

**Exterior Building Color & Material Samples**  
**Color Drawdowns**  
**Drainage Reports**  
**TIMA**  
**Abbreviated Water & Sewer Need Report**  
**Archaeological Resources**  
**Airport Vicinity Development Checklist**  
**Parking Study**  
**Trip Generation Comparison**  
**Parking Master Plan**  
**Water Study**  
**Wastewater Study**  
**Stormwater Waiver Application**

# PRELIMINARY DRAINAGE REPORT FOR NOTRE DAME PREPARATORY HIGH SCHOOL: NEW PARKING LOTS, PERFORMING ARTS BUILDING AND FOOTBALL STADIUM

APRIL 13, 2012  
1<sup>st</sup> Revision: June 15, 2012

COS Plan Check No. 1747-12  
Case No. 9-PP-2012

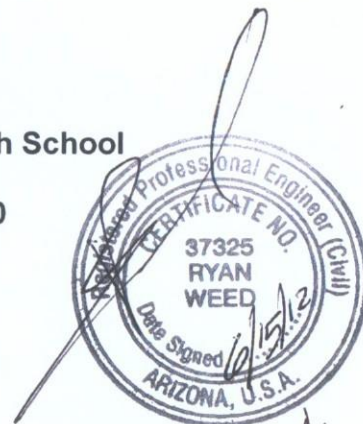
*Prepared for:*

Notre Dame Preparatory High School  
9701 E. Bell Road  
Scottsdale, AZ 85260  
(480) 634-8200

*Prepared by:*

Coe & Van Loo Consultants, Inc.  
4550 N. 12th Street  
Phoenix, AZ 85014  
(602) 264-6831

Expires: 3/31/14



CVL Job Number: 1.01.0145702

September 25, 2012

Mr. Don Gerkin  
Senior Civil Engineer  
City of Scottsdale  
Stormwater Management Division  
7447 E. Indian School Road, Suite 125  
Scottsdale, Arizona 85251

Re: Notre Dame Preparatory High School  
Case No: 9-PP-2012  
COS Plan Check No.: 1747-12  
CVL Project No.: 1.01.0145702

Dear Mr. Gerkin:

The following Preliminary Drainage Report was previously submitted to the City for review, and minor comments were received. As part of the submittal of the Phase 2A design review, wash modification, and NAOS/drainage easement release, a copy of this previously submitted report is being re-submitted for reference.

However, as the project has progressed from the preliminary stage into a Design Review submittal, minor site revisions have occurred. Coe & Van Loo Consultants, Inc, is including a copy of the revised Appendix D, Proposed Condition Hydraulic Analysis to address the site revisions that have occurred thus far. By doing this, the Appendix D is now up to date, and matches the proposed improvements being submitted with Phase 2A Design Review.

A final drainage report will be submitted with the construction documents, and all text, figures, and plates will be updated at this time.

Should you have questions or concerns, please contact me directly at (602) 264-6831 or [jgeisler@cvlci.com](mailto:jgeisler@cvlci.com).

Sincerely,

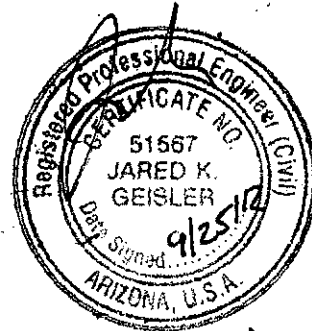
COE & VAN LOO  
Consultants, Inc.



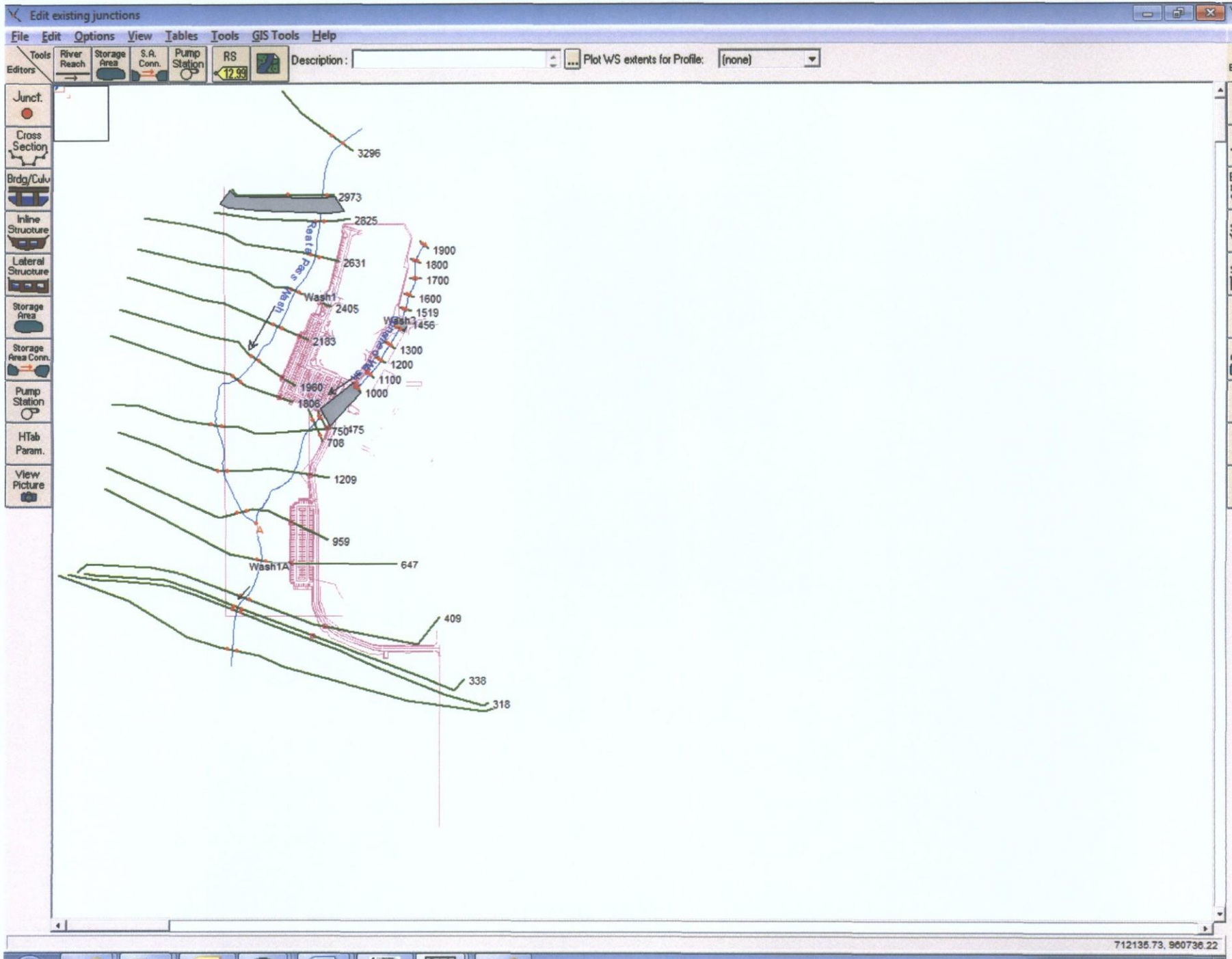
Jared Geisler, PE  
Project Manager

# APPENDIX D

## Proposed Conditions Hydraulic Analysis



Expires 12/31/13

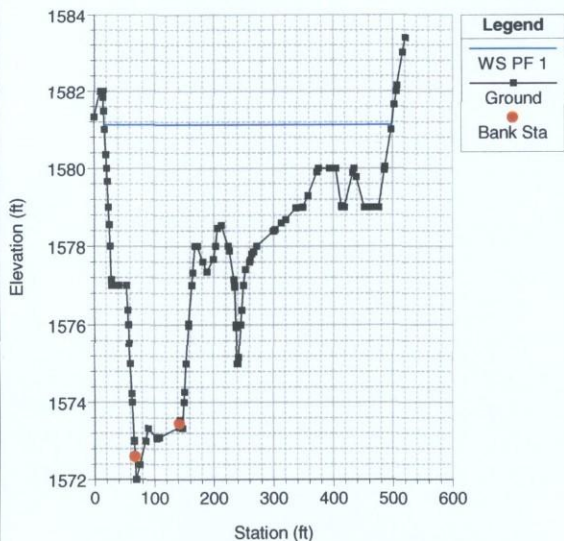


Reata Pass wash - Proposed conditions HEC-RAS output

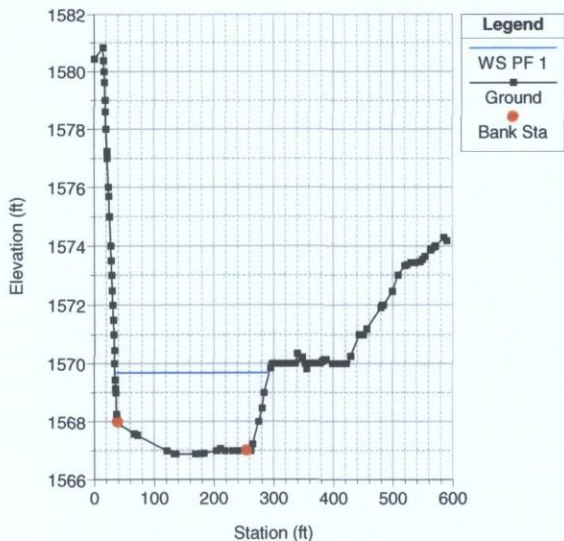
HEC-RAS Plan: PR0919 Profile: PF 1

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)	
Wash1	3296	PF 1	13269.00	1572.00	1581.13	1581.13	1582.70	0.005408	12.57	1770.04	481.22	0.78
Wash1	2973	PF 1	13269.00	1566.89	1569.68	1571.81	1577.35	0.082760	22.71	613.65	258.36	2.51
Wash1	2920		Bridge									
Wash1	2825	PF 1	13269.00	1565.00	1570.58	1570.58	1572.69	0.013521	15.34	1237.25	293.96	1.16
Wash1	2631	PF 1	13269.00	1564.00	1568.69	1568.79	1569.92	0.013635	13.50	1691.64	721.30	1.12
Wash1	2405	PF 1	13269.00	1561.00	1565.43	1565.49	1566.59	0.018218	13.00	1657.91	732.77	1.24
Wash1	2183	PF 1	13269.00	1557.00	1562.06	1561.93	1562.99	0.014045	11.47	1851.44	804.23	1.08
Wash1	1960	PF 1	13269.00	1555.35	1559.34	1558.87	1560.13	0.011642	9.67	1924.46	792.20	0.97
Wash1	1806	PF 1	13269.00	1553.00	1556.36	1556.36	1557.65	0.022226	13.45	1565.02	768.57	1.35
Wash1	1475	PF 1	13269.00	1547.00	1552.05	1551.66	1552.54	0.009037	8.56	2490.23	1147.88	0.82
Wash1	1209	PF 1	13269.00	1544.00	1548.31	1548.31	1549.14	0.019118	10.93	1915.28	1058.92	1.15
Wash1	959	PF 1	13269.00	1540.10	1545.40	1544.76	1545.90	0.007822	8.05	2433.75	975.63	0.76
Wash1A	647	PF 1	13269.00	1535.00	1542.38	1542.38	1543.20	0.009313	11.82	2294.69	1058.22	0.89
Wash1A	409	PF 1	13269.00	1533.00	1539.21	1538.87	1539.68	0.007822	9.12	2734.49	1368.97	0.79
Wash1A	338	PF 1	13269.00	1532.00	1538.26	1538.26	1539.02	0.010392	11.88	2321.06	1154.99	0.93
Wash1A	318	PF 1	13269.00	1532.00	1536.24	1536.91	1538.45	0.058561	19.63	1354.35	1222.94	2.02
Wash1A	96	PF 1	13269.00	1529.00	1534.57	1534.21	1535.11	0.012005	9.47	2382.49	1408.89	0.93

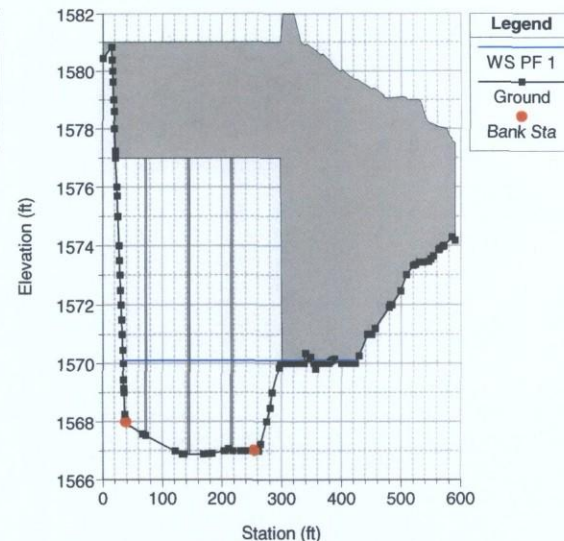
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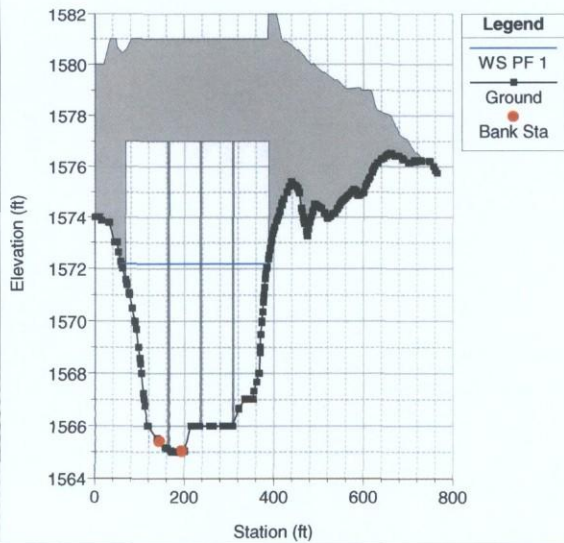
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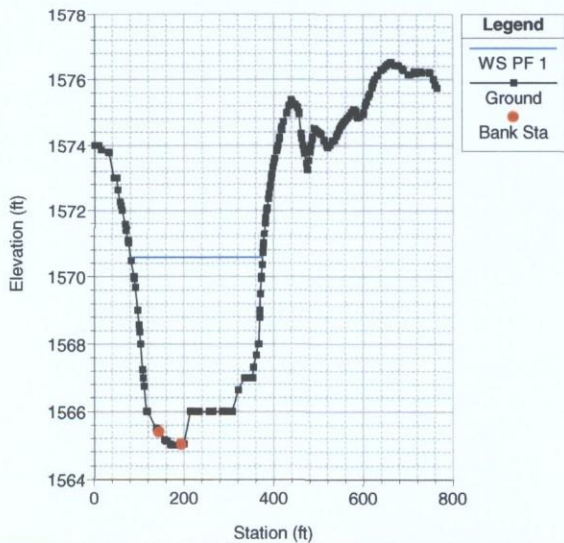
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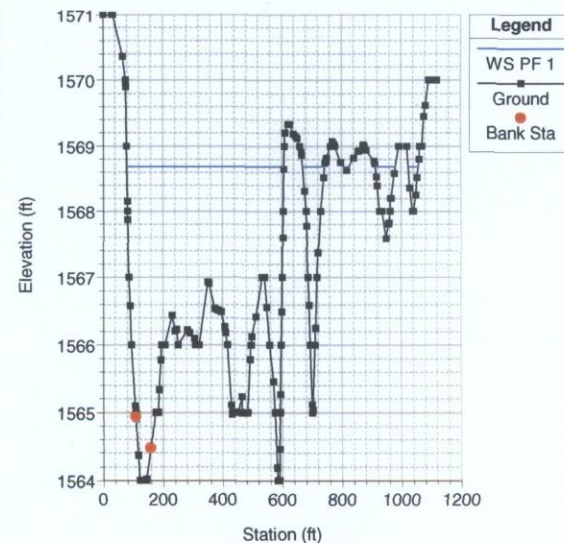
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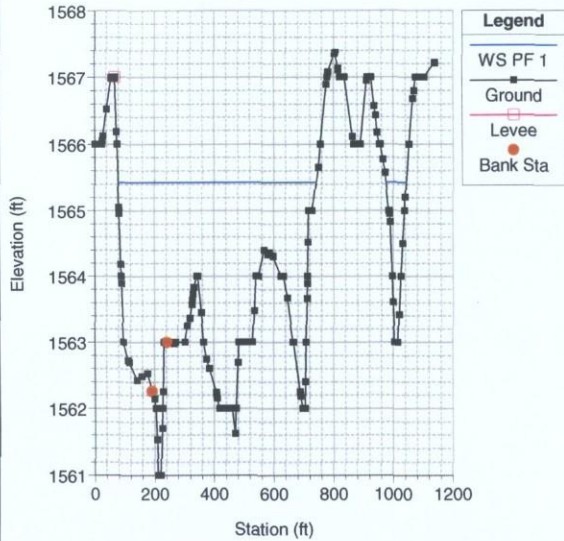
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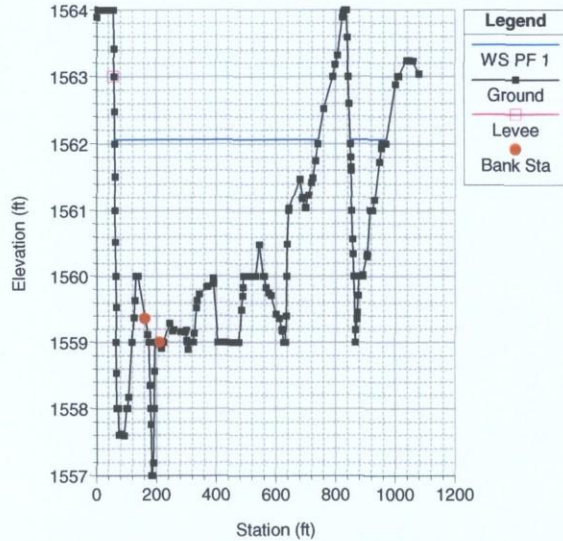
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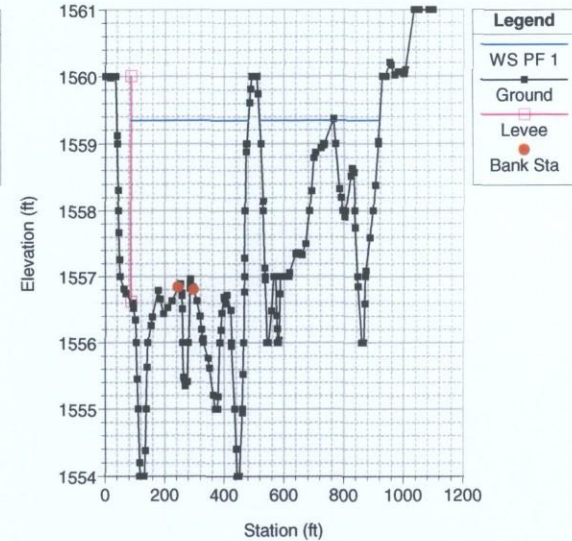
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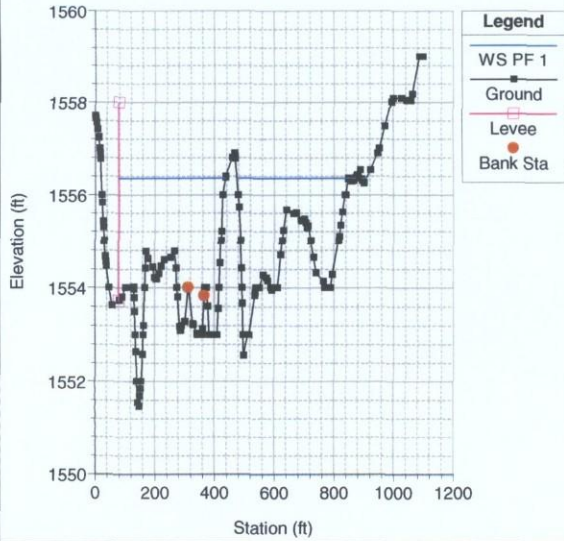
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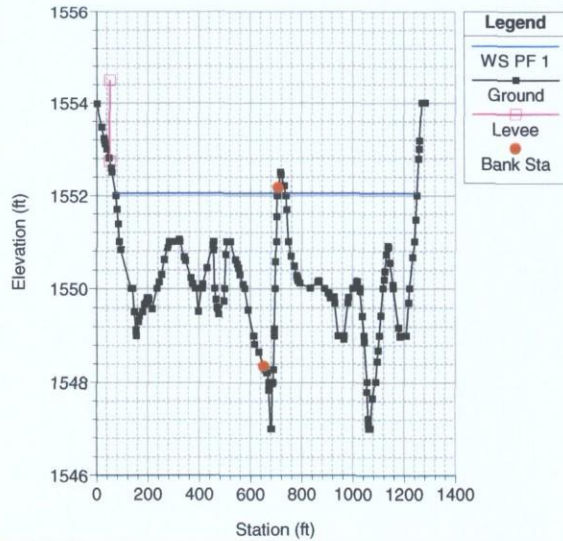
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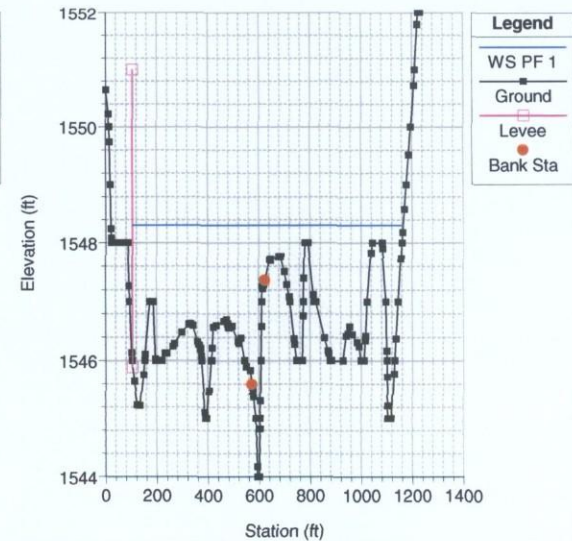
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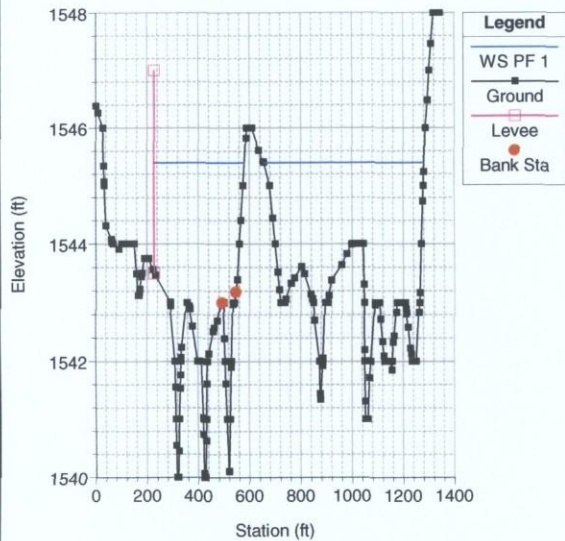
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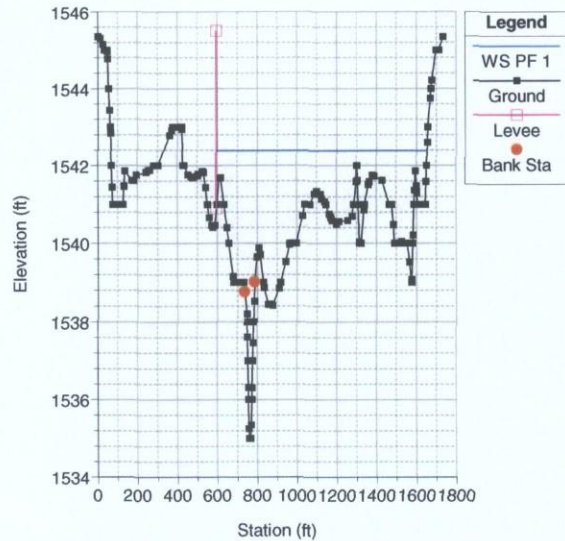
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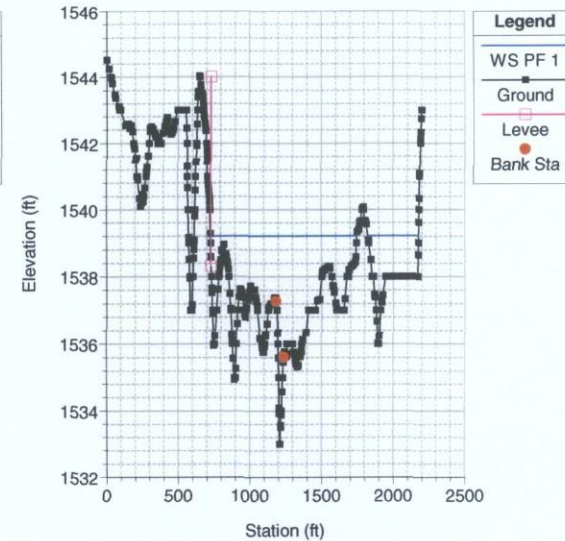
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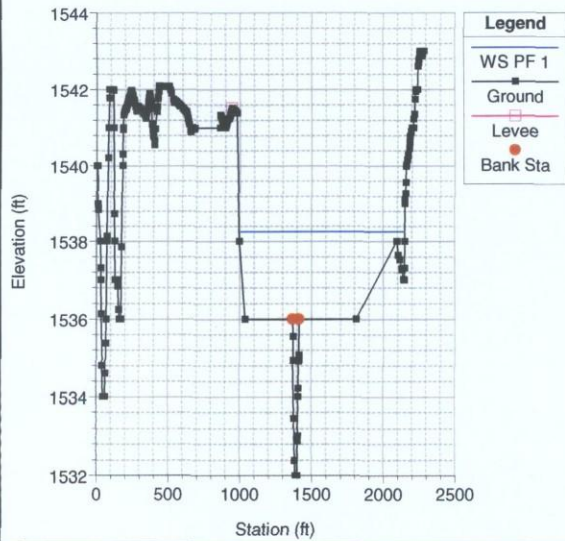
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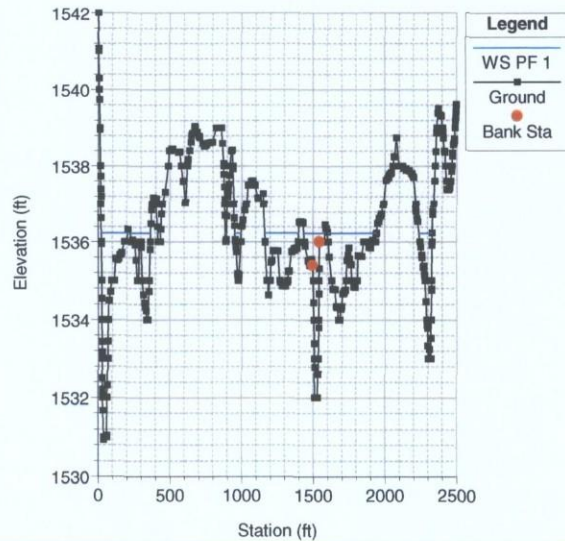
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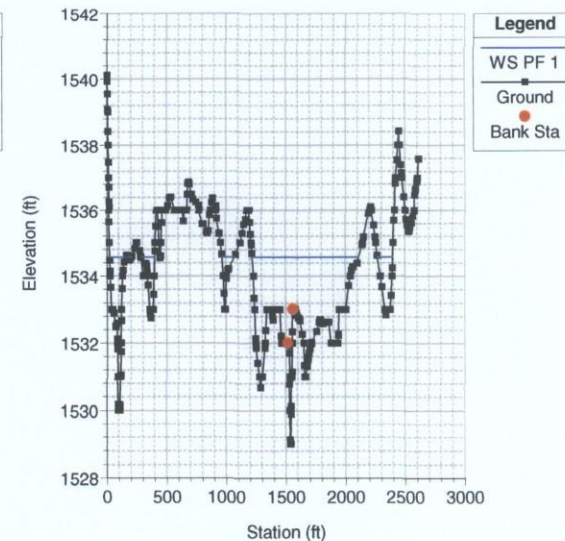
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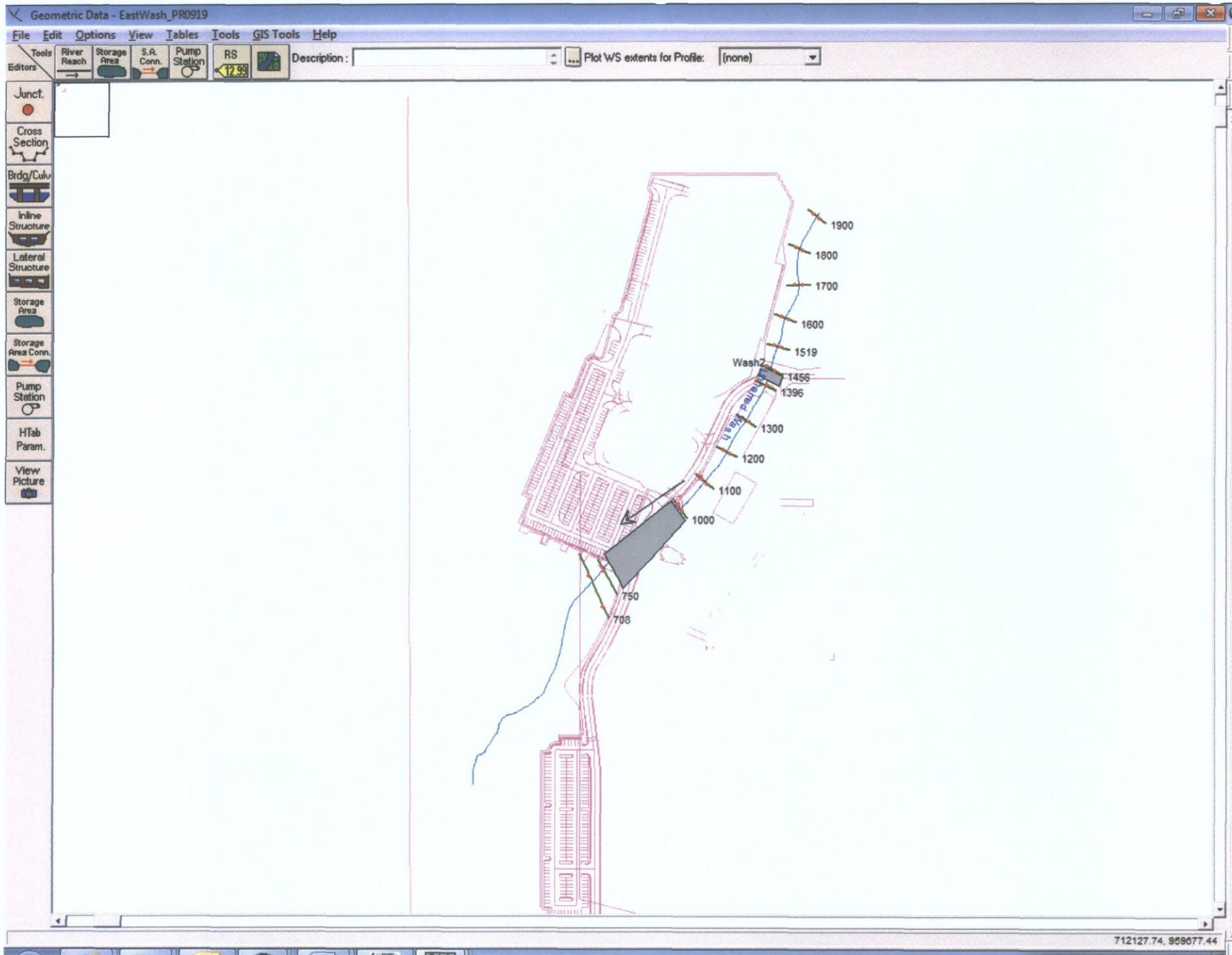


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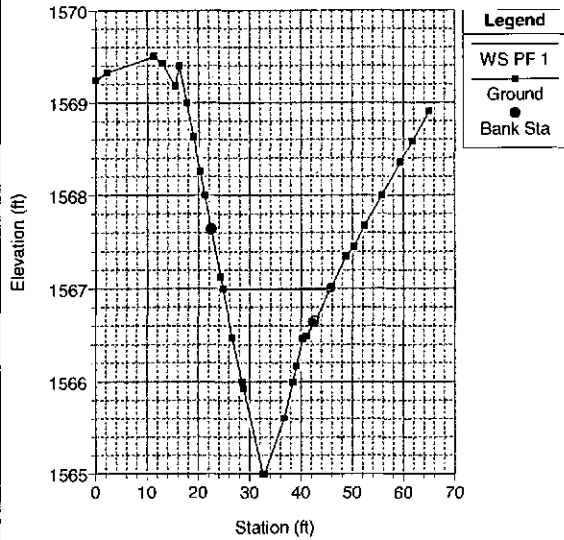
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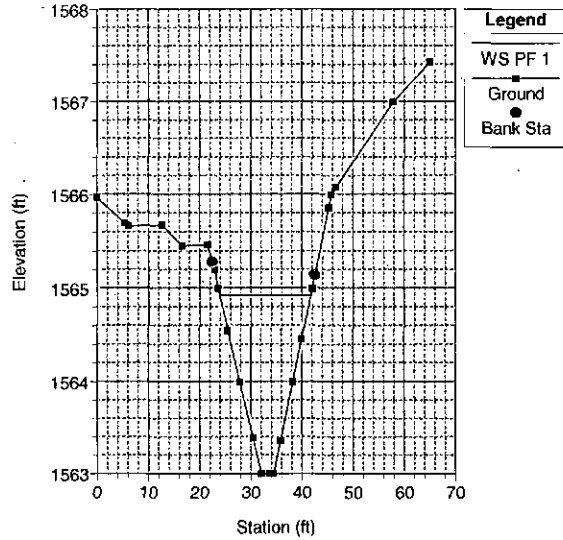


Tributary East wash :- Proposed Conditions HEC-RAS output.

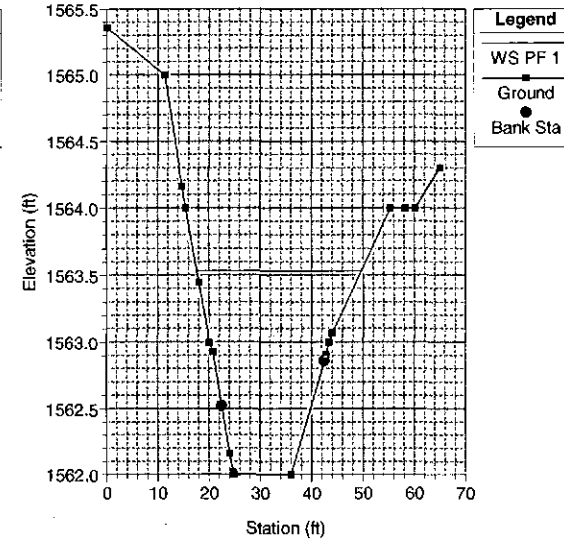
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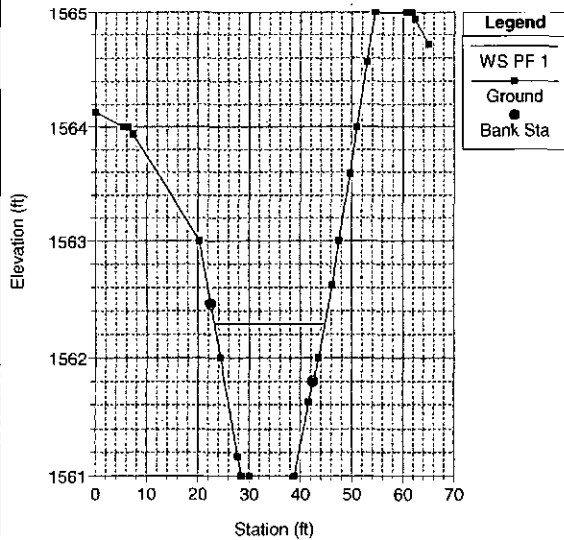
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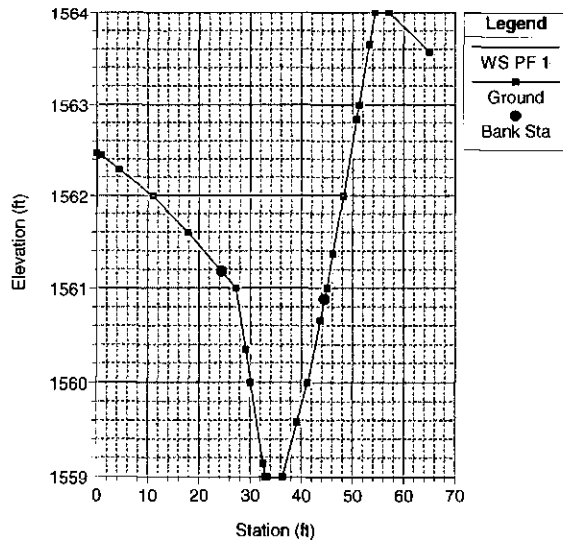
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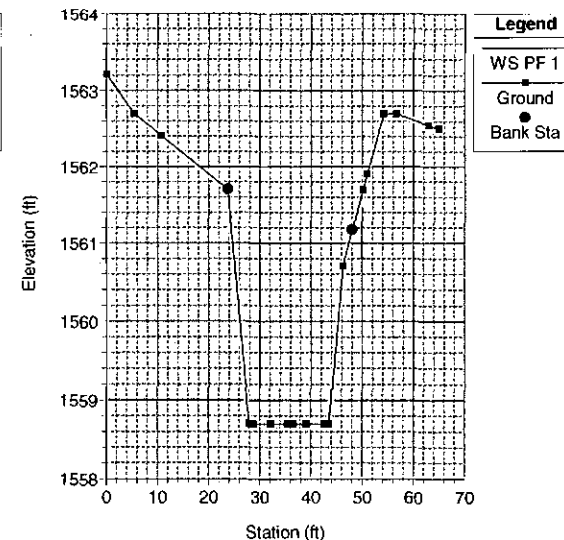
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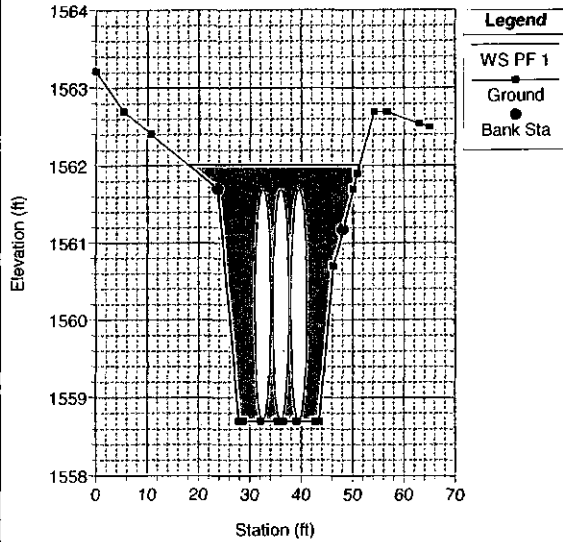
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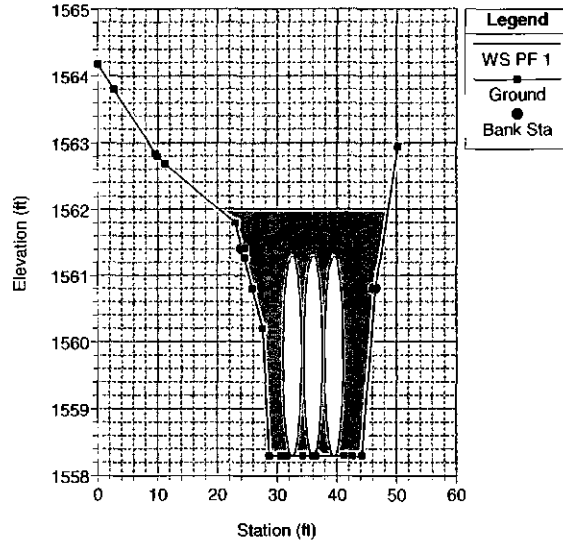
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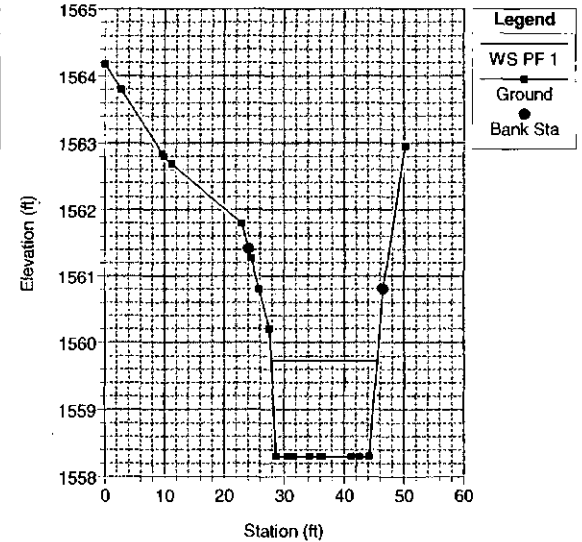
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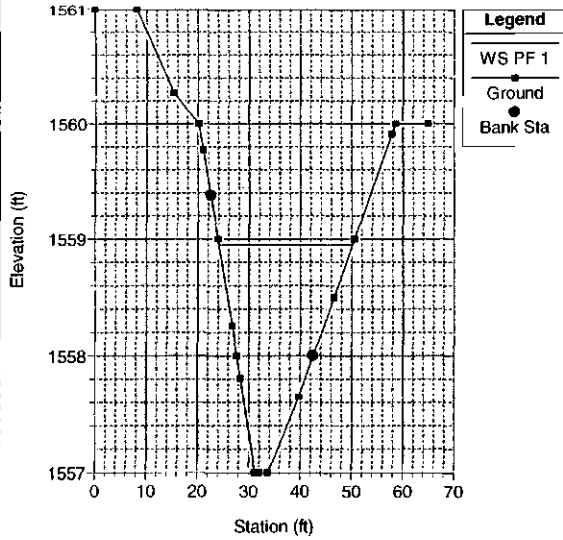
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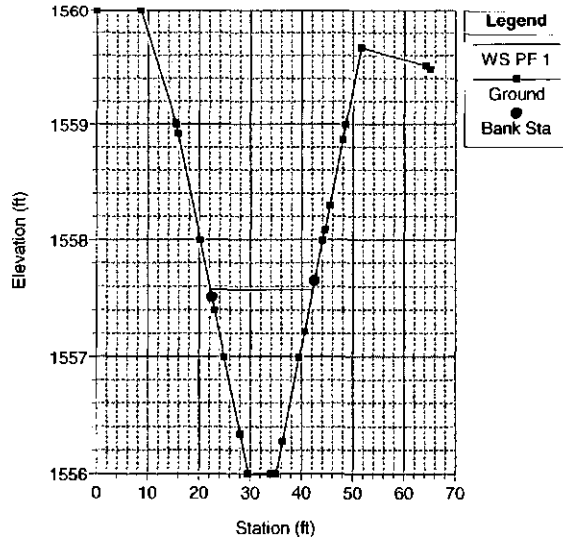
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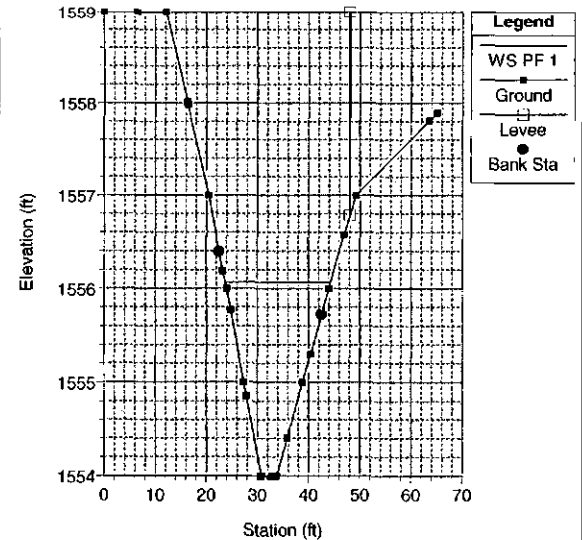
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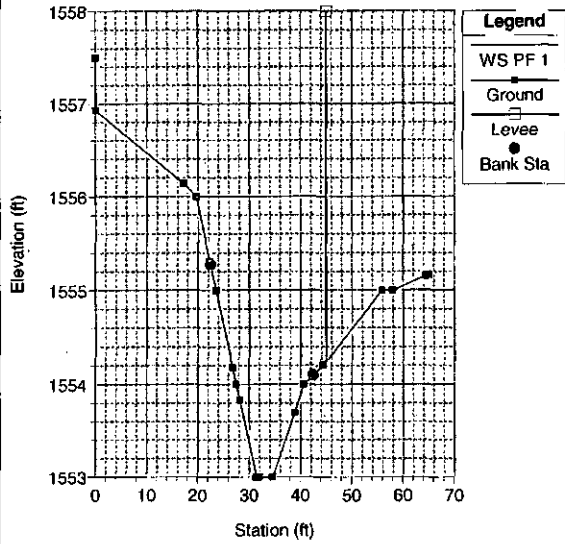
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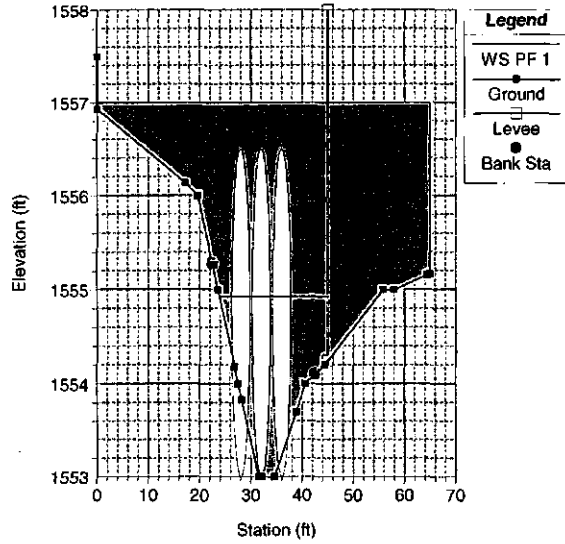
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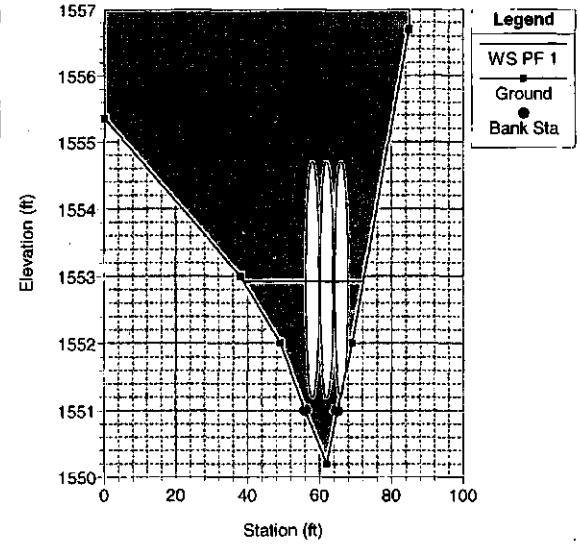
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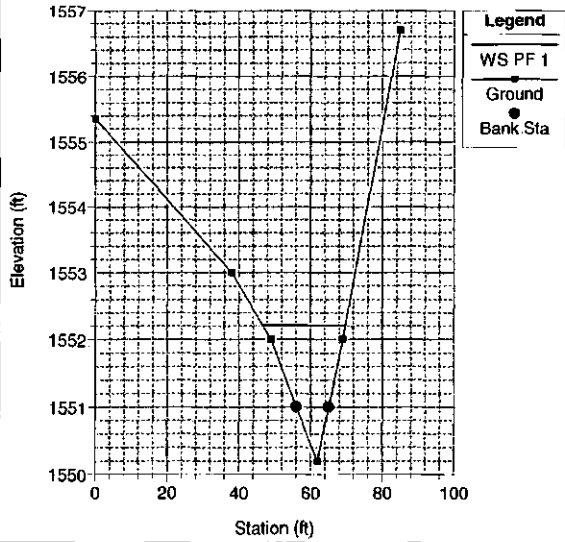
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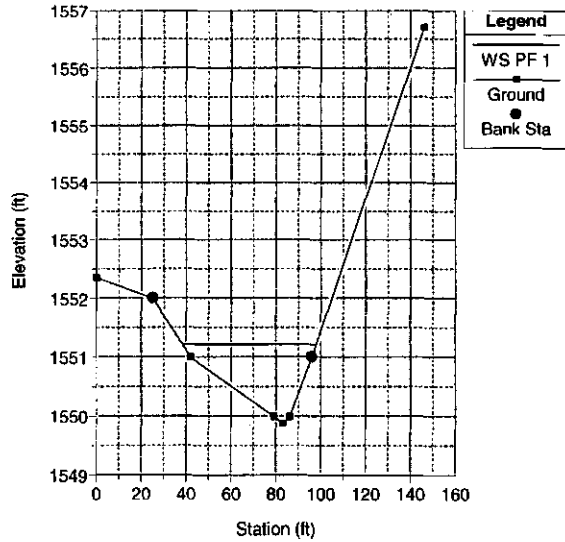
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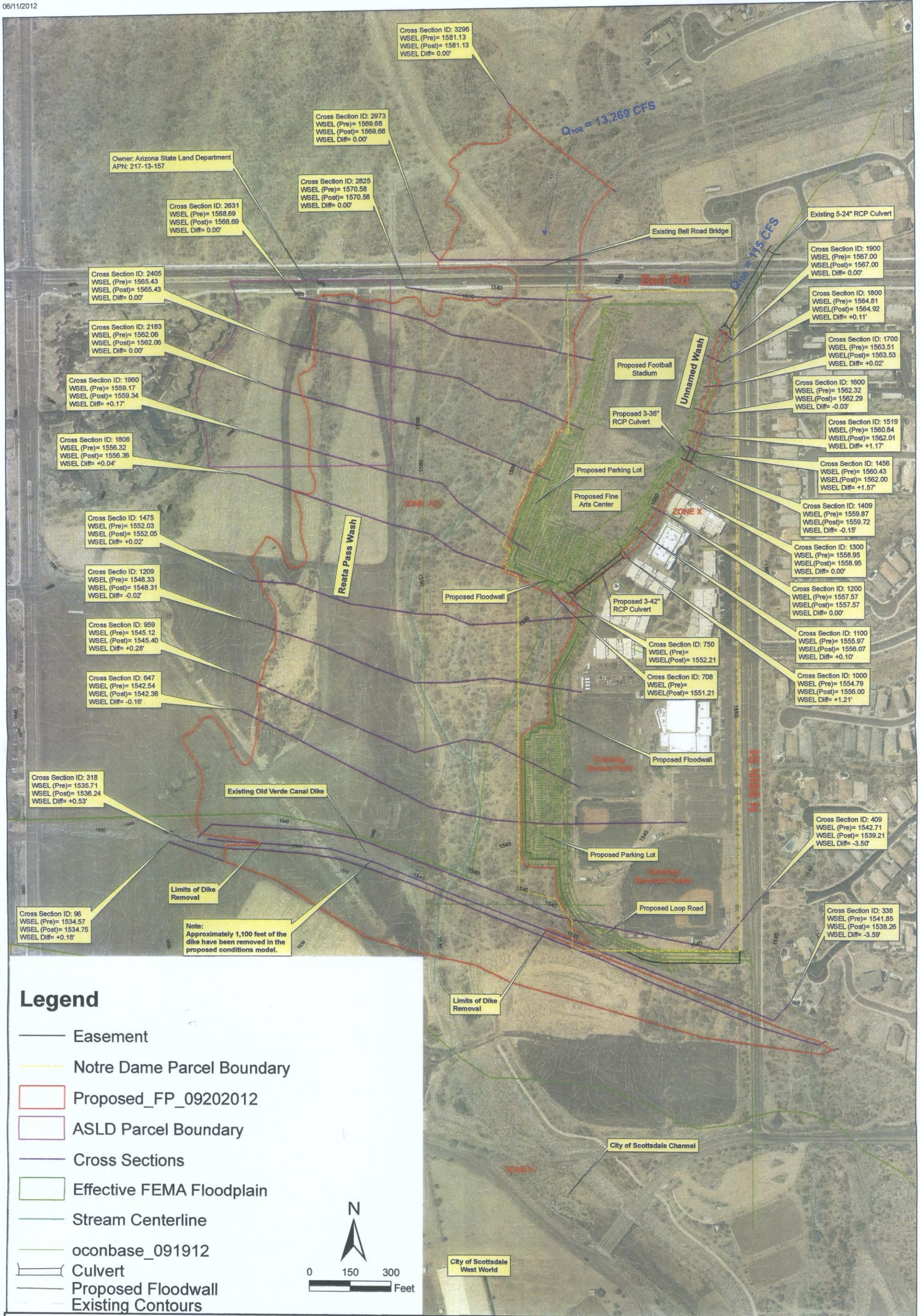


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 River = Unnamed Wash Reach = Wash2 RS = 750



EastWash\_PR0919 Plan: EastWash\_PR0919 9/25/2012  
 River = Unnamed Wash Reach = Wash2 RS = 708





**PROPOSED FLOODPLAIN DELINEATIONS**

**NOTRE DAME**

JOB NO.  
**01-0145702**

4550 NORTH 12TH STREET  
PHOENIX, ARIZONA 85014  
TELEPHONE (602) 264-6831

**COE & VAN LOO**  
PLANNING • ENGINEERING • LANDSCAPE ARCHITECTURE

PLATE 2

**Preliminary Drainage Report  
for  
Notre Dame Preparatory  
High School**

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**Figures**

- Figure 1 Vicinity Map and Location Map  
Figure 2 Flood Insurance Rate Map (FIRM)

**Appendices**

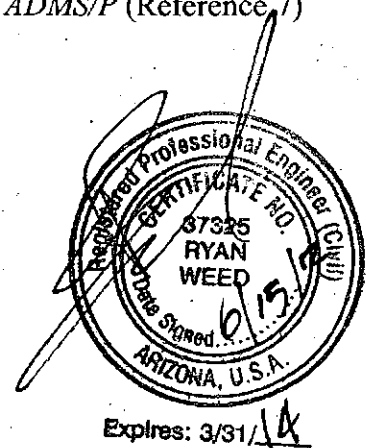
- Appendix A Excerpts from *Master Drainage Report - Notre Dame Preparatory High School, prepared by Argus Consulting, (Reference 6)*  
Appendix B Excerpts from *City of Scottsdale Pinnacle Peak South ADMS/P (Reference 7)*  
Appendix C Existing Conditions Hydraulic Analysis  
Appendix D Proposed Conditions Hydraulic Analysis  
Appendix E Correspondence Between CVL and ASLD  
Appendix F Manning's N-Valve Calculations  
Appendix G Request for Stormwater Storage Waiver  
Appendix H Warning and Disclaimer of Liability Form  
Appendix I Meeting Minutes

**Plates**

- Plate 1 Existing Floodplain Delineations Map  
Plate 2 Proposed Floodplain Delineations Map

**CD**

- Preliminary Drainage Report (PDF) and HEC-RAS Model



## **1.0 INTRODUCTION**

### **1.1. Scope**

Coe & Van Loo, Consultants, Inc. (CVL) has been contracted by Notre Dame Preparatory High School to provide engineering services in support of the proposed expansion of the Notre Dame Preparatory High School (the site). The purpose of this report is to provide hydrologic and hydraulic information of the proposed improvements of the site. In addition, this report addresses off-site runoff, on-site drainage, and detention requirement.

### **1.2. Site Location**

The site is located within the City of Scottsdale, Arizona. The site is bounded on the north by Bell Road, on the south by the Old Verde Canal Dike, on the west by the City of Scottsdale land, and on the east by the 98th Street (see Figure 1). In addition, the site is located in Section 5, Township 3 North, Range 5 East of the Gila and Salt River Meridian.

### **1.3. Proposed Development**

The proposed development will be constructed in three phases. The first phase consists of the construction of three parking areas, loop road, removal of the Old Verde Canal Dike, and the development of engineered graded pad areas. The second and third phases consist of the construction of the football stadium and the fine arts center on the graded pad areas, respectively. The construction sequence for the first, second and third phase are November 2012, January 2013 and January 2014, respectively.

### **1.4. Regulatory Jurisdiction**

This site is located within the City of Scottsdale jurisdiction. The site is designed to meet the City of Scottsdale (COS) Drainage Requirements as stated in the *Design Standards and Policies Manual* (DSPM) (Reference 1). In addition certain aspects of the design are in conformance with Maricopa County's drainage requirements as stated in the *Drainage Policy and Standards Manual* (Reference 2), *Drainage Design Manuals, Volumes 1 and 2: Hydrology and Hydraulics* (Reference 3 and 4).

## 2.0 EXISTING CONDITION AND BENCHMARK INFORMATION

The site is a high school campus which slopes generally southwesterly. The existing runoff that emerges from the school facilities and open areas flow in a southwesterly direction to the onsite retention basins located on the soccer and baseball fields. The Unnamed Wash tributary to the Reata Pass Wash flows southwesterly (Plate 1) and bisects the site. This Unnamed Wash collects stormwater from a 5-24" reinforced concrete pipes (RCP) culvert located under Bell Road. According to the Master Drainage Report for Notre Dame Preparatory High School prepared by Argus Consulting (Reference 6), the estimated 100-Year peak flow entering the Unnamed Wash via the 5-24" RCP culvert is 115 cfs. Refer to Plate 1 for the locations of the existing culverts and the Unnamed and Reata Pass Wash. Also, refer to Appendix A for excerpts from the Master Drainage Report.

CVL conducted a field survey for the site using the City of Scottsdale NAVD-88 datum. The City of Scottsdale benchmark used is:

GPS Point: 8052

E/W Street Alignment: Bell Road

N/S Street Alignment: 104th Street

Description: COS BCF

NAVD'88 Elevation: 1687.94

### **3.0 MANAGEMENT OF OFF-SITE RUNOFF**

#### **3.1. Off-site Hydrology**

The offsite runoff impacting the site are generated north of Bell Road and enter the site through the existing Bell Road bridge on Reata Pass Wash and through the 5-24" RCP culvert under Bell Road on Unnamed Wash.

The site is located within the regional study area of the Pinnacle Peak South Area Drainage Master Study/Plan (ADMS/P) prepared by Tylin International (Reference 7). According to this study, the flows within Reata Pass Wash originate approximately four miles upstream of the site at the mountains range. The ADMS/P Study used a 2-dimensional Model (FLO-2D) to better estimate the peak flows. Based on the FLO-2D model results from the base/worse case scenario, the 100-year, 24-hour runoff within the Reata Pass Wash reaching the site is estimated to be 13,269 cfs (see Appendix B- Exhibit 19, Cross Section 156). According to the Master Drainage Report for Notre Dame Preparatory High School prepared by Argus Consulting (Reference 6), the 100-yr 6-hr peak flow impacting the site is 17,398 cfs. Since the ADMS/P is the most recent updated hydrologic study, CVL decided to use the 100-year, 24-hour runoff of 13,269 cfs for the hydraulic analysis.

#### **3.2. Off-site Runoff Management Plan**

During final engineering, flood walls and/or other structural control measures will be designed to protect the proposed improvements from the off-site runoff. A scour analysis will be performed to design the flood walls. Rip-rap is anticipated to be used for erosion protection at the hydraulic structures. The erosion protection measures used will be designed during final engineering in accordance to the COS design guidelines (Reference 1).

The Old Verde Dike is located south of the site and is impeding the flows within the Reata Pass Wash. To eliminate the flood hazards associated with a possible dike break, a portion of the dike will be removed. The Notre Dame Preparatory High School will remove the dike and fund all the costs associated with its removal based on CVL design. The cost covering all of beneficiary parcels except the Notre Dame parcel will be in exchange for the in-lieu fees associated with the

Notre Dame Storm Water Waiver request. The removal of the Old Verde Canal Dike has been modeled in the proposed conditions hydraulics model. Refer to Plate 2 for the limits of the dike removal, and to Appendix D for the proposed Conditions Hydraulic Analysis.

### 3.3. Hydraulic Analysis

CVL obtained the one (1) foot contour data from Maricopa County and developed the existing cross sections for the Reata Pass Wash and for the Unnamed Wash. The U.S. Army Corps of Engineering HEC-RAS computer program (Reference 8) was used for the hydraulic analysis of the Reata Pass Wash and the Unnamed Wash. Due to the Froud Number reaching critical depth in a few cross-sections, the mixed flow regime was used for both washes. CVL conducted a field reconnaissance to determine the Manning's n-values which resulted in 0.035 and 0.037 for the channel and 0.046 for the left and right overbanks. The proposed site encroachments were modeled into the proposed HEC-RAS model. Refer to Appendix F for the Manning's N-Value calculations. Also, refer to Appendices C and D for the existing and proposed conditions hydraulic analysis, respectively.

The maximum increase in the 100-year water surface elevations on the COS Parcels located west of the site is 0.53-feet, at cross section 318 (Appendix D). Since, the change in water surface elevation is negligible; the existing and proposed floodplain delineations are practically identical. COS is aware of the increase in water surface elevations and they verbally accepted the increase of the water surface elevations during CVL's meeting with COS on April 18, 2012. Meeting minutes are inserted in the Appendix I.

The maximum increase in 100-year water surface elevation on the Arizona State Land Parcel located west of the site is 0.09' at cross section 2183 (Appendix D). Since the change in water surface elevation is negligible; the existing and proposed floodplain delineations are practically identical. CVL submitted a letter to Arizona State Land Department (ASLD) dated March 29, 2012 requesting acceptance of the increased water surface elevations. In a letter from ASLD dated April 17, 2012, the ASLD indicated that they do not have any objections to the proposed water surface increases and the associated proposed floodplain modifications. Refer to Appendix E for a copy of the letters.

The new parking facilities will be either elevated above the adjacent 100-year, 24-hour water surface elevations in Reata Pass Wash or protected by flood walls. Final parking grading will be addressed in the final drainage report. Refer to Section 3.3 for this description.

During final engineering, the drainage easements for washes with flow rates of 50 cfs or more will be dedicated and shown in the final plat.

#### **4.0 REQUEST FOR STORMWATER STORAGE WAIVER**

Based on the 104th and Bell Road Drainage Plan summarized in the Master Drainage Report for Notre Dame Preparatory High School (Reference 6), the time of peak of the Reata Pass Wash is 3.7 hours (Appendix A). In addition the site is located near the West World Regional Retention basin which is located at the downstream end of the Reata Pass Wash. Since the timing of the off-site and on-site peak flows is different and the location of the site near West World Regional Retention basin, the Reata Pass Wash has capacity to handle the additional on-site runoff. The COS indicated during a meeting on March 1, 2012 that direct discharge will be allowed into the Reata Pass Wash. In lieu fees will be assessed based on the square footage of all the proposed new development.

As a result, The COS requires a Request For Stormwater Storage Waiver to allow direct discharge into the Reata Pass Wash. Refer to Appendix G for a copy of the Request For Stormwater Storage Waiver.

## 5.0 FLOOD ZONE INFORMATION

The Maricopa County, Arizona and Incorporated Areas, Flood Insurance Rate Map (FIRM), Community-Panel Number 04013C1265G, Map Revised September 30, 2005 (Reference 5), indicates the subject site falls within Zones AO and Zone X (see Figure 2).

Zone AO within the project area is defined as "Flood depths of 1 foot (usually sheet flow on sloping terrain); average depths determined, with average velocity of 4 feet per second".

Zone X within the project area is defined as "Areas of 500-year flood; areas of 100-year flood with average depths of less than 1 foot or with drainage areas less than 1 square mile; and areas protected by levees from 100-year flood".

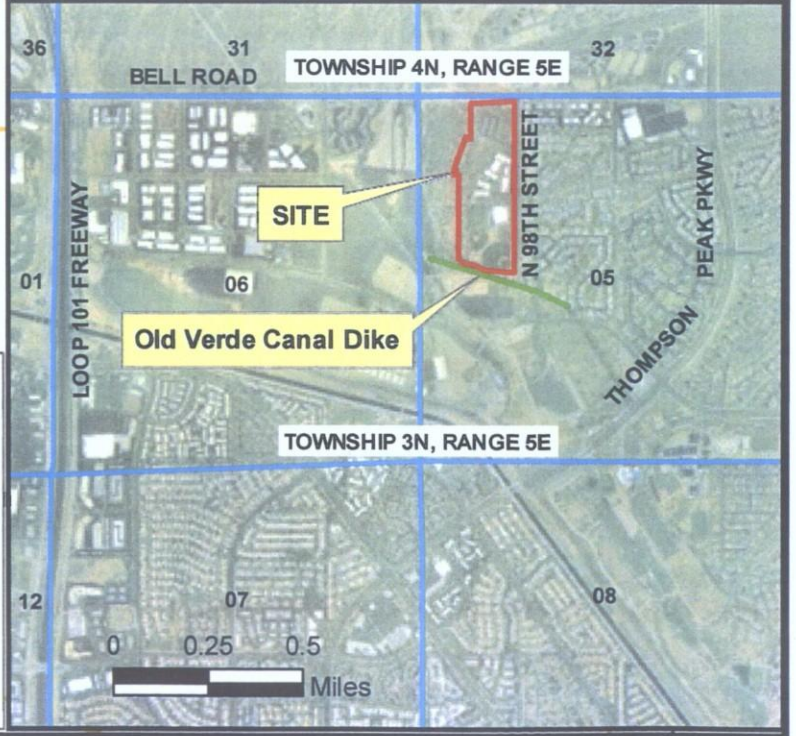
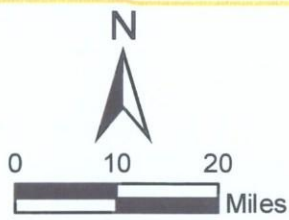
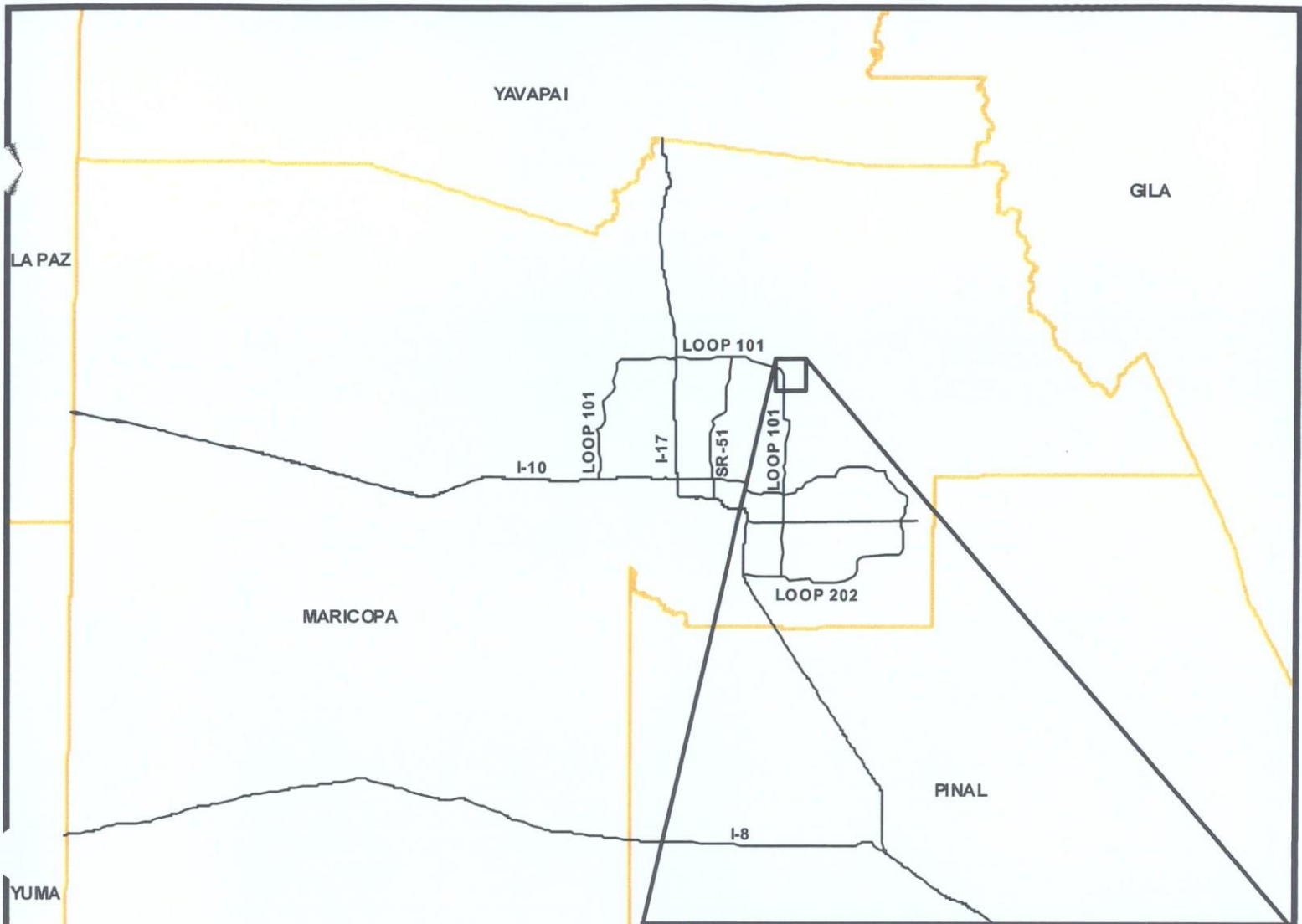
## 6.0 SUMMARY AND CONCLUSIONS

1. Off-site storm water runoff management facilities such as culverts, floodwalls and rip-rap will be designed to safely manage off-site storm water discharges resulting from the 100-year frequency storm event.
2. The loop road will be designed to convey 10-year peak flow maximum water surface elevation below the top of curb, and 100-year street peak flows will be less than 100 cfs with a maximum velocity of 10 fps, a maximum depth of 8-inches and contained within the right-of-way.
3. The finish floor elevations of the proposed Fine Arts Center will be designed a minimum of 18 inches above the 100-year water surface in adjacent streets and drainage paths and a minimum of 14 inches above the low top of curb of the lot.
4. The design of culverts, flood walls and riprap will be based on generally accepted engineering practices and in accordance with the City of Scottsdale and Maricopa County requirements.
5. A Request for Stormwater Storage Waiver for the site is submitted based on the proximity of the site to the West World Regional Retention basin and the difference in timing of the off-site and on-site runoff.

## REFERENCES

1. City of Scottsdale, *Design Standards & Policies Manual*, January 2010.
2. Flood Control District of Maricopa County, *Drainage Policy and Standards Manual*, January 4, 2007.
3. Flood Control District of Maricopa County, *Drainage Design Manual Volume 1, Hydrology*, February 10, 2011.
4. Flood Control District of Maricopa County, *Drainage Design Manual Volume 2, Hydraulics*, January 28, 1996.
5. Federal Emergency Management Agency (FEMA), *Flood Insurance Rate Map (FIRM), Maricopa County, Arizona, and Incorporated Areas, Community Panel Number 04013C1265G*, Map Revised September 30, 2005.
6. Argus Consulting, *Master Drainage Report - Notre Dame Preparatory High School*, March 2010.
7. Tylin International, *City of Scottsdale Pinnacle Peak South Area Drainage Master Study, Hydrology and Hydraulics Report*, April 26, 2012.
8. U.S. Army Corps of Engineers, *HEC-RAS Version 4.1.0*, January, 2010.
9. Phillips, J.V., and Tadayon, S., 2006, Selection of Manning's Roughness Coefficient for Natural and Constructed Vegetated and Non-Vegetated Channels, and Vegetation Maintenance Plan Guidelines for Vegetated Channels in Central Arizona: U.S. Geological Survey, Scientific Investigations Report 2006-5108, 41 p.

## **FIGURES**



**LEGEND:**

- SITE BOUNDARY
- COUNTY BOUNDARY
- SECTION BOUNDARY
- FREEWAY
- 05 SECTION ID
- OLD VERDE CANAL DIKE

**VICINITY & LOCATION MAP**

**NOTRE DAME**

JOB NO.

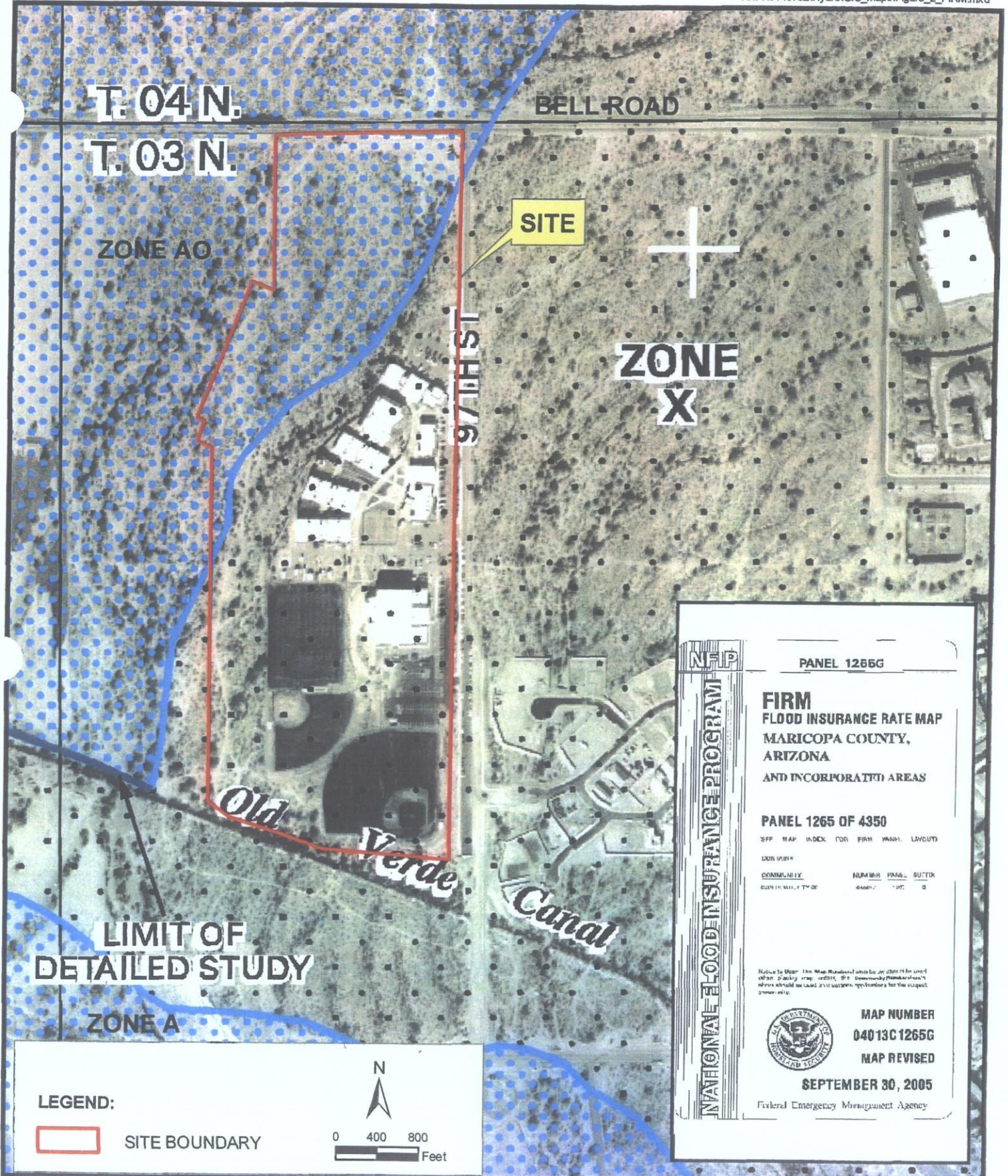
01-0145702

4550 NORTH 12TH STREET  
 PHOENIX, ARIZONA 85014  
 TELEPHONE (602) 264-6831

**COE & VAN LOO**

PLANNING • ENGINEERING • LANDSCAPE ARCHITECTURE

FIGURE 1



**FLOOD INSURANCE RATE MAP**

**NOTRE DAME**

JOB NO.  
01-0145702

4550 NORTH 12TH STREET  
 PHOENIX, ARIZONA 85014  
 TELEPHONE (602) 264-6831

**COE & VAN LOO**  
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**FIGURE 2**

## **APPENDICES**

## **APPENDIX A**

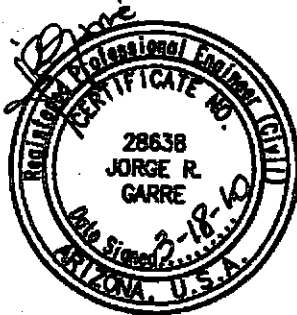
**Excerpts from *Master Drainage Report - Notre Dame Preparatory High School, Prepared by Argus Consulting (Reference 6)***

# Master Drainage Report

## Notre Dame Preparatory

### High School

499-PA-2009



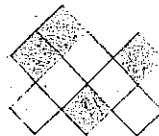
EXPIRES 12/31/12

prepared for:

#### Notre Dame Preparatory High School

9701 E. Bell Road  
Scottsdale, Arizona 85260  
480 634 8200

prepared by:



**ARGUS CONSULTING**  
A CIVIL ENGINEERING COMPANY, PC

10115 E. Bell Road, Suite 107 - #104  
Scottsdale, Arizona 85260  
480 596 1131

March 2010

3891-09

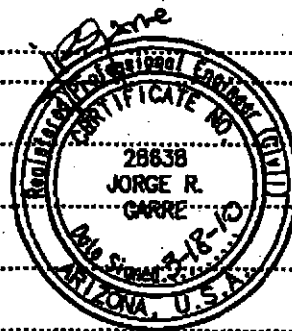
JRG

3/10

Notre Dame Preparatory High School  
Master Drainage Report

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EXPIRES 12/31/12

## LIST OF APPENDICES

Appendix A	Hydrologic Model
Appendix B	HEC-RAS Model (Water Surface Profiles)
Appendix C	Hydraulic Performance for Ex. Culverts on Bell Road

## LIST OF EXHIBITS

Exhibit A	Vicinity Map
Exhibit B	Flood Insurance Rate Map
Exhibit C	Wash Corridors
Exhibit D	Proposed Site Plan
Exhibit E	Conceptual Phasing Plan
Exhibit F	Old Verde Canal Dike

## LIST OF PLATES

PLATE A	Existing Conditions Floodplain
PLATE B	Proposed Conditions Floodplain

```

*****
* FLOOD HYDROGRAPH PACKAGE (HEC-1) *
* JUN 1998 *
* VERSION 4.1 *
* RUN DATE 03JUL06 TIME 09:18:01 *
*****

```

```

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

```

100-7-16-4r

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

```

THIS PROGRAM REPLACES ALL PREVIOUS VERSIONS OF HEC-1 KNOWN AS HEC1 (JAN 73), HEC1GS, HEC1DB, AND HEC1KW. THE DEFINITIONS OF VARIABLES -RTIMP- AND -RTIOR- HAVE CHANGED FROM THOSE USED WITH THE 1973-STYLE INPUT STRUCTURE. THE DEFINITION OF -AMSKK- ON RM-CARD WAS CHANGED WITH REVISIONS DATED 28 SEP 81. THIS IS THE FORTRAN77 VERSION NEW OPTIONS: DAMBREAK OUTFLOW SUBMERGENCE, SINGLE EVENT DAMAGE CALCULATION, DSS:WRITE STAGE FREQUENCY, DSS:READ TIME SERIES AT DESIRED CALCULATION INTERVAL LOSS RATE:GREEN AND AMPT INFILTRATION KINEMATIC WAVE: NEW FINITE DIFFERENCE ALGORITHM

```

LINE ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10
1 ID PROJECT NAME: 104TH & BELL JOB#: 125-02
2 ID PREPARED FOR: TOLL BROTHERS
3 ID PREPARED BY : ARGUS CONSULTING
4 ID
5 ID MODEL COND. : PROPOSED CONDITIONS HYDROLOGY
6 ID STORM EVENT : 100-YR / 6-HR
7 ID FILE NAME : FU100.DAT
8 ID
9 ID
10 ID
11 ID NOTES FROM PREVIOUS MODELERS:
12 ID
13 ID APPROXIMATE HEC-1 MODEL FOR DC RANCH ANALYSIS.
14 ID BASED ON ORIGINAL ULBW CURVE NUMBERS,
15 ID WITH AMC 3 ADJUSTMENT FOR GOLF COURSE AREAS.
16 ID
17 ID MODEL RPBWDC1.6I -- BASE MODEL WAS RPBW1.6I
18 ID
19 ID 100-YEAR 6-HOUR HYPOTHETICAL STORM
20 ID RAINFALL FROM NOAA ATLAS, AREAL REDUCTION FACTOR PER JD RECORDS
21 ID
22 ID RAINFALL & CHANNEL ROUTING OPERATIONS HAVE BEEN MODIFIED IN ACCORDANCE
23 ID WITH SCENARIO 13 FROM SENSITIVITY ANALYSIS FOR REATA PASS HYDROLOGY
24 ID SUB 49 HAS BEEN PLACED DOWNSTREAM OF CP 51 (3/12/90).
25 ID
26 ID THOMPSON PEAK PARKWAY ALIGNMENT HAS BEEN ADJUSTED PER DMB PLANS
27 ID
28 ID 100% OF FLOW FROM THE REATA PASS APEX IS DIVERTED SOUTH TO CAP DIKE 4
29 ID
30 ID PREPARED BY ROBERT L. WARD, P.E., CONSULTING ENGINEER
31 ID FOR WOOD-PATEL & ASSOCIATES, INC.
32 ID REVISED 5/4/95: EXISTING CONDITIONS
33 ID
34 ID PLANNING UNITS III, V & VI
35 ID ADDITIONAL SUB-BASIN REFINEMENT
36 ID REVISED 3/25/99: EXISTING CONDITIONS
37 ID WITH THE REATA PASS DIVERTED SOUTH TO CAP DIKE 4
38 ID
39 ID INCLUDE SPLIT FLOW FROM S. BEARDSLEY TO N. BEARDSLEY WASH
40 ID SPLIT OCCURS AT BASIN 2130 AND IS RETRIEVED AT BASIN 2065A
41 ID REVISED 4/19/99: EXISTING CONDITIONS WITH REVISED DRAINAGE AREAS
42 ID FOR BASINS 2135, 2130, 2065 & 2080B
43 ID FILE: DCX100A.DAT
44 ID
45 ID 100-YEAR EXISTING HEC-1 MODEL
46 ID
47 ID PREPARED BY WOOD-PATEL & ASSOCIATES, INC. BY:JD
48 ID DATE: 5/10/01
49 ID NEW MODEL BASED ON 1' CONTOURS FILE:DCX100.DAT
50 ID BASINS REVISED INCLUDE: 2070, 2130
51 ID
52 ID
53 ID NEW MODEL BASED ON NON-REATA PASS DESERT GREENBELT CONDITION
54 ID AFTER THOMPSON PEAK PARKWAY
55 ID POST DEVELOPMENT DISCHARGE MUST NOT INCREASE FROM THE N.BEARDSLEY

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56 ID INTO THE REATA PASS WASH FILE:DCEX100.DAT  
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 58 ID FUTURE MODEL BASED ON DEVELOPED CONDITIONS  
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 60 ID IMPERVIOUS AREAS FOR DESIGN CONDITIONS  
 61 ID FILE DCFUT100.DAT  
 62 ID 5/22/01  
 63 ID PREPARED BY WOOD-PATEL & ASSOCIATES, INC. BY:JD  
 64 ID  
 65 ID NEW FILE FOR CULVERT MODELING ON UPPER CANYON SIX  
 66 ID WINDGATE AND THOMPSON PEAK PARKWAY  
 67 ID FILE: DCFU100Z.DAT 6/11/01 BY: JCD  
 68 ID \*\*\*\*\*  
 69 ID

\*DIAGRAM  
 70 IT 2 01MAY99 0 1000  
 71 IO 5 0  
 72 JD .0001  
 73 PH .74 1.46 2.47 2.78 2.99 3.39  
 74 JD .001  
 75 JD .01  
 76 JD .1  
 77 JD .5  
 78 JD 1  
 79 JD 5  
 80 JD 25  
 \*\*\*\*\*  
 \* START THE S. BEARDLSEY WASH AND TRIBUTARIES  
 \*\*\*\*\*

81 KK 2070 SUB  
 82 KM RUNOFF FROM SUB 2070  
 83 BA 1.393  
 84 LS 84  
 85 UK 400 .5174 .3 100  
 86 RK 1750 .2962 .055 .048 TRAP 5 3  
 87 RK 3500 .1236 .055 .483 TRAP 10 3  
 88 RK 3400 .0882 .050 TRAP 30 10  
 \*

89 KK R2070 CP  
 90 KM ROUTE SUB 2070 THROUGH SUB 2130  
 91 RS 1 FLOW -1  
 92 RC .055 .050 .055 3433 .051  
 93 RX 0 1 2 22 42 62 63 64  
 94 RY 10 10 10 0 0 10 10 10  
 \*

95 KK 2130 SUB  
 96 KM RUNOFF FROM SUB 2130  
 97 BA .313  
 98 LS 83.9 1.7  
 99 UK 267 .3126 .2 100  
 100 RK 9000 .0941 .045 TRAP 30 3  
 \*

HEC-1 INPUT

PAGE 3

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

101 KK C2130 CP  
 102 KM COMBINE SUB 2130 & CP 2131  
 103 HC 2  
 \*

104 KK 2130S  
 105 KM Split Flow From S. Beardsley to N. Beardsley  
 106 DT SPLIT  
 107 DI 0 1000 2000 3000 3500 4083 4500 5000  
 108 DQ 0 0 120 470 630 710 1060 1400  
 \*

109 KK R2130 CP  
 110 KM ROUTE CP 2130 THROUGH SUB 2135 AND 2136  
 111 RS 2 FLOW -1  
 112 RC .055 .045 .055 4800 .0444  
 113 RX 0 1 2 22 62 82 83 84  
 114 RY 10 10 10 0 0 10 10 10  
 \*

115 KK 2136 SUB  
 116 KM RUNOFF FROM SUB 2136 23% GOLF - GOOD COND. B SOILS=CN 61  
 117 BA .0796  
 118 LS 80.3 2 80.3 2  
 119 UK 400 .4000 .3 50  
 120 UK 400 .15 .15 50  
 121 RK 1190 .043 .04 TRAP 20 2  
 \*

122 KK R2136 CP  
 123 KM ROUTE CP 2130 THROUGH SUB 2135  
 124 RS 5 FLOW -1  
 125 RC .055 .045 .055 3070 .045  
 126 RX 0 1 2 22 102 122 123 124  
 127 RY 10 10 10 0 0 10 10 10

128 KK 2140B SUB  
 129 KM RUNOFF FROM SUB 2140B 20units/15acres =25% imp.  
 130 BA .0241  
 131 LS 74 25  
 132 UK 20 .05 .07 100  
 133 RK 1600 .0313 .016 TRAP 20 2  
 \*

134 KK R2140 CP  
 135 KM ROUTE SUB 2140B TO CP C2140  
 136 RS 1 FLOW -1  
 137 RC .055 .045 .055 1290 .0341  
 138 RX 0 1 2 22 42 62 63 64  
 139 RY 10 10 10 0 0 10 10 10  
 \*

HEC-1 INPUT

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

140 KK 2080C SUB  
 141 KM RUNOFF FROM SUB 2080C 9 acres of commercial  
 142 BA .0159  
 143 LS 72.6 85  
 144 UK 30 .05 .05 100  
 145 RK 1300 .03 .016 TRAP 20 3  
 \*

146 KK 2135 SUB  
 147 KM RUNOFF FROM SUB 2135 33units/17.5acres =28% imp.  
 148 BA .0804  
 149 LS 74 9.5  
 150 UK 100 .08 .3 100  
 151 RK 3070 .045 .04 TRAP 60 3  
 \*

152 KK C2140 CP  
 153 KM COMBINE SUB 2135 & R2130 & SUB 2136 & 2140B & 2080C  
 154 HC 5 1.42  
 \*

155 KK DET  
 156 KM DETENTION AT HORSESHOE CANYON DRIVE 2-20'x11' & 36'x11' Con Arches  
 157 RS 1 FLOW 0  
 158 SA 0 .01 .017 .038 .075 .131 .225 .326  
 159 SE 1780 1781 1782 1783 1784 1785 1786 1787  
 160 SQ 0 200 550 1000 1500 2100 2750 3500  
 \*

161 KK R2141 CP  
 162 KM ROUTE CP 2140 THROUGH SUB 2140A  
 163 RS 1 FLOW -1  
 164 RC .055 .045 .055 2692 .035  
 165 RX 0 1 2 22 42 62 63 64  
 166 RY 10 10 10 0 0 10 10 10  
 \*

167 KK 3011 SUB  
 168 KM TOWN CENTER COMMERCIAL AREAS  
 169 BA .0783  
 170 LS 74.6 85  
 171 UK 20 .05 .05 100  
 172 RK 1500 .03 .016 TRAP 20 2  
 \*

173 KK 2140A SUB  
 174 KM RUNOFF FROM SUB 2140A  
 175 KM NATURAL WASH WITH HIGH URBAN DEVELOPMENT  
 176 BA .0566  
 177 LS 74.6 80  
 178 UK 20 .05 .05 100  
 179 RK 2850 .033 .045 TRAP 100 2  
 \*

HEC-1 INPUT

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

180 KK C2140A CP  
 181 KM COMBINE SUB 2140A & R2140  
 182 HC 3  
 \*

\* \*\*\*\*\*  
 \* START TRIBUTARIES TO THE S. BEARDSLEY WASH  
 \* \*\*\*\*\*  
 \*

183 KK 2150C4 SUB  
 184 KM RUNOFF FROM SUB 2150C4  
 185 KM 1 OF 6 SUB-BASINS FOR 2150  
 186 BA .0281  
 187 LS 86 8  
 188 UK 300 .37 .25 100  
 189 RK 400 .37 .045 .016 TRAP 8 3  
 \*

190 RK 575 .139 .045 TRAP 10 3  
 \*  
 191 KK R2150E ROUTE  
 192 KM ROUTE 2150C4 TO C2150H  
 193 RK 548 .073 .045 TRAP 10 3  
 \*

194 KK 2150C3 SUB  
 195 KM RUNOFF FROM SUB 2150C3  
 196 KM 2 OF 6 SUB-BASINS FOR 2150  
 197 BA .0359  
 198 LS 86 15.1  
 199 UK 400 .506 .25 100  
 200 RK 520 .287 .045 .0128 TRAP 8 3  
 201 RK 712 .126 .045 TRAP 10 3  
 \*

202 KK R2150F ROUTE  
 203 KM ROUTE 2150C3 TO C2150H  
 204 RK 860 .058 .045 TRAP 10 3  
 \*

205 KK 2150C2 SUB  
 206 KM RUNOFF FROM SUB 2150C2  
 207 KM 3 OF 6 SUB-BASINS FOR 2150  
 208 BA .0480  
 209 LS 86 6.6  
 210 UK 155 .519 .25 100  
 211 RK 864 .359 .045 .038 TRAP 8 3  
 212 RK 405 .148 .045 TRAP 10 3  
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HEC-1 INPUT

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

213 KK R2150G ROUTE  
 214 KM ROUTE 2150C2 TO 2150C1  
 215 RK 1500 .06 .045 TRAP 10 3  
 \*

216 KK C2150T CP  
 217 KM COMBINE 2150C4, 2150C3, 2150C2  
 218 HC 3  
 \*

219 KK 2150C1 SUB  
 220 KM RUNOFF FROM SUB 2150C1  
 221 KM 4 OF 6 SUB-BASINS FOR 2150  
 222 BA .0889  
 223 LS 86 15.7  
 224 UK 400 .370 .25 100  
 225 RK 660 .182 .045 .024 TRAP 8 3  
 226 RK 1454 .055 .045 TRAP 10 3  
 \*

227 KK 2150B SUB  
 228 KM RUNOFF FROM SUB 2150B  
 229 KM 5 OF 6 SUB-BASINS FOR 2150  
 230 BA .0317  
 231 LS 86 9.3  
 232 UK 400 .490 .25 100  
 233 RK 1150 .170 .045 TRAP 8 3  
 \*

234 KK C2150H CP  
 235 KM COMBINE 2150C4, 2150C3, 2150C2 & 2150C1 & 2150B @ C2150H  
 236 HC 3  
 \*

237 KK R2150 ROUTE  
 238 KM ROUTE C2150H TO 2150A  
 239 RK 5230 .027 .045 TRAP 20 10  
 \*

240 KK 3210 SUB 7.5 ACRES GOLF @ 39% CN=61  
 241 KM RUNOFF FROM SUB 3210 2/acres @ 9 acres =28% imp.  
 242 BA .0297  
 243 LS 76.3 13.3  
 244 UK 400 .17 .25 100  
 245 RK 1500 .05 .045 TRAP 10 3  
 \*

246 KK R3210 ROUTE  
 247 KM ROUTE 3110 TO CP C2150A  
 248 RK 5230 .027 .045 TRAP 20 10  
 \*

HEC-1 INPUT

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

249 KK 3230 SUB 11.2 ACRES OF GOLF @ 20% CN=61  
 250 KM RUNOFF FROM SUB 3230  
 251 BA .0876

252	LS		81	9					
253	UK	400	.490	.25	100				
254	RK	2420	.135	.045		TRAP	10	3	
	*								
255	KK	R3230	ROUTE						
256	KM		ROUTE C2150H TO 2150A						
257	RK	5230	.027	.045		TRAP	20	10	
	*								
258	KK	2150A	SUB						
259	KM		RUNOFF FROM SUB 2150A						34.5 acres of golf @19% CN=61
260	KM		6 OF 6 SUB-BASINS FOR 2150						lunit/acre for 77 acres =20% imp.
261	KM		INCLUDES SUB 3205						2unit/acre for 33 acres=28% imp
262	BA	.345							
263	LS		74.4	13.3					
264	UK	400	.460	.25	100				
265	RK	1115	.104	.045	.040	TRAP	8	3	
266	RK	4090	.029	.045		TRAP	20	10	
	*								

267	KK	C2150A	CP						
268	KM		COMBINE SUB 2150A AND R2150 & 3210 & 3230						
269	HC	4							
	*								

270	KK	C2151	CP						
271	KM		COMBINE C2140A & C2150A						
272	HC	2							
	*								

\*\*\*\*\*  
 \* THIS IS THE TOTAL FLOW LEAVING DC RANCH IN THE S. BEARDLSEY WASH  
 \* \*\*\*\*\*

273	KK	RC2151							
274	KM		ROUTE CP2151 FLOWS TO CONCENTRATION POINT TPPI						
275	RK	800	.030	.035		TRAP	30	3	
	*								

276	KK	SUB O							
277	KM		RUNOFF FROM SUB O (ON-SITE)						
278	BA	.0142							
279	LS		78	15					
280	UK	155	.007	.15	100				
281	RK	300	.020	.020		TRAP	33	0	
	*								

HEC-1 INPUT

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

282	KK	OFF4							
283	KM		OFFSITE FLOWS FROM MCDOWELL MTNS PRESERVE						
284	BA	.0672							
285	LS		80						
286	UK	400	0.050	0.15	100				
287	RK	1000	0.045	0.045		TRAP	5	5	
	*								

288	KK	ROFF4							
289	KM		ROUTE ROFF4 FLOWS TO CONCENTRATION POINT TPPI						
290	RK	2400	.025	.035		TRAP	5	3	
291	RK	300	.030	.045		TRAP	30	3	
	*								

292	KK	SUB P							
293	KM		RUNOFF FROM SUB P (ON-SITE)						
294	BA	.0575							
295	LS		78	20					
296	UK	155	.007	.15	100				
297	RK	3575	.020	.020		TRAP	33	0	
	*								

298	KK	SUB Q1							
299	KM		RUNOFF FROM SUB Q1 (ON-SITE)						
300	BA	.0242							
301	LS		78	25					
302	UK	155	.007	.15	100				
303	RK	1015	.020	.020		TRAP	33	0	
	*								

304	KK	CTPP1							
305	KM		COMBINE HYDROGRAPHS SUB O, SUB P, SUB Q1, ROFF4 AND RC2151						
306	HC	5							
	*								

307	KK	RCTPP1							
308	KM		ROUTE CTPP1 FLOWS TO CONCENTRATION POINT CLOP11						
309	RK	2200	.025	.045		TRAP	30	3	
	*								

310	KK	SUB J							
311	KM		RUNOFF FROM SUB J (ON-SITE)						
312	BA	.0534							
313	LS		78	20					

314	UK	155	.007	.15	100				
315	RK	3050	.020	.020		TRAP	33	0	
	*								
316	KK	SUBD/E							
317	KM	RUNOFF FROM SUB D/E (ON-SITE)							
318	BA	.0792							
319	LS		78	.24					
320	UK	155	.007	.15	100				
321	RK	1890	.020	.020		TRAP	33	0	
	*								

HEC-1 INPUT

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

322	KK	2080B							
323	KM	RUNOFF FROM SUB 2030B							
324	BA	.0276							
325	LS		67.7	23.8					
326	UK	140	.049	.05	100				
327	RK	1060	.036	.016		TRAP	20	2	
	*								
328	KK	R3006	CP						
329	KM	ROUTE SUB 2030B TO CP C3002							
330	RS	8	FLOW	-1					
331	RC	.055	.045	.055	5190	.0297			
332	RX	0	18	24	30	39	45	51	69
333	RY	10	4	2	0	0	2	4	10
	*								
334	KK	3006							
335	KM	RUNOFF FROM SUB 3006							
336	BA	.0678							
337	LS		67.7	35					
338	UK	400	.0415	.15	100				
339	RK	4990	.0295	.016		TRAP	20	2	
	*								
340	KK	2035							
341	KM	RUNOFF FROM SUB 2035							
342	BA	.0342							
343	LS		67.7	35					
344	UK	255	.025	.15	100				
345	RK	1590	.0289	.016		TRAP	20	2	
	*								
346	KK	C3006							
347	KM	COMBINE SUB 3006 & R3006							
348	HC	3							
	*								
349	KK	DIV20							
350	KM	OFFLINE BASIN							
351	DT	DIV2							
352	DI	0	25	1000					
353	DQ	0	0	975					
	*								
354	KK	DIVRE							
355	KM	RETURN DIVERT AT REATA WASH							
356	DR	DIV2							
	*								

HEC-1 INPUT

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

357	KK	DET6							
358	KM	OFFLINE BASIN WITHIN TOWN CENTER TO BALANCE REATA							
359	KM	USING ONLY THE 2.8ACRES OF LAND FOR STORAGE							
360	KM	BASIN DEPTH IS 3'							
361	RS	1	FLOW	0					
362	SA	2.24	2.72	3.26	3.82	4.42			
363	SE	0	1	2	3	4			
364	SQ	0	4	13.5	20	25			
	*								
365	KK	COMB							
366	KM	COMBINE FLOW BACK TOGETHER BEFORE REATA							
367	HC	2							
	*								
368	KK	2160C SUB							
369	KM	RUNOFF FROM SUB 2160C							
370	BA	.0562							
371	LS		74	35					
372	UK	400	.0333	.15	100				
373	RK	4375	.0312	.016		TRAP	20	2	
	*								
374	KK	DIV30							
375	KM	OFFLINE BASIN							
376	DT	DIV3							
377	DI	0	20	110					

378 DO 0 0 90  
 \*  
 379 KK COM  
 380 KM COMBINE FLOW BACK TOGETHER  
 381 HC 2  
 \*

\* \*\*\*\*\*  
 \* THIS IS THE TOTAL FROM DC RANCH THAT ENTERS BETWEEN PARCELS 'A' & 'B'  
 \* \*\*\*\*\*  
 \*

382 KK RCOM  
 383 KM ROUTE COM FLOWS TO CONCENTRATION POINT CLOOP2  
 384 RK 1550 .025 .035 TRAP 5 3  
 \*

385 KK SUB B  
 386 KM RUNOFF FROM SUB B (ON-SITE)  
 387 BA .0459  
 388 LS 78 33  
 389 UK 155 .007 .15 100  
 390 RK 1650 .020 .020 TRAP 33 0  
 \*

HEC-1 INPUT

PAGE 11

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

391 KK CLOOP2  
 392 KM COMBINE HYDROGRAPHS RCOM AND SUB B  
 393 HC 2  
 \*

\* \*\*\*\*\*  
 \* BACK TO DC RANCH  
 \* \*\*\*\*\*  
 \*

394 KK C2160  
 395 KM RETURN-DIVERT AT REATA WASH  
 396 DR DIV3  
 \*

397 KK 3010  
 398 KM RUNOFF FROM SUB 3010 & SUB 3011  
 399 BA .0134  
 400 LS 67.7 35  
 401 UK 380 .037 .15 100  
 402 RK 2400 .033 .016 TRAP 20 2  
 \*

403 KK C2160  
 404 KM COMBINE HYDROGRAPHS C2160 AND 3010  
 405 HC 2  
 \*

\* \*\*\*\*\*  
 \* THIS IS THE TOTAL FROM DC RANCH THAT ENTERS BETWEEN PARCELS 'B' & 'C'  
 \* \*\*\*\*\*  
 \*

406 KK RC2160  
 407 KM ROUTE C2160 FLOWS TO CONCENTRATION POINT CLOOP3  
 408 RK 650 .025 .035 TRAP 5 3  
 \*

409 KK SUB C  
 410 KM RUNOFF FROM SUB C (ON-SITE)  
 411 BA .0178  
 412 LS 78 32  
 413 UK 125 .007 .15 100  
 414 RK 1080 .020 .020 TRAP 33 0  
 \*

415 KK CLOOP3  
 416 KM COMBINE HYDROGRAPHS RC2160 AND SUB C  
 417 HC 2  
 \*

HEC-1 INPUT

PAGE 12

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

418 KK RCLOOP3  
 419 KM ROUTE CLOOP3 FLOWS TO CONCENTRATION POINT CPARK1  
 420 RK 1100 .025 .035 TRAP 5 3  
 \*

421 KK PARK1  
 422 KM RUNOFF FROM SUB PARK1 (ON-SITE)  
 423 BA .007  
 424 LS 78 5  
 425 UK 100 .020 .15 100  
 426 RK 1000 .020 .020 TRAP 20 10  
 \*

427 KK CPARK1

428 KM COMBINE HYDROGRAPHS RCLOP3 AND PARK1  
429 HC 2  
\*

430 KK CLOP2I  
431 KM COMBINE HYDROGRAPHS CPARK1 AND CLOOP2  
432 HC 2  
\*

433 KK RLOP2I  
434 KM ROUTE CLOP2I FLOWS TO CONCENTRATION POINT CLOOPII  
435 RK 1100 .025 .035 TRAP 5 3  
436 RK 1500 .025 .045 TRAP 30 3  
\*

437 KK ICLOP1  
438 KM COMBINE HYDROGRAPHS SUB D/E AND RLOP2I  
439 HC 2  
\*

440 KK CLOP1I  
441 KM COMBINE HYDROGRAPHS SUB J, RCTEPI AND ICLOP1  
442 HC 3  
\*

443 KK RCLOP1  
444 KM ROUTE CLOP1I FLOWS TO CONCENTRATION POINT CLOOPI  
445 RK 1200 .025 .045 TRAP 30 3  
\*

446 KK SUB A  
447 KM RUNOFF FROM SUB A (ON-SITE)  
448 BA .0395  
449 LS 78 30  
450 UK 145 .007 .15 100  
451 RK 3945 .020 .020 TRAP 33 0  
\*

HEC-1 INPUT

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

452 KK RSUB A  
453 KM ROUTE SUB A FLOWS TO CONCENTRATION POINT CLOOPI  
454 RK 1000 .025 .035 TRAP 5 3  
455 RK 750 .025 .045 TRAP 30 3  
\*

456 KK SUB F  
457 KM RUNOFF FROM SUB F (ON-SITE)  
458 BA .0483  
459 LS 78 26  
460 UK 140 .007 .15 100  
461 RK 3290 .020 .020 TRAP 33 0  
\*

462 KK SUB I  
463 KM RUNOFF FROM SUB I (ON-SITE)  
464 BA .0350  
465 LS 78 30  
466 UK 145 .007 .15 100  
467 RK 2695 .020 .020 TRAP 33 0  
\*

468 KK CLOOPI  
469 KM COMBINE HYDROGRAPHS CLOOPI AND SUB I  
470 KM THIS IS THE TOTAL FLOW IMPACTING THE LOOP ROADWAY  
471 HC 4  
\*

472 KK RCLOP1  
473 KM ROUTE CLOOPI FLOWS TO CONCENTRATION POINT CP1 (BELL ROAD BRIDGE)  
474 RK 800 .025 .045 TRAP 30 3  
\*

475 KK SUB H  
476 KM RUNOFF FROM SUB H (ON-SITE)  
477 BA .0397  
478 LS 78 35  
479 UK 135 .007 .15 100  
480 RK 3040 .020 .020 TRAP 33 0  
\*

481 KK CBEARD  
482 KM COMBINE HYDROGRAPHS RCLOP1 AND SUB M  
483 KM THIS IS THE TOTAL FLOW FROM SOUTH BEARDSLEY WASH  
484 HC 2  
\*

485 KK SUB Q2  
486 KM RUNOFF FROM SUB Q2 (ON-SITE)  
487 BA .0459  
488 LS 78 26  
489 UK 155 .007 .15 100  
490 RK 1660 .020 .020 TRAP 33 0  
\*

LINE	ID	1	2	3	4	5	6	7	8	9	10	
491	KK	RSUBQ2										
492	KM	ROUTE RSUBQ2 FLOWS TO CONCENTRATION POINT CCROSS										
493	RK	1350	.030	.035			TRAP	5		3		
	*											
494	KK	SUB R										
495	KM	RUNOFF FROM SUB R (ON-SITE)										
496	BA	.1052										
497	LS		.78	.20								
498	UK	145	.007	.15	100							
499	RK	4870	.020	.020			TRAP	33		0		
	*											
500	KK	OFF3A										
501	KM	OFFSITE FLOWS FROM MCDOWELL MTNS PRESERVE										
502	KM	UIBW STUDY DRAINAGE AREA 2180										
503	BA	.9875										
504	LS		.86									
505	UK	470	0.045	0.30	100							
506	RK	3100	0.256	0.045			TRAP	10		3		
507	RK	8200	0.073	0.045			TRAP	20		5		
	*											
508	KK	OFF3B										
509	KM	OFFSITE FLOWS FROM MCDOWELL MTNS PRESERVE										
510	KM	UIBW STUDY DRAINAGE AREA 2190										
511	BA	.1594										
512	LS		.79									
513	UK	190	0.091	0.15	100							
514	RK	4100	0.039	0.045			TRAP	30	10	YES		
	*											
515	KK	ROFF3B										
516	KM	ROUTE ROFF3B FLOWS TO CONCENTRATION POINT CCROSS										
517	RK	1850	.030	.045			TRAP	30		5		
	*											
518	KK	CCROSS										
519	KM	COMBINE ROFF3B, SUB R, AND RSUBQ2										
520	HC	3										
	*											

LINE	ID	1	2	3	4	5	6	7	8	9	10	
528	KK	ROFF2										
529	KM	ROUTE ROFF2 FLOWS TO CONCENTRATION POINT CTPP2										
530	RK	1300	.025	.045			TRAP	30		5		
	*											
531	KK	OFF1										
532	KM	OFFSITE FLOWS FROM MCDOWELL MTNS PRESERVE										
533	KM	UIBW STUDY DRAINAGE AREA 2210										
534	BA	1.81										
535	LS		.82									
536	UK	250	0.370	0.30	100							
537	RK	4500	0.187	0.045			TRAP	10		3		
538	RK	10000	0.049	0.045			TRAP	20		10		
	*											
539	KK	ROFF1										
540	KM	ROUTE ROFF1 FLOWS TO CONCENTRATION POINT CTPP2										
541	RK	1450	.025	.045			TRAP	30		5		
	*											
542	KK	SUB S										
543	KM	RUNOFF FROM SUB S (ON-SITE)										
544	BA	.0356										
545	LS		.78	.15								
546	UK	145	.007	.15	100							
547	RK	1250	.020	.020			TRAP	33		0		
	*											
548	KK	CTPP2										
549	KM	COMBINE CCROSS, ROFF2, SUB S, AND ROFF1										
550	KM	THIS IS THE TOTAL FLOW UPSTREAM OF THE THOMPSON PEAK PKWY CROSSING										
551	HC	4										
	*											
552	KK	RTPP2										
553	KM	ROUTE RCTPP2 FLOWS TO CONCENTRATION POINT CTPC1										

554	RK	1450	.027	.045	TRAP	100	5
555	KK	SUB L					
556	KM	RUNOFF FROM SUB L (ON-SITE)					
557	BA	.0581					
558	LS		78	24			
559	UK	150	.007	.15	100		
560	RK	3159	.020	.020	TRAP	33	0
561	KK	PARK2					
562	KM	RUNOFF FROM PARK2 (ON-SITE)					
563	BA	.0288					
564	LS		78	5			
565	UK	200	.020	.15	100		
566	RK	900	.020	.020	TRAP	20	10

HEC-1 INPUT

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

567	KK	R.PARK2					
568	KM	ROUTE R.PARK2 FLOWS TO CONCENTRATION POINT CTPP2					
569	RK	1100	.025	.035	TRAP	5	3
570	KK	CTPC1					
571	KM	COMBINE RTPP22, RPARK2 AND SUB L					
572	HC	3					
573	KK	RCTPC1					
574	KM	ROUTE RCTPC1 FLOWS TO CONCENTRATION POINT C1700 (SECTION 1700 CHANNEL)					
575	RK	1600	.027	.045	TRAP	100	5
576	KK	SUB M					
577	KM	RUNOFF FROM SUB M (ON-SITE)					
578	BA	.0506					
579	LS		78	25			
580	UK	135	.007	.15	100		
581	RK	2245	.020	.020	TRAP	33	0
582	KK	C1700					
583	KM	COMBINE RCTPC1 AND SUB M					
584	HC	2					
585	KK	CPBC					
586	KM	COMBINE CBEARD AND C1700					
587	KM	THIS IS THE COMBINED FLOWS OF BEARDSLEY WASH AND TPCHANNEL					
588	HC	2					

\*\*\*\*\*  
 \* NOW BRING IN THE N. BEARDSLEY WASH AND TRIBUTARIES  
 \* \*\*\*\*\*

589	KK	2020B	SUB		4units/5.5acres =17% imp.		
590	KM	RUNOFF FROM SUB 2020B					
591	KM	1 OF 2 SUB-BASINS FOR 2020					
592	BA	.0920					
593	LS		86	1.6			
594	UK	400	.6098	.25	100		
595	RK	1190	.3565	.045	.011	TRAP	4 3
596	RK	1305	.1877	.045		TRAP	8 4

597	KK	R2020B	CP				
598	KM	ROUTE SUB-BASIN 2020B TO SUB 2020A					
599	RS	1	FLOW		-1		
600	RC	.055	.040	.055	980	.073	
601	RK	0	1	2	42	52	92 93 94
602	RY	10	10	10	0	0	10 10 10

HEC-1 INPUT

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

603	KK	2020A	SUB		5units/6.4acres =17% imp.		
604	KM	RUNOFF FROM SUB 2020A					
605	KM	2 OF 2 SUB-BASINS FOR 2020					
606	BA	.0198					
607	LS		84.8	8.6			
608	UK	180	.5618	.25	100		
609	RK	510	.4314	.045	.002	TRAP	8 3
610	RK	410	.1366	.045		TRAP	4 3
611	KK	C2020 CP					
612	KM	COMBINE SUB-BASIN 2020B AND 2020A					
613	HC	2					

\*  
 614 KK R2020  
 615 KM ROUTE SUB 2020 TO C.P. 2068  
 616 RK 840 .02 .035 TRAP 5 3  
 617 RK 1510 .03 .045 TRAP 15 3  
 \*

618 KK 2015B SUB 13units/8.5acres = 25% imp.  
 619 KM RUNOFF FROM SUB 2015B NEW BASIN  
 620 BA .0133  
 621 LS 78 25  
 622 UK 20 .03 .08 100  
 623 RK 1740 .02 .016 TRAP 22 3  
 \*

624 KK 2060B SUB 18units/26acres =16% imp.  
 625 KM RUNOFF FROM SUB 2060B  
 626 BA .082  
 627 LS 86 7.9 86 7.9  
 628 UK 350 .5857 .25 .33  
 629 UK 400 .3111 .15 .67  
 630 RK 2300 .125 .045 TRAP 5 3  
 \*

631 KK R2060 ROUTE  
 632 KM ROUTE 2060B TO CP 2068  
 633 RS 3 FLOW -1  
 634 RC .055 .045 .055 2960 .0287  
 635 RX 0 1 2 .32 47 77 78 79  
 636 RY 10 10 10 0 0 10 10 10  
 \*

637 KK C2060 CP  
 638 KM COMBINE SUB-BASIN R2060, R2020 & 2015B @ 2060B  
 639 HC 3  
 \*

HEC-1 INPUT

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

640 KK 2040C SUB  
 641 KM RUNOFF FROM SUB 2040C  
 642 KM 1 OF 3 SUB-BASINS FOR 2040  
 643 BA .1247  
 644 LS 86 10.1  
 645 UK 400 .675 .25 100  
 646 RK 1980 .333 .045 .015 TRAP 10 6  
 647 RK 1970 .119 .045 TRAP 15 3  
 \*

648 KK DETC  
 649 KM DETENTION AT UPPER CANYON SIX ROADWAY CROSSING 1-10'x4' RCBC  
 650 RS 1 FLOW 0  
 651 SA 0 .002 .005 .007 .0125 .0563 .085 .123 .178  
 652 SE 2160 2161 2162 2163 2164 2165 2166 2167 2168  
 653 SQ 0 25 80 150 225 280 335 400 450  
 \*

654 KK 2040B SUB  
 655 KM RUNOFF FROM SUB 2040B  
 656 KM 2 OF 3 SUB-BASINS FOR 2040  
 657 BA .5823  
 658 LS 84.7 .3  
 659 UK 400 .4072 .25 100  
 660 RK 2760 .1878 .045 .056 TRAP 10 3  
 661 RK 3800 .053 .045 TRAP 25 3  
 \*

662 KK DETB  
 663 KM DETENTION AT UPPER CANYON SIX ROADWAY CROSSING 3-10'x4' RCBCs  
 664 RS 1 FLOW 0  
 665 SA 0 .0993 .175 .281 .388 .518 .652 .812 .980 1.12  
 666 SA 1.29  
 667 SE 2114 2115 2116 2117 2118 2119 2120 2121 2122 2123  
 668 SE 2124  
 669 SQ 0 75 240 450 675 840 1005 1200 1350 1470  
 670 SQ 1575  
 \*

671 KK C2040A CP  
 672 KM COMBINE SUB 2040B & 2040C  
 673 HC 2  
 \*

674 KK R2040 ROUTE  
 675 KM ROUTE SUB 2040BC TO 2040A  
 676 RK 3864 .036 .045 TRAP 15 4  
 \*

HEC-1 INPUT

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

677 KK 2040A SUB

678 KM RUNOFF FROM SUB 2040A  
 679 KM 3 OF 3 SUB-BASINS FOR 2040  
 680 BA .279  
 681 LS 80 17.8  
 682 UK 400 .608 .25 100  
 683 RK 1160 .271 .045 TRAP 5 3  
 684 RK 2220 .053 .045 TRAP 25 3  
 \*

685 KK C2040 CP  
 686 KM COMBINE C2040A & SUB 2040A  
 687 HC 2  
 \*

688 KK 2050B3 SUB  
 689 KM RUNOFF FROM SUB 2050B3  
 690 KM 1 OF 6 SUB-BASINS FOR 2050  
 691 BA .236  
 692 LS 86 .3  
 693 UK 400 .648 .2 100  
 694 RK 3240 .311 .045 TRAP 10 3  
 \*

695 KK R2050C ROUTE  
 696 KM ROUTE 2050B3 TO R2050C  
 697 RK 1600 .156 .035 TRAP 10 3  
 \*

698 KK 2050B2 SUB  
 699 KM RUNOFF FROM SUB 2050B2  
 700 KM 2 OF 6 SUB-BASINS FOR 2050  
 701 BA .112  
 702 LS 85.1 1.9  
 703 UK 300 .667 .2 100  
 704 RK 2000 .30 .045 .103 TRAP 10 3  
 705 RK 1715 .195 .045 TRAP 15 3  
 \*

706 KK R2050D ROUTE  
 707 KM ROUTE 2050B2 TO R2050C  
 708 RK 1400 .179 .035 TRAP 15 3  
 \*

709 KK C2050B CP  
 710 KM COMBINE 2050B2 & 2050B3  
 711 HC 2  
 \*

HEC-1 INPUT

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

712 KK R2050B ROUTE  
 713 KM ROUTE C2050B TO 2050B1  
 714 RK 800 .098 .035 TRAP 15 3  
 \*

715 KK 2050B1 SUB  
 716 KM 4 OF 6 SUB-BASINS FOR 2050 12units/13.5acres =17% imp.  
 717 BA .1358  
 718 LS 79.5 2.6  
 719 UK 400 .65 .2 100  
 720 RK 1390 .302 .045 .03 TRAP 10 3  
 721 RK 1450 .103 .045 TRAP 15 5  
 \*

722 KK C2050C CP  
 723 KM COMBINE C2050B & 2050B1  
 724 HC 2  
 \*

725 KK R2050A  
 726 KM ROUTE TO 2050B  
 727 RK 2250 .0756 .045 TRAP 15 3  
 \*

728 KK 2050B4 SUB  
 729 KM RUNOFF FROM SUB 2050B4  
 730 KM 3 OF 6 SUB-BASINS FOR 2050  
 731 BA .0321  
 732 LS 86 7.1  
 733 UK 400 .673 .2 100  
 734 RK 730 .375 .045 .005 TRAP 4 3  
 735 RK 720 .153 .045 TRAP 7 3  
 \*

736 KK R2050D ROUTE  
 737 KM ROUTE 2050B4 TO 2050B  
 738 RK 1250 .0756 .045 TRAP 15 3  
 \*

739 KK 2050B SUB  
 740 KM 4 OF 6 SUB-BASINS FOR 2050 15units/12.5acres =23% imp.  
 741 BA .0681  
 742 LS 79.5 6.6  
 743 UK 290 .650 .2 100

744	RK	430	.162	.045	.005	TRAP	10	3
745	RK	1530	.0756	.045		TRAP	15	3
	*							
746	KK	C2050Z	CP					
747	KM	COMBINE SUB 2050B, R2050D, & R2050A						
748	HC	3						
	*							

HEC-1 INPUT

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

749	KK	DET1								
750	KM	DETENTION AT UPPER CANYON SIX ROADWAY CROSSING 1-24'x6'RCBC								
751	RS	1	FLOW	0						
752	SA	0	.001	.002	.003	.004	.0061	.012	.019	.028
753	SA	.060	.083							
754	SE	2101	2102	2103	2104	2105	2106	2107	2108	2109
755	SE	2111	2112							
756	SQ	0	80	200	350	550	750	1000	1200	1350
757	SQ	1700	1800							
	*									

758	KK	2050A1	SUB	BASIN CHANGE DUE TO UPPER CANYON SIX ROADWAY						
759	KM	BASIN 2050A1								
760	BA	.0580								
761	LS		86	1.6						
762	UK	400	.523	.2	100					
763	RK	2140	.283	.045		TRAP	7	3		
	*									

764	KK	R2050E	ROUTE							
765	KM	ROUTE 2050A1 TO C2050D								
766	RK	1770	.1034	.040		TRAP	7	3		
	*									

767	KK	2050A2	SUB	NEW BASIN DUE TO UPPER CANYON SIX ROADWAY						
768	KM	NEW BASIN DUE TO ROADWAY 18units/18acres = 20% imp.								
769	BA	.0964								
770	LS		86	5.8						
771	UK	375	.587	.2	100					
772	RK	1200	.275	.045	.01	TRAP	5	3		
773	RK	2300	.0613	.045		TRAP	7	3		
	*									

774	KK	C2050D	CP							
775	KM	COMBINE C2050Z & R2050E & 2050A2 AT CULVERT								
776	HC	3								
	*									

777	KK	DET2								
778	KM	DETENTION AT UPPER CANYON SIX ROADWAY CROSSING 1-24'x 6'RCBC								
779	RS	1	FLOW	0						
780	SA	0	.001	.003	.0054	.016	.026	.038	.065	.098
781	SA	.177	.222	.284	.291	.30				
782	SE	2086	2087	2088	2089	2090	2091	2092	2093	2094
783	SE	2096	2097	2098	2099	2100				
784	SQ	0	75	200	355	550	755	1000	1200	1335
785	SQ	1660	1840	2000	2100	2200				
	*									

HEC-1 INPUT

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

786	KK	R2050	ROUTE							
787	KM	ROUTE TO SUB 2050A								
788	RK	2630	.0445	.045		TRAP	15	5		
	*									

789	KK	2050A3	SUB	BASIN CHANGE DUE TO UPPER CANYON SIX ROADWAY						
790	KM	SUB 2050A3 9units/9acres = 20% imp.								
791	BA	.0256								
792	LS		86	.11						
793	UK	400	.275	.2	100					
794	RK	360	.1389	.045	.002	TRAP	5	3		
795	RK	1870	.1037	.045		TRAP	7	3		
	*									

796	KK	R2055	ROUTE							
797	KM	ROUTE BASIN 2050A3 TO C2050								
798	RK	1815	.0777	.040		TRAP	7	3		
799	RK	1600	.0444	.045		TRAP	15	5		
	*									

800	KK	2050A	SUB	6 OF 6 SUB-BASINS FOR 2050						
801	KM	26units/20acres = 24% imp.								
802	BA	.1001								
803	LS		75.3	7.5						
804	UK	313	.0955	.2	100					
805	RK	1500	.0777	.040	.01	TRAP	7	3		
806	RK	1600	.0444	.045		TRAP	15	5		
	*									

807	KK	C2050	CP							
-----	----	-------	----	--	--	--	--	--	--	--

808	KM	COMBINE 2050A, R2050E & R2050								
809	HC	3								
	*									
810	KK	C2051 CP								
811	KM	COMBINE C2040 & C2050								
812	HC	2								
	*									
813	KK	DET3								
814	KM	DETENTION AT D1 & D2 CULVERTS						2-24'x8' RCBCs		
815	RS	1 FLOW 0								
816	SA	0 .003 .005 .01 .05 .075 .109 .18 .248 .353								
817	SA	.469 .585 .739 .739								
818	SE	1962 1963 1964 1965 1966 1967 1968 1969 1970 1971								
819	SE	1972 1973 1974 1975								
820	SQ	0 .140 400 720 1100 1520 2000 2500 3040 3600								
821	SQ	4000 4200 4600 5000								
	*									

HEC-1 INPUT

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

822	KK	.2067 SUB								
823	KM	RUNOFF FROM 2067			6units/6acres @ 20% imp.				11acres golf	
824	BA	.0422								
825	LS	73 4.4								
826	UK	65 .067 .15	100							
827	RK	3175 .052 .045			TRAP	5	3			
	*									

828	KK	C2067 CP								
829	KM	COMBINE DET3 AND 2067								
830	HC	2								
	*									

831	KK	R2051 CP								
832	KM	ROUTE CP 2051 THROUGH SUB 2065								
833	RS	1 FLOW -1								
834	RC	.055 .045 .055 3440 .035								
835	RX	0 6 8 10 110 112 114 120								
836	RY	10 4 2 0 0 2 4 10								
	*									

837	KK	2066 SUB								
838	KM	RUNOFF FROM 2066			22units/20acres=23% imp.				7acres golf	
839	BA	.118								
840	LS	74 6.1								
841	UK	204 .191 .15	100							
842	RK	5890 .0315 .045			TRAP	5	3			
	*									

843	KK	2065A								
844	KM	RETURN DIVERT AT SPLIT								
845	DR	SPLIT								
	*									

846	KK	R2131 CP								
847	KM	ROUTE SPLIT THROUGH 2066								
848	RS	2 FLOW -1								
849	RC	.055 .045 .055 1900 .035								
850	RX	0 6 53 57 72 76 122 128								
851	RY	10 4 2 0 0 2 4 10								
	*									

852	KK	C2066 CP								
853	KM	COMBINE SPLIT AND 2066								
854	HC	2								
	*									

855	KK	DET4								
856	KM	DETENTION AT WINDGATE AND SPLIT FLOW FROM S. BEARDSLEY						20'x11' CONARCH		
857	RS	1 FLOW 0								
858	SA	0 .001 .004 .019 .0365 .055 .075 .113 .160								
859	SE	1940 1941 1942 1943 1944 1945 1946 1947 1948								
860	SQ	0 50 150 280 430 600 780 990 1200								
	*									

HEC-1 INPUT

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

861	KK	R2132 CP								
862	KM	ROUTE SPLIT THROUGH 2065								
863	RS	3 FLOW -1								
864	RC	.055 .055 .055 2945 .035								
865	RX	0 6 53 57 87 91 141 147								
866	RY	10 4 2 0 0 2 4 10								
	*									

867	KK	2065 SUB								
868	KM	RUNOFF FROM SUB 2065			21units/14.1acres @ 27% imp.				15acres golf	
869	BA	.1067								
870	LS	73.9 5.6								
871	UK	50 .05 .15	100							

872 RK 3440 .035 .045 TRAP 50 2  
 \*  
 873 KK C2068 CP  
 874 KM COMBINE R2051, R2060, R2131 & SUB 2065  
 875 KM THIS IS THE TOTAL FLOW AT THOMPSON PEAK PARKWAY & N. BEARDSLEY WASH  
 876 HC 4 2.82  
 \*  
 877 KK DET5  
 878 KM DETENTION AT THOMPSON PEAK PARKWAY 2-28'x10'CONARCHES  
 879 RS 1 FLOW 0  
 880 SA 0 .002 .005 .007 .01 .02 .058 .096 .13 .164  
 881 SA .25 .333 .434 .538 .72 1.07  
 882 SE 1841 1842 1843 1844 1845 1846 1847 1848 1849 1850  
 883 SE 1851 1852 1852.5 1853 1854 1855  
 884 SQ 0 150 400 800 1200 1600 2100 2600 3200 3800  
 885 SQ 4400 5100 5350 5600 5800 6200  
 \*

886 KK R2068 CP  
 887 KM ROUTE CP 2068 TO CONFLUENCE WITH THE REATA WASH  
 888 RS 1 FLOW -1  
 889 RC .055 .045 .055 1200 .025  
 890 RK 0 6 53 57 87 91 141 147  
 891 RY 10 4 2 0 0 2 4 10  
 \*

\*\*\*\*\*  
 \* START BEGINNING OF HEC-1 UPSTREAM OF DC RANCH  
 \* \*\*\*\*\*

892 KK SUB39  
 893 KM RUNOFF FROM SUB-BASIN 39  
 894 BA 1.8807  
 895 LS 85  
 896 UK 330 .0433 .2 100  
 897 RK 11240 .0253 .045 TRAP 30 3  
 \*

HEC-1 INPUT

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

898 KK SUB40  
 899 KM RUNOFF FROM SUB-BASIN 40  
 900 BA .5844  
 901 LS 83  
 902 UK 160 .0627 .2 100  
 903 RK 7000 .0350 .045 TRAP 20 3  
 \*

904 KK CP41  
 905 KM COMBINE HYDROGRAPHS SUB39 & SUB40  
 906 HC 2  
 \*

907 KK 41.1 CP  
 908 KM ROUTE CP 41 TO OUTLET OF SUB 41  
 909 RS 5 FLOW -1  
 910 RC .055 .040 .055 9400 .0282  
 911 RK 0 1 101 107 157 163 263 264  
 912 RY 10 8 3 0 0 3 8 10  
 \*

913 KK SUB41  
 914 KM RUNOFF FROM SUB-BASIN 41  
 915 BA .8270  
 916 LS 74 10.1  
 917 UK 280 .2386 .2 100  
 918 RK 9400 .0282 .045 TRAP 50 3  
 \*

919 KK 41.2 CP  
 920 KM COMBINE SUB 41 & CP 41.1  
 921 HC 2  
 \*

922 KK SUB42  
 923 KM RUNOFF FROM SUB-BASIN 42  
 924 BA .5844  
 925 LS 78 23.3  
 926 UK 280 .2386 .2 100  
 927 RK 8750 .0573 .045 TRAP 20 3  
 \*

928 KK SUB43  
 929 KM RUNOFF FROM SUB-BASIN 43  
 930 KM D.A. HAS BEEN ADJUSTED  
 931 BA 1.0665  
 932 LS 85 10.5  
 933 UK 260 .0515 .2 100  
 934 RK 7400 .0255 .045 TRAP 25 3  
 \*

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

935 KK SUB44  
 936 KM RUNOFF FROM SUB-BASIN 44  
 937 KM D.A. HAS BEEN ADJUSTED  
 938 BA .8389  
 939 LS 85 8.1  
 940 UK 260 .0515 .2 100  
 941 RK 9840 .0622 .045 TRAP 25 3  
 \*

942 KK CP45  
 943 KM COMBINE HYDROGRAPHS SUB43 & SUB44  
 944 HC 2  
 \*

945 KK 45.1 CP  
 946 KM ROUTE CP 45 TO OUTLET OF SUB 45  
 947 RS 3 FLOW -1  
 948 RC .055 .040 .055 3600 .0366  
 949 RX 0 1 101 107 137 143 243 244  
 950 RY 10 8 .3 0 0 3 8 10  
 \*

951 KK SUB45  
 952 KM RUNOFF FROM SUB-BASIN 45  
 953 BA .2037  
 954 LS 81 14.5  
 955 UK 125 .1166 .2 100  
 956 RK 3600 .0366 .045 TRAP 30 3  
 \*

957 KK 45.2 CP  
 958 KM COMBINE SUB 45 & CP 45.1  
 959 HC 2  
 \*

960 KK SUB45A  
 961 KM RUNOFF FROM SUB 45A  
 962 BA .1720  
 963 LS 86 6.9  
 964 UK 275 .2200 .2 100  
 965 RK 5400 .0411 .045 TRAP 15 3  
 \*

966 KK SUB46  
 967 KM RUNOFF FROM SUB-BASIN 46  
 968 BA .9268  
 969 LS 86 3.7  
 970 UK 265 .4958 .2 100  
 971 RK 3300 .2271 .045 .111 TRAP 10 3  
 972 RK 7100 .0535 .045 TRAP 25 3  
 \*

HEC-1 INPUT

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

973 KK CP47  
 974 KM COMBINE HYDROGRAPHS CP 45.2, SUB 45A, & SUB 46  
 975 HC 3  
 \*

976 KK 47.1 CP  
 977 KM ROUTE CP 47 TO OUTLET OF SUB 47  
 978 KM ROUTING LENGTH HAS BEEN ADJUSTED FROM 9600' TO 7600'  
 979 KM SLOPE HAS BEEN ADJUSTED TO MATCH NEW ROUTING LENGTH  
 980 RS 4 FLOW -1  
 981 RC .055 .040 .055 7600 .0268  
 982 RX 0 1 101 109 159 167 267 268  
 983 RY 10 9 4 0 0 4 9 10  
 \*

984 KK SUB47  
 985 KM RUNOFF FROM SUB-BASIN 47  
 986 KM MAIN CHANNEL ROUTING LENGTH HAS BEEN ADJUSTED FROM 9600' TO 9300'  
 987 KM SLOPE HAS BEEN ADJUSTED TO NEW ROUTING LENGTH  
 988 BA .3757  
 989 LS 77 8.6  
 990 UK 375 .1000 .2 100  
 991 RK 9300 .0357 .045 TRAP 50 3  
 \*

992 KK 47.2 CP  
 993 KM COMBINE SUB 47 & CP 47.1  
 994 HC 2  
 \*

995 KK CP48  
 996 KM COMBINE HYDROGRAPHS CP 41.2, SUB42, & CP 47.2  
 997 HC 3  
 \*

998 KK 48.1 CP  
 999 KM ROUTE CP 48 TO OUTLET OF SUB 48R

1

1000. KM ADJUSTMENT HAS BEEN MADE TO MOVE OUTLET OF ORIGINAL SUB 48 FURTHER SOUTH  
 1001 RS 1 FLOW -1  
 1002 RC .055 .040 .055 2200 .0291  
 1003 RX 0 1 101 109 184 192 292 293  
 1004 RY 10 9 4 0 0 4 9 10  
 \*

1005 KK SUB48R  
 1006 KM RUNOFF FROM SUB-BASIN 48R  
 1007 KM ORIGINAL SUB 48 D.A. HAS BEEN EXPANDED TO INCLUDE ADDITIONAL AREA  
 1008 KM ASSOCIATED WITH REVISED REATA PASS CHANNEL ALIGNMENT  
 1009 BA .0646  
 1010 LS 71 6.9  
 1011 UK 150 .0733 .2 100  
 1012 RK 2000 .0525 .045 .0343 TRAP 5 3  
 1013 RK 2200 .0291 .045 TRAP 100 3  
 \*

HEC-1 INPUT

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

1014 KK SUB50  
 1015 KM RUNOFF FROM SUB-BASIN 50  
 1016 BA .3580  
 1017 LS 84 2.8  
 1018 UK 300 .3555 .2 100  
 1019 RK 730 .1506 .045 .036 TRAP 10 3  
 1020 RK 6400 .0453 .045 TRAP 25 3  
 \*

1021 KK 48.2 CP  
 1022 KM ROUTE SUB 50 TO CP 48.2 AT OUTLET OF SUB 48R  
 1023 RS 1 FLOW -1  
 1024 RC .055 .040 .055 770 .0291  
 1025 RX 0 1 101 109 184 192 292 293  
 1026 RY 10 9 4 0 0 4 9 10  
 \*

1027 KK CP51  
 1028 KM COMBINE CP 48.1, CP 48.2 & SUB 48R  
 1029 KM THIS IS THE TOTAL DISCHARGE TO THE REATA PASS ALLUVIAL FAN APEX  
 1030 HC 3  
 \*

1031 KK 2006 CP  
 1032 KM ROUTE CP 51 TO DOWNSTREAM END OF SUB 2005  
 1033 RS 3 FLOW -1  
 1034 RC .055 .045 .055 3340 .0341  
 1035 RX 0 35 135 150 225 240 340 375  
 1036 RY 10 3 3 0 0 3 3 10  
 \*

1037 KK 2005 SUB  
 1038 KM RUNOFF FROM 2005  
 1039 BA .1363  
 1040 LS 72 6.70  
 1041 UK 175 .1400 .15 100  
 1042 RK 2600 .0200 .045 TRAP 150 5  
 \*

1043 KK 2007 CP  
 1044 KM COMBINE SUB 2005 & CP 2006  
 1045 HC 2  
 \*

1046 KK 2000 SUB  
 1047 KM RUNOFF FROM SUB 2000  
 1048 BA .7999  
 1049 LS 84 2.6  
 1050 UK 400 .2750 .25 100  
 1051 RK 2625 .0785 .045 .072 TRAP 10 3  
 1052 RK 2300 .0217 .045 TRAP 25 3  
 \*

HEC-1 INPUT

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

1053 KK 2008 CP  
 1054 KM ROUTE RUNOFF FROM SUB 2000 TO DOWNSTREAM END OF SUB 2005  
 1055 RS 2 FLOW -1  
 1056 RC .045 .045 .045 1560 .0192  
 1057 RX 0 1 2 82 127 207 208 209  
 1058 RY 10 10 10 0 0 10 10 10  
 \*

1059 KK 2009 CP  
 1060 KM COMBINE CP 2007 & CP 2008  
 1061 HC 2  
 \*

1062 KK 2011 CP  
 1063 KM ROUTE CP 2009 TO DOWNSTREAM END OF SUB 2010  
 1064 RS 1 FLOW -1  
 1065 RC .055 .045 .055 1400 .0243

1066	RX	0	35	135	150	225	240	340	375
1067	RY	10	3	3	0	0	3	3	10
	*								
1068	KK	2010	SUB						
1069	KM	RUNOFF FROM SUB 2010							
1070	BA	.0933							
1071	LS		83	3.7					
1072	UK	400	.6425	.3	100				
1073	RK	3400	.0213	.045	TRAP	50	3		
	*								

1074	KK	2012	CP						
1075	KM	COMBINE SUB 2010 & CP 2011							
1076	HC	2							
	*								

1077	KK	R2016	CP		*** START DC RANCH HERE ***				
1078	KM	ROUTE CP 2012 THROUGH SUB 2015A							
1079	RS	2	FLOW	-1					
1080	RC	.055	.045	.055	5275	.0297			
1081	RX	0	28	29	41	300	312	313	341
1082	RY	10	3	3	0	0	3	3	10
	*								

1083	KK	2015A	SUB		95units/81.2acres			-23% imp.	
1084	KM	RUNOFF FROM SUB 2015A							
1085	BA	.4432							
1086	LS		82	6.6					
1087	UK	400	.5603	.25	100				
1088	RK	2770	.2165	.045	.12	TRAP	7	3	
1089	RK	3914	.0297	.045	TRAP	260	4		
	*								

HEC-1 INPUT

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

1090	KK	2030C	SUB		=17% imp.				
1091	KM	RUNOFF FROM SUB 2030C							
1092	BA	.1298			52 units /56acres			10.lacres golf	
1093	LS		62	11.5					
1094	UK	400	.033	.15	100				
1095	RK	3825	.0351	.035	TRAP	10	3		
	*								

1096	KK	C2030	CP						
1097	KM	COMBINE 2030 AND C2015 AND R2016							
1098	KM	THIS IS THE TOTAL FLOW TO THE THOMPSON PEAK PARKWAY BRIDGE							
1099	HC	3							
	*								

1100	KK	R2030	ROUTE CP C2030 TO C3000						
1101	KM	ROUTE CP C2030 TO C3000							
1102	RS	1	FLOW	-1					
1103	RC	.055	.045	.055	1280	.0258			
1104	RX	0	42	43	61	371	388	389	431
1105	RY	10	3	3	0	0	3	3	10
	*								

1106	KK	2031							
1107	KM	RUNOFF FROM SUB 2031							
1108	BA	.103							
1109	LS		72.6						
1110	UK	20	.041	.15	100				
1111	RK	860	.0407	.045	TRAP	7	3		
	*								

1112	KK	C3000	CP						
1113	KM	COMBINE REATA WASH AND N. BEARDSLEY WASH & SUB 2031							
1114	HC	3							
	*								

1115	KK	R3000	ROUTE C3000 THROUGH TO C3002						
1116	KM	ROUTE C3000 THROUGH TO C3002							
1117	RS	1	FLOW	-1					
1118	RC	.055	.045	.055	2470	.0236			
1119	RX	0	42	43	61	371	388	389	431
1120	RY	10	3	3	0	0	3	3	10
	*								

1121	KK	2030B	DAVE'S WASH		50units/31.5acres			=26% imp.	
1122	KM	RUNOFF FROM SUB 2030B							
1123	BA	.0492							
1124	LS		67.7	26					
1125	UK	350	.05	.15	100				
1126	RK	2350	.042	.045	TRAP	10	4		
	*								

HEC-1 INPUT

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

1127	KK	R3001	CP						
1128	KM	ROUTE SUB 2030B TO CP C3002							
1129	RS	4	FLOW	-1					

1130	RC	.055	.045	.055	2990	.0271			
1131	RX	0	24	32	40	48	56	64	88
1132	RY	10	4	2	0	0	2	4	10
	*								
1133	KK	2032							
1134	KM	RUNOFF FROM SUB 2032							
1135	BA	.052							
1136	LS		67.7	40					
1137	UK	20	.05	.15	100				
1138	RK	3000	.027	.016		TRAP	20	2	
	*								
1139	KK	2033							
1140	KM	RUNOFF FROM SUB 2033							
1141	BA	.1251							
1142	LS		72.6						
1143	UK	400	.0351	.15	100				
1144	RK	2710	.0263	.045		TRAP	70	5	
	*								

1145	KK	C3002							
1146	KM	COMBINE R3000 & SUB 2032, SUB 2033 & 2030B (DAVE'S WASH)							
1147	HC	4							
	*								

1148	KK	R3002							
1149	KM	ROUTE C3002 THROUGH TO C2036							
1150	RS	2 FLOW	-1						
1151	RC	.055	.045	.055	3030	.0236			
1152	RX	0	42	43	61	371	388	389	431
1153	RY	10	3	3	0	0	3	3	10
	*								

1154	KK	3005							
1155	KM	RUNOFF FROM 3005							
1156	BA	.0893							
1157	LS		67.7	5					
1158	UK	100	.03	.15	100				
1159	RK	2370	.024	.045		TRAP	70	3	
	*								

1160	KK	3004							
1161	KM	RUNOFF FROM 3004							
1162	BA	.0431							
1163	LS		67.7	35					
1164	UK	100	.03	.15	100				
1165	RK	2600	.024	.016		TRAP	20	2	
	*								

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

1166	KK	C3005							
1167	KM	COMBINE SUB. 3004 & 3005							
1168	HC	2							
	*								

1169	KK	C2036							
1170	KM	COMBINE SUB 2034 & R3002							
1171	KM	THIS IS THE TOTAL FLOW WITHIN THE REATA LEAVING DC RANCH							
1172	HC	2							
	*								

\*\*\*\*\*  
 \* THIS IS TOTAL FLOW FROM DC RANCH AT REATA PASS CHANNEL & UNION HILLS DR  
 \* \*\*\*\*\*

1173	KK	RC2036 ROUTE							
1174	KM	ROUTE C2036 TO CPREATA (BEFORE THE CONFLUENCE WITH BEARDSLEY & TPCHANNEL)							
1175	RK	4700	.030	.045		TRAP	200	3	
	*								

1176	KK	RCPREA ROUTE							
1177	KM	ROUTE CPREATA TO BELL ROAD BRIDGE							
1178	RK	600	.030	.045		TRAP	200	3	
	*								

1179	KK	CPI							
1180	KM	COMBINE CPBC & RCPREA							
1181	KM	THIS IS THE TOTAL FLOW WITHIN THE REATA LEAVING DC RANCH							
1182	HC	2							
	*								

\*\*\*\*\*  
 \* THIS IS THE TOTAL FLOW UNDER BELL ROAD BRIDGE  
 \* \*\*\*\*\*

\*\*\*\*\*  
 \* START DEVELOPMENT AREAS SOUTH OF FLOOD CONTROL DIKE  
 \* \*\*\*\*\*

1183	KK	SUB V3							
1184	KM	RUNOFF FROM SUB V3 (ON-SITE)							
1185	BA	.0195							

1186	LS		78	20					
1187	UK	250	.007	.15	100				
1188	RK	915	.020	.020		TRAP	33	0	
	*								
1189	KK	DETV3							
1190	KM	DETENTION BASIN WITHIN PARCEL V3							
1191	RS	1	STOR	-1					
1192	SV	0	0.5						
1193	SQ	0	25						
	*								

1

HEC-1 INPUT

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

1194	KK	SUB V2							
1195	KM	RUNOFF FROM SUB V2 (ON-SITE)							
1196	BA	.0178							
1197	LS		78	17					
1198	UK	250	.007	.15	100				
1199	RK	905	.020	.020		TRAP	33	0	
	*								

1200	KK	SUB V1							
1201	KM	RUNOFF FROM SUB V1 (ON-SITE)							
1202	BA	.0753							
1203	LS		78	16					
1204	UK	250	.007	.15	100				
1205	RK	3885	.020	.020		TRAP	33	0	
	*								

1206	KK	DETV1							
1207	KM	DETENTION BASIN WITHIN PARCEL V1							
1208	RS	1	STOR	-1					
1209	SV	0	1.0						
1210	SQ	0	95						
	*								

1211	KK	SUB U2							
1212	KM	RUNOFF FROM SUB U2 (ON-SITE)							
1213	BA	.0655							
1214	LS		78	21					
1215	UK	145	.007	.15	100				
1216	RK	3575	.020	.020		TRAP	33	0	
	*								

1217	KK	DETU2							
1218	KM	DETENTION BASIN WITHIN PARCEL U2							
1219	RS	1	STOR	-1					
1220	SV	0	1.5						
1221	SQ	0	65						
	*								

1222	KK	SUB U1							
1223	KM	RUNOFF FROM SUB U1 (ON-SITE)							
1224	BA	.0534							
1225	LS		78	20					
1226	UK	140	.007	.15	100				
1227	RK	3565	.020	.020		TRAP	33	0	
	*								

1228	KK	DETV1							
1229	KM	DETENTION BASIN WITHIN PARCEL U1							
1230	RS	1	STOR	-1					
1231	SV	0	1.0						
1232	SQ	0	95						
	*								

1

HEC-1 INPUT

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

1233	KK	SUB T							
1234	KM	RUNOFF FROM SUB T (ON-SITE)							
1235	BA	.0511							
1236	LS		78	25					
1237	UK	140	.007	.15	100				
1238	RK	3080	.020	.020		TRAP	33	0	
	*								

1239	KK	DETT							
1240	KM	DETENTION BASIN WITHIN PARCEL T							
1241	RS	1	STOR	-1					
1242	SV	0	1.0						
1243	SQ	0	90						
	*								

1244	KK	RSUB T							
1245	KM	ROUTE RSUBT FLOWS TO CONCENTRATION POINT CP6							
1246	RK	800	.027	.045		TRAP	10	5	
	*								

1247	KK	SUB 6							
1248	KM	RUNOFF FROM SUB 6 (OUT-PARCEL - ASLD)							
1249	BA	.0127							

1250	LS		78							
1251	UK	200	.050	.15	100					
1252	RK	800	.040	.045		TRAP	10	4		
	*									
1253	KK	CP6								
1254	KM	COMBINE RSUB T AND SUB 6								
1255	HC	2								
	*									
1256	KK	SUB 5								
1257	KM	RUNOFF FROM SUB 5 (OUT-PARCEL - ASLD)								
1258	BA	.0186								
1259	LS		78							
1260	UK	200	.050	.15	100					
1261	RK	1500	.035	.035		TRAP	5	3		
	*									
1262	KK	SUB N								
1263	KM	RUNOFF FROM SUB N (ON-SITE)								
1264	BA	.0544								
1265	LS		78	34						
1266	UK	125	.007	.15	100					
1267	RK	1800	.020	.020		TRAP	33	0		
	*									

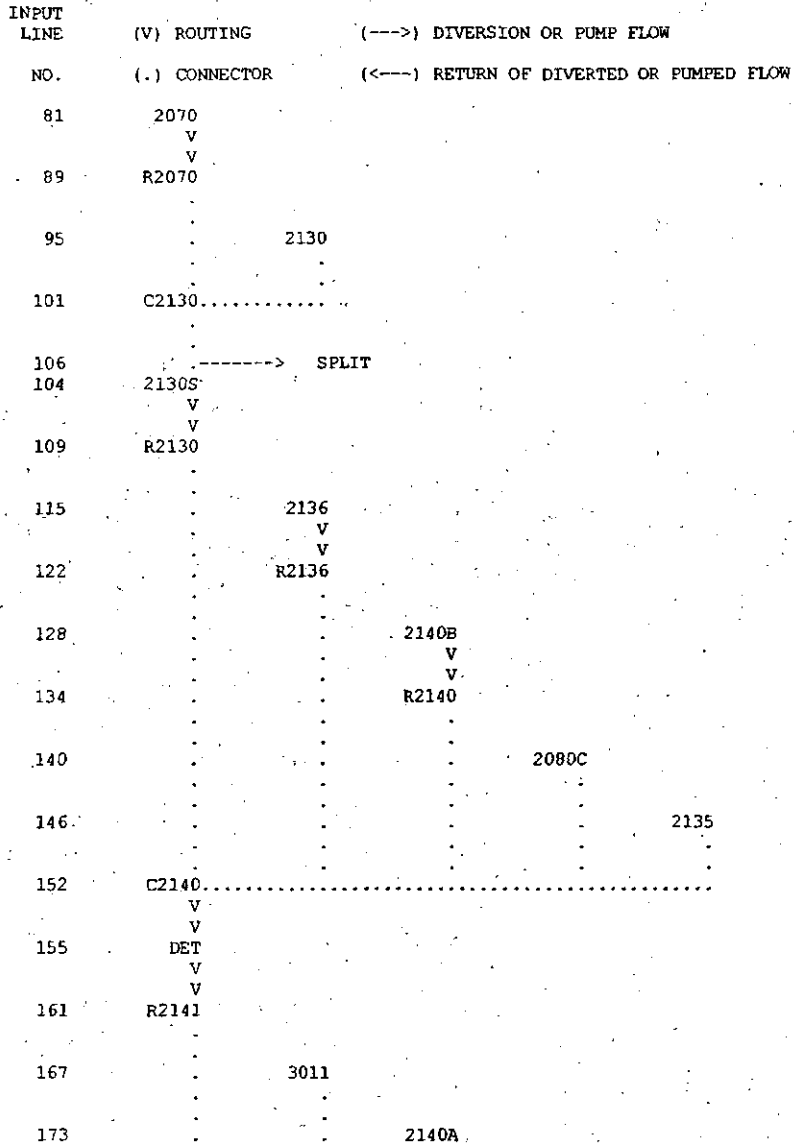
HEC-1 INPUT

PAGE 35

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

1268	KK	DETN								
1269	KM	DETENTION BASIN WITHIN PARCEL N								
1270	RS	1	STOR	-1						
1271	SV	0	1.2							
1272	SQ	0	110							
	*									
1273	ZZ									

SCHEMATIC DIAGRAM OF STREAM NETWORK



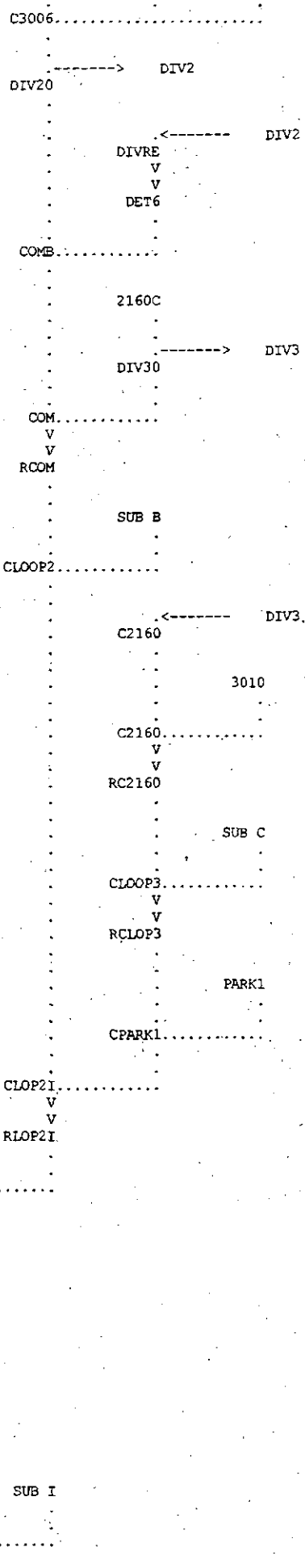
```

180 C2140A.....
183     2150C4
      V
191     R2150E
      V
194     .           2150C3
      V
202     R2150F
      V
205     .           2150C2
      V
213     R2150G
      V
216 C2150T.....
219     .           2150C1
227     .           2150B
234 C2150H.....
      V
237     R2150
      V
240     .           3210
      V
246     R3210
      V
249     .           3230
      V
255     R3230
      V
258     .           2150A
267 C2150A.....
270 C2151.....
      V
273 RC2151
      V
276     SUB O
282     .           OFF4
      V
288     ROFF4
      V
292     .           SUB P
298     .           SUB Q1
304 CTPP1.....
      V
307 RCTPP1
      V
310     SUB J
316     SUBD/E
322     .           2080B
      V
328     R3006
      V
334     .           3006

```

340  
346  
351  
349  
356  
354  
357  
365  
368  
376  
374  
379  
382  
385  
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415  
418  
421  
427  
430  
433  
437  
440  
443  
446  
452  
456  
462  
468

2035



```

472      V
      RCLOP1

475      SUB H

481      CBEARD.....

485      SUB Q2
          V
          V
491      RSUBQ2

494      SUB R

500      OFF3A
          V
          V
508      OFF3B ***
          V
          V
515      ROFF3B

518      CCROSS.....

521      OFF2
          V
          V
528      ROFF2

531      OFF1
          V
          V
539      ROFF1

542      SUB S

548      CTPP2.....
          V
          V
552      RTPP2

555      SUB L

561      PARK2
          V
          V
567      RPARK2

570      CTPC1.....
          V
          V
573      RCTPC1

576      SUB M

582      C1700.....

585      CPBC.....

589      2020B
          V
          V
597      R2020B

603      2020A

611      C2020.....
          V
          V
614      R2020

618      2015B

624      2060B
          V

```

631		V	R2060	
637	C2060	.....		
640	2040C			
	V			
648	DETC			
654			2040B	
			V	
662			DETB	
671	C2040A	.....		
	V			
674	R2040			
677			2040A	
685	C2040	.....		
688			2050B3	
			V	
695			R2050C	
698			2050B2	
			V	
706			R2050D	
709			C2050B	.....
			V	
712			R2050B	
715			2050B1	
722			C2050C	.....
			V	
725			R2050A	
728			2050B4	
			V	
736			R2050D	
739				2050B
746			C2050Z	.....
			V	
749			DET1	
758			2050A1	
			V	
764			R2050E	
767				2050A2
774			C2050D	.....
			V	
777			DET2	
			V	
786			R2050	
789			2050A3	
			V	
796			R2055	

800  
807  
810  
813  
822  
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843  
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867  
873  
877  
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904  
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942  
945  
951  
957  
960  
966

2050A

C2050.....

C2051.....

V

V

DET3

2067

C2067.....

V

V

R2051

2066

2065A

←----- SPLIT

V

V

R2131

C2066.....

V

V

DET4

V

V

R2132

2065

C2068.....

V

V

DET5

V

V

R2068

SUB39

SUB40

CP41.....

V

V

41.1

SUB41

41.2.....

SUB42

SUB43

SUB44

CP45.....

V

V

45.1

SUB45

45.2.....

SUB45A

SUB46

973		CP47	.....
		V	
976		V	
		47.1	
984			SUB47
992		47.2	.....
995		CP48	.....
		V	
		V	
998		48.1	
1005			SUB48R
1014			SUB50
		V	
		V	
1021		48.2	
1027		CP51	.....
		V	
		V	
1031		2006	
1037			2005
1043		2007	.....
1046			2000
		V	
		V	
1053		2008	
1059		2009	.....
		V	
		V	
1062		2011	
1068			2010
1074		2012	.....
		V	
		V	
1077		R2016	
1083			2015A
1090			2030C
1096		C2030	.....
		V	
		V	
1100		R2030	
1106			2031
1112		C3000	.....
		V	
		V	
1115		R3000	
1121		2030B	
		V	
		V	
1127		R3001	
1133			2032
1139			2033
1145		C3002	.....

```

      V
      V
1148  R3002
      V
1154  3005
      V
1160  3004
      V
1166  C3005.....
      V
1169  C2036.....
      V
1173  RC2036
      V
1176  RCPREA
      V
1179  CP1.....
      V
1183  SUB V3
      V
1189  DETV3
      V
1194  SUB V2
      V
1200  SUB V1
      V
1206  DETV1
      V
1211  SUB U2
      V
1217  DETU2
      V
1222  SUB U1
      V
1228  DETU1
      V
1233  SUB T
      V
1239  DETT
      V
1244  RSUB T
      V
1247  SUB 6
      V
1253  CP6.....
      V
1256  SUB 5
      V
1262  SUB N
      V
1268  DETN

```

(\*\*\*) RUNOFF ALSO COMPUTED AT THIS LOCATION

```

*****
*
* FLOOD HYDROGRAPH PACKAGE (HEC-1)
* JUN 1998
* VERSION 4.1
*
* RUN DATE 03JUL06 TIME 09:18:01
*
*****

```

```

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

```

PROJECT NAME: 104TH & BELL  
 PREPARED FOR: TOLL BROTHERS  
 PREPARED BY: ARGUS CONSULTING

JOB#: 125-02

MODEL COND. : PROPOSED CONDITIONS HYDROLOGY

STORM EVENT : 100-YR / 6-HR  
FILE NAME : FU100.DAT

\*\*\*\*\*  
NOTES FROM PREVIOUS MODELERS:

APPROXIMATE HEC-1 MODEL FOR DC RANCH ANALYSIS.  
BASED ON ORIGINAL UIBW CURVE NUMBERS,  
WITH AMC 3 ADJUSTMENT FOR GOLF COURSE AREAS.

MODEL RPBWDC1.6I -- BASE MODEL WAS RPBWL.6I

100-YEAR 6-HOUR HYPOTHETICAL STORM  
RAINFALL FROM NOAA ATLAS, AREAL REDUCTION FACTOR PER JD RECORDS

RAINFALL & CHANNEL ROUTING OPERATIONS HAVE BEEN MODIFIED IN ACCORDANCE  
WITH SCENARIO 13 FROM SENSITIVITY ANALYSIS FOR REATA PASS HYDROLOGY  
SUB 49 HAS BEEN PLACED DOWNSTREAM OF CP 51 (3/12/90).

THOMPSON PEAK PARKWAY ALIGNMENT HAS BEEN ADJUSTED PER DMB PLANS

100% OF FLOW FROM THE REATA PASS APEX IS DIVERTED SOUTH TO CAP DIKE 4

PREPARED BY ROBERT L. WARD, P.E., CONSULTING ENGINEER  
FOR WOOD-PATEL & ASSOCIATES, INC.  
REVISED 5/4/95: EXISTING CONDITIONS

PLANNING UNITS III, V & VI  
ADDITIONAL SUB-BASIN REFINEMENT  
REVISED 3/25/99: EXISTING CONDITIONS  
WITH THE REATA PASS DIVERTED SOUTH TO CAP DIKE 4

INCLUDE SPLIT FLOW FROM S. BEARDSLEY TO N. BEARDSLEY WASH  
SPLIT OCCURS AT BASIN 2130 AND IS RETRIEVED AT BASIN 2065A  
REVISED 4/19/99: EXISTING CONDITIONS WITH REVISED DRAINAGE AREAS  
FOR BASINS 2135, 2130, 2065 & 2080B  
FILE: DCX100A.DAT

100-YEAR EXISTING HEC-1 MODEL

PREPARED BY WOOD-PATEL & ASSOCIATES, INC. BY:JD  
DATE: 5/10/01  
NEW MODEL BASED ON 1' CONTOURS FILE:DCX100.DAT  
BASINS REVISED INCLUDE: 2070, 2130

NEW MODEL BASED ON NON-REATA PASS DESERT GREENBELT CONDITION  
AFTER THOMPSON PEAK PARKWAY  
POST DEVELOPMENT DISCHARGE MUST NOT INCREASE FROM THE N.BEARDSLEY  
INTO THE REATA PASS WASH FILE:DCEX100.DAT

FUTURE MODEL BASED ON DEVELOPED CONDITIONS  
CURVE NUMBERS HAVE BEEN ADJUSTED FOR THE GOLF COURSE AREAS  
IMPERVIOUS AREAS FOR DESIGN CONDITIONS  
FILE DCFUT100.DAT  
5/22/01  
PREPARED BY WOOD-PATEL & ASSOCIATES, INC. BY:JD

NEW FILE FOR CULVERT MODELING ON UPPER CANYON SIX  
WINDGATE AND THOMPSON PEAK PARKWAY  
FILE: DCFU100Z.DAT 6/11/01 BY: JCD  
\*\*\*\*\*

71 IO

OUTPUT CONTROL VARIABLES

IPRNT 5 PRINT CONTROL  
IPLOT 0 PLOT CONTROL  
OSCAL 0. HYDROGRAPH PLOT SCALE

IT

HYDROGRAPH TIME DATA

NMIN 2 MINUTES IN COMPUTATION INTERVAL  
IDATE 1MAY99 STARTING DATE  
ITIME 0000 STARTING TIME  
NQ 1000 NUMBER OF HYDROGRAPH ORDINATES  
NDDATE 2MAY99 ENDING DATE  
NDTIME 0918 ENDING TIME  
ICENT 19 CENTURY MARK

COMPUTATION INTERVAL .03 HOURS  
TOTAL TIME BASE 33.30 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

72 JD

INDEX STORM NO. 1

STRM 3.39 PRECIPITATION DEPTH  
TRDA .00 TRANSPOSITION DRAINAGE AREA

73 PI

PRECIPITATION PATTERN





OPERATION	STATION	PEAK FLOW	TIME OF PEAK	AVERAGE FLOW FOR MAXIMUM PERIOD			BASIN AREA	MAXIMUM STAGE	TIME OF MAX STAGE
				6-HOUR	24-HOUR	72-HOUR			
+									
+	HYDROGRAPH AT								
	2070	3635.	3.17	272.	68.	49.	1.39		
	ROUTED TO								
	R2070	3171.	3.23	272.	68.	49.	1.39		
+	HYDROGRAPH AT								
	2130	761.	3.17	61.	15.	11.	.31		
+	2 COMBINED AT								
	C2130	3860.	3.20	333.	83.	60.	1.71		
+	DIVERSION TO								
	SPLIT	679.	3.20	24.	6.	4.	1.71		
+	HYDROGRAPH AT								
	2130S	3181.	3.20	308.	77.	56.	1.71		
+	ROUTED TO								
	R2130	2884.	3.27	308.	77.	56.	1.71		
+	HYDROGRAPH AT								
	2136	179.	3.13	14.	3.	2.	.08		
+	ROUTED TO								
	R2136	134.	3.33	14.	3.	2.	.08		
+	HYDROGRAPH AT								
	2140B	73.	3.03	4.	1.	1.	.02		
+	ROUTED TO								
	R2140	55.	3.10	4.	1.	1.	.02		
+	HYDROGRAPH AT								
	2080C	82.	3.03	5.	1.	1.	.02		
+	HYDROGRAPH AT								
	2135	131.	3.20	12.	3.	2.	.08		
+	5 COMBINED AT								
	C2140	3161.	3.27	342.	86.	62.	1.42		
	ROUTED TO								
	DET	3163.	3.30	342.	86.	62.	1.42		
	ROUTED TO								
	R2141	3029.	3.33	342.	86.	62.	1.42		
+	HYDROGRAPH AT								
	3011	408.	3.03	26.	6.	5.	.08		
+	HYDROGRAPH AT								
	2140A	213.	3.10	18.	4.	3.	.06		
+	3 COMBINED AT								
	C2140A	3150.	3.33	382.	97.	70.	1.55		
+	HYDROGRAPH AT								
	2150C4	96.	3.10	6.	2.	1.	.03		
+	ROUTED TO								
	R2150E	96.	3.10	6.	2.	1.	.03		
+	HYDROGRAPH AT								
	2150C3	125.	3.10	8.	2.	2.	.04		
+	ROUTED TO								
	R2150F	121.	3.10	8.	2.	2.	.04		
+	HYDROGRAPH AT								
	2150C2	187.	3.07	11.	3.	2.	.05		
+	ROUTED TO								
	R2150G	178.	3.10	11.	3.	2.	.05		
+	3 COMBINED AT								
	C2150T	395.	3.10	26.	6.	5.	.11		
+	HYDROGRAPH AT								
	2150C1	293.	3.10	21.	5.	4.	.09		
+	HYDROGRAPH AT								
	2150B	107.	3.10	7.	2.	1.	.03		
+	3 COMBINED AT								
	C2150H	793.	3.10	54.	14.	10.	.23		
+	ROUTED TO								
	R2150	759.	3.23	54.	14.	10.	.23		
+	HYDROGRAPH AT								
	3210	54.	3.17	5.	1.	1.	.03		

+	ROUTED TO	R3210	52.	3.47	5.	1.	1.	.03
+	HYDROGRAPH AT	3230	231.	3.10	17.	4.	3.	.09
	ROUTED TO	R3230	230.	3.30	17.	4.	3.	.09
+	HYDROGRAPH AT	2150A	582.	3.20	54.	14.	10.	.34
+	4 COMBINED AT	C2150A	1376.	3.27	131.	33.	24.	.69
+	2 COMBINED AT	C2151	4276.	3.30	510.	129.	93.	2.25
+	ROUTED TO	RC2151	4236.	3.30	510.	129.	93.	2.25
+	HYDROGRAPH AT	SUB O	28.	3.17	3.	1.	0.	.01
+	HYDROGRAPH AT	OFF4	121.	3.17	11.	3.	2.	.07
+	ROUTED TO	ROFF4	120.	3.20	11.	3.	2.	.07
+	HYDROGRAPH AT	SUB P	112.	3.20	11.	3.	2.	.06
+	HYDROGRAPH AT	SUB Q1	53.	3.17	5.	1.	1.	.02
+	5 COMBINED AT	CTPP1	4451.	3.30	539.	137.	99.	2.41
+	ROUTED TO	RCTPP1	4427.	3.33	539.	137.	99.	2.41
+	HYDROGRAPH AT	SUB J	106.	3.20	10.	3.	2.	.05
	HYDROGRAPH AT	SUBD/E	171.	3.17	16.	4.	3.	.08
+	HYDROGRAPH AT	20B0B	66.	3.07	4.	1.	1.	.03
+	ROUTED TO	R3006	40.	3.33	4.	1.	1.	.03
+	HYDROGRAPH AT	3006	112.	3.20	12.	3.	2.	.07
+	HYDROGRAPH AT	2035	63.	3.17	6.	2.	1.	.03
+	3 COMBINED AT	C3006	181.	3.20	23.	6.	4.	.13
+	DIVERSION TO	DIV2	156.	3.20	12.	3.	2.	.13
+	HYDROGRAPH AT	DIV20	25.	2.97	11.	3.	2.	.13
+	HYDROGRAPH AT	DIVRE	156.	3.20	12.	3.	2.	.13
+	ROUTED TO	DET6	13.	3.87	7.	3.	2.	.13
+	2 COMBINED AT	COMB	38.	3.87	17.	6.	4.	.13
+	HYDROGRAPH AT	2160C	110.	3.20	12.	3.	2.	.06
+	DIVERSION TO	DIV3	90.	3.20	5.	1.	1.	.06
+	HYDROGRAPH AT	DIV30	20.	3.00	7.	2.	1.	.06
+	2 COMBINED AT	COM	57.	3.80	24.	7.	5.	.19
+	ROUTED TO	RCOM	57.	3.80	24.	7.	5.	.19
+	HYDROGRAPH AT	SUB B	108.	3.17	10.	3.	2.	.05

+	2 COMBINED AT	CLOOP2	154.	3.17	34.	10.	7.	.23
+	HYDROGRAPH AT	C2160	90.	3.20	5.	1.	1.	.06
+	HYDROGRAPH AT	3010	23.	3.20	2.	1.	0.	.01
+	2 COMBINED AT	C2160	112.	3.20	7.	2.	1.	.01
+	ROUTED TO	RC2160	111.	3.20	7.	2.	1.	.01
+	HYDROGRAPH AT	SUB C	46.	3.13	4.	1.	1.	.02
+	2 COMBINED AT	CLOOP3	148.	3.20	11.	3.	2.	.03
+	ROUTED TO	RCLOOP3	146.	3.20	11.	3.	2.	.03
+	HYDROGRAPH AT	PARK1	16.	3.13	1.	0.	0.	.01
+	2 COMBINED AT	CPARK1	158.	3.20	12.	3.	2.	.04
+	2 COMBINED AT	CLOP2I	304.	3.20	46.	13.	9.	.27
+	ROUTED TO	RLOP2I	301.	3.23	46.	13.	9.	.27
+	2 COMBINED AT	ICLOP1	460.	3.20	62.	17.	12.	.35
+	3 COMBINED AT	CL0P1I	4816.	3.33	610.	156.	113.	2.82
+	ROUTED TO	RCLOP1	4791.	3.33	610.	156.	113.	2.82
+	HYDROGRAPH AT	SUB A	83.	3.20	8.	2.	2.	.04
+	ROUTED TO	RSUB A	83.	3.23	8.	2.	2.	.04
+	HYDROGRAPH AT	SUB F	103.	3.17	10.	2.	2.	.05
+	HYDROGRAPH AT	SUB I	79.	3.17	7.	2.	1.	.04
+	4 COMBINED AT	CLOOP1	4959.	3.33	635.	162.	117.	2.94
+	ROUTED TO	RCLOP1	4927.	3.33	635.	162.	117.	2.94
+	HYDROGRAPH AT	SUB H	96.	3.17	9.	2.	2.	.04
+	2 COMBINED AT	CBEARD	4979.	3.33	644.	165.	119.	2.98
+	HYDROGRAPH AT	SUB Q2	101.	3.17	9.	2.	2.	.05
+	ROUTED TO	RSUBQ2	100.	3.20	9.	2.	2.	.05
+	HYDROGRAPH AT	SUB R	207.	3.20	20.	5.	4.	.11
+	HYDROGRAPH AT	OFF3A	1577.	3.37	208.	53.	38.	.99
+	HYDROGRAPH AT	OFF3B	1669.	3.40	232.	59.	42.	1.15
+	ROUTED TO	ROFF3B	1661.	3.43	232.	59.	42.	1.15
+	3 COMBINED AT	CCROSS	1804.	3.40	260.	66.	48.	1.30
+	HYDROGRAPH AT	OFF2	444.	3.20	39.	10.	7.	.22
+	ROUTED TO	ROFF2	439.	3.23	39.	10.	7.	.22

+	HYDROGRAPH AT	OFF1	3719.	3.20	324.	81.	59.	1.81
+	ROUTED TO	ROFF1	3708.	3.23	324.	81.	59.	1.81
+	HYDROGRAPH AT	SUB S	71.	3.17	6.	2.	1.	.04
+	4 COMBINED AT	CTPP2	5202.	3.27	624.	157.	113.	3.37
+	ROUTED TO	RTPP2	5199.	3.27	624.	157.	113.	3.37
+	HYDROGRAPH AT	SUB L	121.	3.17	12.	3.	2.	.06
+	HYDROGRAPH AT	PARK2	55.	3.17	5.	1.	1.	.03
+	ROUTED TO	RPARK2	54.	3.20	5.	1.	1.	.03
+	3 COMBINED AT	CTPC1	5333.	3.27	639.	161.	116.	3.46
+	ROUTED TO	RCTPC1	5262.	3.30	639.	161.	116.	3.46
+	HYDROGRAPH AT	SUB M	114.	3.17	10.	3.	2.	.05
+	2 COMBINED AT	C1700	5329.	3.30	649.	164.	118.	3.51
+	2 COMBINED AT	CPBC	9772.	3.33	1273.	324.	234.	6.48
+	HYDROGRAPH AT	2020B	307.	3.10	20.	5.	4.	.09
+	ROUTED TO	R2020B	294.	3.13	20.	5.	4.	.09
+	HYDROGRAPH AT	2020A	74.	3.07	4.	1.	1.	.02
+	2 COMBINED AT	C2020	348.	3.10	24.	6.	4.	.11
+	ROUTED TO	R2020	345.	3.13	24.	6.	4.	.11
+	HYDROGRAPH AT	2015B	44.	3.07	3.	1.	0.	.01
+	HYDROGRAPH AT	2060B	286.	3.10	19.	5.	3.	.08
+	ROUTED TO	R2060	234.	3.20	19.	5.	3.	.08
+	3 COMBINED AT	C2060	589.	3.17	45.	11.	8.	.21
+	HYDROGRAPH AT	2040C	415.	3.10	29.	7.	5.	.12
+	ROUTED TO	DETC	407.	3.13	29.	7.	5.	.12
+	HYDROGRAPH AT	2040B	1580.	3.17	118.	30.	21.	.58
+	ROUTED TO	DETB	1378.	3.20	118.	30.	21.	.58
+	2 COMBINED AT	C2040A	1708.	3.17	146.	37.	27.	.71
+	ROUTED TO	R2040	1695.	3.23	146.	37.	26.	.71
+	HYDROGRAPH AT	2040A	775.	3.10	56.	14.	10.	.28
+	2 COMBINED AT	C2040	2182.	3.20	201.	51.	37.	.99
+	HYDROGRAPH AT	2050B3	798.	3.07	51.	13.	9.	.24
+	ROUTED TO	R2050C	797.	3.10	51.	13.	9.	.24

+	HYDROGRAPH AT	2050B2	383.	3.10	24.	6.	4.	.11
+	ROUTED TO	R2050D	381.	3.10	24.	6.	4.	.11
	2 COMBINED AT	C2050B	1177.	3.10	74.	19.	13.	.35
+	ROUTED TO	R2050B	1160.	3.10	74.	19.	13.	.35
+	HYDROGRAPH AT	2050B1	344.	3.10	23.	6.	4.	.14
+	2 COMBINED AT	C2050C	1501.	3.10	97.	24.	18.	.48
+	ROUTED TO	R2050A	1456.	3.13	97.	24.	18.	.48
+	HYDROGRAPH AT	2050B4	113.	3.07	7.	2.	1.	.03
+	ROUTED TO	R2050D	113.	3.10	7.	2.	1.	.03
+	HYDROGRAPH AT	2050B	192.	3.10	12.	3.	2.	.07
+	3 COMBINED AT	C2050Z	1731.	3.13	116.	29.	21.	.58
+	ROUTED TO	DET1	1742.	3.13	116.	29.	21.	.58
+	HYDROGRAPH AT	2050A1	197.	3.10	13.	3.	2.	.06
+	ROUTED TO	R2050E	193.	3.10	13.	3.	2.	.06
+	HYDROGRAPH AT	2050A2	332.	3.10	22.	5.	4.	.10
	3 COMBINED AT	C2050D	2238.	3.13	150.	38.	27.	.74
+	ROUTED TO	DET2	2123.	3.13	150.	38.	27.	.74
+	ROUTED TO	R2050	2109.	3.17	150.	38.	27.	.74
+	HYDROGRAPH AT	2050A3	79.	3.13	5.	1.	1.	.03
+	ROUTED TO	R2055	77.	3.17	5.	1.	1.	.03
+	HYDROGRAPH AT	2050A	165.	3.20	15.	4.	3.	.10
+	3 COMBINED AT	C2050	2333.	3.17	170.	43.	31.	.86
+	2 COMBINED AT	C2051	4404.	3.20	369.	93.	67.	1.85
+	ROUTED TO	DET3	4337.	3.20	369.	93.	67.	1.85
+	HYDROGRAPH AT	2067	78.	3.13	5.	1.	1.	.04
+	2 COMBINED AT	C2067	4391.	3.20	374.	94.	68.	1.89
+	ROUTED TO	R2051	4020.	3.27	374.	94.	68.	1.89
+	HYDROGRAPH AT	2066	179.	3.20	16.	4.	3.	.12
+	HYDROGRAPH AT	2065A	679.	3.20	24.	6.	4.	1.71
+	ROUTED TO	R2131	627.	3.27	24.	6.	4.	1.71
+	2 COMBINED AT	C2066	799.	3.27	41.	10.	7.	.12
+	ROUTED TO	DET4	798.	3.27	41.	10.	7.	.12

+	ROUTED TO	R2132	723.	3.37	41.	10.	7.	.12
+	HYDROGRAPH AT	2065	175.	3.17	15.	4.	3.	.11
	4 COMBINED AT	C2068	4882.	3.27	472.	119.	86.	2.82
+	ROUTED TO	DET5	4868.	3.27	472.	119.	86.	2.82
+	ROUTED TO	R2068	4802.	3.30	472.	119.	86.	2.82
+	HYDROGRAPH AT	SUB39	3583.	3.27	379.	96.	69.	1.88
+	HYDROGRAPH AT	SUB40	1387.	3.17	110.	28.	20.	.58
+	2 COMBINED AT	CP41	4590.	3.23	487.	123.	88.	2.47
+	ROUTED TO	41.1	4040.	3.40	486.	123.	88.	2.47
+	HYDROGRAPH AT	SUB41	1126.	3.27	121.	31.	22.	.83
+	2 COMBINED AT	41.2	4780.	3.40	603.	152.	110.	3.29
+	HYDROGRAPH AT	SUB42	1347.	3.17	116.	29.	21.	.58
+	HYDROGRAPH AT	SUB43	2613.	3.17	234.	59.	43.	1.07
+	HYDROGRAPH AT	SUB44	1994.	3.20	182.	46.	33.	.84
+	2 COMBINED AT	CP45	4536.	3.20	414.	104.	75.	1.91
	ROUTED TO	45.1	4296.	3.27	414.	104.	75.	1.91
+	HYDROGRAPH AT	SUB45	574.	3.10	41.	10.	7.	.20
+	2 COMBINED AT	45.2	4556.	3.27	453.	114.	82.	2.11
+	HYDROGRAPH AT	SUB45A	490.	3.13	38.	10.	7.	.17
+	HYDROGRAPH AT	SUB46	2904.	3.13	203.	51.	37.	.93
+	3 COMBINED AT	CP47	6762.	3.20	690.	174.	125.	3.21
+	ROUTED TO	47.1	6324.	3.33	690.	174.	125.	3.21
+	HYDROGRAPH AT	SUB47	470.	3.37	60.	15.	11.	.38
+	2 COMBINED AT	47.2	6755.	3.33	749.	189.	136.	3.58
+	3 COMBINED AT	CP48	11456.	3.37	1436.	363.	262.	7.46
+	ROUTED TO	48.1	11284.	3.40	1436.	363.	262.	7.46
+	HYDROGRAPH AT	SUB48R	74.	3.30	8.	2.	1.	.06
+	HYDROGRAPH AT	SUB50	932.	3.17	72.	18.	13.	.36
+	ROUTED TO	48.2	905.	3.17	72.	18.	13.	.36
+	3 COMBINED AT	CP51	11650.	3.40	1509.	382.	275.	7.88
+	ROUTED TO	2006	11514.	3.43	1509.	382.	275.	7.88
+	HYDROGRAPH AT	2005	172.	3.23	17.	4.	3.	.14

+	2 COMBINED AT	2007	11583.	3.43	1525.	386.	278.	8.02
+	HYDROGRAPH AT	2000	2060.	3.17	160.	40.	29.	.80
+	ROUTED TO	2008	1955.	3.20	160.	40.	29.	.80
+	2 COMBINED AT	2009	12301.	3.43	1673.	423.	305.	8.82
+	ROUTED TO	2011	12182.	3.47	1673.	423.	305.	8.82
+	HYDROGRAPH AT	2010	203.	3.20	18.	5.	3.	.09
+	2 COMBINED AT	2012	12250.	3.47	1690.	427.	308.	8.91
+	ROUTED TO	R2016	11700.	3.53	1688.	427.	308.	8.91
+	HYDROGRAPH AT	2015A	927.	3.23	85.	21.	15.	.44
+	HYDROGRAPH AT	2030C	81.	3.37	12.	3.	2.	.13
+	3 COMBINED AT	C2030	12017.	3.53	1775.	449.	324.	9.49
+	ROUTED TO	R2030	11959.	3.57	1774.	449.	324.	9.49
+	HYDROGRAPH AT	2031	214.	3.07	12.	3.	2.	.10
+	3 COMBINED AT	C3000	13673.	3.53	2213.	560.	404.	12.41
+	ROUTED TO	R3000	13422.	3.60	2211.	560.	404.	12.41
+	HYDROGRAPH AT	2030B	75.	3.20	8.	2.	1.	.05
+	ROUTED TO	R3001	65.	3.33	8.	2.	1.	.05
+	HYDROGRAPH AT	2032	157.	3.07	10.	3.	2.	.05
+	HYDROGRAPH AT	2033	107.	3.37	14.	4.	3.	.13
+	4 COMBINED AT	C3002	13511.	3.60	2237.	568.	409.	12.63
+	ROUTED TO	R3002	13343.	3.63	2235.	568.	409.	12.63
+	HYDROGRAPH AT	3005	89.	3.23	9.	2.	2.	.09
+	HYDROGRAPH AT	3004	104.	3.10	8.	2.	1.	.04
+	2 COMBINED AT	C3005	149.	3.20	17.	4.	3.	.13
+	2 COMBINED AT	C2036	13371.	3.63	2247.	571.	412.	12.77
+	ROUTED TO	RC2036	13299.	3.67	2245.	571.	412.	12.77
+	ROUTED TO	RCPREA	13257.	3.70	2245.	571.	412.	12.77
+	2 COMBINED AT	CPI	17398.	3.67	3412.	872.	629.	19.25
+	HYDROGRAPH AT	SUB V3	33.	3.23	4.	1.	1.	.02
+	ROUTED TO	DET V3	22.	3.40	4.	1.	1.	.02
+	HYDROGRAPH AT	SUB V2	28.	3.23	3.	1.	1.	.02
+	HYDROGRAPH AT	SUB V1	115.	3.27	14.	3.	3.	.08

Peak Flow @  
Bell Road Bridge

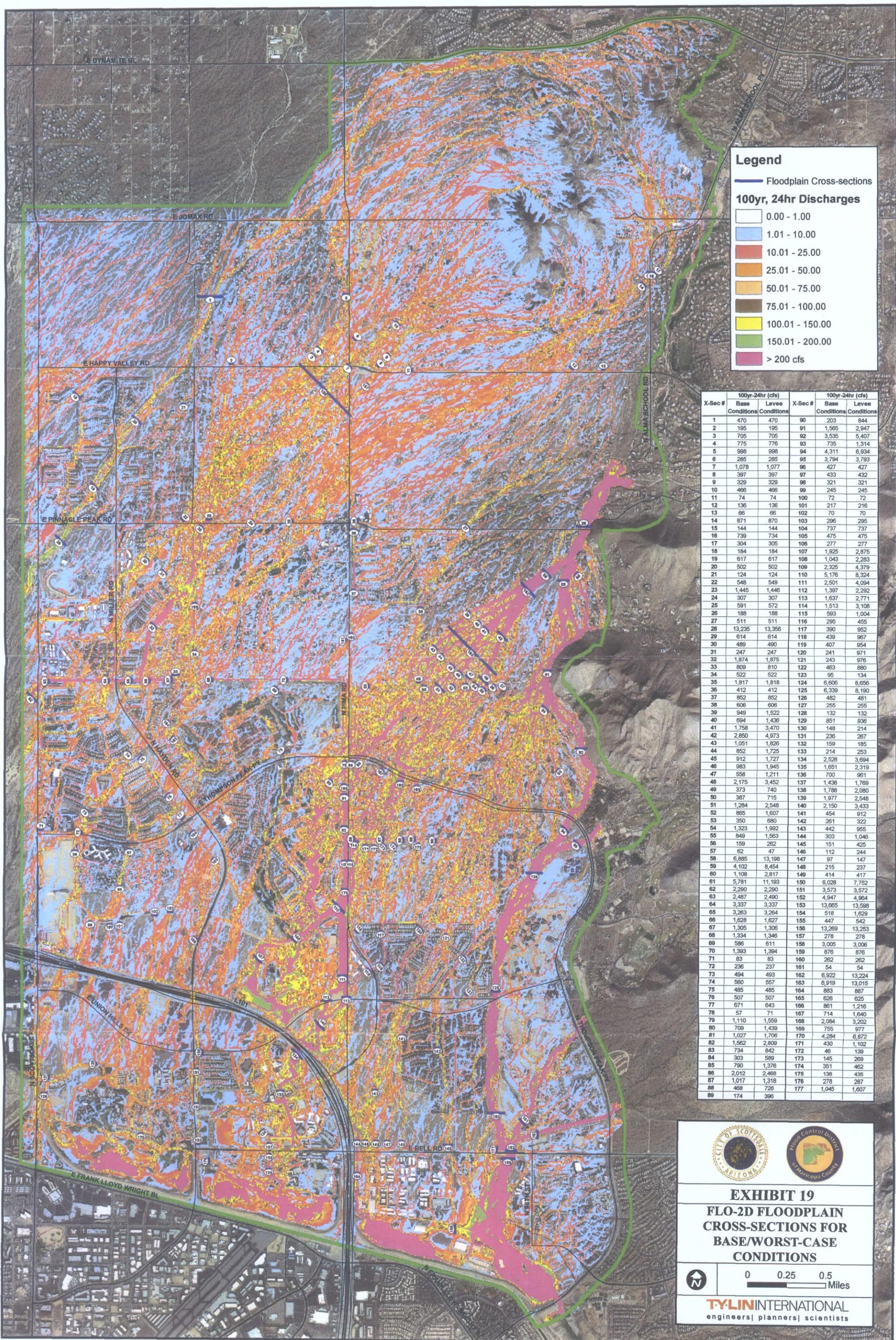
+	ROUTED TO	DETV1	93.	3.40	14.	3.	3.	.08
+	HYDROGRAPH AT	SUB U2	131.	3.20	13.	3.	2.	.07
	ROUTED TO	DETV2	72.	3.40	13.	3.	2.	.07
+	HYDROGRAPH AT	SUB U1	106.	3.20	10.	3.	2.	.05
+	ROUTED TO	DETV1	78.	3.30	10.	3.	2.	.05
+	HYDROGRAPH AT	SUB T	110.	3.17	10.	3.	2.	.05
+	ROUTED TO	DETT	80.	3.30	10.	3.	2.	.05
+	ROUTED TO	RSUB T	79.	3.30	10.	3.	2.	.05
+	HYDROGRAPH AT	SUB 6	27.	3.13	2.	0.	0.	.01
+	2 COMBINED AT	CP6	91.	3.30	12.	3.	2.	.06
+	HYDROGRAPH AT	SUB 5	38.	3.13	3.	1.	1.	.02
+	HYDROGRAPH AT	SUB N	141.	3.13	12.	3.	2.	.05
+	ROUTED TO	DETN	99.	3.23	12.	3.	2.	.05

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

## **APPENDIX B**

**Excerpts from *City of Scottsdale Pinnacle Peak  
South ADMS/P (Reference 7)***

# PINNACLE PEAK SOUTH ADMS/P





**Legend**

- Floodplain Cross-sections


**100yr, 24hr Discharges**

- 0.00 - 1.00
- 1.01 - 10.00
- 10.01 - 25.00
- 25.01 - 50.00
- 50.01 - 75.00
- 75.01 - 100.00
- 100.01 - 150.00
- 150.01 - 200.00
- > 200 cfs

X-Sec #	100yr-24hr (cfs)		X-Sec #	100yr-24hr (cfs)	
	Base Conditions	Levee Conditions		Base Conditions	Levee Conditions
1	470	470	90	203	844
2	195	195	91	1,565	2,947
3	705	705	92	3,535	5,407
4	775	776	93	735	1,314
5	998	998	94	4,311	6,934
6	285	285	95	3,794	3,793
7	1,078	1,077	96	427	427
8	397	397	97	433	432
9	329	329	98	321	321
10	466	466	99	245	245
11	74	74	100	72	72
12	136	136	101	217	216
13	66	66	102	70	70
14	144	144	103	296	295
15	171	171	104	737	737
16	739	734	105	475	475
17	304	305	106	277	277
18	184	184	107	1,925	2,875
19	617	617	108	1,043	2,283
20	502	502	109	2,325	4,379
21	124	124	110	5,176	8,324
22	548	549	111	2,501	4,094
23	1,445	1,446	112	1,397	2,292
24	307	307	113	1,637	2,771
25	591	572	114	1,513	3,108
26	188	188	115	593	1,004
27	511	511	116	295	455
28	13,235	13,356	117	390	952
29	614	614	118	439	967
30	489	490	119	407	954
31	247	247	120	241	971
32	1,874	1,875	121	243	976
33	809	810	122	463	880
34	522	522	123	95	134
35	1,817	1,818	124	6,006	8,656
36	412	412	125	6,339	8,190
37	852	852	126	482	481
38	606	606	127	255	255
39	949	1,522	128	132	132
40	694	1,436	129	851	936
41	1,758	3,470	130	148	214
42	2,850	4,973	131	236	267
43	1,051	1,826	132	159	185
44	852	1,725	133	214	253
45	912	1,727	134	2,528	3,694
46	983	1,945	135	1,651	2,319
47	558	1,211	136	700	961
48	2,175	3,452	137	1,438	1,769
49	373	740	138	1,788	2,080
50	387	715	139	1,977	2,548
51	1,284	2,548	140	2,150	3,433
52	865	1,607	141	454	912
53	350	680	142	261	322
54	1,323	1,992	143	442	965
55	849	1,563	144	303	1,046
56	159	262	145	151	425
57	62	47	146	112	244
58	6,885	13,198	147	97	147
59	4,102	8,454	148	215	237
60	1,108	2,817	149	414	417
61	5,781	11,193	150	6,028	7,752
62	2,290	2,290	151	3,573	3,572
63	2,487	2,490	152	4,947	4,964
64	3,337	3,337	153	13,665	13,598
65	3,263	3,264	154	518	1,629
66	1,628	1,627	155	447	542
67	1,305	1,306	156	13,269	13,253
68	1,334	1,346	157	278	278
69	586	611	158	3,005	3,006
70	1,393	1,394	159	876	876
71	83	83	160	262	262
72	236	237	161	54	54
73	494	493	162	6,922	13,224
74	560	557	163	6,919	13,015
75	485	485	164	883	887
76	507	507	165	626	625
77	671	643	166	861	1,216
78	57	71	167	714	1,640
79	1,110	1,559	168	2,094	3,202
80	709	1,439	169	756	977
81	1,027	1,706	170	4,284	6,872
82	1,562	2,809	171	430	1,102
83	734	842	172	46	139
84	303	589	173	145	269
85	790	1,376	174	351	462
86	2,012	2,468	175	138	435
87	1,017	1,318	176	278	287
88	468	726	177	1,045	1,607
89	174	396			

**EXHIBIT 19**  
**FLO-2D FLOODPLAIN**  
**CROSS-SECTIONS FOR**  
**BASE/WORST-CASE**  
**CONDITIONS**



0    0.25    0.5

Miles

**TYLIN INTERNATIONAL**  
 engineers | planners | scientists

## **APPENDIX C**

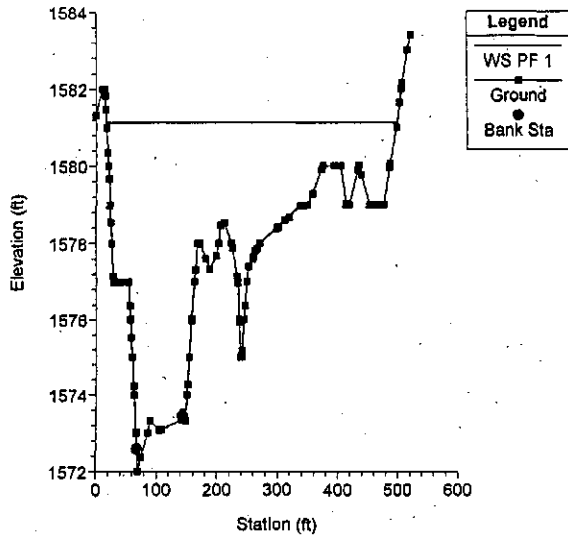
### **Existing Conditions Hydraulic Analysis**

# Existing

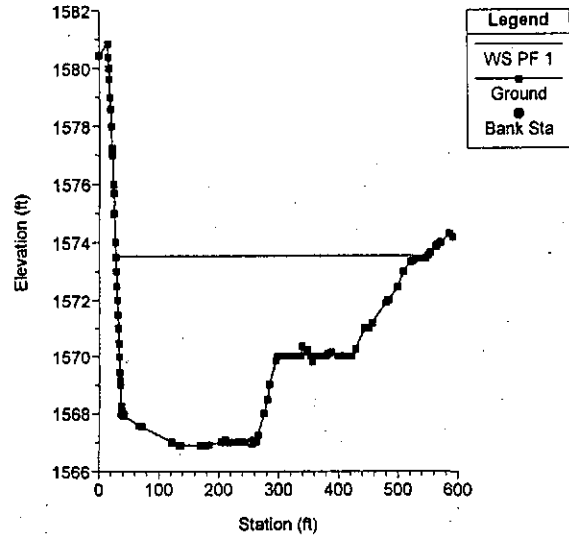
HEC-RAS Plan: EX Profile: PF 1

River	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
Unnamed Wash	Wash2	1900	PF 1	115.00	1565.00	1567.00	1567.00	1567.52	0.017195	5.85	20.08	20.73	0.98
Unnamed Wash	Wash2	1800	PF 1	115.00	1563.00	1564.92	1564.92	1565.47	0.018328	5.97	19.27	17.75	1.01
Unnamed Wash	Wash2	1700	PF 1	115.00	1562.00	1563.51		1563.76	0.006224	4.06	31.19	31.64	0.62
Unnamed Wash	Wash2	1600	PF 1	115.00	1561.00	1562.32	1562.29	1562.79	0.015978	5.53	21.24	21.84	0.95
Unnamed Wash	Wash2	1519	PF 1	115.00	1559.00	1560.84	1560.84	1561.41	0.018177	6.09	18.89	16.69	1.01
Unnamed Wash	Wash2	1456	PF 1	115.00	1558.00	1560.43		1560.66	0.005402	3.92	29.54	21.67	0.57
Unnamed Wash	Wash2	1409	PF 1	115.00	1558.00	1559.87		1560.29	0.011491	5.16	22.51	19.61	0.82
Unnamed Wash	Wash2	1300	PF 1	115.00	1557.00	1558.95		1559.24	0.007629	4.44	28.12	25.99	0.68
Unnamed Wash	Wash2	1200	PF 1	115.00	1556.00	1557.57	1557.57	1558.09	0.018460	5.76	19.96	19.94	1.01
Unnamed Wash	Wash2	1100	PF 1	115.00	1554.00	1555.97		1556.38	0.012006	5.18	22.33	19.69	0.83
Unnamed Wash	Wash2	1000	PF 1	115.00	1553.00	1554.79	1554.71	1555.18	0.012080	5.12	24.89	28.53	0.83
Unnamed Wash	Wash2	922	PF 1	115.00	1552.00	1553.70	1553.70	1554.15	0.014260	5.56	23.55	30.30	0.90
Unnamed Wash	Wash2	825	PF 1	115.00	1551.00	1553.57		1553.66	0.001646	2.60	60.95	79.57	0.33
Unnamed Wash	Wash2	768	PF 1	115.00	1551.00	1553.62		1553.63	0.000130	0.77	244.77	204.73	0.09
Reata Pass Wash	Wash1	3296	PF 1	13269.00	1572.00	1581.13	1581.13	1582.70	0.005408	12.57	1770.04	481.22	0.78
Reata Pass Wash	Wash1	2973	PF 1	13269.00	1566.89	1573.54	1571.81	1574.25	0.002606	7.47	2263.47	521.01	0.52
Reata Pass Wash	Wash1	2920	Bridge										
Reata Pass Wash	Wash1	2825	PF 1	13269.00	1565.00	1570.58	1570.58	1572.69	0.013521	15.34	1237.25	293.96	1.16
Reata Pass Wash	Wash1	2631	PF 1	13269.00	1564.00	1568.79	1568.79	1569.92	0.012232	12.97	1763.78	765.99	1.07
Reata Pass Wash	Wash1	2405	PF 1	13269.00	1561.00	1565.49	1565.49	1566.59	0.016786	12.63	1703.95	737.61	1.19
Reata Pass Wash	Wash1	2183	PF 1	13269.00	1557.00	1562.06	1561.91	1562.99	0.014050	11.47	1851.24	804.20	1.08
Reata Pass Wash	Wash1	1960	PF 1	13269.00	1555.35	1559.17	1558.80	1559.98	0.012930	9.80	1891.89	816.07	1.01
Reata Pass Wash	Wash1	1806	PF 1	13269.00	1553.00	1556.32	1556.32	1557.46	0.020340	12.76	1656.76	811.16	1.28
Reata Pass Wash	Wash1	1475	PF 1	13269.00	1547.00	1552.03		1552.53	0.009294	8.69	2466.71	1146.10	0.83
Reata Pass Wash	Wash1	1209	PF 1	13269.00	1544.00	1548.33	1548.30	1549.11	0.018881	10.92	1989.67	1144.30	1.15
Reata Pass Wash	Wash1	959	PF 1	13269.00	1540.10	1545.12	1544.69	1545.63	0.010206	8.89	2409.96	1150.13	0.86
Reata Pass Wash	Wash1A	847	PF 1	13269.00	1535.00	1542.54		1543.08	0.006635	10.16	2870.20	1507.34	0.78
Reata Pass Wash	Wash1A	409	PF 1	13269.00	1533.00	1542.71		1542.75	0.000273	2.56	8393.66	1942.47	0.16
Reata Pass Wash	Wash1A	338	PF 1	13269.00	1532.00	1541.85	1541.85	1542.63	0.004903	11.18	3067.41	2076.52	0.69
Reata Pass Wash	Wash1A	318	PF 1	13269.00	1532.00	1537.11	1536.91	1537.65	0.010896	10.07	2551.22	1499.08	0.91
Reata Pass Wash	Wash1A	96	PF 1	13269.00	1529.00	1534.57	1534.23	1535.11	0.012005	9.47	2382.49	1408.89	0.93

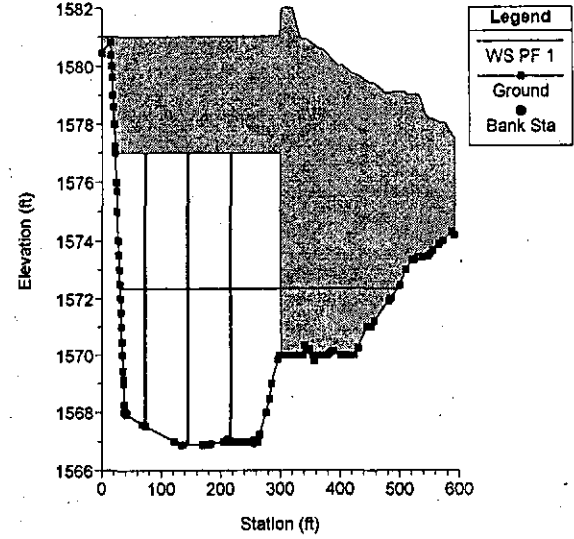
NotreDame\_Existing Plan: EX 6/8/2012  
 River = Reata Pass Wash Reach = Wash1 RS = 3266



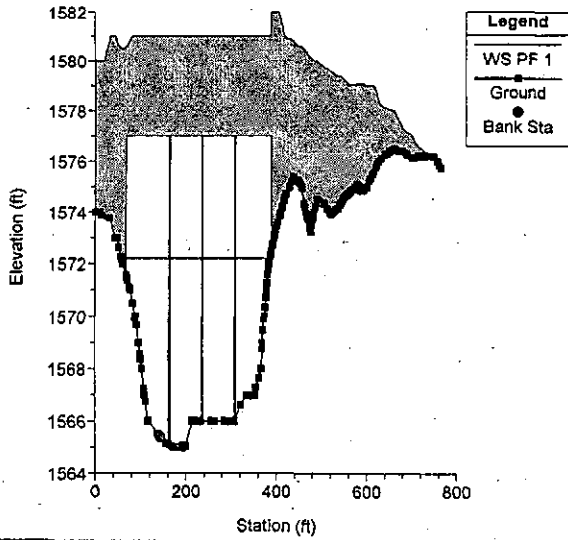
NotreDame\_Existing Plan: EX 6/8/2012  
 River = Reata Pass Wash Reach = Wash1 RS = 2973



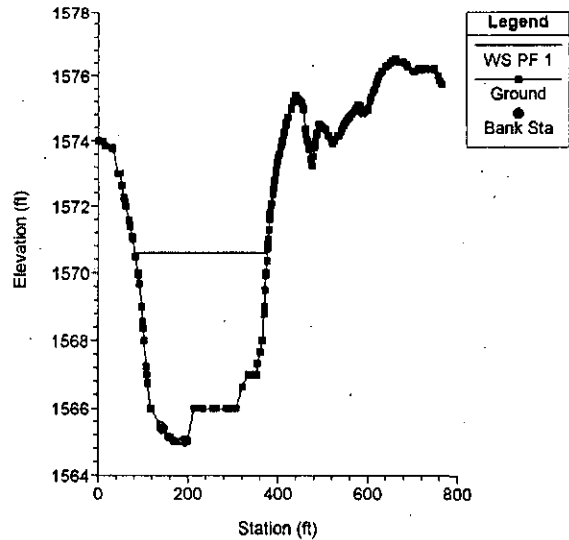
NotreDame\_Existing Plan: EX 6/8/2012  
 River = Reata Pass Wash Reach = Wash1 RS = 3200 BA - Ball Point Bridge (Bridge Section Measured During Field Visit)



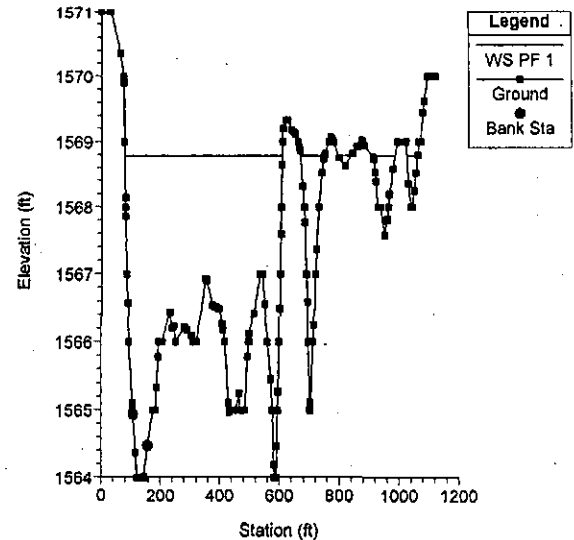
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 River = Reata Pass Wash Reach = Wash1 RS = 2822 BA - Ball Point Bridge (Bridge Section Measured During Field Visit)



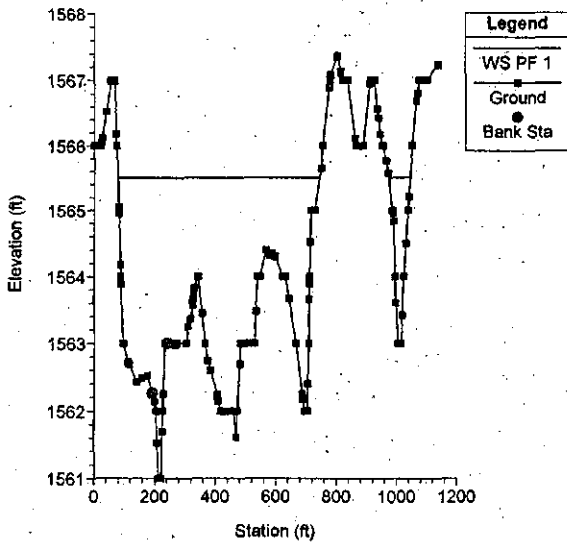
NotreDame\_Existing Plan: EX 6/8/2012  
 River = Reata Pass Wash Reach = Wash1 RS = 2825



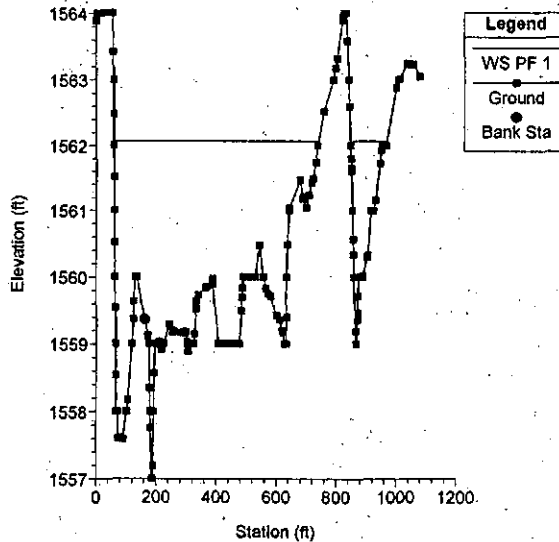
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 River = Reata Pass Wash Reach = Wash1 RS = 2631



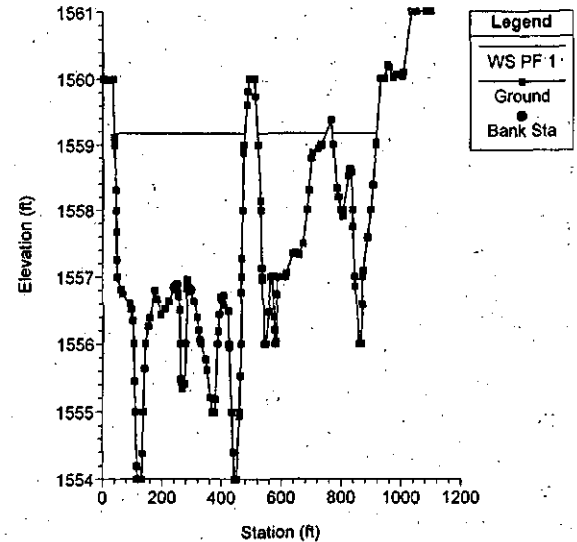
NotreDame\_Existing Plan: EX 6/8/2012  
River = Reata Pass Wash Reach = Wash1 RS = 2405



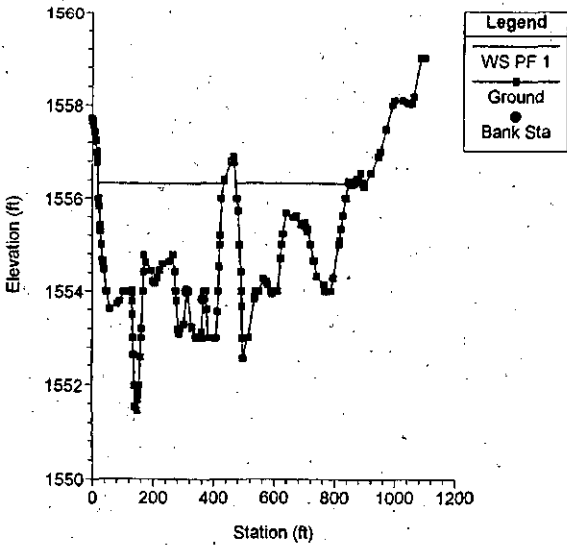
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River = Reata Pass Wash Reach = Wash1 RS = 2183



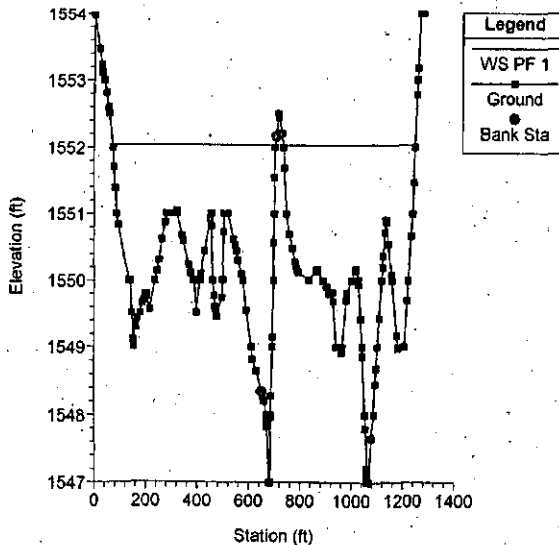
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River = Reata Pass Wash Reach = Wash1 RS = 1960



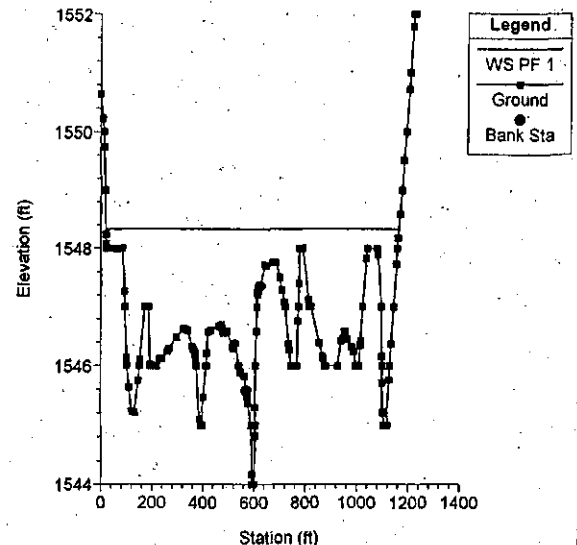
NotreDame\_Existing Plan: EX 6/8/2012  
River = Reata Pass Wash Reach = Wash1 RS = 1806



NotreDame\_Existing Plan: EX 6/8/2012  
River = Reata Pass Wash Reach = Wash1 RS = 1475

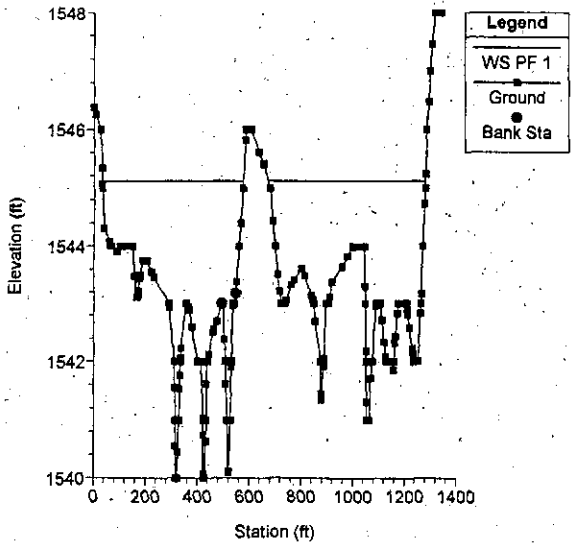


NotreDame\_Existing Plan: EX 6/8/2012  
River = Reata Pass Wash Reach = Wash1 RS = 1209



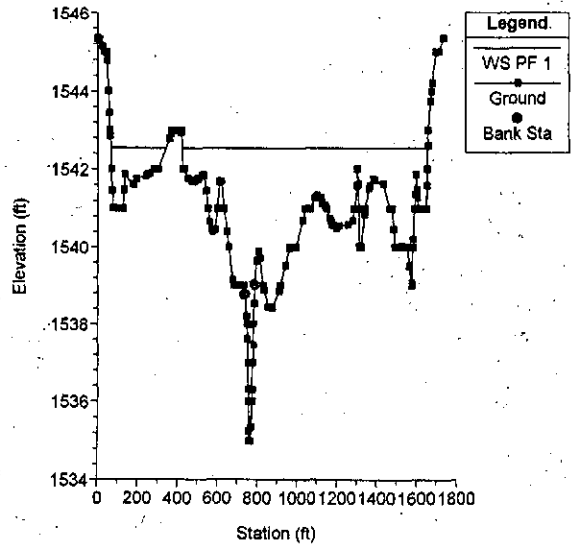
NotreDame\_Existing Plan: EX 6/8/2012

River = Reata Pass Wash Reach = Wash1 RS = 959



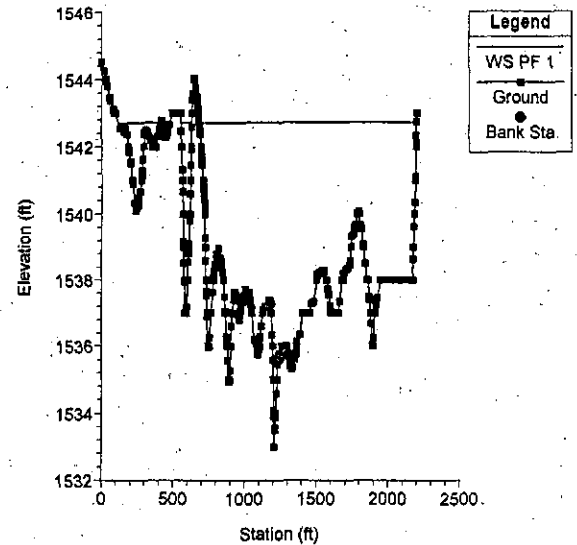
NotreDame\_Existing Plan: EX 6/8/2012

River = Reata Pass Wash Reach = Wash1A RS = 647



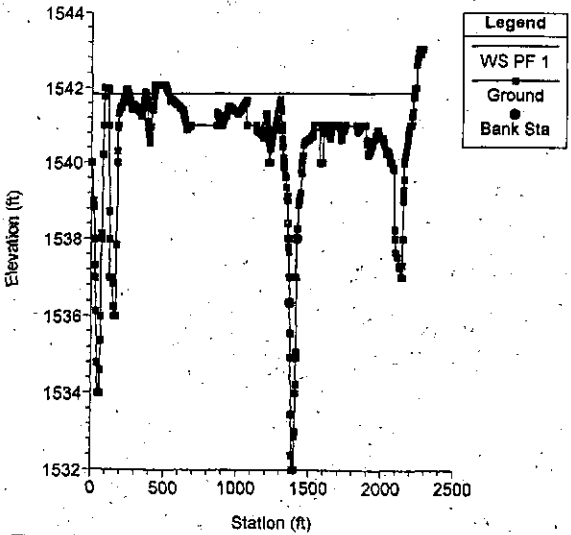
NotreDame\_Existing Plan: EX 6/8/2012

River = Reata Pass Wash Reach = Wash1A RS = 409



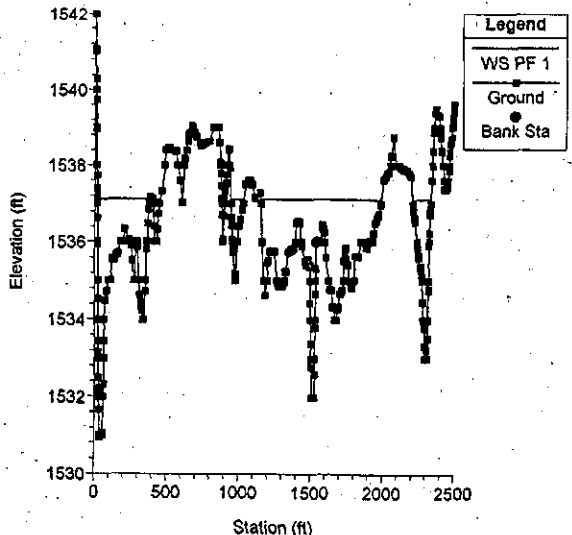
NotreDame\_Existing Plan: EX 6/8/2012

River = Reata Pass Wash Reach = Wash1A RS = 338



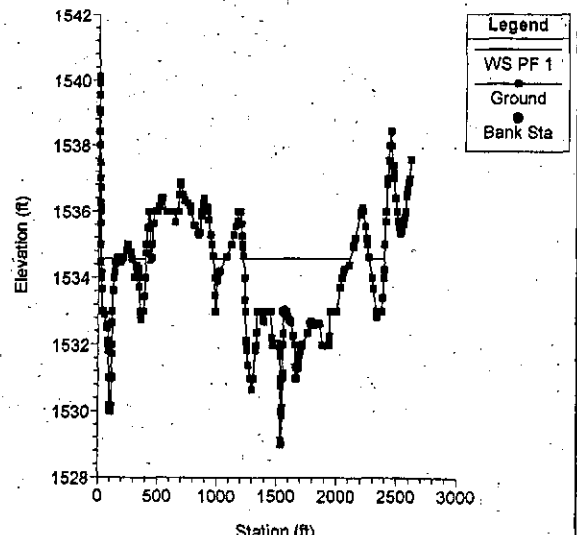
NotreDame\_Existing Plan: EX 6/8/2012

River = Reata Pass Wash Reach = Wash1A RS = 318



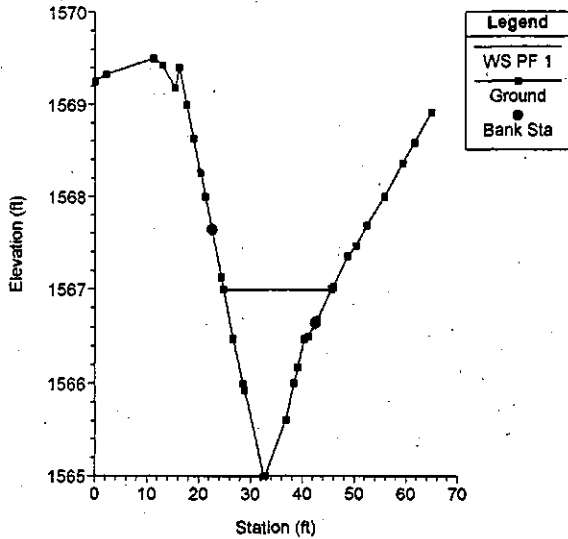
NotreDame\_Existing Plan: EX 6/8/2012

River = Reata Pass Wash Reach = Wash1A RS = 96



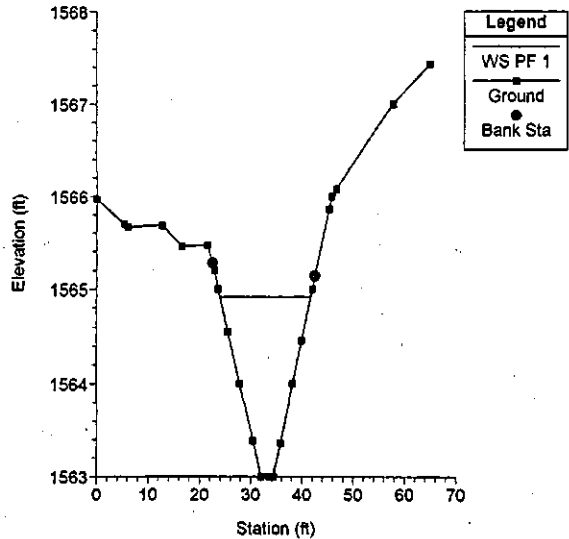
NotreDame\_Existing Plan: EX 6/8/2012

River = Unnamed Wash Reach = Wash2 RS = 1900



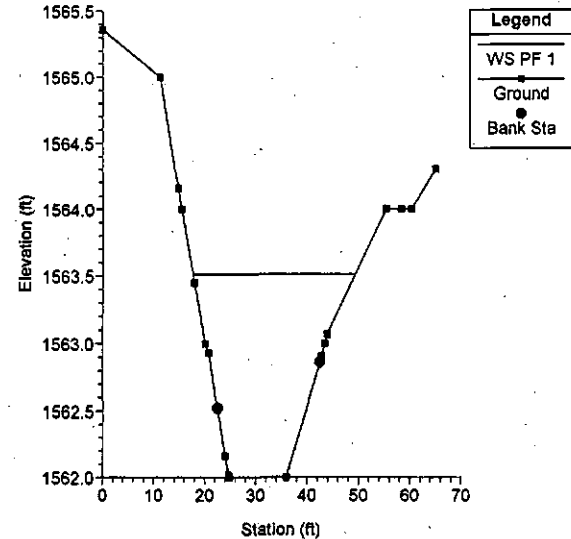
NotreDame\_Existing Plan: EX 6/8/2012

River = Unnamed Wash Reach = Wash2 RS = 1800



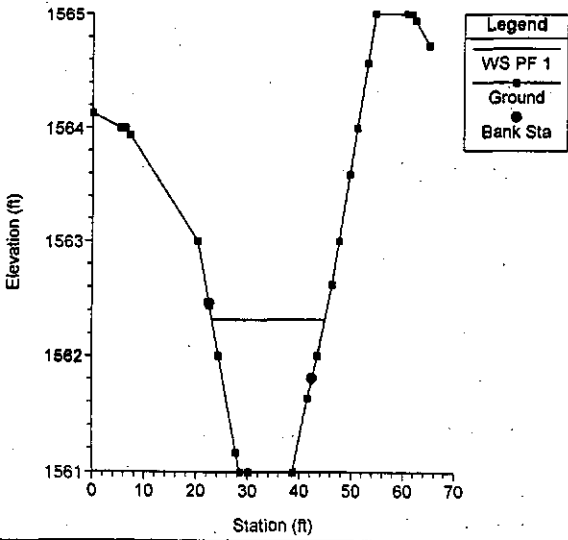
NotreDame\_Existing Plan: EX 6/8/2012

River = Unnamed Wash Reach = Wash2 RS = 1700



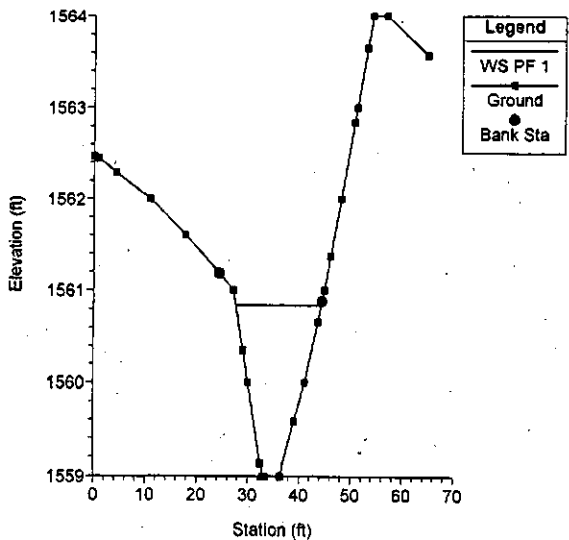
NotreDame\_Existing Plan: EX 6/8/2012

River = Unnamed Wash Reach = Wash2 RS = 1600



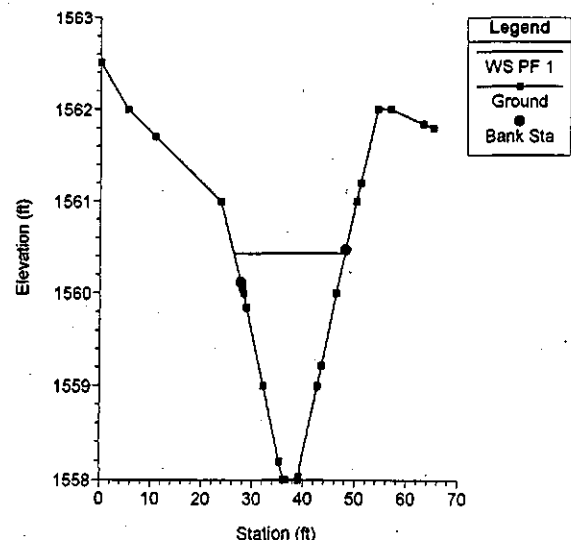
NotreDame\_Existing Plan: EX 6/8/2012

River = Unnamed Wash Reach = Wash2 RS = 1519

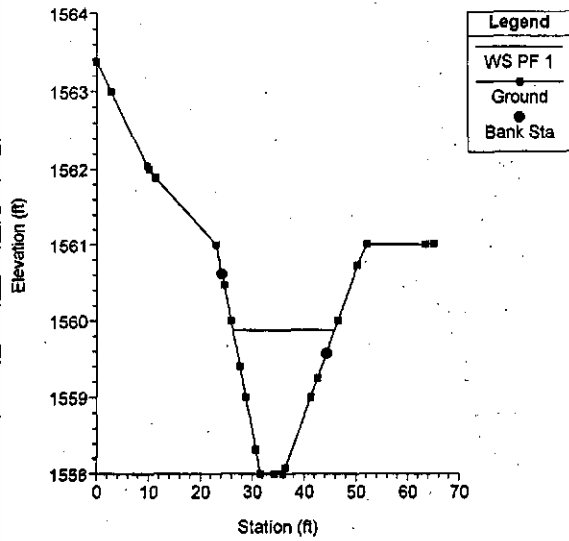


NotreDame\_Existing Plan: EX 6/8/2012

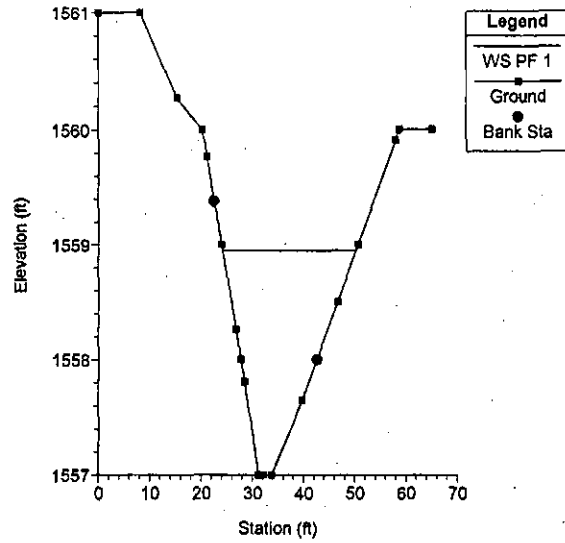
River = Unnamed Wash Reach = Wash2 RS = 1456



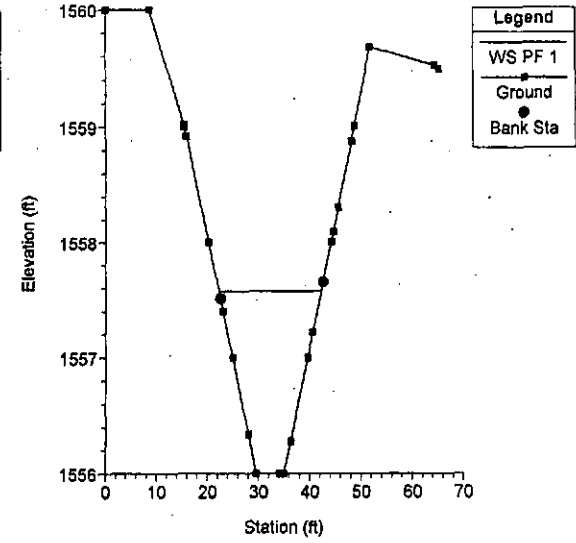
NotreDame\_Existing Plan: EX 6/8/2012  
 River = Unnamed Wash Reach = Wash2 RS = 1409



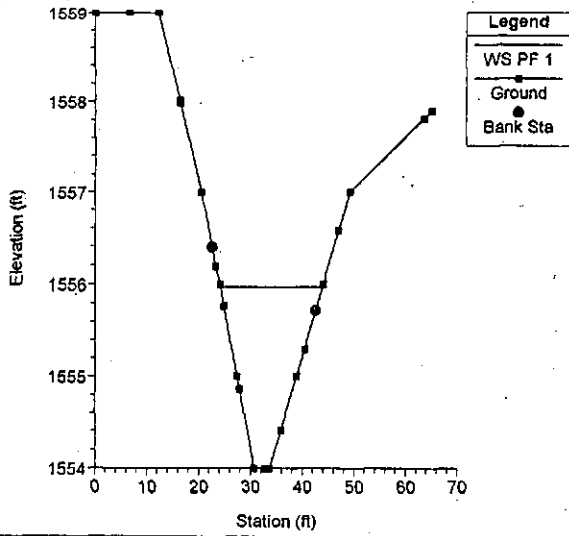
NotreDame\_Existing Plan: EX 6/8/2012  
 River = Unnamed Wash Reach = Wash2 RS = 1300



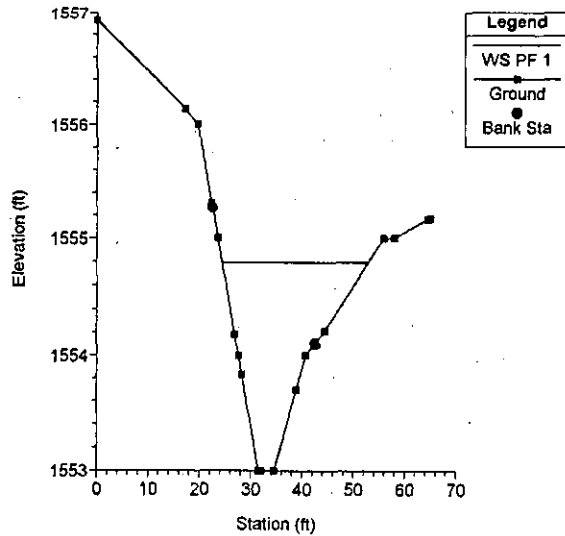
NotreDame\_Existing Plan: EX 6/8/2012  
 River = Unnamed Wash Reach = Wash2 RS = 1200



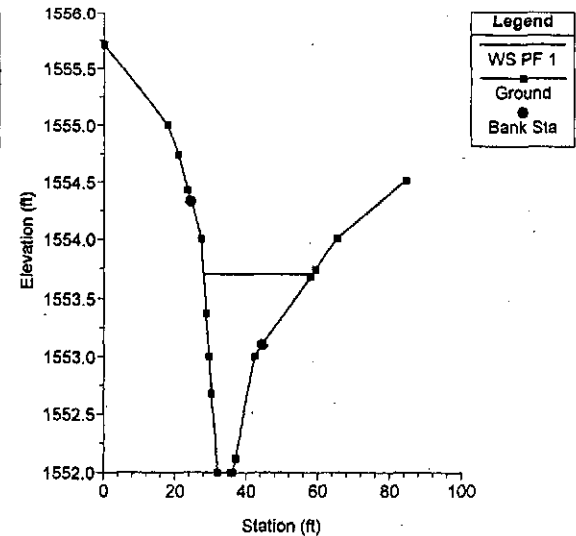
NotreDame\_Existing Plan: EX 6/8/2012  
 River = Unnamed Wash Reach = Wash2 RS = 1100



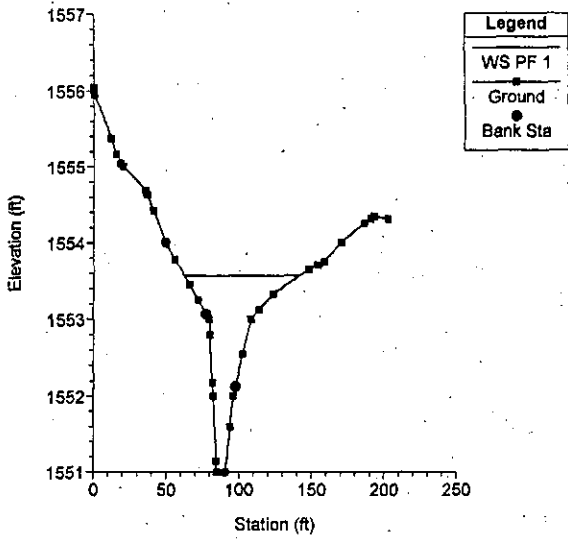
NotreDame\_Existing Plan: EX 6/8/2012  
 River = Unnamed Wash Reach = Wash2 RS = 1000



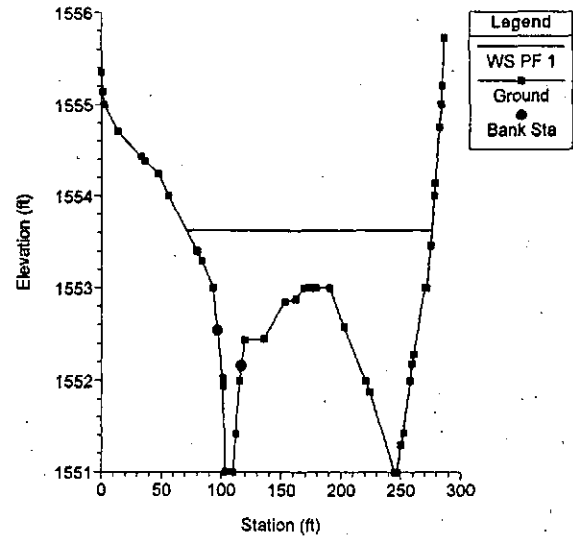
NotreDame\_Existing Plan: EX 6/8/2012  
 River = Unnamed Wash Reach = Wash2 RS = 922



NotreDame\_Existing Plan: EX 6/8/2012  
River = Unnamed Wash Reach = Wash2 RS = 825



NotreDame\_Existing Plan: EX 6/8/2012  
River = Unnamed Wash Reach = Wash2 RS = 798



## **APPENDIX D**

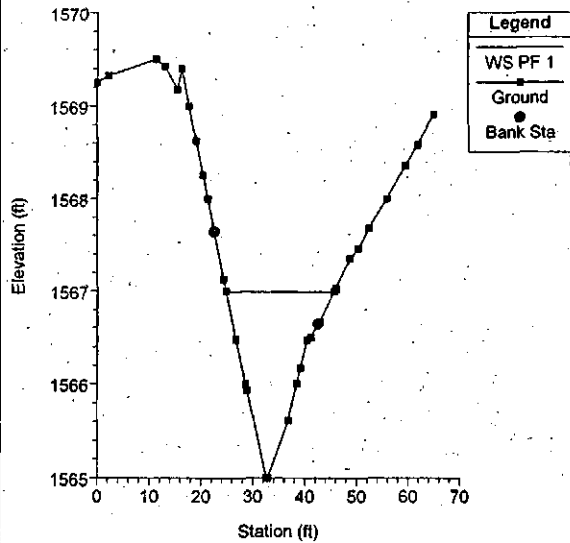
### **Proposed Conditions Hydraulic Analysis**

# Proposed

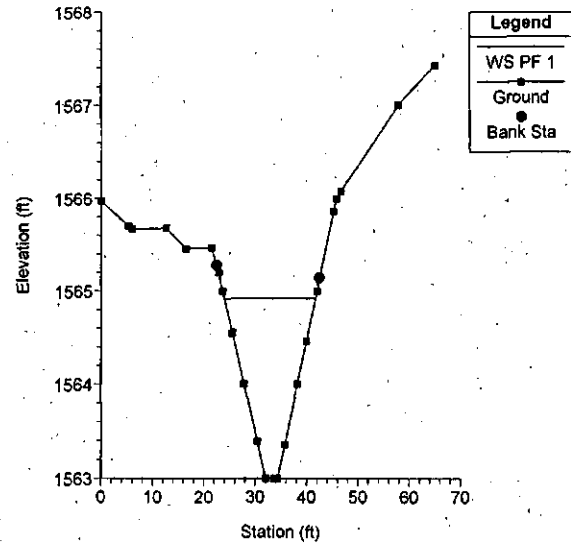
HEC-RAS Plan: PR Profile: PF 1

River	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
Unnamed Wash	Wash2	1900	PF 1	115.00	1565.00	1567.00	1567.00	1567.52	0.017195	5.85	20.08	20.73	0.98
Unnamed Wash	Wash2	1800	PF 1	115.00	1563.00	1564.81	1564.92	1565.49	0.024124	6.61	17.39	16.88	1.15
Unnamed Wash	Wash2	1700	PF 1	115.00	1562.00	1563.53	1563.19	1563.77	0.005980	4.01	31.66	31.89	0.61
Unnamed Wash	Wash2	1600	PF 1	115.00	1561.00	1562.29	1562.29	1562.79	0.017360	5.69	20.63	21.60	0.98
Unnamed Wash	Wash2	1519	PF 1	115.00	1559.00	1561.14	1560.84	1561.49	0.009695	4.75	24.32	20.31	0.75
Unnamed Wash	Wash2	1456	PF 1	115.00	1558.00	1561.27	1559.15	1561.32	0.000467	1.72	68.60	32.48	0.18
Unnamed Wash	Wash2	1461		Culvert									
Unnamed Wash	Wash2	1409	PF 1	115.00	1557.50	1559.57		1559.74	0.002920	3.25	35.43	19.03	0.42
Unnamed Wash	Wash2	1300	PF 1	115.00	1557.00	1558.95	1558.66	1559.24	0.007588	4.43	28.18	26.02	0.68
Unnamed Wash	Wash2	1200	PF 1	115.00	1558.00	1557.57	1557.57	1558.09	0.018446	5.76	19.97	19.95	1.01
Unnamed Wash	Wash2	1100	PF 1	115.00	1554.00	1557.30	1555.82	1557.38	0.000885	2.24	55.76	28.84	0.25
Unnamed Wash	Wash2	1000	PF 1	115.00	1553.00	1557.30	1554.69	1557.32	0.000215	1.43	99.44	45.00	0.13
Unnamed Wash	Wash2	917		Culvert									
Unnamed Wash	Wash2	798	PF 1	115.00	1551.00	1555.59	1552.68	1555.59	0.000027	0.55	307.08	105.00	0.05
Reata Pass Wash	Wash1	3296	PF 1	13269.00	1572.00	1581.13	1581.13	1582.70	0.005408	12.57	1770.04	481.22	0.78
Reata Pass Wash	Wash1	2973	PF 1	13269.00	1566.89	1569.68	1571.81	1577.35	0.082760	22.71	613.65	258.36	2.51
Reata Pass Wash	Wash1	2920		Bridge									
Reata Pass Wash	Wash1	2825	PF 1	13269.00	1565.00	1570.58	1570.58	1572.69	0.013521	15.34	1237.25	293.96	1.16
Reata Pass Wash	Wash1	2631	PF 1	13269.00	1564.00	1568.69	1568.79	1569.92	0.013635	13.50	1691.64	721.30	1.12
Reata Pass Wash	Wash1	2405	PF 1	13269.00	1561.00	1565.43	1565.49	1566.59	0.018218	13.00	1657.91	732.77	1.24
Reata Pass Wash	Wash1	2183	PF 1	13269.00	1557.00	1562.15	1561.93	1563.01	0.012522	11.02	1924.93	811.93	1.03
Reata Pass Wash	Wash1	1960	PF 1	13269.00	1555.35	1559.18	1558.87	1560.06	0.014226	10.25	1790.40	769.66	1.06
Reata Pass Wash	Wash1	1806	PF 1	13269.00	1553.00	1556.34	1556.34	1557.46	0.019788	12.64	1672.48	818.94	1.27
Reata Pass Wash	Wash1	1475	PF 1	13269.00	1547.00	1552.05	1551.66	1552.54	0.009037	8.56	2490.23	1147.88	0.82
Reata Pass Wash	Wash1	1209	PF 1	13269.00	1544.00	1548.31	1548.31	1549.14	0.019118	10.93	1915.26	1058.92	1.15
Reata Pass Wash	Wash1	959	PF 1	13269.00	1540.10	1545.40	1544.76	1545.90	0.007822	8.05	2433.75	975.63	0.76
Reata Pass Wash	Wash1A	647	PF 1	13269.00	1535.00	1542.38	1542.38	1543.20	0.009313	11.82	2294.69	1058.22	0.89
Reata Pass Wash	Wash1A	409	PF 1	13269.00	1533.00	1539.21	1538.87	1539.68	0.007822	9.12	2734.49	1368.97	0.79
Reata Pass Wash	Wash1A	336	PF 1	13269.00	1532.00	1538.26	1538.26	1539.02	0.010392	11.88	2321.06	1154.99	0.93
Reata Pass Wash	Wash1A	318	PF 1	13269.00	1532.00	1536.24	1536.91	1538.45	0.058561	19.63	1354.35	1222.94	2.02
Reata Pass Wash	Wash1A	96	PF 1	13269.00	1529.00	1534.57	1534.21	1535.11	0.012005	9.47	2382.49	1408.89	0.93

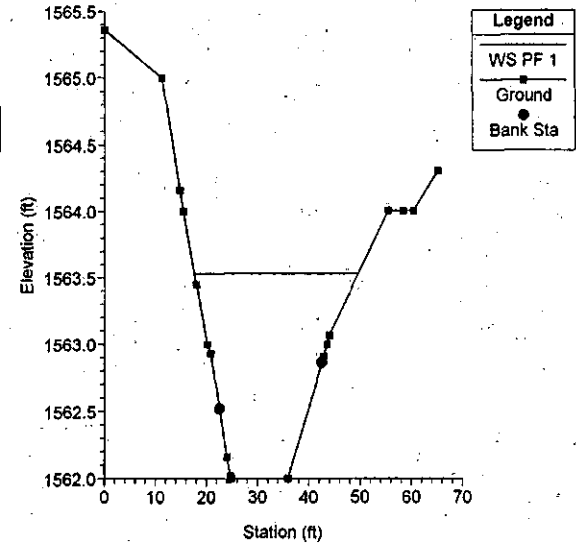
NotreDame\_Proposed Plan: PR 6/8/2012  
 River = Unnamed Wash Reach = Wash2 RS = 1900



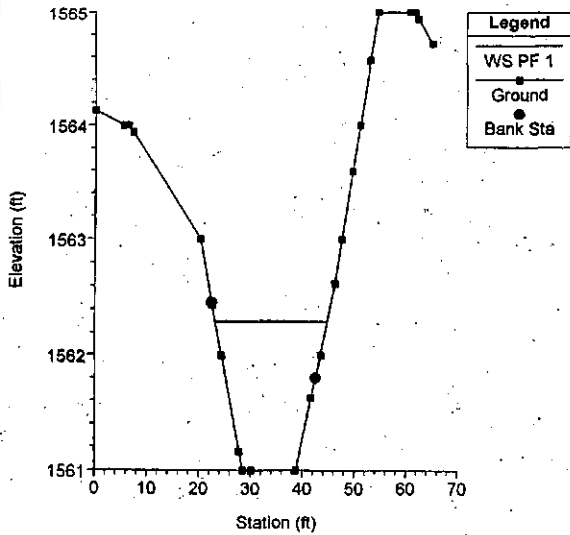
NotreDame\_Proposed Plan: PR 6/8/2012  
 River = Unnamed Wash Reach = Wash2 RS = 1800



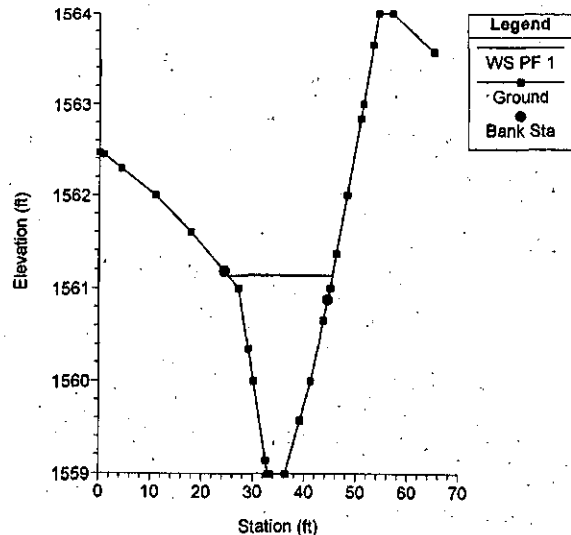
NotreDame\_Proposed Plan: PR 6/8/2012  
 River = Unnamed Wash Reach = Wash2 RS = 1700



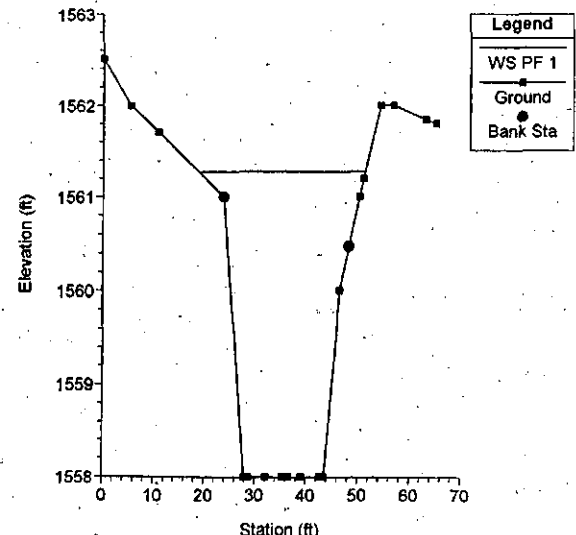
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 River = Unnamed Wash Reach = Wash2 RS = 1600



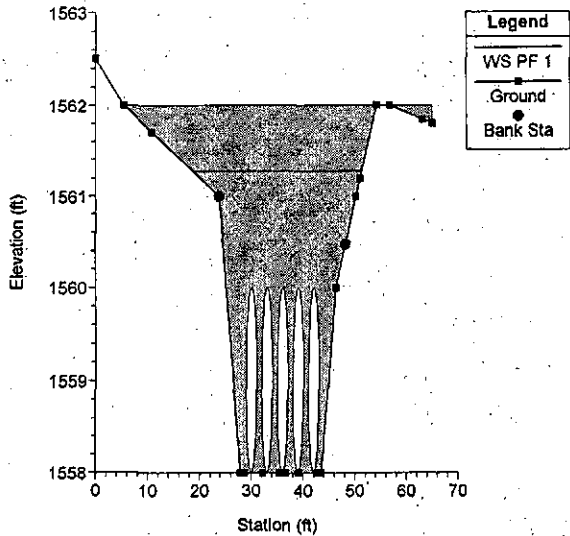
NotreDame\_Proposed Plan: PR 6/8/2012  
 River = Unnamed Wash Reach = Wash2 RS = 1519



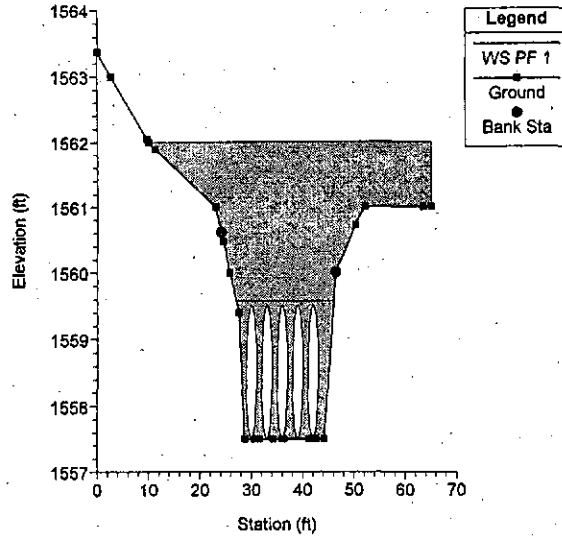
NotreDame\_Proposed Plan: PR 6/8/2012  
 River = Unnamed Wash Reach = Wash2 RS = 1456



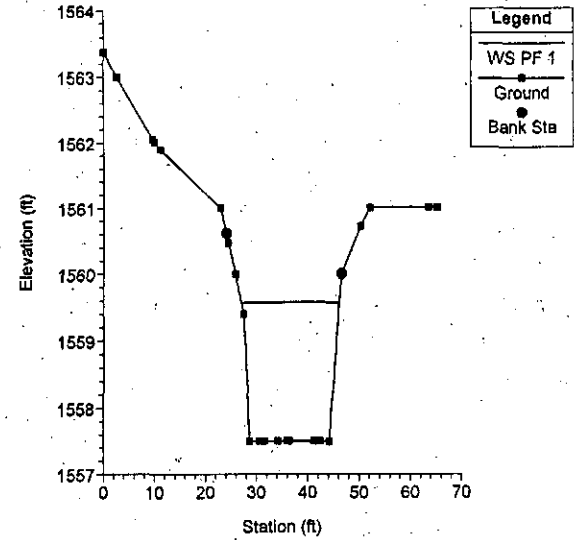
NotreDame\_Proposed Plan: PR 6/8/2012  
 River = Unnamed Wash Reach = Wash2 RS = 1451 Culv



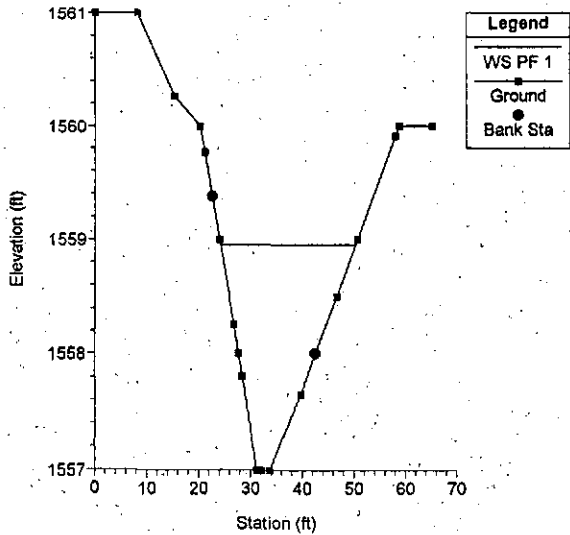
NotreDame\_Proposed Plan: PR 6/8/2012  
 River = Unnamed Wash Reach = Wash2 RS = 1451 Culv



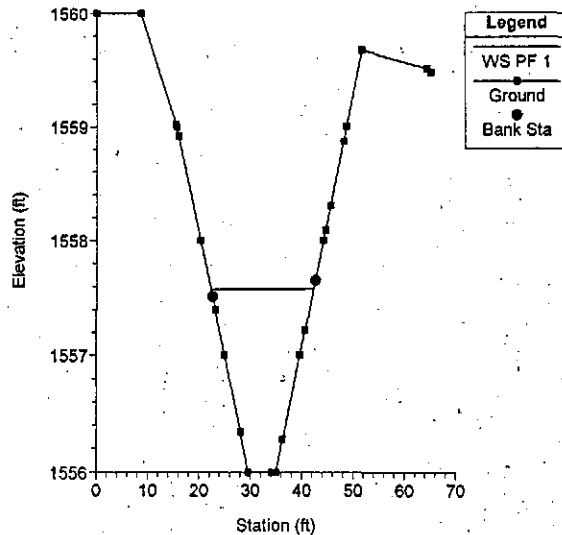
NotreDame\_Proposed Plan: PR 6/8/2012  
 River = Unnamed Wash Reach = Wash2 RS = 1409



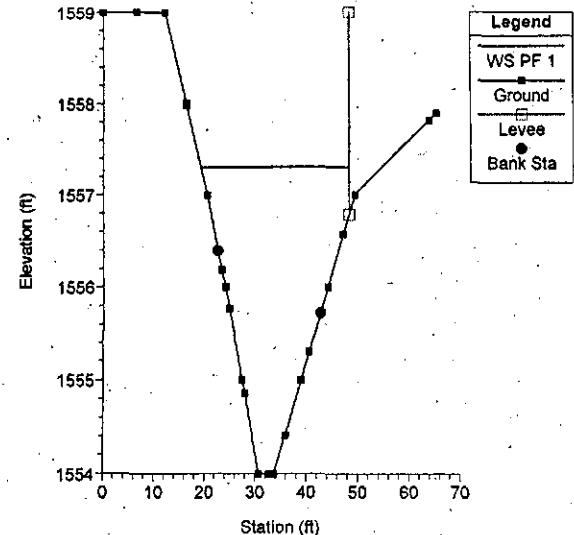
NotreDame\_Proposed Plan: PR 6/8/2012  
 River = Unnamed Wash Reach = Wash2 RS = 1300



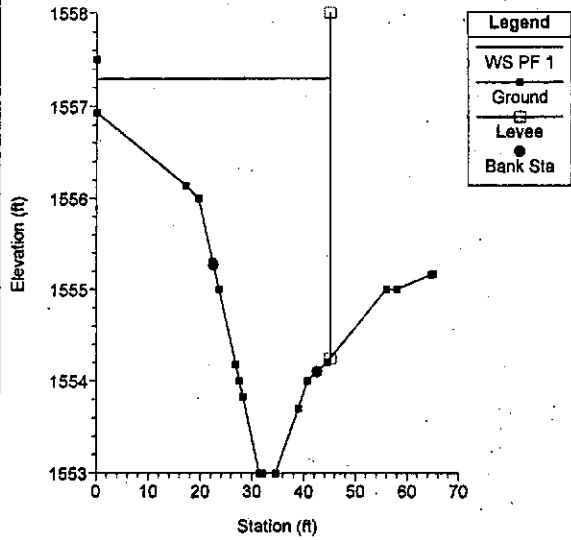
NotreDame\_Proposed Plan: PR 6/8/2012  
 River = Unnamed Wash Reach = Wash2 RS = 1200



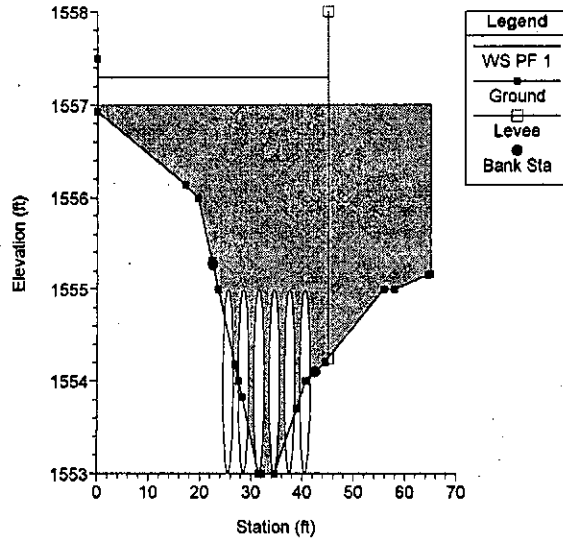
NotreDame\_Proposed Plan: PR 6/8/2012  
 River = Unnamed Wash Reach = Wash2 RS = 1100



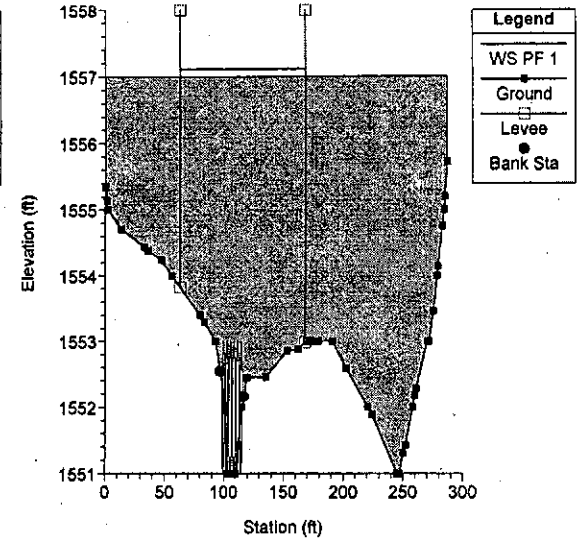
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 River = Unnamed Wash Reach = Wash2 RS = 1000



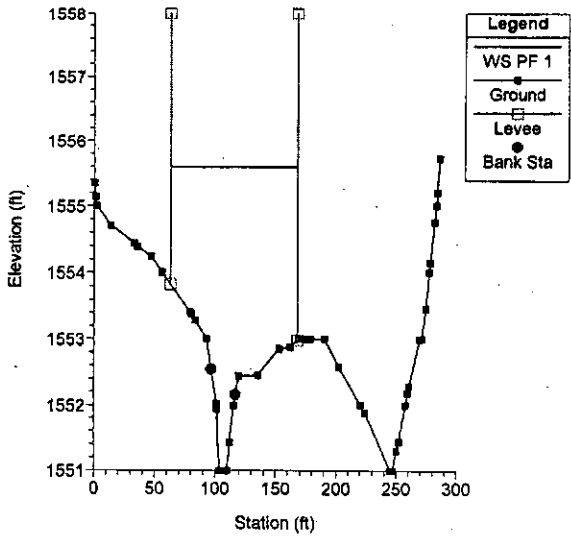
NotreDame\_Proposed Plan: PR 6/8/2012  
 River = Unnamed Wash Reach = Wash2 RS = 917 Culv

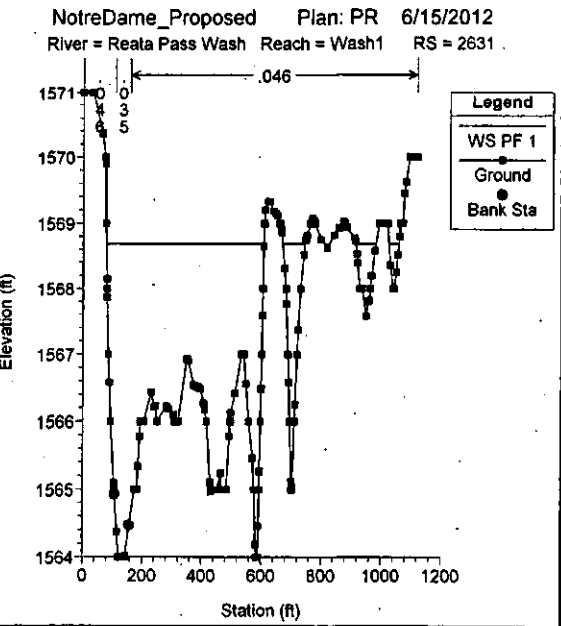
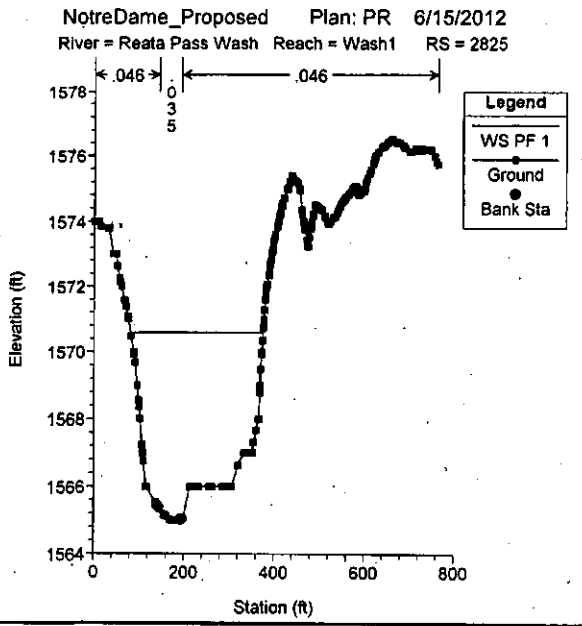
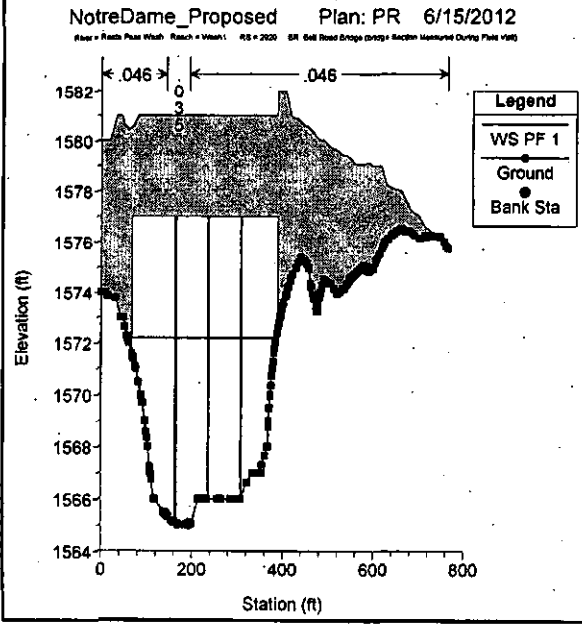
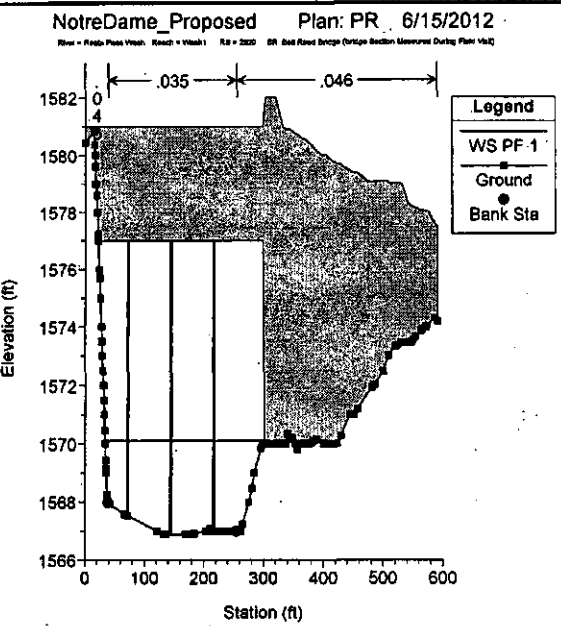
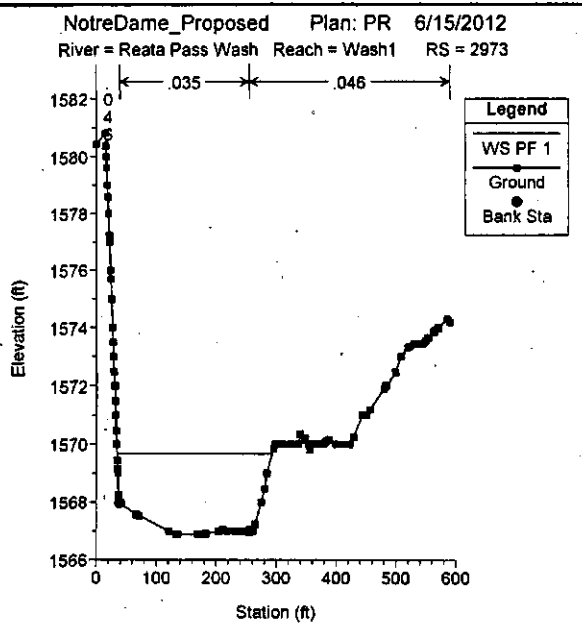
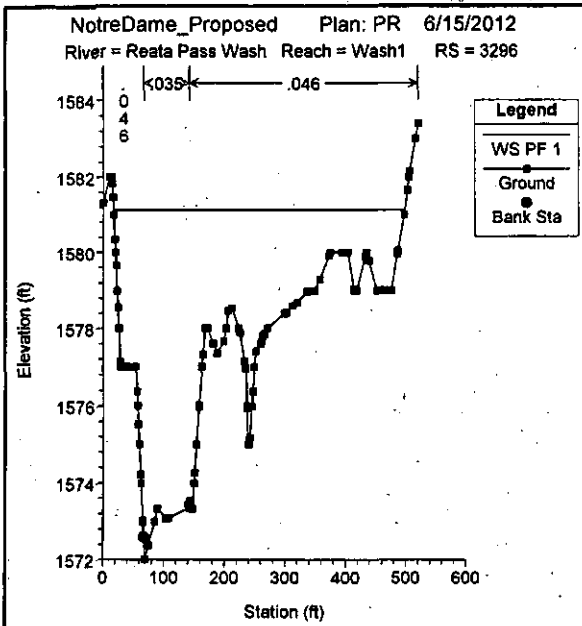


NotreDame\_Proposed Plan: PR 6/8/2012  
 River = Unnamed Wash Reach = Wash2 RS = 917 Culv

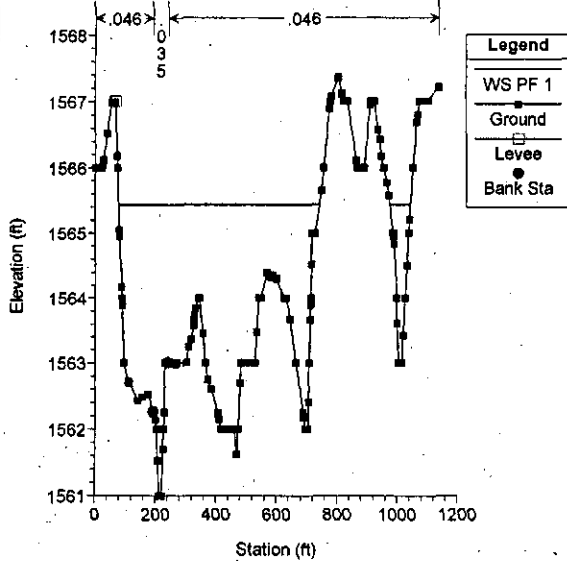


NotreDame\_Proposed Plan: PR 6/8/2012  
 River = Unnamed Wash Reach = Wash2 RS = 706 due to the proximity of cross-section 1475 on Raccoon Pass Wash, a

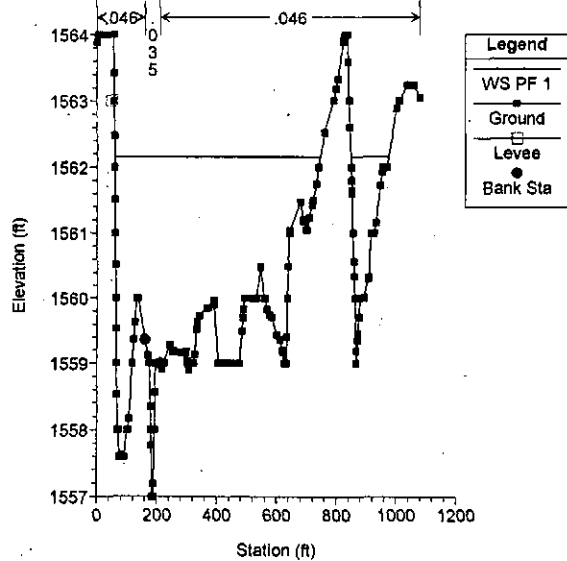




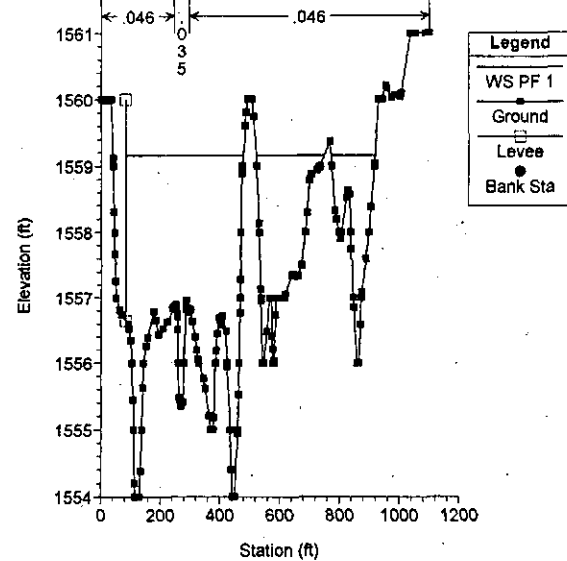
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River = Reata Pass Wash Reach = Wash1 RS = 2405



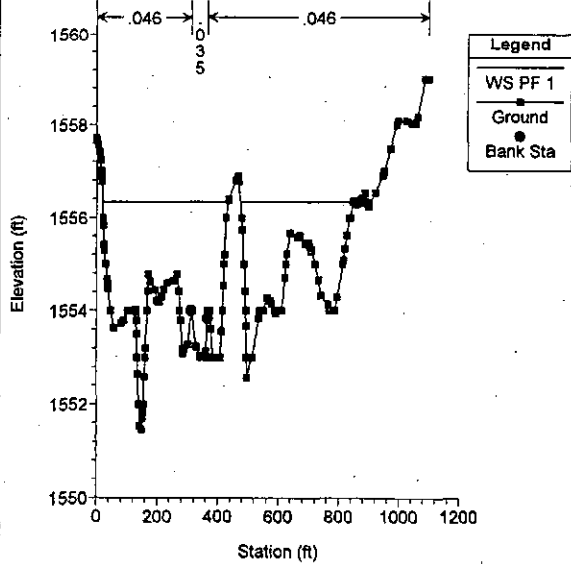
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River = Reata Pass Wash Reach = Wash1 RS = 2183



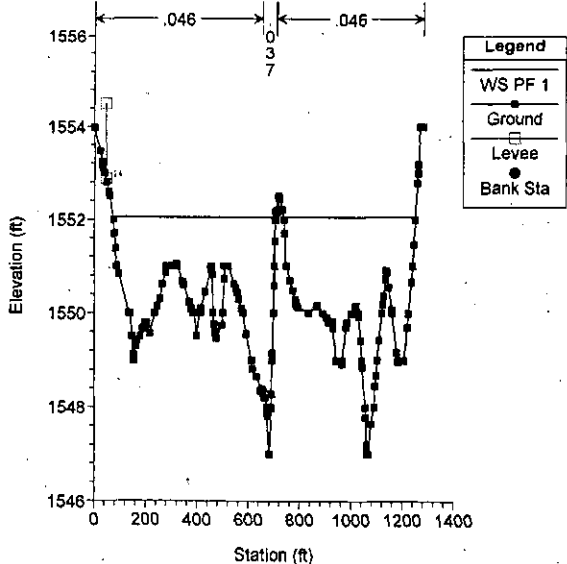
NotreDame\_Proposed Plan: PR 6/15/2012  
River = Reata Pass Wash Reach = Wash1 RS = 1960



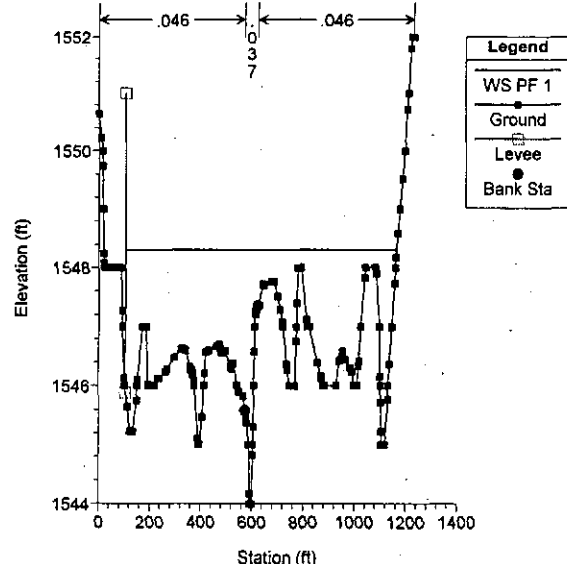
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River = Reata Pass Wash Reach = Wash1 RS = 1806



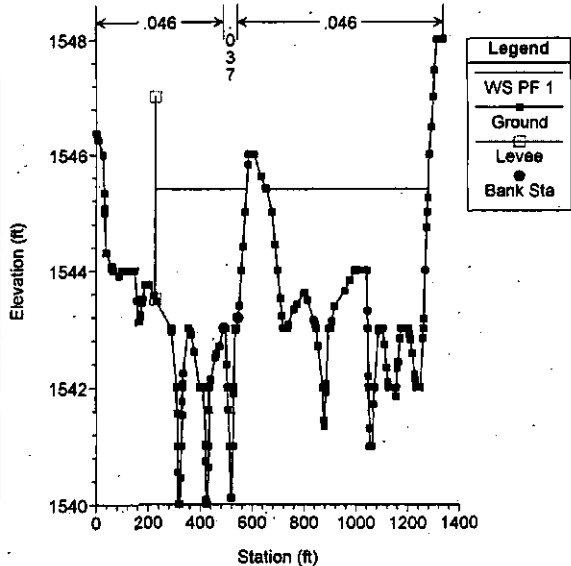
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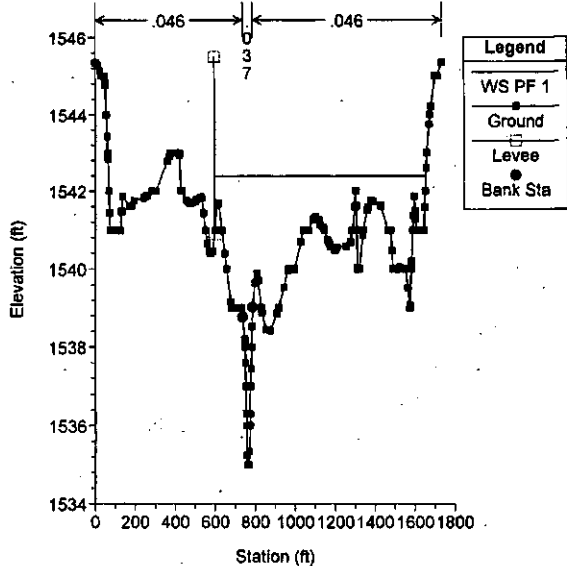
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River = Reata Pass Wash Reach = Wash1 RS = 1209



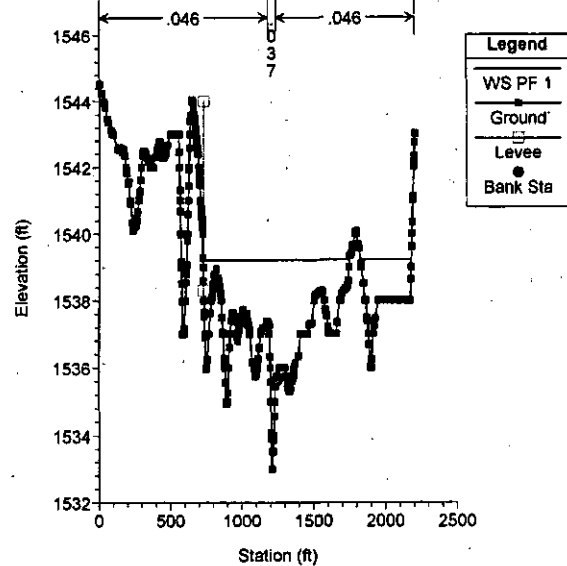
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River = Reata Pass Wash Reach = Wash1 RS = 959



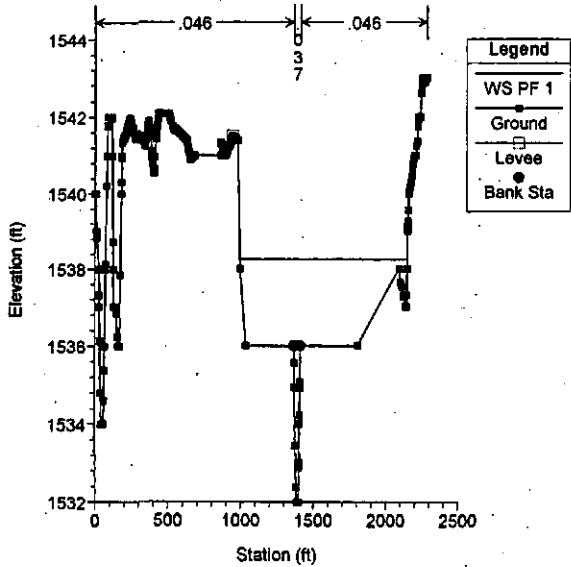
NotreDame\_Proposed Plan: PR 6/15/2012  
River = Reata Pass Wash Reach = Wash1A RS = 647



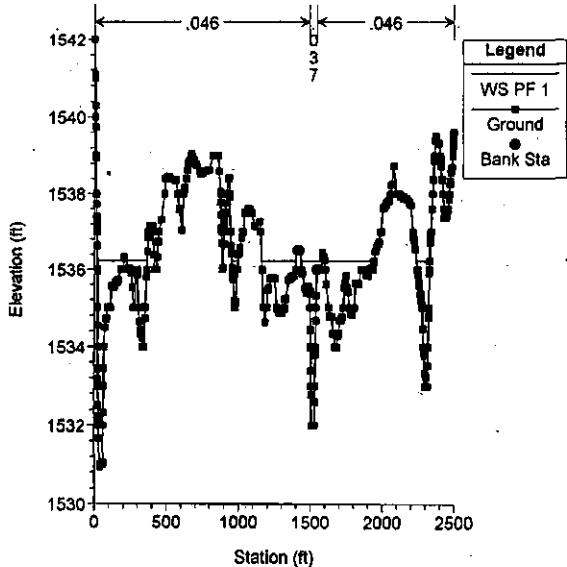
NotreDame\_Proposed Plan: PR 6/15/2012  
River = Reata Pass Wash Reach = Wash1A RS = 409



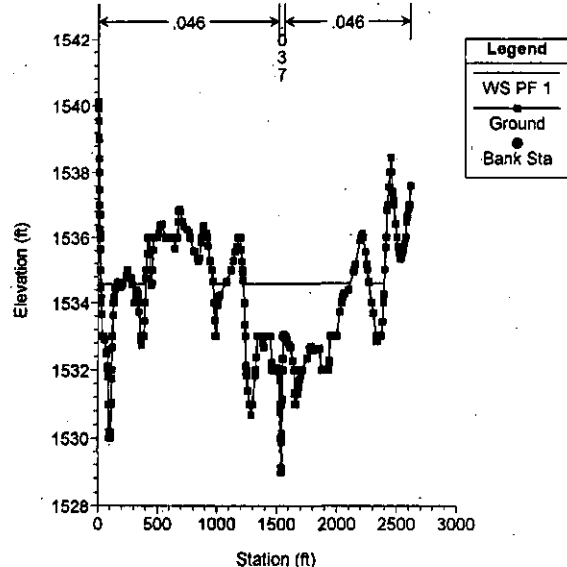
NotreDame\_Proposed Plan: PR 6/15/2012  
River = Reata Pass Wash Reach = Wash1A RS = 338



NotreDame\_Proposed Plan: PR 6/15/2012  
River = Reata Pass Wash Reach = Wash1A RS = 318



NotreDame\_Proposed Plan: PR 6/15/2012  
River = Reata Pass Wash Reach = Wash1A RS = 96



## **APPENDIX E**

### **Correspondence Between CVL and ASLD**



March 29, 2012

Michael Farley  
Arizona State Land Department  
1616 W. Adams Street  
Phoenix, AZ, 85007

Dear Mr. Farley,

During your phone conversation with Ashley Couch (City of Scottsdale) concerning the negligible effect of the proposed improvements at Notre Dame on the State Land Parcel APN #217-13-157, you requested the HEC-RAS model and the floodplain delineations for your review.

As depicted in the attached preliminary model and exhibit, the maximum 100-year water surface increase on the State Land Parcel is 0.14' at cross section 1960. The floodplain delineation is almost identical on the State Land Parcel.

Please let us know if this negligible 100-year water surface increase is acceptable to the Arizona State Land Department.

Regards,

Bassem Naba, PE, CFM, CPESC  
Assistant Project Manager

Owner: Arizona State Land Department  
APN: 217-13-157

$Q_{100} = 17,393$  CFS

Bell Road Bridge

Bell Rd

Proposed Sports Complex

Proposed Parking

Proposed Fine Arts Center

Proposed Parking

WSEL up +0.04'

WSEL up +0.14'

WSEL up +0.16'

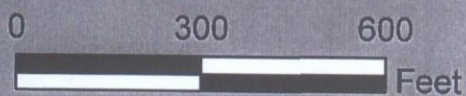
WSEL up +0.62'

Existing Dike to be Removed

This Cross Section  
Used in Existing  
Conditions Model Only

### Legend

- ASLD Parcel Boundary
- Cross Sections
- Existing Floodplain
- Proposed Floodplain
- Stream Centerline
- Proposed Layout



## EXISTING AND PROPOSED FLOODPLAIN DELINEATIONS

4550 NORTH 12TH STREET  
PHOENIX, ARIZONA 85014  
TELEPHONE (602) 264-6831

## NOTRE DAME

N:\01\0145702\Hydro\GIS\_Maps\XSections1.mxd

# COE & VAN LOO

PLANNING · ENGINEERING · LANDSCAPE ARCHITECTURE

JOB NO.

01-0145702

PLATE 1

Janice K. Brewer  
Governor

ARIZONA STATE  LAND DEPARTMENT

Maria Baier  
State Land  
Commissioner

April 17, 2012

Bassem Naba  
Coe & Van Loo Consultants  
4550 N. 12<sup>th</sup> St.  
Phoenix, Arizona 85014

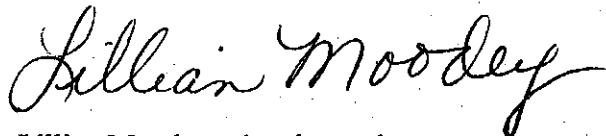
RE: Review of Proposed Floodplain on State Trust Land Parcel – 98<sup>th</sup> St. & Bell

Dear Mr. Naba:

The Arizona State Land Department has received your request on March 30th pertaining to ASLD accepting the increase in the 100-year water surface elevation that will be impacting the State Trust Land (STL) parcel south of Bell Road and between 94<sup>th</sup> Street and 98<sup>th</sup> Street, see Figure 1, due to the construction of improvements at the Notre Dame high school, located just east of this STL parcel. ASLD does not have any objections to the proposed water surface increase and the associated proposed floodplain modification.

In the meantime, should you have any questions or need additional information, please feel free to contact me at 602-364-2224 or [mfarley@land.az.gov](mailto:mfarley@land.az.gov)

Sincerely,



Lillian Moody, Planning and Engineering Section Manager  
Arizona State Land Department

cc: Max Masel, Sales and Leasing Section Manager  
Mark Edelman, Planning Unit Supervisor

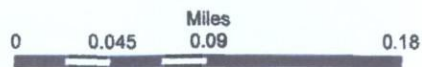


**Legend**

 Surface Parcels



**FIGURE 1**



The Arizona State Land Department makes no warranties implied or expressed, with respect to the information shown on this map.

Map produced by the Arizona State Land Department  
October 09, 2008

© Wesleyink&Associates/MapInfo and  
Map Factory

## **APPENDIX F**

### **Manning's N-Value Calculations**

**NOTRE DAME**  
Manning's "n"-Value Calculation

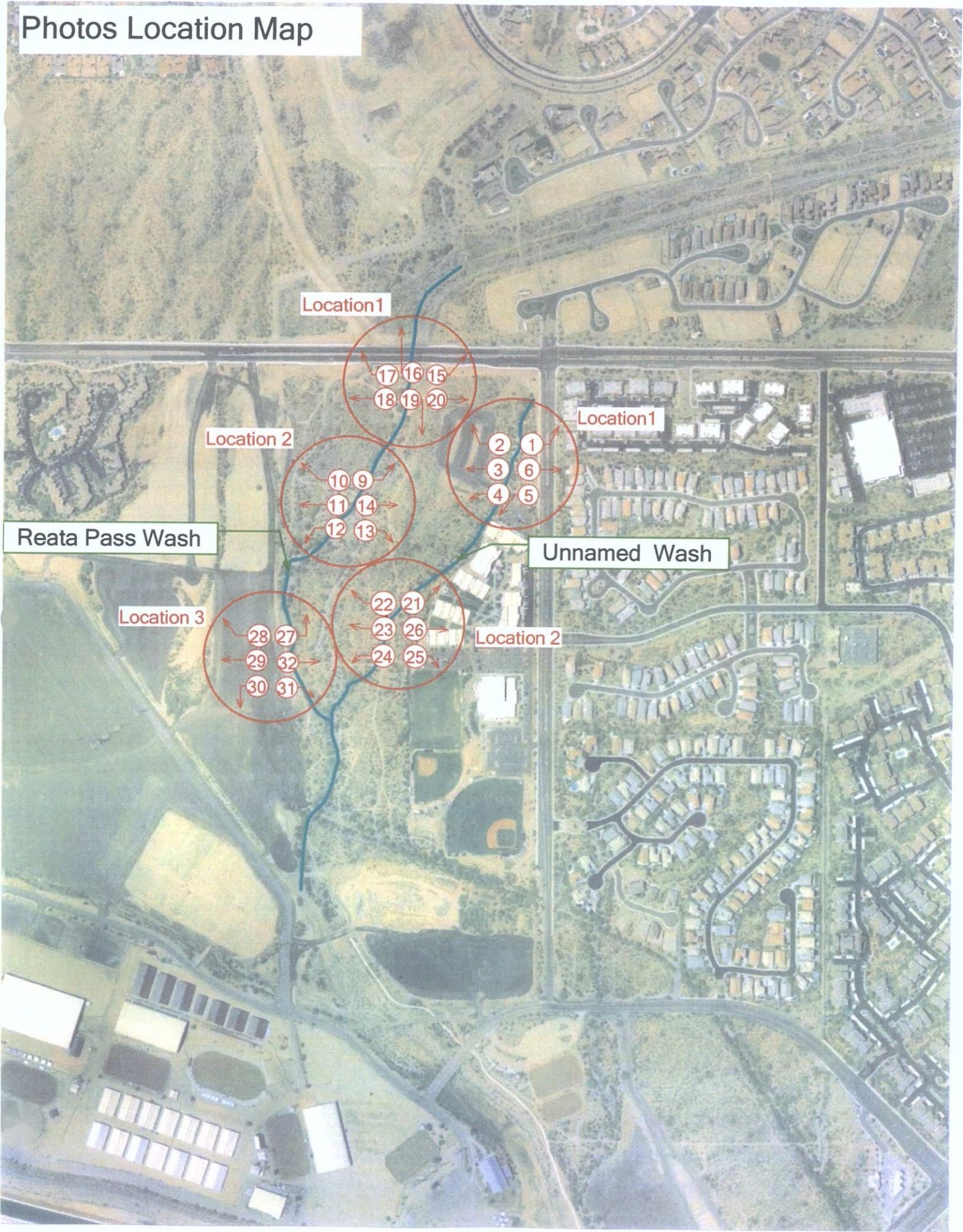
Location #	Wash Name	Cross Section	LOB							Channel							ROB						
			Base Value <sup>(1)</sup>	Adjustments for Roughness Factors <sup>(2)</sup>				Degree of <sup>(3)</sup>	Calculated <sup>(4)</sup>	Base Value <sup>(1)</sup>	Adjustments for Roughness Factors <sup>(2)</sup>				Degree of <sup>(3)</sup>	Calculated <sup>(4)</sup>	Base Value <sup>(1)</sup>	Adjustments for Roughness Factors <sup>(2)</sup>				Degree of <sup>(3)</sup>	Calculated <sup>(4)</sup>
			$n_0$	$n_1$	$n_2$	$n_3$	$n_4$	Meandering, $m$	$n$ -Value	$n_0$	$n_1$	$n_2$	$n_3$	$n_4$	Meandering, $m$	$n$ -Value	$n_0$	$n_1$	$n_2$	$n_3$	$n_4$	Meandering, $m$	$n$ -Value
1	Reata Pass Wash	3296-2825	0.025	0.000	0.000	0.001	0.020	1.0	0.046	0.028	0.000	0.000	0.001	0.006	1.0	0.035	0.025	0.000	0.000	0.001	0.020	1.0	0.046
2		2630-1806	0.025	0.000	0.000	0.001	0.020	1.0	0.046	0.028	0.000	0.000	0.001	0.006	1.0	0.035	0.025	0.000	0.000	0.001	0.020	1.0	0.046
3		1475-96	0.025	0.000	0.000	0.001	0.020	1.0	0.046	0.030	0.000	0.000	0.001	0.006	1.0	0.037	0.025	0.000	0.000	0.001	0.020	1.0	0.046
1	Unnamed Wash	1900-798	0.025	0.000	0.000	0.001	0.020	1.0	0.046	0.028	0.000	0.000	0.001	0.006	1.0	0.035	0.025	0.000	0.000	0.001	0.020	1.0	0.046
2			0.025	0.000	0.000	0.001	0.020	1.0	0.046	0.028	0.000	0.000	0.001	0.006	1.0	0.035	0.025	0.000	0.000	0.001	0.020	1.0	0.046

Reference: Phillips, J.V., and Tadayon, S., 2006, *Selection of Manning's Roughness Coefficient for Natural and Constructed Vegetated and Non-Vegetated Channels, and Vegetation Maintenance Plan Guidelines for Vegetated Channels in Central Arizona: U.S. Geological Survey, Scientific Investigations Report 2006-5108, 41 p.*

Notes:

1.  $n_0$  = Base value of  $n$ . firm earth for overbanks and Gravel and Cobbles for channel (Table 2)
2. Adjustments for roughness factors other than meanders (Table 3), where:
  - $n_1$  = Degree of Irregularity
  - $n_2$  = Variation in channel cross section
  - $n_3$  = Effect of obstructions
  - $n_4$  = Amount of Vegetation
3.  $m$  = Degree of meandering (Table 3)
4.  $n$ -value =  $(n_0 + n_1 + n_2 + n_3 + n_4) * m$

# Photos Location Map



# Unnamed Wash- Location 1



Picture -1-



Picture -2-



Picture -3-



Picture -4-



Picture -5-



Picture -6-

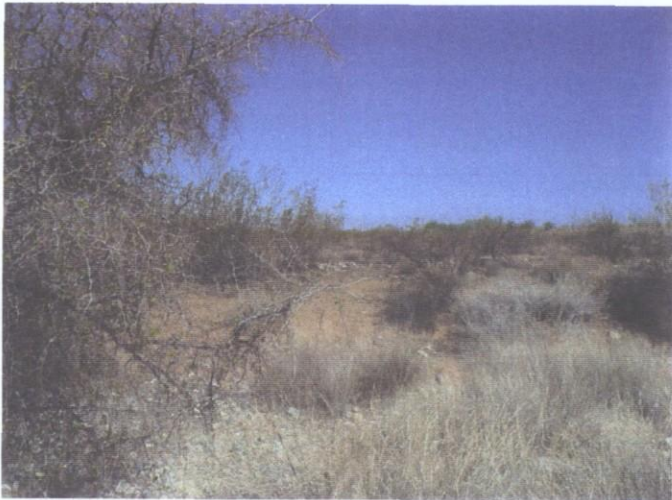
## Reata Pass Wash- Location 2



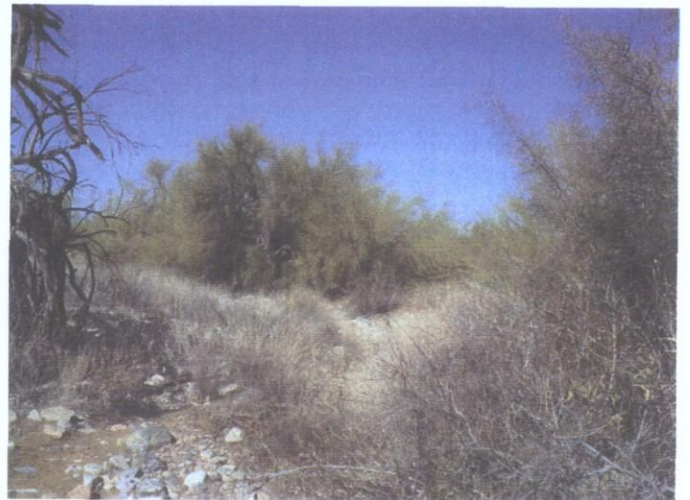
Picture -9-



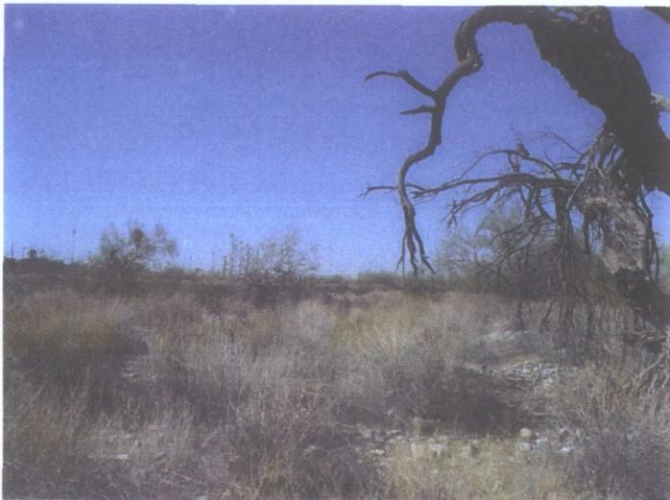
Picture -10-



Picture -11-



Picture -12-



Picture -13-



Picture -14-

# Reata Pass Wash- Location 1



Picture -15-



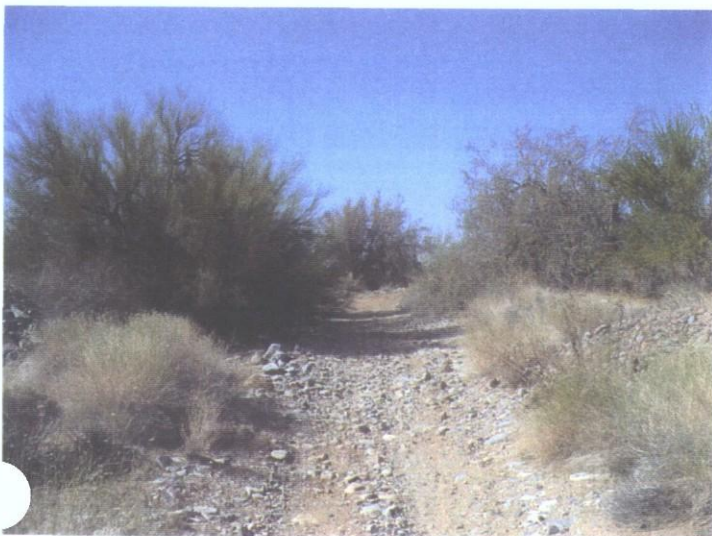
Picture -16-



Picture -17-



Picture -18-



Picture -19-



Picture -20-

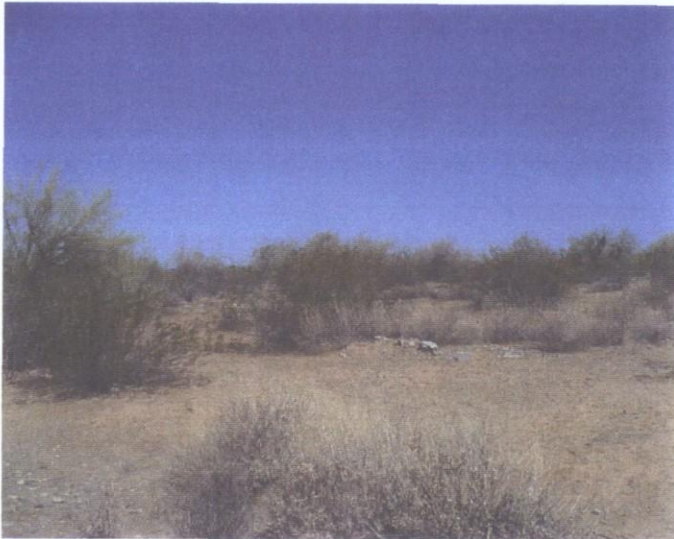
## Unnamed Wash- Location 2



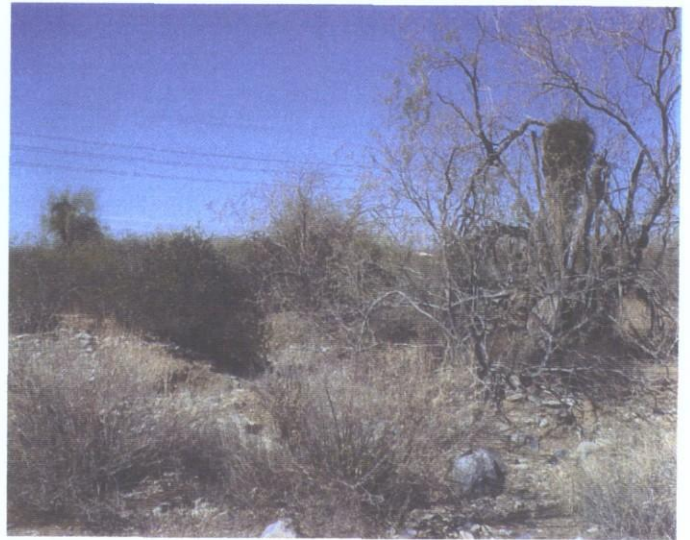
Picture -21-



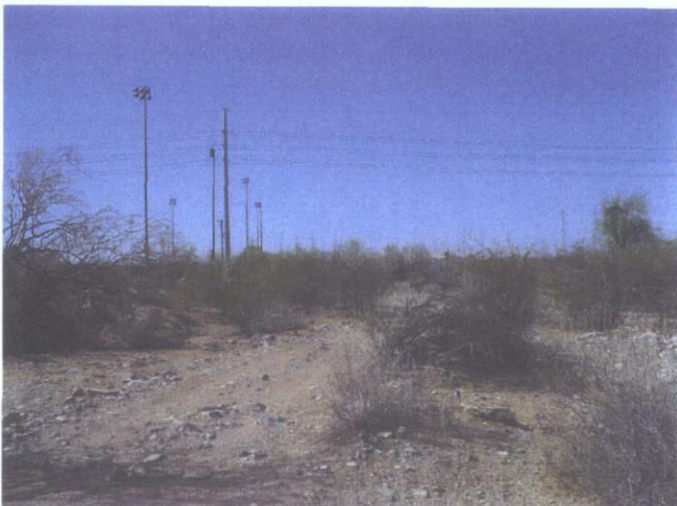
Picture -22-



Picture -23-



Picture -24-



Picture -25-

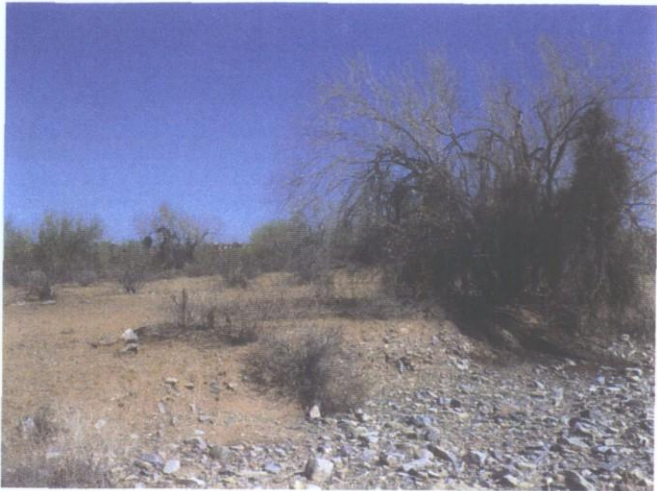


Picture -26-

# Reata Pass Wash- Location 3



Picture -27-



Picture -28-



Picture -29-



Picture -30-



Picture -31-



Picture -32-

**APPENDIX G**

**Request for Stormwater Storage Waiver**



# Request for Stormwater Storage Waiver

City of Scottsdale Case Numbers:

PA

ZN

UP

DR

9

PP

2012

PC#

The applicant/developer must complete and submit this form to the city for processing and obtain approval of waiver request **before submitting improvement plans**. Denial of the waiver may require the developer to submit a revised site plan to the Development Review Board.

Date 6/12/12 Project Name Notre Dame Preparatory High School  
 Project Location Southwest corner of Bell Road and 98th Street  
 Applicant Contact Ryan Weed Company Name Coe & Van Loo Consultants, Inc.  
 Phone 602-285-4730 Fax 602-228-8537 E-mail rweed@cvtci.com  
 Address 4550 N. 12th Street Phoenix, AZ 85014

### Waiver Criteria

A project must meet at least one of four criteria listed below for the city to consider waiving some or all required stormwater storage. **However, regardless of the criteria, a waiver will only be granted if the applicant can demonstrate that the effect of a waiver will not increase the potential for flooding on any property.** Check the applicable box and provide a signed engineering report and supporting engineering analysis that demonstrate the project meets the criteria and that the effect of a waiver will not increase the potential for flooding on any property.

If the runoff for the project has been included in a storage facility at another location, the applicant must demonstrate that the stormwater storage facility was specifically designed to accommodate runoff from the subject property and that the runoff will be conveyed to this location through an adequately designed conveyance facility.

- 1. The development is adjacent to a watercourse or channel that an engineering analysis shows is designed and constructed to handle the additional runoff from the site as a result of not providing full stormwater storage.
- 2. The development is on a parcel less than one-half acre in size.
- 3. Stormwater storage requirements conflict with requirements of the Environmentally Sensitive Lands Ordinance (ESLO). A conflict with ESLO is limited to:
  - Property located in the hillside landform as defined in the city Zoning Ordinance
  - Property in the upper desert landform that has a land slope steeper than 5% as defined in the city Zoning Ordinance
  - Property within the ESL zoning overlay where the only viable location for a stormwater storage basin requires blasting

This waiver only applies to those portions of property meeting one of these three requirements.

- 4. The project is located within the Downtown Area as delineated by the figure 1 below.

By signing below, I certify that the stated project meets the waiver criteria selected above as demonstrated by the attached documentation.

\_\_\_\_\_  
Engineer

6/12/12  
Date

### Planning, Neighborhood & Transportation Division

7447 E Indian School Road, Suite 105 Scottsdale, AZ 85251 • Phone: 480-312-7000 • Fax: 480-312-7088



# Request for Stormwater Storage Waiver

City of Scottsdale Case Numbers:

PA

ZN

UP

DR

PP

PC#

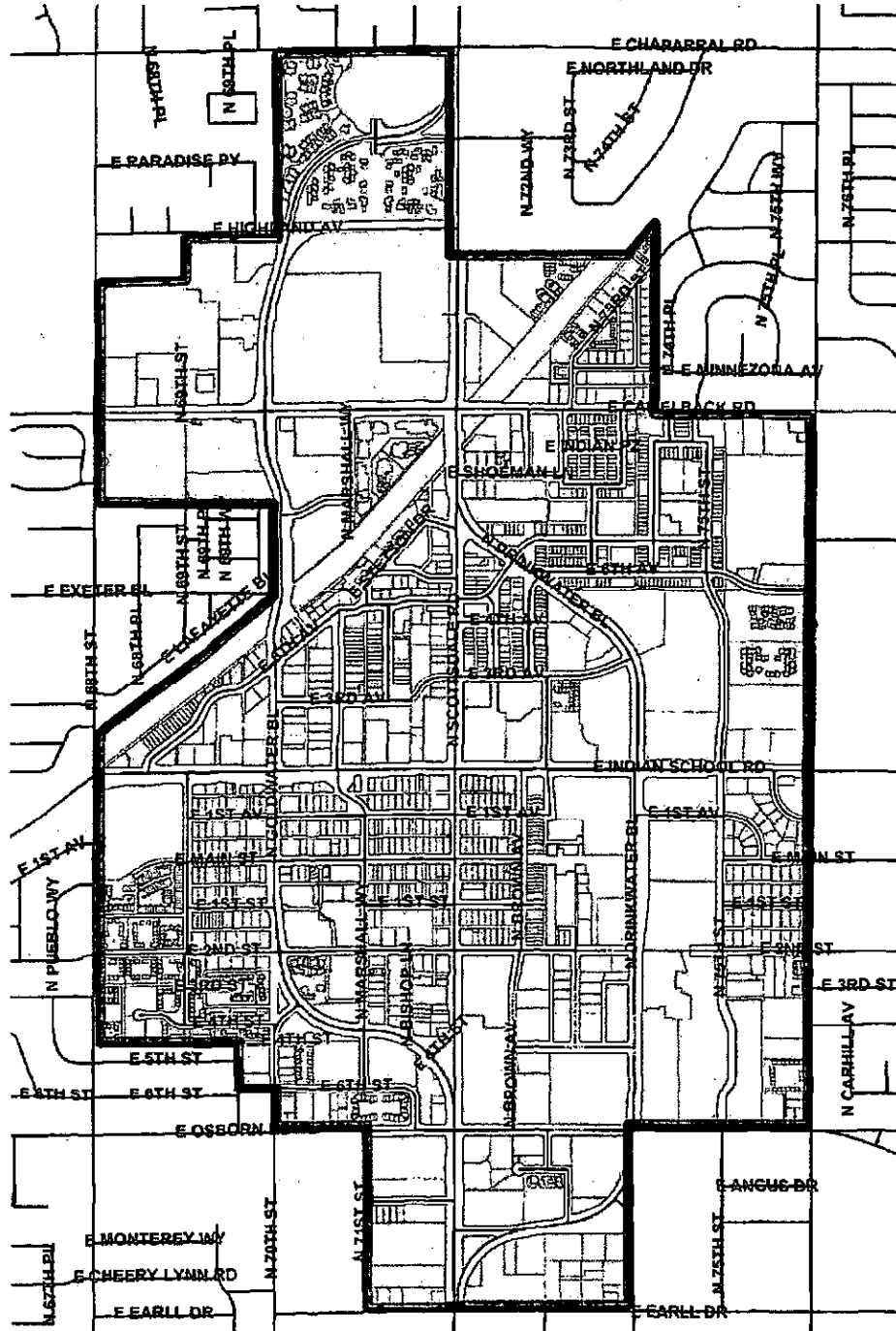


Figure 1. Designated Area for Downtown Stormwater Storage Waivers

## Planning, Neighborhood & Transportation Division

7447 E Indian School Road, Suite 105 Scottsdale, AZ 85251 • Phone: 480-312-7000 • Fax: 480-312-7088



# Request for Stormwater Storage Waiver

City of Scottsdale Case Numbers:

PA

ZN

UP

DR

9

PP 2012

PC#

## CITY STAFF TO COMPLETE THIS PAGE

Project Name Notre Dame Preparatory High School

### Check Appropriate Boxes:

Meets waiver criteria (specify):  1  2  3  4

Recommend approve waiver.

Recommend deny waiver:

None of waiver criteria met.

Downstream conditions prohibit waiver of any storage.

Other:

Explain: \_\_\_\_\_  
\_\_\_\_\_

Return waiver request:

Insufficient data provided.

Other: \_\_\_\_\_

Explain: \_\_\_\_\_  
\_\_\_\_\_

### Recommended Conditions of Waiver:

All storage requirements waived.

Pre development conditions must be maintained.

Other:

Explain: \_\_\_\_\_  
\_\_\_\_\_

Waiver approved per above conditions.

Waiver denied.

\_\_\_\_\_  
Floodplain Administrator or Designee

\_\_\_\_\_  
Date

## Planning, Neighborhood & Transportation Division

7447 E Indian School Road, Suite 105, Scottsdale, AZ 85251 • Phone: 480-312-7000 • Fax: 480-312-7088



# Request for Stormwater Storage Waiver

City of Scottsdale Case Numbers:

- PA -

- ZN -

- UP -

- DR -

9

- PP - 2012

PC#

## In-Lieu Fee and In-Kind Contributions

If the city grants a waiver, the developer is required to calculate and contribute an in-lieu fee based on what it would cost the city to provide the waived storage volume, including costs such as land acquisition, construction, landscaping, design, construction management, and maintenance over a 75-year design life. The fee for this cost is \$1.87 per cubic foot of stormwater storage waived. This unit cost will be updated annually, but the city reserves the right to revise the unit cost at any time.

The Floodplain Administrator considers in-kind contributions on a case-by-case basis. An in-kind contribution can serve as part of or instead of the calculated in-lieu fee. In-kind contributions must be stormwater related and must constitute a public benefit. In-lieu fees and in-kind contributions are subject to the approval of the Floodplain Administrator or designee.

Project Name Notre Dame Preparatory High School

The waived stormwater storage volume is calculated as follows:

**V = CRA; where**

V = stormwater storage volume required, in cubic feet,

C = weighted average runoff coefficient over disturbed area,

R = 100-year/2-hour precipitation depth, in feet (DSPM, Appendix 4-1D, page 11), and

A = area of disturbed ground, in square feet

Furthermore,

$V_w = V - V_p$ , where

$V_w$  = volume waived,

V = volume required, and

$V_p$  = volume provided

R = 2.33

C = 0.82

A = 571,401

V = 91,360

$V_p$  = 0

$V_w$  = 91,360

An in-lieu fee will be paid, based on the following calculations and supporting documentation:  
In-lieu fee (\$) =  $V_w$  (cu. ft.) x \$1.87 per cubic foot = \_\_\_\_\_

An in-kind contribution will be made, as follows:

Removed the Old Verde Canal Dike, graded and reconstructed the area, salvatge and replant existing trees, and re-vegetated all disturbed areas.

No in-lieu fee is required. Reason:

Approved by:

\_\_\_\_\_  
Floodplain Administrator or Designee

\_\_\_\_\_  
Date

**Planning, Neighborhood & Transportation Division**

7447 E Indian School Road, Suite 105, Scottsdale, AZ 85251 • Phone: 480-312-7000 • Fax: 480-312-7088

## **APPENDIX H**

### **Warning and Disclaimer Liability Form**



# WARNING & DISCLAIMER OF LIABILITY

The Drainage and Floodplain Regulations and Ordinances of the City of Scottsdale are intended to "minimize the occurrence of losses, hazards and conditions adversely affecting the public health, safety and general welfare which might result from flooding caused by the surface runoff of rainfall" (Scottsdale Revised Code §37-16).

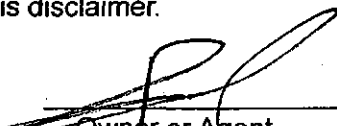
As defined in S.R.C. §37-17, a flood plain or "Special flood hazard area means an area having flood and/or flood related erosion hazards as shown on a FHBM or FIRM as zone A, AO, A1-30, AE, A99, AH, or E, and those areas identified as such by the floodplain administrator, delineated in accordance with subsection 37-18(b) and adopted by the floodplain board." It is possible that a property could be inundated by greater frequency flood events or by a flood greater in magnitude than a 100-year flood. Additionally, much of the Scottsdale area is a dynamic flood area; that is, the floodplains may shift from one location to another, over time, due to natural processes.

### WARNING AND DISCLAIMER OF LIABILITY PURSUANT TO S.R.C §37-22

"The degree of flood protection provided by the requirements in this article is considered reasonable for regulatory purposes and is based on scientific and engineering considerations. Floods larger than the base flood can and will occur on rare occasions. Floodwater heights may be increased by man-made or natural causes. This article (Chapter 37, Article II) shall not create liability on the part of the city, any officer or employee thereof, or the federal government for any flood damages that result from reliance on this article or any administrative decision lawfully made thereunder."

Compliance with Drainage and Floodplain Regulations and Ordinances does not insure complete protection from flooding. The Floodplain Regulations and Ordinances meet established local and federal standards for floodplain management, but neither this review nor the Regulations and Ordinances take into account such flood related problems as natural erosion, streambed meander or man-made obstructions and diversions, all of which may have an adverse affect in the event of a flood. You are advised to consult your own engineer or other expert regarding these considerations.

I have read and understand the above. If I am an agent for an owner I have made the owner aware of and explained this disclaimer.

\_\_\_\_\_  \_\_\_\_\_

Plan Check No.      Owner or Agent      Date      \_\_\_\_\_

# **APPENDIX I**

## **Meeting Minutes**

# Coe & Van Loo Consultants, Inc.

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## MEETING MINUTES

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**Project Name:** Notre Dame College Preparatory High School      **Project Number:** 1.01.0145702

**Date:** 04/18/2012      **Time:** 3:00 PM

**Purpose:** Notre Dame College Preparatory High School drainage effect on city of Scottsdale owned WestWorld Parking Lot.

**Location:** Scottsdale, AZ

**Attendees:** Brian Dygert      City of Scottsdale  
Ashley Couch      City of Scottsdale  
Don Gerkin      City of Scottsdale  
Maria Muiser      City of Scottsdale  
Jesus Murillo      City of Scottsdale  
Kevin Markham      KGM Builders, Inc  
Ryan Weed      Coe & Van Loo, Consultants, Inc  
Bassem Naba      Coe & Van Loo, Consultants, Inc

**Distribution:** Attendees

- | Item No. | Description   |
|----------|---|
| 1.       | Project Description. Coe & Van Loo, Consultants, Inc (CVL) briefly described the proposed improvements at Notre Dame Preparatory High School (NDP) site which consists of a Football Field, Parking Lots additions, and access roads.   |
| 2.       | City of Scottsdale Stormwater Management (COS) presented the effect of the proposed improvement on the WestWorld Parking Lot based on the CVL hydraulic analysis. The proposed improvements encroach on the Reata Pass Wash which has a regulatory 100-year flow of approximately 17,000 cfs. The proposed developments cause the 100-year flood water surface elevation to increase on the WestWorld Parking lot by approximately 0.62 feet. Based on COS description Brian, Maria, and Jesus have verbally accepted the increase of the water surface elevations. |
| 3.       | The NDP project proposes to remove the Old Verde Canal Dike (Dike) based on COS request. COS has agreed that the cost sharing should be calculated based on square footage of beneficiaries from the removal of the Dike. The beneficiaries are determined as follows:  |

**Item No.**

**Description**

- All the lots upstream of the Dike that have lower 100-year water surface elevation as result of removing the Dike. The 100-year water surface elevations to be determined based on comparisons of the existing conditions with the Dike and proposed conditions with Notre Dame Improvements and without the Dike.
  - All the properties downstream of the Dike that are in the Reata Pass 100-year floodplain.
4. WestWorld inquired about the limit of removal of the Dike along the south edge of NDP campus. WestWorld explained that the Dike is providing a natural visual barrier between WestWorld and Notre Dame parking lot. COS determined the limit of Dike removal should be the floodplain limit to the west, and on the east side the limit will be determined by a 4:1 shadow limit to the Parking lot, as shown on the attached drawing. WestWorld agreed to those limits to maintain the visual barrier where it is needed.
5. COS planning department requested a wash modification application to be submitted for the removal of the Dike. CVL explained that because of the location of the Dike within the Wash, re-vegetation should not be required as naturally the Vegetation will grow again. COS planning department explained that re-vegetation requirement will be decided based on the application review.
6. CVL explained that the FLO2D review revealed that FLO2D flow at the site is 10,281 cfs based on Cross section 156 of the attached FLO2D exhibit. COS explained that the Study is 90% complete and did account for flow split at the alluvial fan apex that should be corrected and the infiltration depth should be corrected as well. The FLO2D flow determination is expected to be completed in three weeks. COS expect the flow to be around  $10,281/0.45 = 22,846$  cfs. COS directed CVL to use the 22,846 cfs for now.
7. NDP needs to get a temporary construction easement in for the removal of the Dike.

**END OF MEETING**

*It is believed that the above statements are an accurate summation of the items discussed during this meeting. Upon receipt of these minutes, individuals copied are advised to review the context for discrepancies, additions, or deletions and respond to Bassem Naba, PE, CFM, CPESC within three (3) days of receipt.*

*Prepared by: Bassem Naba, PE, CFM, CPESC*

*Date Prepared: April 23, 2012*

# PLATES