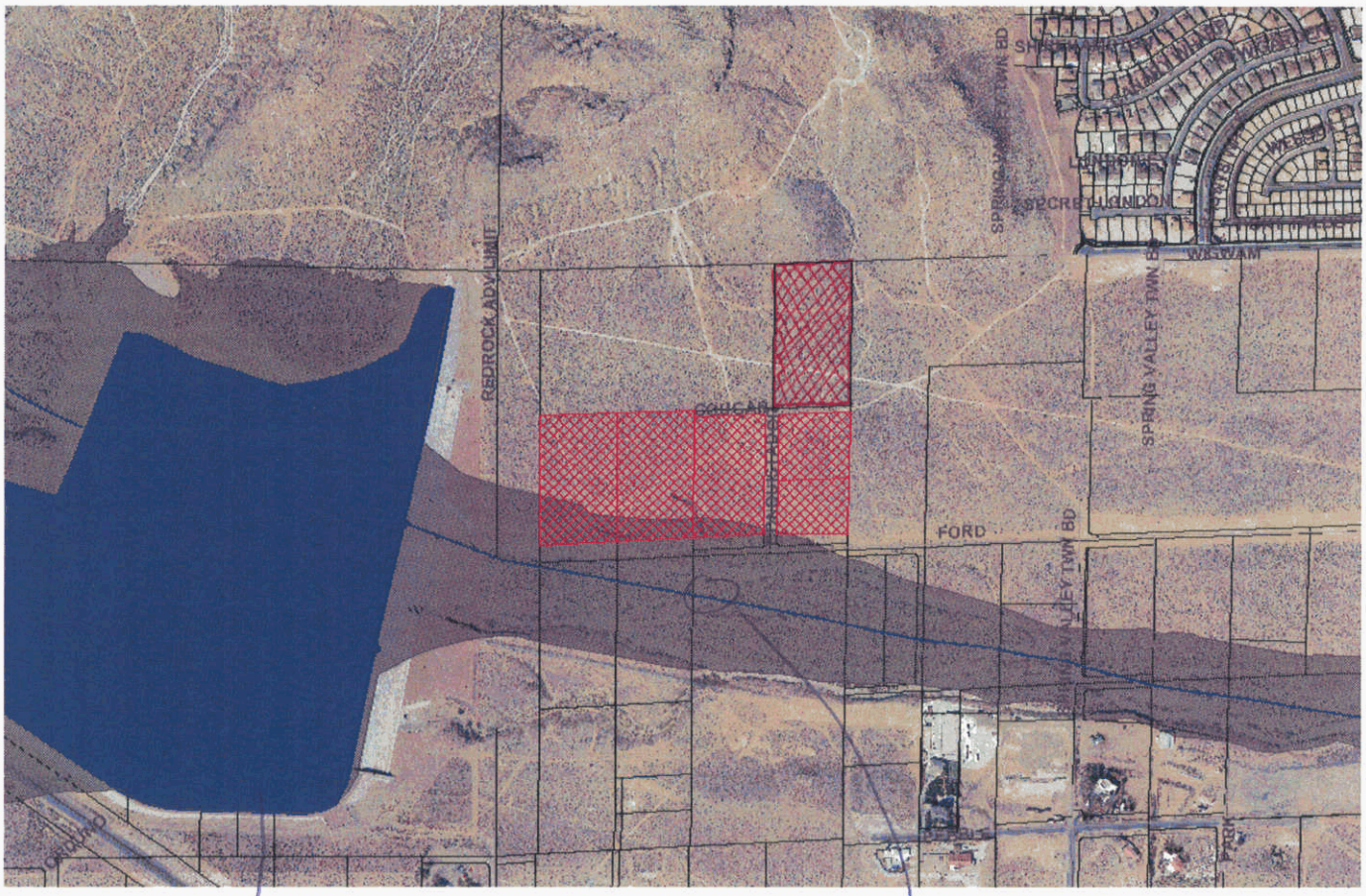
OG-7060

Ford / Conquistador



Upper Blue Diamond Detention Basin
TRBD0930
2270 acre-ft
12747 cfs

Blue Diamond Channel
TRBD0700
Natural wash
571 cfs

Parcel - 17618301004

Owner(s)	FORD 10 ACRES L L C
Address	0
Subdivision	GOV LOT 26
Acres	4.8
Land Use	
Entity	Unincorporated Clark County
ZIP Code	891172506
Panel	2550
Sec/Twn/Rng	18/22/60

REQUEST FOR LETTER OF MAP REVISION

FOR

Ford / Conquistador

CLARK COUNTY, NEVADA

APN # 176-18-301-004 thru -008

PREVIOUSLY SUBMITTED AS:

TECHNICAL DRAINAGE STUDY

FOR

Outfall of Upper Blue Diamond Detention Basin Adjacent to the future Ford/Conquistador Residential Subdivision

CLARK COUNTY, NEVADA

Prepared for:

Locations, Inc.

3230 N. Buffalo Drive, Suite 105

Las Vegas, NV 89129

Office: (702) 498-0267

Fax: (702) 221-0601

Prepared by:

Triton Engineering

6757 W. Charleston Blvd., Suite B

Las Vegas, NV 89146

Office: (702) 254-1480

Fax: (702) 254-3062

September 8, 2006

Triton
Engineering

September 8, 2006

Dave Betley, P. E.
Clark County Development Services
500 S. Grand Central Parkway
Las Vegas, NV 89115

Subject: Addendum #1 to the Technical Drainage Study for
LOMR for Ford/Conquistador
H T E #06-26038

Mr. Betley:

Triton Engineering has received the comments concerning the above-referenced project, dated June 20, 2006. A coordination meeting took place on August 15, 2006, to discuss issues with this LOMR project. In attendance at the coordination meeting were: Kelly Wittwer and Barbara Brown with Triton Engineering, Glenn Hale and Richard Milewski of Clark County Development Services, and Andrew Trelease of Clark County Regional Flood Control District.

It was agreed at the meeting that this submittal should be prepared as a request for Letter of Map Revision (LOMR), so that the site could be removed from the FEMA Special Flood Hazard Zone A before actual improvements to the site are begun. In the coordination meeting, several other items were discussed and agreed upon. The comments are restated and addressed as follows:

1. **It must be clarified if the subject study is intended to be submitted as the basis for a LOMR or if a subsequent study will be submitted for that purpose. Note that a hydraulic modeling method acceptable to FEMA will be required for a LOMR;**

This study is intended to be submitted as the basis for a LOMR. Hydraulic modeling was revised to the HEC-RAS method.

2. **It is noted that in order for the south portion of the future Ford/Conquistador property (which is currently within the flood zone) to be removed from the flood zone, a LOMR will be required.**

This is noted and this study is being submitted as the basis for the LOMR.

6757 W. Charleston Blvd., Suite B • Las Vegas, Nevada 89146
Office: (702) 254-1480 • Fax: (702) 254-3062 • www.tritoneng.com

3. **A technical drainage study will be required for the future Ford/Conquistador development. Note that the LOMR must be approved before permits can be issued for the site;**

This is noted and acceptable.

4. **The location of the detention basin outfall must be shown on the Proposed Basin Exhibit. Also, the location of the 4-foot by 6-foot RCBC which drains offsite basin OFFSITEB must also be shown on the exhibit. A note must be provided on the exhibit indicating that the flow from basin OFFSITEB by-passes the detention basin. The exhibit must be revised accordingly.**

The hydrologic analysis has been revised herein and results are shown on Figure ADD1-1. All drainage basins upstream of the detention basin are referenced from the "Design Memorandum for Blue Diamond Detention Basin", by USACOE, 1998. The existing drainage facility and flow that by-passes the detention basin is included in the analysis as OFBASN. Referring to Figure ADD1-1, under existing conditions, runoff flow that by-passes the detention basin currently flows into a well-defined natural channel within basin EXOF5, and doesn't enter the main channel until about midway across from the subject site. However, to obtain a conservative estimate of the peak flow rates in the main channel adjacent to the subject site, the calculated peak flow rate that by-passes detention (OFBASN) is added directly to the peak outflow rate from the detention basin (BD) just downstream of the basin (COMB1).

Again referring to Figure ADD1-1, under existing conditions, runoff flow from area EXOF1 enters the subject site along the western boundary and combines with onsite flow from area EXON1 at point CP1, where it enters the main channel. Runoff flow from area EXOF2 enters the site along the northern boundary, and combines with onsite flow from area EXON2 at point CP2, where it enters the main channel. Runoff flow from area EXOF3 enters the subject site also along the northern boundary, combining with onsite flow from area EXON3 at point CP3, where it exits the site along the eastern boundary, across several natural drainage paths. Note that within area EXOF3 there is a very well-defined alluvial fan along the base of the adjacent mountain range. Although it appears that under existing conditions, the main flow path from the fan may be toward the east, away from the subject site, it is most conservative to assume that runoff from the fan could easily change direction and flow toward the subject site. Research of the previously-approved school site located east of the subject site indicates that the runoff flow from the majority of area EXOF3 and its associated alluvial fan was included in their analysis as passing completely toward their site to the east. Again, it is evident that even though the runoff flow appears to trend toward the east under existing conditions, it was found to be most conservative to assume that all of this alluvial runoff flow (EXOF3) would impact the subject site.

Runoff flow from the area south of the wash (EXOF5) combines with flow in the wash from point COMB1, and flow generated within the wash area itself

(EXOF4), and all flow combines at the downstream end of the site at point CP4. The 100-year peak flow rate at point CP4 was utilized in the hydraulic analysis throughout the wash area along the subject site.

Under future conditions, the offsite basins may become developed, causing a higher peak flow rate to be generated in the wash, even though the intent is to keep the wash in as natural conditions as possible. Although the future conditions analysis was considered, it was found to be not necessary in this case. The future conditions analysis would include application of a developed-conditions curve number to the existing conditions drainage basins. The future conditions analysis would consist of application of a high-density residential curve number such as is the case with recent surrounding development. However, for existing conditions for the basins studied herein, the existing conditions curve number of 93 is the same as the curve number for apartments/condos (or industrial usage having 72% imperviousness) for Hydrologic Soils Group D. Thus application of the same curve number for future conditions would not result in a higher peak flow rate in the wash. In addition, much of the watershed studied is part of a steep, rocky slope that would likely never become developed.

This LOMR request submittal includes the required forms for FEMA submittal, which require signature from Mr. Dave Betley. This LOMR request submittal also includes a data CD containing the following:

- HEC-RAS hydraulic analysis input/output files
- HEC-1 hydrologic analysis input/output files
- As-built drawings for Blue Diamond Detention Basin (USACOE)
- Report for the CLOMR-Area Downstream of Upper Blue Diamond Detention Basin
- Digital file of revised Zone A in *.dwg format
- Digital file of revised Zone A in *.dxf format

5. **The contour elevations on the Proposed Basin Exhibit are not legible. The exhibit must be revised accordingly;**

The exhibits and analyses have been revised and are included herein.

6. **The initial/overland slope shown on Standard Form 4 for Basin 40 is too flat. Also, Basin 40 has been delineated as one basin. Since a portion of Basin 40 is located north of the wash and a portion is located south of the wash, the basin must be delineated into more than one basin in order to obtain an accurate time of concentration. Appropriate revisions to Standard Form 4 and the hydrologic/hydraulic calculations must be provided;**

The hydrologic and hydraulic analyses have been revised herein. Results of the hydrologic analysis are summarized on Figure ADD1-1, and described in the response to comment 4 above.

7. **Clark County Regional Flood Control District (CCRFCD) concurrence is required since the study includes a hydraulic analysis of a CCRFCD facility and impacts a FEMA designated Zone A. It is the responsibility of the applicant to submit a copy of the drainage study and any addenda to the CCRFCD.**

Upon approval by Clark County, Triton Engineering will submit this study to the CCRFCD for their review and concurrence.

Additional Comments by Clark County:

1. **A copy of the effective FIS hydraulics model must be provided including work maps. If the intended purpose of the study is to revise the flood zone, then an existing FIS analysis must be provided which is incorporated into the effective FIS model;**

   The purpose of this submittal is to be the basis for a Letter of Map Revision (LOMR) for the subject site. Note that the latest map revision below the Blue Diamond Detention Basin in the vicinity of the subject site is the "CLOMR for Area Downstream of Upper Blue Diamond Detention Basin Based on Post Detention Basin Flows", by PBS&J, 2000. The CLOMR did not change the boundary of the effective Zone A area immediately downstream of the detention basin, and thus the hydraulic model has an insignificant comparison with the subject LOMR request. The CLOMR worked to establish new flood zones only for areas downstream of Durango, however established the new, lower, detained peak flow rates throughout the project area, including the vicinity of the subject site.

   The CLOMR states (page 5) that "It is currently the intent of Clark County Regional Flood Control District to manage the area between the detention basin and Durango as a natural flow path without an improved conveyance facility. This results in a floodplain somewhat wider than the normal depth calculations would indicate to account for the channel migration". This was discussed in the coordination meeting and it was agreed that although significant channel migration can be expected, the calculated 100-year peak flow rate is still expected to be contained within the largest outer banks between the detention basin and Durango Drive. As a result, the revised Zone A area in this request should not include islands of removed areas within the larger banks since the entire area between the banks can be expected to convey flow during any storm event because of channel migration.

   In addition, this request submittal includes improved information that is not necessarily comparable to the findings of the CLOMR for the most recent mapping below the detention basin. First, very recent (April 2006) 1-foot

contour topography is provided with this request. The new topographic survey will provide a more accurate portrayal of the revised Zone A area in the vicinity of the subject site, where the effective mapping utilized 5-foot contours (dated 1996) and cross sections at very wide (1500+ feet) intervals. Second, the CLOMR study included in the analysis a single cross section (Section 10) in the vicinity of the subject site, using a peak flow rate of about 600 cfs, while the hydrology provided in this subject request submittal results in about 838 cfs at the same location. The entire CLOMR prepared by PBS&J is included in this submittal, in digital format on the enclosed data CD.

To summarize the approach of this LOMR request, this submittal includes updated topography that will provide a more accurate hydrologic and hydraulic analysis for the subject site. Although the CLOMR prepared by PBS&J for the areas downstream of the detention basin established new, detained, effective peak flow rates downstream of the detention basin, the study did not provide a hydraulic analysis that included revisions to the area of Zone A between the detention basin and Durango Drive. This LOMR request provides accurate information for revision of a portion of this area along the subject site. However, there is no reasonable way to compare upstream and downstream flow depths with the effective FIS because the effective Zone A shown on the map was not created with the current peak (detained) flow rate.

2. **The scale on Figure 4 is incorrect. Please revise or rescale. Highlight the reference information for clarity;**

The exhibits and analyses have been revised and are included herein.

3. **Figure A-5 shows the multiple soils types at the project site. Provide a CN calculation for the project area;**

The exhibits and analyses have been revised and are included herein. Hydrologic Soils Group types are shown on Figure ADD1-1 herein and CN calculations are tabulated on a spreadsheet herein.

4. **Provide additional or topographic evidence to validate the outline area of the contributing basins in Figure D-1;**

The exhibits and analyses have been revised and are included herein.

5. **Provide an electronic copy of the hydraulic models used;**

The exhibits and analyses have been revised and are included herein. Hydraulic models have been included on a data disk herein.

6. **The study must review the Technical Drainage Study for Rhodes Homes School Site and address how this study's hydrologic analysis relates to the reference study;**

The drainage study for the school site was reviewed and found to be generally downstream and east of the subject site. See response to comment #4 above.

7. **Clearly show the limits of the detention basin outfall including topography on Figure D-1(A) and extend the analysis up the toe of the basin;**

The exhibits and analyses have been revised to show the topography for the detention basin outfall to a distance within about 450 feet of the site. The newly-attained (April 2006) topography does not include the area of the spillway and toe of the basin, however, the topography was found to be sufficient for analysis.

8. **The study must address how the proposed analysis will account for channel migration due to sediment deposition or scour;**

This issue was discussed at the coordination meeting. It was agreed that the 100-year peak flow is expected to migrate within the banks of the existing channel. For that reason, the revised boundary for the Special Flood Hazard Zone A will be shown to include all possible locations of the flow within the existing banks.

9. **An annotated FIRM Map must be provided and the proposed flood zone delineation added to Figures D-1 (A-E);**

The annotated FIRM Maps have been added to this submittal as Figures ADD1-3 and ADD1-4. Figure D-1 (A-E) has been replaced with Figure ADD1-2, which provides all of the pertinent topographic information, cross sections, and proposed flood zone delineation.

10. **A future developed offsite hydrologic analysis must also be provided and the study must address how the future project site will be protected;**

See response to comment 4 above.

11. **For all submittals to FEMA for conditional or final Letters of Map Amendment or Revision, the engineer must analyze alluvial fans with a method acceptable to FEMA. The method of analysis may be based on assumptions, limitations and recommended applications. As evidenced on Figure A-5, the project site is subject to alluvial fan flooding Address the degree or extent in which alluvial fan flooding occurring in the project area?**

This was discussed at the coordination meeting. The effective firm panel was reviewed and it was determined that the text "Alluvial Fan Flooding" has an arrow indicating the Blue Diamond Wash channel itself. This is likely to specify the area which exists as a wide, braided stream between the banks of the channel of the Blue Diamond Wash. In other words, any of the areas within the banks can be considered a Special Flood Hazard Zone A since the channels are very likely to migrate back and forth between banks.

The project is clearly impacted by flow from an alluvial fan located north of the subject site. As described in the response to comment #4, the simplest, most practical method of alluvial fan analysis for the subject site is to assume that all of the flow from the fan area impacts the subject site, even though existing conditions indicate that most of the flow may run easterly away from the site. Improvements to the subject site will be analyzed, addressed, and designed in accordance with the CCRFCD Hydrologic Criteria and Drainage Design Manual when the Technical Drainage Study for the site is prepared.

12. **This HEC-1 analysis is a duplication of old datum created in 1996 for the PBS&J design of the Upper Blue Diamond Detention Basin. A new survey will verify the existing conditions and provide a more detailed hydraulic analysis at the project site and adjacent area. This area may have been subjected to change since the 1996 data was originally analyzed. Address our concerns;**

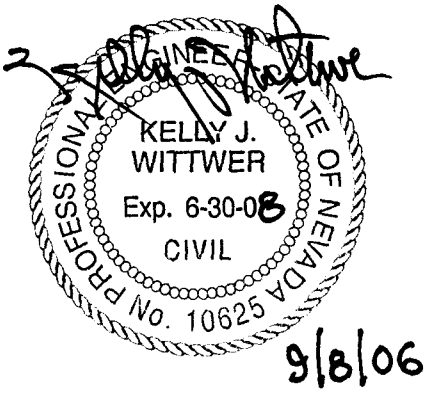
The topography used in the analyses herein was flown in April 2006 and based on the current datum. The topography provides a very detailed concept of existing conditions at the subject site, and the hydraulic analysis herein is based on it.

As for the hydrologic analysis, 1996 5-foot-interval contours are considered to be reasonable for estimation of runoff basin areas, slopes and velocities, and the 5-foot-interval contours were utilized for portions of the hydrologic analysis downstream of the detention basin. Areas upstream of the detention basin were referenced from the US Corps of Engineers study, which was also cross-referenced in the PBS&J study. Field inspection of the areas upstream of the detention basin resulted in some minor changes with a few recent residential developments, however, the changes were found to be negligible and did not warrant revision of the referenced basins.

We hope that this response satisfies all your issues concerning the project. If you have any questions, please contact me.

Sincerely,

Kelly J. Wittwer, P. E.
Triton Engineering, LLC



9/8/06

HYDROLOGIC CRITERIA AND DRAINAGE DESIGN MANUAL

DRAINAGE STUDY INFORMATION FORM

Name of Development: **Request for LOMR for Ford/Conquistador** Date: **September 2006**
(Add. 1 to Outfall of Upper Blue Daimond Detention Basin Adjacent to the future Ford/Conquistador Residential Development)
Location of Development: a) Descriptive (Cross Streets): North/South **Conquistador** East/West: **Ford**
b) Sect. **18** Twn. **22S** Rng. **60E**
Name of Owner: **Locations, Inc.** Assessors Parcel Number: **176-18-301-004 thru -008**
Telephone Number: **(702) 498-0267** Facsimile Number: **(702)221-0601**
Address: **3230 N. Buffalo Drive, Suite 105, Las Vegas, NV 89129**

Contact Person Name: **Kelly J. Wittwer, P.E.** Telephone Number.: **(702) 254-1480**

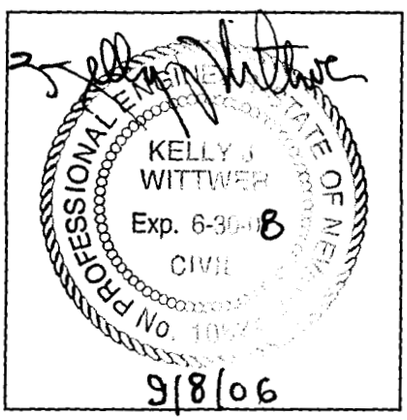
Firm: **Triton Engineering, Inc.** Facsimile Number: **(702)254-3062**

Address: **6757 W. Charleston Blvd., Suite B, Las Vegas, NV 89146**

Type of Land Development/Land Disturbance Process:

	Rezoning		Subdivision Map		Clearing and Grading Only
	Parcel Map		Planned Unit Development	x	Other (Please specify below)
	Large Parcel Map		Building Permit		**LOMR Request**

1. Total Owned Land Area: At site: **16.7 ac.** Being Developed/Disturbed: **16.7 acres**
2. Is a portion or all of the subject property located in a designated FEMA Flood Hazard Area? **YES*** NO
3. Is the property bordered or crossed by an existing or proposed Clark County Regional Flood Control Master Plan Facility? **YES*** NO
4. Proposed type of development (Residential, Commercial, Etc.): **Residential**
5. Approximate upstream land area which drains to the subject site: **80+ acres**
6. Has the site been evaluated in the past? YES **NO** If yes, please identify documentation:
7. If known, please identify the proposed point(s) of runoff from the site: **Discharge to the existing Blue Diamond Outfall Channel drainage facility.**
8. Briefly describe your proposed schedule for the subject project: **ASAP**



Engineer's Seal

Submit this form as part of the required drainage study to the local entity which has jurisdiction over the property. This form may provide sufficient information to serve as the Conceptual Drainage Study.

*Review and concurrence of the Clark County Regional Flood Control District is required.

Local Entity File Number

Revisions	Date

REFERENCE: **STANDARD FORM 1**

APPENDIX

WILLDAN
Serving Public Agencies

181 North Arroyo Grande Blvd., Suite 190 B.
Henderson, Nevada 89074
702/734-3001 fax 702/734-0888
www.willdan.com

MEMORANDUM

TO: Chris O. Stone, P.E. COS

FROM: Isabel Pennington IP

OFFICE: Las Vegas

DATE: June 12, 2006

SUBJECT: WILLDAN / Clark County Development Services Dept. Plan Review Contract
Technical Drainage Study for Outfall of Upper Blue Diamond Detention Basin Adjacent to the future Ford/Conquistador Residential Subdivision
(5267)
Study Dated: May 26, 2006
Location: East of the outfall of the Upper Blue Diamond Detention Basin and north of Ford Avenue
(Sec. 18, T. 22 S., R. 60 E.)
HTE # 06-26038
Prepared by Triton Engineering

We have completed our initial review of the above-referenced **Technical Drainage Study**, and have the following comments:

1. It must be clarified if the subject study is intended to be submitted as the basis for a LOMR or if a subsequent study will be submitted for that purpose. Note that a hydraulic modeling method acceptable to FEMA will be required for a LOMR;

2. It is noted that in order for the south portion of the future Ford/Conquistador property (which is currently within the flood zone) to be removed from the flood zone, a LOMR will be required;

3. A technical drainage study will be required for the future Ford/Conquistador development. Note that the LOMR must be approved before ~~certificates of occupancy~~ permits can be issued for the site;

4. The location of the detention basin outfall must be shown on the Proposed Basin Exhibit. Also, the location of the 4-foot by 6-foot RCBC which drains offsite basin OFFSITEB must also be shown on the exhibit. A note must be provided on the exhibit indicating that the flow from basin OFFSITEB by- passes the detention basin. The exhibit must be revised accordingly;

WILLDAN
Serving Public Agencies

5. The contour elevations on the Proposed Basin Exhibit are not legible. The exhibit must be revised accordingly;

6. The initial/overland slope shown on Standard Form 4 for Basin 40 is too flat. Also, Basin 40 has been delineated as one basin. Since a portion of Basin 40 is located north of the wash and a portion is located south of the wash, the basin must be delineated into more than one basin in order to obtain an accurate time of concentration. Appropriate revisions to Standard Form 4 and the hydrologic/hydraulic calculations must be provided;

7. Clark County Regional Flood Control District (CCRFCD) concurrence is required since the study includes a hydraulic analysis of a CCRFCD facility and impacts a FEMA designated Zone A. It is the responsibility of the applicant to submit a copy of the drainage study and any addenda to the CCRFCD;

All addenda must be submitted directly to Clark County. Any drainage studies or addenda submitted directly to WILLDAN will be returned to Clark County for the necessary log-in procedures.

The items listed herein must be thoroughly addressed and submitted for review prior to acceptance of this study.

A study review workshop with WILLDAN may be scheduled if there are questions concerning the above listed comments.

CONCURRENCE BY CLARK COUNTY DEVELOPMENT SERVICES DEPARTMENT:

Glenn A. Hale, P.E. — Signature

6-20-06 — Date

COMMENTS: SEE ATTACHED

RMM

cc: Kevin K. Elliott, P.E.

HTE: 06-26038
CONQUISTADOR/FORD
JUNE 20, 2006

Additional Comments

1. A copy of the effective FIS hydraulics model must be provided including work maps. If the intended purpose of the study is to revise the flood zone, then an existing FIS analysis must be provided which is incorporated into the effective FIS model;

8. The scale on Figure 4 is incorrect. Please revise or rescale. Highlight the reference information for clarity;

9. Figure A-5 shows the multiple soil types at the project site. Provide a CN calculation for the project area;

10. Provide additional or topographic evidence to validate the outline area of the contributing basins in Figure D-1;

11. Provide an electronic copy of the hydraulic models used;

12. The study must review the Technical Drainage Study for Rhodes Homes School Site and address how this study's hydrologic analysis relates to the reference study;

13. Clearly show the limits of the detention basin outfall including topography on Figure D-1 (A) and extend the analysis up to the toe of the basin;

14. The study must address how the proposed analysis will account for channel migration due to sediment deposition or scour;

15. An annotated FIRM Map must be provided and the proposed flood zone delineation added to Figures D-1 (A-E);

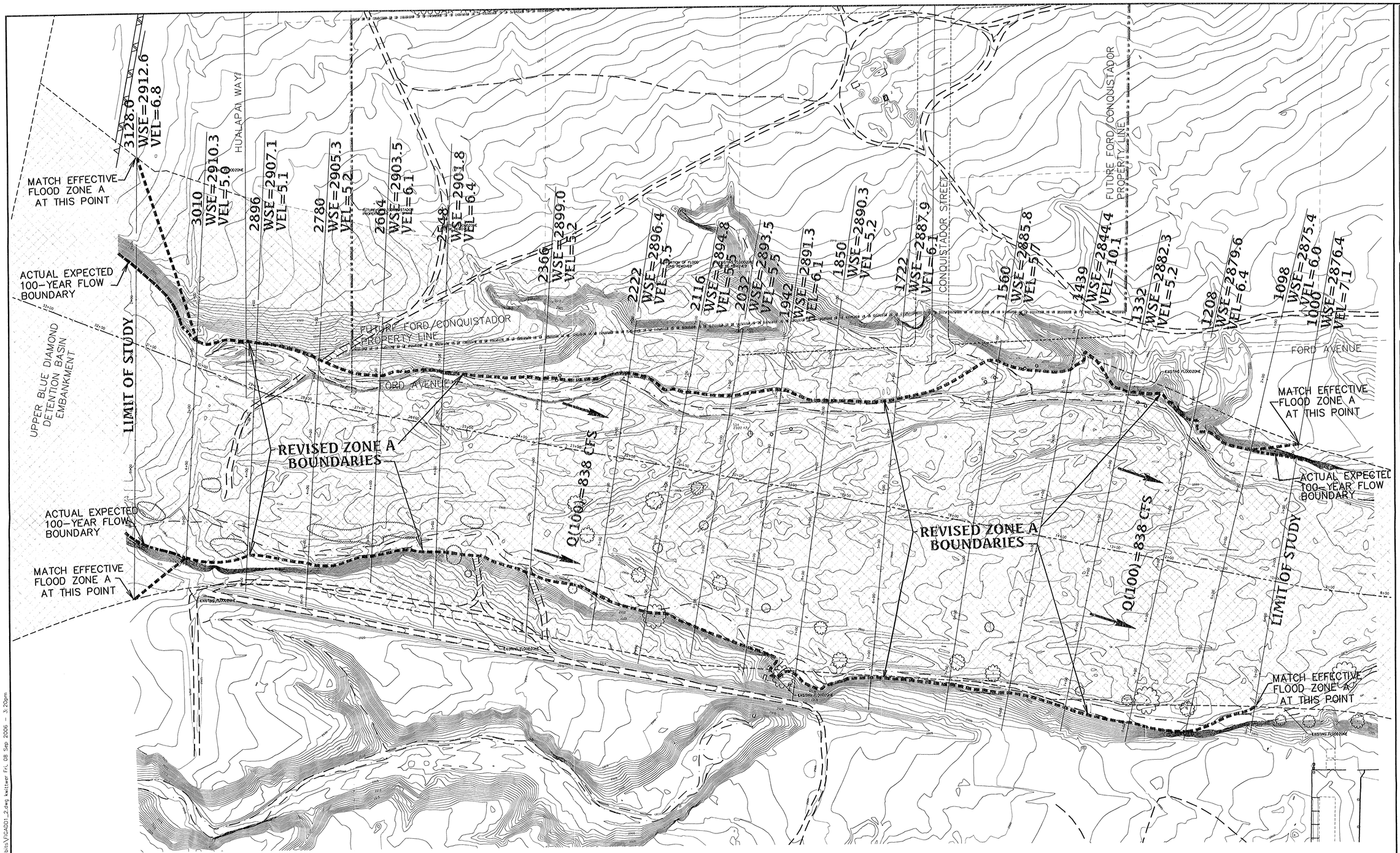
16. A future developed offsite hydrologic analysis must also be provided and the study must address how the future project site will be protected;

17. For all submittals to FEMA for conditional or final Letters of Map Amendment or Revision, the engineer must analyze alluvial fans with a method acceptable to FEMA. The method of analysis may be based on assumptions, limitations and recommended applications. As evidenced on Figure A-6, the project site is subject to alluvial fan flooding. Address the degree or extent in which alluvial fan flooding occurring in the project area?

18. This HEC-1 analysis is a duplication of old datum created in 1996 for the PBSJ design of the Upper Blue Diamond Detention Basin. A new survey will verify the existing conditions and provide a more detailed hydraulic analysis at the project site and adjacent area. This area may have been subjected to change since the 1996 data was originally analyzed. Address our concerns;

rim

FIGURES



NORTH

GRAPHIC SCALE

80 0 40 80 160 320

(IN FEET)
1 inch = 80 ft.

LEGEND

REVISED FLOOD ZONE A BOUNDARY

FORD/CONQUISTADOR PROPERTY BOUNDARY

EFFECTIVE ZONE A AREA

2548
WSE=2901.8
VEL=6.4

HEC-RAS CROSS SECTION LABEL

CALCULATED 100-YEAR WATER SURFACE ELEVATION, FEET

CALCULATED 100-YEAR AVERAGE FLOW VELOCITY, FPS

BASIS OF BEARINGS

NORTH 88°19'56" EAST, BEING THE BEARING OF THE NORTH LINE OF THE NORTHWEST QUARTER (NW 1/4) OF THE SOUTHWEST QUARTER (NW 1/4) OF SECTION 18, TOWNSHIP 22 SOUTH, RANGE 60 EAST, M.D.M., CLARK COUNTY, NEVADA, AS SHOWN ON THAT CERTAIN MAP ON FILE IN THE CLARK COUNTY RECORDER'S OFFICE IN FILE 82, OF SURVEYS, AT PAGE 98.

BENCHMARK

CLARK COUNTY BM STATION - 0C20 19NW06 2000
RIVET AND SQUARE ALUMINUM PLATE IN A CONCRETE HEADWALL SOUTH SIDE OF BLUE DIAMOND ROAD 300 FEET EAST OF HUALAPAI WAY.

ELEVATION = 888.775 METERS (NAVD 88)
ELEVATION = 2915.92 US SURVEY FEET (CALCULATED)

SURVEY PROVIDED BY:

TRI-CORE SURVEYING LLC
6761 W. CHARLESTON BLVD.
LAS VEGAS, NV 89146
(702) 821-1554

NEW TOPOGRAPHY AS OF: APRIL 2006

NO.	DESCRIPTION	DATE	APP'D

DATE: 05/25/06
PM: K. WITTWER
DRAWN BY:
DESIGNED BY:
CHECKED BY:
ADA CHECKED:
JOB NO. 019.001
SCALE: 1"=80'

Triton Engineering
6757 West Charleston Boulevard
Las Vegas, Nevada 89146
Office: (702) 254-1480
Fax: (702) 254-1062
www.tritoneng.com

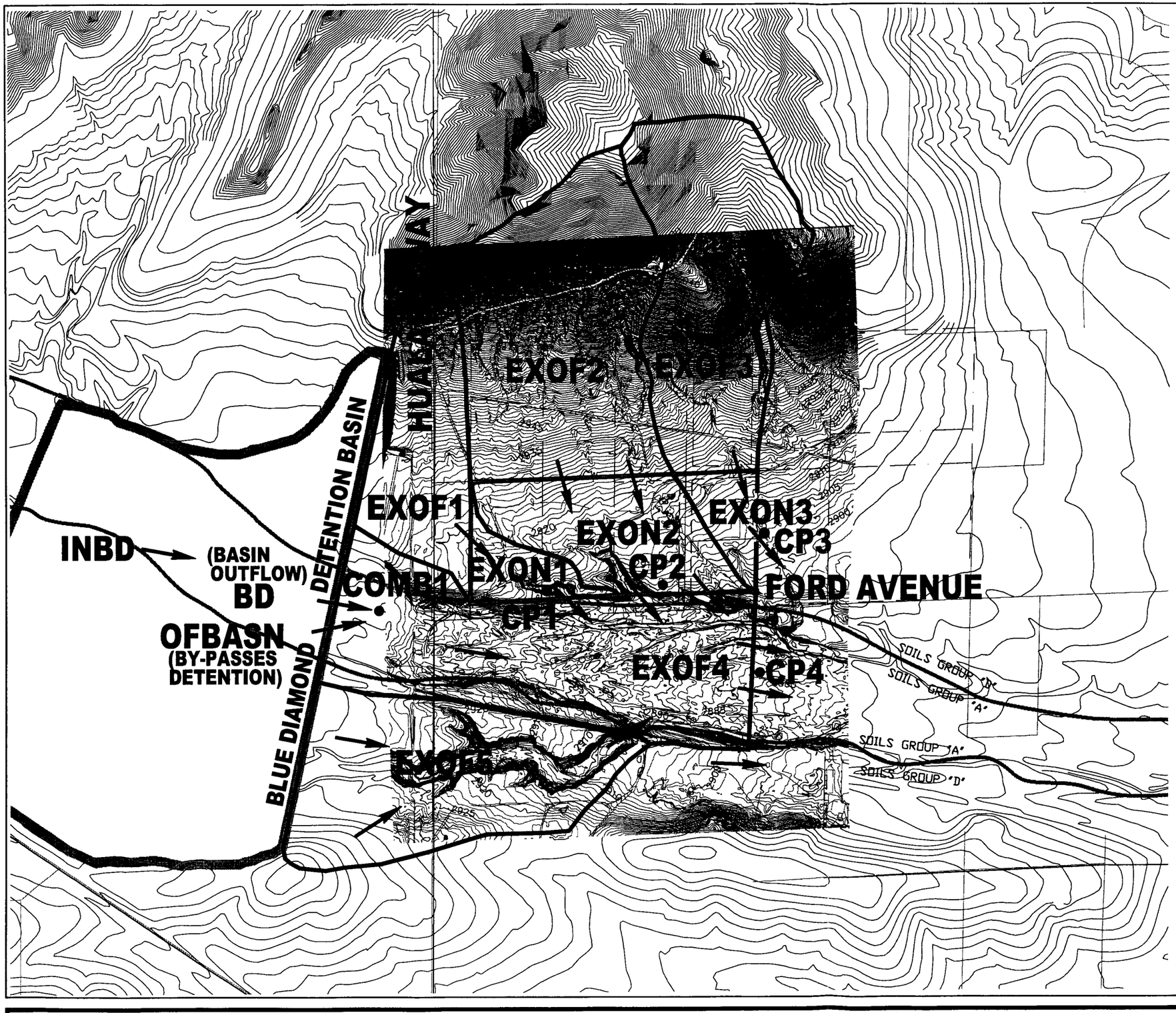
LOCATIONS, INC.

REQUEST FOR LOMR - FORD / CONQUISTADOR

HYDRAULIC CROSS SECTIONS

SHEET 1 OF 1

FIGURE ADD1-2



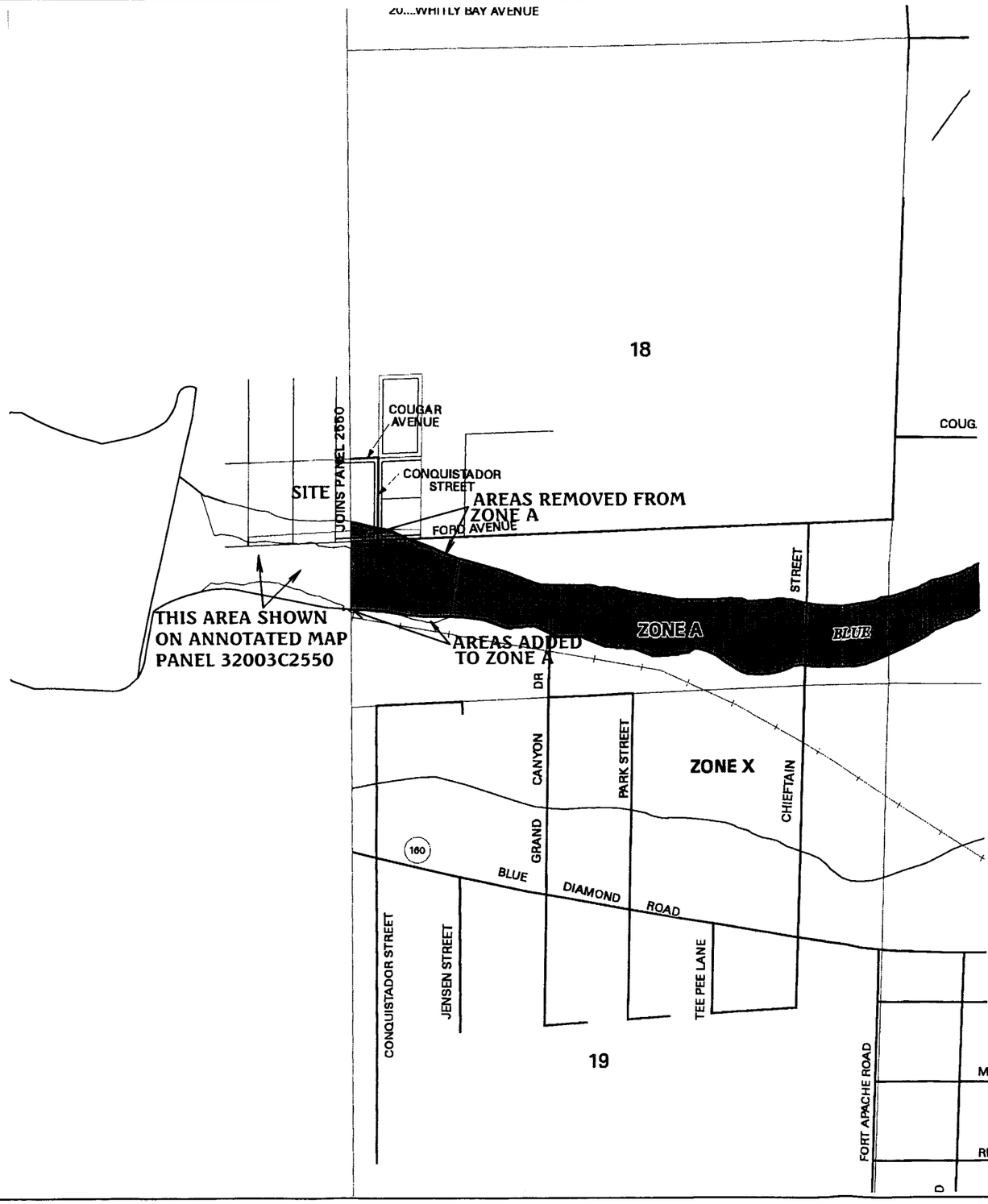
SUMMARY OF PEAK FLOW RATES EXISTING CONDITIONS			
CONC. POINT/ DRAINAGE AREA	AREA, ACRES	PEAK FLOW, CFS 10-YR	100-YR
BD		164	213
COMB1		253	586
CP1		27	55
CP2		65	132
CP3		43	88
CP4		369	838
EXOF1	14.13	21	44
EXOF2	30.39	46	94
EXOF3	25.30	38	78
EXOF4	31.45	17	51
EXOF5	24.76	36	72
EXON1	3.59	5	11
EXON2	12.33	19	38
EXON3	3.07	5	10
INBD		4489	13818
OFBASN	381.00	175	431
			9/6/2006
NOTES:			
1. All basins upstream of the detention basin are referenced from "Design Memorandum for Blue Diamond Detention Basin", by US Army Corps of Engineers, 1998.			
2. Flow that bypasses the detention basin (OFBASN) by way of a storm drain facility, actually enters the well-defined channel within area EXOF5. However, in order to give the most conservative peak flow rates along the subject site, the flow from OFBASN is combined with the detained flow (BD) at point COMB1.			

FIGURE ADD1 - 1

Request for LOMR - Ford / Conquistador

EXISTING CONDITIONS DRAINAGE BASINS

Triton Engineering



MAP SCALE 1" = 1000'

500 0 1000 2000 FEET

300 0 300 600 METERS

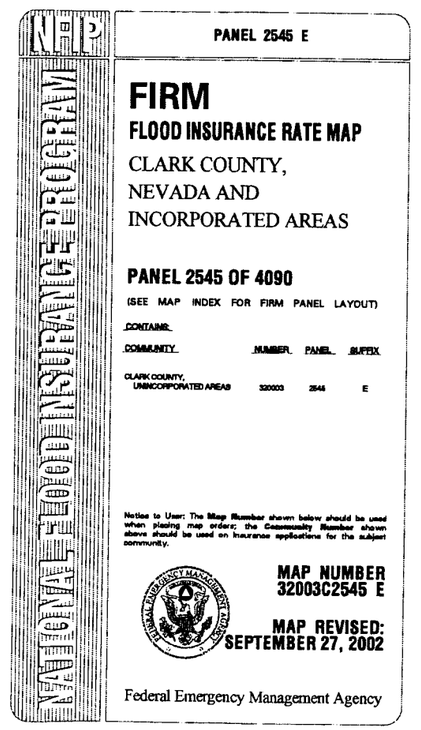
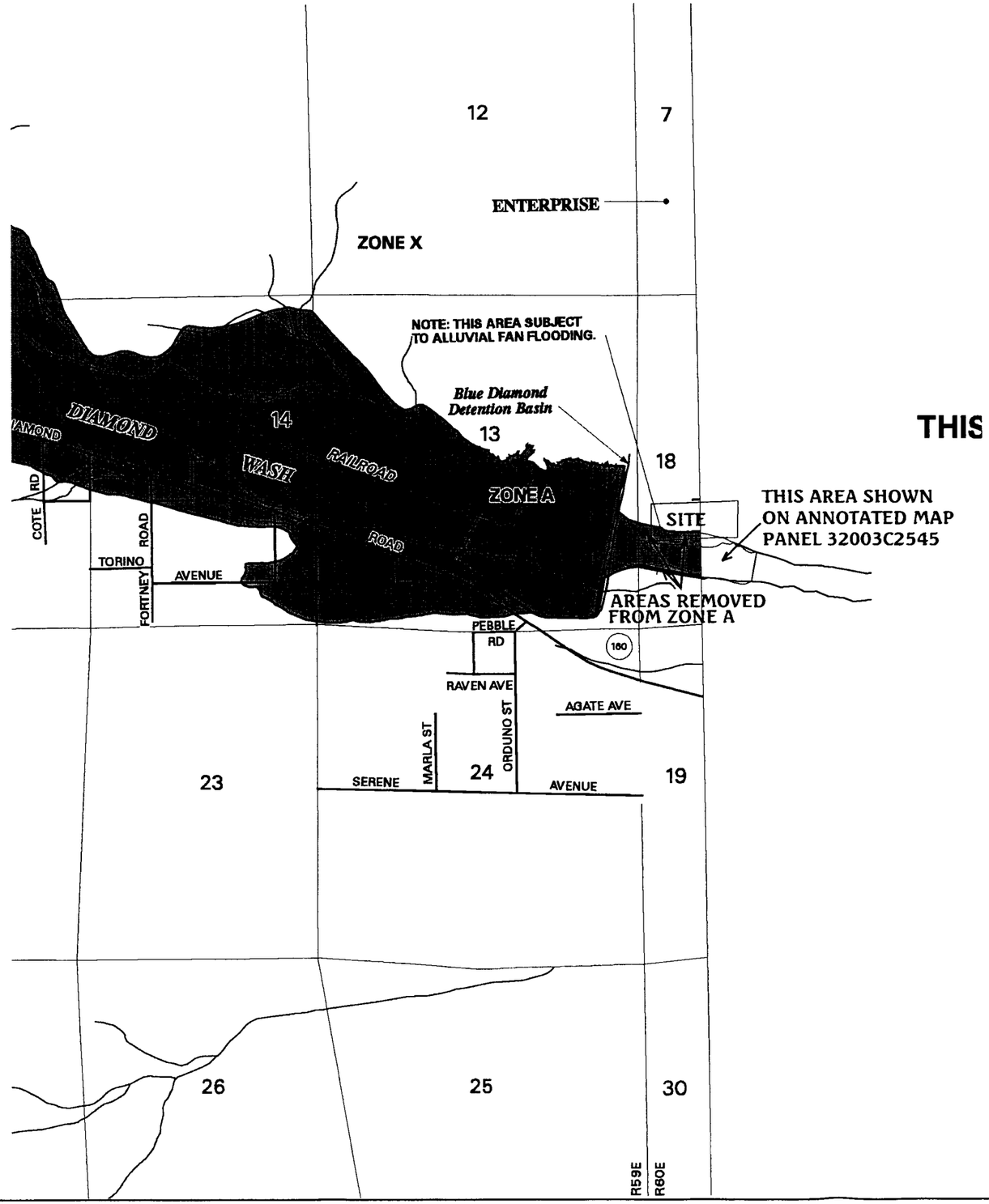


FIGURE ADD1 - 3

Request for LOMR - Ford / Conquistador

ANNOTATED FIRM MAP PANEL 32003C 2545

Triton Engineering



THIS

MAP SCALE 1" = 2000'

1000 0 2000 4000 FEET

PANEL 2550 E

FIRM

FLOOD INSURANCE RATE MAP

CLARK COUNTY, NEVADA AND INCORPORATED AREAS

PANEL 2550 OF 4090

(SEE MAP INDEX FOR FIRM PANEL LAYOUT)

CONTAINS:

COMMUNITY	NUMBER	PANEL	SUFFIX
CLARK COUNTY, UNINCORPORATED AREAS	320003	2550	E

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 32003C2550 E

MAP REVISED: SEPTEMBER 27, 2002

Federal Emergency Management Agency

NATIONAL FLOOD INSURANCE PROGRAM

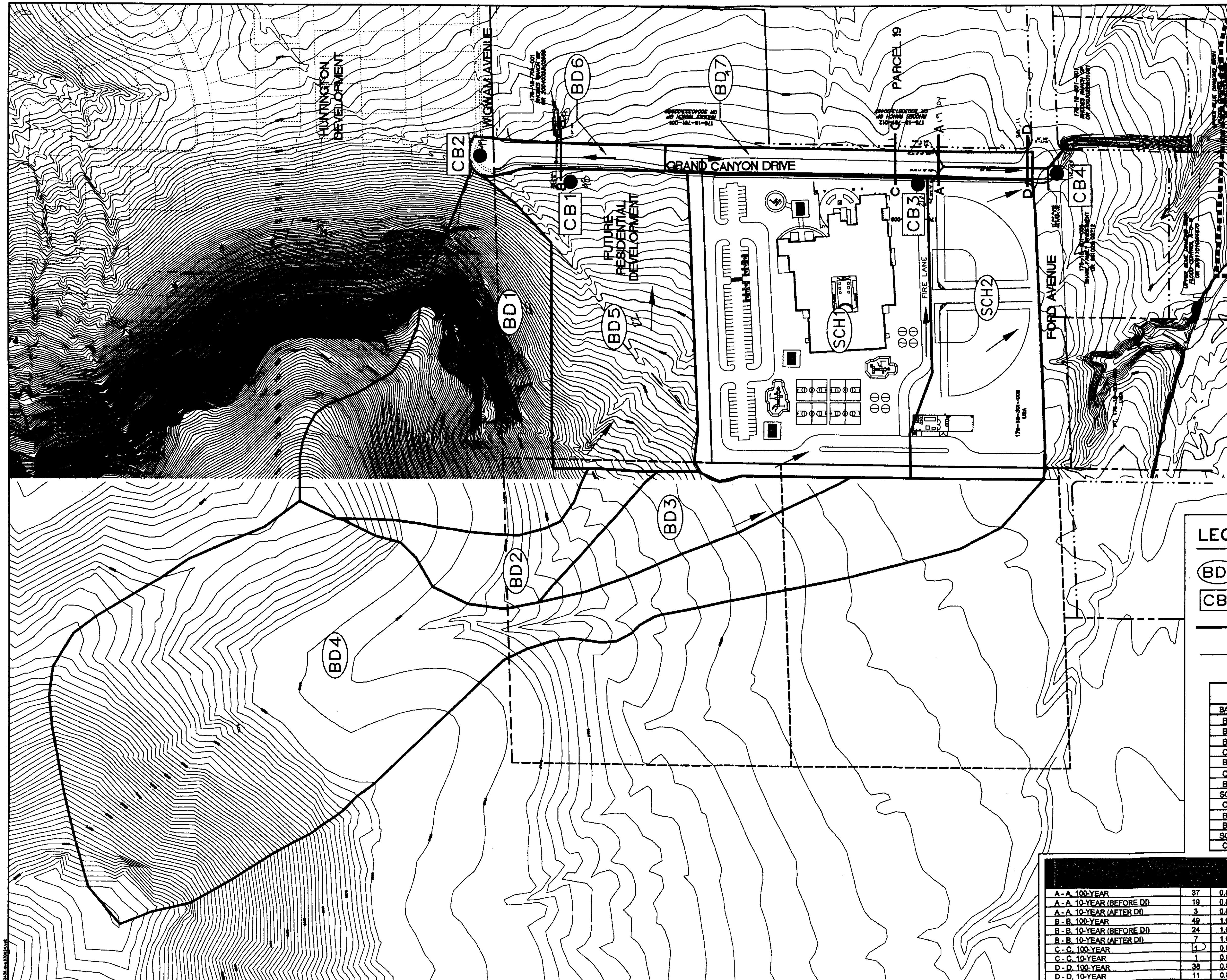
FIGURE ADD1 - 4

Request for LOMR - Ford / Conquistador

ANNOTATED FIRM MAP PANEL 32003C 2550

Triton Engineering

REFERENCE MATERIAL



LEGEND

BD1 — DRAINAGE SUBBASIN

CB1 ● — CONCENTRATION POINT

SUBBASIN BOUNDARY

FLOW DIRECTION

TABLE 4: FUTURE CONDITIONS HEC-1 MODEL			
BASIN	AREA	100-YEAR	100-YEAR
BD1	7.43	20	9
BD2	1.96	7	3
BD5	5.68	22	12
CB1	—	48	23
BD6	0.70	3	2
CB2	—	49	24
BD3	1.96	7	3
SCH1	9.00	30	15
CB3	—	36	18
BD7	1.19	4	2
BD4	19.31	60	27
SCH2	4.43	16	8
CB4	—	112	53

[redacted]						
A - A, 100-YEAR	37	0.80	3.70	0.73	2.70	N/A
A - A, 10-YEAR (BEFORE DI)	19	0.80	3.05	0.61	1.86	No
A - A, 10-YEAR (AFTER DI)	3	0.80	2.30	0.35	0.81	Yes
B - B, 100-YEAR	49	1.06	4.44	0.76	3.37	N/A
B - B, 10-YEAR (BEFORE DI)	24	1.06	3.61	0.63	2.27	No
B - B, 10-YEAR (AFTER DI)	7	1.06	3.10	0.43	1.33	Yes
C - C, 100-YEAR	1	0.80	1.67	0.27	0.45	N/A
C - C, 10-YEAR	1	0.80	1.67	0.27	0.45	Yes
D - D, 100-YEAR	38	0.80	3.73	0.74	2.76	N/A
D - D, 10-YEAR	11	0.80	2.78	0.53	1.47	Yes

RECD JUN 1 0 2005

G.C. WALLACE, INC.
Engineers/Planners/Surveyors
1555 SOUTH RAINBOW BLVD./LAS VEGAS, NEVADA 89146
TELEPHONE: (702) 804-2000 • FAX: (702) 804-2299

G:\754-015\dwg\Hydro\RTC4\FIG7-RTC.dwg mkauffman

RHODES RANCH SCHOOL SITE

RHODES DESIGN AND DEVELOPMENT

GRAND CANYON DRIVE
FUTURE CONDITIONS BASIN MAP

DESIGN:
DRAWN:
CHECK:
ISSUE DATE:
ISSUE EDITOR:
PLOT DATE: 06-10-05
PLOT TIME: 08:17:30

ISSUE DATE

DRAWING
FIG-7
SHT OF SHTS
HTE: 04-60287

FEMA FORMS

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

OVERVIEW & CONCURRENCE FORM

O.M.B No. 1660-0016
Expires: August 31, 2007

PAPERWORK BURDEN DISCLOSURE NOTICE

Public reporting burden for this form is estimated to average 1 hour per response. The burden estimate includes the time for reviewing instructions, searching existing data sources, gathering and maintaining the needed data, and completing, reviewing, and submitting the form. You are not required to respond to this collection of information unless a valid OMB control number appears in the upper right corner of this form. Send comments regarding the accuracy of the burden estimate and any suggestions for reducing this burden to: Information Collections Management, U.S. Department of Homeland Security, Federal Emergency Management Agency, 500 C Street, SW, Washington DC 20472, Paperwork Reduction Project (1660-0016). Submission of the form is required to obtain or retain benefits under the National Flood Insurance Program. **Please do not send your completed survey to the above address.**

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 Parts 60 & 65 of the NFIP Regulations.)

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
Ex: 480301 480287	City of Katy Harris County	TX TX	480301 48201C	0005D 0220G	02/08/83 09/28/90
32003	Unincorporated Clark County	NV	32003C	2545E	09/27/02
32003	Unincorporated Clark County	NV	32003C	2550E	09/27/02

2. *Flooding Source:* Blue Diamond Wash

3. Project Name/Identifier: Request for LOMR for Ford/Conquistador

4. FEMA zone designations affected: Zone A *(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 ☐ *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 types of flooding and structures *(check all that apply)*

Types of Flooding:	☒ Riverine	☐ Coastal	☐ Shallow Flooding (e.g., Zones AO and AH)
	☐ Alluvial fan	☐ Lakes	☐ Other (Attach Description)
Structures:	☐ Channelization	☐ Levee/Floodwall	☐ Bridge/Culvert
	☒ Dam	☐ Fill	☐ Other, Attach Description

C. REVIEW FEE

Has the review fee for the appropriate request category been included?	☒ Yes	Fee amount: $_____
	☐ No, Attach Explanation	

Please see the DHS-FEMA Web site at http://www.fema.gov/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: Kelly J. Wittwer, P.E.	Company: Triton Engineering, LLC	
Mailing Address: 6757 W Charleston Blvd. , Suite B	Daytime Telephone No.: 702-254-1480	Fax No.: 702-254-3062
Las Vegas, NV 89146	E-Mail Address: kwittwer@tritoneng.com	
Signature of Requester (required):		Date: 9/8/06

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 requirement that no fill be 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. 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: David Betley, P.E.,		Telephone No.: 702-455-4808
Community Name: Clark County Nevada	Community Official's Signature (required):	Date:

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. 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: Kelly J. Wittwer, P.E.	License No.: 10625	Expiration Date: 06-30-08
Company Name: Triton Engineering, LLC.	Telephone No.: 702-254-1480	Fax No.: 702-254-3062
Signature:		Date: 9/8/06

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: August 31, 2007

PAPERWORK REDUCTION ACT

Public reporting burden for this form is estimated to average 3.25 hours per response. The burden estimate includes the time for reviewing instructions, searching existing data sources, gathering and maintaining the needed data, and completing, reviewing, and submitting the form. You are not required to respond to this collection of information unless a valid OMB control number appears in the upper right corner of this form. Send comments regarding the accuracy of the burden estimate and any suggestions for reducing this burden to: Information Collections Management, U.S. Department of Homeland Security, Federal Emergency Management Agency, 500 C Street, SW, Washington DC 20472, Paperwork Reduction Project (1660-0016). Submission of the form is required to obtain or retain benefits under the National Flood Insurance Program. **Please do not send your completed survey to the above address.**

Flooding Source: Blue Diamond Wash
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 2) ☐ 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.)	FIS (cfs)	Revised (cfs)
Downstream of Upper Blue Diamond Detention Basin	varies	600 (given in CLOMR for areas downstream of the det. Basin)	838

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

☐ Statistical Analysis of Gage Records ☒ Precipitation/Runoff Model HEC-1 [TR-20, HEC-1, HEC-HMS etc.]
☐ 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. The document, "Numerical Models Accepted by FEMA for NFIP Usage" lists the models accepted by DHS-FEMA. This document can be found at: http://www.fema.gov/fhm/en_modl.shtm.

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

Was sediment transport considered? ☐ 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.

B. HYDRAULICS

1. Reach to be Revised

	Description	Cross Section	Water-Surface Elevations (ft.)	
			Effective	Proposed/Revised
Downstream Limit	360+/- feet downstream of subject site	1000	Not known, see text	2876.4 (Q(100)=838 cfs)
Upstream Limit	390+/- feet upstream of subject site	3128	Not known, see text	2912.6 (Q(100)=838 cfs)

2. Hydraulic Method Used HEC-RAS

Hydraulic Analysis HEC-RAS [HEC-2 , HEC-RAS, Other (Attach description)]

B. HYDRAULICS (CONTINUED)

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. These review programs verify that the hydraulic estimates and assumptions in the model data are in accordance with NFIP requirements, and that the data are comparable with the assumptions and limitations of HEC-2/HEC-RAS. CHECK-2 and CHECK-RAS identify areas of potential error or concern. These tools do not replace engineering judgment. CHECK-2 and CHECK-RAS can be downloaded from http://www.fema.gov/fhm/frm_soft.shtm. We recommend that you review your HEC-2 and HEC-RAS models with CHECK-2 and CHECK-RAS. If you disagree with a message, please attach an explanation of why the message is not valid in this case. Review of your submittal and resolution of valid modeling discrepancies will result in reduced review time.

HEC-2/HEC-RAS models reviewed with CHECK-2/CHECK-RAS? ☒ Yes ☐ No

4. Models Submitted ☒ Diskette Submitted

	Natural Run		Floodway Run		Datum
Duplicate Effective Model*	File Name:	Plan Name:	File Name:	Plan Name:	_____
Corrected Effective Model*	File Name:	Plan Name:	File Name:	Plan Name:	_____
Existing or Pre-Project Conditions Model	File Name:	Plan Name:	File Name:	Plan Name:	_____
Revised or Post-Project Conditions Model	File Name: BD.prj	Plan Name: 1	File Name:	Plan Name:	NAVD 88
Other - (attach description)	File Name:	Plan Name:	File Name:	Plan Name:	_____

*Not required for revisions to approximate 1%-annual-chance floodplains (Zone A) – for details, refer to the corresponding section of the instructions.

The document "Numerical Models Accepted by FEMA for NFIP Usage" lists the models accepted by DHS-FEMA. This document can be found at: http://www.fema.gov/fhm/en_modl.shtm.

C. MAPPING REQUIREMENTS

A **certified topographic 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.).

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,** 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 of revision.

☒ Annotated FIRM and/or FBFM Included ☒ Digital Mapping (GIS/CADD) Data Submitted (Recommended)

D. COMMON REGULATORY REQUIREMENTS*

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

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.
- The proposed project encroaches upon a SFHA with or without BFEs established and would result in increases above 1.00 foot.

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/CLOMR 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 added. Elements and examples of regulatory floodway revision notification can be found in the MT-2 Form 2 Instructions.)

4. For LOMR/CLOMR requests, does this request have the potential to impact an endangered species? ☐ Yes ☒ No

If Yes, please submit documentation from the community to show that they have complied with Sections 9 and 10 of the Endangered Species Act (ESA). Section 9 of the ESA prohibits anyone from "taking" or harming an endangered species. If an action might harm an endangered species, a permit is required from U.S. Fish and Wildlife Service or National Marine Fisheries Service under Section 10 of the ESA.

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.

5. For LOMR requests, does this request require property owner notification and acceptance of BFE increases? ☐ Yes ☒ No

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

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

HYDROLOGY

HYDROLOGIC CRITERIA AND DRAINAGE DESIGN MANUAL - STANDARD FORM 4

Momentum Engineers, Ltd.
6101 Kings Brook Ct.
Las Vegas NV 89149

PROJECT NO. : 06015 **PROJECT: Ford/Conquistador LOMR**

FILE : frm4 **CALCULATED BY: B Brown** **DATE : 09/05/06**

Sub-Basin Data					Initial/Overland Time (T_i)			Travel Time (T_t)					T_c	T_c Check (Urbanized Basins)		Final T_c	T_{lag}	Remarks
DESIG	CN	K	AREA (acres)	AREA (mi^2)	LENGTH (ft)	SLOPE (%)	T_i (min)	LENGTH (ft)	SLOPE (%)	V_1 (fps)	V_2 (fps)	T_t (min)	$T_c=T_i+T_t$ (min)	TOTAL (ft)	T_c (min)	T_c (min)	T_{lag} (hrs)	Remarks
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)	(18)	(19)
UNDEVELOPED CONDITION																		
EXOF1	93	0.838	14.13	0.0221	200	20.0	2.5	1255	5.7	3.5	7.0	4.2	6.6	N/A	N/A	6.6	0.100	
EXOF2	93	0.838	30.39	0.0475	200	20.0	2.5	1410	12.0	5.1	10.2	3.1	5.6	N/A	N/A	5.6	0.100	
EXOF3	93	0.838	25.30	0.0395	200	20.0	2.5	1340	9.7	4.6	9.2	3.3	5.8	N/A	N/A	5.8	0.100	
EXOF4	82	0.692	31.45	0.0491	450	2.0	12.4	2060	1.7	1.9	3.8	11.1	23.5	N/A	N/A	23.5	0.235	
EXOF5	93	0.838	24.76	0.0387	500	16.0	4.2	1660	1.8	2.0	3.9	9.1	13.3	N/A	N/A	13.3	0.133	
EXON1	93	0.838	3.59	0.0056	200	2.0	5.3	380	5.6	3.5	N/A	1.8	7.1	N/A	N/A	7.1	0.100	
EXON2	93	0.838	12.33	0.0193	200	2.0	5.3	450	3.2	2.6	N/A	2.8	8.1	N/A	N/A	8.1	0.100	
EXON3	93	0.838	3.07	0.0048	200	2.0	5.3	140	3.1	2.6	N/A	0.9	6.2	N/A	N/A	6.2	0.100	

$T_i=(1.8(1.1-K)L^{(1/2)})/(S^{1/3})$

$T_c=T_i+T_t$

$K=0.0132(CN)-.39$

$T_{lag} = 0.6T_c$

For the travel time (T_t) calculations,
V_1 applies to the first 500 feet of travel distance;
V_2 applies to the remaining travel distance.

Travel Time Velocity Formulas

Existing	Developed
$V_1 = 14.8*(S/100)^{1/2}$	$V_1 = 20.2*(S/100)^{1/2}$
$V_2 = 29.4*(S/100)^{1/2}$	$V_2 = 30.6*(S/100)^{1/2}$

All basins over one square mile are calculated by the equation

$T_{lag}=20Kn(L*L_c/S^{0.5})^{0.33}$

REFERENCE: **CCRFCD HYDROLOGIC CRITERIA AND DRAINAGE DESIGN MANUAL**

STANDARD FORM 4

CURVE NUMBER DETERMINATION*

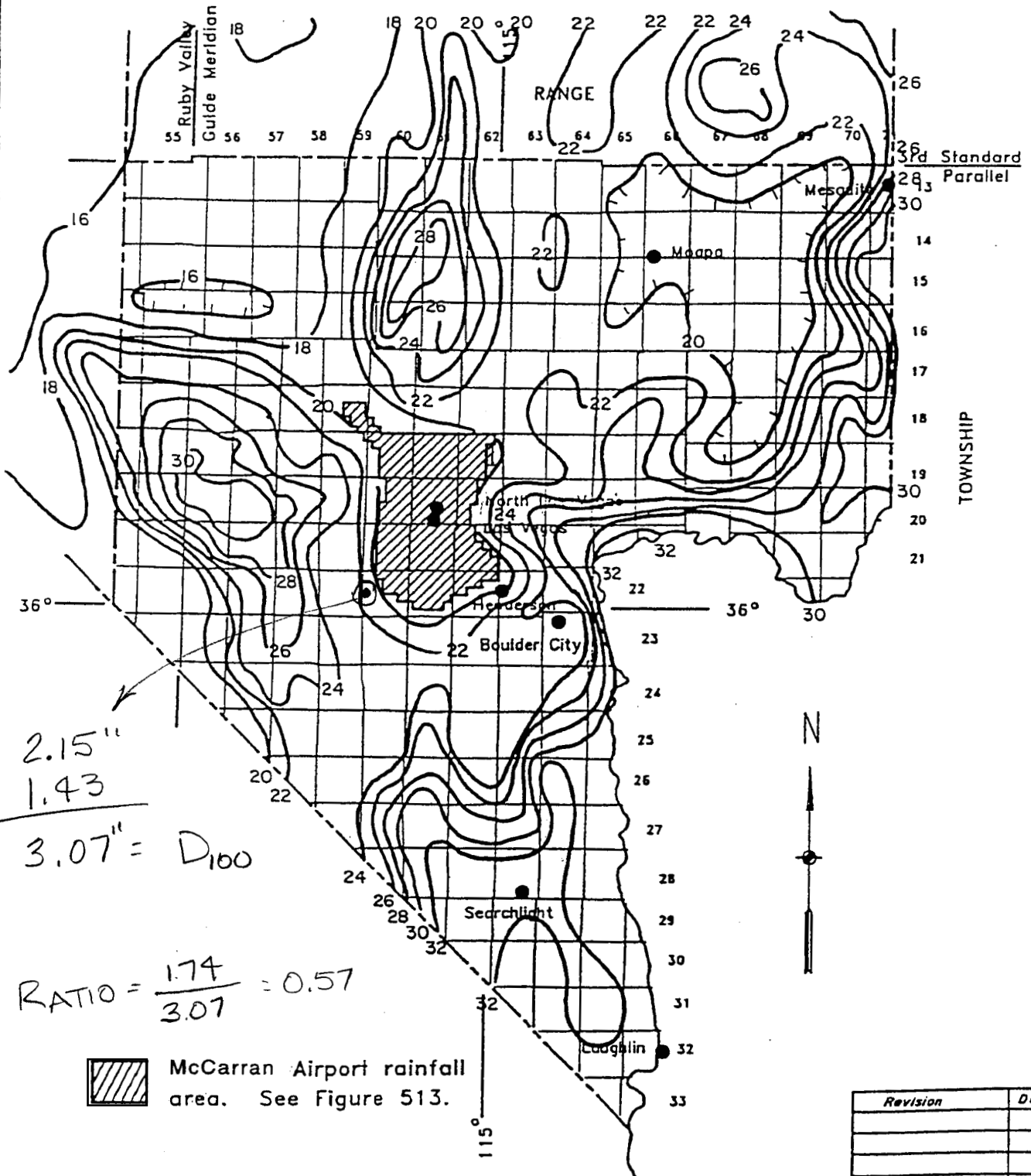
LOMR for Ford/Conquistador

9/5/2006 BY B.BROWN

BASIN	HYDROLOGIC SOIL GROUP	LAND USE	CURVE NUMBER	PERCENT OF TOTAL	FINAL CN	REMARKS
EXOF1, EXOF2, EXOF3, EXON1, EXON2, EXON3 EXOF5	D	NAT. DESERT	93	100	93	TABLE 602, 4 OF 4 Herbaceous cover, poor hydrologic condition
EXOF4	D	NAT. DESERT and business	93	15		Table 602, 1 of 4 Urban districts
	A	NAT. DESERT	80	85	82	Table 602A

*Based on Clark County Regional Flood Control District Hydrologic Criteria and Drainage Design Manual, Updated 2000.

RAINFALL DEPTH-DURATION-FREQUENCY
100-YEAR, 6-HOUR
(DEPTHS IN TENTHS OF INCHES)



2.15"
1.43
3.07" = D_{100}

$\text{RATIO} = \frac{1.74}{3.07} = 0.57$

McCarran Airport rainfall area. See Figure 513.

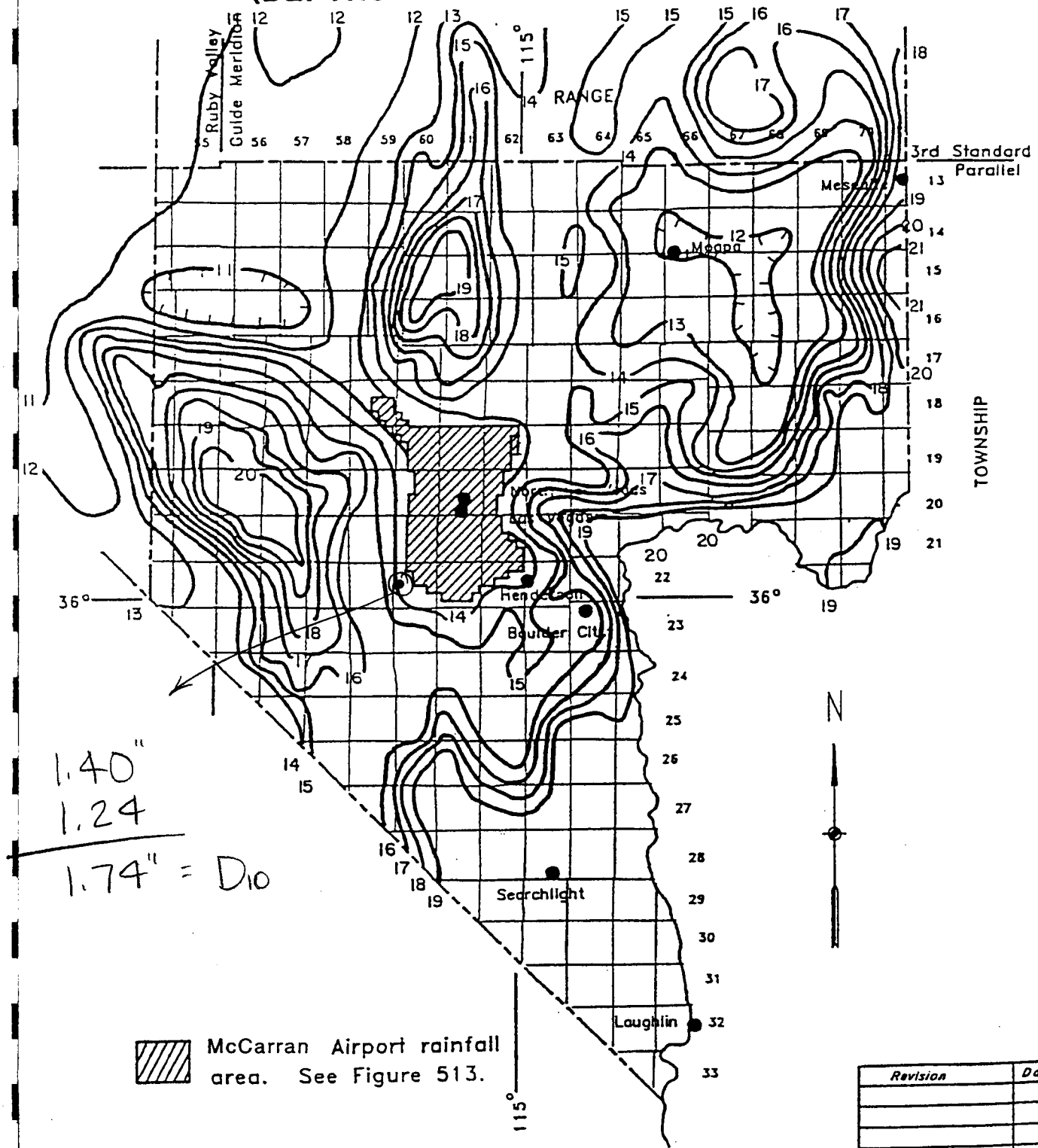
Revision	Date

WRC ENGINEERING

REFERENCE:
NOAA ATLAS 2, VOLUME VII NEVADA, 1973

FIGURE 506

RAINFALL DEPTH-DURATION-FREQUENCY
10-YEAR, 6-HOUR
(DEPTHS IN TENTHS OF INCHES)



1.40"
1.24
1.74" = D10

Revision	Date

WRC ENGINEERING

REFERENCE:
NOAA ATLAS 2, VOLUME VII NEVADA, 1973

FIGURE 503

```
1*****************************************
*                                       *
*   FLOOD HYDROGRAPH PACKAGE  (HEC-1)   *
*              JUN   1998               *
*            VERSION 4.1                *
*                                       *
*  RUN DATE   05SEP06  TIME  20:08:03   *
*                                       *
*****************************************
```

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

```
X     X  XXXXXXX   XXXXX           X
X     X  X        X     X         XX
X     X  X        X                X
XXXXXXX  XXXX     X        XXXXX   X
X     X  X        X                X
X     X  X        X     X          X
X     X  XXXXXXX   XXXXX          XXX
```

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

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


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

              *DIAGRAM          *
    1         ID
    2         ID     EXISTING CONDITIONS MODEL
    3         ID     LOMR FOR FORD / CONQUISTADOR
    4         ID     MOMENTUM ENGINEERS - - B BROWN
    5         ID
    6         ID     THE MAJORITY OF THIS MODEL IS REFERENCED FROM THE CLOMR FOR AREAS DOWNSTREA
    7         ID     THE BDDB.  ALL BASINS UPSTREAM OF THE DAM ARE REFERENCED AS SUCH.
    8         ID     ALL BASINS DOWNSTREAM OF THE DAM ARE NEWLY CONSIDERED IN THIS ANALYSIS.
    9         ID
   10         ID     6-HOUR STORM DISTRIBUTION #3
   11         ID     10- AND 100-YEAR STORM EVENTS
   12         ID
   13         ID
   14         ID
   15         ID
   16         IT       5       0       0     300
   17         IO       5       0       0
   18         IN       5       0       0
   19         JR    PREC    0.57       1
              *
   20         ID   * BLUE DIAMOND DETENTION BASINS REFRENCED FROM MPU BASIN DELINEATION BY COE
   21         ID   ***************************************************************************
   22         ID    BLUE DIAMOND DETENTION BASIN DESIGN.....................FILE = BDDB.LA1
   23         ID    SOURCE OF FILE= NEWBDDB1.LA1.....................................
   24         ID    ===============================================================================
   25         ID    MODEL CREATED TO DUPLICATE THE BLUE DIAMOND DETENTION BASIN DESIGN
   26         ID    AS OF JAN 31 1996.
   27         ID    FILE NEWBDDB1.LA1 DATED 6-23-96 WAS USED, AND RAINFALL & PATTERN ADJUSTED
   28         ID    RAIN = 1.76 (CURVE) X 1.26 (TF) = 2.22 IN.  AS STATED IN TROP. DM DRAFT
   29         ID    PATTERN # = 4.95     DA =68.25    DARF =
   30         ID                            JLF  2/1/96
```

```
31          ID              ****************************************
32          ID    (A REVISED EL-VOL-STO IS COMING SOON.  THIS DOES NOT INCLUDE IT)
33          ID    ELEVATIONS ARE NGVD
34          ID              ****************************************
35          ID    COMMENTS BELOW THIS POINT WERE IN FILE NEWBDDB1.LA1 AND THEREFORE
36          ID    RAIN, DARF & PATTERNS BELOW THIS POINT ARE NOT APPLICABLE TO THIS FILE
37          ID    ======================================================================
38          ID
39          ID    REVISED TO ESTIMATE RUNOFF FROM 0.6 SQ.MI. AREA CONTRIBUTING TO A CP AT
40          ID    BLUE DIAMOND ROAD, JUST U/S OF BLUE DIAMOND DB.
41          ID
42          ID    DEPTH-AREA AND PATTERN FOR AREA ABOVE BLUE DIAMOND DB.
43          ID    DA = 68.25 MI2.  DARF = . PATTERN # = 4.9.
44          ID    RAIN =  1.75 (CURVE) X  1.26 (TF) =  2.20 IN.
45          ID
46          ID                                HN 6/22/95
47          ID    ======================================================================
48          ID
1                                        HEC-1 INPUT                                    PAGE  2

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

49          KK      71
50          KM    RUNOFF FROM SCS SUBAREA 71
51          BA     6.9
52          KM    LAS VEGAS STANDARD PROJECT SUMMER THUNDERSTORM
53          PB     2.22
54          PI     .533   1.039    .559    .786    .891    .165    .261    .204    .077    .232
55          PI     .055    .131    .081    .185    .139    .212    .264    .268    .293    .237
56          PI     .233    .157    .386    .270    .268    .140    .109    .029    .188    .105
57          PI     .157    .174    .344    .388    .514    .718    .589   1.256   1.023   1.255
58          PI    1.842   2.158    .282    .302    .574    .710    .293    .135    .233    .161
59          PI     .258    .168    .373    .514    .789    .554    .735    .741    .108    .108
60          PI     .132    .053    .053    .053    .105    .025    .053    .027    .080    .025
61          PI     .053    .027
62          LU       0    0.50       0
63          UD    0.42
            *

64          KK     71R
65          KM    ROUTE 71 THRU 501
66          RM       5    0.39    0.15
            *

67          KK     501
68          KM    RUNOFF FROM SCS SUBAREA 501
69          BA    11.28
70          KM    LAS VEGAS STANDARD PROJECT SUMMER THUNDERSTORM
71          PB     2.22
72          PI     .533   1.039    .559    .786    .891    .165    .261    .204    .077    .232
73          PI     .055    .131    .081    .185    .139    .212    .264    .268    .293    .237
74          PI     .233    .157    .386    .270    .268    .140    .109    .029    .188    .105
75          PI     .157    .174    .344    .388    .514    .718    .589   1.256   1.023   1.255
76          PI    1.842   2.158    .282    .302    .574    .710    .293    .135    .233    .161
77          PI     .258    .168    .373    .514    .789    .554    .735    .741    .108    .108
78          PI     .132    .053    .053    .053    .105    .025    .053    .027    .080    .025
79          PI     .053    .027
80          LU       0    0.50       0
81          UD    0.45
            •

82          KK     501C
83          KM    COMBINE 71 AND 501
84          HC       2
            •

85          KK     501R
86          KM    ROUTE 501C THRU 502
87          RM       5    0.40    0.15
```

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

  88      KK     502
  89      KM   RUNOFF FROM SCS SUBAREA 502
  90      KM   DRAINAGE AREA CORRECTED BY JP 2/21/92
  91      BA   27.40
  92      KM   LAS VEGAS STANDARD PROJECT SUMMER THUNDERSTORM
  93      PB    2.22
  94      PI    .533   1.039    .559    .786    .891    .165    .261    .204    .077    .232
  95      PI    .055    .131    .081    .185    .139    .212    .264    .268    .293    .237
  96      PI    .233    .157    .386    .270    .268    .140    .109    .029    .188    .105
  97      PI    .157    .174    .344    .388    .514    .718    .589   1.256   1.023   1.255
  98      PI   1.842   2.158    .282    .302    .574    .710    .293    .135    .233    .161
  99      PI    .258    .168    .373    .514    .789    .554    .735    .741    .108    .108
 100      PI    .132    .053    .053    .053    .105    .025    .053    .027    .080    .025
 101      PI    .053    .027
 102      LU      0    0.50       0
 103      UD   0.95
          *

 104      KK    502C
 105      KM   COMBINE 501R AND 502
 106      HC       2
          •

 107      KK      72
 108      KM   RUNOFF FROM SCS SUBAREA 72
 109      BA    6.58
 110      KM   LAS VEGAS STANDARD PROJECT SUMMER THUNDERSTORM
 111      PB    2.22
 112      PI    .533   1.039    .559    .786    .891    .165    .261    .204    .077    .232
 113      PI    .055    .131    .081    .185    .139    .212    .264    .268    .293    .237
 114      PI    .233    .157    .386    .270    .268    .140    .109    .029    .188    .105
 115      PI    .157    .174    .344    .388    .514    .718    .589   1.256   1.023   1.255
 116      PI   1.842   2.158    .282    .302    .574    .710    .293    .135    .233    .161
 117      PI    .258    .168    .373    .514    .789    .554    .735    .741    .108    .108
 118      PI    .132    .053    .053    .053    .105    .025    .053    .027    .080    .025
 119      PI    .053    .027
 120      LU      0    0.50       0
 121      UD   0.46
          *

 122      KK   502CC
 123      KM   COMBINE 72 AND 502C
 124      HC       2
          *

 125      KK    502R
 126      KM   ROUTE 502CC THRU 503
 127      RM       4    0.36    0.15
          *
```



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

 128      KK      73
 129      KM   RUNOFF FROM SCS SUBAREA 73
 130      BA    4.02
 131      KM   LAS VEGAS STANDARD PROJECT SUMMER THUNDERSTORM
 132      PB    2.22
 133      PI    .533   1.039    .559    .786    .891    .165    .261    .204    .077    .232
 134      PI    .055    .131    .081    .185    .139    .212    .264    .268    .293    .237
 135      PI    .233    .157    .386    .270    .268    .140    .109    .029    .188    .105
 136      PI    .157    .174    .344    .388    .514    .718    .589   1.256   1.023   1.255
 137      PI   1.842   2.158    .282    .302    .574    .710    .293    .135    .233    .161
```

```
138          PI    .258    .168    .373    .514    .789    .554    .735    .741    .108    .108
139          PI    .132    .053    .053    .053    .105    .025    .053    .027    .080    .025
140          PI    .053    .027
141          LU      0    0.50       0
142          UD   0.47
             *

143          KK     73R
144          KM   ROUTE 73 THRU 503
145          RM       4    0.36    0.15
             *

146          KK     503
147          KM   RUNOFF FROM SCS SUBAREA 503
148          BA    5.54
149          KM   LAS VEGAS STANDARD PROJECT SUMMER THUNDERSTORM
150          PB    2.22
151          PI    .533   1.039    .559    .786    .891    .165    .261    .204    .077    .232
152          PI    .055    .131    .081    .185    .139    .212    .264    .268    .293    .237
153          PI    .233    .157    .386    .270    .268    .140    .109    .029    .188    .105
154          PI    .157    .174    .344    .388    .514    .718    .589   1.256   1.023   1.255
155          PI   1.842   2.158    .282    .302    .574    .710    .293    .135    .233    .161
156          PI    .258    .168    .373    .514    .789    .554    .735    .741    .108    .108
157          PI    .132    .053    .053    .053    .105    .025    .053    .027    .080    .025
158          PI    .053    .027
159          LU      0    0.50       0
160          UD   0.94
             •

161          KK    503C
162          KM   COMBINE 502R, 73, AND 503
163          HC       3
             *

164          KK    503R
165          KM   ROUTE 503 THRU 504
166          RM       4    0.36    0.15
             *
```



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

167          KK     504
168          KM   RUNOFF FROM SCS SUBAREA 504
169          BA    6.53
170          KM   LAS VEGAS STANDARD PROJECT SUMMER THUNDERSTORM
171          PB    2.22
172          PI    .533   1.039    .559    .786    .891    .165    .261    .204    .077    .232
173          PI    .055    .131    .081    .185    .139    .212    .264    .268    .293    .237
174          PI    .233    .157    .386    .270    .268    .140    .109    .029    .188    .105
175          PI    .157    .174    .344    .388    .514    .718    .589   1.256   1.023   1.255
176          PI   1.842   2.158    .282    .302    .574    .710    .293    .135    .233    .161
177          PI    .258    .168    .373    .514    .789    .554    .735    .741    .108    .108
178          PI    .132    .053    .053    .053    .105    .025    .053    .027    .080    .025
179          PI    .053    .027
180          LU      0    0.50       0
181          UD   0.91
             •

182          KK    INBD
183          KM   COMBINE 503R AND 504 - FLOW ABOVE BLUE DIAMOND
184          KM   CHANNEL CAPACITY = 12300 CFS
185          HC       2
             * ==========================================================================

186          KK      BD
187          KM   BLUE DIAMOND DETENTION BASIN
188          KM   100YR COMPUTED PROBABILITY DETENTION DESIGN ... ON-LINE
189          KM   BROAD-CRESTED WEIR SPILLWAY - 1000 FT LONG
```

```
190          KM   30" DIA OUTLET
191          KM   SPILLWAY CREST = 2915 FT NGVD
192          KM   TOP OF DAM = 2930 FT NGVD
193          RS       1    STOR      -1
194          SV       0     1.6    12.8    37.2    79.3   150.8   264.7   433.2   668.8   973.4
195          SV  1340.8  1775.1  2281.8  2398.2  2514.5  2630.9  2747.2  2863.6  3444.8  4026.3
196          SQ       0      38      74      97     116     132     147     160     172     183
197          SQ     194     204     214    3716   10117   18406   28221   39354  110911  203572
198          SE    2857    2860    2865    2870    2875    2880    2885    2890    2895    2900
199          SE    2905    2910    2915    2916    2917    2918    2919    2920    2925    2930
             * ===========================================================================
             *

200          KK  OFBASN
201          KM          THIS BASIN TRIBUTARY TO THE RCB THAT BYPASSES DETENTION, DISCHARGING
202          KM          INTO THE BLUE DIAMOND WASH UNDER THE DAM - REFERENCED FROM CLOMR
203          BA  0.5953
204          PB    2.77
205          LS       0      88
206          UD   0.307
             *
```



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

207          KK   COMB1
208          KM           COMBINE DETAINED FLOW AND BYPASS FLOW
209          HC       2
             *

210          KK   EXOF5
211          KM            BEGIN BASINS DOWNSTREAM OF BDDB
212          BA   .0387
213          PB    3.07
214          KM             SDN #3
215          PC   0.000   0.020   0.057   0.070   0.087   0.108   0.124   0.130   0.130   0.130
216          PC   0.130   0.130   0.130   0.133   0.140   0.142   0.148   0.158   0.172   0.181
217          PC   0.190   0.197   0.199   0.200   0.201   0.204   0.214   0.229   0.241   0.249
218          PC   0.251   0.256   0.270   0.278   0.281   0.283   0.295   0.322   0.352   0.409
219          PC   0.499   0.590   0.710   0.744   0.781   0.812   0.819   0.835   0.851   0.856
220          PC   0.860   0.868   0.876   0.888   0.910   0.926   0.937   0.950   0.970   0.976
221          PC   0.982   0.985   0.987   0.989   0.990   0.993   0.993   0.994   0.995   0.998
222          PC   0.998   0.999   1.000
223          LS       0      93
224          UD   0.133
             *

225          KK   EXOF4
226          BA   .0491
227          LS       0      82
228          UD   0.235
             *

229          KK   EXOF1
230          BA   .0221
231          LS       0      93
232          UD   0.100
             *

233          KK   EXON1
234          BA   .0056
235          LS       0      93
236          UD   0.100
             *

237          KK     CP1
238          HC       2
             *
```

```
          239          KK   EXOF2
          240          BA   .0475
          241          LS      0      93
          242          UD   0.100
                       *
```



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

          243          KK   EXON2
          244          BA   .0193
          245          LS      0      93
          246          UD   0.100
                       *

          247          KK     CP2
          248          HC       2
                       *

          249          KK     CP4
          250          HC       5
                       *

          251          KK   EXOF3
          252          BA  0.0395
          253          LS      0      93
          254          UD   0.100
                       *

          255          KK   EXON3
          256          BA   .0048
          257          LS      0      93
          258          UD   0.100
                       *

          259          KK     CP3
          260          HC       2
                       *
          261          ZZ
```

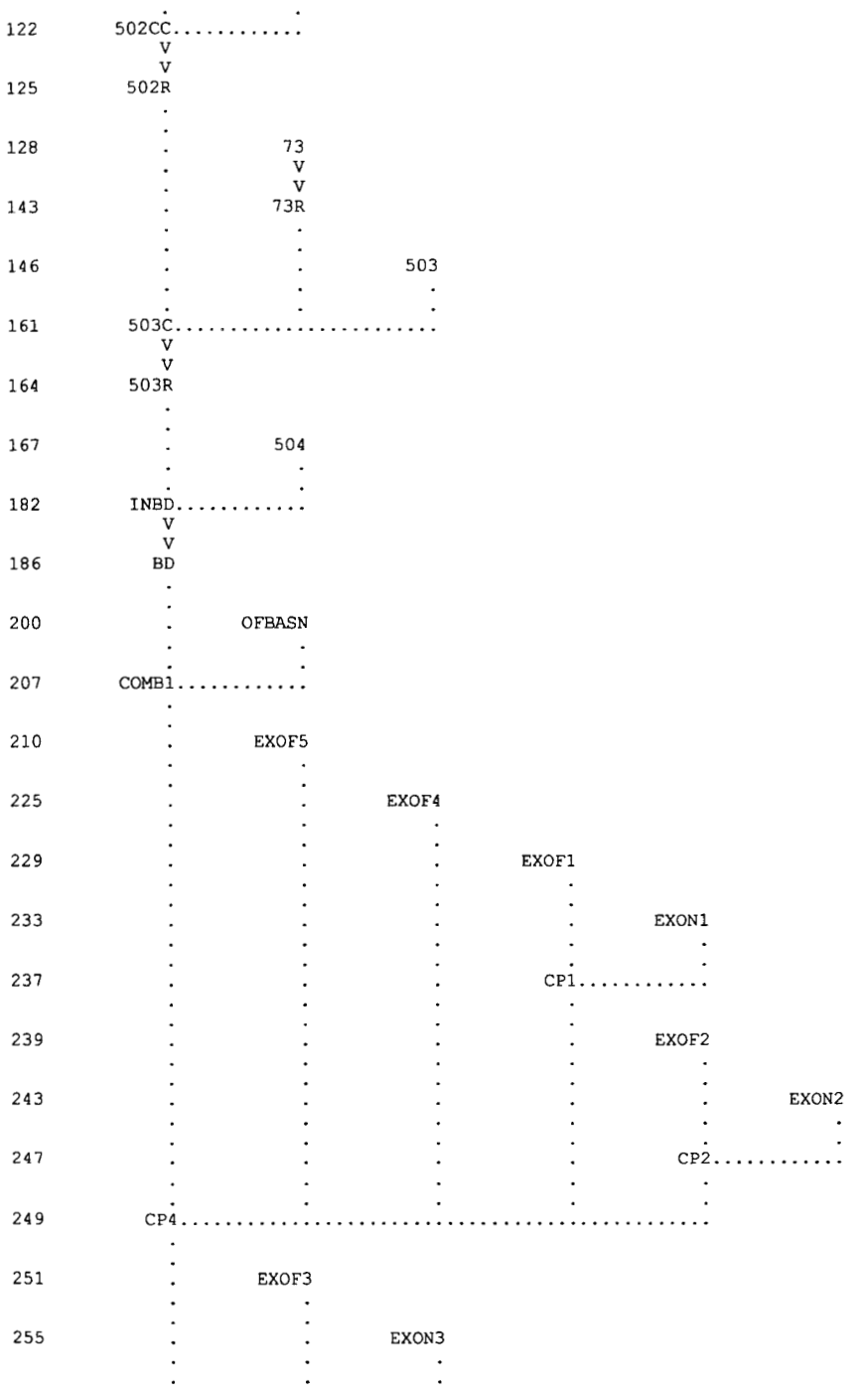
1

SCHEMATIC DIAGRAM OF STREAM NETWORK

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

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

    49          71
                 V
                 V
    64         71R
                 .
                 .
    67           .          501
                 .            .
                 .            .
    82        501C............
                 V
                 V
    85        501R
                 .
                 .
    88           .          502
                 .            .
                 .            .
   104        502C............
                 .
                 .
   107           .           72
                 .            .
```


122
502CC
125
502R
128
73
143
73R
146
503
161
503C
164
503R
167
504
182
INBD
186
BD
200
OFBASN
207
COMB1
210
EXOF5
225
EXOF4
229
EXOF1
233
EXON1
237
CP1
239
EXOF2
243
EXON2
247
CP2
249
CP4
251
EXOF3
255
EXON3

```
 259          .         CP3.....

(***) RUNOFF ALSO COMPUTED AT THIS LOCATION
1*****************************************
*                                       *
*   FLOOD HYDROGRAPH PACKAGE  (HEC-1)   *
*               JUN  1998               *
*            VERSION 4.1                *
*                                       *
*  RUN DATE   05SEP06  TIME  20:08:03   *
*                                       *
*****************************************
```


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


EXISTING CONDITIONS MODEL
LOMR FOR FORD / CONQUISTADOR
MOMENTUM ENGINEERS - ~ B BROWN

THE MAJORITY OF THIS MODEL IS REFERENCED FROM THE CLOMR FOR AREAS DOWNSTREA
THE BDDB. ALL BASINS UPSTREAM OF THE DAM ARE REFERENCED AS SUCH.
ALL BASINS DOWNSTREAM OF THE DAM ARE NEWLY CONSIDERED IN THIS ANALYSIS.

6-HOUR STORM DISTRIBUTION #3
10- AND 100-YEAR STORM EVENTS

```
 17 IO          OUTPUT CONTROL VARIABLES
                      IPRNT          5  PRINT CONTROL
                      IPLOT          0  PLOT CONTROL
                      QSCAL         0.  HYDROGRAPH PLOT SCALE
                          * BLUE DIAMOND DETENTION BASINS REFRENCED FROM MPU BASIN DELINEATION BY COE
                          ************************************************************************
                          BLUE DIAMOND DETENTION BASIN DESIGN.....................FILE = BDDB.LA1
                          SOURCE OF FILE= NEWBDDB1.LA1.....................................
                          ========================================================================
                          MODEL CREATED TO DUPLICATE THE BLUE DIAMOND DETENTION BASIN DESIGN
                          AS OF JAN 31 1996.
                          FILE NEWBDDB1.LA1 DATED 6-23-96 WAS USED, AND RAINFALL & PATTERN ADJUSTED
                          RAIN = 1.76 (CURVE) X 1.26 (TF) = 2.22 IN.  AS STATED IN TROP. DM DRAFT
                          PATTERN # = 4.95     DA =68.25    DARF =
                                                  JLF  2/1/96
                                     ***************************************
                          (A REVISED EL-VOL-STO IS COMING SOON.  THIS DOES NOT INCLUDE IT)
                          ELEVATIONS ARE NGVD
                                     ***************************************
                          COMMENTS BELOW THIS POINT WERE IN FILE NEWBDDB1.LA1 AND THEREFORE
                          RAIN, DARF & PATTERNS BELOW THIS POINT ARE NOT APPLICABLE TO THIS FILE
                          ========================================================================

                          REVISED TO ESTIMATE RUNOFF FROM 0.6 SQ.MI. AREA CONTRIBUTING TO A CP AT
                          BLUE DIAMOND ROAD, JUST U/S OF BLUE DIAMOND DB.

                          DEPTH-AREA AND PATTERN FOR AREA ABOVE BLUE DIAMOND DB.
                          DA = 68.25 MI2.  DARF = . PATTERN # = 4.9.
                          RAIN =  1.75 (CURVE) X  1.26 (TF) =  2.20 IN.

                                                    HN 6/22/95
                        ========================================================================


    IT          HYDROGRAPH TIME DATA
                      NMIN          5  MINUTES IN COMPUTATION INTERVAL
                     IDATE      1    0  STARTING DATE
```

```
                    ITIME        0000  STARTING TIME
                      NQ          300  NUMBER OF HYDROGRAPH ORDINATES
                    NDDATE      2    0  ENDING DATE
                    NDTIME        0055  ENDING TIME
                    ICENT           19  CENTURY MARK

                 COMPUTATION INTERVAL     .08 HOURS
                     TOTAL TIME BASE   24.92 HOURS

          ENGLISH UNITS
               DRAINAGE AREA         SQUARE MILES
               PRECIPITATION DEPTH   INCHES
               LENGTH, ELEVATION     FEET
               FLOW                  CUBIC FEET PER SECOND
               STORAGE VOLUME        ACRE-FEET
               SURFACE AREA          ACRES
               TEMPERATURE           DEGREES FAHRENHEIT

     JP          MULTI-PLAN OPTION
                      NPLAN           1  NUMBER OF PLANS

     JR          MULTI-RATIO OPTION
                     RATIOS OF PRECIPITATION
                     .57      1.00
1

             PEAK FLOW AND STAGE (END-OF-PERIOD) SUMMARY FOR MULTIPLE PLAN-RATIO ECONOMIC COMPUTATIONS
                                 FLOWS IN CUBIC FEET PER SECOND,  AREA IN SQUARE MILES
                                                 TIME TO PEAK IN HOURS

                                                                                  RATIOS APPLIED TO PRECIPITATION
 OPERATION       STATION     AREA     PLAN                    RATIO 1  RATIO 2
                                                                  .57      1.00

 HYDROGRAPH AT
+                    71      6.90      1   FLOW                 984.     2790.
                                             TIME                3.83      3.75

 ROUTED TO
+                   71R      6.90      1   FLOW                 843.     2456.
                                             TIME                4.17      4.17

 HYDROGRAPH AT
+                   501     11.28      1   FLOW                1534.     4356.
                                             TIME                3.83      3.83

   2 COMBINED AT
+                  501C     18.18      1   FLOW                1934.     5713.
                                             TIME                3.92      3.92

 ROUTED TO
+                  501R     18.18      1   FLOW                1785.     5324.
                                             TIME                4.33      4.33

 HYDROGRAPH AT
+                   502     27.40      1   FLOW                1956.     5951.
                                             TIME                4.33      4.33

   2 COMBINED AT
+                  502C     45.58      1   FLOW                3741.    11275.
                                             TIME                4.33      4.33

 HYDROGRAPH AT
+                    72      6.58      1   FLOW                 880.     2511.
                                             TIME                3.83      3.83

   2 COMBINED AT
+                 502CC     52.16      1   FLOW                4015.    12220.
                                             TIME                4.33      4.25
```

ROUTED TO						
+	502R	52.16	1	FLOW	3848.	11697.
				TIME	4.67	4.67
HYDROGRAPH AT						
+	73	4.02	1	FLOW	528.	1513.
				TIME	3.83	3.83
ROUTED TO						
+	73R	4.02	1	FLOW	459.	1336.
				TIME	4.25	4.17
HYDROGRAPH AT						
+	503	5.54	1	FLOW	399.	1212.
				TIME	4.33	4.33
3 COMBINED AT						
+	503C	61.72	1	FLOW	4423.	13507.
				TIME	4.58	4.58
ROUTED TO						
+	503R	61.72	1	FLOW	4243.	13013.
				TIME	4.92	4.92
HYDROGRAPH AT						
+	504	6.53	1	FLOW	484.	1470.
				TIME	4.25	4.25
2 COMBINED AT						
+	INBD	68.25	1	FLOW	4489.	13818.
				TIME	4.92	4.92
ROUTED TO						
+	BD	68.25	1	FLOW	164.	213.
				TIME	6.92	8.00
			** PEAK STAGES IN FEET **			
			1	STAGE	2891.70	2914.67
				TIME	7.00	8.00
HYDROGRAPH AT						
+	OFBASN	.60	1	FLOW	175.	431.
				TIME	3.67	3.67
2 COMBINED AT						
+	COMB1	68.85	1	FLOW	253.	586.
				TIME	5.00	3.67
HYDROGRAPH AT						
+	EXOF5	.04	1	FLOW	36.	72.
				TIME	3.58	3.58
HYDROGRAPH AT						
+	EXOF4	.05	1	FLOW	17.	51.
				TIME	3.67	3.67
HYDROGRAPH AT						
+	EXOF1	.02	1	FLOW	21.	44.
				TIME	3.50	3.50
HYDROGRAPH AT						
+	EXON1	.01	1	FLOW	5.	11.
				TIME	3.50	3.50
2 COMBINED AT						
+	CP1	.03	1	FLOW	27.	55.
				TIME	3.50	3.50
HYDROGRAPH AT						

+	EXOF2	.05	1	FLOW	5.	.
				TIME	3.50	3.50
HYDROGRAPH AT						
+	EXON2	.02	1	FLOW	19.	38.
				TIME	3.50	3.50
2 COMBINED AT						
+	CP2	.07	1	FLOW	65.	132.
				TIME	3.50	3.50
5 COMBINED AT						
+	CP4	69.03	1	FLOW	369.	838.
				TIME	3.58	3.58
HYDROGRAPH AT						
+	EXOF3	.04	1	FLOW	38.	78.
				TIME	3.50	3.50
HYDROGRAPH AT						
+	EXON3	.00	1	FLOW	5.	10.
				TIME	3.50	3.50
2 COMBINED AT						
+	CP3	.04	1	FLOW	43.	88.
				TIME	3.50	3.50

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

HYDROLOGIC CRITERIA AND DRAINAGE DESIGN MANUAL

TIME OF CONCENTRATION

PBS&J, Inc.
Project No. :
File: STDFRM4.XLS

DEVELOPMENT : CLOMR

CALCULATED BY : SCOTT STROSNIDER

DATE: JANUARY 2000

SUB-BASIN DATA					INITIAL / OVERLAND TIME (Ti)			TRAVEL TIME (Tt)					Tc	Tc CHECK URBANIZED BASINS		FINAL Tc	Tlag	REMARKS
DESIG: (1)	CN	K (2)	AREA (acres) (3)	AREA (mi^2)	LENGTH (ft) (4)	SLOPE (%) (5)	Ti (min) (6)	LENGTH (ft) (7)	SLOPE (%) (8)	LAND COVER k	VELOCITY* (fps) (9)	Tt (min) (10)	Tc = Ti + Tt (min) (11)	TOTAL LENGTH (ft) (12)	Tc = (L/180)+10 (min) (13)	Tc = (min) (14)	Tlag= 0.6Tc/60 (hrs)	
BASIN-27	63	0.442	93.6	0.1462	300	0.5	25.9	8300	1.8	NA	2.6	53.6	79.5	8600	N/A	79.5	0.795	
BASIN-28	63	0.442	41.5	0.0648	250	0.5	23.6	3750	1.9	NA	2.2	29.1	52.7	4000	N/A	52.7	0.527	
BASIN-29	63	0.442	27.0	0.0422	200	0.5	21.1	3500	1.8	NA	1.8	32.2	53.3	3700	N/A	53.3	0.533	
BASIN-30	74	0.587	134.4	0.2100	500	0.5	26.0	4300	1.2	NA	3.8	18.8	44.8	4800	N/A	44.8	0.448	
BASIN-31	88	0.772	98.3	0.1536	500	0.5	16.7	3800	1.5	NA	5.1	12.4	29.1	4300	N/A	29.1	0.291	
BASIN-32	63	0.442	24.2	0.0378	250	0.5	23.6	2750	1.8	NA	1.8	25.3	48.9	3000	N/A	48.9	0.489	
BASIN-33	82	0.692	61.1	0.0954	500	0.5	20.7	2500	1.5	NA	4.0	10.4	31.0	3000	N/A	31.0	0.310	
BASIN-34	68	0.508	123.6	0.1932	300	0.5	23.3	9050	1.8	NA	3.6	42.1	65.4	9350	N/A	65.4	0.654	
BASIN-35	78	0.640	69.8	0.1091	250	0.5	16.5	10750	1.8	NA	3.6	49.2	65.7	11000	N/A	65.7	0.657	
BASIN-36	88	0.772	37.5	0.0585	250	0.5	11.8	4350	1.9	NA	4.1	17.6	29.4	4600	N/A	29.4	0.294	
BASIN-37	83	0.706	78.7	0.1229	300	0.5	15.5	6700	1.9	NA	4.6	24.1	39.6	7000	N/A	39.6	0.396	
BASIN-38	73	0.574	84.9	0.1326	300	0.5	20.7	6100	1.9	NA	3.8	26.5	47.2	6400	N/A	47.2	0.472	
BASIN-40	84	0.719	361.6	0.8775	500	0.5	19.3	11200	1.4	NA	7.2	25.8	45.1	11700	N/A	45.1	0.451	
OFFSITE	88	0.772	381.0	0.5953	500	0.8	14.2	8000	2.5	NA	8.1	16.4	30.7	8500	N/A	30.7	0.307	

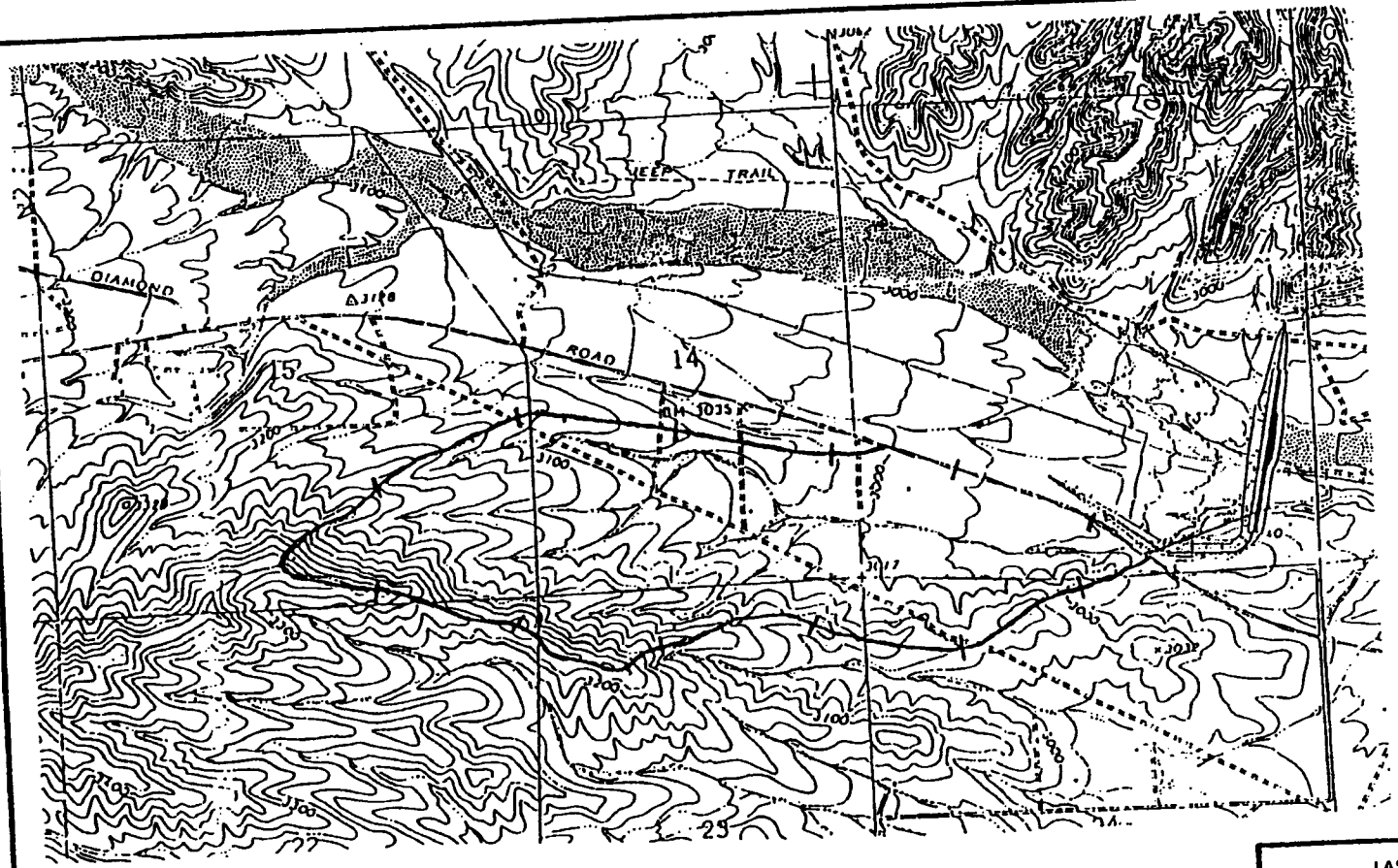
Tc = Ti + Tt Ti = 1.8 (1.1 - K) L^1/2 / S^1/3

lag = 0.6Tc K = 0.0132 (CN) - 0.39

* The velocity in column 9 is based on approximate channel properties.

REFERENCE :

STANDARD FORM 4



SCALE 1:24 000

1 0 1 KILOMETER

CONTOUR INTERVAL 20 FEET

LAS VEGAS WASH & TRIBUTARIES
(TROPICANA AND FLAMINGO WASHES, NEVADA)
BLUE DIAMOND DETENTION BASIN

INTERIOR DRAINAGE AREA

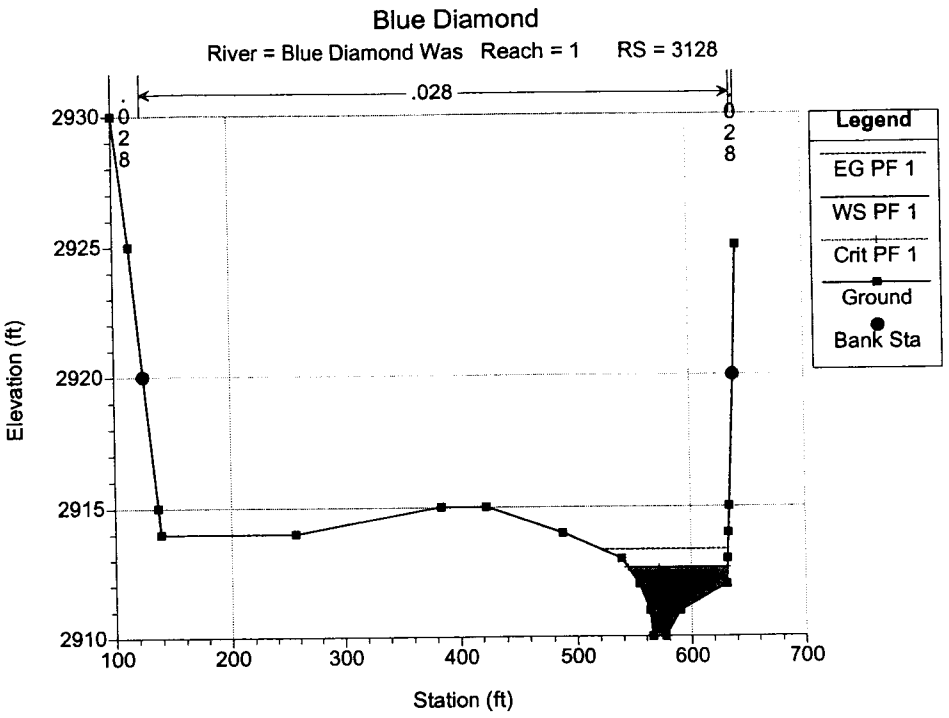
U.S. ARMY CORPS OF ENGINEERS
LOS ANGELES DISTRICT

PLATE 8

HYDRAULIC ANALYSIS

HEC-RAS Plan: Plan 01 River: Blue Diamond Was Reach: 1 Profile: PF 1

Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
			(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
1	3128	PF 1	838.00	2910.00	2912.64	2912.64	2913.36	0.010450	6.80	123.19	87.11	1.01
1	3010	PF 1	838.00	2909.00	2910.25	2910.25	2910.64	0.012945	5.03	166.46	218.47	1.02
1	2896	PF 1	838.00	2905.00	2907.10	2907.10	2907.50	0.012083	5.07	165.20	202.05	0.99
1	2780	PF 1	838.00	2903.00	2905.29	2905.29	2905.71	0.011746	5.23	160.21	183.58	0.99
1	2664	PF 1	838.00	2901.00	2903.52	2903.52	2904.09	0.011504	6.08	137.81	122.82	1.01
1	2548	PF 1	838.00	2900.00	2901.83	2901.83	2902.46	0.011332	6.36	131.86	108.76	1.02
1	2366	PF 1	838.00	2896.00	2899.01	2899.01	2899.43	0.013355	5.18	161.70	207.04	1.03
1	2222	PF 1	838.00	2893.00	2896.39	2896.39	2896.86	0.012094	5.52	151.71	163.11	1.01
1	2116	PF 1	838.00	2892.00	2894.76	2894.76	2895.23	0.011968	5.50	152.35	164.30	1.01
1	2032	PF 1	838.00	2890.00	2893.53	2893.53	2894.00	0.012509	5.52	151.83	168.55	1.02
1	1942	PF 1	838.00	2888.00	2891.34	2891.34	2891.92	0.011197	6.09	137.58	120.77	1.01
1	1850	PF 1	838.00	2887.00	2890.27	2890.27	2890.69	0.012878	5.21	160.87	198.16	1.02
1	1722	PF 1	838.00	2885.00	2887.87	2887.87	2888.44	0.010974	6.10	137.48	119.00	1.00
1	1560	PF 1	838.00	2882.00	2885.82	2885.80	2886.32	0.011911	5.65	148.32	152.88	1.01
1	1439	PF 1	838.00	2881.00	2884.36	2884.36	2884.90	0.011373	5.91	141.76	131.59	1.00
1	1332	PF 1	838.00	2879.00	2882.25	2882.25	2882.67	0.013574	5.19	161.57	208.63	1.04
1	1208	PF 1	838.00	2877.00	2879.58	2879.58	2880.20	0.010586	6.35	131.90	104.51	1.00
1	1098	PF 1	838.00	2875.00	2877.35		2877.90	0.004891	5.97	140.31	67.82	0.73
1	1000	PF 1	838.00	2874.00	2876.43	2876.42	2877.22	0.010001	7.11	117.83	74.07	0.99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.028
Legend
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WS PF 1
Crit PF 1
Ground
Bank Sta
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Station (ft)
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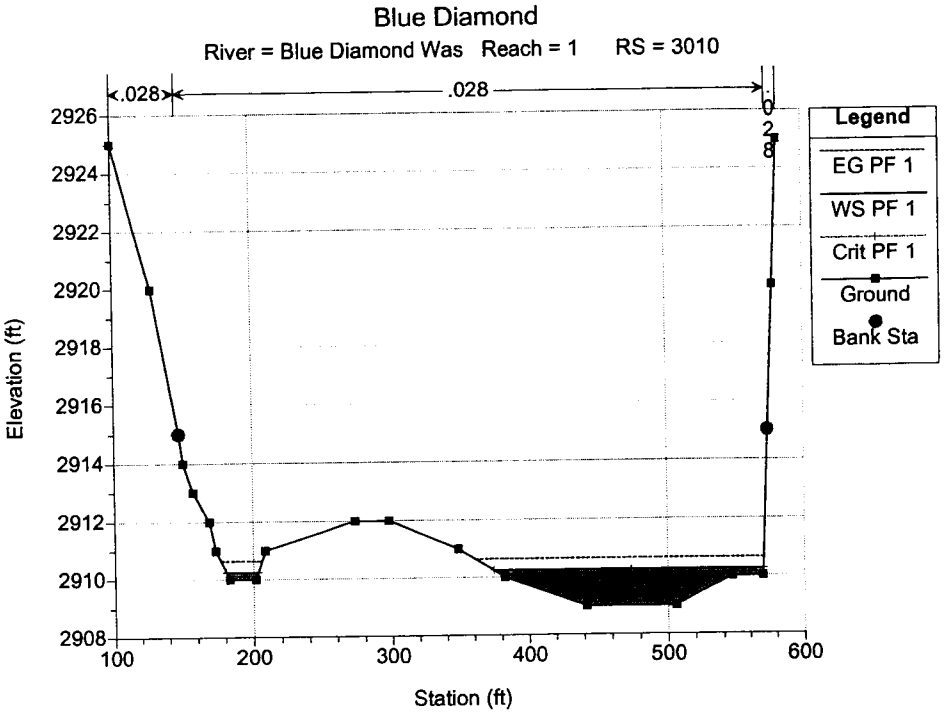
2925
2920
2915
2910
100
200
300
400
500
600
700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.028
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)
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2924
2922
2920
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2914
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2908
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200
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400
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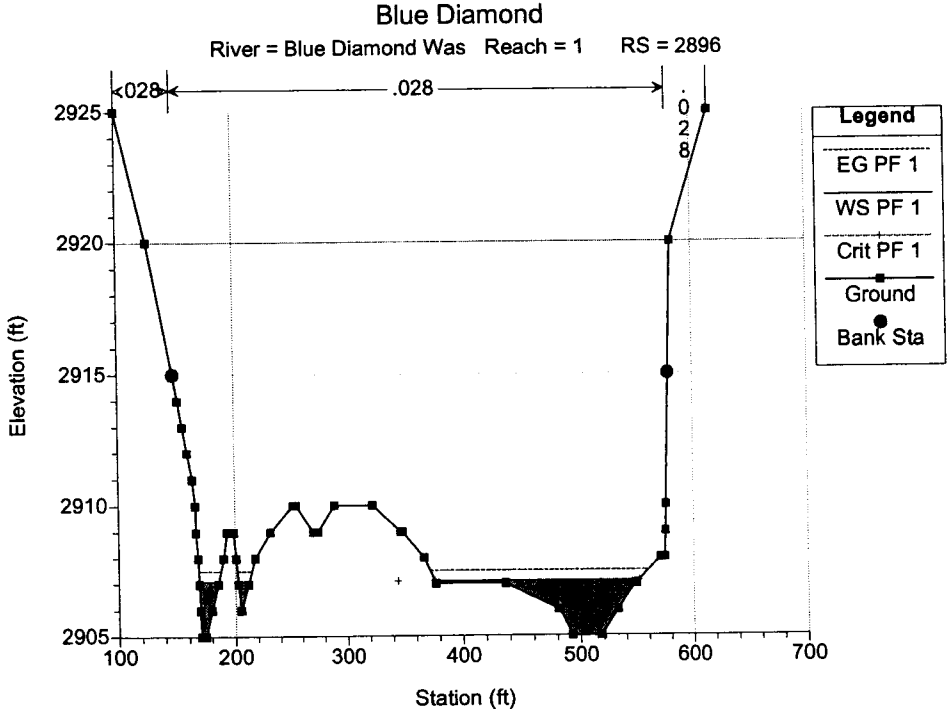
600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.028
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WS PF 1
Crit PF 1
Ground
Bank Sta
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Station (ft)
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300
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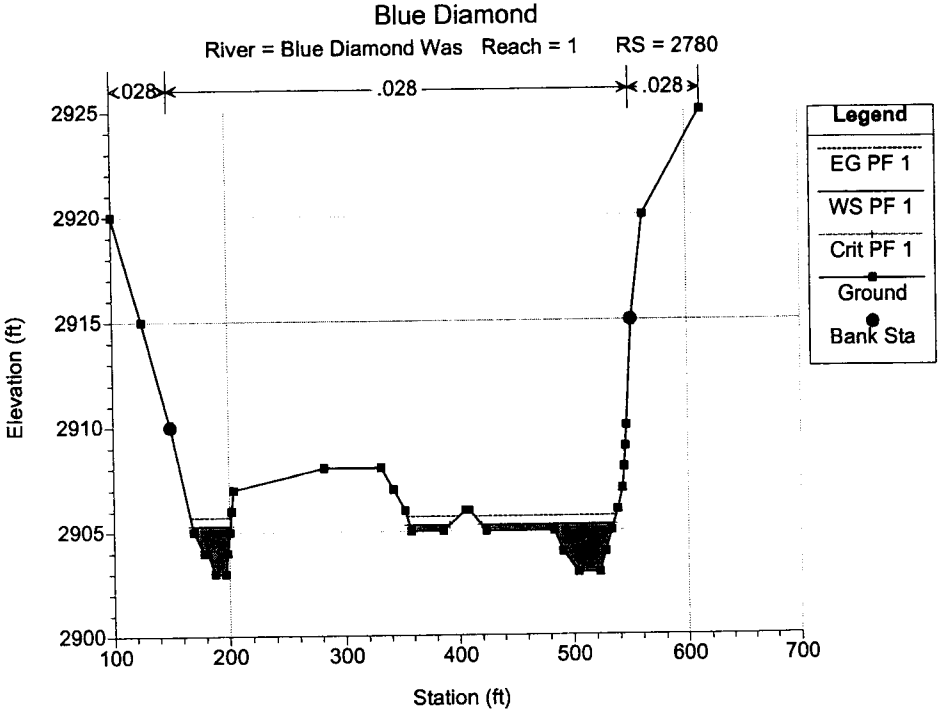
700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WS PF 1
Crit PF 1
Ground
Bank Sta
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Station (ft)
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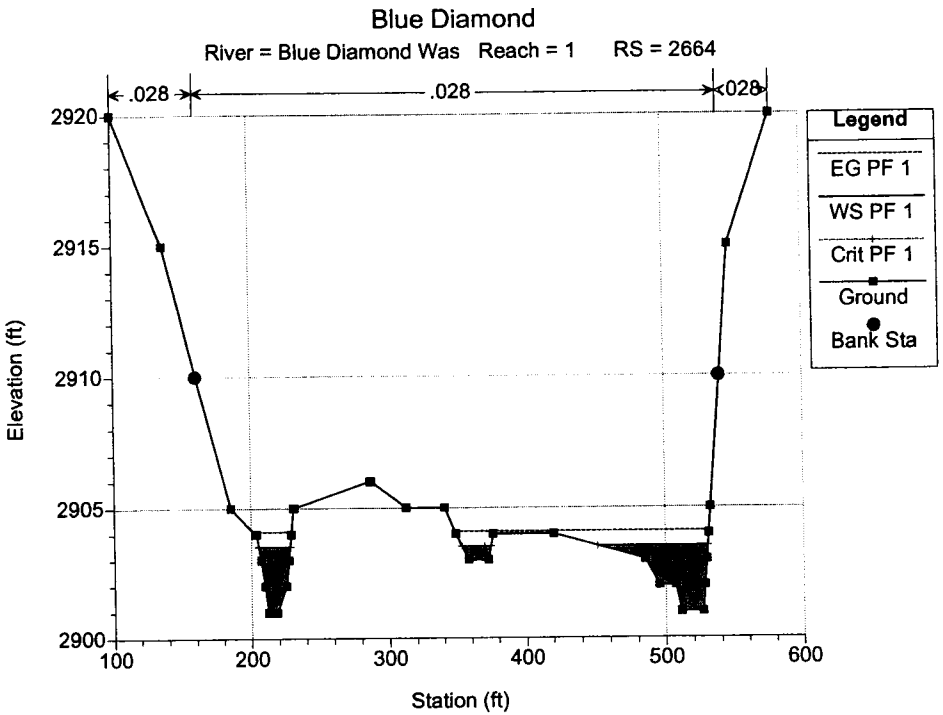
600
700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.028
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EG PF 1
WS PF 1
Crit PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)
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2915
2910
2905
2900
100
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300
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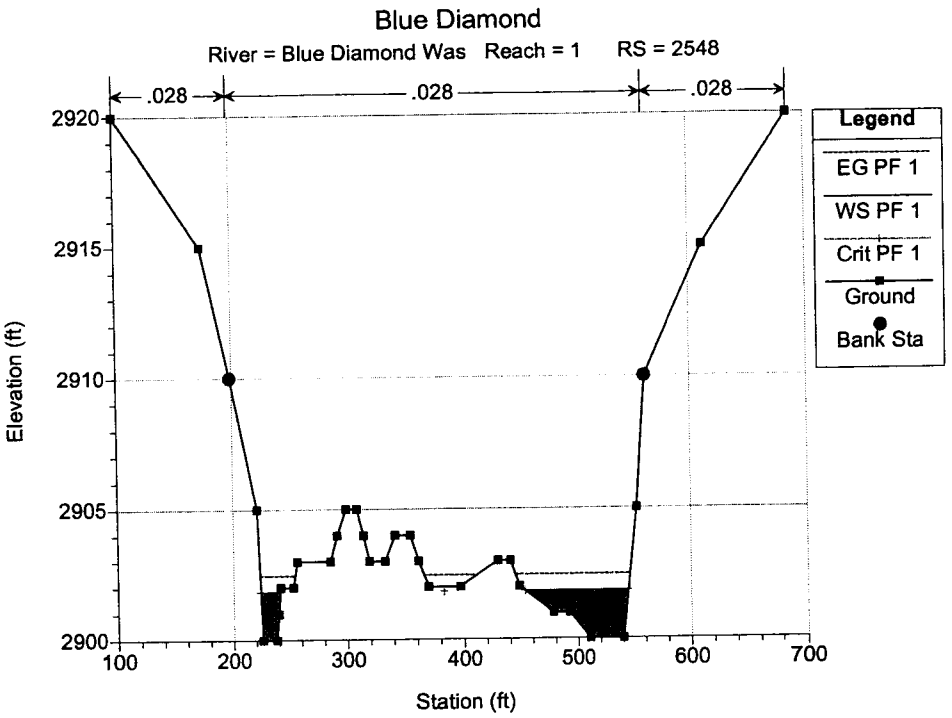
500
600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.028
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Bank Sta
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Station (ft)
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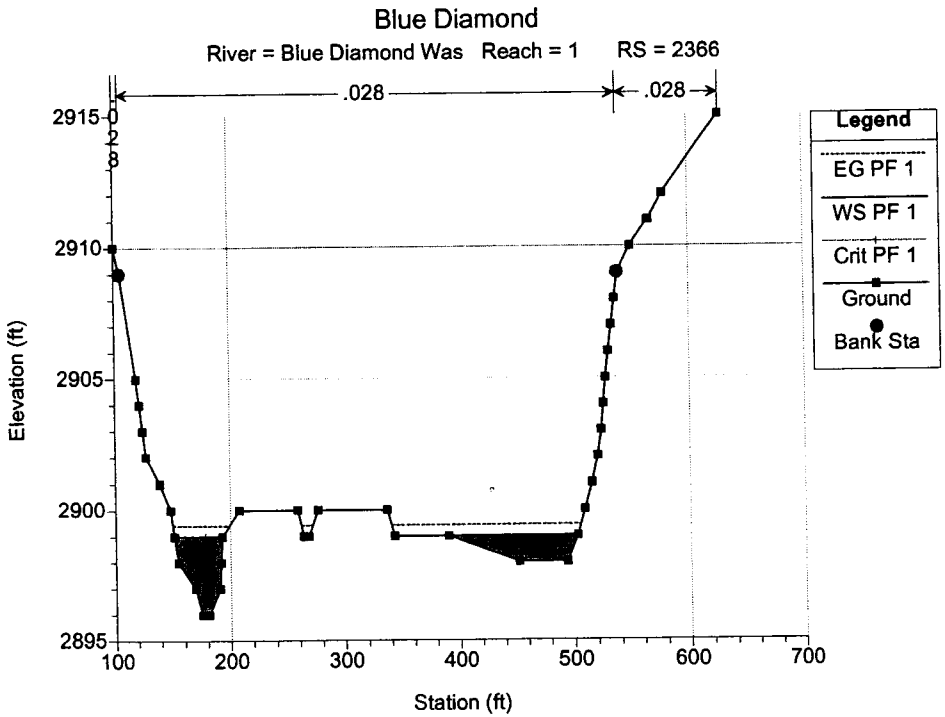
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.028
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Legend
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WS PF 1
Crit PF 1
Ground
Bank Sta
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Station (ft)
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2895
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200
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400
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600
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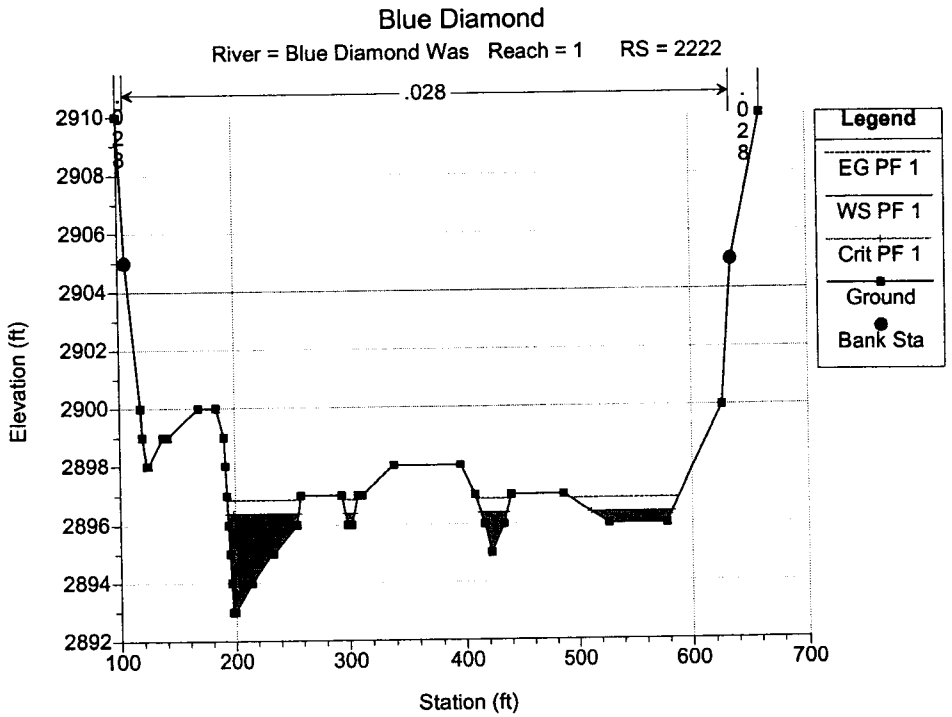
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River = Blue Diamond Was Reach = 1 RS = 2222
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.028
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)
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2908
2906
2904
2902
2900
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2896
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100
200
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400
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600
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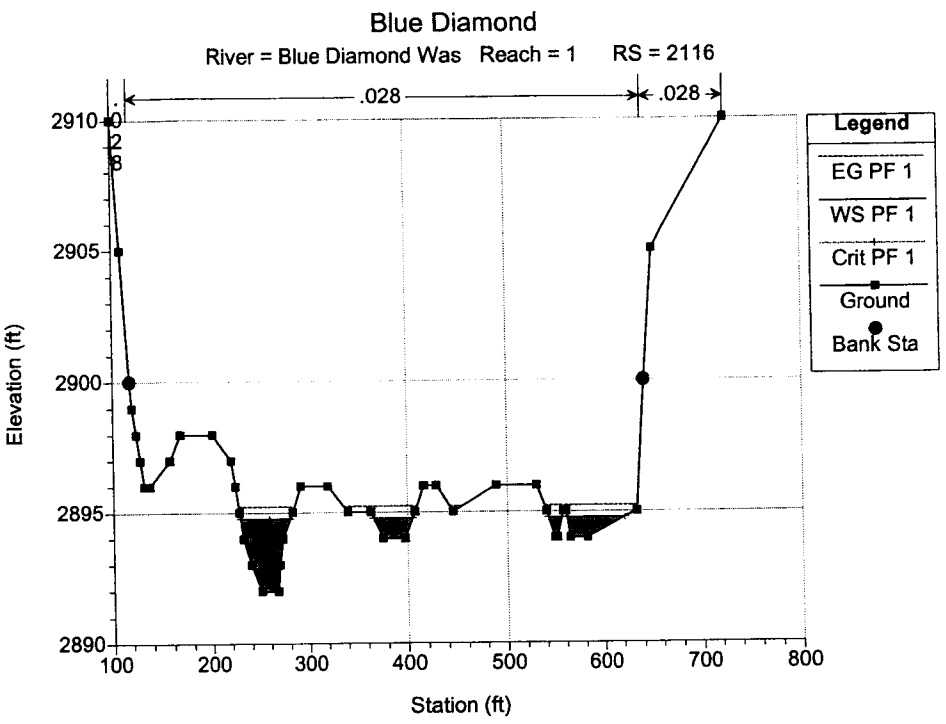
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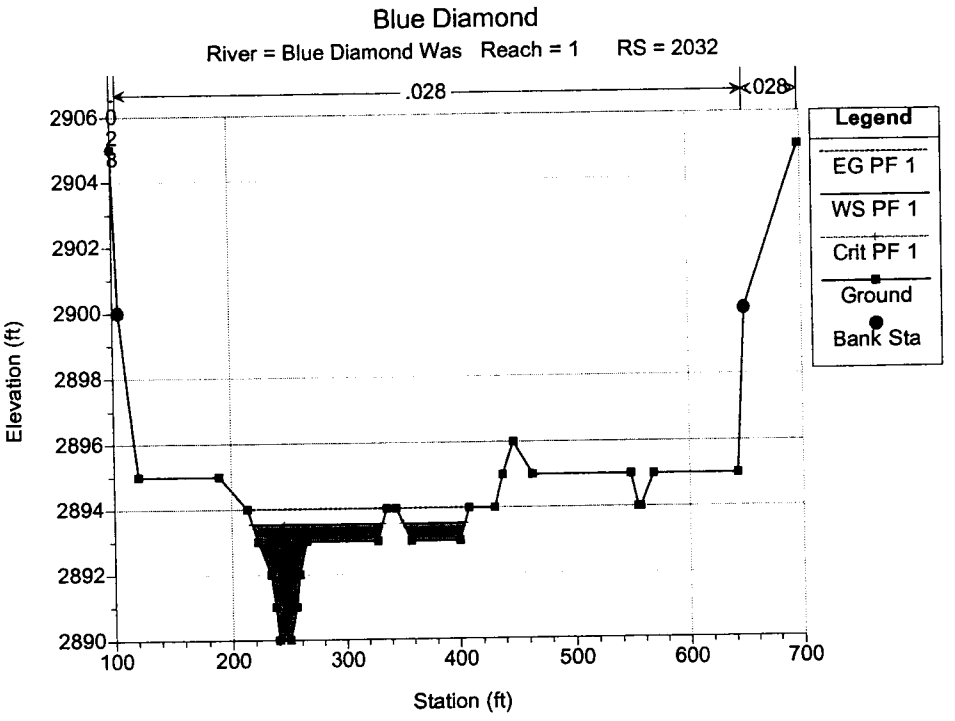
WS PF 1
Crit PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)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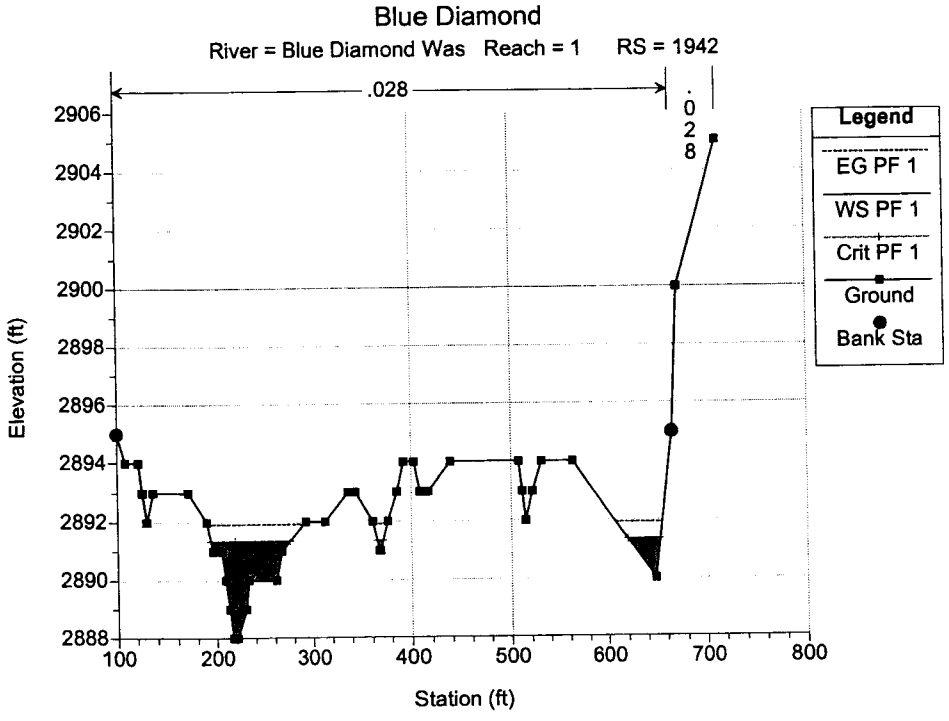
WS PF 1
Crit PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)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Crit PF 1
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Bank Sta
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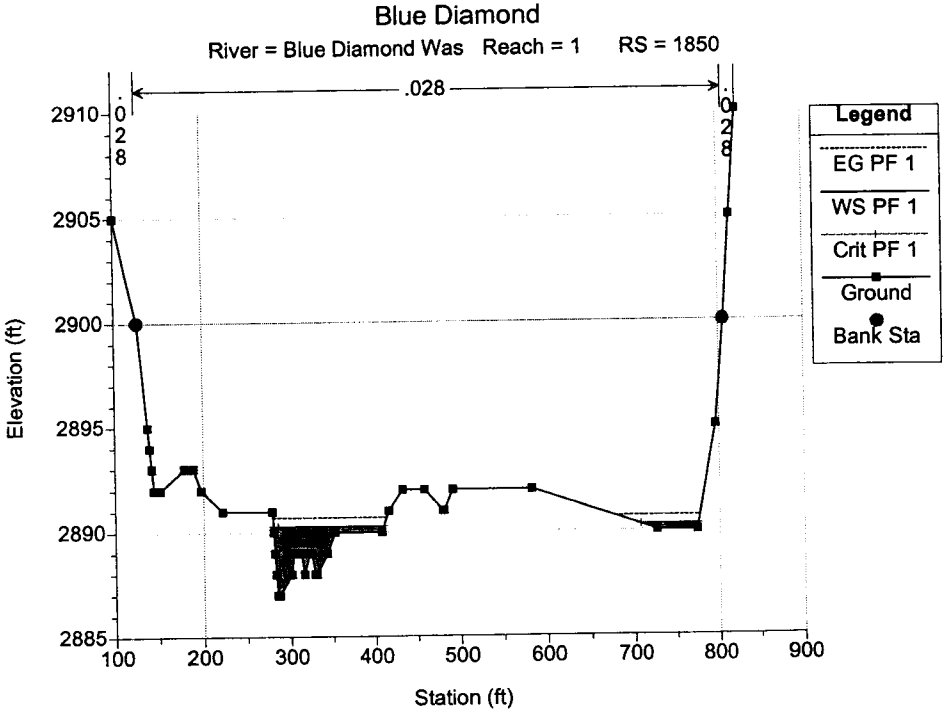
Station (ft)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Crit PF 1
Ground
Bank Sta
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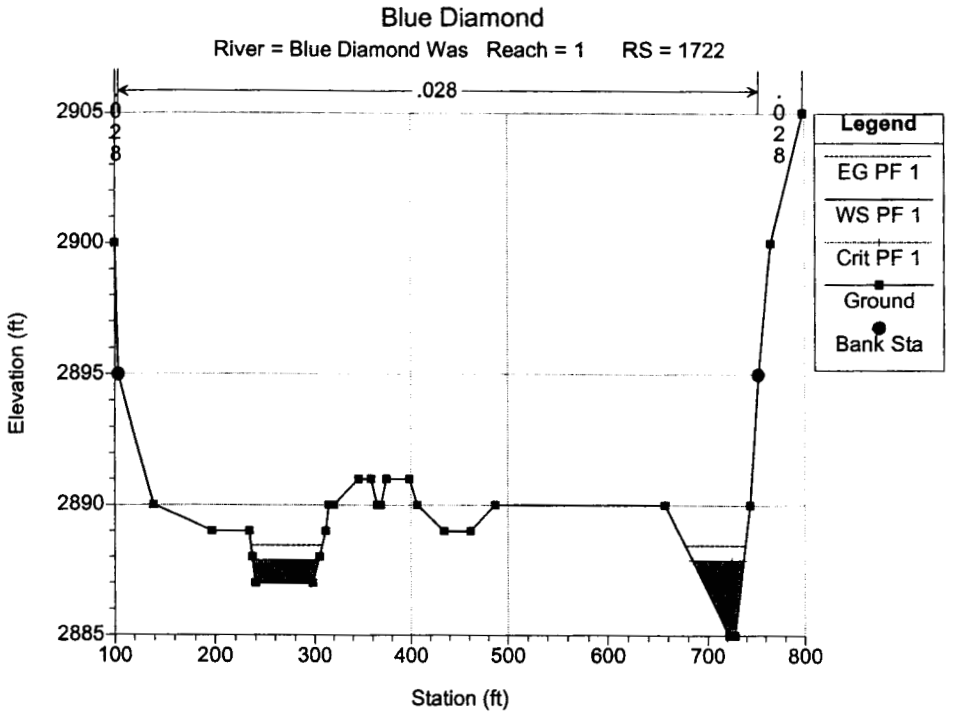
Station (ft)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Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)
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2890
2885
100
200
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400
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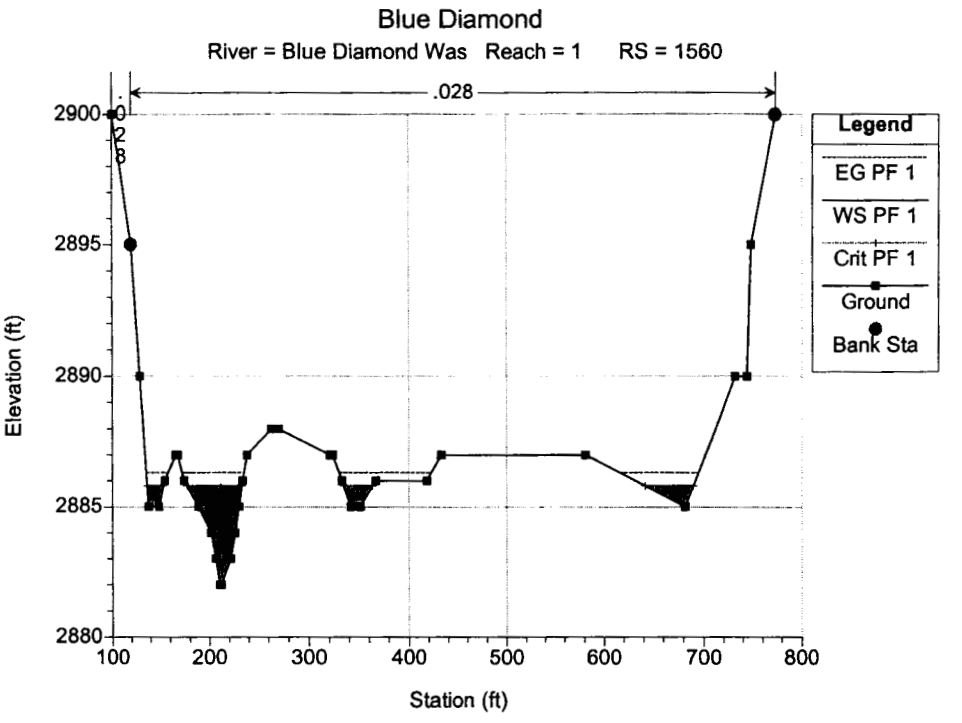
600
700
800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River = Blue Diamond Was Reach = 1 RS = 1560
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Legend
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Crit PF 1
Ground
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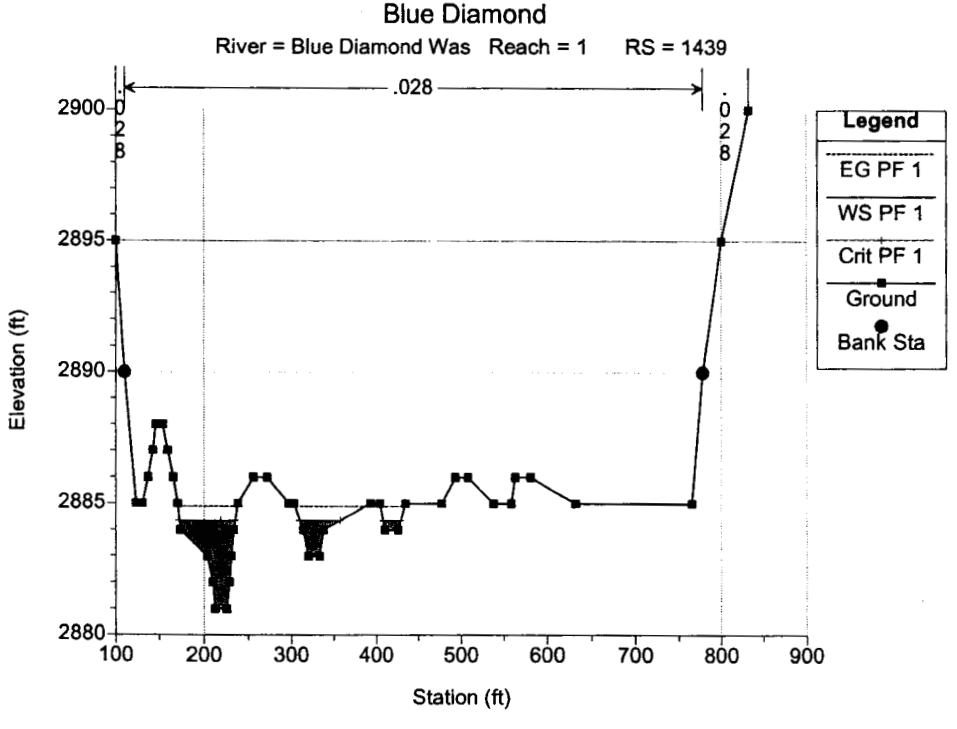
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EG PF 1
WS PF 1
Crit PF 1
Ground
Bank Sta
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2890
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300
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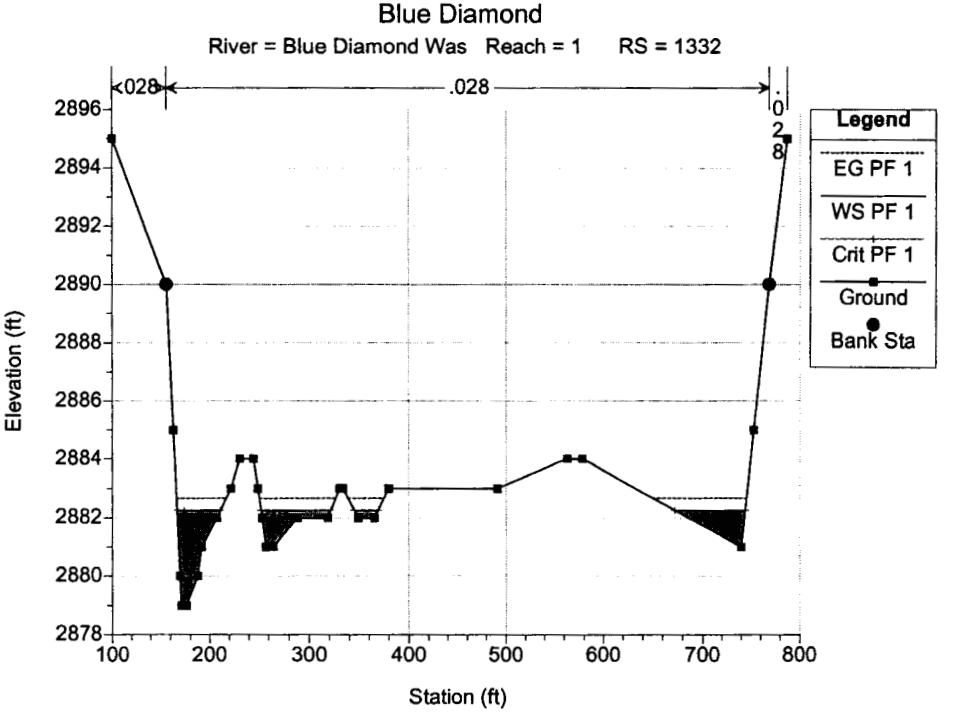
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WS PF 1
Crit PF 1
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Bank Sta
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Station (ft)
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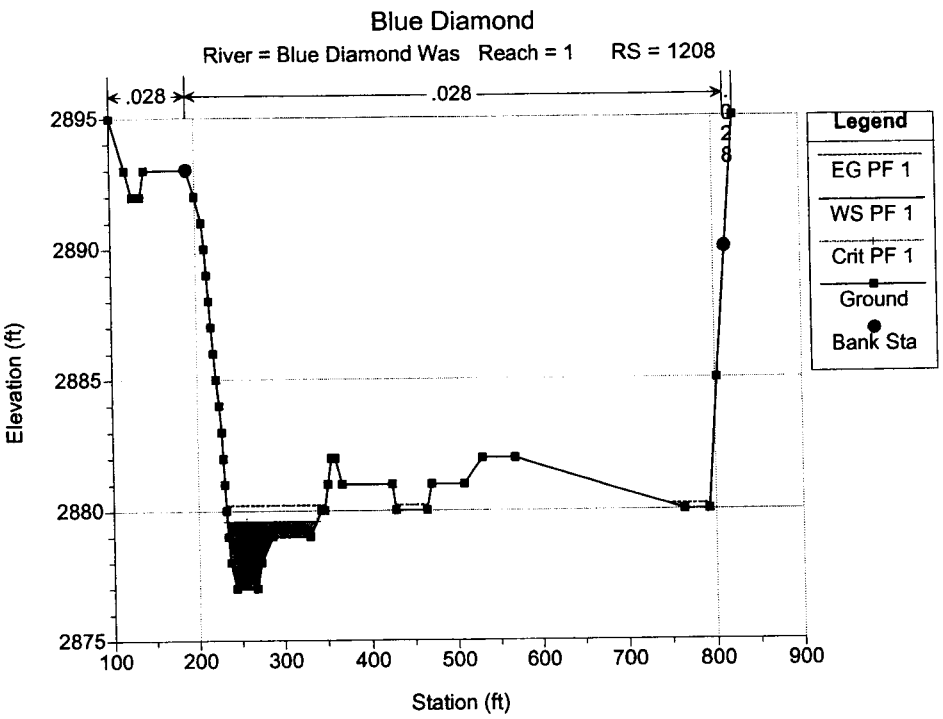
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Bank Sta
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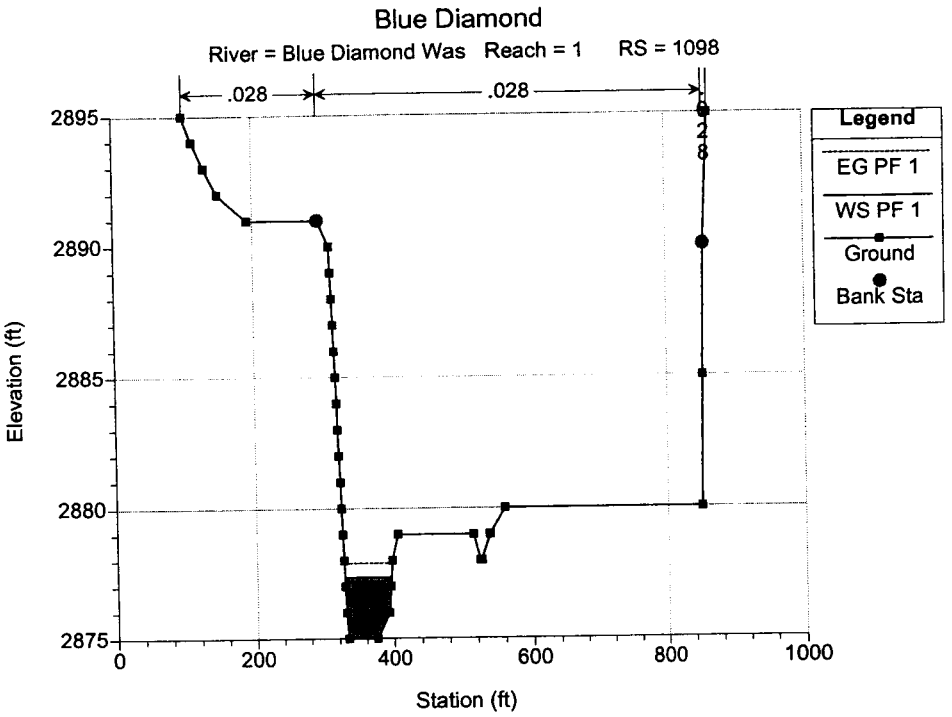
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Legend
EG PF 1
WS PF 1
Ground
Bank Sta
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Station (ft)
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2885
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2875
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200
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600
800
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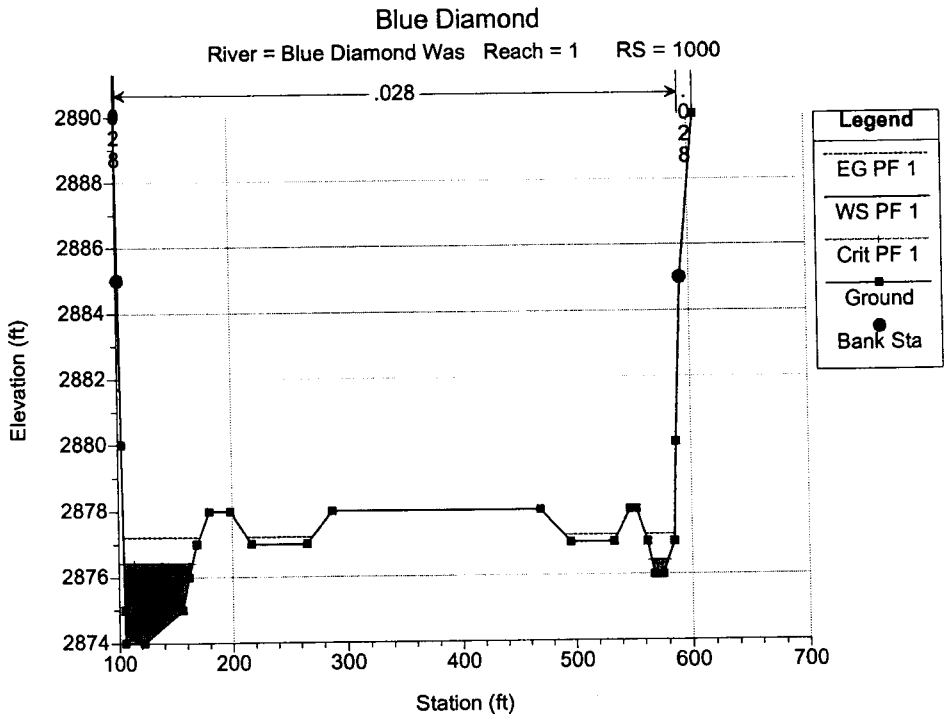
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.028
.028
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)
2890
2888
2886
2884
2882
2880
2878
2876
2874
100
200
300
400
500
600
700

HEC-RAS Version 3.1 November 2002
U.S. Army Corp of Engineers
Hydrologic Engineering Center
609 Second Street, Suite D
Davis, California 95616-4687
(916) 756-1104

```
X     X  XXXXXX    XXXX        XXXX       XX      XXXX
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X     X  X        X    X       X   X    X    X        X
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****

PROJECT DATA
Project Title: Blue Diamond
Project File : BD.prj
Run Date and Time: 9/6/2006 9:59:49 AM

Project in English units

****

PLAN DATA

Plan Title: Plan 01
Plan File : C:\06015 - ford conquistador LOMR\hydraulics\BD.p01

Geometry Title: existing conditions
Geometry File : c:\06015 - ford conquistador LOMR\BD.g01

Flow Title : Blue Diamond Wash
Flow File : C:\06015 - ford conquistador LOMR\hydraulics\BD.f01

Plan Summary Information:
Number of: Cross Sections = 19 Mulitple Openings = 0
Culverts = 0 Inline Structures = 0
Bridges = 0 Lateral Structures = 0

Computational Information
Water surface calculation tolerance = 0.01
Critical depth calculaton tolerance = 0.01
Maximum number of interations = 20
Maximum difference tolerance = 0.3
Flow tolerance factor = 0.001

Computation Options
Critical depth computed only where necessary
Conveyance Calculation Method: At breaks in n values only
Friction Slope Method: Average Conveyance
Computational Flow Regime: Subcritical Flow

****

FLOW DATA

Flow Title: Blue Diamond Wash
Flow File : C:\06015 - ford conquistador LOMR\hydraulics\BD.f01

Flow Data (cfs)

River	Reach	RS	PF 1
Blue Diamond Was	1	3128	838

Boundary Conditions

River	Reach	Profile	Upstream	Downstream
Blue Diamond Was1		PF 1	Normal S = 0.01	Normal S = 0.01

GEOMETRY DATA

Geometry Title: existing conditions
Geometry File : c:\06015 - ford conquistador LOMR\BD.g01

CROSS SECTION

RIVER: Blue Diamond Was
REACH: 1 RS: 3128

INPUT
Description:
Station Elevation Data num= 21

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
100	2930	113.9	2925	125.1	2920	136.62	2915	138.96	2914
256.49	2914	383.87	2915	423.29	2915	488	2914	538.78	2913
554.31	2912	563.08	2911	565.37	2910	576.55	2910	590	2911
630.91	2912	631.81	2913	632.82	2914	633.75	2915	638.26	2920
642	2925								

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
100	.028	125.1	.028	638.26	.028

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
125.1	638.26	118	118	.1	.3

CROSS SECTION OUTPUT Profile #PF 1

			Left OB	Channel	Right OB
E.G. Elev (ft)	2913.36	Element		0.028	
Vel Head (ft)	0.72	Wt. n-Val.			
W.S. Elev (ft)	2912.64	Reach Len. (ft)	118.00	118.00	118.00
Crit W.S. (ft)	2912.64	Flow Area (sq ft)		123.19	
E.G. Slope (ft/ft)	0.010450	Area (sq ft)		123.19	
Q Total (cfs)	838.00	Flow (cfs)		838.00	
Top Width (ft)	87.11	Top Width (ft)		87.11	
Vel Total (ft/s)	6.80	Avg. Vel. (ft/s)		6.80	
Max Chl Dpth (ft)	2.64	Hydr. Depth (ft)		1.41	
Conv. Total (cfs)	8197.5	Conv. (cfs)		8197.5	
Length Wtd. (ft)	118.00	Wetted Per. (ft)		87.73	
Min Ch El (ft)	2910.00	Shear (lb/sq ft)		0.92	
Alpha	1.00	Stream Power (lb/ft s)		6.23	
Frctn Loss (ft)	1.37	Cum Volume (acre-ft)		7.22	
C & E Loss (ft)	0.10	Cum SA (acres)		7.43	

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical depth for the water surface and continued on with the calculations.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.
Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program defaulted to critical depth.

CROSS SECTION

RIVER: Blue Diamond Was
REACH: 1 RS: 3010

INPUT
Description:
Station Elevation Data num= 22

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
100	2925	128.55	2920	147.76	2915	150.5	2914	157.51	2913
168.96	2912	173.48	2911	183.4	2910	201.97	2910	208.8	2911
273.23	2912	297.87	2912	348.43	2911	382.1	2910	382.25	2910
441.75	2909	505.65	2909	546.54	2910	569.34	2910	573.6	2915
578	2920	582.19	2925						

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
100	.028	147.76	.028	573.6	.028

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
147.76	573.6	106	114	.1	.3

CROSS SECTION OUTPUT Profile #PF 1

E.G. Elev (ft)	2910.64	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.39	Wt. n-Val.		0.028	
W.S. Elev (ft)	2910.25	Reach Len. (ft)	106.00	114.00	114.00
Crit W.S. (ft)	2910.25	Flow Area (sq ft)		166.46	
E.G. Slope (ft/ft)	0.012945	Area (sq ft)		166.46	
Q Total (cfs)	838.00	Flow (cfs)		838.00	
Top Width (ft)	218.47	Top Width (ft)		218.47	
Vel Total (ft/s)	5.03	Avg. Vel. (ft/s)		5.03	
Max Chl Dpth (ft)	1.25	Hydr. Depth (ft)		0.76	
Conv. Total (cfs)	7365.3	Conv. (cfs)		7365.3	
Length Wtd. (ft)	114.00	Wetted Per. (ft)		218.63	
Min Ch El (ft)	2909.00	Shear (lb/sq ft)		0.62	
Alpha	1.00	Stream Power (lb/ft s)		3.10	
Frctn Loss (ft)	1.43	Cum Volume (acre-ft)		6.83	
C & E Loss (ft)	0.00	Cum SA (acres)		7.01	

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical depth for the water surface and continued on with the calculations.
Warning: Divided flow computed for this cross-section.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.
Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program defaulted to critical depth.

CROSS SECTION

RIVER: Blue Diamond Was
REACH: 1 RS: 2896

INPUT
Description:
Station Elevation Data num= 50

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
100	2925	125.82	2920	147.42	2915	151.35	2914	155.23	2913
159.21	2912	163.48	2911	166	2910	166.23	2909	168.16	2908
169.06	2907	169.82	2906	170.59	2905	174.48	2905	179.94	2906
185.73	2907	190.44	2908	193.33	2909	198.99	2909	201.03	2908
202.88	2907	204.98	2906	211.49	2907	217.72	2908	231.28	2909
251.57	2910	254.26	2910	269.8	2909	273.93	2909	288.78	2910
322.16	2910	346.72	2909	347.67	2909	366.53	2908	376.78	2907
436.12	2907	480.6	2906	481.83	2906	492.87	2905	517.91	2905

532.38	2906	548.21	2907	548.84	2907	570.18	2908	573.82	2908
574.5	2909	575.1	2910	578.26	2915	581.4	2920	616	2925

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
100	.028	147.42	.028	578.26	.028

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
147.42	578.26	94	116	110	.1	.3

CROSS SECTION OUTPUT Profile #PF 1

E.G. Elev (ft)	2907.50	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.40	Wt. n-Val.		0.028	
W.S. Elev (ft)	2907.10	Reach Len. (ft)	94.00	116.00	110.00
Crit W.S. (ft)	2907.10	Flow Area (sq ft)		165.20	
E.G. Slope (ft/ft)	0.012083	Area (sq ft)		165.20	
Q Total (cfs)	838.00	Flow (cfs)		838.00	
Top Width (ft)	202.05	Top Width (ft)		202.05	
Vel Total (ft/s)	5.07	Avg. Vel. (ft/s)		5.07	
Max Chl Dpth (ft)	2.10	Hydr. Depth (ft)		0.82	
Conv. Total (cfs)	7623.5	Conv. (cfs)		7623.5	
Length Wtd. (ft)	116.00	Wetted Per. (ft)		203.74	
Min Ch El (ft)	2905.00	Shear (lb/sq ft)		0.61	
Alpha	1.00	Stream Power (lb/ft s)		3.10	
Frctn Loss (ft)	1.38	Cum Volume (acre-ft)		6.39	
C & E Loss (ft)	0.00	Cum SA (acres)		6.46	

Warning: The energy equation could not be balanced within the specified number of iterations. The program selected the water surface that had the least amount of error between computed and assumed values.
Warning: Divided flow computed for this cross-section.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.
Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program defaulted to critical depth.

CROSS SECTION

RIVER: Blue Diamond Was
REACH: 1 RS: 2780

INPUT
Description:
Station Elevation Data num= 35

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
100	2920	125.94	2915	150.43	2910	169.53	2905	178.31	2904
181.36	2904	187.89	2903	197.06	2903	198.75	2904	200.51	2905
202.2	2906	204.11	2907	282.07	2908	331.47	2908	342.22	2907
352.38	2906	357.78	2905	386.14	2905	405.77	2906	408.25	2906
423.52	2905	483.7	2905	491.17	2904	504.19	2903	522.78	2903
528	2904	533.18	2905	538.41	2906	542.71	2907	544.38	2908
545.47	2909	546.4	2910	551.13	2915	562.08	2920	613	2925

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
100	.028	150.43	.028	551.13	.028

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
150.43	551.13	116	116	116	.1	.3

CROSS SECTION OUTPUT Profile #PF 1

E.G. Elev (ft)	2905.71	Element	Left OB	Channel	Right OB

Vel Head (ft)	0.42	Wt. n-Val.			0.028			
W.S. Elev (ft)	2905.29	Reach Len. (ft)	116.00		116.00		116.00	
Crit W.S. (ft)	2905.29	Flow Area (sq ft)			160.21			
E.G. Slope (ft/ft)	0.011746	Area (sq ft)			160.21			
Q Total (cfs)	838.00	Flow (cfs)			838.00			
Top Width (ft)	183.58	Top Width (ft)			183.58			
Vel Total (ft/s)	5.23	Avg. Vel. (ft/s)			5.23			
Max Chl Dpth (ft)	2.29	Hydr. Depth (ft)			0.87			
Conv. Total (cfs)	7732.1	Conv. (cfs)			7732.1			
Length Wtd. (ft)	116.00	Wetted Per. (ft)			184.73			
Min Ch El (ft)	2903.00	Shear (lb/sq ft)			0.64			
Alpha	1.00	Stream Power (lb/ft s)			3.33			
Frctn Loss (ft)	1.35	Cum Volume (acre-ft)			5.96			
C & E Loss (ft)	0.01	Cum SA (acres)			5.95			

Warning: The energy equation could not be balanced within the specified number of iterations. The program selected the water surface that had the least amount of error between computed and assumed values.
Warning: Divided flow computed for this cross-section.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.
Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program defaulted to critical depth.

CROSS SECTION

RIVER: Blue Diamond Was
REACH: 1 RS: 2664

INPUT
Description:
Station Elevation Data num= 36

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
100	2920	137.02	2915	160.3	2910	185.56	2905	203.23	2904
203.92	2904	207.32	2903	210.12	2902	212.44	2901	218.69	2901
225.36	2902	227.42	2903	229.22	2904	231.02	2905	231.66	2905
286.57	2906	287.39	2906	312.81	2905	340.71	2905	348.56	2904
357.95	2903	372.57	2903	375.98	2904	420.22	2904	485.3	2903
495.29	2902	507.11	2902	510.97	2901	526.8	2901	528.22	2902
529.63	2903	531.04	2904	532.44	2905	539.46	2910	546.6	2915
578.45	2920								

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
100	.028	160.3	.028	539.46	.028

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.

Left	Right	Left	Channel	Right	Coeff Contr.	Expan.
160.3	539.46		114	116	118	.1	.3

CROSS SECTION OUTPUT Profile #PF 1

E.G. Elev (ft)	2904.09	Element	Left OB		Channel		Right OB	
Vel Head (ft)	0.57	Wt. n-Val.			0.028			
W.S. Elev (ft)	2903.52	Reach Len. (ft)	114.00		116.00		118.00	
Crit W.S. (ft)	2903.52	Flow Area (sq ft)			137.81			
E.G. Slope (ft/ft)	0.011504	Area (sq ft)			137.81			
Q Total (cfs)	838.00	Flow (cfs)			838.00			
Top Width (ft)	122.82	Top Width (ft)			122.82			
Vel Total (ft/s)	6.08	Avg. Vel. (ft/s)			6.08			
Max Chl Dpth (ft)	2.52	Hydr. Depth (ft)			1.12			
Conv. Total (cfs)	7812.9	Conv. (cfs)			7812.9			
Length Wtd. (ft)	116.00	Wetted Per. (ft)			124.80			
Min Ch El (ft)	2901.00	Shear (lb/sq ft)			0.79			
Alpha	1.00	Stream Power (lb/ft s)			4.82			
Frctn Loss (ft)	1.32	Cum Volume (acre-ft)			5.56			

* C & E Loss (ft)	•	0.01	* Cum SA (acres)	*	*	5.54	•	*	

Warning: The energy equation could not be balanced within the specified number of iterations. The program selected the water surface that had the least amount of error between computed and assumed values.
Warning: Divided flow computed for this cross-section.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.
Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program defaulted to critical depth.

CROSS SECTION

RIVER: Blue Diamond Was
REACH: 1 RS: 2548

INPUT
Description:
Station Elevation Data num= 33

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
100	2920	173.85	2915	198.78	2910	221.49	2905	225.54	2900
238.04	2900	239.93	2901	241.6	2902	252.7	2902	256.29	2903
285.19	2903	291.41	2904	298.97	2905	308.45	2905	314.19	2904
319.14	2903	332.79	2903	341.32	2904	354.31	2904	361.36	2903
369.74	2902	396.58	2902	429.45	2903	440.23	2903	448.14	2902
477.89	2901	492.24	2901	510.93	2900	540.12	2900	552.74	2905
560.75	2910	612	2915	686	2920				

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
100	.028	198.78	.028	560.75	.028

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
198.78	560.75	182	176	.1	.3

CROSS SECTION OUTPUT Profile #PF 1

• E.G. Elev (ft)	• 2902.46	* Element	* Left OB	* Channel	• Right OB *
* Vel Head (ft)	* 0.63	* Wt. n-Val.	•	* 0.028	• •
* W.S. Elev (ft)	* 2901.83	• Reach Len. (ft)	* 182.00	• 182.00	• 176.00 •
* Crit W.S. (ft)	• 2901.83	* Flow Area (sq ft)	*	• 131.86	• •
* E.G. Slope (ft/ft)	*0.011332	• Area (sq ft)	•	* 131.86	* •
• Q Total (cfs)	• 838.00	* Flow (cfs)	*	* 838.00	• *
* Top Width (ft)	* 108.76	• Top Width (ft)	*	• 108.76	• •
* Vel Total (ft/s)	• 6.36	* Avg. Vel. (ft/s)	*	• 6.36	• *
* Max Chl Dpth (ft)	* 1.83	* Hydr. Depth (ft)	*	* 1.21	* *
* Conv. Total (cfs)	• 7872.2	• Conv. (cfs)	*	• 7872.2	* •
* Length Wtd. (ft)	* 182.00	• Wetted Per. (ft)	*	* 110.50	• *
* Min Ch El (ft)	* 2900.00	• Shear (lb/sq ft)	•	* 0.84	• •
* Alpha	• 1.00	• Stream Power (lb/ft s)	•	* 5.37	• *
* Frctn Loss (ft)	• 2.24	* Cum Volume (acre-ft)	*	* 5.21	• *
* C & E Loss (ft)	* 0.06	* Cum SA (acres)	*	* 5.23	• *

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical depth for the water surface and continued on with the calculations.
Warning: Divided flow computed for this cross-section.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.
Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program defaulted to critical depth.

CROSS SECTION

RIVER: Blue Diamond Was
REACH: 1 RS: 2366

INPUT
Description:
Station Elevation Data num= 42

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
100	2910	105	2909	119	2905	121.82	2904	124.56	2903
127.2	2902	139.31	2901	148.34	2900	151.55	2899	154.86	2898
169.28	2897	175.16	2896	180.98	2896	190.58	2897	191.74	2898
192.96	2899	208.08	2900	258.6	2900	263.76	2899	268.25	2899
276.15	2900	336.21	2900	342.59	2899	390.4	2899	451.89	2898
493.95	2898	503.2	2899	509.64	2900	515.73	2901	520.62	2902
523.79	2903	525.58	2904	527.48	2905	530.23	2906	532.78	2907
535.6	2908	538.5	2909	549.74	2910	565.19	2911	565.86	2911
578.03	2912	627	2915						

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
100	.028	105	.028	538.5	.028

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
105	538.5	154	144	.1	.3

CROSS SECTION OUTPUT Profile #PF 1

E.G. Elev (ft)	2899.43	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.42	Wt. n-Val.		0.028	
W.S. Elev (ft)	2899.01	Reach Len. (ft)	154.00	144.00	124.00
Crit W.S. (ft)	2899.01	Flow Area (sq ft)		161.70	
E.G. Slope (ft/ft)	0.013355	Area (sq ft)		161.70	
Q Total (cfs)	838.00	Flow (cfs)		838.00	
Top Width (ft)	207.04	Top Width (ft)		207.04	
Vel Total (ft/s)	5.18	Avg. Vel. (ft/s)		5.18	
Max Chl Dpth (ft)	3.01	Hydr. Depth (ft)		0.78	
Conv. Total (cfs)	7251.4	Conv. (cfs)		7251.4	
Length Wtd. (ft)	144.00	Wetted Per. (ft)		208.15	
Min Ch El (ft)	2896.00	Shear (lb/sq ft)		0.65	
Alpha	1.00	Stream Power (lb/ft s)		3.36	
Frctn Loss (ft)	1.83	Cum Volume (acre-ft)		4.59	
C & E Loss (ft)	0.01	Cum SA (acres)		4.57	

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical depth for the water surface and continued on with the calculations.
Warning: Divided flow computed for this cross-section.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.
Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program defaulted to critical depth.

CROSS SECTION

RIVER: Blue Diamond Was
REACH: 1 RS: 2222

INPUT
Description:
Station Elevation Data num= 41

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
100	2910	106.14	2905	118.19	2900	119.6	2899	122.96	2898
124.18	2898	137.26	2899	141.43	2899	168.27	2900	184.08	2900
190.51	2899	191.7	2898	192.92	2897	194.02	2896	195.27	2895
196.36	2894	197.64	2893	199.37	2893	214.55	2894	231.98	2895

233.6	2895	254.66	2896	257.97	2897	293.53	2897	298.89	2896
302.37	2896	307.63	2897	311.19	2897	338.78	2898	395.42	2898
408.31	2897	416.66	2896	422.33	2895	433.04	2896	439.81	2897
486.31	2897	526.91	2896	577.65	2896	626	2900	635	2905
661	2910								

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
100	.028	106.14	.028	635	.028

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
106.14	635	112	106	94	.1	.3

CROSS SECTION OUTPUT Profile #PF 1

E.G. Elev (ft)	2896.86	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.47	Wt. n-Val.		0.028	
W.S. Elev (ft)	2896.39	Reach Len. (ft)	112.00	106.00	94.00
Crit W.S. (ft)	2896.39	Flow Area (sq ft)		151.71	
E.G. Slope (ft/ft)	0.012094	Area (sq ft)		151.71	
Q Total (cfs)	838.00	Flow (cfs)		838.00	
Top Width (ft)	163.11	Top Width (ft)		163.11	
Vel Total (ft/s)	5.52	Avg. Vel. (ft/s)		5.52	
Max Chl Dpth (ft)	3.38	Hydr. Depth (ft)		0.93	
Conv. Total (cfs)	7620.2	Conv. (cfs)		7620.2	
Length Wtd. (ft)	106.00	Wetted Per. (ft)		164.77	
Min Ch El (ft)	2893.00	Shear (lb/sq ft)		0.70	
Alpha	1.00	Stream Power (lb/ft s)		3.84	
Frctn Loss (ft)	1.28	Cum Volume (acre-ft)		4.07	
C & E Loss (ft)	0.00	Cum SA (acres)		3.96	

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical depth for the water surface and continued on with the calculations.
Warning: Divided flow computed for this cross-section.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.
Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program defaulted to critical depth.

CROSS SECTION

RIVER: Blue Diamond Was
REACH: 1 RS: 2116

INPUT
Description:
Station Elevation Data num= 45

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
100	2910	108.78	2905	117.49	2900	119.91	2899	123.92	2898
127.91	2897	131.91	2896	136.74	2896	156.61	2897	167.07	2898
167.46	2898	200.15	2898	219.84	2897	223.79	2896	227.75	2895
231.71	2894	239.68	2893	250.23	2892	266.95	2892	269.03	2893
272.12	2894	282.55	2895	291.49	2896	319.69	2896	339.89	2895
362.91	2895	375.21	2894	397.36	2894	407.45	2895	416.35	2896
428.61	2896	445.02	2895	489.06	2896	529.46	2896	539.65	2895
547.82	2894	550.89	2894	556.6	2895	559.8	2895	564.13	2894
581.84	2894	633	2895	641	2900	651	2905	725	2910

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
100	.028	117.49	.028	641	.028

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
117.49	641	79	84	90	.1	.3

CROSS SECTION OUTPUT Profile #PF 1

E.G. Elev (ft)	2895.23	Element	Left OB	Channel	Right OB	
Vel Head (ft)	0.47	Wt. n-Val.		0.028		
W.S. Elev (ft)	2894.76	Reach Len. (ft)	79.00	84.00	90.00	
Crit W.S. (ft)	2894.76	Flow Area (sq ft)		152.35		
E.G. Slope (ft/ft)	*0.011968	Area (sq ft)		152.35		
Q Total (cfs)	838.00	Flow (cfs)		838.00		
Top Width (ft)	164.30	Top Width (ft)		164.30		
Vel Total (ft/s)	5.50	Avg. Vel. (ft/s)		5.50		
Max Chl Dpth (ft)	2.76	Hydr. Depth (ft)		0.93		
Conv. Total (cfs)	7660.2	Conv. (cfs)		7660.2		
Length Wtd. (ft)	84.00	Wetted Per. (ft)		165.20		
Min Ch El (ft)	2892.00	Shear (lb/sq ft)		0.69		
Alpha	1.00	Stream Power (lb/ft s)		3.79		
Frctn Loss (ft)	1.03	Cum Volume (acre-ft)		3.70		
C & E Loss (ft)	0.00	Cum SA (acres)		3.56		

Warning: Divided flow computed for this cross-section.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section.
This may indicate the need for additional cross sections.
Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program defaulted to critical depth.

CROSS SECTION

RIVER: Blue Diamond Was
REACH: 1 RS: 2032

INPUT
Description:
Station Elevation Data num= 30

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
100	2905	105.12	2900	121.19	2895	189.76	2895	213.66	2894
222.9	2893	233.67	2892	237.58	2891	240.52	2890	249.56	2890
255.49	2891	258.57	2892	264.51	2893	328.21	2893	336.15	2894
344.53	2894	357.67	2893	400.66	2893	408.66	2894	430.68	2894
438.05	2895	447.68	2896	463.59	2895	547.79	2895	554.02	2894
556.25	2894	567.94	2895	642	2895	649	2900	698	2905

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
100	.028	105.12	.028	649	.028

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
105.12	649	90	90	.1	.3

CROSS SECTION OUTPUT Profile #PF 1

E.G. Elev (ft)	2894.00	Element	Left OB	Channel	Right OB	
Vel Head (ft)	0.47	Wt. n-Val.		0.028		
W.S. Elev (ft)	2893.53	Reach Len. (ft)	90.00	90.00	90.00	
Crit W.S. (ft)	2893.53	Flow Area (sq ft)		151.83		
E.G. Slope (ft/ft)	*0.012509	Area (sq ft)		151.83		
Q Total (cfs)	838.00	Flow (cfs)		838.00		
Top Width (ft)	168.55	Top Width (ft)		168.55		
Vel Total (ft/s)	5.52	Avg. Vel. (ft/s)		5.52		
Max Chl Dpth (ft)	3.53	Hydr. Depth (ft)		0.90		
Conv. Total (cfs)	7492.7	Conv. (cfs)		7492.7		
Length Wtd. (ft)	90.00	Wetted Per. (ft)		169.32		
Min Ch El (ft)	2890.00	Shear (lb/sq ft)		0.70		
Alpha	1.00	Stream Power (lb/ft s)		3.86		
Frctn Loss (ft)	1.06	Cum Volume (acre-ft)		3.41		
C & E Loss (ft)	0.01	Cum SA (acres)		3.24		

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

Warning: The energy equation could not be balanced within the specified number of iterations.  The
         program used critical depth for the water surface and continued on with the calculations.
Warning: Divided flow computed for this cross-section.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section.
         This may indicate the need for additional cross sections.
Warning: During the standard step iterations, when the assumed water surface was set equal to critical
         depth, the calculated water surface came back below critical depth.  This indicates that there is
         not a valid subcritical answer.  The program defaulted to critical depth.

CROSS SECTION


RIVER: Blue Diamond Was
REACH: 1                  RS: 1942

INPUT
Description:
Station Elevation Data    num=      43
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
**********************************************************************************
     100    2895  108.58    2894  121.68    2894  125.21    2893  129.31    2892
  129.46    2892  135.77    2893  170.95    2893  189.97    2892  196.41    2891
  205.32    2891  209.42    2890  213.18    2889   216.9    2888  221.12    2888
   230.2    2889   232.9    2890  261.55    2890  267.37    2891  292.64    2892
  312.94    2892  336.51    2893  344.02    2893  360.73    2892   367.7    2891
  368.48    2891  376.06    2892  385.39    2893  392.16    2894  402.78    2894
  408.56    2893  416.38    2893  438.66    2894   507.9    2894  511.12    2893
  514.37    2892  521.08    2893  530.79    2894  562.88    2894     648    2890
     665    2895     671    2900     712    2905

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
**********************************************
     100    .028     100    .028     665    .028

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
          100     665               89      92      95             .1      .3

CROSS SECTION OUTPUT  Profile #PF 1
**********************************************************************************************
• E.G. Elev (ft)          * 2891.92  * Element               •  Left OB •  Channel  * Right OB *
• Vel Head (ft)           *    0.58  * Wt. n-Val.           *          •   0.028  *          •
* W.S. Elev (ft)          * 2891.34  * Reach Len. (ft)      *   89.00  *   92.00  •   95.00  *
* Crit W.S. (ft)          * 2891.34  * Flow Area (sq ft)    •          *  137.58  *          *
• E.G. Slope (ft/ft)      *0.011197  • Area (sq ft)         *          *  137.58  *          *
* Q Total (cfs)           *  838.00  * Flow (cfs)           *          *  838.00  *          •
• Top Width (ft)          *  120.77  • Top Width (ft)       *          *  120.77  •          *
• Vel Total (ft/s)        *    6.09  • Avg. Vel. (ft/s)     *          *    6.09  •          •
• Max Chl Dpth (ft)       •    3.34  * Hydr. Depth (ft)     *          *    1.14  •          *
* Conv. Total (cfs)       *  7919.5  • Conv. (cfs)          *          *  7919.5  *          *
• Length Wtd. (ft)        •   92.00  * Wetted Per. (ft)     *          •  121.78  *          *
• Min Ch El (ft)          • 2888.00  * Shear (lb/sq ft)     •          •    0.79  *          *
• Alpha                   •    1.00  * Stream Power (lb/ft s) •        •    4.81  *          *
* Frctn Loss (ft)         •    1.10  * Cum Volume (acre-ft)  *          •    3.11  *          *
* C & E Loss (ft)         •    0.05  • Cum SA (acres)       *          •    2.94  *          *
**********************************************************************************************

Warning: The energy equation could not be balanced within the specified number of iterations.  The
         program selected the water surface that had the least amount of error between computed and
         assumed values.
Warning: Divided flow computed for this cross-section.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section.
         This may indicate the need for additional cross sections.
Warning: During the standard step iterations, when the assumed water surface was set equal to critical
         depth, the calculated water surface came back below critical depth.  This indicates that there is
         not a valid subcritical answer.  The program defaulted to critical depth.

CROSS SECTION
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RIVER: Blue Diamond Was
REACH: 1 RS: 1850

INPUT
Description:
Station Elevation Data num= 42

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
100	2905	126.43	2900	137.65	2895	139.99	2894	142.28	2893
144.53	2892	151.93	2892	179.24	2893	189.35	2893	197.96	2892
198.13	2892	222.13	2891	279.13	2891	280.44	2890	281.76	2889
283.13	2888	284.46	2887	286.5	2887	300.85	2888	303.28	2889
312.23	2889	315.85	2888	321.78	2889	324.17	2889	328.2	2888
330.15	2888	342.71	2889	352.52	2890	407.78	2890	415.67	2891
432.59	2892	458.26	2892	479.67	2891	480.98	2891	491.63	2892
582.15	2892	726	2890	774	2890	796	2895	806	2900
814	2905	823	2910						

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
100	.028	126.43	.028	806	.028

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
126.43	806	120	128	136	.1	.3

CROSS SECTION OUTPUT Profile #PF 1

E.G. Elev (ft)	2890.69	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.42	Wt. n-Val.		0.028	
W.S. Elev (ft)	2890.27	Reach Len. (ft)	120.00	128.00	136.00
Crit W.S. (ft)	2890.27	Flow Area (sq ft)		160.87	
E.G. Slope (ft/ft)	*0.012878	Area (sq ft)		160.87	
Q Total (cfs)	838.00	Flow (cfs)		838.00	
Top Width (ft)	198.16	Top Width (ft)		198.16	
Vel Total (ft/s)	5.21	Avg. Vel. (ft/s)		5.21	
Max Chl Dpth (ft)	3.27	Hydr. Depth (ft)		0.81	
Conv. Total (cfs)	7384.6	Conv. (cfs)		7384.6	
Length Wtd. (ft)	128.00	Wetted Per. (ft)		199.96	
Min Ch El (ft)	2887.00	Shear (lb/sq ft)		0.65	
Alpha	1.00	Stream Power (lb/ft s)		3.37	
Frctn Loss (ft)	1.52	Cum Volume (acre-ft)		2.80	
C & E Loss (ft)	0.02	Cum SA (acres)		2.61	

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical depth for the water surface and continued on with the calculations.
Warning: Divided flow computed for this cross-section.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.
Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program defaulted to critical depth.

CROSS SECTION

RIVER: Blue Diamond Was
REACH: 1 RS: 1722

INPUT
Description:
Station Elevation Data num= 29

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
100	2900	103.66	2895	139.05	2890	197.12	2889	233.98	2889
236.93	2888	240.14	2887	298.01	2887	304.88	2888	311.59	2889
314.65	2890	320.29	2890	345.79	2891	358.39	2891	364.56	2890

368.44	2890	374.55	2891	398.3	2891	406.51	2890	434.47	2889
461.69	2889	487.11	2890	657	2890	722	2885	728	2885
744	2890	753	2895	766	2900	798	2905		

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
100	.028	103.66	.028	753	.028

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
103.66	753	182	162	140	.1	.3

CROSS SECTION OUTPUT Profile #PF 1

E.G. Elev (ft)	2888.44	Element	Left OB	Channel	Right OB	
Vel Head (ft)	0.58	Wt. n-Val.		0.028		
W.S. Elev (ft)	2887.87	Reach Len. (ft)	182.00	162.00	140.00	
Crit W.S. (ft)	2887.87	Flow Area (sq ft)		137.48		
E.G. Slope (ft/ft)	0.010974	Area (sq ft)		137.48		
Q Total (cfs)	838.00	Flow (cfs)		838.00		
Top Width (ft)	119.00	Top Width (ft)		119.00		
Vel Total (ft/s)	6.10	Avg. Vel. (ft/s)		6.10		
Max Chl Dpth (ft)	2.86	Hydr. Depth (ft)		1.16		
Conv. Total (cfs)	7999.4	Conv. (cfs)		7999.4		
Length Wtd. (ft)	162.00	Wetted Per. (ft)		119.74		
Min Ch El (ft)	2885.00	Shear (lb/sq ft)		0.79		
Alpha	1.00	Stream Power (lb/ft s)		4.79		
Frctn Loss (ft)	1.85	Cum Volume (acre-ft)		2.36		
C & E Loss (ft)	0.02	Cum SA (acres)		2.14		

Warning: The energy equation could not be balanced within the specified number of iterations. The program selected the water surface that had the least amount of error between computed and assumed values.
Warning: Divided flow computed for this cross-section.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.
Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program defaulted to critical depth.

CROSS SECTION

RIVER: Blue Diamond Was
REACH: 1 RS: 1560

INPUT
Description:
Station Elevation Data num= 35

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
100	2900	119.71	2895	128.74	2890	138.08	2885	148.66	2885
154.86	2886	165.9	2887	167.75	2887	174.38	2886	188.76	2885
202	2884	206.34	2883	210.74	2882	211.61	2882	221.61	2883
226.02	2884	230.04	2885	234.08	2886	238.37	2887	263.31	2888
270.63	2888	321.22	2887	323.51	2887	332.86	2886	341.7	2885
351.28	2885	367.1	2886	418.43	2886	432.84	2887	581.48	2887
682	2885	732	2890	744	2890	748	2895	773	2900

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
100	.028	119.71	.028	773	.028

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
119.71	773	134	121	109	.1	.3

CROSS SECTION OUTPUT Profile #PF 1

E.G. Elev (ft)	2886.32	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.50	Wt. n-Val.		0.028	
W.S. Elev (ft)	2885.82	Reach Len. (ft)	134.00	121.00	109.00
Crit W.S. (ft)	2885.80	Flow Area (sq ft)		148.32	
E.G. Slope (ft/ft)	0.011911	Area (sq ft)		148.32	
Q Total (cfs)	838.00	Flow (cfs)		838.00	
Top Width (ft)	152.88	Top Width (ft)		152.88	
Vel Total (ft/s)	5.65	Avg. Vel. (ft/s)		5.65	
Max Chl Dpth (ft)	3.82	Hydr. Depth (ft)		0.97	
Conv. Total (cfs)	7678.2	Conv. (cfs)		7678.2	
Length Wtd. (ft)	121.00	Wetted Per. (ft)		153.95	
Min Ch El (ft)	2882.00	Shear (lb/sq ft)		0.72	
Alpha	1.00	Stream Power (lb/ft s)		4.05	
Frctn Loss (ft)	1.41	Cum Volume (acre-ft)		1.83	
C & E Loss (ft)	0.00	Cum SA (acres)		1.64	

Warning: Divided flow computed for this cross-section.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section.
This may indicate the need for additional cross sections.

CROSS SECTION

RIVER: Blue Diamond Was
REACH: 1 RS: 1439

INPUT
Description:
Station Elevation Data num= 46

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
100	2895	110.22	2890	123.42	2885	130.39	2885	136.92	2886
142.72	2887	146.08	2888	153.87	2888	159.38	2887	165.75	2886
170.42	2885	173.3	2884	203.8	2883	210.37	2882	212.66	2881
225.53	2881	228.53	2882	230.97	2883	233.41	2884	238.1	2885
238.24	2885	256.22	2886	272.13	2886	297.01	2885	302.67	2885
313.39	2884	319.58	2883	332.78	2883	337.49	2884	392.98	2885
404.04	2885	409.86	2884	425.91	2884	434.26	2885	477.51	2885
493.51	2886	508.24	2886	538.22	2885	559	2885	563.29	2886
581.13	2886	632	2885	765	2885	778	2890	800	2895
832	2900								

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
100	.028	110.22	.028	778	.028

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
110.22	778	110	107	104	.1	.3

CROSS SECTION OUTPUT Profile #PF 1

E.G. Elev (ft)	2884.90	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.54	Wt. n-Val.		0.028	
W.S. Elev (ft)	2884.36	Reach Len. (ft)	110.00	107.00	104.00
Crit W.S. (ft)	2884.36	Flow Area (sq ft)		141.76	
E.G. Slope (ft/ft)	0.011373	Area (sq ft)		141.76	
Q Total (cfs)	838.00	Flow (cfs)		838.00	
Top Width (ft)	131.59	Top Width (ft)		131.59	
Vel Total (ft/s)	5.91	Avg. Vel. (ft/s)		5.91	
Max Chl Dpth (ft)	3.36	Hydr. Depth (ft)		1.08	
Conv. Total (cfs)	7857.9	Conv. (cfs)		7857.9	
Length Wtd. (ft)	107.00	Wetted Per. (ft)		132.80	
Min Ch El (ft)	2881.00	Shear (lb/sq ft)		0.76	
Alpha	1.00	Stream Power (lb/ft s)		4.48	
Frctn Loss (ft)	1.33	Cum Volume (acre-ft)		1.42	
C & E Loss (ft)	0.04	Cum SA (acres)		1.24	

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical depth for the water surface and continued on with the calculations.
Warning: Divided flow computed for this cross-section.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.
Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program defaulted to critical depth.

CROSS SECTION

RIVER: Blue Diamond Was
REACH: 1 RS: 1332

INPUT
Description:
Station Elevation Data num= 30

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
100	2895	156.35	2890	163.22	2885	170.11	2880	171.49	2879
176.33	2879	187.77	2880	191.78	2881	207.21	2882	221.84	2883
231.18	2884	245.14	2884	249.39	2883	253.66	2882	257.62	2881
264.72	2881	288.37	2882	318.54	2882	330.63	2883	333.86	2883
349.19	2882	365.81	2882	379.98	2883	491.05	2883	563.45	2884
578.38	2884	740	2881	753	2885	769	2890	787	2895

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
100	.028	156.35	.028	769	.028

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
156.35	769	136	124	112	.1	.3

CROSS SECTION OUTPUT Profile #PF 1

			Left OB	Channel	Right OB
E.G. Elev (ft)	2882.67	Element		0.028	
Vel Head (ft)	0.42	Wt. n-Val.			
W.S. Elev (ft)	2882.25	Reach Len. (ft)	136.00	124.00	112.00
Crit W.S. (ft)	2882.25	Flow Area (sq ft)		161.57	
E.G. Slope (ft/ft)	0.013574	Area (sq ft)		161.57	
Q Total (cfs)	838.00	Flow (cfs)		838.00	
Top Width (ft)	208.63	Top Width (ft)		208.63	
Vel Total (ft/s)	5.19	Avg. Vel. (ft/s)		5.19	
Max Chl Dpth (ft)	3.25	Hydr. Depth (ft)		0.77	
Conv. Total (cfs)	7192.7	Conv. (cfs)		7192.7	
Length Wtd. (ft)	124.00	Wetted Per. (ft)		210.30	
Min Ch El (ft)	2879.00	Shear (lb/sq ft)		0.65	
Alpha	1.00	Stream Power (lb/ft s)		3.38	
Frctn Loss (ft)	1.48	Cum Volume (acre-ft)		1.05	
C & E Loss (ft)	0.02	Cum SA (acres)		0.82	

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical depth for the water surface and continued on with the calculations.
Warning: Divided flow computed for this cross-section.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.
Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program defaulted to critical depth.

CROSS SECTION

RIVER: Blue Diamond Was
REACH: 1 RS: 1208

INPUT

Description:
Station Elevation Data num= 45

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
100	2895	117.94	2893	126.5	2892	136.2	2892	141.28	2893
190.49	2893	199.83	2892	207.64	2891	210.45	2890	212.67	2889
214.88	2888	217.24	2887	219.57	2886	222.51	2885	225.68	2884
228.23	2883	229.91	2882	231.27	2881	232.74	2880	234.55	2879
237.04	2878	237.06	2878	244.02	2877	268.06	2877	273.23	2878
286.38	2879	330.44	2879	343.57	2880	347.13	2880	351.17	2881
355.44	2882	359.86	2882	367.48	2881	424.62	2881	429	2880
464.86	2880	470.44	2881	508.66	2881	530.18	2882	568.55	2882
764	2880	792	2880	802	2885	813	2890	824	2895

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
100	.028	190.49	.028	813	.028

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
190.49	813	121	110	99	.1	.3

CROSS SECTION OUTPUT Profile #PF 1

E.G. Elev (ft)	2880.20	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.63	Wt. n-Val.		0.028	
W.S. Elev (ft)	2879.58	Reach Len. (ft)	121.00	110.00	99.00
Crit W.S. (ft)	2879.58	Flow Area (sq ft)		131.90	
E.G. Slope (ft/ft)	0.010586	Area (sq ft)		131.90	
Q Total (cfs)	838.00	Flow (cfs)		838.00	
Top Width (ft)	104.51	Top Width (ft)		104.51	
Vel Total (ft/s)	6.35	Avg. Vel. (ft/s)		6.35	
Max Chl Dpth (ft)	2.58	Hydr. Depth (ft)		1.26	
Conv. Total (cfs)	8144.9	Conv. (cfs)		8144.9	
Length Wtd. (ft)	110.00	Wetted Per. (ft)		105.07	
Min Ch El (ft)	2877.00	Shear (lb/sq ft)		0.83	
Alpha	1.00	Stream Power (lb/ft s)		5.27	
Frctn Loss (ft)	0.76	Cum Volume (acre-ft)		0.63	
C & E Loss (ft)	0.02	Cum SA (acres)		0.38	

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical depth for the water surface and continued on with the calculations.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.
Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program defaulted to critical depth.

CROSS SECTION

RIVER: Blue Diamond Was
REACH: 1 RS: 1098

INPUT
Description:
Station Elevation Data num= 36

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
100	2895	113.8	2894	130.14	2893	149.66	2892	192.19	2891
295.52	2891	311.29	2890	312.62	2889	314.09	2888	315.49	2887
316.85	2886	318.12	2885	319.51	2884	320.87	2883	322.23	2882
323.68	2881	324.99	2880	326.37	2879	327.77	2878	329.12	2877
330.5	2876	333.01	2875	375.57	2875	392.83	2876	395.52	2877
398.24	2878	406.85	2879	514.22	2879	524.25	2878	526.64	2878
537.78	2879	559.97	2880	850	2880	852	2885	855	2890
863	2895								

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
100	.028	295.52	.028	855	.028

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
295.52	855	79	98	118	.1	.3

CROSS SECTION OUTPUT Profile #PF 1

E.G. Elev (ft)	2877.90	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.55	Wt. n-Val.		0.028	
W.S. Elev (ft)	2877.35	Reach Len. (ft)	79.00	98.00	118.00
Crit W.S. (ft)		Flow Area (sq ft)		140.31	
E.G. Slope (ft/ft)	0.004891	Area (sq ft)		140.31	
Q Total (cfs)	838.00	Flow (cfs)		838.00	
Top Width (ft)	67.82	Top Width (ft)		67.82	
Vel Total (ft/s)	5.97	Avg. Vel. (ft/s)		5.97	
Max Chl Dpth (ft)	2.35	Hydr. Depth (ft)		2.07	
Conv. Total (cfs)	11982.4	Conv. (cfs)		11982.4	
Length Wtd. (ft)	98.00	Wetted Per. (ft)		68.73	
Min Ch El (ft)	2875.00	Shear (lb/sq ft)		0.62	
Alpha	1.00	Stream Power (lb/ft s)		3.72	
Frctn Loss (ft)	0.66	Cum Volume (acre-ft)		0.29	
C & E Loss (ft)	0.02	Cum SA (acres)		0.16	

Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.

CROSS SECTION

RIVER: Blue Diamond Was
REACH: 1 RS: 1000

INPUT
Description:
Station Elevation Data num= 27

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
100	2890	101.6	2885	103.38	2880	105.21	2875	105.59	2874
122.21	2874	156.22	2875	162.07	2876	168.55	2877	169.22	2877
180.06	2878	198.74	2878	217.04	2877	265.58	2877	287.59	2878
469.17	2878	495.56	2877	533.85	2877	547.6	2878	552.91	2878
562.43	2877	568.11	2876	575.41	2876	585	2877	587	2880
592	2885	605	2890						

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
100	.028	101.6	.028	592	.028

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
101.6	592	0	0	0	.1	.3

CROSS SECTION OUTPUT Profile #PF 1

E.G. Elev (ft)	2877.22	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.79	Wt. n-Val.		0.028	
W.S. Elev (ft)	2876.43	Reach Len. (ft)			
Crit W.S. (ft)	2876.42	Flow Area (sq ft)		117.83	
E.G. Slope (ft/ft)	0.010001	Area (sq ft)		117.83	
Q Total (cfs)	838.00	Flow (cfs)		838.00	
Top Width (ft)	74.07	Top Width (ft)		74.07	
Vel Total (ft/s)	7.11	Avg. Vel. (ft/s)		7.11	
Max Chl Dpth (ft)	2.43	Hydr. Depth (ft)		1.59	
Conv. Total (cfs)	8379.7	Conv. (cfs)		8379.7	
Length Wtd. (ft)		Wetted Per. (ft)		75.95	

Min Ch El (ft)	2874.00	Shear (lb/sq ft)		0.97	
Alpha	1.00	Stream Power (lb/ft s)		6.89	
Frctn Loss (ft)		Cum Volume (acre-ft)			
C & E Loss (ft)		Cum SA (acres)			

Warning: Divided flow computed for this cross-section.

SUMMARY OF MANNING'S N VALUES

River:Blue Diamond Was

Reach	River Sta.	n1	n2	n3
1	3128	.028	.028	.028
1	3010	.028	.028	.028
1	2896	.028	.028	.028
1	2780	.028	.028	.028
1	2664	.028	.028	.028
1	2548	.028	.028	.028
1	2366	.028	.028	.028
1	2222	.028	.028	.028
1	2116	.028	.028	.028
1	2032	.028	.028	.028
1	1942	.028	.028	.028
1	1850	.028	.028	.028
1	1722	.028	.028	.028
1	1560	.028	.028	.028
1	1439	.028	.028	.028
1	1332	.028	.028	.028
1	1208	.028	.028	.028
1	1098	.028	.028	.028
1	1000	.028	.028	.028

SUMMARY OF REACH LENGTHS

River: Blue Diamond Was

Reach	River Sta.	Left	Channel	Right
1	3128	118	118	118
1	3010	106	114	114
1	2896	94	116	110
1	2780	116	116	116
1	2664	114	116	118
1	2548	182	182	176
1	2366	154	144	124
1	2222	112	106	94
1	2116	79	84	90
1	2032	90	90	90
1	1942	89	92	95
1	1850	120	128	136
1	1722	182	162	140
1	1560	134	121	109
1	1439	110	107	104
1	1332	136	124	112
1	1208	121	110	99
1	1098	79	98	118
1	1000	0	0	0

SUMMARY OF CONTRACTION AND EXPANSION COEFFICIENTS
River: Blue Diamond Was

Reach	River Sta.	Contr.	Expan.
1	3128	.1	.3
1	3010	.1	.3
1	2896	.1	.3
1	2780	.1	.3
1	2664	.1	.3
1	2548	.1	.3
1	2366	.1	.3
1	2222	.1	.3
1	2116	.1	.3
1	2032	.1	.3
1	1942	.1	.3
1	1850	.1	.3
1	1722	.1	.3
1	1560	.1	.3
1	1439	.1	.3
1	1332	.1	.3
1	1208	.1	.3
1	1098	.1	.3
1	1000	.1	.3

Profile Output Table - Standard Table 1

Reach	River Sta	Profile	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
1	3128	PF 1	838.00	2910.00	2912.64	2912.64	2913.36	0.010450	6.80	123.19	87.11	1.01
1	3010	PF 1	838.00	2909.00	2910.25	2910.25	2910.64	0.012945	5.03	166.46	218.47	1.02
1	2896	PF 1	838.00	2905.00	2907.10	2907.10	2907.50	0.012083	5.07	165.20	202.05	0.99
1	2780	PF 1	838.00	2903.00	2905.29	2905.29	2905.71	0.011746	5.23	160.21	183.58	0.99
1	2664	PF 1	838.00	2901.00	2903.52	2903.52	2904.09	0.011504	6.08	137.81	122.82	1.01
1	2548	PF 1	838.00	2900.00	2901.83	2901.83	2902.46	0.011332	6.36	131.86	108.76	1.02
1	2366	PF 1	838.00	2896.00	2899.01	2899.01	2899.43	0.013355	5.18	161.70	207.04	1.03
1	2222	PF 1	838.00	2893.00	2896.39	2896.39	2896.86	0.012094	5.52	151.71	163.11	1.01
1	2116	PF 1	838.00	2892.00	2894.76	2894.76	2895.23	0.011968	5.50	152.35	164.30	1.01
1	2032	PF 1	838.00	2890.00	2893.53	2893.53	2894.00	0.012509	5.52	151.83	168.55	1.02
1	1942	PF 1	838.00	2888.00	2891.34	2891.34	2891.92	0.011197	6.09	137.58	120.77	1.01
1	1850	PF 1	838.00	2887.00	2890.27	2890.27	2890.69	0.012878	5.21	160.87	198.16	1.02
1	1722	PF 1	838.00	2885.00	2887.87	2887.87	2888.44	0.010974	6.10	137.48	119.00	1.00
1	1560	PF 1	838.00	2882.00	2885.82	2885.80	2886.32	0.011911	5.65	148.32	152.88	1.01
1	1439	PF 1	838.00	2881.00	2884.36	2884.36	2884.90	0.011373	5.91	141.76	131.59	1.00
1	1332	PF 1	838.00	2879.00	2882.25	2882.25	2882.67	0.013574	5.19	161.57	208.63	1.04
1	1208	PF 1	838.00	2877.00	2879.58	2879.58	2880.20	0.010586	6.35	131.90	104.51	1.00
1	1098	PF 1	838.00	2875.00	2877.35		2877.90	0.004891	5.97	140.31	67.82	0.73
1	1000	PF 1	838.00	2874.00	2876.43	2876.42	2877.22	0.010001	7.11	117.83	74.07	0.99

Profile Output Table - Standard Table 2

Reach	River Sta	Profile	E.G. Elev (ft)	W.S. Elev (ft)	Vel Head (ft)	Frctn Loss (ft)	C & E Loss (ft)	Q Left (cfs)	Q Channel (cfs)	Q Right (cfs)	Top Width (ft)
1	3128	PF 1	2913.36	2912.64	0.72	1.37	0.10		838.00		87.11
1	3010	PF 1	2910.64	2910.25	0.39	1.43	0.00		838.00		218.47
1	2896	PF 1	2907.50	2907.10	0.40	1.38	0.00		838.00		202.05
1	2780	PF 1	2905.71	2905.29	0.42	1.35	0.01		838.00		183.58
1	2664	PF 1	2904.09	2903.52	0.57	1.32	0.01		838.00		122.82
1	2548	PF 1	2902.46	2901.83	0.63	2.24	0.06		838.00		108.76
1	2366	PF 1	2899.43	2899.01	0.42	1.83	0.01		838.00		207.04
1	2222	PF 1	2896.86	2896.39	0.47	1.28	0.00		838.00		163.11
1	2116	PF 1	2895.23	2894.76	0.47	1.03	0.00		838.00		164.30
1	2032	PF 1	2894.00	2893.53	0.47	1.06	0.01		838.00		168.55
1	1942	PF 1	2891.92	2891.34	0.58	1.10	0.05		838.00		120.77
1	1850	PF 1	2890.69	2890.27	0.42	1.52	0.02		838.00		198.16
1	1722	PF 1	2888.44	2887.87	0.58	1.85	0.02		838.00		119.00
1	1560	PF 1	2886.32	2885.82	0.50	1.41	0.00		838.00		152.88

1	1439	PF 1	2884.90	2884.36	0.54	1.33	0.04		838.00		131.59
1	1332	PF 1	2882.67	2882.25	0.42	1.48	0.02		838.00		208.63
1	1208	PF 1	2880.20	2879.58	0.63	0.76	0.02		838.00		104.51
1	1098	PF 1	2877.90	2877.35	0.55	0.66	0.02		838.00		67.82
1	1000	PF 1	2877.22	2876.43	0.79				838.00		74.07

****

ERRORS WARNINGS AND NOTES
Errors Warnings and Notes for Plan : Plan 01

River: Blue Diamond Was Reach: 1 RS: 3128 Profile: PF 1
Warning:The energy equation could not be balanced within the specified number of iterations. The program used critical depth for the water surface and continued on with the calculations.
Warning:The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.
Warning:During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program defaulted to critical depth.
River: Blue Diamond Was Reach: 1 RS: 3010 Profile: PF 1
Warning:The energy equation could not be balanced within the specified number of iterations. The program used critical depth for the water surface and continued on with the calculations.
Warning:Divided flow computed for this cross-section.
Warning:The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.
Warning:During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program defaulted to critical depth.
River: Blue Diamond Was Reach: 1 RS: 2896 Profile: PF 1
Warning:The energy equation could not be balanced within the specified number of iterations. The program selected the water surface that had the least amount of error between computed and assumed values.
Warning:Divided flow computed for this cross-section.
Warning:The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.
Warning:During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program defaulted to critical depth.
River: Blue Diamond Was Reach: 1 RS: 2780 Profile: PF 1
Warning:The energy equation could not be balanced within the specified number of iterations. The program selected the water surface that had the least amount of error between computed and assumed values.
Warning:Divided flow computed for this cross-section.
Warning:The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.
Warning:During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program defaulted to critical depth.
River: Blue Diamond Was Reach: 1 RS: 2664 Profile: PF 1
Warning:The energy equation could not be balanced within the specified number of iterations. The program selected the water surface that had the least amount of error between computed and assumed values.
Warning:Divided flow computed for this cross-section.
Warning:The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.
Warning:During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program defaulted to critical depth.
River: Blue Diamond Was Reach: 1 RS: 2548 Profile: PF 1
Warning:The energy equation could not be balanced within the specified number of iterations. The program used critical depth for the water surface and continued on with the calculations.
Warning:Divided flow computed for this cross-section.
Warning:The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.
Warning:During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program defaulted to critical depth.
River: Blue Diamond Was Reach: 1 RS: 2366 Profile: PF 1
Warning:The energy equation could not be balanced within the specified number of iterations. The program used critical depth for the water surface and continued on with the calculations.
Warning:Divided flow computed for this cross-section.
Warning:The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate

the need for additional cross sections.
Warning:During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program defaulted to critical depth.
River: Blue Diamond Was Reach: 1 RS: 2222 Profile: PF 1
Warning:The energy equation could not be balanced within the specified number of iterations. The program used critical depth for the water surface and continued on with the calculations.
Warning:Divided flow computed for this cross-section.
Warning:The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.
Warning:During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program defaulted to critical depth.
River: Blue Diamond Was Reach: 1 RS: 2116 Profile: PF 1
Warning:Divided flow computed for this cross-section.
Warning:The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.
Warning:During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program defaulted to critical depth.
River: Blue Diamond Was Reach: 1 RS: 2032 Profile: PF 1
Warning:The energy equation could not be balanced within the specified number of iterations. The program used critical depth for the water surface and continued on with the calculations.
Warning:Divided flow computed for this cross-section.
Warning:The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.
Warning:During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program defaulted to critical depth.
River: Blue Diamond Was Reach: 1 RS: 1942 Profile: PF 1
Warning:The energy equation could not be balanced within the specified number of iterations. The program selected the water surface that had the least amount of error between computed and assumed values.
Warning:Divided flow computed for this cross-section.
Warning:The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.
Warning:During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program defaulted to critical depth.
River: Blue Diamond Was Reach: 1 RS: 1850 Profile: PF 1
Warning:The energy equation could not be balanced within the specified number of iterations. The program used critical depth for the water surface and continued on with the calculations.
Warning:Divided flow computed for this cross-section.
Warning:The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.
Warning:During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program defaulted to critical depth.
River: Blue Diamond Was Reach: 1 RS: 1722 Profile: PF 1
Warning:The energy equation could not be balanced within the specified number of iterations. The program selected the water surface that had the least amount of error between computed and assumed values.
Warning:Divided flow computed for this cross-section.
Warning:The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.
Warning:During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program defaulted to critical depth.
River: Blue Diamond Was Reach: 1 RS: 1560 Profile: PF 1
Warning:Divided flow computed for this cross-section.
Warning:The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.
River: Blue Diamond Was Reach: 1 RS: 1439 Profile: PF 1
Warning:The energy equation could not be balanced within the specified number of iterations. The program used critical depth for the water surface and continued on with the calculations.
Warning:Divided flow computed for this cross-section.
Warning:The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.
Warning:During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program defaulted to critical depth.
River: Blue Diamond Was Reach: 1 RS: 1332 Profile: PF 1

Warning:The energy equation could not be balanced within the specified number of iterations. The program used critical depth for the water surface and continued on with the calculations.
Warning:Divided flow computed for this cross-section.
Warning:The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.
Warning:During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program defaulted to critical depth.

River: Blue Diamond Was Reach: 1 RS: 1208 Profile: PF 1
Warning:The energy equation could not be balanced within the specified number of iterations. The program used critical depth for the water surface and continued on with the calculations.
Warning:The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.
Warning:The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.
Warning:During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program defaulted to critical depth.

River: Blue Diamond Was Reach: 1 RS: 1098 Profile: PF 1
Warning:The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.

River: Blue Diamond Was Reach: 1 RS: 1000 Profile: PF 1
Warning:Divided flow computed for this cross-section.

DATA CD