68	0.00	1.36	0.00	1.43
10/22/2000	2230	0.00	1.68	0.00	1.36	0.00	1.43
10/22/2000	2245	0.00	1.68	0.00	1.36	0.00	1.43
10/22/2000	2300	0.00	1.68	0.00	1.36	0.00	1.43
10/22/2000	2315	0.00	1.68	0.00	1.36	0.00	1.43
10/22/2000	2330	0.00	1.68	0.00	1.36	0.00	1.43
10/22/2000	2345	0.00	1.68	0.00	1.36	0.00	1.43
10/22/2000	2400	0.00	1.68	0.00	1.36	0.00	1.43
10/23/2000	15	0.00	1.68	0.00	1.36	0.00	1.43
10/23/2000	30	0.00	1.68	0.00	1.36	0.00	1.43
10/23/2000	45	0.00	1.68	0.00	1.36	0.00	1.43
10/23/2000	100	0.00	1.68	0.00	1.36	0.00	1.43
10/23/2000	115	0.00	1.68	0.00	1.36	0.00	1.43
10/23/2000	130	0.00	1.68	0.00	1.36	0.00	1.43
10/23/2000	145	0.00	1.68	0.00	1.36	0.00	1.43
10/23/2000	200	0.00	1.68	0.00	1.36	0.00	1.43
10/23/2000	215	0.00	1.68	0.00	1.36	0.00	1.43
10/23/2000	230	0.00	1.68	0.00	1.36	0.00	1.43
10/23/2000	245	0.00	1.68	0.00	1.36	0.00	1.43
10/23/2000	300	0.00	1.68	0.00	1.36	0.00	1.43
10/23/2000	315	0.00	1.68	0.00	1.36	0.00	1.43
10/23/2000	330	0.00	1.68	0.00	1.36	0.00	1.43
10/23/2000	345	0.00	1.68	0.00	1.36	0.00	1.43
10/23/2000	400	0.00	1.68	0.00	1.36	0.00	1.43
10/23/2000	415	0.00	1.68	0.00	1.36	0.00	1.43
10/23/2000	430	0.00	1.68	0.00	1.36	0.00	1.43
10/23/2000	445	0.00	1.68	0.00	1.36	0.00	1.43
10/23/2000	500	0.00	1.68	0.00	1.36	0.00	1.43
10/23/2000	515	0.00	1.68	0.00	1.36	0.00	1.43
10/23/2000	530	0.00	1.68	0.00	1.36	0.00	1.43
10/23/2000	545	0.00	1.68	0.00	1.36	0.00	1.43
10/23/2000	600	0.00	1.68	0.00	1.36	0.00	1.43
10/23/2000	615	0.00	1.68	0.00	1.36	0.00	1.43
10/23/2000	630	0.00	1.68	0.00	1.36	0.00	1.43
10/23/2000	645	0.00	1.68	0.00	1.36	0.00	1.43
10/23/2000	700	0.00	1.68	0.00	1.36	0.00	1.43
10/23/2000	715	0.00	1.68	0.00	1.36	0.00	1.43
10/23/2000	730	0.00	1.68	0.00	1.36	0.00	1.43
10/23/2000	745	0.00	1.68	0.00	1.36	0.00	1.43
10/23/2000	800	0.00	1.68	0.00	1.36	0.00	1.43
10/23/2000	815	0.00	1.68	0.00	1.36	0.00	1.43
10/23/2000	830	0.00	1.68	0.00	1.36	0.00	1.43
10/23/2000	845	0.00	1.68	0.00	1.36	0.00	1.43
10/23/2000	900	0.00	1.68	0.00	1.36	0.00	1.43
10/23/2000	915	0.00	1.68	0.00	1.36	0.00	1.43
10/23/2000	930	0.00	1.68	0.00	1.36	0.00	1.43
10/23/2000	945	0.00	1.68	0.00	1.36	0.00	1.43
10/23/2000	1000	0.00	1.68	0.00	1.36	0.00	1.43
10/23/2000	1015	0.00	1.68	0.00	1.36	0.00	1.43
10/23/2000	1030	0.00	1.68	0.00	1.36	0.00	1.43
10/23/2000	1045	0.00	1.68	0.00	1.36	0.00	1.43
10/23/2000	1100	0.00	1.68	0.00	1.36	0.00	1.43

Date	Time (increments of 15 minu	Raingage # 5515 Current	Raingage # 5515 Total	Raingage # 5595 Current	Raingage # 5595 Total	Raingage # 5610 Current	Raingage # 5610 Total
10/23/2000	1115	0.00	1.68	0.00	1.36	0.00	1.43
10/23/2000	1130	0.00	1.68	0.00	1.36	0.00	1.43
10/23/2000	1145	0.00	1.68	0.00	1.36	0.00	1.43
10/23/2000	1200	0.00	1.68	0.00	1.36	0.00	1.43
10/23/2000	1215	0.00	1.68	0.00	1.36	0.00	1.43
10/23/2000	1230	0.00	1.68	0.00	1.36	0.00	1.43
10/23/2000	1245	0.00	1.68	0.00	1.36	0.00	1.43
10/23/2000	1300	0.00	1.68	0.00	1.36	0.00	1.43
10/23/2000	1315	0.00	1.68	0.00	1.36	0.00	1.43
10/23/2000	1330	0.00	1.68	0.00	1.36	0.00	1.43
10/23/2000	1345	0.00	1.68	0.00	1.36	0.00	1.43
10/23/2000	1400	0.00	1.68	0.00	1.36	0.00	1.43
10/23/2000	1415	0.00	1.68	0.00	1.36	0.00	1.43
10/23/2000	1430	0.00	1.68	0.00	1.36	0.00	1.43
10/23/2000	1445	0.00	1.68	0.00	1.36	0.00	1.43
10/23/2000	1500	0.00	1.68	0.00	1.36	0.00	1.43
10/23/2000	1515	0.00	1.68	0.00	1.36	0.00	1.43
10/23/2000	1530	0.04	1.72	0.04	1.40	0.00	1.43
10/23/2000	1545	0.00	1.72	0.00	1.40	0.12	1.55
10/23/2000	1600	0.00	1.72	0.00	1.40	0.00	1.55
10/23/2000	1615	0.00	1.72	0.00	1.40	0.00	1.55
10/23/2000	1630	0.00	1.72	0.00	1.40	0.00	1.55
10/23/2000	1645	0.00	1.72	0.00	1.40	0.00	1.55
10/23/2000	1700	0.00	1.72	0.00	1.40	0.00	1.55
10/23/2000	1715	0.00	1.72	0.00	1.40	0.00	1.55
10/23/2000	1730	0.00	1.72	0.00	1.40	0.00	1.55
10/23/2000	1745	0.00	1.72	0.00	1.40	0.00	1.55
10/23/2000	1800	0.00	1.72	0.00	1.40	0.00	1.55
10/23/2000	1815	0.00	1.72	0.00	1.40	0.00	1.55
10/23/2000	1830	0.00	1.72	0.00	1.40	0.04	1.59
10/23/2000	1845	0.00	1.72	0.00	1.40	0.00	1.59
10/23/2000	1900	0.00	1.72	0.00	1.40	0.00	1.59
10/23/2000	1915	0.00	1.72	0.00	1.40	0.00	1.59
10/23/2000	1930	0.00	1.72	0.00	1.40	0.04	1.63
10/23/2000	1945	0.00	1.72	0.00	1.40	0.00	1.63
10/23/2000	2000	0.00	1.72	0.00	1.40	0.00	1.63
10/23/2000	2015	0.00	1.72	0.00	1.40	0.00	1.63
10/23/2000	2030	0.00	1.72	0.00	1.40	0.00	1.63
10/23/2000	2045	0.00	1.72	0.00	1.40	0.00	1.63
10/23/2000	2100	0.00	1.72	0.00	1.40	0.00	1.63
10/23/2000	2115	0.00	1.72	0.00	1.40	0.04	1.67
10/23/2000	2130	0.00	1.72	0.00	1.40	0.00	1.67
10/23/2000	2145	0.00	1.72	0.00	1.40	0.04	1.71
10/23/2000	2200	0.00	1.72	0.08	1.48	0.00	1.71
10/23/2000	2215	0.00	1.72	0.04	1.52	0.00	1.71
10/23/2000	2230	0.00	1.72	0.04	1.56	0.00	1.71
10/23/2000	2245	0.08	1.80	0.04	1.60	0.04	1.75
10/23/2000	2300	0.00	1.80	0.00	1.60	0.00	1.75
10/23/2000	2315	0.00	1.80	0.00	1.60	0.00	1.75
10/23/2000	2330	0.04	1.84	0.00	1.60	0.00	1.75
10/23/2000	2345	0.00	1.84	0.00	1.60	0.00	1.75
10/23/2000	2400	0.00	1.84	0.00	1.60	0.00	1.75

H.3. Weighted Rain Gage Data

Date	Time (increments of 15 minutes)	Weighted Raingage Current	Total
10/21/2000	15	0.00	0.00
10/21/2000	30	0.00	0.00
10/21/2000	45	0.00	0.00
10/21/2000	100	0.00	0.00
10/21/2000	115	0.00	0.00
10/21/2000	130	0.00	0.00
10/21/2000	145	0.00	0.00
10/21/2000	200	0.00	0.00
10/21/2000	215	0.00	0.00
10/21/2000	230	0.00	0.00
10/21/2000	245	0.00	0.00
10/21/2000	300	0.00	0.00
10/21/2000	315	0.00	0.00
10/21/2000	330	0.00	0.00
10/21/2000	345	0.00	0.00
10/21/2000	400	0.00	0.00
10/21/2000	415	0.00	0.00
10/21/2000	430	0.00	0.00
10/21/2000	445	0.00	0.00
10/21/2000	500	0.00	0.00
10/21/2000	515	0.00	0.00
10/21/2000	530	0.00	0.00
10/21/2000	545	0.00	0.00
10/21/2000	600	0.00	0.00
10/21/2000	615	0.00	0.00
10/21/2000	630	0.00	0.00
10/21/2000	645	0.00	0.00
10/21/2000	700	0.00	0.00
10/21/2000	715	0.00	0.00
10/21/2000	730	0.00	0.00
10/21/2000	745	0.00	0.00
10/21/2000	800	0.00	0.00
10/21/2000	815	0.00	0.00
10/21/2000	830	0.00	0.00
10/21/2000	845	0.00	0.00
10/21/2000	900	0.00	0.00
10/21/2000	915	0.00	0.00
10/21/2000	930	0.00	0.00
10/21/2000	945	0.00	0.00
10/21/2000	1000	0.00	0.00
10/21/2000	1015	0.00	0.00
10/21/2000	1030	0.00	0.00
10/21/2000	1045	0.00	0.00
10/21/2000	1100	0.00	0.00
10/21/2000	1115	0.00	0.00
10/21/2000	1130	0.00	0.00
10/21/2000	1145	0.00	0.00
10/21/2000	1200	0.00	0.00
10/21/2000	1215	0.00	0.00
10/21/2000	1230	0.00	0.00

Date	Time (increments of 15 minutes)	Weighted Raingage Current	Total	
10/21/2000	1245	0.00	0.00	
10/21/2000	1300	0.00	0.00	
10/21/2000	1315	0.00	0.00	
10/21/2000	1330	0.00	0.00	
10/21/2000	1345	0.00	0.00	
10/21/2000	1400	0.00	0.00	
10/21/2000	1415	0.00	0.00	
10/21/2000	1430	0.00	0.00	
10/21/2000	1445	0.00	0.00	
10/21/2000	1500	0.00	0.00	
10/21/2000	1515	0.00	0.00	
10/21/2000	1530	0.00	0.00	
10/21/2000	1545	0.00	0.00	
10/21/2000	1600	0.00	0.00	
10/21/2000	1615	0.00	0.00	
10/21/2000	1630	0.00	0.00	
10/21/2000	1645	0.00	0.00	
10/21/2000	1700	0.00	0.00	
10/21/2000	1715	0.00	0.00	
10/21/2000	1730	0.00	0.00	
10/21/2000	1745	0.00	0.00	
10/21/2000	1800	0.00	0.00	
10/21/2000	1815	0.00	0.00	
10/21/2000	1830	0.00	0.00	
10/21/2000	1845	0.00	0.00	
10/21/2000	1900	0.00	0.00	0
10/21/2000	1915	0.00	0.00	
10/21/2000	1930	0.00	0.00	0
10/21/2000	1945	0.00	0.00	
10/21/2000	2000	0.00	0.00	0
10/21/2000	2015	0.00	0.00	
10/21/2000	2030	0.01	0.01	.0057
10/21/2000	2045	0.01	0.01	
10/21/2000	2100	0.03	0.04	.0228
10/21/2000	2115	0.04	0.08	
10/21/2000	2130	0.02	0.10	.0571
10/21/2000	2145	0.11	0.21	
10/21/2000	2200	0.07	0.28	.1600
10/21/2000	2215	0.02	0.30	
10/21/2000	2230	0.02	0.32	.1829
10/21/2000	2245	0.00	0.32	
10/21/2000	2300	0.00	0.32	.1829
10/21/2000	2315	0.00	0.32	
10/21/2000	2330	0.00	0.32	.1829
10/21/2000	2345	0.04	0.36	
10/21/2000	2400	0.17	0.53	.3029
10/22/2000	15	0.07	0.60	
10/22/2000	30	0.03	0.62	.3543
10/22/2000	45	0.02	0.65	
10/22/2000	100	0.04	0.69	.5143

Date	Time (increments of 15 minutes)	Weighted Raingage Current	Total	
10/22/2000	115	0.05	0.73	
10/22/2000	130	0.05	−0.79	.4514
10/22/2000	145	0.03	0.82	
10/22/2000	200	0.11	−0.93	.5314
10/22/2000	215	0.04	0.97	
10/22/2000	230	0.09	−1.06	.6057
10/22/2000	245	0.07	1.12	
10/22/2000	300	0.04	−1.17	.6686
10/22/2000	315	0.02	1.18	
10/22/2000	330	0.00	−1.18	.6743
10/22/2000	345	0.04	1.22	
10/22/2000	400	0.01	−1.24	.7086
10/22/2000	415	0.04	1.27	
10/22/2000	430	0.03	−1.30	.7429
10/22/2000	445	0.03	1.33	
10/22/2000	500	0.09	−1.42	.8114
10/22/2000	515	0.00	1.42	
10/22/2000	530	0.00	−1.42	.8114
10/22/2000	545	0.03	1.45	
10/22/2000	600	0.00	−1.45	.8286
10/22/2000	615	0.00	1.45	
10/22/2000	630	0.02	−1.47	.84
10/22/2000	645	0.00	1.47	
10/22/2000	700	0.00	−1.47	.84
10/22/2000	715	0.00	1.47	
10/22/2000	730	0.00	−1.47	.84
10/22/2000	745	0.00	1.47	
10/22/2000	800	0.00	−1.47	.84
10/22/2000	815	0.00	1.47	
10/22/2000	830	0.01	−1.47	.84
10/22/2000	845	0.00	1.47	
10/22/2000	900	0.00	−1.47	.84
10/22/2000	915	0.01	1.48	
10/22/2000	930	0.00	−1.48	.8457
10/22/2000	945	0.02	1.50	
10/22/2000	1000	0.00	−1.50	.8571
10/22/2000	1015	0.00	1.50	
10/22/2000	1030	0.00	−1.50	.8571
10/22/2000	1045	0.00	1.50	
10/22/2000	1100	0.00	−1.50	.8571
10/22/2000	1115	0.00	1.50	
10/22/2000	1130	0.00	−1.50	.8571
10/22/2000	1145	0.00	1.50	
10/22/2000	1200	0.00	−1.50	.8571
10/22/2000	1215	0.00	1.50	
10/22/2000	1230	0.00	−1.50	.8571
10/22/2000	1245	0.00	1.50	
10/22/2000	1300	0.00	−1.50	.8571
10/22/2000	1315	0.00	1.50	
10/22/2000	1330	0.00	−1.50	.8571

Date	Time (increments of 15 minutes)	Weighted Raingage Current	Total
10/22/2000	1345	0.00	1.50
10/22/2000	1400	0.00	1.50 - .8571
10/22/2000	1415	0.00	1.50
10/22/2000	1430	0.00	1.50 - .8571
10/22/2000	1445	0.00	1.50
10/22/2000	1500	0.00	1.50 - .8171
10/22/2000	1515	0.00	1.50
10/22/2000	1530	0.00	1.50 - .8571
10/22/2000	1545	0.00	1.50
10/22/2000	1600	0.00	1.50 - .8571
10/22/2000	1615	0.00	1.50
10/22/2000	1630	0.00	1.50 - .8571
10/22/2000	1645	0.00	1.50
10/22/2000	1700	0.00	1.50 - .8571
10/22/2000	1715	0.00	1.50
10/22/2000	1730	0.00	1.50 - .8571
10/22/2000	1745	0.00	1.50
10/22/2000	1800	0.00	1.50 - .8571
10/22/2000	1815	0.00	1.50
10/22/2000	1830	0.00	1.50 - .8571
10/22/2000	1845	0.00	1.50
10/22/2000	1900	0.00	1.50 - .8571
10/22/2000	1915	0.00	1.50
10/22/2000	1930	0.00	1.50 - .8571
10/22/2000	1945	0.00	1.50
10/22/2000	2000	0.00	1.50 - .8571
10/22/2000	2015	0.00	1.50
10/22/2000	2030	0.00	1.50 - .8571
10/22/2000	2045	0.00	1.50
10/22/2000	2100	0.00	1.50 - .8571
10/22/2000	2115	0.00	1.50
10/22/2000	2130	0.00	1.50 - .8571
10/22/2000	2145	0.00	1.50
10/22/2000	2200	0.00	1.50 - .8171
10/22/2000	2215	0.00	1.50
10/22/2000	2230	0.00	1.50 - .8571
10/22/2000	2245	0.00	1.50
10/22/2000	2300	0.00	1.50 - .8571
10/22/2000	2315	0.00	1.50
10/22/2000	2330	0.00	1.50 - .8571
10/22/2000	2345	0.00	1.50
10/22/2000	2400	0.00	1.50 - .8571
10/23/2000	15	0.00	1.50
10/23/2000	30	0.00	1.50 - .8571
10/23/2000	45	0.00	1.50
10/23/2000	100	0.00	1.50 - .85-1
10/23/2000	115	0.00	1.50
10/23/2000	130	0.00	1.50 - .8571
10/23/2000	145	0.00	1.50
10/23/2000	200	0.00	1.50 - .8571

Date	Time (increments of 15 minutes)	Weighted Raingage Current	Total	
10/23/2000	215	0.00	1.50	
10/23/2000	230	0.00	1.50	- .8571
10/23/2000	245	0.00	1.50	
10/23/2000	300	0.00	1.50	- .8571
10/23/2000	315	0.00	1.50	
10/23/2000	330	0.00	1.50	- .8571
10/23/2000	345	0.00	1.50	
10/23/2000	400	0.00	1.50	- .8571
10/23/2000	415	0.00	1.50	
10/23/2000	430	0.00	1.50	- .8571
10/23/2000	445	0.00	1.50	
10/23/2000	500	0.00	1.50	- .8571
10/23/2000	515	0.00	1.50	
10/23/2000	530	0.00	1.50	- .8571
10/23/2000	545	0.00	1.50	
10/23/2000	600	0.00	1.50	- .8571
10/23/2000	615	0.00	1.50	
10/23/2000	630	0.00	1.50	- .8571
10/23/2000	645	0.00	1.50	
10/23/2000	700	0.00	1.50	- .8571
10/23/2000	715	0.00	1.50	
10/23/2000	730	0.00	1.50	- .8571
10/23/2000	745	0.00	1.50	
10/23/2000	800	0.00	1.50	- .8571
10/23/2000	815	0.00	1.50	
10/23/2000	830	0.00	1.50	- .8571
10/23/2000	845	0.00	1.50	
10/23/2000	900	0.00	1.50	- .8571
10/23/2000	915	0.00	1.50	
10/23/2000	930	0.00	1.50	- .8571
10/23/2000	945	0.00	1.50	
10/23/2000	1000	0.00	1.50	- .8571
10/23/2000	1015	0.00	1.50	
10/23/2000	1030	0.00	1.50	- .8571
10/23/2000	1045	0.00	1.50	
10/23/2000	1100	0.00	1.50	- .8571
10/23/2000	1115	0.00	1.50	
10/23/2000	1130	0.00	1.50	- .8571
10/23/2000	1145	0.00	1.50	
10/23/2000	1200	0.00	1.50	- .8571
10/23/2000	1215	0.00	1.50	
10/23/2000	1230	0.00	1.50	- .8571
10/23/2000	1245	0.00	1.50	
10/23/2000	1300	0.00	1.50	- .8571
10/23/2000	1315	0.00	1.50	
10/23/2000	1330	0.00	1.50	- .8571
10/23/2000	1345	0.00	1.50	
10/23/2000	1400	0.00	1.50	- .8571
10/23/2000	1415	0.00	1.50	
10/23/2000	1430	0.00	1.50	- .8571

Date	Time (increments of 15 minutes)	Weighted Raingage Current	Total	
10/23/2000	1445	0.00	1.50	
10/23/2000	1500	0.00	1.50	-.8571,
10/23/2000	1515	0.00	1.50	
10/23/2000	1530	0.02	1.52	-.8686
10/23/2000	1545	0.06	1.58	
10/23/2000	1600	0.00	1.58	-.9028
10/23/2000	1615	0.00	1.58	
10/23/2000	1630	0.00	1.58	-.9028
10/23/2000	1645	0.00	1.58	
10/23/2000	1700	0.00	1.58	-.9028
10/23/2000	1715	0.00	1.58	
10/23/2000	1730	0.00	1.58	-.9028
10/23/2000	1745	0.00	1.58	
10/23/2000	1800	0.00	1.58	-.9028
10/23/2000	1815	0.00	1.58	
10/23/2000	1830	0.02	1.60	-.9143
10/23/2000	1845	0.00	1.60	
10/23/2000	1900	0.00	1.60	-.9143,
10/23/2000	1915	0.00	1.60	
10/23/2000	1930	0.02	1.62	-.9257
10/23/2000	1945	0.00	1.62	
10/23/2000	2000	0.00	1.62	-.9257
10/23/2000	2015	0.00	1.62	
10/23/2000	2030	0.00	1.62	-.9257
10/23/2000	2045	0.00	1.62	
10/23/2000	2100	0.00	1.62	-.9257
10/23/2000	2115	0.02	1.64	
10/23/2000	2130	0.00	1.64	-.9371
10/23/2000	2145	0.02	1.66	
10/23/2000	2200	0.01	1.67	-.9543
10/23/2000	2215	0.01	1.68	
10/23/2000	2230	0.01	1.69	-.9657
10/23/2000	2245	0.05	1.74	
10/23/2000	2300	0.00	1.74	-.9943.
10/23/2000	2315	0.00	1.74	
10/23/2000	2330	0.01	1.75	-1
10/23/2000	2345	0.00	1.75	
10/23/2000	2400	0.00	1.75	-1

H.4. Output Summary

```
1*****************************************
*                                       *
*   FLOOD HYDROGRAPH PACKAGE  (HEC-1)   *
*             MAY   1991                *
*           VERSION 4.0.1E              *
*     Lahey F77L-EM/32 version 5.01     *
*        Dodson & Associates, Inc.      *
*   DATE  06/29/01  TIME  09:45:30      *
*****************************************
```

```
*****************************************
*                                       *
*    U.S. ARMY CORPS OF ENGINEERS       *
*    HYDROLOGIC ENGINEERING CENTER      *
*          609 SECOND STREET            *
*       DAVIS, CALIFORNIA 95616         *
*           (916) 551-1748              *
*                                       *
*****************************************
```

```
X     X  XXXXXXX   XXXXX          X
X     X  X        X     X        XX
X     X  X        X               X
XXXXXXX  XXXX     X        XXXXX  X
X     X  X        X               X
X     X  X        X     X         X
X     X  XXXXXXX   XXXXX         XXX
```

THIS PROGRAM REPLACES ALL PREVIOUS VERSIONS OF HEC-1 KNOWN AS HEC1 (JAN 73), HEC1GS, HEC1DB, AND HEC1KW.

THE DEFINITIONS OF VARIABLES -RTIMP- AND -RTIOR- HAVE CHANGED FROM THOSE USED WITH THE 1973-STYLE INPUT STRUCTURE.
THE DEFINITION OF -AMSKK- ON RM-CARD WAS CHANGED WITH REVISIONS DATED 28 SEP 81. THIS IS THE FORTRAN77 VERSION
NEW OPTIONS: DAMBREAK OUTFLOW SUBMERGENCE , SINGLE EVENT DAMAGE CALCULATION, DSS:WRITE STAGE FREQUENCY,
DSS:READ TIME SERIES AT DESIRED CALCULATION INTERVAL LOSS RATE:GREEN AND AMPT INFILTRATION
KINEMATIC WAVE: NEW FINITE DIFFERENCE ALGORITHM

1 HEC-1 INPUT PAGE 1

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

  1           ID   Project ID: SECTION 15 - Major Basin: 01 - Return Period: 10 Years
  2           ID   ****************************************************************************
  3           ID   **                                                                        **
  4           ID   **                     Glendale/Peoria ADMP Update                        **
  5           ID   **                                                                        **
  6           ID   ****************************************************************************
  7           ID   ****************************************************************************
  8           ID   PROJECT:                Glendale Peoria ADMP Update
  9           ID   CLIENT:                 Flood Control District of Maricopa County
 10           ID   PREPARED BY:            Entellus, Inc.
 11           ID   PROJECT No:             FCD 99-44              Entellus 310.017
 12           ID   FILE NAME: 10S15WS.DAT                   CREATED DATE: FEB. 15, 2001
 13           ID   MODIFIED:
 14           ID   STORM:                  10-year 6 hour CALIBRATION STORM With Storage
 15           ID   DEVELOPMENT CONDITIONS: Existing Conditions
 16           ID
 17           ID   DDM MCUHP1
              *
              *
              *
              * ****************************************************************************
 18           IT       5                     500
 19           IO       5
              *
              *DIAGRAM
              *
              *
              *
              *

 20           KK   N11P1   BASIN
 21           PB    1.75
 22           IN      30
 23           PC       0       0       0       0   .0057   .0228   .0571   .1600   .1829   .1829
 24           PC   .1829   .3029   .3543   .3943   .4514   .5314   .6057   .6686   .6743   .7086
 25           PC   .7429   .8114   .8114   .8286     .84     .84     .84     .84     .84     .84
 26           PC   .8457   .8571   .8571   .8571   .8571   .8571   .8571   .8571   .8571   .8571
 27           PC   .8571   .8571   .8571   .8571   .8571   .8571   .8571   .8571   .8571   .8571
 28           PC   .8571   .8571   .8571   .8571   .8571   .8571   .8571   .8571   .8571   .8571
 29           PC   .8571   .8571   .8571   .8571   .8571   .8571   .8571   .8571   .8571   .8571
 30           PC   .8571   .8571   .8571   .8571   .8571   .8571   .8571   .8571   .8571   .8571
 31           PC   .8571   .8571   .8571   .8571   .8571   .8571   .8571   .8571   .8571   .8571
 32           PC   .8686   .9028   .9028   .9028   .9028   .9028   .9143   .9143   .9257   .9257
 33           PC   .9257   .9257   .9371   .9543   .9657   .9943       1       1       1       1
 34           BA    .117
 35           LG    0.34    0.35    3.95    0.48       1
 36           UC   0.292   0.252
 37           UA       0     3.0     5.0     8.0    12.0    20.0    43.0    75.0    90.0    96.0
 38           UA     100
```

```
                *
                *
                * *** ROUTE RN11P1  ********************************************************
                * ROUTE RN11P1 IS 2675 FT WITH A SLOPE OF 0.0103
                * CROSS SECTION IS A RURAL ROAD
                *
                * DDM   ***** Preserved *****
                                                HEC-1 INPUT                                                    PAGE  2

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

  39            KK  RN11P1
  40            RS       5   FLOW       0
  41            RC    0.04    0.03    0.04    2675  0.0103
  42            RX       0       1      70      75      95     100     136     137
  43            RY       8       3       1       0       0       1       3       8
                *
                * *** STORAGE AT PINNACLE PEAK AND 90TH AVE
                *

  44            KK  SRN11P
  45            KO       3
  46            RS       1    STOR       0
  47            SQ       0      18     153     285
  48            SE  312.67  313.47  313.87  314.07
  49            SA       0   .0462   .5383
  50            SE  312.67   313.5     314
                *
                *

  51            KK   N11L5   BASIN
  52            BA    .074
  53            LG    0.32    0.32    2.65    1.20       3
  54            UC   1.017   1.204
  55            UA       0     5.0    16.0    30.0    65.0    77.0    84.0    90.0    94.0    97.0
  56            UA     100
                *
                *

  57            KK   N11L1   BASIN
  58            BA    .074
  59            LG    0.31    0.35    2.65    1.35      12
  60            UC   0.883   0.894
  61            UA       0     5.0    16.0    30.0    65.0    77.0    84.0    90.0    94.0    97.0
  62            UA     100
                *
                *
                * *** DIVERSION DN11L1 *****************************************************
                * SPLIT FLOW IS CALCULATED BASED ON EXISTING TOPOGRAPHY
                *
                * DDM   ***** Preserved *****

  63            KK  DN11L1
  64            DT  N11L1I
  65            DI       0      18      36      55      73      91     109     127     145
  66            DQ       0      13      23      34      46      57      69      80      91
                *
                *
                * *** ROUTE RN11LE *********************************************************
                * ROUTE RN11LE IS 879 FT WITH A SLOPE OF 0.0011
                * CROSS SECTION IS PINNACLE PEAK ROAD (MEASURED)
                *
                * DDM   ***** Preserved *****
                                                HEC-1 INPUT                                                    PAGE  3

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

  67            KK  RN11LE
  68            RS       7   FLOW       0
  69            RC    0.04    0.03    0.04     879   0.011
  70            RX       0       1      43      48      73      78     120     121
  71            RY       8       3       1       0       0       1       3       8
                *
                *
                * DDM   ***** Preserved *****

  72            KK  CN11L5
  73            HC       3
                *
```

```
*
* *** DIVERSION DN11L5 ********************************************************
* THIS SPLIT IS BASED ON THE LEVEL 3 IMPROVEMENTS
*
* DDM   ***** Preserved *****

KK  DN11L5
DT  N11L5I
DI       0      18      36      55      73      91     109     127     145
DQ       0       0       0       0       0       0       0       0       0
*
*
* *** ROUTE RN11L5 ************************************************************
* ROUTE RN11L5 IS 1300 FT WITH A SLOPE OF 0.0062
* CROSS SECTION IS A SUBDIVISION ROAD
*
* DDM   ***** Preserved *****

KK  RN11L5
RS       2   FLOW       0
RC    0.03    0.02    0.03    1300  0.0062
RX       0       1      50      55      77      82     149     150
RY       8       3       1       0       0       1       3       8
*
*

KK  N11I31   BASIN
BA    .016
LG    0.24    0.35    2.65    1.31      12
UC   0.579   0.791
UA       0     5.0    16.0    30.0    65.0    77.0    84.0    90.0    94.0    97.0
UA     100
*
*
* DDM   ***** Preserved *****

KK  C11I31
HC       2
*
*
* *** ROUTE R11I31 ************************************************************
* ROUTE R11I31 IS 1307 FT WITH A SLOPE OF 0.0061
* CROSS SECTION IS A SUBDIVISION ROAD
*
* DDM   ***** Preserved *****
```



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

KK  R11I31
RS       2   FLOW       0
RC    0.03    0.02    0.03    1307  0.0061
RX       0       1      70      75      97     102     139     140
RY       8       3       1       0       0       1       3       8
*
*

KK  N11I32   BASIN
BA    .041
LG    0.30    0.35    2.74    1.13       5
UC   0.679   0.589
UA       0     5.0    16.0    30.0    65.0    77.0    84.0    90.0    94.0    97.0
UA     100
*
*
* *** ROUTE R11I32 ************************************************************
* ROUTE R11I32 IS 1759 FT WITH A SLOPE OF 0.0045
* CROSS SECTION IS A SUBDIVISION ROAD
*
* DDM   ***** Preserved *****

KK  R11I32
RS       3   FLOW       0
RC    0.03    0.02    0.03    1759  0.0045
RX       0       1      48      53      83      88     131     132
RY       8       3       2       0       0       2       3       8
*
*

KK  N11I23   BASIN
```

```
108          BA    .044
109          LG    0.24    0.35    2.65    1.37      27
110          UC   0.663   0.659
111          UA       0     5.0    16.0    30.0    65.0    77.0    84.0    90.0    94.0    97.0
112          UA     100
             *
             *
             * DDM   ***** Preserved *****

113          KK  C11I23
114          HC       3
             *
             *
             * *** ROUTE R11I23 ************************************************************
             * ROUTE R11I23 IS 1405 FT WITH A SLOPE OF 0.0071
             * CROSS SECTION IS A SMALLER SUBDIVISION ROAD
             *
             * DDM   ***** Preserved *****
                                          HEC-1 INPUT                                          PAGE  5
LINE         ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10

115          KK  R11I23
116          RS       3   FLOW       0
117          RC    0.04    0.03    0.04    1405  0.0071
118          RX       0       1      73      78     113     118     161     162
119          RY       8       3       1       0       0       1       3       8
             *
             *

120          KK  N11I14   BASIN
121          BA    .029
122          LG    0.31    0.35    2.65    1.37      13
123          UC   0.654   0.660
124          UA       0     3.0     5.0     8.0    12.0    20.0    43.0    75.0    90.0    96.0
125          UA     100
             *
             *
             * DDM   ***** Preserved *****

126          KK  C11I14
127          HC       2
             *
             *
             * *** ROUTE R11I14 ************************************************************
             * ROUTE R11I14 IS 1275 FT WITH A SLOPE OF 0.0055
             * CROSS SECTION IS A SMALLER SUBDIVISION ROAD
             *
             * DDM   ***** Preserved *****

128          KK  R11I14
129          RS       3   FLOW       0
130          RC    0.04    0.03    0.04    1275  0.0055
131          RX       0       1      56      61     101     106     190     191
132          RY       8       3       1       0       0       1       3       8
             *
             *

133          KK   N11I4   BASIN
134          BA    .023
135          LG    0.31    0.30    2.65    1.38      13
136          UC   0.646   0.704
137          UA       0     5.0    16.0    30.0    65.0    77.0    84.0    90.0    94.0    97.0
138          UA     100
             *
             *
             *
             * DDM   ***** Preserved *****

139          KK  CN11I4
140          HC       2
             *
             *
             *
                                          HEC-1 INPUT                                          PAGE  6
LINE         ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10

141          KK  N11I24   BASIN
```

```
142          BA    .015
143          LG    0.24    0.29    2.65    1.38      29
144          UC   0.567   0.863
145          UA       0     5.0    16.0    30.0    65.0    77.0    84.0    90.0    94.0    97.0
146          UA     100
             *
             *
             * *** ROUTE R11I24 ************************************************************
             * ROUTE R11I24 IS 1365 FT WITH A SLOPE OF 0.0059
             * CROSS SECTION IS A SMALLER SUBDIVISION ROAD
             *
             * DDM   ***** Preserved *****

147          KK  R11I24
148          RS      10   FLOW       0
149          RC    0.04    0.03    0.04    1365  0.0059
150          RX       0       1      50      55      95     100     160     161
151          RY       8       3       2       0       0       2       3       8
             *
             *

152          KK   N11I3   BASIN
153          BA    .018
154          LG    0.30    0.35    2.65    1.39      14
155          UC   0.608   0.727
156          UA       0     5.0    16.0    30.0    65.0    77.0    84.0    90.0    94.0    97.0
157          UA     100
             *
             *
             * DDM   ***** Preserved *****

158          KK  CN11I3
159          HC       2
             *
             *
             * *** ROUTE RN11I3 ************************************************************
             * ROUTE RN11I3 IS 1310 FT WITH A SLOPE OF 0.0069
             * CROSS SECTION IS A SMALLER SUBDIVISION ROAD
             *
             * DDM   ***** Preserved *****

160          KK  RN11I3
161          RS       7   FLOW       0
162          RC    0.04    0.03    0.04    1310  0.0069
163          RX       0       1      54      59      90      95     135     136
164          RY       8       3       1       0       0       1       3       8
             *
             *
```



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

165          KK   N11I2   BASIN
166          BA    .026
167          LG    0.30    0.35    2.65    1.40      15
168          UC   0.654   0.719
169          UA       0     5.0    16.0    30.0    65.0    77.0    84.0    90.0    94.0    97.0
170          UA     100
             *
             *
             *
             * DDM   ***** Preserved *****

171          KK  CN11I2
172          HC       2
             *
             *

173          KK   N11L2   BASIN
174          BA    .010
175          LG    0.30    0.35    2.65    1.40      15
176          UC   0.425   0.470
177          UA       0     5.0    16.0    30.0    65.0    77.0    84.0    90.0    94.0    97.0
178          UA     100
             *
             *
             * *** DIVERSION DN11L2 ********************************************************
             * THIS DIVERSION IS IN PLACE TO ACCOUNT FOR THE LEVEL 3 IMPROVEMENTS
             *
             * DDM   ***** Preserved *****
```

```
179          KK  DN11L2
180          DT  N11L2I
181          DI       0      18      36      55      73      91     109     127     500
182          DQ       0       0       0       0       0       0       0       0       0
             *
             *
             * *** ROUTE RN11L2 ***********************************************************
             * ROUTE RN11L2 IS 442 FT WITH A SLOPE OF 0.0063
             * CROSS SECTION IS A SUBDIVISION ROAD
             *
             * DDM   ***** Preserved *****

183          KK  RN11L2
184          RS       2   FLOW       0
185          RC    0.03    0.02    0.03     442  0.0063
186          RX       0       1      32      37      69      74     112     113
187          RY       8       3       2       0       0       2       3       8
             *
             *
                                          HEC-1 INPUT                                                    PAGE  8
LINE         ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10

188          KK  N11I33   BASIN
189          BA    .004
190          LG    0.30    0.35    2.65    1.40      15
191          UC   0.446   0.539
192          UA       0     5.0    16.0    30.0    65.0    77.0    84.0    90.0    94.0    97.0
193          UA     100
             *
             *
             * DDM   ***** Preserved *****

194          KK  C11I33
195          HC       2
             *
             *
             *
             * *** DIVERSION D11I33 ********************************************************
             * 50% DIVERTED EAST
             *
             * DDM   ***** Preserved *****

196          KK  D11I33
197          DT  11I33I
198          DI       0       2      10      20     100     200     400
199          DQ       0       1       5      10      50     100     200
             *
             *
             *
             * *** ROUTE R133S *************************************************************
             * ROUTE RI33S IS 1156 FT WITH A SLOPE OF 0.0063
             * CROSS SECTION IS A SUBDIVISION ROAD
             *
             * DDM   ***** Preserved *****

200          KK   RI33S
201          RS       7   FLOW       0
202          RC    0.03    0.02    0.03    1156  0.0063
203          RX       0       1      42      47      77      82     117     118
204          RY       8       3       2       0       0       2       3       8
             *
             *
             *

205          KK  N11I27   BASIN
206          BA    .011
207          LG    0.27    0.35    2.65    1.36      14
208          UC   0.488   0.624
209          UA       0     5.0    16.0    30.0    65.0    77.0    84.0    90.0    94.0    97.0
210          UA     100
             *
             *
                                          HEC-1 INPUT                                                    PAGE  9
LINE         ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10

211          KK  N11I26   BASIN
```

```
212          BA     .005
213          LG    0.23    0.35    2.65    1.30      12
214          UC   0.504   0.986
215          UA       0     5.0    16.0    30.0    65.0    77.0    84.0    90.0    94.0    97.0
216          UA     100
             *
             *
             * DDM   ***** Preserved *****

217          KK  C11I26
218          HC       3
             *
             *
             * *** ROUTE R11I26 ************************************************************
             * ROUTE R11I26 IS 1382 FT WITH A SLOPE OF 0.0065
             * CROSS SECTION IS OVERLAND FLOW
             *
             * DDM   ***** Preserved *****

219          KK  R11I26
220          RS      12   FLOW       0
221          RC    0.05    0.05    0.05    1382  0.0065
222          RX       0     200     250     260     270     280     330     530
223          RY       3       2       1       0       0       1       2       8
             *
             *

224          KK  N11I22   BASIN
225          BA    .038
226          LG    0.31    0.35    4.20    0.49      11
227          UC   0.454   0.365
228          UA       0     5.0    16.0    30.0    65.0    77.0    84.0    90.0    94.0    97.0
229          UA     100
             *
             *
             * DDM   ***** Preserved *****

230          KK  C11I22
231          HC       2
             *
             * *** STORAGE NORTH OF WILLIAMS ROAD BETWEEN 88TH AVE AND 87TH AVE
             *

232          KK  S11I22
233          KO       3
234          RS       1    STOR       0
235          SQ       0      12
236          SE  293.45  294.05
237          SA       0    .103
238          SE  293.45     294
             *
             *
             * *** ROUTE R11I22 ************************************************************
             * ROUTE R11I22 IS 1750 FT WITH A SLOPE OF 0.0057
             * CROSS SECTION IS A SUBDIVISION ROAD
             *
             * DDM   ***** Preserved *****
1                                          HEC-1 INPUT                                          PAGE 10

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

239          KK  R11I22
240          RS       6   FLOW       0
241          RC    0.03    0.02    0.03    1750  0.0057
242          RX       0       1      43      48      94      99     137     138
243          RY       8       2       1       0       0       1       2       8
             *
             *

244          KK   N11I6   BASIN
245          BA    .033
246          LG    0.30    0.35    2.65    1.40      15
247          UC   0.750   0.832
248          UA       0     5.0    16.0    30.0    65.0    77.0    84.0    90.0    94.0    97.0
249          UA     100
             *
             *
             * DDM   ***** Preserved *****

250          KK  C11I16
```

```
251          HC       2
             *
             *
             * *** ROUTE RN11I6 ************************************************************
             * ROUTE RN11I6 IS 990 FT WITH A SLOPE OF 0.0051
             * CROSS SECTION IS A SUBDIVISION ROAD
             *
             * DDM   ***** Preserved *****

252          KK  RN11I6
253          RS       3   FLOW       0
254          RC    0.03    0.02    0.03     990  0.0051
255          RX       0       1      45      50      90      95     143     144
256          RY       8       3       1       0       0       1       3       8
             *
             *

257          KK   N11I7   BASIN
258          BA    .021
259          LG    0.30    0.35    2.65    1.40      15
260          UC   0.671   0.778
261          UA       0     5.0    16.0    30.0    65.0    77.0    84.0    90.0    94.0    97.0
262          UA     100
             *
             *
             *
             * DDM   ***** Preserved *****

263          KK  CN11I7
264          HC       2
             *
             *
```



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

265          KK   N11L3   BASIN
266          BA    .063
267          LG    0.30    0.29    2.65    1.38      14
268          UC   0.608   0.593
269          UA       0     5.0    16.0    30.0    65.0    77.0    84.0    90.0    94.0    97.0
270          UA     100
             *
             *
             *
             *
             * *** DIVERSION DN11L3 *********************************************************
             * THIS DIVERSION IS IN PLACE TO ACCOUNT FOR THE LEVEL 3 IMPROVEMENTS
             *
             * DDM   ***** Preserved *****

271          KK  DN11L3
272          DT  N11L3I
273          DI       0      18      36      55      73      91     109     127     500
274          DQ       0       0       0       0       0       0       0       0       0
             *
             * *** ROUTE RN11L3 *************************************************************
             * ROUTE RN11L3 IS 1145 FT WITH A SLOPE OF 0.0079
             * CROSS SECTION IS A SUBDIVISION ROAD
             *
             * DDM   ***** Preserved *****

275          KK  RN11L3
276          RS       1   FLOW      -1
277          RC    0.03    0.02    0.03    1145  0.0079
278          RX       0       1      50      55      90      95     145     146
279          RY       8       3       1       0       0       1       3       8
             *
             *

280          KK  N11I30   BASIN
281          BA    .017
282          LG    0.14    0.35    2.65    1.12       5
283          UC   0.329   0.368
284          UA       0     5.0    16.0    30.0    65.0    77.0    84.0    90.0    94.0    97.0
285          UA     100
             *
             *

286          KK  N11I28   BASIN
```

```
 287          BA    .023
 288          LG    0.27    0.35    2.65    1.35      13
 289          UC   0.596   0.701
 290          UA       0     5.0    16.0    30.0    65.0    77.0    84.0    90.0    94.0    97.0
 291          UA     100
              *
              *
              *
              * *** DIVERSION RECOVER D11I33  ******************************************
              * RECOVER FLOWS FROM D11I33
1                                          HEC-1 INPUT                                          PAGE 12

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

 292          KK  D11I33
 293          DR  11I33I
              *
              *
              *
              * *** ROUTE RI33E ***********************************************************
              * ROUTE RI33E IS 1497 FT WITH A SLOPE OF 0.0048
              * CROSS SECTION IS A SUBVISION ROAD
              *
              * DDM   ***** Preserved *****

 294          KK   RI33E
 295          RS      11   FLOW       0
 296          RC    0.03    0.02    0.03    1497  0.0048
 297          RX       0       1      50      55      90      95     145     146
 298          RY       8       3       1       0       0       1       3       8
              *
              *
              * DDM   ***** Preserved *****

 299          KK  C11I30
 300          HC       4
              *
              *
              * *** ROUTE R11I30 **********************************************************
              * ROUTE R11I30 IS 860 FT WITH A SLOPE OF 0.0052
              * CROSS SECTION IS A SMALLER SUBDIVISION ROAD
              *
              * DDM   ***** Preserved *****

 301          KK  R11I30
 302          RS       3   FLOW       0
 303          RC    0.04    0.03    0.04     860  0.0052
 304          RX       0       1      42      47      77      82     131     132
 305          RY       8       3       2       0       0       2       3       8
              *
              *

 306          KK  N11I29   BASIN
 307          BA    .006
 308          LG    0.30    0.35    2.65    1.20       5
 309          UC   0.354   0.388
 310          UA       0     5.0    16.0    30.0    65.0    77.0    84.0    90.0    94.0    97.0
 311          UA     100
              *
              *
              * *** ROUTE R11I29 **********************************************************
              * ROUTE R11I29 IS 1350 FT WITH A SLOPE OF 0.0067
              * CROSS SECTION IS OVERLAND FLOW
              *
              * DDM   ***** Preserved *****
1                                          HEC-1 INPUT                                          PAGE 13

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

 312          KK  R11I29
 313          RS      14   FLOW       0
 314          RC    0.05    0.05    0.05    1350  0.0067
 315          RX       0     200     250     260     270     280     330     530
 316          RY       3       2       1       0       0       1       2       8
              *
              *

 317          KK  N11I25   BASIN
 318          BA    .021
```

```
319          LG    0.27    0.30    8.00    0.09      13
320          UC   0.292   0.280
321          UA       0     5.0    16.0    30.0    65.0    77.0    84.0    90.0    94.0    97.0
322          UA     100
             *
             *
             * DDM   ***** Preserved *****

323          KK  C11I25
324          HC       3
             *
             *
             * *** ROUTE R11I25 ************************************************************
             * ROUTE R11I25 IS 689 FT WITH A SLOPE OF 0.0065
             * CROSS SECTION IS OVERLAND FLOW
             *
             * DDM   ***** Preserved *****

325          KK  R11I25
326          RS       3   FLOW       0
327          RC    0.05    0.05    0.05     689  0.0065
328          RX       0     200     250     260     270     280     330     530
329          RY       3       2       1       0       0       1       2       8
             *
             *

330          KK   N11L4   BASIN
331          BA    .010
332          LG    0.30    0.35    2.65    1.39      14
333          UC   0.396   0.550
334          UA       0     3.0     5.0     8.0    12.0    20.0    43.0    75.0    90.0    96.0
335          UA     100
             *
             *
             * *** DIVERSION DN11L4 ********************************************************
             * THIS DIVERSION IS IN PLACE TO ACCOUNT FOR THE LEVEL 3 IMPROVEMENTS
             *
             * DDM   ***** Preserved *****
                                          HEC-1 INPUT                                          PAGE 14

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

336          KK  DN11L4
337          DT  N11L4I
338          DI       0      18      36      55      73      91     109     127     500
339          DQ       0       0       0       0       0       0       0       0       0
             *
             *
             * *** ROUTE RN11L4 ************************************************************
             * ROUTE RN11L4 IS 737 FT WITH A SLOPE OF 0.0075
             * CROSS SECTION IS OVERLAND FLOW
             *
             * DDM   ***** Preserved *****

340          KK  RN11L4
341          RS       7   FLOW       0
342          RC    0.05    0.05    0.05     737  0.0075
343          RX       0     200     250     260     270     280     330     530
344          RY       3       2       1       0       0       1       2       8
             *
             *

345          KK   N22B7   BASIN
346          BA    .015
347          LG    0.30    0.35    2.65    1.20       5
348          UC   0.429   0.377
349          UA       0     5.0    16.0    30.0    65.0    77.0    84.0    90.0    94.0    97.0
350          UA     100
             *
             *
             * DDM   ***** Preserved *****

351          KK  CN22B7
352          HC       2
             *
             *
             * *** ROUTE RN22B7 ************************************************************
             * ROUTE RN22B7 IS 1415 FT WITH A SLOPE OF 0.006
             * CROSS SECTION IS OVERLAND FLOW
             *
```

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

KK  RN22B7
RS      12   FLOW       0
RC    0.05    0.05    0.05    1415   0.006
RX       0     200     250     260     270     280     330     530
RY       3       2       1       0       0       1       2       8
*
*

KK   N22B4   BASIN
BA    .036
LG    0.32    0.35    2.76    1.24      10
UC   0.579   0.445
UA       0     5.0    16.0    30.0    65.0    77.0    84.0    90.0    94.0    97.0
UA     100
*
*
* DDM   ***** Preserved *****
```



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

KK  CN22B4
HC       2
*
*
* *** ROUTE RN22B4 ************************************************************
* ROUTE RN22B4 IS 953 FT WITH A SLOPE OF 0.0042
* CROSS SECTION IS OVERLAND FLOW
*
* DDM   ***** Preserved *****

KK  RN22B4
RS       7   FLOW       0
RC    0.05    0.05    0.05     953  0.0042
RX       0     200     250     260     270     280     330     530
RY       3       2       1       0       0       1       2       8
*
*

KK   N22B1   BASIN
BA    .019
LG    0.30    0.35    2.65    1.38      14
UC   0.438   0.322
UA       0     5.0    16.0    30.0    65.0    77.0    84.0    90.0    94.0    97.0
UA     100
*
*
* DDM   ***** Preserved *****

KK  CN22B1
HC       2
*
*
* *** ROUTE RN22B1 ************************************************************
* ROUTE RN22B1 IS 373 FT WITH A SLOPE OF 0.0054
* CROSS SECTION IS A SUBDIVISION ROAD WITH A WALL ON THE WEST SIDE
*
* DDM   ***** Preserved *****

KK  RN22B1
RS       1   FLOW       0
RC    0.03    0.02    0.03     373  0.0054
RX       0       1      11      21      27      52     132     133
RY       8       2       0       2       3       3       4       8
*
*

KK  N11I20   BASIN
BA    .010
LG    0.32    0.35    3.01    1.01       8
UC   0.321   0.279
UA       0     5.0    16.0    30.0    65.0    77.0    84.0    90.0    94.0    97.0
UA     100
*
*
*
```

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

 390          KK  N11I21   BASIN
 391          BA    .020
 392          LG    0.30    0.35    2.65    1.39      14
 393          UC   0.600   0.685
 394          UA       0     5.0    16.0    30.0    65.0    77.0    84.0    90.0    94.0    97.0
 395          UA     100
              *
              *
              * DDM   ***** Preserved *****

 396          KK  C11I20
 397          HC       4
              *
              * *** STORAGE NORTH OF WILLIAMS AND 87TH AVE
              *

 398          KK  S11I20
 399          KO       3
 400          RS       1    STOR       0
 401          SQ       0      21     145     422
 402          SE  290.88  291.68  292.30  292.88
 403          SA       0   .0276    .114    .264
 404          SE  290.88   291.5     292   292.5
              *
              *
              *
              * *** ROUTE R11I20 ************************************************************
              * ROUTE R11I20 IS 699 FT WITH A SLOPE OF 0.0057
              * CROSS SECTION IS A SUBDIVISION ROAD
              *
              * DDM   ***** Preserved *****

 405          KK  R11I20
 406          RS       1   FLOW       0
 407          RC    0.03    0.02    0.03     699  0.0057
 408          RX       0       1      24      29      69      74     148     149
 409          RY       8       2       1       0       0       1       3       8
              *
              *

 410          KK  N11I11   BASIN
 411          BA    .018
 412          LG    0.25    0.35    2.65    1.40      30
 413          UC   0.579   0.715
 414          UA       0     5.0    16.0    30.0    65.0    77.0    84.0    90.0    94.0    97.0
 415          UA     100
              *
              *
              * DDM   ***** Preserved *****
                                          HEC-1 INPUT                                          PAGE 17
LINE          ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10

 416          KK  C11I11
 417          HC       2
              *
              *
              *
              * *** ROUTE R11I11 ************************************************************
              * ROUTE R11I11 IS 598 FT WITH A SLOPE OF 0.0033
              * CROSS SECTION IS A SUBDIVISION ROAD (MEASURE)
              *
              * DDM   ***** Preserved *****

 418          KK  R11I11
 419          RD
 420          RC    0.03    0.02    0.03     598  0.0033
 421          RX       0       1      20      30      60      70     175     176
 422          RY       8       4       3       0       0       3       4       8
              *
              *

 423          KK  N11I12   BASIN
 424          BA    .024
 425          LG    0.25    0.35    4.10    0.53      28
 426          UC   0.542   0.548
 427          UA       0     5.0    16.0    30.0    65.0    77.0    84.0    90.0    94.0    97.0
```

```
428          UA     100
             *
             *
             *
             * DDM   ***** Preserved *****

429          KK  C11I12
430          HC       2
             *
             *
             * *** DIVERSION D11I12 ************************************************
             * SPLIT WAS CALCULATED USING EXISTING TOPOGRAPHY
             *
             * DDM   ***** Preserved *****

431          KK  D11I12
432          DT  11I12I
433          DI       0      36      73     109     145     182     218     291     327
434          DQ       0       0      15      24      31      36      49      66      74
             *
             *
             *
             * *** ROUTE RI12S ***********************************************************
             * ROUTE RI12S IS 1347 FT WITH A SLOPE OF 0.0052
             * CROSS SECTION IS A SUBDIVISION ROAD
             *
             * DDM   ***** Preserved *****
1                                          HEC-1 INPUT                                                    PAGE 18
LINE         ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10

435          KK   RI12S
436          RS       3   FLOW       0
437          RC    0.03    0.02    0.03    1347  0.0052
438          RX       0       1      75      80     120     125     190     191
439          RY       8       3       1       0       0       1       3       8
             *
             *

440          KK   N11I9   BASIN
441          BA    .012
442          LG    0.26    0.35    2.65    1.34      13
443          UC   0.571   0.841
444          UA       0     5.0    16.0    30.0    65.0    77.0    84.0    90.0    94.0    97.0
445          UA     100
             *
             *
             * DDM   ***** Preserved *****

446          KK  CN11I9
447          HC       2
             *
             *

448          KK  N11I10   BASIN
449          BA    .021
450          LG    0.30    0.35    2.65    1.39      14
451          UC   0.696   0.886
452          UA       0     5.0    16.0    30.0    65.0    77.0    84.0    90.0    94.0    97.0
453          UA     100
             *
             *
             * *** ROUTE R11I10 **********************************************************
             * ROUTE R11I10 IS 1180 FT WITH A SLOPE OF 0.0044
             * CROSS SECTION IS OVERLAND FLOW
             *
             * DDM   ***** Preserved *****

454          KK  R11I10
455          RS      12   FLOW       0
456          RC    0.05    0.05    0.05    1180  0.0044
457          RX       0     200     250     260     270     280     330     530
458          RY       3       2       1       0       0       1       2       8
             *
             *

459          KK   N11I8   BASIN
460          BA    .014
461          LG    0.28    0.35    2.65    1.37      14
462          UC   0.542   0.643
```

```
463          UA        0     5.0    16.0    30.0    65.0    77.0    84.0    90.0    94.0    97.0
464          UA      100
             *
             *
             *
             * DDM    ***** Preserved *****
                                          HEC-1 INPUT                                                PAGE 19
LINE         ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10

465          KK  CN11I8
466          HC        2
             *
             *
             *
             * DDM    ***** Preserved *****

467          KK   DUMMY
468          HC        5
             *
             * *** STORAGE BEHIND DEER VALLEY RD
             *

469          KK  SDUMMY
470          KO        3
471          RS        1    STOR        0
472          SQ        0      69      438
473          SE   277.78  278.48   278.68
474          SA        0  .22341
475          SE   277.78   278.5
             *
             *
             *

476          KK   N11P2   BASIN
477          BA     .265
478          LG     0.35    0.35    3.45    0.67       0
479          UC    0.438   0.356
480          UA        0     3.0     5.0     8.0    12.0    20.0    43.0    75.0    90.0    96.0
481          UA      100
             *
             *
             * *** DIVERSION DN11P2 ***********************************************************
             * THE DITCH ON THE NORTH SIDE OF CALLE LEJOS WAS ESTIMATED
             * TO CARRY 80 CFS. THE SPLIT WAS DETERMINED OVER AND ABOVE THIS FLOW.
             *
             * DDM    ***** Preserved *****

482          KK  DN11P2
483          DT  N11P2I
484          DI        0      10      50      80     116     189     298     407
485          DQ        0      10      50      80      97     133     186     239
             *
             *
             *
             * *** ROUTE RN11PS ****************************************************************
             * ROUTE RN11PS IS 3032 FT WITH A SLOPE OF 0.0099
             * CROSS SECTION IS SHALLOW CONCENTRATED FLOW
             *
             * DDM    ***** Preserved *****
                                          HEC-1 INPUT                                                PAGE 20
LINE         ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10

486          KK  RN11PS
487          RS        7   FLOW        0
488          RC     0.03    0.02    0.03    3032  0.0099
489          RX        0     200     250     260     300     320     370     570
490          RY        3       2       1       0       0       1       2       8
             *
             *

491          KK   N21I1   BASIN
492          BA     .111
493          LG     0.32    0.32    2.65    1.20       3
494          UC    0.817   0.659
495          UA        0     5.0    16.0    30.0    65.0    77.0    84.0    90.0    94.0    97.0
496          UA      100
             *
```

```
            * COMBINE THE ROUTED DIVERTED FLOW WITH THIS SUBBASIN
            *
            * DDM   ***** Preserved *****

 497        KK  CN21I1
 498        HC       2
            *
            *
            * *** DIVERSION DN21I1 ***********************************************************
            * THIS DIVERSION IS IN PLACE TO ACCOUNT FOR THE LEVEL 3 IMPROVEMENTS
            *
            * DDM   ***** Preserved *****

 499        KK  DN21I1
 500        DT  N21I1I
 501        DI       0      18      36      55      73      91     109     127     500
 502        DQ       0       0       0       0       0       0       0       0       0
            *
            *
            * *** ROUTE RN21I1 ***************************************************************
            * ROUTE RN21I1 IS 754 FT WITH A SLOPE OF 0.008
            * CROSS SECTION IS SHALLOW CONCENTRATED FLOW
            *
            * DDM   ***** Preserved *****

 503        KK  RN21I1
 504        RS       3   FLOW       0
 505        RC    0.05    0.05    0.05     754   0.008
 506        RX       0     200     250     260     300     320     370     570
 507        RY       3       2       1       0       0       1       2       8
            *
            *

 508        KK   N22B8   BASIN
 509        BA    .018
 510        LG    0.32    0.35    2.65    1.20       3
 511        UC   0.475   0.373
 512        UA       0     5.0    16.0    30.0    65.0    77.0    84.0    90.0    94.0    97.0
 513        UA     100
            *
            *
            * DDM   ***** Preserved *****
                                        HEC-1 INPUT                                          PAGE 21
LINE        ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10

 514        KK  CN22B8
 515        HC       2
            *
            *
            * *** ROUTE RN22B8 ***************************************************************
            * ROUTE RN22B8 IS 1332 FT WITH A SLOPE OF 0.006
            * CROSS SECTION IS A SMALLER SUBDIVISION ROAD
            *
            * DDM   ***** Preserved *****

 516        KK  RN22B8
 517        RS       3   FLOW       0
 518        RC    0.04    0.03    0.04    1332   0.006
 519        RX       0       1      43      48      78      83     168     169
 520        RY       8       3       1       0       0       1       3       8
            *
            *

 521        KK   N22B5   BASIN
 522        BA    .029
 523        LG    0.31    0.35    2.65    1.20       4
 524        UC   0.608   0.524
 525        UA       0     5.0    16.0    30.0    65.0    77.0    84.0    90.0    94.0    97.0
 526        UA     100
            *
            *
            * DDM   ***** Preserved *****

 527        KK  CN22B5
 528        HC       2
            *
            *
            * *** ROUTE RN22B5 ***************************************************************
            * ROUTE RN22B5 IS 684 FT WITH A SLOPE OF 0.0058
```

```
            * CROSS SECTION IS SUBDIVISION ROAD
            *
            * DDM   ***** Preserved *****

529         KK  RN22B5
530         RS       2   FLOW       0
531         RC    0.03    0.02    0.03     684  0.0058
532         RX       0       1      50      55      85      95     145     146
533         RY       8       3       1       0       0       1       3       8
            *
            *

534         KK   N22B2   BASIN
535         BA    .023
536         LG    0.31    0.35    2.61    1.41      12
537         UC   0.475   0.331
538         UA       0     5.0    16.0    30.0    65.0    77.0    84.0    90.0    94.0    97.0
539         UA     100
            *
            *
            *
            * *** DIVERSION RECOVER DN11P2  ********************************************
            * RECOVER FLOWS FROM DN11P2
                                          HEC-1 INPUT                                          PAGE 22
LINE        ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10

540         KK   DN11P
541         DR  N11P2I
            *
            *
            * *** ROUTE R11PE ************************************************************
            * ROUTE R11PE IS 3010 FT WITH A SLOPE OF 0.009
            * CROSS SECTION IS SHALLOW CONCENTRATED FLOW
            *
            * DDM   ***** Preserved *****

542         KK   R11PE
543         RS      12    FLOW       0
544         RC    0.05    0.05    0.05    3010   0.009
545         RX       0     200     250     260     270     280     330     530
546         RY       3       2       1       0       0       1       2       8
            *
            *

547         KK   N21I2   BASIN
548         BA    .057
549         LG    0.32    0.29    4.65    0.32       3
550         UC   0.608   0.710
551         UA       0     5.0    16.0    30.0    65.0    77.0    84.0    90.0    94.0    97.0
552         UA     100
            *
            *
            * DDM   ***** Preserved *****

553         KK  CN21I2
554         HC       2    0.32
            *
            *
            * *** DIVERSION DN21I2 *******************************************************
            * THIS DIVERSION IS IN PLACE TO ACCOUNT FOR THE LEVEL 3 IMPROVEMENTS
            *
            * DDM   ***** Preserved *****

555         KK  DN21I2
556         DT  N21I2I
557         DI       0      18      36      55      73      91     109     127     500
558         DQ       0       0       0       0       0       0       0       0       0
            *
            *
            * *** ROUTE RN21I2 ***********************************************************
            * ROUTE RN21I2 IS 866 FT WITH A SLOPE OF 0.0058
            * CROSS SECTION IS SHALLOW CONCENTRATED FLOW
            *
            * DDM   ***** Preserved *****
                                          HEC-1 INPUT                                          PAGE 23
LINE        ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10
```

```
559          KK  RN21I2
560          RS       4   FLOW       0
561          RC    0.05    0.05    0.05     866  0.0058
562          RX       0     200     250     260     270     280     330     530
563          RY       3       2       1       0       0       1       2       8
             *
             *

564          KK   N22B9   BASIN
565          BA    .022
566          LG    0.34    0.35    2.65    1.20       1
567          UC   0.412   0.263
568          UA       0     5.0    16.0    30.0    65.0    77.0    84.0    90.0    94.0    97.0
569          UA     100
             *
             *
             * DDM   ***** Preserved *****

570          KK  CN22B9
571          HC       2
             *
             *
             * *** ROUTE RN22B9 ************************************************************
             * ROUTE RN22B9 IS 1387 FT WITH A SLOPE OF 0.0058
             * CROSS SECTION IS OVERLAND FLOW
             *
             * DDM   ***** Preserved *****

572          KK  RN22B9
573          RS       7   FLOW       0
574          RC    0.05    0.05    0.05    1387  0.0058
575          RX       0     200     250     260     270     280     330     530
576          RY       3       2       1       0       0       1       2       8
             *
             *

577          KK   N22B6   BASIN
578          BA    .035
579          LG    0.30    0.35    2.65    1.20       5
580          UC   0.738   0.692
581          UA       0     5.0    16.0    30.0    65.0    77.0    84.0    90.0    94.0    97.0
582          UA     100
             *
             *
             * DDM   ***** Preserved *****

583          KK  CN22B6
584          HC       2
             *
             *
             * *** ROUTE RN22B6 ************************************************************
             * ROUTE RN22B6 IS 834 FT WITH A SLOPE OF 0.0048
             * CROSS SECTION IS OVERLAND FLOW
             *
             * DDM   ***** Preserved *****
```



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

585          KK  RN22B6
586          RS       4   FLOW       0
587          RC    0.05    0.05    0.05     834  0.0048
588          RX       0     200     250     260     270     280     330     530
589          RY       3       2       1       0       0       1       2       8
             *
             *

590          KK   N22B3   BASIN
591          BA    .009
592          LG    0.32    0.35    2.65    1.34      10
593          UC   0.471   0.513
594          UA       0     5.0    16.0    30.0    65.0    77.0    84.0    90.0    94.0    97.0
595          UA     100
             *
             *
             * DDM   ***** Preserved *****

596          KK  CN22B3
597          HC       2
             *
```

```
            *
            * *** ROUTE RN22B3 ************************************************************
            * ROUTE RN22B3 IS 853 FT WITH A SLOPE OF 0.0012
            * CROSS SECTION IS A SUBDIVISION ROAD WITH A WALL ON THE WEST SIDE
            *
            * DDM   ***** Preserved *****

598         KK  RN22B3
599         RS       3   FLOW       0
600         RC    0.03    0.02    0.03     853  0.0012
601         RX       0       1      11      21      51      56     141     142
602         RY       8       2       0       2       2       3       4       8
            *
            *
            * DDM   ***** Preserved *****

603         KK  CN22B2
604         HC       3     .57
            *
            * *** STORAGE PONDING AT WILLIAMS AND 85TH AVE

605         KK   S22B2
606         KO       3                                21
607         RS       1    STOR       0
608         SQ    .011     310
609         SE  291.26  292.46
610         SA    .011   .2249
611         SE  291.26  292.46
            *
            *
            * *** ROUTE RN22B2 ************************************************************
            * ROUTE RN22B2 IS 737 FT WITH A SLOPE OF 0.0054
            * CROSS SECTION IS A SUBDIVISION ROAD
            *
            * DDM   ***** Preserved *****
                                          HEC-1 INPUT                                          PAGE 25
LINE        ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10

612         KK  RN22B2
613         RS       1   FLOW       0
614         RC    0.03    0.02    0.03     737  0.0054
615         RX       0       1      34      39      79      84     114     115
616         RY       8       3       2       0       0       2       3       8
            *
            *

617         KK   N22A8   BASIN
618         BA    .023
619         LG    0.26    0.35    2.65    1.41      27
620         UC   0.596   0.592
621         UA       0     5.0    16.0    30.0    65.0    77.0    84.0    90.0    94.0    97.0
622         UA     100
            *
            *
            * DDM   ***** Preserved *****

623         KK  CN22A8
624         HC       2
            *
            *
            * *** ROUTE RN22A8 ************************************************************
            * ROUTE RN22A8 IS 388 FT WITH A SLOPE OF 0.0052
            * CROSS SECTION IS A SUBDIVISION ROAD
            *
            * DDM   ***** Preserved *****

625         KK  RN22A8
626         RD
627         RC    0.03    0.02    0.03     388  0.0052
628         RX       0       1      34      39      79      84     114     115
629         RY       8       4       3       0       0       3       4       8
            *
            *

630         KK   N22A6   BASIN
631         BA    .020
632         LG    0.24    0.35    2.65    1.39      29
633         UC   0.592   0.626
634         UA       0     5.0    16.0    30.0    65.0    77.0    84.0    90.0    94.0    97.0
```

```
 635          UA     100
              *
              *

 636          KK   N22A5   BASIN
 637          BA    .016
 638          LG    0.25    0.35    2.65    1.40      30
 639          UC   0.738   0.803
 640          UA       0     5.0    16.0    30.0    65.0    77.0    84.0    90.0    94.0    97.0
 641          UA     100
              *
              *
              * DDM   ***** Preserved *****
1                                          HEC-1 INPUT                                                    PAGE 26

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

 642          KK  CN22A5
 643          HC       3
              *
              * *** STORAGE PONDING AT VIA MONTOYA AND 85TH AVE

 644          KK   S22A6
 645          KO       3                                21
 646          RS       1    STOR       0
 647          SQ       0      42     131     911
 648          SE  285.39  286.29  286.49  286.99
 649          SA       0   .0293   .0467   .1022
 650          SE  285.39     286   286.5     287
              *
              *
              * *** ROUTE RN22A5 ************************************************************
              * ROUTE RN22A5 IS 1348 FT WITH A SLOPE OF 0.0045
              * CROSS SECTION IS A RURAL ROAD
              *
              * DDM   ***** Preserved *****

 651          KK  RN22A5
 652          RS       5   FLOW       0
 653          RC    0.04    0.03    0.04    1348  0.0045
 654          RX       0     300     310     320     340     345     415     416
 655          RY       4       3       1       3       3       4       5       8
              *
              *

 656          KK   N22A2   BASIN
 657          BA    .009
 658          LG    0.33    0.35    2.65    1.28       6
 659          UC   0.833   1.493
 660          UA       0     5.0    16.0    30.0    65.0    77.0    84.0    90.0    94.0    97.0
 661          UA     100
              *
              *

 662          KK   N22A3   BASIN
 663          BA    .032
 664          LG    0.35    0.35    4.35    0.40       0
 665          UC   0.500   0.433
 666          UA       0     5.0    16.0    30.0    65.0    77.0    84.0    90.0    94.0    97.0
 667          UA     100
              *
              *
              *
              *
              * DDM   ***** Preserved *****
1                                          HEC-1 INPUT                                                    PAGE 27

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

 668          KK  C22AX1
 669          HC       3
              *
              * *** STORAGE PRMROS ***********************************************************
              *  DETENTION POND FOR PRMROS SCHOOL
              * 30' WEIR (50' WIDE) (DRAINAGE REPORT), WEIR ELEVATION = 1280.39
              *    WEIR COEFF = 2.7
              * A 4'X 8' BOX CULVERT DRAINS THE SUBBASIN
              *
```

```
670          KK  PRMROS
671          KO       3
672          RS       1    STOR       0
673          SQ       0      48      96     192     252     360     360
674          SE    1277    1278    1279    1280    1281    1282    1283
675          SV       0   0.012   0.038   0.079   0.132   0.199     0.2
676          SE    1277    1278    1279    1280    1281    1282    1283
             *
             *
             * *** ROUTE R22AX1 ************************************************************
             * ROUTE R22AX1 IS 464 FT WITH A SLOPE OF 0.0037
             * CROSS SECTION IS THE CHANNEL ON THE SOUTH SIDE OF DEER VALLEY ROAD
             *
             * DDM   ***** Preserved *****

677          KK  R22AX1
678          RS       1   FLOW       0
679          RC    0.04    0.03    0.04     464  0.0037
680          RX       0       1      27      36      62     100     150     500
681          RY       8       4       1       1       4       4       5       6
             *
             *
             *

682          KK   N22A1   BASIN
683          BA    .020
684          LG    0.28    0.27    8.80    0.07      14
685          UC   0.346   0.358
686          UA       0     5.0    16.0    30.0    65.0    77.0    84.0    90.0    94.0    97.0
687          UA     100
             *
             *
             * DDM   ***** Preserved *****

688          KK  C22AX2
689          HC       2
             *
             *
             * *** ROUTE R22AX2 ************************************************************
             * ROUTE R22AX2 IS 283 FT WITH A SLOPE OF 0.0025
             * CROSS SECTION IS THE CHANNEL ON THE SOUTH SIDE OF DEER VALLEY ROAD
             *
             * DDM   ***** Preserved *****
                                          HEC-1 INPUT                                                    PAGE 28
LINE         ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10

690          KK  R22AX2
691          RS       1   FLOW      -1
692          RC    0.04    0.03    0.04     283  0.0025
693          RX       0       1      27      36      62     100     150     500
694          RY       8       4       1       1       4       4       5       6
             *
             *
             * *** DIVERSION RECOVER D11I12  ********************************************
             * RECOVER FLOWS FROM D11I12

695          KK  N11I12
696          DR  11I12I
             *
             *
             * *** ROUTE R12E ***********************************************************
             * ROUTE R12E IS 1505 FT WITH A SLOPE OF 0.004
             * CROSS SECTION IS OVERLAND FLOW
             *
             * DDM   ***** Preserved *****

697          KK    R12E
698          RS      10   FLOW       0
699          RC    0.05    0.05    0.05    1505   0.004
700          RX       0     200     250     260     270     280     330     530
701          RY       3       2       1       0       0       1       2       8
             *
             *

702          KK  N11I13   BASIN
703          BA    .027
704          LG    0.32    0.35    2.65    1.31       8
705          UC   0.750   0.728
706          UA       0     5.0    16.0    30.0    65.0    77.0    84.0    90.0    94.0    97.0
```

```
 707          UA     100
              *
              *
              * DDM   ***** Preserved *****

 708          KK  C22AX3
 709          HC       3
              *
              * *** STORAGE AT DEER VALLEY ROAD
              *

 710          KK  S22AX3
 711          KO       3
 712          RS       1    STOR       0
 713          SQ       0      88     661
 714          SE  277.84  278.54  278.74
 715          SA       0   .7877
 716          SE  277.84   278.5
              *
              *
              * *** ROUTE R22AX3 ************************************************************
              * ROUTE R22AX3 IS 512 FT WITH A SLOPE OF 0.0025
              * CROSS SECTION IS THE CHANNEL ON THE SOUTH SIDE OF DEER VALLEY ROAD
              *
              * DDM   ***** Preserved *****
1                                          HEC-1 INPUT                                                    PAGE 29

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

 717          KK  R22AX3
 718          RS       1   FLOW       0
 719          RC    0.04    0.03    0.04     512  0.0025
 720          RX       0       1      27      36      62     100     150     500
 721          RY       8       4       1       1       4       4       5       6
              *
              *

 722          KK   N22A4   BASIN
 723          BA    .023
 724          LG    0.10    0.35    2.65    1.50      55
 725          UC   0.296   0.340
 726          UA       0     5.0    16.0    30.0    65.0    77.0    84.0    90.0    94.0    97.0
 727          UA     100
              *
              *
              *

 728          KK   N11I1   BASIN
 729          BA    .038
 730          LG    0.31    0.35    2.65    1.37      13
 731          UC   0.967   1.352
 732          UA       0     5.0    16.0    30.0    65.0    77.0    84.0    90.0    94.0    97.0
 733          UA     100
              *
              *
              *

 734          KK   N11I5   BASIN
 735          BA    .014
 736          LG    0.32    0.35    2.65    1.33      10
 737          UC   0.896   1.736
 738          UA       0     5.0    16.0    30.0    65.0    77.0    84.0    90.0    94.0    97.0
 739          UA     100
              *
              *

 740          KK   N22A7   BASIN
 741          BA    .010
 742          LG    0.25    0.32    7.60    0.11      30
 743          UC   0.267   0.246
 744          UA       0     5.0    16.0    30.0    65.0    77.0    84.0    90.0    94.0    97.0
 745          UA     100
              *
              * *** STORAGE AT VIA MONTOYA AND 83RD AVE
              *

 746          KK  SN22A7
 747          KO       3
 748          RS       1    STOR       0
 749          SQ       0       9      24     169     586
```

```
750          SE  286.59  287.29  287.59  287.89  288.19
751          SA       0    .026   .1385
752          SE  286.59   287.5     288
             *
             *
             * DDM   ***** Preserved *****
```



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

753          KK  DUMMY3
754          HC       4
             *
755          ZZ
```

1

SCHEMATIC DIAGRAM OF STREAM NETWORK

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

            (.) CONNECTOR        (<---) RETURN OF DIVERTED OR PUMPED FLOW

   20        N11P1
                V
                V
   39       RN11P1
                V
                V
   44       SRN11P
                .
                .
   51           .       N11L5
                .           .
                .           .
   57           .           .       N11L1
                .           .           .
                .           .           .
   64           .           .           .-------> N11L1I
   63           .           .      DN11L1
                .           .           V
                .           .           V
   67           .           .      RN11LE
                .           .           .
                .           .           .
   72       CN11L5......................
                .
                .
   75           .-------> N11L5I
   74       DN11L5
                V
                V
   78       RN11L5
                .
                .
   83           .      N11I31
                .           .
                .           .
            C11I31............
                V
                V
   91       R11I31
                .
                .
   96           .      N11I32
                .           V
                .           V
  102           .      R11I32
                .           .
                .           .
  107           .           .      N11I23
                .           .           .
                .           .           .
  113       C11I23......................
                V
                V
  115       R11I23
                .
                .
  120           .      N11I14
                .           .
                .           .
  126       C11I14............
                V
                V
  128       R11I14
                .
                .
  133           .       N11I4
                .           .
                .           .
  139       CN11I4............
                .
                .
                .      N11I24
                .           V
                .           V
```

```
147          .      R11I24
             .           .
             .           .
152          .           .       N11I3
             .           .           .
             .           .           .
             .      CN11I3............
             .           V
             .           V
160          .      RN11I3
             .           .
             .           .
165          .           .       N11I2
             .           .           .
             .           .           .
171          .      CN11I2............
             .           .
             .           .
173          .           .       N11L2
             .           .           .
             .           .           .
180          .           .           .-------> N11L2I
179          .           .      DN11L2
             .           .           V
             .           .           V
183          .           .      RN11L2
             .           .           .
             .           .           .
188          .           .           .      N11I33
             .           .           .           .
             .           .           .           .
194          .           .      C11I33............
             .           .           .
             .           .           .
197          .           .           .-------> 11I33I
196          .           .      D11I33
             .           .           V
             .           .           V
200          .           .       RI33S
             .           .           .
             .           .           .
             .           .           .      N11I27
             .           .           .           .
             .           .           .           .
211          .           .           .           .      N11I26
             .           .           .           .           .
             .           .           .           .           .
217          .           .      C11I26........................
             .           .           V
             .           .           V
219          .           .      R11I26
             .           .           .
             .           .           .
224          .           .           .      N11I22
             .           .           .           .
             .           .           .           .
230          .           .      C11I22............
             .           .           V
             .           .           V
232          .           .      S11I22
             .           .           V
             .           .           V
239          .           .      R11I22
             .           .           .
             .           .           .
244          .           .           .       N11I6
             .           .           .           .
             .           .           .           .
250          .           .      C11I16............
             .           .           V
             .           .           V
252          .           .      RN11I6
             .           .           .
             .           .           .
257          .           .           .       N11I7
             .           .           .           .
             .           .           .           .
263          .           .      CN11I7............
             .           .           .
             .           .           .
265          .           .           .       N11L3
```

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                .          .          .          .
                .          .          .          .
272             .          .          .          .-------> N11L3I
271             .          .          .     DN11L3
                .          .          .          V
                .          .          .          V
                .          .          .     RN11L3
                .          .          .          .
                .          .          .          .
280             .          .          .          .     N11I30
                .          .          .          .          .
                .          .          .          .          .
286             .          .          .          .          .      N11I28
                .          .          .          .          .           .
                .          .          .          .          .           .
293             .          .          .          .          .           .<-------  11I33I
292             .          .          .          .          .      D11I33
                .          .          .          .          .           V
                .          .          .          .          .           V
294             .          .          .          .          .       RI33E
                .          .          .          .          .           .
                .          .          .          .          .           .
299             .          .          .     C11I30.....................................
                .          .          .          V
                .          .          .          V
301             .          .          .     R11I30
                .          .          .          .
                .          .          .          .
306             .          .          .          .     N11I29
                .          .          .          .          V
                .          .          .          .          V
312             .          .          .          .     R11I29
                .          .          .          .          .
                .          .          .          .          .
317             .          .          .          .          .      N11I25
                .          .          .          .          .           .
                .          .          .          .          .           .
323             .          .          .     C11I25........................
                .          .          .          V
                .          .          .          V
325             .          .          .     R11I25
                .          .          .          .
                .          .          .          .
330             .          .          .          .      N11L4
                .          .          .          .          .
                .          .          .          .          .
337             .          .          .          .          .-------> N11L4I
336             .          .          .          .     DN11L4
                .          .          .          .          V
                .          .          .          .          V
340             .          .          .          .     RN11L4
                .          .          .          .          .
                .          .          .          .          .
345             .          .          .          .          .       N22B7
                .          .          .          .          .           .
                .          .          .          .          .           .
351             .          .          .          .     CN22B7............
                .          .          .          .          V
                .          .          .          .          V
353             .          .          .          .     RN22B7
                .          .          .          .          .
                .          .          .          .          .
358             .          .          .          .          .       N22B4
                .          .          .          .          .           .
                .          .          .          .          .           .
364             .          .          .          .     CN22B4............
                .          .          .          .          V
                .          .          .          .          V
366             .          .          .          .     RN22B4
                .          .          .          .          .
                .          .          .          .          .
371             .          .          .          .          .       N22B1
                .          .          .          .          .           .
                .          .          .          .          .           .
377             .          .          .          .     CN22B1............
                .          .          .          .          V
                .          .          .          .          V
379             .          .          .          .     RN22B1
                .          .          .          .          .
                .          .          .          .          .
384             .          .          .          .          .      N11I20
```

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390                                                                  N11I21
                                                                        .
                                                                        .
                                C11I20.....................................
                                     V
                                     V
398                             S11I20
                                     V
                                     V
405                             R11I20
                                     .
                                     .
410                                  .      N11I11
                                     .           .
                                     .           .
416                             C11I11............
                                     V
                                     V
418                             R11I11
                                     .
                                     .
423                                  .      N11I12
                                     .           .
                                     .           .
429                             C11I12............
                                     .
                                     .
432                                  .-------> 11I12I
431                             D11I12
                                     V
                                     V
435                              RI12S
                                     .
                                     .
440                                  .       N11I9
                                     .           .
                                     .           .
446                             CN11I9............
                                     .
                                     .
                                     .      N11I10
                                     .           V
                                     .           V
454                                  .      R11I10
                                     .           .
                                     .           .
459                                  .           .       N11I8
                                     .           .          .
                                     .           .          .
465                                  .      CN11I8............
                                     .           .
                                     .           .
467                 DUMMY.............................................
                        V
                        V
469                 SDUMMY
                        .
                        .
476                     .       N11P2
                        .           .
                        .           .
483                     .           .-------> N11P2I
482                     .      DN11P2
                        .           V
                        .           V
486                     .      RN11PS
                        .           .
                        .           .
491                     .           .       N21I1
                        .           .           .
                        .           .           .
497                     .      CN21I1............
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500                     .           .-------> N21I1I
'99                     .      DN21I1
                        .           V
                        .           V
503                     .      RN21I1
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508             .           .       N22B8
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1               .      CN22B8............
                .           V
                .           V
516             .      RN22B8
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                .           .
521             .           .       N22B5
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                .           .           .
527             .      CN22B5............
                .           V
                .           V
529             .      RN22B5
                .           .
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534             .           .       N22B2
                .           .           .
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541             .           .           .<-------  N11P2I
540             .           .       DN11P
                .           .           V
                .           .           V
542             .           .       R11PE
                .           .           .
                .           .           .
547             .           .           .       N21I2
                .           .           .           .
                .           .           .           .
553             .           .      CN21I2............
                .           .           .
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556             .           .           .------->  N21I2I
555             .           .      DN21I2
                .           .           V
                .           .           V
559             .           .      RN21I2
                .           .           .
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564             .           .           .       N22B9
                .           .           .           .
                .           .           .           .
570             .           .      CN22B9............
                .           .           V
                .           .           V
572             .           .      RN22B9
                .           .           .
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577             .           .           .       N22B6
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583             .           .      CN22B6............
                .           .           V
                .           .           V
585             .           .      RN22B6
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590             .           .           .       N22B3
                .           .           .           .
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596             .           .      CN22B3............
                .           .           V
                .           .           V
598             .           .      RN22B3
                .           .           .
                .           .           .
603             .      CN22B2........................
                .           V
                .           V
605             .      S22B2
                .           V
                .           V
612             .      RN22B2
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                .           .       N22A8
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623          CN22A8............
                  V
                  V
625          RN22A8
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630                  N22A6
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636                      .      N22A5
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642          CN22A5......................
                  V
                  V
644           S22A6
                  V
                  V
651          RN22A5
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                  .
656                  N22A2
                      .
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662                      .      N22A3
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668          C22AX1......................
                  V
                  V
670          PRMROS
                  V
                  V
677          R22AX1
                  .
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682                  N22A1
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688          C22AX2............
                  V
                  V
--           R22AX2
                  .
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696                      .<-------  11I12I
695                  N11I12
                      .
                      .
697                   R12E
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                      .
702                      .      N11I13
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708          C22AX3......................
                  V
                  V
710          S22AX3
                  V
                  V
717          R22AX3
                  .
                  .
722                  N22A4
                      .
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728                      .      N11I1
                         .          .
                         .          .
734                      .          .      N11I5
                         .          .          .
                         .          .          .
740                      .          .          .      N22A7
                         .          .          .          V
                         .          .          .          V
'6                       .          .          .     SN22A7
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                         .          .          .          .
-755                 DUMMY3...................................
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(***) RUNOFF ALSO COMPUTED AT THIS LOCATION

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	N11P1	0.	5.67	0.	0.	0.	0.12		
ROUTED TO	RN11P1	0.	5.92	0.	0.	0.	0.12	0.00	5.92
ROUTED TO	SRN11P	0.	5.92	0.	0.	0.	0.12	312.68	5.92
HYDROGRAPH AT	N11L5	0.	8.42	0.	0.	0.	0.07		
HYDROGRAPH AT	N11L1	2.	8.33	1.	0.	0.	0.07		
DIVERSION TO	N11L1I	1.	8.33	1.	0.	0.	0.07		
HYDROGRAPH AT	DN11L1	0.	8.33	0.	0.	0.	0.07		
ROUTED TO	RN11LE	0.	8.42	0.	0.	0.	0.07	0.01	8.42
3 COMBINED AT	CN11L5	1.	8.33	1.	0.	0.	0.26		
DIVERSION TO	N11L5I	0.	8.33	0.	0.	0.	0.26		
HYDROGRAPH AT	DN11L5	1.	8.33	1.	0.	0.	0.26		
ROUTED TO	RN11L5	1.	8.50	1.	0.	0.	0.26	0.01	8.50
HYDROGRAPH AT	N11I31	0.	8.17	0.	0.	0.	0.02		
2 COMBINED AT	C11I31	1.	8.42	1.	0.	0.	0.28		
ROUTED TO	R11I31	1.	8.50	1.	0.	0.	0.28	0.02	8.58
HYDROGRAPH AT	N11I32	0.	8.17	0.	0.	0.	0.04		
ROUTED TO	R11I32	0.	8.33	0.	0.	0.	0.04	0.00	8.33
HYDROGRAPH AT	N11I23	2.	8.17	2.	1.	0.	0.04		
3 COMBINED AT	C11I23	4.	8.33	3.	1.	1.	0.37		
ROUTED TO	R11I23	4.	8.50	3.	1.	1.	0.37	0.05	8.50
HYDROGRAPH AT	N11I14	1.	8.33	1.	0.	0.	0.03		
2 COMBINED AT	C11I14	5.	8.42	3.	1.	1.	0.39		
ROUTED TO	R11I14	5.	8.67	3.	1.	1.	0.39	0.05	8.67
HYDROGRAPH AT	N11I4	1.	8.17	0.	0.	0.	0.02		
2 COMBINED AT	CN11I4	5.	8.58	4.	1.	1.	0.42		

	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	N11I24	1.	8.17	1.	0.	0.	0.01		
	ROUTED TO									
+		R11I24	1.	8.42	1.	0.	0.	0.01		
+									0.01	8.42
	HYDROGRAPH AT									
+		N11I3	0.	8.17	0.	0.	0.	0.02		
	2 COMBINED AT									
+		CN11I3	1.	8.33	1.	0.	0.	0.03		
	ROUTED TO									
+		RN11I3	1.	8.50	1.	0.	0.	0.03		
+									0.02	8.50
	HYDROGRAPH AT									
+		N11I2	1.	8.17	1.	0.	0.	0.03		
	2 COMBINED AT									
+		CN11I2	2.	8.42	1.	1.	0.	0.06		
	HYDROGRAPH AT									
+		N11L2	0.	5.67	0.	0.	0.	0.01		
	DIVERSION TO									
+		N11L2I	0.	5.67	0.	0.	0.	0.01		
	HYDROGRAPH AT									
+		DN11L2	0.	5.67	0.	0.	0.	0.01		
	ROUTED TO									
+		RN11L2	0.	5.75	0.	0.	0.	0.01		
+									0.00	5.75
	HYDROGRAPH AT									
+		N11I33	0.	8.00	0.	0.	0.	0.00		
	2 COMBINED AT									
+		C11I33	0.	5.75	0.	0.	0.	0.01		
	DIVERSION TO									
		11I33I	0.	5.75	0.	0.	0.	0.01		
	HYDROGRAPH AT									
+		D11I33	0.	5.75	0.	0.	0.	0.01		
	ROUTED TO									
+		RI33S	0.	5.83	0.	0.	0.	0.01		
+									0.00	5.83
	HYDROGRAPH AT									
+		N11I27	0.	8.08	0.	0.	0.	0.01		
	HYDROGRAPH AT									
+		N11I26	0.	8.17	0.	0.	0.	0.00		
	3 COMBINED AT									
+		C11I26	1.	8.17	0.	0.	0.	0.03		
	ROUTED TO									
+		R11I26	1.	8.42	0.	0.	0.	0.03		
+									0.04	8.50
	HYDROGRAPH AT									
+		N11I22	1.	5.67	1.	0.	0.	0.04		
	2 COMBINED AT									
+		C11I22	1.	8.17	1.	0.	0.	0.07		
	ROUTED TO									
+		S11I22	1.	8.17	1.	0.	0.	0.07		
+									293.52	8.17
	ROUTED TO									
+		R11I22	1.	8.33	1.	0.	0.	0.07		
+									0.01	8.33
	HYDROGRAPH AT									
+		N11I6	1.	8.25	1.	0.	0.	0.03		
	2 COMBINED AT									
		C11I16	2.	8.33	2.	1.	0.	0.10		
	ROUTED TO									

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
	RN11I6	2.	8.42	2.	1.	0.	0.10	0.02	8.42
HYDROGRAPH AT	N11I7	1.	8.17	0.	0.	0.	0.02		
2 COMBINED AT	CN11I7	3.	8.42	2.	1.	0.	0.12		
HYDROGRAPH AT	N11L3	2.	8.17	1.	0.	0.	0.06		
DIVERSION TO	N11L3I	0.	8.17	0.	0.	0.	0.06		
HYDROGRAPH AT	DN11L3	2.	8.17	1.	0.	0.	0.06		
ROUTED TO	RN11L3	2.	8.25	1.	0.	0.	0.06	0.01	8.25
HYDROGRAPH AT	N11I30	0.	5.67	0.	0.	0.	0.02		
HYDROGRAPH AT	N11I28	1.	8.17	0.	0.	0.	0.02		
HYDROGRAPH AT	D11I33	0.	5.75	0.	0.	0.	0.00		
ROUTED TO	RI33E	0..	5.92	0.	0.	0.	0.00	0.00	5.92
4 COMBINED AT	C11I30	3.	8.17	2.	1.	0.	0.10		
ROUTED TO	R11I30	3.	8.33	2.	1.	0.	0.10	0.04	8.33
HYDROGRAPH AT	N11I29	0.	5.67	0.	0.	0.	0.01		
ROUTED TO	R11I29	0.	6.00	0.	0.	0.	0.01	0.00	6.00
HYDROGRAPH AT	N11I25	1.	5.58	0.	0.	0.	0.02		
3 COMBINED AT	C11I25	3.	8.17	2.	1.	0.	0.13		
ROUTED TO	R11I25	3.	8.42	2.	1.	0.	0.13	0.19	8.42
HYDROGRAPH AT	N11L4	0.	8.08	0.	0.	0.	0.01		
DIVERSION TO	N11L4I	0.	8.08	0.	0.	0.	0.01		
HYDROGRAPH AT	DN11L4	0.	8.08	0.	0.	0.	0.01		
ROUTED TO	RN11L4	0.	8.25	0.	0.	0.	0.01	0.02	8.33
HYDROGRAPH AT	N22B7	0.	5.67	0.	0.	0.	0.01		
2 COMBINED AT	CN22B7	0.	8.08	0.	0.	0.	0.02		
ROUTED TO	RN22B7	0.	8.50	0.	0.	0.	0.02	0.03	8.50
HYDROGRAPH AT	N22B4	1.	5.75	0.	0.	0.	0.04		
2 COMBINED AT									

	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
+		CN22B4	1.	8.17	1.	0.	0.	0.06		
	ROUTED TO	RN22B4	1.	8.50	1.	0.	0.	0.06		
+									0.08	8.50
	HYDROGRAPH AT									
+		N22B1	1.	5.67	0.	0.	0.	0.02		
	2 COMBINED AT									
+		CN22B1	2.	8.33	1.	0.	0.	0.08		
	ROUTED TO									
+		RN22B1	2.	8.33	1.	0.	0.	0.08		
+									0.43	8.33
	HYDROGRAPH AT									
+		N11I20	0.	5.58	0.	0.	0.	0.01		
	HYDROGRAPH AT									
+		N11I21	1.	8.17	0.	0.	0.	0.02		
	4 COMBINED AT									
+		C11I20	5.	8.33	4.	1.	1.	0.24		
	ROUTED TO									
+		S11I20	5.	8.33	4.	1.	1.	0.24		
+									291.08	8.33
	ROUTED TO									
+		R11I20	5.	8.42	4.	1.	1.	0.24		
+									0.04	8.42
	HYDROGRAPH AT									
+		N11I11	1.	8.17	1.	0.	0.	0.02		
	2 COMBINED AT									
+		C11I11	6.	8.33	5.	2.	1.	0.26		
	ROUTED TO									
+		R11I11	6.	8.50	5.	2.	1.	0.26		
	HYDROGRAPH AT									
		N11I12	1.	8.08	1.	0.	0.	0.02		
	2 COMBINED AT									
+		C11I12	7.	8.42	5.	2.	1.	0.28		
	DIVERSION TO									
+		11I12I	0.	8.42	0.	0.	0.	0.28		
	HYDROGRAPH AT									
+		D11I12	7.	8.42	5.	2.	1.	0.28		
	ROUTED TO									
+		RI12S	7.	8.58	5.	2.	1.	0.28		
+									0.06	8.58
	HYDROGRAPH AT									
+		N11I9	0.	8.17	0.	0.	0.	0.01		
	2 COMBINED AT									
+		CN11I9	8.	8.58	6.	2.	1.	0.29		
	HYDROGRAPH AT									
+		N11I10	1.	8.25	0.	0.	0.	0.02		
	ROUTED TO									
+		R11I10	1.	8.58	0.	0.	0.	0.02		
+									0.04	8.67
	HYDROGRAPH AT									
+		N11I8	0.	8.08	0.	0.	0.	0.01		
	2 COMBINED AT									
+		CN11I8	1.	8.42	1.	0.	0.	0.04		
	5 COMBINED AT									
+		DUMMY	18.	8.50	13.	5.	3.	0.93		
	ROUTED TO									
+		SDUMMY	18.	8.50	13.	5.	3.	0.93		
									277.97	8.58
	HYDROGRAPH AT									
+		N11P2	0.	0.08	0.	0.	0.	0.26		

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
DIVERSION TO	N11P2I	0.	0.08	0.	0.	0.	0.26		
HYDROGRAPH AT	DN11P2	0.	0.08	0.	0.	0.	0.26		
ROUTED TO	RN11PS	0.	0.08	0.	0.	0.	0.26		
HYDROGRAPH AT	N21I1	1.	8.25	0.	0.	0.	0.11		
2 COMBINED AT	CN21I1	1.	8.25	0.	0.	0.	0.38		
DIVERSION TO	N21I1I	0.	8.25	0.	0.	0.	0.38		
HYDROGRAPH AT	DN21I1	1.	8.25	0.	0.	0.	0.38		
ROUTED TO	RN21I1	1.	8.42	0.	0.	0.	0.38	0.01	8.42
HYDROGRAPH AT	N22B8	0.	5.67	0.	0.	0.	0.02		
2 COMBINED AT	CN22B8	1.	8.33	1.	0.	0.	0.39		
ROUTED TO	RN22B8	1.	8.50	1.	0.	0.	0.39	0.01	8.50
HYDROGRAPH AT	N22B5	0.	8.08	0.	0.	0.	0.03		
2 COMBINED AT	CN22B5	1.	8.42	1.	0.	0.	0.42		
ROUTED TO	RN22B5	1.	8.50	1.	0.	0.	0.42	0.01	8.50
HYDROGRAPH AT	N22B2	1.	5.67	0.	0.	0.	0.02		
HYDROGRAPH AT	DN11P	0.	0.08	0.	0.	0.	0.00		
ROUTED TO	R11PE	0.	0.08	0.	0.	0.	0.00		
HYDROGRAPH AT	N21I2	0.	8.17	0.	0.	0.	0.06		
2 COMBINED AT	CN21I2	0.	8.17	0.	0.	0.	0.06		
DIVERSION TO	N21I2I	0.	8.17	0.	0.	0.	0.06		
HYDROGRAPH AT	DN21I2	0.	8.17	0.	0.	0.	0.06		
ROUTED TO	RN21I2	0.	8.33	0.	0.	0.	0.06	0.02	8.42
HYDROGRAPH AT	N22B9	0.	5.58	0.	0.	0.	0.02		
2 COMBINED AT	CN22B9	0.	8.25	0.	0.	0.	0.08		
ROUTED TO	RN22B9	0.	8.67	0.	0.	0.	0.08	0.02	8.67
HYDROGRAPH AT	N22B6	0.	8.17	0.	0.	0.	0.04		
2 COMBINED AT	CN22B6	1.	8.50	0.	0.	0.	0.11		

	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
	ROUTED TO	RN22B6	1.	8.67	0.	0.	0.	0.11	0.05	8.75
+	HYDROGRAPH AT	N22B3	0.	8.00	0.	0.	0.	0.01		
+	2 COMBINED AT	CN22B3	1.	8.58	1.	0.	0.	0.12		
+	ROUTED TO	RN22B3	1.	8.67	1.	0.	0.	0.12	0.44	8.75
+	3 COMBINED AT	CN22B2	2.	8.42	2.	1.	0.	0.57		
+	ROUTED TO	S22B2	2.	8.42	2.	1.	0.	0.57	291.27	8.42
+	ROUTED TO	RN22B2	2.	8.50	2.	1.	0.	0.57	0.02	8.50
+	HYDROGRAPH AT	N22A8	1.	8.17	1.	0.	0.	0.02		
+	2 COMBINED AT	CN22A8	3.	8.33	2.	1.	1.	0.59		
+	ROUTED TO	RN22A8	3.	8.42	2.	1.	1.	0.59		
+	HYDROGRAPH AT	N22A6	1.	8.17	1.	0.	0.	0.02		
+	HYDROGRAPH AT	N22A5	1.	8.25	1.	0.	0.	0.02		
+	3 COMBINED AT	CN22A5	5.	8.33	4.	1.	1.	0.63		
+	ROUTED TO	S22A6	5.	8.33	4.	1.	1.	0.63	285.50	8.33
+	ROUTED TO	RN22A5	5.	8.50	4.	1.	1.	0.63	1.80	8.50
+	HYDROGRAPH AT	N22A2	0.	8.33	0.	0.	0.	0.01		
+	HYDROGRAPH AT	N22A3	0.	0.08	0.	0.	0.	0.03		
+	3 COMBINED AT	C22AX1	5.	8.50	4.	1.	1.	0.67		
+	ROUTED TO	PRMROS	5.	8.50	4.	1.	1.	0.67	1277.11	8.50
+	ROUTED TO	R22AX1	5.	8.58	4.	1.	1.	0.67	1.33	8.58
+	HYDROGRAPH AT	N22A1	1.	10.58	1.	0.	0.	0.02		
+	2 COMBINED AT	C22AX2	6.	8.50	4.	2.	1.	0.69		
+	ROUTED TO	R22AX2	6.	8.58	4.	2.	1.	0.69	1.40	8.58
+	HYDROGRAPH AT	N11I12	0.	0.08	0.	0.	0.	0.00		
+	ROUTED TO	R12E	0.	0.08	0.	0.	0.	0.00		
	HYDROGRAPH AT	N11I13	0.	8.25	0.	0.	0.	0.03		

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
3 COMBINED AT	C22AX3	6.	8.50	5.	2.	1.	0.72		
ROUTED TO	S22AX3	6.	8.58	5.	2.	1.	0.72	277.89	8.58
ROUTED TO	R22AX3	6.	8.58	5.	2.	1.	0.72	1.41	8.58
HYDROGRAPH AT	N22A4	3.	5.58	2.	1.	0.	0.02		
HYDROGRAPH AT	N11I1	1.	8.50	1.	0.	0.	0.04		
HYDROGRAPH AT	N11I5	0.	8.58	0.	0.	0.	0.01		
HYDROGRAPH AT	N22A7	1.	5.58	0.	0.	0.	0.01		
ROUTED TO	SN22A7	1.	5.58	0.	0.	0.	0.01	286.65	5.58
4 COMBINED AT	DUMMY3	4.	5.58	3.	1.	1.	0.09		

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