DRAFT TECHNICAL SUPPORT DATA NOTEBOOK

FOR

Sonoran Desert Drive at
Skunk Creek
Phoenix, Arizona

CLOMR Application

Prepared for:

City of Phoenix

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5th Floor
Phoenix, AZ 85003

Prepared By:

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EXPIRES: 06-30-16

June 2014

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1.0 INTRODUCTION

1.1 Purpose

The City of Phoenix (City) is preparing to construct Sonoran Desert Drive from North Valley Parkway to the Interstate 17 (I-17) and Loop 303 traffic interchange in northern Phoenix. Sonoran Desert Drive crosses Skunk Creek east of the traffic interchange. The proposed Sonoran Desert Drive will be crossing the 100-year Federal Emergency Management Agency (FEMA) effective floodplain and floodway with a bridge. Properties near the Skunk Creek crossing are vacant. A majority of the properties are owned by the Arizona State Land Department (ASLD). The purpose of this study is to document the effects of constructing the Sonoran Desert Drive bridge across the FEMA floodway and floodplains.

1.2 Authority

The City retained Hunter Contracting for the design-build construction portion of Sonoran Desert Drive. Kimley-Horn is a subconsultant to Hunter Contracting to prepare the hydraulic analysis and Conditional Letter of Map Revision (CLOMR) application. This analysis was conducted to revise the hydraulics and floodplain mapping for Skunk Creek based on the bridge construction. Contact information for this study is listed below:

Kimley-Horn
Zach Schmidt, P.E., CFM
7740 N. 16th Street, Suite 300
Phoenix, AZ 85020

City of Phoenix
Hasan Mushtaq, P.E., Ph. D., CFM
200 W. Washington Street
5th Floor
Phoenix, AZ 85003

1.3 Location

The Sonoran Desert Drive crossing over Skunk Creek (the Crossing) is located in North Phoenix in Maricopa County. The proposed project is connecting Sonoran Desert Drive from North Valley Parkway to the I-17 and Loop 303 traffic interchange. The proposed Sonoran Desert Drive alignment will be crossing undeveloped vacant land. A majority of the land is owned by ASLD. More specifically, the Crossing lies within Sections 14 and 23 of Township 5 North, Range 2 East. See **Figure 1** for a Vicinity Map and **Figure 2** for a Location Maps.

Skunk Creek is a major watercourse that flows from north to south in northwestern Phoenix. The Crossing is located in the northern, upstream portion of the watercourse.

1.4 Methodology

1.4.1 Hydrology

The hydrology used for this study is based on the FEMA effective flows for Skunk Creek. The original hydrology was completed as part of Skunk Creek Floodplain Delineation Study (Skunk Creek FDS) completed by Montgomery Watson in March 1996. The effective flows were revised by a Letter of Map Revision (LOMR) completed by Hoskin Engineering Consultants, Inc. in November 2000. The case number for the LOMR is 99-09-592R. The LOMR made a revision to the effective hydrology based on grading that was done within a master planned development named Tramonto. The Tramonto development is located northeast of the I-17 and Carefree Highway traffic interchange. Runoff that was originally being diverted from Skunk Creek was re-directed to Skunk Creek based on grading as part of the Tramonto development. Based on the LOMR (Case No. 99-09-592R), at the Crossing, Skunk Creek conveys 26,700 cfs during the 1-percent annual chance storm event. The improvements made as part of the Crossing do not increase the runoff in Skunk Creek.

1.4.2 Hydraulics

The effective hydraulic model for Skunk Creek was prepared as part of the Skunk Creek FDS. The effective model was revised by the Tramonto LOMR. The effective floodplain limits for Skunk Creek downstream of the LOMR were revised from the Skunk Creek FDS based on the changes to the hydrology. This CLOMR application utilizes cross sections 14.54 through 15.41 for the HEC-2 model from this LOMR. The LOMR used the U.S. Army Corps of Engineers HEC-2 hydraulic modeling program (Version 4.6.2). This CLOMR application also uses HEC-2 (Version 4.6.2).

1.5 Results

Peak discharges from the Tramonto LOMR can be found in **Appendix D**. A summary of the hydraulic results for Skunk Creek can be found in **Section 5.9.2.** Complete hydraulic results are provided in **Appendix E**.

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Figure 1: Vicinity Map

Sonoran Desert Drive
Skunk Creek
May 2014

Project No 191784002

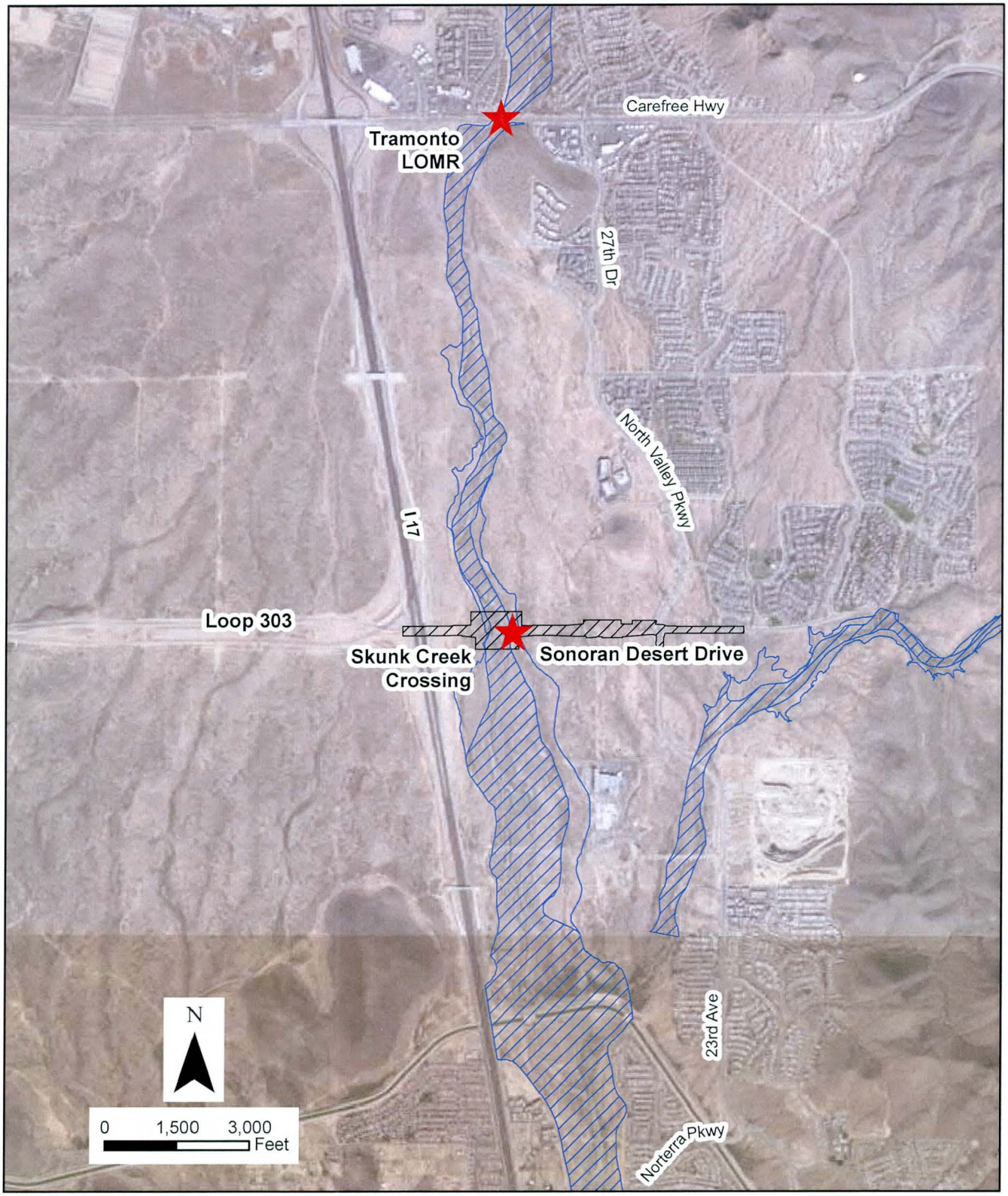

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Figure 2: Location Map

Sonoran Desert Drive
Skunk Creek
May 2014

Project No 191784002

2.0 FEMA FORMS

U.S. DEPARTMENT OF HOMELAND SECURITY
FEDERAL EMERGENCY MANAGEMENT AGENCY

OVERVIEW & CONCURRENCE FORM

O.M.B No. 1660-0016
Expires February 28, 2014

PAPERWORK BURDEN DISCLOSURE NOTICE

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PRIVACY ACT STATEMENT

AUTHORITY: The National Flood Insurance Act of 1968, Public Law 90-448, as amended by the Flood Disaster Protection Act of 1973, Public Law 93-234.

PRINCIPAL PURPOSE(S): This information is being collected for the purpose of determining an applicant's eligibility to request changes to National Flood Insurance Program (NFIP) Flood Insurance Rate Maps (FIRM).

ROUTINE USE(S): The information on this form may be disclosed as generally permitted under 5 U.S.C § 552a(b) of the Privacy Act of 1974, as amended. This includes using this information as necessary and authorized by the routine uses published in DHS/FEMA/NFIP/LOMA-1 National Flood Insurance Program (NFIP); Letter of Map Amendment (LOMA) February 15, 2006, 71 FR 7990.

DISCLOSURE: The disclosure of information on this form is voluntary; however, failure to provide the information requested may delay or prevent FEMA from processing a determination regarding a requested change to a (NFIP) Flood Insurance Rate Maps (FIRM).

A. REQUESTED RESPONSE FROM DHS-FEMA

This request is for a (check one):

☒ CLOMR: A letter from DHS-FEMA commenting on whether a proposed project, if built as proposed, would justify a map revision, or proposed hydrology changes (See 44 CFR Ch. 1, Parts 60, 65 & 72).

☐ LOMR: A letter from DHS-FEMA officially revising the current NFIP map to show the changes to floodplains, regulatory floodway or flood elevations. (See 44 CFR Ch. 1, Parts 60, 65 & 72)

B. OVERVIEW

1. The NFIP map panel(s) affected for all impacted communities is (are):

Community No.	Community Name	State	Map No.	Panel No.	Effective Date
Example: 480301 480287	City of Katy Harris County	TX TX	48473C 48201C	0005D 0220G	02/08/83 09/28/90
040051	City of Phoenix	AZ	04013C	845L	10/16/13
040051	City of Phoenix	AZ	04013C	865L	10/16/13

2. a. Flooding Source: Skunk Creek

   b. Types of Flooding: ☒ Riverine ☐ Coastal ☐ Shallow Flooding (e.g., Zones AO and AH) ☐ Alluvial fan ☐ Lakes ☐ Other (Attach Description)

3. Project Name/Identifier: Sonoran Desert Drive - Skunk Creek

4. FEMA zone designations affected: AE (choices: A, AH, AO, A1-A30, A99, AE, AR, V, V1-V30, VE, B, C, D, X)

5. Basis for Request and Type of Revision:

   a. The basis for this revision request is (check all that apply)

   ☒ Physical Change ☐ Improved Methodology/Data ☐ Regulatory Floodway Revision ☒ Base Map Changes
   ☐ Coastal Analysis ☒ Hydraulic Analysis ☐ Hydrologic Analysis ☐ Corrections
   ☐ Weir-Dam Changes ☐ Levee Certification ☐ Alluvial Fan Analysis ☐ Natural Changes
   ☒ New Topographic Data ☐ Other (Attach Description)

   Note: A photograph and narrative description of the area of concern is not required, but is very helpful during review.

b. The area of revision encompasses the following structures (check all that apply)

Structures: ☐ Channelization ☐ Levee/Floodwall ☒ Bridge/Culvert

☐ Dam ☐ Fill ☐ Other (Attach Description)

6. ☒ Documentation of ESA compliance is submitted (required to initiate CLOMR review). Please refer to the instructions for more information.

C. REVIEW FEE

Has the review fee for the appropriate request category been included? ☒ Yes Fee amount: $4,400

☐ No, Attach Explanation

Please see the DHS-FEMA Web site at http://www.fema.gov/plan/prevent/fhm/frm_fees.shtm for Fee Amounts and Exemptions.

D. SIGNATURE

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

Name: Rick Evans	Company: City of Phoenix	
Mailing Address: 1034 East Madison Street Phoenix, AZ 85034	Daytime Telephone No.: 602 262 4051	Fax No.:
	E-Mail Address: nick.evans@phoenix.gov	
Signature of Requester (required):	Date: 7/10/14	

As the community official responsible for floodplain management, I hereby acknowledge that we have received and reviewed this Letter of Map Revision (LOMR) or conditional LOMR request. Based upon the community's review, we find the completed or proposed project meets or is designed to meet all of the community floodplain management requirements, including the requirements for when fill is placed in the regulatory floodway, and that all necessary Federal, State, and local permits have been, or in the case of a conditional LOMR, will be obtained. For Conditional LOMR requests, the applicant has documented Endangered Species Act (ESA) compliance to FEMA prior to FEMA's review of the Conditional LOMR application. For LOMR requests, I acknowledge that compliance with Sections 9 and 10 of the ESA has been achieved independently of FEMA's process. For actions authorized, funded, or being carried out by Federal or State agencies, documentation from the agency showing its compliance with Section 7(a)(2) of the ESA will be submitted. In addition, we have determined that the land and any existing or proposed structures to be removed from the SFHA are or will be reasonably safe from flooding as defined in 44CFR 65.2(c), and that we have available upon request by FEMA, all analyses and documentation used to make this determination.

Community Official's Name and Title: Hasan Mushtaq, P.E., Ph.D., CFM, Floodplain Manager	Community Name: City of Phoenix	
Mailing Address: 200 West Washington Street Phoenix, AZ 85003	Daytime Telephone No.: 602 262 4026	Fax No.: 602 262 7322
	E-Mail Address: hasan.mushtaq@phoenix.gov	
Community Official's Signature (required):	Date: 7/10/14	

CERTIFICATION BY REGISTERED PROFESSIONAL ENGINEER AND/OR LAND SURVEYOR

This certification is to be signed and sealed by a licensed land surveyor, registered professional engineer, or architect authorized by law to certify elevation information data, hydrologic and hydraulic analysis, and any other supporting information as per NFIP regulations paragraph 65.2(b) and as described in the MT-2 Forms Instructions. All documents submitted in support of this request are correct to the best of my knowledge. I understand that any false statement may be punishable by fine or imprisonment under Title 18 of the United States Code, Section 1001.

Certifier's Name: Zach Schimdt, P.E., CFM	License No.: 50959	Expiration Date: 06/30/2016
Company Name: Kimley-Horn	Telephone No.: 602 906 1116	Fax No.: 602 944 7423
Signature:	Date: 7/10/14	E-Mail Address: zach.schmidt@kimley-horn.com

Ensure the forms that are appropriate to your revision request are included in your submittal.

Form Name and (Number)	Required if ...
☒ Riverine Hydrology and Hydraulics Form (Form 2)	New or revised discharges or water-surface elevations
☒ Riverine Structures Form (Form 3)	Channel is modified, addition/revision of bridge/culverts, addition/revision of levee/floodwall, addition/revision of dam
☐ Coastal Analysis Form (Form 4)	New or revised coastal elevations
☐ Coastal Structures Form (Form 5)	Addition/revision of coastal structure
☐ Alluvial Fan Flooding Form (Form 6)	Flood control measures on alluvial fans

Seal (Optional)

U.S. DEPARTMENT OF HOMELAND SECURITY
FEDERAL EMERGENCY MANAGEMENT AGENCY

RIVERINE HYDROLOGY & HYDRAULICS FORM

O.M.B No. 1660-0016
Expires February 28, 2014

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PRIVACY ACT STATEMENT

AUTHORITY: The National Flood Insurance Act of 1968, Public Law 90-448, as amended by the Flood Disaster Protection Act of 1973, Public Law 93-234.

PRINCIPAL PURPOSE(S): This information is being collected for the purpose of determining an applicant's eligibility to request changes to National Flood Insurance Program (NFIP) Flood Insurance Rate Maps (FIRM).

ROUTINE USE(S): The information on this form may be disclosed as generally permitted under 5 U.S.C § 552a(b) of the Privacy Act of 1974, as amended. This includes using this information as necessary and authorized by the routine uses published in DHS/FEMA/NFIP/LOMA-1 National Flood Insurance Program (NFIP); Letter of Map Amendment (LOMA) February 15, 2006, 71 FR 7990.

DISCLOSURE: The disclosure of information on this form is voluntary; however, failure to provide the information requested may delay or prevent FEMA from processing a determination regarding a requested change to a NFIP Flood Insurance Rate Maps (FIRM).

Flooding Source: Skunk Creek

Note: Fill out one form for each flooding source studied

A. HYDROLOGY

1. Reason for New Hydrologic Analysis (check all that apply)

☒ Not revised (skip to section B) ☐ No existing analysis ☐ Improved data
☐ Alternative methodology ☐ Proposed Conditions (CLOMR) ☐ Changed physical condition of watershed

2. Comparison of Representative 1%-Annual-Chance Discharges

Location	Drainage Area (Sq. Mi.)	Effective/FIS (cfs)	Revised (cfs)

3. Methodology for New Hydrologic Analysis (check all that apply)

☐ Statistical Analysis of Gage Records ☐ Precipitation/Runoff Model → Specify Model: _____
☐ Regional Regression Equations ☐ Other (please attach description)

Please enclose all relevant models in digital format, maps, computations (including computation of parameters), and documentation to support the new analysis.

4. Review/Approval of Analysis

If your community requires a regional, state, or federal agency to review the hydrologic analysis, please attach evidence of approval/review.

5. Impacts of Sediment Transport on Hydrology

Is the hydrology for the revised flooding source(s) affected by sediment transport? ☐ Yes ☐ No

If yes, then fill out Section F (Sediment Transport) of Form 3. If No, then attach your explanation..

B. HYDRAULICS

1. Reach to be Revised

	Description	Cross Section	Water-Surface Elevations (ft.) Effective	Proposed/Revised
Downstream Limit*	SDD, S of Sonoran Desert Drive	14.30	1574.16	1574.16
Upstream Limit*	SDD, N of Sonoran Desert Drive	14.89	1597.00	1597.00

*Proposed/Revised elevations must tie-into the Effective elevations within 0.5 foot at the downstream and upstream limits of revision.

2. Hydraulic Method/Model Used: HEC-2

3. Pre-Submittal Review of Hydraulic Models*

DHS-FEMA has developed two review programs, CHECK-2 and CHECK-RAS, to aid in the review of HEC-2 and HEC-RAS hydraulic models, respectively. We recommend that you review your HEC-2 and HEC-RAS models with CHECK-2 and CHECK-RAS.

4.

Models Submitted	Natural Run		Floodway Run		Datum
Duplicate Effective Model*	File Name: dup_eff.dat	Plan Name:	File Name:	Plan Name:	NGVD29
Corrected Effective Model*	File Name: corr_eff.dat	Plan Name:	File Name:	Plan Name:	NGVD29
Existing or Pre-Project Conditions Model	File Name:	Plan Name:	File Name:	Plan Name:	
Revised or Post-Project Conditions Model	File Name: post_proj.dat	Plan Name:	File Name:	Plan Name:	NGVD29
Other - (attach description)	File Name:	Plan Name:	File Name:	Plan Name:	

* For details, refer to the corresponding section of the instructions.

☒ Digital Models Submitted? (Required)

C. MAPPING REQUIREMENTS

A **certified topographic work map** must be submitted showing the following information (where applicable): the boundaries of the effective, existing, and proposed conditions 1%-annual-chance floodplain (for approximate Zone A revisions) or the boundaries of the 1%- and 0.2%-annual-chance floodplains and regulatory floodway (for detailed Zone AE, AO, and AH revisions); location and alignment of all cross sections with stationing control indicated; stream, road, and other alignments (e.g., dams, levees, etc.); current community easements and boundaries; boundaries of the requester's property; certification of a registered professional engineer registered in the subject State; location and description of reference marks; and the referenced vertical datum (NGVD, NAVD, etc.).

☒ Digital Mapping (GIS/CADD) Data Submitted (preferred)

Topographic Information: One-foot contour mapping

Source: Cooper Aerial Surveys Co Date: July 2013

Accuracy: 1"=40'

Note that the boundaries of the existing or proposed conditions floodplains and regulatory floodway to be shown on the revised FIRM and/or FBFM must tie-in with the effective floodplain and regulatory floodway boundaries. Please attach **a copy of the effective FIRM and/or FBFM**, at the same scale as the original, annotated to show the boundaries of the revised 1%-and 0.2%-annual-chance floodplains and regulatory floodway that tie-in with the boundaries of the effective 1%-and 0.2%-annual-chance floodplain and regulatory floodway at the upstream and downstream limits of the area on revision.

☒ Annotated FIRM and/or FBFM (Required)

D. COMMON REGULATORY REQUIREMENTS*

1. For LOMR/CLOMR requests, do Base Flood Elevations (BFEs) increase? ☐ Yes ☒ No

   a. For CLOMR requests, if either of the following is true, please submit **evidence of compliance with Section 65.12 of the NFIP regulations**:

      - The proposed project encroaches upon a regulatory floodway and would result in increases above 0.00 foot compared to pre-project conditions.
      - The proposed project encroaches upon a SFHA with or without BFEs established and would result in increases above 1.00 foot compared to pre-project conditions.

   b. Does this LOMR request cause increase in the BFE and/or SFHA compared with the effective BFEs and/or SFHA? ☐ Yes ☐ No

      If Yes, please attach **proof of property owner notification and acceptance (if available)**. Elements of and examples of property owner notifications can be found in the MT-2 Form 2 Instructions.

2. Does the request involve the placement or proposed placement of fill? ☒ Yes ☐ No

   If Yes, the community must be able to certify that the area to be removed from the special flood hazard area, to include any structures or proposed structures, meets all of the standards of the local floodplain ordinances, and is reasonably safe from flooding in accordance with the NFIP regulations set forth at 44 CFR 60.3(A)(3), 65.5(a)(4), and 65.6(a)(14). Please see the MT-2 instructions for more information.

3. For LOMR requests, is the regulatory floodway being revised? ☐ Yes ☐ No

   If Yes, attach **evidence of regulatory floodway revision notification**. As per Paragraph 65.7(b)(1) of the NFIP Regulations, notification is required for requests involving revisions to the regulatory floodway. (Not required for revisions to approximate 1%-annual-chance floodplains [studied Zone A designation] unless a regulatory floodway is being established. Elements and examples of regulatory floodway revision notification can be found in the MT-2 Form 2 Instructions.)

4. For CLOMR requests, please submit documentation to FEMA and the community to show that you have complied with Sections 9 and 10 of the Endangered Species Act (ESA). **See Appendix G**

For actions authorized, funded, or being carried out by Federal or State agencies, please submit documentation from the agency showing its compliance with Section 7(a)(2) of the ESA. Please see the MT-2 instructions for more detail.

* Not inclusive of all applicable regulatory requirements. For details, see 44 CFR parts 60 and 65.

DEPARTMENT OF HOMELAND SECURITY
FEDERAL EMERGENCY MANAGEMENT AGENCY

RIVERINE STRUCTURES FORM

O.M.B. NO. 1660-0016
Expires February 28, 2014

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DISCLOSURE: The disclosure of information on this form is voluntary; however, failure to provide the information requested may delay or prevent FEMA from processing a determination regarding a requested change to a NFIP Flood Insurance Rate Maps (FIRM).

Flooding Source: Skunk Creek

Note: Fill out one form for each flooding source studied.

A. GENERAL

Complete the appropriate section(s) for each Structure listed below:

Channelization.....complete Section B
Bridge/Culvert.....complete Section C
Dam.....complete Section D
Levee/Floodwall.....complete Section E
Sediment Transport.....complete Section F (if required)

Description Of Modeled Structure

1. Name of Structure: Sonoran Desert Drive Bridge

   Type (check one): ☐ Channelization ☒ Bridge/Culvert ☐ Levee/Floodwall ☐ Dam

   Location of Structure: 14.59

   Downstream Limit/Cross Section: 14.60

   Upstream Limit/Cross Section: 14.57

2. Name of Structure: _____

   Type (check one): ☐ Channelization ☐ Bridge/Culvert ☐ Levee/Floodwall ☐ Dam

   Location of Structure: _____

   Downstream Limit/Cross Section: _____

   Upstream Limit/Cross Section: _____

3. Name of Structure: _____

   Type (check one) ☐ Channelization ☐ Bridge/Culvert ☐ Levee/Floodwall ☐ Dam

   Location of Structure: _____

   Downstream Limit/Cross Section: _____

   Upstream Limit/Cross Section: _____

NOTE: FOR MORE STRUCTURES, ATTACH ADDITIONAL PAGES AS NEEDED.

B. CHANNELIZATION

Flooding Source: _____

Name of Structure: _____

1. Hydraulic Considerations

The channel was designed to carry _____ (cfs) and/or the _____-year flood.

The design elevation in the channel is based on (check one):

☐ Subcritical flow ☐ Critical flow ☐ Supercritical flow ☐ Energy grade line

If there is the potential for a hydraulic jump at the following locations, check all that apply and attach an explanation of how the hydraulic jump is controlled without affecting the stability of the channel.

☐ Inlet to channel ☐ Outlet of channel ☐ At Drop Structures ☐ At Transitions

☐ Other locations (specify): _____

2. Channel Design Plans

Attach the plans of the channelization certified by a registered professional engineer, as described in the instructions.

3. Accessory Structures

The channelization includes (check one):

☐ Levees [Attach Section E (Levee/Floodwall)] ☐ Drop structures ☐ Superelevated sections

☐ Transitions in cross sectional geometry ☐ Debris basin/detention basin [Attach Section D (Dam/Basin)] ☐ Energy dissipator

☐ Weir ☐ Other (Describe):

4. Sediment Transport Considerations

Are the hydraulics of the channel affected by sediment transport? ☐ Yes ☐ No

If yes, then fill out Section F (Sediment Transport) of Form 3. If No, then attach your explanation for why sediment transport was not considered.

C. BRIDGE/CULVERT

Flooding Source: Skunk Creek

Name of Structure: Sonoran Desert Drive Bridge

1. This revision reflects (check one):

☒ Bridge/culvert not modeled in the FIS

☐ Modified bridge/culvert previously modeled in the FIS

☐ Revised analysis of bridge/culvert previously modeled in the FIS

2. Hydraulic model used to analyze the structure (e.g., HEC-2 with special bridge routine, WSPRO, HY8): HEC-2 with special bridge
If different than hydraulic analysis for the flooding source, justify why the hydraulic analysis used for the flooding source could not analyze the structures. Attach justification.

3. Attach plans of the structures certified by a registered professional engineer. The plan detail and information should include the following (check the information that has been provided):

☒ Dimensions (height, width, span, radius, length)

☐ Shape (culverts only)

☒ Material

☒ Beveling or Rounding

☐ Wing Wall Angle

☐ Skew Angle

☒ Distances Between Cross Sections

☒ Erosion Protection

☒ Low Chord Elevations – Upstream and Downstream

☒ Top of Road Elevations – Upstream and Downstream

☒ Structure Invert Elevations – Upstream and Downstream

☒ Stream Invert Elevations – Upstream and Downstream

☐ Cross-Section Locations

4. Sediment Transport Considerations

Are the hydraulics of the structure affected by sediment transport? ☐ Yes ☒ No

If Yes, then fill out Section F (Sediment Transport) of Form 3. If no, then attach an explanation.

D. DAM/BASIN

Flooding Source: _____
Name of Structure: _____

1. This request is for (check one): ☐ Existing dam/basin ☐ New dam/basin ☐ Modification of existing dam/basin

2. The dam/basin was designed by (check one): ☐ Federal agency ☐ State agency ☐ Private organization ☐ Local government agency

   Name of the agency or organization: _____

3. The Dam was permitted as (check one): ☐ Federal Dam ☐ State Dam

   Provide the permit or identification number (ID) for the dam and the appropriate permitting agency or organization

   Permit or ID number _____ Permitting Agency or Organization _____

   a. ☐ Local Government Dam ☐ Private Dam

   Provided related drawings, specification and supporting design information.

4. Does the project involve revised hydrology? ☐ Yes ☐ No

   If Yes, complete the Riverine Hydrology & Hydraulics Form (Form 2).

   Was the dam/basin designed using critical duration storm? (must account for the maximum volume of runoff)

   ☐ Yes, provide supporting documentation with your completed Form 2.

   ☐ No, provide a written explanation and justification for not using the critical duration storm.

5. Does the submittal include debris/sediment yield analysis? ☐ Yes ☐ No

   If Yes, then fill out Section F (Sediment Transport). If No, then attach your explanation for why debris/sediment analysis was not considered?

6. Does the Base Flood Elevation behind the dam/basin or downstream of the dam/basin change? ☐ Yes ☐ No

   If Yes, complete the Riverine Hydrology & Hydraulics Form (Form 2) and complete the table below.

FREQUENCY (% annual chance)	Stillwater Elevation Behind the Dam/Basin FIS	REVISED
10-year (10%)	_____	_____
50-year (2%)	_____	_____
100-year (1%)	_____	_____
500-year (0.2%)	_____	_____
Normal Pool Elevation	_____	_____

7. Please attach a copy of the formal Operation and Maintenance Plan

E. LEVEE/FLOODWALL

1. System Elements

a. This Levee/Floodwall analysis is based on (check one): ☐ upgrading of an existing levee/floodwall system ☐ a newly constructed levee/floodwall system ☐ reanalysis of an existing levee/floodwall system

b. Levee elements and locations are (check one):

☐ earthen embankment, dike, berm, etc. Station _____ to _____
☐ structural floodwall Station _____ to _____
☐ Other (describe): Station _____ to _____

c. Structural Type (check one): ☐ monolithic cast-in place reinforced concrete ☐ reinforced concrete masonry block ☐ sheet piling
☐ Other (describe): _____

d. Has this levee/floodwall system been certified by a Federal agency to provide protection from the base flood?

☐ Yes ☐ No

If Yes, by which agency? _____

e. Attach certified drawings containing the following information (indicate drawing sheet numbers):

1. Plan of the levee embankment and floodwall structures. Sheet Numbers: _____
2. A profile of the levee/floodwall system showing the Base Flood Elevation (BFE), levee and/or wall crest and foundation, and closure locations for the total levee system. Sheet Numbers: _____
3. A profile of the BFE, closure opening outlet and inlet invert elevations, type and size of opening, and kind of closure. Sheet Numbers: _____
4. A layout detail for the embankment protection measures. Sheet Numbers: _____
5. Location, layout, and size and shape of the levee embankment features, foundation treatment, Floodwall structure, closure structures, and pump stations. Sheet Numbers: _____

2. Freeboard

a. The minimum freeboard provided above the BFE is:

Riverine

3.0 feet or more at the downstream end and throughout ☐ Yes ☐ No

3.5 feet or more at the upstream end ☐ Yes ☐ No

4.0 feet within 100 feet upstream of all structures and/or constrictions ☐ Yes ☐ No

Coastal

1.0 foot above the height of the one percent wave associated with the 1%-annual-chance stillwater surge elevation or maximum wave runup (whichever is greater). ☐ Yes ☐ No

2.0 feet above the 1%-annual-chance stillwater surge elevation ☐ Yes ☐ No

Please note, occasionally exceptions are made to the minimum freeboard requirement. If an exception is requested, attach documentation addressing Paragraph 65.10(b)(1)(ii) of the NFIP Regulations.

If No is answered to any of the above, please attach an explanation.

b. Is there an indication from historical records that ice-jamming can affect the BFE? ☐ Yes ☐ No

If Yes, provide ice-jam analysis profile and evidence that the minimum freeboard discussed above still exists.

3. Closures

a. Openings through the levee system (check one): ☐ exists ☐ does not exist

If opening exists, list all closures:

Channel Station	Left or Right Bank	Opening Type	Highest Elevation for Opening Invert	Type of Closure Device

(Extend table on an added sheet as needed and reference)

Note: Geotechnical and geologic data

In addition to the required detailed analysis reports, data obtained during field and laboratory investigations and used in the design analysis for the following system features should be submitted in a tabulated summary form. (Reference U.S. Army Corps of Engineers [USACE] EM-1110-2-1906 Form 2086.)

4. Embankment Protection

a. The maximum levee slope land side is: _____

b. The maximum levee slope flood side is: _____

c. The range of velocities along the levee during the base flood is: _____ (min.) to _____ (max.)

d. Embankment material is protected by (describe what kind): _____

e. Riprap Design Parameters (check one): ☐ Velocity ☐ Tractive stress
Attach references

Reach		Sideslope	Flow Depth	Velocity	Curve or Straight	Stone Riprap			Depth of Toedown
						D_{100}	D_{50}	Thickness	
Sta	to								
Sta	to								
Sta	to								
Sta	to								
Sta	to								
Sta	to								

(Extend table on an added sheet as needed and reference each entry)

f. Is a bedding/filter analysis and design attached? ☐ Yes ☐ No

g. Describe the analysis used for other kinds of protection used (include copies of the design analysis):

Attach engineering analysis to support construction plans.

5. Embankment And Foundation Stability

a. Identify locations and describe the basis for selection of critical location for analysis:
_____

☐ Overall height: Sta.: _____, height _____ ft.

☐ Limiting foundation soil strength:

Strength ϕ = _____ degrees, c = _____ psf

Slope: SS = _____ (h) to _____ (v)

(Repeat as needed on an added sheet for additional locations)

b. Specify the embankment stability analysis methodology used (e.g., circular arc, sliding block, infinite slope, etc.):
_____

c. Summary of stability analysis results:

E. LEVEE/FLOODWALL (CONTINUED)

5. Embankment And Foundation Stability (continued)

Case	Loading Conditions	Critical Safety Factor	Criteria (Min.)
I	End of construction		1.3
II	Sudden drawdown		1.0
III	Critical flood stage		1.4
IV	Steady seepage at flood stage		1.4
VI	Earthquake (Case I)		1.0

(Reference: USACE EM-1110-2-1913 Table 6-1)

d. Was a seepage analysis for the embankment performed? ☐ Yes ☐ No

If Yes, describe methodology used:

e. Was a seepage analysis for the foundation performed? ☐ Yes ☐ No

f. Were uplift pressures at the embankment landside toe checked? ☐ Yes ☐ No

g. Were seepage exit gradients checked for piping potential? ☐ Yes ☐ No

h. The duration of the base flood hydrograph against the embankment is _____ hours.

Attach engineering analysis to support construction plans.

6. Floodwall And Foundation Stability

a. Describe analysis submittal based on Code (check one): ☐ UBC (1988) ☐ Other (specify): _____

b. Stability analysis submitted provides for: ☐ Overturning ☐ Sliding If not, explain: _____

c. Loading included in the analyses were: ☐ Lateral earth @ P_A = _____ psf; P_p = _____ psf

☐ Surcharge-Slope @ _____, ☐ surface _____ psf

☐ Wind @ P_w = _____ psf

☐ Seepage (Uplift); _____ ☐ Earthquake @ P_{eq} = _____ %g

☐ 1%-annual-chance significant wave height: _____ ft.

☐ 1%-annual-chance significant wave period: _____ sec.

d. Summary of Stability Analysis Results: Factors of Safety.
Itemize for each range in site layout dimension and loading condition limitation for each respective reach.

Loading Condition	Criteria (Min)		Sta	To	Sta	To
	Overturn	Sliding	Overturn	Sliding	Overturn	Sliding
Dead & Wind	1.5	1.5				
Dead & Soil	1.5	1.5				
Dead, Soil, Flood, & Impact	1.5	1.5				
Dead, Soil, & Seismic	1.3	1.3				

(Ref: FEMA 114 Sept 1986; USACE EM 1110-2-2502)
Note: (Extend table on an added sheet as needed and reference)

E. LEVEE/FLOODWALL (CONTINUED)

6. Floodwall And Foundation Stability (continued)

e. Foundation bearing strength for each soil type:

Bearing Pressure	Sustained Load (psf)	Short Term Load (psf)
Computed design maximum		
Maximum allowable		

f. Foundation scour protection ☐ is, ☐ is not provided. If provided, attach explanation and supporting documentation:

Attach engineering analysis to support construction plans.

7. Settlement

a. Has anticipated potential settlement been determined and incorporated into the specified construction elevations to maintain the established freeboard margin? ☐ Yes ☐ No

b. The computed range of settlement is _____ ft. to _____ ft.

c. Settlement of the levee crest is determined to be primarily from : ☐ Foundation consolidation ☐ Embankment compression ☐ Other (Describe): _____

d. Differential settlement of floodwalls ☐ has ☐ has not been accommodated in the structural design and construction.

Attach engineering analysis to support construction plans.

8. Interior Drainage

a. Specify size of each interior watershed:

Draining to pressure conduit: _____ acres
Draining to ponding area: _____ acres

b. Relationships Established

Ponding elevation vs. storage	☐ Yes	☐ No
Ponding elevation vs. gravity flow	☐ Yes	☐ No
Differential head vs. gravity flow	☐ Yes	☐ No

c. The river flow duration curve is enclosed: ☐ Yes ☐ No

d. Specify the discharge capacity of the head pressure conduit: _____ cfs

e. Which flooding conditions were analyzed?

• Gravity flow (Interior Watershed)	☐ Yes	☐ No
• Common storm (River Watershed)	☐ Yes	☐ No
• Historical ponding probability	☐ Yes	☐ No
• Coastal wave overtopping	☐ Yes	☐ No

If No for any of the above, attach explanation.

e. Interior drainage has been analyzed based on joint probability of interior and exterior flooding and the capacities of pumping and outlet facilities to provide the established level of flood protection. ☐ Yes ☐ No If No, attach explanation.

g. The rate of seepage through the levee system for the base flood is _____ cfs

h. The length of levee system used to drive this seepage rate in item g: _____ ft.

E. LEVEE/FLOODWALL (CONTINUED)

8. Interior Drainage (continued)

i. Will pumping plants be used for interior drainage? ☐ Yes ☐ No

If Yes, include the number of pumping plants: _____ For each pumping plant, list:

	Plant #1	Plant #2
The number of pumps		
The ponding storage capacity		
The maximum pumping rate		
The maximum pumping head		
The pumping starting elevation		
The pumping stopping elevation		
Is the discharge facility protected?		
Is there a flood warning plan?		
How much time is available between warning and flooding?		

Will the operation be automatic? ☐ Yes ☐ No

If the pumps are electric, are there backup power sources? ☐ Yes ☐ No

(Reference: USACE EM-1110-2-3101, 3102, 3103, 3104, and 3105)

Include a copy of supporting documentation of data and analysis. Provide a map showing the flooded area and maximum ponding elevations for all interior watersheds that result in flooding.

9. Other Design Criteria

a. The following items have been addressed as stated:

Liquefaction ☐ is ☐ is not a problem

Hydrocompaction ☐ is ☐ is not a problem

Heave differential movement due to soils of high shrink/swell ☐ is ☐ is not a problem

b. For each of these problems, state the basic facts and corrective action taken:

Attach supporting documentation

c. If the levee/floodwall is new or enlarged, will the structure adversely impact flood levels and/or flow velocities floodside of the structure?
☐ Yes ☐ No Attach supporting documentation

d. Sediment Transport Considerations:

Was sediment transport considered? ☐ Yes ☐ No
If Yes, then fill out Section F (Sediment Transport). If No, then attach your explanation for why sediment transport was not considered.

10. Operational Plan And Criteria

a. Are the planned/installed works in full compliance with Part 65.10 of the NFIP Regulations? ☐ Yes ☐ No

b. Does the operation plan incorporate all the provisions for closure devices as required in Paragraph 65.10(c)(1) of the NFIP regulations?
☐ Yes ☐ No

c. Does the operation plan incorporate all the provisions for interior drainage as required in Paragraph 65.10(c)(2) of the NFIP regulations?
☐ Yes ☐ No If the answer is No to any of the above, please attach supporting documentation.

E. LEVEE/FLOODWALL (CONTINUED)

11. Maintenance Plan

Please attach a copy of the fomal maintenance plan for the levee/floodwall

12. Operations and Maintenance Plan

Please attach a copy of the formal Operations and Maintenance Plan for the levee/floodwall.

CERTIFICATION OF THE LEVEE DOCUMENTION

This certification is to be signed and sealed by a licensed registered professional engineer authorized by law to certify elevation information data, hydrologic and hydraulic analysis, and any other supporting information as per NFIP regulations paragraph 65.10(e) and as described in the MT-2 Forms Instructions. All documents submitted in support of this request are correct to the best of my knowledge. I understand that any false statement may be punishable by fine or imprisonment under Title 18 of the United States Code, Section 1001.

Certifier's Name: _____ License No.: _____ Expiration Date: _____

Company Name: _____ Telephone No.: _____ Fax No.: _____

Signature: _____ Date: _____ E-Mail Address: _____

F. SEDIMENT TRANSPORT

Flooding Source: _____

Name of Structure: _____

If there is any indication from historical records that sediment transport (including scour and deposition) can affect the Base Flood Elevation (BFE); and/or based on the stream morphology, vegetative cover, development of the watershed and bank conditions, there is a potential for debris and sediment transport (including scour and deposition) to affect the BFEs, then provide the following information along with the supporting documentation:

Sediment load associated with the base flood discharge: Volume _____ acre-feet

Debris load associated with the base flood discharge: Volume _____ acre-feet

Sediment transport rate _____ (percent concentration by volume)

Method used to estimate sediment transport: _____

Most sediment transport formulas are intended for a range of hydraulic conditions and sediment sizes; attach a detailed explanation for using the selected method.

Method used to estimate scour and/or deposition: _____

Method used to revise hydraulic or hydrologic analysis (model) to account for sediment transport: _____

Please note that bulked flows are used to evaluate the performance of a structure during the base flood; however, FEMA does not map BFEs based on bulked flows.

If a sediment analysis has not been performed, an explanation as to why sediment transport (including scour and deposition) will not affect the BFEs or structures must be provided.

Sediment Transport Explanation

No additional sediment transport was considered for this study. A sediment transport analysis was not a part of the scope for this project. The sediment transport analysis completed as part of the Skunk Creek Watercourse Master Plan completed by Tetra Tech in July 2001 was used as a basis. The analysis showed that Skunk Creek is in an aggradation state at the bridge crossing.

FEDERAL EMERGENCY MANAGEMENT AGENCY

PAYMENT INFORMATION FORM

Community Name: City of Phoenix

Project Identifier: Sonoran Desert Drive - Skunk Creek

THIS FORM MUST BE MAILED, ALONG WITH THE APPROPRIATE FEE, TO THE ADDRESS BELOW OR FAXED TO THE FAX NUMBER BELOW.

Please make check or money order payable to the National Flood Insurance Program.

Type of Request:

☐ MT-1 application
☑ MT-2 application

LOMC Clearinghouse
847 South Pickett Street
Alexandria, VA 22304-4605
Attn.: LOMC Manager

☐ EDR application

FEMA Project Library
847 South Pickett Street
Alexandria, VA 22304-4605
FAX (703) 212-4090

Request No. (if known): _____ **Check No.:** 10477 **Amount:** 4,400

☐ INITIAL FEE* ☐ FINAL FEE ☐ FEE BALANCE** ☐ MASTER CARD ☐ VISA ☑ CHECK ☐ MONEY ORDER

*Note: Check only for EDR and/or Alluvial Fan requests (as appropriate).

****Note: Check only if submitting a corrected fee for an ongoing request.**

COMPLETE THIS SECTION *ONLY* IF PAYING BY CREDIT CARD

CARD NUMBER EXP. DATE

				–					–					–					–		
1	2	3	4		5	6	7	8		9	10	11	12		13	14	15	16		Month		Year

_____ Date

_____ Signature

NAME *(AS IT APPEARS ON CARD)*: _____
(please print or type)

ADDRESS: _____
(for your credit card receipt-please print or type) _____

DAYTIME PHONE: _____

3.0 SURVEY AND MAPPING INFORMATION

3.1 Digital Projection Information

Electronic files containing the aerial mapping for the Sonoran Desert Drive project are provided with this report. The survey for Skunk Creek is projected to the Arizona State Plane (Central) 1983 coordinate system. Vertical data is based on National Geodetic Vertical Datum of 1929 (NGVD 29).

3.2 Field Survey information

A field survey was conducted by Premier Engineering Corporation to confirm the results of the aerial mapping discussed in 3.3. The survey control information is summarized in **Appendix C**.

3.3 Mapping

Aerial mapping completed as part of the Skunk Creek FDS was used as a basis for the effective hydraulic model. The model is based on two-foot contours. Cross sections added to the effective model are based on the detailed aerial mapping completed for the Sonoran Desert Drive project. Aerial mapping was completed by Cooper Aerial Surveys Co in July 2013. The aerial mapping completed for the Sonoran Desert Drive project is based on one-foot contours. The revised cross sections are added to the Corrected Effective Model.

4.0 HYDROLOGY

The FEMA effective hydrology for Skunk Creek, established by the Tramonto LOMR, was used for this study. The effective hydrology for Skunk Creek has a peak discharge of 26,700 cfs at the Crossing for the 1-percent annual chance flood event. Excerpts from the Tramonto LOMR are included in **Appendix D**.

5.0 HYDRAULICS

5.1 Method Description

The hydraulic analysis for this project was performed using the U.S. Army Corps of Engineers HEC-2 program. The HEC-2 program matches the modeling program that was used in the effective hydraulic model for the Tramonto LOMR.

The subcritical steady-state flow regime was used for hydraulic modeling. Hydraulic profiles were computer for the 1-percent annual chance storm event floodplain and floodway.

Three models were created for this CLOMR application: Duplicate Effective Model, Corrected Effective Model and a Post-Project Conditions Model. The Pre-Project Conditions are the same as the Corrected Effective, so no separate Pre-Project Conditions Model was created. **Appendix E** provides modeling results.

5.1.1 Duplicate Effective Model

Digital copies of the effective HEC-2 LOMR models were obtained from the City. The hydraulic model was re-produced on Kimley-Horn's computer equipment to produce the Duplicate Effective Model. The Duplicate Effective Model is the basis for this CLOMR application.

The Duplicate Effective Model water surface elevations (WSEL) matched the WSELs from the Effective model. Refer to **Table 2**.

5.1.2 Corrected Effective Model (Pre-Project Conditions)

The Corrected Effective Model is defined by FEMA as the model that corrects any errors that occur, adds any additional cross sections, or incorporates more detailed topographic information for the Duplicate Effective Model. The Corrected Effective Model is the same as the Pre-Project Conditions Model for this CLOMR application. The Corrected Effective Model was run using HEC-2. In this analysis, changes made to the Corrected Effective Model include adding cross sections to prepare for the effects of the proposed bridge crossing in the Post-Project Conditions Model. The added cross sections are 14.57, 14.60 and 14.67. Cross section 14.57 and 14.60, immediately upstream and downstream of the proposed bridge within the proposed Sonoran Desert Drive right-of-way, use detailed topographic mapping obtained for this project. Cross section 14.67, outside of the proposed Sonoran Desert Drive right-of-way, uses the mapping obtained for the Skunk Creek FDS.

In addition to the new cross sections, the effective mapping compared to the Duplicate Effective Model does not appear to match for effective cross sections 14.54 and 14.74. There is a difference in floodplain widths and locations for the effective cross sections 14.54 and 14.74. Refer to **Table 1** for a comparison of floodplain widths from the Duplicate Effective Model and measure widths from the effective mapping. Refer to the work map in **Appendix H** for the limits of the Corrected Effective floodplain mapping. Refer to **Table 3** and **Table 4** for a comparison of results.

Table 1. Duplicate Effective Model vs. Effective Mapping

Cross Section	Duplicate Effective Model Floodplain Width [ft]	Effective Mapping Floodplain Width [ft]	Difference [ft]
14.54	839	770	-69
14.74	852	613	-239

5.1.2.1. Post-Project Conditions Model

The Post-Project Conditions Model contains the proposed bridge crossing and grading improvements for the Crossing. The proposed grading improvements include construction of the bridge abutments. The proposed bridge includes the construction of four piers within Skunk Creek. Construction of the bridge piers will include activity that will affect the channel in the cross section. However, for hydraulic purposes the existing section within the channel was not modified to show the construction activity. This represents a more conservative approach. The proposed bridge and grading improvements for abutments are shown in cross sections 14.60 and 14.57. Cross section 14.67 was not changed from the Corrected Effective (Pre-Project Conditions) Model. The Post-Project Conditions Model shows that the proposed bridge and grading improvements result in increases in WSELs of less than one foot compared to the Corrected Effective Model (Pre-Project Conditions). Refer to **Appendix F** for current design plans for Sonoran Desert Drive. Refer to **Table 4** and **Table 5** for a comparison of results.

5.2 Work Study Map

A work map (scaled 1 inch = 200 feet) is provided in **Appendix H** to present the delineated floodplain for Skunk Creek at the Crossing. A work map is provided for the Pre- and Post-Project conditions. The work map also provides the locations of the cross sections, the river centerline, and the 100-year floodplain and floodway delineations.

5.3 Parameter Estimation

5.3.1 Roughness Coefficients

The models prepared for this study used Manning's roughness coefficients similar to the Duplicate Effective Model. The Duplicate Effective Model identified a roughness coefficient of 0.059 and 0.042 in the left and right overbanks respectively. The Duplicate Effective Model used a roughness coefficient of 0.039 for the channel. These values were reviewed and deemed acceptable for this study.

5.3.2 Expansion and Contraction Coefficients

Expansion and contraction coefficients used were 0.1 and 0.3 along the wash and 0.3 and 0.5 upstream and downstream of the bridge crossing. These values were used in the Effective Model and match what is described in Chapter 3 of the HEC-RAS Hydraulic Reference Manual and are generally accepted engineering hydraulic parameters.

5.4 Cross Section Descriptions

Duplicate Effective Model cross sections were taken from the Tramonte LOMR. The FEMA Flood Insurance Study (FIS) cross sections for Skunk Creek are 'AY' (14.89) and 'AX' (14.30). Additional cross sections, 14.67, 14.60 and 14.57 were added to the Corrected Effective (Pre-Project Conditions) and Post-Project Conditions Models. Cross section locations are shown in the work map provided in **Appendix H**. The tie-in cross sections are 14.89 and 14.54.

5.5 Modeling Considerations

5.5.1 Hydraulic Jump and Drop Analysis

There are no hydraulic jumps or sudden drops within the project limits.

5.5.2 Bridges and Culverts

The proposed bridge for Sonoran Desert Drive being constructed as part of this CLOMR application was input into the Post-Project conditions model. The proposed bridge is a 5-span bridge with four 4.5 foot diameter piers. Based on the City of Phoenix Storm Water Policies and Standards, the proposed bridge pier widths were doubled in the hydraulic model to account for debris. The bridge was input into the HEC-2 model using the special bridge approach with BT and SP records.

5.5.3 Levees and Dikes

There are no levees or dikes within the project limits.

5.5.4 Non-Levee Embankments

There are no non-levee embankments within the project limits.

5.5.5 Islands and Flow Splits

There are no islands or flow splits within the project limits.

5.5.6 Ineffective Flow Areas

Ineffective areas were included in the cross sections upstream and downstream of the proposed bridge. The ineffective stations were set using an expansion of 1:1 and 2:1 for upstream and downstream, respectively. Ineffective area elevations were set at the proposed bridge roadway elevation.

5.5.7 Supercritical Flow

Per FEMA mapping criteria, the model was run with a subcritical flow regime.

5.6 Floodway Modeling

Floodway modeling is included with the models. The floodway boundaries were not modified as part of this study.

5.7 Issues Encountered During the Study

5.7.1 Special Issues and Solutions

No special issues were encountered in this study.

5.7.2 Modeling Warning and Error Messages

Typical model warnings were encountered in HEC-2 modeling:

Critical Depth Assumed

Conveyance Change Outside Acceptable Range

Minimum Specific Energy

Probable Minimum Specific Energy

20 Trials Attempted to Balance WSEL

Warning messages were reviewed. No additional cross sections were added since spacing is consistent with effective modeling and gives an acceptable representation of the conditions.

5.8 Calibration

No calibration was used in the modeling for this study.

5.9 Final Results

5.9.1 Hydraulic Analysis Results

A review of the hydraulic results indicates reasonable water surface profiles for Skunk Creek at the crossing with Sonoran Desert Drive. All hydraulic models were completed in the NGVD 29 Vertical Datum. The hydraulic results are included in summary tables in **Appendix E**.

5.9.2 Verification or Comparison of Results

All models were run using HEC-2. The results of the Duplicate Effective Model match the results that shown in the FIS for Skunk Creek.

Table 2 is a comparison of the WSELs between the Duplicate Effective Model and the effective model from the Tramonto LOMR. A review of the Corrected Effective (Pre-Project Conditions) Model hydraulic results indicate reasonable water surface profiles for the Crossing. **Table 3** provides a comparison of floodplain and floodway WSELs for the Duplicate Effective Model and the Corrected Effective Model. WSELs were interpolated between effective cross sections for the Duplicate Effective Model. Differences are due to the more detailed topography and additional cross sections. The Pre-Project Conditions Model cross sections were revised to show the proposed bridge with grading improvements for the Post-Project Conditions model. **Table 4** provides a comparison of the Pre- and Post-Project Conditions models. The Post-Project Conditions model increases the floodplain WSELs a maximum of 0.33 feet. Floodway elevations change due to the effects of the proposed bridge and detailed topography at bridge. Changes to

the floodway elevations are located within the Sonoran Desert Drive right-of-way. **Table 5** provides a comparison of the Duplicate Effective Model and the Post-Project Conditions Model. WSELs were interpolated between effective cross sections for the Duplicate Effective Model. All WSELs shown in the tables are in the NAVD 88 vertical datum. ***Interpolated between cross sections**

Table 6 is a comparison of the floodplain and floodway widths and velocities for the Duplicate Effective and Post-Project Conditions models. Results from the hydraulic models (NGVD 29) were converted to NAVD 88. Elevations from the NGVD 29 vertical datum are 1.95 feet less than elevations in NAVD 88, in the project area. Refer to **Appendix A** for VERTCON data.

Table 2. Duplicate Effective vs. Effective Model

FEMA Lettered Cross Section	River Station	100-Year Floodplain WSEL			100-Year Floodway WSEL		
		Effective Model	Duplicate Effective Model	Change [ft]	Effective Model	Duplicate Effective Model	Change [ft]
AX	14.30	1576.11	1576.11	0.00	1576.98	1576.98	0.00
---	14.54	1585.64	1585.64	0.00	1586.24	1586.24	0.00
---	14.74	1593.68	1593.68	0.00	1593.58	1593.58	0.00
AY	14.89	1598.95	1598.95	0.00	1599.84	1599.84	0.00
---	15.06	1604.88	1604.88	0.00	1604.83	1604.83	0.00
AZ	15.12	1607.17	1607.17	0.00	1607.15	1607.15	0.00

Table 3. Duplicate Effective vs. Corrected Effective

FEMA Lettered Cross Section	River Station	100-Year Floodplain WSEL			100-Year Floodway WSEL		
		Duplicate Effective Model	Corrected Effective Model	Change [ft]	Duplicate Effective Model	Corrected Effective Model	Change [ft]
AX	14.30	1576.11	1576.11	0.00	1576.98	1576.98	0.00
---	14.54	1585.64	1585.64	0.00	1586.24	1586.24	0.00
---	14.57	1586.95*	1586.27	-0.68	1585.83*	1586.49	+0.66
---	14.60	1587.99*	1587.76	-0.23	1587.21*	1588.01	+0.80
---	14.67	1590.88*	1591.60	+0.72	1591.02*	1592.52	+1.50
---	14.74	1593.68	1593.66	-0.02	1593.58	1593.58	0.00
AY	14.89	1598.95	1598.98	+0.03	1599.84	1599.85	+0.01
---	15.06	1604.88	1604.88	0.00	1604.83	1604.83	0.00
AZ	15.12	1607.17	1607.17	0.00	1607.15	1607.15	0.00

*Interpolated between cross sections

Table 4. Corrected Effective vs. Post-Project Conditions

FEMA Lettered Cross Section	River Station	100-Year Floodplain WSEL			100-Year Floodway WSEL		
		Corrected Effective Model	Post-Project Conditions Model	Change [ft]	Corrected Effective Model	Post-Project Conditions Model	Change [ft]
AX	14.30	1576.11	1576.11	0.00	1576.98	1576.98	0.00
---	14.54	1585.64	1585.64	0.00	1586.24	1586.24	0.00
---	14.57	1586.27	1586.60	+0.33	1586.49	1586.98	+0.49
---	14.60	1587.76	1586.60	-1.16	1588.01	1586.98	-1.03
---	14.67	1591.60	1591.16	-0.44	1592.52	1591.05	-1.47
---	14.74	1593.66	1593.68	+0.02	1593.58	1593.58	0.00
AY	14.89	1598.98	1598.95	-0.03	1599.85	1599.85	0.00
---	15.06	1604.88	1604.88	0.00	1604.83	1604.83	0.00
AZ	15.12	1607.17	1607.17	0.00	1607.15	1607.15	0.00

Table 5. Duplicate Effective vs. Post-Project Conditions

FEMA Lettered Cross Section	River Station	100-Year Floodplain WSEL			100-Year Floodway WSEL		
		Duplicate Effective Model	Post-Project Conditions Model	Change [ft]	Duplicate Effective Model	Post-Project Conditions Model	Change [ft]
AX	14.30	1576.11	1576.11	0.00	1576.98	1576.98	0.00
---	14.54	1585.64	1585.64	0.00	1586.24	1586.24	0.00
---	14.57	1586.95*	1586.60	-0.35	1585.83*	1586.98	+1.15
---	14.60	1587.99*	1586.60	-1.39	1587.21*	1586.98	-0.23
---	14.67	1590.88*	1591.16	+0.28	1591.02*	1591.05	+0.03
---	14.74	1593.68	1593.68	0.00	1593.58	1593.58	0.00
AY	14.89	1598.95	1598.95	0.00	1599.84	1599.85	+0.01
---	15.06	1604.88	1604.88	0.00	1604.83	1604.83	0.00
AZ	15.12	1607.17	1607.17	0.00	1607.15	1607.15	0.00

*Interpolated between cross sections

Table 6. HEC-2 Results Comparison

FEMA Lettered Cross Section	River Station	Duplicate Effective Conditions Model				Post-Project Conditions Model			
		Floodplain		Floodway		Floodplain		Floodway	
		Width	Velocity	Width	Velocity	Width	Velocity	Width	Velocity
AX	14.30	2213	10.8	950	8.7	2213	10.8	950	8.7
---	14.54	839	8.0	530	7.3	839	8.0	530	7.3
---	14.57	---	---	---	---	585	9.1	587	7.3
---	14.60	---	---	---	---	585	15	587	10.5
---	14.67	---	---	---	---	840	9.5	395	9.0
---	14.74	852	14.7	400	11.2	851	14.7	400	11.2
AY	14.89	569	13.7	480	8.3	569	13.7	480	8.3
---	15.06	767	9.3	418	10.6	767	9.3	418	10.6
AZ	15.12	821	11.2	376	13.4	821	11.2	376	13.4

6.0 EROSION, SEDIMENT TRANSPORT, AND GEOMORPHIC ANALYSIS

An erosion hazard setback analysis was completed as part of the Skunk Creek Watercourse Masterplan prepared by Tetra Tech Inc. in August of 2001. The analysis was used to establish erosion hazards zones that would protect the natural wide open Skunk Creek. The report was prepared for the Flood Control District of Maricopa County and adopted by the City. The erosion hazard zone is a part of the City's zoning ordinance 657. Zoning ordinance 657-8B allows for construction in the erosion hazard zone for roadway and bridge crossings.

No Sediment Transport was conducted as part of this study.

7.0 DRAFT FIS DATA

7.1 Summary of Discharges

No new hydrologic analysis was performed for this study. The FEMA effective hydrology done as part of the Tramonto LOMR was used for this study. The 1-percent annual chance flood event peak discharge used for this study was 26,700 cfs.

7.2 Floodway Data

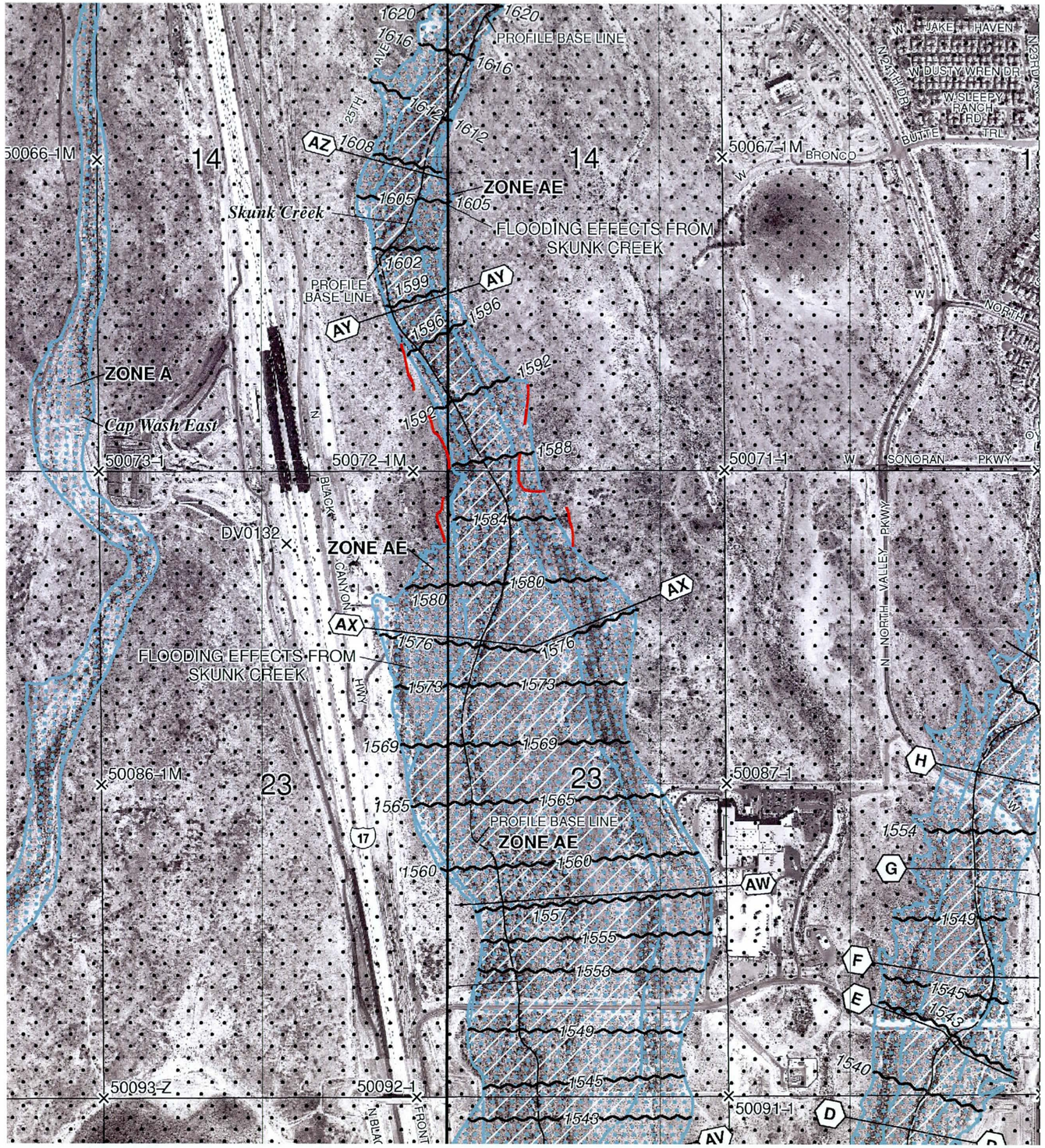
The Floodway Data table for Skunk Creek is shown at the end of this section. There are no changes to the WSELs for the floodplain and floodways for the FEMA effective cross sections. WSELs shown in the Floodway Data tables are in North American Vertical Datum of 1988 (NAVD 88). Elevations from the NGVD 29 vertical datum are 1.95 feet less than elevations in NAVD 88 in the project area.

7.3 Annotated Flood Insurance Rate Maps

Skunk Creek is located on the FEMA Flood Insurance Map (FIRM) panel numbers 04013C0845L and 04013C0865L, effective October 16, 2013. **Figure 3** is the annotated FEMA Effective FIRM.

7.4 Flood Profiles

The revised flood profiles are provided at the end of this section. Electronic files are included on CD included at the back of this report.



NFIP

PANEL 0845L

NATIONAL FLOOD INSURANCE PROGRAM

FIRM

FLOOD INSURANCE RATE MAP

MARICOPA COUNTY, ARIZONA

AND INCORPORATED AREAS

PANEL 845 OF 4425

(SEE MAP INDEX FOR FIRM PANEL LAYOUT)

CONTAINS:

COMMUNITY	NUMBER	PANEL	SUFFIX
MARICOPA COUNTY	040037	0845	L
PHOENIX, CITY OF	040051	0845	L

Notice to User: The **Map Number** shown below should be used when placing map orders; the **Community Number** shown above should be used on insurance applications for the subject community.

MAP NUMBER
04013C0845L

MAP REVISED
OCTOBER 16, 2013

Federal Emergency Management Agency

NFIP

PANEL 0865L

NATIONAL FLOOD INSURANCE PROGRAM

FIRM

FLOOD INSURANCE RATE MAP

MARICOPA COUNTY, ARIZONA

AND INCORPORATED AREAS

PANEL 865 OF 4425

(SEE MAP INDEX FOR FIRM PANEL LAYOUT)

CONTAINS:

COMMUNITY	NUMBER	PANEL	SUFFIX
MARICOPA COUNTY	040037	0865	L
PHOENIX, CITY OF	040051	0865	L

Notice to User: The **Map Number** shown below should be used when placing map orders; the **Community Number** shown above should be used on insurance applications for the subject community.

MAP NUMBER
04013C0865L

MAP REVISED
OCTOBER 16, 2013

Federal Emergency Management Agency

REVISED FLOODPLAIN

NOTE: ALL ELEVATIONS SHOW LOCATED IN NAVD88 VERTICAL DATUM

MAP SCALE 1" = 1000'

500 0 1000 2000 FEET

300 0 300 600 METERS

NO.	REVISION	DATE

Kimley»Horn

© 2014 KIMLEY-HORN AND ASSOCIATES, INC.

7740 North 16th Street, Suite 300
Phoenix, Arizona 85020 (602) 944-5500

SCALE (H): 1"=1000'
SCALE (V): NONE
DESIGNED BY: ZRS
DRAWN BY: ZRS
CHECKED BY: LSM
DATE: 06/14

CITY OF PHOENIX
SONORAN DESERT DRIVE
SKUNK CREEK

FIGURE 3 – FEMA ANNOTATED FIRM

PROJECT NO.
ST85110090

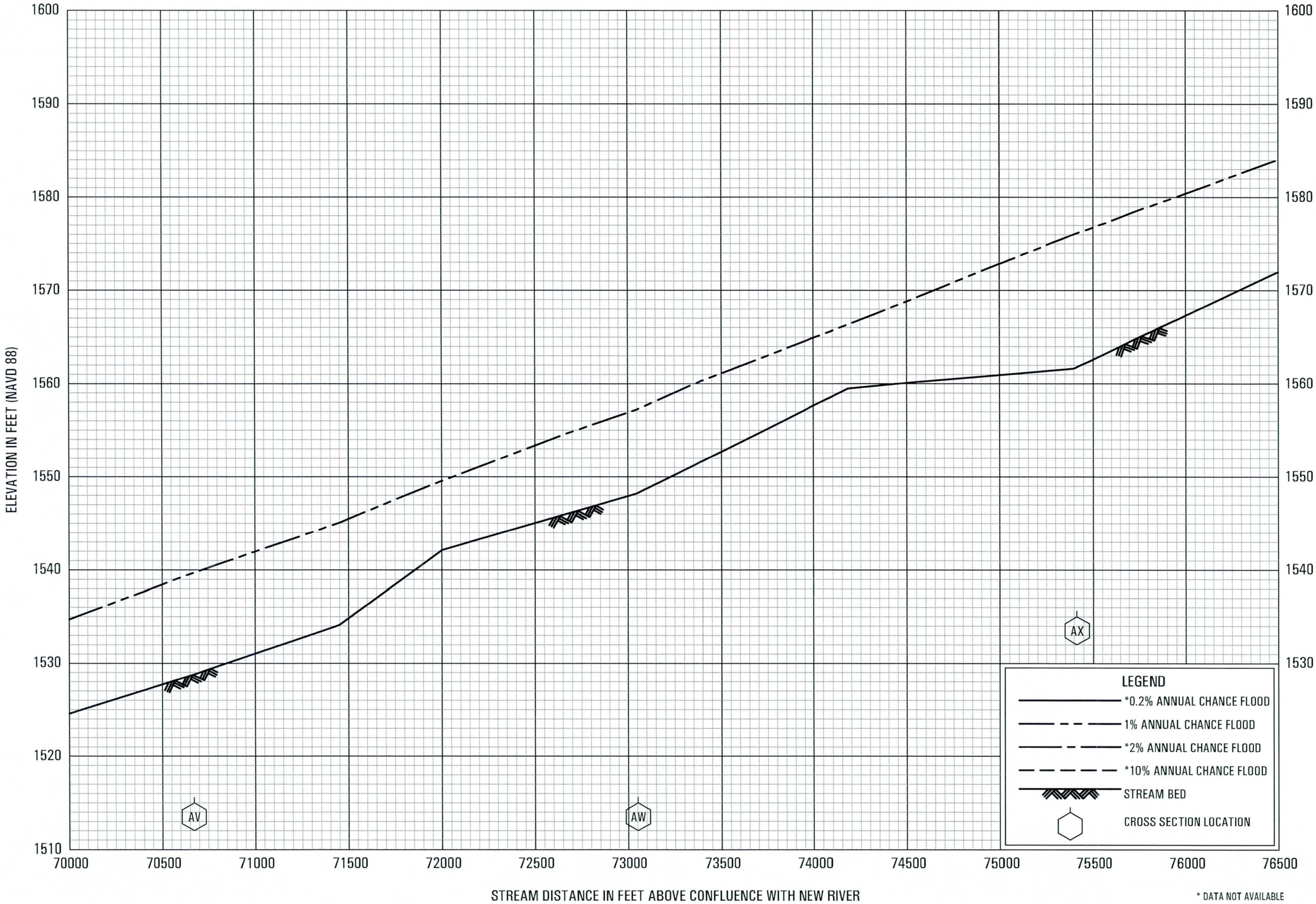
DRAWING NAME
FIGURE 3

1 OF 1

K:\PHX_Roadway\191284002-Sonoran Desert Dr - I-17 to North Valley Pkwy\Cadd\Exhibits\WatRes\Annotated FIRM.dwg Jun 04, 2014 nick.stafford
XREFS: FP_workmap bh-address
THE INSTRUMENTS OF SERVICE, INCLUDING REPORTS AND DESIGNS PRESENTED HEREIN, AS AN INSTRUMENT OF SERVICE, IS INTENDED ONLY FOR THE SPECIFIC PURPOSE AND CLIENT FOR WHICH IT WAS PREPARED. REUSE OF AND IMPROPER RELIANCE ON THIS DOCUMENT WITHOUT WRITTEN AUTHORIZATION AND ADAPTATION BY KIMLEY-HORN AND ASSOCIATES, INC. SHALL BE WITHOUT LIABILITY TO KIMLEY-HORN AND ASSOCIATES, INC.

FLOODING SOURCE		FLOODWAY			BASE FLOOD WATER SURFACE ELEVATION			
CROSS SECTION	DISTANCE[1]	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY	WITHOUT FLOODWAY	WITH FLOODWAY	INCREASE
					(FEET NAVD)			
Skunk Creek (Cont'd)								
AA	31,820	295	2,152	4.0	1,305.1	1,305.1	1,305.2	0.1
AB	32,836	286	1,724	4.9	1,308.2	1,308.2	1,308.2	0.0
AC	33,893	124	580	4.5	1,311.6	1,311.6	1,311.6	0.0
AD	34,815	100	413	5.3	1,317.9	1,317.9	1,317.9	0.0
AE	36,270	194	340	5.3	1,322.8	1,322.8	1,322.8	0.0
AF	37,780	124	271	6.4	1,329.2	1,329.2	1,329.2	0.0
AG	46,341	896	4,669	8.4	1,380.6	1,380.6	1,380.6	0.0
AH	47,848	350	3,568	10.9	1,387.3	1,387.3	1,387.3	0.0
AI	49,107	737	4,189	10.2	1,401.2	1,401.2	1,402.2	1.0
AJ	49,932	728	3,278	12.7	1,404.9	1,404.9	1,405.3	0.4
AK	50,974	467	3,662	10.7	1,412.4	1,412.4	1,412.4	0.0
AL	51,779	428	2,924	13.3	1,415.3	1,415.3	1,415.3	0.0
AM	53,221	407	3,197	12.2	1,423.5	1,423.5	1,423.5	0.0
AN	53,699	486	3,021	12.9	1,428.5	1,428.5	1,428.5	0.0
AO	54,903	449	2,756	14.2	1,436.6	1,436.6	1,436.6	0.0
AP	55,980	422	3,143	12.4	1,443.7	1,443.7	1,443.7	0.0
AQ	57,040	486	3,476	11.2	1,452.3	1,452.3	1,452.3	0.0
AR	58,087	506	4,114	9.5	1,457.5	1,457.5	1,457.5	0.0
AS	64,460	910	4,132	8.5	1,495.3	1,495.3	1,495.3	0.0
AT	65,960	1,100	4,128	8.5	1,505.0	1,505.0	1,505.0	0.0
AU	67,460	1,960	4,481	7.8	1,514.2	1,514.2	1,514.2	0.0
AV	70,646	962	3,867	6.9	1,539.7	1,539.7	1,540.5	0.8
AW	73,075	1,524	2,981	9.0	1,557.2	1,557.2	1,557.4	0.2
AX	75,398	950	3,064	8.7	1,576.1	1,576.1	1,577.0	0.9
AY	78,461	480	3,227	8.3	1,598.8	1,598.8	1,599.7	0.9
AZ	79,675	376	2,000	13.4	1607.2	1607.2	1,607.2	0.0

[1]Stream Distance in Feet Above Confluence With New River



FLOOD PROFILES

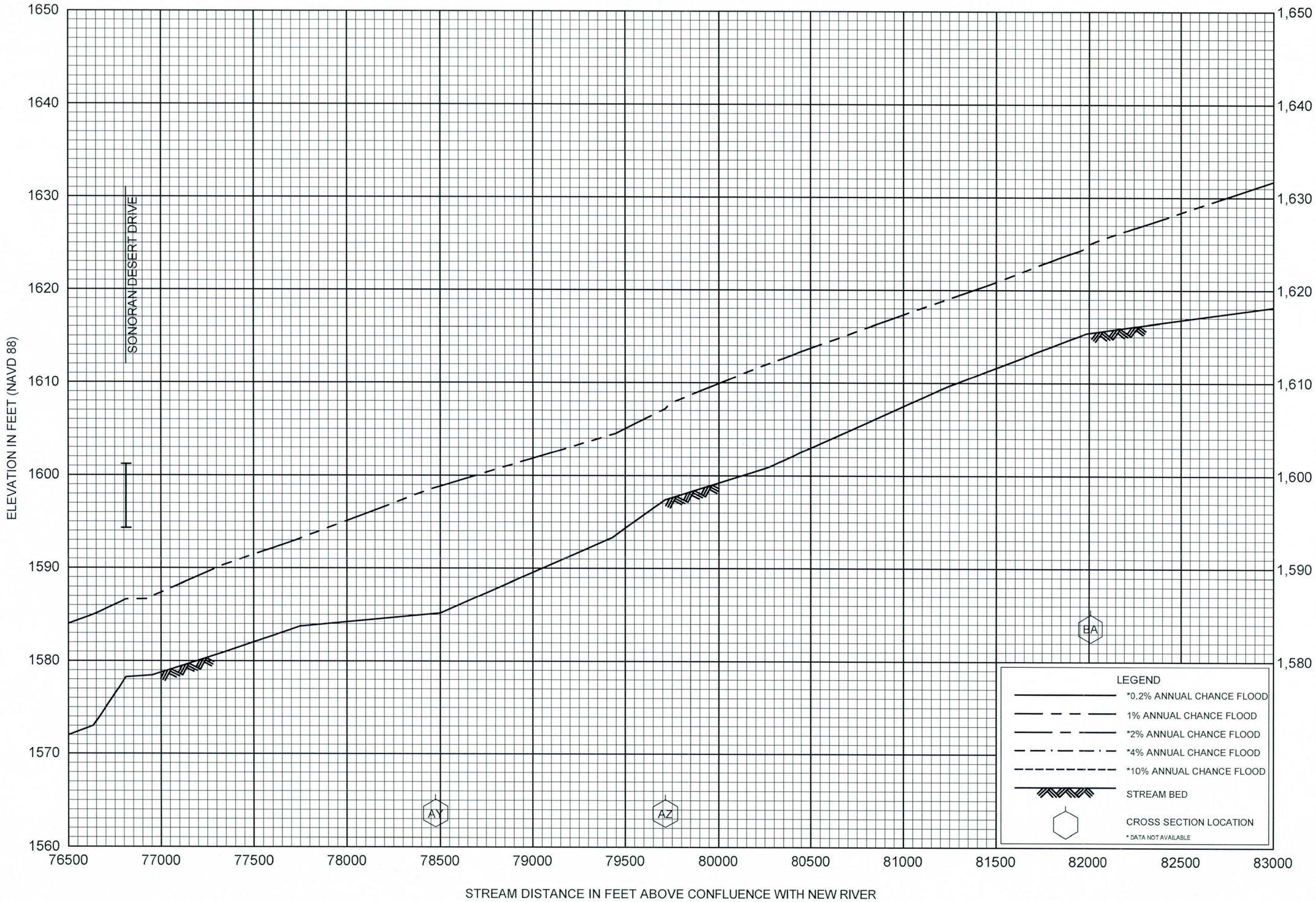
SKUNK CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY

MARICOPA COUNTY, AZ

AND INCORPORATED AREAS

1174P



FLOOD PROFILES

SKUNK CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY

MARICOPA COUNTY, AZ

AND INCORPORATED AREAS

1175P

Appendix A. References

- A.1 Data Collection Summary

A.1 Data Collection Summary

Data Collected and Reviewed

Arizona Department of Water Resources. *State Standard 1, Instructions for Organizing and Submitting Technical Support Data Notebooks (TSDN) for Flood Studies,* August 2012.

City of Phoenix, Storm Water Policies and Standards, December 2013.

Federal Emergency Management Agency, *Flood Insurance Rate Map*, Panels *04013C0845L* and *040130865L*, October 16, 2013.

Federal Emergency Management Agency. *Flood Insurance Study, Maricopa County, Arizona and Incorporated Areas*, October 16, 2013.

Hoskin Engineering Consultants, *LOMR for Skunk Creek through Tramonto*, Case No. 99-09-592R November 6, 2000.

Montgomery Watson, Inc., June 1997, Skunk Creek Floodplain Delineation Study, Between the Central Arizona Project Aqueduct and New River Mountain, Technical Data Notebook.

Montgomery Watson, Inc., June 1997, Skunk Creek Floodplain Delineation Study, Technical Data Notebook, Section 4: Hydraulic Analysis.

Montgomery Watson, Inc., June 1997, Skunk Creek Floodplain Delineation Study, Mapping.

Tetra Tech, Inc., August 2001, Skunk Creek Watercourse Masterplan.

Appendix B. General Documentation and Correspondence

- B.1 General Project Documentation and Correspondence (*Placeholder*)
- B.2 Public Notification (*Placeholder*)
- B.3 FEMA Correspondence (*Placeholder*)

B.1 General Project Documentation and Correspondence (Placeholder)

Questions concerning the VERTCON process may be mailed to NGS

Latitude: 33 46 09

Longitude: 112 07 01

NGVD 29 height: 0.00 ft

Datum shift(NAVD 88 minus NGVD 29): 1.952 feet

Converted to NAVD 88 height: 1.952 feet

B.2 Public Notification (Placeholder)

B.3 FEMA Correspondence (Placeholder)

Appendix C. Survey Field Notes

Appendix D. Hydrologic Supporting Documentation

- D.1 Hydrologic Documentation

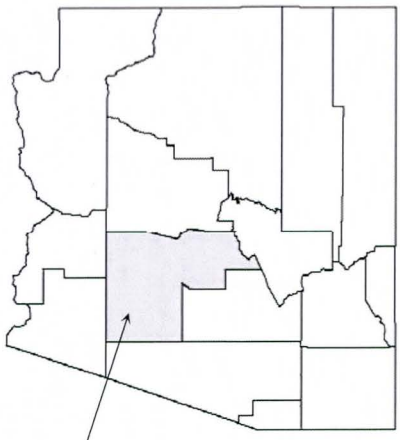
D.1 Hydrologic Documentation

FLOOD INSURANCE STUDY

VOLUME 1 OF 23

MARICOPA COUNTY, ARIZONA
AND INCORPORATED AREAS

COMMUNITY NAME	COMMUNITY NUMBER
AVONDALE, CITY OF	040038
BUCKEYE, TOWN OF	040039
CAREFREE, TOWN OF	040126
CAVE CREEK, TOWN OF	040129
CHANDLER, CITY OF	040040
EL MIRAGE, CITY OF	040041
FOUNTAIN HILLS, TOWN OF	040135
GILA BEND, TOWN OF	040043
GILBERT, TOWN OF	040044
GLENDALE, CITY OF	040045
GOODYEAR, CITY OF	040046
GUADALUPE, TOWN OF	040111
LITCHFIELD PARK, CITY OF	040128
MARICOPA COUNTY (UNINCORPORATED AREAS)	040037
MESA, CITY OF	040048
PARADISE VALLEY, TOWN OF	040049
PEORIA, CITY OF	040050
PHOENIX, CITY OF	040051
QUEEN CREEK, TOWN OF	040132
SCOTTSDALE, CITY OF	045012
SURPRISE, CITY OF	040053
TEMPE, CITY OF	040054
TOLLESON, CITY OF	040055
WICKENBURG, TOWN OF	040056
YOUNGTOWN, TOWN OF	040057



REVISED: OCTOBER 16, 2013

Federal Emergency Management Agency

FLOOD INSURANCE STUDY NUMBER
04013CV001B

Table 3. Summary of Discharges

FLOODING SOURCE AND LOCATION	DRAINAGE AREA (Sq. Miles)	PEAK DISCHARGES (cfs) 10-PERCENT ANNUAL CHANCE	2-PERCENT ANNUAL CHANCE	1-PERCENT ANNUAL CHANCE	0.2-PERCENT ANNUAL CHANCE
Scatter Wash North Branch					
Just upstream of confluence with Scatter Wash South Branch	--[2]	--[2]	--[2]	2,642	--[2]
Scatter Wash South Branch					
At 23rd Avenue	--[2]	--[2]	--[2]	1,071	--[2]
Just above Deer Valley Road	--[2]	--[2]	--[2]	674	--[2]
Just upstream of the confluence with Scatter Wash North Branch	--[2]	--[2]	--[2]	311	--[2]
Scott Avenue Wash (It derives the majority of its peak 1%-annual-chance discharge from flow diverted from Sand Tank Wash above Interstate 8)					
At Watermelon Road	--[1]	--[1]	--[1]	2,600	--[1]
Downstream of I-8	--[1]	--[1]	--[1]	3,865	--[1]
Upstream of I-8	--[1]	--[1]	--[1]	13,156	--[1]
Skunk Creek					
At confluence with Arizona Canal	19.9	2,200	6,700	11,000	33,000
Downstream of confluence with Scatter Wash (At 59th Avenue)	0.4	2,000	5,500	8,400	22,000
Upstream of confluence with Scatter Wash	0.9	1,600	2,200	2,600	4,600
At Outflow of Adobe Dam	0	1,370	1,650	1,730	2,000
At Inflow of Adobe Dam	89.6	15,000	29,000	39,000	85,000
At Granite Reef Aqueduct	63.49	--[1]	--[1]	26,700	--[1]
At Carefree Highway	40.11	--[1]	--[1]	27,300	--[1]
At confluence with Rodger Creek	32.67	--[1]	--[1]	24,400	--[1]
At confluence with Cline Creek	15.76	--[1]	--[1]	11,800	--[1]

--[1] Data Not Computed
--[2] Data Not Available

Request for a Letter of Map Revision for Skunk Creek Through

TRAMONTO

A Development Located in Phoenix, Arizona

Case No. 99-09-592R

November 6, 2000

Prepared for:
Communities Southwest
5343 N. 16th Street, Ste. 460
Phoenix, AZ 85016

Prepared by:

eering Consultants, Inc.

323 W. Roosevelt Street, Suite 200
Phoenix, Arizona 85003
(602) 252-8384

T108.01

HEC 980034-20

FEDERAL EMERGENCY MANAGEMENT AGENCY **HYDROLOGIC ANALYSIS**	O.M.B No. 3067-0148 Expires April 30, 2001

PUBLIC BURDEN DISCLOSURE NOTICE

Public reporting burden for this form is estimated to average **3.67** hours per response. The burden estimate includes the time for reviewing instructions, searching existing data sources, gathering and maintaining the needed data, and completing and reviewing the form. Send comments regarding the accuracy of the burden estimate and any suggestions for reducing this burden to: Information Collections Management, Federal Emergency Management Agency, 500 C Street, S.W., Washington DC 20472; and to the Office of Management and Budget, Paperwork Reduction Project (3067-0148), Washington, DC 20503.

You are not required to respond to this collection of information unless a valid OMB Control Number is displayed in the upper right corner of this form.

Note: Fill out one form for each flooding source studied

Community Name: Maricopa County, Unincorporated Areas / Phoenix, City of

Flooding Source: Skunk Creek

Project Name/Identifier: Tramonto Master Planned Community

1. REASON FOR NEW HYDROLOGIC ANALYSIS

☐ No existing analysis ☐ Improved data ☐ Changed physical condition of watershed

☐ Alternative methodology ☒ Proposed Conditions (CLOMR) ☐ Other

For the reason stated above, please attach a detailed explanation. If a computer program/model was used in revising the hydrologic analysis, **please provide a diskette with the input files** for the same flood recurrence intervals contained in the FIS for that stream; and at least for the 1% annual chance (base) flood where no detailed study exists.

Explanation provided: ☒ Yes ☐ No **Diskettes provided:** ☒ Yes ☐ No

2. METHODOLOGY FOR NEW ANALYSIS

Indicate Method	Required Data	Data Included
☐ Statistical Analysis of Gage Records	Form 3 - Attachment A	☐ Yes ☐ No
☐ Regional Regression Equations	Form 3 - Attachment C	☐ Yes ☐ No
☐ Precipitation/Runoff Model	Form 3 - Attachment D	☐ Yes ☐ No
☒ Other	Back-up computations and supporting data	☒ Yes ☐ No

3. APPROVAL OF ANALYSIS

The hydrologic analysis has already been approved by a local, state, or Federal Agency. ☐ Yes ☒ No ☐ Not Required

If Yes, attach evidence of approval. ☐ **Approval attached.** If No, attach explanation. ☒ **Explanation attached.**

4. COMPARISON OF BASE FLOOD DISCHARGES

Location:	Drainage Area (SqMi)	FIS(cfs)	Revised (cfs)
Sta 17.48	_____	27,300	27,300
Sta 17.39, Flow Split to be Removed	_____	23,700	27,300
Sta 16.86, Downstream of Carefree Highway	_____	23,300	26,700

Note: When revised discharges are not significantly different than the FIS discharges, FEMA may require a confidence limits analysis (see attachment B) at a later date to complete the review.

If only a portion of a detailed study area was revised please attach an explanation describing the transition from the proposed discharges to the effective discharges. ☐ **Explanation Included** ☒ **Explanation Not Required**

5. HISTORICAL FLOODING INFORMATION

If historical data are available for the flooding source please provide: Location, peak discharges/water-surface elevations and dates, and source of information. ☐ **Data Attached** ☐ **Data Not Available**

PLEASE REFER TO THE INSTRUCTIONS FOR THE APPROPRIATE MAILING ADDRESS

Appendix E. Hydraulic Analysis Supporting Documentation

- E.1 Effective FIS Documentation
- E.2 Duplicate Effective HEC-2 Model
- E.3 Corrected Effective (Pre-Project Conditions) HEC-2 Model
- E.4 Post-Project Conditions HEC-2 Model

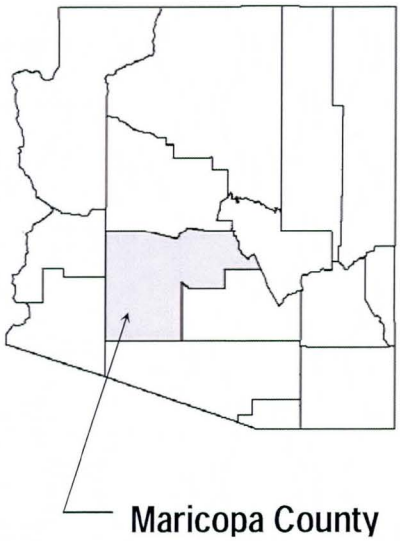
E.1 Effective FIS Documentation

FLOOD INSURANCE STUDY

VOLUME 4 OF 23

MARICOPA COUNTY, ARIZONA
AND INCORPORATED AREAS

COMMUNITY NAME	COMMUNITY NUMBER
AVONDALE, CITY OF	040038
BUCKEYE, TOWN OF	040039
CAREFREE, TOWN OF	040126
CAVE CREEK, TOWN OF	040129
CHANDLER, CITY OF	040040
EL MIRAGE, CITY OF	040041
FOUNTAIN HILLS, TOWN OF	040135
GILA BEND, TOWN OF	040043
GILBERT, TOWN OF	040044
GLENDALE, CITY OF	040045
GOODYEAR, CITY OF	040046
GUADALUPE, TOWN OF	040111
LITCHFIELD PARK, CITY OF	040128
MARICOPA COUNTY (UNINCORPORATED AREAS)	040037
MESA, CITY OF	040048
PARADISE VALLEY, TOWN OF	040049
PEORIA, CITY OF	040050
PHOENIX, CITY OF	040051
QUEEN CREEK, TOWN OF	040132
SCOTTSDALE, CITY OF	045012
SURPRISE, CITY OF	040053
TEMPE, CITY OF	040054
TOLLESON, CITY OF	040055
WICKENBURG, TOWN OF	040056
YOUNGTOWN, TOWN OF	040057



REVISED: OCTOBER 16, 2013

Federal Emergency Management Agency

FLOOD INSURANCE STUDY NUMBER
04013CV004B

FLOODING SOURCE		FLOODWAY			BASE FLOOD WATER SURFACE ELEVATION			
CROSS SECTION	DISTANCE[1]	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY	WITHOUT FLOODWAY	WITH FLOODWAY	INCREASE
					(FEET NAVD)			
Skunk Creek (Cont'd)								
AA	31,820	295	2,152	4.0	1,305.1	1,305.1	1,305.2	0.1
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AK	50,974	467	3,662	10.7	1,412.4	1,412.4	1,412.4	0.0
AL	51,779	428	2,924	13.3	1,415.3	1,415.3	1,415.3	0.0
AM	53,221	407	3,197	12.2	1,423.5	1,423.5	1,423.5	0.0
AN	53,699	486	3,021	12.9	1,428.5	1,428.5	1,428.5	0.0
AO	54,903	449	2,756	14.2	1,436.6	1,436.6	1,436.6	0.0
AP	55,980	422	3,143	12.4	1,443.7	1,443.7	1,443.7	0.0
AQ	57,040	486	3,476	11.2	1,452.3	1,452.3	1,452.3	0.0
AR	58,087	506	4,114	9.5	1,457.5	1,457.5	1,457.5	0.0
AS	64,460	910	4,132	8.5	1,495.3	1,495.3	1,495.3	0.0
AT	65,960	1,100	4,128	8.5	1,505.0	1,505.0	1,505.0	0.0
AU	67,460	1,960	4,481	7.8	1,514.2	1,514.2	1,514.2	0.0
AV	70,646	962	3,867	6.9	1,539.7	1,539.7	1,540.5	0.8
AW	73,075	1,524	2,981	9.0	1,557.2	1,557.2	1,557.4	0.2
AX	75,398	950	3,064	8.7	1,576.1	1,576.1	1,577.0	0.9
AY	78,461	480	3,227	8.3	1,598.8	1,598.8	1,599.7	0.9
AZ	79,675	376	2,000	13.4	1607.2	1607.2	1,607.2	0.0

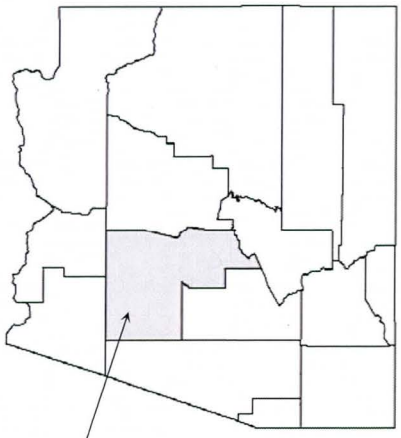
[1]Stream Distance in Feet Above Confluence With New River

FLOOD INSURANCE STUDY

VOLUME 18 OF 23

MARICOPA COUNTY, ARIZONA
AND INCORPORATED AREAS

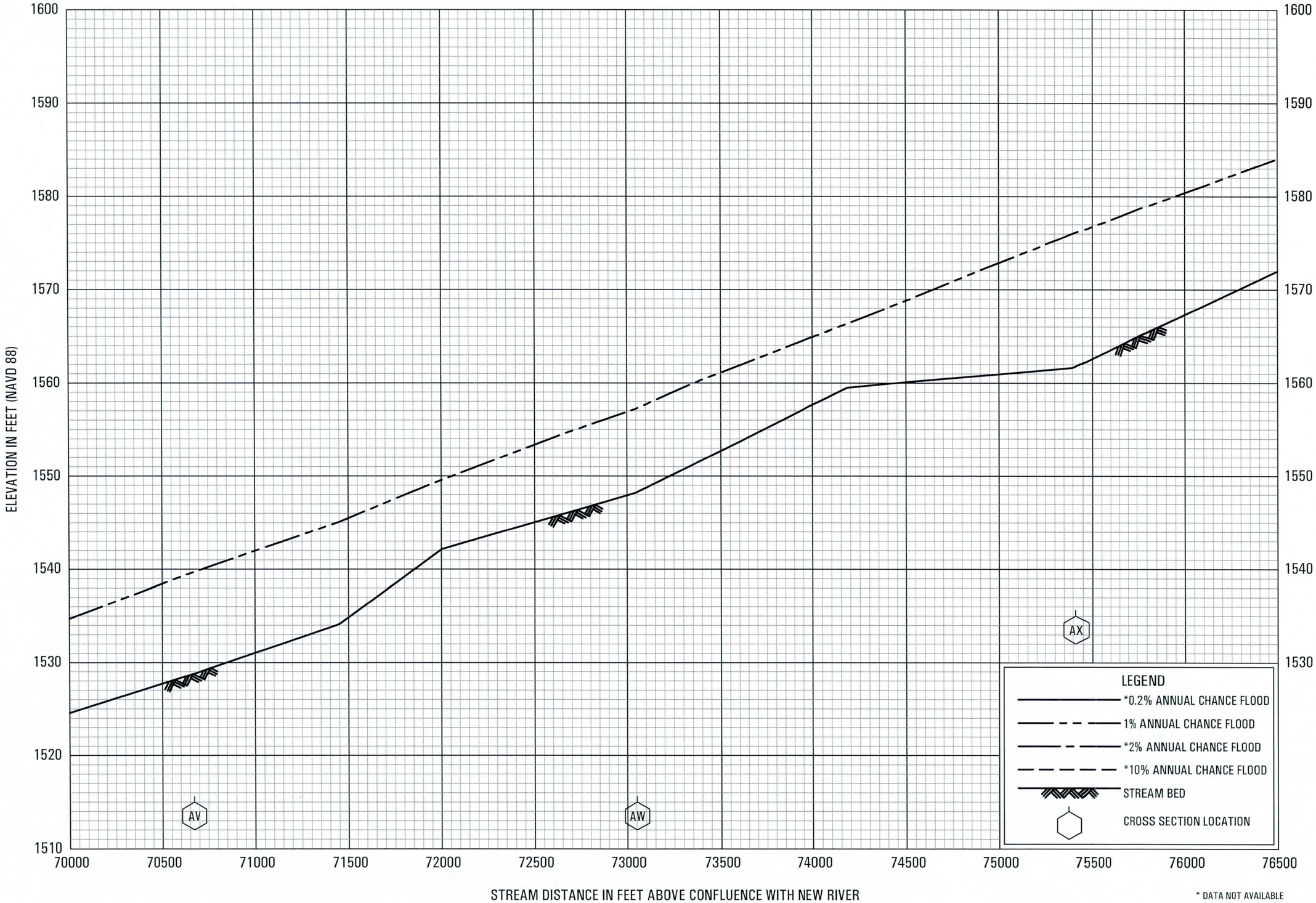
COMMUNITY NAME	COMMUNITY NUMBER
AVONDALE, CITY OF	040038
BUCKEYE, TOWN OF	040039
CAREFREE, TOWN OF	040126
CAVE CREEK, TOWN OF	040129
CHANDLER, CITY OF	040040
EL MIRAGE, CITY OF	040041
FOUNTAIN HILLS, TOWN OF	040135
GILA BEND, TOWN OF	040043
GILBERT, TOWN OF	040044
GLENDALE, CITY OF	040045
GOODYEAR, CITY OF	040046
GUADALUPE, TOWN OF	040111
LITCHFIELD PARK, CITY OF	040128
MARICOPA COUNTY (UNINCORPORATED AREAS)	040037
MESA, CITY OF	040048
PARADISE VALLEY, TOWN OF	040049
PEORIA, CITY OF	040050
PHOENIX, CITY OF	040051
QUEEN CREEK, TOWN OF	040132
SCOTTSDALE, CITY OF	045012
SURPRISE, CITY OF	040053
TEMPE, CITY OF	040054
TOLLESON, CITY OF	040055
WICKENBURG, TOWN OF	040056
YOUNGTOWN, TOWN OF	040057



REVISED: OCTOBER 16, 2013

Federal Emergency Management Agency

FLOOD INSURANCE STUDY NUMBER
04013CV018B



* DATA NOT AVAILABLE

FLOOD PROFILES

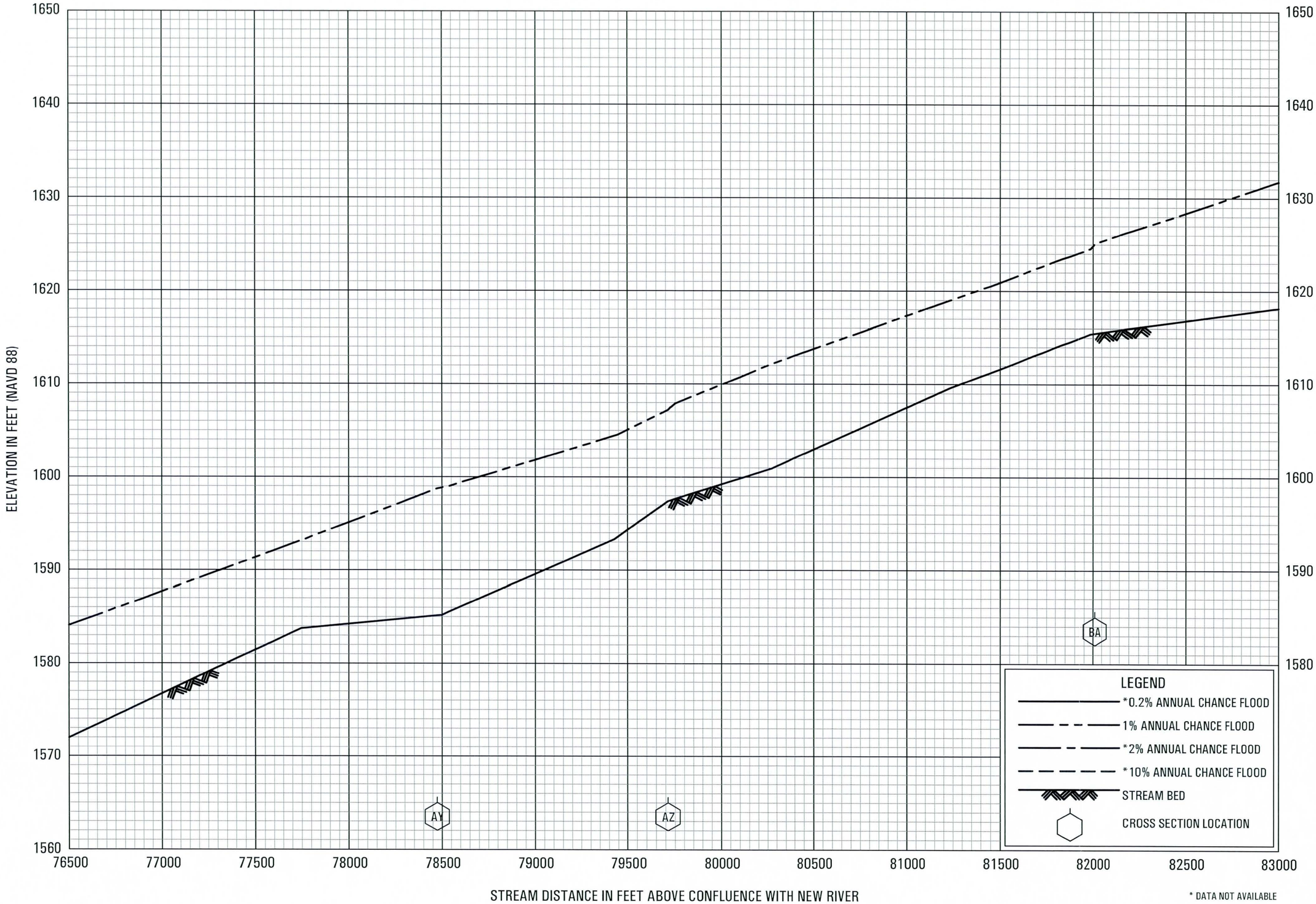
SKUNK CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY

MARICOPA COUNTY, AZ

AND INCORPORATED AREAS

1174P



* DATA NOT AVAILABLE

FLOOD PROFILES

SKUNK CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY

MARICOPA COUNTY, AZ

AND INCORPORATED AREAS

1175P

E.2 Duplicate Effective HEC-2 Model

```
1*****************************************                    ****************************************
 *  HEC-2 WATER SURFACE PROFILES           *                    *  U.S. ARMY CORPS OF ENGINEERS        *
 *                                         *                    *  HYDROLOGIC ENGINEERING CENTER       *
 *  Version   4.6.2;  May 1991             *                    *  609 SECOND STREET, SUITE D          *
 *                                         *                    *  DAVIS, CALIFORNIA 95616-4687        *
 *  RUN DATE    08MAY14    TIME   15:10:37 *                    *          (916) 756-1104              *
 *****************************************                    ****************************************

                                        X     X  XXXXXXX   XXXXX              XXXXX
                                        X     X  X        X     X            X     X
                                        X     X  X        X                        X
                                        XXXXXXX  XXXX     X          XXXXX    XXXXX
                                        X     X  X        X                  X
                                        X     X  X        X     X            X
                                        X     X  XXXXXXX   XXXXX             XXXXXXX
1
   08MAY14      15:10:37                                                                          PAGE    1


                                                                          THIS RUN EXECUTED 08MAY14    15:10:37
 ************************************
  HEC-2 WATER SURFACE PROFILES

  Version   4.6.2;  May 1991
 ************************************


        DUPLICATE EFFECTIVE MODEL FOR SONORAN DESERT DRIVE OVER SKUNK CREEK

        PREPARED BY KIMLEY-HORN
        FILENAME:    DUP_EFF.DAT

        PROFILE 1: EFFECTIVE FLOODPLAIN
        PROFILE 2: EFFECTIVE FLOODWAY

        MODEL COPIED FROM TRAMONTO LOMR. COMMENTS REMAIN UNCHANGED.  COMMENTS
        REMAIN UNCHANGED.

        COMPLETE HEC-2 MODEL FOR ENTIRE SKUNK CREEK FLOODPLAIN DELINEATION STUDY
        HEC ANALYSIS INCLUDES SECTIONS 13.00 TO 17.95 (FLOODPLAIN ANALYSIS ONLY)
        MONTGOMERY WATSON ANALYSIS INCLUDES SECTIONS 18.09 TO 20.62 AND 22.96 TO
        CASTRO FLEET ANALYSIS (DEL WEBB) INCLUDES SECTIONS 20.64 TO 22.95


 SPLIT FLOW BEING PERFORMED


 SF      SPLIT FLOW FROM SECTIONS 13.02 TO 13.28


 TW      I-17 SPLIT FLOW
         WEIR FLOW OCCURS ALONG I-17 BETWEEN CROSS-SECTIONS 13.02 & 13.28
         FLOW WEIRS OVER THE NORTH BOUND LANES OF I-17 AND ALSO OVER THE
         EMBANKMENT INTO THE CENTRAL ARIZONA PROJECT CANAL
 WS    11   13.02   13.28      -1     2.6
 WC     0  1527.2     490  1526.1     725    1526     780  1524.5     830    1526
 WC   855  1526.7     995    1528    1230    1530    1515    1532    1750    1534
 WC  1840  1534.5
1
   08MAY14      15:10:37                                                                          PAGE    2


 T1      SKUNK CREEK FLOODPLAIN AND FLOODWAY DELINEATION (METHOD 1)
 T2      100-YEAR FREQUENCY           DATE:  FEBRUARY 1998
 T2      RUN INCORPORATING FCDMC'S AND FEMA'S REVISIONS AT NEW RIVER ROAD BRIDGE
 T3      MONT. WAT. AND HEC

 J1  ICHECK    INQ       NINV      IDIR      STRT      METRIC    HVINS     Q         WSEL      FQ

                 2                                                                  1522.96

 J2  NPROF     IPLOT     PRFVS     XSECV     XSECH     FN        ALLDC     IBW       CHNIM     ITRACE

       1                  -1


 J3  VARIABLE CODES FOR SUMMARY PRINTOUT

      38        43         1         8        42         3        61         2        55        26
      56        39        38        38        53         4        54       110       115       150
     200

 J5  LPRNT    NUMSEC                    ********REQUESTED SECTION NUMBERS********
```

```
    -10        8     14.30     14.54     14.74     14.89     15.06     15.12     15.22     15.41

        SPLIT FLOW ANALYSES AT CAP CANAL & CAREFREE HWY
        NO FLOODWAY ANALYSIS PERFORMED FOR CROSS SECTIONS 13.00 TO 13.28
        DUE TO WEIR FLOW AND PONDING OF WATER UPSTREAM OF THE CAP CANAL BERM.
        THE FLOODWAY CONCEPT IS NOT APPLICABLE FOR THIS REACH.
        Q100 INCREASED FROM 15700 CFS TO 18900 CFS DUE TO UPSTREAM DEVELOPMENT.

QT        2      18900      18900
NC     .025       .025       .025        .3         .5
ET                 9.1        9.1                                                          9820       10065
        DOWNSTREAM OF BRINK OF CAP OVERCHUTE NO.1 (BOR STA 470+80)
        OVERFLOW DISCHARGE HAS BEEN ADJUSTED TO ACCOUNT FOR SPLIT FLOW TO CAP
        OVERCHUTE NO.2 (BOR STA 492+04)
X1    13.00         8       9820      10065
GR    1527.0      7780     1518.5     7780.5     1518.5     7939.5     1527.0       7940     1527.0       9820
GR    1518.5    9820.5     1518.5    10064.5     1527.0      10065

ET                 9.1        9.1                                                          9820       10065
        UPSTREAM ENTRANCE TO CAP OVERCUTE NO.1
X1    13.02         8       9820      10065        120        120        120
GR    1527.0      7780      1519     7780.5       1519     7939.5     1527.0       7940     1527.0       9820
GR     1519     9820.5      1519    10064.5     1527.0      10065
1
   08MAY14      15:10:37                                                                                    PAGE    3


NC      .04        .04        .04        .3         .5
ET                 9.1        9.1                                                          9537       10350
X1    13.04        77       9721      10130        100        100        100
GR    1531.2      7311     1526.9       7365     1526.6       7377     1527.8       7428       1527       7475
GR    1526.6      7516     1520.1       7540     1519.5       7577     1519.3       7631     1519.6       7648
GR    1518.7      7682       1519       7704     1518.1       7758     1518.4       7790     1520.6       7803
GR    1526.7      7829     1527.1       7840     1526.9       7898     1526.2       7917       1531       7961
GR    1532.2      7999       1532       8035     1532.1       8067     1532.4       8106     1537.1       8125
GR    1532.3      8139     1533.8       8206     1533.4       8257     1532.9       8297     1532.3       8355
GR    1532.9      8404     1533.1       8450     1533.5       8518     1533.5       8547     1533.9       8592
GR    1534.2      8649     1533.7       8711     1532.6       8807     1532.4       8944     1532.6       8993
GR      1533      9051     1532.4       9144     1533.9       9163     1536.3       9206     1537.1       9230
GR    1536.6      9261     1535.6       9288     1533.9       9315     1532.8       9358     1532.3       9408
GR    1532.3      9438     1532.1       9481     1529.4       9537     1527.9       9567     1527.1       9596
GR    1527.1      9632     1527.7       9669     1527.5       9710       1528       9721     1522.3       9749
GR    1520.2      9797     1519.6       9890     1520.1       9931     1521.2       9949     1520.1       9966
GR    1518.8      9976     1519.8      10027     1520.7      10082     1521.2      10108     1527.1      10130
GR    1526.8     10162     1526.5      10210       1527      10249     1527.4      10274     1527.5      10325
GR    1528.4     10355     1528.1      10398

NC     .069       .044       .050         .1         .3
ET                 9.1        9.1                                                          9550       10679
X1    13.08        57       9615      10182        230        230        230
GR     1532      7732       1530       7863       1528       7933       1526       8065       1525       8114
GR    1524.5      8264       1524       8409     1522.2       8469     1522.5       8605     1522.2       8621
GR    1522.8      8775     1522.9       8828       1523       8862     1522.5       8926     1521.9       8955
GR    1520.4      8966     1522.5       9024     1524.4       9127       1524       9197     1524.1       9265
GR    1524.4      9305       1524       9386     1524.3       9436     1523.7       9447     1523.6       9533
GR    1524.2      9615     1523.4       9651     1522.6       9720     1520.4       9740     1522.2       9755
GR    1522.9      9781     1524.6       9805     1520.9       9821       1521       9836     1522.2       9847
GR      1523      9886     1522.2       9978     1518.5       9992     1518.2      10002     1518.8      10008
GR    1522.4     10023       1522      10070     1521.1      10078       1522      10090       1522      10106
GR      1520     10131     1521.5      10160     1523.5      10182     1523.9      10210     1524.3      10274
GR    1524.7     10346       1526      10460     1525.8      10512     1524.4      10555     1524.5      10575
GR      1526     10616       1528      10679

NC     .038       .042       .052         .1         .3
ET                 9.1        9.1                                                          9421       10816
        NEW CROSS SECTION:  GR CARD DATA DEVELOPED FROM TOPOGRAPHIC MAPS
X1    13.16        53       9953      10288        420        425        421
GR     1534      7863       1532       8128       1530       8316       1528       8551     1526.5       8641
GR     1528      8791     1528.3       8868       1528       8888       1526       8946       1525       9139
GR     1526      9169     1526.2       9219       1526       9255     1525.3       9389       1526       9405
GR    1526.5      9421       1526       9442     1525.5       9459       1526       9481     1526.4       9632
GR     1526      9721       1525       9736       1526       9751       1528       9929     1528.3       9936
GR     1528      9943       1526       9953       1524       9963       1522       9981     1521.5       9991
GR     1522     10001       1524      10043     1524.5      10093       1524      10148       1523      10163
GR     1524     10215       1523      10220       1524      10225       1525      10235       1524      10245
GR    1523.2     10250       1524      10255       1526      10273     1526.2      10288       1526      10303
GR    1525.8     10323       1526      10349       1528      10689     1528.4      10744       1528      10774
GR    1527.5     10784       1528      10793     1529.8      10816
        CROSS-SECTION AT WHICH FLOWS TO CAP OVERCHUTES 1 AND 2 RECOMBINE.
        WSEL MATCHES AT THIS CROSS-SECTION
1
   08MAY14      15:10:37                                                                                    PAGE    4


ET                 9.1        9.1                                                          9537       10802
X1    13.28        65       9671      10110        390        610        600
GR     1536      8217     1534.9       8297     1534.2       8552     1534.3       8677       1534       8812
GR     1532      8979       1530       9107     1529.3       9165       1530       9205       1532       9255
GR    1532.2      9337     1531.5       9390     1531.5       9439     1530.1       9484     1525.7       9507
GR    1526.0      9523     1529.8       9537     1530.1       9605     1530.9       9671     1530.2       9682
GR    1530.4      9709     1531.2       9726     1531.3       9776     1530.4       9840     1529.7       9851
```

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GR   1530.9      9901     1531.6      9962     1530.6      9975     1522.9      9991     1522.6     10000
GR   1522.9     10034     1530.4     10052     1530.6     10083     1527.4     10097     1531.2     10110
GR   1531.0     10143     1531.2     10169     1532.3     10193     1532.9     10222     1532.2     10250
GR   1532.2     10302     1532.2     10347     1531.6     10363     1532.0     10389     1531.1     10421
GR   1531.1     10475     1531.1     10529     1529.7     10581     1530.3     10594     1530.6     10634
GR   1530.0     10654     1530.5     10667     1529.9     10697     1531.7     10727     1532.2     10771
GR   1532.9     10840     1533.5     10884     1533.9     10956     1533.3     10961     1534.6     10969
GR   1534.9     10995     1534.0     11002     1533.5     11019     1534.9     11025     1535.4     11065
        Q100 INCREASED FROM 23300,23300 TO 26700,26700 CFS
        DUE TO UPSTREAM DEVELOPMENT.

QT        2     26700     26700
ET                9.1       7.1                                   9670     10602                    11043
X1    13.40        74      9670     10319       650       590    678.6
GR     1540      8520      1538      8940      1536      9105     1535      9155      1536      9197
GR   1536.2      9202      1536      9212    1535.9    9214.5     1536      9217    1536.5      9287
GR     1536      9359    1535.5      9414      1536      9474   1537.5      9641    1537.6      9670
GR   1536.4      9692    1534.6      9719    1527.4      9732   1530.8      9748    1532.1      9770
GR   1530.0      9782    1534.1      9800    1533.9      9820   1535.3      9840    1534.9      9849
GR   1535.8      9866    1536.5      9908    1537.1      9939   1536.9      9968    1535.2      9980
GR   1529.0      9994    1528.7     10000    1529.7     10010   1534.5     10033    1534.1     10063
GR   1534.3     10084    1534.3     10102    1536.0     10133   1536.4     10164    1535.0     10177
GR   1535.9     10194    1535.2     10209    1526.8     10246   1528.5     10252    1529.1     10269
GR   1537.1     10289    1537.5     10319    1536.6     10361   1535.1     10379    1535.3     10395
GR   1536.0     10422    1535.1     10447    1535.7     10465   1535.8     10514    1535.1     10539
GR   1535.0     10600    1535.4     10653    1535.5     10687   1535.0     10726    1534.3     10744
GR   1534.4     10772    1535.1     10797    1534.7     10833   1535.5     10874    1535.5     10910
GR   1535.1     10944    1534.7     11001    1535.1     11027   1538.7     11030    1539.0     11043
GR   1538.8     11070    1537.4     11080    1540.1     11101   1539.6     11142

ET                         7.1                                   9160     10494
X1    13.55        79      9688     10494       740       850    787.3
GR   1544.6      8416    1544.5      8496    1543.9      8598   1543.5      8689    1542.8      8797
GR   1542.2      8877    1541.9      8929    1541.3      8950   1540.3      8963    1539.6      8985
GR   1540.1      8993    1540.1      9040    1539.8      9081   1540.4      9104    1540.0      9157
GR   1540.8      9241    1541.2      9311    1540.5      9346   1541.0      9443    1540.2      9451
GR   1541.2      9464    1541.0      9477    1541.9      9510   1542.7      9558    1543.1      9592
GR   1543.3      9645    1543.1      9688    1541.9      9715   1539.8      9736    1540.1      9742
GR   1538.2      9757    1537.4      9776    1532.2      9787   1535.6      9804    1540.7      9828
GR   1539.7      9836    1541.7      9855    1541.6      9877   1542.0      9897    1541.4      9930
GR   1541.8      9965    1535.8      9988    1535.2     10000   1538.4     10010    1540.8     10031
GR   1540.9     10045    1540.5     10054    1541.3     10065   1541.2     10098    1541.8     10123
GR   1541.3     10132    1542.7     10150    1541.1     10176   1539.5     10191    1538.7     10208
GR   1537.7     10219    1539.2     10233    1541.4     10262   1541.1     10270    1542.0     10283
GR   1542.3     10307    1541.4     10349    1537.3     10370   1537.9     10380    1537.0     10394
GR   1538.6     10403    1541.0     10432    1542.6     10456   1543.0     10494    1544.4     10550
1
   08MAY14      15:10:37                                                                          PAGE     5

GR   1544.5     10623    1545.0     10680    1545.2     10743   1544.8     10802    1544.6     10856
GR   1544.2     10907    1544.1     10973    1545.1     10985   1545.3     10993

ET                9.1       7.1                                   9055     10482     8335     10646
X1    13.66        92      9477     10486       500       540    549.1
GR   1548.4      8244    1548.9      8287    1549.0      8335   1548.3      8352    1548.2      8399
GR   1548.3      8462    1548.0      8514    1547.5      8594   1546.9      8663    1546.0      8720
GR   1545.8      8738    1544.9      8780    1544.1      8828   1543.6      8914    1543.1      8917
GR   1543.7      8921    1544.0      8985    1544.6      9048   1545.1      9086    1545.3      9138
GR   1546.1      9173    1546.5      9234    1546.3      9275   1546.0      9318    1545.7      9360
GR   1545.3      9383    1545.1      9436    1544.5      9449   1545.0      9457    1544.1      9467
GR   1545.4      9477    1544.9      9492    1543.5      9512   1540.2      9528    1540.5      9540
GR   1542.2      9550    1546.6      9572    1546.4      9585   1542.7      9600    1542.8      9619
GR   1543.3      9627    1542.4      9643    1543.1      9655   1546.0      9667    1546.6      9689
GR   1546.7      9709    1546.1      9717    1546.0      9736   1544.6      9744    1546.0      9753
GR   1545.3      9775    1546.1      9791    1546.1      9829   1547.5      9852    1547.5      9878
GR   1546.7      9894    1546.7      9941    1545.9      9956   1544.6      9988    1542.1     10000
GR   1542.3     10006    1543.9     10015    1543.0     10055   1543.5     10063    1546.5     10083
GR   1546.6     10108    1546.0     10119    1547.2     10133   1546.3     10145    1547.2     10160
GR   1546.2     10177    1546.6     10193    1546.1     10207   1546.4     10246    1546.8     10280
GR   1547.3     10324    1547.3     10357    1546.7     10379   1545.6     10392    1543.2     10408
GR   1543.9     10430    1542.9     10442    1542.6     10465   1548.6     10486    1549.3     10509
GR   1549.5     10557    1549.8     10592    1549.9     10646   1549.4     10686    1549.5     10727
GR   1549.4     10784    1549.5     10846

ET                9.1       7.1                                   8708     10232     8212     10433
        CROSS-SECTION PROVIDED BY AERIAL MAPPER SKEWED TO CONTAIN FLOW
X1    13.86        90      9330     10042      1060      1050   1049.1
GR   1556.0      8212    1554.0      8550    1553.0      8600   1553.4      8617    1552.4      8685
GR   1551.6      8708    1551.5      8749    1550.6      8759   1551.7      8767    1552.1      8788
GR   1551.5      8817    1554.3      8863    1555.1      8895   1555.4      8908    1555.1      8935
GR   1555.0      8975    1555.5      9022    1556.1      9072   1556.9      9125    1557.1      9165
GR   1557.3      9223    1556.6      9242    1557.3      9263   1557.4      9298    1557.0      9319
GR   1556.1      9330    1553.5      9344    1552.5      9379   1551.4      9393    1552.9      9404
GR   1552.7      9416    1551.9      9420    1553.3      9429   1553.2      9446    1549.8      9464
GR   1549.3      9472    1549.8      9494    1553.0      9513   1553.6      9535    1553.4      9596
GR   1552.9      9605    1553.3      9613    1553.5      9634   1553.4      9666    1553.2      9716
GR   1552.5      9727    1553.4      9739    1552.6      9770   1553.6      9784    1553.4      9803
GR   1551.8      9819    1551.2      9831    1552.5      9842   1551.1      9855    1553.3      9864
GR   1553.3      9885    1551.8      9919    1549.0      9936   1549.0      9948    1551.6      9970
GR   1550.4      9983    1547.6      9991    1546.3     10000   1551.6     10009    1554.6     10023
GR   1555.7     10042    1555.6     10083    1554.3     10149   1550.9     10159    1552.6     10171
GR   1554.4     10197    1554.7     10232    1556.0     10271   1557.0     10327    1557.5     10379
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GR   1557.7      10433     1557.5      10477     1557.5      10546     1557.7      10596     1557.6      10656
GR   1557.4      10695     1557.1      10752     1556.8      10820     1556.5      10873     1556.1      10945
GR   1555.9      10962     1555.7      11006     1558.1      11035     1561.0      11054     1561.7      11092

ET                 9.1        7.1                                          8805      10529      8530      10608
        CROSS-SECTION PROVIDED BY AERIAL MAPPER SKEWED TO CONTAIN FLOW
X1    14.07         65       9879      10059      1050       1100      1134.1
GR   1565.4       8530       1564       8652      1562       8685      1560.7       8705     1560.7       8805
GR     1562       8920     1562.4       9043    1562.8       9116      1563.1       9185     1562.8       9201
GR   1562.8       9250     1563.3       9286    1563.7       9321      1563.4       9353     1562.5       9394
GR   1561.5       9417     1561.4       9462    1562.3       9530      1562.4       9554     1562.0       9566
1
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GR   1562.0       9614     1562.3       9680    1563.1       9746      1563.6       9814     1564.0       9855
GR   1564.3       9879     1560.9       9898    1561.4       9904      1558.5       9924     1558.9       9938
GR   1558.9       9959     1557.5       9972    1557.5       9978      1558.5      10000     1562.0      10020
GR   1562.6      10040     1564.5      10059    1564.0      10077      1563.5      10125     1563.1      10151
GR   1562.6      10166     1562.7      10176    1562.2      10201      1563.1      10217     1563.0      10249
GR   1563.1      10300     1563.0      10338    1563.2      10381      1563.1      10396     1562.3      10404
GR   1563.1      10408     1563.1      10454    1563.1      10499      1564.1      10516     1565.5      10571
GR   1566.0      10608     1565.9      10656    1565.8      10710      1565.6      10758     1564.7      10813
GR   1564.3      10848     1564.8      10873    1565.1      10923      1570.0      10950     1570.8      10989

        The following GR record has been modified as per discussion with the
        FEMA technical evaluator. From station 8450 to station 9500, the
        elevations are read from the topographic map. From station 9563 to
        station 11361, the elevations remain the same as provided by the
        Aerial Mapping Company, Inc (AMCI) (March 17, 1998).

ET                           7.1                                          9210      10160
X1    14.30         73       9923      10027      1010       1210      1213.6
GR   1576.2       8450     1575.9       8550    1574.1       8650      1573.7       8750     1573.5       8850
GR   1573.4       8950     1573.3       9050    1572.5       9150      1572.5       9250     1571.9       9350
GR   1571.9       9450     1573.5       9500    1573.8       9563      1574.2       9626     1573.5       9652
GR   1573.1       9672     1573.8       9707    1573.7       9731      1573.8       9769     1573.2       9788
GR   1573.2       9836     1572.9       9878    1572.4       9906      1571.6       9923     1570.4       9941
GR   1565.1       9961     1565.2       9967    1560.0       9973      1560.3       9983     1559.6      10000
GR   1566.5      10011     1570.0      10027    1570.1      10045      1569.4      10052     1570.1      10062
GR   1571.0      10097     1571.2      10131    1571.1      10157      1572.5      10191     1572.9      10211
GR   1572.6      10251     1572.3      10297    1572.5      10351      1572.2      10386     1571.8      10410
GR   1572.1      10417     1571.7      10437    1571.7      10448      1571.5      10480     1571.6      10515
GR   1572.7      10552     1572.9      10571    1572.7      10608      1572.4      10642     1571.4      10681
GR   1571.6      10735     1571.9      10765    1572.0      10792      1571.2      10804     1571.8      10811
GR   1573.2      10852     1575.9      10899    1577.1      10931      1577.9      10967     1578.4      10992
GR   1578.7      11034     1578.6      11096    1578.4      11179      1578.2      11233     1577.7      11273
GR   1582.1      11295     1582.8      11336    1577.8      11361

ET                 9.1        7.1                                          9950      10480      9283      10588
X1    14.54         65       9950      10480      1410       1150      1273.2
GR   1584.8       8984     1584.8       9072    1584.7       9160      1584.7       9220     1584.9       9283
GR   1584.7       9355     1584.5       9421    1584.2       9499      1583.8       9525     1583.4       9546
GR   1583.7       9563     1583.4       9621    1583.8       9683      1583.0       9715     1583.4       9741
GR   1582.9       9767     1583.5       9798    1583.9       9818      1584.2       9845     1584.0       9892
GR   1583.2       9926     1581.9       9950    1574.4       9970      1574.0       9986     1571.6      10000
GR   1576.7      10045     1574.9      10066    1577.8      10080      1579.5      10110     1577.7      10136
GR   1578.5      10153     1578.1      10177    1576.3      10199      1576.9      10222     1576.6      10259
GR   1577.7      10273     1577.7      10287    1578.9      10306      1578.4      10354     1578.1      10384
GR   1577.0      10410     1578.1      10416    1578.3      10428      1577.7      10437     1580.1      10458
GR   1583.0      10480     1583.8      10495    1584.2      10523      1584.8      10556     1585.0      10588
GR   1584.4      10623     1583.5      10669    1583.4      10695      1583.4      10738     1583.8      10762
GR   1584.1      10808     1583.9      10821    1583.9      10881      1584.2      10936     1584.2      10999
GR   1584.2      11072     1584.3      11131    1584.1      11205      1584.2      11269     1584.9      11381
1
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NC     .059       .042       .039         .1         .3
        CROSS-SECTION PROVIDED BY AERIAL MAPPER SKEWED TO CONTAIN FLOW
ET                 9.1        7.1                                          9700      10100                 10380
X1    14.74         39       9976      10076      1180        970      1070.9
GR   1594.6       9253     1594.6       9384    1593.5       9435      1592.2       9495     1591.7       9526
GR   1590.5       9540     1589.6       9564    1589.3       9615      1589.0       9650     1587.4       9663
GR   1587.4       9705     1587.0       9720    1588.5       9769      1588.3       9791     1587.1       9809
GR   1586.1       9837     1585.5       9853    1585.1       9871      1585.5       9891     1584.9       9917
GR   1585.0       9952     1587.3       9976    1581.8       9988      1581.8      10000     1582.1      10024
GR   1581.7      10057     1588.3      10076    1588.3      10095      1590.2      10125     1591.0      10145
GR   1591.6      10172     1591.5      10203    1591.5      10225      1591.6      10248     1591.7      10375
GR     1592      10380     1591.6      10500      1592      10635      1592.6      10690

ET                 9.1        7.1                                          9600      10080      9490
X1    14.89         49       9938      10059       700        760       756.4
GR   1601.5       9234     1601.3       9270    1599.7       9318      1598.4       9337     1597.4       9377
GR   1597.0       9406     1596.9       9434    1597.5       9460      1598.4       9477     1598.5       9494
GR   1597.0       9511     1595.3       9549    1593.2       9572      1593.5       9577     1590.8       9587
GR   1591.2       9606     1591.0       9626    1592.0       9633      1593.0       9659     1592.7       9671
GR   1593.5       9683     1593.6       9702    1592.4       9714      1592.5       9741     1592.4       9775
GR   1592.7       9804     1591.3       9817    1591.4       9847      1591.8       9869     1592.2       9890
GR   1593.0       9906     1592.5       9927    1591.9       9938      1589.9       9949     1589.9       9956
GR   1587.2       9979     1583.3       9995    1583.2      10000      1583.3      10013     1583.8      10032
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GR   1588.0     10042    1596.4     10059    1597.2     10087    1598.2     10101    1599.3     10141
GR   1599.6     10186    1600.2     10236    1600.4     10284    1600.5     10319

ET                         7.1                                   9972     10390
X1     15.06        62     9972     10390      670       950     930.3
GR   1603.3      9119    1603.9      9192    1604.4      9267    1604.9      9349    1605.9      9431
GR   1606.0      9497    1606.1      9575    1606.3      9620    1606.6      9663    1606.5      9685
GR   1605.7      9707    1603.0      9733    1599.7      9751    1599.0      9759    1599.5      9764
GR   1600.1      9782    1600.6      9800    1600.6      9836    1601.4      9872    1602.1      9917
GR   1602.2      9972    1597.9      9988    1593.0     10000    1591.5     10010    1591.3     10020
GR   1594.5     10043    1593.9     10060    1595.3     10070    1597.5     10089    1598.0     10109
GR   1597.8     10126    1595.7     10138    1596.7     10152    1600.2     10174    1600.1     10205
GR   1593.4     10229    1593.7     10246    1596.4     10268    1596.6     10283    1597.3     10298
GR   1597.8     10314    1597.1     10323    1598.4     10337    1597.4     10350    1600.0     10367
GR   1601.4     10390    1601.3     10411    1599.6     10441    1595.7     10453    1600.3     10470
GR   1600.7     10480    1602.7     10495    1603.6     10517    1605.1     10549    1606.0     10581
GR   1606.6     10621    1606.9     10667    1607.1     10713    1607.2     10776    1607.4     10855
GR   1607.4     10916    1607.6     10950

ET                       9.1        7.1                                   9975     10351     9503     10546
X1     15.12        61     9975     10351      255       330     283.6
GR   1604.6      9081    1604.5      9136    1604.6      9184    1605.2      9236    1605.8      9313
GR   1606.1      9379    1606.4      9423    1606.8      9503    1606.7      9545    1606.5      9620
GR   1606.2      9665    1605.5      9703    1604.5      9754    1603.8      9762    1604.4      9792
GR   1603.5      9836    1603.5      9865    1602.9      9886    1603.3      9903    1603.9      9928
GR   1604.1      9975    1596.3     10000    1596.9     10009    1596.4     10015    1596.7     10032
GR   1595.8     10059    1600.2     10070    1601.3     10087    1601.7     10109    1602.2     10130
GR   1602.4     10144    1601.5     10156    1602.1     10176    1602.1     10205    1601.7     10213
GR   1602.2     10230    1602.8     10258    1595.4     10282    1596.7     10302    1597.2     10319
GR   1601.5     10351    1600.3     10370    1601.1     10378    1601.1     10387    1603.1     10417
1
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GR   1603.4     10441    1603.1     10480    1602.9     10493    1603.8     10513    1604.1     10532
GR   1606.5     10546    1606.1     10564    1607.2     10587    1608.2     10621    1609.1     10657
GR   1609.8     10716    1610.4     10769    1610.7     10822    1611.1     10863    1611.2     10909
GR     1611     10955

ET                       9.1        7.1                                   9977     10500     9749     10672
X1     15.22        54     9977     10348      535       600     553.1
GR   1609.2      9347    1609.6      9393    1610.2      9448    1610.9      9497    1611.3      9548
GR   1611.8      9619    1612.0      9694    1612.0      9749    1611.9      9816    1611.1      9893
GR   1610.5      9937    1609.1      9977    1599.9      9996    1599.4     10000    1599.2     10022
GR   1598.9     10041    1602.7     10057    1605.6     10077    1606.6     10091    1606.1     10113
GR   1606.8     10126    1607.7     10151    1607.9     10166    1606.7     10191    1606.0     10210
GR   1606.8     10234    1605.9     10242    1606.2     10249    1604.1     10260    1605.4     10269
GR   1605.1     10282    1602.0     10301    1601.5     10310    1601.9     10327    1607.8     10348
GR   1608.2     10374    1608.0     10413    1607.9     10439    1604.5     10461    1607.3     10480
GR   1607.9     10507    1609.1     10527    1611.0     10570    1612.3     10605    1613.6     10657
GR   1613.8     10672    1613.4     10708    1613.6     10752    1614.3     10797    1615.1     10850
GR   1615.6     10891    1616.3     10934    1616.8     10987    1617.2     11062

ET                         7.1                                   9979     10353
X1     15.41        57     9979     10353      980       950     968.9
GR   1618.0      9542    1618.6      9643    1618.9      9676    1620.7      9683    1619.0      9694
GR   1619.4      9751    1619.7      9787    1620.0      9830    1619.2      9867    1619.4      9907
GR   1619.7      9940    1618.7      9968    1615.1      9979    1609.8      9993    1609.2     10000
GR   1608.3     10009    1607.6     10021    1609.7     10027    1610.4     10043    1610.4     10053
GR   1611.1     10058    1612.8     10070    1613.1     10077    1611.8     10085    1612.0     10096
GR   1610.1     10106    1611.9     10113    1613.0     10124    1613.0     10135    1612.5     10157
GR   1611.8     10178    1612.0     10194    1610.2     10212    1610.9     10221    1610.4     10245
GR   1609.6     10257    1609.4     10282    1608.7     10297    1610.1     10310    1611.0     10324
GR   1611.0     10333    1614.7     10353    1618.6     10383    1620.1     10403    1620.5     10426
GR   1621.2     10440    1619.6     10464    1617.9     10479    1618.1     10496    1619.3     10517
GR   1620.0     10534    1621.0     10569    1622.0     10607    1622.6     10642    1622.9     10678
GR   1623.0     10732    1623.1     10769

ET                         7.1                                   9890     10182
X1     15.55        46     9935     10147      730       550     755.3
GR   1625.7      9335    1625.5      9408    1625.7      9486    1625.9      9510    1625.7      9532
GR   1626.2      9567    1627.0      9622    1628.0      9645    1627.1      9680    1626.7      9703
GR   1626.5      9731    1626.1      9761    1625.3      9790    1623.7      9822    1622.3      9835
GR   1618.7      9858    1619.5      9869    1619.7      9906    1619.5      9935    1618.8      9954
GR   1615.4      9972    1615.3      9982    1613.8      9991    1613.9     10000    1614.7     10030
GR   1615.2     10057    1614.9     10078    1613.4     10093    1614.5     10104    1617.5     10126
GR   1619.4     10147    1620.5     10184    1620.7     10222    1620.5     10247    1620.2     10266
GR   1619.4     10278    1618.9     10314    1619.4     10326    1620.0     10343    1624.2     10368
GR   1625.0     10381    1625.1     10410    1625.3     10453    1625.2     10483    1625.1     10525
GR   1625.0     10531

ET                         7.1                                   9477     10116
X1     15.75        50     9977     10102      880      1030    1048.4
GR   1633.1      9040    1633.1      9098    1632.7      9146    1632.0      9185    1632.0      9268
GR   1631.5      9319    1630.5      9364    1630.7      9404    1629.9      9431    1626.7      9467
GR   1626.1      9481    1624.3      9500    1624.3      9515    1623.4      9534    1619.5      9549
GR   1619.5      9557    1622.4      9566    1624.1      9580    1624.8      9602    1625.6      9637
GR   1626.1      9689    1626.0      9712    1625.0      9736    1625.4      9751    1627.1      9769
1
   08MAY14      15:10:37                                                                          PAGE     9

GR   1628.7      9816    1628.8      9835    1627.8      9850    1628.0      9875    1628.6      9933
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GR   1627.2      9944    1626.9      9963    1626.1      9967    1625.7      9977    1619.8     10000
GR   1620.1     10015    1621.2     10027    1621.5     10050    1616.7     10070    1616.3     10079
GR   1627.5     10102    1627.9     10116    1627.5     10121    1628.4     10138    1629.3     10174
GR   1630.3     10210    1631.2     10259    1631.4     10307    1631.7     10370    1631.7     10411

ET                          7.1                                   9817     10210
X1    15.89        58     9969     10210      700       730     738.4
GR   1636.6      9095    1637.0      9172    1636.9      9243    1637.2      9312    1637.1      9359
GR   1637.6      9398    1638.1      9428    1637.5      9460    1634.0      9490    1630.6      9517
GR   1631.6      9522    1631.8      9539    1631.4      9550    1631.6      9571    1632.6      9626
GR   1633.3      9676    1633.4      9714    1632.5      9744    1631.7      9775    1630.9      9809
GR   1629.2      9818    1629.2      9822    1630.6      9831    1631.6      9850    1632.4      9866
GR   1632.6      9887    1632.1      9901    1636.5      9919    1635.9      9934    1633.3      9949
GR   1633.2      9969    1632.2      9981    1626.9     10000    1627.0     10011    1628.2     10018
GR   1627.9     10035    1626.8     10056    1626.8     10068    1630.8     10096    1630.7     10121
GR   1631.1     10172    1630.2     10182    1630.1     10194    1633.5     10210    1635.6     10224
GR   1636.1     10243    1636.9     10296    1637.0     10337    1637.2     10370    1637.1     10414
GR   1636.4     10440    1636.4     10469    1635.7     10477    1636.7     10492    1636.9     10535
GR   1637.6     10578    1637.2     10598    1637.2     10621

ET                          7.1                                   9760     10130
X1    16.07        42     9948     10130      980       840     950.3
GR   1648.3      9258    1648.3      9327    1648.3      9384    1648.1      9446    1648.0      9494
GR   1647.3      9536    1646.8      9578    1645.7      9614    1644.4      9631    1641.8      9648
GR   1641.5      9701    1641.1      9720    1638.4      9734    1637.8      9750    1639.7      9760
GR   1637.5      9781    1639.3      9791    1639.5      9822    1638.8      9854    1638.8      9877
GR   1639.4      9884    1640.1      9902    1640.1      9948    1638.8      9974    1634.8      9986
GR   1634.3     10000    1634.7     10037    1635.4     10044    1636.2     10071    1636.3     10089
GR   1635.5     10105    1635.5     10113    1643.3     10130    1644.3     10166    1645.7     10196
GR   1646.5     10222    1646.6     10267    1646.7     10315    1646.2     10350    1645.8     10392
GR   1645.6     10433    1645.5     10494

ET                          7.1                                   9600     10068
X1    16.19        54     9934     10077      540       660     645.6
GR   1652.0      9011    1652.5      9072    1652.6      9131    1652.8      9193    1652.7      9235
GR   1651.8      9260    1649.9      9281    1647.9      9326    1645.6      9377    1644.7      9385
GR   1645.2      9392    1646.1      9431    1646.6      9457    1646.3      9500    1645.4      9506
GR   1646.3      9515    1646.3      9539    1645.2      9548    1645.8      9556    1645.2      9574
GR   1643.7      9600    1641.7      9613    1640.9      9624    1641.8      9639    1641.7      9652
GR   1642.7      9664    1642.9      9687    1642.4      9695    1642.5      9709    1644.9      9730
GR   1646.3      9760    1646.9      9781    1647.2      9807    1646.2      9817    1645.8      9833
GR   1646.5      9855    1646.9      9881    1644.9      9907    1644.4      9934    1643.9      9950
GR   1638.9      9966    1639.7      9981    1637.5     10000    1637.8     10018    1637.9     10034
GR   1639.1     10048    1652.0     10077    1652.8     10101    1653.2     10139    1653.3     10192
GR   1653.0     10245    1652.7     10291    1652.4     10341    1652.2     10389

ET                          7.1                                   9760     10042
X1    16.27        50     9760     10045      400       425     422.1
GR   1655.1      9044    1655.3      9106    1655.6      9139    1655.9      9198    1656.1      9247
GR   1656.3      9283    1655.9      9326    1654.9      9357    1652.7      9394    1650.9      9404
GR   1650.4      9443    1650.5      9466    1650.7      9508    1648.7      9529    1648.6      9539
GR   1646.7      9553    1648.2      9572    1647.6      9588    1648.6      9600    1647.5      9623
GR   1649.0      9643    1650.5      9667    1650.2      9682    1650.3      9700    1649.6      9724
1
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GR   1650.2      9760    1648.3      9771    1647.7      9798    1646.1      9816    1647.3      9835
GR   1647.9      9853    1649.6      9872    1649.9      9892    1648.8      9905    1648.9      9915
GR   1648.4      9923    1648.9      9947    1643.5      9967    1642.4      9990    1639.4     10000
GR   1639.8     10009    1640.0     10032    1654.9     10045    1655.9     10052    1656.0     10111
GR   1656.2     10158    1656.4     10207    1656.4     10255    1656.5     10316    1656.1     10391

ET                          7.1                                   9906     10430
X1    16.49        46     9906     10130     1190      1150    1153.6
GR   1667.1      9520    1667.6      9583    1667.4      9619    1665.7      9661    1665.1      9708
GR   1664.9      9776    1664.1      9808    1661.9      9841    1661.5      9871    1659.1      9888
GR   1659.2      9906    1653.7      9925    1653.9      9933    1653.8      9961    1653.3     10000
GR   1654.5     10018    1658.6     10040    1658.9     10066    1658.1     10073    1657.8     10095
GR   1659.1     10104    1659.5     10130    1653.7     10147    1654.0     10168    1653.7     10211
GR   1655.7     10224    1655.2     10234    1655.3     10246    1656.7     10253    1657.7     10285
GR   1658.8     10316    1659.1     10335    1658.9     10371    1657.8     10413    1656.7     10420
GR   1657.4     10428    1657.6     10438    1656.8     10446    1657.6     10465    1659.8     10485
GR   1662.4     10512    1663.3     10532    1664.0     10582    1664.5     10619    1664.7     10669
GR   1664.8     10742

NC     .043      .057     .043        .1        .3
ET                          7.1                                   9940     10590
X1    16.68        51     9928     10590      940      1160     997.5
GR   1682.1      9880    1676.2      9916    1673.5      9928    1662.9      9950    1662.6      9956
GR   1666.6      9964    1666.2      9989    1662.3     10000    1662.8     10009    1662.7     10020
GR   1664.5     10025    1665.2     10043    1665.3     10076    1664.9     10100    1662.9     10107
GR   1662.9     10120    1661.5     10135    1665.1     10142    1665.4     10161    1664.6     10168
GR   1664.2     10183    1664.5     10192    1663.7     10218    1662.3     10230    1661.7     10247
GR   1662.9     10262    1664.5     10302    1664.0     10308    1663.9     10353    1664.0     10390
GR   1663.6     10437    1663.5     10463    1662.9     10470    1663.5     10479    1662.7     10511
GR   1661.8     10530    1661.3     10540    1661.3     10553    1662.3     10569    1666.8     10590
GR   1675.2     10612    1674.8     10641    1675.2     10677    1675.4     10718    1675.4     10765
GR   1675.3     10821    1675.4     10870    1675.6     10900    1675.6     10938    1676.0     10964
GR   1676.0     11005


QT        2     27300     27300
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NC     .059       .042       .033         .3          .5

        DOWNSTREAM FACE OF CAREFREE HIGHWAY BRIDGE.
        BRIDGE OPENING ADJUSTED BY FACTOR OF 0.707 TO ACCOUNT FOR
        45 DEGREE SKEW.  DOWNSTREAM REACH LENGTHS REDUCED TO
        ACCOUNT FOR NEW CAREFREE HIGHWAY BRIDGE CONSTRUCTION.

X1    16.86          6       9893      10317       888.2       778.2       879.1       0.707
X2                                                                                                15
X3       10                                                                    1685        1685
GR   1685.3       9893    1671.01       9933     1670.42       10000     1669.51       10103     1669.11       10273
GR   1685.3      10317

        UPSTREAM FACE OF CAREFREE HIGHWAY BRIDGE.
        APPROXIMATELY 3,600 CFS DIVERTS OUT OF THE SKUNK CREEK WASH
        AT APPROXIMATELY 1,500 FEET WEST OF THE MAIN HIGHWAY BRIDGE.
        REFER TO SPLIT FLOW MODEL FROM CROSS-SECTION 16.87 TO CROSS-SECTION
        17.48. CROSS-SECTION 17.48 IS THE POINT OF FLOW MATCHING.
1
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        BT BASED UPON "AS-BUILT" PLANS ADJUSTED TO ACCOUNT FOR MAPPED
        CONDITIONS.  DOWNSTREAM REACH LENGTHS FOR CROSS-SECTION 16.87
        INCREASED TO 146 FT TO REFLECT THE ADDITION OF THE SOUTHERN
        HALF OF THE CAREFREE HIGHWAY BRIDGE. PIER WIDTH OF 3.5 FEET
        MULTIPLIED BY DEBRIS FACTOR OF 2 = 3 PIERS AT 7-FOOT WIDTH EACH.

SB     1.05       1.56        2.7          0         232          21        2254           2     1670.71     1669.11
X1    16.87          6       9890      10320         146         146         146       0.707
X2        0          0          1     1681.1        1686           0           0        1.33        .707          15
X3       10                                                                    1685        1685
BT        4       9885     1685.6                    9918      1685.7                   10102      1686.0
BT    10337     1685.8
GR   1684.9       9890    1671.81       9943     1671.88       10000     1672.01       10108     1670.71       10272
GR   1684.1      10320

QT        2      27300      27300
NC     .059       .042       .033         .1          .3

        GR DATA FOR SECTIONS 16.96 TO 17.95 IS BASED UPON ONE-FOOT MAPPING
        FROM CARTER-BURGESS DIGITAL TERRAIN MODEL. DATE: 2-24-99
        GR ELEVATIONS FOR SECTIONS 16.96 TO 17.95 ARE BASED UPON
        CITY OF PHOENIX DATUM.  MONTGOMERY-WATSON GR DATA ARE BASED UPON
        NGVD 1927 DATUM.  THE GR DATA FOR SECTIONS 16.96 TO 17.95 ARE
        RAISED BY 0.21 FEET ON THE X1 CARD FOR CONVERSION TO THE
        NGVD 1927 DATUM.

ET                 9.1        7.1                                        9914       10348        9914       10348
X1    16.96         61       9932      10342         410         600       456.2         1.0        0.21
X2                                                                                                15
GR   1684.1    9539.39    1680.00    9594.54     1682.00     9637.67     1680.00     9655.49     1680.00     9757.68
GR   1678.5    9807.96    1678.00    9870.41     1678.00     9902.01     1684.00     9929.31        1684        9932
GR   1684.0    9947.83     1678.0       9966     1677.71     9988.98     1676.00    10007.22     1676.00    10075.82
GR   1679.4   10134.07     1679.9   10257.04     1682.44     10270.3     1682.91    10282.57     1684.29    10307.33
GR   1684.7      10342     1685.2   10383.59      1685.6    10435.94     1684.59    10503.13     1681.61    10542.21
GR   1681.7   10567.46     1684.5   10601.12      1685.0    10660.64     1685.14     10704.2     1685.85    10830.52
GR   1686.6    10864.9     1688.5   10909.44      1688.7    10920.87     1688.46    10970.87     1688.21     11018.3
GR   1688.4   11061.63     1687.9   11137.84      1687.9    11246.93     1687.23    11567.48     1686.77    11645.69
GR   1686.1   11668.64     1685.0   11730.35      1682.7    11795.39     1683.11     11904.8     1683.60    11972.35
GR   1680.6   11995.13     1681.3   12009.48      1680.0    12021.63     1680.01    12033.37     1683.12     12052.5
GR   1684.1   12068.44     1683.2   12108.19      1683.9    12127.91     1683.29    12159.06     1683.75    12199.78
GR   1684.7   12221.54     1685.3   12302.92      1686.2    12482.15     1686.01    12553.87     1686.23    12583.61
GR   1685.8   12619.86

ET                 9.1        7.1                                        9650       10470        9533       10470
X1    17.06         68       9947      10090         630         440       566.0                    0.21
X2                                                                                                15
GR   1694.0    9385.95    1693.95    9443.14     1690.00     9475.62     1690.00     9497.53     1688.00     9557.26
GR   1684.0    9581.93    1682.31    9621.41     1686.00     9643.26     1686.00     9763.42     1684.00     9806.79
GR   1684.0    9929.44    1682.68       9947     1681.50     9963.19     1680.00     9982.51     1682.00     9988.59
GR   1682.0   10002.50     1678.0   10029.28     1678.00    10052.12     1684.48    10064.34     1686.00    10069.46
GR   1687.9      10090     1689.0   10122.23      1689.3    10215.28     1688.00    10336.61     1688.10    10396.62
1
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GR   1687.8   10487.99     1688.0   10511.72      1687.4    10522.16     1688.38    10572.12     1688.62    10626.53
GR   1689.6   10646.45     1690.6   10749.60      1690.3    10800.60     1690.98    10928.08     1690.54    11030.08
GR   1690.9   11081.08     1690.9   11116.85      1690.4    11217.90     1690.40    11307.94     1690.05    11414.59
GR   1688.9   11515.03     1688.4   11541.26      1687.2    11553.62     1688.71    11570.43     1688.71    11611.26
GR   1686.9   11659.40     1686.6   11686.45      1689.0    11715.46     1689.84    11790.80     1690.01    11846.52
GR   1691.6   11921.73     1691.6   11976.53      1690.2    12032.71     1690.45    12064.67     1689.28    12092.70
GR   1687.0   12101.40     1689.2   12110.11      1686.7    12121.50     1687.03    12132.17     1690.17    12142.33
GR   1688.6   12152.05     1690.3   12176.39      1690.4    12191.90     1689.44    12200.38     1691.39    12313.66
GR   1691.5   12385.08     1691.0   12479.24      1692.1    12605.82

NC     .048       .048       .046         .1          .3
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ET                 9.1       7.1                                   9788      10668       9746      10695
X1    17.18         56      9978     10254       610       510     600.8                   0.21
X2                                                                                                   15
GR   1699.8    9493.99   1697.06   9664.32   1695.56   9715.97   1694.00   9779.51   1692.05   9808.56
GR   1693.2    9845.85   1692.49   9935.01   1692.00   9963.19   1688.74      9978   1686.00   9990.45
GR   1686.0   10011.48    1690.0  10053.30   1690.00  10123.73   1687.29  10145.22   1686.00  10162.51
GR   1688.0   10206.89    1688.0  10244.97   1689.35     10254   1694.00  10284.66   1696.00  10342.46
GR   1695.4   10386.32    1695.1  10446.24   1694.00  10516.41   1693.77  10575.40   1693.06  10655.64
GR   1694.5   10749.27    1695.8  10806.19   1695.72  10933.46    1696.0  10997.29    1695.9  11083.48
GR   1696.1   11089.79    1696.5  11108.75   1695.63  11237.26    1694.8  11322.92    1693.7  11408.60
GR   1692.9   11445.19    1692.4  11459.18   1693.31  11474.48    1692.3  11499.27    1692.8  11568.83
GR   1693.0   11665.60    1693.9  11794.13   1694.57  11930.31    1695.5  12034.58    1695.9  12115.02
GR   1695.7   12238.17    1695.9  12285.64   1692.73  12313.61    1692.5  12332.10    1696.4  12352.81
GR   1695.9   12381.62    1696.6  12395.49   1696.08  12435.45    1696.7  12500.30    1698.0  12576.83
GR   1698.2   12621.60

ET                 9.1       7.1                                   9628      10535       9568      10560
X1    17.30         53      9970     10156       630       580     644.4                   0.21
X2                                                                                                   15
GR   1710.5   9112.36   1710.00   9177.76   1709.63   9217.43   1704.60   9322.93   1704.00   9419.22
GR   1703.9   9448.82   1701.30   9534.19   1700.00   9566.96   1700.00   9598.26   1698.00   9656.94
GR   1698.0   9720.94   1697.35   9761.09   1698.00   9881.54   1697.02   9933.98   1696.00   9946.95
GR   1692.0   9962.55      1692      9970   1692.00  10031.21   1694.00  10063.76   1696.00  10074.95
GR   1696.0  10119.18    1697.2     10156    1697.7  10169.28   1698.00  10277.48   1696.00  10295.67
GR   1696.1  10308.57    1698.0  10327.84    1698.0  10437.49   1700.00  10523.21   1700.30  10569.87
GR   1700.6  10584.84    1699.9  10675.27    1700.1  10755.39   1699.09  10873.25   1698.71  10927.80
GR   1699.6  11081.73    1699.2  11129.84    1699.4  11231.27   1700.25  11358.81   1700.39  11481.95
GR   1700.5  11585.67    1702.2  11666.67    1700.7  11730.00   1700.10  11772.84   1699.51  11807.15
GR   1696.2  11820.90    1696.9  11838.62    1700.5  11855.95   1700.12  11882.17   1700.24  11925.03
GR   1701.8  11987.03    1701.9  12128.46    1702.0  12183.66

ET                 9.1       7.1                                   9758      10471       9731      10473
X1    17.39         55      9893     10179       465       530     500.0                   0.21
X2                                                                                                   15
GR   1711.1   9116.73   1710.00   9167.22   1710.00   9190.00   1707.78   9326.23   1706.00   9403.55
GR   1706.0   9430.65   1705.12   9471.20   1704.74   9555.58   1704.99   9664.90   1705.40   9710.74
GR   1703.9   9779.45   1702.00   9887.09   1697.84      9893   1698.00   9898.69   1698.00   9920.72
GR   1700.0   9928.58    1696.0   9951.05   1696.00   9973.40   1698.00   9991.02   1700.00  10057.52
GR   1700.0  10099.04    1698.0  10111.87   1698.00  10131.69   1702.00  10144.53   1702.00  10170.78
1
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GR   1701.3     10179    1700.0  10195.61    1702.0  10231.60   1702.16  10316.97   1702.77  10463.14
GR   1703.1  10621.24    1703.1  10798.44    1702.8  10893.36   1702.71  10911.99   1702.16  10938.60
GR   1703.1  10984.81    1703.6  11071.94    1704.0  11149.81   1704.00  11216.87   1704.77  11322.45
GR   1704.5  11451.58    1704.3  11532.28    1705.1  11566.52   1702.62  11580.13   1704.07  11595.54
GR   1702.3  11601.47    1702.4  11622.56    1705.9  11645.05   1704.94  11673.91   1704.89  11732.23
GR   1705.4  11786.90    1704.9  11887.47    1705.2  11960.19   1704.78  12035.23   1704.18  12058.85

NC      .06      .060      .042        .1        .3
QT        2     27300     27300

ET                 9.1       7.1                                9488.92      10340       9478      10355

        APPROX. 3,600 CFS DIVERTS INTO RIGHT OVERBANK FROM THIS CROSS-SECTION
        DOWNSTREAM.  REFER TO SPLIT FLOW MODEL FOR RIGHT OVERBANK ANALYSIS.
        FLOODWAY ANALYSIS USES ENTIRE FLOW AND IS STRICTLY FOR MAIN CHANNEL.

X1    17.48         40      9893     10073       429       429     429.4                   0.21
X2                                                                                                   15
GR   1716.0   9372.88   1710.84   9458.51   1708.00   9485.84   1708.00   9544.18   1707.25   9597.50
GR   1706.6   9679.17   1706.00   9739.84   1706.00   9877.04   1702.68      9893   1702.00   9936.69
GR   1702.0  10037.70   1704.40  10047.62   1706.00  10063.16   1706.00     10073   1706.00  10247.95
GR   1706.5  10301.08    1706.8  10455.69   1706.73  10561.82   1706.57  10600.14   1706.88  10693.59
GR   1707.2  10757.24    1708.0  10805.71   1708.14  10845.01   1709.12  10975.02   1708.96  11014.26
GR   1707.7  11046.61    1707.6  11059.28   1708.52  11074.56   1706.96  11086.14   1708.52  11099.03
GR   1707.8  11126.83    1708.7  11136.13   1704.10  11173.88   1706.87  11188.45   1707.99  11249.19
GR   1708.8  11382.36    1709.3  11482.61   1709.58  11541.69   1710.44  11616.42   1711.83  11696.98

ET                 9.1       7.1                                9516.45      10263       9440      10274
X1    17.57         33      9923     10040       365       500     474.4                   0.21
X2                                                                                                   15
GR   1720.8   9203.88   1716.95   9303.56   1715.14   9335.15   1714.09   9428.56   1714.36   9471.01
GR   1710.0   9508.10   1711.13   9548.25   1712.00   9576.05   1712.00   9686.77   1708.00   9871.91
GR   1706.0   9897.50   1706.00      9923   1702.00   9930.23   1703.39   9971.46   1706.17  10007.46
GR   1708.7  10020.08   1710.00     10040   1708.32  10114.97   1711.29  10161.60   1712.00  10169.27
GR   1712.0  10401.97   1711.82  10474.54   1711.46  10628.12   1710.00  10672.93   1708.32  10688.83
GR   1710.0  10716.66   1710.06  10827.37   1711.41  10887.64   1713.38  11026.76   1713.78  11097.48
GR   1714.3  11153.34   1714.48  11225.31   1715.18  11289.40

ET                 9.1       7.1                                9423.70      10270       9350      10296
X1    17.65         31      9924     10021       370       500     460.8                   0.21
X2                                                                                                   15
GR   1734.7   9336.28   1726.00   9382.74   1716.00   9413.87   1714.00   9475.55   1712.00   9482.60
GR   1712.5   9493.88   1713.77   9550.02   1713.27   9594.24   1714.00   9630.30   1713.10   9665.77
GR   1714.0   9812.95   1711.89   9899.02   1708.00   9912.78   1707.04      9924   1704.00   9959.39
GR   1704.0   9984.01    1708.1   9992.68   1710.00  10000.49   1711.07     10021   1714.00  10077.36
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GR   1715.2   10133.98     1715.9   10205.53      1714.2    10358.37     1713.30    10370.66     1712.00    10376.05
GR   1712.0   10399.95     1714.0   10455.92      1715.9    10593.80     1716.54    10726.83     1718.00    10854.12
GR   1718.1   10903.11
1
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ET                 9.1        7.1                                        9642.06       10578        9600       10605
X1    17.78         28       9931      10026         490         720       661.3                     0.21
X2                                                                                                                  15
GR   1751.5    9514.89    1741.31    9570.53     1732.00     9599.65     1721.18     9627.65     1716.00     9684.50
GR   1718.0    9717.21    1718.27    9765.64     1720.00     9841.50     1720.00        9931     1720.00     9955.49
GR   1714.0    9973.26     1714.0    9988.08     1713.17       10026     1716.00    10070.76     1716.23    10151.26
GR   1715.8   10235.37     1718.0   10282.17     1720.00    10309.14     1720.00    10385.19     1716.00    10409.40
GR   1716.0   10447.79     1720.0   10488.02     1720.00    10527.03     1722.00    10585.51     1722.00    10781.23
GR   1723.6   10884.80     1724.0   10986.97     1724.69    11024.28

ET                 9.1        7.1                                        9745.39       10665        9700       10678
X1    17.84         29       9925      10219         310         310       341.7                     0.21
X2                                                                                                                  15
GR   1730.7    9670.69    1728.76    9713.32     1724.00     9753.84     1720.00     9772.54     1720.44     9790.38
GR   1722.1    9800.90    1724.00    9834.61     1724.00     9909.89     1723.00        9925     1722.00     9940.13
GR   1719.4    9955.16     1718.0   10029.40     1718.00    10048.88     1718.00    10133.86     1720.00    10164.50
GR   1720.1      10219     1722.0   10230.85     1722.00    10374.53     1723.13    10440.30     1722.38    10487.83
GR   1720.0   10533.75     1720.0   10579.92     1722.00    10616.26     1722.00    10663.58     1724.00    10716.91
GR   1724.5   10765.44     1725.3   10867.86     1725.36    10903.95     1726.37    11049.41

        CLOUD ROAD CROSSES THROUGH THIS CROSS-SECTION.
        3-60" CMPS:CAPACITY IGNORED

ET                           7.1                                        9818.68       10595
X1    17.95         42       9867      10047         500         520       563.8                     0.21
X2                                                                                                                  15
GR   1740.3    9755.02    1730.00    9818.34     1726.64     9852.10     1726.15        9867     1725.94     9873.24
GR   1724.0    9879.76     1724.0    9941.90     1722.00    10021.83     1722.00    10042.15     1723.30       10047
GR   1726.5   10058.87     1726.0   10131.78      1726.8    10166.46     1726.86    10219.74     1728.00    10281.54
GR   1728.0   10340.58     1726.0   10351.82      1724.0    10391.92     1724.22    10410.16     1728.00    10440.86
GR   1728.0   10470.78     1726.5   10517.06      1726.0    10529.03     1722.85    10545.77     1728.15    10569.84
GR   1730.0   10647.71     1730.1   10713.11      1730.0    10858.38     1729.75    10888.71     1730.00    11036.40
GR   1731.1   11046.39     1734.0   11060.67      1731.9    11064.15     1734.74    11068.55     1752.62    11081.31
GR   1754.9   11117.17     1762.6   11121.41      1773.7    11131.30     1795.88    11138.65     1761.77    11146.48
GR   1754.6   11150.26     1844.6   11242.14

        END OF CARTER-BURGESS ONE-FOOT CONTOUR MAPPING.
        MONTGOMERY-WATSON TWO-FOOT INTERVAL CONTOUR MAPPING RESUMES.

QT        2      27700      27700
ET                           7.1                                         9895       10610
X1    18.09         60       9936      10310       712.5         375       705.8
X2                                                                                                                  15
GR   1788.5       9672     1784.1       9713      1776.9        9762      1771.6       9792     1748.2       9828
GR   1733.9       9855     1732.7       9862      1729.9        9872      1729.7       9880     1731.3       9885
GR   1730.9       9900     1727.3       9919      1730.5        9936      1727.5       9951     1728.2       9971
GR   1728.2       9991     1727.4      10000      1727.8       10006      1728.8      10065     1729.6      10076
GR   1731.3      10090     1731.8      10119      1731.7       10178      1730.9      10226     1729.9      10264
GR   1726.2      10280     1725.9      10290      1733.0       10310      1732.9      10333     1731.3      10380
GR   1730.4      10407     1729.1      10447      1728.6       10497      1729.1      10522     1723.5      10540
1
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GR   1723.7      10556     1728.6      10573      1731.4       10597      1733.6      10633     1734.3      10663
GR   1734.2      10717     1733.5      10772      1732.5       10799      1732.3      10847     1732.4      10899
GR   1732.3      10935     1733.1      10974      1733.0       11013      1732.8      11076     1733.3      11132
GR   1733.7      11210     1734.0      11263      1734.7       11349      1735.8      11423     1736.6      11479
GR   1737.7      11538     1738.0      11570      1738.6       11595      1739.1      11632     1739.7      11661

NC     .055       .055       .030
ET                           7.1                                         9752       10425
X1    18.16         34       9836      10075         345         360       377.6
X2                                                                                                                  15
GR   1755.1       9687     1739.9       9711      1736.1        9724      1734.0       9754     1730.7       9768
GR   1730.5       9775     1733.9       9788      1735.2        9810      1735.2       9836     1734.7       9860
GR   1733.3       9877     1732.7       9892      1732.9        9911      1732.5       9951     1732.5       9981
GR   1729.6       9996     1729.6      10000      1729.6       10020      1728.8      10050     1739.0      10075
GR   1737.8      10078     1737.2      10095      1735.8       10124      1734.7      10139     1734.0      10155
GR   1733.5      10199       1730      10330        1730       10380        1734      10430       1736      10650
GR   1736.9      10750       1738      10930        1738       11040        1740      11130
        NEW CROSS SECTION: GR CARD DATA FOR 18.20 DEVELOPED FROM TOPOGRAPHIC MAP
        CROSS SECTION ADDED TO MODEL FLOW OVER CLOUD ROAD
        CAPACITY OF 3-60" CMPS IGNORED

ET                           7.1                                         9630       10330
X1    18.23         19       9800      10010         370         400       370
X2                                                                                                                  15
GR     1750       9510       1740       9550       1736        9640       1734       9650       1736       9660
GR     1736       9690       1735       9700       1736        9710       1738       9780       1738       9800
GR     1736       9930       1734       9950       1732        9965       1730      10000     1738.8      10010
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GR     1740      10240      1740      10480      1740      10730      1742      10870

ET                          7.1                                       9630      10330
X1    18.29         57      9914      10049       200        310       300
GR   1750.9       9535    1741.6       9583    1737.2       9597    1739.5       9608    1739.1       9634
GR   1737.5       9647    1732.6       9660    1737.5       9678    1739.3       9712    1740.2       9758
GR   1740.1       9788    1739.1       9800    1739.7       9812    1738.7       9832    1735.8       9852
GR   1737.4       9872    1738.3       9914    1737.0       9932    1735.5       9949    1735.0       9968
GR   1734.0       9976    1734.6       9984    1734.3      10000    1735.5      10009    1735.3      10020
GR   1733.5      10029    1739.9      10049    1740.5      10076    1740.0      10115    1736.1      10130
GR   1734.7      10144    1736.9      10160    1738.4      10185    1742.0      10213    1742.5      10244
GR   1742.8      10266    1742.2      10270    1742.8      10286    1742.8      10318    1742.7      10349
GR   1742.8      10388    1742.5      10395    1742.5      10429    1742.2      10468    1742.6      10472
GR   1742.5      10553    1741.1      10565    1742.8      10574    1743.2      10607    1743.0      10634
GR   1743.3      10693    1744.6      10746    1744.9      10795    1745.6      10858    1746.0      10899
GR   1747.1      10970    1747.8      11035

NC     .055       .055       .042
ET                          7.1                                       9832      10475
X1    18.49         63      9832      10037    1162.5        850    1099.7
GR   1762.2       9699    1754.7       9727    1746.3       9755    1747.1       9766    1747.4       9792
GR   1747.4       9832    1745.9       9853    1742.7       9867    1743.3       9895    1744.9       9909
GR   1744.8       9930    1744.6       9965    1741.7       9985    1741.9      10000    1745.2      10015
GR   1746.9      10037    1746.9      10052    1746.2      10060    1745.8      10072    1747.3      10082
GR   1747.8      10111    1748.7      10142    1748.9      10167    1749.0      10202    1748.9      10243
GR   1748.7      10282    1748.2      10327    1748.0      10379    1747.8      10394    1746.5      10406
GR   1747.4      10417    1743.7      10434    1744.0      10445    1746.9      10464    1742.3      10481
1
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GR   1746.3      10497    1748.9      10522    1750.3      10562    1751.2      10602    1751.4      10637
GR   1751.9      10676    1752.2      10727    1752.5      10780    1752.7      10817    1753.1      10834
GR   1753.7      10873    1754.2      10897    1754.5      10951    1754.9      10998    1755.3      11036
GR   1755.7      11087    1757.1      11131    1757.6      11137    1757.6      11163    1759.2      11194
GR   1759.0      11230    1759.4      11254    1760.4      11285    1761.5      11316    1763.0      11352
GR   1766.6      11387    1769.6      11411    1778.1      11458

NC     .040       .040       .030
ET                          7.1                                       9700      10480
X1    18.57         62      9947      10041       275        675     389.0
GR   1785.6       9578    1759.3       9624    1751.3       9644    1748.8       9663    1748.5       9671
GR   1746.0       9703    1743.7       9714    1743.5       9735    1746.6       9747    1749.2       9772
GR   1750.4       9819    1750.1       9829    1750.3       9832    1751.1       9879    1752.5       9926
GR   1752.5       9947    1745.1       9969    1744.4      10000    1744.4      10001    1745.5      10006
GR   1745.9      10014    1751.5      10041    1749.2      10062    1751.5      10076    1751.5      10102
GR   1750.9      10116    1751.2      10146    1752.4      10170    1752.3      10224    1751.4      10247
GR   1752.2      10263    1753.1      10302    1753.6      10332    1753.3      10360    1753.7      10386
GR   1751.0      10400    1753.4      10416    1752.6      10452    1752.5      10474    1751.8      10490
GR   1752.7      10507    1752.8      10528    1754.2      10560    1755.2      10585    1756.5      10600
GR   1757.0      10645    1757.7      10678    1757.9      10717    1758.1      10766    1758.8      10820
GR   1759.2      10862    1760.1      10915    1760.2      10941    1760.5      10950    1760.8      10964
GR   1760.4      10993    1760.2      11007    1761.1      11021    1761.8      11048    1765.7      11082
GR   1770.4      11111    1776.8      11148

QT         2      27300      27300
ET                  9.1        7.1                                       9380      10125       9321      10244
X1    18.74         69      9975      10142       750        650     917.8
GR   1770.0       9245    1770.1       9249    1763.2       9269    1763.1       9291    1762.2       9321
GR   1760.3       9332    1758.0       9362    1757.6       9377    1752.0       9388    1754.6       9404
GR   1753.8       9417    1750.4       9437    1750.7       9454    1754.9       9479    1756.6       9493
GR   1756.7       9528    1756.7       9552    1757.1       9583    1757.8       9616    1758.2       9656
GR   1758.9       9692    1760.0       9729    1759.4       9750    1759.8       9767    1758.1       9791
GR   1758.5       9814    1759.2       9851    1759.0       9883    1758.5       9908    1757.0       9924
GR   1757.7       9938    1757.7       9975    1755.1       9986    1755.0      10000    1755.2      10018
GR   1755.3      10042    1757.7      10056    1758.5      10111    1758.7      10142    1759.6      10163
GR   1760.5      10198    1760.9      10244    1760.1      10281    1759.2      10318    1759.3      10336
GR   1759.6      10361    1759.5      10381    1759.2      10434    1761.4      10471    1763.1      10502
GR   1763.6      10533    1763.5      10581    1763.1      10628    1763.7      10660    1763.7      10706
GR   1763.6      10752    1763.6      10796    1763.9      10855    1763.8      10889    1761.9      10896
GR   1763.9      10910    1764.0      10932    1766.7      10947    1766.0      10962    1764.0      10991
GR   1762.8      11003    1766.7      11018    1768.5      11036    1779.0      11093

ET                  9.1        7.1                                       9576      10140       9470      10165
X1    18.84         46      9915      10036       500        325     497.1
GR   1772.3       9380    1771.7       9419    1770.8       9450    1764.5       9475    1756.9       9503
GR   1757.6       9512    1758.4       9522    1758.5       9531    1757.4       9538    1759.8       9557
GR   1759.9       9576    1758.7       9586    1759.6       9597    1759.6       9604    1758.6       9612
GR   1760.0       9620    1760.6       9649    1760.6       9679    1761.0       9702    1759.8       9721
GR   1760.5       9732    1760.6       9768    1759.8       9784    1759.8       9797    1761.3       9818
GR   1763.1       9848    1763.4       9888    1763.2       9915    1759.9       9942    1758.0       9987
GR   1755.9      10000    1755.7      10008    1762.6      10036    1763.3      10051    1762.5      10101
GR   1760.8      10107    1762.3      10115    1764.2      10145    1765.5      10182    1766.0      10209
GR   1765.0      10231    1765.0      10258    1765.5      10308    1764.9      10357    1765.4      10413
GR   1765.4      10417
1
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ET                          7.1                                       9639      10480
X1    18.96         70      9924      10021       525        600     631.7
GR   1779.1       9326    1778.7       9377    1776.0       9418    1774.9       9427    1773.9       9442
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GR   1769.0      9458     1767.7      9482     1766.0      9489     1767.1      9496     1767.3      9514
GR   1767.0      9536     1768.0      9545     1768.8      9570     1768.6      9607     1768.1      9640
GR   1767.9      9649     1767.8      9687     1767.3      9714     1767.7      9726     1767.9      9764
GR   1767.6      9796     1768.2      9809     1768.3      9837     1768.6      9862     1768.2      9894
GR   1768.0      9924     1762.2      9931     1762.6      9938     1762.6      9959     1762.9     10000
GR   1763.3     10007     1766.3     10021     1767.2     10035     1767.2     10043     1766.0     10055
GR   1766.9     10069     1765.7     10100     1766.7     10107     1766.3     10125     1764.5     10137
GR   1769.4     10159     1771.0     10193     1770.9     10235     1770.5     10281     1769.0     10317
GR   1768.7     10347     1767.5     10358     1768.8     10370     1768.8     10401     1767.4     10408
GR   1768.5     10414     1769.0     10436     1769.7     10455     1770.2     10515     1770.5     10574
GR   1770.6     10644     1770.7     10686     1770.9     10731     1771.0     10781     1771.3     10818
GR   1771.2     10877     1772.4     10930     1773.1     10975     1773.1     11027     1773.4     11087
GR   1773.8     11135     1773.9     11195     1774.3     11217     1774.5     11277     1774.6     11298

NC     .031       .031       .045
1
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    SECNO      DEPTH      CWSEL      CRIWS      WSELK      EG         HV         HL         OLOSS      L-BANK ELEV
    Q          QLOB       QCH        QROB       ALOB       ACH        AROB       VOL        TWA        R-BANK ELEV
    TIME       VLOB       VCH        VROB       XNL        XNCH       XNR        WTN        ELMIN      SSTA
    SLOPE      XLOBL      XLCH       XLOBR      ITRIAL     IDC        ICONT      CORAR      TOPWID     ENDST

*SECNO 14.300

3265 DIVIDED FLOW

7185 MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED
    14.300     14.56   1574.16   1574.16   1574.16   1575.12       .96      9.14       .10   1571.60
   26700.0    5904.7    9812.2   10983.1    1318.6     906.6    1864.7     629.7     258.0   1570.00
       .30      4.48     10.82      5.89      .038      .052      .042      .000   1559.60   8646.87
   .008517     1010.     1214.     1210.        10        18         0       .00   2213.30  10868.65

*SECNO 14.540

3265 DIVIDED FLOW

3470 ENCROACHMENT STATIONS=     9283.0   10588.0  TYPE=      1  TARGET=     1305.000
    14.540     12.09   1583.69       .00   1583.69   1584.67       .98      9.55       .01   1581.90
   26700.0     219.2   26474.5      6.3     103.5    3326.5       4.4     739.3     303.8   1583.00
       .35      2.12      7.96      1.43      .038      .052      .042      .000   1571.60   9530.89
   .006749     1410.     1273.     1150.         4         0         0       .00    839.24  10492.90

*SECNO 14.740

3301 HV CHANGED MORE THAN HVINS

7185 MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED
    14.740     10.03   1591.73   1591.73   1591.73   1593.70      1.97      8.15       .30   1587.30
   26700.0   12573.5   13087.7    1038.7    1917.6     892.6     199.7     820.8     325.2   1588.30
       .38      6.56     14.66      5.20      .059      .039      .042      .000   1581.70   9523.94
   .008244     1180.     1071.      970.         3        12         0       .00    851.61  10375.55

*SECNO 14.890

3470 ENCROACHMENT STATIONS=     9490.0   10319.0  TYPE=      1  TARGET=    -9490.000
    14.890     13.80   1597.00   1596.53   1597.00   1598.98      1.98      5.28       .00   1591.90
   26700.0   10307.3   16384.7       8.0    1838.1    1195.0       6.3     870.9     336.9   1596.40
       .40      5.61     13.71      1.27      .059      .039      .042      .000   1583.20   9510.98
   .006355      700.      756.      760.         9        11         0       .00    569.09  10080.07

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    SECNO      DEPTH      CWSEL      CRIWS      WSELK      EG         HV         HL         OLOSS      L-BANK ELEV
    Q          QLOB       QCH        QROB       ALOB       ACH        AROB       VOL        TWA        R-BANK ELEV
    TIME       VLOB       VCH        VROB       XNL        XNCH       XNR        WTN        ELMIN      SSTA
    SLOPE      XLOBL      XLCH       XLOBR      ITRIAL     IDC        ICONT      CORAR      TOPWID     ENDST

*SECNO 15.060

3301 HV CHANGED MORE THAN HVINS

    15.060     11.63   1602.93       .00   1602.93   1604.16      1.22      5.10       .08   1602.20
   26700.0    1310.6   23650.9    1738.5     428.6    2552.0     298.6     931.7     349.3   1601.40
       .42      3.06      9.27      5.82      .059      .039      .042      .000   1591.30   9733.36
   .005370      670.      930.      950.         3         0         0       .00    767.36  10500.72

*SECNO 15.120

3301 HV CHANGED MORE THAN HVINS
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7185 MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED

3470 ENCROACHMENT STATIONS=     9503.0   10546.0  TYPE=      1  TARGET=     1043.000
    15.120      9.82   1605.22   1605.22   1605.22   1606.94      1.72      1.99       .15   1604.10
   26700.0    1064.5   22413.2    3222.3     337.2    2005.7     466.9     951.7     354.4   1601.50
       .43      3.16     11.17      6.90      .059      .039      .042      .000   1595.40   9717.32
   .009347      255.      284.      330.         4        10         0       .00    821.21  10538.53


*SECNO 15.220

3470 ENCROACHMENT STATIONS=     9749.0   10672.0  TYPE=      1  TARGET=      923.000
    15.220     11.30   1610.20       .00   1610.20   1612.00      1.79      5.03       .02   1609.10
   26700.0      27.4   23513.9    3158.8      17.3    2099.6     485.5     986.5     363.6   1607.80
       .45      1.58     11.20      6.51      .059      .039      .042      .000   1598.90   9945.53
   .008699      535.      553.      600.         3         0         0       .00    606.40  10551.93


*SECNO 15.410
    15.410      9.94   1617.54       .00   1617.54   1619.36      1.82      7.36       .01   1615.10
   26700.0      20.7   26566.4     112.9       9.1    2447.1      31.0    1042.9     374.8   1614.70
       .47      2.28     10.86      3.64      .059      .039      .042      .000   1607.60   9971.54
   .006699      980.      969.      950.         3         0         0       .00    403.31  10374.85


FLOW DISTRIBUTION FOR SECNO=     16.86          CWSEL=   1677.00

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    SECNO     DEPTH     CWSEL     CRIWS     WSELK     EG        HV        HL        OLOSS     L-BANK ELEV
    Q         QLOB      QCH       QROB      ALOB      ACH       AROB      VOL       TWA       R-BANK ELEV
    TIME      VLOB      VCH       VROB      XNL       XNCH      XNR       WTN       ELMIN     SSTA
    SLOPE     XLOBL     XLCH      XLOBR     ITRIAL    IDC       ICONT     CORAR     TOPWID    ENDST


STA=    9909.   10193.
  PER Q=    100.0
   AREA=   1828.3
    VEL=     14.9
  DEPTH=      6.8

FLOW DISTRIBUTION FOR SECNO=     16.87          CWSEL=   1680.84

STA=    9902.   10194.
  PER Q=    100.0
   AREA=   2387.4
    VEL=     11.4
  DEPTH=      8.4

FLOW DISTRIBUTION FOR SECNO=     16.96          CWSEL=   1684.88

STA=    9914.    9929.    9932.   10342.
  PER Q=       .5       .0     99.5
   AREA=     36.1      1.8   2099.5
    VEL=      3.6      1.9     12.9
  DEPTH=      2.4       .7      5.1

FLOW DISTRIBUTION FOR SECNO=     17.06          CWSEL=   1689.87

STA=    9533.    9621.    9763.    9807.    9929.    9947.   10090.   10397.   10470.
  PER Q=      7.8      9.6      3.8     15.0      2.6     56.4      3.1      1.6
   AREA=    376.9    559.0    201.8    693.3    110.9   1159.1    303.4    122.8
    VEL=      5.6      4.7      5.2      5.9      6.4     13.3      2.8      3.6
  DEPTH=      4.3      3.9      4.7      5.7      6.3      8.1      1.0      1.7

FLOW DISTRIBUTION FOR SECNO=     17.18          CWSEL=   1695.24

STA=    9746.    9846.    9935.    9978.   10254.   10516.   10695.
  PER Q=      3.1      3.8      4.0     82.2      3.0      4.0
   AREA=    169.0    195.1    147.6   1898.1    152.5    263.3
    VEL=      5.0      5.3      7.3     11.8      5.4      4.1
  DEPTH=      1.7      2.2      3.4      6.9       .6      1.5

1
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    SECNO     DEPTH     CWSEL     CRIWS     WSELK     EG        HV        HL        OLOSS     L-BANK ELEV
    Q         QLOB      QCH       QROB      ALOB      ACH       AROB      VOL       TWA       R-BANK ELEV
    TIME      VLOB      VCH       VROB      XNL       XNCH      XNR       WTN       ELMIN     SSTA
    SLOPE     XLOBL     XLCH      XLOBR     ITRIAL    IDC       ICONT     CORAR     TOPWID    ENDST


FLOW DISTRIBUTION FOR SECNO=     17.30          CWSEL=   1701.39

STA=    9568.    9721.    9882.    9934.    9963.    9970.   10156.   10277.   10309.   10437.   10560.
  PER Q=      6.4     11.9      4.2      5.3      2.8     45.2      8.5      3.6      8.8      3.3
   AREA=    367.5    563.3    192.6    172.6     68.4   1295.5    410.1    142.3    428.6    226.2
    VEL=      4.7      5.8      6.0      8.4     11.0      9.5      5.6      6.9      5.6      3.9
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  DEPTH=      2.4      3.5      3.7      6.0      9.2      7.0      3.4      4.6      3.3      1.8

 FLOW DISTRIBUTION FOR SECNO=     17.39          CWSEL=   1705.16

 STA=    9731.    9779.    9887.    9893.   10179.   10196.   10232.   10317.   10463.   10473.
   PER Q=       .2      4.2       .9     73.1      2.3      4.4      6.1      8.3       .4
    AREA=     25.4    215.6     29.7   1720.4     71.5    142.3    245.3    363.7     21.4
     VEL=      2.2      5.4      8.7     11.6      8.9      8.4      6.8      6.2      5.0
   DEPTH=       .5      2.0      5.0      6.0      4.3      4.0      2.9      2.5      2.2

 FLOW DISTRIBUTION FOR SECNO=     17.48          CWSEL=   1709.83

 STA=    9478.    9486.    9544.    9598.    9679.    9740.    9877.    9893.   10073.   10248.   10301.   10355.
   PER Q=       .1      1.1      1.5      3.7      3.9     10.3      2.2     57.5     13.1      3.5      3.0
    AREA=      9.5     94.2    106.1    219.6    201.1    495.9     84.2   1254.7    632.3    178.7    165.1
     VEL=      2.5      3.3      3.8      4.6      5.3      5.7      7.2     12.5      5.7      5.4      4.9
   DEPTH=      1.2      1.6      2.0      2.7      3.3      3.6      5.3      7.0      3.6      3.4      3.1

 FLOW DISTRIBUTION FOR SECNO=     17.57          CWSEL=   1713.84

 STA=    9477.    9508.    9548.    9576.    9687.    9872.    9898.    9923.   10040.   10115.   10162.   10169.   10274.
   PER Q=       .7      2.3       .8      2.2     14.2      5.3      6.7     53.2      8.1      3.9       .2      2.1
    AREA=     56.1    123.1     57.4    180.5    672.1    169.7    194.6   1002.6    335.1    178.4     15.2    170.7
     VEL=      3.6      5.2      4.0      3.4      5.8      8.6      9.5     14.5      6.6      6.0      3.8      3.3
   DEPTH=      1.8      3.1      2.1      1.6      3.6      6.6      7.6      8.6      4.5      3.8      2.0      1.6

 FLOW DISTRIBUTION FOR SECNO=     17.65          CWSEL=   1717.56

 STA=    9410.    9494.    9550.    9630.    9813.    9899.    9924.   10021.   10077.   10206.   10296.
   PER Q=      3.6      4.3      5.2     11.9      7.1      6.2     51.0      5.4      3.5      1.9
    AREA=    236.2    236.8    303.5    694.5    379.3    212.2   1050.1    271.5    284.8    176.9
     VEL=      4.1      5.0      4.6      4.7      5.1      8.0     13.3      5.4      3.3      2.9
   DEPTH=      2.8      4.2      3.8      3.8      4.4      8.5     10.8      4.8      2.2      2.0

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    SECNO     DEPTH     CWSEL     CRIWS     WSELK     EG        HV        HL        OLOSS     L-BANK ELEV
    Q         QLOB      QCH       QROB      ALOB      ACH       AROB      VOL       TWA       R-BANK ELEV
    TIME      VLOB      VCH       VROB      XNL       XNCH      XNR       WTN       ELMIN     SSTA
    SLOPE     XLOBL     XLCH      XLOBR     ITRIAL    IDC       ICONT     CORAR     TOPWID    ENDST

 FLOW DISTRIBUTION FOR SECNO=     17.78          CWSEL=   1722.50

 STA=    9625.    9685.    9717.    9766.    9842.    9931.   10026.   10071.   10151.   10235.   10282.   10385.   10448.
   PER Q=      3.8      4.0      3.9      3.9      2.7     22.2     10.2     12.6     13.6      5.9      3.8      8.3
    AREA=    211.7    172.9    201.0    239.0    204.5    602.6    344.7    496.7    527.4    252.0    262.4    345.0
     VEL=      4.9      6.3      5.3      4.4      3.6     10.0      8.0      7.0      7.0      6.3      3.9      6.5
   DEPTH=      3.5      5.3      4.2      3.2      2.3      6.3      7.7      6.2      6.3      5.4      2.5      5.5

 STA=   10448.   10488.   10605.
   PER Q=      3.4      1.9
    AREA=    172.4    169.9
     VEL=      5.4      3.0
   DEPTH=      4.3      1.5

 FLOW DISTRIBUTION FOR SECNO=     17.84          CWSEL=   1724.75

 STA=    9749.    9801.    9925.   10219.   10375.   10488.   10534.   10580.   10664.   10678.
   PER Q=      3.6      1.0     70.2      7.5      3.2      3.3      5.6      5.1       .5
    AREA=    159.8    105.7   1617.7    405.2    213.9    153.5    209.3    248.2     32.6
     VEL=      6.1      2.7     11.8      5.1      4.1      5.9      7.3      5.6      4.2
   DEPTH=      3.1       .9      5.5      2.6      1.9      3.3      4.5      3.0      2.3

 FLOW DISTRIBUTION FOR SECNO=     17.95          CWSEL=   1730.50

 STA=    9817.    9867.   10047.   10132.   10220.   10282.   10392.   10410.   10471.   10529.   10570.   11039.
   PER Q=      2.1     54.7      8.0      6.4      3.0      8.2      3.2      3.8      3.6      5.4      1.4
    AREA=    124.7   1240.0    358.4    319.2    176.7    384.2    112.7    196.8    189.0    213.4    218.9
     VEL=      4.6     12.0      6.1      5.5      4.7      5.8      7.8      5.3      5.1      7.0      1.8
   DEPTH=      2.5      6.9      4.2      3.6      2.9      3.5      6.2      3.2      3.2      5.2       .5

 FLOW DISTRIBUTION FOR SECNO=     18.09          CWSEL=   1734.95

 STA=    9853.    9919.    9936.   10310.   10407.   10447.   10497.   10522.   10540.   10556.   10573.   10633.   10899.
   PER Q=      4.7      2.0     49.8      3.8      3.8      6.1      3.1      3.8      5.5      3.7      3.0      4.2
    AREA=    281.4    102.8   1938.1    290.6    208.0    305.0    152.5    155.7    181.6    149.6    207.0    438.5
     VEL=      4.6      5.5      7.1      3.6      5.0      5.6      5.6      6.8      8.4      6.9      4.1      2.6
   DEPTH=      4.3      6.0      5.2      3.0      5.2      6.1      6.1      8.6     11.3      8.8      3.4      1.6

 STA=   10899.   11076.   11366.
   PER Q=      3.9      2.5
    AREA=    384.6    331.5
     VEL=      2.8      2.1
   DEPTH=      2.2      1.1

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    SECNO     DEPTH     CWSEL     CRIWS     WSELK     EG        HV        HL        OLOSS     L-BANK ELEV
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     Q         QLOB      QCH       QROB      ALOB      ACH       AROB      VOL       TWA       R-BANK ELEV
     TIME      VLOB      VCH       VROB      XNL       XNCH      XNR       WTN       ELMIN     SSTA
     SLOPE     XLOBL     XLCH      XLOBR     ITRIAL    IDC       ICONT     CORAR     TOPWID    ENDST


 FLOW DISTRIBUTION FOR SECNO=     18.16          CWSEL=   1736.55

 STA=    9722.    9775.    9836.   10075.   10199.   10330.   10380.   10430.   10650.   10711.
   PER Q=      3.5      2.6     50.3      3.3     17.9     11.5      6.2      4.6       .1
    AREA=    145.8    135.6   1025.0    183.7    628.7    327.5    227.5    340.8     16.8
     VEL=      6.6      5.3     13.6      5.0      7.9      9.7      7.6      3.7      1.2
   DEPTH=      2.8      2.2      4.4      1.5      4.8      6.5      4.5      1.5       .3

 FLOW DISTRIBUTION FOR SECNO=     18.23          CWSEL=   1741.75

 STA=    9543.    9640.    9660.    9690.    9710.    9780.    9800.   10010.   10240.   10480.   10730.   10852.
   PER Q=      5.9      3.4      4.0      3.0      6.7      1.3     59.3      6.8      4.4      4.5       .7
    AREA=    343.4    135.0    172.4    125.0    332.4     75.0   1333.1    540.0    419.5    437.0    106.9
     VEL=      4.7      7.0      6.4      6.7      5.6      4.8     12.3      3.5      2.9      2.9      1.8
   DEPTH=      3.5      6.7      5.7      6.2      4.7      3.7      6.3      2.3      1.7      1.7       .9

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 T1       Floodway Run - Method 1
 T2       Date:  5-65-14
 T3       Floodway Run - Method 1

 J1  ICHECK    INQ       NINV      IDIR      STRT      METRIC    HVINS     Q         WSEL      FQ

      -10        3                                                                  1522.96

 J2  NPROF     IPLOT     PRFVS     XSECV     XSECH     FN        ALLDC     IBW       CHNIM     ITRACE

       2                  -1

 *SECNO 14.300

 3301 HV CHANGED MORE THAN HVINS

 7185 MINIMUM SPECIFIC ENERGY
 3720 CRITICAL DEPTH ASSUMED

 3470 ENCROACHMENT STATIONS=     9210.0   10160.0  TYPE=      1  TARGET=      950.000
     14.300     15.43   1575.03   1575.03   1575.03   1576.49      1.46     10.39       .22   1571.60
    26700.0    9589.3   11865.3    5245.4    1484.2     997.5     582.4     580.7     191.4   1570.00
        .28      6.46     11.90      9.01      .038      .052      .042      .000   1559.60   9210.00
    .009056     1010.     1214.     1210.        10        18         0       .00    950.00  10160.00


 *SECNO 14.540

 3301 HV CHANGED MORE THAN HVINS


 3470 ENCROACHMENT STATIONS=     9950.0   10480.0  TYPE=      1  TARGET=      530.000
     14.540     12.69   1584.29       .00   1584.29   1585.12       .83      8.57       .06   1581.90
    26700.0        .0   26700.0        .0        .0    3644.1        .0     680.3     213.9 100000.00
        .33       .00      7.33       .00      .000      .052      .000      .000   1571.60   9950.00
    .005112     1410.     1273.     1150.         4         0         0       .00    530.00  10480.00


 *SECNO 14.740

 3301 HV CHANGED MORE THAN HVINS

 7185 MINIMUM SPECIFIC ENERGY
 3720 CRITICAL DEPTH ASSUMED

 3470 ENCROACHMENT STATIONS=     9700.0   10100.0  TYPE=      1  TARGET=      400.000
     14.740      9.93   1591.63   1591.63   1591.63   1594.44      2.80      7.83       .59   1587.30
    26700.0   11420.7   14669.6     609.7    1426.8     882.3      79.1     756.1     225.7   1588.30
        .36      8.00     16.63      7.70      .059      .039      .042      .000   1581.70   9700.00
    .010765     1180.     1071.      970.         2        15         0       .00    400.00  10100.00


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     SECNO     DEPTH     CWSEL     CRIWS     WSELK     EG        HV        HL        OLOSS     L-BANK ELEV
     Q         QLOB      QCH       QROB      ALOB      ACH       AROB      VOL       TWA       R-BANK ELEV
     TIME      VLOB      VCH       VROB      XNL       XNCH      XNR       WTN       ELMIN     SSTA
     SLOPE     XLOBL     XLCH      XLOBR     ITRIAL    IDC       ICONT     CORAR     TOPWID    ENDST


 *SECNO 14.890

 3301 HV CHANGED MORE THAN HVINS


 3302 WARNING:  CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE,  KRATIO =  1.51
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3470 ENCROACHMENT STATIONS=     9600.0   10080.0  TYPE=      1  TARGET=      480.000
    14.890     14.69   1597.89       .00   1597.89   1599.55      1.66      5.01       .11   1591.90
   26700.0   10339.7   16293.5      66.7    1898.7    1303.1      25.1     802.7     232.9   1596.40
       .38      5.45     12.50      2.66      .059      .039      .042      .000   1583.20   9600.00
   .004709      700.      756.      760.         5         0         0       .00    480.00  10080.00


*SECNO 15.060

3470 ENCROACHMENT STATIONS=     9972.0   10390.0  TYPE=      1  TARGET=      418.000
    15.060     11.58   1602.88       .00   1602.88   1604.61      1.73      5.03       .02   1602.20
   26700.0        .0   26700.0        .0        .0    2529.5        .0     858.5     241.5 100000.00
       .40       .00     10.56       .00      .000      .039      .000      .000   1591.30   9972.00
   .007097      670.      930.      950.         4         0         0       .00    418.00  10390.00


*SECNO 15.120

3301 HV CHANGED MORE THAN HVINS

7185 MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED

3470 ENCROACHMENT STATIONS=     9975.0   10351.0  TYPE=      1  TARGET=      376.000
    15.120      9.80   1605.20   1605.20   1605.20   1607.97      2.77      2.72       .31   1604.10
   26700.0        .0   26700.0        .0        .0    1999.7        .0     873.3     244.1 100000.00
       .41       .00     13.35       .00      .000      .039      .000      .000   1595.40   9975.00
   .013624      255.      284.      330.         3        15         0       .00    376.00  10351.00


*SECNO 15.220

3301 HV CHANGED MORE THAN HVINS
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    SECNO      DEPTH      CWSEL      CRIWS      WSELK      EG         HV         HL         OLOSS      L-BANK ELEV
    Q          QLOB       QCH        QROB       ALOB       ACH        AROB       VOL        TWA        R-BANK ELEV
    TIME       VLOB       VCH        VROB       XNL        XNCH       XNR        WTN        ELMIN      SSTA
    SLOPE      XLOBL      XLCH       XLOBR      ITRIAL     IDC        ICONT      CORAR      TOPWID     ENDST


3302 WARNING:  CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE,  KRATIO =  1.65

3470 ENCROACHMENT STATIONS=     9977.0   10500.0  TYPE=      1  TARGET=      523.000
    15.220     12.27   1611.17       .00   1611.17   1612.45      1.28      4.33       .15   1609.10
   26700.0        .0   23214.3    3485.7        .0    2460.6     569.0     905.5     249.9   1607.80
       .42       .00      9.43      6.13      .000      .039      .042      .000   1598.90   9977.00
   .005033      535.      553.      600.         4         0         0       .00    523.00  10500.00


*SECNO 15.410

3301 HV CHANGED MORE THAN HVINS


3470 ENCROACHMENT STATIONS=     9979.0   10353.0  TYPE=      1  TARGET=      374.000
    15.410      9.38   1616.98       .00   1616.98   1619.19      2.21      6.46       .28   1615.10
   26700.0        .0   26700.0        .0        .0    2236.8        .0     964.0     259.8 100000.00
       .45       .00     11.94       .00      .000      .039      .000      .000   1607.60   9979.00
   .009264      980.      969.      950.         3         0         0       .00    374.00  10353.00


FLOW DISTRIBUTION FOR SECNO=     16.86          CWSEL=   1677.00

STA=    9909.   10193.
  PER Q=    100.0
   AREA=   1830.4
    VEL=     14.9
  DEPTH=      6.8

FLOW DISTRIBUTION FOR SECNO=     16.87          CWSEL=   1680.84

STA=    9902.   10194.
  PER Q=    100.0
   AREA=   2387.4
    VEL=     11.4
  DEPTH=      8.4

FLOW DISTRIBUTION FOR SECNO=     16.96          CWSEL=   1684.88
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    SECNO      DEPTH      CWSEL      CRIWS      WSELK      EG         HV         HL         OLOSS      L-BANK ELEV
    Q          QLOB       QCH        QROB       ALOB       ACH        AROB       VOL        TWA        R-BANK ELEV
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     TIME      VLOB      VCH       VROB      XNL       XNCH      XNR       WTN       ELMIN     SSTA
     SLOPE     XLOBL     XLCH      XLOBR     ITRIAL    IDC       ICONT     CORAR     TOPWID    ENDST


 STA=    9914.    9929.    9932.   10342.
   PER Q=       .5       .0     99.5
    AREA=     36.1      1.8   2099.5
     VEL=      3.6      1.9     12.9
   DEPTH=      2.4       .7      5.1

 FLOW DISTRIBUTION FOR SECNO=     17.06          CWSEL=   1690.24

 STA=    9650.    9763.    9807.    9929.    9947.   10090.   10122.   10215.   10337.   10397.   10470.
   PER Q=      7.7      4.4     16.7      2.8     60.9       .7       .7      2.0      1.8      2.3
    AREA=    456.9    218.1    739.3    117.4   1212.7     50.9     81.7    167.2    118.7    150.3
     VEL=      4.6      5.5      6.2      6.6     13.7      3.6      2.4      3.2      4.1      4.1
   DEPTH=      4.0      5.0      6.0      6.7      8.5      1.6       .9      1.4      2.0      2.0

 FLOW DISTRIBUTION FOR SECNO=     17.18          CWSEL=   1695.19

 STA=    9788.    9809.    9846.    9935.    9963.    9978.   10254.   10285.   10313.   10516.   10575.   10656.   10668.
   PER Q=       .9      1.8      3.7      1.8      2.2     83.4      2.6       .1       .2       .8      2.0       .4
    AREA=     46.1     87.9    190.5     77.1     68.3   1883.8    101.4     13.9     30.7     64.7    125.7     22.6
     VEL=      5.3      5.7      5.4      6.3      8.8     12.1      7.1      2.0      2.0      3.4      4.4      4.4
   DEPTH=      2.2      2.4      2.1      2.7      4.6      6.8      3.3       .5       .2      1.1      1.6      1.8

 FLOW DISTRIBUTION FOR SECNO=     17.30          CWSEL=   1701.48

 STA=    9628.    9721.    9761.    9882.    9934.    9963.    9970.   10156.   10277.   10309.   10437.   10523.   10535.
   PER Q=      5.5      3.1      9.2      4.3      5.3      2.7     45.3      8.7      3.7      9.0      3.0       .1
    AREA=    289.8    144.4    433.2    197.3    175.2     69.1   1312.2    421.0    145.1    440.1    194.7     14.5
     VEL=      5.2      5.8      5.8      5.9      8.3     10.9      9.4      5.6      6.9      5.6      4.2      2.7
   DEPTH=      3.1      3.6      3.6      3.8      6.1      9.3      7.1      3.5      4.7      3.4      2.3      1.2

 FLOW DISTRIBUTION FOR SECNO=     17.39          CWSEL=   1705.16

 STA=    9758.    9779.    9887.    9893.   10179.   10196.   10232.   10317.   10463.   10471.
   PER Q=       .2      4.2       .9     73.2      2.3      4.4      6.1      8.2       .3
    AREA=     17.4    214.9     29.7   1718.6     71.4    142.0    244.7    362.7     17.0
     VEL=      2.9      5.4      8.7     11.6      8.9      8.4      6.8      6.2      4.8
   DEPTH=       .8      2.0      5.0      6.0      4.3      3.9      2.9      2.5      2.2

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     SECNO     DEPTH     CWSEL     CRIWS     WSELK     EG        HV        HL        OLOSS     L-BANK ELEV
     Q         QLOB      QCH       QROB      ALOB      ACH       AROB      VOL       TWA       R-BANK ELEV
     TIME      VLOB      VCH       VROB      XNL       XNCH      XNR       WTN       ELMIN     SSTA
     SLOPE     XLOBL     XLCH      XLOBR     ITRIAL    IDC       ICONT     CORAR     TOPWID    ENDST


 FLOW DISTRIBUTION FOR SECNO=     17.48          CWSEL=   1709.84

 STA=    9489.    9544.    9598.    9679.    9740.    9877.    9893.   10073.   10248.   10301.   10340.
   PER Q=      1.1      1.5      3.8      4.0     10.4      2.2     58.0     13.3      3.6      2.1
    AREA=     89.9    106.7    220.6    201.8    497.6     84.4   1256.9    634.5    179.4    120.2
     VEL=      3.3      3.8      4.7      5.4      5.7      7.2     12.6      5.7      5.4      4.9
   DEPTH=      1.6      2.0      2.7      3.3      3.6      5.3      7.0      3.6      3.4      3.1

 FLOW DISTRIBUTION FOR SECNO=     17.57          CWSEL=   1713.88

 STA=    9516.    9548.    9576.    9687.    9872.    9898.    9923.   10040.   10115.   10162.   10169.   10263.
   PER Q=      1.7       .9      2.3     14.5      5.4      6.8     53.9      8.3      4.0       .2      2.0
    AREA=     95.1     58.6    185.2    680.0    170.8    195.7   1007.5    338.3    180.4     15.6    156.8
     VEL=      4.8      4.0      3.5      5.8      8.7      9.5     14.6      6.7      6.0      3.9      3.4
   DEPTH=      3.0      2.1      1.7      3.7      6.7      7.7      8.6      4.5      3.9      2.0      1.7

 FLOW DISTRIBUTION FOR SECNO=     17.65          CWSEL=   1717.65

 STA=    9424.    9494.    9550.    9630.    9813.    9899.    9924.   10021.   10077.   10206.   10270.
   PER Q=      3.5      4.4      5.3     12.1      7.3      6.2     50.9      5.5      3.6      1.3
    AREA=    224.4    241.5    310.3    709.8    386.6    214.3   1058.3    276.2    295.6    122.2
     VEL=      4.2      5.0      4.6      4.7      5.1      7.9     13.1      5.4      3.4      2.8
   DEPTH=      3.2      4.3      3.9      3.9      4.5      8.6     10.9      4.9      2.3      1.9

 FLOW DISTRIBUTION FOR SECNO=     17.78          CWSEL=   1722.49

 STA=    9642.    9685.    9717.    9766.    9842.    9931.   10026.   10071.   10151.   10235.   10282.   10385.   10448.
   PER Q=      3.6      4.0      3.9      3.9      2.7     22.2     10.2     12.7     13.6      5.9      3.8      8.3
    AREA=    184.5    172.8    200.8    238.7    204.2    602.2    344.5    496.4    527.1    251.8    262.0    344.8
     VEL=      5.3      6.3      5.4      4.5      3.6     10.1      8.1      7.0      7.0      6.4      3.9      6.6
   DEPTH=      4.3      5.3      4.1      3.1      2.3      6.3      7.7      6.2      6.3      5.4      2.5      5.5

 STA=   10448.   10488.   10578.
   PER Q=      3.4      1.9
    AREA=    172.2    160.9
     VEL=      5.4      3.1
   DEPTH=      4.3      1.8

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    SECNO     DEPTH     CWSEL     CRIWS     WSELK     EG        HV        HL        OLOSS     L-BANK ELEV
    Q         QLOB      QCH       QROB      ALOB      ACH       AROB      VOL       TWA       R-BANK ELEV
    TIME      VLOB      VCH       VROB      XNL       XNCH      XNR       WTN       ELMIN     SSTA
    SLOPE     XLOBL     XLCH      XLOBR     ITRIAL    IDC       ICONT     CORAR     TOPWID    ENDST


FLOW DISTRIBUTION FOR SECNO=     17.84          CWSEL=   1724.75

STA=    9749.    9801.    9925.   10219.   10375.   10488.   10534.   10580.   10664.   10665.
  PER Q=      3.6      1.1     70.5      7.6      3.2      3.4      5.6      5.1       .0
   AREA=    160.3    106.8   1620.3    406.6    215.0    153.9    209.7    249.0      3.6
    VEL=      6.1      2.7     11.9      5.1      4.1      6.0      7.3      5.6      2.5
  DEPTH=      3.1       .9      5.5      2.6      1.9      3.4      4.5      3.0      2.5

FLOW DISTRIBUTION FOR SECNO=     17.95          CWSEL=   1730.51

STA=    9819.    9867.   10047.   10132.   10220.   10282.   10392.   10410.   10471.   10529.   10570.   10595.
  PER Q=      2.1     55.1      8.1      6.5      3.1      8.3      3.3      3.9      3.6      5.5       .6
   AREA=    124.7   1241.3    359.0    319.7    177.1    384.9    112.8    197.2    189.4    213.7     46.5
    VEL=      4.7     12.1      6.2      5.6      4.7      5.9      7.9      5.4      5.2      7.0      3.4
  DEPTH=      2.6      6.9      4.2      3.6      2.9      3.5      6.2      3.3      3.3      5.2      1.8

FLOW DISTRIBUTION FOR SECNO=     18.09          CWSEL=   1735.16

STA=    9895.    9936.   10310.   10407.   10447.   10497.   10522.   10540.   10556.   10573.   10610.
  PER Q=      5.1     57.7      4.6      4.4      7.0      3.5      4.3      6.2      4.2      3.0
   AREA=    242.3   2015.0    310.6    216.2    315.3    157.6    159.4    184.9    153.1    167.4
    VEL=      5.8      7.9      4.1      5.6      6.2      6.2      7.5      9.3      7.6      4.9
  DEPTH=      5.9      5.4      3.2      5.4      6.3      6.3      8.9     11.6      9.0      4.5

FLOW DISTRIBUTION FOR SECNO=     18.16          CWSEL=   1736.96

STA=    9752.    9775.    9836.   10075.   10199.   10330.   10380.   10425.
  PER Q=      3.1      3.1     53.3      4.0     18.8     11.7      6.1
   AREA=    114.7    160.2   1119.1    221.8    681.5    347.6    231.8
    VEL=      7.4      5.3     13.2      5.0      7.7      9.3      7.2
  DEPTH=      5.0      2.6      4.8      1.8      5.2      7.0      5.2

FLOW DISTRIBUTION FOR SECNO=     18.23          CWSEL=   1741.77

STA=    9630.    9640.    9650.    9660.    9690.    9700.    9710.    9780.    9800.   10010.   10240.   10330.
  PER Q=      1.1      2.0      2.0      4.5      1.7      1.7      7.7      1.5     68.0      7.9      1.9
   AREA=     55.5     67.7     67.7    173.0     62.7     62.7    333.8     75.4   1337.3    544.6    159.1
    VEL=      5.3      8.0      8.0      7.3      7.7      7.7      6.4      5.5     14.1      4.0      3.3
  DEPTH=      5.5      6.8      6.8      5.8      6.3      6.3      4.8      3.8      6.4      2.4      1.8

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                                                                                THIS RUN EXECUTED 08MAY14    15:13:02
*************************************
 HEC-2 WATER SURFACE PROFILES

 Version   4.6.2;  May 1991
*************************************


NOTE- ASTERISK (*) AT LEFT OF CROSS-SECTION NUMBER INDICATES MESSAGE IN SUMMARY OF ERRORS LIST


MONT. WAT. AND HEC

SUMMARY PRINTOUT

      SECNO       Q       CWSEL     DEPTH     ELMIN      EG       DIFEG     CRIWS     VLOB      VCH      VROB      XLCH      SECNO

*     14.300  26700.00   1574.16     14.56   1559.60   1575.12      .00   1574.16      4.48     10.82      5.89   1213.60    14.30
*     14.300  26700.00   1575.03     15.43   1559.60   1576.49     1.37   1575.03      6.46     11.90      9.01   1213.60    14.30

      14.540  26700.00   1583.69     12.09   1571.60   1584.67      .00       .00      2.12      7.96      1.43   1273.20    14.54
      14.540  26700.00   1584.29     12.69   1571.60   1585.12      .45       .00       .00      7.33       .00   1273.20    14.54

*     14.740  26700.00   1591.73     10.03   1581.70   1593.70      .00   1591.73      6.56     14.66      5.20   1070.90    14.74
*     14.740  26700.00   1591.63      9.93   1581.70   1594.44      .74   1591.63      8.00     16.63      7.70   1070.90    14.74

      14.890  26700.00   1597.00     13.80   1583.20   1598.98      .00   1596.53      5.61     13.71      1.27    756.40    14.89
*     14.890  26700.00   1597.89     14.69   1583.20   1599.55      .57       .00      5.45     12.50      2.66    756.40    14.89

      15.060  26700.00   1602.93     11.63   1591.30   1604.16      .00       .00      3.06      9.27      5.82    930.30    15.06
      15.060  26700.00   1602.88     11.58   1591.30   1604.61      .45       .00       .00     10.56       .00    930.30    15.06

*     15.120  26700.00   1605.22      9.82   1595.40   1606.94      .00   1605.22      3.16     11.17      6.90    283.60    15.12
*     15.120  26700.00   1605.20      9.80   1595.40   1607.97     1.03   1605.20       .00     13.35       .00    283.60    15.12

      15.220  26700.00   1610.20     11.30   1598.90   1612.00      .00       .00      1.58     11.20      6.51    553.10    15.22
*     15.220  26700.00   1611.17     12.27   1598.90   1612.45      .46       .00       .00      9.43      6.13    553.10    15.22

      15.410  26700.00   1617.54      9.94   1607.60   1619.36      .00       .00      2.28     10.86      3.64    968.90    15.41
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15.410	26700.00	1616.98	9.38	1607.60	1619.19	-.17	.00	.00	11.94	.00	968.90	15.41

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MONT. WAT. AND HEC

SUMMARY PRINTOUT

	SECNO	SSTA	TOPWID	ENDST
*	14.300	8646.87	2213.30	10868.65
*	14.300	9210.00	950.00	10160.00
	14.540	9530.89	839.24	10492.90
	14.540	9950.00	530.00	10480.00
*	14.740	9523.94	851.61	10375.55
*	14.740	9700.00	400.00	10100.00
	14.890	9510.98	569.09	10080.07
*	14.890	9600.00	480.00	10080.00
	15.060	9733.36	767.36	10500.72
	15.060	9972.00	418.00	10390.00
*	15.120	9717.32	821.21	10538.53
*	15.120	9975.00	376.00	10351.00
	15.220	9945.53	606.40	10551.93
*	15.220	9977.00	523.00	10500.00
	15.410	9971.54	403.31	10374.85
	15.410	9979.00	374.00	10353.00

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MONT. WAT. AND HEC

SUMMARY PRINTOUT TABLE 110

	SECNO	CWSEL	DIFKWS	EG	TOPWID	QLOB	QCH	QROB	PERENC	STENCL	STCHL	STCHR	STENCR
*	14.300	1574.16	.00	1575.12	2213.30	5904.67	9812.20	10983.13	.00	.00	9923.00	10027.00	.00
*	14.300	1575.03	.00	1576.49	950.00	9589.30	11865.30	5245.40	950.00	9210.00	9923.00	10027.00	10160.00
	14.540	1583.69	.00	1584.67	839.24	219.17	26474.51	6.32	1305.00	9283.00	9950.00	10480.00	10588.00
	14.540	1584.29	.00	1585.12	530.00	.00	26700.00	.00	530.00	9950.00	9950.00	10480.00	10480.00
*	14.740	1591.73	.00	1593.70	851.61	12573.53	13087.74	1038.72	10380.00	.00	9976.00	10076.00	10380.00
*	14.740	1591.63	.00	1594.44	400.00	11420.69	14669.58	609.74	400.00	9700.00	9976.00	10076.00	10100.00
	14.890	1597.00	.00	1598.98	569.09	10307.29	16384.68	8.03	-9490.00	9490.00	9938.00	10059.00	10319.00
*	14.890	1597.89	.00	1599.55	480.00	10339.75	16293.54	66.71	480.00	9600.00	9938.00	10059.00	10080.00
	15.060	1602.93	.00	1604.16	767.36	1310.58	23650.94	1738.48	.00	.00	9972.00	10390.00	.00
	15.060	1602.88	.00	1604.61	418.00	.00	26700.00	.00	418.00	9972.00	9972.00	10390.00	10390.00
*	15.120	1605.22	.00	1606.94	821.21	1064.47	22413.19	3222.34	1043.00	9503.00	9975.00	10351.00	10546.00
*	15.120	1605.20	.00	1607.97	376.00	.00	26700.00	.00	376.00	9975.00	9975.00	10351.00	10351.00
	15.220	1610.20	.00	1612.00	606.40	27.35	23513.85	3158.80	923.00	9749.00	9977.00	10348.00	10672.00
*	15.220	1611.17	.00	1612.45	523.00	.00	23214.30	3485.70	523.00	9977.00	9977.00	10348.00	10500.00
	15.410	1617.54	.00	1619.36	403.31	20.70	26566.40	112.90	.00	.00	9979.00	10353.00	.00
	15.410	1616.98	.00	1619.19	374.00	.00	26700.00	.00	374.00	9979.00	9979.00	10353.00	10353.00

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MONT. WAT. AND HEC

SUMMARY PRINTOUT TABLE 150

	SECNO	XLCH	ELTRD	ELLC	ELMIN	Q	CWSEL	CRIWS	EG	10*KS	VCH	AREA	.01K
*	14.300	1213.60	.00	.00	1559.60	26700.00	1574.16	1574.16	1575.12	85.17	10.82	4089.92	2893.09
*	14.300	1213.60	.00	.00	1559.60	26700.00	1575.03	1575.03	1576.49	90.56	11.90	3064.13	2805.71
	14.540	1273.20	.00	.00	1571.60	26700.00	1583.69	.00	1584.67	67.49	7.96	3434.36	3249.96
	14.540	1273.20	.00	.00	1571.60	26700.00	1584.29	.00	1585.12	51.12	7.33	3644.07	3734.32
*	14.740	1070.90	.00	.00	1581.70	26700.00	1591.73	1591.73	1593.70	82.44	14.66	3009.84	2940.61
*	14.740	1070.90	.00	.00	1581.70	26700.00	1591.63	1591.63	1594.44	107.65	16.63	2388.30	2573.42
	14.890	756.40	.00	.00	1583.20	26700.00	1597.00	1596.53	1598.98	63.55	13.71	3039.51	3349.36

*	14.890	756.40	.00	.00	1583.20	26700.00	1597.89	.00	1599.55	47.09	12.50	3226.89	3890.86
	15.060	930.30	.00	.00	1591.30	26700.00	1602.93	.00	1604.16	53.70	9.27	3279.17	3643.57
	15.060	930.30	.00	.00	1591.30	26700.00	1602.88	.00	1604.61	70.97	10.56	2529.49	3169.29
*	15.120	283.60	.00	.00	1595.40	26700.00	1605.22	1605.22	1606.94	93.47	11.17	2809.91	2761.72
*	15.120	283.60	.00	.00	1595.40	26700.00	1605.20	1605.20	1607.97	136.24	13.35	1999.72	2287.47
	15.220	553.10	.00	.00	1598.90	26700.00	1610.20	.00	1612.00	86.99	11.20	2602.46	2862.63
*	15.220	553.10	.00	.00	1598.90	26700.00	1611.17	.00	1612.45	50.33	9.43	3029.60	3763.37
	15.410	968.90	.00	.00	1607.60	26700.00	1617.54	.00	1619.36	66.99	10.86	2487.24	3262.17
	15.410	968.90	.00	.00	1607.60	26700.00	1616.98	.00	1619.19	92.64	11.94	2236.78	2773.96

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MONT. WAT. AND HEC

SUMMARY PRINTOUT TABLE 150

	SECNO	Q	CWSEL	DIFWSP	DIFWSX	DIFKWS	TOPWID	XLCH
*	14.300	26700.00	1574.16	.00	9.51	.00	2213.30	1213.60
*	14.300	26700.00	1575.03	.87	10.27	.00	950.00	1213.60
	14.540	26700.00	1583.69	.00	9.54	.00	839.24	1273.20
	14.540	26700.00	1584.29	.60	9.26	.00	530.00	1273.20
*	14.740	26700.00	1591.73	.00	8.04	.00	851.61	1070.90
*	14.740	26700.00	1591.63	-.10	7.34	.00	400.00	1070.90
	14.890	26700.00	1597.00	.00	5.27	.00	569.09	756.40
*	14.890	26700.00	1597.89	.89	6.26	.00	480.00	756.40
	15.060	26700.00	1602.93	.00	5.93	.00	767.36	930.30
	15.060	26700.00	1602.88	-.05	4.98	.00	418.00	930.30
*	15.120	26700.00	1605.22	.00	2.29	.00	821.21	283.60
*	15.120	26700.00	1605.20	-.02	2.32	.00	376.00	283.60
	15.220	26700.00	1610.20	.00	4.98	.00	606.40	553.10
*	15.220	26700.00	1611.17	.97	5.97	.00	523.00	553.10
	15.410	26700.00	1617.54	.00	7.34	.00	403.31	968.90
	15.410	26700.00	1616.98	-.56	5.80	.00	374.00	968.90

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SUMMARY OF ERRORS AND SPECIAL NOTES

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CAUTION SECNO=     13.000  PROFILE=  1  CRITICAL DEPTH ASSUMED
CAUTION SECNO=     13.000  PROFILE=  2  CRITICAL DEPTH ASSUMED

WARNING SECNO=     13.160  PROFILE=  1  CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE
WARNING SECNO=     13.160  PROFILE=  2  CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE

WARNING SECNO=     13.280  PROFILE=  1  CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE
WARNING SECNO=     13.280  PROFILE=  2  CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE

WARNING SECNO=     13.400  PROFILE=  1  CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE
WARNING SECNO=     13.400  PROFILE=  2  CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE

WARNING SECNO=     13.550  PROFILE=  1  CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE

CAUTION SECNO=     14.300  PROFILE=  1  CRITICAL DEPTH ASSUMED
CAUTION SECNO=     14.300  PROFILE=  1  MINIMUM SPECIFIC ENERGY
CAUTION SECNO=     14.300  PROFILE=  2  CRITICAL DEPTH ASSUMED
CAUTION SECNO=     14.300  PROFILE=  2  MINIMUM SPECIFIC ENERGY

CAUTION SECNO=     14.740  PROFILE=  1  CRITICAL DEPTH ASSUMED
CAUTION SECNO=     14.740  PROFILE=  1  MINIMUM SPECIFIC ENERGY
CAUTION SECNO=     14.740  PROFILE=  2  CRITICAL DEPTH ASSUMED
CAUTION SECNO=     14.740  PROFILE=  2  MINIMUM SPECIFIC ENERGY

WARNING SECNO=     14.890  PROFILE=  2  CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE

CAUTION SECNO=     15.120  PROFILE=  1  CRITICAL DEPTH ASSUMED
CAUTION SECNO=     15.120  PROFILE=  1  MINIMUM SPECIFIC ENERGY
CAUTION SECNO=     15.120  PROFILE=  2  CRITICAL DEPTH ASSUMED
CAUTION SECNO=     15.120  PROFILE=  2  MINIMUM SPECIFIC ENERGY

WARNING SECNO=     15.220  PROFILE=  2  CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE

CAUTION SECNO=     15.550  PROFILE=  1  CRITICAL DEPTH ASSUMED
CAUTION SECNO=     15.550  PROFILE=  1  MINIMUM SPECIFIC ENERGY
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 WARNING SECNO=     15.750  PROFILE=  2  CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE

 CAUTION SECNO=     15.890  PROFILE=  1  CRITICAL DEPTH ASSUMED
 CAUTION SECNO=     15.890  PROFILE=  1  MINIMUM SPECIFIC ENERGY
 CAUTION SECNO=     15.890  PROFILE=  2  CRITICAL DEPTH ASSUMED
 CAUTION SECNO=     15.890  PROFILE=  2  PROBABLE MINIMUM SPECIFIC ENERGY
 CAUTION SECNO=     15.890  PROFILE=  2  20 TRIALS ATTEMPTED TO BALANCE WSEL

 CAUTION SECNO=     16.270  PROFILE=  1  CRITICAL DEPTH ASSUMED
 CAUTION SECNO=     16.270  PROFILE=  1  MINIMUM SPECIFIC ENERGY
 CAUTION SECNO=     16.270  PROFILE=  2  CRITICAL DEPTH ASSUMED
 CAUTION SECNO=     16.270  PROFILE=  2  MINIMUM SPECIFIC ENERGY

 WARNING SECNO=     16.490  PROFILE=  2  CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE
1
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 WARNING SECNO=     16.680  PROFILE=  2  CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE

 CAUTION SECNO=     16.860  PROFILE=  1  CRITICAL DEPTH ASSUMED
 CAUTION SECNO=     16.860  PROFILE=  1  MINIMUM SPECIFIC ENERGY
 CAUTION SECNO=     16.860  PROFILE=  2  CRITICAL DEPTH ASSUMED
 CAUTION SECNO=     16.860  PROFILE=  2  MINIMUM SPECIFIC ENERGY

 CAUTION SECNO=     16.870  PROFILE=  1  HYDRAULIC JUMP D.S.
 WARNING SECNO=     16.870  PROFILE=  1  CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE
 CAUTION SECNO=     16.870  PROFILE=  2  HYDRAULIC JUMP D.S.
 WARNING SECNO=     16.870  PROFILE=  2  CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE

 CAUTION SECNO=     16.960  PROFILE=  1  CRITICAL DEPTH ASSUMED
 CAUTION SECNO=     16.960  PROFILE=  1  PROBABLE MINIMUM SPECIFIC ENERGY
 CAUTION SECNO=     16.960  PROFILE=  1  20 TRIALS ATTEMPTED TO BALANCE WSEL
 CAUTION SECNO=     16.960  PROFILE=  2  CRITICAL DEPTH ASSUMED
 CAUTION SECNO=     16.960  PROFILE=  2  PROBABLE MINIMUM SPECIFIC ENERGY
 CAUTION SECNO=     16.960  PROFILE=  2  20 TRIALS ATTEMPTED TO BALANCE WSEL

 CAUTION SECNO=     17.060  PROFILE=  2  CRITICAL DEPTH ASSUMED
 CAUTION SECNO=     17.060  PROFILE=  2  MINIMUM SPECIFIC ENERGY

 CAUTION SECNO=     17.180  PROFILE=  1  CRITICAL DEPTH ASSUMED
 CAUTION SECNO=     17.180  PROFILE=  1  MINIMUM SPECIFIC ENERGY
 CAUTION SECNO=     17.180  PROFILE=  2  CRITICAL DEPTH ASSUMED
 CAUTION SECNO=     17.180  PROFILE=  2  MINIMUM SPECIFIC ENERGY

 WARNING SECNO=     18.090  PROFILE=  1  CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE

 CAUTION SECNO=     18.160  PROFILE=  1  CRITICAL DEPTH ASSUMED
 CAUTION SECNO=     18.160  PROFILE=  1  MINIMUM SPECIFIC ENERGY

 CAUTION SECNO=     18.230  PROFILE=  1  CRITICAL DEPTH ASSUMED
 CAUTION SECNO=     18.230  PROFILE=  1  PROBABLE MINIMUM SPECIFIC ENERGY
 CAUTION SECNO=     18.230  PROFILE=  1  20 TRIALS ATTEMPTED TO BALANCE WSEL
 CAUTION SECNO=     18.230  PROFILE=  2  CRITICAL DEPTH ASSUMED
 CAUTION SECNO=     18.230  PROFILE=  2  PROBABLE MINIMUM SPECIFIC ENERGY
 CAUTION SECNO=     18.230  PROFILE=  2  20 TRIALS ATTEMPTED TO BALANCE WSEL

 WARNING SECNO=     18.290  PROFILE=  2  CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE

 CAUTION SECNO=     18.490  PROFILE=  2  CRITICAL DEPTH ASSUMED
 CAUTION SECNO=     18.490  PROFILE=  2  MINIMUM SPECIFIC ENERGY

 CAUTION SECNO=     18.570  PROFILE=  1  CRITICAL DEPTH ASSUMED
 CAUTION SECNO=     18.570  PROFILE=  1  MINIMUM SPECIFIC ENERGY
 WARNING SECNO=     18.570  PROFILE=  2  CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE

 CAUTION SECNO=     18.740  PROFILE=  1  CRITICAL DEPTH ASSUMED
 CAUTION SECNO=     18.740  PROFILE=  1  MINIMUM SPECIFIC ENERGY
 CAUTION SECNO=     18.740  PROFILE=  2  CRITICAL DEPTH ASSUMED
 CAUTION SECNO=     18.740  PROFILE=  2  MINIMUM SPECIFIC ENERGY

 CAUTION SECNO=     18.840  PROFILE=  2  CRITICAL DEPTH ASSUMED
1
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 CAUTION SECNO=     18.840  PROFILE=  2  MINIMUM SPECIFIC ENERGY

 CAUTION SECNO=     18.960  PROFILE=  1  CRITICAL DEPTH ASSUMED
 CAUTION SECNO=     18.960  PROFILE=  1  PROBABLE MINIMUM SPECIFIC ENERGY
 CAUTION SECNO=     18.960  PROFILE=  1  20 TRIALS ATTEMPTED TO BALANCE WSEL
 CAUTION SECNO=     18.960  PROFILE=  2  CRITICAL DEPTH ASSUMED
 CAUTION SECNO=     18.960  PROFILE=  2  PROBABLE MINIMUM SPECIFIC ENERGY
 CAUTION SECNO=     18.960  PROFILE=  2  20 TRIALS ATTEMPTED TO BALANCE WSEL

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 Floodway width summary: MONT. WAT. AND HEC
 Profile No.  2
```

Section Number	Elevation Increase	Top Width	Left Encroach Station	Left Sta Distance From Center	Center Station	Right Sta Distance From Center	Right Encroach Station
13.000	.00	245.00	9820.00	122.50	9942.50	122.50	10065.00
13.020	.00	245.00	9820.00	122.50	9942.50	122.50	10065.00
13.040	.00	813.00	9537.00	388.50	9925.50	424.50	10350.00
13.080	.00	1129.00	9550.00	348.50	9898.50	780.50	10679.00
13.160	.00	1395.00	9421.00	699.50	10120.50	695.50	10816.00
13.280	.00	1265.00	9537.00	353.50	9890.50	911.50	10802.00
13.400	.94	932.00	9670.00	324.50	9994.50	607.50	10602.00
13.550	.99	1334.00	9160.00	931.00	10091.00	403.00	10494.00
13.660	.44	1427.00	9055.00	926.50	9981.50	500.50	10482.00
13.860	.73	1524.00	8708.00	978.00	9686.00	546.00	10232.00
14.070	.11	1724.00	8805.00	1164.00	9969.00	560.00	10529.00
14.300	.87	950.00	9210.00	765.00	9975.00	185.00	10160.00
14.540	.60	530.00	9950.00	265.00	10215.00	265.00	10480.00
14.740	-.10	400.00	9700.00	326.00	10026.00	74.00	10100.00
14.890	.89	480.00	9600.00	398.50	9998.50	81.50	10080.00
15.060	-.05	418.00	9972.00	209.00	10181.00	209.00	10390.00
15.120	-.02	376.00	9975.00	188.00	10163.00	188.00	10351.00
15.220	.97	523.00	9977.00	185.50	10162.50	337.50	10500.00
15.410	-.56	374.00	9979.00	187.00	10166.00	187.00	10353.00
15.550	.43	292.00	9890.00	151.00	10041.00	141.00	10182.00
15.750	.97	639.00	9477.00	562.50	10039.50	76.50	10116.00
15.890	.94	393.00	9817.00	272.50	10089.50	120.50	10210.00
16.070	.91	370.00	9760.00	279.00	10039.00	91.00	10130.00
16.190	.25	468.00	9600.00	405.50	10005.50	62.50	10068.00
16.270	.51	282.00	9760.00	142.50	9902.50	139.50	10042.00
16.490	.96	524.00	9906.00	112.00	10018.00	412.00	10430.00
16.680	-.15	650.00	9940.00	319.00	10259.00	331.00	10590.00
16.860	*** Encroachments not set ***						
16.870	*** Encroachments not set ***						
16.960	.00	434.00	9914.00	223.00	10137.00	211.00	10348.00
17.060	.37	820.00	9650.00	368.50	10018.50	451.50	10470.00
17.180	-.05	880.00	9788.00	328.00	10116.00	552.00	10668.00
17.300	.08	907.00	9628.00	435.00	10063.00	472.00	10535.00
17.390	-.01	713.00	9758.00	278.00	10036.00	435.00	10471.00
17.480	.01	851.08	9488.92	494.08	9983.00	357.00	10340.00
17.570	.04	746.55	9516.45	465.05	9981.50	281.50	10263.00
17.650	.09	846.30	9423.70	548.80	9972.50	297.50	10270.00
17.780	.00	935.94	9642.06	336.44	9978.50	599.50	10578.00
17.840	.01	919.61	9745.39	326.61	10072.00	593.00	10665.00
17.950	.01	776.32	9818.68	138.32	9957.00	638.00	10595.00
18.090	.21	715.00	9895.00	228.00	10123.00	487.00	10610.00
18.160	.41	673.00	9752.00	203.50	9955.50	469.50	10425.00
18.230	.02	700.00	9630.00	275.00	9905.00	425.00	10330.00
18.290	1.04	700.00	9630.00	351.50	9981.50	348.50	10330.00
18.490	.09	643.00	9832.00	102.50	9934.50	540.50	10475.00
18.570	.56	780.00	9700.00	294.00	9994.00	486.00	10480.00
18.740	.06	745.00	9380.00	678.50	10058.50	66.50	10125.00

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18.840	.88	564.00	9576.00	399.50	9975.50	164.50	10140.00
18.960	.52	841.00	9639.00	333.50	9972.50	507.50	10480.00

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FLOODWAY DATA, MONT. WAT. AND HEC
PROFILE NO. 2

STATION	FLOODWAY WIDTH	FLOODWAY SECTION AREA	FLOODWAY MEAN VELOCITY	WATER SURFACE ELEVATION WITH FLOODWAY	WITHOUT FLOODWAY	DIFFERENCE
13.000	245.	1207.	12.7	1523.4	1523.4	.0
13.020	245.	1444.	10.6	1524.9	1524.9	.0
13.040	494.	2425.	6.3	1526.7	1526.7	.0
13.080	1116.	4530.	3.4	1527.6	1527.6	.0
13.160	1379.	3417.	4.5	1528.5	1528.5	.0
13.280	1265.	2512.	7.5	1532.6	1532.6	.0
13.400	932.	4069.	6.6	1538.9	1538.0	.9
13.550	1334.	4546.	5.9	1544.2	1543.2	1.0
13.660	1427.	4111.	6.5	1548.3	1547.9	.4
13.860	1524.	4444.	6.0	1556.6	1555.9	.7
14.070	1724.	3978.	6.7	1564.8	1564.7	.1
14.300	950.	3064.	8.7	1575.1	1574.2	.9
14.540	530.	3644.	7.3	1584.3	1583.7	.6
14.740	400.	2388.	11.2	1591.6	1591.7	-.1
14.890	480.	3227.	8.3	1597.9	1597.0	.9
15.060	418.	2529.	10.6	1602.8	1602.9	-.1
15.120	376.	2000.	13.4	1605.2	1605.2	.0
15.220	523.	3030.	8.8	1611.2	1610.2	1.0
15.410	374.	2237.	11.9	1616.9	1617.5	-.6
15.550	292.	1946.	13.7	1623.5	1623.1	.4

15.750	639.	4041.	6.6	1631.4	1630.4	1.0
15.890	393.	2127.	12.6	1636.3	1635.4	.9
16.070	370.	2689.	9.9	1645.1	1644.2	.9
16.190	468.	2695.	9.9	1649.1	1648.9	.2
16.270	282.	1810.	14.7	1652.8	1652.3	.5
16.490	524.	3350.	8.0	1663.0	1662.0	1.0
16.680	650.	3046.	8.8	1668.4	1668.6	-.2
16.860	267.	1830.	14.9	1677.0	1677.0	.0
16.870	284.	2387.	11.4	1680.8	1680.8	.0
16.960	426.	2137.	12.8	1684.9	1684.9	.0
17.060	820.	3313.	8.2	1690.3	1689.9	.4
17.180	880.	2713.	10.1	1695.1	1695.2	-.1
17.300	907.	3837.	7.1	1701.5	1701.4	.1
17.390	713.	2819.	9.7	1705.2	1705.2	.0
17.480	851.	3392.	8.0	1709.8	1709.8	.0
17.570	747.	3084.	8.9	1713.8	1713.8	.0
17.650	846.	3839.	7.1	1717.7	1717.6	.1
17.780	936.	4163.	6.6	1722.5	1722.5	.0
17.840	916.	3125.	8.7	1724.7	1724.7	.0
17.950	776.	3366.	8.1	1730.5	1730.5	.0
18.090	715.	3922.	7.1	1735.1	1734.9	.2
18.160	673.	2877.	9.6	1736.9	1736.5	.4

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FLOODWAY DATA, MONT. WAT. AND HEC
PROFILE NO. 2

STATION	FLOODWAY WIDTH	FLOODWAY SECTION AREA	FLOODWAY MEAN VELOCITY	WATER SURFACE ELEVATION WITH FLOODWAY	WATER SURFACE ELEVATION WITHOUT FLOODWAY	DIFFERENCE
18.230	700.	2939.	9.4	1741.7	1741.7	.0
18.290	700.	3845.	7.2	1744.1	1743.1	1.0
18.490	643.	2780.	10.0	1751.0	1750.9	.1
18.570	780.	3079.	9.0	1754.7	1754.1	.6
18.740	745.	2612.	10.5	1760.7	1760.6	.1
18.840	564.	2616.	10.4	1765.6	1764.7	.9
18.960	841.	3403.	8.0	1771.8	1771.3	.5

E.3 Corrected Effective (Pre-Project Conditions) HEC-2 Model

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1*****************************************
 *  HEC-2 WATER SURFACE PROFILES          *
 *                                        *
 *  Version   4.6.2;  May 1991            *
 *                                        *
 *  RUN DATE    09MAY14    TIME   15:12:00 *
 *****************************************
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*************************************
*  U.S. ARMY CORPS OF ENGINEERS     *
*  HYDROLOGIC ENGINEERING CENTER    *
*  609 SECOND STREET, SUITE D       *
*  DAVIS, CALIFORNIA 95616-4687     *
*          (916) 756-1104           *
*************************************
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X     X  XXXXXXX   XXXXX              XXXXX
X     X  X        X     X            X     X
X     X  X        X                        X
XXXXXXX  XXXX     X          XXXXX    XXXXX
X     X  X        X                  X
X     X  X        X     X            X
X     X  XXXXXXX   XXXXX             XXXXXXX
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1
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                                                                THIS RUN EXECUTED 09MAY14    15:12:00
 ************************************
 HEC-2 WATER SURFACE PROFILES

 Version   4.6.2;  May 1991
 ************************************


        CORRECTED EFFECTIVE MODEL FOR SONORAN DESERT DRIVE OVER SKUNK CREEK

        PREPARED BY KIMLEY-HORN
        FILENAME:   CORR_EFF.DAT

        PROFILE 1: PRE-PROJECT FLOODPLAIN
        PROFILE 2: PRE-PROJECT FLOODWAY

        COMMENTS FROM TRAMONTO LOMR REMAIN UNCHANGED.  ADDED CROSS SECTION 14.67
        14.60, AND 14.57. CROSS SECTIONS ADDED FOR PROPSOED SONORAN DESERT DRIVE
        BRIDGE.  CROSS SECTION 14.67 USES MAPPING FROM THE MAPPING FROM THE
        SKUNK CREEK FLOODPLAIN DELINEATION. CROSS SECTION 14.60 AND 14.57 UTILIZ
        MAPPING OBTAINED FOR THE SONORAN DESERT DRIVE PROJECT.

        COMPLETE HEC-2 MODEL FOR ENTIRE SKUNK CREEK FLOODPLAIN DELINEATION STUDY
        HEC ANALYSIS INCLUDES SECTIONS 13.00 TO 17.95 (FLOODPLAIN ANALYSIS ONLY)
        MONTGOMERY WATSON ANALYSIS INCLUDES SECTIONS 18.09 TO 20.62 AND 22.96 TO
        CASTRO FLEET ANALYSIS (DEL WEBB) INCLUDES SECTIONS 20.64 TO 22.95


 SPLIT FLOW BEING PERFORMED


 SF      SPLIT FLOW FROM SECTIONS 13.02 TO 13.28


 TW      I-17 SPLIT FLOW
         WEIR FLOW OCCURS ALONG I-17 BETWEEN CROSS-SECTIONS 13.02 & 13.28
         FLOW WEIRS OVER THE NORTH BOUND LANES OF I-17 AND ALSO OVER THE
         EMBANKMENT INTO THE CENTRAL ARIZONA PROJECT CANAL
 WS    11   13.02   13.28      -1     2.6
 WC     0  1527.2     490  1526.1     725    1526     780  1524.5     830    1526
 WC   855  1526.7     995    1528    1230    1530    1515    1532    1750    1534
 WC  1840  1534.5
1
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 T1      SKUNK CREEK FLOODPLAIN AND FLOODWAY DELINEATION (METHOD 1)
 T2      100-YEAR FREQUENCY           DATE:  FEBRUARY 1998
 T2      RUN INCORPORATING FCDMC'S AND FEMA'S REVISIONS AT NEW RIVER ROAD BRIDGE
 T3      MONT. WAT. AND HEC

 J1  ICHECK    INQ       NINV      IDIR      STRT      METRIC    HVINS     Q         WSEL      FQ

                2                                                                   1522.96

 J2  NPROF     IPLOT     PRFVS     XSECV     XSECH     FN        ALLDC     IBW       CHNIM     ITRACE

       1                 -1


 J3  VARIABLE CODES FOR SUMMARY PRINTOUT

      38        43         1         8        42         3        61         2        55        26
      56        39        38        38        53         4        54       110       115       150
     200
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J5  LPRNT    NUMSEC                    ********REQUESTED SECTION NUMBERS********

    -10        11     14.30     14.54     14.57     14.60     14.67     14.74     14.89     15.06
                     15.12     15.22     15.41
        SPLIT FLOW ANALYSES AT CAP CANAL & CAREFREE HWY
        NO FLOODWAY ANALYSIS PERFORMED FOR CROSS SECTIONS 13.00 TO 13.28
        DUE TO WEIR FLOW AND PONDING OF WATER UPSTREAM OF THE CAP CANAL BERM.
        THE FLOODWAY CONCEPT IS NOT APPLICABLE FOR THIS REACH.
        Q100 INCREASED FROM 15700 CFS TO 18900 CFS DUE TO UPSTREAM DEVELOPMENT.

QT        2      18900      18900
NC     .025       .025       .025        .3         .5
ET                 9.1        9.1                                                          9820       10065
        DOWNSTREAM OF BRINK OF CAP OVERCHUTE NO.1 (BOR STA 470+80)
        OVERFLOW DISCHARGE HAS BEEN ADJUSTED TO ACCOUNT FOR SPLIT FLOW TO CAP
        OVERCHUTE NO.2 (BOR STA 492+04)
X1    13.00          8       9820      10065
GR   1527.0       7780     1518.5     7780.5     1518.5     7939.5     1527.0       7940     1527.0       9820
GR   1518.5     9820.5     1518.5    10064.5     1527.0      10065

ET                 9.1        9.1                                                          9820       10065
        UPSTREAM ENTRANCE TO CAP OVERCUTE NO.1
X1    13.02          8       9820      10065        120        120        120
GR   1527.0       7780       1519     7780.5       1519     7939.5     1527.0       7940     1527.0       9820
GR     1519     9820.5       1519    10064.5     1527.0      10065

NC      .04        .04        .04        .3         .5
ET                 9.1        9.1                                                          9537       10350
1
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X1    13.04         77       9721      10130        100        100        100
GR   1531.2       7311     1526.9       7365     1526.6       7377     1527.8       7428       1527       7475
GR   1526.6       7516     1520.1       7540     1519.5       7577     1519.3       7631     1519.6       7648
GR   1518.7       7682       1519       7704     1518.1       7758     1518.4       7790     1520.6       7803
GR   1526.7       7829     1527.1       7840     1526.9       7898     1526.2       7917       1531       7961
GR   1532.2       7999       1532       8035     1532.1       8067     1532.4       8106     1537.1       8125
GR   1532.3       8139     1533.8       8206     1533.4       8257     1532.9       8297     1532.3       8355
GR   1532.9       8404     1533.1       8450     1533.5       8518     1533.5       8547     1533.9       8592
GR   1534.2       8649     1533.7       8711     1532.6       8807     1532.4       8944     1532.6       8993
GR     1533       9051     1532.4       9144     1533.9       9163     1536.3       9206     1537.1       9230
GR   1536.6       9261     1535.6       9288     1533.9       9315     1532.8       9358     1532.3       9408
GR   1532.3       9438     1532.1       9481     1529.4       9537     1527.9       9567     1527.1       9596
GR   1527.1       9632     1527.7       9669     1527.5       9710       1528       9721     1522.3       9749
GR   1520.2       9797     1519.6       9890     1520.1       9931     1521.2       9949     1520.1       9966
GR   1518.8       9976     1519.8      10027     1520.7      10082     1521.2      10108     1527.1      10130
GR   1526.8      10162     1526.5      10210       1527      10249     1527.4      10274     1527.5      10325
GR   1528.4      10355     1528.1      10398

NC     .069       .044       .050         .1         .3
ET                 9.1        9.1                                                          9550       10679
X1    13.08         57       9615      10182        230        230        230
GR     1532       7732       1530       7863       1528       7933       1526       8065       1525       8114
GR   1524.5       8264       1524       8409     1522.2       8469     1522.5       8605     1522.2       8621
GR   1522.8       8775     1522.9       8828       1523       8862     1522.5       8926     1521.9       8955
GR   1520.4       8966     1522.5       9024     1524.4       9127       1524       9197     1524.1       9265
GR   1524.4       9305       1524       9386     1524.3       9436     1523.7       9447     1523.6       9533
GR   1524.2       9615     1523.4       9651     1522.6       9720     1520.4       9740     1522.2       9755
GR   1522.9       9781     1524.6       9805     1520.9       9821       1521       9836     1522.2       9847
GR     1523       9886     1522.2       9978     1518.5       9992     1518.2      10002     1518.8      10008
GR   1522.4      10023       1522      10070     1521.1      10078       1522      10090       1522      10106
GR     1520      10131     1521.5      10160     1523.5      10182     1523.9      10210     1524.3      10274
GR   1524.7      10346       1526      10460     1525.8      10512     1524.4      10555     1524.5      10575
GR     1526      10616       1528      10679

NC     .038       .042       .052         .1         .3
ET                 9.1        9.1                                                          9421       10816
        NEW CROSS SECTION:  GR CARD DATA DEVELOPED FROM TOPOGRAPHIC MAPS
X1    13.16         53       9953      10288        420        425        421
GR     1534       7863       1532       8128       1530       8316       1528       8551     1526.5       8641
GR     1528       8791     1528.3       8868       1528       8888       1526       8946       1525       9139
GR     1526       9169     1526.2       9219       1526       9255     1525.3       9389       1526       9405
GR   1526.5       9421       1526       9442     1525.5       9459       1526       9481     1526.4       9632
GR     1526       9721       1525       9736       1526       9751       1528       9929     1528.3       9936
GR     1528       9943       1526       9953       1524       9963       1522       9981     1521.5       9991
GR     1522      10001       1524      10043     1524.5      10093       1524      10148       1523      10163
GR     1524      10215       1523      10220       1524      10225       1525      10235       1524      10245
GR   1523.2      10250       1524      10255       1526      10273     1526.2      10288       1526      10303
GR   1525.8      10323       1526      10349       1528      10689     1528.4      10744       1528      10774
GR   1527.5      10784       1528      10793     1529.8      10816
        CROSS-SECTION AT WHICH FLOWS TO CAP OVERCHUTES 1 AND 2 RECOMBINE.
        WSEL MATCHES AT THIS CROSS-SECTION
1
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ET                 9.1        9.1                                                          9537       10802
X1    13.28         65       9671      10110        390        610        600
GR     1536       8217     1534.9       8297     1534.2       8552     1534.3       8677       1534       8812
GR     1532       8979       1530       9107     1529.3       9165       1530       9205       1532       9255
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GR   1532.2      9337     1531.5      9390     1531.5      9439     1530.1      9484     1525.7      9507
GR   1526.0      9523     1529.8      9537     1530.1      9605     1530.9      9671     1530.2      9682
GR   1530.4      9709     1531.2      9726     1531.3      9776     1530.4      9840     1529.7      9851
GR   1530.9      9901     1531.6      9962     1530.6      9975     1522.9      9991     1522.6     10000
GR   1522.9     10034     1530.4     10052     1530.6     10083     1527.4     10097     1531.2     10110
GR   1531.0     10143     1531.2     10169     1532.3     10193     1532.9     10222     1532.2     10250
GR   1532.2     10302     1532.2     10347     1531.6     10363     1532.0     10389     1531.1     10421
GR   1531.1     10475     1531.1     10529     1529.7     10581     1530.3     10594     1530.6     10634
GR   1530.0     10654     1530.5     10667     1529.9     10697     1531.7     10727     1532.2     10771
GR   1532.9     10840     1533.5     10884     1533.9     10956     1533.3     10961     1534.6     10969
GR   1534.9     10995     1534.0     11002     1533.5     11019     1534.9     11025     1535.4     11065
        Q100 INCREASED FROM 23300,23300 TO 26700,26700 CFS
        DUE TO UPSTREAM DEVELOPMENT.

QT        2     26700     26700
ET                9.1       7.1                                   9670     10602                     11043
X1    13.40       74      9670     10319       650       590     678.6
GR     1540     8520      1538      8940      1536      9105      1535      9155      1536      9197
GR   1536.2     9202      1536      9212    1535.9    9214.5      1536      9217    1536.5      9287
GR     1536     9359    1535.5      9414      1536      9474    1537.5      9641    1537.6      9670
GR   1536.4     9692    1534.6      9719    1527.4      9732    1530.8      9748    1532.1      9770
GR   1530.0     9782    1534.1      9800    1533.9      9820    1535.3      9840    1534.9      9849
GR   1535.8     9866    1536.5      9908    1537.1      9939    1536.9      9968    1535.2      9980
GR   1529.0     9994    1528.7     10000    1529.7     10010    1534.5     10033    1534.1     10063
GR   1534.3    10084    1534.3     10102    1536.0     10133    1536.4     10164    1535.0     10177
GR   1535.9    10194    1535.2     10209    1526.8     10246    1528.5     10252    1529.1     10269
GR   1537.1    10289    1537.5     10319    1536.6     10361    1535.1     10379    1535.3     10395
GR   1536.0    10422    1535.1     10447    1535.7     10465    1535.8     10514    1535.1     10539
GR   1535.0    10600    1535.4     10653    1535.5     10687    1535.0     10726    1534.3     10744
GR   1534.4    10772    1535.1     10797    1534.7     10833    1535.5     10874    1535.5     10910
GR   1535.1    10944    1534.7     11001    1535.1     11027    1538.7     11030    1539.0     11043
GR   1538.8    11070    1537.4     11080    1540.1     11101    1539.6     11142

ET                       7.1                                   9160     10494
X1    13.55       79      9688     10494       740       850     787.3
GR   1544.6     8416    1544.5      8496    1543.9      8598    1543.5      8689    1542.8      8797
GR   1542.2     8877    1541.9      8929    1541.3      8950    1540.3      8963    1539.6      8985
GR   1540.1     8993    1540.1      9040    1539.8      9081    1540.4      9104    1540.0      9157
GR   1540.8     9241    1541.2      9311    1540.5      9346    1541.0      9443    1540.2      9451
GR   1541.2     9464    1541.0      9477    1541.9      9510    1542.7      9558    1543.1      9592
GR   1543.3     9645    1543.1      9688    1541.9      9715    1539.8      9736    1540.1      9742
GR   1538.2     9757    1537.4      9776    1532.2      9787    1535.6      9804    1540.7      9828
GR   1539.7     9836    1541.7      9855    1541.6      9877    1542.0      9897    1541.4      9930
GR   1541.8     9965    1535.8      9988    1535.2     10000    1538.4     10010    1540.8     10031
GR   1540.9    10045    1540.5     10054    1541.3     10065    1541.2     10098    1541.8     10123
GR   1541.3    10132    1542.7     10150    1541.1     10176    1539.5     10191    1538.7     10208
GR   1537.7    10219    1539.2     10233    1541.4     10262    1541.1     10270    1542.0     10283
GR   1542.3    10307    1541.4     10349    1537.3     10370    1537.9     10380    1537.0     10394
GR   1538.6    10403    1541.0     10432    1542.6     10456    1543.0     10494    1544.4     10550
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GR   1544.5    10623    1545.0     10680    1545.2     10743    1544.8     10802    1544.6     10856
GR   1544.2    10907    1544.1     10973    1545.1     10985    1545.3     10993

ET                9.1       7.1                                   9055     10482     8335     10646
X1    13.66       92      9477     10486       500       540     549.1
GR   1548.4     8244    1548.9      8287    1549.0      8335    1548.3      8352    1548.2      8399
GR   1548.3     8462    1548.0      8514    1547.5      8594    1546.9      8663    1546.0      8720
GR   1545.8     8738    1544.9      8780    1544.1      8828    1543.6      8914    1543.1      8917
GR   1543.7     8921    1544.0      8985    1544.6      9048    1545.1      9086    1545.3      9138
GR   1546.1     9173    1546.5      9234    1546.3      9275    1546.0      9318    1545.7      9360
GR   1545.3     9383    1545.1      9436    1544.5      9449    1545.0      9457    1544.1      9467
GR   1545.4     9477    1544.9      9492    1543.5      9512    1540.2      9528    1540.5      9540
GR   1542.2     9550    1546.6      9572    1546.4      9585    1542.7      9600    1542.8      9619
GR   1543.3     9627    1542.4      9643    1543.1      9655    1546.0      9667    1546.6      9689
GR   1546.7     9709    1546.1      9717    1546.0      9736    1544.6      9744    1546.0      9753
GR   1545.3     9775    1546.1      9791    1546.1      9829    1547.5      9852    1547.5      9878
GR   1546.7     9894    1546.7      9941    1545.9      9956    1544.6      9988    1542.1     10000
GR   1542.3    10006    1543.9     10015    1543.0     10055    1543.5     10063    1546.5     10083
GR   1546.6    10108    1546.0     10119    1547.2     10133    1546.3     10145    1547.2     10160
GR   1546.2    10177    1546.6     10193    1546.1     10207    1546.4     10246    1546.8     10280
GR   1547.3    10324    1547.3     10357    1546.7     10379    1545.6     10392    1543.2     10408
GR   1543.9    10430    1542.9     10442    1542.6     10465    1548.6     10486    1549.3     10509
GR   1549.5    10557    1549.8     10592    1549.9     10646    1549.4     10686    1549.5     10727
GR   1549.4    10784    1549.5     10846

ET                9.1       7.1                                   8708     10232     8212     10433
        CROSS-SECTION PROVIDED BY AERIAL MAPPER SKEWED TO CONTAIN FLOW
X1    13.86       90      9330     10042      1060      1050    1049.1
GR   1556.0     8212    1554.0      8550    1553.0      8600    1553.4      8617    1552.4      8685
GR   1551.6     8708    1551.5      8749    1550.6      8759    1551.7      8767    1552.1      8788
GR   1551.5     8817    1554.3      8863    1555.1      8895    1555.4      8908    1555.1      8935
GR   1555.0     8975    1555.5      9022    1556.1      9072    1556.9      9125    1557.1      9165
GR   1557.3     9223    1556.6      9242    1557.3      9263    1557.4      9298    1557.0      9319
GR   1556.1     9330    1553.5      9344    1552.5      9379    1551.4      9393    1552.9      9404
GR   1552.7     9416    1551.9      9420    1553.3      9429    1553.2      9446    1549.8      9464
GR   1549.3     9472    1549.8      9494    1553.0      9513    1553.6      9535    1553.4      9596
GR   1552.9     9605    1553.3      9613    1553.5      9634    1553.4      9666    1553.2      9716
GR   1552.5     9727    1553.4      9739    1552.6      9770    1553.6      9784    1553.4      9803
GR   1551.8     9819    1551.2      9831    1552.5      9842    1551.1      9855    1553.3      9864
GR   1553.3     9885    1551.8      9919    1549.0      9936    1549.0      9948    1551.6      9970
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GR   1550.4       9983     1547.6       9991     1546.3      10000     1551.6      10009     1554.6      10023
GR   1555.7      10042     1555.6      10083     1554.3      10149     1550.9      10159     1552.6      10171
GR   1554.4      10197     1554.7      10232     1556.0      10271     1557.0      10327     1557.5      10379
GR   1557.7      10433     1557.5      10477     1557.5      10546     1557.7      10596     1557.6      10656
GR   1557.4      10695     1557.1      10752     1556.8      10820     1556.5      10873     1556.1      10945
GR   1555.9      10962     1555.7      11006     1558.1      11035     1561.0      11054     1561.7      11092

ET                 9.1        7.1                                        8805      10529      8530      10608
        CROSS-SECTION PROVIDED BY AERIAL MAPPER SKEWED TO CONTAIN FLOW
X1    14.07         65       9879     10059      1050      1100      1134.1
GR   1565.4       8530       1564      8652      1562      8685      1560.7      8705     1560.7      8805
GR     1562       8920     1562.4      9043    1562.8      9116      1563.1      9185     1562.8      9201
GR   1562.8       9250     1563.3      9286    1563.7      9321      1563.4      9353     1562.5      9394
GR   1561.5       9417     1561.4      9462    1562.3      9530      1562.4      9554     1562.0      9566
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GR   1562.0       9614     1562.3      9680    1563.1      9746      1563.6      9814     1564.0      9855
GR   1564.3       9879     1560.9      9898    1561.4      9904      1558.5      9924     1558.9      9938
GR   1558.9       9959     1557.5      9972    1557.5      9978      1558.5     10000     1562.0     10020
GR   1562.6      10040     1564.5     10059    1564.0     10077      1563.5     10125     1563.1     10151
GR   1562.6      10166     1562.7     10176    1562.2     10201      1563.1     10217     1563.0     10249
GR   1563.1      10300     1563.0     10338    1563.2     10381      1563.1     10396     1562.3     10404
GR   1563.1      10408     1563.1     10454    1563.1     10499      1564.1     10516     1565.5     10571
GR   1566.0      10608     1565.9     10656    1565.8     10710      1565.6     10758     1564.7     10813
GR   1564.3      10848     1564.8     10873    1565.1     10923      1570.0     10950     1570.8     10989

        The following GR record has been modified as per discussion with the
        FEMA technical evaluator. From station 8450 to station 9500, the
        elevations are read from the topographic map. From station 9563 to
        station 11361, the elevations remain the same as provided by the
        Aerial Mapping Company, Inc (AMCI) (March 17, 1998).

ET                           7.1                                       9210      10160
X1    14.30         73       9923     10027      1010      1210      1213.6
GR   1576.2       8450     1575.9      8550    1574.1      8650      1573.7      8750     1573.5      8850
GR   1573.4       8950     1573.3      9050    1572.5      9150      1572.5      9250     1571.9      9350
GR   1571.9       9450     1573.5      9500    1573.8      9563      1574.2      9626     1573.5      9652
GR   1573.1       9672     1573.8      9707    1573.7      9731      1573.8      9769     1573.2      9788
GR   1573.2       9836     1572.9      9878    1572.4      9906      1571.6      9923     1570.4      9941
GR   1565.1       9961     1565.2      9967    1560.0      9973      1560.3      9983     1559.6     10000
GR   1566.5      10011     1570.0     10027    1570.1     10045      1569.4     10052     1570.1     10062
GR   1571.0      10097     1571.2     10131    1571.1     10157      1572.5     10191     1572.9     10211
GR   1572.6      10251     1572.3     10297    1572.5     10351      1572.2     10386     1571.8     10410
GR   1572.1      10417     1571.7     10437    1571.7     10448      1571.5     10480     1571.6     10515
GR   1572.7      10552     1572.9     10571    1572.7     10608      1572.4     10642     1571.4     10681
GR   1571.6      10735     1571.9     10765    1572.0     10792      1571.2     10804     1571.8     10811
GR   1573.2      10852     1575.9     10899    1577.1     10931      1577.9     10967     1578.4     10992
GR   1578.7      11034     1578.6     11096    1578.4     11179      1578.2     11233     1577.7     11273
GR   1582.1      11295     1582.8     11336    1577.8     11361

ET                 9.1        7.1                                       9950      10480      9283      10588
X1    14.54         65       9950     10480      1410      1150      1273.2
GR   1584.8       8984     1584.8      9072    1584.7      9160      1584.7      9220     1584.9      9283
GR   1584.7       9355     1584.5      9421    1584.2      9499      1583.8      9525     1583.4      9546
GR   1583.7       9563     1583.4      9621    1583.8      9683      1583.0      9715     1583.4      9741
GR   1582.9       9767     1583.5      9798    1583.9      9818      1584.2      9845     1584.0      9892
GR   1583.2       9926     1581.9      9950    1574.4      9970      1574.0      9986     1571.6     10000
GR   1576.7      10045     1574.9     10066    1577.8     10080      1579.5     10110     1577.7     10136
GR   1578.5      10153     1578.1     10177    1576.3     10199      1576.9     10222     1576.6     10259
GR   1577.7      10273     1577.7     10287    1578.9     10306      1578.4     10354     1578.1     10384
GR   1577.0      10410     1578.1     10416    1578.3     10428      1577.7     10437     1580.1     10458
GR   1583.0      10480     1583.8     10495    1584.2     10523      1584.8     10556     1585.0     10588
GR   1584.4      10623     1583.5     10669    1583.4     10695      1583.4     10738     1583.8     10762
GR   1584.1      10808     1583.9     10821    1583.9     10881      1584.2     10936     1584.2     10999
GR   1584.2      11072     1584.3     11131    1584.1     11205      1584.2     11269     1584.9     11381
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NC     .059       .042       .039         .1          .3
        START OF KIMLEY-HORN REVISIONS
        CROSS-SECTION ADDED FOR PROPOSED SONORAN DESERT DRIVE BRIDGE
ET                           7.1                                       9834      10263
X1    14.57         88       9961     10164       150       190       177
GR   1585.5       9758     1585.5      9764    1585.5      9769      1585.6      9786     1585.6      9797
GR   1585.6       9802     1585.7      9808    1585.7      9846      1585.0      9848     1583.9      9851
GR   1580.2       9862     1577.5      9869    1577.6      9899      1581.0      9915     1581.3      9922
GR   1581.2       9961     1580.8      9966    1580.4      9972      1580.0      9977     1579.6      9982
GR   1578.8       9987     1578.3      9990    1577.7      9992      1577.0      9995     1576.8     10000
GR   1576.8      10005     1576.9     10010    1577.8     10074      1578.4     10079     1579.0     10082
GR   1579.0      10089     1578.9     10095    1578.5     10101      1577.8     10105     1577.1     10110
GR   1576.9      10118     1577.1     10130    1577.3     10140      1577.8     10144     1578.4     10149
GR   1578.9      10152     1579.2     10158    1579.3     10164      1579.6     10193     1579.5     10199
GR   1579.4      10204     1579.3     10210    1579.3     10215      1579.2     10220     1579.2     10226
GR   1579.0      10231     1578.9     10236    1578.8     10242      1578.4     10257     1578.2     10276
GR   1579.0      10281     1580.7     10284    1582.7     10287      1587.2     10294     1587.8     10299
GR   1588.3      10303     1588.5     10308    1588.6     10313      1587.8     10321     1587.9     10335
GR   1587.9      10343     1588.0     10353    1588.2     10359      1587.9     10364     1587.5     10369
GR   1587.6      10380     1587.5     10387    1587.4     10392      1586.4     10395     1585.7     10398
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GR   1585.9     10412     1585.9     10418     1586.0     10425     1585.9     10430     1586.0     10436
GR   1586.1     10441     1586.0     10446     1586.0     10452     1585.9     10457     1585.9     10462
GR   1586.0     10467     1586.1     10473     1586.1     10475
        CROSS-SECTION ADDED FOR PROPOSED SONORAN DESERT DRIVE BRIDGE

ET                          7.1                                   9730      10129
X1    14.60        84      9936     10112       120       122       141
GR   1585.9      9669     1586.1      9676    1586.1      9681    1586.3      9687     1586.5      9695
GR   1586.6      9701     1587.2      9725    1586.7      9743    1586.4      9750     1584.6      9756
GR   1582.2      9761     1581.4      9763    1578.6      9770    1578.2      9776     1578.3      9785
GR   1578.2      9790     1578.3      9795    1578.7      9805    1579.8      9810     1580.1      9815
GR   1580.2      9820     1580.8      9835    1581.1      9841    1581.9      9858     1582.5      9869
GR   1582.8      9875     1583.0      9881    1583.1      9886    1583.7      9902     1583.2      9930
GR   1583.1      9936     1582.3      9940    1580.6      9945    1578.9      9951     1578.0      9969
GR   1577.8      9976     1577.0     10000    1577.4     10021    1577.9     10038     1578.1     10047
GR   1578.5     10062     1578.6     10069    1580.2     10080    1580.9     10085     1582.1     10094
GR   1582.5     10101     1582.8     10107    1583.1     10112    1583.5     10128     1583.9     10136
GR   1584.1     10141     1583.8     10149    1583.4     10155    1583.3     10162     1583.3     10167
GR   1583.4     10173     1583.0     10178    1582.3     10183    1582.9     10188     1583.3     10203
GR   1582.9     10214     1582.8     10220    1582.2     10229    1581.5     10236     1581.1     10242
GR   1581.5     10249     1582.4     10258    1583.6     10263    1584.2     10266     1585.1     10271
GR   1585.4     10280     1585.6     10285    1585.7     10290    1585.9     10295     1586.2     10300
GR   1587.2     10307     1587.3     10312    1587.4     10318    1587.6     10324     1587.7     10331
GR   1587.8     10336     1588.0     10351    1588.1     10362    1588.1     10368
        CROSS-SECTION ADDED FOR PROPOSED SONORAN DESERT DRIVE BRIDGE

ET                          7.1                                   9696      10091
X1    14.67        17      9958     10080       477       317       387
GR   1590.0      9368     1588.0      9513    1586.0      9624    1584.0      9648     1584.0      9668
GR   1584.0      9693     1582.0      9702    1582.0      9723    1582.0      9958     1580.0      9987
GR   1579.5     10000     1580.0     10014    1582.0     10080    1584.0     10157     1586.0     10171
GR   1588.0     10195     1590.0     10312
        CROSS-SECTION PROVIDED BY AERIAL MAPPER SKEWED TO CONTAIN FLOW
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ET                   9.1        7.1                                   9700      10100                10380
X1    14.74         39      9976     10076       433       341     365.9
GR   1594.6      9253     1594.6      9384    1593.5      9435    1592.2      9495     1591.7      9526
GR   1590.5      9540     1589.6      9564    1589.3      9615    1589.0      9650     1587.4      9663
GR   1587.4      9705     1587.0      9720    1588.5      9769    1588.3      9791     1587.1      9809
GR   1586.1      9837     1585.5      9853    1585.1      9871    1585.5      9891     1584.9      9917
GR   1585.0      9952     1587.3      9976    1581.8      9988    1581.8     10000     1582.1     10024
GR   1581.7     10057     1588.3     10076    1588.3     10095    1590.2     10125     1591.0     10145
GR   1591.6     10172     1591.5     10203    1591.5     10225    1591.6     10248     1591.7     10375
GR     1592     10380     1591.6     10500      1592     10635    1592.6     10690
        END OF KIMLEY-HORN REVISIONS

ET                   9.1        7.1                                   9600      10080       9490
X1    14.89         49      9938     10059       700       760     756.4
GR   1601.5      9234     1601.3      9270    1599.7      9318    1598.4      9337     1597.4      9377
GR   1597.0      9406     1596.9      9434    1597.5      9460    1598.4      9477     1598.5      9494
GR   1597.0      9511     1595.3      9549    1593.2      9572    1593.5      9577     1590.8      9587
GR   1591.2      9606     1591.0      9626    1592.0      9633    1593.0      9659     1592.7      9671
GR   1593.5      9683     1593.6      9702    1592.4      9714    1592.5      9741     1592.4      9775
GR   1592.7      9804     1591.3      9817    1591.4      9847    1591.8      9869     1592.2      9890
GR   1593.0      9906     1592.5      9927    1591.9      9938    1589.9      9949     1589.9      9956
GR   1587.2      9979     1583.3      9995    1583.2     10000    1583.3     10013     1583.8     10032
GR   1588.0     10042     1596.4     10059    1597.2     10087    1598.2     10101     1599.3     10141
GR   1599.6     10186     1600.2     10236    1600.4     10284    1600.5     10319

ET                          7.1                                   9972      10390
X1    15.06         62      9972     10390       670       950     930.3
GR   1603.3      9119     1603.9      9192    1604.4      9267    1604.9      9349     1605.9      9431
GR   1606.0      9497     1606.1      9575    1606.3      9620    1606.6      9663     1606.5      9685
GR   1605.7      9707     1603.0      9733    1599.7      9751    1599.0      9759     1599.5      9764
GR   1600.1      9782     1600.6      9800    1600.6      9836    1601.4      9872     1602.1      9917
GR   1602.2      9972     1597.9      9988    1593.0     10000    1591.5     10010     1591.3     10020
GR   1594.5     10043     1593.9     10060    1595.3     10070    1597.5     10089     1598.0     10109
GR   1597.8     10126     1595.7     10138    1596.7     10152    1600.2     10174     1600.1     10205
GR   1593.4     10229     1593.7     10246    1596.4     10268    1596.6     10283     1597.3     10298
GR   1597.8     10314     1597.1     10323    1598.4     10337    1597.4     10350     1600.0     10367
GR   1601.4     10390     1601.3     10411    1599.6     10441    1595.7     10453     1600.3     10470
GR   1600.7     10480     1602.7     10495    1603.6     10517    1605.1     10549     1606.0     10581
GR   1606.6     10621     1606.9     10667    1607.1     10713    1607.2     10776     1607.4     10855
GR   1607.4     10916     1607.6     10950

ET                   9.1        7.1                                   9975      10351       9503      10546
X1    15.12         61      9975     10351       255       330     283.6
GR   1604.6      9081     1604.5      9136    1604.6      9184    1605.2      9236     1605.8      9313
GR   1606.1      9379     1606.4      9423    1606.8      9503    1606.7      9545     1606.5      9620
GR   1606.2      9665     1605.5      9703    1604.5      9754    1603.8      9762     1604.4      9792
GR   1603.5      9836     1603.5      9865    1602.9      9886    1603.3      9903     1603.9      9928
GR   1604.1      9975     1596.3     10000    1596.9     10009    1596.4     10015     1596.7     10032
GR   1595.8     10059     1600.2     10070    1601.3     10087    1601.7     10109     1602.2     10130
GR   1602.4     10144     1601.5     10156    1602.1     10176    1602.1     10205     1601.7     10213
GR   1602.2     10230     1602.8     10258    1595.4     10282    1596.7     10302     1597.2     10319
GR   1601.5     10351     1600.3     10370    1601.1     10378    1601.1     10387     1603.1     10417
GR   1603.4     10441     1603.1     10480    1602.9     10493    1603.8     10513     1604.1     10532
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GR   1606.5     10546    1606.1     10564     1607.2     10587     1608.2     10621     1609.1     10657
GR   1609.8     10716    1610.4     10769     1610.7     10822     1611.1     10863     1611.2     10909
GR     1611     10955

ET                9.1       7.1                                     9977     10500      9749     10672
X1    15.22        54      9977     10348       535       600      553.1
GR   1609.2      9347    1609.6      9393     1610.2      9448     1610.9      9497     1611.3      9548
GR   1611.8      9619    1612.0      9694     1612.0      9749     1611.9      9816     1611.1      9893
GR   1610.5      9937    1609.1      9977     1599.9      9996     1599.4     10000     1599.2     10022
GR   1598.9     10041    1602.7     10057     1605.6     10077     1606.6     10091     1606.1     10113
GR   1606.8     10126    1607.7     10151     1607.9     10166     1606.7     10191     1606.0     10210
GR   1606.8     10234    1605.9     10242     1606.2     10249     1604.1     10260     1605.4     10269
GR   1605.1     10282    1602.0     10301     1601.5     10310     1601.9     10327     1607.8     10348
GR   1608.2     10374    1608.0     10413     1607.9     10439     1604.5     10461     1607.3     10480
GR   1607.9     10507    1609.1     10527     1611.0     10570     1612.3     10605     1613.6     10657
GR   1613.8     10672    1613.4     10708     1613.6     10752     1614.3     10797     1615.1     10850
GR   1615.6     10891    1616.3     10934     1616.8     10987     1617.2     11062

ET                         7.1                                     9979     10353
X1    15.41        57      9979     10353       980       950      968.9
GR   1618.0      9542    1618.6      9643     1618.9      9676     1620.7      9683     1619.0      9694
GR   1619.4      9751    1619.7      9787     1620.0      9830     1619.2      9867     1619.4      9907
GR   1619.7      9940    1618.7      9968     1615.1      9979     1609.8      9993     1609.2     10000
GR   1608.3     10009    1607.6     10021     1609.7     10027     1610.4     10043     1610.4     10053
GR   1611.1     10058    1612.8     10070     1613.1     10077     1611.8     10085     1612.0     10096
GR   1610.1     10106    1611.9     10113     1613.0     10124     1613.0     10135     1612.5     10157
GR   1611.8     10178    1612.0     10194     1610.2     10212     1610.9     10221     1610.4     10245
GR   1609.6     10257    1609.4     10282     1608.7     10297     1610.1     10310     1611.0     10324
GR   1611.0     10333    1614.7     10353     1618.6     10383     1620.1     10403     1620.5     10426
GR   1621.2     10440    1619.6     10464     1617.9     10479     1618.1     10496     1619.3     10517
GR   1620.0     10534    1621.0     10569     1622.0     10607     1622.6     10642     1622.9     10678
GR   1623.0     10732    1623.1     10769

ET                         7.1                                     9890     10182
X1    15.55        46      9935     10147       730       550      755.3
GR   1625.7      9335    1625.5      9408     1625.7      9486     1625.9      9510     1625.7      9532
GR   1626.2      9567    1627.0      9622     1628.0      9645     1627.1      9680     1626.7      9703
GR   1626.5      9731    1626.1      9761     1625.3      9790     1623.7      9822     1622.3      9835
GR   1618.7      9858    1619.5      9869     1619.7      9906     1619.5      9935     1618.8      9954
GR   1615.4      9972    1615.3      9982     1613.8      9991     1613.9     10000     1614.7     10030
GR   1615.2     10057    1614.9     10078     1613.4     10093     1614.5     10104     1617.5     10126
GR   1619.4     10147    1620.5     10184     1620.7     10222     1620.5     10247     1620.2     10266
GR   1619.4     10278    1618.9     10314     1619.4     10326     1620.0     10343     1624.2     10368
GR   1625.0     10381    1625.1     10410     1625.3     10453     1625.2     10483     1625.1     10525
GR   1625.0     10531

ET                         7.1                                     9477     10116
X1    15.75        50      9977     10102       880      1030     1048.4
GR   1633.1      9040    1633.1      9098     1632.7      9146     1632.0      9185     1632.0      9268
GR   1631.5      9319    1630.5      9364     1630.7      9404     1629.9      9431     1626.7      9467
GR   1626.1      9481    1624.3      9500     1624.3      9515     1623.4      9534     1619.5      9549
GR   1619.5      9557    1622.4      9566     1624.1      9580     1624.8      9602     1625.6      9637
GR   1626.1      9689    1626.0      9712     1625.0      9736     1625.4      9751     1627.1      9769
GR   1628.7      9816    1628.8      9835     1627.8      9850     1628.0      9875     1628.6      9933
1
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GR   1627.2      9944    1626.9      9963     1626.1      9967     1625.7      9977     1619.8     10000
GR   1620.1     10015    1621.2     10027     1621.5     10050     1616.7     10070     1616.3     10079
GR   1627.5     10102    1627.9     10116     1627.5     10121     1628.4     10138     1629.3     10174
GR   1630.3     10210    1631.2     10259     1631.4     10307     1631.7     10370     1631.7     10411

ET                         7.1                                     9817     10210
X1    15.89        58      9969     10210       700       730      738.4
GR   1636.6      9095    1637.0      9172     1636.9      9243     1637.2      9312     1637.1      9359
GR   1637.6      9398    1638.1      9428     1637.5      9460     1634.0      9490     1630.6      9517
GR   1631.6      9522    1631.8      9539     1631.4      9550     1631.6      9571     1632.6      9626
GR   1633.3      9676    1633.4      9714     1632.5      9744     1631.7      9775     1630.9      9809
GR   1629.2      9818    1629.2      9822     1630.6      9831     1631.6      9850     1632.4      9866
GR   1632.6      9887    1632.1      9901     1636.5      9919     1635.9      9934     1633.3      9949
GR   1633.2      9969    1632.2      9981     1626.9     10000     1627.0     10011     1628.2     10018
GR   1627.9     10035    1626.8     10056     1626.8     10068     1630.8     10096     1630.7     10121
GR   1631.1     10172    1630.2     10182     1630.1     10194     1633.5     10210     1635.6     10224
GR   1636.1     10243    1636.9     10296     1637.0     10337     1637.2     10370     1637.1     10414
GR   1636.4     10440    1636.4     10469     1635.7     10477     1636.7     10492     1636.9     10535
GR   1637.6     10578    1637.2     10598     1637.2     10621

ET                         7.1                                     9760     10130
X1    16.07        42      9948     10130       980       840      950.3
GR   1648.3      9258    1648.3      9327     1648.3      9384     1648.1      9446     1648.0      9494
GR   1647.3      9536    1646.8      9578     1645.7      9614     1644.4      9631     1641.8      9648
GR   1641.5      9701    1641.1      9720     1638.4      9734     1637.8      9750     1639.7      9760
GR   1637.5      9781    1639.3      9791     1639.5      9822     1638.8      9854     1638.8      9877
GR   1639.4      9884    1640.1      9902     1640.1      9948     1638.8      9974     1634.8      9986
GR   1634.3     10000    1634.7     10037     1635.4     10044     1636.2     10071     1636.3     10089
GR   1635.5     10105    1635.5     10113     1643.3     10130     1644.3     10166     1645.7     10196
GR   1646.5     10222    1646.6     10267     1646.7     10315     1646.2     10350     1645.8     10392
GR   1645.6     10433    1645.5     10494

ET                         7.1                                     9600     10068
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X1    16.19        54      9934     10077       540       660     645.6
GR   1652.0      9011    1652.5      9072    1652.6      9131    1652.8      9193    1652.7      9235
GR   1651.8      9260    1649.9      9281    1647.9      9326    1645.6      9377    1644.7      9385
GR   1645.2      9392    1646.1      9431    1646.6      9457    1646.3      9500    1645.4      9506
GR   1646.3      9515    1646.3      9539    1645.2      9548    1645.8      9556    1645.2      9574
GR   1643.7      9600    1641.7      9613    1640.9      9624    1641.8      9639    1641.7      9652
GR   1642.7      9664    1642.9      9687    1642.4      9695    1642.5      9709    1644.9      9730
GR   1646.3      9760    1646.9      9781    1647.2      9807    1646.2      9817    1645.8      9833
GR   1646.5      9855    1646.9      9881    1644.9      9907    1644.4      9934    1643.9      9950
GR   1638.9      9966    1639.7      9981    1637.5     10000    1637.8     10018    1637.9     10034
GR   1639.1     10048    1652.0     10077    1652.8     10101    1653.2     10139    1653.3     10192
GR   1653.0     10245    1652.7     10291    1652.4     10341    1652.2     10389

ET                          7.1                                   9760     10042
X1    16.27        50      9760     10045       400       425     422.1
GR   1655.1      9044    1655.3      9106    1655.6      9139    1655.9      9198    1656.1      9247
GR   1656.3      9283    1655.9      9326    1654.9      9357    1652.7      9394    1650.9      9404
GR   1650.4      9443    1650.5      9466    1650.7      9508    1648.7      9529    1648.6      9539
GR   1646.7      9553    1648.2      9572    1647.6      9588    1648.6      9600    1647.5      9623
GR   1649.0      9643    1650.5      9667    1650.2      9682    1650.3      9700    1649.6      9724
GR   1650.2      9760    1648.3      9771    1647.7      9798    1646.1      9816    1647.3      9835
1
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GR   1647.9      9853    1649.6      9872    1649.9      9892    1648.8      9905    1648.9      9915
GR   1648.4      9923    1648.9      9947    1643.5      9967    1642.4      9990    1639.4     10000
GR   1639.8     10009    1640.0     10032    1654.9     10045    1655.9     10052    1656.0     10111
GR   1656.2     10158    1656.4     10207    1656.4     10255    1656.5     10316    1656.1     10391

ET                          7.1                                   9906     10430
X1    16.49        46      9906     10130      1190      1150    1153.6
GR   1667.1      9520    1667.6      9583    1667.4      9619    1665.7      9661    1665.1      9708
GR   1664.9      9776    1664.1      9808    1661.9      9841    1661.5      9871    1659.1      9888
GR   1659.2      9906    1653.7      9925    1653.9      9933    1653.8      9961    1653.3     10000
GR   1654.5     10018    1658.6     10040    1658.9     10066    1658.1     10073    1657.8     10095
GR   1659.1     10104    1659.5     10130    1653.7     10147    1654.0     10168    1653.7     10211
GR   1655.7     10224    1655.2     10234    1655.3     10246    1656.7     10253    1657.7     10285
GR   1658.8     10316    1659.1     10335    1658.9     10371    1657.8     10413    1656.7     10420
GR   1657.4     10428    1657.6     10438    1656.8     10446    1657.6     10465    1659.8     10485
GR   1662.4     10512    1663.3     10532    1664.0     10582    1664.5     10619    1664.7     10669
GR   1664.8     10742

NC     .043      .057      .043        .1        .3
ET                          7.1                                   9940     10590
X1    16.68        51      9928     10590       940      1160     997.5
GR   1682.1      9880    1676.2      9916    1673.5      9928    1662.9      9950    1662.6      9956
GR   1666.6      9964    1666.2      9989    1662.3     10000    1662.8     10009    1662.7     10020
GR   1664.5     10025    1665.2     10043    1665.3     10076    1664.9     10100    1662.9     10107
GR   1662.9     10120    1661.5     10135    1665.1     10142    1665.4     10161    1664.6     10168
GR   1664.2     10183    1664.5     10192    1663.7     10218    1662.3     10230    1661.7     10247
GR   1662.9     10262    1664.5     10302    1664.0     10308    1663.9     10353    1664.0     10390
GR   1663.6     10437    1663.5     10463    1662.9     10470    1663.5     10479    1662.7     10511
GR   1661.8     10530    1661.3     10540    1661.3     10553    1662.3     10569    1666.8     10590
GR   1675.2     10612    1674.8     10641    1675.2     10677    1675.4     10718    1675.4     10765
GR   1675.3     10821    1675.4     10870    1675.6     10900    1675.6     10938    1676.0     10964
GR   1676.0     11005


QT       2     27300     27300
NC     .059      .042      .033        .3        .5

        DOWNSTREAM FACE OF CAREFREE HIGHWAY BRIDGE.
        BRIDGE OPENING ADJUSTED BY FACTOR OF 0.707 TO ACCOUNT FOR
        45 DEGREE SKEW.  DOWNSTREAM REACH LENGTHS REDUCED TO
        ACCOUNT FOR NEW CAREFREE HIGHWAY BRIDGE CONSTRUCTION.

X1    16.86         6      9893     10317     888.2     778.2     879.1     0.707
X2                                                                                          15
X3       10                                                                  1685      1685
GR   1685.3      9893   1671.01      9933   1670.42     10000   1669.51     10103   1669.11     10273
GR   1685.3     10317

        UPSTREAM FACE OF CAREFREE HIGHWAY BRIDGE.
        APPROXIMATELY 3,600 CFS DIVERTS OUT OF THE SKUNK CREEK WASH
        AT APPROXIMATELY 1,500 FEET WEST OF THE MAIN HIGHWAY BRIDGE.
        REFER TO SPLIT FLOW MODEL FROM CROSS-SECTION 16.87 TO CROSS-SECTION
        17.48. CROSS-SECTION 17.48 IS THE POINT OF FLOW MATCHING.
        BT BASED UPON "AS-BUILT" PLANS ADJUSTED TO ACCOUNT FOR MAPPED
1
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        CONDITIONS.  DOWNSTREAM REACH LENGTHS FOR CROSS-SECTION 16.87
        INCREASED TO 146 FT TO REFLECT THE ADDITION OF THE SOUTHERN
        HALF OF THE CAREFREE HIGHWAY BRIDGE. PIER WIDTH OF 3.5 FEET
        MULTIPLIED BY DEBRIS FACTOR OF 2 = 3 PIERS AT 7-FOOT WIDTH EACH.


SB     1.05      1.56       2.7         0       232        21      2254         2   1670.71   1669.11
X1    16.87         6      9890     10320       146       146       146     0.707
X2        0         0         1    1681.1      1686         0         0      1.33      .707        15
X3       10                                                                  1685      1685
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BT        4      9885    1685.6                 9918     1685.7                 10102     1686.0
BT    10337    1685.8
GR   1684.9      9890   1671.81      9943   1671.88      10000   1672.01      10108   1670.71      10272
GR   1684.1     10320


QT        2     27300     27300
NC     .059      .042      .033        .1         .3

        GR DATA FOR SECTIONS 16.96 TO 17.95 IS BASED UPON ONE-FOOT MAPPING
        FROM CARTER-BURGESS DIGITAL TERRAIN MODEL. DATE: 2-24-99
        GR ELEVATIONS FOR SECTIONS 16.96 TO 17.95 ARE BASED UPON
        CITY OF PHOENIX DATUM.  MONTGOMERY-WATSON GR DATA ARE BASED UPON
        NGVD 1927 DATUM.  THE GR DATA FOR SECTIONS 16.96 TO 17.95 ARE
        RAISED BY 0.21 FEET ON THE X1 CARD FOR CONVERSION TO THE
        NGVD 1927 DATUM.

ET                 9.1       7.1                                   9914     10348      9914     10348
X1    16.96         61      9932     10342       410       600     456.2       1.0      0.21
X2                                                                                              15
GR   1684.1    9539.39   1680.00   9594.54   1682.00   9637.67   1680.00   9655.49   1680.00   9757.68
GR   1678.5    9807.96   1678.00   9870.41   1678.00   9902.01   1684.00   9929.31      1684      9932
GR   1684.0    9947.83    1678.0      9966   1677.71   9988.98   1676.00  10007.22   1676.00  10075.82
GR   1679.4   10134.07    1679.9  10257.04   1682.44   10270.3   1682.91  10282.57   1684.29  10307.33
GR   1684.7      10342    1685.2  10383.59    1685.6  10435.94   1684.59  10503.13   1681.61  10542.21
GR   1681.7   10567.46    1684.5  10601.12    1685.0  10660.64   1685.14   10704.2   1685.85  10830.52
GR   1686.6    10864.9    1688.5  10909.44    1688.7  10920.87   1688.46  10970.87   1688.21   11018.3
GR   1688.4   11061.63    1687.9  11137.84    1687.9  11246.93   1687.23  11567.48   1686.77  11645.69
GR   1686.1   11668.64    1685.0  11730.35    1682.7  11795.39   1683.11   11904.8   1683.60  11972.35
GR   1680.6   11995.13    1681.3  12009.48    1680.0  12021.63   1680.01  12033.37   1683.12   12052.5
GR   1684.1   12068.44    1683.2  12108.19    1683.9  12127.91   1683.29  12159.06   1683.75  12199.78
GR   1684.7   12221.54    1685.3  12302.92    1686.2  12482.15   1686.01  12553.87   1686.23  12583.61
GR   1685.8   12619.86


ET                 9.1       7.1                                   9650     10470      9533     10470
X1    17.06         68      9947     10090       630       440     566.0                0.21
X2                                                                                              15
GR   1694.0   9385.95   1693.95   9443.14   1690.00   9475.62   1690.00   9497.53   1688.00   9557.26
GR   1684.0   9581.93   1682.31   9621.41   1686.00   9643.26   1686.00   9763.42   1684.00   9806.79
GR   1684.0   9929.44   1682.68      9947   1681.50   9963.19   1680.00   9982.51   1682.00   9988.59
GR   1682.0  10002.50    1678.0  10029.28   1678.00  10052.12   1684.48  10064.34   1686.00  10069.46
GR   1687.9     10090    1689.0  10122.23    1689.3  10215.28   1688.00  10336.61   1688.10  10396.62
GR   1687.8  10487.99    1688.0  10511.72    1687.4  10522.16   1688.38  10572.12   1688.62  10626.53
1
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GR   1689.6  10646.45    1690.6  10749.60    1690.3  10800.60   1690.98  10928.08   1690.54  11030.08
GR   1690.9  11081.08    1690.9  11116.85    1690.4  11217.90   1690.40  11307.94   1690.05  11414.59
GR   1688.9  11515.03    1688.4  11541.26    1687.2  11553.62   1688.71  11570.43   1688.71  11611.26
GR   1686.9  11659.40    1686.6  11686.45    1689.0  11715.46   1689.84  11790.80   1690.01  11846.52
GR   1691.6  11921.73    1691.6  11976.53    1690.2  12032.71   1690.45  12064.67   1689.28  12092.70
GR   1687.0  12101.40    1689.2  12110.11    1686.7  12121.50   1687.03  12132.17   1690.17  12142.33
GR   1688.6  12152.05    1690.3  12176.39    1690.4  12191.90   1689.44  12200.38   1691.39  12313.66
GR   1691.5  12385.08    1691.0  12479.24    1692.1  12605.82


NC     .048      .048      .046        .1         .3

ET                 9.1       7.1                                   9788     10668      9746     10695
X1    17.18         56      9978     10254       610       510     600.8                0.21
X2                                                                                              15
GR   1699.8   9493.99   1697.06   9664.32   1695.56   9715.97   1694.00   9779.51   1692.05   9808.56
GR   1693.2   9845.85   1692.49   9935.01   1692.00   9963.19   1688.74      9978   1686.00   9990.45
GR   1686.0  10011.48    1690.0  10053.30   1690.00  10123.73   1687.29  10145.22   1686.00  10162.51
GR   1688.0  10206.89    1688.0  10244.97   1689.35     10254   1694.00  10284.66   1696.00  10342.46
GR   1695.4  10386.32    1695.1  10446.24   1694.00  10516.41   1693.77  10575.40   1693.06  10655.64
GR   1694.5  10749.27    1695.8  10806.19   1695.72  10933.46    1696.0  10997.29    1695.9  11083.48
GR   1696.1  11089.79    1696.5  11108.75   1695.63  11237.26    1694.8  11322.92    1693.7  11408.60
GR   1692.9  11445.19    1692.4  11459.18   1693.31  11474.48    1692.3  11499.27    1692.8  11568.83
GR   1693.0  11665.60    1693.9  11794.13   1694.57  11930.31    1695.5  12034.58    1695.9  12115.02
GR   1695.7  12238.17    1695.9  12285.64   1692.73  12313.61    1692.5  12332.10    1696.4  12352.81
GR   1695.9  12381.62    1696.6  12395.49   1696.08  12435.45    1696.7  12500.30    1698.0  12576.83
GR   1698.2  12621.60


ET                 9.1       7.1                                   9628     10535      9568     10560
X1    17.30         53      9970     10156       630       580     644.4                0.21
X2                                                                                              15
GR   1710.5   9112.36   1710.00   9177.76   1709.63   9217.43   1704.60   9322.93   1704.00   9419.22
GR   1703.9   9448.82   1701.30   9534.19   1700.00   9566.96   1700.00   9598.26   1698.00   9656.94
GR   1698.0   9720.94   1697.35   9761.09   1698.00   9881.54   1697.02   9933.98   1696.00   9946.95
GR   1692.0   9962.55      1692      9970   1692.00  10031.21   1694.00  10063.76   1696.00  10074.95
GR   1696.0  10119.18    1697.2     10156    1697.7  10169.28   1698.00  10277.48   1696.00  10295.67
GR   1696.1  10308.57    1698.0  10327.84    1698.0  10437.49   1700.00  10523.21   1700.30  10569.87
GR   1700.6  10584.84    1699.9  10675.27    1700.1  10755.39   1699.09  10873.25   1698.71  10927.80
GR   1699.6  11081.73    1699.2  11129.84    1699.4  11231.27   1700.25  11358.81   1700.39  11481.95
GR   1700.5  11585.67    1702.2  11666.67    1700.7  11730.00   1700.10  11772.84   1699.51  11807.15
GR   1696.2  11820.90    1696.9  11838.62    1700.5  11855.95   1700.12  11882.17   1700.24  11925.03
GR   1701.8  11987.03    1701.9  12128.46    1702.0  12183.66
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ET                 9.1       7.1                                   9758      10471       9731      10473
X1    17.39         55      9893     10179       465       530     500.0                  0.21
X2                                                                                          15
GR   1711.1    9116.73    1710.00   9167.22   1710.00   9190.00   1707.78   9326.23   1706.00   9403.55
GR   1706.0    9430.65    1705.12   9471.20   1704.74   9555.58   1704.99   9664.90   1705.40   9710.74
GR   1703.9    9779.45    1702.00   9887.09   1697.84      9893   1698.00   9898.69   1698.00   9920.72
GR   1700.0    9928.58     1696.0   9951.05   1696.00   9973.40   1698.00   9991.02   1700.00  10057.52
GR   1700.0   10099.04     1698.0  10111.87   1698.00  10131.69   1702.00  10144.53   1702.00  10170.78
GR   1701.3      10179     1700.0  10195.61    1702.0  10231.60   1702.16  10316.97   1702.77  10463.14
1
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GR   1703.1   10621.24     1703.1  10798.44    1702.8  10893.36   1702.71  10911.99   1702.16  10938.60
GR   1703.1   10984.81     1703.6  11071.94    1704.0  11149.81   1704.00  11216.87   1704.77  11322.45
GR   1704.5   11451.58     1704.3  11532.28    1705.1  11566.52   1702.62  11580.13   1704.07  11595.54
GR   1702.3   11601.47     1702.4  11622.56    1705.9  11645.05   1704.94  11673.91   1704.89  11732.23
GR   1705.4   11786.90     1704.9  11887.47    1705.2  11960.19   1704.78  12035.23   1704.18  12058.85

NC       .06       .060      .042        .1        .3
QT         2      27300     27300

ET                 9.1       7.1                                  9488.92      10340       9478      10355

        APPROX. 3,600 CFS DIVERTS INTO RIGHT OVERBANK FROM THIS CROSS-SECTION
        DOWNSTREAM.  REFER TO SPLIT FLOW MODEL FOR RIGHT OVERBANK ANALYSIS.
        FLOODWAY ANALYSIS USES ENTIRE FLOW AND IS STRICTLY FOR MAIN CHANNEL.

X1    17.48         40      9893     10073       429       429     429.4                  0.21
X2                                                                                          15
GR   1716.0    9372.88    1710.84   9458.51   1708.00   9485.84   1708.00   9544.18   1707.25   9597.50
GR   1706.6    9679.17    1706.00   9739.84   1706.00   9877.04   1702.68      9893   1702.00   9936.69
GR   1702.0   10037.70    1704.40  10047.62   1706.00  10063.16   1706.00     10073   1706.00  10247.95
GR   1706.5   10301.08     1706.8  10455.69   1706.73  10561.82   1706.57  10600.14   1706.88  10693.59
GR   1707.2   10757.24     1708.0  10805.71   1708.14  10845.01   1709.12  10975.02   1708.96  11014.26
GR   1707.7   11046.61     1707.6  11059.28   1708.52  11074.56   1706.96  11086.14   1708.52  11099.03
GR   1707.8   11126.83     1708.7  11136.13   1704.10  11173.88   1706.87  11188.45   1707.99  11249.19
GR   1708.8   11382.36     1709.3  11482.61   1709.58  11541.69   1710.44  11616.42   1711.83  11696.98

ET                 9.1       7.1                                  9516.45      10263       9440      10274
X1    17.57         33      9923     10040       365       500     474.4                  0.21
X2                                                                                          15
GR   1720.8    9203.88    1716.95   9303.56   1715.14   9335.15   1714.09   9428.56   1714.36   9471.01
GR   1710.0    9508.10    1711.13   9548.25   1712.00   9576.05   1712.00   9686.77   1708.00   9871.91
GR   1706.0    9897.50    1706.00      9923   1702.00   9930.23   1703.39   9971.46   1706.17  10007.46
GR   1708.7   10020.08    1710.00     10040   1708.32  10114.97   1711.29  10161.60   1712.00  10169.27
GR   1712.0   10401.97    1711.82  10474.54   1711.46  10628.12   1710.00  10672.93   1708.32  10688.83
GR   1710.0   10716.66    1710.06  10827.37   1711.41  10887.64   1713.38  11026.76   1713.78  11097.48
GR   1714.3   11153.34    1714.48  11225.31   1715.18  11289.40

ET                 9.1       7.1                                  9423.70      10270       9350      10296
X1    17.65         31      9924     10021       370       500     460.8                  0.21
X2                                                                                          15
GR   1734.7    9336.28    1726.00   9382.74   1716.00   9413.87   1714.00   9475.55   1712.00   9482.60
GR   1712.5    9493.88    1713.77   9550.02   1713.27   9594.24   1714.00   9630.30   1713.10   9665.77
GR   1714.0    9812.95    1711.89   9899.02   1708.00   9912.78   1707.04      9924   1704.00   9959.39
GR   1704.0    9984.01     1708.1   9992.68   1710.00  10000.49   1711.07     10021   1714.00  10077.36
GR   1715.2   10133.98     1715.9  10205.53    1714.2  10358.37   1713.30  10370.66   1712.00  10376.05
GR   1712.0   10399.95     1714.0  10455.92    1715.9  10593.80   1716.54  10726.83   1718.00  10854.12
GR   1718.1   10903.11
1
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ET                 9.1       7.1                                  9642.06      10578       9600      10605
X1    17.78         28      9931     10026       490       720     661.3                  0.21
X2                                                                                          15
GR   1751.5    9514.89    1741.31   9570.53   1732.00   9599.65   1721.18   9627.65   1716.00   9684.50
GR   1718.0    9717.21    1718.27   9765.64   1720.00   9841.50   1720.00      9931   1720.00   9955.49
GR   1714.0    9973.26     1714.0   9988.08   1713.17     10026   1716.00  10070.76   1716.23  10151.26
GR   1715.8   10235.37     1718.0  10282.17   1720.00  10309.14   1720.00  10385.19   1716.00  10409.40
GR   1716.0   10447.79     1720.0  10488.02   1720.00  10527.03   1722.00  10585.51   1722.00  10781.23
GR   1723.6   10884.80     1724.0  10986.97   1724.69  11024.28

ET                 9.1       7.1                                  9745.39      10665       9700      10678
X1    17.84         29      9925     10219       310       310     341.7                  0.21
X2                                                                                          15
GR   1730.7    9670.69    1728.76   9713.32   1724.00   9753.84   1720.00   9772.54   1720.44   9790.38
GR   1722.1    9800.90    1724.00   9834.61   1724.00   9909.89   1723.00      9925   1722.00   9940.13
GR   1719.4    9955.16     1718.0  10029.40   1718.00  10048.88   1718.00  10133.86   1720.00  10164.50
GR   1720.1      10219     1722.0  10230.85   1722.00  10374.53   1723.13  10440.30   1722.38  10487.83
GR   1720.0   10533.75     1720.0  10579.92   1722.00  10616.26   1722.00  10663.58   1724.00  10716.91
GR   1724.5   10765.44     1725.3  10867.86   1725.36  10903.95   1726.37  11049.41

        CLOUD ROAD CROSSES THROUGH THIS CROSS-SECTION.
        3-60" CMPS:CAPACITY IGNORED
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ET                          7.1                                     9818.68      10595
X1    17.95        42       9867      10047       500       520      563.8                    0.21
X2                                                                                                  15
GR   1740.3   9755.02    1730.00    9818.34   1726.64   9852.10   1726.15       9867     1725.94   9873.24
GR   1724.0   9879.76     1724.0    9941.90   1722.00  10021.83   1722.00   10042.15     1723.30     10047
GR   1726.5  10058.87     1726.0   10131.78    1726.8  10166.46   1726.86   10219.74     1728.00  10281.54
GR   1728.0  10340.58     1726.0   10351.82    1724.0  10391.92   1724.22   10410.16     1728.00  10440.86
GR   1728.0  10470.78     1726.5   10517.06    1726.0  10529.03   1722.85   10545.77     1728.15  10569.84
GR   1730.0  10647.71     1730.1   10713.11    1730.0  10858.38   1729.75   10888.71     1730.00  11036.40
GR   1731.1  11046.39     1734.0   11060.67    1731.9  11064.15   1734.74   11068.55     1752.62  11081.31
GR   1754.9  11117.17     1762.6   11121.41    1773.7  11131.30   1795.88   11138.65     1761.77  11146.48
GR   1754.6  11150.26     1844.6   11242.14

        END OF CARTER-BURGESS ONE-FOOT CONTOUR MAPPING.
        MONTGOMERY-WATSON TWO-FOOT INTERVAL CONTOUR MAPPING RESUMES.


QT        2     27700      27700
ET                          7.1                                      9895      10610
X1    18.09        60       9936      10310     712.5       375     705.8
X2                                                                                                  15
GR   1788.5      9672     1784.1       9713    1776.9      9762    1771.6       9792     1748.2    9828
GR   1733.9      9855     1732.7       9862    1729.9      9872    1729.7       9880     1731.3    9885
GR   1730.9      9900     1727.3       9919    1730.5      9936    1727.5       9951     1728.2    9971
GR   1728.2      9991     1727.4      10000    1727.8     10006    1728.8      10065     1729.6   10076
GR   1731.3     10090     1731.8      10119    1731.7     10178    1730.9      10226     1729.9   10264
GR   1726.2     10280     1725.9      10290    1733.0     10310    1732.9      10333     1731.3   10380
GR   1730.4     10407     1729.1      10447    1728.6     10497    1729.1      10522     1723.5   10540
1
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GR   1723.7     10556     1728.6      10573    1731.4     10597    1733.6      10633     1734.3   10663
GR   1734.2     10717     1733.5      10772    1732.5     10799    1732.3      10847     1732.4   10899
GR   1732.3     10935     1733.1      10974    1733.0     11013    1732.8      11076     1733.3   11132
GR   1733.7     11210     1734.0      11263    1734.7     11349    1735.8      11423     1736.6   11479
GR   1737.7     11538     1738.0      11570    1738.6     11595    1739.1      11632     1739.7   11661

NC     .055      .055       .030
ET                          7.1                                      9752      10425
X1    18.16        34       9836      10075       345       360     377.6
X2                                                                                                  15
GR   1755.1      9687     1739.9       9711    1736.1      9724    1734.0       9754     1730.7    9768
GR   1730.5      9775     1733.9       9788    1735.2      9810    1735.2       9836     1734.7    9860
GR   1733.3      9877     1732.7       9892    1732.9      9911    1732.5       9951     1732.5    9981
GR   1729.6      9996     1729.6      10000    1729.6     10020    1728.8      10050     1739.0   10075
GR   1737.8     10078     1737.2      10095    1735.8     10124    1734.7      10139     1734.0   10155
GR   1733.5     10199       1730      10330      1730     10380      1734      10430       1736   10650
GR   1736.9     10750       1738      10930      1738     11040      1740      11130
        NEW CROSS SECTION: GR CARD DATA FOR 18.20 DEVELOPED FROM TOPOGRAPHIC MAP
        CROSS SECTION ADDED TO MODEL FLOW OVER CLOUD ROAD
        CAPACITY OF 3-60" CMPS IGNORED

ET                          7.1                                      9630      10330
X1    18.23        19       9800      10010       370       400       370
X2                                                                                                  15
GR     1750      9510       1740       9550      1736      9640      1734       9650       1736    9660
GR     1736      9690       1735       9700      1736      9710      1738       9780       1738    9800
GR     1736      9930       1734       9950      1732      9965      1730      10000     1738.8   10010
GR     1740     10240       1740      10480      1740     10730      1742      10870

ET                          7.1                                      9630      10330
X1    18.29        57       9914      10049       200       310       300
GR   1750.9      9535     1741.6       9583    1737.2      9597    1739.5       9608     1739.1    9634
GR   1737.5      9647     1732.6       9660    1737.5      9678    1739.3       9712     1740.2    9758
GR   1740.1      9788     1739.1       9800    1739.7      9812    1738.7       9832     1735.8    9852
GR   1737.4      9872     1738.3       9914    1737.0      9932    1735.5       9949     1735.0    9968
GR   1734.0      9976     1734.6       9984    1734.3     10000    1735.5      10009     1735.3   10020
GR   1733.5     10029     1739.9      10049    1740.5     10076    1740.0      10115     1736.1   10130
GR   1734.7     10144     1736.9      10160    1738.4     10185    1742.0      10213     1742.5   10244
GR   1742.8     10266     1742.2      10270    1742.8     10286    1742.8      10318     1742.7   10349
GR   1742.8     10388     1742.5      10395    1742.5     10429    1742.2      10468     1742.6   10472
GR   1742.5     10553     1741.1      10565    1742.8     10574    1743.2      10607     1743.0   10634
GR   1743.3     10693     1744.6      10746    1744.9     10795    1745.6      10858     1746.0   10899
GR   1747.1     10970     1747.8      11035

NC     .055      .055       .042
ET                          7.1                                      9832      10475
X1    18.49        63       9832      10037    1162.5       850    1099.7
GR   1762.2      9699     1754.7       9727    1746.3      9755    1747.1       9766     1747.4    9792
GR   1747.4      9832     1745.9       9853    1742.7      9867    1743.3       9895     1744.9    9909
GR   1744.8      9930     1744.6       9965    1741.7      9985    1741.9      10000     1745.2   10015
GR   1746.9     10037     1746.9      10052    1746.2     10060    1745.8      10072     1747.3   10082
GR   1747.8     10111     1748.7      10142    1748.9     10167    1749.0      10202     1748.9   10243
GR   1748.7     10282     1748.2      10327    1748.0     10379    1747.8      10394     1746.5   10406
GR   1747.4     10417     1743.7      10434    1744.0     10445    1746.9      10464     1742.3   10481
1
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GR   1746.3     10497     1748.9      10522    1750.3     10562    1751.2      10602     1751.4   10637
GR   1751.9     10676     1752.2      10727    1752.5     10780    1752.7      10817     1753.1   10834
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GR   1753.7     10873     1754.2     10897     1754.5     10951     1754.9     10998     1755.3     11036
GR   1755.7     11087     1757.1     11131     1757.6     11137     1757.6     11163     1759.2     11194
GR   1759.0     11230     1759.4     11254     1760.4     11285     1761.5     11316     1763.0     11352
GR   1766.6     11387     1769.6     11411     1778.1     11458

NC     .040      .040      .030
ET                         7.1                                     9700      10480
X1    18.57        62      9947     10041       275       675     389.0
GR   1785.6      9578     1759.3      9624     1751.3      9644     1748.8      9663     1748.5      9671
GR   1746.0      9703     1743.7      9714     1743.5      9735     1746.6      9747     1749.2      9772
GR   1750.4      9819     1750.1      9829     1750.3      9832     1751.1      9879     1752.5      9926
GR   1752.5      9947     1745.1      9969     1744.4     10000     1744.4     10001     1745.5     10006
GR   1745.9     10014     1751.5     10041     1749.2     10062     1751.5     10076     1751.5     10102
GR   1750.9     10116     1751.2     10146     1752.4     10170     1752.3     10224     1751.4     10247
GR   1752.2     10263     1753.1     10302     1753.6     10332     1753.3     10360     1753.7     10386
GR   1751.0     10400     1753.4     10416     1752.6     10452     1752.5     10474     1751.8     10490
GR   1752.7     10507     1752.8     10528     1754.2     10560     1755.2     10585     1756.5     10600
GR   1757.0     10645     1757.7     10678     1757.9     10717     1758.1     10766     1758.8     10820
GR   1759.2     10862     1760.1     10915     1760.2     10941     1760.5     10950     1760.8     10964
GR   1760.4     10993     1760.2     11007     1761.1     11021     1761.8     11048     1765.7     11082
GR   1770.4     11111     1776.8     11148

QT        2     27300     27300
ET                 9.1       7.1                                     9380      10125      9321      10244
X1    18.74        69      9975     10142       750       650     917.8
GR   1770.0      9245     1770.1      9249     1763.2      9269     1763.1      9291     1762.2      9321
GR   1760.3      9332     1758.0      9362     1757.6      9377     1752.0      9388     1754.6      9404
GR   1753.8      9417     1750.4      9437     1750.7      9454     1754.9      9479     1756.6      9493
GR   1756.7      9528     1756.7      9552     1757.1      9583     1757.8      9616     1758.2      9656
GR   1758.9      9692     1760.0      9729     1759.4      9750     1759.8      9767     1758.1      9791
GR   1758.5      9814     1759.2      9851     1759.0      9883     1758.5      9908     1757.0      9924
GR   1757.7      9938     1757.7      9975     1755.1      9986     1755.0     10000     1755.2     10018
GR   1755.3     10042     1757.7     10056     1758.5     10111     1758.7     10142     1759.6     10163
GR   1760.5     10198     1760.9     10244     1760.1     10281     1759.2     10318     1759.3     10336
GR   1759.6     10361     1759.5     10381     1759.2     10434     1761.4     10471     1763.1     10502
GR   1763.6     10533     1763.5     10581     1763.1     10628     1763.7     10660     1763.7     10706
GR   1763.6     10752     1763.6     10796     1763.9     10855     1763.8     10889     1761.9     10896
GR   1763.9     10910     1764.0     10932     1766.7     10947     1766.0     10962     1764.0     10991
GR   1762.8     11003     1766.7     11018     1768.5     11036     1779.0     11093

ET                 9.1       7.1                                     9576      10140      9470      10165
X1    18.84        46      9915     10036       500       325     497.1
GR   1772.3      9380     1771.7      9419     1770.8      9450     1764.5      9475     1756.9      9503
GR   1757.6      9512     1758.4      9522     1758.5      9531     1757.4      9538     1759.8      9557
GR   1759.9      9576     1758.7      9586     1759.6      9597     1759.6      9604     1758.6      9612
GR   1760.0      9620     1760.6      9649     1760.6      9679     1761.0      9702     1759.8      9721
GR   1760.5      9732     1760.6      9768     1759.8      9784     1759.8      9797     1761.3      9818
GR   1763.1      9848     1763.4      9888     1763.2      9915     1759.9      9942     1758.0      9987
GR   1755.9     10000     1755.7     10008     1762.6     10036     1763.3     10051     1762.5     10101
GR   1760.8     10107     1762.3     10115     1764.2     10145     1765.5     10182     1766.0     10209
GR   1765.0     10231     1765.0     10258     1765.5     10308     1764.9     10357     1765.4     10413
GR   1765.4     10417
1
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ET                         7.1                                     9639      10480
X1    18.96        70      9924     10021       525       600     631.7
GR   1779.1      9326     1778.7      9377     1776.0      9418     1774.9      9427     1773.9      9442
GR   1769.0      9458     1767.7      9482     1766.0      9489     1767.1      9496     1767.3      9514
GR   1767.0      9536     1768.0      9545     1768.8      9570     1768.6      9607     1768.1      9640
GR   1767.9      9649     1767.8      9687     1767.3      9714     1767.7      9726     1767.9      9764
GR   1767.6      9796     1768.2      9809     1768.3      9837     1768.6      9862     1768.2      9894
GR   1768.0      9924     1762.2      9931     1762.6      9938     1762.6      9959     1762.9     10000
GR   1763.3     10007     1766.3     10021     1767.2     10035     1767.2     10043     1766.0     10055
GR   1766.9     10069     1765.7     10100     1766.7     10107     1766.3     10125     1764.5     10137
GR   1769.4     10159     1771.0     10193     1770.9     10235     1770.5     10281     1769.0     10317
GR   1768.7     10347     1767.5     10358     1768.8     10370     1768.8     10401     1767.4     10408
GR   1768.5     10414     1769.0     10436     1769.7     10455     1770.2     10515     1770.5     10574
GR   1770.6     10644     1770.7     10686     1770.9     10731     1771.0     10781     1771.3     10818
GR   1771.2     10877     1772.4     10930     1773.1     10975     1773.1     11027     1773.4     11087
GR   1773.8     11135     1773.9     11195     1774.3     11217     1774.5     11277     1774.6     11298

NC     .031      .031      .045
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    SECNO     DEPTH     CWSEL     CRIWS     WSELK     EG        HV        HL        OLOSS     L-BANK ELEV
    Q         QLOB      QCH       QROB      ALOB      ACH       AROB      VOL       TWA       R-BANK ELEV
    TIME      VLOB      VCH       VROB      XNL       XNCH      XNR       WTN       ELMIN     SSTA
    SLOPE     XLOBL     XLCH      XLOBR     ITRIAL    IDC       ICONT     CORAR     TOPWID    ENDST


*SECNO 14.300

3265 DIVIDED FLOW

7185 MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED
   14.300     14.56   1574.16   1574.16   1574.16   1575.12       .96      9.14       .10   1571.60
  26700.0    5904.7    9812.2   10983.1    1318.6     906.6    1864.7     629.7     258.0   1570.00
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       .30      4.48     10.82      5.89      .038      .052      .042      .000   1559.60   8646.87
   .008517     1010.     1214.     1210.        10        18         0       .00   2213.30  10868.65


*SECNO 14.540

3265 DIVIDED FLOW


3470 ENCROACHMENT STATIONS=     9283.0   10588.0  TYPE=      1  TARGET=     1305.000
    14.540     12.09   1583.69       .00   1583.69   1584.67       .98      9.55       .01   1581.90
   26700.0     219.2   26474.5       6.3     103.5    3326.5       4.4     739.3     303.8   1583.00
       .35      2.12      7.96      1.43      .038      .052      .042      .000   1571.60   9530.89
   .006749     1410.     1273.     1150.         4         0         0       .00    839.24  10492.90


*SECNO 14.570

3301 HV CHANGED MORE THAN HVINS

    14.570      7.52   1584.32       .00   1584.32   1586.43      2.11      1.42       .34   1581.20
   26700.0    3514.9   16422.8    6762.2     488.5    1281.1     642.6     751.1     306.3   1579.30
       .35      7.20     12.82     10.52      .059      .039      .042      .000   1576.80   9849.86
   .009750      150.      177.      190.         3         0         0       .00    439.65  10289.51


*SECNO 14.600
7185 MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED
    14.600      8.81   1585.81   1585.81   1585.81   1588.12      2.31      1.36       .06   1583.10
   26700.0    6223.0   17059.6    3417.4     808.0    1207.6     456.4     758.4     307.8   1583.10
       .36      7.70     14.13      7.49      .059      .039      .042      .000   1577.00   9751.96
   .010617      120.      141.      122.         9        11         0       .00    540.87  10292.83
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     SECNO      DEPTH      CWSEL      CRIWS      WSELK      EG         HV         HL         OLOSS      L-BANK ELEV
     Q          QLOB       QCH        QROB       ALOB       ACH        AROB       VOL        TWA        R-BANK ELEV
     TIME       VLOB       VCH        VROB       XNL        XNCH       XNR        WTN        ELMIN      SSTA
     SLOPE      XLOBL      XLCH       XLOBR      ITRIAL     IDC        ICONT      CORAR      TOPWID     ENDST


*SECNO 14.670

3301 HV CHANGED MORE THAN HVINS


3302 WARNING:  CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE,  KRATIO =  1.92

    14.670     10.15   1589.65       .00   1589.65   1590.33       .68      2.04       .16   1582.00
   26700.0   12962.6    9589.6    4147.8    2776.1    1088.9     720.1     792.5     314.6   1582.00
       .37      4.67      8.81      5.76      .059      .039      .042      .000   1579.50   9393.49
   .002889      477.      387.      317.         3         0         0       .00    897.95  10291.43


*SECNO 14.740

3301 HV CHANGED MORE THAN HVINS

3685 20 TRIALS ATTEMPTED WSEL,CWSEL
3693 PROBABLE MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED
    14.740     10.01   1591.71   1591.71   1591.71   1593.70      1.99      1.81       .39   1587.30
   26700.0   12557.0   13119.5    1023.5    1907.3     890.3     192.9     827.7     322.6   1588.30
       .38      6.58     14.74      5.31      .059      .039      .042      .000   1581.70   9525.35
   .008355      433.      366.      341.        20         5         0       .00    849.83  10375.17


*SECNO 14.890

3470 ENCROACHMENT STATIONS=     9490.0   10319.0  TYPE=      1  TARGET=    -9490.000
    14.890     13.83   1597.03   1596.53   1597.03   1598.99      1.97      5.29       .00   1591.90
   26700.0   10324.6   16366.9       8.5    1844.3    1196.8       6.6     877.7     334.3   1596.40
       .40      5.60     13.68      1.28      .059      .039      .042      .000   1583.20   9510.81
   .006310      700.      756.      760.         9        11         0       .00    569.76  10080.57


*SECNO 15.060

3301 HV CHANGED MORE THAN HVINS

    15.060     11.63   1602.93       .00   1602.93   1604.15      1.22      5.09       .07   1602.20
   26700.0    1308.4   23654.2    1737.3     427.7    2550.6     298.2     938.5     346.7   1601.40
       .43      3.06      9.27      5.83      .059      .039      .042      .000   1591.30   9733.38
   .005381      670.      930.      950.         3         0         0       .00    767.25  10500.63
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    SECNO      DEPTH      CWSEL      CRIWS      WSELK      EG         HV         HL         OLOSS      L-BANK ELEV
    Q          QLOB       QCH        QROB       ALOB       ACH        AROB       VOL        TWA        R-BANK ELEV
    TIME       VLOB       VCH        VROB       XNL        XNCH       XNR        WTN        ELMIN      SSTA
    SLOPE      XLOBL      XLCH       XLOBR      ITRIAL     IDC        ICONT      CORAR      TOPWID     ENDST

*SECNO 15.120
7185 MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED

3470 ENCROACHMENT STATIONS=     9503.0   10546.0  TYPE=      1  TARGET=     1043.000
    15.120      9.82   1605.22   1605.22   1605.22   1606.94      1.72      1.99       .15   1604.10
   26700.0    1068.2   22406.2    3225.6     338.4    2007.5     467.8     958.5     351.8   1601.50
       .44      3.16     11.16      6.90      .059      .039      .042      .000   1595.40   9717.08
   .009314      255.      284.      330.         4        10         0       .00    821.47  10538.56

*SECNO 15.220

3470 ENCROACHMENT STATIONS=     9749.0   10672.0  TYPE=      1  TARGET=      923.000
    15.220     11.30   1610.20       .00   1610.20   1612.00      1.80      5.03       .02   1609.10
   26700.0      27.2   23516.7    3156.1      17.2    2098.5     484.9     993.3     361.0   1607.80
       .45      1.58     11.21      6.51      .059      .039      .042      .000   1598.90   9945.61
   .008717      535.      553.      600.         3         0         0       .00    606.25  10551.86

*SECNO 15.410
    15.410      9.94   1617.54       .00   1617.54   1619.36      1.82      7.36       .01   1615.10
   26700.0      20.7   26566.2     113.0       9.1    2447.8      31.1    1049.8     372.2   1614.70
       .48      2.28     10.85      3.64      .059      .039      .042      .000   1607.60   9971.54
   .006692      980.      969.      950.         3         0         0       .00    403.33  10374.86

FLOW DISTRIBUTION FOR SECNO=     16.86          CWSEL=   1677.00

STA=    9909.   10193.
  PER Q=    100.0
   AREA=   1828.4
    VEL=     14.9
  DEPTH=      6.8

FLOW DISTRIBUTION FOR SECNO=     16.87          CWSEL=   1680.84

STA=    9902.   10194.
  PER Q=    100.0
   AREA=   2387.4
    VEL=     11.4
  DEPTH=      8.4

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    SECNO      DEPTH      CWSEL      CRIWS      WSELK      EG         HV         HL         OLOSS      L-BANK ELEV
    Q          QLOB       QCH        QROB       ALOB       ACH        AROB       VOL        TWA        R-BANK ELEV
    TIME       VLOB       VCH        VROB       XNL        XNCH       XNR        WTN        ELMIN      SSTA
    SLOPE      XLOBL      XLCH       XLOBR      ITRIAL     IDC        ICONT      CORAR      TOPWID     ENDST

FLOW DISTRIBUTION FOR SECNO=     16.96          CWSEL=   1684.88

STA=    9914.    9929.    9932.   10342.
  PER Q=       .5       .0     99.5
   AREA=     36.1      1.8   2099.5
    VEL=      3.6      1.9     12.9
  DEPTH=      2.4       .7      5.1

FLOW DISTRIBUTION FOR SECNO=     17.06          CWSEL=   1689.87

STA=    9533.    9621.    9763.    9807.    9929.    9947.   10090.   10397.   10470.
  PER Q=      7.8      9.6      3.8     15.0      2.6     56.4      3.1      1.6
   AREA=    376.9    559.0    201.8    693.3    110.9   1159.1    303.4    122.8
    VEL=      5.6      4.7      5.2      5.9      6.4     13.3      2.8      3.6
  DEPTH=      4.3      3.9      4.7      5.7      6.3      8.1      1.0      1.7

FLOW DISTRIBUTION FOR SECNO=     17.18          CWSEL=   1695.24

STA=    9746.    9846.    9935.    9978.   10254.   10516.   10695.
  PER Q=      3.1      3.8      4.0     82.2      3.0      4.0
   AREA=    169.0    195.1    147.6   1898.1    152.5    263.3
    VEL=      5.0      5.3      7.3     11.8      5.4      4.1
  DEPTH=      1.7      2.2      3.4      6.9       .6      1.5

FLOW DISTRIBUTION FOR SECNO=     17.30          CWSEL=   1701.39

STA=    9568.    9721.    9882.    9934.    9963.    9970.   10156.   10277.   10309.   10437.   10560.
  PER Q=      6.4     11.9      4.2      5.3      2.8     45.2      8.5      3.6      8.8      3.3
   AREA=    367.5    563.3    192.6    172.6     68.4   1295.5    410.1    142.3    428.6    226.2
    VEL=      4.7      5.8      6.0      8.4     11.0      9.5      5.6      6.9      5.6      3.9
  DEPTH=      2.4      3.5      3.7      6.0      9.2      7.0      3.4      4.6      3.3      1.8

FLOW DISTRIBUTION FOR SECNO=     17.39          CWSEL=   1705.16
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STA=	9731.	9779.	9887.	9893.	10179.	10196.	10232.	10317.	10463.	10473.
PER Q=	.2	4.2	.9	73.1	2.3	4.4	6.1	8.3	.4	
AREA=	25.4	215.6	29.7	1720.4	71.5	142.3	245.3	363.7	21.4	
VEL=	2.2	5.4	8.7	11.6	8.9	8.4	6.8	6.2	5.0	
DEPTH=	.5	2.0	5.0	6.0	4.3	4.0	2.9	2.5	2.2	

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SECNO	DEPTH	CWSEL	CRIWS	WSELK	EG	HV	HL	OLOSS	L-BANK ELEV
Q	QLOB	QCH	QROB	ALOB	ACH	AROB	VOL	TWA	R-BANK ELEV
TIME	VLOB	VCH	VROB	XNL	XNCH	XNR	WTN	ELMIN	SSTA
SLOPE	XLOBL	XLCH	XLOBR	ITRIAL	IDC	ICONT	CORAR	TOPWID	ENDST

FLOW DISTRIBUTION FOR SECNO= 17.48 CWSEL= 1709.83

STA=	9478.	9486.	9544.	9598.	9679.	9740.	9877.	9893.	10073.	10248.	10301.	10355.
PER Q=	.1	1.1	1.5	3.7	3.9	10.3	2.2	57.5	13.1	3.5	3.0	
AREA=	9.5	94.2	106.1	219.6	201.1	495.9	84.2	1254.7	632.3	178.7	165.1	
VEL=	2.5	3.3	3.8	4.6	5.3	5.7	7.2	12.5	5.7	5.4	4.9	
DEPTH=	1.2	1.6	2.0	2.7	3.3	3.6	5.3	7.0	3.6	3.4	3.1	

FLOW DISTRIBUTION FOR SECNO= 17.57 CWSEL= 1713.84

STA=	9477.	9508.	9548.	9576.	9687.	9872.	9898.	9923.	10040.	10115.	10162.	10169.	10274.
PER Q=	.7	2.3	.8	2.2	14.2	5.3	6.7	53.2	8.1	3.9	.2	2.1	
AREA=	56.1	123.1	57.4	180.5	672.1	169.7	194.6	1002.6	335.1	178.4	15.2	170.7	
VEL=	3.6	5.2	4.0	3.4	5.8	8.6	9.5	14.5	6.6	6.0	3.8	3.3	
DEPTH=	1.8	3.1	2.1	1.6	3.6	6.6	7.6	8.6	4.5	3.8	2.0	1.6	

FLOW DISTRIBUTION FOR SECNO= 17.65 CWSEL= 1717.56

STA=	9410.	9494.	9550.	9630.	9813.	9899.	9924.	10021.	10077.	10206.	10296.
PER Q=	3.6	4.3	5.2	11.9	7.1	6.2	51.0	5.4	3.5	1.9	
AREA=	236.2	236.8	303.5	694.5	379.3	212.2	1050.1	271.5	284.8	176.9	
VEL=	4.1	5.0	4.6	4.7	5.1	8.0	13.3	5.4	3.3	2.9	
DEPTH=	2.8	4.2	3.8	3.8	4.4	8.5	10.8	4.8	2.2	2.0	

FLOW DISTRIBUTION FOR SECNO= 17.78 CWSEL= 1722.50

STA=	9625.	9685.	9717.	9766.	9842.	9931.	10026.	10071.	10151.	10235.	10282.	10385.	10448.
PER Q=	3.8	4.0	3.9	3.9	2.7	22.2	10.2	12.6	13.6	5.9	3.8	8.3	
AREA=	211.7	172.9	201.0	239.0	204.5	602.6	344.7	496.7	527.4	252.0	262.4	345.0	
VEL=	4.9	6.3	5.3	4.4	3.6	10.0	8.0	7.0	7.0	6.3	3.9	6.5	
DEPTH=	3.5	5.3	4.2	3.2	2.3	6.3	7.7	6.2	6.3	5.4	2.5	5.5	

STA=	10448.	10488.	10605.
PER Q=	3.4	1.9	
AREA=	172.4	169.9	
VEL=	5.4	3.0	
DEPTH=	4.3	1.5	

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SECNO	DEPTH	CWSEL	CRIWS	WSELK	EG	HV	HL	OLOSS	L-BANK ELEV
Q	QLOB	QCH	QROB	ALOB	ACH	AROB	VOL	TWA	R-BANK ELEV
TIME	VLOB	VCH	VROB	XNL	XNCH	XNR	WTN	ELMIN	SSTA
SLOPE	XLOBL	XLCH	XLOBR	ITRIAL	IDC	ICONT	CORAR	TOPWID	ENDST

FLOW DISTRIBUTION FOR SECNO= 17.84 CWSEL= 1724.75

STA=	9749.	9801.	9925.	10219.	10375.	10488.	10534.	10580.	10664.	10678.
PER Q=	3.6	1.0	70.2	7.5	3.2	3.3	5.6	5.1	.5	
AREA=	159.8	105.7	1617.7	405.2	213.9	153.5	209.3	248.2	32.6	
VEL=	6.1	2.7	11.8	5.1	4.1	5.9	7.3	5.6	4.2	
DEPTH=	3.1	.9	5.5	2.6	1.9	3.3	4.5	3.0	2.3	

FLOW DISTRIBUTION FOR SECNO= 17.95 CWSEL= 1730.50

STA=	9817.	9867.	10047.	10132.	10220.	10282.	10392.	10410.	10471.	10529.	10570.	11039.
PER Q=	2.1	54.7	8.0	6.4	3.0	8.2	3.2	3.8	3.6	5.4	1.4	
AREA=	124.7	1240.0	358.4	319.2	176.7	384.2	112.7	196.8	189.0	213.4	218.9	
VEL=	4.6	12.0	6.1	5.5	4.7	5.8	7.8	5.3	5.1	7.0	1.8	
DEPTH=	2.5	6.9	4.2	3.6	2.9	3.5	6.2	3.2	3.2	5.2	.5	

FLOW DISTRIBUTION FOR SECNO= 18.09 CWSEL= 1734.95

STA=	9853.	9919.	9936.	10310.	10407.	10447.	10497.	10522.	10540.	10556.	10573.	10633.	10899.
PER Q=	4.7	2.0	49.8	3.8	3.8	6.1	3.1	3.8	5.5	3.7	3.0	4.2	
AREA=	281.4	102.8	1938.1	290.6	208.0	305.0	152.5	155.7	181.6	149.6	207.0	438.5	
VEL=	4.6	5.5	7.1	3.6	5.0	5.6	5.6	6.8	8.4	6.9	4.1	2.6	
DEPTH=	4.3	6.0	5.2	3.0	5.2	6.1	6.1	8.6	11.3	8.8	3.4	1.6	

STA=	10899.	11076.	11366.
PER Q=	3.9	2.5	
AREA=	384.6	331.5	
VEL=	2.8	2.1	

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  DEPTH=      2.2      1.1

FLOW DISTRIBUTION FOR SECNO=     18.16          CWSEL=   1736.55

STA=    9722.    9775.    9836.   10075.   10199.   10330.   10380.   10430.   10650.   10711.
  PER Q=      3.5      2.6     50.3      3.3     17.9     11.5      6.2      4.6       .1
   AREA=    145.8    135.6   1025.0    183.7    628.7    327.5    227.5    340.8     16.8
    VEL=      6.6      5.3     13.6      5.0      7.9      9.7      7.6      3.7      1.2
  DEPTH=      2.8      2.2      4.4      1.5      4.8      6.5      4.5      1.5       .3

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   09MAY14      15:12:00                                                                          PAGE   25

    SECNO     DEPTH     CWSEL     CRIWS     WSELK     EG        HV        HL        OLOSS     L-BANK ELEV
    Q         QLOB      QCH       QROB      ALOB      ACH       AROB      VOL       TWA       R-BANK ELEV
    TIME      VLOB      VCH       VROB      XNL       XNCH      XNR       WTN       ELMIN     SSTA
    SLOPE     XLOBL     XLCH      XLOBR     ITRIAL    IDC       ICONT     CORAR     TOPWID    ENDST

FLOW DISTRIBUTION FOR SECNO=     18.23          CWSEL=   1741.75

STA=    9543.    9640.    9660.    9690.    9710.    9780.    9800.   10010.   10240.   10480.   10730.   10852.
  PER Q=      5.9      3.4      4.0      3.0      6.7      1.3     59.3      6.8      4.4      4.5       .7
   AREA=    343.4    135.0    172.4    125.0    332.4     75.0   1333.1    540.0    419.5    437.0    106.9
    VEL=      4.7      7.0      6.4      6.7      5.6      4.8     12.3      3.5      2.9      2.9      1.8
  DEPTH=      3.5      6.7      5.7      6.2      4.7      3.7      6.3      2.3      1.7      1.7       .9

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   09MAY14      15:12:00                                                                          PAGE   26

T1      Floodway Run - Method 1
T2      Date:  4-25-97
T3      Floodway Run - Method 1

J1  ICHECK    INQ       NINV      IDIR      STRT      METRIC    HVINS     Q         WSEL      FQ

    -10         3                                                                   1522.96

J2  NPROF     IPLOT     PRFVS     XSECV     XSECH     FN        ALLDC     IBW       CHNIM     ITRACE

     2                  -1

*SECNO 14.300

3301 HV CHANGED MORE THAN HVINS

7185 MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED

3470 ENCROACHMENT STATIONS=     9210.0   10160.0  TYPE=      1  TARGET=      950.000
    14.300     15.43   1575.03   1575.03   1575.03   1576.49      1.46     10.39       .22   1571.60
   26700.0    9589.3   11865.3    5245.4    1484.2     997.5     582.4     580.7     191.4   1570.00
       .28      6.46     11.90      9.01      .038      .052      .042      .000   1559.60   9210.00
   .009056     1010.     1214.     1210.        10        18         0       .00    950.00  10160.00

*SECNO 14.540

3301 HV CHANGED MORE THAN HVINS

3470 ENCROACHMENT STATIONS=     9950.0   10480.0  TYPE=      1  TARGET=      530.000
    14.540     12.69   1584.29       .00   1584.29   1585.12       .83      8.57       .06   1581.90
   26700.0        .0   26700.0        .0        .0    3644.1        .0     680.3     213.9 100000.00
       .33       .00      7.33       .00      .000      .052      .000      .000   1571.60   9950.00
   .005112     1410.     1273.     1150.         4         0         0       .00    530.00  10480.00

*SECNO 14.570

3301 HV CHANGED MORE THAN HVINS

3470 ENCROACHMENT STATIONS=     9834.0   10263.0  TYPE=      1  TARGET=      429.000
    14.570      7.74   1584.54       .00   1584.54   1586.74      2.19      1.21       .41   1581.20
   26700.0    3777.5   17346.6    5575.9     513.9    1327.3     534.7     692.4     215.8   1579.30
       .34      7.35     13.07     10.43      .059      .039      .042      .000   1576.80   9849.24
   .009665      150.      177.      190.         4         0         0       .00    413.76  10263.00

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   09MAY14      15:12:00                                                                          PAGE   27

    SECNO     DEPTH     CWSEL     CRIWS     WSELK     EG        HV        HL        OLOSS     L-BANK ELEV
    Q         QLOB      QCH       QROB      ALOB      ACH       AROB      VOL       TWA       R-BANK ELEV
    TIME      VLOB      VCH       VROB      XNL       XNCH      XNR       WTN       ELMIN     SSTA
    SLOPE     XLOBL     XLCH      XLOBR     ITRIAL    IDC       ICONT     CORAR     TOPWID    ENDST

*SECNO 14.600
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3301 HV CHANGED MORE THAN HVINS

3685 20 TRIALS ATTEMPTED WSEL,CWSEL
3693 PROBABLE MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED

3470 ENCROACHMENT STATIONS=     9730.0   10129.0  TYPE=      1  TARGET=      399.000
    14.600      9.06   1586.06   1586.06   1586.06   1588.99      2.93      1.44       .22   1583.10
   26700.0    7157.4   19198.4     344.2     854.0    1251.4      46.7     699.3     217.0   1583.10
       .34      8.38     15.34      7.37      .059      .039      .042      .000   1577.00   9751.13
   .011937      120.      141.      122.        20        11         0       .00    377.87  10129.00


*SECNO 14.670
3280 CROSS SECTION     14.67 EXTENDED       .57 FEET


3301 HV CHANGED MORE THAN HVINS


3302 WARNING:  CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE,  KRATIO =  1.86


3470 ENCROACHMENT STATIONS=     9696.0   10091.0  TYPE=      1  TARGET=      395.000
    14.670     11.07   1590.57       .00   1590.57   1591.64      1.08      2.47       .19   1582.00
   26700.0   13782.0   12368.3     549.7    2240.5    1200.9      92.7     727.7     220.9   1582.00
       .35      6.15     10.30      5.93      .059      .039      .042      .000   1579.50   9696.00
   .003467      477.      387.      317.         3         0         0       .00    395.00  10091.00


*SECNO 14.740

3301 HV CHANGED MORE THAN HVINS

7185 MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED

3470 ENCROACHMENT STATIONS=     9700.0   10100.0  TYPE=      1  TARGET=      400.000
    14.740      9.93   1591.63   1591.63   1591.63   1594.44      2.81      2.24       .52   1587.30
   26700.0   11417.7   14673.2     609.1    1425.7     881.9      79.0     755.3     224.6   1588.30
       .36      8.01     16.64      7.71      .059      .039      .042      .000   1581.70   9700.00
   .010787      433.      366.      341.         3        15         0       .00    400.00  10100.00


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   09MAY14      15:12:00                                                                                PAGE   28

    SECNO      DEPTH      CWSEL      CRIWS      WSELK      EG         HV         HL         OLOSS      L-BANK ELEV
    Q          QLOB       QCH        QROB       ALOB       ACH        AROB       VOL        TWA        R-BANK ELEV
    TIME       VLOB       VCH        VROB       XNL        XNCH       XNR        WTN        ELMIN      SSTA
    SLOPE      XLOBL      XLCH       XLOBR      ITRIAL     IDC        ICONT      CORAR      TOPWID     ENDST


*SECNO 14.890

3301 HV CHANGED MORE THAN HVINS


3302 WARNING:  CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE,  KRATIO =  1.51


3470 ENCROACHMENT STATIONS=     9600.0   10080.0  TYPE=      1  TARGET=      480.000
    14.890     14.70   1597.90       .00   1597.90   1599.56      1.66      5.01       .12   1591.90
   26700.0   10342.1   16290.9      66.9    1899.6    1303.4      25.2     801.9     231.9   1596.40
       .38      5.44     12.50      2.66      .059      .039      .042      .000   1583.20   9600.00
   .004703      700.      756.      760.         5         0         0       .00    480.00  10080.00


*SECNO 15.060

3470 ENCROACHMENT STATIONS=     9972.0   10390.0  TYPE=      1  TARGET=      418.000
    15.060     11.58   1602.88       .00   1602.88   1604.61      1.73      5.03       .02   1602.20
   26700.0        .0   26700.0        .0        .0    2529.1        .0     857.7     240.5 100000.00
       .41       .00     10.56       .00      .000      .039      .000      .000   1591.30   9972.00
   .007101      670.      930.      950.         4         0         0       .00    418.00  10390.00


*SECNO 15.120

3301 HV CHANGED MORE THAN HVINS

7185 MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED

3470 ENCROACHMENT STATIONS=     9975.0   10351.0  TYPE=      1  TARGET=      376.000
    15.120      9.80   1605.20   1605.20   1605.20   1607.97      2.77      2.72       .31   1604.10
   26700.0        .0   26700.0        .0        .0    1999.6        .0     872.4     243.0 100000.00
       .41       .00     13.35       .00      .000      .039      .000      .000   1595.40   9975.00
   .013626      255.      284.      330.         3        15         0       .00    376.00  10351.00
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*SECNO 15.220

3301 HV CHANGED MORE THAN HVINS

1
   09MAY14      15:12:00                                                                                                PAGE   29

    SECNO      DEPTH      CWSEL      CRIWS      WSELK      EG         HV         HL         OLOSS      L-BANK ELEV
    Q          QLOB       QCH        QROB       ALOB       ACH        AROB       VOL        TWA        R-BANK ELEV
    TIME       VLOB       VCH        VROB       XNL        XNCH       XNR        WTN        ELMIN      SSTA
    SLOPE      XLOBL      XLCH       XLOBR      ITRIAL     IDC        ICONT      CORAR      TOPWID     ENDST


3302 WARNING:  CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE,  KRATIO =  1.65

3470 ENCROACHMENT STATIONS=     9977.0   10500.0  TYPE=      1  TARGET=      523.000
    15.220     12.27   1611.17       .00   1611.17   1612.45      1.28      4.33       .15   1609.10
   26700.0        .0   23214.2    3485.8        .0    2460.7     569.0     904.7     248.8   1607.80
       .43       .00      9.43      6.13      .000      .039      .042      .000   1598.90   9977.00
   .005033      535.      553.      600.         4         0         0       .00    523.00  10500.00

*SECNO 15.410

3301 HV CHANGED MORE THAN HVINS

3470 ENCROACHMENT STATIONS=     9979.0   10353.0  TYPE=      1  TARGET=      374.000
    15.410      9.38   1616.98       .00   1616.98   1619.19      2.21      6.46       .28   1615.10
   26700.0        .0   26700.0        .0        .0    2236.8        .0     963.1     258.8 100000.00
       .45       .00     11.94       .00      .000      .039      .000      .000   1607.60   9979.00
   .009264      980.      969.      950.         3         0         0       .00    374.00  10353.00

FLOW DISTRIBUTION FOR SECNO=     16.86          CWSEL=   1677.00

STA=    9909.   10193.
  PER Q=    100.0
   AREA=   1830.4
    VEL=     14.9
  DEPTH=      6.8

FLOW DISTRIBUTION FOR SECNO=     16.87          CWSEL=   1680.84

STA=    9902.   10194.
  PER Q=    100.0
   AREA=   2387.4
    VEL=     11.4
  DEPTH=      8.4

FLOW DISTRIBUTION FOR SECNO=     16.96          CWSEL=   1684.88

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   09MAY14      15:12:00                                                                                                PAGE   30

    SECNO      DEPTH      CWSEL      CRIWS      WSELK      EG         HV         HL         OLOSS      L-BANK ELEV
    Q          QLOB       QCH        QROB       ALOB       ACH        AROB       VOL        TWA        R-BANK ELEV
    TIME       VLOB       VCH        VROB       XNL        XNCH       XNR        WTN        ELMIN      SSTA
    SLOPE      XLOBL      XLCH       XLOBR      ITRIAL     IDC        ICONT      CORAR      TOPWID     ENDST


STA=    9914.    9929.    9932.   10342.
  PER Q=       .5       .0     99.5
   AREA=     36.1      1.8   2099.5
    VEL=      3.6      1.9     12.9
  DEPTH=      2.4       .7      5.1

FLOW DISTRIBUTION FOR SECNO=     17.06          CWSEL=   1690.24

STA=    9650.    9763.    9807.    9929.    9947.   10090.   10122.   10215.   10337.   10397.   10470.
  PER Q=      7.7      4.4     16.7      2.8     60.9       .7       .7      2.0      1.8      2.3
   AREA=    456.9    218.1    739.3    117.4   1212.7     50.9     81.7    167.2    118.7    150.3
    VEL=      4.6      5.5      6.2      6.6     13.7      3.6      2.4      3.2      4.1      4.1
  DEPTH=      4.0      5.0      6.0      6.7      8.5      1.6       .9      1.4      2.0      2.0

FLOW DISTRIBUTION FOR SECNO=     17.18          CWSEL=   1695.19

STA=    9788.    9809.    9846.    9935.    9963.    9978.   10254.   10285.   10313.   10516.   10575.   10656.   10668.
  PER Q=       .9      1.8      3.7      1.8      2.2     83.4      2.6       .1       .2       .8      2.0       .4
   AREA=     46.1     87.9    190.5     77.1     68.3   1883.8    101.4     13.9     30.7     64.7    125.7     22.6
    VEL=      5.3      5.7      5.4      6.3      8.8     12.1      7.1      2.0      2.0      3.4      4.4      4.4
  DEPTH=      2.2      2.4      2.1      2.7      4.6      6.8      3.3       .5       .2      1.1      1.6      1.8

FLOW DISTRIBUTION FOR SECNO=     17.30          CWSEL=   1701.48

STA=    9628.    9721.    9761.    9882.    9934.    9963.    9970.   10156.   10277.   10309.   10437.   10523.   10535.
  PER Q=      5.5      3.1      9.2      4.3      5.3      2.7     45.3      8.7      3.7      9.0      3.0       .1
   AREA=    289.8    144.4    433.2    197.3    175.2     69.1   1312.2    421.0    145.1    440.1    194.7     14.5
    VEL=      5.2      5.8      5.8      5.9      8.3     10.9      9.4      5.6      6.9      5.6      4.2      2.7
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  DEPTH=      3.1      3.6      3.6      3.8      6.1      9.3      7.1      3.5      4.7      3.4      2.3      1.2

 FLOW DISTRIBUTION FOR SECNO=     17.39          CWSEL=   1705.16

 STA=    9758.    9779.    9887.    9893.   10179.   10196.   10232.   10317.   10463.   10471.
   PER Q=       .2       4.2       .9     73.2      2.3      4.4      6.1      8.2       .3
    AREA=     17.4    214.9     29.7   1718.6     71.4    142.0    244.7    362.7     17.0
     VEL=      2.9      5.4      8.7     11.6      8.9      8.4      6.8      6.2      4.8
   DEPTH=       .8      2.0      5.0      6.0      4.3      3.9      2.9      2.5      2.2

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    09MAY14      15:12:00                                                                                    PAGE   31

     SECNO     DEPTH     CWSEL     CRIWS     WSELK     EG        HV        HL        OLOSS     L-BANK ELEV
     Q         QLOB      QCH       QROB      ALOB      ACH       AROB      VOL       TWA       R-BANK ELEV
     TIME      VLOB      VCH       VROB      XNL       XNCH      XNR       WTN       ELMIN     SSTA
     SLOPE     XLOBL     XLCH      XLOBR     ITRIAL    IDC       ICONT     CORAR     TOPWID    ENDST

 FLOW DISTRIBUTION FOR SECNO=     17.48          CWSEL=   1709.84

 STA=    9489.    9544.    9598.    9679.    9740.    9877.    9893.   10073.   10248.   10301.   10340.
   PER Q=      1.1      1.5      3.8      4.0     10.4      2.2     58.0     13.3      3.6      2.1
    AREA=     89.9    106.7    220.6    201.8    497.6     84.4   1256.9    634.5    179.4    120.2
     VEL=      3.3      3.8      4.7      5.4      5.7      7.2     12.6      5.7      5.4      4.9
   DEPTH=      1.6      2.0      2.7      3.3      3.6      5.3      7.0      3.6      3.4      3.1

 FLOW DISTRIBUTION FOR SECNO=     17.57          CWSEL=   1713.88

 STA=    9516.    9548.    9576.    9687.    9872.    9898.    9923.   10040.   10115.   10162.   10169.   10263.
   PER Q=      1.7       .9      2.3     14.5      5.4      6.8     53.9      8.3      4.0       .2      2.0
    AREA=     95.1     58.6    185.2    680.0    170.8    195.7   1007.5    338.3    180.4     15.6    156.8
     VEL=      4.8      4.0      3.5      5.8      8.7      9.5     14.6      6.7      6.0      3.9      3.4
   DEPTH=      3.0      2.1      1.7      3.7      6.7      7.7      8.6      4.5      3.9      2.0      1.7

 FLOW DISTRIBUTION FOR SECNO=     17.65          CWSEL=   1717.65

 STA=    9424.    9494.    9550.    9630.    9813.    9899.    9924.   10021.   10077.   10206.   10270.
   PER Q=      3.5      4.4      5.3     12.1      7.3      6.2     50.9      5.5      3.6      1.3
    AREA=    224.4    241.5    310.3    709.8    386.6    214.3   1058.3    276.2    295.6    122.2
     VEL=      4.2      5.0      4.6      4.7      5.1      7.9     13.1      5.4      3.4      2.8
   DEPTH=      3.2      4.3      3.9      3.9      4.5      8.6     10.9      4.9      2.3      1.9

 FLOW DISTRIBUTION FOR SECNO=     17.78          CWSEL=   1722.49

 STA=    9642.    9685.    9717.    9766.    9842.    9931.   10026.   10071.   10151.   10235.   10282.   10385.   10448.
   PER Q=      3.6      4.0      3.9      3.9      2.7     22.2     10.2     12.7     13.6      5.9      3.8      8.3
    AREA=    184.5    172.8    200.8    238.7    204.2    602.2    344.5    496.4    527.1    251.8    262.0    344.8
     VEL=      5.3      6.3      5.4      4.5      3.6     10.1      8.1      7.0      7.0      6.4      3.9      6.6
   DEPTH=      4.3      5.3      4.1      3.1      2.3      6.3      7.7      6.2      6.3      5.4      2.5      5.5

 STA=   10448.   10488.   10578.
   PER Q=      3.4      1.9
    AREA=    172.2    160.9
     VEL=      5.4      3.1
   DEPTH=      4.3      1.8

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    09MAY14      15:12:00                                                                                    PAGE   32

     SECNO     DEPTH     CWSEL     CRIWS     WSELK     EG        HV        HL        OLOSS     L-BANK ELEV
     Q         QLOB      QCH       QROB      ALOB      ACH       AROB      VOL       TWA       R-BANK ELEV
     TIME      VLOB      VCH       VROB      XNL       XNCH      XNR       WTN       ELMIN     SSTA
     SLOPE     XLOBL     XLCH      XLOBR     ITRIAL    IDC       ICONT     CORAR     TOPWID    ENDST

 FLOW DISTRIBUTION FOR SECNO=     17.84          CWSEL=   1724.75

 STA=    9749.    9801.    9925.   10219.   10375.   10488.   10534.   10580.   10664.   10665.
   PER Q=      3.6      1.1     70.5      7.6      3.2      3.4      5.6      5.1       .0
    AREA=    160.3    106.8   1620.3    406.6    215.0    153.9    209.7    249.0      3.6
     VEL=      6.1      2.7     11.9      5.1      4.1      6.0      7.3      5.6      2.5
   DEPTH=      3.1       .9      5.5      2.6      1.9      3.4      4.5      3.0      2.5

 FLOW DISTRIBUTION FOR SECNO=     17.95          CWSEL=   1730.51

 STA=    9819.    9867.   10047.   10132.   10220.   10282.   10392.   10410.   10471.   10529.   10570.   10595.
   PER Q=      2.1     55.1      8.1      6.5      3.1      8.3      3.3      3.9      3.6      5.5       .6
    AREA=    124.7   1241.3    359.0    319.7    177.1    384.9    112.8    197.2    189.4    213.7     46.5
     VEL=      4.7     12.1      6.2      5.6      4.7      5.9      7.9      5.4      5.2      7.0      3.4
   DEPTH=      2.6      6.9      4.2      3.6      2.9      3.5      6.2      3.3      3.3      5.2      1.8

 FLOW DISTRIBUTION FOR SECNO=     18.09          CWSEL=   1735.16

 STA=    9895.    9936.   10310.   10407.   10447.   10497.   10522.   10540.   10556.   10573.   10610.
   PER Q=      5.1     57.7      4.6      4.4      7.0      3.5      4.3      6.2      4.2      3.0
    AREA=    242.3   2015.0    310.6    216.2    315.3    157.6    159.4    184.9    153.1    167.4
     VEL=      5.8      7.9      4.1      5.6      6.2      6.2      7.5      9.3      7.6      4.9
   DEPTH=      5.9      5.4      3.2      5.4      6.3      6.3      8.9     11.6      9.0      4.5

 FLOW DISTRIBUTION FOR SECNO=     18.16          CWSEL=   1736.96
```

STA=	9752.	9775.	9836.	10075.	10199.	10330.	10380.	10425.
PER Q=	3.1	3.1	53.3	4.0	18.8	11.7	6.1	
AREA=	114.7	160.2	1119.1	221.8	681.5	347.6	231.8	
VEL=	7.4	5.3	13.2	5.0	7.7	9.3	7.2	
DEPTH=	5.0	2.6	4.8	1.8	5.2	7.0	5.2	

FLOW DISTRIBUTION FOR SECNO= 18.23 CWSEL= 1741.77

STA=	9630.	9640.	9650.	9660.	9690.	9700.	9710.	9780.	9800.	10010.	10240.	10330.
PER Q=	1.1	2.0	2.0	4.5	1.7	1.7	7.7	1.5	68.0	7.9	1.9	
AREA=	55.5	67.7	67.7	173.0	62.7	62.7	333.8	75.4	1337.3	544.6	159.1	
VEL=	5.3	8.0	8.0	7.3	7.7	7.7	6.4	5.5	14.1	4.0	3.3	
DEPTH=	5.5	6.8	6.8	5.8	6.3	6.3	4.8	3.8	6.4	2.4	1.8	

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09MAY14 15:12:00 PAGE 33

THIS RUN EXECUTED 09MAY14 15:14:38

****
HEC-2 WATER SURFACE PROFILES

Version 4.6.2; May 1991
****

NOTE- ASTERISK (*) AT LEFT OF CROSS-SECTION NUMBER INDICATES MESSAGE IN SUMMARY OF ERRORS LIST

MONT. WAT. AND HEC

SUMMARY PRINTOUT

	SECNO	Q	CWSEL	DEPTH	ELMIN	EG	DIFEG	CRIWS	VLOB	VCH	VROB	XLCH	SECNO
*	14.300	26700.00	1574.16	14.56	1559.60	1575.12	.00	1574.16	4.48	10.82	5.89	1213.60	14.30
*	14.300	26700.00	1575.03	15.43	1559.60	1576.49	1.37	1575.03	6.46	11.90	9.01	1213.60	14.30
	14.540	26700.00	1583.69	12.09	1571.60	1584.67	.00	.00	2.12	7.96	1.43	1273.20	14.54
	14.540	26700.00	1584.29	12.69	1571.60	1585.12	.45	.00	.00	7.33	.00	1273.20	14.54
	14.570	26700.00	1584.32	7.52	1576.80	1586.43	.00	.00	7.20	12.82	10.52	177.00	14.57
	14.570	26700.00	1584.54	7.74	1576.80	1586.74	.31	.00	7.35	13.07	10.43	177.00	14.57
*	14.600	26700.00	1585.81	8.81	1577.00	1588.12	.00	1585.81	7.70	14.13	7.49	141.00	14.60
*	14.600	26700.00	1586.06	9.06	1577.00	1588.99	.87	1586.06	8.38	15.34	7.37	141.00	14.60
*	14.670	26700.00	1589.65	10.15	1579.50	1590.33	.00	.00	4.67	8.81	5.76	387.00	14.67
*	14.670	26700.00	1590.57	11.07	1579.50	1591.64	1.32	.00	6.15	10.30	5.93	387.00	14.67
*	14.740	26700.00	1591.71	10.01	1581.70	1593.70	.00	1591.71	6.58	14.74	5.31	365.90	14.74
*	14.740	26700.00	1591.63	9.93	1581.70	1594.44	.73	1591.63	8.01	16.64	7.71	365.90	14.74
	14.890	26700.00	1597.03	13.83	1583.20	1598.99	.00	1596.53	5.60	13.68	1.28	756.40	14.89
*	14.890	26700.00	1597.90	14.70	1583.20	1599.56	.56	.00	5.44	12.50	2.66	756.40	14.89
	15.060	26700.00	1602.93	11.63	1591.30	1604.15	.00	.00	3.06	9.27	5.83	930.30	15.06
	15.060	26700.00	1602.88	11.58	1591.30	1604.61	.45	.00	.00	10.56	.00	930.30	15.06
*	15.120	26700.00	1605.22	9.82	1595.40	1606.94	.00	1605.22	3.16	11.16	6.90	283.60	15.12
*	15.120	26700.00	1605.20	9.80	1595.40	1607.97	1.03	1605.20	.00	13.35	.00	283.60	15.12
	15.220	26700.00	1610.20	11.30	1598.90	1612.00	.00	.00	1.58	11.21	6.51	553.10	15.22
*	15.220	26700.00	1611.17	12.27	1598.90	1612.45	.46	.00	.00	9.43	6.13	553.10	15.22
	15.410	26700.00	1617.54	9.94	1607.60	1619.36	.00	.00	2.28	10.85	3.64	968.90	15.41
	15.410	26700.00	1616.98	9.38	1607.60	1619.19	-.17	.00	.00	11.94	.00	968.90	15.41

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MONT. WAT. AND HEC

SUMMARY PRINTOUT

	SECNO	SSTA	TOPWID	ENDST
*	14.300	8646.87	2213.30	10868.65
*	14.300	9210.00	950.00	10160.00
	14.540	9530.89	839.24	10492.90
	14.540	9950.00	530.00	10480.00
	14.570	9849.86	439.65	10289.51
	14.570	9849.24	413.76	10263.00
*	14.600	9751.96	540.87	10292.83

*	14.600	9751.13	377.87	10129.00
*	14.670	9393.49	897.95	10291.43
*	14.670	9696.00	395.00	10091.00
*	14.740	9525.35	849.83	10375.17
*	14.740	9700.00	400.00	10100.00
	14.890	9510.81	569.76	10080.57
*	14.890	9600.00	480.00	10080.00
	15.060	9733.38	767.25	10500.63
	15.060	9972.00	418.00	10390.00
*	15.120	9717.08	821.47	10538.56
*	15.120	9975.00	376.00	10351.00
	15.220	9945.61	606.25	10551.86
*	15.220	9977.00	523.00	10500.00
	15.410	9971.54	403.33	10374.86
	15.410	9979.00	374.00	10353.00

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MONT. WAT. AND HEC

SUMMARY PRINTOUT TABLE 110

	SECNO	CWSEL	DIFKWS	EG	TOPWID	QLOB	QCH	QROB	PERENC	STENCL	STCHL	STCHR	STENCR
*	14.300	1574.16	.00	1575.12	2213.30	5904.67	9812.20	10983.13	.00	.00	9923.00	10027.00	.00
*	14.300	1575.03	.00	1576.49	950.00	9589.30	11865.30	5245.40	950.00	9210.00	9923.00	10027.00	10160.00
	14.540	1583.69	.00	1584.67	839.24	219.17	26474.51	6.32	1305.00	9283.00	9950.00	10480.00	10588.00
	14.540	1584.29	.00	1585.12	530.00	.00	26700.00	.00	530.00	9950.00	9950.00	10480.00	10480.00
	14.570	1584.32	.00	1586.43	439.65	3514.94	16422.81	6762.25	.00	.00	9961.00	10164.00	.00
	14.570	1584.54	.00	1586.74	413.76	3777.51	17346.63	5575.85	429.00	9834.00	9961.00	10164.00	10263.00
*	14.600	1585.81	.00	1588.12	540.87	6223.04	17059.59	3417.36	.00	.00	9936.00	10112.00	.00
*	14.600	1586.06	.00	1588.99	377.87	7157.40	19198.38	344.22	399.00	9730.00	9936.00	10112.00	10129.00
*	14.670	1589.65	.00	1590.33	897.95	12962.56	9589.61	4147.83	.00	.00	9958.00	10080.00	.00
*	14.670	1590.57	.00	1591.64	395.00	13782.00	12368.32	549.68	395.00	9696.00	9958.00	10080.00	10091.00
*	14.740	1591.71	.00	1593.70	849.83	12557.01	13119.51	1023.48	10380.00	.00	9976.00	10076.00	10380.00
*	14.740	1591.63	.00	1594.44	400.00	11417.72	14673.16	609.12	400.00	9700.00	9976.00	10076.00	10100.00
	14.890	1597.03	.00	1598.99	569.76	10324.57	16366.91	8.52	-9490.00	9490.00	9938.00	10059.00	10319.00
*	14.890	1597.90	.00	1599.56	480.00	10342.13	16290.94	66.93	480.00	9600.00	9938.00	10059.00	10080.00
	15.060	1602.93	.00	1604.15	767.25	1308.43	23654.23	1737.34	.00	.00	9972.00	10390.00	.00
	15.060	1602.88	.00	1604.61	418.00	.00	26700.00	.00	418.00	9972.00	9972.00	10390.00	10390.00
*	15.120	1605.22	.00	1606.94	821.47	1068.21	22406.23	3225.56	1043.00	9503.00	9975.00	10351.00	10546.00
*	15.120	1605.20	.00	1607.97	376.00	.00	26700.00	.00	376.00	9975.00	9975.00	10351.00	10351.00
	15.220	1610.20	.00	1612.00	606.25	27.18	23516.69	3156.13	923.00	9749.00	9977.00	10348.00	10672.00
*	15.220	1611.17	.00	1612.45	523.00	.00	23214.23	3485.77	523.00	9977.00	9977.00	10348.00	10500.00
	15.410	1617.54	.00	1619.36	403.33	20.74	26566.22	113.04	.00	.00	9979.00	10353.00	.00
	15.410	1616.98	.00	1619.19	374.00	.00	26700.00	.00	374.00	9979.00	9979.00	10353.00	10353.00

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MONT. WAT. AND HEC

SUMMARY PRINTOUT TABLE 150

	SECNO	XLCH	ELTRD	ELLC	ELMIN	Q	CWSEL	CRIWS	EG	10*KS	VCH	AREA	.01K
*	14.300	1213.60	.00	.00	1559.60	26700.00	1574.16	1574.16	1575.12	85.17	10.82	4089.92	2893.09
*	14.300	1213.60	.00	.00	1559.60	26700.00	1575.03	1575.03	1576.49	90.56	11.90	3064.13	2805.71
	14.540	1273.20	.00	.00	1571.60	26700.00	1583.69	.00	1584.67	67.49	7.96	3434.36	3249.96
	14.540	1273.20	.00	.00	1571.60	26700.00	1584.29	.00	1585.12	51.12	7.33	3644.07	3734.32
	14.570	177.00	.00	.00	1576.80	26700.00	1584.32	.00	1586.43	97.50	12.82	2412.18	2704.03
	14.570	177.00	.00	.00	1576.80	26700.00	1584.54	.00	1586.74	96.65	13.07	2375.85	2715.88
*	14.600	141.00	.00	.00	1577.00	26700.00	1585.81	1585.81	1588.12	106.17	14.13	2471.96	2591.24
*	14.600	141.00	.00	.00	1577.00	26700.00	1586.06	1586.06	1588.99	119.37	15.34	2152.15	2443.74
*	14.670	387.00	.00	.00	1579.50	26700.00	1589.65	.00	1590.33	28.89	8.81	4584.97	4967.41
*	14.670	387.00	.00	.00	1579.50	26700.00	1590.57	.00	1591.64	34.67	10.30	3534.04	4534.31

*	14.740	365.90	.00	.00	1581.70	26700.00	1591.71	1591.71	1593.70	83.55	14.74	2990.53	2921.06
*	14.740	365.90	.00	.00	1581.70	26700.00	1591.63	1591.63	1594.44	107.87	16.64	2386.64	2570.77
	14.890	756.40	.00	.00	1583.20	26700.00	1597.03	1596.53	1598.99	63.10	13.68	3047.71	3361.16
*	14.890	756.40	.00	.00	1583.20	26700.00	1597.90	.00	1599.56	47.03	12.50	3228.23	3893.17
	15.060	930.30	.00	.00	1591.30	26700.00	1602.93	.00	1604.15	53.81	9.27	3276.55	3639.67
	15.060	930.30	.00	.00	1591.30	26700.00	1602.88	.00	1604.61	71.01	10.56	2529.08	3168.44
*	15.120	283.60	.00	.00	1595.40	26700.00	1605.22	1605.22	1606.94	93.14	11.16	2813.72	2766.58
*	15.120	283.60	.00	.00	1595.40	26700.00	1605.20	1605.20	1607.97	136.26	13.35	1999.63	2287.29
	15.220	553.10	.00	.00	1598.90	26700.00	1610.20	.00	1612.00	87.17	11.21	2600.61	2859.71
*	15.220	553.10	.00	.00	1598.90	26700.00	1611.17	.00	1612.45	50.33	9.43	3029.66	3763.49
	15.410	968.90	.00	.00	1607.60	26700.00	1617.54	.00	1619.36	66.92	10.85	2488.03	3263.82
	15.410	968.90	.00	.00	1607.60	26700.00	1616.98	.00	1619.19	92.64	11.94	2236.78	2773.96

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MONT. WAT. AND HEC

SUMMARY PRINTOUT TABLE 150

	SECNO	Q	CWSEL	DIFWSP	DIFWSX	DIFKWS	TOPWID	XLCH
*	14.300	26700.00	1574.16	.00	9.51	.00	2213.30	1213.60
*	14.300	26700.00	1575.03	.87	10.27	.00	950.00	1213.60
	14.540	26700.00	1583.69	.00	9.54	.00	839.24	1273.20
	14.540	26700.00	1584.29	.60	9.26	.00	530.00	1273.20
	14.570	26700.00	1584.32	.00	.63	.00	439.65	177.00
	14.570	26700.00	1584.54	.22	.26	.00	413.76	177.00
*	14.600	26700.00	1585.81	.00	1.49	.00	540.87	141.00
*	14.600	26700.00	1586.06	.25	1.52	.00	377.87	141.00
*	14.670	26700.00	1589.65	.00	3.84	.00	897.95	387.00
*	14.670	26700.00	1590.57	.92	4.50	.00	395.00	387.00
*	14.740	26700.00	1591.71	.00	2.06	.00	849.83	365.90
*	14.740	26700.00	1591.63	-.08	1.06	.00	400.00	365.90
	14.890	26700.00	1597.03	.00	5.31	.00	569.76	756.40
*	14.890	26700.00	1597.90	.87	6.27	.00	480.00	756.40
	15.060	26700.00	1602.93	.00	5.90	.00	767.25	930.30
	15.060	26700.00	1602.88	-.05	4.98	.00	418.00	930.30
*	15.120	26700.00	1605.22	.00	2.29	.00	821.47	283.60
*	15.120	26700.00	1605.20	-.02	2.32	.00	376.00	283.60
	15.220	26700.00	1610.20	.00	4.98	.00	606.25	553.10
*	15.220	26700.00	1611.17	.97	5.97	.00	523.00	553.10
	15.410	26700.00	1617.54	.00	7.34	.00	403.33	968.90
	15.410	26700.00	1616.98	-.57	5.80	.00	374.00	968.90

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SUMMARY OF ERRORS AND SPECIAL NOTES

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CAUTION SECNO=     13.000  PROFILE=  1  CRITICAL DEPTH ASSUMED
CAUTION SECNO=     13.000  PROFILE=  2  CRITICAL DEPTH ASSUMED

WARNING SECNO=     13.160  PROFILE=  1  CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE
WARNING SECNO=     13.160  PROFILE=  2  CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE

WARNING SECNO=     13.280  PROFILE=  1  CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE
WARNING SECNO=     13.280  PROFILE=  2  CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE

WARNING SECNO=     13.400  PROFILE=  1  CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE
WARNING SECNO=     13.400  PROFILE=  2  CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE

WARNING SECNO=     13.550  PROFILE=  1  CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE

CAUTION SECNO=     14.300  PROFILE=  1  CRITICAL DEPTH ASSUMED
CAUTION SECNO=     14.300  PROFILE=  1  MINIMUM SPECIFIC ENERGY
CAUTION SECNO=     14.300  PROFILE=  2  CRITICAL DEPTH ASSUMED
CAUTION SECNO=     14.300  PROFILE=  2  MINIMUM SPECIFIC ENERGY

CAUTION SECNO=     14.600  PROFILE=  1  CRITICAL DEPTH ASSUMED
CAUTION SECNO=     14.600  PROFILE=  1  MINIMUM SPECIFIC ENERGY
CAUTION SECNO=     14.600  PROFILE=  2  CRITICAL DEPTH ASSUMED
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 CAUTION SECNO=     14.600  PROFILE=  2  PROBABLE MINIMUM SPECIFIC ENERGY
 CAUTION SECNO=     14.600  PROFILE=  2  20 TRIALS ATTEMPTED TO BALANCE WSEL

 WARNING SECNO=     14.670  PROFILE=  1  CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE
 WARNING SECNO=     14.670  PROFILE=  2  CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE

 CAUTION SECNO=     14.740  PROFILE=  1  CRITICAL DEPTH ASSUMED
 CAUTION SECNO=     14.740  PROFILE=  1  PROBABLE MINIMUM SPECIFIC ENERGY
 CAUTION SECNO=     14.740  PROFILE=  1  20 TRIALS ATTEMPTED TO BALANCE WSEL
 CAUTION SECNO=     14.740  PROFILE=  2  CRITICAL DEPTH ASSUMED
 CAUTION SECNO=     14.740  PROFILE=  2  MINIMUM SPECIFIC ENERGY

 WARNING SECNO=     14.890  PROFILE=  2  CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE

 CAUTION SECNO=     15.120  PROFILE=  1  CRITICAL DEPTH ASSUMED
 CAUTION SECNO=     15.120  PROFILE=  1  MINIMUM SPECIFIC ENERGY
 CAUTION SECNO=     15.120  PROFILE=  2  CRITICAL DEPTH ASSUMED
 CAUTION SECNO=     15.120  PROFILE=  2  MINIMUM SPECIFIC ENERGY

 WARNING SECNO=     15.220  PROFILE=  2  CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE

 CAUTION SECNO=     15.550  PROFILE=  1  CRITICAL DEPTH ASSUMED
 CAUTION SECNO=     15.550  PROFILE=  1  MINIMUM SPECIFIC ENERGY

 WARNING SECNO=     15.750  PROFILE=  2  CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE

 CAUTION SECNO=     15.890  PROFILE=  1  CRITICAL DEPTH ASSUMED
 CAUTION SECNO=     15.890  PROFILE=  1  MINIMUM SPECIFIC ENERGY
 CAUTION SECNO=     15.890  PROFILE=  2  CRITICAL DEPTH ASSUMED
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 CAUTION SECNO=     15.890  PROFILE=  2  PROBABLE MINIMUM SPECIFIC ENERGY
 CAUTION SECNO=     15.890  PROFILE=  2  20 TRIALS ATTEMPTED TO BALANCE WSEL

 CAUTION SECNO=     16.270  PROFILE=  1  CRITICAL DEPTH ASSUMED
 CAUTION SECNO=     16.270  PROFILE=  1  MINIMUM SPECIFIC ENERGY
 CAUTION SECNO=     16.270  PROFILE=  2  CRITICAL DEPTH ASSUMED
 CAUTION SECNO=     16.270  PROFILE=  2  MINIMUM SPECIFIC ENERGY

 WARNING SECNO=     16.490  PROFILE=  2  CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE

 WARNING SECNO=     16.680  PROFILE=  2  CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE

 CAUTION SECNO=     16.860  PROFILE=  1  CRITICAL DEPTH ASSUMED
 CAUTION SECNO=     16.860  PROFILE=  1  MINIMUM SPECIFIC ENERGY
 CAUTION SECNO=     16.860  PROFILE=  2  CRITICAL DEPTH ASSUMED
 CAUTION SECNO=     16.860  PROFILE=  2  MINIMUM SPECIFIC ENERGY

 CAUTION SECNO=     16.870  PROFILE=  1  HYDRAULIC JUMP D.S.
 WARNING SECNO=     16.870  PROFILE=  1  CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE
 CAUTION SECNO=     16.870  PROFILE=  2  HYDRAULIC JUMP D.S.
 WARNING SECNO=     16.870  PROFILE=  2  CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE

 CAUTION SECNO=     16.960  PROFILE=  1  CRITICAL DEPTH ASSUMED
 CAUTION SECNO=     16.960  PROFILE=  1  PROBABLE MINIMUM SPECIFIC ENERGY
 CAUTION SECNO=     16.960  PROFILE=  1  20 TRIALS ATTEMPTED TO BALANCE WSEL
 CAUTION SECNO=     16.960  PROFILE=  2  CRITICAL DEPTH ASSUMED
 CAUTION SECNO=     16.960  PROFILE=  2  PROBABLE MINIMUM SPECIFIC ENERGY
 CAUTION SECNO=     16.960  PROFILE=  2  20 TRIALS ATTEMPTED TO BALANCE WSEL

 CAUTION SECNO=     17.060  PROFILE=  2  CRITICAL DEPTH ASSUMED
 CAUTION SECNO=     17.060  PROFILE=  2  MINIMUM SPECIFIC ENERGY

 CAUTION SECNO=     17.180  PROFILE=  1  CRITICAL DEPTH ASSUMED
 CAUTION SECNO=     17.180  PROFILE=  1  MINIMUM SPECIFIC ENERGY
 CAUTION SECNO=     17.180  PROFILE=  2  CRITICAL DEPTH ASSUMED
 CAUTION SECNO=     17.180  PROFILE=  2  MINIMUM SPECIFIC ENERGY

 WARNING SECNO=     18.090  PROFILE=  1  CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE

 CAUTION SECNO=     18.160  PROFILE=  1  CRITICAL DEPTH ASSUMED
 CAUTION SECNO=     18.160  PROFILE=  1  MINIMUM SPECIFIC ENERGY

 CAUTION SECNO=     18.230  PROFILE=  1  CRITICAL DEPTH ASSUMED
 CAUTION SECNO=     18.230  PROFILE=  1  PROBABLE MINIMUM SPECIFIC ENERGY
 CAUTION SECNO=     18.230  PROFILE=  1  20 TRIALS ATTEMPTED TO BALANCE WSEL
 CAUTION SECNO=     18.230  PROFILE=  2  CRITICAL DEPTH ASSUMED
 CAUTION SECNO=     18.230  PROFILE=  2  PROBABLE MINIMUM SPECIFIC ENERGY
 CAUTION SECNO=     18.230  PROFILE=  2  20 TRIALS ATTEMPTED TO BALANCE WSEL

 WARNING SECNO=     18.290  PROFILE=  2  CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE

 CAUTION SECNO=     18.490  PROFILE=  2  CRITICAL DEPTH ASSUMED
 CAUTION SECNO=     18.490  PROFILE=  2  MINIMUM SPECIFIC ENERGY
1
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 CAUTION SECNO=     18.570  PROFILE=  1  CRITICAL DEPTH ASSUMED
 CAUTION SECNO=     18.570  PROFILE=  1  MINIMUM SPECIFIC ENERGY
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WARNING SECNO=     18.570  PROFILE=  2  CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE

CAUTION SECNO=     18.740  PROFILE=  1  CRITICAL DEPTH ASSUMED
CAUTION SECNO=     18.740  PROFILE=  1  MINIMUM SPECIFIC ENERGY
CAUTION SECNO=     18.740  PROFILE=  2  CRITICAL DEPTH ASSUMED
CAUTION SECNO=     18.740  PROFILE=  2  MINIMUM SPECIFIC ENERGY

CAUTION SECNO=     18.840  PROFILE=  2  CRITICAL DEPTH ASSUMED
CAUTION SECNO=     18.840  PROFILE=  2  MINIMUM SPECIFIC ENERGY

CAUTION SECNO=     18.960  PROFILE=  1  CRITICAL DEPTH ASSUMED
CAUTION SECNO=     18.960  PROFILE=  1  PROBABLE MINIMUM SPECIFIC ENERGY
CAUTION SECNO=     18.960  PROFILE=  1  20 TRIALS ATTEMPTED TO BALANCE WSEL
CAUTION SECNO=     18.960  PROFILE=  2  CRITICAL DEPTH ASSUMED
CAUTION SECNO=     18.960  PROFILE=  2  PROBABLE MINIMUM SPECIFIC ENERGY
CAUTION SECNO=     18.960  PROFILE=  2  20 TRIALS ATTEMPTED TO BALANCE WSEL
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Floodway width summary: MONT. WAT. AND HEC
Profile No. 2

Section Number	Elevation Increase	Top Width	Left Encroach Station	Left Sta Distance From Center	Center Station	Right Sta Distance From Center	Right Encroach Station
13.000	.00	245.00	9820.00	122.50	9942.50	122.50	10065.00
13.020	.00	245.00	9820.00	122.50	9942.50	122.50	10065.00
13.040	.00	813.00	9537.00	388.50	9925.50	424.50	10350.00
13.080	.00	1129.00	9550.00	348.50	9898.50	780.50	10679.00
13.160	.00	1395.00	9421.00	699.50	10120.50	695.50	10816.00
13.280	.00	1265.00	9537.00	353.50	9890.50	911.50	10802.00
13.400	.94	932.00	9670.00	324.50	9994.50	607.50	10602.00
13.550	.99	1334.00	9160.00	931.00	10091.00	403.00	10494.00
13.660	.44	1427.00	9055.00	926.50	9981.50	500.50	10482.00
13.860	.73	1524.00	8708.00	978.00	9686.00	546.00	10232.00
14.070	.11	1724.00	8805.00	1164.00	9969.00	560.00	10529.00
14.300	.87	950.00	9210.00	765.00	9975.00	185.00	10160.00
14.540	.60	530.00	9950.00	265.00	10215.00	265.00	10480.00
14.570	.22	429.00	9834.00	228.50	10062.50	200.50	10263.00
14.600	.25	399.00	9730.00	294.00	10024.00	105.00	10129.00
14.670	.92	395.00	9696.00	323.00	10019.00	72.00	10091.00
14.740	-.08	400.00	9700.00	326.00	10026.00	74.00	10100.00
14.890	.87	480.00	9600.00	398.50	9998.50	81.50	10080.00
15.060	-.05	418.00	9972.00	209.00	10181.00	209.00	10390.00
15.120	-.02	376.00	9975.00	188.00	10163.00	188.00	10351.00
15.220	.97	523.00	9977.00	185.50	10162.50	337.50	10500.00
15.410	-.57	374.00	9979.00	187.00	10166.00	187.00	10353.00
15.550	.43	292.00	9890.00	151.00	10041.00	141.00	10182.00
15.750	.98	639.00	9477.00	562.50	10039.50	76.50	10116.00
15.890	.94	393.00	9817.00	272.50	10089.50	120.50	10210.00
16.070	.91	370.00	9760.00	279.00	10039.00	91.00	10130.00
16.190	.25	468.00	9600.00	405.50	10005.50	62.50	10068.00
16.270	.51	282.00	9760.00	142.50	9902.50	139.50	10042.00
16.490	.96	524.00	9906.00	112.00	10018.00	412.00	10430.00
16.680	-.15	650.00	9940.00	319.00	10259.00	331.00	10590.00
16.860	*** Encroachments not set ***						
16.870	*** Encroachments not set ***						
16.960	.00	434.00	9914.00	223.00	10137.00	211.00	10348.00
17.060	.37	820.00	9650.00	368.50	10018.50	451.50	10470.00
17.180	-.05	880.00	9788.00	328.00	10116.00	552.00	10668.00
17.300	.08	907.00	9628.00	435.00	10063.00	472.00	10535.00
17.390	-.01	713.00	9758.00	278.00	10036.00	435.00	10471.00
17.480	.01	851.08	9488.92	494.08	9983.00	357.00	10340.00
17.570	.04	746.55	9516.45	465.05	9981.50	281.50	10263.00
17.650	.09	846.30	9423.70	548.80	9972.50	297.50	10270.00
17.780	.00	935.94	9642.06	336.44	9978.50	599.50	10578.00
17.840	.01	919.61	9745.39	326.61	10072.00	593.00	10665.00
17.950	.01	776.32	9818.68	138.32	9957.00	638.00	10595.00
18.090	.21	715.00	9895.00	228.00	10123.00	487.00	10610.00
18.160	.41	673.00	9752.00	203.50	9955.50	469.50	10425.00
18.230	.02	700.00	9630.00	275.00	9905.00	425.00	10330.00
18.290	1.04	700.00	9630.00	351.50	9981.50	348.50	10330.00

18.490	.09	643.00	9832.00	102.50	9934.50	540.50	10475.00
18.570	.56	780.00	9700.00	294.00	9994.00	486.00	10480.00
18.740	.06	745.00	9380.00	678.50	10058.50	66.50	10125.00
18.840	.88	564.00	9576.00	399.50	9975.50	164.50	10140.00
18.960	.52	841.00	9639.00	333.50	9972.50	507.50	10480.00

FLOODWAY DATA, MONT. WAT. AND HEC
PROFILE NO. 2

STATION	FLOODWAY WIDTH	FLOODWAY SECTION AREA	FLOODWAY MEAN VELOCITY	WATER SURFACE ELEVATION WITH FLOODWAY	WATER SURFACE ELEVATION WITHOUT FLOODWAY	DIFFERENCE
13.000	245.	1207.	12.7	1523.4	1523.4	.0
13.020	245.	1444.	10.6	1524.9	1524.9	.0
13.040	494.	2425.	6.3	1526.7	1526.7	.0
13.080	1116.	4530.	3.4	1527.6	1527.6	.0
13.160	1379.	3417.	4.5	1528.5	1528.5	.0
13.280	1265.	2512.	7.5	1532.6	1532.6	.0
13.400	932.	4069.	6.6	1538.9	1538.0	.9
13.550	1334.	4546.	5.9	1544.2	1543.2	1.0
13.660	1427.	4111.	6.5	1548.3	1547.9	.4
13.860	1524.	4444.	6.0	1556.6	1555.9	.7
14.070	1724.	3978.	6.7	1564.8	1564.7	.1
14.300	950.	3064.	8.7	1575.1	1574.2	.9
14.540	530.	3644.	7.3	1584.3	1583.7	.6
14.570	414.	2376.	11.2	1584.5	1584.3	.2
14.600	378.	2152.	12.4	1586.0	1585.8	.2
14.670	395.	3534.	7.6	1590.5	1589.6	.9
14.740	400.	2387.	11.2	1591.6	1591.7	-.1
14.890	480.	3228.	8.3	1597.9	1597.0	.9
15.060	418.	2529.	10.6	1602.8	1602.9	-.1
15.120	376.	2000.	13.4	1605.2	1605.2	.0
15.220	523.	3030.	8.8	1611.2	1610.2	1.0
15.410	374.	2237.	11.9	1616.9	1617.5	-.6
15.550	292.	1946.	13.7	1623.5	1623.1	.4
15.750	639.	4041.	6.6	1631.4	1630.4	1.0
15.890	393.	2127.	12.6	1636.3	1635.4	.9
16.070	370.	2689.	9.9	1645.1	1644.2	.9
16.190	468.	2695.	9.9	1649.1	1648.9	.2
16.270	282.	1810.	14.7	1652.8	1652.3	.5
16.490	524.	3350.	8.0	1663.0	1662.0	1.0
16.680	650.	3046.	8.8	1668.4	1668.6	-.2
16.860	267.	1830.	14.9	1677.0	1677.0	.0
16.870	284.	2387.	11.4	1680.8	1680.8	.0
16.960	426.	2137.	12.8	1684.9	1684.9	.0
17.060	820.	3313.	8.2	1690.3	1689.9	.4
17.180	880.	2713.	10.1	1695.1	1695.2	-.1
17.300	907.	3837.	7.1	1701.5	1701.4	.1
17.390	713.	2819.	9.7	1705.2	1705.2	.0
17.480	851.	3392.	8.0	1709.8	1709.8	.0
17.570	747.	3084.	8.9	1713.8	1713.8	.0
17.650	846.	3839.	7.1	1717.7	1717.6	.1
17.780	936.	4163.	6.6	1722.5	1722.5	.0
17.840	916.	3125.	8.7	1724.7	1724.7	.0

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FLOODWAY DATA, MONT. WAT. AND HEC
PROFILE NO. 2

STATION	FLOODWAY WIDTH	FLOODWAY SECTION AREA	FLOODWAY MEAN VELOCITY	WATER SURFACE ELEVATION WITH FLOODWAY	WATER SURFACE ELEVATION WITHOUT FLOODWAY	DIFFERENCE
17.950	776.	3366.	8.1	1730.5	1730.5	.0
18.090	715.	3922.	7.1	1735.1	1734.9	.2
18.160	673.	2877.	9.6	1736.9	1736.5	.4
18.230	700.	2939.	9.4	1741.7	1741.7	.0
18.290	700.	3845.	7.2	1744.1	1743.1	1.0
18.490	643.	2780.	10.0	1751.0	1750.9	.1
18.570	780.	3079.	9.0	1754.7	1754.1	.6
18.740	745.	2612.	10.5	1760.7	1760.6	.1
18.840	564.	2616.	10.4	1765.6	1764.7	.9
18.960	841.	3403.	8.0	1771.8	1771.3	.5

E.4 Post-Project Conditions HEC-2 Model

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1*****************************************
 *  HEC-2 WATER SURFACE PROFILES          *
 *                                        *
 *  Version   4.6.2;  May 1991            *
 *                                        *
 *  RUN DATE    09MAY14    TIME   15:18:24 *
 *****************************************
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****************************************
*  U.S. ARMY CORPS OF ENGINEERS        *
*  HYDROLOGIC ENGINEERING CENTER       *
*  609 SECOND STREET, SUITE D          *
*  DAVIS, CALIFORNIA 95616-4687        *
*          (916) 756-1104              *
****************************************
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X     X  XXXXXXX   XXXXX              XXXXX
X     X  X        X     X            X     X
X     X  X        X                        X
XXXXXXX  XXXX     X          XXXXX    XXXXX
X     X  X        X                  X
X     X  X        X     X            X
X     X  XXXXXXX   XXXXX             XXXXXXX
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1
   09MAY14      15:18:24                                                                                PAGE    1
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                                                                                THIS RUN EXECUTED 09MAY14    15:18:25
 ************************************
  HEC-2 WATER SURFACE PROFILES

  Version   4.6.2;  May 1991
 ************************************


        POST-PROJECT MODEL FOR SONORAN DESERT DRIVE OVER SKUNK CREEK

        PREPARED BY KIMLEY-HORN
        FILENAME:   POST_PRJ.DAT

        PROFILE 1: POST-PROJECT FLOODPLAIN
        PROFILE 2: POST-PROJECT FLOODWAY

        COMMENTS FROM TRAMONTO LOMR REMAIN UNCHANGED.  ADDED CROSS SECTION 14.67
        14.60, AND 14.57. CROSS SECTIONS ADDED FOR PROPSOED SONORAN DESERT DRIVE
        BRIDGE.  CROSS SECTION 14.67 USES MAPPING FROM THE MAPPING FROM THE
        SKUNK CREEK FLOODPLAIN DELINEATION. CROSS SECTION 14.60 AND 14.57 UTILIZ
        MAPPING OBTAINED FOR THE SONORAN DESERT DRIVE PROJECT.

        COMPLETE HEC-2 MODEL FOR ENTIRE SKUNK CREEK FLOODPLAIN DELINEATION STUDY
        HEC ANALYSIS INCLUDES SECTIONS 13.00 TO 17.95 (FLOODPLAIN ANALYSIS ONLY)
        MONTGOMERY WATSON ANALYSIS INCLUDES SECTIONS 18.09 TO 20.62 AND 22.96 TO
        CASTRO FLEET ANALYSIS (DEL WEBB) INCLUDES SECTIONS 20.64 TO 22.95


 SPLIT FLOW BEING PERFORMED


 SF      SPLIT FLOW FROM SECTIONS 13.02 TO 13.28


 TW      I-17 SPLIT FLOW
         WEIR FLOW OCCURS ALONG I-17 BETWEEN CROSS-SECTIONS 13.02 & 13.28
         FLOW WEIRS OVER THE NORTH BOUND LANES OF I-17 AND ALSO OVER THE
         EMBANKMENT INTO THE CENTRAL ARIZONA PROJECT CANAL
 WS    11   13.02   13.28      -1     2.6
 WC     0  1527.2     490  1526.1     725    1526     780  1524.5     830    1526
 WC   855  1526.7     995    1528    1230    1530    1515    1532    1750    1534
 WC  1840  1534.5
1
   09MAY14      15:18:24                                                                                PAGE    2


 T1      SKUNK CREEK FLOODPLAIN AND FLOODWAY DELINEATION (METHOD 1)
 T2      100-YEAR FREQUENCY           DATE:  FEBRUARY 1998
 T2      RUN INCORPORATING FCDMC'S AND FEMA'S REVISIONS AT NEW RIVER ROAD BRIDGE
 T3      MONT. WAT. AND HEC

 J1  ICHECK    INQ       NINV      IDIR      STRT      METRIC    HVINS     Q         WSEL      FQ

                 2                                                                  1522.96

 J2  NPROF     IPLOT     PRFVS     XSECV     XSECH     FN        ALLDC     IBW       CHNIM     ITRACE

       1                  -1


 J3  VARIABLE CODES FOR SUMMARY PRINTOUT

      38        43         1         8        42         3        61         2        55        26
      56        39        38        38        53         4        54       110       115       150
     100       200
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 J5  LPRNT    NUMSEC                    ********REQUESTED SECTION NUMBERS********

     -10        11     14.30     14.54     14.57     14.60     14.67     14.74     14.89     15.06
                     15.12     15.22     15.41
         SPLIT FLOW ANALYSES AT CAP CANAL & CAREFREE HWY
         NO FLOODWAY ANALYSIS PERFORMED FOR CROSS SECTIONS 13.00 TO 13.28
         DUE TO WEIR FLOW AND PONDING OF WATER UPSTREAM OF THE CAP CANAL BERM.
         THE FLOODWAY CONCEPT IS NOT APPLICABLE FOR THIS REACH.
         Q100 INCREASED FROM 15700 CFS TO 18900 CFS DUE TO UPSTREAM DEVELOPMENT.

 QT        2      18900      18900
 NC     .025       .025       .025         .3          .5
 ET                 9.1        9.1                                                                  9820       10065
         DOWNSTREAM OF BRINK OF CAP OVERCHUTE NO.1 (BOR STA 470+80)
         OVERFLOW DISCHARGE HAS BEEN ADJUSTED TO ACCOUNT FOR SPLIT FLOW TO CAP
         OVERCHUTE NO.2 (BOR STA 492+04)
 X1    13.00          8       9820      10065
 GR   1527.0       7780     1518.5     7780.5     1518.5     7939.5     1527.0       7940     1527.0       9820
 GR   1518.5     9820.5     1518.5    10064.5     1527.0      10065

 ET                 9.1        9.1                                                                  9820       10065
         UPSTREAM ENTRANCE TO CAP OVERCUTE NO.1
 X1    13.02          8       9820      10065        120        120        120
 GR   1527.0       7780       1519     7780.5       1519     7939.5     1527.0       7940     1527.0       9820
 GR     1519     9820.5       1519    10064.5     1527.0      10065

 NC      .04        .04        .04         .3          .5
 ET                 9.1        9.1                                                                  9537       10350
1
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 X1    13.04         77       9721      10130        100        100        100
 GR   1531.2       7311     1526.9       7365     1526.6       7377     1527.8       7428       1527       7475
 GR   1526.6       7516     1520.1       7540     1519.5       7577     1519.3       7631     1519.6       7648
 GR   1518.7       7682       1519       7704     1518.1       7758     1518.4       7790     1520.6       7803
 GR   1526.7       7829     1527.1       7840     1526.9       7898     1526.2       7917       1531       7961
 GR   1532.2       7999       1532       8035     1532.1       8067     1532.4       8106     1537.1       8125
 GR   1532.3       8139     1533.8       8206     1533.4       8257     1532.9       8297     1532.3       8355
 GR   1532.9       8404     1533.1       8450     1533.5       8518     1533.5       8547     1533.9       8592
 GR   1534.2       8649     1533.7       8711     1532.6       8807     1532.4       8944     1532.6       8993
 GR     1533       9051     1532.4       9144     1533.9       9163     1536.3       9206     1537.1       9230
 GR   1536.6       9261     1535.6       9288     1533.9       9315     1532.8       9358     1532.3       9408
 GR   1532.3       9438     1532.1       9481     1529.4       9537     1527.9       9567     1527.1       9596
 GR   1527.1       9632     1527.7       9669     1527.5       9710       1528       9721     1522.3       9749
 GR   1520.2       9797     1519.6       9890     1520.1       9931     1521.2       9949     1520.1       9966
 GR   1518.8       9976     1519.8      10027     1520.7      10082     1521.2      10108     1527.1      10130
 GR   1526.8      10162     1526.5      10210       1527      10249     1527.4      10274     1527.5      10325
 GR   1528.4      10355     1528.1      10398

 NC     .069       .044       .050         .1          .3
 ET                 9.1        9.1                                                                  9550       10679
 X1    13.08         57       9615      10182        230        230        230
 GR     1532       7732       1530       7863       1528       7933       1526       8065       1525       8114
 GR   1524.5       8264       1524       8409     1522.2       8469     1522.5       8605     1522.2       8621
 GR   1522.8       8775     1522.9       8828       1523       8862     1522.5       8926     1521.9       8955
 GR   1520.4       8966     1522.5       9024     1524.4       9127       1524       9197     1524.1       9265
 GR   1524.4       9305       1524       9386     1524.3       9436     1523.7       9447     1523.6       9533
 GR   1524.2       9615     1523.4       9651     1522.6       9720     1520.4       9740     1522.2       9755
 GR   1522.9       9781     1524.6       9805     1520.9       9821       1521       9836     1522.2       9847
 GR     1523       9886     1522.2       9978     1518.5       9992     1518.2      10002     1518.8      10008
 GR   1522.4      10023       1522      10070     1521.1      10078       1522      10090       1522      10106
 GR     1520      10131     1521.5      10160     1523.5      10182     1523.9      10210     1524.3      10274
 GR   1524.7      10346       1526      10460     1525.8      10512     1524.4      10555     1524.5      10575
 GR     1526      10616       1528      10679

 NC     .038       .042       .052         .1          .3
 ET                 9.1        9.1                                                                  9421       10816
         NEW CROSS SECTION:  GR CARD DATA DEVELOPED FROM TOPOGRAPHIC MAPS
 X1    13.16         53       9953      10288        420        425        421
 GR     1534       7863       1532       8128       1530       8316       1528       8551     1526.5       8641
 GR     1528       8791     1528.3       8868       1528       8888       1526       8946       1525       9139
 GR     1526       9169     1526.2       9219       1526       9255     1525.3       9389       1526       9405
 GR   1526.5       9421       1526       9442     1525.5       9459       1526       9481     1526.4       9632
 GR     1526       9721       1525       9736       1526       9751       1528       9929     1528.3       9936
 GR     1528       9943       1526       9953       1524       9963       1522       9981     1521.5       9991
 GR     1522      10001       1524      10043     1524.5      10093       1524      10148       1523      10163
 GR     1524      10215       1523      10220       1524      10225       1525      10235       1524      10245
 GR   1523.2      10250       1524      10255       1526      10273     1526.2      10288       1526      10303
 GR   1525.8      10323       1526      10349       1528      10689     1528.4      10744       1528      10774
 GR   1527.5      10784       1528      10793     1529.8      10816
         CROSS-SECTION AT WHICH FLOWS TO CAP OVERCHUTES 1 AND 2 RECOMBINE.
         WSEL MATCHES AT THIS CROSS-SECTION
1
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 ET                 9.1        9.1                                                                  9537       10802
 X1    13.28         65       9671      10110        390        610        600
 GR     1536       8217     1534.9       8297     1534.2       8552     1534.3       8677       1534       8812
 GR     1532       8979       1530       9107     1529.3       9165       1530       9205       1532       9255
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GR   1532.2      9337     1531.5      9390     1531.5      9439     1530.1      9484     1525.7      9507
GR   1526.0      9523     1529.8      9537     1530.1      9605     1530.9      9671     1530.2      9682
GR   1530.4      9709     1531.2      9726     1531.3      9776     1530.4      9840     1529.7      9851
GR   1530.9      9901     1531.6      9962     1530.6      9975     1522.9      9991     1522.6     10000
GR   1522.9     10034     1530.4     10052     1530.6     10083     1527.4     10097     1531.2     10110
GR   1531.0     10143     1531.2     10169     1532.3     10193     1532.9     10222     1532.2     10250
GR   1532.2     10302     1532.2     10347     1531.6     10363     1532.0     10389     1531.1     10421
GR   1531.1     10475     1531.1     10529     1529.7     10581     1530.3     10594     1530.6     10634
GR   1530.0     10654     1530.5     10667     1529.9     10697     1531.7     10727     1532.2     10771
GR   1532.9     10840     1533.5     10884     1533.9     10956     1533.3     10961     1534.6     10969
GR   1534.9     10995     1534.0     11002     1533.5     11019     1534.9     11025     1535.4     11065
        Q100 INCREASED FROM 23300,23300 TO 26700,26700 CFS
        DUE TO UPSTREAM DEVELOPMENT.

QT        2     26700     26700
ET                9.1       7.1                                   9670     10602                    11043
X1    13.40       74      9670     10319      650       590      678.6
GR     1540     8520      1538      8940     1536      9105      1535      9155     1536      9197
GR   1536.2     9202      1536      9212   1535.9    9214.5      1536      9217   1536.5      9287
GR     1536     9359    1535.5      9414     1536      9474    1537.5      9641   1537.6      9670
GR   1536.4     9692    1534.6      9719   1527.4      9732    1530.8      9748   1532.1      9770
GR   1530.0     9782    1534.1      9800   1533.9      9820    1535.3      9840   1534.9      9849
GR   1535.8     9866    1536.5      9908   1537.1      9939    1536.9      9968   1535.2      9980
GR   1529.0     9994    1528.7     10000   1529.7     10010    1534.5     10033   1534.1     10063
GR   1534.3    10084    1534.3     10102   1536.0     10133    1536.4     10164   1535.0     10177
GR   1535.9    10194    1535.2     10209   1526.8     10246    1528.5     10252   1529.1     10269
GR   1537.1    10289    1537.5     10319   1536.6     10361    1535.1     10379   1535.3     10395
GR   1536.0    10422    1535.1     10447   1535.7     10465    1535.8     10514   1535.1     10539
GR   1535.0    10600    1535.4     10653   1535.5     10687    1535.0     10726   1534.3     10744
GR   1534.4    10772    1535.1     10797   1534.7     10833    1535.5     10874   1535.5     10910
GR   1535.1    10944    1534.7     11001   1535.1     11027    1538.7     11030   1539.0     11043
GR   1538.8    11070    1537.4     11080   1540.1     11101    1539.6     11142

ET                       7.1                                   9160     10494
X1    13.55       79      9688     10494      740       850      787.3
GR   1544.6     8416    1544.5      8496   1543.9      8598    1543.5      8689   1542.8      8797
GR   1542.2     8877    1541.9      8929   1541.3      8950    1540.3      8963   1539.6      8985
GR   1540.1     8993    1540.1      9040   1539.8      9081    1540.4      9104   1540.0      9157
GR   1540.8     9241    1541.2      9311   1540.5      9346    1541.0      9443   1540.2      9451
GR   1541.2     9464    1541.0      9477   1541.9      9510    1542.7      9558   1543.1      9592
GR   1543.3     9645    1543.1      9688   1541.9      9715    1539.8      9736   1540.1      9742
GR   1538.2     9757    1537.4      9776   1532.2      9787    1535.6      9804   1540.7      9828
GR   1539.7     9836    1541.7      9855   1541.6      9877    1542.0      9897   1541.4      9930
GR   1541.8     9965    1535.8      9988   1535.2     10000    1538.4     10010   1540.8     10031
GR   1540.9    10045    1540.5     10054   1541.3     10065    1541.2     10098   1541.8     10123
GR   1541.3    10132    1542.7     10150   1541.1     10176    1539.5     10191   1538.7     10208
GR   1537.7    10219    1539.2     10233   1541.4     10262    1541.1     10270   1542.0     10283
GR   1542.3    10307    1541.4     10349   1537.3     10370    1537.9     10380   1537.0     10394
GR   1538.6    10403    1541.0     10432   1542.6     10456    1543.0     10494   1544.4     10550
1
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GR   1544.5    10623    1545.0     10680   1545.2     10743    1544.8     10802   1544.6     10856
GR   1544.2    10907    1544.1     10973   1545.1     10985    1545.3     10993

ET                9.1       7.1                                   9055     10482     8335     10646
X1    13.66       92      9477     10486      500       540      549.1
GR   1548.4     8244    1548.9      8287   1549.0      8335    1548.3      8352   1548.2      8399
GR   1548.3     8462    1548.0      8514   1547.5      8594    1546.9      8663   1546.0      8720
GR   1545.8     8738    1544.9      8780   1544.1      8828    1543.6      8914   1543.1      8917
GR   1543.7     8921    1544.0      8985   1544.6      9048    1545.1      9086   1545.3      9138
GR   1546.1     9173    1546.5      9234   1546.3      9275    1546.0      9318   1545.7      9360
GR   1545.3     9383    1545.1      9436   1544.5      9449    1545.0      9457   1544.1      9467
GR   1545.4     9477    1544.9      9492   1543.5      9512    1540.2      9528   1540.5      9540
GR   1542.2     9550    1546.6      9572   1546.4      9585    1542.7      9600   1542.8      9619
GR   1543.3     9627    1542.4      9643   1543.1      9655    1546.0      9667   1546.6      9689
GR   1546.7     9709    1546.1      9717   1546.0      9736    1544.6      9744   1546.0      9753
GR   1545.3     9775    1546.1      9791   1546.1      9829    1547.5      9852   1547.5      9878
GR   1546.7     9894    1546.7      9941   1545.9      9956    1544.6      9988   1542.1     10000
GR   1542.3    10006    1543.9     10015   1543.0     10055    1543.5     10063   1546.5     10083
GR   1546.6    10108    1546.0     10119   1547.2     10133    1546.3     10145   1547.2     10160
GR   1546.2    10177    1546.6     10193   1546.1     10207    1546.4     10246   1546.8     10280
GR   1547.3    10324    1547.3     10357   1546.7     10379    1545.6     10392   1543.2     10408
GR   1543.9    10430    1542.9     10442   1542.6     10465    1548.6     10486   1549.3     10509
GR   1549.5    10557    1549.8     10592   1549.9     10646    1549.4     10686   1549.5     10727
GR   1549.4    10784    1549.5     10846

ET                9.1       7.1                                   8708     10232     8212     10433
        CROSS-SECTION PROVIDED BY AERIAL MAPPER SKEWED TO CONTAIN FLOW
X1    13.86       90      9330     10042     1060      1050     1049.1
GR   1556.0     8212    1554.0      8550   1553.0      8600    1553.4      8617   1552.4      8685
GR   1551.6     8708    1551.5      8749   1550.6      8759    1551.7      8767   1552.1      8788
GR   1551.5     8817    1554.3      8863   1555.1      8895    1555.4      8908   1555.1      8935
GR   1555.0     8975    1555.5      9022   1556.1      9072    1556.9      9125   1557.1      9165
GR   1557.3     9223    1556.6      9242   1557.3      9263    1557.4      9298   1557.0      9319
GR   1556.1     9330    1553.5      9344   1552.5      9379    1551.4      9393   1552.9      9404
GR   1552.7     9416    1551.9      9420   1553.3      9429    1553.2      9446   1549.8      9464
GR   1549.3     9472    1549.8      9494   1553.0      9513    1553.6      9535   1553.4      9596
GR   1552.9     9605    1553.3      9613   1553.5      9634    1553.4      9666   1553.2      9716
GR   1552.5     9727    1553.4      9739   1552.6      9770    1553.6      9784   1553.4      9803
GR   1551.8     9819    1551.2      9831   1552.5      9842    1551.1      9855   1553.3      9864
GR   1553.3     9885    1551.8      9919   1549.0      9936    1549.0      9948   1551.6      9970
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GR   1550.4      9983     1547.6      9991     1546.3     10000     1551.6     10009     1554.6     10023
GR   1555.7     10042     1555.6     10083     1554.3     10149     1550.9     10159     1552.6     10171
GR   1554.4     10197     1554.7     10232     1556.0     10271     1557.0     10327     1557.5     10379
GR   1557.7     10433     1557.5     10477     1557.5     10546     1557.7     10596     1557.6     10656
GR   1557.4     10695     1557.1     10752     1556.8     10820     1556.5     10873     1556.1     10945
GR   1555.9     10962     1555.7     11006     1558.1     11035     1561.0     11054     1561.7     11092

ET                 9.1       7.1                                       8805     10529      8530     10608
        CROSS-SECTION PROVIDED BY AERIAL MAPPER SKEWED TO CONTAIN FLOW
X1    14.07        65      9879     10059      1050      1100     1134.1
GR   1565.4      8530      1564      8652      1562      8685     1560.7      8705     1560.7      8805
GR     1562      8920    1562.4      9043    1562.8      9116     1563.1      9185     1562.8      9201
GR   1562.8      9250    1563.3      9286    1563.7      9321     1563.4      9353     1562.5      9394
GR   1561.5      9417    1561.4      9462    1562.3      9530     1562.4      9554     1562.0      9566
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GR   1562.0      9614    1562.3      9680    1563.1      9746     1563.6      9814     1564.0      9855
GR   1564.3      9879    1560.9      9898    1561.4      9904     1558.5      9924     1558.9      9938
GR   1558.9      9959    1557.5      9972    1557.5      9978     1558.5     10000     1562.0     10020
GR   1562.6     10040    1564.5     10059    1564.0     10077     1563.5     10125     1563.1     10151
GR   1562.6     10166    1562.7     10176    1562.2     10201     1563.1     10217     1563.0     10249
GR   1563.1     10300    1563.0     10338    1563.2     10381     1563.1     10396     1562.3     10404
GR   1563.1     10408    1563.1     10454    1563.1     10499     1564.1     10516     1565.5     10571
GR   1566.0     10608    1565.9     10656    1565.8     10710     1565.6     10758     1564.7     10813
GR   1564.3     10848    1564.8     10873    1565.1     10923     1570.0     10950     1570.8     10989

        The following GR record has been modified as per discussion with the
        FEMA technical evaluator. From station 8450 to station 9500, the
        elevations are read from the topographic map. From station 9563 to
        station 11361, the elevations remain the same as provided by the
        Aerial Mapping Company, Inc (AMCI) (March 17, 1998).

ET                           7.1                                       9210     10160
X1    14.30        73      9923     10027      1010      1210     1213.6
GR   1576.2      8450    1575.9      8550    1574.1      8650     1573.7      8750     1573.5      8850
GR   1573.4      8950    1573.3      9050    1572.5      9150     1572.5      9250     1571.9      9350
GR   1571.9      9450    1573.5      9500    1573.8      9563     1574.2      9626     1573.5      9652
GR   1573.1      9672    1573.8      9707    1573.7      9731     1573.8      9769     1573.2      9788
GR   1573.2      9836    1572.9      9878    1572.4      9906     1571.6      9923     1570.4      9941
GR   1565.1      9961    1565.2      9967    1560.0      9973     1560.3      9983     1559.6     10000
GR   1566.5     10011    1570.0     10027    1570.1     10045     1569.4     10052     1570.1     10062
GR   1571.0     10097    1571.2     10131    1571.1     10157     1572.5     10191     1572.9     10211
GR   1572.6     10251    1572.3     10297    1572.5     10351     1572.2     10386     1571.8     10410
GR   1572.1     10417    1571.7     10437    1571.7     10448     1571.5     10480     1571.6     10515
GR   1572.7     10552    1572.9     10571    1572.7     10608     1572.4     10642     1571.4     10681
GR   1571.6     10735    1571.9     10765    1572.0     10792     1571.2     10804     1571.8     10811
GR   1573.2     10852    1575.9     10899    1577.1     10931     1577.9     10967     1578.4     10992
GR   1578.7     11034    1578.6     11096    1578.4     11179     1578.2     11233     1577.7     11273
GR   1582.1     11295    1582.8     11336    1577.8     11361

ET                 9.1       7.1                                       9950     10480      9283     10588
X1    14.54        65      9950     10480      1410      1150     1273.2
GR   1584.8      8984    1584.8      9072    1584.7      9160     1584.7      9220     1584.9      9283
GR   1584.7      9355    1584.5      9421    1584.2      9499     1583.8      9525     1583.4      9546
GR   1583.7      9563    1583.4      9621    1583.8      9683     1583.0      9715     1583.4      9741
GR   1582.9      9767    1583.5      9798    1583.9      9818     1584.2      9845     1584.0      9892
GR   1583.2      9926    1581.9      9950    1574.4      9970     1574.0      9986     1571.6     10000
GR   1576.7     10045    1574.9     10066    1577.8     10080     1579.5     10110     1577.7     10136
GR   1578.5     10153    1578.1     10177    1576.3     10199     1576.9     10222     1576.6     10259
GR   1577.7     10273    1577.7     10287    1578.9     10306     1578.4     10354     1578.1     10384
GR   1577.0     10410    1578.1     10416    1578.3     10428     1577.7     10437     1580.1     10458
GR   1583.0     10480    1583.8     10495    1584.2     10523     1584.8     10556     1585.0     10588
GR   1584.4     10623    1583.5     10669    1583.4     10695     1583.4     10738     1583.8     10762
GR   1584.1     10808    1583.9     10821    1583.9     10881     1584.2     10936     1584.2     10999
GR   1584.2     11072    1584.3     11131    1584.1     11205     1584.2     11269     1584.9     11381
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NC     .059       .042       .039         .3          .5
        START OF KIMLEY-HORN REVISIONS
        CROSS-SECTION ADDED FOR PROPOSED SONORAN DESERT DRIVE BRIDGE
        EXPANSION AND CONTRACTION COEFFICIENTS REVISED FOR BRIDGE
ET                           7.1                                       9834     10263
X1    14.57        67      9961     10164       150       190       177
X3                                  9790.4    1596.2   10392.2    1596.2
GR   1585.5      9758    1585.5      9764    1585.5      9769     1586.5    9790.4     1586.5    9793.4
GR   1578.5    9816.6    1577.5      9869    1577.6      9899     1581.0      9915     1581.3      9922
GR   1581.2      9961    1580.8      9966    1580.4      9972     1580.0      9977     1579.6      9982
GR   1578.8      9987    1578.3      9990    1577.7      9992     1577.0      9995     1576.8     10000
GR   1576.8     10005    1576.9     10010    1577.8     10074     1578.4     10079     1579.0     10082
GR   1579.0     10089    1578.9     10095    1578.5     10101     1577.8     10105     1577.1     10110
GR   1576.9     10118    1577.1     10130    1577.3     10140     1577.8     10144     1578.4     10149
GR   1578.9     10152    1579.2     10158    1579.3     10164     1579.6     10193     1579.5     10199
GR   1579.4     10204    1579.3     10210    1579.3     10215     1579.2     10220     1579.2     10226
GR   1579.0     10231    1578.9     10236    1578.8     10242     1578.4     10257     1578.2     10276
GR   1578.5   10366.1    1586.5   10389.2    1586.5   10392.2     1585.7     10398     1585.9     10412
GR   1585.9     10418    1586.0     10425    1585.9     10430     1586.0     10436     1586.1     10441
GR   1586.0     10446    1586.0     10452    1585.9     10457     1585.9     10462     1586.0     10467
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GR   1586.1      10473     1586.1      10475
        CROSS-SECTION ADDED FOR PROPOSED SONORAN DESERT DRIVE BRIDGE
        PER THE COP OF STORM WATER POLICIES AND STANDARDS PIER WIDTHS
        SHOULD BE MODELED WITH DOUBLE THE DESIGN WIDTH
        DESIGN PIER WIDTH IS 4.5 FEET.  4 PIERS
        ADJUSTED BRIDGE CHANNEL INVERT TO MAKE TRAPEZOIDAL AREA
        SIMILAR TO NET AREA UNDER BRIDGE, PER HEC-2 MANUAL.

ET                          7.1                                     9730      10129
SB      0.9        1.6       2.6         0       570        36      6625          3       1582          0
X1    14.60         71      9936     10112       120       122       141
X2        0          0         1    1593.1    1596.3         0         0       1.33          0
X3                                   9682.3    1596.2   10283.9    1596.2
BT      -16     9668.7    1595.1               9682.7    1596.5               9797.2     1598.7
BT             9801.7    1598.8               9806.2    1598.9               9918.2     1599.8
BT             9922.7    1599.9               9927.2    1600.0              10039.2     1600.0
BT            10043.7    1599.9              10048.2    1599.8              10160.2     1598.7
BT            10164.7    1598.6              10169.2    1598.5              10284.7     1596.3
BT            10368.7    1593.1
GR   1585.9       9669    1586.1       9676    1586.5    9682.3    1586.5    9685.3     1578.5    9708.5
GR   1578.3       9785    1578.2       9790    1578.3      9795    1578.7      9805     1579.8      9810
GR   1580.1       9815    1580.2       9820    1580.8      9835    1581.1      9841     1581.9      9858
GR   1582.5       9869    1582.8       9875    1583.0      9881    1583.1      9886     1583.7      9902
GR   1583.2       9930    1583.1       9936    1582.3      9940    1580.6      9945     1578.9      9951
GR   1578.0       9969    1577.8       9976    1577.0     10000    1577.4     10021     1577.9     10038
GR   1578.1      10047    1578.5      10062    1578.6     10069    1580.2     10080     1580.9     10085
GR   1582.1      10094    1582.5      10101    1582.8     10107    1583.1     10112     1583.5     10128
GR   1583.9      10136    1584.1      10141    1583.8     10149    1583.4     10155     1583.3     10162
GR   1583.3      10167    1583.4      10173    1583.0     10178    1582.3     10183     1582.9     10188
GR   1583.3      10203    1582.9      10214    1582.8     10220    1582.2     10229     1581.5     10236
GR   1581.1      10242    1578.5      10258    1586.5   10280.9    1586.5   10283.9     1585.7     10290
GR   1585.9      10295    1586.2      10300    1587.2     10307    1587.3     10312     1587.4     10318
GR   1587.6      10324    1587.7      10331    1587.8     10336    1588.0     10351     1588.1     10362
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GR   1588.1      10368
        CROSS-SECTION ADDED FOR PROPOSED SONORAN DESERT DRIVE BRIDGE
        EXPANSION AND CONTRACTION COEFFECIENTS RETURN TO STANDARD

NC                                      0.1       0.3
ET                          7.1                                     9696      10091
X1    14.67         17      9958     10080       477       317       387
GR   1590.0       9368    1588.0      9513    1586.0      9624    1584.0      9648     1584.0      9668
GR   1584.0       9693    1582.0      9702    1582.0      9723    1582.0      9958     1580.0      9987
GR   1579.5      10000    1580.0     10014    1582.0     10080    1584.0     10157     1586.0     10171
GR   1588.0      10195    1590.0     10312
        CROSS-SECTION PROVIDED BY AERIAL MAPPER SKEWED TO CONTAIN FLOW

ET                  9.1       7.1                                     9700      10100                10380
X1    14.74         39      9976     10076       433       341     365.9
GR   1594.6       9253    1594.6      9384    1593.5      9435    1592.2      9495     1591.7      9526
GR   1590.5       9540    1589.6      9564    1589.3      9615    1589.0      9650     1587.4      9663
GR   1587.4       9705    1587.0      9720    1588.5      9769    1588.3      9791     1587.1      9809
GR   1586.1       9837    1585.5      9853    1585.1      9871    1585.5      9891     1584.9      9917
GR   1585.0       9952    1587.3      9976    1581.8      9988    1581.8     10000     1582.1     10024
GR   1581.7      10057    1588.3     10076    1588.3     10095    1590.2     10125     1591.0     10145
GR   1591.6      10172    1591.5     10203    1591.5     10225    1591.6     10248     1591.7     10375
GR     1592      10380    1591.6     10500      1592     10635    1592.6     10690
        END OF KIMLEY-HORN REVISIONS

ET                  9.1       7.1                                     9600      10080       9490
X1    14.89         49      9938     10059       700       760     756.4
GR   1601.5       9234    1601.3      9270    1599.7      9318    1598.4      9337     1597.4      9377
GR   1597.0       9406    1596.9      9434    1597.5      9460    1598.4      9477     1598.5      9494
GR   1597.0       9511    1595.3      9549    1593.2      9572    1593.5      9577     1590.8      9587
GR   1591.2       9606    1591.0      9626    1592.0      9633    1593.0      9659     1592.7      9671
GR   1593.5       9683    1593.6      9702    1592.4      9714    1592.5      9741     1592.4      9775
GR   1592.7       9804    1591.3      9817    1591.4      9847    1591.8      9869     1592.2      9890
GR   1593.0       9906    1592.5      9927    1591.9      9938    1589.9      9949     1589.9      9956
GR   1587.2       9979    1583.3      9995    1583.2     10000    1583.3     10013     1583.8     10032
GR   1588.0      10042    1596.4     10059    1597.2     10087    1598.2     10101     1599.3     10141
GR   1599.6      10186    1600.2     10236    1600.4     10284    1600.5     10319

ET                          7.1                                     9972      10390
X1    15.06         62      9972     10390       670       950     930.3
GR   1603.3       9119    1603.9      9192    1604.4      9267    1604.9      9349     1605.9      9431
GR   1606.0       9497    1606.1      9575    1606.3      9620    1606.6      9663     1606.5      9685
GR   1605.7       9707    1603.0      9733    1599.7      9751    1599.0      9759     1599.5      9764
GR   1600.1       9782    1600.6      9800    1600.6      9836    1601.4      9872     1602.1      9917
GR   1602.2       9972    1597.9      9988    1593.0     10000    1591.5     10010     1591.3     10020
GR   1594.5      10043    1593.9     10060    1595.3     10070    1597.5     10089     1598.0     10109
GR   1597.8      10126    1595.7     10138    1596.7     10152    1600.2     10174     1600.1     10205
GR   1593.4      10229    1593.7     10246    1596.4     10268    1596.6     10283     1597.3     10298
GR   1597.8      10314    1597.1     10323    1598.4     10337    1597.4     10350     1600.0     10367
GR   1601.4      10390    1601.3     10411    1599.6     10441    1595.7     10453     1600.3     10470
GR   1600.7      10480    1602.7     10495    1603.6     10517    1605.1     10549     1606.0     10581
GR   1606.6      10621    1606.9     10667    1607.1     10713    1607.2     10776     1607.4     10855
GR   1607.4      10916    1607.6     10950
1
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ET                 9.1       7.1                                   9975      10351      9503      10546
X1    15.12         61      9975     10351       255       330     283.6
GR   1604.6       9081    1604.5      9136    1604.6      9184    1605.2       9236    1605.8       9313
GR   1606.1       9379    1606.4      9423    1606.8      9503    1606.7       9545    1606.5       9620
GR   1606.2       9665    1605.5      9703    1604.5      9754    1603.8       9762    1604.4       9792
GR   1603.5       9836    1603.5      9865    1602.9      9886    1603.3       9903    1603.9       9928
GR   1604.1       9975    1596.3     10000    1596.9     10009    1596.4      10015    1596.7      10032
GR   1595.8      10059    1600.2     10070    1601.3     10087    1601.7      10109    1602.2      10130
GR   1602.4      10144    1601.5     10156    1602.1     10176    1602.1      10205    1601.7      10213
GR   1602.2      10230    1602.8     10258    1595.4     10282    1596.7      10302    1597.2      10319
GR   1601.5      10351    1600.3     10370    1601.1     10378    1601.1      10387    1603.1      10417
GR   1603.4      10441    1603.1     10480    1602.9     10493    1603.8      10513    1604.1      10532
GR   1606.5      10546    1606.1     10564    1607.2     10587    1608.2      10621    1609.1      10657
GR   1609.8      10716    1610.4     10769    1610.7     10822    1611.1      10863    1611.2      10909
GR     1611      10955

ET                 9.1       7.1                                   9977      10500      9749      10672
X1    15.22         54      9977     10348       535       600     553.1
GR   1609.2       9347    1609.6      9393    1610.2      9448    1610.9       9497    1611.3       9548
GR   1611.8       9619    1612.0      9694    1612.0      9749    1611.9       9816    1611.1       9893
GR   1610.5       9937    1609.1      9977    1599.9      9996    1599.4      10000    1599.2      10022
GR   1598.9      10041    1602.7     10057    1605.6     10077    1606.6      10091    1606.1      10113
GR   1606.8      10126    1607.7     10151    1607.9     10166    1606.7      10191    1606.0      10210
GR   1606.8      10234    1605.9     10242    1606.2     10249    1604.1      10260    1605.4      10269
GR   1605.1      10282    1602.0     10301    1601.5     10310    1601.9      10327    1607.8      10348
GR   1608.2      10374    1608.0     10413    1607.9     10439    1604.5      10461    1607.3      10480
GR   1607.9      10507    1609.1     10527    1611.0     10570    1612.3      10605    1613.6      10657
GR   1613.8      10672    1613.4     10708    1613.6     10752    1614.3      10797    1615.1      10850
GR   1615.6      10891    1616.3     10934    1616.8     10987    1617.2      11062

ET                          7.1                                   9979      10353
X1    15.41         57      9979     10353       980       950     968.9
GR   1618.0       9542    1618.6      9643    1618.9      9676    1620.7       9683    1619.0       9694
GR   1619.4       9751    1619.7      9787    1620.0      9830    1619.2       9867    1619.4       9907
GR   1619.7       9940    1618.7      9968    1615.1      9979    1609.8       9993    1609.2      10000
GR   1608.3      10009    1607.6     10021    1609.7     10027    1610.4      10043    1610.4      10053
GR   1611.1      10058    1612.8     10070    1613.1     10077    1611.8      10085    1612.0      10096
GR   1610.1      10106    1611.9     10113    1613.0     10124    1613.0      10135    1612.5      10157
GR   1611.8      10178    1612.0     10194    1610.2     10212    1610.9      10221    1610.4      10245
GR   1609.6      10257    1609.4     10282    1608.7     10297    1610.1      10310    1611.0      10324
GR   1611.0      10333    1614.7     10353    1618.6     10383    1620.1      10403    1620.5      10426
GR   1621.2      10440    1619.6     10464    1617.9     10479    1618.1      10496    1619.3      10517
GR   1620.0      10534    1621.0     10569    1622.0     10607    1622.6      10642    1622.9      10678
GR   1623.0      10732    1623.1     10769

ET                          7.1                                   9890      10182
X1    15.55         46      9935     10147       730       550     755.3
GR   1625.7       9335    1625.5      9408    1625.7      9486    1625.9       9510    1625.7       9532
GR   1626.2       9567    1627.0      9622    1628.0      9645    1627.1       9680    1626.7       9703
GR   1626.5       9731    1626.1      9761    1625.3      9790    1623.7       9822    1622.3       9835
GR   1618.7       9858    1619.5      9869    1619.7      9906    1619.5       9935    1618.8       9954
GR   1615.4       9972    1615.3      9982    1613.8      9991    1613.9      10000    1614.7      10030
GR   1615.2      10057    1614.9     10078    1613.4     10093    1614.5      10104    1617.5      10126
1
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GR   1619.4      10147    1620.5     10184    1620.7     10222    1620.5      10247    1620.2      10266
GR   1619.4      10278    1618.9     10314    1619.4     10326    1620.0      10343    1624.2      10368
GR   1625.0      10381    1625.1     10410    1625.3     10453    1625.2      10483    1625.1      10525
GR   1625.0      10531

ET                          7.1                                   9477      10116
X1    15.75         50      9977     10102       880      1030    1048.4
GR   1633.1       9040    1633.1      9098    1632.7      9146    1632.0       9185    1632.0       9268
GR   1631.5       9319    1630.5      9364    1630.7      9404    1629.9       9431    1626.7       9467
GR   1626.1       9481    1624.3      9500    1624.3      9515    1623.4       9534    1619.5       9549
GR   1619.5       9557    1622.4      9566    1624.1      9580    1624.8       9602    1625.6       9637
GR   1626.1       9689    1626.0      9712    1625.0      9736    1625.4       9751    1627.1       9769
GR   1628.7       9816    1628.8      9835    1627.8      9850    1628.0       9875    1628.6       9933
GR   1627.2       9944    1626.9      9963    1626.1      9967    1625.7       9977    1619.8      10000
GR   1620.1      10015    1621.2     10027    1621.5     10050    1616.7      10070    1616.3      10079
GR   1627.5      10102    1627.9     10116    1627.5     10121    1628.4      10138    1629.3      10174
GR   1630.3      10210    1631.2     10259    1631.4     10307    1631.7      10370    1631.7      10411

ET                          7.1                                   9817      10210
X1    15.89         58      9969     10210       700       730     738.4
GR   1636.6       9095    1637.0      9172    1636.9      9243    1637.2       9312    1637.1       9359
GR   1637.6       9398    1638.1      9428    1637.5      9460    1634.0       9490    1630.6       9517
GR   1631.6       9522    1631.8      9539    1631.4      9550    1631.6       9571    1632.6       9626
GR   1633.3       9676    1633.4      9714    1632.5      9744    1631.7       9775    1630.9       9809
GR   1629.2       9818    1629.2      9822    1630.6      9831    1631.6       9850    1632.4       9866
GR   1632.6       9887    1632.1      9901    1636.5      9919    1635.9       9934    1633.3       9949
GR   1633.2       9969    1632.2      9981    1626.9     10000    1627.0      10011    1628.2      10018
GR   1627.9      10035    1626.8     10056    1626.8     10068    1630.8      10096    1630.7      10121
GR   1631.1      10172    1630.2     10182    1630.1     10194    1633.5      10210    1635.6      10224
GR   1636.1      10243    1636.9     10296    1637.0     10337    1637.2      10370    1637.1      10414
GR   1636.4      10440    1636.4     10469    1635.7     10477    1636.7      10492    1636.9      10535
GR   1637.6      10578    1637.2     10598    1637.2     10621

ET                          7.1                                   9760      10130
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X1    16.07        42      9948     10130       980       840     950.3
GR   1648.3      9258    1648.3      9327    1648.3      9384    1648.1      9446    1648.0      9494
GR   1647.3      9536    1646.8      9578    1645.7      9614    1644.4      9631    1641.8      9648
GR   1641.5      9701    1641.1      9720    1638.4      9734    1637.8      9750    1639.7      9760
GR   1637.5      9781    1639.3      9791    1639.5      9822    1638.8      9854    1638.8      9877
GR   1639.4      9884    1640.1      9902    1640.1      9948    1638.8      9974    1634.8      9986
GR   1634.3     10000    1634.7     10037    1635.4     10044    1636.2     10071    1636.3     10089
GR   1635.5     10105    1635.5     10113    1643.3     10130    1644.3     10166    1645.7     10196
GR   1646.5     10222    1646.6     10267    1646.7     10315    1646.2     10350    1645.8     10392
GR   1645.6     10433    1645.5     10494

ET                          7.1                                   9600     10068
X1    16.19        54      9934     10077       540       660     645.6
GR   1652.0      9011    1652.5      9072    1652.6      9131    1652.8      9193    1652.7      9235
GR   1651.8      9260    1649.9      9281    1647.9      9326    1645.6      9377    1644.7      9385
GR   1645.2      9392    1646.1      9431    1646.6      9457    1646.3      9500    1645.4      9506
GR   1646.3      9515    1646.3      9539    1645.2      9548    1645.8      9556    1645.2      9574
GR   1643.7      9600    1641.7      9613    1640.9      9624    1641.8      9639    1641.7      9652
GR   1642.7      9664    1642.9      9687    1642.4      9695    1642.5      9709    1644.9      9730
GR   1646.3      9760    1646.9      9781    1647.2      9807    1646.2      9817    1645.8      9833
1
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GR   1646.5      9855    1646.9      9881    1644.9      9907    1644.4      9934    1643.9      9950
GR   1638.9      9966    1639.7      9981    1637.5     10000    1637.8     10018    1637.9     10034
GR   1639.1     10048    1652.0     10077    1652.8     10101    1653.2     10139    1653.3     10192
GR   1653.0     10245    1652.7     10291    1652.4     10341    1652.2     10389

ET                          7.1                                   9760     10042
X1    16.27        50      9760     10045       400       425     422.1
GR   1655.1      9044    1655.3      9106    1655.6      9139    1655.9      9198    1656.1      9247
GR   1656.3      9283    1655.9      9326    1654.9      9357    1652.7      9394    1650.9      9404
GR   1650.4      9443    1650.5      9466    1650.7      9508    1648.7      9529    1648.6      9539
GR   1646.7      9553    1648.2      9572    1647.6      9588    1648.6      9600    1647.5      9623
GR   1649.0      9643    1650.5      9667    1650.2      9682    1650.3      9700    1649.6      9724
GR   1650.2      9760    1648.3      9771    1647.7      9798    1646.1      9816    1647.3      9835
GR   1647.9      9853    1649.6      9872    1649.9      9892    1648.8      9905    1648.9      9915
GR   1648.4      9923    1648.9      9947    1643.5      9967    1642.4      9990    1639.4     10000
GR   1639.8     10009    1640.0     10032    1654.9     10045    1655.9     10052    1656.0     10111
GR   1656.2     10158    1656.4     10207    1656.4     10255    1656.5     10316    1656.1     10391

ET                          7.1                                   9906     10430
X1    16.49        46      9906     10130      1190      1150    1153.6
GR   1667.1      9520    1667.6      9583    1667.4      9619    1665.7      9661    1665.1      9708
GR   1664.9      9776    1664.1      9808    1661.9      9841    1661.5      9871    1659.1      9888
GR   1659.2      9906    1653.7      9925    1653.9      9933    1653.8      9961    1653.3     10000
GR   1654.5     10018    1658.6     10040    1658.9     10066    1658.1     10073    1657.8     10095
GR   1659.1     10104    1659.5     10130    1653.7     10147    1654.0     10168    1653.7     10211
GR   1655.7     10224    1655.2     10234    1655.3     10246    1656.7     10253    1657.7     10285
GR   1658.8     10316    1659.1     10335    1658.9     10371    1657.8     10413    1656.7     10420
GR   1657.4     10428    1657.6     10438    1656.8     10446    1657.6     10465    1659.8     10485
GR   1662.4     10512    1663.3     10532    1664.0     10582    1664.5     10619    1664.7     10669
GR   1664.8     10742

NC     .043      .057      .043        .1        .3
ET                          7.1                                   9940     10590
X1    16.68        51      9928     10590       940      1160     997.5
GR   1682.1      9880    1676.2      9916    1673.5      9928    1662.9      9950    1662.6      9956
GR   1666.6      9964    1666.2      9989    1662.3     10000    1662.8     10009    1662.7     10020
GR   1664.5     10025    1665.2     10043    1665.3     10076    1664.9     10100    1662.9     10107
GR   1662.9     10120    1661.5     10135    1665.1     10142    1665.4     10161    1664.6     10168
GR   1664.2     10183    1664.5     10192    1663.7     10218    1662.3     10230    1661.7     10247
GR   1662.9     10262    1664.5     10302    1664.0     10308    1663.9     10353    1664.0     10390
GR   1663.6     10437    1663.5     10463    1662.9     10470    1663.5     10479    1662.7     10511
GR   1661.8     10530    1661.3     10540    1661.3     10553    1662.3     10569    1666.8     10590
GR   1675.2     10612    1674.8     10641    1675.2     10677    1675.4     10718    1675.4     10765
GR   1675.3     10821    1675.4     10870    1675.6     10900    1675.6     10938    1676.0     10964
GR   1676.0     11005

QT        2     27300     27300
NC     .059      .042      .033        .3        .5

        DOWNSTREAM FACE OF CAREFREE HIGHWAY BRIDGE.
        BRIDGE OPENING ADJUSTED BY FACTOR OF 0.707 TO ACCOUNT FOR
        45 DEGREE SKEW.  DOWNSTREAM REACH LENGTHS REDUCED TO
        ACCOUNT FOR NEW CAREFREE HIGHWAY BRIDGE CONSTRUCTION.
1
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X1    16.86         6      9893     10317     888.2     778.2     879.1     0.707
X2                                                                                                15
X3       10                                                                   1685      1685
GR   1685.3      9893   1671.01      9933   1670.42     10000   1669.51     10103   1669.11     10273
GR   1685.3     10317

        UPSTREAM FACE OF CAREFREE HIGHWAY BRIDGE.
        APPROXIMATELY 3,600 CFS DIVERTS OUT OF THE SKUNK CREEK WASH
        AT APPROXIMATELY 1,500 FEET WEST OF THE MAIN HIGHWAY BRIDGE.
        REFER TO SPLIT FLOW MODEL FROM CROSS-SECTION 16.87 TO CROSS-SECTION
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        17.48. CROSS-SECTION 17.48 IS THE POINT OF FLOW MATCHING.
        BT BASED UPON "AS-BUILT" PLANS ADJUSTED TO ACCOUNT FOR MAPPED
        CONDITIONS.  DOWNSTREAM REACH LENGTHS FOR CROSS-SECTION 16.87
        INCREASED TO 146 FT TO REFLECT THE ADDITION OF THE SOUTHERN
        HALF OF THE CAREFREE HIGHWAY BRIDGE. PIER WIDTH OF 3.5 FEET
        MULTIPLIED BY DEBRIS FACTOR OF 2 = 3 PIERS AT 7-FOOT WIDTH EACH.

SB     1.05       1.56        2.7          0        232         21       2254          2    1670.71    1669.11
X1    16.87          6       9890      10320        146        146        146      0.707
X2        0          0          1     1681.1       1686          0          0       1.33       .707         15
X3       10                                                                          1685       1685
BT        4       9885     1685.6                   9918     1685.7                 10102     1686.0
BT    10337     1685.8
GR   1684.9       9890    1671.81       9943    1671.88      10000    1672.01      10108    1670.71      10272
GR   1684.1      10320


QT        2      27300      27300
NC     .059       .042       .033         .1          .3

        GR DATA FOR SECTIONS 16.96 TO 17.95 IS BASED UPON ONE-FOOT MAPPING
        FROM CARTER-BURGESS DIGITAL TERRAIN MODEL. DATE: 2-24-99
        GR ELEVATIONS FOR SECTIONS 16.96 TO 17.95 ARE BASED UPON
        CITY OF PHOENIX DATUM.  MONTGOMERY-WATSON GR DATA ARE BASED UPON
        NGVD 1927 DATUM.  THE GR DATA FOR SECTIONS 16.96 TO 17.95 ARE
        RAISED BY 0.21 FEET ON THE X1 CARD FOR CONVERSION TO THE
        NGVD 1927 DATUM.

ET                 9.1        7.1                                   9914      10348       9914      10348
X1    16.96         61       9932      10342        410        600      456.2        1.0       0.21
X2                                                                                                     15
GR   1684.1    9539.39    1680.00    9594.54    1682.00    9637.67    1680.00    9655.49    1680.00    9757.68
GR   1678.5    9807.96    1678.00    9870.41    1678.00    9902.01    1684.00    9929.31       1684       9932
GR   1684.0    9947.83     1678.0       9966    1677.71    9988.98    1676.00   10007.22    1676.00   10075.82
GR   1679.4   10134.07     1679.9   10257.04    1682.44    10270.3    1682.91   10282.57    1684.29   10307.33
GR   1684.7      10342     1685.2   10383.59     1685.6   10435.94    1684.59   10503.13    1681.61   10542.21
GR   1681.7   10567.46     1684.5   10601.12     1685.0   10660.64    1685.14    10704.2    1685.85   10830.52
GR   1686.6    10864.9     1688.5   10909.44     1688.7   10920.87    1688.46   10970.87    1688.21    11018.3
GR   1688.4   11061.63     1687.9   11137.84     1687.9   11246.93    1687.23   11567.48    1686.77   11645.69
GR   1686.1   11668.64     1685.0   11730.35     1682.7   11795.39    1683.11    11904.8    1683.60   11972.35
GR   1680.6   11995.13     1681.3   12009.48     1680.0   12021.63    1680.01   12033.37    1683.12    12052.5
GR   1684.1   12068.44     1683.2   12108.19     1683.9   12127.91    1683.29   12159.06    1683.75   12199.78
1
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GR   1684.7   12221.54     1685.3   12302.92     1686.2   12482.15    1686.01   12553.87    1686.23   12583.61
GR   1685.8   12619.86


ET                 9.1        7.1                                   9650      10470       9533      10470
X1    17.06         68       9947      10090        630        440      566.0                  0.21
X2                                                                                                     15
GR   1694.0    9385.95    1693.95    9443.14    1690.00    9475.62    1690.00    9497.53    1688.00    9557.26
GR   1684.0    9581.93    1682.31    9621.41    1686.00    9643.26    1686.00    9763.42    1684.00    9806.79
GR   1684.0    9929.44    1682.68       9947    1681.50    9963.19    1680.00    9982.51    1682.00    9988.59
GR   1682.0   10002.50     1678.0   10029.28    1678.00   10052.12    1684.48   10064.34    1686.00   10069.46
GR   1687.9      10090     1689.0   10122.23     1689.3   10215.28    1688.00   10336.61    1688.10   10396.62
GR   1687.8   10487.99     1688.0   10511.72     1687.4   10522.16    1688.38   10572.12    1688.62   10626.53
GR   1689.6   10646.45     1690.6   10749.60     1690.3   10800.60    1690.98   10928.08    1690.54   11030.08
GR   1690.9   11081.08     1690.9   11116.85     1690.4   11217.90    1690.40   11307.94    1690.05   11414.59
GR   1688.9   11515.03     1688.4   11541.26     1687.2   11553.62    1688.71   11570.43    1688.71   11611.26
GR   1686.9   11659.40     1686.6   11686.45     1689.0   11715.46    1689.84   11790.80    1690.01   11846.52
GR   1691.6   11921.73     1691.6   11976.53     1690.2   12032.71    1690.45   12064.67    1689.28   12092.70
GR   1687.0   12101.40     1689.2   12110.11     1686.7   12121.50    1687.03   12132.17    1690.17   12142.33
GR   1688.6   12152.05     1690.3   12176.39     1690.4   12191.90    1689.44   12200.38    1691.39   12313.66
GR   1691.5   12385.08     1691.0   12479.24     1692.1   12605.82


NC     .048       .048       .046         .1          .3

ET                 9.1        7.1                                   9788      10668       9746      10695
X1    17.18         56       9978      10254        610        510      600.8                  0.21
X2                                                                                                     15
GR   1699.8    9493.99    1697.06    9664.32    1695.56    9715.97    1694.00    9779.51    1692.05    9808.56
GR   1693.2    9845.85    1692.49    9935.01    1692.00    9963.19    1688.74       9978    1686.00    9990.45
GR   1686.0   10011.48     1690.0   10053.30    1690.00   10123.73    1687.29   10145.22    1686.00   10162.51
GR   1688.0   10206.89     1688.0   10244.97    1689.35      10254    1694.00   10284.66    1696.00   10342.46
GR   1695.4   10386.32     1695.1   10446.24    1694.00   10516.41    1693.77   10575.40    1693.06   10655.64
GR   1694.5   10749.27     1695.8   10806.19    1695.72   10933.46     1696.0   10997.29     1695.9   11083.48
GR   1696.1   11089.79     1696.5   11108.75    1695.63   11237.26    1694.8   11322.92     1693.7   11408.60
GR   1692.9   11445.19     1692.4   11459.18    1693.31   11474.48     1692.3   11499.27     1692.8   11568.83
GR   1693.0   11665.60     1693.9   11794.13    1694.57   11930.31     1695.5   12034.58     1695.9   12115.02
GR   1695.7   12238.17     1695.9   12285.64    1692.73   12313.61     1692.5   12332.10     1696.4   12352.81
GR   1695.9   12381.62     1696.6   12395.49    1696.08   12435.45     1696.7   12500.30     1698.0   12576.83
GR   1698.2   12621.60


ET                 9.1        7.1                                   9628      10535       9568      10560
X1    17.30         53       9970      10156        630        580      644.4                  0.21
X2                                                                                                     15
GR   1710.5    9112.36    1710.00    9177.76    1709.63    9217.43    1704.60    9322.93    1704.00    9419.22
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GR   1703.9    9448.82    1701.30    9534.19    1700.00    9566.96    1700.00    9598.26    1698.00    9656.94
GR   1698.0    9720.94    1697.35    9761.09    1698.00    9881.54    1697.02    9933.98    1696.00    9946.95
GR   1692.0    9962.55       1692       9970    1692.00   10031.21    1694.00   10063.76    1696.00   10074.95
GR   1696.0   10119.18     1697.2      10156     1697.7   10169.28    1698.00   10277.48    1696.00   10295.67
GR   1696.1   10308.57     1698.0   10327.84     1698.0   10437.49    1700.00   10523.21    1700.30   10569.87
GR   1700.6   10584.84     1699.9   10675.27     1700.1   10755.39    1699.09   10873.25    1698.71   10927.80
GR   1699.6   11081.73     1699.2   11129.84     1699.4   11231.27    1700.25   11358.81    1700.39   11481.95
GR   1700.5   11585.67     1702.2   11666.67     1700.7   11730.00    1700.10   11772.84    1699.51   11807.15
1
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GR   1696.2   11820.90     1696.9   11838.62     1700.5   11855.95    1700.12   11882.17    1700.24   11925.03
GR   1701.8   11987.03     1701.9   12128.46     1702.0   12183.66

ET                 9.1        7.1                                        9758      10471       9731      10473
X1    17.39         55       9893      10179        465        530      500.0                   0.21
X2                                                                                                        15
GR   1711.1    9116.73    1710.00    9167.22    1710.00    9190.00    1707.78    9326.23    1706.00    9403.55
GR   1706.0    9430.65    1705.12    9471.20    1704.74    9555.58    1704.99    9664.90    1705.40    9710.74
GR   1703.9    9779.45    1702.00    9887.09    1697.84       9893    1698.00    9898.69    1698.00    9920.72
GR   1700.0    9928.58     1696.0    9951.05    1696.00    9973.40    1698.00    9991.02    1700.00   10057.52
GR   1700.0   10099.04     1698.0   10111.87    1698.00   10131.69    1702.00   10144.53    1702.00   10170.78
GR   1701.3      10179     1700.0   10195.61     1702.0   10231.60    1702.16   10316.97    1702.77   10463.14
GR   1703.1   10621.24     1703.1   10798.44     1702.8   10893.36    1702.71   10911.99    1702.16   10938.60
GR   1703.1   10984.81     1703.6   11071.94     1704.0   11149.81    1704.00   11216.87    1704.77   11322.45
GR   1704.5   11451.58     1704.3   11532.28     1705.1   11566.52    1702.62   11580.13    1704.07   11595.54
GR   1702.3   11601.47     1702.4   11622.56     1705.9   11645.05    1704.94   11673.91    1704.89   11732.23
GR   1705.4   11786.90     1704.9   11887.47     1705.2   11960.19    1704.78   12035.23    1704.18   12058.85

NC      .06       .060      .042         .1         .3
QT        2      27300     27300

ET                 9.1        7.1                                     9488.92      10340       9478      10355

        APPROX. 3,600 CFS DIVERTS INTO RIGHT OVERBANK FROM THIS CROSS-SECTION
        DOWNSTREAM.  REFER TO SPLIT FLOW MODEL FOR RIGHT OVERBANK ANALYSIS.
        FLOODWAY ANALYSIS USES ENTIRE FLOW AND IS STRICTLY FOR MAIN CHANNEL.

X1    17.48         40       9893      10073        429        429      429.4                   0.21
X2                                                                                                        15
GR   1716.0    9372.88    1710.84    9458.51    1708.00    9485.84    1708.00    9544.18    1707.25    9597.50
GR   1706.6    9679.17    1706.00    9739.84    1706.00    9877.04    1702.68       9893    1702.00    9936.69
GR   1702.0   10037.70    1704.40   10047.62    1706.00   10063.16    1706.00      10073    1706.00   10247.95
GR   1706.5   10301.08     1706.8   10455.69    1706.73   10561.82    1706.57   10600.14    1706.88   10693.59
GR   1707.2   10757.24     1708.0   10805.71    1708.14   10845.01    1709.12   10975.02    1708.96   11014.26
GR   1707.7   11046.61     1707.6   11059.28    1708.52   11074.56    1706.96   11086.14    1708.52   11099.03
GR   1707.8   11126.83     1708.7   11136.13    1704.10   11173.88    1706.87   11188.45    1707.99   11249.19
GR   1708.8   11382.36     1709.3   11482.61    1709.58   11541.69    1710.44   11616.42    1711.83   11696.98

ET                 9.1        7.1                                     9516.45      10263       9440      10274
X1    17.57         33       9923      10040        365        500      474.4                   0.21
X2                                                                                                        15
GR   1720.8    9203.88    1716.95    9303.56    1715.14    9335.15    1714.09    9428.56    1714.36    9471.01
GR   1710.0    9508.10    1711.13    9548.25    1712.00    9576.05    1712.00    9686.77    1708.00    9871.91
GR   1706.0    9897.50    1706.00       9923    1702.00    9930.23    1703.39    9971.46    1706.17   10007.46
GR   1708.7   10020.08    1710.00      10040    1708.32   10114.97    1711.29   10161.60    1712.00   10169.27
GR   1712.0   10401.97    1711.82   10474.54    1711.46   10628.12    1710.00   10672.93    1708.32   10688.83
GR   1710.0   10716.66    1710.06   10827.37    1711.41   10887.64    1713.38   11026.76    1713.78   11097.48
GR   1714.3   11153.34    1714.48   11225.31    1715.18   11289.40
1
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ET                 9.1        7.1                                     9423.70      10270       9350      10296
X1    17.65         31       9924      10021        370        500      460.8                   0.21
X2                                                                                                        15
GR   1734.7    9336.28    1726.00    9382.74    1716.00    9413.87    1714.00    9475.55    1712.00    9482.60
GR   1712.5    9493.88    1713.77    9550.02    1713.27    9594.24    1714.00    9630.30    1713.10    9665.77
GR   1714.0    9812.95    1711.89    9899.02    1708.00    9912.78    1707.04       9924    1704.00    9959.39
GR   1704.0    9984.01     1708.1    9992.68    1710.00   10000.49    1711.07      10021    1714.00   10077.36
GR   1715.2   10133.98     1715.9   10205.53     1714.2   10358.37    1713.30   10370.66    1712.00   10376.05
GR   1712.0   10399.95     1714.0   10455.92     1715.9   10593.80    1716.54   10726.83    1718.00   10854.12
GR   1718.1   10903.11

ET                 9.1        7.1                                     9642.06      10578       9600      10605
X1    17.78         28       9931      10026        490        720      661.3                   0.21
X2                                                                                                        15
GR   1751.5    9514.89    1741.31    9570.53    1732.00    9599.65    1721.18    9627.65    1716.00    9684.50
GR   1718.0    9717.21    1718.27    9765.64    1720.00    9841.50    1720.00       9931    1720.00    9955.49
GR   1714.0    9973.26     1714.0    9988.08    1713.17      10026    1716.00   10070.76    1716.23   10151.26
GR   1715.8   10235.37     1718.0   10282.17    1720.00   10309.14    1720.00   10385.19    1716.00   10409.40
GR   1716.0   10447.79     1720.0   10488.02    1720.00   10527.03    1722.00   10585.51    1722.00   10781.23
GR   1723.6   10884.80     1724.0   10986.97    1724.69   11024.28

ET                 9.1        7.1                                     9745.39      10665       9700      10678
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X1    17.84        29      9925     10219       310       310     341.7                  0.21
X2                                                                                        15
GR   1730.7   9670.69   1728.76   9713.32   1724.00   9753.84   1720.00   9772.54   1720.44   9790.38
GR   1722.1   9800.90   1724.00   9834.61   1724.00   9909.89   1723.00      9925   1722.00   9940.13
GR   1719.4   9955.16    1718.0  10029.40   1718.00  10048.88   1718.00  10133.86   1720.00  10164.50
GR   1720.1     10219    1722.0  10230.85   1722.00  10374.53   1723.13  10440.30   1722.38  10487.83
GR   1720.0  10533.75    1720.0  10579.92   1722.00  10616.26   1722.00  10663.58   1724.00  10716.91
GR   1724.5  10765.44    1725.3  10867.86   1725.36  10903.95   1726.37  11049.41

        CLOUD ROAD CROSSES THROUGH THIS CROSS-SECTION.
        3-60" CMPS:CAPACITY IGNORED

ET                          7.1                                 9818.68     10595
X1    17.95        42      9867     10047       500       520     563.8                  0.21
X2                                                                                        15
GR   1740.3   9755.02   1730.00   9818.34   1726.64   9852.10   1726.15      9867   1725.94   9873.24
GR   1724.0   9879.76    1724.0   9941.90   1722.00  10021.83   1722.00  10042.15   1723.30     10047
GR   1726.5  10058.87    1726.0  10131.78    1726.8  10166.46   1726.86  10219.74   1728.00  10281.54
GR   1728.0  10340.58    1726.0  10351.82    1724.0  10391.92   1724.22  10410.16   1728.00  10440.86
GR   1728.0  10470.78    1726.5  10517.06    1726.0  10529.03   1722.85  10545.77   1728.15  10569.84
GR   1730.0  10647.71    1730.1  10713.11    1730.0  10858.38   1729.75  10888.71   1730.00  11036.40
GR   1731.1  11046.39    1734.0  11060.67    1731.9  11064.15   1734.74  11068.55   1752.62  11081.31
GR   1754.9  11117.17    1762.6  11121.41    1773.7  11131.30   1795.88  11138.65   1761.77  11146.48
GR   1754.6  11150.26    1844.6  11242.14

        END OF CARTER-BURGESS ONE-FOOT CONTOUR MAPPING.
        MONTGOMERY-WATSON TWO-FOOT INTERVAL CONTOUR MAPPING RESUMES.

1
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QT        2     27700     27700
ET                          7.1                                    9895     10610
X1    18.09        60      9936     10310     712.5       375     705.8
X2                                                                                        15
GR   1788.5      9672    1784.1      9713    1776.9      9762    1771.6      9792    1748.2      9828
GR   1733.9      9855    1732.7      9862    1729.9      9872    1729.7      9880    1731.3      9885
GR   1730.9      9900    1727.3      9919    1730.5      9936    1727.5      9951    1728.2      9971
GR   1728.2      9991    1727.4     10000    1727.8     10006    1728.8     10065    1729.6     10076
GR   1731.3     10090    1731.8     10119    1731.7     10178    1730.9     10226    1729.9     10264
GR   1726.2     10280    1725.9     10290    1733.0     10310    1732.9     10333    1731.3     10380
GR   1730.4     10407    1729.1     10447    1728.6     10497    1729.1     10522    1723.5     10540
GR   1723.7     10556    1728.6     10573    1731.4     10597    1733.6     10633    1734.3     10663
GR   1734.2     10717    1733.5     10772    1732.5     10799    1732.3     10847    1732.4     10899
GR   1732.3     10935    1733.1     10974    1733.0     11013    1732.8     11076    1733.3     11132
GR   1733.7     11210    1734.0     11263    1734.7     11349    1735.8     11423    1736.6     11479
GR   1737.7     11538    1738.0     11570    1738.6     11595    1739.1     11632    1739.7     11661

NC     .055      .055      .030
ET                          7.1                                    9752     10425
X1    18.16        34      9836     10075       345       360     377.6
X2                                                                                        15
GR   1755.1      9687    1739.9      9711    1736.1      9724    1734.0      9754    1730.7      9768
GR   1730.5      9775    1733.9      9788    1735.2      9810    1735.2      9836    1734.7      9860
GR   1733.3      9877    1732.7      9892    1732.9      9911    1732.5      9951    1732.5      9981
GR   1729.6      9996    1729.6     10000    1729.6     10020    1728.8     10050    1739.0     10075
GR   1737.8     10078    1737.2     10095    1735.8     10124    1734.7     10139    1734.0     10155
GR   1733.5     10199      1730     10330      1730     10380      1734     10430      1736     10650
GR   1736.9     10750      1738     10930      1738     11040      1740     11130
        NEW CROSS SECTION: GR CARD DATA FOR 18.20 DEVELOPED FROM TOPOGRAPHIC MAP
        CROSS SECTION ADDED TO MODEL FLOW OVER CLOUD ROAD
        CAPACITY OF 3-60" CMPS IGNORED

ET                          7.1                                    9630     10330
X1    18.23        19      9800     10010       370       400       370
X2                                                                                        15
GR     1750      9510      1740      9550      1736      9640      1734      9650      1736      9660
GR     1736      9690      1735      9700      1736      9710      1738      9780      1738      9800
GR     1736      9930      1734      9950      1732      9965      1730     10000    1738.8     10010
GR     1740     10240      1740     10480      1740     10730      1742     10870

ET                          7.1                                    9630     10330
X1    18.29        57      9914     10049       200       310       300
GR   1750.9      9535    1741.6      9583    1737.2      9597    1739.5      9608    1739.1      9634
GR   1737.5      9647    1732.6      9660    1737.5      9678    1739.3      9712    1740.2      9758
GR   1740.1      9788    1739.1      9800    1739.7      9812    1738.7      9832    1735.8      9852
GR   1737.4      9872    1738.3      9914    1737.0      9932    1735.5      9949    1735.0      9968
GR   1734.0      9976    1734.6      9984    1734.3     10000    1735.5     10009    1735.3     10020
GR   1733.5     10029    1739.9     10049    1740.5     10076    1740.0     10115    1736.1     10130
GR   1734.7     10144    1736.9     10160    1738.4     10185    1742.0     10213    1742.5     10244
GR   1742.8     10266    1742.2     10270    1742.8     10286    1742.8     10318    1742.7     10349
GR   1742.8     10388    1742.5     10395    1742.5     10429    1742.2     10468    1742.6     10472
GR   1742.5     10553    1741.1     10565    1742.8     10574    1743.2     10607    1743.0     10634
GR   1743.3     10693    1744.6     10746    1744.9     10795    1745.6     10858    1746.0     10899
1
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GR   1747.1     10970    1747.8     11035
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NC     .055      .055      .042
ET                         7.1                                        9832     10475
X1    18.49        63      9832     10037    1162.5       850    1099.7
GR   1762.2      9699    1754.7      9727    1746.3      9755    1747.1      9766    1747.4      9792
GR   1747.4      9832    1745.9      9853    1742.7      9867    1743.3      9895    1744.9      9909
GR   1744.8      9930    1744.6      9965    1741.7      9985    1741.9     10000    1745.2     10015
GR   1746.9     10037    1746.9     10052    1746.2     10060    1745.8     10072    1747.3     10082
GR   1747.8     10111    1748.7     10142    1748.9     10167    1749.0     10202    1748.9     10243
GR   1748.7     10282    1748.2     10327    1748.0     10379    1747.8     10394    1746.5     10406
GR   1747.4     10417    1743.7     10434    1744.0     10445    1746.9     10464    1742.3     10481
GR   1746.3     10497    1748.9     10522    1750.3     10562    1751.2     10602    1751.4     10637
GR   1751.9     10676    1752.2     10727    1752.5     10780    1752.7     10817    1753.1     10834
GR   1753.7     10873    1754.2     10897    1754.5     10951    1754.9     10998    1755.3     11036
GR   1755.7     11087    1757.1     11131    1757.6     11137    1757.6     11163    1759.2     11194
GR   1759.0     11230    1759.4     11254    1760.4     11285    1761.5     11316    1763.0     11352
GR   1766.6     11387    1769.6     11411    1778.1     11458

NC     .040      .040      .030
ET                         7.1                                        9700     10480
X1    18.57        62      9947     10041     275       675     389.0
GR   1785.6      9578    1759.3      9624    1751.3      9644    1748.8      9663    1748.5      9671
GR   1746.0      9703    1743.7      9714    1743.5      9735    1746.6      9747    1749.2      9772
GR   1750.4      9819    1750.1      9829    1750.3      9832    1751.1      9879    1752.5      9926
GR   1752.5      9947    1745.1      9969    1744.4     10000    1744.4     10001    1745.5     10006
GR   1745.9     10014    1751.5     10041    1749.2     10062    1751.5     10076    1751.5     10102
GR   1750.9     10116    1751.2     10146    1752.4     10170    1752.3     10224    1751.4     10247
GR   1752.2     10263    1753.1     10302    1753.6     10332    1753.3     10360    1753.7     10386
GR   1751.0     10400    1753.4     10416    1752.6     10452    1752.5     10474    1751.8     10490
GR   1752.7     10507    1752.8     10528    1754.2     10560    1755.2     10585    1756.5     10600
GR   1757.0     10645    1757.7     10678    1757.9     10717    1758.1     10766    1758.8     10820
GR   1759.2     10862    1760.1     10915    1760.2     10941    1760.5     10950    1760.8     10964
GR   1760.4     10993    1760.2     11007    1761.1     11021    1761.8     11048    1765.7     11082
GR   1770.4     11111    1776.8     11148

QT        2     27300     27300
ET                 9.1       7.1                                        9380     10125     9321     10244
X1    18.74        69      9975     10142     750       650     917.8
GR   1770.0      9245    1770.1      9249    1763.2      9269    1763.1      9291    1762.2      9321
GR   1760.3      9332    1758.0      9362    1757.6      9377    1752.0      9388    1754.6      9404
GR   1753.8      9417    1750.4      9437    1750.7      9454    1754.9      9479    1756.6      9493
GR   1756.7      9528    1756.7      9552    1757.1      9583    1757.8      9616    1758.2      9656
GR   1758.9      9692    1760.0      9729    1759.4      9750    1759.8      9767    1758.1      9791
GR   1758.5      9814    1759.2      9851    1759.0      9883    1758.5      9908    1757.0      9924
GR   1757.7      9938    1757.7      9975    1755.1      9986    1755.0     10000    1755.2     10018
GR   1755.3     10042    1757.7     10056    1758.5     10111    1758.7     10142    1759.6     10163
GR   1760.5     10198    1760.9     10244    1760.1     10281    1759.2     10318    1759.3     10336
GR   1759.6     10361    1759.5     10381    1759.2     10434    1761.4     10471    1763.1     10502
GR   1763.6     10533    1763.5     10581    1763.1     10628    1763.7     10660    1763.7     10706
GR   1763.6     10752    1763.6     10796    1763.9     10855    1763.8     10889    1761.9     10896
GR   1763.9     10910    1764.0     10932    1766.7     10947    1766.0     10962    1764.0     10991
GR   1762.8     11003    1766.7     11018    1768.5     11036    1779.0     11093
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ET                 9.1       7.1                                        9576     10140     9470     10165
X1    18.84        46      9915     10036     500       325     497.1
GR   1772.3      9380    1771.7      9419    1770.8      9450    1764.5      9475    1756.9      9503
GR   1757.6      9512    1758.4      9522    1758.5      9531    1757.4      9538    1759.8      9557
GR   1759.9      9576    1758.7      9586    1759.6      9597    1759.6      9604    1758.6      9612
GR   1760.0      9620    1760.6      9649    1760.6      9679    1761.0      9702    1759.8      9721
GR   1760.5      9732    1760.6      9768    1759.8      9784    1759.8      9797    1761.3      9818
GR   1763.1      9848    1763.4      9888    1763.2      9915    1759.9      9942    1758.0      9987
GR   1755.9     10000    1755.7     10008    1762.6     10036    1763.3     10051    1762.5     10101
GR   1760.8     10107    1762.3     10115    1764.2     10145    1765.5     10182    1766.0     10209
GR   1765.0     10231    1765.0     10258    1765.5     10308    1764.9     10357    1765.4     10413
GR   1765.4     10417

ET                         7.1                                        9639     10480
X1    18.96        70      9924     10021     525       600     631.7
GR   1779.1      9326    1778.7      9377    1776.0      9418    1774.9      9427    1773.9      9442
GR   1769.0      9458    1767.7      9482    1766.0      9489    1767.1      9496    1767.3      9514
GR   1767.0      9536    1768.0      9545    1768.8      9570    1768.6      9607    1768.1      9640
GR   1767.9      9649    1767.8      9687    1767.3      9714    1767.7      9726    1767.9      9764
GR   1767.6      9796    1768.2      9809    1768.3      9837    1768.6      9862    1768.2      9894
GR   1768.0      9924    1762.2      9931    1762.6      9938    1762.6      9959    1762.9     10000
GR   1763.3     10007    1766.3     10021    1767.2     10035    1767.2     10043    1766.0     10055
GR   1766.9     10069    1765.7     10100    1766.7     10107    1766.3     10125    1764.5     10137
GR   1769.4     10159    1771.0     10193    1770.9     10235    1770.5     10281    1769.0     10317
GR   1768.7     10347    1767.5     10358    1768.8     10370    1768.8     10401    1767.4     10408
GR   1768.5     10414    1769.0     10436    1769.7     10455    1770.2     10515    1770.5     10574
GR   1770.6     10644    1770.7     10686    1770.9     10731    1771.0     10781    1771.3     10818
GR   1771.2     10877    1772.4     10930    1773.1     10975    1773.1     11027    1773.4     11087
GR   1773.8     11135    1773.9     11195    1774.3     11217    1774.5     11277    1774.6     11298

NC     .031      .031      .045
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SECNO     DEPTH     CWSEL     CRIWS     WSELK     EG        HV        HL        OLOSS     L-BANK ELEV
Q         QLOB      QCH       QROB      ALOB      ACH       AROB      VOL       TWA       R-BANK ELEV
```

```
    TIME      VLOB      VCH       VROB      XNL       XNCH      XNR       WTN       ELMIN     SSTA
    SLOPE     XLOBL     XLCH      XLOBR     ITRIAL    IDC       ICONT     CORAR     TOPWID    ENDST


*SECNO 14.300

3265 DIVIDED FLOW

7185 MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED
    14.300     14.56   1574.16   1574.16   1574.16   1575.12       .96      9.14       .10   1571.60
   26700.0    5904.7    9812.2   10983.1    1318.6     906.6    1864.7     629.7     258.0   1570.00
       .30      4.48     10.82      5.89      .038      .052      .042      .000   1559.60   8646.87
   .008517     1010.     1214.     1210.        10        18         0       .00   2213.30  10868.65


*SECNO 14.540

3265 DIVIDED FLOW


3470 ENCROACHMENT STATIONS=     9283.0   10588.0  TYPE=      1  TARGET=     1305.000
    14.540     12.09   1583.69       .00   1583.69   1584.67       .98      9.55       .01   1581.90
   26700.0     219.2   26474.5       6.3     103.5    3326.5       4.4     739.3     303.8   1583.00
       .35      2.12      7.96      1.43      .038      .052      .042      .000   1571.60   9530.89
   .006749     1410.     1273.     1150.         4         0         0       .00    839.24  10492.90


*SECNO 14.570

3470 ENCROACHMENT STATIONS=     9790.4   10392.2  TYPE=      1  TARGET=      601.800
 ELENCL=   1596.20  ELENCR=   1596.20
    14.570      7.85   1584.65       .00   1584.65   1585.67      1.02       .98       .02   1581.20
   26700.0    4695.0   12305.8    9699.2     859.0    1348.7    1250.3     753.2     306.6   1579.30
       .35      5.47      9.12      7.76      .059      .039      .042      .000   1576.80   9798.77
   .004612      150.      177.      190.         4         0         0       .00    585.09  10383.86


*SECNO 14.600

3301 HV CHANGED MORE THAN HVINS

 *
3302 WARNING:  CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE,  KRATIO =   .55

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    SECNO     DEPTH     CWSEL     CRIWS     WSELK     EG        HV        HL        OLOSS     L-BANK ELEV
    Q         QLOB      QCH       QROB      ALOB      ACH       AROB      VOL       TWA       R-BANK ELEV
    TIME      VLOB      VCH       VROB      XNL       XNCH      XNR       WTN       ELMIN     SSTA
    SLOPE     XLOBL     XLCH      XLOBR     ITRIAL    IDC       ICONT     CORAR     TOPWID    ENDST


CLASS A LOW FLOW

3420 BRIDGE W.S.=    2375.65 BRIDGE VELOCITY=        .00     CALCULATED CHANNEL AREA=   2313439.

 EGPRS      EGLWC       H3       QWEIR      QLOW      BAREA   TRAPEZOID      ELLC     ELTRD     WEIRLN
                                                                 AREA
       .00   1587.14      .00        0.    26700.     6625.     6297.     1593.10   1596.30        0.


3470 ENCROACHMENT STATIONS=     9682.3   10283.9  TYPE=      1  TARGET=      601.601
 ELENCL=   1596.20  ELENCR=   1596.20
    14.600      7.65   1584.65       .00   1584.65   1587.14      2.48      1.47       .00   1583.10
   26700.0    8919.2   15008.5    2772.3     990.4    1003.5     338.0     761.8     308.3   1583.10
       .36      9.01     14.96      8.20      .059      .039      .042      .000   1577.00   9690.65
   .015232      120.      141.      122.         0         0         0       .00    584.96  10275.62


*SECNO 14.670

3301 HV CHANGED MORE THAN HVINS


3302 WARNING:  CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE,  KRATIO =  2.05

    14.670      9.71   1589.21       .00   1589.21   1590.01       .80      2.71       .17   1582.00
   26700.0   12843.2    9847.7    4009.0    2533.9    1035.0     632.4     793.6     315.2   1582.00
       .37      5.07      9.51      6.34      .059      .039      .042      .000   1579.50   9425.50
   .003608      477.      387.      317.         3         0         0       .00    840.11  10265.60


*SECNO 14.740

3301 HV CHANGED MORE THAN HVINS

3685 20 TRIALS ATTEMPTED WSEL,CWSEL
3693 PROBABLE MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED
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    14.740     10.03   1591.73   1591.73   1591.73   1593.70      1.97      2.07       .35   1587.30
   26700.0   12572.0   13090.7    1037.3    1916.6     892.4     199.1     827.1     322.9   1588.30
       .38      6.56     14.67      5.21      .059      .039      .042      .000   1581.70   9524.07
   .008254      433.      366.      341.        20         8         0       .00    851.45  10375.52


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    SECNO     DEPTH     CWSEL     CRIWS     WSELK     EG        HV        HL        OLOSS     L-BANK ELEV
    Q         QLOB      QCH       QROB      ALOB      ACH       AROB      VOL       TWA       R-BANK ELEV
    TIME      VLOB      VCH       VROB      XNL       XNCH      XNR       WTN       ELMIN     SSTA
    SLOPE     XLOBL     XLCH      XLOBR     ITRIAL    IDC       ICONT     CORAR     TOPWID    ENDST


 *SECNO 14.890

 3470 ENCROACHMENT STATIONS=     9490.0   10319.0  TYPE=      1  TARGET=    -9490.000
    14.890     13.80   1597.00   1596.52   1597.00   1598.98      1.98      5.28       .00   1591.90
   26700.0   10308.9   16383.0       8.1    1838.7    1195.2       6.4     877.2     334.7   1596.40
       .40      5.61     13.71      1.27      .059      .039      .042      .000   1583.20   9510.96
   .006351      700.      756.      760.         9        11         0       .00    569.15  10080.12


 *SECNO 15.060

 3301 HV CHANGED MORE THAN HVINS

    15.060     11.63   1602.93       .00   1602.93   1604.16      1.22      5.10       .08   1602.20
   26700.0    1310.1   23651.6    1738.2     428.4    2551.7     298.5     938.0     347.0   1601.40
       .43      3.06      9.27      5.82      .059      .039      .042      .000   1591.30   9733.37
   .005372      670.      930.      950.         3         0         0       .00    767.33  10500.70


 *SECNO 15.120
 7185 MINIMUM SPECIFIC ENERGY
 3720 CRITICAL DEPTH ASSUMED

 3470 ENCROACHMENT STATIONS=     9503.0   10546.0  TYPE=      1  TARGET=     1043.000
    15.120      9.82   1605.22   1605.22   1605.22   1606.94      1.72      1.99       .15   1604.10
   26700.0    1066.1   22410.1    3223.8     337.8    2006.5     467.3     958.0     352.1   1601.50
       .44      3.16     11.17      6.90      .059      .039      .042      .000   1595.40   9717.21
   .009332      255.      284.      330.         4        10         0       .00    821.33  10538.54


 *SECNO 15.220

 3470 ENCROACHMENT STATIONS=     9749.0   10672.0  TYPE=      1  TARGET=      923.000
    15.220     11.30   1610.20       .00   1610.20   1612.00      1.79      5.03       .02   1609.10
   26700.0      27.3   23515.2    3157.5      17.3    2099.1     485.2     992.8     361.4   1607.80
       .45      1.58     11.20      6.51      .059      .039      .042      .000   1598.90   9945.57
   .008708      535.      553.      600.         3         0         0       .00    606.33  10551.90


 *SECNO 15.410
    15.410      9.94   1617.54       .00   1617.54   1619.36      1.82      7.36       .01   1615.10
   26700.0      20.7   26566.3     113.0       9.1    2447.5      31.1    1049.3     372.5   1614.70
       .48      2.28     10.85      3.64      .059      .039      .042      .000   1607.60   9971.54
   .006696      980.      969.      950.         3         0         0       .00    403.32  10374.86


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    SECNO     DEPTH     CWSEL     CRIWS     WSELK     EG        HV        HL        OLOSS     L-BANK ELEV
    Q         QLOB      QCH       QROB      ALOB      ACH       AROB      VOL       TWA       R-BANK ELEV
    TIME      VLOB      VCH       VROB      XNL       XNCH      XNR       WTN       ELMIN     SSTA
    SLOPE     XLOBL     XLCH      XLOBR     ITRIAL    IDC       ICONT     CORAR     TOPWID    ENDST


 FLOW DISTRIBUTION FOR SECNO=     16.86          CWSEL=   1677.00

 STA=    9909.   10193.
   PER Q=    100.0
    AREA=   1828.3
     VEL=     14.9
   DEPTH=      6.8

 FLOW DISTRIBUTION FOR SECNO=     16.87          CWSEL=   1680.84

 STA=    9902.   10194.
   PER Q=    100.0
    AREA=   2387.4
     VEL=     11.4
   DEPTH=      8.4

 FLOW DISTRIBUTION FOR SECNO=     16.96          CWSEL=   1684.88

 STA=    9914.    9929.    9932.   10342.
   PER Q=       .5       .0     99.5
    AREA=     36.1      1.8   2099.5
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    VEL=      3.6      1.9     12.9
  DEPTH=      2.4       .7      5.1

FLOW DISTRIBUTION FOR SECNO=     17.06          CWSEL=   1689.87

STA=    9533.    9621.    9763.    9807.    9929.    9947.   10090.   10397.   10470.
  PER Q=      7.8      9.6      3.8     15.0      2.6     56.4      3.1      1.6
   AREA=    376.9    559.0    201.8    693.3    110.9   1159.1    303.4    122.8
    VEL=      5.6      4.7      5.2      5.9      6.4     13.3      2.8      3.6
  DEPTH=      4.3      3.9      4.7      5.7      6.3      8.1      1.0      1.7

FLOW DISTRIBUTION FOR SECNO=     17.18          CWSEL=   1695.24

STA=    9746.    9846.    9935.    9978.   10254.   10516.   10695.
  PER Q=      3.1      3.8      4.0     82.2      3.0      4.0
   AREA=    169.0    195.1    147.6   1898.1    152.5    263.3
    VEL=      5.0      5.3      7.3     11.8      5.4      4.1
  DEPTH=      1.7      2.2      3.4      6.9       .6      1.5

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    SECNO     DEPTH     CWSEL     CRIWS     WSELK     EG        HV        HL        OLOSS     L-BANK ELEV
    Q         QLOB      QCH       QROB      ALOB      ACH       AROB      VOL       TWA       R-BANK ELEV
    TIME      VLOB      VCH       VROB      XNL       XNCH      XNR       WTN       ELMIN     SSTA
    SLOPE     XLOBL     XLCH      XLOBR     ITRIAL    IDC       ICONT     CORAR     TOPWID    ENDST

FLOW DISTRIBUTION FOR SECNO=     17.30          CWSEL=   1701.39

STA=    9568.    9721.    9882.    9934.    9963.    9970.   10156.   10277.   10309.   10437.   10560.
  PER Q=      6.4     11.9      4.2      5.3      2.8     45.2      8.5      3.6      8.8      3.3
   AREA=    367.5    563.3    192.6    172.6     68.4   1295.5    410.1    142.3    428.6    226.2
    VEL=      4.7      5.8      6.0      8.4     11.0      9.5      5.6      6.9      5.6      3.9
  DEPTH=      2.4      3.5      3.7      6.0      9.2      7.0      3.4      4.6      3.3      1.8

FLOW DISTRIBUTION FOR SECNO=     17.39          CWSEL=   1705.16

STA=    9731.    9779.    9887.    9893.   10179.   10196.   10232.   10317.   10463.   10473.
  PER Q=       .2      4.2       .9     73.1      2.3      4.4      6.1      8.3       .4
   AREA=     25.4    215.6     29.7   1720.4     71.5    142.3    245.3    363.7     21.4
    VEL=      2.2      5.4      8.7     11.6      8.9      8.4      6.8      6.2      5.0
  DEPTH=       .5      2.0      5.0      6.0      4.3      4.0      2.9      2.5      2.2

FLOW DISTRIBUTION FOR SECNO=     17.48          CWSEL=   1709.83

STA=    9478.    9486.    9544.    9598.    9679.    9740.    9877.    9893.   10073.   10248.   10301.   10355.
  PER Q=       .1      1.1      1.5      3.7      3.9     10.3      2.2     57.5     13.1      3.5      3.0
   AREA=      9.5     94.2    106.1    219.6    201.1    495.9     84.2   1254.7    632.3    178.7    165.1
    VEL=      2.5      3.3      3.8      4.6      5.3      5.7      7.2     12.5      5.7      5.4      4.9
  DEPTH=      1.2      1.6      2.0      2.7      3.3      3.6      5.3      7.0      3.6      3.4      3.1

FLOW DISTRIBUTION FOR SECNO=     17.57          CWSEL=   1713.84

STA=    9477.    9508.    9548.    9576.    9687.    9872.    9898.    9923.   10040.   10115.   10162.   10169.   10274.
  PER Q=       .7      2.3       .8      2.2     14.2      5.3      6.7     53.2      8.1      3.9       .2      2.1
   AREA=     56.1    123.1     57.4    180.5    672.1    169.7    194.6   1002.6    335.1    178.4     15.2    170.7
    VEL=      3.6      5.2      4.0      3.4      5.8      8.6      9.5     14.5      6.6      6.0      3.8      3.3
  DEPTH=      1.8      3.1      2.1      1.6      3.6      6.6      7.6      8.6      4.5      3.8      2.0      1.6

FLOW DISTRIBUTION FOR SECNO=     17.65          CWSEL=   1717.56

STA=    9410.    9494.    9550.    9630.    9813.    9899.    9924.   10021.   10077.   10206.   10296.
  PER Q=      3.6      4.3      5.2     11.9      7.1      6.2     51.0      5.4      3.5      1.9
   AREA=    236.2    236.8    303.5    694.5    379.3    212.2   1050.1    271.5    284.8    176.9
    VEL=      4.1      5.0      4.6      4.7      5.1      8.0     13.3      5.4      3.3      2.9
  DEPTH=      2.8      4.2      3.8      3.8      4.4      8.5     10.8      4.8      2.2      2.0

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    SECNO     DEPTH     CWSEL     CRIWS     WSELK     EG        HV        HL        OLOSS     L-BANK ELEV
    Q         QLOB      QCH       QROB      ALOB      ACH       AROB      VOL       TWA       R-BANK ELEV
    TIME      VLOB      VCH       VROB      XNL       XNCH      XNR       WTN       ELMIN     SSTA
    SLOPE     XLOBL     XLCH      XLOBR     ITRIAL    IDC       ICONT     CORAR     TOPWID    ENDST

FLOW DISTRIBUTION FOR SECNO=     17.78          CWSEL=   1722.50

STA=    9625.    9685.    9717.    9766.    9842.    9931.   10026.   10071.   10151.   10235.   10282.   10385.   10448.
  PER Q=      3.8      4.0      3.9      3.9      2.7     22.2     10.2     12.6     13.6      5.9      3.8      8.3
   AREA=    211.7    172.9    201.0    239.0    204.5    602.6    344.7    496.7    527.4    252.0    262.4    345.0
    VEL=      4.9      6.3      5.3      4.4      3.6     10.0      8.0      7.0      7.0      6.3      3.9      6.5
  DEPTH=      3.5      5.3      4.2      3.2      2.3      6.3      7.7      6.2      6.3      5.4      2.5      5.5

STA=   10448.   10488.   10605.
  PER Q=      3.4      1.9
   AREA=    172.4    169.9
    VEL=      5.4      3.0
  DEPTH=      4.3      1.5
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FLOW DISTRIBUTION FOR SECNO=    17.84          CWSEL=   1724.75

STA=    9749.    9801.    9925.   10219.   10375.   10488.   10534.   10580.   10664.   10678.
  PER Q=      3.6      1.0     70.2      7.5      3.2      3.3      5.6      5.1       .5
   AREA=    159.8    105.7   1617.7    405.2    213.9    153.5    209.3    248.2     32.6
    VEL=      6.1      2.7     11.8      5.1      4.1      5.9      7.3      5.6      4.2
  DEPTH=      3.1       .9      5.5      2.6      1.9      3.3      4.5      3.0      2.3

FLOW DISTRIBUTION FOR SECNO=     17.95          CWSEL=   1730.50

STA=    9817.    9867.   10047.   10132.   10220.   10282.   10392.   10410.   10471.   10529.   10570.   11039.
  PER Q=      2.1     54.7      8.0      6.4      3.0      8.2      3.2      3.8      3.6      5.4      1.4
   AREA=    124.7   1240.0    358.4    319.2    176.7    384.2    112.7    196.8    189.0    213.4    218.9
    VEL=      4.6     12.0      6.1      5.5      4.7      5.8      7.8      5.3      5.1      7.0      1.8
  DEPTH=      2.5      6.9      4.2      3.6      2.9      3.5      6.2      3.2      3.2      5.2       .5

FLOW DISTRIBUTION FOR SECNO=     18.09          CWSEL=   1734.95

STA=    9853.    9919.    9936.   10310.   10407.   10447.   10497.   10522.   10540.   10556.   10573.   10633.   10899.
  PER Q=      4.7      2.0     49.8      3.8      3.8      6.1      3.1      3.8      5.5      3.7      3.0      4.2
   AREA=    281.4    102.8   1938.1    290.6    208.0    305.0    152.5    155.7    181.6    149.6    207.0    438.5
    VEL=      4.6      5.5      7.1      3.6      5.0      5.6      5.6      6.8      8.4      6.9      4.1      2.6
  DEPTH=      4.3      6.0      5.2      3.0      5.2      6.1      6.1      8.6     11.3      8.8      3.4      1.6

STA=   10899.   11076.   11366.
  PER Q=      3.9      2.5
   AREA=    384.6    331.5
    VEL=      2.8      2.1
  DEPTH=      2.2      1.1

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    SECNO     DEPTH     CWSEL     CRIWS     WSELK     EG        HV        HL        OLOSS     L-BANK ELEV
    Q         QLOB      QCH       QROB      ALOB      ACH       AROB      VOL       TWA       R-BANK ELEV
    TIME      VLOB      VCH       VROB      XNL       XNCH      XNR       WTN       ELMIN     SSTA
    SLOPE     XLOBL     XLCH      XLOBR     ITRIAL    IDC       ICONT     CORAR     TOPWID    ENDST

FLOW DISTRIBUTION FOR SECNO=     18.16          CWSEL=   1736.55

STA=    9722.    9775.    9836.   10075.   10199.   10330.   10380.   10430.   10650.   10711.
  PER Q=      3.5      2.6     50.3      3.3     17.9     11.5      6.2      4.6       .1
   AREA=    145.8    135.6   1025.0    183.7    628.7    327.5    227.5    340.8     16.8
    VEL=      6.6      5.3     13.6      5.0      7.9      9.7      7.6      3.7      1.2
  DEPTH=      2.8      2.2      4.4      1.5      4.8      6.5      4.5      1.5       .3

FLOW DISTRIBUTION FOR SECNO=     18.23          CWSEL=   1741.75

STA=    9543.    9640.    9660.    9690.    9710.    9780.    9800.   10010.   10240.   10480.   10730.   10852.
  PER Q=      5.9      3.4      4.0      3.0      6.7      1.3     59.3      6.8      4.4      4.5       .7
   AREA=    343.4    135.0    172.4    125.0    332.4     75.0   1333.1    540.0    419.5    437.0    106.9
    VEL=      4.7      7.0      6.4      6.7      5.6      4.8     12.3      3.5      2.9      2.9      1.8
  DEPTH=      3.5      6.7      5.7      6.2      4.7      3.7      6.3      2.3      1.7      1.7       .9

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T1      Floodway Run - Method 1
T2      Date:  4-25-97
T3      Floodway Run - Method 1

J1  ICHECK    INQ       NINV      IDIR      STRT      METRIC    HVINS     Q         WSEL      FQ

     -10        3                                                                  1522.96

J2  NPROF     IPLOT     PRFVS     XSECV     XSECH     FN        ALLDC     IBW       CHNIM     ITRACE

     2                  -1

*SECNO 14.300

3301 HV CHANGED MORE THAN HVINS

7185 MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED

3470 ENCROACHMENT STATIONS=     9210.0   10160.0  TYPE=      1  TARGET=      950.000
    14.300     15.43   1575.03   1575.03   1575.03   1576.49      1.46     10.39       .22   1571.60
   26700.0    9589.3   11865.3    5245.4    1484.2     997.5     582.4     580.7     191.4   1570.00
       .28      6.46     11.90      9.01      .038      .052      .042      .000   1559.60   9210.00
   .009056     1010.     1214.     1210.        10        18         0       .00    950.00  10160.00

*SECNO 14.540

3301 HV CHANGED MORE THAN HVINS

3470 ENCROACHMENT STATIONS=     9950.0   10480.0  TYPE=      1  TARGET=      530.000
    14.540     12.69   1584.29       .00   1584.29   1585.12       .83      8.57       .06   1581.90
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   26700.0        .0   26700.0        .0        .0    3644.1        .0     680.3     213.9 100000.00
       .33       .00      7.33       .00      .000      .052      .000      .000   1571.60   9950.00
   .005112     1410.     1273.     1150.         4         0         0       .00    530.00  10480.00


 *SECNO 14.570

 3470 ENCROACHMENT STATIONS=     9790.4   10392.2  TYPE=      1  TARGET=      601.800
  ELENCL=   1596.20  ELENCR=   1596.20
    14.570      8.23   1585.03       .00   1585.03   1585.93       .90       .77       .03   1581.20
   26700.0    4729.6   12220.4    9750.0     920.7    1425.6    1333.9     695.1     216.2   1579.30
       .34      5.14      8.57      7.31      .059      .039      .042      .000   1576.80   9797.67
   .003780      150.      177.      190.         4         0         0       .00    587.29  10384.95


 *SECNO 14.600
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    SECNO     DEPTH     CWSEL     CRIWS     WSELK     EG        HV        HL        OLOSS     L-BANK ELEV
    Q         QLOB      QCH       QROB      ALOB      ACH       AROB      VOL       TWA       R-BANK ELEV
    TIME      VLOB      VCH       VROB      XNL       XNCH      XNR       WTN       ELMIN     SSTA
    SLOPE     XLOBL     XLCH      XLOBR     ITRIAL    IDC       ICONT     CORAR     TOPWID    ENDST


 3301 HV CHANGED MORE THAN HVINS


 3302 WARNING:  CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE,  KRATIO =   .57

 CLASS A LOW FLOW

 3420 BRIDGE W.S.=    2376.03 BRIDGE VELOCITY=        .00     CALCULATED CHANNEL AREA=   2315449.

  EGPRS      EGLWC       H3       QWEIR      QLOW      BAREA   TRAPEZOID      ELLC     ELTRD     WEIRLN
                                                                  AREA
       .00   1587.10      .00         0.    26700.     6625.     6297.     1593.10   1596.30        0.


 3470 ENCROACHMENT STATIONS=     9682.3   10283.9  TYPE=      1  TARGET=      601.601
  ELENCL=   1596.20  ELENCR=   1596.20
    14.600      8.03   1585.03       .00   1585.03   1587.10      2.07      1.18       .00   1583.10
   26700.0    8910.7   14707.0    3082.3    1083.5    1070.1     400.1     704.3     217.9   1583.10
       .34      8.22     13.74      7.70      .059      .039      .042      .000   1577.00   9689.56
   .011804      120.      141.      122.         0         0         0       .00    587.14  10276.70


 *SECNO 14.670

 3301 HV CHANGED MORE THAN HVINS


 3470 ENCROACHMENT STATIONS=     9696.0   10091.0  TYPE=      1  TARGET=      395.000
    14.670      9.60   1589.10       .00   1589.10   1590.66      1.56      3.50       .05   1582.00
   26700.0   13491.2   12645.2     563.6    1856.4    1022.0      76.5     731.4     222.6   1582.00
       .35      7.27     12.37      7.36      .059      .039      .042      .000   1579.50   9696.00
   .006205      477.      387.      317.         3         0         0       .00    395.00  10091.00


 *SECNO 14.740

 3301 HV CHANGED MORE THAN HVINS

 7185 MINIMUM SPECIFIC ENERGY
 3720 CRITICAL DEPTH ASSUMED
1
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    SECNO     DEPTH     CWSEL     CRIWS     WSELK     EG        HV        HL        OLOSS     L-BANK ELEV
    Q         QLOB      QCH       QROB      ALOB      ACH       AROB      VOL       TWA       R-BANK ELEV
    TIME      VLOB      VCH       VROB      XNL       XNCH      XNR       WTN       ELMIN     SSTA
    SLOPE     XLOBL     XLCH      XLOBR     ITRIAL    IDC       ICONT     CORAR     TOPWID    ENDST


 3470 ENCROACHMENT STATIONS=     9700.0   10100.0  TYPE=      1  TARGET=      400.000
    14.740      9.93   1591.63   1591.63   1591.63   1594.44      2.81      3.18       .38   1587.30
   26700.0   11416.8   14674.3     608.9    1425.3     881.8      79.0     756.3     226.4   1588.30
       .36      8.01     16.64      7.71      .059      .039      .042      .000   1581.70   9700.00
   .010794      433.      366.      341.         2         8         0       .00    400.00  10100.00


 *SECNO 14.890

 3301 HV CHANGED MORE THAN HVINS


 3302 WARNING:  CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE,  KRATIO =  1.52
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3470 ENCROACHMENT STATIONS=     9600.0   10080.0  TYPE=      1  TARGET=      480.000
    14.890     14.70   1597.90       .00   1597.90   1599.56      1.66      5.01       .12   1591.90
   26700.0   10342.9   16290.2      67.0    1899.9    1303.5      25.2     802.9     233.6   1596.40
       .38      5.44     12.50      2.66      .059      .039      .042      .000   1583.20   9600.00
   .004702      700.      756.      760.         5         0         0       .00    480.00  10080.00


*SECNO 15.060

3470 ENCROACHMENT STATIONS=     9972.0   10390.0  TYPE=      1  TARGET=      418.000
    15.060     11.58   1602.88       .00   1602.88   1604.61      1.73      5.03       .02   1602.20
   26700.0        .0   26700.0        .0        .0    2529.0        .0     858.8     242.2 100000.00
       .41       .00     10.56       .00      .000      .039      .000      .000   1591.30   9972.00
   .007102      670.      930.      950.         4         0         0       .00    418.00  10390.00


*SECNO 15.120

3301 HV CHANGED MORE THAN HVINS

7185 MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED

3470 ENCROACHMENT STATIONS=     9975.0   10351.0  TYPE=      1  TARGET=      376.000
    15.120      9.80   1605.20   1605.20   1605.20   1607.97      2.77      2.72       .31   1604.10
   26700.0        .0   26700.0        .0        .0    1999.9        .0     873.5     244.8 100000.00
       .41       .00     13.35       .00      .000      .039      .000      .000   1595.40   9975.00
   .013619      255.      284.      330.         3        15         0       .00    376.00  10351.00


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    SECNO      DEPTH      CWSEL      CRIWS      WSELK      EG         HV         HL         OLOSS      L-BANK ELEV
    Q          QLOB       QCH        QROB       ALOB       ACH        AROB       VOL        TWA        R-BANK ELEV
    TIME       VLOB       VCH        VROB       XNL        XNCH       XNR        WTN        ELMIN      SSTA
    SLOPE      XLOBL      XLCH       XLOBR      ITRIAL     IDC        ICONT      CORAR      TOPWID     ENDST


*SECNO 15.220

3301 HV CHANGED MORE THAN HVINS


3302 WARNING:  CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE,  KRATIO =  1.64


3470 ENCROACHMENT STATIONS=     9977.0   10500.0  TYPE=      1  TARGET=      523.000
    15.220     12.27   1611.17       .00   1611.17   1612.45      1.28      4.33       .15   1609.10
   26700.0        .0   23214.5    3485.5        .0    2460.5     568.9     905.7     250.6   1607.80
       .43       .00      9.43      6.13      .000      .039      .042      .000   1598.90   9977.00
   .005035      535.      553.      600.         4         0         0       .00    523.00  10500.00


*SECNO 15.410

3301 HV CHANGED MORE THAN HVINS


3470 ENCROACHMENT STATIONS=     9979.0   10353.0  TYPE=      1  TARGET=      374.000
    15.410      9.38   1616.98       .00   1616.98   1619.19      2.21      6.46       .28   1615.10
   26700.0        .0   26700.0        .0        .0    2236.9        .0     964.2     260.5 100000.00
       .45       .00     11.94       .00      .000      .039      .000      .000   1607.60   9979.00
   .009263      980.      969.      950.         3         0         0       .00    374.00  10353.00


FLOW DISTRIBUTION FOR SECNO=     16.86          CWSEL=   1677.00

STA=    9909.   10193.
  PER Q=    100.0
   AREA=   1830.3
    VEL=     14.9
  DEPTH=      6.8

FLOW DISTRIBUTION FOR SECNO=     16.87          CWSEL=   1680.84

STA=    9902.   10194.
  PER Q=    100.0
   AREA=   2387.4
    VEL=     11.4
  DEPTH=      8.4

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    SECNO      DEPTH      CWSEL      CRIWS      WSELK      EG         HV         HL         OLOSS      L-BANK ELEV
    Q          QLOB       QCH        QROB       ALOB       ACH        AROB       VOL        TWA        R-BANK ELEV
    TIME       VLOB       VCH        VROB       XNL        XNCH       XNR        WTN        ELMIN      SSTA
    SLOPE      XLOBL      XLCH       XLOBR      ITRIAL     IDC        ICONT      CORAR      TOPWID     ENDST
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FLOW DISTRIBUTION FOR SECNO=     16.96          CWSEL=   1684.88

STA=    9914.    9929.    9932.   10342.
  PER Q=       .5       .0     99.5
   AREA=     36.1      1.8   2099.5
    VEL=      3.6      1.9     12.9
  DEPTH=      2.4       .7      5.1

FLOW DISTRIBUTION FOR SECNO=     17.06          CWSEL=   1690.24

STA=    9650.    9763.    9807.    9929.    9947.   10090.   10122.   10215.   10337.   10397.   10470.
  PER Q=      7.7      4.4     16.7      2.8     60.9       .7       .7      2.0      1.8      2.3
   AREA=    456.9    218.1    739.3    117.4   1212.7     50.9     81.7    167.2    118.7    150.3
    VEL=      4.6      5.5      6.2      6.6     13.7      3.6      2.4      3.2      4.1      4.1
  DEPTH=      4.0      5.0      6.0      6.7      8.5      1.6       .9      1.4      2.0      2.0

FLOW DISTRIBUTION FOR SECNO=     17.18          CWSEL=   1695.19

STA=    9788.    9809.    9846.    9935.    9963.    9978.   10254.   10285.   10313.   10516.   10575.   10656.   10668.
  PER Q=       .9      1.8      3.7      1.8      2.2     83.4      2.6       .1       .2       .8      2.0       .4
   AREA=     46.1     87.9    190.5     77.1     68.3   1883.8    101.4     13.9     30.7     64.7    125.7     22.6
    VEL=      5.3      5.7      5.4      6.3      8.8     12.1      7.1      2.0      2.0      3.4      4.4      4.4
  DEPTH=      2.2      2.4      2.1      2.7      4.6      6.8      3.3       .5       .2      1.1      1.6      1.8

FLOW DISTRIBUTION FOR SECNO=     17.30          CWSEL=   1701.48

STA=    9628.    9721.    9761.    9882.    9934.    9963.    9970.   10156.   10277.   10309.   10437.   10523.   10535.
  PER Q=      5.5      3.1      9.2      4.3      5.3      2.7     45.3      8.7      3.7      9.0      3.0       .1
   AREA=    289.8    144.4    433.2    197.3    175.2     69.1   1312.2    421.0    145.1    440.1    194.7     14.5
    VEL=      5.2      5.8      5.8      5.9      8.3     10.9      9.4      5.6      6.9      5.6      4.2      2.7
  DEPTH=      3.1      3.6      3.6      3.8      6.1      9.3      7.1      3.5      4.7      3.4      2.3      1.2

FLOW DISTRIBUTION FOR SECNO=     17.39          CWSEL=   1705.16

STA=    9758.    9779.    9887.    9893.   10179.   10196.   10232.   10317.   10463.   10471.
  PER Q=       .2      4.2       .9     73.2      2.3      4.4      6.1      8.2       .3
   AREA=     17.4    214.9     29.7   1718.6     71.4    142.0    244.7    362.7     17.0
    VEL=      2.9      5.4      8.7     11.6      8.9      8.4      6.8      6.2      4.8
  DEPTH=       .8      2.0      5.0      6.0      4.3      3.9      2.9      2.5      2.2

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    SECNO     DEPTH     CWSEL     CRIWS     WSELK     EG        HV        HL        OLOSS     L-BANK ELEV
    Q         QLOB      QCH       QROB      ALOB      ACH       AROB      VOL       TWA       R-BANK ELEV
    TIME      VLOB      VCH       VROB      XNL       XNCH      XNR       WTN       ELMIN     SSTA
    SLOPE     XLOBL     XLCH      XLOBR     ITRIAL    IDC       ICONT     CORAR     TOPWID    ENDST

FLOW DISTRIBUTION FOR SECNO=     17.48          CWSEL=   1709.84

STA=    9489.    9544.    9598.    9679.    9740.    9877.    9893.   10073.   10248.   10301.   10340.
  PER Q=      1.1      1.5      3.8      4.0     10.4      2.2     58.0     13.3      3.6      2.1
   AREA=     89.9    106.7    220.6    201.8    497.6     84.4   1256.9    634.5    179.4    120.2
    VEL=      3.3      3.8      4.7      5.4      5.7      7.2     12.6      5.7      5.4      4.9
  DEPTH=      1.6      2.0      2.7      3.3      3.6      5.3      7.0      3.6      3.4      3.1

FLOW DISTRIBUTION FOR SECNO=     17.57          CWSEL=   1713.88

STA=    9516.    9548.    9576.    9687.    9872.    9898.    9923.   10040.   10115.   10162.   10169.   10263.
  PER Q=      1.7       .9      2.3     14.5      5.4      6.8     53.9      8.3      4.0       .2      2.0
   AREA=     95.1     58.6    185.2    680.0    170.8    195.7   1007.5    338.3    180.4     15.6    156.8
    VEL=      4.8      4.0      3.5      5.8      8.7      9.5     14.6      6.7      6.0      3.9      3.4
  DEPTH=      3.0      2.1      1.7      3.7      6.7      7.7      8.6      4.5      3.9      2.0      1.7

FLOW DISTRIBUTION FOR SECNO=     17.65          CWSEL=   1717.65

STA=    9424.    9494.    9550.    9630.    9813.    9899.    9924.   10021.   10077.   10206.   10270.
  PER Q=      3.5      4.4      5.3     12.1      7.3      6.2     50.9      5.5      3.6      1.3
   AREA=    224.4    241.5    310.3    709.8    386.6    214.3   1058.3    276.2    295.6    122.2
    VEL=      4.2      5.0      4.6      4.7      5.1      7.9     13.1      5.4      3.4      2.8
  DEPTH=      3.2      4.3      3.9      3.9      4.5      8.6     10.9      4.9      2.3      1.9

FLOW DISTRIBUTION FOR SECNO=     17.78          CWSEL=   1722.49

STA=    9642.    9685.    9717.    9766.    9842.    9931.   10026.   10071.   10151.   10235.   10282.   10385.   10448.
  PER Q=      3.6      4.0      3.9      3.9      2.7     22.2     10.2     12.7     13.6      5.9      3.8      8.3
   AREA=    184.5    172.8    200.8    238.7    204.2    602.2    344.5    496.4    527.1    251.8    262.0    344.8
    VEL=      5.3      6.3      5.4      4.5      3.6     10.1      8.1      7.0      7.0      6.4      3.9      6.6
  DEPTH=      4.3      5.3      4.1      3.1      2.3      6.3      7.7      6.2      6.3      5.4      2.5      5.5

STA=   10448.   10488.   10578.
  PER Q=      3.4      1.9
   AREA=    172.2    160.9
    VEL=      5.4      3.1
  DEPTH=      4.3      1.8

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SECNO	DEPTH	CWSEL	CRIWS	WSELK	EG	HV	HL	OLOSS	L-BANK ELEV
Q	QLOB	QCH	QROB	ALOB	ACH	AROB	VOL	TWA	R-BANK ELEV
TIME	VLOB	VCH	VROB	XNL	XNCH	XNR	WTN	ELMIN	SSTA
SLOPE	XLOBL	XLCH	XLOBR	ITRIAL	IDC	ICONT	CORAR	TOPWID	ENDST

FLOW DISTRIBUTION FOR SECNO= 17.84 CWSEL= 1724.75

STA=	9749.	9801.	9925.	10219.	10375.	10488.	10534.	10580.	10664.	10665.
PER Q=	3.6	1.1	70.5	7.6	3.2	3.4	5.6	5.1	.0	
AREA=	160.3	106.8	1620.3	406.6	215.0	153.9	209.7	249.0	3.6	
VEL=	6.1	2.7	11.9	5.1	4.1	6.0	7.3	5.6	2.5	
DEPTH=	3.1	.9	5.5	2.6	1.9	3.4	4.5	3.0	2.5	

FLOW DISTRIBUTION FOR SECNO= 17.95 CWSEL= 1730.51

STA=	9819.	9867.	10047.	10132.	10220.	10282.	10392.	10410.	10471.	10529.	10570.	10595.
PER Q=	2.1	55.1	8.1	6.5	3.1	8.3	3.3	3.9	3.6	5.5	.6	
AREA=	124.7	1241.3	359.0	319.7	177.1	384.9	112.8	197.2	189.4	213.7	46.5	
VEL=	4.7	12.1	6.2	5.6	4.7	5.9	7.9	5.4	5.2	7.0	3.4	
DEPTH=	2.6	6.9	4.2	3.6	2.9	3.5	6.2	3.3	3.3	5.2	1.8	

FLOW DISTRIBUTION FOR SECNO= 18.09 CWSEL= 1735.16

STA=	9895.	9936.	10310.	10407.	10447.	10497.	10522.	10540.	10556.	10573.	10610.
PER Q=	5.1	57.7	4.6	4.4	7.0	3.5	4.3	6.2	4.2	3.0	
AREA=	242.3	2015.0	310.6	216.2	315.3	157.6	159.4	184.9	153.1	167.4	
VEL=	5.8	7.9	4.1	5.6	6.2	6.2	7.5	9.3	7.6	4.9	
DEPTH=	5.9	5.4	3.2	5.4	6.3	6.3	8.9	11.6	9.0	4.5	

FLOW DISTRIBUTION FOR SECNO= 18.16 CWSEL= 1736.96

STA=	9752.	9775.	9836.	10075.	10199.	10330.	10380.	10425.
PER Q=	3.1	3.1	53.3	4.0	18.8	11.7	6.1	
AREA=	114.7	160.2	1119.1	221.8	681.5	347.6	231.8	
VEL=	7.4	5.3	13.2	5.0	7.7	9.3	7.2	
DEPTH=	5.0	2.6	4.8	1.8	5.2	7.0	5.2	

FLOW DISTRIBUTION FOR SECNO= 18.23 CWSEL= 1741.77

STA=	9630.	9640.	9650.	9660.	9690.	9700.	9710.	9780.	9800.	10010.	10240.	10330.
PER Q=	1.1	2.0	2.0	4.5	1.7	1.7	7.7	1.5	68.0	7.9	1.9	
AREA=	55.5	67.7	67.7	173.0	62.7	62.7	333.8	75.4	1337.3	544.6	159.1	
VEL=	5.3	8.0	8.0	7.3	7.7	7.7	6.4	5.5	14.1	4.0	3.3	
DEPTH=	5.5	6.8	6.8	5.8	6.3	6.3	4.8	3.8	6.4	2.4	1.8	

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THIS RUN EXECUTED 09MAY14 15:20:56

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HEC-2 WATER SURFACE PROFILES

Version 4.6.2; May 1991
****

NOTE- ASTERISK (*) AT LEFT OF CROSS-SECTION NUMBER INDICATES MESSAGE IN SUMMARY OF ERRORS LIST

MONT. WAT. AND HEC

SUMMARY PRINTOUT

	SECNO	Q	CWSEL	DEPTH	ELMIN	EG	DIFEG	CRIWS	VLOB	VCH	VROB	XLCH	SECNO
*	14.300	26700.00	1574.16	14.56	1559.60	1575.12	.00	1574.16	4.48	10.82	5.89	1213.60	14.30
*	14.300	26700.00	1575.03	15.43	1559.60	1576.49	1.37	1575.03	6.46	11.90	9.01	1213.60	14.30
	14.540	26700.00	1583.69	12.09	1571.60	1584.67	.00	.00	2.12	7.96	1.43	1273.20	14.54
	14.540	26700.00	1584.29	12.69	1571.60	1585.12	.45	.00	.00	7.33	.00	1273.20	14.54
	14.570	26700.00	1584.65	7.85	1576.80	1585.67	.00	.00	5.47	9.12	7.76	177.00	14.57
	14.570	26700.00	1585.03	8.23	1576.80	1585.93	.26	.00	5.14	8.57	7.31	177.00	14.57
*	14.600	26700.00	1584.65	7.65	1577.00	1587.14	.00	.00	9.01	14.96	8.20	141.00	14.60
*	14.600	26700.00	1585.03	8.03	1577.00	1587.10	-.03	.00	8.22	13.74	7.70	141.00	14.60
*	14.670	26700.00	1589.21	9.71	1579.50	1590.01	.00	.00	5.07	9.51	6.34	387.00	14.67
	14.670	26700.00	1589.10	9.60	1579.50	1590.66	.65	.00	7.27	12.37	7.36	387.00	14.67
*	14.740	26700.00	1591.73	10.03	1581.70	1593.70	.00	1591.73	6.56	14.67	5.21	365.90	14.74
*	14.740	26700.00	1591.63	9.93	1581.70	1594.44	.74	1591.63	8.01	16.64	7.71	365.90	14.74
	14.890	26700.00	1597.00	13.80	1583.20	1598.98	.00	1596.52	5.61	13.71	1.27	756.40	14.89
*	14.890	26700.00	1597.90	14.70	1583.20	1599.56	.57	.00	5.44	12.50	2.66	756.40	14.89
	15.060	26700.00	1602.93	11.63	1591.30	1604.16	.00	.00	3.06	9.27	5.82	930.30	15.06
	15.060	26700.00	1602.88	11.58	1591.30	1604.61	.45	.00	.00	10.56	.00	930.30	15.06

*	15.120	26700.00	1605.22	9.82	1595.40	1606.94	.00	1605.22	3.16	11.17	6.90	283.60	15.12
*	15.120	26700.00	1605.20	9.80	1595.40	1607.97	1.03	1605.20	.00	13.35	.00	283.60	15.12
	15.220	26700.00	1610.20	11.30	1598.90	1612.00	.00	.00	1.58	11.20	6.51	553.10	15.22
*	15.220	26700.00	1611.17	12.27	1598.90	1612.45	.46	.00	.00	9.43	6.13	553.10	15.22
	15.410	26700.00	1617.54	9.94	1607.60	1619.36	.00	.00	2.28	10.85	3.64	968.90	15.41
	15.410	26700.00	1616.98	9.38	1607.60	1619.19	-.17	.00	.00	11.94	.00	968.90	15.41

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MONT. WAT. AND HEC

SUMMARY PRINTOUT

	SECNO	SSTA	TOPWID	ENDST
*	14.300	8646.87	2213.30	10868.65
*	14.300	9210.00	950.00	10160.00
	14.540	9530.89	839.24	10492.90
	14.540	9950.00	530.00	10480.00
	14.570	9798.77	585.09	10383.86
	14.570	9797.67	587.29	10384.95
*	14.600	9690.65	584.96	10275.62
*	14.600	9689.56	587.14	10276.70
*	14.670	9425.50	840.11	10265.60
	14.670	9696.00	395.00	10091.00
*	14.740	9524.07	851.45	10375.52
*	14.740	9700.00	400.00	10100.00
	14.890	9510.96	569.15	10080.12
*	14.890	9600.00	480.00	10080.00
	15.060	9733.37	767.33	10500.70
	15.060	9972.00	418.00	10390.00
*	15.120	9717.21	821.33	10538.54
*	15.120	9975.00	376.00	10351.00
	15.220	9945.57	606.33	10551.90
*	15.220	9977.00	523.00	10500.00
	15.410	9971.54	403.32	10374.86
	15.410	9979.00	374.00	10353.00

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MONT. WAT. AND HEC

SUMMARY PRINTOUT TABLE 100

	SECNO	EGLWC	ELLC	EGPRS	ELTRD	QPR	QWEIR	CLASS	H3	DEPTH	CWSEL	VCH	EG
*	14.600	1587.14	1593.10	.00	1596.30	26700.00	.00	1.00	.00	7.65	1584.65	14.96	1587.14
*	14.600	1587.10	1593.10	.00	1596.30	26700.00	.00	1.00	.00	8.03	1585.03	13.74	1587.10

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MONT. WAT. AND HEC

SUMMARY PRINTOUT TABLE 110

	SECNO	CWSEL	DIFKWS	EG	TOPWID	QLOB	QCH	QROB	PERENC	STENCL	STCHL	STCHR	STENCR
*	14.300	1574.16	.00	1575.12	2213.30	5904.67	9812.20	10983.13	.00	.00	9923.00	10027.00	.00
*	14.300	1575.03	.00	1576.49	950.00	9589.30	11865.30	5245.40	950.00	9210.00	9923.00	10027.00	10160.00
	14.540	1583.69	.00	1584.67	839.24	219.17	26474.51	6.32	1305.00	9283.00	9950.00	10480.00	10588.00
	14.540	1584.29	.00	1585.12	530.00	.00	26700.00	.00	530.00	9950.00	9950.00	10480.00	10480.00
	14.570	1584.65	.00	1585.67	585.09	4695.01	12305.80	9699.18	601.80	9790.40	9961.00	10164.00	10392.20
	14.570	1585.03	.00	1585.93	587.29	4729.60	12220.36	9750.04	601.80	9790.40	9961.00	10164.00	10392.20
*	14.600	1584.65	.00	1587.14	584.96	8919.22	15008.50	2772.28	601.60	9682.30	9936.00	10112.00	10283.90
*	14.600	1585.03	.00	1587.10	587.14	8910.74	14706.96	3082.31	601.60	9682.30	9936.00	10112.00	10283.90
*	14.670	1589.21	.00	1590.01	840.11	12843.25	9847.74	4009.01	.00	.00	9958.00	10080.00	.00
	14.670	1589.10	.00	1590.66	395.00	13491.22	12645.20	563.58	395.00	9696.00	9958.00	10080.00	10091.00

*	14.740	1591.73	.00	1593.70	851.45	12572.05	13090.65	1037.30	10380.00	.00	9976.00	10076.00	10380.00
*	14.740	1591.63	.00	1594.44	400.00	11416.76	14674.32	608.92	400.00	9700.00	9976.00	10076.00	10100.00
	14.890	1597.00	.00	1598.98	569.15	10308.90	16383.02	8.07	-9490.00	9490.00	9938.00	10059.00	10319.00
*	14.890	1597.90	.00	1599.56	480.00	10342.86	16290.15	66.99	480.00	9600.00	9938.00	10059.00	10080.00
	15.060	1602.93	.00	1604.16	767.33	1310.12	23651.64	1738.24	.00	.00	9972.00	10390.00	.00
	15.060	1602.88	.00	1604.61	418.00	.00	26700.00	.00	418.00	9972.00	9972.00	10390.00	10390.00
*	15.120	1605.22	.00	1606.94	821.33	1066.15	22410.07	3223.78	1043.00	9503.00	9975.00	10351.00	10546.00
*	15.120	1605.20	.00	1607.97	376.00	.00	26700.00	.00	376.00	9975.00	9975.00	10351.00	10351.00
	15.220	1610.20	.00	1612.00	606.33	27.27	23515.21	3157.52	923.00	9749.00	9977.00	10348.00	10672.00
*	15.220	1611.17	.00	1612.45	523.00	.00	23214.50	3485.50	523.00	9977.00	9977.00	10348.00	10500.00
	15.410	1617.54	.00	1619.36	403.32	20.72	26566.31	112.97	.00	.00	9979.00	10353.00	.00
	15.410	1616.98	.00	1619.19	374.00	.00	26700.00	.00	374.00	9979.00	9979.00	10353.00	10353.00

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MONT. WAT. AND HEC

SUMMARY PRINTOUT TABLE 150

	SECNO	XLCH	ELTRD	ELLC	ELMIN	Q	CWSEL	CRIWS	EG	10*KS	VCH	AREA	.01K
*	14.300	1213.60	.00	.00	1559.60	26700.00	1574.16	1574.16	1575.12	85.17	10.82	4089.92	2893.09
*	14.300	1213.60	.00	.00	1559.60	26700.00	1575.03	1575.03	1576.49	90.56	11.90	3064.13	2805.71
	14.540	1273.20	.00	.00	1571.60	26700.00	1583.69	.00	1584.67	67.49	7.96	3434.36	3249.96
	14.540	1273.20	.00	.00	1571.60	26700.00	1584.29	.00	1585.12	51.12	7.33	3644.07	3734.32
	14.570	177.00	.00	.00	1576.80	26700.00	1584.65	.00	1585.67	46.12	9.12	3457.91	3931.62
	14.570	177.00	.00	.00	1576.80	26700.00	1585.03	.00	1585.93	37.80	8.57	3680.16	4342.82
*	14.600	141.00	1596.30	1593.10	1577.00	26700.00	1584.65	.00	1587.14	152.32	14.96	2331.84	2163.40
*	14.600	141.00	1596.30	1593.10	1577.00	26700.00	1585.03	.00	1587.10	118.04	13.74	2553.75	2457.51
*	14.670	387.00	.00	.00	1579.50	26700.00	1589.21	.00	1590.01	36.08	9.51	4201.27	4444.98
	14.670	387.00	.00	.00	1579.50	26700.00	1589.10	.00	1590.66	62.05	12.37	2954.90	3389.62
*	14.740	365.90	.00	.00	1581.70	26700.00	1591.73	1591.73	1593.70	82.54	14.67	3008.08	2938.81
*	14.740	365.90	.00	.00	1581.70	26700.00	1591.63	1591.63	1594.44	107.94	16.64	2386.10	2569.92
	14.890	756.40	.00	.00	1583.20	26700.00	1597.00	1596.52	1598.98	63.51	13.71	3040.27	3350.46
*	14.890	756.40	.00	.00	1583.20	26700.00	1597.90	.00	1599.56	47.02	12.50	3228.64	3893.88
	15.060	930.30	.00	.00	1591.30	26700.00	1602.93	.00	1604.16	53.72	9.27	3278.61	3642.73
	15.060	930.30	.00	.00	1591.30	26700.00	1602.88	.00	1604.61	71.02	10.56	2528.98	3168.23
*	15.120	283.60	.00	.00	1595.40	26700.00	1605.22	1605.22	1606.94	93.32	11.17	2811.62	2763.90
*	15.120	283.60	.00	.00	1595.40	26700.00	1605.20	1605.20	1607.97	136.19	13.35	1999.95	2287.90
	15.220	553.10	.00	.00	1598.90	26700.00	1610.20	.00	1612.00	87.08	11.20	2601.57	2861.23
*	15.220	553.10	.00	.00	1598.90	26700.00	1611.17	.00	1612.45	50.35	9.43	3029.41	3762.99
	15.410	968.90	.00	.00	1607.60	26700.00	1617.54	.00	1619.36	66.96	10.85	2487.64	3263.00
	15.410	968.90	.00	.00	1607.60	26700.00	1616.98	.00	1619.19	92.63	11.94	2236.92	2774.24

A MAXIMUM OF 5 TABLES MAY BE GENERATED

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SUMMARY OF ERRORS AND SPECIAL NOTES

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CAUTION SECNO=     13.000  PROFILE=  1  CRITICAL DEPTH ASSUMED
CAUTION SECNO=     13.000  PROFILE=  2  CRITICAL DEPTH ASSUMED

WARNING SECNO=     13.160  PROFILE=  1  CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE
WARNING SECNO=     13.160  PROFILE=  2  CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE

WARNING SECNO=     13.280  PROFILE=  1  CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE
WARNING SECNO=     13.280  PROFILE=  2  CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE

WARNING SECNO=     13.400  PROFILE=  1  CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE
WARNING SECNO=     13.400  PROFILE=  2  CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE

WARNING SECNO=     13.550  PROFILE=  1  CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE

CAUTION SECNO=     14.300  PROFILE=  1  CRITICAL DEPTH ASSUMED
CAUTION SECNO=     14.300  PROFILE=  1  MINIMUM SPECIFIC ENERGY
CAUTION SECNO=     14.300  PROFILE=  2  CRITICAL DEPTH ASSUMED
CAUTION SECNO=     14.300  PROFILE=  2  MINIMUM SPECIFIC ENERGY
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 WARNING SECNO=     14.600  PROFILE=  1  CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE
 WARNING SECNO=     14.600  PROFILE=  2  CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE

 WARNING SECNO=     14.670  PROFILE=  1  CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE

 CAUTION SECNO=     14.740  PROFILE=  1  CRITICAL DEPTH ASSUMED
 CAUTION SECNO=     14.740  PROFILE=  1  PROBABLE MINIMUM SPECIFIC ENERGY
 CAUTION SECNO=     14.740  PROFILE=  1  20 TRIALS ATTEMPTED TO BALANCE WSEL
 CAUTION SECNO=     14.740  PROFILE=  2  CRITICAL DEPTH ASSUMED
 CAUTION SECNO=     14.740  PROFILE=  2  MINIMUM SPECIFIC ENERGY

 WARNING SECNO=     14.890  PROFILE=  2  CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE

 CAUTION SECNO=     15.120  PROFILE=  1  CRITICAL DEPTH ASSUMED
 CAUTION SECNO=     15.120  PROFILE=  1  MINIMUM SPECIFIC ENERGY
 CAUTION SECNO=     15.120  PROFILE=  2  CRITICAL DEPTH ASSUMED
 CAUTION SECNO=     15.120  PROFILE=  2  MINIMUM SPECIFIC ENERGY

 WARNING SECNO=     15.220  PROFILE=  2  CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE

 CAUTION SECNO=     15.550  PROFILE=  1  CRITICAL DEPTH ASSUMED
 CAUTION SECNO=     15.550  PROFILE=  1  MINIMUM SPECIFIC ENERGY

 WARNING SECNO=     15.750  PROFILE=  2  CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE

 CAUTION SECNO=     15.890  PROFILE=  1  CRITICAL DEPTH ASSUMED
 CAUTION SECNO=     15.890  PROFILE=  1  MINIMUM SPECIFIC ENERGY
 CAUTION SECNO=     15.890  PROFILE=  2  CRITICAL DEPTH ASSUMED
 CAUTION SECNO=     15.890  PROFILE=  2  PROBABLE MINIMUM SPECIFIC ENERGY
 CAUTION SECNO=     15.890  PROFILE=  2  20 TRIALS ATTEMPTED TO BALANCE WSEL

 CAUTION SECNO=     16.270  PROFILE=  1  CRITICAL DEPTH ASSUMED
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 CAUTION SECNO=     16.270  PROFILE=  1  MINIMUM SPECIFIC ENERGY
 CAUTION SECNO=     16.270  PROFILE=  2  CRITICAL DEPTH ASSUMED
 CAUTION SECNO=     16.270  PROFILE=  2  MINIMUM SPECIFIC ENERGY

 WARNING SECNO=     16.490  PROFILE=  2  CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE

 WARNING SECNO=     16.680  PROFILE=  2  CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE

 CAUTION SECNO=     16.860  PROFILE=  1  CRITICAL DEPTH ASSUMED
 CAUTION SECNO=     16.860  PROFILE=  1  MINIMUM SPECIFIC ENERGY
 CAUTION SECNO=     16.860  PROFILE=  2  CRITICAL DEPTH ASSUMED
 CAUTION SECNO=     16.860  PROFILE=  2  MINIMUM SPECIFIC ENERGY

 CAUTION SECNO=     16.870  PROFILE=  1  HYDRAULIC JUMP D.S.
 WARNING SECNO=     16.870  PROFILE=  1  CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE
 CAUTION SECNO=     16.870  PROFILE=  2  HYDRAULIC JUMP D.S.
 WARNING SECNO=     16.870  PROFILE=  2  CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE

 CAUTION SECNO=     16.960  PROFILE=  1  CRITICAL DEPTH ASSUMED
 CAUTION SECNO=     16.960  PROFILE=  1  PROBABLE MINIMUM SPECIFIC ENERGY
 CAUTION SECNO=     16.960  PROFILE=  1  20 TRIALS ATTEMPTED TO BALANCE WSEL
 CAUTION SECNO=     16.960  PROFILE=  2  CRITICAL DEPTH ASSUMED
 CAUTION SECNO=     16.960  PROFILE=  2  PROBABLE MINIMUM SPECIFIC ENERGY
 CAUTION SECNO=     16.960  PROFILE=  2  20 TRIALS ATTEMPTED TO BALANCE WSEL

 CAUTION SECNO=     17.060  PROFILE=  2  CRITICAL DEPTH ASSUMED
 CAUTION SECNO=     17.060  PROFILE=  2  MINIMUM SPECIFIC ENERGY

 CAUTION SECNO=     17.180  PROFILE=  1  CRITICAL DEPTH ASSUMED
 CAUTION SECNO=     17.180  PROFILE=  1  MINIMUM SPECIFIC ENERGY
 CAUTION SECNO=     17.180  PROFILE=  2  CRITICAL DEPTH ASSUMED
 CAUTION SECNO=     17.180  PROFILE=  2  MINIMUM SPECIFIC ENERGY

 WARNING SECNO=     18.090  PROFILE=  1  CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE

 CAUTION SECNO=     18.160  PROFILE=  1  CRITICAL DEPTH ASSUMED
 CAUTION SECNO=     18.160  PROFILE=  1  MINIMUM SPECIFIC ENERGY

 CAUTION SECNO=     18.230  PROFILE=  1  CRITICAL DEPTH ASSUMED
 CAUTION SECNO=     18.230  PROFILE=  1  PROBABLE MINIMUM SPECIFIC ENERGY
 CAUTION SECNO=     18.230  PROFILE=  1  20 TRIALS ATTEMPTED TO BALANCE WSEL
 CAUTION SECNO=     18.230  PROFILE=  2  CRITICAL DEPTH ASSUMED
 CAUTION SECNO=     18.230  PROFILE=  2  PROBABLE MINIMUM SPECIFIC ENERGY
 CAUTION SECNO=     18.230  PROFILE=  2  20 TRIALS ATTEMPTED TO BALANCE WSEL

 WARNING SECNO=     18.290  PROFILE=  2  CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE

 CAUTION SECNO=     18.490  PROFILE=  2  CRITICAL DEPTH ASSUMED
 CAUTION SECNO=     18.490  PROFILE=  2  MINIMUM SPECIFIC ENERGY

 CAUTION SECNO=     18.570  PROFILE=  1  CRITICAL DEPTH ASSUMED
 CAUTION SECNO=     18.570  PROFILE=  1  MINIMUM SPECIFIC ENERGY
 WARNING SECNO=     18.570  PROFILE=  2  CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE
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CAUTION SECNO=     18.740  PROFILE=  1  CRITICAL DEPTH ASSUMED
CAUTION SECNO=     18.740  PROFILE=  1  MINIMUM SPECIFIC ENERGY
CAUTION SECNO=     18.740  PROFILE=  2  CRITICAL DEPTH ASSUMED
CAUTION SECNO=     18.740  PROFILE=  2  MINIMUM SPECIFIC ENERGY

CAUTION SECNO=     18.840  PROFILE=  2  CRITICAL DEPTH ASSUMED
CAUTION SECNO=     18.840  PROFILE=  2  MINIMUM SPECIFIC ENERGY

CAUTION SECNO=     18.960  PROFILE=  1  CRITICAL DEPTH ASSUMED
CAUTION SECNO=     18.960  PROFILE=  1  PROBABLE MINIMUM SPECIFIC ENERGY
CAUTION SECNO=     18.960  PROFILE=  1  20 TRIALS ATTEMPTED TO BALANCE WSEL
CAUTION SECNO=     18.960  PROFILE=  2  CRITICAL DEPTH ASSUMED
CAUTION SECNO=     18.960  PROFILE=  2  PROBABLE MINIMUM SPECIFIC ENERGY
CAUTION SECNO=     18.960  PROFILE=  2  20 TRIALS ATTEMPTED TO BALANCE WSEL
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Floodway width summary: MONT. WAT. AND HEC
Profile No. 2

Section Number	Elevation Increase	Top Width	Left Encroach Station	Left Sta Distance From Center	Center Station	Right Sta Distance From Center	Right Encroach Station
13.000	.00	245.00	9820.00	122.50	9942.50	122.50	10065.00
13.020	.00	245.00	9820.00	122.50	9942.50	122.50	10065.00
13.040	.00	813.00	9537.00	388.50	9925.50	424.50	10350.00
13.080	.00	1129.00	9550.00	348.50	9898.50	780.50	10679.00
13.160	.00	1395.00	9421.00	699.50	10120.50	695.50	10816.00
13.280	.00	1265.00	9537.00	353.50	9890.50	911.50	10802.00
13.400	.94	932.00	9670.00	324.50	9994.50	607.50	10602.00
13.550	.99	1334.00	9160.00	931.00	10091.00	403.00	10494.00
13.660	.44	1427.00	9055.00	926.50	9981.50	500.50	10482.00
13.860	.73	1524.00	8708.00	978.00	9686.00	546.00	10232.00
14.070	.11	1724.00	8805.00	1164.00	9969.00	560.00	10529.00
14.300	.87	950.00	9210.00	765.00	9975.00	185.00	10160.00
14.540	.60	530.00	9950.00	265.00	10215.00	265.00	10480.00
14.570	.38	601.80	9790.40	272.10	10062.50	329.70	10392.20
14.600	.38	601.60	9682.30	341.70	10024.00	259.90	10283.90
14.670	-.11	395.00	9696.00	323.00	10019.00	72.00	10091.00
14.740	-.11	400.00	9700.00	326.00	10026.00	74.00	10100.00
14.890	.89	480.00	9600.00	398.50	9998.50	81.50	10080.00
15.060	-.05	418.00	9972.00	209.00	10181.00	209.00	10390.00
15.120	-.02	376.00	9975.00	188.00	10163.00	188.00	10351.00
15.220	.97	523.00	9977.00	185.50	10162.50	337.50	10500.00
15.410	-.56	374.00	9979.00	187.00	10166.00	187.00	10353.00
15.550	.43	292.00	9890.00	151.00	10041.00	141.00	10182.00
15.750	.97	639.00	9477.00	562.50	10039.50	76.50	10116.00
15.890	.94	393.00	9817.00	272.50	10089.50	120.50	10210.00
16.070	.91	370.00	9760.00	279.00	10039.00	91.00	10130.00
16.190	.25	468.00	9600.00	405.50	10005.50	62.50	10068.00
16.270	.51	282.00	9760.00	142.50	9902.50	139.50	10042.00
16.490	.96	524.00	9906.00	112.00	10018.00	412.00	10430.00
16.680	-.15	650.00	9940.00	319.00	10259.00	331.00	10590.00
16.860	*** Encroachments not set ***						
16.870	*** Encroachments not set ***						
16.960	.00	434.00	9914.00	223.00	10137.00	211.00	10348.00
17.060	.37	820.00	9650.00	368.50	10018.50	451.50	10470.00
17.180	-.05	880.00	9788.00	328.00	10116.00	552.00	10668.00
17.300	.08	907.00	9628.00	435.00	10063.00	472.00	10535.00
17.390	-.01	713.00	9758.00	278.00	10036.00	435.00	10471.00
17.480	.01	851.08	9488.92	494.08	9983.00	357.00	10340.00
17.570	.04	746.55	9516.45	465.05	9981.50	281.50	10263.00
17.650	.09	846.30	9423.70	548.80	9972.50	297.50	10270.00
17.780	.00	935.94	9642.06	336.44	9978.50	599.50	10578.00
17.840	.01	919.61	9745.39	326.61	10072.00	593.00	10665.00
17.950	.01	776.32	9818.68	138.32	9957.00	638.00	10595.00
18.090	.21	715.00	9895.00	228.00	10123.00	487.00	10610.00
18.160	.41	673.00	9752.00	203.50	9955.50	469.50	10425.00
18.230	.02	700.00	9630.00	275.00	9905.00	425.00	10330.00
18.290	1.04	700.00	9630.00	351.50	9981.50	348.50	10330.00

18.490	.09	643.00	9832.00	102.50	9934.50	540.50	10475.00
18.570	.56	780.00	9700.00	294.00	9994.00	486.00	10480.00
18.740	.06	745.00	9380.00	678.50	10058.50	66.50	10125.00
18.840	.88	564.00	9576.00	399.50	9975.50	164.50	10140.00
18.960	.52	841.00	9639.00	333.50	9972.50	507.50	10480.00

FLOODWAY DATA, MONT. WAT. AND HEC
PROFILE NO. 2

STATION	FLOODWAY WIDTH	FLOODWAY SECTION AREA	FLOODWAY MEAN VELOCITY	WATER SURFACE ELEVATION WITH FLOODWAY	WATER SURFACE ELEVATION WITHOUT FLOODWAY	DIFFERENCE
13.000	245.	1207.	12.7	1523.4	1523.4	.0
13.020	245.	1444.	10.6	1524.9	1524.9	.0
13.040	494.	2425.	6.3	1526.7	1526.7	.0
13.080	1116.	4530.	3.4	1527.6	1527.6	.0
13.160	1379.	3417.	4.5	1528.5	1528.5	.0
13.280	1265.	2512.	7.5	1532.6	1532.6	.0
13.400	932.	4069.	6.6	1538.9	1538.0	.9
13.550	1334.	4546.	5.9	1544.2	1543.2	1.0
13.660	1427.	4111.	6.5	1548.3	1547.9	.4
13.860	1524.	4444.	6.0	1556.6	1555.9	.7
14.070	1724.	3978.	6.7	1564.8	1564.7	.1
14.300	950.	3064.	8.7	1575.1	1574.2	.9
14.540	530.	3644.	7.3	1584.3	1583.7	.6
14.570	587.	3680.	7.3	1585.0	1584.6	.4
14.600	587.	2554.	10.5	1585.1	1584.7	.4
14.670	395.	2955.	9.0	1589.1	1589.2	-.1
14.740	400.	2386.	11.2	1591.6	1591.7	-.1
14.890	480.	3229.	8.3	1597.9	1597.0	.9
15.060	418.	2529.	10.6	1602.8	1602.9	-.1
15.120	376.	2000.	13.4	1605.2	1605.2	.0
15.220	523.	3029.	8.8	1611.2	1610.2	1.0
15.410	374.	2237.	11.9	1616.9	1617.5	-.6
15.550	292.	1946.	13.7	1623.5	1623.1	.4
15.750	639.	4041.	6.6	1631.4	1630.4	1.0
15.890	393.	2126.	12.6	1636.3	1635.4	.9
16.070	370.	2689.	9.9	1645.1	1644.2	.9
16.190	468.	2695.	9.9	1649.1	1648.9	.2
16.270	282.	1810.	14.7	1652.8	1652.3	.5
16.490	524.	3350.	8.0	1663.0	1662.0	1.0
16.680	650.	3046.	8.8	1668.4	1668.6	-.2
16.860	267.	1830.	14.9	1677.0	1677.0	.0
16.870	284.	2387.	11.4	1680.8	1680.8	.0
16.960	426.	2137.	12.8	1684.9	1684.9	.0
17.060	820.	3313.	8.2	1690.3	1689.9	.4
17.180	880.	2713.	10.1	1695.1	1695.2	-.1
17.300	907.	3837.	7.1	1701.5	1701.4	.1
17.390	713.	2819.	9.7	1705.2	1705.2	.0
17.480	851.	3392.	8.0	1709.8	1709.8	.0
17.570	747.	3084.	8.9	1713.8	1713.8	.0
17.650	846.	3839.	7.1	1717.7	1717.6	.1
17.780	936.	4163.	6.6	1722.5	1722.5	.0
17.840	916.	3125.	8.7	1724.7	1724.7	.0

1

09MAY14 15:18:24 PAGE 44

FLOODWAY DATA, MONT. WAT. AND HEC
PROFILE NO. 2

STATION	FLOODWAY WIDTH	FLOODWAY SECTION AREA	FLOODWAY MEAN VELOCITY	WATER SURFACE ELEVATION WITH FLOODWAY	WATER SURFACE ELEVATION WITHOUT FLOODWAY	DIFFERENCE
17.950	776.	3366.	8.1	1730.5	1730.5	.0
18.090	715.	3922.	7.1	1735.1	1734.9	.2
18.160	673.	2877.	9.6	1736.9	1736.5	.4
18.230	700.	2939.	9.4	1741.7	1741.7	.0
18.290	700.	3845.	7.2	1744.1	1743.1	1.0
18.490	643.	2780.	10.0	1751.0	1750.9	.1
18.570	780.	3079.	9.0	1754.7	1754.1	.6
18.740	745.	2612.	10.5	1760.7	1760.6	.1
18.840	564.	2616.	10.4	1765.6	1764.7	.9
18.960	841.	3403.	8.0	1771.8	1771.3	.5

Appendix F. 60% Design Plans

CITY OF PHOENIX
STREET TRANSPORTATION DEPARTMENT
DESIGN & CONSTRUCTION MANAGEMENT DIVISION

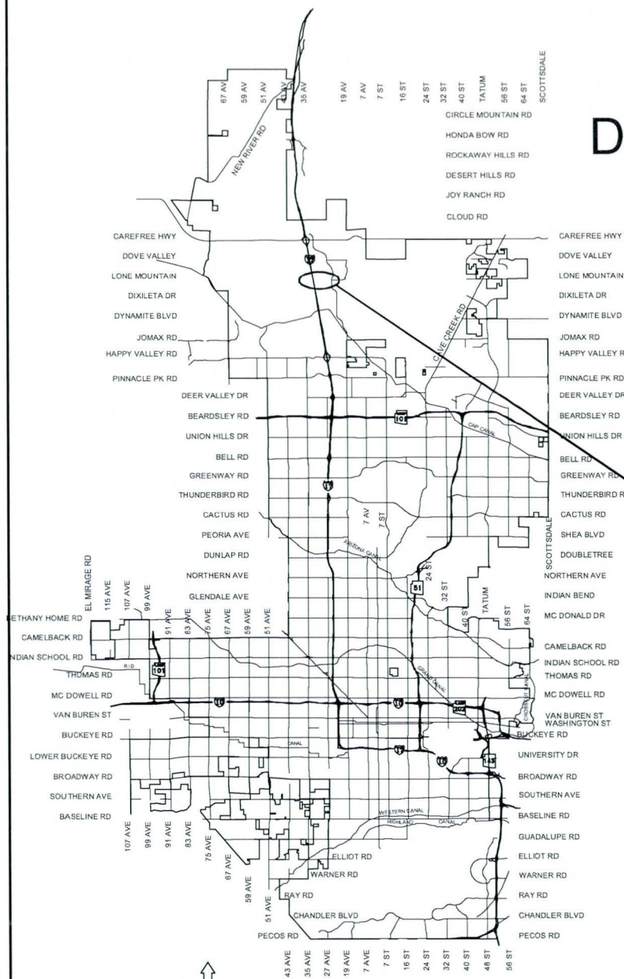
F.H.W.A. REGION	STATE	PROJECT NO.	NO.	TOTAL	AS BUILT
9	ARIZ.	ST85110090	1	137	

PRELIMINARY
60%
NOT FOR CONSTRUCTION OR RECORDING

Kimley»Horn
KIMLEY-HORN & ASSOCIATES, INC.
7740 N. 16TH STREET, SUITE 300
PHOENIX, AZ 85020
Phone: 602-944-5500
Fax: 602-944-7423
www.kimley-horn.com

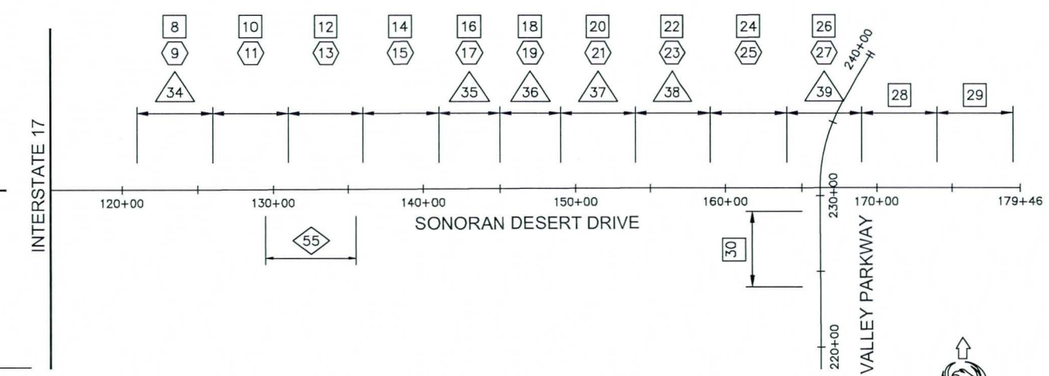
SONORAN DESERT DRIVE
I-17 TO NORTH VALLEY PARKWAY
ST85110090

2014



VICINITY MAP
NTS

City of Phoenix
N



KEY MAP
NTS

City of Phoenix
N

XX PAVING PLAN SHEETS
XX PAVING PROFILE SHEETS
XX SKUNK CREEK BRIDGE
XX DRAINAGE PLAN & PROFILE SHEETS

LENGTH OF PROJECT = 5,426 LF = 1.03 MILES
AREA OF DISTURBANCE = 18.72 ACRES

APPROVED _____ DATE _____
ASSISTANT STREET TRANSPORTATION DIRECTOR

APPROVED _____ DATE _____
DEPUTY STREET TRANSPORTATION DIRECTOR

MAYOR
GREG STANTON

CITY MANAGER
ED ZUERCHER

CITY COUNCIL

DISTRICT NO 1.	THELDA WILLIAMS
DISTRICT NO 2.	JIM WARING
DISTRICT NO 3.	BILL GATES
DISTRICT NO 4.	LAURA PASTOR
DISTRICT NO 5.	DANIEL VALENZUELA
DISTRICT NO 6.	SAL DICICCIO
DISTRICT NO 7.	MICHAEL NOWAKOWSKI
DISTRICT NO 8.	KATE GALLEGO

INDEX OF SHEETS

SHEET No.	SHEET TITLE
1	COVER SHEET
2	LEGEND AND NOTES SHEET
3 - 4	ROADWAY SUMMARY SHEETS
5 - 6	TYPICAL SECTIONS
7	SURVEY CONTROL SHEET
8 - 30	PAVING PLAN & PROFILE SHEETS
31 - 32	PCCP JOINT SPACING PLANS
33	STORM DRAIN SUMMARY SHEET
34 - 39	DRAINAGE PLAN & PROFILE SHEETS
40 - 42	CONNECTOR PIPE PROFILES SHEETS
43	CULVERT PLAN & PROFILE SHEET
44	ALTERNATE PIPE MATERIAL SHEET
45 - 46	DRAINAGE DETAIL SHEETS
47 - 52	STORM DRAIN DETAIL SHEETS
53 - 54	BANK PROTECTION PLAN & DETAILS
55 - 83	SKUNK CREEK BRIDGE & DETAIL SHEETS
84 - 88	SIGNING & PAVMENT MARKING SHEETS
89 - 91	TRAFFIC SIGNAL PLAN SHEETS
92 - 98	NATIVE PLANT INVENTORY
99 - 128	LANDSCAPING & IRRIGATION PLAN SHEETS
129 - 135	STREET LIGHTING PLAN SHEETS
136 - 137	STREET LIGHTING DETAIL SHEET

CITY BENCHMARKS:

MARICOPA COUNTY FLOOD CONTROL BRASS CAP APPROXIMATELY 150' WEST OF INTERSECTION AT NORTH VALLEY PARKWAY AND DIXILETA ROAD, HAVING A PUBLISHED ELEVATION OF 1541.969 (COP-NGVD '29).

CITY OF PHOENIX BRASS CAP IN HANDHOLE AT INTERSECTION OF NORTH VALLEY PARKWAY AND DOVE VALLEY ROAD, HAVING A PUBLISHED ELEVATION OF 1631.349 (COP-NGVD '29).

CALL TWO WORKING DAYS BEFORE YOU DIG
602-263-1100
1-800-STAKE-IT
(OUTSIDE MARICOPA COUNTY)

"PER CITY OF PHOENIX CITY CODE CHAPTER 2, SECTION 2-28, THESE PLANS ARE FOR OFFICIAL USE ONLY AND MAY NOT BE SHARED WITH OTHERS EXCEPT AS REQUIRED TO FULFILL THE OBLIGATIONS OF THE CONTRACTOR'S CONTRACT WITH THE CITY OF PHOENIX."

ST85110090: QS 5N 2E - 13, 14, 23, 24: SONORAN DESERT DRIVE: I-17 TO NORTH VALLEY PARKWAY 60% SUBMITTAL (JUNE 5, 2014)

ST85110090

SONORAN DESERT DRIVE
I-17 TO NORTH VALLEY PARKWAY
PHOENIX STREETS – MARICOPA CO.

PRELIMINARY
60%
NOT FOR CONSTRUCTION OR RECORDING

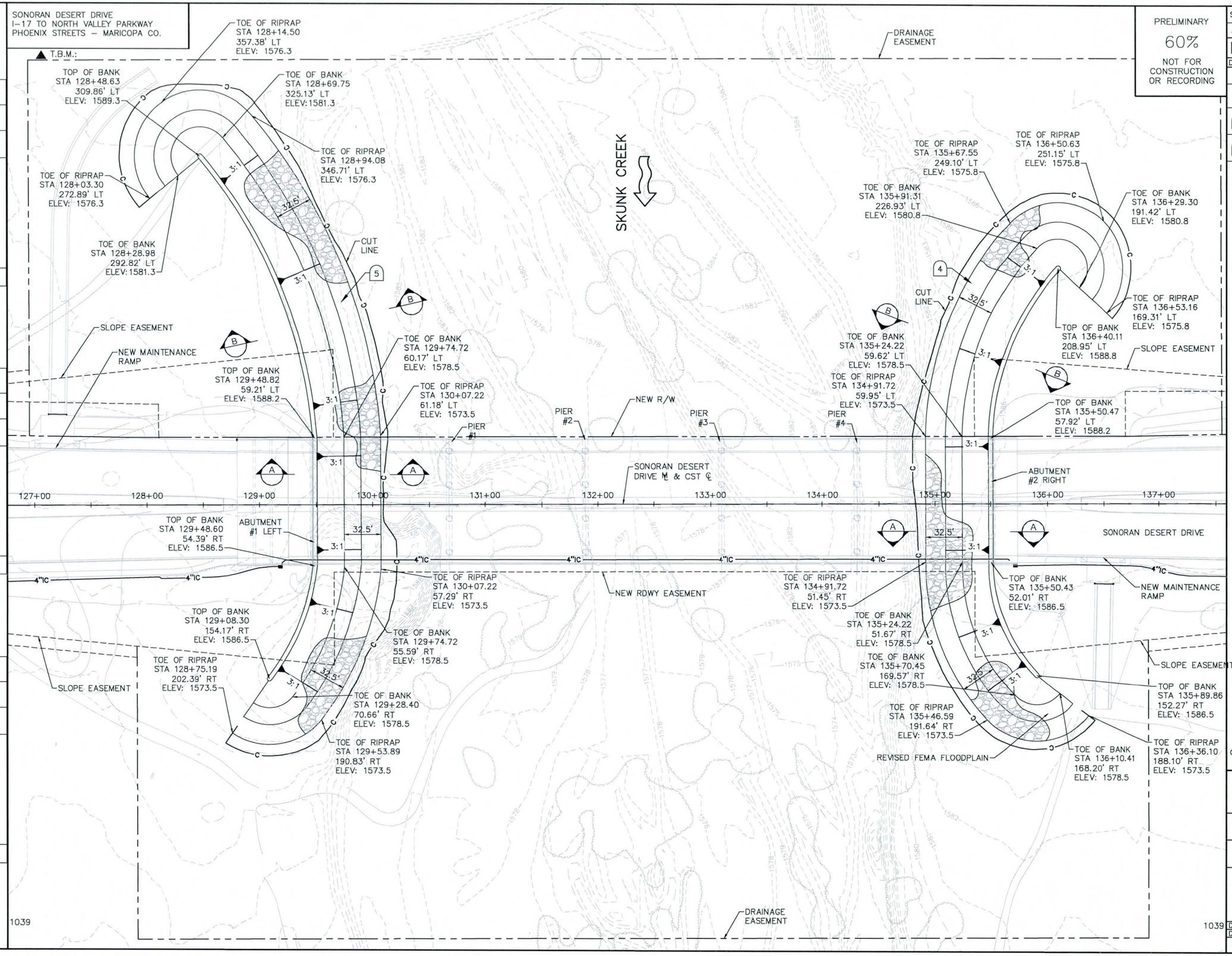
STATE	PROJ. NO.	SHT	TOTAL
ARIZ.	ST85110090	53	137

Kimley»Horn 7740 N. 16TH STREET SUITE 300 PHOENIX, AZ 85020 Phone: 602-944-5500 Fax: 602-944-7423 www.kimley-horn.com

DR: ZRS | DES: ZRS | CK: DJL | DATE: 06/14

ABUTMENT PROTECTION

NO	DESCRIPTION	QTY (CY)
4	RIPRAP, D50=16", SEE SHEET 54	3,874
5	RIPRAP, D50=16", SEE SHEET 54	4,588



City of Phoenix
N

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BANK PROTECTION PLAN

CITY OF PHOENIX, ARIZONA
STREET TRANSPORTATION DEPARTMENT

SONORAN DESERT DRIVE
I-17 TO NORTH VALLEY PARKWAY
ST85110090

DR: ZRS	DES: ZRS	CK: DJL	SHT	TOTAL
DATE: 06/14	DATE: 06/14	DATE: 06/14		
SCALE: 1"=40'			53	137

REVISION BY CITY OF PHOENIX

NO.	DESCRIPTION	REV BY	CKD BY	DATE

REVISION BY CITY OF PHOENIX

NO.	DESCRIPTION	REV BY	CKD BY	DATE

REVISION BY CITY OF PHOENIX

NO.	DESCRIPTION	REV BY	CKD BY	DATE

6/5/2014 4:08 PM VARNER, JOEL
K:\PHX_Roadway\193784002-SoroDrn Deset Dr - I-17 to North Valley Pkwy\Cadd\ST85110090T01.dwg

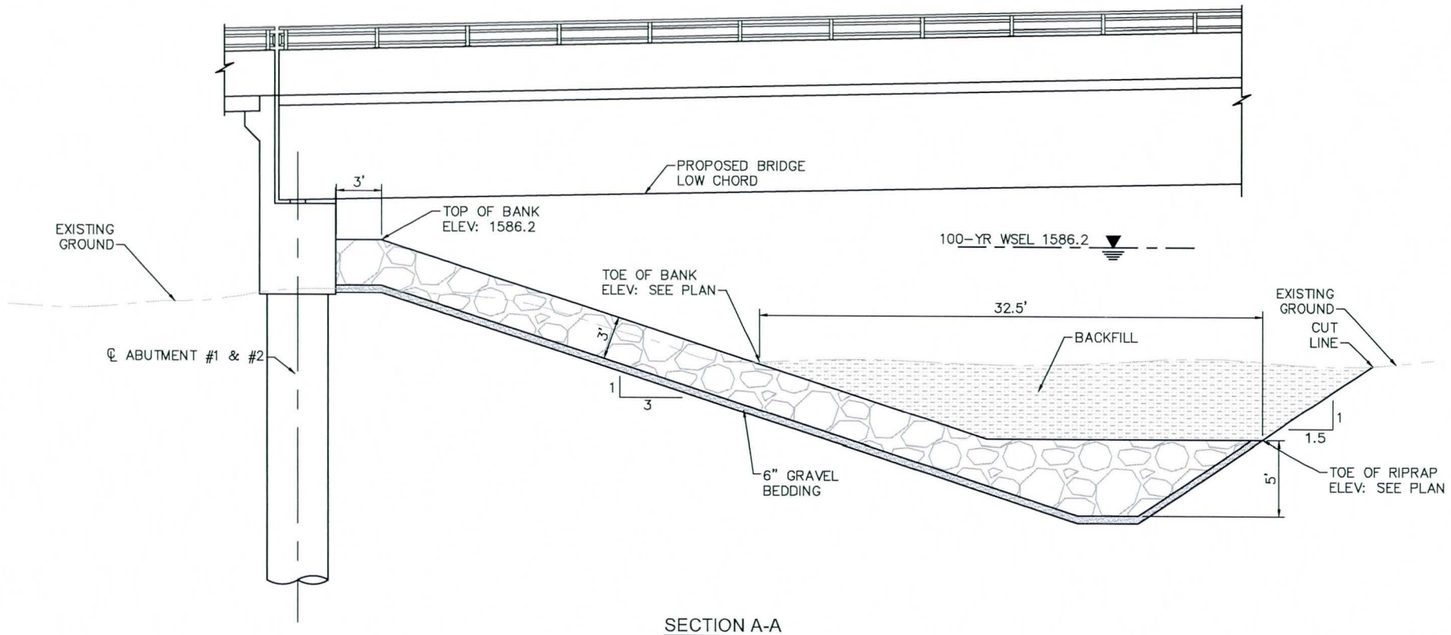
SONORAN DESERT DRIVE
I-17 TO NORTH VALLEY PARKWAY
PHOENIX STREETS – MARICOPA CO.

PRELIMINARY
60%
NOT FOR CONSTRUCTION OR RECORDING

STATE	PROJ. NO.	SHT	TOTAL
ARIZ.	ST85110090	54	137

Kimley»Horn 7740 N. 16TH STREET SUITE 300 PHOENIX, AZ 85020 Phone: 602-944-5500 Fax: 602-944-7423 www.kimley-horn.com

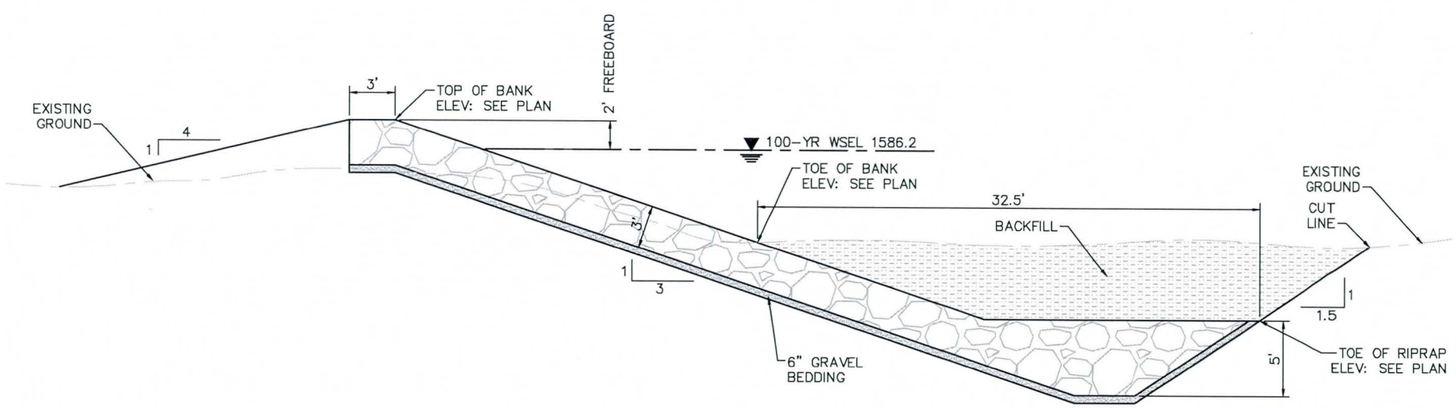
DR: ZRS | DES: ZRS | CK: DJL | DATE: 06/14



SECTION A-A
HORZ: 1"=5'

ROCK RIPRAP GRADATION	
STONE SIZE	% GRADATION SMALLER THAN
24"	100
20"	85
16"	50
8"	15

GRAVEL BEDDING GRADATION	
SIEVE SIZE	% GRADATION SMALLER THAN
3"	90–100
3/4"	20–90
#4	0–20
#200	0–3



SECTION B-B
HORZ: 1"=5'

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(OUTSIDE MARICOPA COUNTY)

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BANK PROTECTION TYPICAL SECTIONS

CITY OF PHOENIX, ARIZONA
STREET TRANSPORTATION DEPARTMENT

SONORAN DESERT DRIVE
I-17 TO NORTH VALLEY PARKWAY
ST85110090

DR: ZRS	DES: ZRS	CK: DJL	SHT	TOTAL
DATE: 06/14	DATE: 06/14	DATE: 06/14	54	137
SCALE: 1"=5'				

REVISION BY CITY OF PHOENIX

NO.	DESCRIPTION	REV BY	CKD BY	DATE

REVISION BY CITY OF PHOENIX

NO.	DESCRIPTION	REV BY	CKD BY	DATE

REVISION BY CITY OF PHOENIX

NO.	DESCRIPTION	REV BY	CKD BY	DATE

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SONORAN DESERT DRIVE
I-17 TO NORTH VALLEY PARKWAY
PHOENIX STREETS – MARICOPA CO.

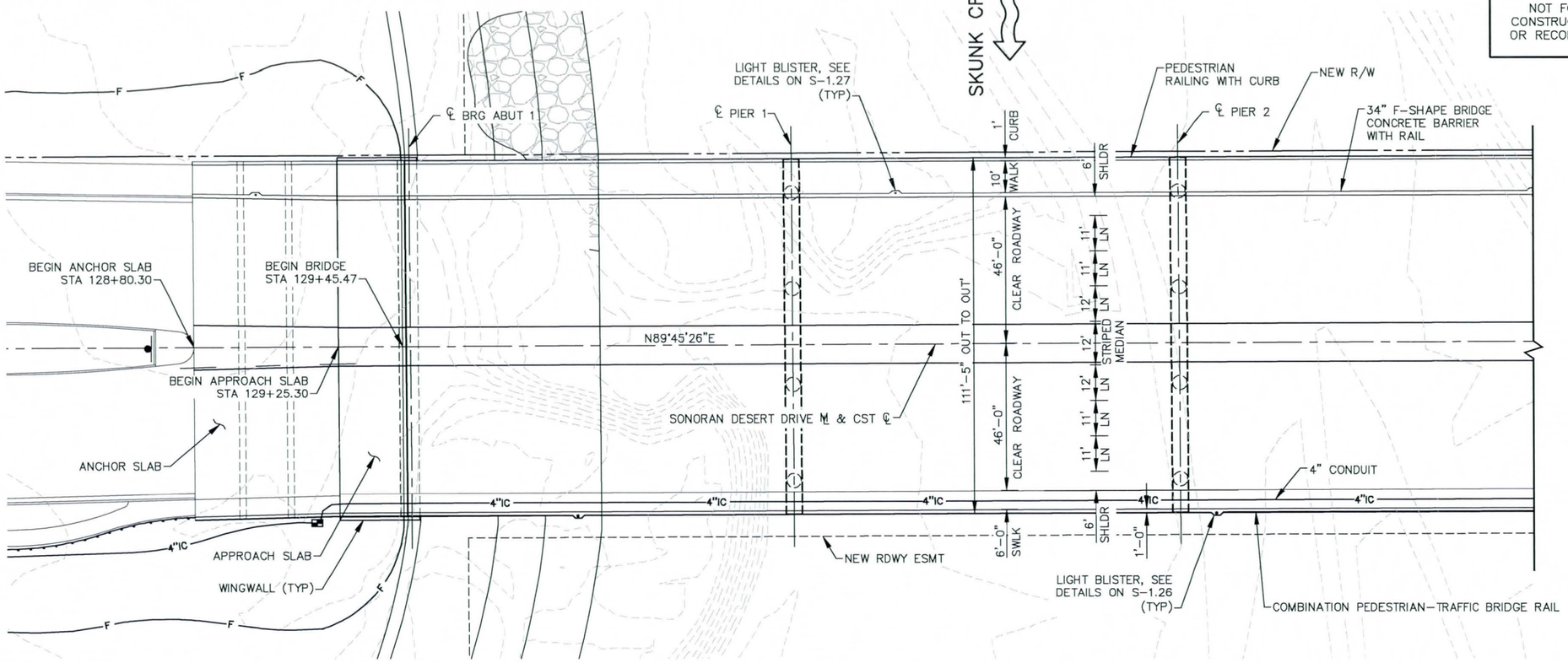
PRELIMINARY
60%
NOT FOR CONSTRUCTION OR RECORDING

STATE	PROJ. NO.	SHT	TOTAL
ARIZ.	ST85110090	55	137

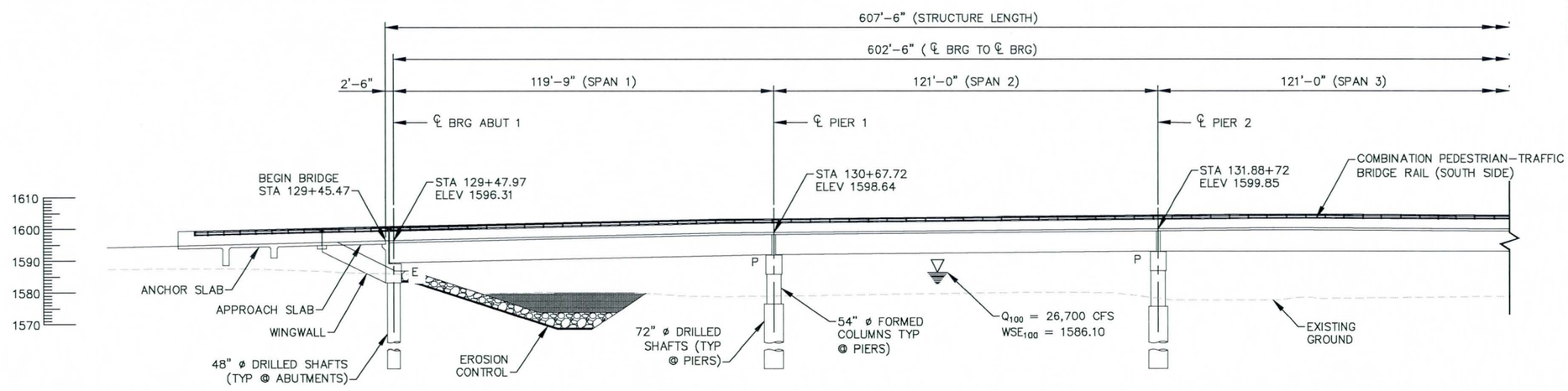
Kimley»Horn
7740 N. 16TH STREET
SUITE 300
PHOENIX, AZ 85020
Phone: 602-944-5500
Fax: 602-944-7423
www.kimley-horn.com

DR: MSK	DES: DJL	CK: KJK	DATE: 06/14

City of Phoenix
N



PLAN
NEW 5 SPAN PRESTRESSED CONCRETE AASHTO TYPE VI (MODIFIED) GIRDER BRIDGE
SKEW 0°0'0"
SCALE: 1"=20'-0"



ELEVATION
SCALE: 1"=20'-0"

INDEX OF DRAWINGS

DRAWING NO.	DRAWING TITLE
S-1.01	GENERAL PLAN AND ELEVATION 1
S-1.02	GENERAL PLAN AND ELEVATION 2
S-1.03	GENERAL NOTES & QUANTITIES
S-1.04	FOUNDATION PLAN
S-1.05	DRILLED SHAFT DETAILS
S-1.06	ABUTMENT 1 PLAN AND ELEVATION
S-1.07	ABUTMENT 2 PLAN AND ELEVATION
S-1.08	ABUTMENT DETAILS 1
S-1.09	ABUTMENT DETAILS 2
S-1.10	WINGWALL DETAILS
S-1.11	PIER PLAN AND ELEVATION
S-1.12	PIER DETAILS
S-1.13	GIRDER LAYOUT 1
S-1.14	GIRDER LAYOUT 2
S-1.15	GIRDER DETAILS 1
S-1.16	GIRDER DETAILS 2
S-1.17	BEARING PAD DETAILS
S-1.18	DECK TYPICAL SECTION
S-1.19	INTERMEDIATE DIAPHRAGMS
S-1.20	ABUTMENT DIAPHRAGM DETAILS
S-1.21	PIER DIAPHRAGM DETAILS
S-1.22	MISCELLANEOUS DETAILS 1
S-1.23	MISCELLANEOUS DETAILS 2
S-1.24	SCREED ELEVATIONS 1
S-1.25	SCREED ELEVATIONS 2
S-1.26	COMB PED-TRAFFIC BRIDGE RAIL
S-1.27	34" F-SHAPE BRIDGE BARRIER WITH RAIL
S-1.28	PEDESTRIAN RAILING WITH CURB
S-1.29	CONDUIT DETAILS
S-1.30*	APPROACH SLAB ELEVATIONS
SF-1.01 – 1.05*	FOUNDATION DATA SHEETS

*NOT INCLUDED IN THIS STAGE

ADOT STRUCTURE DETAIL DRAWINGS INDEX

DRAWING NO.	DRAWING TITLE
SD 2.01	APPROACH SLAB DETAILS
SD 2.02	TYPE I ANCHOR SLAB DETAILS
SD 3.02	DECK JOINT ASSEMBLY STRIP SEAL
SD 5.01	STRUCTURE EXCAVATION PAYMENT LIMITS
SD 5.02	STRUCTURE BACKFILL PAYMENT LIMITS

NOTES:

1. STATIONING AND ELEVATIONS ARE GIVEN ALONG SONORAN DESERT DRIVE ℳ & CST ℄

CALL TWO WORKING DATE BEFORE YOU DIG
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(OUTSIDE MARICOPA COUNTY)

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GENERAL PLAN AND ELEVATION 1

CITY OF PHOENIX, ARIZONA
STREET TRANSPORTATION DEPARTMENT

SONORAN DESERT DRIVE
I-17 TO NORTH VALLEY PARKWAY
ST85110090

DR: MSK	DES: DJL	CK: KJK	SHT	TOTAL
DATE: 06/14	DATE: 06/14	DATE: 06/14		
DWG NO: S-1.01			55	137

REVISION BY CITY OF PHOENIX

NO.	DESCRIPTION	REV BY	CKD BY	DATE

REVISION BY CITY OF PHOENIX

NO.	DESCRIPTION	REV BY	CKD BY	DATE

REVISION BY CITY OF PHOENIX

NO.	DESCRIPTION	REV BY	CKD BY	DATE

K:\PHX_Roadway\191784002-Sonoran Desert Dr - I-17 to North Valley Pkwy\Cadd\ST85110090GP01.dwg 6/5/2014 4:10 PM VARNER, JOEL

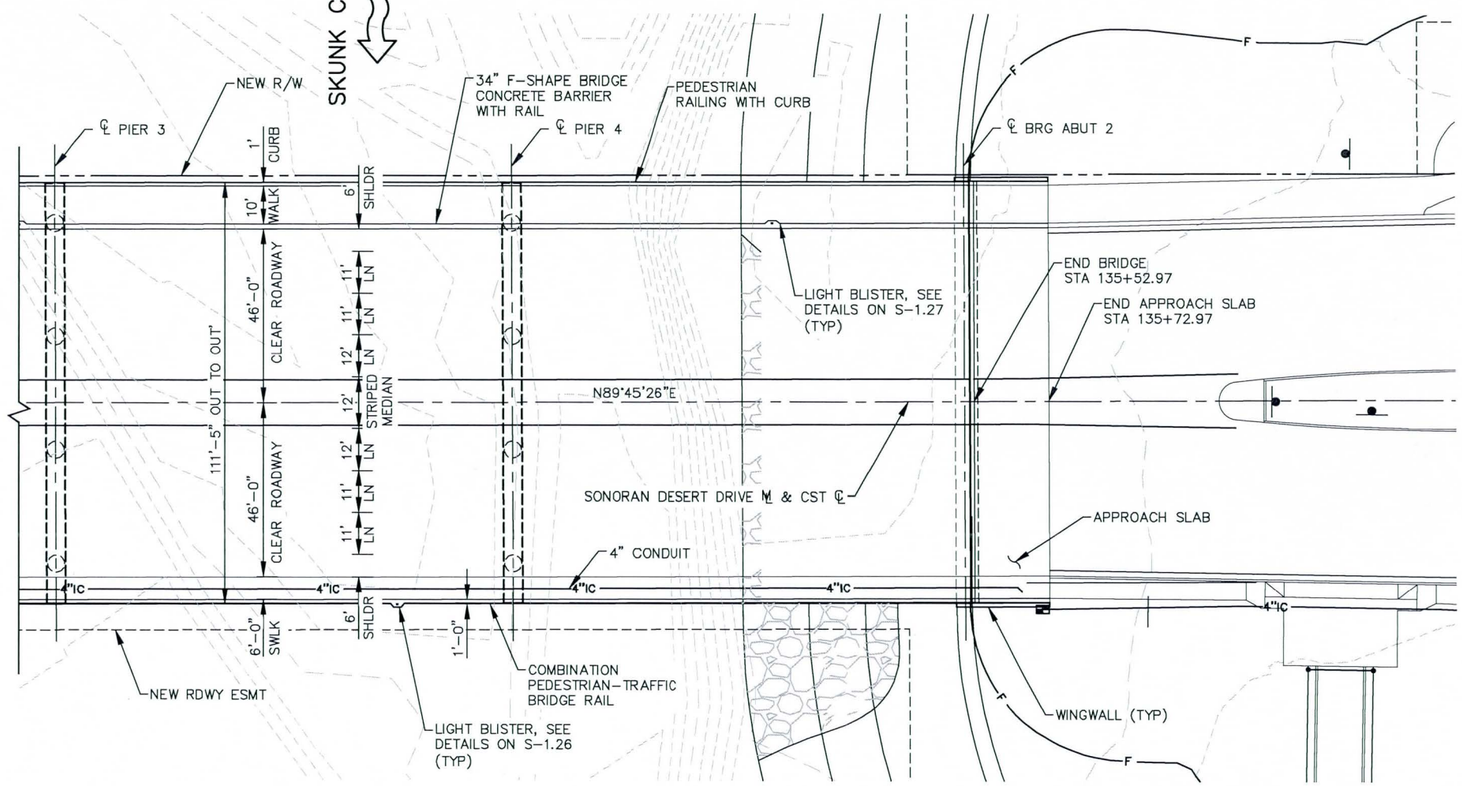
SONORAN DESERT DRIVE
I-17 TO NORTH VALLEY PARKWAY
PHOENIX STREETS – MARICOPA CO.

STATE	PROJ. NO.	SHT	TOTAL
ARIZ.	ST85110090	56	137

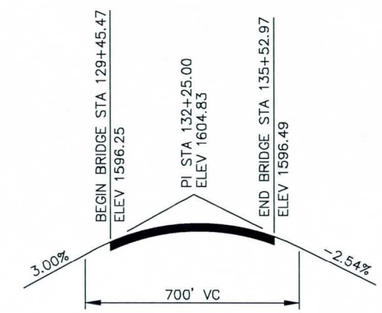
Kimley»Horn
7740 N. 16TH STREET
SUITE 300
PHOENIX, AZ 85020
Phone: 602-944-5500
Fax: 602-944-7423
www.kimley-horn.com

DR: MSK	DES: DJL	CK: KJK	DATE: 06/14

PRELIMINARY
60%
NOT FOR CONSTRUCTION OR RECORDING

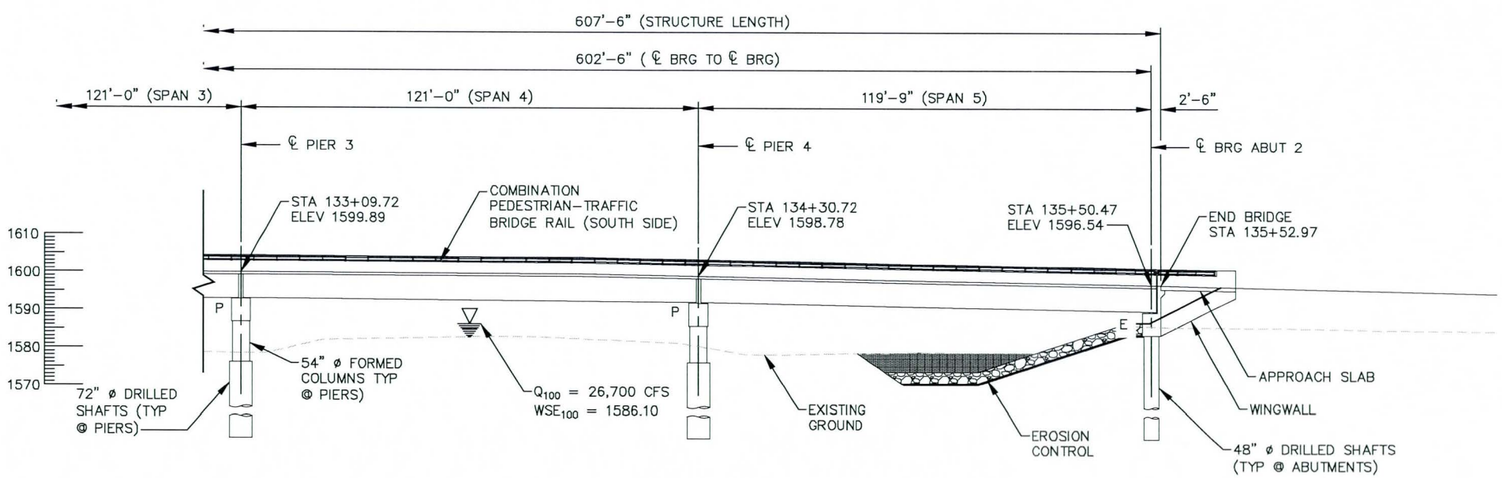


PLAN
NEW 5 SPAN PRESTRESSED CONCRETE AASHTO TYPE VI (MODIFIED) GIRDER BRIDGE
SKEW 0°0'0"
SCALE: 1"=20'-0"



NOTES:

1. STATIONING AND ELEVATIONS ARE GIVEN ALONG SONORAN DESERT DRIVE ℳ & CST ℄



ELEVATION
SCALE: 1"=20'-0"

CALL TWO WORKING DAYS BEFORE YOU DIG
602-263-1100
1-800-STAKE-IT
(OUTSIDE MARICOPA COUNTY)

"PER CITY OF PHOENIX CITY CODE CHAPTER 2, SECTION 2-28 THESE PLANS ARE FOR OFFICIAL USE ONLY & MAY NOT BE SHARED WITH OTHERS EXCEPT AS REQUIRED TO FULFILL THE OBLIGATIONS OF THE CONTRACTOR'S CONTRACT WITH THE CITY OF PHOENIX."

GENERAL PLAN AND ELEVATION 2

CITY OF PHOENIX, ARIZONA
STREET TRANSPORTATION DEPARTMENT

SONORAN DESERT DRIVE
I-17 TO NORTH VALLEY PARKWAY
ST85110090

DR: MSK	DES: DJL	CK: KJK	SHT	TOTAL
DATE: 06/14	DATE: 06/14	DATE: 06/14		
DWG NO: S-1.02			56	137

REVISION BY CITY OF PHOENIX

NO.	DESCRIPTION	REV BY	CKD BY	DATE

REVISION BY CITY OF PHOENIX

NO.	DESCRIPTION	REV BY	CKD BY	DATE

REVISION BY CITY OF PHOENIX

NO.	DESCRIPTION	REV BY	CKD BY	DATE

6/5/2014 4:11 PM VARNER, JOEL
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SONORAN DESERT DRIVE
I-17 TO NORTH VALLEY PARKWAY
PHOENIX STREETS – MARICOPA CO.

PRELIMINARY
60%
NOT FOR CONSTRUCTION OR RECORDING

STATE	PROJ. NO.	SHT	TOTAL
ARIZ.	ST85110090	57	137

Kimley»Horn
7740 N. 16TH STREET
SUITE 300
PHOENIX, AZ 85020
Phone: 602-944-5500
Fax: 602-944-7423
www.kimley-horn.com

DR: MSK | DES: DJL | CK: KJK | DATE: 06/14

GENERAL NOTES

DESIGN SPECIFICATIONS

AASHTO LRFD BRIDGE DESIGN SPECIFICATIONS, FIFTH EDITION, 2010, (LRFD) INCLUDING 2010 INTERIM REVISIONS.

CONSTRUCTION SPECIFICATIONS

MARICOPA ASSOCIATION OF GOVERNMENTS (MAG), UNIFORM STANDARD SPECIFICATION FOR PUBLIC WORKS CONSTRUCTION AND REVISION DATE.

CITY OF PHOENIX SUPPLEMENT TO MAG UNIFORM STANDARD SPECIFICATIONS.

ARIZONA DEPARTMENT OF TRANSPORTATION STANDARD SPECIFICATIONS FOR ROAD AND BRIDGE CONSTRUCTION 2008 EDITION. APPLICABLE WHEN REFERENCED IN SPECIAL PROVISIONS AND AREAS NOT COVERED BY MAG SPECIFICATION.

DESIGN LOADING

LIVE LOAD, HL-93 (LRFD)

DEAD LOAD INCLUDED ALLOWANCES OF 25 PSF FOR FUTURE WEARING SURFACE.

THE SUPERSTRUCTURE IS DESIGNED AS A COMPOSITE SECTION WITH THE TOP ½" OF SLAB THICKNESS REMOVED FROM THE DESIGN SECTION PROPERTIES TO ACCOUNT FOR GRINDING, GROOVING AND WEARING.

SEISMIC PERFORMANCE ZONE 1 (ACCELERATION COEFFICIENT OF 0.04).

DESIGN MAXIMUM SCOUR 21'-0".

RATING

RATING FACTORS ARE BASED ON AASHTO LRFR AND LFD METHODS WITH LFD LOAD RATING FOR INVENTORY BASED ON HS-25.

LFR METHOD (HS-25): INVENTORY 1.06
OPERATING 1.71

LRFR METHOD (HL-93): INVENTORY 1.23
OPERATING 1.77

CONCRETE STRENGTHS

DECK, DIAPHRAGMS. . . . . f'c = 4500 psi – ADOT CLASS S
ABUTMENTS, PIERS, COLUMNS . . . . . f'c = 3500 psi – ADOT CLASS S
GIRDERS . . . . . f'c = VARIES – SEE GIRDER SHTS
DRILLED SHAFTS. . . . . f'c = 3500 psi – ADOT CLASS S

REINFORCING STEEL SHALL CONFORM TO ASTM A615 EXCEPT WHERE ASTM A706 IS SPECIFIED FOR WELDABILITY. ALL REINFORCING STEEL SHALL BE FURNISHED AS GRADE 60.

PRESTRESSING STEEL SHALL CONFORM TO ASTM A416 GRADE 270 LOW RELAXATION 7-WIRE STRAND.

ALL BENDS AND HOOKS SHALL MEET THE REQUIREMENTS OF AASHTO LRFD SECTION 5.10.2. ALL BEND DIMENSIONS FOR REINFORCING STEEL SHALL BE OUT-TO-OUT OF BARS. ALL PLACEMENT DIMENSIONS FOR REINFORCING STEEL SHALL BE CENTER OF BARS UNLESS NOTED OTHERWISE.

ALL REINFORCING STEEL SHALL HAVE 2 INCH CLEAR COVER, UNLESS NOTED OTHERWISE.

CHAMFER ALL EXPOSED CORNERS ¾" UNLESS NOTED OTHERWISE.

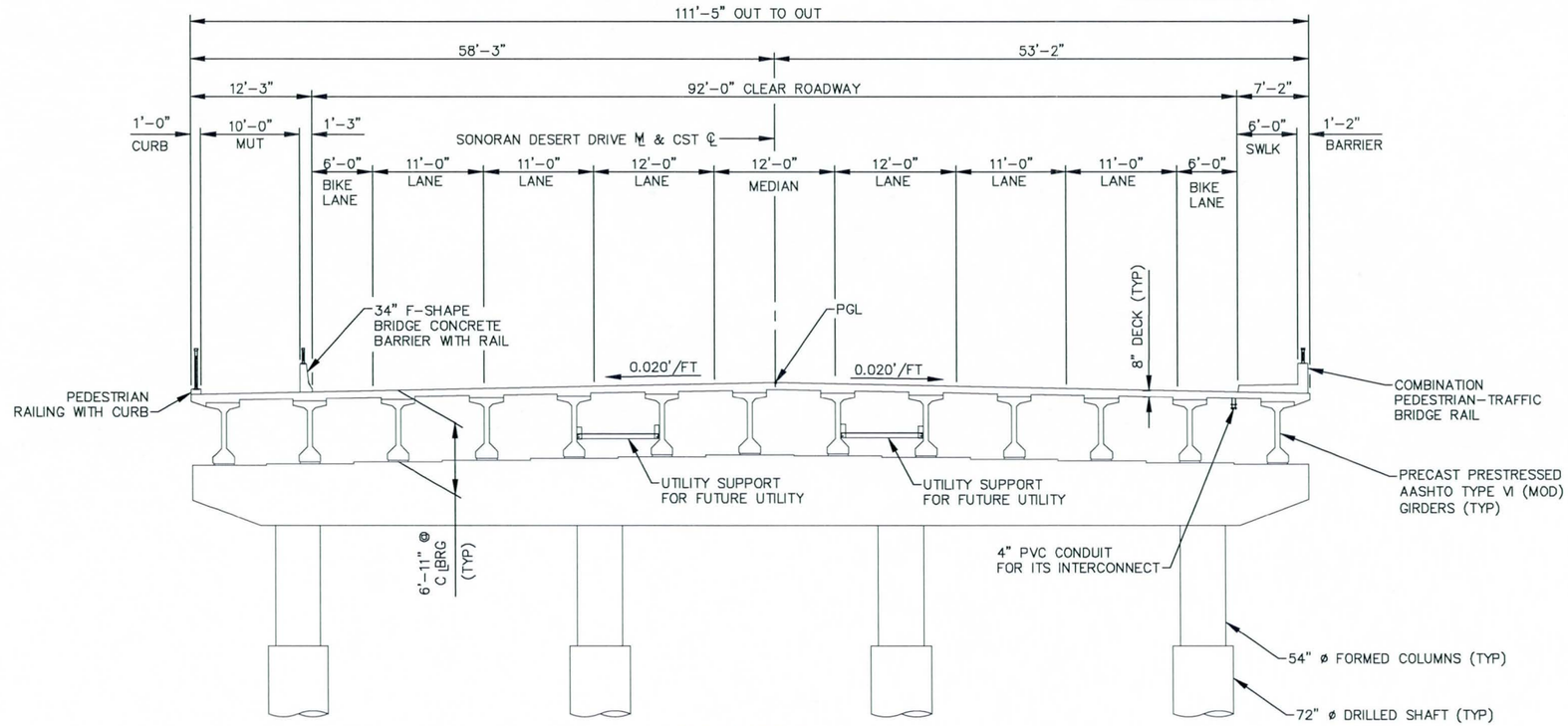
ALL WELDING SHALL CONFORM TO THE REQUIREMENTS OF THE AMERICAN WELDING SOCIETY BRIDGE WELDING CODE D1.5-2002, UNLESS NOTED OTHERWISE.

ALL STRUCTURAL STEEL SHALL CONFORM TO ASTM A500 GRADE B, AND A53 GRADE B, UNLESS NOTED OTHERWISE.

DIMENSIONS SHALL NOT BE SCALED FROM DRAWINGS.

STRUCTURE SHALL BE PAINTED IN ACCORDANCE WITH THE STANDARD SPECIFICATION AND THE SPECIAL PROVISIONS.

STAY-IN-PLACE DECK FORMS SHALL NOT BE USED ON THIS BRIDGE.



TYPICAL SECTION
SCALE: ⅜"=1'-0"

APPROXIMATE QUANTITIES

ITEM	STRUCTURE EXCAVATION	STRUCTURE BACKFILL	CONCRETE CLASS S (f'c=3500 psi)	CONCRETE CLASS S (f'c=4500 psi)	REINFORCING STEEL	AASHTO GIRDER TYPE VI (MOD)	48" ø DRILLED SHAFT	72" ø DRILLED SHAFT	34" F-SHAPE BRIDGE CONCRETE BARRIER WITH RAIL	PEDESTRIAN PARAPET AND RAILING	PEDESTRIAN RAILING WITH CURB	STRUCTURAL STEEL
	CY	CY	CY	CY	LBS	LF	LF	LF	LF	LF	LF	LBS
ABUTMENT 1	87	191	162		22,468		420					
ABUTMENT 2	87	191	162		22,468		420					
PIER 1			160		28,971			352				
PIER 2			160		28,971			352				
PIER 3			160		28,971			352				
PIER 4			160		28,971			352				
SUPERSTRUCTURE			169	2,390	605,342	7,800			693	693	693	62,950
TOTAL	174	382	1,133	2,390	766,161	7,800	840	1,408	693	693	693	62,950
AS BUILT												

CONCRETE APPROACH SLAB. . . . . 4,457 SF
CONCRETE ANCHOR SLAB ADOT DETAIL SD 2.02 . . . . . 5,014 SF
DECK JOINT ASSEMBLIES (STRIP SEAL). . . . . 223 LF
ELASTOMERIC BEARING PAD-PINNED. . . . . 104 EA
ELASTOMERIC BEARING PAD-EXPANSION. . . . . 26 EA
STRUCTURAL STEEL . . . . . 62,950 LBS
RESTRAINER, VERTICAL (EXPANSION) . . . . . 24 EA
RESTRAINER, VERTICAL (FIXED) . . . . . 48 EA

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GENERAL NOTES AND QUANTITIES

CITY OF PHOENIX, ARIZONA
STREET TRANSPORTATION DEPARTMENT

SONORAN DESERT DRIVE
I-17 TO NORTH VALLEY PARKWAY
ST85110090

DR: MSK	DES: DJL	CK: KJK	SHT	TOTAL
DATE: 06/14	DATE: 06/14	DATE: 06/14		
DWG NO: S-1.03			57	137

REVISION BY CITY OF PHOENIX
NO. | DESCRIPTION | REV BY | CKD BY | DATE

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SONORAN DESERT DRIVE
I-17 TO NORTH VALLEY PARKWAY
PHOENIX STREETS – MARICOPA CO.

PRELIMINARY
60%
NOT FOR CONSTRUCTION OR RECORDING

STATE	PROJ. NO.	SHT	TOTAL
ARIZ.	ST85110090	58	137

Kimley»Horn
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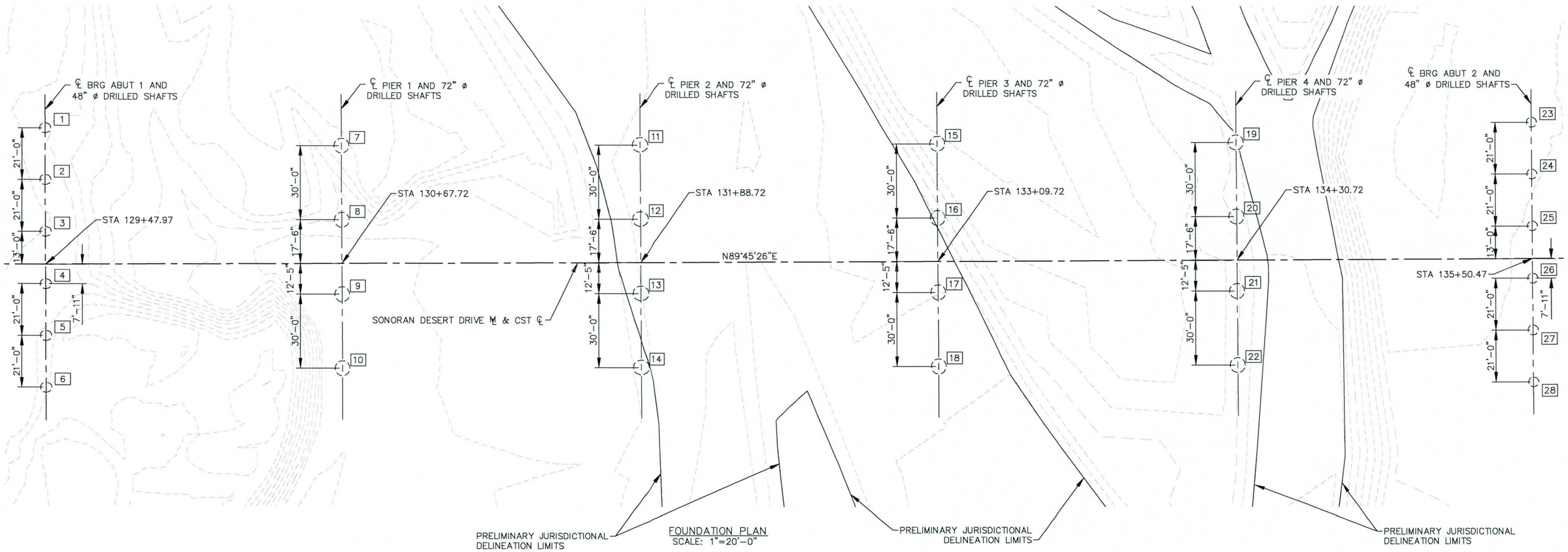
SUITE 300
PHOENIX, AZ 85020
Phone: 602-944-5500
Fax: 602-944-7423
www.kimley-horn.com

DR: MSK | DES: DJL | CK: KJK | DATE: 06/14



FOUNDATION PLAN
SCALE: 1"=20'-0"

DRILLED SHAFT NOTES:

1. DESIGN LOADS
   ABUTMENT . . . . . 394 KIPS (EXTREME EVENT LIMITS STATE)
   PIERS . . . . . 2275 KIPS (STRENGTH LIMIT STATE)
2. STATIONS ARE MEASURED ALONG SONORAN DESERT DRIVE ℳ AND CST ℄.
3. [6] INDICATES DRILLED SHAFT FOUNDATION IDENTIFICATION NUMBER.
4. NO NEW SHAFT DRILLING IS PERMITTED WITHIN 4 SHAFT DIAMETERS MEASURED CENTER TO CENTER UNTIL 48 HOURS AFTER THE CONCRETING OF THE DRILLED SHAFT.
5. IF BENTONITE SLURRY ASSISTED DRILLING IS REQUIRED DUE TO GROUNDWATER, PROVIDE 4–2" DIA (48"ø DRILLED SHAFTS) AND 6–2" DIA (72"ø DRILLED SHAFTS) SCHEDULE 80 RIGID PVC PIPES SPACED EQUALLY AS SHOWN ON DRILLED SHAFT DETAILS SHEET TO ALLOW INSPECTION OF THE DRILLED SHAFT FOUNDATIONS BY MEANS OF GAMMA RAY LOGGING DEVICE. SECURELY TIE THE PIPE TO THE OUTSIDE OF THE REINFORCING CAGE AND EXTEND FROM THE BOTTOM OF THE REINFORCING CAGE TO 12" ABOVE THE TOP OF DRILLED SHAFTS WITH CAPS AT EACH END.
6. THE LENGTH OF DRILLED SHAFT IS BASED ON A COMBINATION OF END BEARING AND SIDE FRICTION RESISTANCE OF THE SHAFT LENGTH BELOW THE MAXIMUM ANTICIPATED SCOUR DEPTH, AND IS THE MINIMUM LENGTH REQUIRED.
7. SEE DRAWINGS SF–1.01 THRU 1.05 FOR FOUNDATION DATA.

48" DIA DRILLED SHAFT –ABUT		
DRILLED SHAFT	ELEV A	ELEV B
1	1582.95	1512.95
2	1582.95	1512.95
3	1582.95	1512.95
4	1582.95	1512.95
5	1582.95	1512.95
6	1582.95	1512.95
23	1583.18	1513.18
24	1583.18	1513.18
25	1583.18	1513.18
26	1583.18	1513.18
27	1583.18	1513.18
28	1583.18	1513.18

FOR LOCATIONS OF ELEVATIONS A & B SEE DRAWING S–1.05

72" DIA DRILLED SHAFT –ABUT		
DRILLED SHAFT	ELEV A	ELEV B
7	1572.43	1492.43
8	1572.43	1492.43
9	1572.43	1492.43
10	1572.43	1492.43
11	1573.66	1493.66
12	1573.66	1493.66
13	1573.66	1493.66
14	1573.66	1493.66
15	1573.71	1493.71
16	1573.71	1493.71
17	1573.71	1493.71
18	1573.71	1493.71
19	1572.56	1492.56
20	1572.56	1492.56
21	1572.56	1492.56
22	1572.56	1492.56

FOR LOCATIONS OF ELEVATIONS A & B SEE DRAWING S–1.05

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FOUNDATION PLAN

CITY OF PHOENIX, ARIZONA
STREET TRANSPORTATION DEPARTMENT

SONORAN DESERT DRIVE
I-17 TO NORTH VALLEY PARKWAY
ST85110090

DR: MSK	DES: DJL	CK: KJK	SHT	TOTAL
DATE: 06/14	DATE: 06/14	DATE: 06/14		
DWG NO: S–1.04			58	137

NO.	DESCRIPTION	REV BY	CKD BY	DATE
	REVISION BY CITY OF PHOENIX			

NO.	DESCRIPTION	REV BY	CKD BY	DATE
	REVISION BY CITY OF PHOENIX			

NO.	DESCRIPTION	REV BY	CKD BY	DATE
	REVISION BY CITY OF PHOENIX			

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SONORAN DESERT DRIVE
I-17 TO NORTH VALLEY PARKWAY
PHOENIX STREETS – MARICOPA CO.

PRELIMINARY
60%
NOT FOR CONSTRUCTION OR RECORDING

STATE	PROJ. NO.	SHT	TOTAL
ARIZ.	ST85110090	59	137

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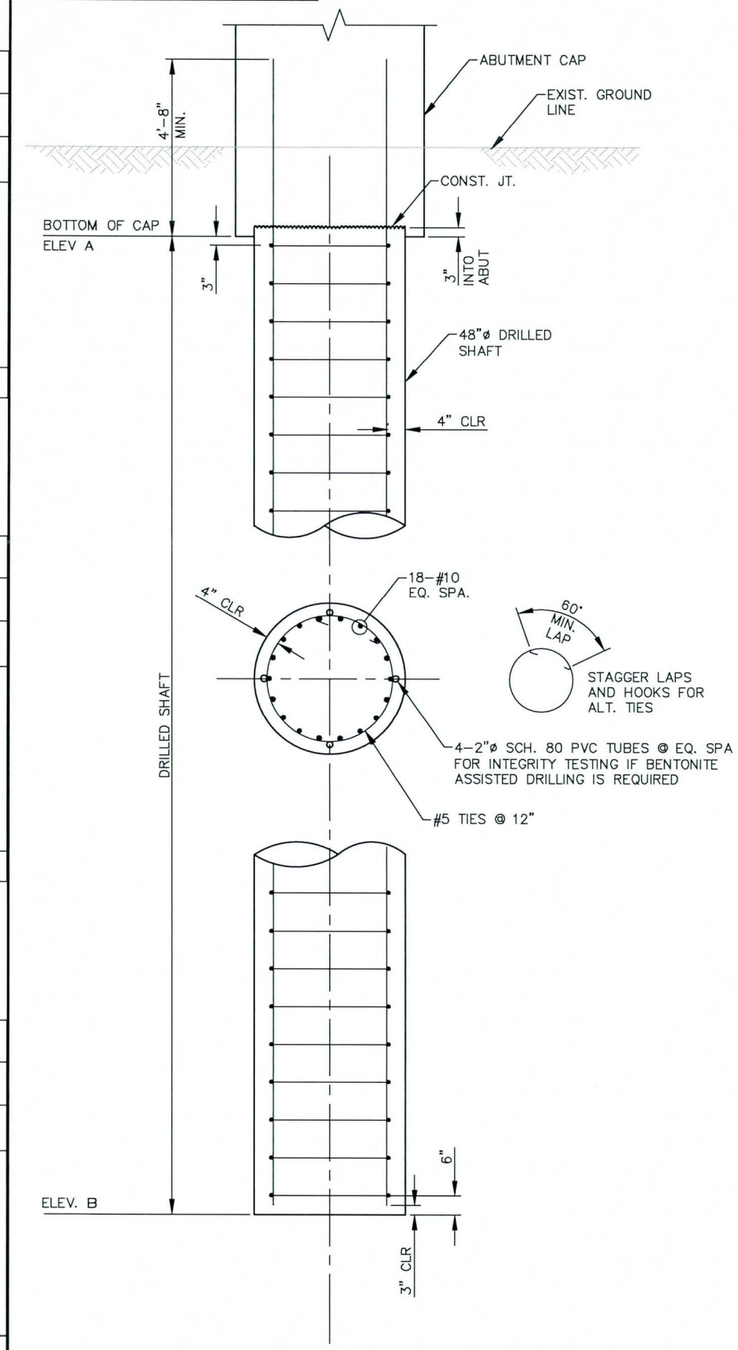
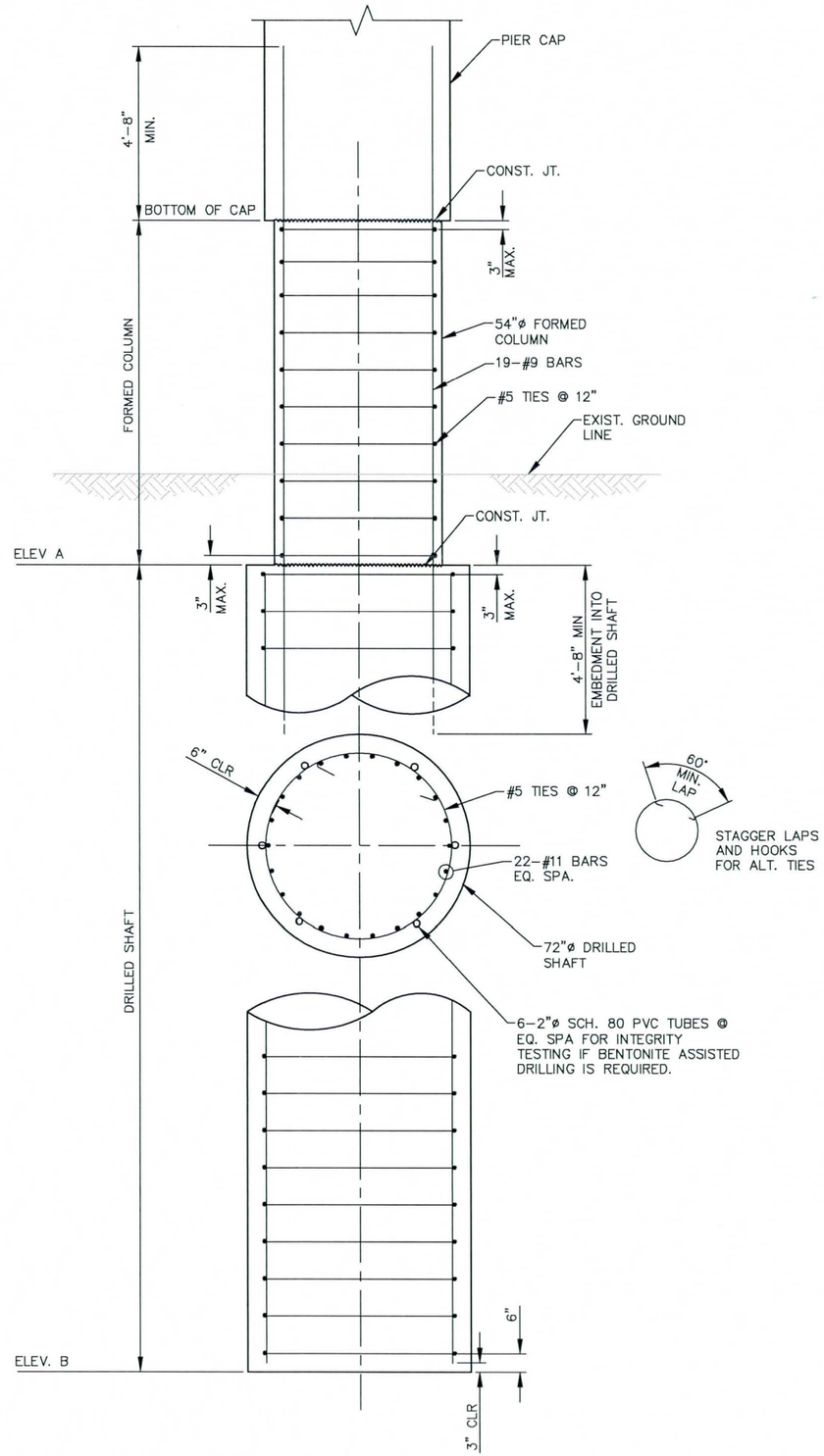
www.kimley-horn.com

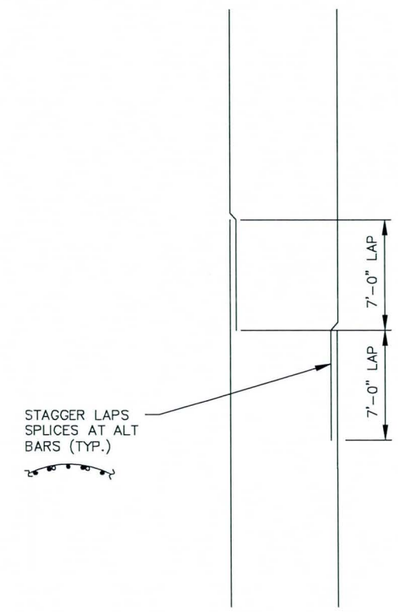
DR: MSK	DES: DJL	CK: KJK	DATE: 06/14



DRILLED SHAFT AT ABUTMENT #1 AND #2
SCALE: ⅜"=1'-0"



DRILLED SHAFT AT PIER
SCALE: ⅜"=1'-0"



SPLICE DETAIL
N.T.S.

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DRILLED SHAFT DETAILS

CITY OF PHOENIX, ARIZONA
STREET TRANSPORTATION DEPARTMENT

SONORAN DESERT DRIVE
I-17 TO NORTH VALLEY PARKWAY
ST85110090

DR: MSK	DES: DJL	CK: KJK	SHT	TOTAL
DATE: 06/14	DATE: 06/14	DATE: 06/14		
DWG NO: S-1.05			59	137

REVISION BY CITY OF PHOENIX

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SONORAN DESERT DRIVE
I-17 TO NORTH VALLEY PARKWAY
PHOENIX STREETS – MARICOPA CO.

PRELIMINARY
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NOT FOR CONSTRUCTION OR RECORDING

STATE	PROJ. NO.	SHT	TOTAL
ARIZ.	ST85110090	60	137

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Phone: 602-944-5500
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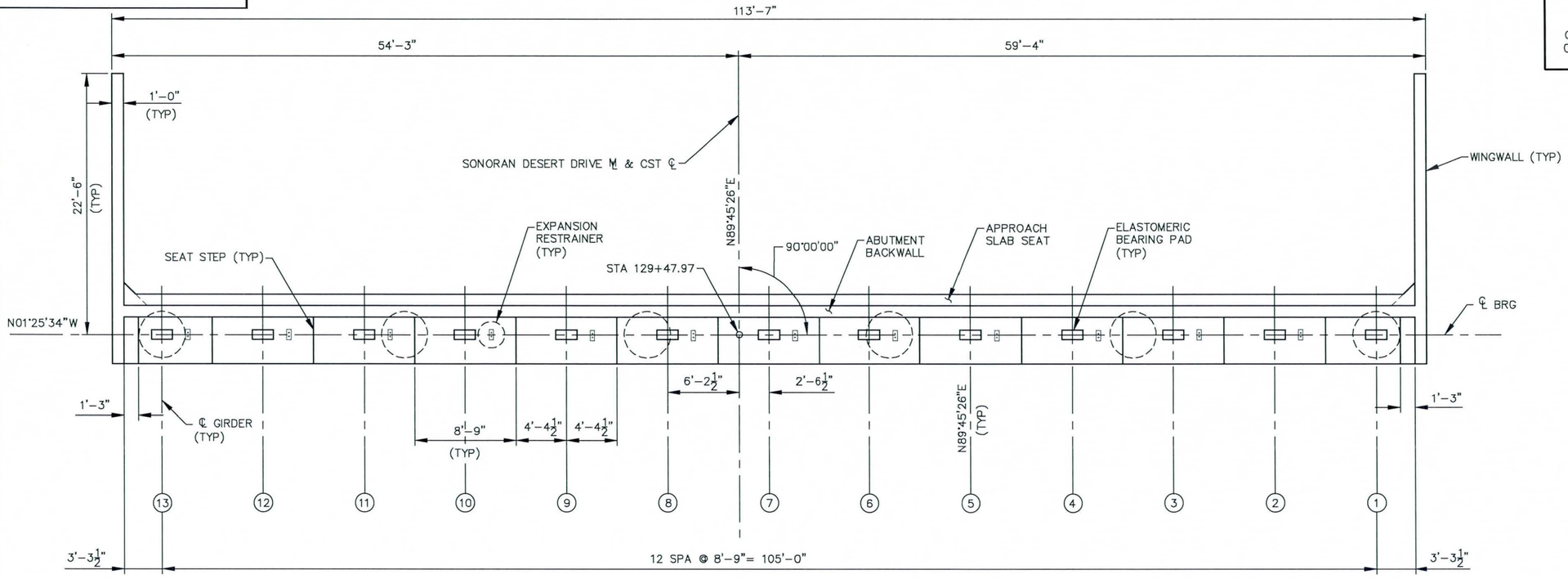
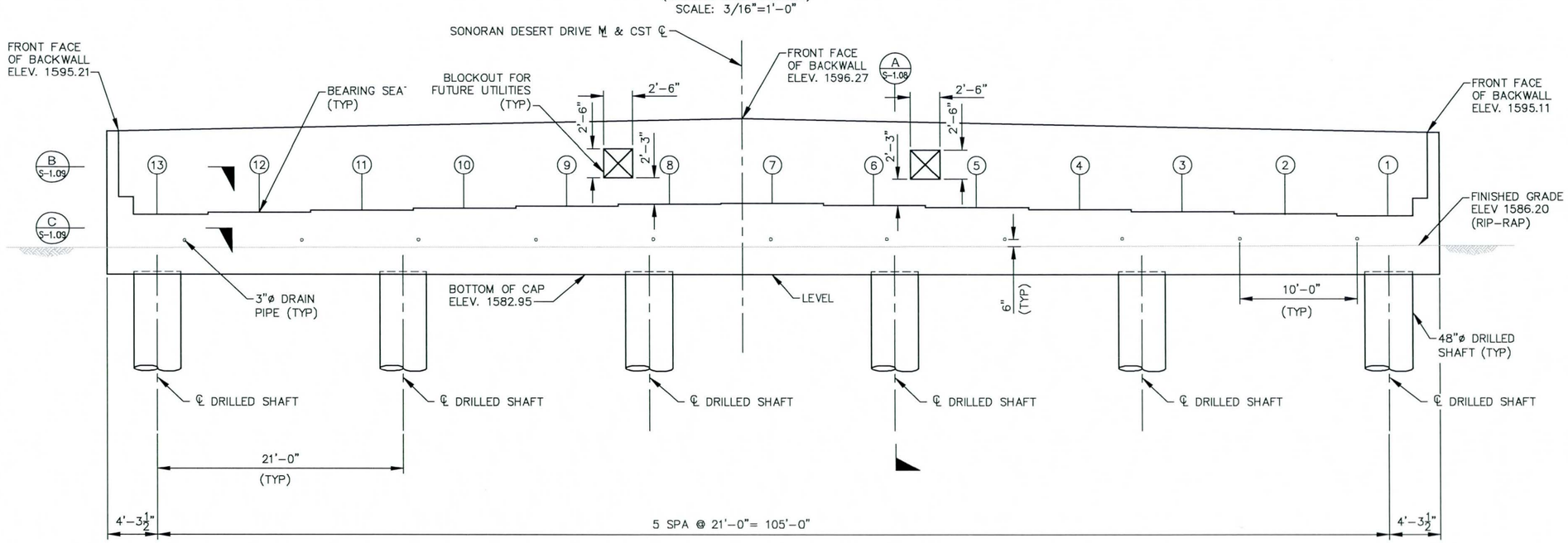
www.kimley-horn.com

DR: RLS	DES: DJL	CK: KJK	DATE: 06/14



PLAN
(LOOKING BACK STATION)
SCALE: 3/16"=1'-0"



ELEVATION
SCALE: 3/16"=1'-0"

BEARING SEAT ELEVATION	
GIRDER	ELEVATION
1	1587.95
2	1588.12
3	1588.30
4	1588.47
5	1588.65
6	1588.82
7	1589.00
8	1588.92
9	1588.75
10	1588.57
11	1588.40
12	1588.22
13	1588.05

NOTE:

FOR REINFORCING AT UTILITY BLOCKOUT DETAILS SEE SHEETS S-1.09 AND S-1.23.

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ABUTMENT 1 PLAN AND ELEVATION

CITY OF PHOENIX, ARIZONA
STREET TRANSPORTATION DEPARTMENT

SONORAN DESERT DRIVE
I-17 TO NORTH VALLEY PARKWAY
ST85110090

DR: RLS	DES: DJL	CK: KJK	SHT	TOTAL
DATE: 06/14	DATE: 06/14	DATE: 06/14		
DWG NO: S-1.06			60	137

REVISION BY CITY OF PHOENIX

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REVISION BY CITY OF PHOENIX

NO.	DESCRIPTION	REV BY	CKD BY	DATE

REVISION BY CITY OF PHOENIX

NO.	DESCRIPTION	REV BY	CKD BY	DATE

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SONORAN DESERT DRIVE
I-17 TO NORTH VALLEY PARKWAY
PHOENIX STREETS – MARICOPA CO.

PRELIMINARY
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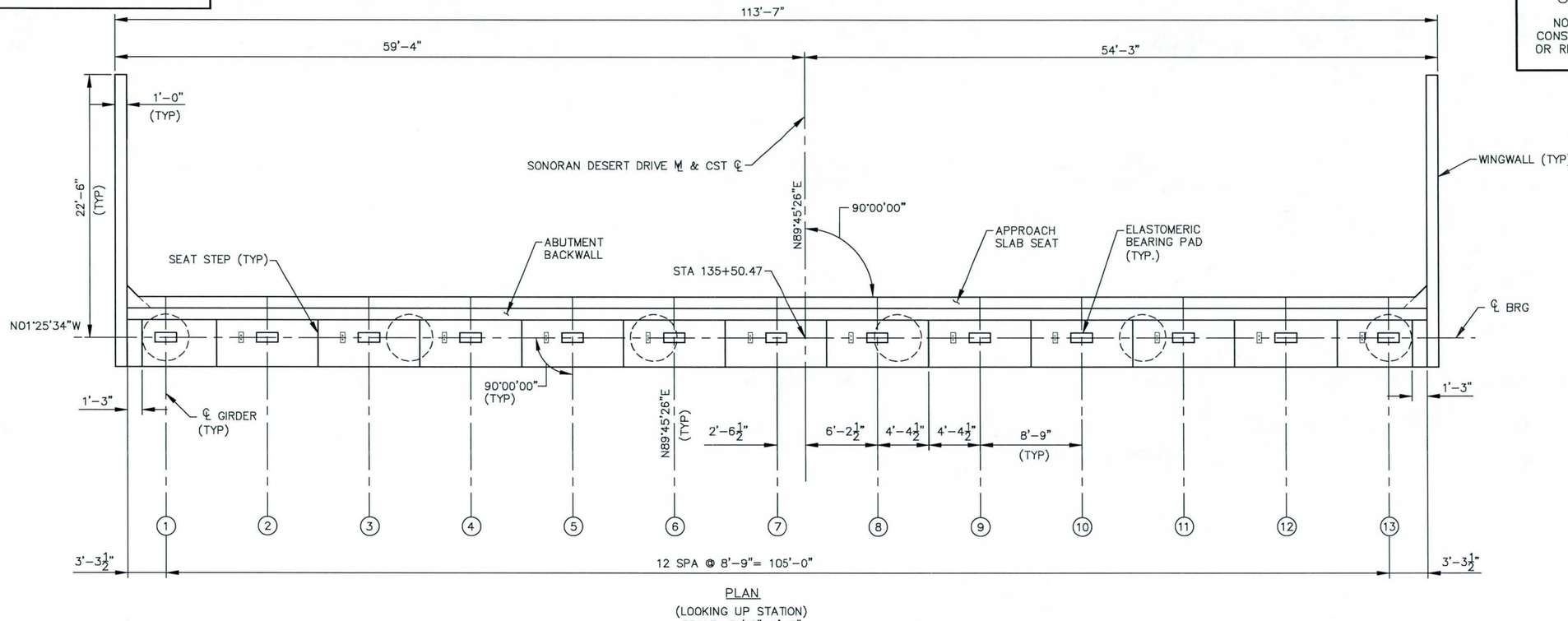
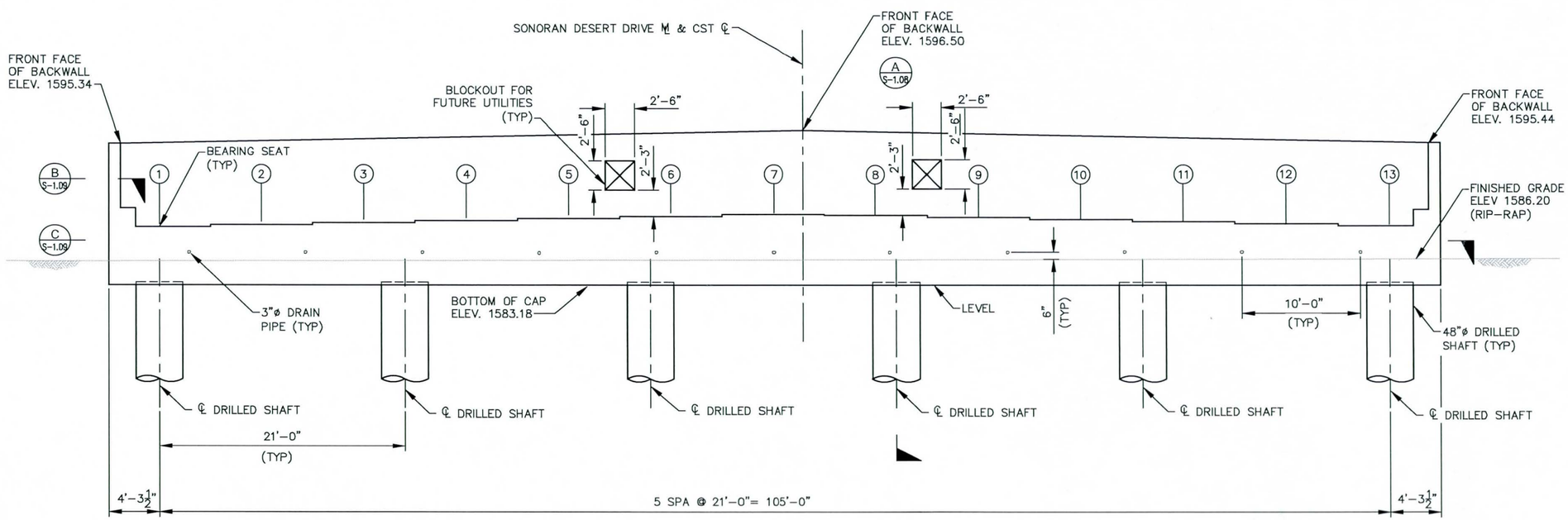
DR: RLS	DES: DJL	CK: KJK	DATE: 06/14



PLAN
(LOOKING UP STATION)
SCALE: 3/16"=1'-0"

BEARING SEAT ELEVATION	
GIRDER	ELEVATION
1	1588.18
2	1588.35
3	1588.53
4	1588.70
5	1588.88
6	1589.05
7	1589.23
8	1589.15
9	1588.98
10	1588.80
11	1588.63
12	1588.45
13	1588.28



ELEVATION
SCALE: 3/16"=1'-0"

NOTE:

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ABUTMENT 2 PLAN AND ELEVATION

CITY OF PHOENIX, ARIZONA
STREET TRANSPORTATION DEPARTMENT

SONORAN DESERT DRIVE
I-17 TO NORTH VALLEY PARKWAY
ST85110090

DR: RLS	DES: DJL	CK: KJK	SHT	TOTAL
DATE: 06/14	DATE: 06/14	DATE: 06/14		
DWG NO: S-1.07			61	137

REVISION BY CITY OF PHOENIX

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SONORAN DESERT DRIVE
I-17 TO NORTH VALLEY PARKWAY
PHOENIX STREETS – MARICOPA CO.

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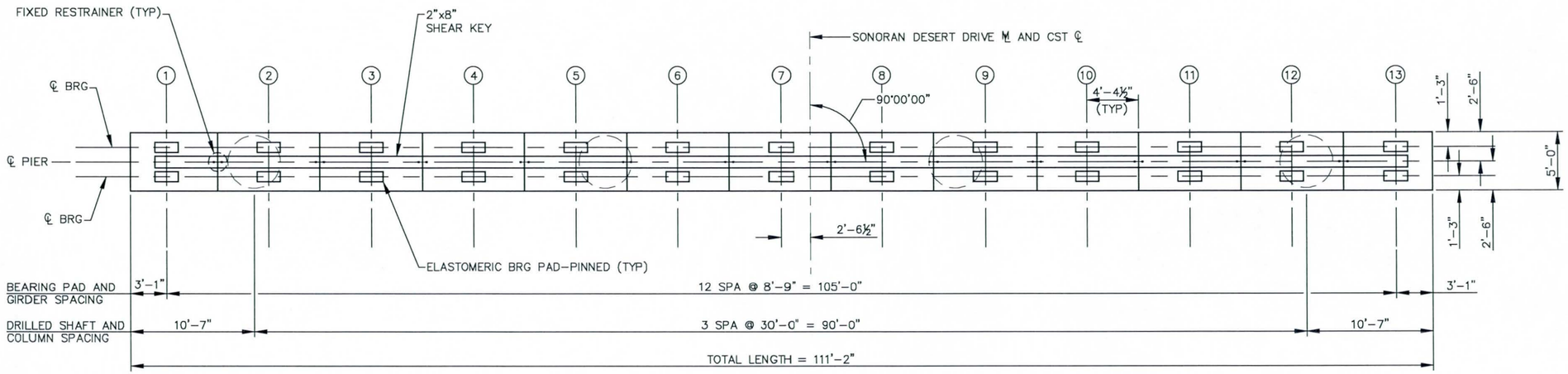
DR: MSK	DES: DJL	CK: KJK	DATE: 06/14



PLAN
SCALE: 3/16"=1'-0"

BEARING SEAT ELEVATIONS				
LOCATION	PIER 1	PIER 2	PIER 3	PIER 4
	STA 130+67.72	STA 131+88.72	STA 133+09.72	STA 134+30.72
1	1590.43	1591.66	1591.71	1590.56
2	1590.60	1591.84	1591.88	1590.74
3	1590.78	1592.01	1592.06	1590.91
4	1590.95	1592.19	1592.23	1591.09
5	1591.13	1592.36	1592.41	1591.26
6	1591.30	1592.54	1592.58	1591.44
7	1591.48	1592.71	1592.76	1591.61
8	1591.40	1592.64	1592.69	1591.54
9	1591.23	1592.46	1592.51	1591.37
10	1591.05	1592.29	1592.34	1591.19
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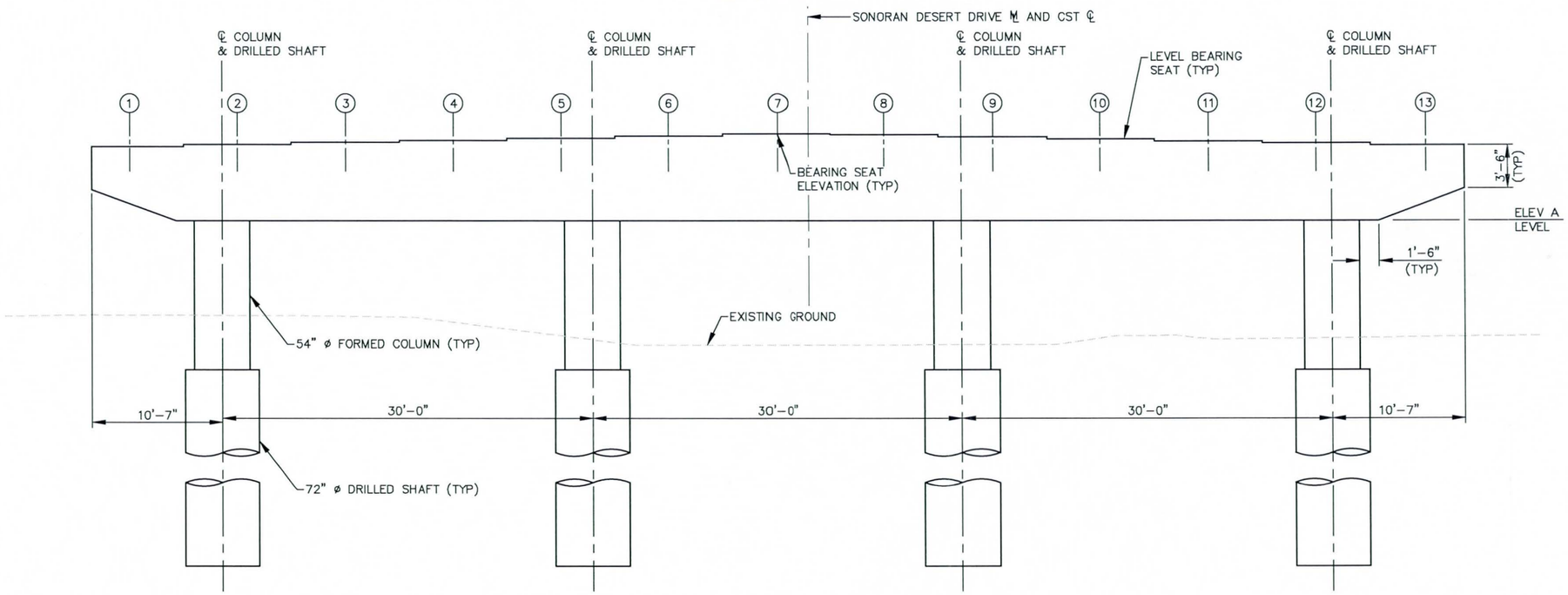


ELEVATION
SCALE: 3/16"=1'-0"

CALL TWO WORKING DAYS BEFORE YOU DIG
602-263-1100
1-800-STAKE-IT
(OUTSIDE MARICOPA COUNTY)

"PER CITY OF PHOENIX CITY CODE CHAPTER 2, SECTION 2-28 THESE PLANS ARE FOR OFFICIAL USE ONLY & MAY NOT BE SHARED WITH OTHERS EXCEPT AS REQUIRED TO FULFILL THE OBLIGATIONS OF THE CONTRACTOR'S CONTRACT WITH THE CITY OF PHOENIX."

PIER PLAN AND ELEVATION

CITY OF PHOENIX, ARIZONA
STREET TRANSPORTATION DEPARTMENT

SONORAN DESERT DRIVE
I-17 TO NORTH VALLEY PARKWAY
ST85110090

DR: MSK	DES: DJL	CK: KJK	SHT	TOTAL
DATE: 06/14	DATE: 06/14	DATE: 06/14		
DWG NO: S-1.11			65	137

REVISION BY CITY OF PHOENIX

NO.	DESCRIPTION	REV BY	CKD BY	DATE

REVISION BY CITY OF PHOENIX

NO.	DESCRIPTION	REV BY	CKD BY	DATE

REVISION BY CITY OF PHOENIX

NO.	DESCRIPTION	REV BY	CKD BY	DATE

[redacted] VARNER, JOEL [redacted] 6/5/2014 4:14 PM [redacted] R:\PHX_Roadway\191784002-Sonoran Desert Dr - I-17 to North Valley Pkwy\Cadd\ST85110090-S06.dwg [redacted]

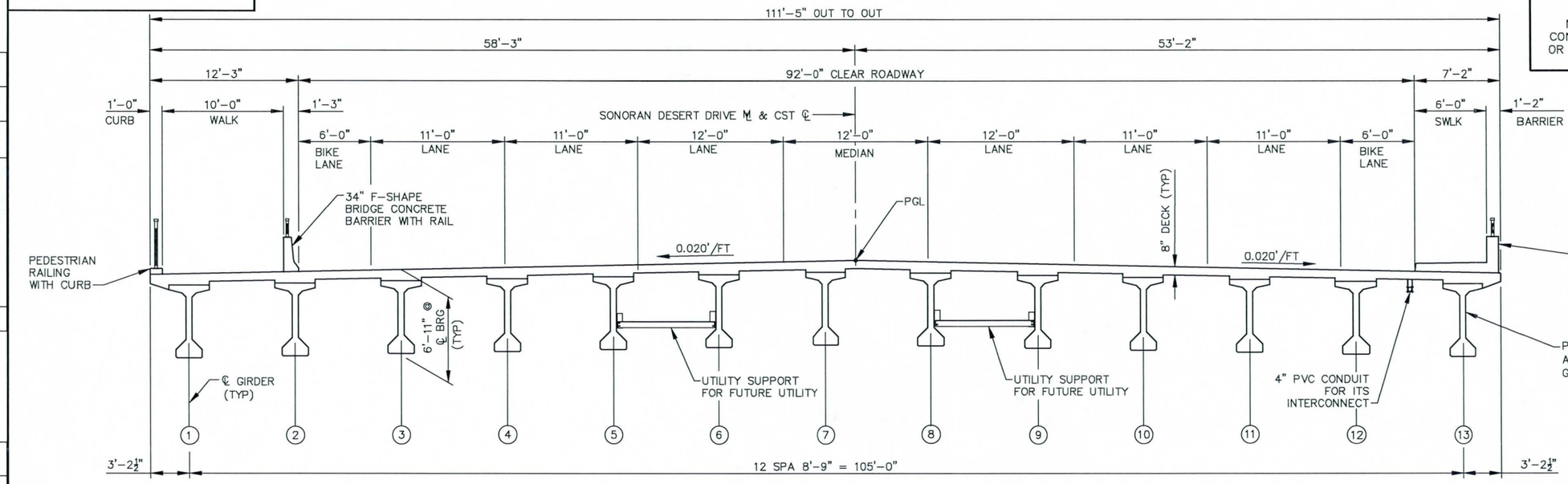
SONORAN DESERT DRIVE
I-17 TO NORTH VALLEY PARKWAY
PHOENIX STREETS – MARICOPA CO.

PRELIMINARY
60%
NOT FOR CONSTRUCTION OR RECORDING

STATE	PROJ. NO.	SHT	TOTAL
ARIZ.	ST85110090	72	137

Kimley»Horn
7740 N. 16TH STREET
SUITE 300
PHOENIX, AZ 85020
Phone: 602-944-5500
Fax: 602-944-7423
www.kimley-horn.com

DR: MSK | DES: DJL | CK: KJK | DATE: 06/14



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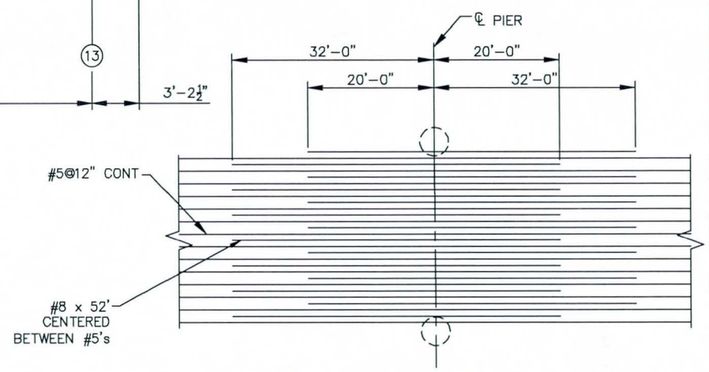

TOP LONGITUDINAL REINFORCEMENT DETAIL AT PIERS
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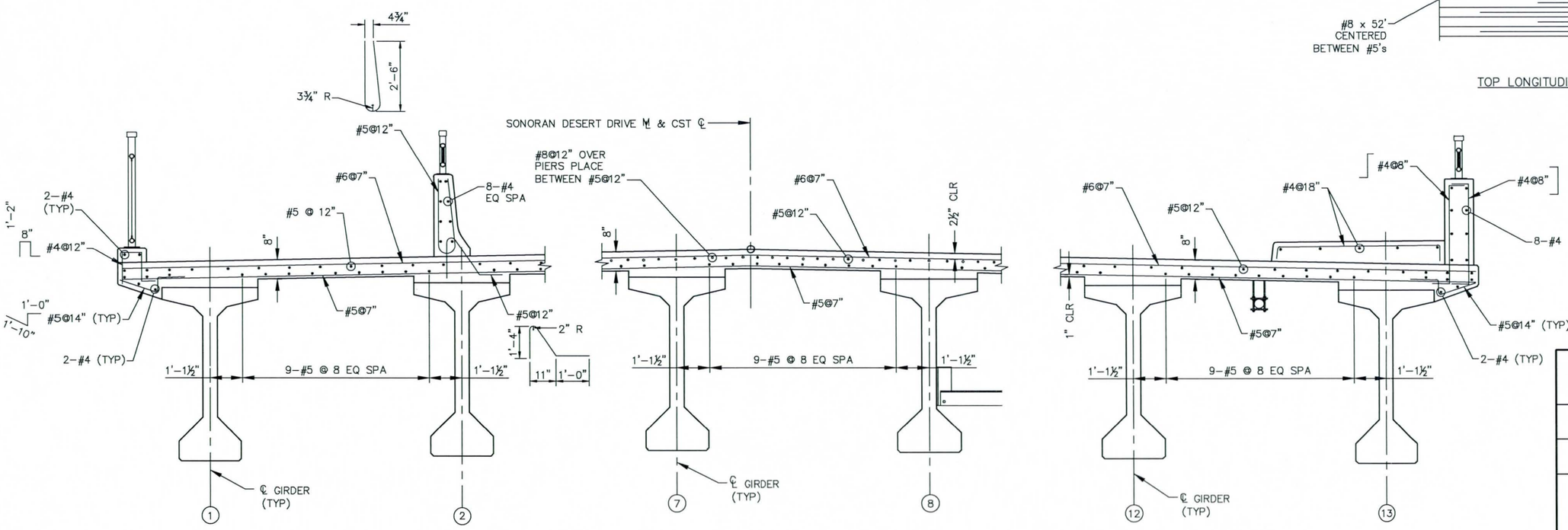

PARTIAL SECTION TYPICAL DECK REINFORCING
SCALE: ¾"=1'–0"

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1-800-STAKE-IT
(OUTSIDE MARICOPA COUNTY)

"PER CITY OF PHOENIX CITY CODE CHAPTER 2, SECTION 2–28 THESE PLANS ARE FOR OFFICIAL USE ONLY & MAY NOT BE SHARED WITH OTHERS EXCEPT AS REQUIRED TO FULFILL THE OBLIGATIONS OF THE CONTRACTOR'S CONTRACT WITH THE CITY OF PHOENIX."

DECK TYPICAL SECTION

CITY OF PHOENIX, ARIZONA
STREET TRANSPORTATION DEPARTMENT

SONORAN DESERT DRIVE
I-17 TO NORTH VALLEY PARKWAY
ST85110090

DR: MSK	DES: DJL	CK: KJK	SHT	TOTAL
DATE: 06/14	DATE: 06/14	DATE: 06/14		
DWG NO: S–1.18			72	137

REVISION BY CITY OF PHOENIX

NO.	DESCRIPTION	REV BY	CKD BY	DATE

REVISION BY CITY OF PHOENIX

NO.	DESCRIPTION	REV BY	CKD BY	DATE

VARNER, JOEL
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Appendix G. ESA Compliance Documentation

BIOLOGICAL EVALUATION

Sonoran Desert Drive
Interstate 17 to North Valley Parkway
Phoenix, Arizona
COP Project # ST 85110090

Prepared for:

City of Phoenix
Street Transportation Department

Prepared by:

Kimley-Horn
7740 N. 16th Street, Suite 300
Phoenix, Arizona 85020
(602) 944-5500

KHA Project Number 191784002 June 2014
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Kimley»Horn

BIOLOGICAL EVALUATION

Sonoran Desert Drive

Interstate 17 to North Valley Parkway

Phoenix, Arizona

COP Project # ST 85110090

Prepared for:
City of Phoenix
Street Transportation Department

Prepared by:
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7740 N. 16th Street, Suite 300
Phoenix, Arizona 85020
(602) 944-5500

KHA Project Number 191784002

June 2014
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Appendix E: Tucson Shovel-Nosed Snake Awareness Handout (1pg)

BIOLOGICAL EVALUATION

1. PROJECT LOCATION

The Sonoran Desert Drive (SDD) project extends from approximately 200 feet west of Interstate 17 (I-17) to approximately 0.3 miles east of North Valley Parkway (NVP) in Phoenix, Maricopa County, Arizona (**Figure 1. State Location Map** and **Figure 2. Vicinity Map**). The project area is approximately 50.5 acres (19.9 acres of State Trust Land and 30.6 acres of private land).

Throughout this Biological Evaluation (BE) the term "project limits" is used to represent the construction footprint, while the term "project area" also includes surrounding lands, outside but adjacent to the project limits. The term "project vicinity" is used to denote a more expansive landscape context.

2. PROJECT DESCRIPTION

The scope of work west of I-17 consists of re-striping the existing roadway and installing new guidance signs. Excavation and roadway construction will not occur west of I-17. The SDD from I-17 east to NVP will include three lanes in each direction with a raised median. The SDD improvements include a four span bridge crossing of Skunk Creek. The bridge includes constructing four piers in the main channel and overbanks and two abutments near the extents of the existing floodplain. The intent of the bridge is to span a majority of the existing floodplain. SDD will tie into the existing Arizona Department of Transportation (ADOT) roadway, approximately 620 feet west of Skunk Creek. The existing ADOT roadway was constructed as part of the I-17 and State Route (SR) 303 traffic interchange. Full-width pavement will be provided for the full length of the property immediately southeast of the SDD/NVP intersection. The extent of these improvements is being negotiated between the property owner and the City of Phoenix; therefore, the end project location (0.3 miles east of the SDD/NVP intersection) provides room for the most conservative scenario.

3. LOCATION DESCRIPTION

The project area is located within the Arizona Upland subdivision within the Sonoran Desertscrub biotic community and consists of undeveloped native desert with the exception of the I-17/SR 303 traffic interchange in the western portion of the project area and NVP in the eastern portion of the project area (Brown 1994). Kimley-Horn conducted field reconnaissance of the project area on June 25, 2014. Ground photographs are provided in **Appendix B** and the photograph locations/directions are depicted on **Figure 2**. The project area is located within Sections 13, 14, 23 and 24, T5N, R2E, Gila and Salt River Baseline and Meridian. The project area is located on the *Biscuit Flat, Arizona* and *New River SE, Arizona* United States Geological Survey (USGS) 7.5-minute quadrangle maps. The project area is approximately 1,580 feet above mean sea level (MSL). The project area slopes/drains to the south.

The following soils occur within the project area: Antho-Carrizo-Maripo complex; Carefree cobbly clay loam, 1 to 8 percent slopes; Gilman loams; Pinamt-Tremant complex, 1 to 10 percent slopes; and Tremant gravelly sandy loams (USDA 2014). Information from the Arizona Department of Water Resources (ADWR) website was reviewed for water wells located in the vicinity of the project area. According to well registration records, groundwater depth is greater than approximately 200 feet below ground surface in the project area (ADWR 2014). However, groundwater levels can fluctuate due to seasonal variations, groundwater withdrawal or injection, and other factors.

4. SPECIES IDENTIFICATION

Kimley-Horn obtained an official species list for the project area from the U.S. Fish and Wildlife Service (USFWS) Information, Planning, and Conservation (IPaC) system on June 23, 2014 (**Appendix C**). The list included nine (9) threatened, endangered or candidate species that should be evaluated for the project area. The list was reviewed by a qualified biologist to determine species that may occur in the project vicinity.

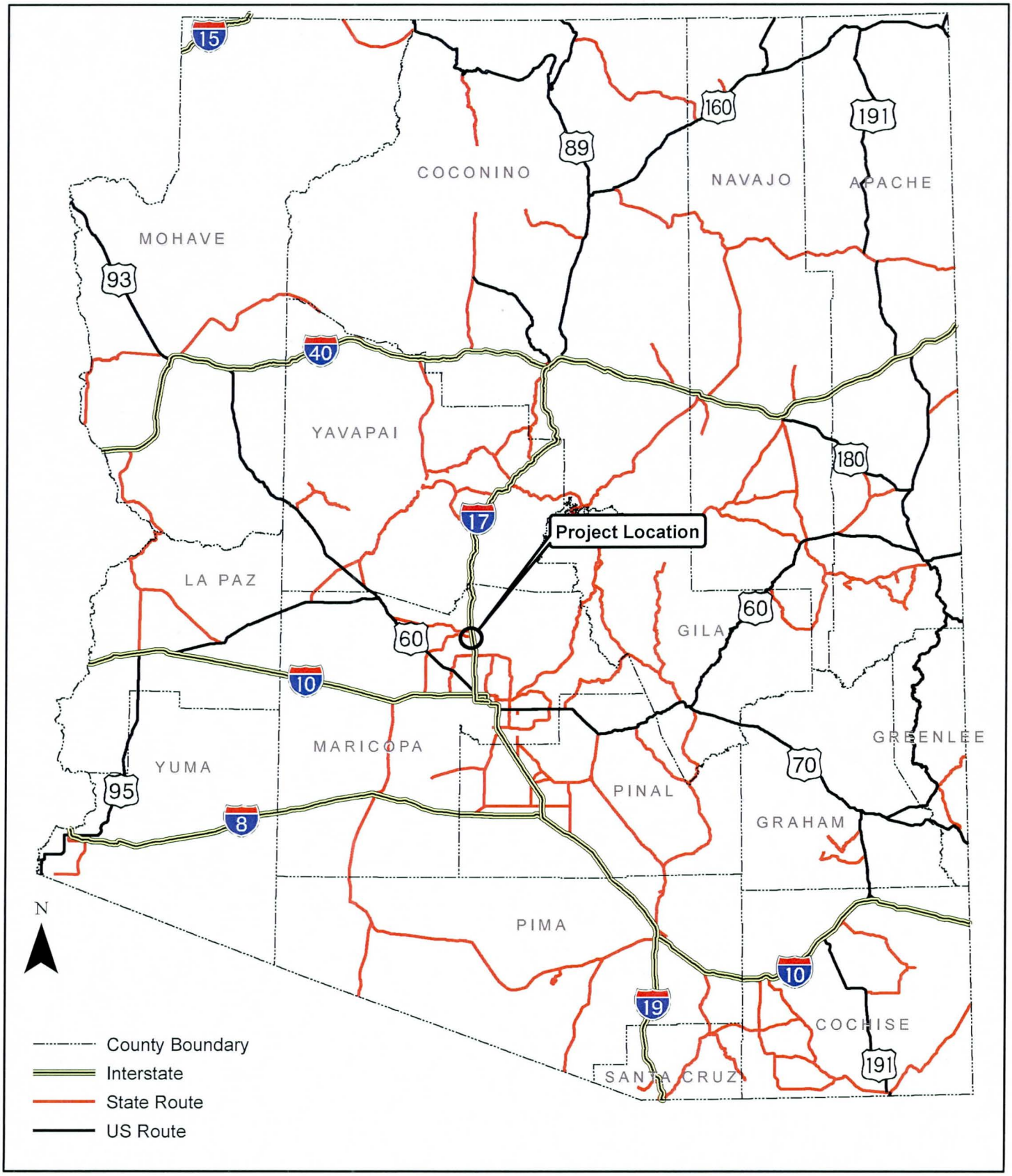

Figure 1. State Location Map

Source: USGS, 2010

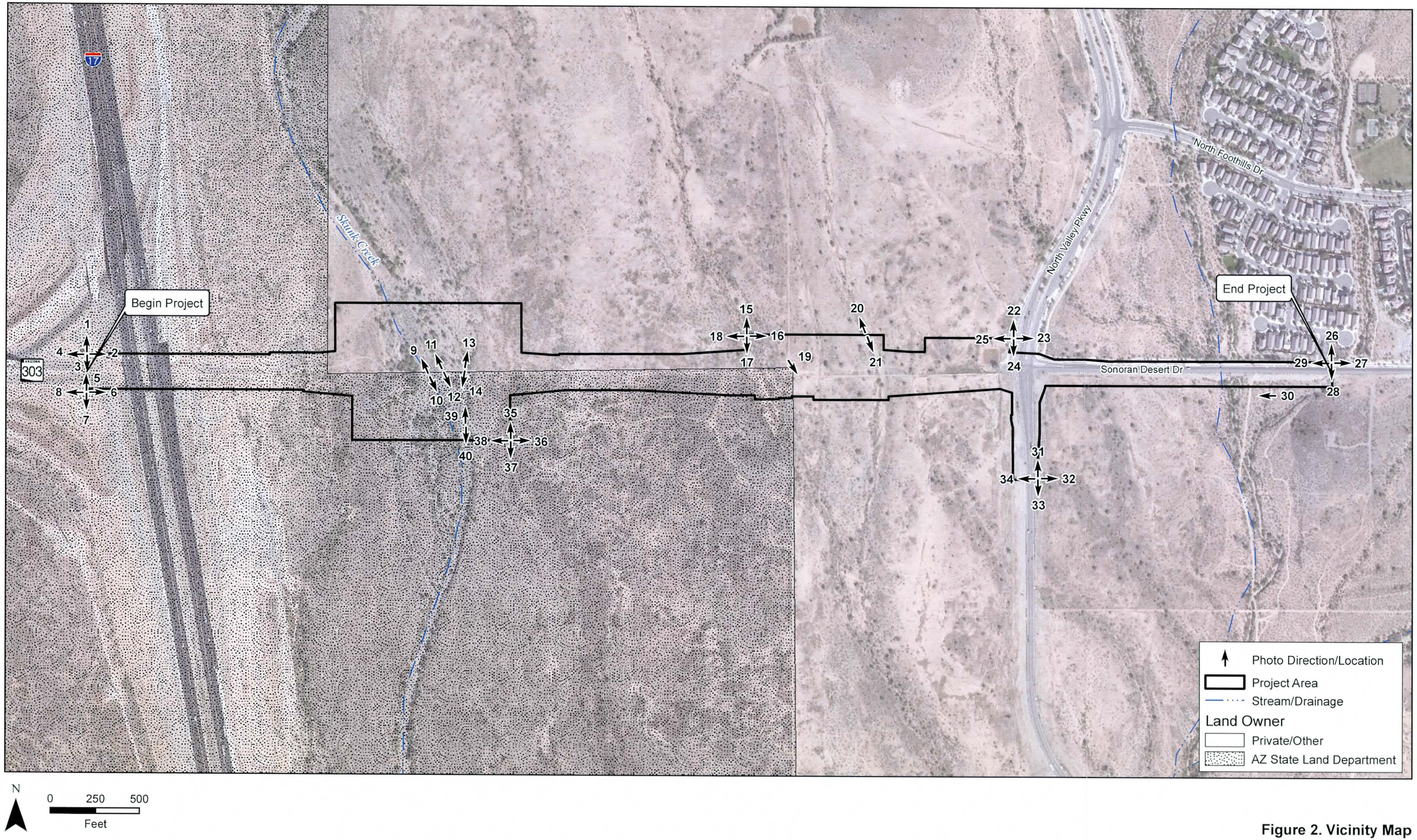

Figure 2. Vicinity Map

Two species shown in **Table 1** that are candidates for listing have the potential to occur in the project area and are analyzed in detail in **Section 5**.

Table 1. Federally Listed and Special Status Species Included In This Evaluation

Common name	Scientific name	Status*
Sonoran Desert tortoise	*Gopherus morafkai*	C
Tucson shovel-nosed snake	*Chionactis occipitalis klauber*	C

* C = Candidate

Species included in the USFWS list, but excluded from further evaluation are addressed in **Table 2**. This project will have no effect on the species listed in **Table 2.** Additionally, there is no federally designated Critical Habitat within the project vicinity.

Table 2. Species Excluded From Further Evaluation

Common Name *Scientific Name*	**Status***	**Habitat (USFWS 2014)**	**Exclusion Justification**
California Least tern *Sterna antillarum browni*	E	Elevation: < 2,000 feet Open, bare or sparsely vegetated sand, sandbars, gravel pits, or exposed flats along shorelines of inland rivers, lakes, reservoirs, or drainage systems.	Suitable habitat for this species is not present in the project area.
Gila topminnow *Poeciliopsis occidentalis occidentalis*	E	Elevation range: < 4,500 feet Habitat: Small streams, springs, and cienegas vegetated shallows	Suitable habitat for this species is not present in the project area.
Lesser long-nosed bat *Leptonycteris curasoae yerbabuenae*	E	Elevation: 1,600-7,500 feet Habitat: desertscrub habitat with agave and columnar cacti present as food plants. Day roosts in caves and abandoned tunnels. Forages at night on nectar, pollen, and fruit of paniculate agaves and columnar cacti.	Suitable roosting habitat is not present in the project area.
Roundtail chub *Gila robusta*	C	Elevation: 1,000-7,500 feet Habitat: cool to warm waters of rivers and streams, often occupy the deepest pools and eddies of large streams.	Suitable habitat for this species is not present in the project area.
Southwestern willow flycatcher *Empidonax traillii extimus*	E	Elevation: < 8,500 feet Habitat: cottonwood/willow and tamarisk vegetation communities along rivers and streams.	Suitable habitat for this species is not present in the project area.
Sprague's pipit *Anthus spragueii*	C	Elevation: <5,000 feet Habitat: Well developed, native desert grasslands.	Suitable habitat for this species is not present in the project area.

Common Name *Scientific Name*	**Status***	**Habitat (USFWS 2014)**	**Exclusion Justification**
Yellow-billed cuckoo *Coccyzus americanus*	PT	Elevation: 6,500 feet Habitat: large blocks of riparian woodlands (cottonwood, willow, or tamarisk galleries).	Suitable habitat for this species is not present in the project area.

* T = Threatened; E = Endangered; PT = Proposed Threatened; C = Candidate

5. SPECIES EVALUATION

Sonoran Desert Tortoise (Gopherus morafkai)

Life History Information

According to the Arizona Game and Fish Department (AGFD), the Sonoran Desert tortoise is found south and east of the Colorado River, in the central and western parts of Arizona and Sonora, Mexico (AGFD 2013). The northeastern-most tortoise records in Arizona occur along the Salt River near Roosevelt Lake in Gila County, although populations here have not been confirmed with recent observations. The middle San Pedro River drainage in Cochise County harbors the eastern-most substantial tortoise populations. Sonoran Desert tortoise observations have been confirmed in extreme southeastern Cochise County, but most probably represent released captives. Tortoises have been found as far southwest as the Barry M. Goldwater Range, Yuma Proving Ground, and the Cabeza Prieta National Wildlife Refuge (Averill-Murray and Klug 2000).

Mating occurs during the summer monsoon season. Females begin laying eggs before or during the onset of the summer rains in late June or early July. Population density varies greatly among 18 tortoise plots surveyed in Arizona, ranging from about 15 to over 150 adult tortoises per square mile (Averill-Murray and Klug 2000).

The Sonoran Desert tortoise occurs at elevations ranging from about 510 feet in Mojave desertscrub to semidesert grassland and interior chaparral at about 5,300 feet. The AGFD describes the habitat for this species as follows: occurs primarily on rocky slopes and bajadas of Mohave and Sonoran desertscrub. Caliche caves in incised, cut banks of washes (arroyos) are also used for shelter sites, especially in the Lower Colorado River Valley subdivision (AGFD 2010). The USFWS habitat description states that this species may encroach into desert grassland, juniper woodland, interior chaparral habitats, and even pine communities. Washes and valley bottoms may be used in dispersal (USFWS 2014). According to the AGFD, a microhabitat selection study was conducted east of Phoenix on the Florence Military Reservation (Grandmaison, et al 2010). Sonoran desert tortoises were found to use gently rolling alluvial fans bisected by desert washes, as opposed to boulder-strewn hillsides, and selected habitat with a higher percentage of vegetative canopy cover. Desert washes were of particular importance in microhabitat selection. Results from the Florence Military Reservation study suggest that tortoises may use large washes proximate to the mountain ranges surrounding the study area more than had been previously assumed (AGFD 2011). Sonoran Desert tortoises eat a variety of annual and perennial grasses, forbs, and succulents (Grover, et al 1995).

Survey History

Surveys have not been conducted in the project vicinity. The species overall population density varies greatly among 18 tortoise plots surveyed in Arizona, ranging from about 15 to over 150 adult tortoises per square mile (Averill-Murray and Klug 2000).

Habitat Evaluation and Suitability

The project area is approximately four miles northwest of suitable habitat designated by the Bureau of Land Management (BLM) as Category 3 habitat in Union Hills (BLM 1992). HabiMap modeled the project limits as suitable habitat. The project area does not contain rocky steep mountainous slopes, but does provide dispersal habitat. The nearest rocky steep mountainous slopes are approximately two miles northwest of the project area. The AGFD on-line environmental review tool did identify occurrences of individuals within three miles of the project vicinity.

Analysis and Determination of Effects

Direct effects
The majority of ground-disturbing project activities will occur within areas of upland desertscrub vegetation that are relatively undisturbed except for dirt roads/trails. There is an existing traffic interchange (I-17/SR 303) in the western portion of the project area and NVP in the eastern portion of the project area, so the potential for Sonoran Desert tortoises is lower than if this was undisturbed dispersal habitat. Mitigations measures (see below) will be implemented to alleviate potential impacts to Sonoran Desert tortoises occurring on-site. Therefore, direct impacts to tortoises occurring during construction activities within the project limits are unlikely. However, the project will result in the construction of a road (SDD) in suitable dispersal habitat.

Indirect effects
Due to the implementation of the proposed mitigation measures, indirect effects on the Sonoran Desert tortoise are anticipated to be minor. These indirect effects stem from the fragmentation of the dispersal habitat in the project area by the proposed roadway. This type of dispersal habitat is not unique or rare for this area; therefore, impacts are anticipated to be minimal.

Interrelated actions
There are no known interrelated actions at this time.

Interdependent actions
There are no known interdependent actions at this time.

Cumulative effects
Future state or private activities are not known at this time; therefore, cumulative effects are not anticipated.

Summary
The proposed project may impact individuals of Sonoran Desert tortoises, but is not likely to result in a trend toward federal listing or loss of viability.

Tucson shovel-nosed snake (Chionactis occipitalis klauberi)

Life History Information

Historically, the Tucson shovel-nosed snake was known to occur from Pima County in the Avra and Santa Cruz valleys and from western Pinal and a portion of eastern Maricopa counties. One-third of their range, as of 2001, has been converted to either urban development or agriculture. Reproductive activity for this species generally occurs in April through July. They are nocturnal, and often forage for insects, centipedes, spiders, buried moth pupae and scorpions which many times they stalk from beneath the surface of the sand or loose soil. This species is found at elevations ranging from 785-1,662 feet and its habitat is described as Sonoran Desertscrub. This species is found in more productive creosote-mesquite floodplain habitats, with soils described as soft, sandy loams, with sparse gravel. The required home range for the Tucson shovel-nosed snake is about five acres. It has no known corridor or migratory needs but potential barriers may include highways, major roads and streams (AGFD 2010a).

Survey History

Although no systematic surveys have been conducted to assess the Tucson shovel-nosed snakes status throughout their range, the area between the Tucson and Phoenix metropolitan areas is believed to encompass the majority of their current range. Particularly west of Tucson northward along Avra Valley in Pima County to western Pinal County, and then north into eastern Maricopa County (USFWS 2010). Surveys have not been conducted in the project area.

Habitat Evaluation and Suitability

The AGFD on-line environmental review tool did not identify occurrences of individuals within three miles of the project vicinity; however, suitable habitat for this species is present in the project area. Furthermore, the *AGFD's HabiMap™ Arizona* was accessed to review species distribution information for the Tucson shovel-nosed snake. Species distribution models were created for all of the Species of Greatest Conservation Need (SGCN). These species distribution models were modeled to represent the historic, present, and potential distribution for an individual species. A specific set of parameters was used for each species distribution model, including vegetation, elevation and slope associations, and known occurrences (AGFD 2011a). The species distribution model depicted distribution of the Tucson shovel-nosed snake within the project area. Therefore, this species and its habitat were evaluated for potential impacts.

Analysis and Determination of Effects

Direct effects
The majority of ground-disturbing project activities will occur within areas of upland desertscrub vegetation that are relatively undisturbed except for dirt roads/trails. There is an existing traffic interchange (I-17/SR 303) in the western portion of the project area and NVP in the eastern portion of the project area, so the potential for Tucson shovel-nosed snakes to occur is lower than if this was undisturbed habitat. Mitigations measures (see below) will be implemented to alleviate potential impacts to Tucson shovel-nosed snakes occurring on-site. Therefore, direct impacts to individuals occurring during construction activities within the project limits are unlikely. However, the project will result in the construction of a road (SDD) in suitable habitat.

Indirect effects
Due to the implementation of the proposed mitigation measures, indirect effects on the Tucson shovel-nosed snake are anticipated to be minor. These indirect effects stem from the fragmentation of the suitable habitat in the project area by the proposed roadway. This type of habitat is not unique or rare for this area; therefore, impacts are anticipated to be minimal.

Interrelated actions
There are no known interrelated actions at this time.

Interdependent actions
There are no known interdependent actions at this time.

Cumulative effects
Future state or private activities are not known at this time; therefore, cumulative effects are not anticipated.

Summary
The proposed project may impact individuals of Tucson shovel-nosed snakes, but is not likely to result in a trend toward federal listing or loss of viability.

6. MITIGATION MEASURES

Design Builder Responsibilities:

- **The Design Builder will arrange for a qualified biologist to give a worker awareness presentation to all on-site workers prior to the start of construction. The worker awareness presentation will include, at a minimum, information regarding the biology and status of the western burrowing owl, Sonoran Desert tortoise, and Tucson shovel-nosed snake, and a summary of the measures that are being implemented to prevent impacts to individual western burrowing owl, Sonoran Desert tortoise, and Tucson shovel-nosed snake that may be encountered during construction.**

- **Prior to construction, all personnel who will be on-site, including, but not limited to, contractors, Design Builder' employees, supervisors, inspectors, and subcontractors shall review the attached "Western Burrowing Owl Awareness" flyer.**

- **Prior to construction, all personnel who will be on-site, including, but not limited to, contractors, Design Builder's employees, supervisors, inspectors, and subcontractors shall review the attached "Tucson Shovel-nosed Snake Awareness" flyer.**

- **The Design Builder shall avoid any interaction with tortoise and shall immediately inform the City of Phoenix (602-534-6030) if a tortoise is present at the construction site. Activity within 100 feet of a tortoise shall cease and shall not resume until the tortoise leaves on its own accord or is relocated by a qualified biologist.**

- **The Design Builder will employ a biologist to complete a pre-construction survey for burrowing owls 2 weeks prior to construction in all suitable habitats that will be disturbed. The biologist shall possess a burrowing owl survey protocol training certificate issued by the Arizona Game and Fish Department. Upon completion of the surveys, the biologist shall contact the City of Phoenix (602-534-6030) to provide survey results.**

- **If any burrowing owls are located during construction, the contractor shall stop work at that location and notify the City of Phoenix immediately. The Design Builder will contact the City of Phoenix (602-534-6030) to determine whether the owls can be avoided or must be relocated. If owls must be relocated, the Design Builder will employ Wild at Heart Inc. and Bob Fox (480-595-5047) to relocate burrowing owls from the project area, as appropriate.**

- **If any burrowing owls or active burrows are identified during construction, no construction activities will take place within 100 feet of any active burrow until the owls have been relocated.**

- **If tree or shrub removal will occur from February 15 through August 31, at least 14 days prior to tree pruning or removal activities the Design Builder will arrange for a biologist experienced in bird surveys to conduct a bird nest search of all trees that will be removed. The bird nest search will be conducted within 10 days prior to tree or shrub removal and will include a search for visible nests, observation of the trees to determine the potential presence of cavity nests, and potential relocation of nests. No tree pruning or removal is allowed unless only inactive nests are present or all active nests have been successfully relocated by a qualified biologist with the appropriate USFWS permit. Between September 1 and February 15, tree/limb removal is not subject to this restriction.**

Design Builder Responsibilities (continued):

- **To prevent the introduction of invasive species seeds, the Design Builder shall inspect all earthmoving and hauling equipment at the equipment storage facility and the equipment shall be washed prior to entering the construction site.**

- **To prevent invasive species seeds from leaving the site, the Design Builder shall inspect all construction equipment and remove all attached plant/vegetation and soil/mud debris prior to leaving the construction site.**

- **All disturbed soils not paved that will not be landscaped or otherwise permanently stabilized by construction shall be seeded using species native to the project vicinity.**

- **Protected native plants within the project limits will be impacted by this project; therefore, the Design Builder will determine if Arizona Department of Agriculture notification is needed. If notification is needed, the Design Builder will send the notification at least 60 calendar days prior to the start of construction.**

7. COORDINATION

During the environmental review process, the following were scoped for species concerns:

- AGFD On-Line Environmental Review Tool accessed on 06/23/2014 and is recorded under Search ID: 20140623023765 (**Appendix C**).
- USFWS IPaC system accessed on 06/23/2014 and is recorded under Consultation Tracking Number: 02EAAZ00-2014-SLI-0334 (**Appendix C**).

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USFWS. 2014. Quick Reference Guide to all Arizona Species (June 18)

9. SIGNATURES

Prepared by: _____ Date: 06/27/2014

Jennifer Tremayne, REP
Senior Biologist

APPENDIX A

State Sensitive Species, Protected Native Plants, Migratory Bird Treaty Act

I. State Sensitive Species

The Arizona Game and Fish Department (AGFD) on-line environmental review tool was accessed by Jennifer Tremayne on June 23, 2014 to determine special status species known to occur in the project vicinity. The review tool is included in the attachments of this report.

The AGFD on-line environmental review tool included a list of special status species known to occur within three miles of the project vicinity. The species listed by the on-line environmental review tool included:

- Sonoran Desert tortoise (*Gopherus morafkai*) (See Section 5. Species Evaluation)
- Arizona Toad (*Anaxyrus microscaphus*)

Arizona Toad (*Anaxyrus microscaphus*)
The Arizona toad is listed as a species of concern by the U.S. Fish and Wildlife Service (USFWS). The range for the Arizona toad in Arizona is east to west central Arizona, canyons and flood plains south of the Mogollon Rim, and also found in East Clear Creek. This species occurs in Apache, Coconino, Gila, Graham, Greenlee, La Paz, Maricopa, Mohave, Navajo, and Yavapai counties at an elevation between 480-8,400 feet (AGFD 2013a). Habitat for this species is described as areas of shallow, flowing, permanent water over sandy or rocky substrates, typically in river canyons or foothill streams (Nigro & Rorabaugh. 2008). The nearest occurrence of this species is 1.3 miles south of the project area in a mesquite bosque adjacent to the Central Arizona Project (CAP) canal where a pond has formed. The project area does not provide habitat for this species. Therefore, the project has no impact on the Arizona toad.

II. Noxious and Invasive Species

The AGFD on-line environmental review tool included a standard response for treatment and management of invasive species. This project will incorporate the following measures to prevent the introduction and spread of invasive species:

Design Builder Responsibilities:

- **To prevent the introduction of invasive species seeds, the Design Builder shall inspect all earthmoving and hauling equipment at the equipment storage facility and the equipment shall be washed prior to entering the construction site.**

- **To prevent invasive species seeds from leaving the site, the Design Builder shall inspect all construction equipment and remove all attached plant/vegetation and soil/mud debris prior to leaving the construction site.**

- **All disturbed soils not paved that will not be landscaped or otherwise permanently stabilized by construction shall be seeded using species native to the project vicinity.**

III. Protected Native Plants

The project area was assessed for the presence of protected native plants on June 24, 2014. The project area was assessed by conducting pedestrian and vehicular transects. The following protected plants were identified during field reconnaissance: foothills paloverde (*Parkinsonia microphylla*), blue paloverde (*Parkinsonia floridum*), velvet mesquite (*Prosopis velutina*), ironwood (*Olneya tesota*), saguaro (*Carnegiea* gigantea), barrel cactus (*Ferocactus wislizeni*), hedgehog (*Echinocereus* engelmannii), chain fruit cholla (*Cylindropuntia fulgida),* and teddy bear cholla (*Cylindropuntia bigelovii*). The following mitigation measure is required:

Design Builder Responsibility:

- **Protected native plants within the project limits will be impacted by this project; therefore, the Contractor will determine if Arizona Department of Agriculture notification is needed. If notification is needed, the Contractor will send the notification at least 60 calendar days prior to the start of construction.**

IV. Migratory Bird Treaty Act

The western burrowing owl (*Athene cunicularia hypugaea*) was also evaluated as part of this project. Although AGFD did not list this species as a known occurrence within three miles of the project area, suitable habitat does exist within the project area (vacant lands with the potential for suitable burrows). Furthermore, the *AGFD's HabiMap™ Arizona* was accessed to review species distribution information for the Western burrowing owl. Species distribution models were created for all of the Species of Greatest Conservation Need (SGCN). These species distribution models were modeled to represent the historic, present, and potential distribution for an individual species. A specific set of parameters was used for each species distribution model, including vegetation, elevation and slope associations, and known occurrences (AGFD 2011a). The species distribution model depicted distribution of the Western burrowing owl within the project area. Therefore, this species and its habitat were evaluated for potential impacts.

Western burrowing owl (*Athene cunicularia hypugaea*)

The burrowing owl is listed as a species of concern by the USFWS and they are also protected federally by the Migratory Bird Treaty Act (MBTA) and Arizona state law (ARS Title 17). According to the AGFD website, the western burrowing owl utilizes well drained grasslands, steppes, deserts, prairies, and agricultural lands, often associated with burrowing mammals. Western burrowing owls are known to occupy vacant lots near human habitation, golf courses, or airports (AGFD 2001). During field reconnaissance on June 24, 2014 conducted by Jennifer Tremayne and Jason Getz, no western burrowing owls or suitable burrows were observed within or adjacent to the project limits. However, suitable habitat does exist within the project area. Impacts to owls occurring during construction activities within the project limits are unlikely. The project will result in construction within suitable habitat. Therefore, the proposed project may impact individuals of western burrowing owls, but is not likely to result in a trend toward federal listing or loss of viability. The following mitigation measures will be required:

Design Builder Responsibilities:

- **The Design Builder will arrange for a qualified biologist to give a worker awareness presentation to all on-site workers prior to the start of construction. The worker awareness presentation will include, at a minimum, information regarding the biology and status of the western burrowing owl, Sonoran Desert tortoise, and Tucson shovel-nosed snake, and a summary of the measures that are being implemented to prevent impacts to individual western burrowing owl, Sonoran Desert tortoise, and Tucson shovel-nosed snake that may be encountered during construction.**

- **Prior to construction, all personnel who will be on-site, including, but not limited to, contractors, Contractors' employees, supervisors, inspectors, and subcontractors shall review the attached "Western Burrowing Owl Awareness" flyer.**

- **The Design Builder will employ a biologist to complete a pre-construction survey for burrowing owls 2 weeks prior to construction in all suitable habitats that will be disturbed. The biologist shall possess a burrowing owl survey protocol training certificate issued by the Arizona Game and Fish Department. Upon completion of the surveys, the biologist shall contact the City of Phoenix (602-534-6030) to provide survey results.**

Design Builder Responsibilities (continued):

- **If any burrowing owls are located during construction, the contractor shall stop work at that location and notify the City of Phoenix immediately. The Design Builder will contact the City of Phoenix (602-534-6030) to determine whether the owls can be avoided or must be relocated. If owls must be relocated, the Design Builder will employ Wild at Heart Inc. and Bob Fox (480-595-5047) to relocate burrowing owls from the project area, as appropriate.**

- **If any burrowing owls or active burrows are identified during construction, no construction activities will take place within 100 feet of any active burrow until the owls have been relocated.**

Migratory birds may nest on the ground, on structures, or in trees, shrubs, or other vegetation within the project limits. In accordance with the MBTA, a pre-construction bird nesting survey would be conducted for active migratory bird nests in potentially impacted trees and shrubs. Trees and shrubs that are conducive to nesting will be impacted by the project. The following mitigation measures will be implemented:

Design Builder Responsibility:

- **If tree or shrub removal will occur from February 15 through August 31, at least 14 days prior to tree pruning or removal activities the Design Builder will arrange for a biologist experienced in bird surveys to conduct a bird nest search of all trees that will be removed. The bird nest search will be conducted within 10 days prior to tree or shrub removal and will include a search for visible nests, observation of the trees to determine the potential presence of cavity nests, and potential relocation of nests. No tree pruning or removal is allowed unless only inactive nests are present or all active nests have been successfully relocated by a qualified biologist with the appropriate USFWS permit. Between September 1 and February 15, tree/limb removal is not subject to this restriction.**

APPENDIX B
Ground Photographs

Photo 1: View from the northwest corner of the project area looking north

Photo 2: View from the northwest corner of the project area looking east

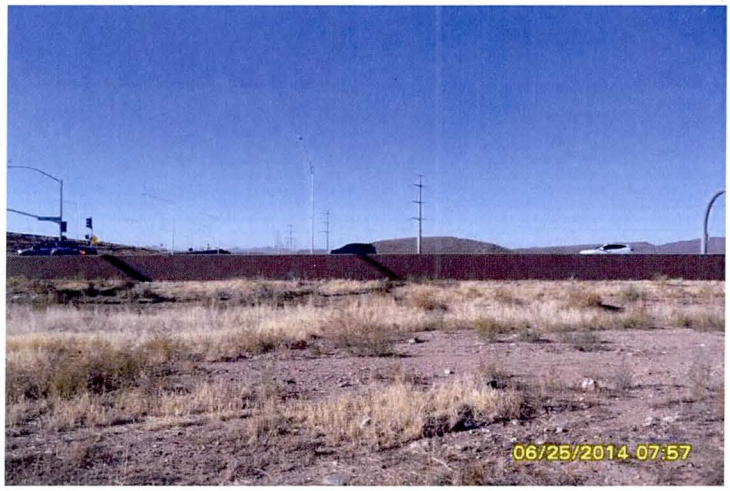

Photo 3: View from the northwest corner of the project area looking south

Kimley»Horn
7740 N. 16th Street, Suite 300
Phoenix, Arizona 85020
Phone: (602) 944-5500 / Fax: (602) 944-7423

Sonoran Desert Drive – North Valley Parkway to I-17
COP Project # ST85110090
Ground Photography

Job No. 191784002

June 25, 2014

Photo 4: View from the northwest corner of the project area looking west

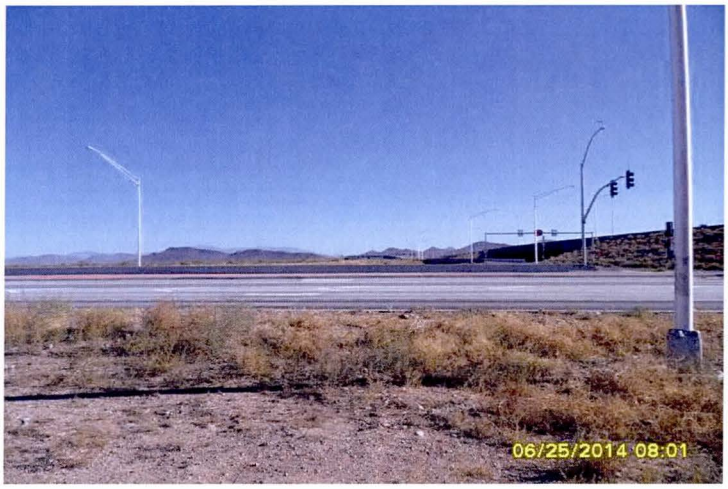

Photo 5: View from the southwest corner of the project area looking north

Photo 6: View from the southwest corner of the project area looking east

Photo 7: View from the southwest corner of the project area looking south

Photo 8: View from the southwest corner of the project area looking west

Photo 9: Looking upstream in the westernmost channel of Skunk Creek

Photo 10: Looking downstream in the westernmost channel of Skunk Creek

Photo 11: Looking upstream in the central channel of Skunk Creek

Photo 12: Looking downstream in the central channel of Skunk Creek

Photo 13: Looking upstream in the easternmost channel of Skunk Creek

Photo 14: Looking downstream in the easternmost channel of Skunk Creek

Photo 15: View in the central portion of the project area looking north

Photo 16: View in the central portion of the project area looking east

Photo 17: View in the central portion of the project area looking south

Photo 18: View in the central portion of the project area looking west

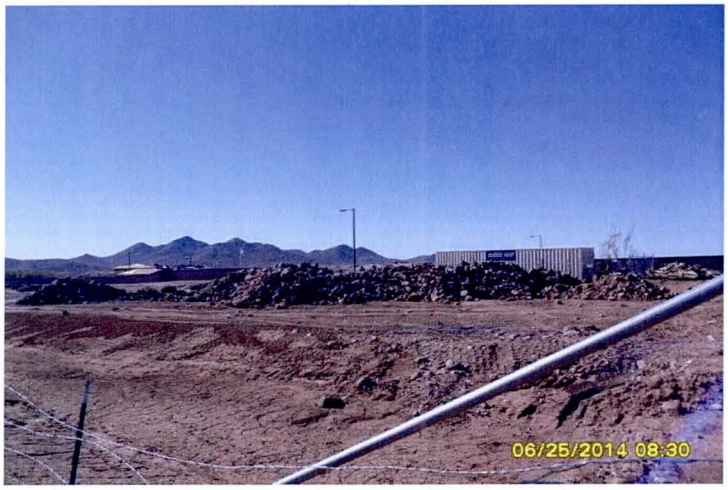

Photo 19: View of single-family residential development under construction south of the project area

Photo 20: View of non-jurisdictional wash looking upstream

Photo 21: Looking downstream at the non-jurisdictional wash location (no wash and all flows have been bermed to avoid entering development)

Photo 22: View at North Valley Parkway looking north

Photo 23: View at North Valley Parkway looking east

Photo 24: View at North Valley Parkway looking south

Photo 25: View at North Valley Parkway looking west

Photo 26: View at the eastern project area boundary looking north

Photo 27: View at the eastern project area boundary looking east

Photo 28: View at the eastern project area boundary looking south

Photo 29: View at the eastern project area boundary looking west

Photo 30: View along the southern side of Sonoran Desert Drive looking west

Photo 31: View at the southern project area boundary looking north

Photo 32: View at the southern project area boundary looking east

Photo 33: View at the southern project area boundary looking south

Photo 34: View at the southern project area boundary looking west

Photo 35: View at the southeast corner of the drainage easement at Skunk Creek looking north

Photo 36: View at the southeast corner of the drainage easement at Skunk Creek looking east

Photo 37: View at the southeast corner of the drainage easement at Skunk Creek looking south

Photo 38: View at the southeast corner of the drainage easement at Skunk Creek looking west

Photo 39: Main channel of Skunk Creek looking upstream

Photo 40: Main channel of Skunk Creek looking upstream

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Sonoran Desert Drive – North Valley Parkway to I-17
COP Project # ST85110090
Ground Photography

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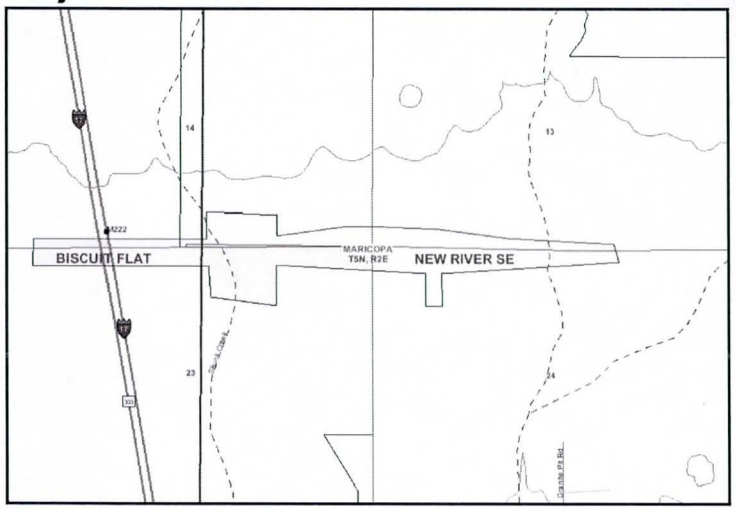
June 25, 2014

APPENDIX C

Arizona Game & Fish Department on-line environmental review tool and U.S. Fish and Wildlife Service (USFWS) Arizona Ecological Services Field Office Official Species List

Arizona's On-line Environmental Review Tool
Search ID: 20140623023765
Project Name: Sonoran Desert Drive
Date: 6/23/2014 10:54:49 AM

Project Location



Project Name: Sonoran Desert Drive
Submitted By: Jennifer Tremayne
On behalf of: CONSULTING
Project Search ID: 20140623023765
Date: 6/23/2014 10:54:44 AM
Project Category: Transportation & Infrastructure,Road construction (including staging areas),Realignment/ new roads
Project Coordinates (UTM Zone 12-NAD 83): 396322.595, 3737112.888 meter
Project Area: 101.123 acres
Project Perimeter: 5871.255 meter
County: MARICOPA
USGS 7.5 Minute Quadrangle ID: 1161
Quadrangle Name: BISCUIT FLAT
Project locality is not anticipated to change

Location Accuracy Disclaimer

Project locations are assumed to be both precise and accurate for the purposes of environmental review. The creator/owner of the Project Review Receipt is solely responsible for the project location and thus the correctness of the Project Review Receipt content.

The Department appreciates the opportunity to provide in-depth comments and project review when additional information or environmental documentation becomes available.

Special Status Species Occurrences/Critical Habitat/Tribal Lands within 3 miles of Project Vicinity:

Name	Common Name	FWS	USFS	BLM	State
Anaxyrus microscaphus	Arizona Toad	SC			
Gopherus morafkai	Sonoran Desert Tortoise	C*	S		WSC

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Please review the entire receipt for project type recommendations and/or species or location information and retain a copy for future reference. If any of the information you provided did not accurately reflect this project, or if project plans change, another review should be conducted, as this determination may not be valid.

Arizona's On-line Environmental Review Tool:

1. This On-line Environmental Review Tool inquiry has generated recommendations regarding the potential impacts of your project on Special Status Species (SSS) and other wildlife of Arizona. SSS include all U.S. Fish and Wildlife Service federally listed, U.S. Bureau of Land Management sensitive, U.S. Forest Service sensitive, and Arizona Game and Fish Department (Department) recognized species of concern.
2. These recommendations have been made by the Department, under authority of Arizona Revised Statutes Title 5 (Amusements and Sports), 17 (Game and Fish), and 28 (Transportation). These recommendations are preliminary in scope, designed to provide early considerations for all species of wildlife, pertinent to the project type you entered.
3. This receipt, generated by the automated On-line Environmental Review Tool does not constitute an official project review by Department biologists and planners. Further coordination may be necessary as appropriate under the National Environmental Policy Act (NEPA) and/or the Endangered Species Act (ESA).

The U.S. Fish and Wildlife Service (USFWS) has regulatory authority over all federally listed species under the ESA. Contact USFWS Ecological Services Offices: http://arizonaes.fws.gov/.

Phoenix Main Office
2321 W. Royal Palm Road, Suite 103
Phoenix, AZ 85021
Phone 602-242-0210
Fax 602-242-2513

Tucson Sub-Office
201 North Bonita, Suite 141
Tucson, AZ 85745
Phone 520-670-6144
Fax 520-670-6154

Flagstaff Sub-Office
323 N. Leroux Street, Suite 101
Flagstaff, AZ 86001
Phone 928-226-0614
Fax 928-226-1099

Disclaimer:

1. This is a preliminary environmental screening tool. It is not a substitute for the potential knowledge gained by having a biologist conduct a field survey of the project area.
2. The Department's Heritage Data Management System (HDMS) data is not intended to include potential distribution of special status species. Arizona is large and diverse with plants, animals, and environmental conditions that are ever changing. Consequently, many areas may contain species that biologists do not know about or species previously noted in a particular area may no longer occur there.
3. Not all of Arizona has been surveyed for special status species, and surveys that have been conducted have varied greatly in scope and intensity. Such surveys may reveal previously undocumented population of species of special concern.
4. HDMS data contains information about species occurrences that have actually been reported to the Department.

Arizona Game and Fish Department Mission

To conserve, enhance, and restore Arizona's diverse wildlife resources and habitats through aggressive protection and

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management programs, and to provide wildlife resources and safe watercraft and off-highway vehicle recreation for the enjoyment, appreciation, and use by present and future generations.

Project Category: Transportation & Infrastructure,Road construction (including staging areas),Realignment/ new roads

Project Type Recommendations:

All degraded and disturbed lands should be restored to their natural state. Vegetation restoration projects (including treatments of invasive or exotic species) should have a completed site-evaluation plan (identifying environmental conditions necessary to re-establish native vegetation), a revegetation plan (species, density, method of establishment), a short and long-term monitoring plan, including adaptive management guidelines to address needs for replacement vegetation.

Based on the project type entered; coordination with Arizona Department of Environmental Quality may be required (http://www.azdeq.gov/).

Based on the project type entered; coordination with County Flood Control districts may be required.

Based on the project type entered; coordination with State Historic Preservation Office may be required http://azstateparks.com/SHPO/index.html

Based on the project type entered; coordination with U.S. Army Corps of Engineers may be required (http://www.spl.usace.army.mil/regulatory/phonedir.html)

During planning and construction, minimize potential introduction or spread of exotic invasive species. Invasive species can be plants, animals (exotic snails), and other organisms (e.g. microbes), which may cause alteration to ecological functions or compete with or prey upon native species and can cause social impacts (e.g. livestock forage reduction, increase wildfire risk). The terms noxious weed or invasive plants are often used interchangeably. Precautions should be taken to wash all equipment utilized in the project activities before and after project activities to reduce the spread of invasive species. Arizona has noxious weed regulations (Arizona Revised Statutes, Rules R3-4-244 and R3-4-245). See Arizona Department of Agriculture website for restricted plants http://www.azda.gov/PSD/quarantine5.htm. Additionally, the U.S. Department of Agriculture has information regarding pest and invasive plant control methods including: pesticide, herbicide, biological control agents, and mechanical control: http://www.usda.gov/wps/portal/usdahome. The Department regulates the importation, purchasing, and transportation of wildlife and fish (Restricted Live Wildlife), please refer to the hunting regulations for further information http://www.azgfd.gov/h_f/hunting_rules.shtml.

During the planning stages of your project, please consider the local or regional needs of wildlife in regards to movement, connectivity, and access to habitat needs. Loss of this permeability prevents wildlife from accessing resources, finding mates, reduces gene flow, prevents wildlife from re-colonizing areas where local extirpations may have occurred, and ultimately prevents wildlife from contributing to ecosystem functions, such as pollination, seed dispersal, control of prey numbers, and resistance to invasive species. In many cases, streams and washes provide natural movement corridors for wildlife and should be maintained in their natural state. Uplands also support a large diversity of species, and should be contained within important

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wildlife movement corridors. In addition, maintaining biodiversity and ecosystem functions can be facilitated through improving designs of structures, fences, roadways, and culverts to promote passage for a variety of wildlife.

Hydrological considerations: design culverts to minimize impacts to channel geometry, or design channel geometry (low flow, overbank, floodplains) and substrates to carry expected discharge using local drainages of appropriate size as templates. Aquatic wildlife considerations: reduce/minimize barriers to migration of amphibians or fish (e.g. eliminate falls). Terrestrial wildlife: washes and stream corridors often provide important corridors for movement. Overall culvert width, height, and length should be optimized for movement of the greatest number and diversity of species expected to utilize the passage. Culvert designs should consider moisture, light, and noise, while providing clear views at both ends to maximize utilization. For many species, fencing is an important design feature that can be utilized with culverts to funnel wildlife into these areas and minimize the potential for roadway collisions. Guidelines for culvert designs to facilitate wildlife passage can be found at http://www.azgfd.gov/hgis/guidelines.aspx.

Minimization and mitigation of impacts to wildlife and fish species due to changes in water quality, quantity, chemistry, temperature, and alteration to flow regimes (timing, magnitude, duration, and frequency of floods) should be evaluated. Minimize impacts to springs, in-stream flow, and consider irrigation improvements to decrease water use. If dredging is a project component, consider timing of the project in order to minimize impacts to spawning fish and other aquatic species (including spawning seasons), and to reduce spread of exotic invasive species. We recommend early direct coordination with Project Evaluation Program for projects that could impact water resources, wetlands, streams, springs, and/or riparian habitats.

Planning: consider impacts of lighting intensity on mammals and birds and develop measures or alternatives that can be taken to increase human safety while minimizing potential impacts to wildlife. Conduct wildlife surveys to determine species within project area, and evaluate proposed activities based on species biology and natural history to determine if artificial lighting may disrupt behavior patterns or habitat use.

Preconstruction - Consider design structures and construction plans that minimize impacts to channel geometry (i.e. width/depth ratio, sinuosity, allow overflow channels) to avoid alteration of hydrological function. Identify whether wildlife species use the structure for roosting or nesting during anticipated construction period. Plan the timing of construction/maintenance to minimize impacts to wildlife species. In addition to the species list generated by the Arizona's On-line Environmental Review Tool, the Department recommends that surveys be conducted at the bridge and in the vicinity of the bridge to identify additional or currently undocumented bat, bird, or aquatic species in the project area. To minimize impacts to birds and bats, as well as aquatic species, consider conducting maintenance and construction activities outside the breeding/maternity season (breeding seasons for birds and bats usually occur spring - summer). Examining the crevices for the presence of bats prior to pouring new paving materials. When bats are present, the top of the crevices should be sealed to prevent material from dripping or falling through the cracks and potentially onto bats. If bats are present, maintenance and construction (including paving and milling) activities should be conducted during nighttime hours, if possible, when the fewest number of bats will be roosting. Consider incorporating roosting habitat for bats into bridge designs. Minimize impacts to the vegetation community. A revegetation plan should be developed to replace impacted communities. Unavoidable impacts to vegetation should be mitigated on-site whenever possible. During construction: Erosion control structures and drainage features should be used to prevent introduction of sediment laden runoff into the waterway. Minimize instream construction activity. If culverts are planned, mitigate impacts to wildlife and fish movement. Guidelines for bridge designs to facilitate wildlife passage can be found at http://www.azgfd.gov/hgis/guidelines.aspx.

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Recommendations will be dependant upon goals of the fence project and the wildlife species expected to be impacted by the project. General guidelines for ensuring wildlife-friendly fences include: barbless wire on the top and bottom with the maximum fence height 42", minimum height for bottom 16". Modifications to this design may be considered for fencing anticipated to be routinely encountered by elk, bighorn sheep or pronghorn (e.g., Pronghorn fencing would require 18" minimum height on the bottom). Please refer to the Department's Fencing Guidelines located at http://www.azgfd.gov/hgis/guidelines.aspx.

The Department recommends that wildlife surveys are conducted to determine if noise-sensitive species occur within the project area. Avoidance or minimization measures could include conducting project activities outside of breeding seasons.

The Department requests further coordination to provide project/species specific recommendations, please contact Project Evaluation Program directly.

Trenches should be covered or back-filled as soon as possible. Incorporate escape ramps in ditches or fencing along the perimeter to deter small mammals and herptefauna (snakes, lizards, tortoise) from entering ditches.

Project Location and/or Species recommendations:

Heritage Data Management System records indicate that one or more listed, proposed, or candidate species or Critical Habitat (Designated or Proposed) have been documented in the vicinity of your project (refer to page 1 of the receipt). Please contact:
Ecological Services Office
US Fish and Wildlife Service
2321 W. Royal Palm Rd.
Phoenix, AZ 85021-4951
Phone: 602-242-0210
Fax: 602-242-2513

Recommendations Disclaimer:

1. Potential impacts to fish and wildlife resources may be minimized or avoided by the recommendations generated from information submitted for your proposed project.
2. These recommendations are proposed actions or guidelines to be considered during **preliminary project development**.
3. Additional site specific recommendations may be proposed during further NEPA/ESA analysis or through coordination with affected agencies.
4. Making this information directly available does not substitute for the Department's review of project proposals, and should not decrease our opportunity to review and evaluate additional project information and/or new project proposals.
5. The Department is interested in the conservation of all fish and wildlife resources, including those Special Status Species listed on this receipt, and those that may have not been documented within the project vicinity as well as other game and nongame wildlife.
6. **Further coordination requires the submittal of this initialed and signed Environmental Review Receipt with a cover letter and project plans or documentation that includes project narrative, acreage to be impacted, how construction or project activity(s) are to be accomplished, and project locality information (including site map).**
7. Upon receiving information by AZGFD, please allow 30 days for completion of project reviews. Mail requests to:

Project Evaluation Program, Habitat Branch
Arizona Game and Fish Department
5000 West Carefree Highway

 APPLICATION INITIALS: JCT

Phoenix, Arizona 85086-5000
Phone Number: (623) 236-7600
Fax Number: (623) 236-7366

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2. Unauthorized attempts to upload information or change information on this website are strictly prohibited and may be punishable under the Computer Fraud and Abuse Act of 1986 and/or the National Information Infrastructure Protection Act .
3. The Department reserves the right at any time, without notice, to enhance, modify, alter, or suspend the website and to terminate or restrict your access to the website.
4. This Environmental Review is based on the project study area that was entered. The review must be redone if the project study area, location, or the type of project changes. If additional information becomes available, this review may need to be reconsidered.
5. A signed and initialed copy of the Environmental Review Receipt indicates that the entire receipt has been read by the signer of the Environmental Review Receipt.

Security:

The Environmental Review and project planning web application operates on a complex State computer system. This system is monitored to ensure proper operation, to verify the functioning of applicable security features, and for other like purposes. Anyone using this system expressly consents to such monitoring and is advised that if such monitoring reveals possible evidence of criminal activity, system personnel may provide the evidence of such monitoring to law enforcement officials. Unauthorized attempts to upload or change information; to defeat or circumvent security measures; or to utilize this system for other than its intended purposes are prohibited.

This website maintains a record of each environmental review search result as well as all contact information. This information is maintained for internal tracking purposes. Information collected in this application will not be shared outside of the purposes of the Department.

If the Environmental Review Receipt and supporting material are not mailed to the Department or other appropriate agencies within six (6) months of the Project Review Receipt date, the receipt is considered to be null and void, and a new review must be initiated.

Print this Environmental Review Receipt using your Internet browser's print function and keep it for your records. Signature of this receipt indicates the signer has read and understands the information provided.

Signature: _____

Date: 07/09/2014

Proposed Date of Implementation: _____

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Please provide point of contact information regarding this Environmental Review.

Application or organization responsible for project implementation

Agency/organization: Kimley-Horn and Associates, Inc.

Contact Name: Jennifer Tremayne

Address: 7740 N 16th Street, Suite 300

City, State, Zip: Phoenix, AZ 85020

Phone: 602-906-1187

E-mail: jennifer.tremayne@kimley-horn.com

Person Conducting Search (if not applicant)

Agency/organization: _____

Contact Name: _____

Address: _____

City, State, Zip: _____

Phone: _____

E-mail: _____

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United States Department of the Interior

FISH AND WILDLIFE SERVICE
Arizona Ecological Services Field Office
2321 WEST ROYAL PALM ROAD, SUITE 103
PHOENIX, AZ 85021
PHONE: (602)242-0210 FAX: (602)242-2513
URL: www.fws.gov/southwest/es/arizona/;
www.fws.gov/southwest/es/EndangeredSpecies/lists/

Consultation Tracking Number: 02EAAZ00-2014-SLI-0334 June 23, 2014
Project Name: Sonoran Desert Drive

Subject: List of threatened and endangered species that may occur in your proposed project location, and/or may be affected by your proposed project.

To Whom It May Concern:

The Fish and Wildlife Service (Service) is providing this list under section 7(c) of the Endangered Species Act (Act) of 1973, as amended (16 U.S.C. 1531 *et seq.*). The list you have generated identifies threatened, endangered, proposed, and candidate species, and designated and proposed critical habitat, that *may* occur within one or more delineated United States Geological Survey 7.5 minute quadrangles with which your project polygon intersects. Each quadrangle covers, at minimum, 49 square miles. Please refer to the species information links found at http://www.fws.gov/southwest/es/arizona/Docs_Species.htm or http://www.fws.gov/southwest/es/arizona/Documents/MiscDocs/AZSpeciesReference.pdf for a quick reference, to determine if suitable habitat for the species on your list occurs in your project area.

The purpose of the Act is to provide a means whereby threatened and endangered species and the habitats upon which they depend may be conserved. Under sections 7(a)(1) and 7(a)(2) of the Act and its implementing regulations (50 CFR 402 *et seq.*), Federal agencies are required to utilize their authorities to carry out programs for the conservation of Federal trust resources and to determine whether projects may affect federally listed species and/or designated critical habitat. A Biological Assessment is required for construction projects (or other undertakings having similar physical impacts) that are major Federal actions significantly affecting the quality of the human environment as defined in the National Environmental Policy Act (42 U.S.C. 4332(2)(c)). For projects other than major construction activities, the Service suggests that a biological evaluation similar to a Biological Assessment be prepared to determine whether the project may affect listed or proposed species and/or designated or proposed critical habitat. Recommended contents of a Biological Assessment are described at 50 CFR 402.12.

If the Federal action agency determines that listed species or critical habitat *may be affected* by a federally funded, permitted or authorized activity, the agency must consult with us pursuant to 50 CFR 402. Note that a "may affect" determination includes effects that may not be adverse and that may be beneficial, insignificant, or discountable. An effect exists even if only one individual or habitat segment may be affected. The effects analysis should include the entire action area, which often extends well outside the project boundary or "footprint" (e.g., downstream). If the Federal action agency determines that the action may jeopardize a *proposed* species or adversely modify *proposed* critical habitat, the agency must enter into a section 7 conference. The agency may choose to confer with us on an action that may affect proposed species or critical habitat.

Candidate species are those for which there is sufficient information to support a proposal for listing. Although candidate species have no legal protection under the Act, we recommend that they be considered in the planning process in the event they become proposed or listed prior to project completion. More information on the regulations (50 CFR 402) and procedures for section 7 consultation, including the role of permit or license applicants, can be found in our Endangered Species Consultation Handbook at: http://www.fws.gov/endangered/esa-library/pdf/TOC-GLOS.PDF.

In addition to species listed under the Act, we advise you to consider species protected under the Migratory Bird Treaty Act (MBTA) (16 U.S.C. 703-712) and the Bald and Golden Eagle Protection Act (BGEPA) (16 U.S.C. 668 *et seq.*). Both laws prohibit the take of covered species. The list of MBTA-protected birds is in 50 CFR 10.13 (for an alphabetical list see http://www.fws.gov/migratorybirds/RegulationsPolicies/mbta/MBTANDX.HTML). The Service's Division of Migratory Birds is the lead for consultations under these laws (Southwest Regional Office phone number: 505/248-7882). For more information regarding the MBTA, BGEPA, and permitting processes, please visit the following web site: http://www.fws.gov/migratorybirds/mbpermits.html. Guidance for minimizing impacts to migratory birds for projects including communications towers (e.g. cellular, digital television, radio, and emergency broadcast) can be found at: http://www.fws.gov/southwest/es/arizona/CellTower.htm

Although bald eagles (*Haliaeetus leucocephalus*) are no longer listed under the Act, they are protected under both the BGEPA and the MBTA. If a bald eagle nest occurs in or near the proposed project area, our office should be contacted. An evaluation must be performed to determine whether the project is likely to disturb nesting bald eagles (see http://www.fws.gov/southeast/es/baldeagle/) and the Division of Migratory Birds consulted if necessary. The National Bald Eagle Management Guidelines provide recommendations to minimize potential project impacts to bald eagles (see http://www.fws.gov/midwest/eagle/pdf/NationalBaldEagleManagementGuidelines.pdf).

Activities that involve streams and/or wetlands are regulated by the U.S. Army Corps of Engineers (Corps). We recommend that you contact the Corps to determine their interest in proposed projects in these areas. For activities within a National Wildlife Refuge, we recommend that you contact refuge staff for specific information about refuge resources.

If your action is on Indian land or has implications for off-reservation tribal interests, we encourage you to contact the tribe(s) and the Bureau of Indian Affairs (BIA) to discuss potential tribal concerns, and to invite any affected tribe and the BIA to participate in the section 7

consultation. In keeping with our tribal trust responsibility, we will notify tribes that may be affected by proposed actions when section 7 consultation is initiated. For more information, please contact our tribal coordinator, John Nystedt, at (928) 556-2160 or John_Nystedt@fws.gov.

The State of Arizona protects some species not protected by Federal law. We recommend you contact the Arizona Game and Fish Department (AGFD) for animals and Arizona Department of Agriculture for plants to determine if species protected by or of concern to the State may occur in your action area. The AGFD has an Environmental Review On-Line Tool that can be accessed at http://www.azgfd.gov/hgis/. We also recommend that you coordinate with the AGFD regarding your project.

For additional communications regarding this project, please refer to the consultation Tracking Number in the header of this letter. We appreciate your concern for threatened and endangered species. If we may be of further assistance, please contact Brenda Smith at 928/556-2157 for projects in Northern Arizona, our general Phoenix number (602/242-0210) for central Arizona, or Jean Calhoun at 520/670-6150 (x223) for projects in southern Arizona.

Sincerely,

/s/

Steven L. Spangle

Field Supervisor

Attachment

United States Department of Interior
Fish and Wildlife Service

Project name: Sonoran Desert Drive

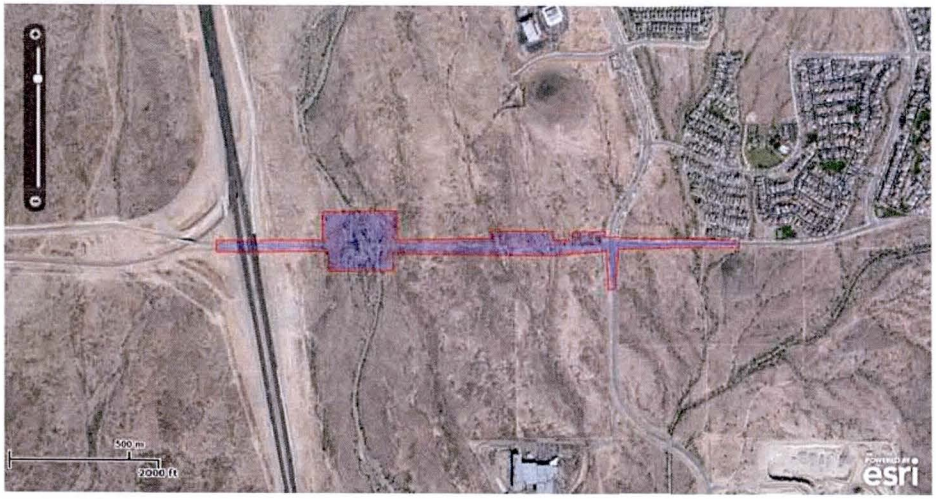
Official Species List

Provided by:

Arizona Ecological Services Field Office
2321 WEST ROYAL PALM ROAD, SUITE 103
PHOENIX, AZ 85021
(602) 242-0210
http://www.fws.gov/southwest/es/arizona/
http://www.fws.gov/southwest/es/EndangeredSpecies/lists/

Consultation Tracking Number: 02EAAZ00-2014-SLI-0334
Project Type: Transportation
Project Description: The project involves the construction of Sonoran Desert Drive (SDD) from North Valley Parkway (NVP) to Interstate 17 (I-17) in Phoenix, Maricopa County, Arizona. SDD from NVP west to I-17 will include three lanes in each direction. SDD improvements include a bridge crossing of Skunk Creek. SDD will tie into the existing Arizona Department of Transportation (ADOT) roadway approximately 620 feet west of Skunk Creek.

Project Location Map:



Project Coordinates: MULTIPOLYGON (((-112.130739 33.7694154, -112.125927 33.7694393, -112.1259162 33.7705096, -112.122526 33.7705497, -112.1225046 33.7694575, -112.1182512 33.7695247, -112.1182558 33.7698009, -112.1155005 33.7698017, -112.1154772 33.7694708, -112.1146296 33.769453, -112.114635 33.7697473, -112.1131383 33.7698097, -112.1132186 33.7695899, -112.1070926 33.7694695, -112.1070992 33.7691957, -112.1098104 33.7692167, -112.112554 33.7691533, -112.1126993 33.7676454, -112.1130373 33.7676543, -112.1131381 33.7690499, -112.1155702 33.7688763, -112.1227082 33.7689293, -112.1226684 33.7682761, -112.1256661 33.7682582, -112.1256771 33.7690157, -112.1307169 33.7689804, -112.130739 33.7694154)))

Project Counties: Maricopa, AZ

United States Department of Interior
Fish and Wildlife Service

Project name: Sonoran Desert Drive

Endangered Species Act Species List

There are a total of 9 threatened, endangered, or candidate species on your species list. Species on this list should be considered in an effects analysis for your project and could include species that exist in another geographic area. For example, certain fish may appear on the species list because a project could affect downstream species. Critical habitats listed on the **Has Critical Habitat** lines may or may not lie within your project area. See the **Critical habitats within your project area** section further below for critical habitat that lies within your project. Please contact the designated FWS office if you have questions.

California Least tern *(Sterna antillarum browni)*
Listing Status: Endangered

Gila topminnow *(Poeciliopsis occidentalis)*
Population: U.S.A. only
Listing Status: Endangered

Lesser Long-Nosed bat *(Leptonycteris curasoae yerbabuenae)*
Population: Entire
Listing Status: Endangered

Roundtail chub *(Gila robusta)*
Population: Lower Colorado River Basin DPS
Listing Status: Candidate

Sonoran desert tortoise *(Gopherus morafkai)*
Listing Status: Candidate

Southwestern Willow flycatcher *(Empidonax traillii extimus)*
Population: Entire
Listing Status: Endangered
Has Critical Habitat: Final designated

Sprague's Pipit *(Anthus spragueii)*
Listing Status: Candidate

Tucson Shovel-Nosed Snake *(Chionactis occipitalis klauberi)*
Listing Status: Candidate

Yellow-Billed Cuckoo *(Coccyzus americanus)*
Population: Western U.S. DPS
Listing Status: Proposed Threatened

Critical habitats that lie within your project area

There are no critical habitats within your project area.

APPENDIX D

Western Burrowing Owl Awareness Handout (1pg)

Western Burrowing Owl Awareness

ADOT Environmental Planning Group

1611 W. Jackson St- Mail Drop EM02

Phoenix, AZ 85007

The purpose of this flyer is to provide ADOT employees and contractors, working on roadside projects, with basic knowledge to reduce the risk of incidental take of Western Burrowing Owls.

Legal Status:

Western Burrowing Owls are protected under the Federal Migratory Bird Treaty Act of 1918. All migratory birds and their parts are fully protected. They are also protected under Arizona State Law in Title 17-101, Title 17-235, and Title 17-236.

What to look for:

- Description– small, ground-dwelling owl
- Length– 19.5-25.0 cm (7.68-9.85 inches)
- Wingspan– 58.42 (23.0 inches)
- Mass– about 150 grams
- Males are typically slightly larger than females.
- Round head, lacks ear tufts
- Distinct oval facial ruff, framed by a broad, puffy white eyebrow
- Eyes contain a bright yellow iris

Where are owls found?

- Dry, open, short grass, treeless plains.
- Dependent on fossorial mammals (ground squirrels, prairie dogs, badgers, etc.) to construct burrows.
- Human dominated landscapes: golf courses, airports, agricultural fields

Identifying an active burrow:

- Owls use burrows constructed by ground squirrels, badgers, coyotes and tortoises. They can also use pipes, culverts, and ditches.
- Presence of excrement (whitewash) near entrance to burrow
- Burrowing owls frequently decorate entrance of burrows with cow or horse manure, feathers, vegetation and trash items.

How to avoid them:

- Scan ahead prior to arriving at a sign location.
- If burrowing owls are observed within the project area, stop and move at least 300 feet beyond the owl or occupied burrow before resuming work.

If you think your work may potentially impact a Burrowing Owl or active burrow, please stop.
Move at least 300 feet from the animal or burrow before resuming work.

APPENDIX E

Tucson Shovel-Nosed Snake Awareness Handout (1pg)

Tucson Shovel-Nosed Snake Awareness

ADOT Environmental Planning Group
1611 W. Jackson St- Mail Drop EM02
Phoenix, AZ 85007

The purpose of this flyer is to provide ADOT employees and contractors working on roadside project with basic knowledge to reduce the risk of impacting Tucson Shovel-Nosed Snake.

Legal Status:

Tucson Shovel-Nosed Snake (*Chionactis occipitalis klauberi*) is a Candidate species. Listing is warranted but precluded by higher priority listing actions (75 FR 16050, March 31, 2010).

Species Description:

- Small, burrowing loose-sand dweller
- Length– 10-17 inches
- Shovel-shaped snout, inset lower jaw
- Whitish or yellow body
- Black or brown bands, with orange-red in between
- Bands do not encircle the body
- Non-poisonous; coloring mimics the coral snake

Where are snakes found?

- Creosote-mesquite floodplains
- Areas associated with soft sandy soils, sparse gravel
- Frequents washes

Where are they active?

- Active in the morning and just before sunset or during moderate temperatures
- Stays underground during the heat of the day
- "Swims" rapidly through loose sand, leaves smooth wave-like tracks
- Usually rest by day under hiding cover such as shrubs, and occasionally found under surface objects such as boards

How to avoid them:

- Scan ahead prior to arriving at project location.
- If shovel-nosed snakes are observed within the project area, stop and allow species to leave on its own accord.

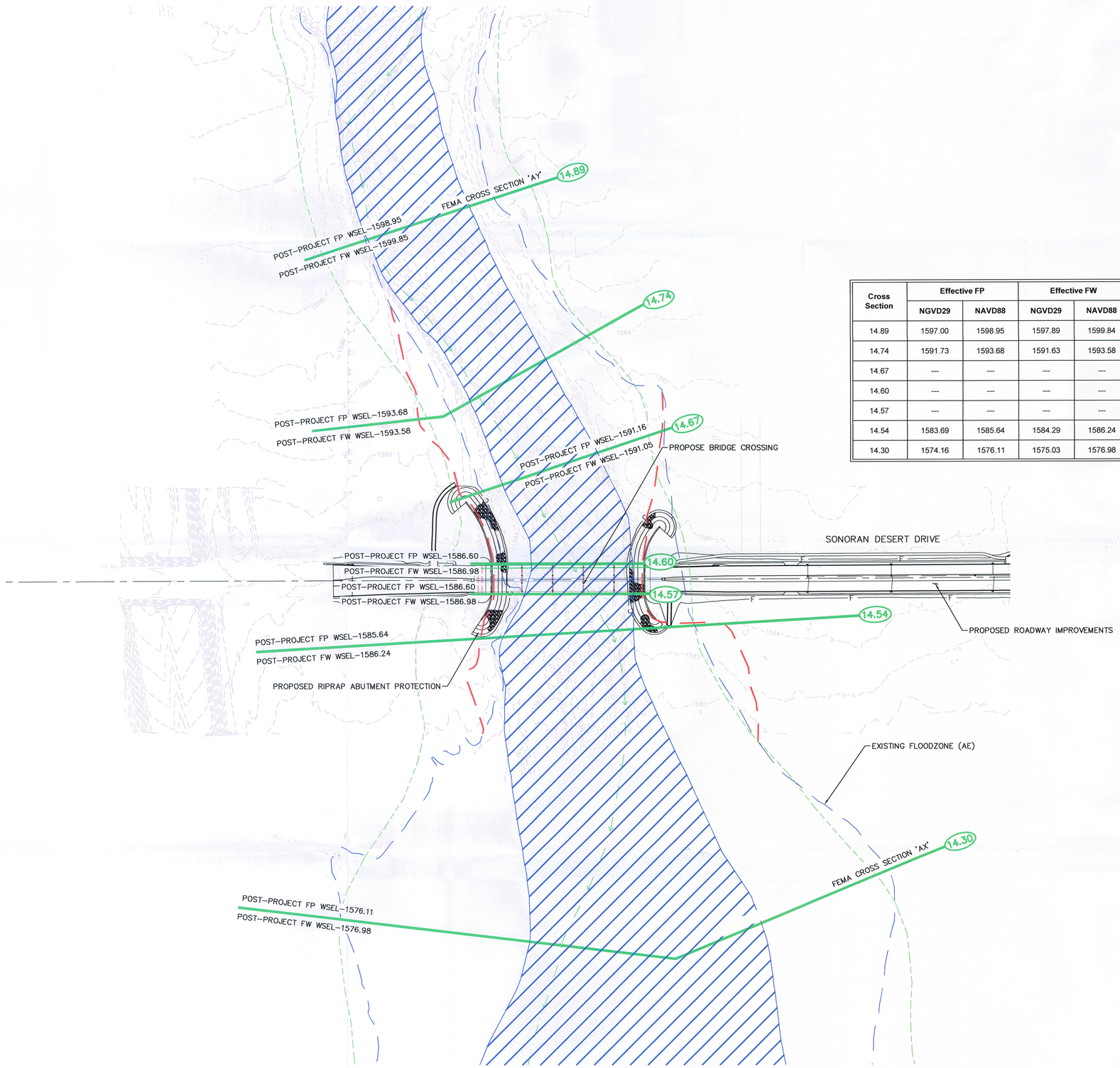
If you think your work may potentially impact a shovel-nosed snake, please stop and allow species to leave on its own accord.

Source: US Fish & Wildlife Service-Arizona Ecological Services Field Office, Tucson Shovel-Nosed Snake, Document Library-Document by Species

(April 14, 2013)

Appendix H. Work map

Appendix I. CD Containing Electronic Files



LEGEND

- EFFECTIVE FEMA FLOODPLAIN
- EFFECTIVE FEMA FLOODWAY
- EFFECTIVE FEMA RIVER CENTERLINE
- LONG TERM EROSION HAZARD ZONE (SKUNK CREEK WCMP)
- POST-PROJECT FLOODPLAIN
- XX.XX CROSS SECTION
- XXXX EXISTING CONTOUR

NOTE: EXISTING CONTOURS SHOWN ARE IN NGVD29 VERTICAL DATUM. NAVD88 ELEVATIONS ARE 1.95 FEET HIGHER.

Cross Section	Effective FP		Effective FW		Pre-Project FP		Pre-Project FW		Post-Project FP		Post Project FW	
	NGVD29	NAVD88	NGVD29	NAVD88	NGVD29	NAVD88	NGVD29	NAVD88	NGVD29	NAVD88	NGVD29	NAVD88
14.89	1597.00	1598.95	1597.89	1599.84	1597.03	1598.98	1597.90	1599.85	1597.00	1598.95	1597.90	1599.85
14.74	1591.73	1593.68	1591.63	1593.58	1591.71	1593.66	1591.63	1593.58	1591.73	1593.68	1591.63	1593.58
14.67	---	---	---	---	1589.65	1591.60	1590.57	1592.52	1589.21	1591.16	1589.10	1591.05
14.60	---	---	---	---	1585.81	1587.76	1586.06	1588.01	1584.65	1586.60	1585.03	1586.98
14.57	---	---	---	---	1584.32	1586.27	1584.54	1586.49	1584.65	1586.60	1585.03	1586.98
14.54	1583.69	1585.64	1584.29	1586.24	1583.69	1585.64	1584.29	1586.24	1583.69	1585.64	1584.29	1586.24
14.30	1574.16	1576.11	1575.03	1576.98	1574.16	1576.11	1575.03	1576.98	1574.16	1576.11	1575.03	1576.98

GRAPHIC SCALE
200 0 100 200 400
(IN FEET)

N

NO.	REVISION	BY	DATE	APPR.

Kimley»Horn

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7740 North 16th Street, Suite 300
Phoenix, Arizona 85020 (602) 944-5500

SCALE (H): 1"=200'
SCALE (V): NONE
DESIGNED BY: ZRS
DRAWN BY: ZRS
CHECKED BY: LSM
DATE: 06/14

CITY OF PHOENIX
SONORAN DESERT DRIVE
SKUNK CREEK
STUDY WORK MAP

PROJECT NO.
ST85110090

DRAWING NAME
WORKMAP

K:\PHX_Roadway\101784001-Sonoran Desert Dr - L-17 to North Valley Pkwy\Cadd\Exhibits\WorkMap\Study workmap.dwg Jul 08, 2014 zachary.schmidt
KRESTA JOB: ST85110090 JOB: ST85110090 ATTACHED XREFS: ST85110090-XV, ST85110090-XC, ST85110090-XP, ST85110090-XW
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