PIMA COUNTY
FLOOD CONTROL

AIRPORT WASH PHYSICAL MAP REVISION TECHNICAL DATA NOTEBOOK

Airport Wash

CONTRACT NO.
CT-FC-15****204

BASIN MANAGEMENT STUDY PHASE 2

Prepared for: Pima County Regional Flood Control District
Prepared by: CMG Drainage Engineering, Inc.

FEBRUARY 2016

CMG DRAINAGE ENGINEERING, INC.

Kimley»Horn

AIRPORT WASH PHYSICAL MAP REVISION TECHNICAL DATA NOTEBOOK

Airport Wash Basin Management Study – Phase 2

Location:
Portions of Sections 2, 11 & 12; Township 15 South, Range 13 East
Portions of Sections 7, 17, 18, 20 – 23, 26 – 28, 34 & 35; Township 15 South, Range 14 East
Pima County, Arizona

Prepared for:

PIMA COUNTY
FLOOD CONTROL

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February 2, 2016
CMG Project No. 14-063

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TDN Report (text, all Appendices and Figures) (pdf format)
Digital Workmap:
Shapefiles of Hydrologic Watersheds
Shapefiles of Concentration Points
Shapefiles of HEC-RAS Cross Sections and Stream Centerlines
Shapefiles of Proposed Floodplain Limits
Aerial Photos and Shapefile of Topographic Contours (2-ft interval)

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SECTION 1: INTRODUCTION

1.1 Purpose

In December 2014, the Pima County Regional Flood Control District (RFCD) initiated a regional basin management study, Airport Wash Basin Management Study Phase 2, in south-central Tucson, Arizona. CMG Drainage Engineering, Inc. (CMG) was selected as the prime consultant to conduct the study. The scope of work for the study included updating floodplain delineations, identifying existing flood-prone areas and providing alternatives to mitigate future flood hazards within the study.

This Technical Data Notebook (TDN) has been prepared in support of a Physical Map Revision (PMR) submittal to revise the 500-year or 100-year floodplain, or Special Flood Hazard Area (SFHA) associated with Airport Wash, Pima County, Arizona. This segment of Airport Wash is located in portions of Sections 2, 11 & 12, Township 15 South, Range 13 East; Sections 7, 17, 18, 20 through 23, 26 through 28, 34 & 35, Township 15 South, Range 14 East. The purpose of this PMR application is to support proposed changes to the effective Flood Insurance Rate Map (FIRM) SFHA boundaries based on updated hydrology and detailed hydraulic analyses.

1.2 Authority for Study

The National Flood Insurance Act of 1968 created the National Flood Insurance Program (NFIP) to improve basic knowledge about flood hazards and reduce future flood damages through State and local community floodplain management regulations. The Federal Emergency Management Agency (FEMA) is charged with administration of the NFIP. In addition to providing flood insurance and floodplain management regulations, the NFIP identifies and maps the nation's floodplains. The floodplains are depicted on Flood Insurance Rate Maps, or FIRMs, for each local community. FEMA recognizes that changes to the maps may be necessary over time due to improvements in the techniques used in assessing flood risks, changes in physical conditions in the floodplains or watersheds, or the availability of new scientific or technical data. The NFIP regulations allow FEMA to revise and amend maps, as warranted, and require that each NFIP community inform FEMA of any new studies that present information that more accurately reflects existing flood risks and affects Base Flood Elevations (BFEs) in the community. This PMR application has been undertaken to fulfill this NFIP requirement for updating the hydrology and the flood hazard mapping within the study area on the effective floodplain limits.

The analyses contained in this report were conducted under the authority and direction of the RFCD. The RFCD's project manager is Janice Hughes. Ms. Hughes may be contacted at the following address:

Ms. Janice Hughes, PE
Project Manager
Pima County Regional Flood Control District
97 E Congress St, 2nd Floor
Tucson, AZ 85701
(520) 724-4600

1.3 Location of Study

The Airport Wash study area is located within Sections 2, 11 & 12, Township 15 South, Range 13 East; Sections 7, 17, 18, 20 – 23, 26 – 28, 34 & 35, Township 15 South, Range 14 East, G&SRB&M, in Pima County, Arizona. The study reaches run northwesterly, with its downstream limit to be Santa Cruz River and its upstream limit to be Craycroft Road. The study reaches were further divided into three main segments: Main Channel, North Fork, and South Fork. Total length of the study reaches is approximately 14.3 miles, including all tributaries studied. The study reaches are covered by FIRM Panels (effective date of June 16, 2011) 04019C2286L, 04019C2288L, 04019C2289L, 04019C2880L, and 04019C2900L. Therefore, these FIRM Panels would be modified by this study. A location and vicinity map for the study area are shown on Figure 1.

1.4 Hydrologic and Hydraulic Methodology

Airport Wash is part of COT's Tucson Stormwater Management Study (TSMS), which was developed in the mid-1990s and is the primary basis for hydrologic modeling within the City. However, an up to date TSMS hydrologic model for Airport Wash and its supporting documents are not readily available. Therefore, it is difficult to update the Airport Wash TSMS hydrologic model to incorporate up-to-date hydrologic modeling software, recent development within the watershed, updated rainfall data and soil data, and other supporting parameters for hydrologic analyses. It was determined at the scoping meeting of this project that a new hydrologic analysis is necessary to provide updated hydrology data for Airport Wash floodplain delineation. As stated in the Scope of Work of the project, the hydrologic analysis shall be based on RFCD's hydrology method.

Hydrologic analyses were performed to update the 10%, 2%, 1%, and 0.2% annual chance flood regulatory discharge rates at various concentration points along Airport Wash based on

improved methodology and more recent topographic mapping in the watersheds. The hydrologic modeling was performed using the U.S. Army Corps of Engineers' HEC-HMS Version 4.0, December 2013 computer program. The methodology is consistent with Arizona Department of Water Resources (ADWR) State Standard for Hydrologic Modeling Guidelines (SS10-07) and RFCD's Technical Policies. These technical policies include *Tech-010* (Rainfall Input for Hydrologic Modeling), *Tech-015* (Acceptable Methods for Determining Peak Discharges), and *Tech-018* (Acceptable Model Parameterization for Determining Peak Discharges.

The U.S. Army Corps of Engineers' river system modeling software, HEC-RAS Version 4.1.0, January 2010, was used to model the water surface elevations and determine floodplain limits for the 1% and 0.2% annual chance flood. The hydraulic models are based updated topographic information collected along the study reaches.

1.5 Acknowledgments

Assistance, guidance and review were provided during the development of this study by the following RFCD staff, among others:

Bill Zimmerman, Deputy Director
Janice Hughes, PE, Project Manager
Terry Hendricks, CFM, Technical Review

1.6 Study Results

The information presented in this TDN has been developed to support this PMR application. The application has been reviewed and accepted by the RFCD and City of Tucson (COT), the local agencies with jurisdiction over the affected watercourse. The study results provide more accurate and detailed floodplain delineation for the study area.

SECTION 2: FEMA FORMS

2.1 Study Documentation Abstract for FEMA Submittals

2.1.1 Date Study Accepted

_____

2.1.2 Study Contractor

CMG Drainage Engineering, Inc.
3555 North Mountain Avenue
Tucson, AZ 85719
Phone: (520) 882-4244

Prepared by: Jiankang Wang, PE
jwang@cmgdrainage.com

2.1.3 FEMA Technical Review Contractor

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2.1.4 FEMA Regional Reviewer

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2.1.5 State Technical Reviewer

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2.1.6 Local Technical Reviewer

Terry Hendricks, Chief Hydrologist
Pima County Regional Flood Control District
201 N Stone Avenue, 9th Floor
Tucson, Arizona 85001
Phone: (520) 724-4600

2.1.7 Reach Description

The study reaches run northwesterly, with its downstream limit to be Santa Cruz River and its upstream limit to be Craycroft Road. The study reaches were further divided into three main segments: Main Channel, North Fork, and South Fork. Total length of the study reaches is approximately 14.3 miles, including all tributaries studied. The Main Channel segment includes reaches from Santa Cruz River at the downstream to Country Club Road at the upstream. Channels in this segment are incised constructed channels, with significant portion of the channels having earthen channel bottoms and sideslopes. Limited portion of the channels has concrete-lined channel bottom and sideslopes. Overall longitudinal slope for this channel is approximately 0.006 feet per feet. North Fork and South Fork channels are located east of Country Club Road, where the reaches are mainly natural channels, with dense vegetation at some locations. North Fork and South Fork reaches join together at Country Club and then drain to Main Channel at the downstream.

The study reaches are currently designated as SFHA Zone AE or A on the following FIRM Panels with an effective date of June 16, 2011:

- 04019C2286L, 04019C2288L, 04019C2289L, 04019C2880L,and 04019C2900L

These FIRM Panels and the study area are shown on Figure 2.

2.1.8 USGS Quadrangle Sheets

The watersheds for the study area are shown on Tucson, Tucson SW, and Tucson SE, USGS 7.5-Minute, 1:24,000 Quadrangle Maps for Arizona. The floodplain mapping study area is contained on Tucson and Tucson SW Quadrangle Maps.

2.1.9 Unique Conditions and Problems

There were no remarkable unique conditions or problems encountered during the course of this study.

2.1.10 Coordination of Peak Discharges

Stream flow data is not available for the study area. A HEC-HMS model was developed to generate hydrology data for the study area based on both 3-hr and 24-hr hypothetical storm events, whichever generated high peak discharge rates, for the 10%, 2%, 1%, and 0.2% annual chance recurrence interval. The HEC-HMS model was set up in accordance with RFCD's guidelines and policies.

2.2 FEMA Forms

FEMA MT-2 Forms are included in Appendix A including:

- MT-2 Form 1, Overview and Concurrence Form, plus Attachment 1-1: Part C. Review Fee – Exemption explanation
- MT-2 Form 2, Riverine Hydrology & Hydraulics Form
- MT-2 Form 3, Riverine Structures

SECTION 3: SURVEY AND MAPPING INFORMATION

3.1 Digital Projection Information

Electronic data prepared for this project are based on the digital project shown as follows:

- Horizontal Datum: NAD83(HARN)
- Projection: Arizona State Plane, Central Zone
- Units: International Feet
- Vertical Datum: NAVD88

3.2 Field Survey Information

Ashby Surveying & Drafting, Inc. performed supplemental field survey for the drainage structures within the study area in 2015. The survey data collected for bridges/culverts, wherever applicable, included culvert sizes, materials, invert elevations, bridge pier sizes, bridge abutment dimensions, bridge low/high chord elevations, and structure geometries at the inlets and outlets. Supporting field information, metadata, and projection information are provided in Appendix C.3.

3.3 Mapping

Pima County's GIS Department provided 2008 bare earth LIDAR data and 2008 aerial photography, which were prepared under the management of the Pima Association of Governments (PAG), for this study. Topographic mapping with 2-foot interval contours was generated by utilizing Pima County's 2008 bare earth LIDAR data.

SECTION 4: HYDROLOGY

4.1 Method Description

As noted in Section 1.4 above, the U.S. Army Corps of Engineers' HEC-HMS, Version 4.0, December 2013, was used to develop peak flow rates and hydrographs from the 10%, 2%, 1%, and 0.2% annual chance storms occurring over the Airport Wash watershed contributing flow to the concentration point where Airport Wash drains to Santa Cruz River.

4.2 Parameter Estimation

4.2.1 Drainage Area Boundaries

The limits of the study watershed extend from Santa Cruz River on the downstream end (T15S, 13E, Section 02) to southeast of Houghton Road and Interstate 10 (I-10) on the upstream end (T16S, R15E, Sections 12). The watershed varies in elevations from approximately 2410 feet at the downstream end to 3110 at the upstream end. Watershed areas west of Country Club Road are highly urbanized, including residential and commercial developments, Tucson International Airport (TIA), Interstate 19 (I-19) and Union Pacific RailRoad (UPRR), et al. Watershed areas east of Country Club Road are predominately natural, with couple of roadways, isolated residential subdivisions and sand gravel pits. Overall watercourse longitudinal slopes are estimated to be approximately 0.007 feet per feet.

4.2.2 Watershed Work Maps

A watershed work map was developed for the project using PAG's 2008 aerial photos and the 2-foot interval contours generated by PAG's 2008 bare earth LIDAR data. This map was generated at a horizontal scale of 1 inch = 1000 feet. The watershed map, which is provided as Figure 5 in Appendix G, illustrates the following information:

- Survey Township, Range & Section information;
- Subbasin boundaries and flow concentration points;
- Routing reach flow paths;
- HEC-HMS model schematic diagram;
- Discharge summary table.

4.2.3 Gage Data

Airport Wash is an un-gaged watercourse, therefore no stream flow gage data was available for this study.

4.2.4 Statistical Parameters

Rainfall data records and information were acquired from NOAA Atlas 14, *Precipitation-Frequency Atlas of the United States, Volume 1 Version 4.0: Semiarid Southwest (Arizona, Southeast California, Nevada, New Mexico, Utah)*, 2004, Revised 2006.

4.2.5 Precipitation

As noted in the previous section, rainfall data for this study was acquired from NOAA Atlas 14 records for the Airport Wash watershed. Per requirements contained in RFCD Technical Policy TECH-010 *Rainfall Input for Hydrologic Modeling*, values that correspond to the upper bound of the 90% confidence interval were used.

Five point rainfall locations were evaluated across the Airport Wash watershed area. The rainfall depth differences among these five rainfall points were found to be negligible. Therefore, one representative rainfall values (Point Rainfall ID #1) were used for the lower portion of the watershed (Main Channel watershed) and another representative rainfall values (Point Rainfall ID #3) were used for the upper portion of the watershed (North Fork and South Fork watersheds). The rainfall data are summarized in Table 1 and are shown on Figure 3. NOAA 14 data sheets are included in Appendix D.1.

Table 1: NOAA 14 Precipitation Table

Point Rainfall ID	NOAA 14 Rainfall Depth (Upper 90%) (Inches)							
	10-year		50-year		100-year		500-year	
	3-hour	24-hour	3-hour	24-hour	3-hour	24-hour	3-hour	24-hour
1*	2.06	2.77	2.82	3.73	3.20	4.19	4.16	5.35
2	2.08	2.78	2.85	3.74	3.23	4.20	4.19	5.35
3**	2.10	2.78	2.88	3.74	3.26	4.20	4.24	5.35
4	2.11	2.79	2.90	3.76	3.28	4.22	4.27	5.38
5	2.11	2.82	2.90	3.79	3.29	4.25	4.28	5.40

*Rainfall data from Point Rainfall ID #1 were utilized in Main Channel watershed
**Rainfall data from Point Rainfall ID #3 were utilized in North Fork and South Fork watersheds.

Time of concentration (Tc) for Airport Wash watershed was estimated to be 5.34 hour. According to RFCD Technical Policy TECH-018 *Acceptable Model Parameterization for Determining Peak Discharges*, a 24-hour Type I storm should be used. However, at some

smaller subwatersheds in the upper watershed area, shorter duration and higher intensity storms may pose higher flooding hazard risks. Therefore, a 3-hour Type II storm, in addition to the 24-hour Type I storm, was also utilized in the HEC-HMS model. Higher discharge rates from either 24-hour Type I storm or 3-hour Type II storm were recorded and were utilized in the floodplain mapping analysis.

Rainfall areal reduction factors were used to convert the point rainfall to equivalent depths of rainfall over each watershed based on the procedures found in Section 3.3.3 of Arizona State Standard SS 10-07. The rainfall areal reduction factors vary depending on storm duration, watershed area, and watershed location. The eastern Arizona depth-area reduction factors were applied to this watershed. With total of 80 subwatersheds, it is troublesome to assign different rainfall areal reduction factor, in the HEC-HMS model, according to the drainage area at each concentration point. Therefore, per instructions from RFCD, an average areal reduction factor was applied to each different watershed size group, at 5 square miles interval. The grouped areal reduction factors are summarized in Table 2. Computations of the average areal factors are provided in Appendix D.1.

Table 2: Average Rainfall Areal Reduction Factor Summary Table

Watershed Size (Square Miles)	Average Rainfall Areal Reduction Factor	
	3-hour	24-hour
<=1	1	1
1~5	0.916	0.958
5~10	0.830	0.910
10~15	0.785	0.880
15~20	0.755	0.860
20~25	0.740	0.850

4.2.6 Physical Parameters

Available Airport Wash TSMS data, including subwatershed boundaries, concentration point locations, 100-year peak discharge rates, and other supporting parameters were utilized to facilitate the new hydrology analysis. Concentration points and their associated peak discharge rates were provided at existing TSMS nodes, wherever applicable. In addition, concentration points were added at key locations, such as major roadway crossings and drainage structure locations, if there are no existing TSMS nodes.

The Airport Wash watershed was subdivided into 80 subwatersheds, varying in size from 0.030 to 0.995 square miles. Subwatershed physical characteristics are summarized and are

provided in Appendix D.2. A schematic diagram of HEC-HMS stream network can be found on Figure 5 (Existing Conditions Hydrology Map).

Per requirements contained in RFCD Technical Policy TECH-018, the U.S. Natural Resource Conservation Service (NRCS) Curve Number method was chosen to be the rainfall loss methodology. Curve Numbers were obtained by utilizing the Curve Number tables and Hydrologic Soil Group shapefiles associated with the PC-Hydro user Guide. Vegetation cover was determined to be Desert Brush with an estimated 20% cover density for the entire Airport Wash watershed. Hydrologic soil data can were shown on Figure 4. Impervious cover density for each subwatershed was obtained by utilizing PAG's 2008 aerial photos and Google Maps aerial photos. Impervious cover density are provided in Appendix D.2.

Runoff transformation was modeled using the SCS Unit Hydrograph method. This method requires that subwatershed Lag Times, which are 60% of time of concentration (T_c), be input in the HEC-HMS model. T_c for each subwatershed was computed by using method described in Technical Release 55 Urban Hydrology for Small Watersheds by NRCS (TR-55, 1986). The hydraulic flow length for each sub-watershed is divided into three parts: overland flow, shallow concentrated flow, and channel flow. Hydraulic properties are determined for each part in each watershed. The total time of concentration for each watershed is calculated as the sum of the individual travel times for each segment.

The first part, overland flow, includes thin sheet flow over plane surfaces and are non-converging flows over irregular surfaces. Flow length of 100 feet (L_1) was used for overland flow computations for each watershed. Manning's roughness coefficients were obtained from Table 3-1 in the TR-55 Manual. Rainfall depths (2-year) are NOAA 14 upper 90% without area-depth reduction factor. Travel times (T_1) for this segment are obtained from Equation 3-3 in TR-55 Manual and their computations are included in the attached Compact Disc (CD).

Shallow concentrated surface flow is the next modeling element. As shown on Figure 3-1 in the TR-55 Manual, the average velocity in this segment is a function of land slope (S_2). The average velocities also depend on whether the flow path is paved or unpaved. The travel time (T_2) is then calculated by using the flow length (L_2) and the average velocity in this segment. The computations are included in the attached CD.

Channel flow is the final routing element in each watershed. Flow length (L_3), land slope (S_3), channel size, channel Manning's roughness coefficient, and peak discharge rate are needed for computing the travel time (T_3) in this segment. Representative channel shapes were

obtained from HEC-GeoRAS computer program by utilizing PAG's 2008 bare earth LIDAR data. Manning's roughness coefficients are estimated from aerial photos. The peak discharge rates that were used to calculate velocity were obtained by Regional Regression Equation 13 for Southern Arizona by USGS. Channel velocities were obtained by HEC-RAS. These computations are included in the attached CD.

The total time of concentration (T_c) is calculated as the sum of the individual travel time for the three consecutive flow segments: $T_c = T_1 + T_2 + T_3$ and a lag time of $T_{lag} = 0.6T_c$ is used to estimate the peak discharge. A summary table for the physical characteristics, which were used to develop the runoff hydrographs, is provided in Appendix D.2. Figure 5 shows the watershed boundaries.

The Modified Puls normal depth storage routing was used to route runoff in natural channels between subwatersheds and Kinematic Wave method was used to route runoff in constructed channels and steep channels. Storage-Discharge relationships for Modified Puls normal depth storage routing are obtained from HEC-RAS results and Microsoft Excel. Number of Routing Step for Kinematic Wave Channel Routing was estimated by utilizing the channel length and channel velocity for each routing reach. These computations are included in the attached CD.

Diversion flow analyses were performed at subwatersheds AW036, AW440, and AW012 to determine whether flow diversion should be included in the HEC-HMS hydrologic model. Per RFCD's guidance, if the diversion flow is less than 100 cfs during 100-year rainfall event, it is not necessary to include diversion flow in the hydrologic model. At subwatershed AW036, HY-8 analysis for existing 2-6'x3' RCBC indicated that less than 28 cfs, during 100-year rainfall event, breakout to other watersheds. Therefore, there is no need to include the diversion flow at this location. At subwatershed AW440, the 20-ft wide concrete channel between 1st Avenue and UPRR contains the 100-year runoff (723 cfs). Therefore, there is no need to include the diversion flow at this location. At subwatershed AW012, diversion flow at this location is over 100 cfs. Diversion flow at this location is included in the HEC-HMS model. Diversion flow computations at these locations are included in Appendix D.5.

The East Basin on Los Reales Landfill (referenced in Appendix A.1), which is located at the southwest corner of Los Reales Road and Craycroft Road, has an estimated volume of 518.3 acre-feet retention volume at an elevation of 2737.0 based on PAG's 2008 bare earth LIDAR data. Retention volume for the East Basin keeps expanding over the years and eventually will reach design volume of 1128 acre-feet. The East Basin fully contains the

runoff from upstream watershed of the East Basin, for both 500-year and 100-year rainfall events. Volume computation for the East Basin on Los Reales Landfill is provided in Appendix D.4. As shown on the Post-Development Plan for Los Reales Landfill in Appendix A.1, the East Basin will remain in place after landfill closure. HEC-HMS parameters are summarized in Table 3.

Table 3: HEC-HMS parameters Summary Table

HEC-HMS Model Parameters	Description
Airport Wash Watershed Area	• Approximately 22.87 square miles, with 80 subwatersheds in total.
Topographic Data and Aerial Photos	• 2008 PAG bare earth LIDAR data and 2008 1-ft aerial photos.
Storm Frequencies Evaluated	• 100-year rainfall event for the entire watershed. • 10-, 50-, and 500-year in effective FEMA Zone AE area.
Rainfall Data	• NOAA 14 (upper 90%) rainfall depths for both 3-hour Type I and 24-hour Type II storms. • Areal reduction factors were applied per Table 3.0 in Arizona State Standard [SS10-07]. An average areal reduction factor was applied to each of the following watershed size group: <=1 sq mi; 1~5 sq mi; 5~10; sq mi; 10~15 sq mi; 15~20 sq; and 20~25 sq mi.
Rainfall Loss Method	• Used the SCS Curve Number method. • SCS Curve Numbers were obtained from hydrologic soils (soil data from RFCD's PC-Hydro) and vegetation covers. • Impervious cover densities were estimated by utilizing PAG aerial photos and Google Maps aerial.
Transform	• Used SCS Unit Hydrograph method. • Times of Concentration (Tc) were computed by utilizing the method detailed in Chapter 3 of NRCS's TR55. • For the Channel segment in Tc computation, HEC-RAS was utilized to obtain channel velocities. Q100s from USGS Regional Regression Equation 13 by utilizing local watershed areas were used as the channel discharges in the HEC-RAS.
Channel Routing	• Modified Puls method was applied to natural channels. • Kinematic Wave method was applied to constructed channels.
Diversion Flow Verification	• Verified that diversion flow at subwatershed AW036, and AW440 are less than 100 cfs and thus is not necessary to be included in the HEC-HMS model. • Verified that diversion flow at subwatershed AW012 is over 100 cfs and thus included in the HEC-HMS model.
Retention Basin	• Based on PAG's 2008 bare earth LIDAR data, the East Basin on Los Reales Landfill provides 518.3 acre-feet retention volume at an elevation of 2737.0. The basin fully contains both 100-year and 500-year runoff from upstream watersheds.

Naming of the subwatersheds, routing reaches, and junctions in the HEC-HMS model is summarized in Table 4.

Table 4: Subwatershed, Routing Reach & Junction Naming Summary Table

Items	Example Name	Description
Subwatersheds	AW002 (North Fork) AW202(South Fork) AW402(Main Channel)	• # increases by 2. For example, AW002, AW004, … • Naming Sequence: from upstream to downstream. • North Fork start with #0, South Fork starts with #2, Main Channel starts with #4
Routing Reach	R204_206 R216&220_222	• R204_206: Routing reach conveys runoff from subwatershed 204 to subwatershed 206. • R216&220_222: Routing reach conveys runoff from subwatershed 216 & 220 to subwatershed 222.
Junction	J004 J216&220	• J004: Junction at subwatershed AW004. • J216&220: Junction at subwatershed AW216 and AW220.

4.3 Issues encountered during the Study

4.3.1 Special Problems and Solutions

There were no special problems or unique situations encountered during the hydrologic modeling for this study.

4.3.2 Modeling Warnings and Error Messages

There were no modeling warnings and error messages encountered during the hydrologic modeling for this study.

4.4 Calibration

No calibration was conducted in this study.

4.5 Final Results

4.5.1 Hydrologic Analysis Results

The HEC-HMS model has multiple simulation runs to cover different storms and different rainfall aerial reduction factors. An Excel file named “Hydrology Results.xlsx” was utilized to extract the appropriate peak discharge rate, higher discharges from either 3-hour or 24-hour storms with suitable rainfall aerial reduction factor, at each concentration point. The results of the HEC-HMS modeling for Airport Wash are summarized by subwatershed in Table 5. At

most concentration points, peak discharge rates from 3-hour Type II storm are higher than those from 24-hour Type II storm, with couple of exceptions that are denoted in Table 5. See Appendix H for the Airport Wash HEC-HMS electronic input file.

Table 5: HEC-HMS Discharge Rate Summary Table

Concentration Point	WaterShed Area (cumulative)	HEC-HMS Q (cfs)			
	(sq mile)	10-Year	50-Year	100-Year	500-Year
AW002	0.081	-	-	130	-
AW004	0.335	-	-	486	-
AW006	0.685	-	-	666	-
AW008	1.198	-	-	862	-
AW010	1.372	-	-	895	-
AW012_No_Split	1.59	-	-	920	-
AW012_Split	1.59	-	-	688	-
AW014	0.166	-	-	191	-
AW016	0.318	-	-	429	-
AW018	0.738	-	-	778	-
AW012&018	2.328	-	-	1109	-
AW020	0.482	-	-	559	-
AW022	0.823	-	-	793	-
AW024&D012	0.285	-	-	455	-
AW022&024	1.108	-	-	1073	-
AW026	1.241	-	-	1108	-
AW028	1.763	-	-	1326	-
AW030	2.715	-	-	1160	-
AW028&030	4.478	-	-	2476	-
AW032	4.855	-	-	2521	-
AW034	0.312	-	-	269	-
AW036	0.39	-	-	288	-
AW038	0.72	-	-	609	-
AW040	0.803	-	-	648	-
AW042	0.144	-	-	184	-
AW40&042	0.947	-	-	735	-
AW044	1.216	-	-	888	-
AW048	0.335	-	-	431	-
AW050	0.553	-	-	536	-
AW032&050	5.408	-	-	2285	-
AW052	5.482	-	-	2287	-
AW054	0.29	-	-	376	-
AW056	0.426	-	-	378	-
AW052&056	5.908	-	-	2425	-
AW058	6.348	-	-	2475	-
AW060	0.059	-	-	131	-
AW062	6.624	-	-	2477	-
AW064	0.223	-	-	307	-
AW066	0.435	-	-	492	-

Table 5: HEC-HMS Discharge Rate Summary Table

Concentration Point	WaterShed Area (cumulative)	HEC-HMS Q (cfs)			
	(sq mile)	10-Year	50-Year	100-Year	500-Year
AW068	0.508	-	-	514	-
AW062&068	7.132	-	-	2568	-
AW070	7.362	-	-	2558	-
AW202	0.44	-	-	473	-
AW204	1.06	-	-	974	-
AW206	1.778	-	-	1438	-
AW206&224	3.167	-	-	2306	-
AW208	0.388	-	-	409	-
AW210	0.207	-	-	237	-
AW208&210	0.595	-	-	641	-
AW212	1.307	-	-	833	-
AW214	0.2	-	-	284	-
AW216	0.363	-	-	401	-
AW218	0.095	-	-	127	-
AW220	0.23	-	-	257	-
AW216&220	0.593	-	-	610	-
AW222	0.802	-	-	737	-
AW224	1.389	-	-	969	-
AW206&212&224	4.474	-	-	2982	-
AW226	0.283	-	-	320	-
AW228	5.752	-	-	2801	-
AW230	6.324	-	-	2854	-
AW232	0.351	-	-	394	-
AW234	1.02	-	-	710	-
AW236	0.309	-	-	325	-
AW230&234&236	7.653	-	-	3125	-
AW238	8.063	-	-	3130	-
AW240	0.28	-	-	323	-
AW242	8.679	-	-	3173	-
AW244	0.356	-	-	467	-
AW246	0.875	-	-	626	-
AW242&246	9.554	-	-	3240	-
AW248	9.759	-	-	3193	-
AW250	10.432	-	-	2887	-
AW070&250	17.794	1,566	3,182	3993	6,283
AW402	0.218	-	-	356	-
AW404	0.58	-	-	589	-
AW406	0.989	-	-	1152	-
AW408	1.019	-	-	1052	-
AW410	18.283	1,590	3,181	3993	6,299
AW412	19.81	1,668	3,198	4021	6,347
AW414	20.469	1,666	3,180	3876	6,157
AW416	20.966	1,786	3,217	3876	6,157
AW418	21.214	1,816	3,233	3875	6,157
AW420*	21.504	1,909	3,255	3891	6,157

Table 5: HEC-HMS Discharge Rate Summary Table

Concentration Point	WaterShed Area (cumulative)	HEC-HMS Q (cfs)			
	(sq mile)	10-Year	50-Year	100-Year	500-Year
AW422	0.144	-	-	245	-
AW424*	21.944	2,038	3,286	3927	6,159
AW426*	22.157	2,077	3,301	3943	6,158
AW428	22.277	2,091	3,312	3953	6,158
AW430	0.067	-	-	122	-
AW432	0.336	-	-	521	-
AW434	0.455	-	-	641	-
AW436	0.499	-	-	660	949
AW428&436	22.776	2,224	3,550	4249	6,160
AW438	22.87	2,234	3,567	4267	6,160
AW440	0.607	-	-	723	-

*100-Year discharge rates from 24-hr storm are higher than those from 3-hr storm.

4.5.2 Verification of Results

The Airport Wash PMR hydrologic results were compared with those obtained from USGS's regional regression equation for Southern Arizona Flood Region 5 (Reference 18), the effective regulatory discharge rate in the Flood Insurance Study (FIS), and TSMS discharge rates from COT GIS website, if they are available. The Regional Regression Equations are obtained by using least-squares multiple-regression analyses to the available gaged data in each region. The Regional Regression Equation for Southern Arizona Flood Region 5 for estimating the 100-year discharge rates for this region is shown as follows:

$$Q_{100} = 10^{(5.651 - 2.634 A^{-0.12})}$$

Where, Q_{100} = the 100-year discharge rate, in cubic feet per second
A = the drainage area, in square miles

At major roadway crossings or major watersheds, the 100-year discharge rates from this study were somewhat less than, but are within the standard error (42.6%) of, those obtained from USGS's Regional Regression Equation for Southern Arizona Flood Region 5.

In effective FIS, there is only one available discharge for Airport Wash. The location of the discharge is at its confluence with Santa Cruz River and the 100-discharge rate for Airport Wash is 8,100 cfs, which was developed before the TSMS study. The FIS discharge rate is approximately two times of the 100-year discharge rate (4,267 cfs) obtained in this study at the same location. Major differences between these two discharge rates are likely due to

differences in hydrology method and hydrologic parameters.

The 100-year discharge rates from this study were also compared to those obtained from TSMS nodes at similar locations. Discharge rates from this study are generally in agreement with the TSMS discharges. As shown in the discharge summary table on Figure 5, at the downstream end of North Fork and South Fork watersheds (AW070 & AW250), the discharge rates from this study and TSMS are almost identical. Discharge rates along the main channel of Airport Wash are slightly less than those in TSMS. As shown in Appendix A.1, TSMS discharge rates for Airport Wash were approved by FEMA in 1997, but were not recorded in the FIS. The FEMA Approval Letter for Airport Wash TSMS hydrology is provided in Appendix A.1. Therefore, the flood discharge rates generated by HEC-HMS model in this study are considered reasonable per guidelines in Appendix C of FEMA's Guidelines & Specifications for Flood Hazard Mapping Partners. Table 6 summarizes the results of the discharge comparisons.

Table 6: Comparison to Similar Watershed - 100Yr Recurrence Interval Storm

Concentration Point	WaterShed Area (cumulative)	Q_{100} (Regional Regression Equation)	HEC-HMS Q_{100} *	TSMS Q_{100}	$(Q_{HMS} - Q_{Reg}) / Q_{Reg}$	$(Q_{HMS} - Q_{TSMS}) / Q_{TSMS}$	Roadway Crossing / Major Watershed
	(sq mile)	(cfs)	(cfs)	(cfs)			
AW028&030	4.478	2,823	2,476	2,143	-12%	16%	Craycroft Rd
AW070*	7.362	3,785	2,558	2,532	-32%	1%	End of South Fork
AW206&212&224	4.474	2,821	2,982	2,659	6%	12%	Kolb Rd
AW250	10.432	4,603	2,887	2,937	-37%	-2%	End of North Fork
AW070&250*	17.794	6,115	3,993	4,601	-35%	-13%	Co North/South
AW416*	20.966	6,649	3,876	5,012	-42%	-23%	Nogales HWY
AW438*	22.870	6,946	4,267	5,162	-39%	-17%	Santa Cruz River
In FIS, Q_{100}=8,100 cfs, which is about 2 time of $Q_{HMS,100}$ (4,267 cfs) at this location							Santa Cruz River

*discharge values have been reduced by the Los Reales Landfill retention basin.

SECTION 5: HYDRAULICS

5.1 Method Description

The currently FEMA mapped portion of Airport Wash is the primary subject of this PMR application. Airport Wash floodplain mapping limit extends from its confluence with Santa Cruz River at the downstream end to Craycroft Road at the upstream end. The study reaches include Airport Wash main channel (± 5.2 miles), South Fork channel and its tributaries (± 5.0 miles), and North Fork channel and its tributaries (± 4.1 miles). South Fork and North Fork channels join at Country Club Road and then drain to the main channel. The main channel segment includes constructed earthen or armored channels. This segment of the channel drains across TIA and highly urbanized COT areas. The channels at North Fork and South Fork are generally natural with relatively dense vegetation at a portion of the channel bottoms, which significantly reduces the channels' runoff conveyance capacity. Overbank area are generally lightly vegetated. This segment of the channels is generally not well entrenched and the floodplain is broad and gently sloping. This area has few developments, except for couple of major roadways and mining pits. In Airport Wash, flow is generally in a southeast to northwest direction.

On the effective FIRMs and FIS report, the Airport Wash from its confluence with Santa Cruz River to approximately 3.6 miles upstream on the main channel (approximately 1000 feet south of Valencia Road) is shown as FEMA flood Zone AE with 10%, 2%, 1%, and 0.2% annual chance flood water surface elevation profiles. In addition, floodway is also mapped in this segment of the reach. This PMR updates all of these water surface elevation profiles, including floodplain and floodway limits. The areas upstream of Zone AE is currently mapped as Zone A on the effective FIRMs. This PMR intends to remap the effective Zone A area as Zone AE. Only 1% annual chance flood water surface elevations and floodplain limits are established for this reach segment.

HEC-RAS, Version 4.1.0 (January 2010, U.S. Army Corps of Engineers) was used to determine the water surface elevations. There are two HEC-RAS models, one for the effective Zone AE areas (with 5 profiles) and the other one for the effective Zone A areas (with only the 100-year profile). The downstream boundary conditions for the HEC-RAS model in effective Zone AE areas were determined by utilizing 10-year Santa Cruz River water surface elevation at this location, while the boundary conditions for the HEC-RAS model in the effective Zone A areas were determined by utilizing the 100-year water surface elevations from the downstream

effective Zone AE HEC-RAS model. Computations for Santa Cruz River's 10-year water surface elevation at its confluence with Airport Wash are included in Appendix E.5.

5.2 Work Study Maps

Hydraulic work maps were developed for the project using Pima County aerial photography and topographic GIS data for the floodplain mapping areas. These maps were generated at a horizontal scale of 1 inch = 200 feet. Streets and property line base information have been imported from Pima County effective DFIRM panels 0419C2286L, 0419C2288L, 0419C2289L, 04019C2880L, and 0419C2900L that were provided by RFCD. The GIS data was provided as bare earth LIDAR data (2008), which was used to generate topography with a contour interval of 2 feet.

In addition to the information mentioned above, the Hydraulic Work Maps, which are provided as Figure 7 (Sheets 1 through 8) in Appendix E, illustrate the following:

- Survey Township, Range & Section information;
- Stream channel center lines / profile base lines;
- River & reach identifiers that correspond to the HEC-RAS model;
- HEC-RAS hydraulic cross-section lines with graphic representation of the 1% and 0.2% annual chance flood water surface elevations;
- Effective 0.2% and 1% annual chance flood floodplain and floodway boundaries, if available; in effective Zone AE areas;
- Proposed 0.2% and 1% annual chance flood floodplain and floodway boundaries, if available.
- Drainage structures and their associated discharges.

5.3 Parameter Estimation

5.3.1 Roughness Coefficients

A field reconnaissance study was conducted to observe channel and overbank conditions, and to determine Manning's roughness coefficients. Channels in the main channel segment are constructed channels, while the channels in South Fork and North Fork are mainly natural channels, with dense vegetation at channel bottoms in many locations. Manning's roughness coefficients were estimated based on Table 3-1 in HEC-RAS v 4.1 Reference Manual. In addition, *Selection of Manning's Roughness Coefficient for Natural and Constructed Vegetated and Non-Vegetated Channel, and Vegetation Maintenance Plan*

Guidelines for Vegetated Channels in Central Arizona (Reference 12) was also consulted in the Manning's roughness coefficients determination. Selected photos for the channels and their estimated Manning's roughness coefficients are provided in Appendix E.1. A summary of the selected Manning's roughness coefficients is provided in Table 7.

Table 7: Summary of Manning's "n" Roughness Coefficients

Upstream Cross Section	Downstream Cross Section	Manning's n		
		Left Overbank	Channel	Right Overbank
Main Channel				
0.001	0.022	0.04	0.033	0.04
0.033	0.163	0.04	0.025	0.03
0.174	0.380	0.045	0.015	0.045
0.412	0.478	0.045	0.030	0.045
0.487	0.761	0.055	0.030	0.055
0.775	0.801	0.055	0.015	0.055
0.839	0.915	0.055	0.027	0.055
0.946	1.471	0.055	0.030	0.055
1.509	1.570	0.055	0.027	0.055
1.598	1.979	0.055	0.030	0.055
2.017	2.135	0.055	0.030	0.055
2.165	3.031	0.05	0.032	0.055
3.069	3.175	0.05	0.027	0.055
3.209	3.587	0.055	0.025	0.045
3.616	4.278	0.045	0.027	0.045
4.316	4.411	0.045	0.030	0.045
4.432	4.531	0.045	0.025	0.045
4.552	4.938	0.045	0.030	0.045
4.964	5.078	0.045	0.035	0.045
5.112	5.112	0.045	0.020	0.045
5.166	5.205	0.03	0.065	0.05
South Fork				
6.000	6.135	0.03	0.065	0.05
6.220	9.606	0.05	0.065	0.05
10.000	10.107	0.05	0.030	0.05
10.196	10.477	0.05	0.065	0.05
10.541	10.756	0.05	0.050	0.05
10.851	11.172	0.05	0.065	0.05
12.000	12.297	0.05	0.065	0.05
North Fork				
20.000	22.620	0.05	0.065	0.05
23.000	23.358	0.05	0.065	0.05
24.000	24.073	0.05	0.065	0.05
24.169	24.302	0.05	0.050	0.05
24.315	25.089	0.05	0.065	0.05

Table 7: Summary of Manning's "n" Roughness Coefficients

Upstream Cross Section	Downstream Cross Section	Manning's n		
		Left Overbank	Channel	Right Overbank
Split Flow Channel Along I-19				
30.000	30.091	0.055	0.032	0.055
30.144	30.091	0.04	0.055	0.045
30.195	30.195	0.04	0.055	0.025

5.3.2 Expansion and Contraction Coefficients

Expansion and contraction coefficients used in the HEC-RAS model are based on guidance provided in the HEC-RAS User's Guide and Hydraulic Reference Manual. Expansion coefficient of 0.3 and contraction coefficient of 0.1 were used at all cross sections, except for the cross sections adjacent to culverts and bridges, where expansion coefficient of 0.5 and contraction coefficient of 0.3 were used.

5.4 Cross Section Description

This PMR proposes to update the floodplain mapping and/or SFHA zone designations based on revised hydrologic and hydraulic analyses. HEC-RAS models have been prepared for this project. All geometric data for cross sections are based on Pima County's 2008 LIDAR data, which were provided by RFCD for this project.

Cross section locations were chosen based on guidance provided in the HEC-RAS User's Guide, Hydraulic Reference Manual, and Arizona State Standard for Floodplain Hydraulic Modeling (SS 09-02). The cross sections were located considering changes in channel geometry, discharge, slope, roughness, and distance between cross sections for computational stability. In the effective Zone AE areas, cross sections on the FIRMs were duplicated, if they are deemed to be appropriate, in the HEC-RAS model for this study. However, many cross sections on the effective FIRMs are not being duplicated in the current HEC-RAS model because the locations or extents of those cross sections are not suitable to be coded into the HEC-RAS model. For example, Cross Section B-B on FIRM panel 0419C2286L extends across a bridge, which makes this cross section not suitable to be included in the HEC-RAS model. Some of the cross sections on the effective FIRMs, such as Cross Section C-C on FIRM panel 0419C2286L, were modified (likely shortened) because the proposed floodplain areas are significantly reduced, at many locations, compared to those on effective FIRMs.

Geometric data for each cross section were initially obtained by HEC-GeoRAS utilizing ArcGIS Version 10.1. Those data were then imported into HEC-RAS for hydraulic analyses. The cross sections were oriented to be perpendicular to estimated flow paths of the 100-year flood event.

The location of the channel center line/profile base line and cross-sections are shown on the work maps provided in Appendix G.

5.5 Modeling Consideration

5.5.1 Hydraulic Jump and Drop Analysis

There were no locations where significant hydraulic jumps or drops were noted.

5.5.2 Bridges and Culverts

There are forty five culverts/bridges within the study limit. The locations and sizes of these culverts/bridges are shown in Figure 7 and Table 8. Per RFCD Technical Policy, TECH-019 (Standards for Floodplain Hydraulic Modeling), debris loading on bridge piers needs to be considered for floodplain mappings. The policy states “a: For bridge piers less than 4 feet wide, the bridge pier width is to be doubled in width or increased to a width of 4 feet, whichever is greater. b: For bridge piers 4 feet wide or wider, 4 feet is to be added to the pier to reflect debris loading.” Bridge modeling in this study follows the policy in pier debris loading treatment.

Cross sections and the conveyance areas of the bridges/culverts are supposed to be taken perpendicular to the flow lines. However, as shown in Table 8, at several culverts/bridges, the roadways/decks are not perpendicular to the flow lines going through the bridges/culverts. Skew angels were obtained for the culverts/bridges and were applied to the bounding cross sections of these structures, if the skew angles are more than 15 degrees. The input geometric data for the skewed bridges (with skew angles more than 15 degree) were manual adjusted to represent the conveyance areas perpendicular to the flow lines. Ashby Surveying & Drafting, Inc. surveyed all of the bridges/culverts and their sealed surveying documents are provided in Appendix C.3.

Table 8: Existing Drainage Structure Summary Table

Culvert ID	Field Survey ID by Ashby	Roadway Name	Structure Size and Material	Length (ft)	Skew Angle (Degrees)
CV01	CV01	Calle Santa Cruz	5-12'x10' RCBC	68	8
BR01	BR01	West of I-19	Arch	45	22

Table 8: Existing Drainage Structure Summary Table

Culvert ID	Field Survey ID by Ashby	Roadway Name	Structure Size and Material	Length (ft)	Skew Angle (Degrees)
BR02	BR02	West of I-19	Arch	83	59
BR03	BR03	West of I-19	Arch	47	0
BR04	BR04	I-19	Bridge	52	35
BR05	BR05	I-19	Bridge	52	35
CV02	CV02	Santa Clara Ave	6-12'x10' RCBC	55	0
CV03	CV03	Drexel Rd	6-7'x12' RCBC	65	16
CV04	CV04	12th Ave.	6-12'x7' RCBC	100	22
CV05	CV05	Liberty Ave.	6-12'x10' RCBC	50	0
CV06	CV06	6th Ave.	6-7'x12' RCBC	73	29
CV07	CV07	Bilby Rd.	6-7'x12' RCBC	71	26
BR06	BR06	Nogales Hwy	4-Span Bridge	76	5
BR07	BR07	Railroad	4-Span Bridge	14	3
CV08	CV08	Park Ave.	6-12'x7' RCBC	87	43
CV09	CV09	Valencia Rd	6-12'x6' RCBC	139	29
BR08	BR08	Valencia Rd	Bridge	34	0
CV10	CV10	TIA	9-10'x6' RCBC	500	0
CV11	CV11	TIA	9-10'x6' RCBC	200	14
CV12	CV12	Plummer Ave.	7-10'x6' RCBC	34	0
BR09	BR09	Tucson Blvd	Bridge	77	44
BR10	BR10	Tucson Blvd	Bridge	70	33
CV13	CV13	Los Reales Rd	6-10'x8' RCBC	70	53
CV15	CV15	Alvernon Way	2-10'x4' RCBC	44	0
CV16	CV16	Alvernon Way	58"x36" CMPA	67	0
CV17	CV17	Alvernon Way	4-10'x5' RCBC	44	0
CV19	CV19	Alvernon Way	6-10'x4' RCBC	44	0
CV23	CV23	Swan Rd	3-72"x44" ACMP	68	0
CV24	CV24	Swan Rd	3-72"x44" ACMP	68	0
CV25	CV25	Swan Rd	3-72"x44" ACMP	68	0
CV26	CV26	Swan Rd	3-72"x44" ACMP	68	0
CV27	CV27	Swan Rd	3-72"x44" ACMP	68	0
CV28	CV28	Swan Rd	3-72"x44" CMPA	68	0
CV29	CV29	Swan Rd	3-72"x44" CMPA	85	0
CV30	CV30	Swan Rd	3-72"x44" CMPA	74	0
CV31	CV31	Swan Rd	3-72"x44" CMPA	74	0
CV32	CV32	Swan Rd	3-72"x44" CMPA	76	0
CV33	CV33	Swan Rd	3-72"x44" CMPA	72	0
CV34	CV34	Swan Rd	3-72"x44" CMPA	70	0
CV36	CV36	Swan Rd	1-72"x44" CMPA	80	0
CV37	CV37	Swan Rd	1-72"x44" CMPA	84	0
CV38	CV38	Swan Rd	1-72"x44" CMPA	83	0
CV39	CV39	Swan Rd	1-72"x44" CMPA	80	0

Table 8: Existing Drainage Structure Summary Table

Culvert ID	Field Survey ID by Ashby	Roadway Name	Structure Size and Material	Length (ft)	Skew Angle (Degrees)
CV40	CV40	Swan Rd	1-72"x44" CMPA	80	0
CV53	CV53	I-19	2-10'x5' RCBC	210	0

5.5.3 Levees and Dikes

This Section is not applicable

5.5.4 Non-Levee Embankments

There are no uncertified non-levee embankments within the study reach

5.5.5 Islands and Flow Splits

Four lateral weirs were modeled in this study to simulate the flow splits. These lateral weirs are natural non-elevated overbank areas. The weir coefficients for natural non-elevated lateral weirs should be much less than these for constructed inline weirs due to flow momentum loss by turning flow direction sideways, less efficient weir shape and material, and less efficient downstream flow regimes (overland flow compared to channel flow). Per Table 3-1 Lateral Weir Coefficients in HEC-RAS 2D User's Manual Version 5.0 Beta (Reference 15), weir coefficient of 0.5 was utilized in analyzing the amount of flow escaping the main river. The locations of the lateral weirs and the amount of split flow at 1% annual chance rainfall event are shown in Table 9 and Figure 7.

Table 9: Lateral Weirs Discharge Summary Table

Study Reach	Location	Lateral Weir Discharge (cfs)
Main Channel, Reach 2	East of I-19, near cross section 0.487	119
South Fork, Reach 2	East of Swan Road, near cross section 8.558	47
South Fork, Reach 2	West of Swan Road, near cross section 8.205	402
North Fork, Reach 3	East of Swan Road, near cross section 22.105	165

Per RFCD's guidance, if the split flow is over 100 cfs, the discharge rate of the split flow is directly added on top of the HEC-HMS peak discharge rate for the receiving watershed for floodplain mapping. These discharge rates are shown on Figure 7.

5.5.6 Ineffective Flow Areas

Ineffective flow areas were model in the following situations:

- Cross Sections immediately upstream or downstream of bridges/culverts;
- Cross Sections in the vicinity of flow obstructing structures, such as residential and commercial buildings;
- Cross Sections in the vicinity of abruptly expanded or contracted floodplain areas.

Expansion ratio of 2:1 and contraction ratio of 1:1 were utilized in determining ineffective flow areas.

5.5.7 Supercritical Flow

Per FEMA requirements for floodplain modeling, the HEC-RAS analyses were performed using subcritical flow regimes. Therefore, this section is not applicable.

5.6 Floodway Modeling

Floodway modeling was performed for the channel in the effective FEMA Zone AE areas. This segment of the channels is well incised constructed channels. At locations, where 100-year runoff is contained within the incised channels, the floodway limits match the 100-year floodplain limits. At locations, where 100-year runoff spreads outside of the incised channels, floodway encroachment modeling was performed to obtain the floodway limits. Negative surcharges, no more than -0.04 ft, were observed at some cross sections. These negative surcharges are within the maximum allowable negative surcharge of -0.04 ft, which was documented in our communication with FEMA Region IX. This document is provided in Appendix E.5.

5.7 Issues Encountered During the Study

5.7.1 Special Issues and Solutions

There were no special problems encountered during this study.

5.7.2 Model Warnings and Error Messages

The HEC-RAS modeling produced no error messages. The model warnings were reviewed according to procedures outlined in the HEC-RAS User's Manual and a quality control check was performed on the model results per Arizona State Standard for Floodplain Hydraulic Modeling (SS 09-02) guidelines. The hydraulic results were reviewed at locations where warnings were issued and all results were found to be reasonable.

5.8 Calibration

No model calibration was performed in this study.

5.9 Final Results

5.9.1 Hydraulic Analysis Results

The HEC-RAS model (Filenames: aw_ae_14063.prj and AirportWashZoneA.prj) results are summarized in HEC-RAS summary output tables provided in Appendix E.5. A printout of the Airport Wash HEC-RAS input/output report has also been provided in Appendix E.5.

At most locations in the Airport Wash main channel, 1% annual chance flood discharges are contained in the channel. These segments of the channel are listed as follows:

- from its confluence with Santa Cruz River to Cross Section 0.437,
- from Cross Section 0.543 to Cross Section 2.203,
- from Cross Section 2.690 to Cross Section 4.154,
- from Cross Section 4.432 to 4.704,
- from Cross Section 4.78 to 4.919.

The 1% annual chance flood discharge containment in channel has also been shown on Hydraulic Workmaps (Figure 7). Electronic copies of the HEC-RAS models are included on a CD, which is provided in Appendix H.

5.9.2 Verification of Results

The limits of the Airport Wash 1% and/or 0.2% annual chance floodplain determined in this study are super-imposed on the current effective floodplain limits on the Annotated FIRM exhibit (Figure 8) provided in Appendix E. The current FEMA mapping was done by utilizing significantly bigger discharges, compared to this study. This study, which is based on updated hydrologic data, more detailed hydraulic mapping methods and more accurate topography than those were used in the effective study, shows that 1% and 0.2% annual chance flood are contained within the channel for a significant portion of the Airport Wash main channel segment. In the South Fork and North Fork areas, the overall 1% annual chance floodplains in this study are similar in locations and extends, when compared to those in on the effective FIRMs. An effective and proposed floodplain mapping area comparison exhibit is provided in Figure 8.

SECTION 6: EROSION AND SEDIMENT TRANSPORT

The study reaches are relatively stable constructed channels or natural watercourses with no historical indications that sediment transport can be expected to greatly affect base flood elevations. Consequently, sediment transport was not included in the scope of this PMR study.

SECTION 7: DRAFT FIS REPORT DATA

7.1 Summary of Discharges

The current effective FIS for Pima County has only discharges at Airport Wash's confluence with Santa Cruz River. The Discharges at this location were updated and discharges were added at other locations in the HEC-RAS model. Table 10 contains the following steady flow data that were utilized in the HEC-RAS models and were proposed to be included in the FIS peak discharge table by this PMR.

Table 10: HEC-RAS Discharge Summary Table

Study Reach	River Station	Location	Drainage Area (sq mi)	HEC-HMS Q (cfs)			
				10-Year	50-Year	100-Year	500-Year
Main Channel, Reach 1	0.291	West of I-19	22.87	2,234	3,567	4,267	6,160
Main Channel, Reach 2	2.997	Valencia Rd	22.27	2,091	3,312	3,953	6,158
Main Channel, Reach 2	3.633	West of Valencia Rd	19.81	1,668	3,198	4,021	6,347
Main Channel, Reach 3	3.894	TIA	19.81	-	-	4,021	-
Main Channel, Reach 3	5.205	Country Club Rd	17.79	-	-	3,993	-
North Fork, Reach 1	20.484	East of Country Club Rd	7.36	-	-	2,558	-
North Fork, Reach 2	21.948	West of Swan Rd	6.62	-	-	2,477	-
North Fork, Reach 3	22.62	East of Swan Rd	5.48	-	-	2,287	-
South Fork, Reach 1	7.749	East of Alvernon Way	9.76	-	-	3,193	-
South Fork, Reach 2	8.401	Swan Rd	8.68	-	-	3,173	-
South Fork, Reach 3	9.662	Craycroft Rd	8.06	-	-	3,130	-

7.2 Floodway Data

Floodway modeling was performed in the effective Zone AE areas. Floodway limits are shown on Figure 7 and an electronic copy of the HEC-RAS model, including the floodway modeling, is included on a CD in Appendix H. As shown in Table 11, some of the Cross Sections in the Floodway Data Table were removed because they go across drainage structures and some others were extended or shortened due to the extents of the proposed floodplain limits.

Table 11: Floodway Data Table

Flooding Source		Floodway			Base Flood Water-Surface Elevation (Feet, NAVD88)				
Cross Section	Distance[1]	Width (feet)	Section Area (square feet)	Mean Velocity (feet per second)	Regulatory	Without Floodway	With Floodway	Increase	Comments
Airport Wash									
A	396	103	668	6.4	2424.1	2416.9[2]	2416.9	0.0	extended
B	Removed, Cross Section goes across a drainage structure								
C	1,832	59	323	13.2	2428.8	2428.8	2428.8	0.0	shortened
D	2,191	71	485	7.9	2432.5	2432.5	2432.5	0.0	same
E	2,635	100	549	7.0	2451.3	2451.3	2451.3	0.0	same
F	Removed, Cross Section goes across a drainage structure								
G	Removed, Cross Section goes across a drainage structure								
H	2,962	131	669	5.9	2452.5	2452.5	2452.5	0.0	shortened
I	3,100	128	682	5.8	2452.7	2452.7	2452.7	0.0	shortened
J	3,739	108	539	7.3	2453.8	2453.8	2453.8	0.0	same
K	4,409	85	471	8.4	2455.9	2455.9	2455.9	0.0	same
L	Removed, Cross Section goes across a drainage structure								
M	4,583	91	352	11.2	2456.3	2456.3	2456.3	0.0	shortened
N	5,386	119	479	8.3	2467.7	2467.7	2467.7	0.0	same
O	Removed, Cross Section goes across a drainage structure								
P	6,347	103	368	10.7	2474.0	2474.0	2474.0	0.0	shortened
Q	Removed, Cross Section goes across a drainage structure								
R	7,229	83	446	8.9	2481.1	2481.1	2481.1	0.0	same
S	7,788	86	504	7.9	2484.1	2484.0	2484.1	0.0	same
T	8,681	68	348	11.4	2487.1	2487.1	2487.1	0.0	same
U	9,589	61	430	9.2	2493.3	2493.3	2493.3	0.0	same
V	Removed, Cross Section goes across a drainage structure								
W	10,719	91	442	9.0	2502.7	2502.7	2502.7	0.0	same
X	Removed, Cross Section goes across a drainage structure								
Y	11,521	87	382	10.4	2507.5	2507.5	2507.5	0.0	same
Z	12,171	134	320	12.4	2512.9	2512.9	2512.9	0.0	same
AA	12,234	149	416	9.5	2515.3	2515.3	2515.3	0.0	same

Table 11: Floodway Data Table

Flooding Source		Floodway			Base Flood Water-Surface Elevation (Feet, NAVD88)				
Cross Section	Distance[1]	Width (feet)	Section Area (square feet)	Mean Velocity (feet per second)	Regulatory	Without Floodway	With Floodway	Increase	Comments
AB	13,042	122	632	6.3	2521.5	2521.5	2521.5	0.0	shortened
AC	13,179	240	808	4.9	2522.3	2522.3	2522.3	0.0	same
AD	13,237	346	659	6.0	2522.3	2522.3	2522.3	0.0	same
AE	13,348	180	561	7.1	2522.7	2522.7	2522.7	0.0	same
AF	13,665	229	751	5.3	2525.9	2525.9	2525.9	0.0	same
AG	14,188	168	522	7.6	2527.6	2527.6	2527.6	0.0	same
AH	14,827	87	654	6.1	2530.6	2530.6	2530.6	0.0	same
AI	Removed, Cross Section goes across a drainage structure								
AJ	15,154	126	695	5.7	2533.8	2533.8	2533.8	0.0	same
AK	15,824	82	443	8.9	2535.5	2535.5	2535.5	0.0	same
AL	16,062	95	510	7.8	2541.2	2541.2	2541.2	0.0	shortened
AM	16,215	91	462	8.6	2541.6	2541.6	2541.6	0.0	shortened
AN	16,801	118	530	7.6	2543.4	2543.4	2543.4	0.0	shortened
AO	17,335	92	406	9.9	2546.2	2546.2	2546.2	0.0	same
AP	17,715	88	377	10.7	2547.9	2547.9	2547.9	0.0	same
AQ	17,899	91	474	8.5	2549.5	2549.5	2549.5	0.0	same
AR	18,105	90	401	10.0	2549.8	2549.8	2549.8	0.0	same
AS	18,676	88	388	10.4	2552.5	2552.5	2552.5	0.0	same
AT	19,483	83	345	11.7	2556.6	2556.6	2556.6	0.0	same

[1]Feet above confluence with Santa Cruz River

[2]Elevation computed by utilizing 10-year water surface elevation from Santa Cruz River for backwater effects

7.3 Annotated Flood Insurance Rate Maps

An annotated FIRM exhibit (Figure 8) was developed for the project using effective FIRM panels 04019C2286L, 04019C2288L 04019C2289L, 04019C2880L and 04019C2900L. This map was generated at a scale, 1 inch = 2000 feet. The annotated FIRM's also include the proposed floodplain and floodway limits.

7.4 Flood Profiles

Flood profiles have not been included in this study.

APPENDIX A

REFERENCES

A.1 - Data Collection Summary
A.2 - Referenced Documents

A.1 – DATA COLLECTION SUMMARY

Includes:

- FEMA Approval Letter for TSMS Hydrology at Airport Wash
- Los Reales Landfill On-Site Drainage Management Report
- LIDAR Source Data
- Nebraska Wash Drainage Improvement As-Built Plan (used for split flow verification @ subwatershed AW440)

Joanne

Federal Emergency Management Agency

Washington, D.C. 20472

OCT 10 1997

CERTIFIED MAIL
RETURN RECEIPT REQUESTED

IN REPLY REFER TO:
Case No.: 97-09-006R

The Honorable George Miller
Mayor, City of Tucson
P.O. Box 27210
Tucson, Arizona 85726

Community: City of Tucson, Arizona
Community No.: 040076

104

Dear Mayor Miller:

This responds to a letter dated September 25, 1996, from Ms. Sandra Steichen, City of Tucson Department of Transportation, regarding proposed revisions to the peak discharge values for Julian and Airport Washes in the City of Tucson. Ms. Steichen requested that the Federal Emergency Management Agency (FEMA) reconsider its determination concerning the reasonableness of the discharges associated with the flood having a 1-percent chance of being equaled or exceeded in any given year (base flood). In a letter dated May 21, 1996 (Case No. 96-09-235R), we indicated we could not accept the proposed base flood discharge values, derived using the U.S. Army Corps of Engineers HEC-1 rainfall-runoff computer model, because the information submitted with the City's request did not adequately demonstrate the proposed discharge values were reasonable and further investigation was warranted. In support of her request, Ms. Steichen provided a report entitled "Additional Information Regarding City of Tucson Proposed Revisions to Peak Base-Flood Discharge Values," prepared by Simons, Li, and Associates, Inc. (SLA), dated September 23, 1996.

In a letter dated September 23, 1996, Mr. Michael E. Zeller, P.E., P.H., Principal and Senior Vice President, SLA, provided a revised proposed base flood discharge for Julian Wash, changing it from 3,599 cubic feet per second (cfs) to 3,357 cfs. During a telephone conversation on November 25, 1996, Mr. Zeller explained that the decrease is the result of corrections to parameters in the HEC-1 model developed as part of the Tucson Stormwater Management Study. Subsequent to that conversation, SLA sent us a review copy of the HEC-1 model for Julian Wash. The presence of large detention basins along Julian Wash are effective in reducing flood discharges from that watershed. To judge the reasonableness of the proposed discharges for Julian Wash, we evaluated the discharges without the detention basins.

In a letter dated September 16, 1997, sent via facsimile transmission, Mr. Zeller provided revised base flood discharges for North Fork Airport Wash, South Fork Airport Wash, and Airport Wash. These revised base flood discharges are as follows: 1,984 cfs for North Fork Airport Wash at Node AW0490, drainage area of 6.309 square miles (revised from 1,524 cfs); 3,259 cfs for South Fork Airport Wash at Node AW0290, drainage area 9.674 square miles (revised from 2,555 cfs); and 5,090 cfs for Airport Wash at Node AW0680, drainage area 22.103 square miles (revised from 4,331 cfs).

All data required to complete our review of this request for a Conditional Letter of Map Revision were submitted with the previously referenced letters from Ms. Steichen and Mr. Zeller. We have reviewed the information provided in support of this request and agree that the revised base flood discharges for Julian and Airport Washes are reasonable at the locations for which they were computed by SLA. Because they are reasonable, the proposed values may be used by the City of Tucson as the basis for future revisions to the effective Flood Insurance Rate Map. Please note that we will judge the reasonableness of base flood discharges at other locations using the same approach as used in making this determination.

The use of rainfall-runoff modeling is accompanied by uncertainties associated with defining antecedent conditions and the temporal and spatial distribution, duration, and frequency of rainfall. Because of the uncertainty involved in using a rainfall-runoff model to determine the frequency of a discharge value, we judge the reasonableness of the results of a rainfall-runoff model using a statistical analysis of streamflow data at a gaging station or regional regression equations. This is consistent with our requirements for detailed hydrologic analyses as outlined in our *Flood Insurance Study Guidelines and Specifications for Study Contractors* (January 1995). In a 1981 report entitled *Estimating Peak Flow Frequencies for Natural Ungaged Watersheds*, the U.S. Water Resources Council demonstrated the use of U.S. Geological Survey regression equations was a reasonable approach for estimating the magnitude and frequency of peak discharges for ungaged watersheds.

In general, as part of our evaluation of reasonableness of the discharge values, we do not review all detailed input to the rainfall-runoff model. Future revision requests using the same hydrologic model with changes in key parameters may result in discharge values that are not considered reasonable. For example, a change in the infiltration rates used in a rainfall-runoff model may result in significantly different discharge values, even though previous discharges were considered reasonable. We would review those new results using our standard procedures to determine reasonableness.

If you have any questions regarding floodplain management regulations for your community or the National Flood Insurance Program in general, please contact the Consultation Coordination Officer (CCO) for your community. Information on the CCO for your community may be obtained by contacting the Director, Mitigation Division of FEMA in San Francisco, California, at (415) 923-7177. If you have any technical questions regarding this letter, please contact Mr. Karl Mohr of our staff in Washington, DC, either by telephone at (202) 646-2770 or by facsimile at (202) 646-4596.

Sincerely,

Frederick H. Sharrocks, Jr., Chief
Hazard Identification Branch
Mitigation Directorate

cc: Ms. Sandra Steichen, Hydrologist
Stormwater Section, Planning Division
City of Tucson Department of Transportation

Mr. Terry Hendricks, Principal Hydrologist
Pima County Department of Transportation and
Flood Control District

Mr. Michael E. Zeller, P.E., P.H.
Principal and Senior Vice President
Simons, Li, and Associates, Inc.

APPENDIX S

OFF-SITE AND ON-SITE DRAINAGE MANAGEMENT

LOS REALES LANDFILL
ON-SITE DRAINAGE MANAGEMENT

TUCSON, ARIZONA

Prepared for

CITY OF TUCSON

May 2004

Prepared by

EMCON/OWT, Inc.
305 South Euclid Ave. Suite 101
Tucson, Arizona 85719]

Project 824792

Los Reales Landfill On-Site Drainage Management

Tucson, Arizona

The material and data in this report were prepared under the supervision and direction of the undersigned. This report was prepared consistent with current and generally accepted geologic and environmental consulting principles and practices that are within the limitations provided herein.

EMCON/OWT, Inc.

Craig Young, P.E.
Project Engineer

Registered Professional Engineer (Civil)
CERTIFICATE NO. 27290
GARTH R. BOWERS
Date Signed 6/16/04
ARIZONA U.S.A.

Garth R. Bowers, P.E.
Senior Project Manager

2 RETENTION/DETENTION BASINS

2.1 Design Criteria and Strategy

The landfill area contributing to the on-site surface water drainage system was divided into three drainage areas. Each drainage area will drain into retention/detention basins located on the perimeter of the landfill as follows: The North Basin which drains the North drainage area, the East Basin which drains the East drainage area, and the Southwest Basin which drains the Southwest drainage area. Flows originating on the landfill cover will be conveyed to the retention/detention basins via diversion berms, downdrains, and perimeter channels. For permitting purposes of this Solid Waste Facility Plan, the downdrains and diversion berms are conceptually sized. Drainage from both storm events will be discharged at controlled flowrates into naturally occurring channels of either the existing Airport Wash or Rodeo Wash watersheds. Flow control structures need to be located and sized as needed during operation of the landfill to accommodate changing conditions. Final design of the post-closure bench and downdrain system will be included in the construction-level design of the final cover.

The retention/detention characteristics of the three basins vary based on their physical location and interaction with the off-site run-on control system. The East Basin, which also collects off-site flows from the headwaters of the Rodeo Wash watershed, is a full retention basin. It is sized to retain two "piggy backed" 100-year, 24-hour storms from the combined on-site/off-site watershed. It is anticipated that a permanent pool of water will exist in the bottom of this basin except in periods of prolonged drought. The North Basin will be a functional retention basin, which is sized to contain the entire 100-year, 24-hour storm runoff but has a low flow bleed off discharge to slowly drain the basin by gravity to the existing Rodeo Wash channels. The Southwest Basin will be a retention/detention basin which will retain flows from smaller storms (up to the 5.8 year event) and detain flows from larger events. The outlet flows from the Southwest Basin will be conveyed under Swan Road through existing CMP culverts which will be modified to control flows to match the existing 100-year storm flowrates.

2.2 Design Calculations and Results

In order to approximate on-site drainage, the City of Tucson Method was used to estimate the peak discharge from the landfill for both a 25-year, 24-hour design storm event and 100-year, 24-hour design storm event. The hydrologic design data calculations using the City of Tucson Method are presented in Appendix A. In order to size the

retention/detention basins, the landfill drainage area was divided into three basins as discussed above (Drainage Map of Appendix A).

Sizing of the basins were based on the volumes calculated in Table 1 and Table 2 to provide effective retention of flows from routine events at the site. These basins will capture the initial portion of the storm events no greater than the 100-year 24-hour storm and will provide for continued discharge of the final portion of the storm event, which exceeds the design volume of the basin.

TABLE 1

Retension/Detension Basin
On-site Drainage Design Data
25-year, 24-hour Storm Event
Los Reales Landfill
Tucson, Arizona

Basin	Drainage Area (acres)	Runoff Coefficient (C)	Rainfall Depth (inches)	Calculated Volume (acre-feet)
North	99.9	0.68	3.4	19.3
East	336.5	0.68	3.4	64.8
Southwest	234.6	0.68	3.4	45.2

TABLE 2

Retension/Detension Basin
On-site Drainage Design Data
100-year, 24-hour Storm Event
Los Reales Landfill
Tucson, Arizona

Basin	Drainage Area (acres)	Runoff Coefficient (C)	Rainfall Depth (inches)	Calculated Volume (acre-feet)
North	99.9	0.68	4.2	23.8
East	336.5	0.68	4.2	80.1
Southwest	234.6	0.68	4.2	55.8

Note that the volumes presented for the East Basin in tables 1 & 2 are the projected volume of on-site flows. Since the basin collects both on- and off-site flows, the design volume of the basin is substantially larger (minimum capacity of 492.4 acre-ft). See Section 6 for details.

sediment. An earthen bottom was preserved to accommodate required maintenance to remove accumulations of sediment from off-site flows.

The flow from the off-site channel will be diverted to the off-site spreading basin. The spreading basin discharges into the existing Airport Wash channel towards the southwest at controlled depth and velocity.

The remaining area of off-site run-on to the site, along the northern portion of the east boundary of the site will be collected by the East Retention Basin. This basin was sized to collect "piggy-backed" 100-year run-off from both the off-site contributing area and the east on-site drainage area, as discussed in Section 2. Based on Black and Veatch (1997), the off-site contribution during a 100-yr event is 194.0 acre-ft. The additional volume required for on-site flows not included in the Black and Veatch contributing area is 52.2 acre-ft. Since the basin is designed to contain twice the 100-yr storm runoff volume, the minimum size required for the basin is 492.4 acre-ft. This minimum volume must be provided in the East basin area prior to construction of the south channel and south expansion area. If the East basin is constructed to the design floor presented on Master Stormwater Plan in Appendix A at 3:1 sideslopes from existing grade, the resultant basin capacity would be 1128 acre-ft, which is substantially larger than the required volume for a double 100-year storm event.

PRELIMINARY DRAINAGE REPORT
DRAFT TEAM REVIEW SUBMITTAL

LOS REALES LANDFILL AND ASSOCIATED PROPERTIES

5300 E. Los Reales Road
Tucson, Arizona 85706
Proposed Zoning
Planning Case #????
T15S-R14E-S(23, 24, 26, 14)
Floodplain Section's Record #????

Prepared for

City of Tucson Environmental Services
100 N. Stone, 2nd Floor
Tucson, Arizona 85701
(520) 791-5414

Prepared by

Shaw™ EMCON/OWT, Inc.
Shaw Environmental, Inc.
305 South Euclid Avenue, Suite 101
Tucson, Arizona 85719

Project 824792

10/31/2005

PRELIMINARY NOT FOR CONSTRUCTION

Los Reales Landfill and Associated Properties Drainage Report
Tucson, Arizona

The material and data in this report were prepared under the supervision and direction of the undersigned. This report was prepared consistent with current and generally accepted civil and environmental engineering consulting principles and practices that are within the limitations provided herein.

EMCON/OWT, Inc.

A division of Shaw Environmental, Inc.

PRELIMINARY - NOT FOR CONSTRUCTION

Justin S. Rogers, E.I.T.
Staff Engineer

Garth R. Bowers, P.E.
Senior Project Manager

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PRELIMINARY - NOT FOR CONSTRUCTION

5 DETENTION/RETENTION BASINS

5.A Basin Locations and Description

There are three proposed retention or detention basins for the development located within the Rodeo Wash or Airport Wash Watersheds. The Rodeo Wash Watershed is a critical watershed, and the Airport Wash Watershed is a balanced watershed. The East and North Basins are sized to retain the runoff from a full 100-year storm event. The Southwest Basin is a retention/detention basin. The estimations for the expected volume are contained in Appendix B and hydraulic design calculations are contained in Appendix E. The location and layout of the basins are shown on Drawing 2 in Appendix A.

The North and Southwest Basins will comply with the landscaping/grading guidelines of COT 10-01.0 (Pima County Stormwater Detention/Retention Basin Manual (PCFCD, 1987)). Final construction plans will include consideration of the requirements of this development code. The East Basin is designed to function as a long-term retention basin with a semi-permanent pool. The design of the basin will incorporate vector control measures as discussed in Section 5.B below. Where possible, the final design of this basin will comply with the landscaping and grading plans of COT 10-01.0, however, some variances will be requested as pare of the PAD.

5.B Basin Design

The North Basin is sized to fully retain the 100-year storm event, and has a low-flow outlet structure which has been sized to drain the basin in approximately 30 hours. The expected volume from the 100-year event is approximately 37 acre-feet of runoff and is adequately sized to contain this volume. The outlet consists of two 24-inch CMP culverts in the location shown on Drawing 2. The outflows and drainage capabilities of this design were estimated using the HEC-5 culvert method and an incremental volume approach assuming the basin was full at the start of discharge. The highest flowrate (26 cfs) is expected very late in the storm event and was therefore not combined with the Small 22 and Small 23 flowrates. The outflow hydrograph and calculations are shown in Appendix E. A full inflow/outflow hydrograph should be performed using HEC-HMS or equivalent for a construction-level design to fully evaluate the interaction of the basin outflow hydrograph with the downstream watershed hydrograph.

The East Basin is sized to fully retain the 100-year storm event. The expected volume from the 100-year event is approximately 274 acre-feet of runoff and is adequately sized

to contain this volume. The expected inundated area of the basin is shown on Drawing 2. Water accumulated in the basin will infiltrate into the soil, as well as evaporate over time. It is expected that some water will usually be present at the bottom of the basin.

Final design of the basin should incorporate measures to reduce the development of vector habitat specifically in the vicinity of the anticipated normal pool elevation. For example, the conceptual design of this basin includes a pool depth which will likely normally exceed 6 feet and will have relatively steep sides. This will minimize the likelihood of development of sheltering vegetation to reduce potential vector habitat. This could be supplemented by a maintenance program to remove vegetation that does grow in this area and/or stocking the pool with species that prey on the vector species

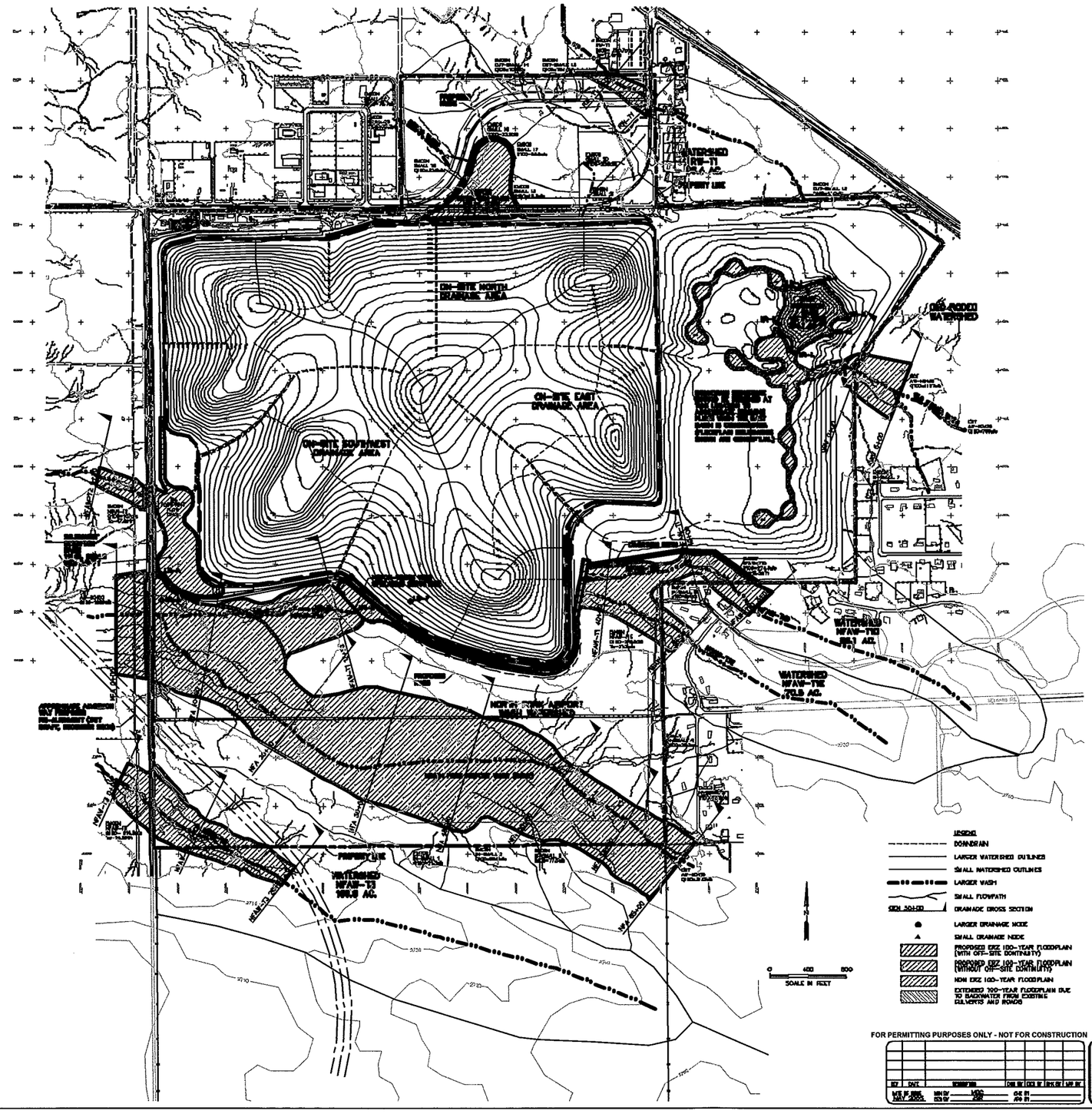
The East Basin and surrounding graded area has a much larger capacity than the 100-year event (approximately 8,000 acre-feet), and therefore an outlet structure is not needed for emergency outflows.

The Southwest Detention Basin was sized as part of the original SWFP drainage report. The expected inflow to the basin from the 100-year storm event is approximately 56 acre-feet. The basin is designed to retain the initial portion of these flows and detain the remainder to reduce the peak outflow rate to or below pre-development conditions. These flows and the calculations of this design are included in this report in Appendix E for completeness. A full inflow/outflow hydrograph was performed. The maximum outflow is 107 cfs, which is much less than the pre-development flowrate of 216.9 cfs from the pre-development watershed NFAW-T2.

5.C Basin and Drainageway Maintenance

The maintenance of the basins and drainagways will be performed by the City of Tucson as part of the landfill maintenance. After construction, the basins, channels, and culverts should be inspected on a regular basis. Special attention should be paid to culverts, channels and weirs to maintain a clear flowpath that is free from weeds and debris.

Additionally, after every major storm event, a check should be made of the stormwater control structures. Debris should be removed from structures and damages to channels or other structures should be repaired. It is expected that small amounts of rilling, scour, or other erosion will occur over the life of the structures. This erosion should be repaired as needed to maintain the integrity of the structures. Sediment removal should also be performed as needed to ensure that hydraulic structures (including basins, channels, culverts, and spreading structures) perform as designed.



NOTES:

1. SOUTH TOPOGRAPHY PREPARED BY COOPER AERIAL SURVEYS CO. DATE OF AERIAL: JUNE 26, 2002
2. LANDFILL TOPOGRAPHY PREPARED BY COOPER AERIAL SURVEYS CO. DATE OF AERIAL: JULY 24, 2003
3. SOUTH AND SOUTHEAST OFF-SITE TOPOGRAPHY TAKEN FROM PIMA COUNTY WEB SITE (2006) AND IS BASED ON 1998 MAPPING. TOPOGRAPHY SHOWN IN THESE AREAS IS APPROXIMATE.

PRELIMINARY

FOR PERMITTING PURPOSES ONLY - NOT FOR CONSTRUCTION

REV	DATE	REVISION	DWN BY	CKD BY	RVW BY	APP BY

MCE P. REG. NO. 17-20-2005 | MIN BY MDC | CKD BY JBF | 24 BY | 30 BY

Shaw Environmental, Inc.

CITY OF TUCSON
LOS REALES LANDFILL
TUCSON, ARIZONA

STORMWATER DRAINAGE PLAN
POST-DEVELOPMENT PLAN

DRAWING NO. 2

PROJECT NO. 654760

Orthophotos Metadata 2008

- Orthophotos - Color
- Digital Elevation Models - DEMs
- LIDAR Elevation Data

Orthophotos 2008 - Color

Name(s)	Orthophotos; Color; 3-band RGB
Flight Date	April 2008
Spatial Domain	Surrounding Tucson Area: Eastern Pima County Southern Pinal County, Eastern Cochise County
Format	Tiff/Tfw Image File Format
Feature type	raster
Resolution	4 inch, 1 foot resolutions
Horizontal Control	Final adjusted results were adjusted to Arizona State Plane Coordinates, Central Zone NAD83-92 (HARN), NAVD88, in units of International Foot.
Source	Pima Association of Governments

Orthophotos **2008 - Digital Elevation Models - DEMs**

Name(s)	DEM-Digital Elevation Models
Format	ASCII Point Files
Control	Final adjusted results were adjusted to Arizona State Plane Coordinates, Central Zone NAD83-92 (HARN), NAVD88, in units of International Foot.
Accuracy	Relates to standards for 1' = 200', 2.00 foot c.i. photogrammetric mapping (vertical accuracy is +/- 0.5 feet on any given point of the dataset
File Specifications	▪ ***DEMs*** are point files only (txt) ▪ ***DEMs*** are filtered at 2 foot minimum ▪ ***DEMs*** files do not support DTM contours

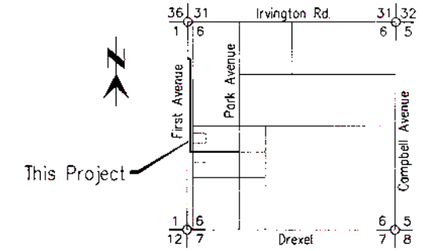
Orthophotos 2008 - LIDAR Elevation Data

Name(s)	2008 LiDAR Data Set
Format	ASCII Point files, LAS format
Control	2008 Project Ground Control
Accuracy and File Specifications	▪ Flight Height: 1,200m ▪ Bare Earth data set

©Pima Association of Governments | 1 E Broadway Blvd, Suite 401, Tucson, AZ 85701 | Telephone (520) 792-1093 , FAX (5

Nebraska Wash

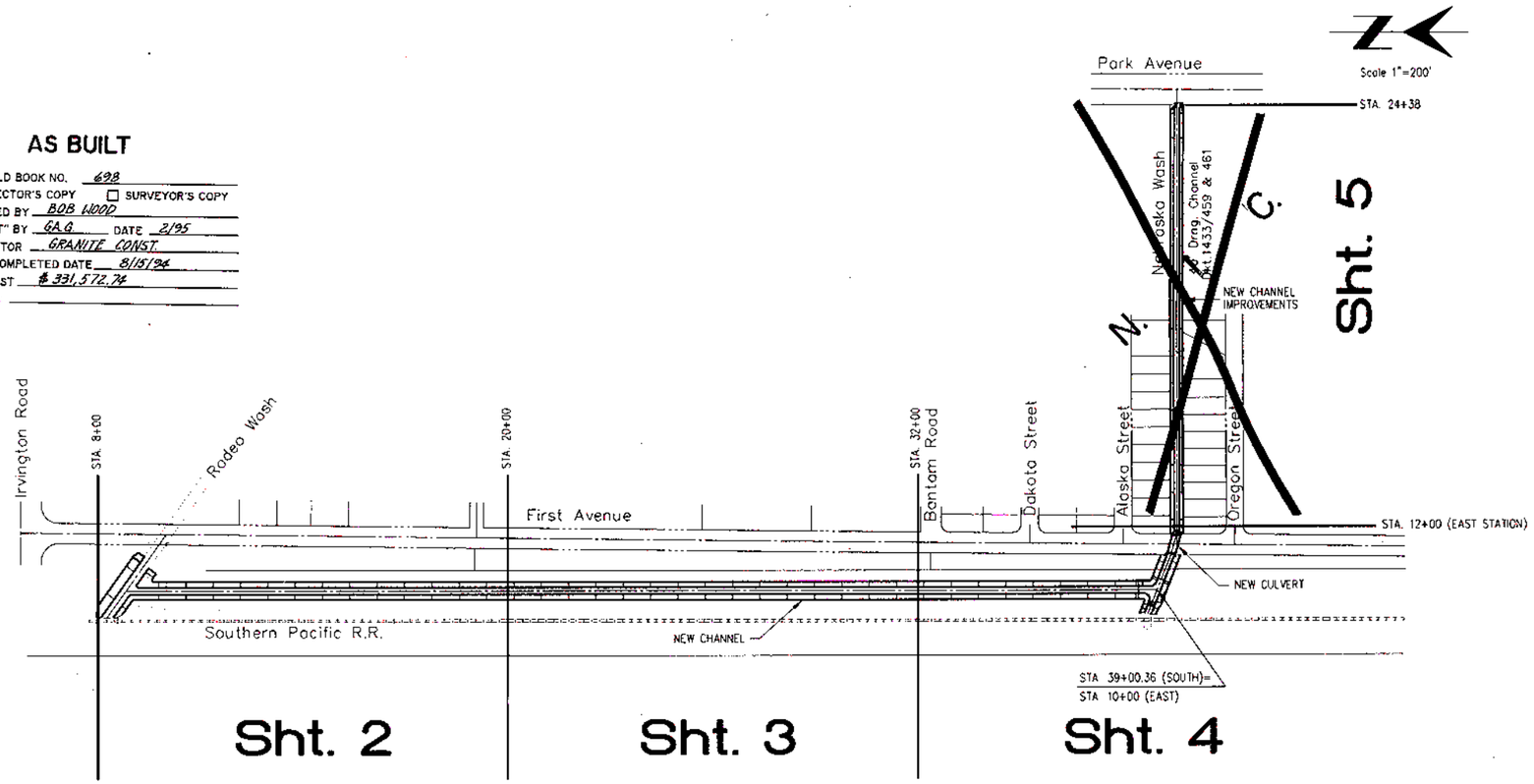
Drainage Improvements



Location Plan
Located in the West 1/2 of Section 6, Township 15 South, Range 14 East, G.&S.R.B.&M., Pima County, Arizona
Scale: 3" = 1 Mile

AS BUILT

INSP. FIELD BOOK NO. 698
☒ INSPECTOR'S COPY ☐ SURVEYOR'S COPY
INSPECTED BY BOB WOOD
"AS BUILT" BY G.A.G. DATE 2/95
CONTRACTOR GRANITE CONST.
CONST. COMPLETED DATE 8/15/94
FINAL COST $331,572.74
REMARKS



GENERAL NOTES

1. BASIS OF BEARING: THE LINE BETWEEN THE S.M. IN CASTING AT THE NORTHWEST CORNER OF SEC. 6, T15S, R14E, AND THE BCSM 15.08' NORTHERLY OF THE WEST 1/16 COR. OF SEC. 6 (IRVINGTON ROAD & PARK AVE.) AS SHOWN ON RECORD OF SURVEY BK 5, PG 97. SAID BEARING BEING N 89°25'29" E.
2. BASIS OF ELEVATION: "X" ON THE WEST END OF THE SOUTHWEST WINGWALL OF THE RAILROAD BRIDGE OVER RODEO WASH, SOUTH OF IRVINGTON ROAD. BM #1 IN FB 1868A, ELEV.= 2496.01
3. ALL WORK SHALL CONFORM TO THE CITY OF TUCSON STANDARD SPECIFICATIONS AND DETAILS OR AS OTHERWISE INDICATED.
4. CONTRACTOR SHALL COMPLY WITH ALL APPLICABLE OCCUPATIONAL SAFETY AND HEALTH ADMINISTRATION REGULATIONS.
5. CONTRACTOR TO VERIFY LOCATIONS AND ELEVATIONS OF ALL EXISTING UTILITIES PRIOR TO ANY CONSTRUCTION. CALL "BLUE STAKE" 792-2211, TWO FULL WORKING DAYS PRIOR TO ANY EXCAVATION.
6. CONTRACTOR SHALL COORDINATE WITH U.S. WEST COMMUNICATIONS & SOUTHWEST GAS CORPORATION THE RELOCATION OF THEIR RESPECTIVE SERVICE LINES.
7. THE CONTRACTOR SHALL OBTAIN ALL PERMITS REQUIRED BY GOVERNMENTAL AGENCIES, INCLUDING NPDES PERMIT.
8. THE PAVING CONTRACTOR SHALL ADJUST VALVES, METERS, MANHOLE AND CLEANOUT RINGS AND COVERS AND ALL SURFACE UTILITY APPURTENANCES TO GRADE.
9. THE CONTRACTOR AGREES TO PROTECT ALL ADJACENT PROPERTY AND EXISTING IMPROVEMENTS, INCLUDING POSITIVE CONTROL OF EARTH SPILLAGE, CONSTRUCTION WATER AND RUNOFF WATERS.
10. ASPHALTIC CONCRETE PAVING SHALL BE AS SHOWN ON THE DRAWINGS PER CITY OF TUCSON STANDARD SPECIFICATIONS, DIVISION 400, SECTIONS 406 (NO. 1 MIX, UNLESS NOTED OTHERWISE). A.B.C. SHALL CONFORM TO CITY OF TUCSON STANDARD SPECIFICATIONS, DIVISION 300, SECTION 303 AND SHALL BE COMPACTED TO 100% OF ASTM D698 (A, C, OR D) OF SUBGRADE SHALL BE SCARIFIED TO A DEPTH OF 6" AND COMPACTED PER CITY OF TUCSON STANDARD SPECIFICATIONS, DIVISION 200, SECTION 203. EMBANKMENT SHALL BE COMPACTED TO 95% OF THE MAXIMUM DENSITY AS DETERMINED IN ACCORDANCE WITH ASTM D698 (A, C, OR D) AND D1556 OR D2167. CONCRETE SHALL BE IN ACCORDANCE WITH DIVISION 601 AND SECTION 1006. CONCRETE FOR SIDEWALKS SHALL BE CLASS "B" ALL OTHER CONCRETE SHALL BE CLASS "S" 3000 PSI UNLESS OTHERWISE NOTED.
11. UNDERGROUND UTILITIES OF RECORD ARE SHOWN AS ACCURATELY AS POSSIBLE. LOCATIONS ARE BASED ON AS-BUILT INFO FURNISHED BY UTILITY COMPANIES OR OWNER, AND ENGINEER ASSUMES NO RESPONSIBILITY FOR IMPROPER LOCATIONS OR FAILURE TO SHOW UTILITY LOCATIONS ON CONSTRUCTION PLANS. THE CONTRACTOR SHALL VERIFY HORIZONTAL AND VERTICAL LOCATION OF ALL UTILITIES PRIOR TO ANY CONSTRUCTION AND ASSUMES FULL RESPONSIBILITY FOR ANY DAMAGE AND/OR REPAIR THERETO.
12. SURVEY WAS PERFORMED BY CITY OF TUCSON AS PROVIDED IN FIELD BOOK 1868 A

APPROVED: 12/15/93
DIRECTOR OF TUCSON WATER — DATE

WATER SYSTEM MODIFICATION NOTES

1. ALL WATER MODIFICATION CONSTRUCTION WORK IS TO CONFORM TO TUCSON WATER STANDARD SPECIFICATIONS AND DETAILS. SEE THE WATER SYSTEM MODIFICATION SPECIFICATIONS IN THE SPECIAL PROVISIONS.
2. WATER SYSTEM MODIFICATION PRECONSTRUCTION PROCEDURE: THE CONTRACTOR SHALL CONTACT MR. HANK LEON, FIELD ENGINEERING, TUCSON WATER (791-2665) PRIOR TO ANY WATER WORK. NO WATER SYSTEM CONSTRUCTION IS TO BEGIN UNTIL WRITTEN AUTHORIZATION HAS BEEN ISSUED.
3. NEW WATER LINES ARE TO BE INSTALLED AT A MINIMUM DEPTH OF 30" BELOW PROPOSED SUBGRADE OR STRUCTURES. IN ALL AREAS THE MINIMUM DEPTH WILL BE 44" FROM FINISHED GRADE.
4. SPECIAL WATER USE PERMITS:

   PRIOR TO COMMENCING WORK, THE CONTRACTOR MUST OBTAIN TWO SPECIAL WATER USE PERMITS. (ALSO SEE SPECIAL SPECIFICATIONS)

   CONSTRUCTION WATER SPECIAL PERMIT: THERE WILL BE NO CHARGE FOR THIS PERMIT, BUT THE CONTRACTOR MUST PAY THE SUM OF $30.00 PLUS TAX AS THE ESTIMATED COST OF THE WATER TO BE USED.

   METERED FIRE HYDRANT ONLY PERMIT: THIS NON-TRANSFERABLE PERMIT WILL ENTITLE THE CONTRACTOR TO USE WATER FROM EXISTING FIRE HYDRANTS AT APPROVED LOCATIONS, THROUGH A METER ACQUIRED THROUGH TUCSON WATER COMMERCIAL SECTION.
5. THE CONTRACTOR WILL BE RESPONSIBLE FOR MAINTAINING SERVICE TO ALL WATER CUSTOMERS DURING CONSTRUCTION. IT WILL BE HIS RESPONSIBILITY TO DETERMINE WHICH SERVICES WILL BE EFFECTED BY THIS PROJECT. IF INTERRUPTION OF SERVICE IS UNAVOIDABLE, THE CONTRACTOR WILL NOTIFY THE CUSTOMER A MINIMUM OF 48 HOURS IN ADVANCE AND COORDINATE SHUT-DOWN TIMES. EVERY EFFORT WILL BE MADE TO MINIMIZE DISRUPTION TO THE CUSTOMER. IF NECESSARY, TIE-OVERS, RECONNECTIONS, ETC. WILL BE MADE WHILE BUSINESS CUSTOMERS ARE CLOSED.
6. SHUT-DOWN OF THE EXISTING WATER SYSTEM REQUIRING THE OPERATION OF TUCSON WATER VALVES WILL BE COORDINATED THROUGH A TUCSON WATER FIELD INSPECTOR.
7. THE CONTRACTOR WILL CONTACT TUCSON FIRE DEPARTMENT, FIRE PREVENTION UNIT (791-4502), 48 HOURS PRIOR TO SHUT-DOWN OF ANY FIRE SERVICE PROTECTION LINES AND/OR FIRE HYDRANTS.

LEGEND

	EXIST. CURB & PAVEMENT		EXIST. TREE
	NEW CONCRETE	W	EXIST. WATER METER
OHE	OVER HEAD ELECTRIC		EXIST. FIRE HYDRANT
	EXIST. CHAINLINK FENCE		EXIST. PK NAIL
	EXIST. WOOD FENCE	C	ELECTRIC PULLBOX
W	EXIST. WATER LINE & VALVE	G	EXIST. GAS METER
UGE	EXIST. UNDERGROUND ELECTRIC		MAILBOX
G	EXIST. GAS LINE	S.M.	SURVEY MONUMENT (EXIST.)
UGT	EXIST. UNDERGROUND TELEPHONE LINE	PP	EXIST. POWER POLE
S	EXIST. SEWER LINE & M.H.		BASIS OF ELEVATION
CTV	EXIST. UNDERGROUND TELEVISION		EXIST. CONCRETE WALL
OHTV	EXIST. OVERHEAD TELEVISION LINE		EXIST. BUILDING

792-2211

RS Engineering
consulting engineers
RSE# 9106.13

NO.	DATE	REVISION	BY	CH	APPR

CITY OF TUCSON, ARIZONA
DEPARTMENT OF TRANSPORTATION — ENGINEERING DIVISION
NEBRASKA WASH
DRAINAGE IMPROVEMENTS
1 OF 6

DRWN: LWH/DK 7/93	APPD BY _____ CITY ENGINEER 19__	REF _____	SCALE H. 1"=200'
DSGN: FG 7/93			
CHKD: RCA 7/93	APPD BY _____ 19__	PLAN NO. D-93-04	

STA. 11+25±, 48± LT TO
STA. 11+25±, 48± RT
122'
~~96'~~± 8" DIP(CL.350) RESTRAINED
4-8"x22 1/2" BENDS
INSTALL DIP @ INV=2499.20
CONNECT TO EXIST. N. & S

STA. 11+68.62
LEVEL WING, TYPE A
PER ADOT STD. B-08.10, L=~~11'~~ 6'
MODIFIED : SKEW WING 25°
PERPENDICULAR TO HEADWALL
2" PIPE HANDRAIL INSTALLED BEHIND THIS WINGWALL

K/6 PAVEMENT REPLACEMENT

STA. 11+72.77 (EAST)
ANGLE POINT
STA. 11+68.62
LEVEL WING, TYPE A
PER ADOT
STD. B-08.10, L=~~12'~~ 7'
MODIFIED : SKEW WING
TO 33' FROM HEADWALL

RELOCATE UNDERGROUND
TELEPHONE, ELECTRIC, GAS,
& CABLE TV BY OTHERS

STA. 12+00, MATCHLINE, SEE SHT. 5

GUARDRAIL ELIMINATED

STA 11+25±, 48± LT. TO
STA 11+25±, 48± RT.
REMOVE & DISPOSE OF
~~56'~~± 82' CA PIPE & 40'± DIP

25 LF GUARDRAIL (TIMBER POST)
1-25' TRANSITION W/BEAM (TIMBER POST) TO CONCRETE PARAPET WALL (C-10.25) MODIFIED PER DETAIL R
1-FLARED BCT ASSEMBLY (TIMBER POST) REFER TO C-10.03 FOR TO C-10.03 FOR MEASUREMENT LIMITS.
ALL GUARD RAIL SHALL BE PLACED PER ADOT STD'S & SPEC'S LATEST EDITION (TYP. EA. SIDE, 4 SIDES 250± LF GUARDRAIL TOTAL).
R/4

BANTAM ROAD
DAKOTA STREET
ALASKA STREET
NEBRASKA WASH
OREGON STREET
FIRST AVENUE
SOUTHERN PACIFIC RAILROAD
S. FLETCHER AVE
STA. 32+00, MATCHLINE, SEE SHT. 3

55 HOUSE
54
67
84
FND BCSM
BRASS STEM ONLY
CAP BROKEN OFF

S00°00'36"E 289.43'
S00°00'57"E 273.96'
S00°00'36"E 327.07'
179.62'
N00°00'36"W 499.97'
S00°36'02"E

FND BCSM
PLACE GUARDRAIL ON THE STREET SIDE OF POWER POLES (TYP BOTH SIDES)
B/6 PARAPET WALL & PEDESTRIAN RAIL (BOTH SIDES), SEE DETAIL
E/6
STA. 11+43.88, 8.11' RT.
PK NAIL SET FOR THIS SURVEY
FND BCSM

RELOCATE EXIST
POWER POLE & DOWNWIRE
(BY OTHERS)
CONSTR. CENTERLINE
123'
STA 32+57±, 57'± RT. TO
STA 32+57±, 57'± LT.
REMOVE & DISPOSE OF
~~114'~~± CA PIPE

REMOVE EXIST. CMP'S (8)
CONSTRUCT 3-8'X5'X52' RCBC
PER A.D.O.T. STD. B-02.30
SKEW=15°00'00", RT.
SLOPE=0.50%
MODIFIED: NO CURB, OMIT 4' TOEDOWNS.

STA. 11+14.79 (EAST) ANGLE POINT
OUTLET LEVEL WING, TYPE A
PER ADOT STD. B-08.10
L=20'
MODIFIED: SKEW LEFT WING 68°
PERPENDICULAR TO HEADWALL
SKEW RIGHT WING 27°
PERPENDICULAR TO HEADWALL

GRADE CONTROL STRUCTURE (TYP.) G/6
A/6
TOP OF CONCRETE
GUNITE ELEV. = 2509.00
SEE SPILLWAY DETAIL I/6
F/6
STA. 38+46
BEGIN CONCRETE
GUNITE CONFLUENCE
6'x6" TOEDOWN ON
BOTTOM & BANKS.
EXTEND WIRE MESH
INTO TOEDOWN

STA. 9+25.11 (EAST)
EXIST. 3-48"X30" CMP
TO REMAIN

STA. 9+48 (EAST)
BEGIN CONCRETE GUNITE

GRADE 50'± SOUTH OF
PROPOSED SPILLWAY TO
DIRECT RUNOFF INTO CHANNEL
20' WIDE x 1.5' DEEP

STA.39+00.36 (SOUTH)
=STA.10+00 (EAST)

STA. 32+57, 57' RT. TO 57' LT
4-8"x22 1/2" BENDS
123' ~~114'~~ ± 8" DIP (CL.350) RESTRAINED
INSTALL DIP @ INV=2496.10
CONNECT TO EXIST. E. & W.

BENCHMARK #9 "X" ON S. EDGE CONC. SIDEWALK @ W. END OF WALK, S/E COR. 1ST AVE AND BANTAM RD. ELEV.=2507.70

BENCHMARK #15 IFS TOP BCSM IN CONCRETE @ 1ST. AVE. & OREGON STREET ELEV.= 2511.28

792-2211

1'-3/4" EDGE OF PARAPET WALL
1'-0"
4"
25' WBEAM TRANSITION

GUARDRAIL CONNECTION DETAIL R

32+00 33+00 34+00 35+00 36+00 37+00 38+00 39+00 9+00 10+00 11+00 12+00 13+00
"EAST STATIONS"

2510
2500
2490

EXIST. GRADE @ CONSTR. CENTERLINE
EXIST. 8" WATERLINE TO BE RELOCATED
STA. 34+00 GRADE CONTROL STRUCTURE
TOP OF CHANNEL
STA. 36+50 GRADE CONTROL STRUCTURE
STA. 38+46 6'x6" TOEDOWN BEGIN CONCRETE GUNITE CONFLUENCE
ELEV.=2503.20
ELEV.=2500.05
0.45%
FINAL GRADE @ CONSTR. CENTERLINE
NEW 8" DIP WATERLINE INV 2496.1
IDENTICAL POINT
EXIST. 3-48"X30" CMP TO REMAIN
STA. 9+47.97 BEGIN CONC. BANK PROTECTION
STA.9+51 INV=2505.75
STA.9+61 INV.=2503.50
STA.9+87.11 ℄ SPILLWAY
TOP OF EXIST. LEFT BANK
TOP OF EXIST. RIGHT BANK
TOP OF CHANNEL
EXIST. GRADE @ CONSTR. CENTERLINE
0.50%
1.0%
0.0%
3:1 (TYP.)
0.50%
0.50%
FINAL GRADE @ CONSTR. CENTERLINE
INV.=3.74
INV.=4.00
EXIST. 8" WATERLINE TO BE RELOCATED
STA.11+41.71 3-8'X5'X52' RCBC
EXIST. GAS LINE
EXIST. CATV
2.5' TOEDOWN
TOP OF EXIST. RIGHT BANK
TOP OF EXIST. LEFT BANK
EXIST. GRADE @ CONSTR. CENTERLINE
ELEV. 2507.76
CONCRETE INLET DROP/APRON
W/6"x6"x2.1x2.1 WIRE MESH, 2.5'x6" TOEDOWN. EXTEND WIRE MESH TO TOEDOWN. PLACE 1/2" BITUMINOUS FILLER AGAINST WINGWALLS & CULVERT.
EXIST. ELECT. EXIST. TELEPHONE
NEW 8" DIP WATERLINE INV=2499.2
EXIST. 18" SEWER LINE INV.=2497.1±

AS BUILT
G.A.G. 2/95

RS Engineering
consulting engineers
595 SOUTH MEYER AVENUE, TUCSON, ARIZONA 85701 (602) 791-3933

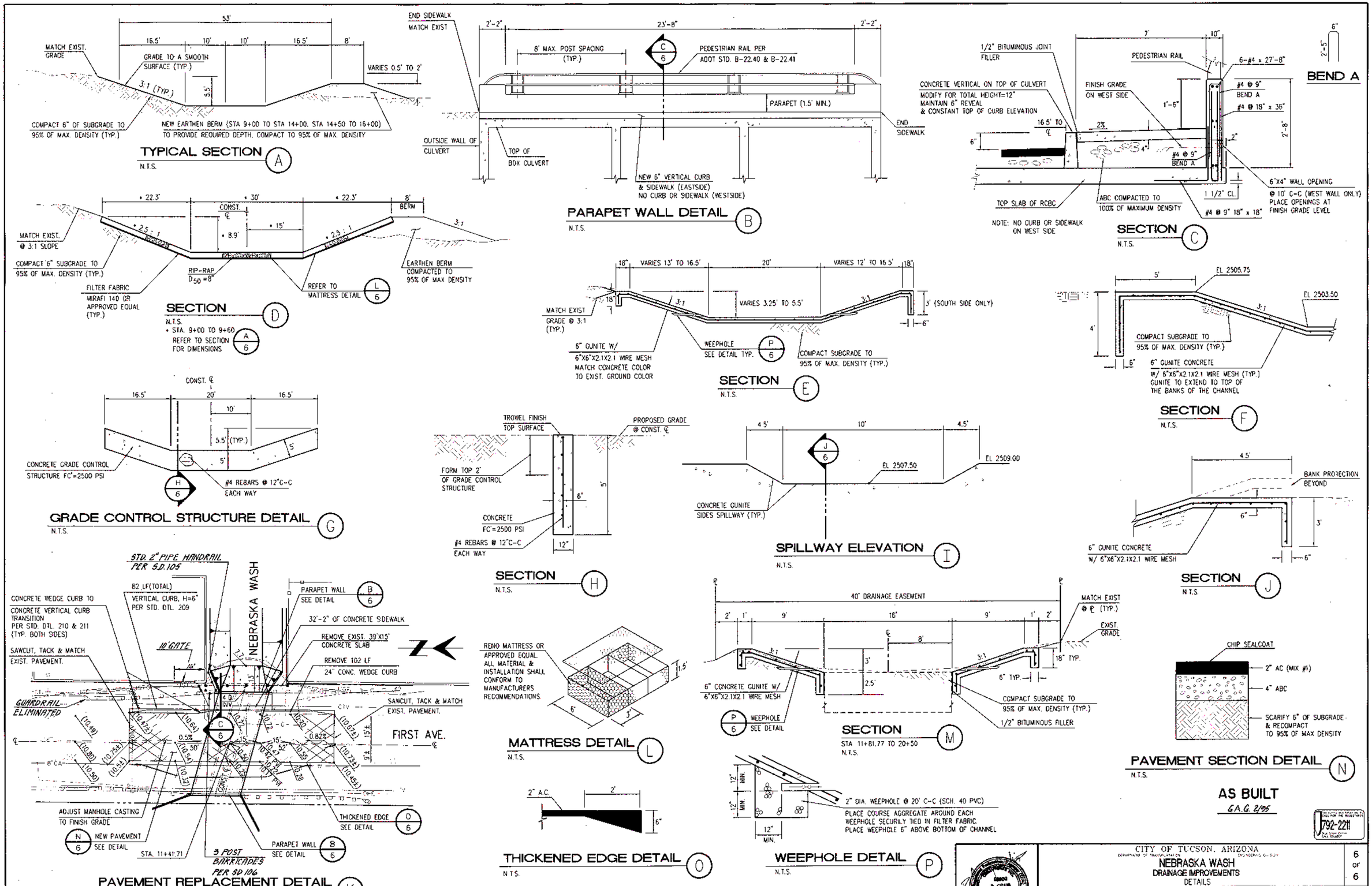
NO.	DATE	REVISION	BY	CH	APPR

CITY OF TUCSON, ARIZONA
DEPARTMENT OF WASTEWATER MANAGEMENT, ENGINEERING DIVISION

NEBRASKA WASH
DRAINAGE IMPROVEMENTS
FROM STA. 32+00 TO STA. 39+00.36 (SOUTH) & STA. 9+25 (EAST) TO STA. 12+00

4 OF 6

DRWN: LWH\DK 7/93
DSGN: FG 7/93
CHKD: RCA 7/93
APPD BY _____ 19__ CITY ENGINEER
APPD BY _____ 19__
REF _____ SCALE H. 1" = 40' V. 1" = 4'
PLAN NO. D-93-04


TYPICAL SECTION A
N.T.S.
MATCH EXIST. GRADE
GRADE TO A SMOOTH SURFACE (TYP.)
VARIES 0.5' TO 2'
3:1 (TYP.)
COMPACT 6" OF SUBGRADE TO 95% OF MAX. DENSITY (TYP.)
NEW EARTHEN BERM (STA 9+00 TO STA 14+00, STA 14+50 TO 16+00) TO PROVIDE REQUIRED DEPTH, COMPACT TO 95% OF MAX. DENSITY
PARAPET WALL DETAIL B
N.T.S.
END SIDEWALK MATCH EXIST
8' MAX. POST SPACING (TYP.)
PEDESTRIAN RAIL PER ADOT STD. B-22.40 & B-22.41
PARAPET (1.5' MIN.)
OUTSIDE WALL OF CULVERT
TOP OF BOX CULVERT
NEW 6" VERTICAL CURB & SIDEWALK (EASTSIDE) NO CURB OR SIDEWALK (WESTSIDE)
END SIDEWALK
SECTION C
N.T.S.
1/2" BITUMINOUS JOINT FILLER
CONCRETE VERTICAL ON TOP OF CULVERT
MODIFY FOR TOTAL HEIGHT=12"
MAINTAIN 6" REVEAL
& CONSTANT TOP OF CURB ELEVATION
PEDESTRIAN RAIL
FINISH GRADE ON WEST SIDE
6-#4 x 27'-8"
#4 @ 9" BEND A
#4 @ 18" x 36"
BEND A
TOP SLAB OF RCBC
ABC COMPACTED TO 100% OF MAXIMUM DENSITY
#4 @ 9" 18" x 18"
6"x4" WALL OPENING @ 10' C-C (WEST WALL ONLY) PLACE OPENINGS AT FINISH GRADE LEVEL
NOTE: NO CURB OR SIDEWALK ON WEST SIDE
SECTION D
N.T.S.
• STA. 9+00 TO 9+60 REFER TO SECTION A/6 FOR DIMENSIONS
MATCH EXIST. @ 3:1 SLOPE
COMPACT 6" SUBGRADE TO 95% OF MAX. DENSITY (TYP.)
FILTER FABRIC MIRAFI 140 OR APPROVED EQUAL (TYP.)
RIP-RAP D50=8"
REFER TO MATTRESS DETAIL L/6
EARTHEN BERM COMPACTED TO 95% OF MAX DENSITY
SECTION E
N.T.S.
MATCH EXIST GRADE @ 3:1 (TYP.)
VARIES 3.25' TO 5.5'
3' (SOUTH SIDE ONLY)
6" GUNITE W/ 6"X6"X2.1X2.1 WIRE MESH MATCH CONCRETE COLOR TO EXIST. GROUND COLOR
WEEPHOLE SEE DETAIL TYP. P/6
COMPACT SUBGRADE TO 95% OF MAX. DENSITY (TYP.)
SECTION F
N.T.S.
EL 2505.75
EL 2503.50
COMPACT SUBGRADE TO 95% OF MAX. DENSITY (TYP.)
6" GUNITE CONCRETE W/ 6"X6"X2.1X2.1 WIRE MESH (TYP.) GUNITE TO EXTEND TO TOP OF THE BANKS OF THE CHANNEL
GRADE CONTROL STRUCTURE DETAIL G
N.T.S.
CONST. ℄
CONCRETE GRADE CONTROL STRUCTURE FC'=2500 PSI
#4 REBARS @ 12"C-C EACH WAY
SECTION H
N.T.S.
TROWEL FINISH TOP SURFACE
PROPOSED GRADE @ CONST. ℄
FORM TOP 2' OF GRADE CONTROL STRUCTURE
CONCRETE FC'=2500 PSI
#4 REBARS @ 12"C-C EACH WAY
SPILLWAY ELEVATION I
N.T.S.
EL 2507.50
EL 2509.00
CONCRETE GUNITE SIDES SPILLWAY (TYP.)
SECTION J
N.T.S.
BANK PROTECTION BEYOND
6" GUNITE CONCRETE W/ 6"X6"X2.1X2.1 WIRE MESH
PAVEMENT REPLACEMENT DETAIL K
SCALE 1"=20'
STD. 2" PIPE HANDRAIL PER S.D. 105
B2 LF(TOTAL) VERTICAL CURB, H=6" PER STD. DTL. 209
CONCRETE WEDGE CURB TO CONCRETE VERTICAL CURB TRANSITION PER STD. DTL. 210 & 211 (TYP. BOTH SIDES)
SAWCUT, TACK & MATCH EXIST. PAVEMENT.
10' GATE
NEBRASKA WASH
PARAPET WALL SEE DETAIL B/6
32'-2" OF CONCRETE SIDEWALK
REMOVE EXIST. 39'X15' CONCRETE SLAB
REMOVE 102 LF 24" CONC. WEDGE CURB
GUARDRAIL ELIMINATED
SAWCUT, TACK & MATCH EXIST. PAVEMENT.
FIRST AVE.
ADJUST MANHOLE CASTING TO FINISH GRADE
NEW PAVEMENT SEE DETAIL N/6
STA. 11+41.71
3 POST BARRICADES PER SD 106
PARAPET WALL SEE DETAIL 8/6
THICKENED EDGE SEE DETAIL O/6
MATTRESS DETAIL L
N.T.S.
RENO MATTRESS OR APPROVED EQUAL. ALL MATERIAL & INSTALLATION SHALL CONFORM TO MANUFACTURERS RECOMMENDATIONS.
THICKENED EDGE DETAIL O
N.T.S.
2" A.C.
SECTION M
STA 11+81.77 TO 20+50
N.T.S.
40' DRAINAGE EASEMENT
MATCH EXIST @ ℄ (TYP.)
EXIST. GRADE
6" CONCRETE GUNITE W/ 6"X6"X2.1X2.1 WIRE MESH
WEEPHOLE SEE DETAIL P/6
COMPACT SUBGRADE TO 95% OF MAX. DENSITY (TYP.)
1/2" BITUMINOUS FILLER
WEEPHOLE DETAIL P
N.T.S.
2" DIA. WEEPHOLE @ 20' C-C (SCH. 40 PVC)
PLACE COURSE AGGREGATE AROUND EACH WEEPHOLE SECURILY TIED IN FILTER FABRIC. PLACE WEEPHOLE 6" ABOVE BOTTOM OF CHANNEL
PAVEMENT SECTION DETAIL N
N.T.S.
CHIP SEALCOAT
2" AC (MIX #1)
4" ABC
SCARIFY 6" OF SUBGRADE & RECOMPACT TO 95% OF MAX DENSITY
AS BUILT
G.A.G. 2/95
792-2211
RS Engineering
consulting engineers
RSE# 9106.13
NO. DATE REVISION BY CH APPR
CITY OF TUCSON, ARIZONA
NEBRASKA WASH
DRAINAGE IMPROVEMENTS
DETAILS
6 of 6
DRWN: LWH\DK 7/93
DSGN: FG 7/93
CHKD: RCA 7/93
APPD BY ____ 19__ CITY ENGINEER
APPD BY ____ 19__
REF ____ SCALE AS NOTED
PLAN NO. D-93-04

A.2 REFERENCED DOCUMENTS

1. National Flood Insurance Program-Program Description Report, FEMA, August 1, 2002;
2. Arizona Department of Water Resources, *State Standard for Hydrologic Modeling Guidelines (SS 10-07),* August 2007;
3. U.S. Army Corps of Engineers, Hydrologic Engineering Center, *HEC-HMS Hydrologic Modeling System User's Manual,* Version 4.0, December 2013;
4. National Oceanic and Atmospheric Administration (NOAA) *Atlas 14, Precipitation Frequency Atlas for the United States: Volume 1 – Version 4.0 The Semiarid Southwest. National Weather Service, Hydrometeorological Design Studies Center,* 2006;
5. Pima County Regional Flood Control District *Technical Policy TECH-010, Rainfall Input for Hydrologic Modeling,* May, 2007;
6. Pima County Regional Flood Control District *Technical Policy TECH-015, Acceptable Methods for Determining Peak Discharges,* October, 2007;
7. Pima County Regional Flood Control District *Technical Policy TECH-018, Acceptable Model Parameterization for Determining Peak Discharge,* November, 2012;
8. Pima County Regional Flood Control District, PC-HYDRO, *User Guide – Pima County Hydrology Procedures,* Version 5, March 2007;
9. NRCS, TR-55 Urban Hydrology for Small Watersheds, June 1986;
10. USGS, Open File Report 93-419, *Methods for Estimating Magnitude and Frequency of Floods in the Southwestern United States*, pg. 20 & 59, 1994;
11. Arizona Department of Water Resources, *State Standard for Floodplain Hydraulic Modeling,* State Standard (SS 09-02), July 2002;
12. United States Geological Survey (USGS), Scientific Investigations Report 2006-5108, *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*, 2007;
13. FEMA, *Guidelines & Specifications for Flood Hazard Mapping Partners, Appendix C, Guidance for Riverine Flooding Analyses and Mapping*, November 2009;
14. U.S. Army Corps of Engineers *HEC-RAS River Analysis System User Manual*, Version 4.1.0, January 2010;
15. U.S. Army Corps of Engineers *HEC-RAS River Analysis System User Manual*, Version 5.0 Beta, August 2015;
16. FEMA, *Flood Insurance Study (FIS) for Pima County, Arizona and Incorporated Areas*, June 16, 2011;
17. Pima County Regional Flood Control District *Technical Policy TECH-019, Standards for Floodplain Hydraulic Modeling,* November, 2012;
18. USGS, SIR 2014-5211, *Methods for Estimating Magnitude and Frequency of Floods in Arizona, Developed with Unregulated and Rural Peak-Flow Data through Water Year 2010*, pg. 29, 2014;

APPENDIX B

GENERAL DOCUMENTATION AND CORRESPONDENCE

B.1 - General Project Documentation and Correspondence
B.2 - Contract Documents
B.3 - Public Notification
B.4 - FEMA Correspondence

(Not Applicable)

APPENDIX C

SURVEY FIELD NOTES

C.1 - Digital Projection Information
C.2 – Quality Assurance Letter
C.3 - Survey Field Notes at Structures

C.1 – DIGITAL PROJECTION INFORMATION

Delivered Project Digital Projection

NAD_1983_HARN_StatePlane_Arizona_Central_FIPS_0202_Feet_Intl

Projection: Transverse_Mercator

False_Easting:700000.00000000

False_Northing : 0.00000000

Central_Meridian: -111.91666667

Scale_Factor: 0.99990000

Latitude_Of_Origin: 31.00000000

Linear Unit: Foot

Geographic Coordinate System: GCS_North_American_1983_HARN

Datum: D_North_American_1983_HARN

Prime Meridian: Greenwich

Angular Unit: Degree

C.2 – QUALITY ASSURANCE LETTER

Corporate Headquarters: Colorado Springs Colorado

Ann Arbor Michigan

Charlotte North Carolina

Ft. Collins Colorado

Pelham New York

Portland Oregon

Sacramento California

St. Louis Missouri

Sanborn Middle East

Mumbai India

30 December 2008

Manny Rosas, GIS Administrator
Pima Association of Governments
177 N. Church Ave.
Suite 405
Tucson, AZ 85701

Re: FEMA Results for the PAG 2008 Ortho Project (Contract – 08-5951-01)

Dear Mr. Rosas,

Attached you will find the results of the FEMA checkpoints for PAG 2008 LiDAR data. Sanborn's contracted Arizona State Registered Land-Surveyor, Greg Thompson, performed a review of the report and is in agreement with the results.

Background

To ensure the accuracy of the PAG 2008 LiDAR data, Sanborn was contracted to implement a project plan that included the integration of FEMA checkpoints as part of the QA/QC process. To support this initiative, Sanborn collected 69 checkpoints as part of the control survey effort. This meets the minimum standards for vertical accuracy testing and reporting as defined in FEMA's map modernization requirements. FEMA recommends 20 checkpoints in each of the major land cover categories representative of floodplains being mapped; this normally requires a minimum of 60 checkpoints for at least three land cover categories. The three categories surveyed were:

1. Bare Earth and Low Grass
2. High Grass, Weeds, and Crops
3. Brush lands/low trees

Field data was acquired using GPS equipment and static surveying methods. Sanborn team surveyed all checkpoint following the procedures in NOAA Technical Memorandum NOS NGS-58, "Guidelines for Establishing GPS-Derived Ellipsoid Heights (Standards: 2 cm and 5 cm)" and use NGS' latest Geoid Model to compute NAVD88 orthometric heights accurate to 5-cm at the 95% confidence level. (The x and y coordinates of checkpoints will be accurate to 2-cm at the 95% confidence level.)

Final adjusted results were adjusted to Arizona State Plane Coordinates, Central Zone NAD83-92 (HARN), NAVD88, in units of International Foot.

Testing Methodology

As stated in the Guidelines and Specifications for Flood Hazard Mapping Partners (April 2003), Section A.87.6.1, "The Root Mean Square Error (RMSE) is the square root of the average of the set of squared differences between dataset coordinate values and coordinate values from an independent source of higher accuracy for identical points…TINs (and DEMs derived therefrom) should normally have a maximum RMSE of 18.5 centimeters, equivalent to

2-foot contours, in flat terrain. The following are the results from the PAG 2008 Ortho Program.

Bare Earth:

Number	Easting	Northing	Known Z	Laser Z	Dz ----------
1	1001837.162	410093.611	2587.031	2587.530	+0.499
7	999345.782	449442.944	2441.401	2441.640	+0.239
20	933721.166	412981.849	2439.091	2439.310	+0.219
17	933650.558	412993.658	2438.451	2438.660	+0.209
15	897369.501	552863.803	1937.257	1937.430	+0.173
3	1159921.689	349431.234	4294.062	4294.210	+0.148
8	1005806.086	434836.185	2509.196	2509.340	+0.144
9	1000927.946	448200.185	2446.309	2446.400	+0.091
13	994444.372	503631.914	2655.984	2656.070	+0.086
11	994513.846	503595.055	2658.012	2658.090	+0.078
18	955798.751	425094.504	2540.814	2540.880	+0.066
2	906521.919	540616.247	1946.585	1946.640	+0.055
12	987338.200	503575.338	2542.972	2542.930	-0.042
14	965580.705	519074.819	2667.182	2667.120	-0.062
21	955893.647	425085.496	2541.302	2541.240	-0.062
5	1021871.892	457772.536	2472.149	2472.080	-0.069
6	1033139.499	445741.877	2610.656	2610.580	-0.076
16	939704.593	416728.203	2432.726	2432.640	-0.086
10	985754.835	454784.703	2313.130	2312.980	-0.150
19	939508.793	416651.451	2432.802	2432.630	-0.172
22	1027485.930	416573.872	2740.833	2740.650	-0.183
4	1156429.917	365109.827	4055.003	outside	*

Average dz	+0.053
Minimum dz	-0.183
Maximum dz	+0.499
Average magnitude	0.139
Root mean square	**0.171 (foot)**
Std deviation	0.166

Medium Vegetation:

Number	Easting	Northing	Known Z	Laser Z	Dz ----------
1	1187028.525	351518.925	4080.561	4080.540	-0.021
2	1117108.620	363592.785	3587.077	3586.940	-0.137
3	1073972.909	383419.761	3240.515	3240.590	+0.075
4	1010832.502	410849.441	2643.786	2643.990	+0.204
5	1005445.314	419156.617	2579.495	2579.880	+0.385
6	1045092.088	435136.157	2724.009	2724.050	+0.041

7	1069748.640	446273.392	2760.125	2760.050	-0.075
8	1033371.126	464364.855	2518.606	2518.310	-0.296
9	1054207.161	418935.174	2886.854	2886.950	+0.096
10	955203.805	487660.945	2178.734	2179.130	+0.396
11	997532.713	434803.804	2460.164	2460.250	+0.086
12	979509.921	492673.940	2417.792	2418.190	+0.398
13	995655.491	465569.990	2344.777	2344.690	-0.087
14	997550.935	482620.376	2598.648	2598.550	-0.098
15	1001334.429	474026.061	2493.153	2493.240	+0.087
16	990196.690	487542.780	2546.083	outside	*
17	990519.334	490352.801	2559.039	2559.110	+0.071
18	998219.739	493708.248	2936.804	2937.080	+0.276
19	996795.607	504234.682	2727.497	2727.370	-0.127
20	988245.902	501104.027	2560.988	2560.870	-0.118
21	985960.009	501595.086	2553.169	2553.130	-0.039
22	997446.853	506178.000	2694.613	2695.140	+0.527
23	987398.768	503506.302	2546.335	2546.410	+0.075
24	985971.797	501493.493	2552.516	2552.570	+0.054
25	997540.656	506124.929	2707.864	2708.230	+0.366
26	991206.370	506306.455	2518.406	2518.250	-0.156
27	978945.698	519233.465	2782.405	2782.330	-0.075
28	978935.642	519272.398	2784.006	2784.080	+0.074
29	965555.375	519044.382	2666.260	2666.260	+0.000
30	897298.425	552978.606	1937.352	1937.730	+0.378
31	910066.011	514280.384	2003.658	2003.840	+0.182

Average dz	+0.085
Minimum dz	-0.296
Maximum dz	+0.527
Average magnitude	0.167
Root mean square	**0.217 (foot)**
Std deviation	0.203

High Vegetation:

Number	Easting	Northing	Known Z	Laser Z	Dz
1	1041505.790	408998.331	2868.881	2869.410	+0.529
4	1007421.616	441240.211	2501.880	2502.270	+0.390
9	988302.547	500937.045	2557.959	2558.170	+0.211
10	993323.041	504876.742	2616.818	2616.900	+0.082
3	944799.536	483176.205	2406.404	2406.480	+0.076
6	993338.640	505132.410	2616.096	2616.130	+0.034
13	995168.385	519848.931	2773.051	2773.040	-0.011
8	996811.199	504124.980	2733.504	2733.470	-0.034
14	995094.857	519807.072	2771.624	2771.590	-0.034
5	995053.089	492295.493	2741.552	2741.500	-0.052
7	986911.443	504348.439	2463.848	2463.780	-0.068

11	986965.447	504425.310	2458.159	2458.090	-0.069
12	993296.411	506167.522	2598.730	2598.640	-0.090
16	919968.908	521623.590	2003.520	2003.130	-0.390
15	909979.986	514314.158	2004.186	2003.740	-0.446
2	988498.629	488163.006	2506.243	outside	*

Average dz	+0.009
Minimum dz	-0.446
Maximum dz	+0.529
Average magnitude	0.168
Root mean square	**0.240 (foot)**
Std deviation	0.248

Sanborn concludes that the overall RMSE of the LiDAR data is within PAG 2008 Ortho project requirements, as it meets the +/- 15.0 cm (0.492 foot) RMSE at 95% confidence for all three categories. RMSE is an indicator of overall accuracy of the product and is not used for individual point accuracy.

Please contact me at (719) 593-0093 extension 5645 or Jamie Young (General Manager – ext. 5602) if you have any question regarding the report.

Sincerely,

Andrew Lucero
Sanborn
Senior Project Manager

C.3 – SURVEY FIELD NOTES AT STRUCTURES

Includes:

- Ashby Survey Field Notes

Table 8: Existing Drainage Structure Summary Table

Culvert ID	Field Survey ID by Ashby	Roadway Name	Structure Size and Material	Length (ft)	Skew Angle (Degrees)
CV01	CV01	Calle Santa Cruz	5-12'x10' RCBC	68	8
BR01	BR01	West of I-19	Arch	45	22
BR02	BR02	West of I-19	Arch	83	59
BR03	BR03	West of I-19	Arch	47	0
BR04	BR04	I-19	Bridge	52	35
BR05	BR05	I-19	Bridge	52	35
CV02	CV02	Santa Clara Ave	6-12'x10' RCBC	55	0
CV03	CV03	Drexel Rd	6-7'x12' RCBC	65	16
CV04	CV04	12th Ave.	6-12'x7' RCBC	100	22
CV05	CV05	Liberty Ave.	6-12'x10' RCBC	50	0
CV06	CV06	6th Ave.	6-7'x12' RCBC	73	29
CV07	CV07	Bilby Rd.	6-7'x12' RCBC	71	26
BR06	BR06	Nogales Hwy	4-Span Bridge	76	5
BR07	BR07	Railroad	4-Span Bridge	14	3
CV08	CV08	Park Ave.	6-12'x7' RCBC	87	43
CV09	CV09	Valencia Rd	6-12'x6' RCBC	139	29
BR08	BR08	Valencia Rd	Bridge	34	0
CV10	CV10	TIA	9-10'x6' RCBC	500	0
CV11	CV11	TIA	9-10'x6' RCBC	200	14
CV12	CV12	Plummer Ave.	7-10'x6' RCBC	34	0
BR09	BR09	Tucson Blvd	Bridge	77	44
BR10	BR10	Tucson Blvd	Bridge	70	33
CV13	CV13	Los Reales Rd	6-10'x8' RCBC	70	53
CV15	CV15	Alvernon Way	2-10'x4' RCBC	44	0
CV16	CV16	Alvernon Way	58"x36" CMPA	67	0
CV17	CV17	Alvernon Way	4-10'x5' RCBC	44	0
CV19	CV19	Alvernon Way	6-10'x4' RCBC	44	0
CV23	CV23	Swan Rd	3-72"x44" ACMP	68	0
CV24	CV24	Swan Rd	3-72"x44" ACMP	68	0
CV25	CV25	Swan Rd	3-72"x44" ACMP	68	0
CV26	CV26	Swan Rd	3-72"x44" ACMP	68	0
CV27	CV27	Swan Rd	3-72"x44" ACMP	68	0
CV28	CV28	Swan Rd	3-72"x44" CMPA	68	0
CV29	CV29	Swan Rd	3-72"x44" CMPA	85	0
CV30	CV30	Swan Rd	3-72"x44" CMPA	74	0
CV31	CV31	Swan Rd	3-72"x44" CMPA	74	0
CV32	CV32	Swan Rd	3-72"x44" CMPA	76	0
CV33	CV33	Swan Rd	3-72"x44" CMPA	72	0
CV34	CV34	Swan Rd	3-72"x44" CMPA	70	0
CV36	CV36	Swan Rd	1-72"x44" CMPA	80	0

Table 8: Existing Drainage Structure Summary Table

Culvert ID	Field Survey ID by Ashby	Roadway Name	Structure Size and Material	Length (ft)	Skew Angle (Degrees)
CV37	CV37	Swan Rd	1-72"x44" CMPA	84	0
CV38	CV38	Swan Rd	1-72"x44" CMPA	83	0
CV39	CV39	Swan Rd	1-72"x44" CMPA	80	0
CV40	CV40	Swan Rd	1-72"x44" CMPA	80	0
CV53	CV53	I-19	2-10'x5' RCBC	210	0

DRAINAGE STRUCTURES

FROM 12TH AVE TO SANTA CRUZ RIVER (EXCLUDING I-19)

FOR

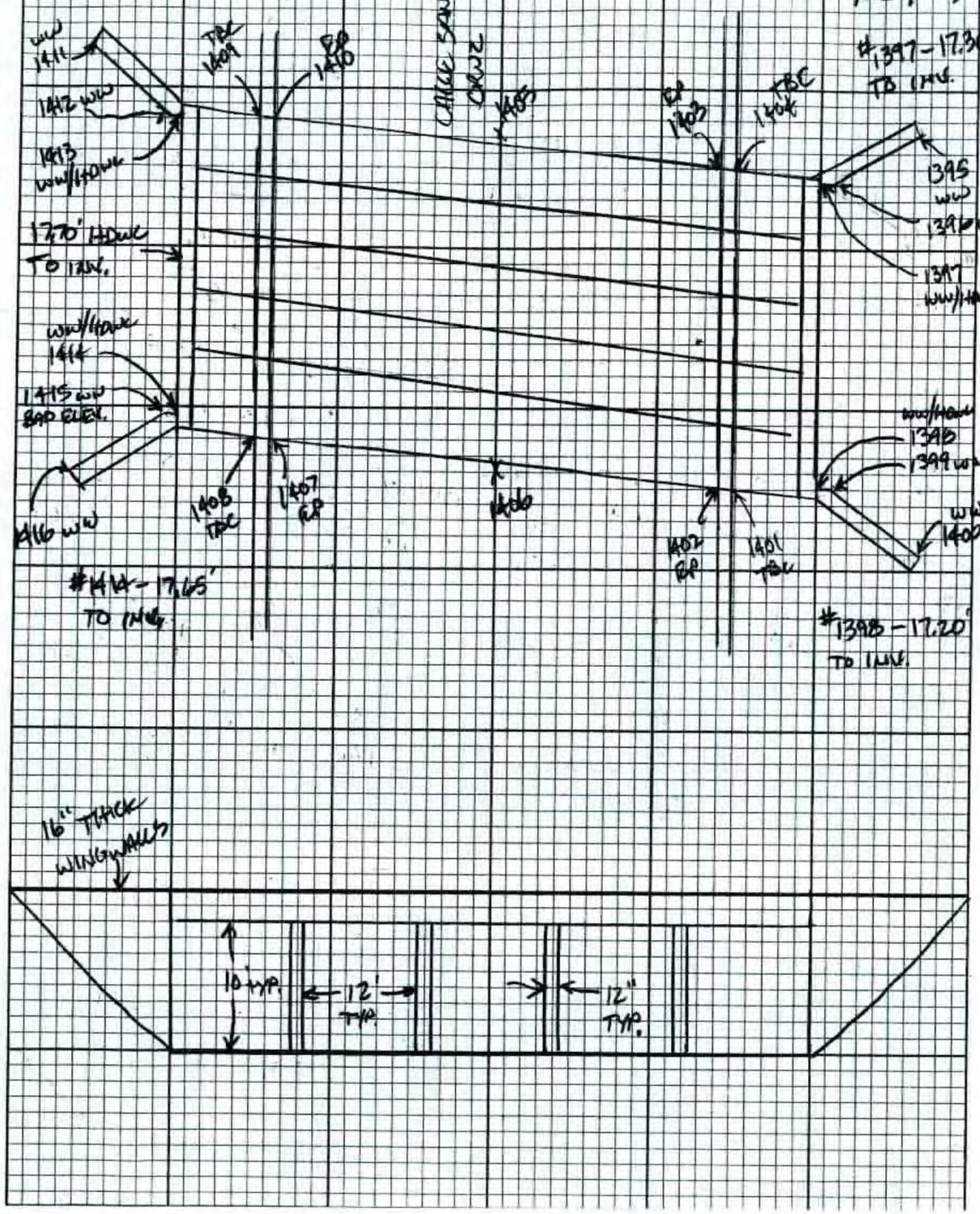
CULVERT IDs:
CV01, BR01, BR02, BR03, CV02, CV03 & CV04

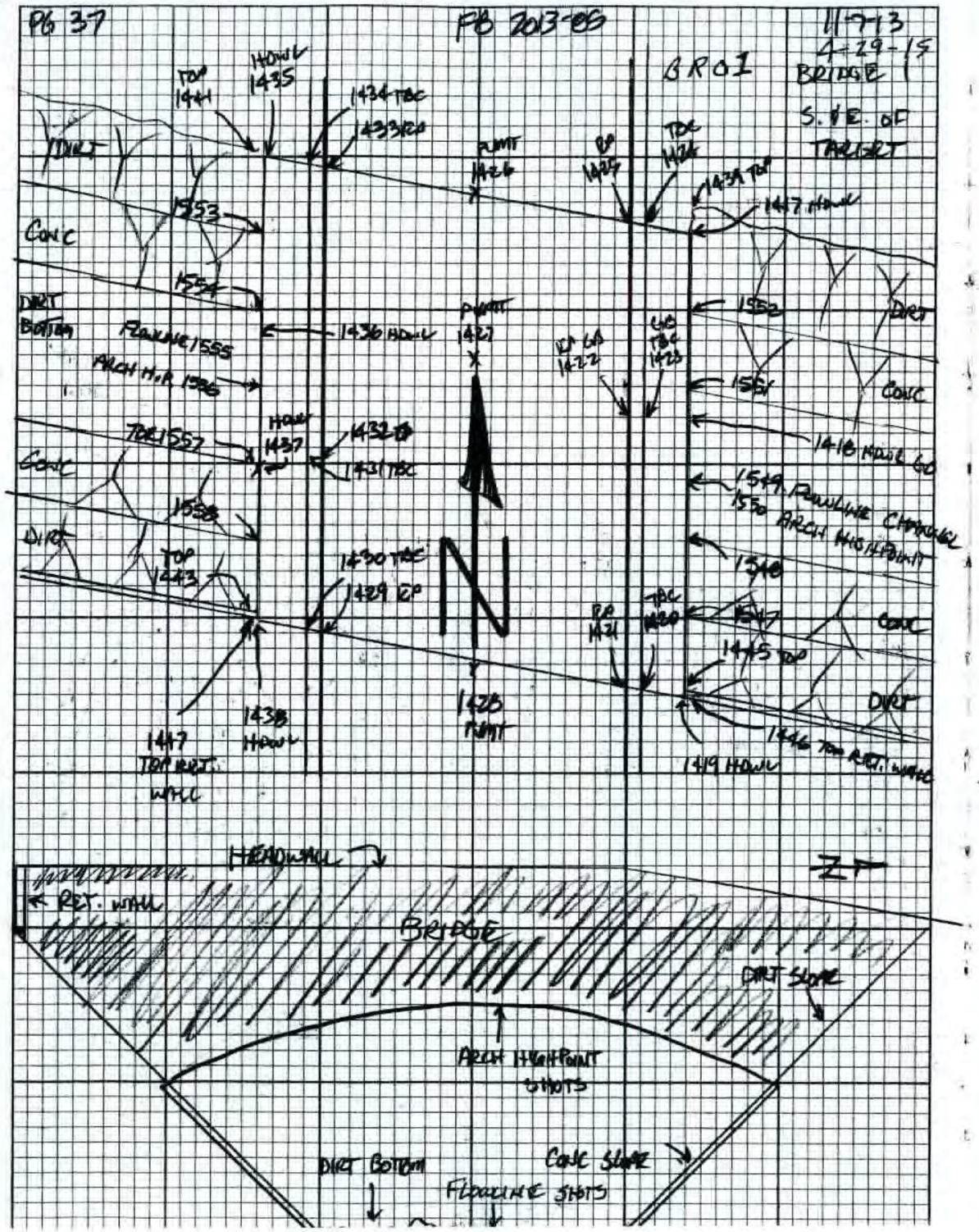
PG 36

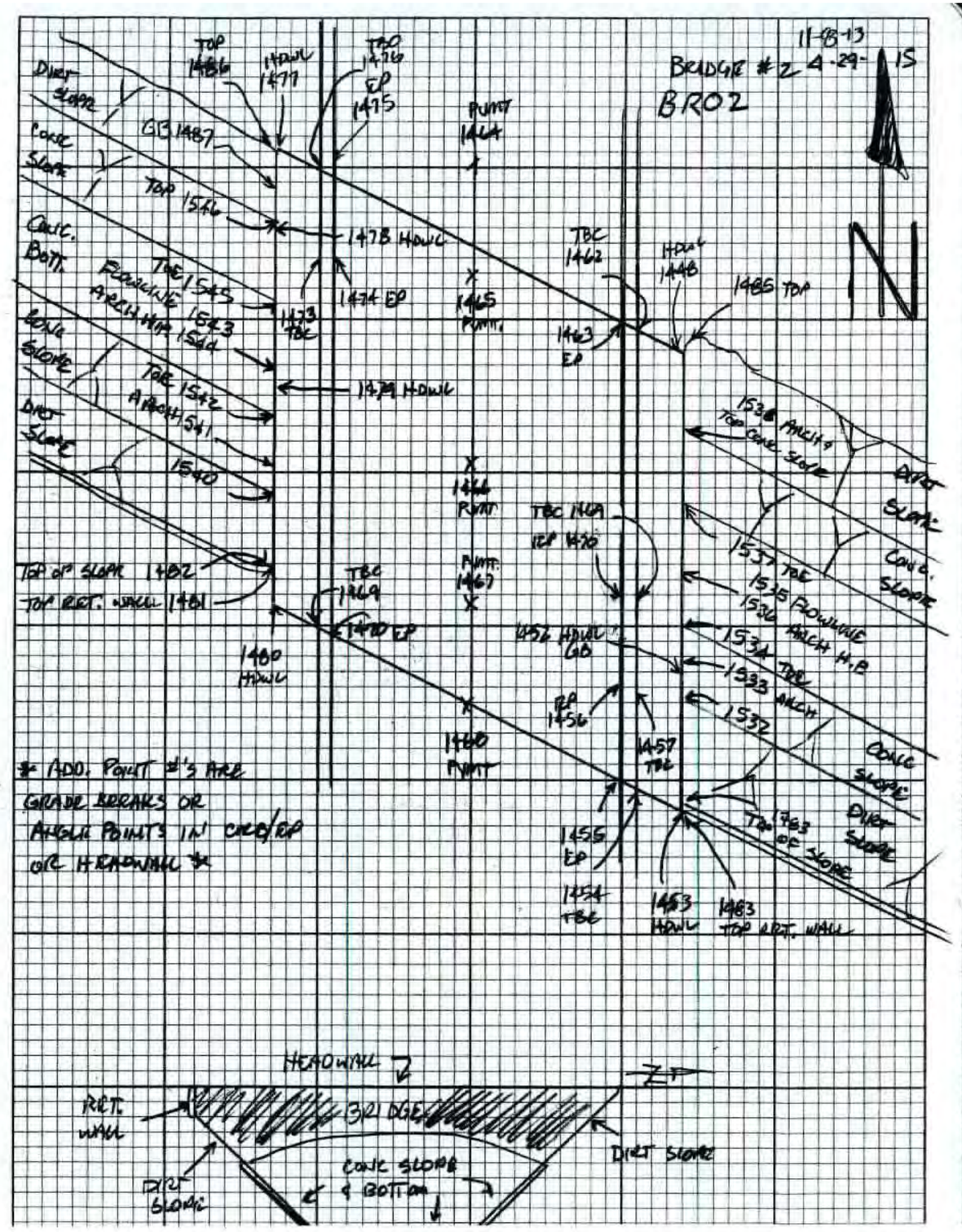
PB 2013-85

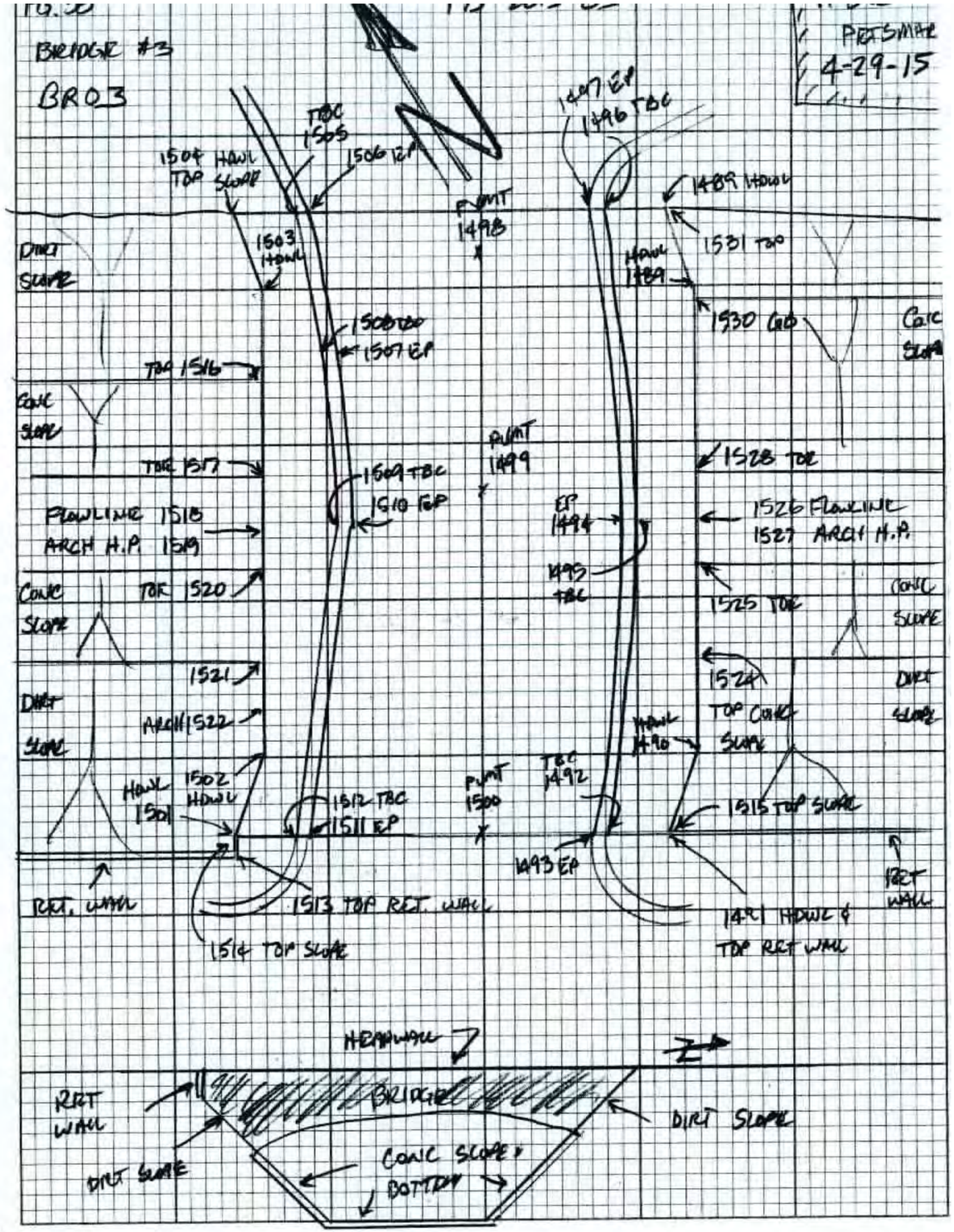
CV01

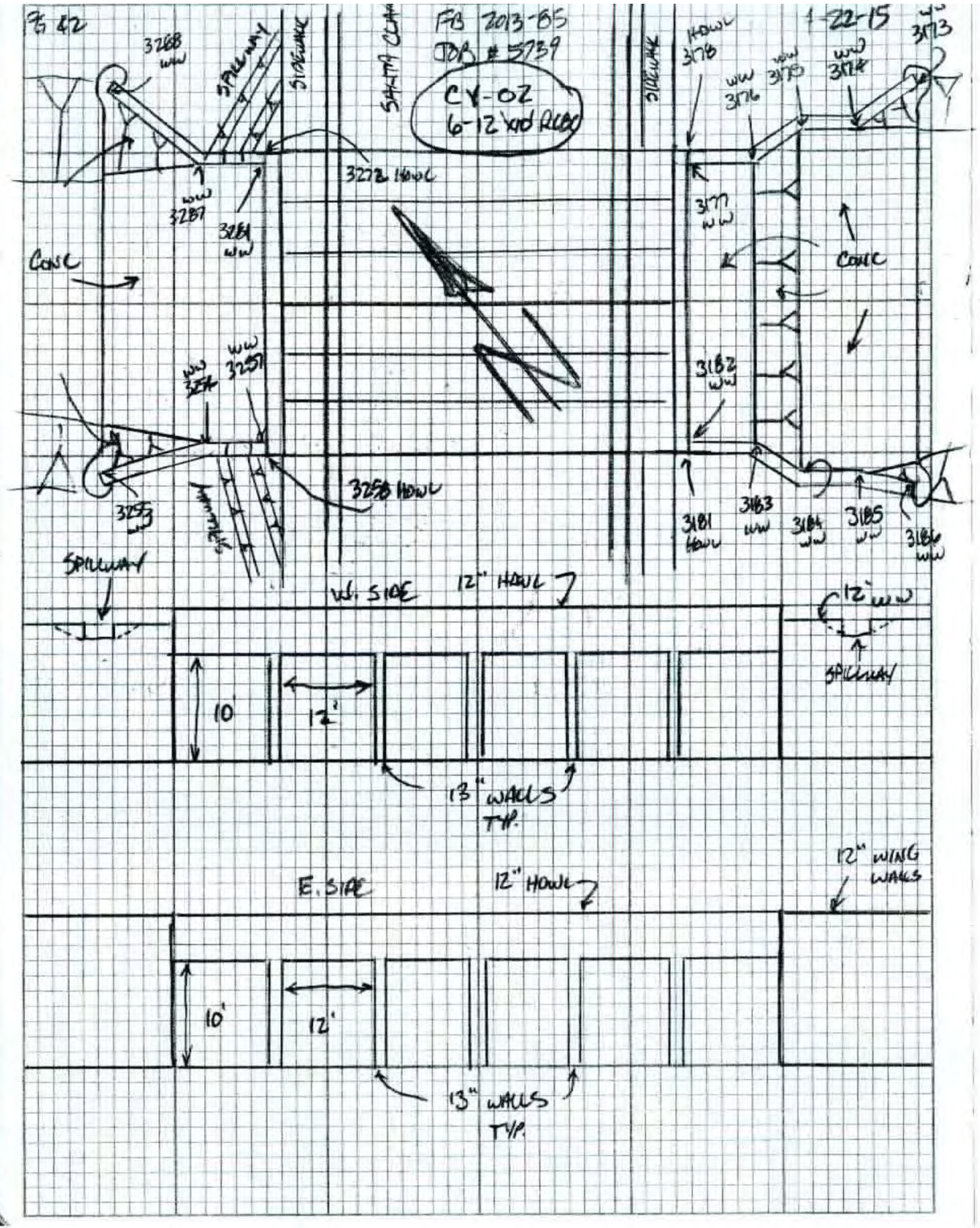
11-6-13
4-29-15

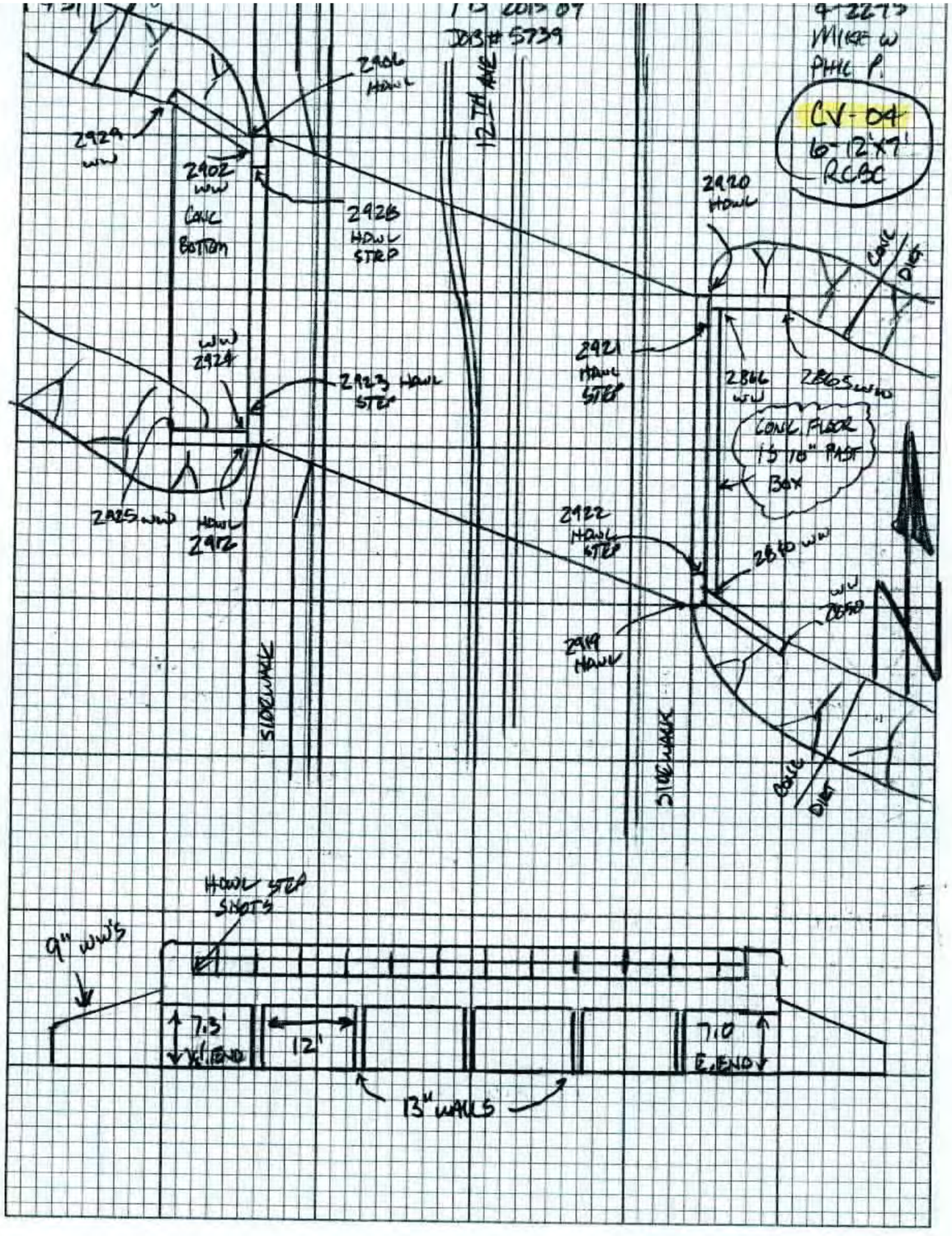


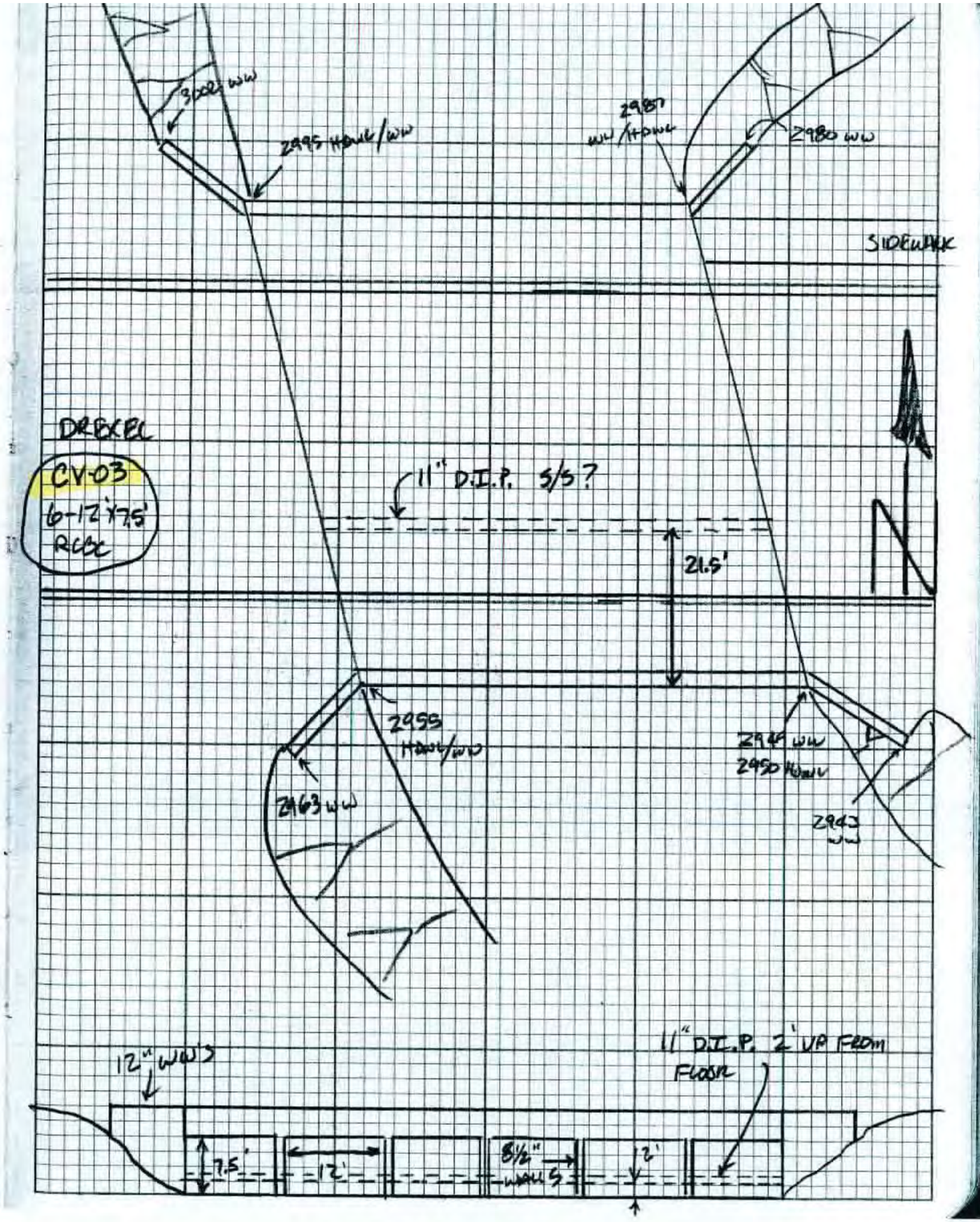

PG 37
PB 2013-05
11-7-13
4-29-15
BR01
BRIDGE
S. OF TARGET
DIRT
CONC
DIRT BOTTOM
FLOWLINE 1555
ARCH H.P. 1556
TOP 1441
HDWL 1435
1434 TBC
1433 EP
PUMP 1426
EP 1427
TBC 1428
1436 HDWL
PUMP 1427
EP GB 1422
GB TBC 1420
1552
1554
1553
1557
HDWL 1437
1432 EP
1431 TBC
1418 HDWL GB
1549 FLOWLINE CHANGE
1550 ARCH HIGHPOINT
1548
1547
1545 TOP
1446 TOP RET. WALL
1449 HDWL
1447 HDWL
1439 TOP
1538
TOP 1443
1430 TBC
1429 EP
EP 1421
TBC 1420
1438 HDWL
1428 PUMP
1417 TOP RET. WALL
HEADWALL
RET. WALL
BRIDGE
DIRT SLOPE
ARCH HIGHPOINT SHOTS
DIRT BOTTOM
CONC SLOPE
FLOWLINE SHOTS
ZP


11-8-13
4-29-15
BRIDGE #2
BR02
DIRT SLOPE
CONC SLOPE
CONC. BOTT.
FLOWLINE
ARCH H.P.
DIRT SLOPE
TOP 1486
HDWL 1477
TBC 1476
EP 1475
PUMP 1464
GB 1487
TOP 1546
1478 HDWL
1474 EP
1473 TBC
1465 PUMP
TBC 1462
HDWL 1448
1465 TOP
1463 EP
1545
1543
1544
TBC 1542
ARCH 1541
1540
1479 HDWL
1536 ARCH H.P.
TOP CONC. SLOPE
1537 TBC
1535 FLOWLINE
1536 ARCH H.P.
1534 TBC
1533 ARCH
1532
1466 PUMP
TBC 1469
EP 1470
PUMP 1467
TOP OF SLOPE 1482
TOP RET. WALL 1481
TBC 1469
1470 EP
1452 HDWL GB
1480 HDWL
1460 PUMP
EP 1456
1457 TBC
1456 EP
1454 TBC
1453 HDWL
1463 TOP RET. WALL
TOP 1463 OF SLOPE
* ADD. POINT #'S ARE GRADE BREAKS OR ANGLE POINTS IN CURB/EP OR HEADWALL *
HEADWALL
RET. WALL
BRIDGE
DIRT SLOPE
CONC SLOPE & BOTTOM
ZP


BRIDGE #3
BR03
PRESENT
4-29-15
1504 HAUL TOP SLOPE
TOC 1505
1506 EP
1503 HAUL
DIRT SLOPE
1508 TOC
1507 EP
TOP 1516
CONC SLOPE
TOE 1517
1509 TOC
1510 EP
FLOWLINE 1518
ARCH H.P. 1519
CONC SLOPE
TOE 1520
1521
DIRT SLOPE
ARCH 1522
HAUL 1501
1502 HAUL
1512 TOC
1511 EP
1513 TOP RET. WALL
1514 TOP SLOPE
RET. WALL
POINT 1498
POINT 1499
POINT 1500
1497 EP
1496 TOC
1489 HAUL
1531 TOE
HAUL 1489
1530 TOE
CONC SLOPE
1528 TOE
1526 FLOWLINE
1527 ARCH H.P.
EP 1494
1495 TOC
1525 TOE
CONC SLOPE
1524 TOP CONC SLOPE
DIRT SLOPE
HAUL 1490
TOC 1492
1515 TOP SLOPE
1493 EP
RET WALL
1491 HAUL & TOP RET WALL
HEADWALL
N
RET WALL
BRIDGE
DIRT SLOPE
DIRT SLOPE
CONC SLOPE BOTTOM


PG 42
FB 2013-85
JOB # 5739
CY-02
6-12 x 10 RCBC
1-22-15
3268 WW
SPILLWAY
SIDEWALK
SAFETY CLAMP
3272 HOWL
3287 WW
3281 WW
CONC
3257 WW
3254 WW
3253 WW
3258 HOWL
SPILLWAY
W. SIDE
12" HOWL
3278 HOWL
3276 WW
3275 WW
3274 WW
3273 WW
3277 WW
CONC
3282 WW
3281 HOWL
3283 WW
3284 WW
3285 WW
3286 WW
12" WW
SPILLWAY
10'
12'
13" WALLS TYP.
E. SIDE
12" HOWL
12" WING WALLS
10'
12'
13" WALLS TYP.


JOB # 5739
MIKE W
PHIL P.
CV-04
6-12'x7'
RCBC
12TH AVE
2906 HDWL
2929 WW
2902 WW
CONC BOTTOM
2928 HDWL STRP
2920 HDWL
CONC
DIRT
WW 2924
2923 HDWL STEP
2921 HDWL STEP
2866 WW
2865 WW
CONC FLOOR 1'5 10" PAST BOX
2925 WW
HDWL 2926
2922 HDWL STEP
2860 WW
WW 2858
2919 HDWL
SIDEWALK
SIDEWALK
CONC
DIRT
HDWL STEP SHOTS
9" WW'S
7.3' W.END
12'
7.0 E.END
13" WALLS


3002 WW
2995 HDWL/WW
2987 WW/HDWL
2980 WW
SIDEWALK
DRBXBL
CV-03
6-12'x7.5'
RCBC
11" D.I.P. S/S?
21.5'
2955 HDWL/WW
2963 WW
2948 WW
2950 HDWL
2943 WW
12" WW'S
11" D.I.P. 2' UP FROM FLOOR
7.5'
12'
8½" WALLS
2'

PointNo.	Northing(Y)	Easting(X)	Elev(Z)	Description
2835	418348.50	990709.07	2483.01	NG
2836	418357.90	990709.09	2483.22	.C
2837	418359.05	990709.73	2483.12	.TOP/CONC
2838	418367.28	990700.07	2483.33	.TOP-/CONC
2839	418377.46	990696.84	2483.51	..TOP/CONC
2840	418377.96	990697.89	2482.53	.WW
2841	418359.74	990704.51	2483.27	.C-
2842	418362.46	990702.20	2483.32	.C
2843	418364.48	990700.01	2483.30	.C-
2844	418365.51	990696.69	2483.19	..C.SW
2845	418371.20	990696.61	2483.69	.SW
2846	418377.48	990696.70	2483.54	.SW
2847	418365.91	990690.75	2483.02	.TBC
2848	418365.91	990690.03	2482.89	.EP
2849	418370.92	990690.68	2483.58	.TBC
2850	418367.88	990707.99	2477.72	..WW
2851	418369.25	990708.49	2476.22	TOE/CONC
2852	418419.62	990696.69	2483.55	.SW
2853	418419.38	990690.74	2483.48	.TBC
2854	418419.35	990690.02	2482.85	.EP
2855	418464.32	990690.04	2482.88	.EP
2856	418464.00	990690.79	2483.51	.TBC
2857	418461.87	990696.65	2483.51	.SW
2858	418473.98	990696.73	2483.54	.SW
2859	418476.18	990697.36	2483.64	..SW.C
2860	418472.54	990702.04	2483.56	.C.C1
2861	418466.79	990698.64	2483.42	.C1-
2862	418461.91	990697.34	2483.46	..C1
2863	418467.57	990707.12	2480.97	.C-
2864	418462.22	990710.12	2477.44	..C
2865	418461.44	990709.32	2477.61	.WW
2866	418461.28	990697.80	2482.68	..WW
2867	418476.05	990690.76	2483.43	..TBC
2868	418476.07	990689.98	2482.79	..EP
2869	418474.75	990709.97	2483.46	TOP
2870	418455.26	990710.12	2474.70	TOE
2871	418415.07	990710.69	2474.11	NG
2872	418420.21	990698.42	2474.59	INV
2873	418374.54	990707.87	2475.63	TOE
2874	418384.81	990672.63	2483.26	PVMT
2875	418384.97	990661.12	2483.23	.EP
2876	418384.84	990660.43	2484.11	.TBC
2877	418440.74	990660.63	2484.03	.TBC
2878	418440.74	990661.34	2483.25	.EP
2879	418474.94	990660.83	2483.15	..EP
2880	418474.91	990660.14	2483.97	..TBC
2881	418434.56	990672.96	2483.21	PVMT
2882	418472.64	990672.62	2483.19	PVMT
2883	418488.39	990643.56	2484.12	.TBC
2884	418488.32	990642.83	2483.39	.EP
2885	418476.55	990645.06	2483.49	.EP-
2886	418476.89	990645.78	2484.29	.TBC-
2887	418465.45	990648.75	2484.37	.TBC
2888	418465.20	990647.96	2483.73	.EP
2889	418453.32	990650.58	2483.68	.EP-
2890	418453.53	990651.26	2484.42	.TBC-
2891	418429.11	990653.62	2484.39	.TBC
2892	418429.10	990652.90	2483.60	.EP
2893	418384.79	990652.91	2483.61	..EP
2894	418384.81	990653.73	2484.25	..TBC
2895	418404.29	990629.39	2483.23	PVMT
2896	418445.34	990628.80	2483.33	PVMT
2897	418487.83	990628.82	2483.37	PVMT
2898	418503.39	990612.24	2482.87	.EP
2899	418503.41	990611.44	2483.55	.TBC
2900	418507.66	990605.12	2483.78	.SW.C
2901	418494.96	990605.71	2483.59	.SW
2902	418494.26	990604.37	2482.16	.WW
2903	418507.38	990603.63	2483.71	.C
2904	418512.58	990601.22	2483.60	.C
2905	418518.55	990593.09	2483.20	..C
2906	418495.00	990604.57	2482.23	.HDWL
2907	418492.85	990611.47	2483.52	.TBC
2908	418453.10	990612.10	2483.00	.EP
2909	418453.08	990611.48	2483.52	.TBC
2910	418452.99	990605.60	2483.59	.SW
2911	418410.92	990605.47	2483.59	.SW
2912	418410.86	990604.52	2482.48	..HDWL
2913	418397.42	990603.05	2483.63	..SW.C
2914	418411.24	990611.42	2483.50	.TBC.SW
2915	418410.72	990612.12	2482.78	.EP
2916	418395.62	990612.19	2482.78	..EP
2917	418395.59	990611.26	2483.43	..TBC
2918	418394.69	990608.31	2483.56	.SW
2919	418377.53	990697.68	2482.53	.HDWL
2920	418461.79	990697.62	2483.09	..HDWL
2921	418457.49	990697.63	2485.04	HDWL
2922	418381.78	990697.62	2485.11	HDWL
2923	418415.15	990604.55	2485.09	HDWL
2924	418412.03	990604.29	2482.11	.WW1
2925	418411.34	990592.11	2477.24	..WW1..C

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12th AVE.
POINT LIST
PIMA COUNTY, ARIZONA

DATE: JUNE 26, 2015
JOB NO: 5739
SHEET: 1 / 7

PointNo.	Northing(Y)	Easting(X)	Elev(Z)	Description
2926	418408.03	990592.62	2480.26	GB
2927	418397.26	990592.38	2481.67	TOP
2928	418490.79	990604.56	2485.23	HDWL
2929	418503.25	990592.45	2476.92	..WW
2930	418503.05	990592.42	2473.80	.C
2931	418463.79	990592.21	2473.77	.C
2932	418422.85	990592.15	2473.78	..C CONTINUE TO WW
2933	418424.35	990604.19	2473.91	INV
2934	418453.70	990604.18	2473.92	INV
2935	418481.61	990603.99	2473.88	INV
2936	418455.83	990698.36	2474.45	INV
2937	418390.53	990698.41	2474.51	INV
2938	419065.92	990229.15	2477.50	.EP
2939	419065.29	990229.28	2478.07	.TBC
2940	419064.72	990208.28	2477.95	..TBC.C
2941	419065.31	990208.27	2477.44	.EP
2942	419058.64	990210.08	2478.09	..C
2943	419049.85	990223.65	2478.09	.WW
2944	419051.27	990223.29	2477.43	.C
2945	419055.67	990227.22	2477.87	.C
2946	419052.14	990233.07	2477.53	..C
2947	419050.56	990232.30	2477.33	TOP
2948	419053.91	990227.28	2477.76	TOP
2949	419057.13	990209.85	2478.13	..WW
2950	419057.39	990209.75	2478.20	.HDWL
2951	419064.31	990177.69	2477.29	.EP
2952	419063.56	990177.79	2477.85	.TBC
2953	419057.39	990177.97	2478.02	SW
2954	419056.23	990177.72	2478.15	.HDWL
2955	419054.69	990132.12	2478.14	..HDWL.WW
2956	419055.76	990130.69	2478.17	.C
2957	419061.95	990128.68	2477.79	..C.TBC
2958	419062.53	990128.62	2477.39	.EP
2959	419055.03	990105.20	2477.56	.EP-
2960	419054.66	990105.70	2478.12	.TBC-
2961	419032.85	990098.44	2477.89	..TBC
2962	419032.91	990097.83	2477.55	..EP
2963	419039.53	990123.81	2478.08	..WW
2964	419040.21	990122.21	2477.25	.C
2965	419030.41	990118.53	2477.64	.C-
2966	419019.92	990119.60	2477.45	..C
2967	419054.30	990123.53	2477.81	NG AT WALL
2968	419055.42	990123.39	2477.84	NG AT WALL
2969	419086.11	990102.20	2477.44	PVMT
2970	419086.47	990120.49	2477.33	PVMT
2971	419087.36	990153.90	2477.20	PVMT
2972	419088.66	990201.81	2477.43	PVMT
2973	419088.86	990222.63	2477.56	PVMT
2974	419113.41	990218.11	2476.86	.EP
2975	419114.06	990218.04	2477.39	.TBC
2976	419115.75	990217.89	2477.44	.SW

PointNo.	Northing(Y)	Easting(X)	Elev(Z)	Description
2977	419119.73	990217.85	2477.58	.SW1
2978	419130.43	990217.14	2476.54	NG
2979	419129.52	990199.80	2475.07	.C
2980	419129.85	990199.15	2477.54	.WW
2981	419136.37	990206.17	2474.90	..C
2982	419112.42	990193.82	2476.68	.EP
2983	419113.17	990193.53	2477.31	..TBC.C
2984	419114.04	990193.39	2477.25	..SW
2985	419117.93	990192.20	2477.40	..SW1
2986	419119.41	990191.62	2477.49	..C
2987	419120.53	990190.07	2477.51	..WW.HDWL
2988	419120.94	990198.62	2477.22	NG AT WALL
2989	419119.77	990198.70	2477.38	NG AT WALL
2990	419112.25	990189.58	2476.53	GUT
2991	419111.02	990153.77	2476.49	.EP
2992	419111.28	990153.72	2477.12	CONC
2993	419117.97	990152.09	2477.34	CONC
2994	419119.32	990152.29	2477.47	.HDWL
2995	419117.88	990112.58	2477.49	..HDWL.WW
2996	419117.05	990112.08	2477.50	.C
2997	419110.44	990113.97	2477.24	..C.TBC
2998	419109.81	990118.36	2476.45	GUT
2999	419109.75	990114.11	2476.72	.EP
3000	419109.29	990098.85	2476.75	..EP
3001	419109.91	990098.82	2477.35	..TBC
3002	419125.39	990098.48	2477.52	..WW
3003	419124.40	990097.88	2477.42	.C
3004	419129.91	990094.75	2476.14	..C
3005	419129.97	990096.21	2476.06	TOP
3006	419125.48	990097.96	2476.41	TOP
3007	419125.57	990087.64	2476.84	NG
3008	419045.17	990217.10	2468.20	TOE/CONC
3009	419057.08	990209.71	2467.92	INV
3010	419055.77	990169.33	2467.72	INV
3011	419040.27	990175.38	2468.30	NG
3012	419039.12	990139.14	2468.89	TOE/CONC
3013	419054.25	990132.17	2467.85	INV
3014	419132.72	990110.19	2466.79	TOE/CONC
3015	419118.14	990112.73	2467.15	INV

T. Wayne Ashby

REGISTERED LAND SURVEYOR
CERTIFICATE NO.
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12th AVE.
POINT LIST
PIMA COUNTY, ARIZONA

DATE: JUNE 26, 2015
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PointNo.	Northing(Y)	Easting(X)	Elev(Z)	Description
3017	419136.31	990146.11	2466.93	NG
3018	419120.80	990190.04	2467.53	INV
3019	419121.03	990186.40	2466.04	TOE/CONC
3020	419135.29	990188.92	2466.77	TOE/CONC
3173	420417.38	989357.21	2464.33	.WW
3174	420420.02	989337.42	2464.34	.WW
3175	420426.55	989329.54	2464.30	.WW
3176	420430.23	989305.64	2464.35	.WW
3177	420445.34	989286.60	2464.46	..WW
3178	420446.34	989287.10	2464.53	.HDWL
3179	420445.28	989286.38	2449.44	INV
3180	420385.03	989238.46	2449.39	INV
3181	420384.39	989237.42	2464.43	..HDWL
3182	420385.04	989238.22	2464.37	.WW
3183	420369.79	989257.17	2464.35	.WW
3184	420347.37	989266.14	2464.39	.WW
3185	420341.23	989273.89	2464.31	.WW
3186	420329.01	989285.94	2464.24	..WW
3187	420328.30	989285.36	2463.74	.C
3188	420326.88	989283.95	2463.33	.C
3189	420323.35	989287.75	2463.80	.C
3190	420323.00	989288.86	2463.68	.C-
3191	420324.43	989290.27	2463.25	.C
3192	420336.65	989292.05	2459.98	.C.GB
3193	420341.31	989274.08	2459.72	..GB
3194	420347.51	989266.39	2459.80	.GB
3195	420386.76	989297.95	2459.69	.GB
3196	420369.94	989318.98	2460.00	.C
3197	420426.21	989329.54	2459.73	..GB
3198	420408.20	989349.69	2460.05	.C.GB
3199	420419.92	989337.24	2459.87	..GB
3200	420412.89	989361.60	2463.11	.C
3201	420414.41	989362.99	2463.58	.C-
3202	420417.01	989362.12	2463.71	.C
3203	420420.05	989358.45	2463.20	.C
3204	420418.26	989357.48	2463.19	..C
3205	420430.08	989305.44	2449.55	.GB
3206	420400.25	989281.63	2449.41	.GB
3207	420370.02	989257.34	2449.32	..GB
3208	420425.64	989364.98	2463.68	NG
3209	420451.33	989333.53	2463.37	NG
3210	420465.83	989301.28	2463.46	.SW1
3211	420468.36	989298.27	2463.30	.SW
3212	420471.26	989294.54	2463.03	.TBC
3213	420471.76	989294.08	2462.46	.EP
3214	420483.24	989279.03	2462.78	PVMT
3215	420464.47	989264.87	2462.69	PVMT
3216	420453.10	989279.06	2462.44	.EP
3217	420447.02	989286.38	2463.29	.SW1
3218	420449.42	989283.35	2463.15	.SW
3219	420452.67	989279.50	2462.99	.TBC..SW

PointNo.	Northing(Y)	Easting(X)	Elev(Z)	Description
3220	420426.53	989258.58	2462.87	..TBC
3221	420429.35	989260.14	2462.34	.EP
3222	420430.08	989259.08	2462.39	.EP
3223	420426.48	989257.73	2462.16	GUT
3224	420414.77	989248.45	2462.20	GUT
3225	420414.18	989248.79	2462.84	.TBC
3226	420412.95	989245.35	2462.39	.EP
3227	420412.23	989246.41	2462.32	.EP
3228	420415.91	989261.54	2463.03	.SW1
3229	420433.05	989239.60	2462.60	PVMT
3230	420402.03	989215.19	2462.71	PVMT
3231	420390.96	989229.30	2462.54	.EP
3232	420390.44	989229.68	2462.86	TBC.SW
3233	420387.50	989233.69	2463.06	.SW
3234	420384.96	989236.70	2463.16	.SW1
3235	420374.21	989227.68	2463.13	..SW1
3236	420376.80	989224.75	2463.04	.SW
3237	420379.77	989221.19	2462.92	..TBC..SW
3238	420380.18	989220.73	2462.57	..EP
3239	420391.19	989206.60	2462.76	PVMT
3240	420349.77	989253.19	2463.13	PVMT
3241	420323.84	989281.51	2463.63	PVMT
3242	420400.74	989193.56	2462.40	.EP
3243	420401.24	989193.06	2462.97	.TBC
3244	420406.54	989186.28	2463.03	.C.C1
3245	420418.16	989195.34	2463.00	.C
3246	420422.01	989190.37	2462.87	..C1
3247	420423.35	989188.87	2462.02	.C1
3248	420403.33	989183.86	2462.82	..C1
3249	420407.67	989178.48	2462.52	.C1
3250	420427.53	989183.41	2462.00	..C1
3251	420429.37	989180.92	2462.92	.C1
3252	420409.50	989176.20	2463.54	..C1
3253	420427.13	989155.97	2462.93	NG
3254	420450.82	989121.98	2462.87	NG
3255	420455.17	989130.81	2462.86	.WW
3256	420433.35	989177.45	2462.85	.WW
3257	420419.66	989195.12	2462.85	..WW
3258	420418.76	989194.62	2464.34	.HDWL
3259	420419.96	989195.08	2449.30	INV

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PointNo.	Northing(Y)	Easting(X)	Elev(Z)	Description
3260	420412.52	989202.99	2462.33	.EP
3261	420412.89	989202.53	2462.95	.TBC
3262	420436.20	989221.21	2462.81	..TBC
3263	420436.17	989221.96	2462.16	GUT
3264	420447.85	989231.37	2462.18	GUT
3265	420433.46	989219.84	2462.23	.EP
3266	420432.71	989220.85	2462.37	.EP
3267	420449.82	989234.54	2462.41	.EP
3268	420450.57	989233.61	2462.32	.EP
3269	420448.65	989231.12	2462.83	.TBC
3270	420449.01	989220.21	2463.08	.C
3271	420480.17	989245.15	2463.09	..C
3272	420480.70	989244.34	2464.39	..HDWL
3273	420479.95	989243.36	2449.33	INV
3274	420474.53	989251.95	2462.89	.TBC
3275	420474.22	989252.48	2462.35	.EP
3276	420492.69	989267.32	2462.49	..EP
3277	420493.02	989266.80	2462.98	..TBC
3278	420498.65	989260.20	2463.17	.C
3279	420487.22	989236.16	2462.92	..C
3280	420488.43	989234.58	2461.88	.C
3281	420480.15	989243.60	2462.88	.WW
3282	420501.42	989262.64	2463.06	..C
3283	420505.50	989257.47	2462.88	.C
3284	420507.66	989254.62	2463.66	.C1
3285	420492.67	989229.17	2461.95	..C
3286	420494.90	989226.76	2462.94	..C1
3287	420494.03	989226.07	2462.91	.WW
3288	420543.90	989202.08	2462.90	..WW
3289	420544.46	989202.84	2462.57	.C
3290	420546.40	989203.73	2462.43	.C
3291	420549.68	989199.30	2462.25	.C
3292	420549.53	989197.34	2462.50	.C-
3293	420547.36	989196.57	2462.15	.C
3294	420551.88	989208.71	2462.43	NG
3295	420536.55	989196.13	2457.63	.C
3296	420520.40	989183.46	2449.19	.C.GB
3297	420474.66	989146.46	2449.17	.C.GB1
3298	420460.72	989135.11	2458.78	.C
3299	420458.70	989125.82	2462.49	.C
3300	420457.60	989124.43	2462.84	.C-
3301	420455.23	989125.07	2462.44	..C
3302	420433.38	989177.42	2449.40	..GB1
3303	420432.40	989178.92	2451.09	SILT
3304	420424.83	989199.15	2450.69	SILT
3305	420436.23	989208.15	2450.56	SILT
3306	420444.62	989214.95	2450.47	SILT
3307	420455.13	989223.53	2450.44	SILT
3308	420465.39	989231.80	2450.85	SILT
3309	420493.77	989225.97	2449.19	..GB
3310	420420.49	989266.52	2450.13	SILT
3311	420410.15	989258.38	2450.44	SILT
3312	420400.14	989250.39	2451.23	SILT
3313	420389.52	989241.94	2451.07	SILT
1488	422333.45	987512.22	2442.54	.HDWL
1489	422322.82	987504.61	2442.34	.HDWL
1490	422262.77	987444.54	2441.89	.HDWL
1491	422255.66	987434.76	2441.91	..HDWL/TOP/ RET/WALL
1492	422264.55	987429.28	2441.70	.TBC
1493	422265.07	987428.84	2441.22	.EP
1494	422298.61	987469.10	2441.42	.EP-
1495	422298.20	987469.56	2441.92	.TBC-
1496	422334.29	987500.28	2442.40	..TBC
1497	422334.65	987499.75	2441.98	..EP
1498	422343.26	987488.21	2441.89	PVMT
1499	422310.11	987459.41	2441.49	PVMT
1500	422273.89	987420.57	2441.20	PVMT
1501	422292.92	987407.36	2441.82	.HDWL

REGISTERED LAND SURVEYOR
CERTIFICATE NO.
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ASHBY
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Ashby
SURVEYING & DRAFTING, INC.
717 N. SWAN ROAD
TUCSON, ARIZONA 85711
TEL: (520) 325-1991 · FAX: (520) 325-2074

12th AVE.
POINT LIST
PIMA COUNTY, ARIZONA

DATE: JUNE 26, 2015
JOB NO: 5739
SHEET: 4 / 7

PointNo.	Northing(Y)	Easting(X)	Elev(Z)	Description
1502	422295.36	987411.33	2441.74	.HDWL
1503	422355.75	987471.03	2442.32	.HDWL
1504	422370.33	987481.22	2442.36	..HDWL
1505	422367.86	987485.32	2442.36	.TBC
1506	422367.58	987485.94	2441.93	.EP
1507	422342.82	987468.65	2441.77	.EP-
1508	422343.22	987468.06	2442.23	.TBC-
1509	422317.48	987445.27	2441.86	.TBC
1510	422317.00	987445.78	2441.39	.EP
1511	422286.94	987411.71	2441.29	..EP
1512	422287.49	987411.21	2441.84	..TBC
1513	422291.92	987405.98	2441.90	TOP/RET/WALL
1514	422292.38	987406.32	2438.20	TOP/SLOPE
1515	422255.78	987435.21	2439.34	TOP/SLOPE
1516	422352.36	987467.76	2432.97	TOP/CONC/SLOPE
1517	422336.99	987452.56	2422.31	TOE/CONC/SLOPE
1518	422325.40	987441.48	2422.24	FLOWLINE
1519	422325.39	987441.48	2439.66	ARCH HIGHPOINT
1520	422316.35	987431.99	2422.32	TOE/CONC/SLOPE
1521	422301.93	987418.26	2432.14	TOP/CONC/SLOPE
1522	422299.35	987415.21	2432.93	ARCH/CONC
1523	422266.23	987448.00	2433.16	ARCH/CONC
1524	422266.26	987447.96	2432.57	TOP/CONC/SLOPE
1525	422280.83	987463.10	2423.04	TOE/CONC/SLOPE
1526	422292.88	987474.86	2422.90	FLOWLINE
1527	422292.87	987474.87	2439.57	ARCH HIGHPOINT
1528	422300.31	987482.49	2423.17	TOE/CONC/SLOPE
1529	422316.56	987498.28	2434.38	ARCH/CONC
1530	422321.44	987503.54	2438.69	GB/CONC/SLOPE
1531	422332.86	987512.02	2441.38	TOP/CONC/SLOPE
3367	422379.37	987469.86	2440.88	TOP
3368	422322.84	987504.70	2442.17	HDWL
3369	422262.70	987444.46	2441.71	HDWL
3370	422295.33	987411.39	2441.61	HDWL
3371	422355.72	987471.11	2442.16	HDWL
3372	422310.85	987512.66	2438.40	TOP/CONC
3373	422291.80	987490.60	2423.31	TOE/CONC
3374	422279.99	987479.74	2423.06	FL CONC
3375	422271.95	987470.05	2422.95	TOE/CONC
3376	422256.52	987455.43	2432.88	TOP/CONC
3377	422245.17	987443.82	2439.22	TOP
3378	422300.63	987399.53	2438.41	TOP
3379	422315.41	987407.38	2431.89	TOP/CONC
3380	422326.75	987423.18	2421.90	TOE/CONC
3381	422337.51	987435.43	2421.93	FL CONC
3382	422347.00	987443.69	2421.79	TOE/CONC
3383	422361.17	987459.83	2432.14	TOP/CONC
3414	422311.23	987492.92	2436.41	BOT OF ARCH
3415	422304.87	987486.63	2438.18	BOT OF ARCH
3416	422298.52	987480.30	2439.18	BOT OF ARCH
3417	422292.73	987474.56	2439.44	BOT OF ARCH

PointNo.	Northing(Y)	Easting(X)	Elev(Z)	Description
3418	422286.32	987468.16	2439.10	BOT OF ARCH
3419	422279.90	987461.71	2438.02	BOT OF ARCH
3420	422273.74	987455.48	2436.22	BOT OF ARCH
3421	422306.57	987422.66	2436.19	BOT OF ARCH
3422	422312.86	987428.82	2438.02	BOT OF ARCH
3423	422319.22	987435.13	2439.16	BOT OF ARCH
3424	422325.62	987441.48	2439.48	BOT OF ARCH
3425	422332.10	987447.93	2439.17	BOT OF ARCH
3426	422338.48	987454.20	2438.06	BOT OF ARCH
3427	422344.78	987460.48	2436.22	BOT OF ARCH
3428	422352.24	987467.79	2432.89	ARCH/CONC
1448	422589.60	987302.36	2442.89	.HDWL
1449	422545.56	987309.36	2441.78	.HDWL GB
1450	422498.72	987317.10	2440.56	.HDWL GB
1451	422464.10	987323.04	2439.41	.HDWL GB
1452	422417.06	987330.58	2439.39	.HDWL GB
1453	422372.52	987337.78	2438.98	..HDWL
1454	422371.28	987332.48	2439.14	.TBC
1455	422371.09	987331.87	2438.72	.EP
1456	422407.33	987324.45	2438.96	.EP
1457	422407.49	987325.09	2439.49	.TBC
1458	422463.30	987317.48	2439.64	.TBC/GB
1459	422463.18	987316.77	2439.15	.EP/GB
1460	422548.68	987304.54	2441.30	.EP
1461	422548.81	987305.28	2441.81	.TBC
1462	422589.09	987298.84	2442.86	..TBC
1463	422589.10	987298.17	2442.34	..EP
1464	422655.48	987277.34	2441.30	PVMT
1465	422586.75	987284.04	2441.15	PVMT
1466	422506.49	987296.62	2439.52	PVMT
1467	422462.61	987303.67	2438.79	PVMT
1468	422405.05	987309.91	2438.59	PVMT
1469	422439.56	987289.53	2438.60	.TBC
1470	422439.52	987290.11	2438.14	.EP
1471	422505.19	987281.10	2438.87	.EP
1472	422505.10	987280.38	2439.33	.TBC
1473	422587.84	987267.65	2440.37	.TBC
1474	422587.76	987268.44	2439.88	.EP
1475	422655.20	987261.45	2440.19	..EP
1476	422655.22	987260.75	2440.69	..TBC

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PointNo.	Northing(Y)	Easting(X)	Elev(Z)	Description
1477	422654.86	987252.83	2440.63	.HDWL
1478	422606.33	987256.96	2440.48	.HDWL
1479	422529.73	987268.64	2439.66	.HDWL
1480	422438.36	987281.90	2438.67	..HDWL
1481	422459.56	987278.73	2438.34	TOP/RET/WALL
1482	422460.08	987278.62	2435.56	TOP/SLOPE
1483	422372.43	987337.90	2439.04	TOP/RET/WALL
1484	422372.69	987337.96	2436.74	TOP/SLOPE
1485	422594.84	987302.00	2442.04	TOP/SLOPE
1486	422655.01	987252.55	2439.30	TOP/SLOPE
1487	422644.04	987253.38	2436.45	GB
1532	422407.60	987332.18	2430.57	TOP/CONC/SLOPE
1533	422420.51	987330.15	2426.86	ARCH/CONC
1534	422447.76	987325.56	2419.79	TOE/CONC/SLOPE
1535	422474.10	987321.04	2419.30	FLOWLINE
1536	422474.11	987321.03	2436.60	ARCH HIGHPOINT
1537	422505.30	987316.57	2419.06	TOE/CONC/SLOPE
1538	422541.84	987309.90	2427.51	ARCH/CONC/SLOPE
1539	422549.56	987308.44	2433.25	GB
1540	422475.33	987275.50	2430.17	TOP/CONC/SLOPE
1541	422484.29	987275.48	2426.80	ARCH/CONC
1542	422512.68	987271.38	2418.78	TOE/CONC/SLOPE
1543	422554.85	987264.45	2418.35	FLOWLINE
1544	422554.83	987264.46	2436.60	ARCH HIGHPOINT
1545	422575.73	987261.96	2418.38	TOE/CONC/SLOPE
1546	422608.25	987256.49	2426.42	ARCH/CONC/TOP/ SLOPE
3349	422606.31	987256.94	2440.30	HDWL
3350	422529.79	987268.58	2439.50	HDWL
3351	422464.30	987323.16	2439.23	HDWL GB
3352	422407.47	987325.17	2439.35	TBC
3353	422363.48	987347.78	2437.80	TOP
3354	422384.86	987350.71	2430.70	TOP/CONC
3355	422419.92	987349.50	2419.95	TOE/CONC
3356	422448.48	987345.35	2419.47	FL CONC
3357	422479.63	987337.93	2419.34	TOE/CONC
3358	422516.79	987331.10	2427.88	TOP/CONC
3359	422621.60	987244.69	2425.32	TOP/CONC
3360	422602.47	987239.50	2417.74	TOE/CONC
3361	422572.38	987243.37	2417.89	FL CONC
3362	422535.61	987252.45	2418.39	TOE/CONC
3363	422499.40	987256.97	2428.77	TOP/CONC
3364	422469.90	987261.36	2436.05	TOP
3365	422676.54	987240.50	2439.89	TOP
3366	422561.30	987323.35	2440.36	TOP
3429	422529.57	987311.92	2431.51	BOT OF ARCH
3430	422514.40	987314.46	2434.53	BOT OF ARCH
3431	422497.65	987317.30	2436.47	BOT OF ARCH
3432	422480.10	987320.34	2436.67	BOT OF ARCH
3433	422463.00	987323.33	2435.46	BOT OF ARCH
3434	422446.31	987326.07	2433.30	BOT OF ARCH
3435	422435.87	987327.75	2431.15	BOT OF ARCH
3436	422499.01	987273.32	2431.00	BOT OF ARCH
3437	422514.40	987270.99	2434.31	BOT OF ARCH
3438	422530.48	987268.52	2436.22	BOT OF ARCH
3439	422547.35	987265.86	2436.66	BOT OF ARCH
3440	422563.75	987263.28	2435.62	BOT OF ARCH
3441	422580.17	987260.83	2433.77	BOT OF ARCH
3442	422595.52	987258.65	2430.54	BOT OF ARCH
1417	422912.28	986975.02	2435.74	.HDWL
1418	422875.86	986976.43	2437.05	.HDWL GB
1419	422803.43	986978.26	2437.66	..HDWL
1420	422803.05	986974.01	2437.73	.TBC
1421	422802.98	986973.30	2437.21	.EP
1422	422875.59	986971.21	2436.50	.EP GB
1423	422875.59	986971.89	2436.96	.TBC GB
1424	422912.28	986970.90	2435.79	..TBC
1425	422912.17	986970.17	2435.24	..EP
1426	422922.65	986956.61	2434.92	PVMT
1427	422884.92	986957.35	2436.36	PVMT
1428	422812.11	986959.14	2437.57	PVMT
1429	422825.54	986943.01	2437.47	.EP
1430	422825.53	986942.32	2437.87	.TBC
1431	422877.18	986941.98	2437.00	.TBC
1432	422877.06	986942.68	2436.45	.EP
1433	422934.09	986942.23	2434.25	..EP
1434	422934.07	986941.56	2434.76	..TBC
1435	422933.92	986932.80	2434.74	.HDWL
1436	422897.18	986933.40	2436.27	.HDWL
1437	422861.25	986934.55	2437.25	.HDWL
1438	422825.42	986935.45	2437.80	..HDWL
1439	422928.32	986974.22	2434.82	TOP
1440	422912.53	986975.19	2431.88	GB
1441	422934.05	986932.66	2431.57	TOP
1442	422919.44	986932.05	2423.47	TOP/CONC/SLOPE
1443	422825.47	986934.90	2431.47	TOP/SLOPE
1444	422818.04	986978.99	2423.46	TOP/CONC/SLOPE
1445	422803.05	986978.35	2429.38	TOP/SLOPE
1446	422798.01	986978.20	2437.94	TOP/RET/WALL
1447	422824.66	986935.41	2437.94	TOP/RET/WALL
1547	422816.89	986978.75	2423.70	ARCH/CONC/TOP/ CONC/SLOPE

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PointNo.	Northing(Y)	Easting(X)	Elev(Z)	Description
1548	422838.58	986977.66	2414.89	TOE/CONC/SLOPE
1549	422858.71	986976.46	2414.32	FLOWLINE
1550	422858.68	986976.50	2434.50	ARCH HIGHPOINT
1551	422880.81	986976.88	2414.53	TOE/CONC/SLOPE
1552	422898.18	986975.51	2423.77	ARCH/CONC/TOP/ CONC/SLOPE
1553	422919.27	986932.11	2423.17	ARCH/CONC/TOP/ CONC/SLOPE
1554	422900.73	986933.18	2415.05	TOE/CONC/SLOPE
1555	422883.31	986933.53	2413.92	FLOWLINE
1556	422883.32	986933.53	2434.33	ARCH HIGHPOINT
1557	422860.92	986934.20	2414.89	TOE/CONC/SLOPE
1558	422841.03	986935.44	2424.21	ARCH/CONC/TOP/ CONC/SLOPE
3331	422945.10	986918.19	2431.34	TOP
3332	422928.70	986911.56	2424.04	TOP/CONC
3333	422904.94	986912.10	2414.10	TOE/CONC
3334	422888.14	986909.88	2414.15	NG
3335	422874.72	986907.51	2414.14	TOE/CONC
3336	422851.88	986908.85	2423.63	TOP/CONC
3337	422834.74	986908.95	2430.03	TOP
3338	422789.50	986991.38	2430.66	TOP
3339	422801.43	986999.59	2424.03	TOP/CONC
3340	422818.21	987007.42	2415.09	TOE/CONC
3341	422847.14	986999.27	2413.85	NG
3342	422870.14	986991.55	2413.93	TOE/CONC
3343	422892.07	986993.98	2424.20	TOP/CONC
3344	422914.24	986991.38	2433.30	TOP
3345	422876.95	986971.97	2436.82	TBC GB
3346	422875.69	986976.46	2436.91	HDWL GB
3347	422861.32	986934.63	2437.17	HDWL
3348	422897.14	986933.49	2436.17	HDWL
3443	422888.37	986975.80	2428.41	BOT OF ARCH
3444	422878.46	986976.12	2431.56	BOT OF ARCH
3445	422868.41	986976.46	2433.58	BOT OF ARCH
3446	422858.29	986976.78	2434.23	BOT OF ARCH
3447	422847.92	986977.11	2433.60	BOT OF ARCH
3448	422837.77	986977.49	2431.98	BOT OF ARCH
3449	422828.07	986978.12	2428.75	BOT OF ARCH
3450	422849.89	986935.14	2428.77	BOT OF ARCH
3451	422859.39	986934.76	2431.85	BOT OF ARCH
3452	422869.38	986934.41	2433.71	BOT OF ARCH
3453	422879.74	986934.02	2434.22	BOT OF ARCH
3454	422889.60	986933.66	2433.59	BOT OF ARCH
3455	422899.73	986933.36	2431.76	BOT OF ARCH
3456	422909.28	986932.91	2428.58	BOT OF ARCH
1395	422976.76	986563.29	2427.83	.WW
1396	422957.73	986541.84	2427.90	.WW
1397	422957.57	986541.20	2427.96	..WW.HDWL
1398	422892.25	986558.24	2427.93	..HDWL.WW
1399	422892.03	986559.67	2427.89	.WW

PointNo.	Northing(Y)	Easting(X)	Elev(Z)	Description
1400	422870.02	986577.78	2427.90	..WW
1401	422889.12	986551.14	2427.83	.TBC
1402	422888.90	986550.57	2427.40	.EP
1403	422957.42	986533.06	2427.19	..EP
1404	422957.54	986533.76	2427.74	..TBC
1405	422953.12	986509.70	2427.70	PVMT
1406	422885.29	986526.98	2427.81	PVMT
1407	422897.44	986499.03	2427.04	.EP
1408	422897.26	986498.45	2427.60	.TBC
1409	422965.48	986480.86	2427.78	..TBC
1410	422965.68	986481.50	2427.12	..EP
1411	422984.39	986454.54	2427.97	.WW
1412	422962.50	986472.56	2427.92	.WW
1413	422962.29	986474.03	2427.94	..WW.HDWL
1414	422896.81	986490.84	2427.93	..HDWL.WW
1415	422896.88	986490.28	0000.00	.WW/NO_ELEV
1416	422878.00	986469.08	2427.96	..WW
3314	422984.40	986454.57	2427.78	WW
3315	422998.85	986435.38	2430.22	TOP
3316	422982.77	986438.30	2425.52	TOP/CONC
3317	422965.81	986447.31	2412.84	TOE/CONC
3318	422922.61	986456.16	2409.94	NG
3319	422895.49	986462.87	2411.06	TOE/CONC
3320	422891.72	986574.87	2410.50	TOE/CONC
3321	422924.47	986568.29	2412.01	NG
3322	422955.87	986560.42	2410.53	TOE/CONC
3323	422975.64	986568.84	2425.40	TOP/CONC
3324	422987.24	986570.58	2429.52	TOP
3325	422957.64	986541.27	2427.74	WW/HDWL
3326	422892.26	986558.27	2427.77	WW/HDWL
3327	422862.79	986579.64	2429.20	TOP
3328	422896.83	986491.03	2427.76	WW/HDWL
3329	422877.71	986465.86	2427.59	TOP/CONC
3330	422850.10	986467.05	2432.63	TOP
3560	422956.53	986540.27	2410.68	INV. NE COR
3561	422893.39	986556.64	2410.75	INV. SE COR
3562	422897.76	986492.00	2410.31	INV. SW COR
3563	422960.90	986475.48	2410.22	INV. NW COR

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TUCSON, ARIZONA 85711
TEL: (520) 325-1991 · FAX: (520) 325-2074

12th AVE.
POINT LIST
PIMA COUNTY, ARIZONA

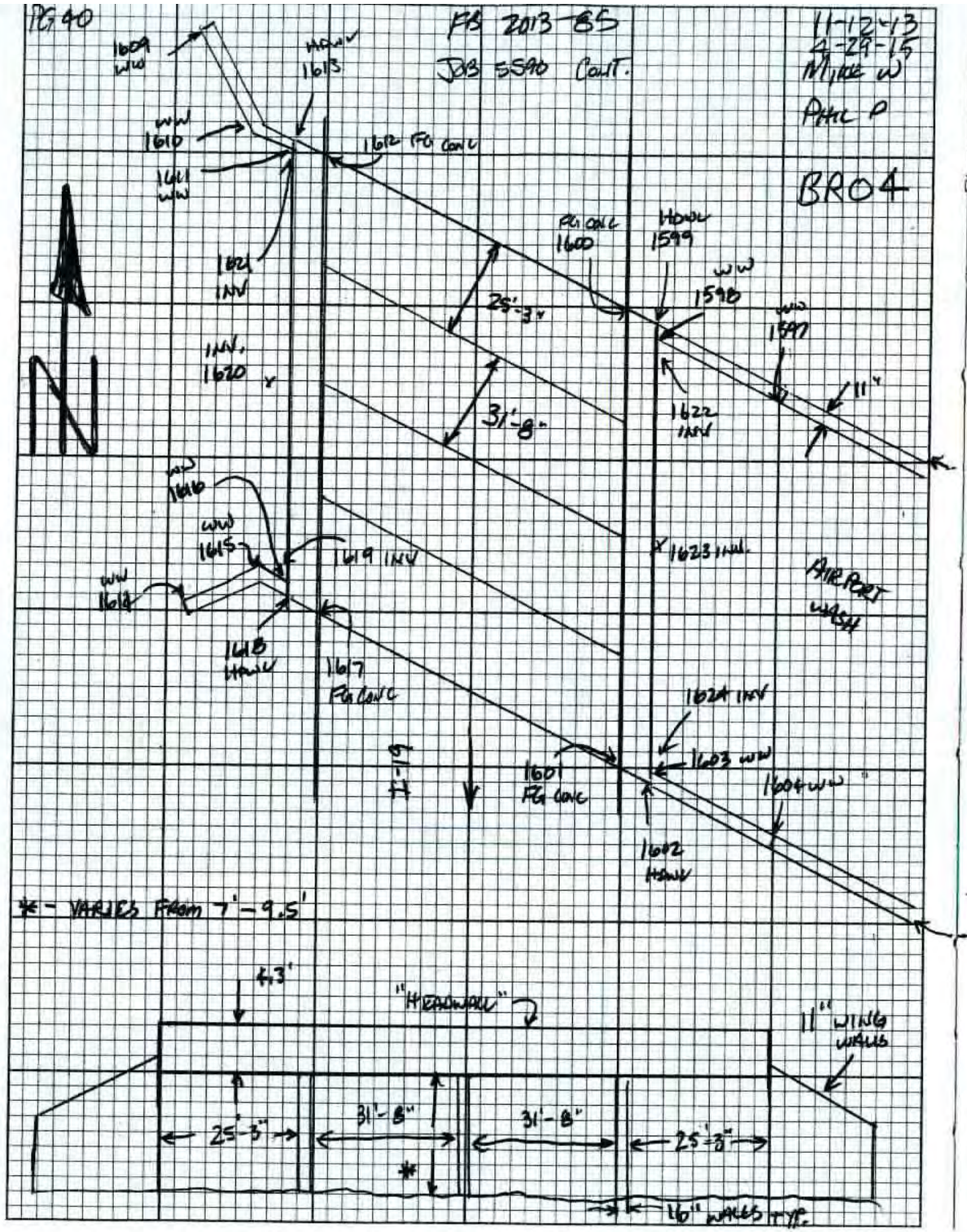
DATE: JUNE 26, 2015
JOB NO: 5739
SHEET: 7 / 7

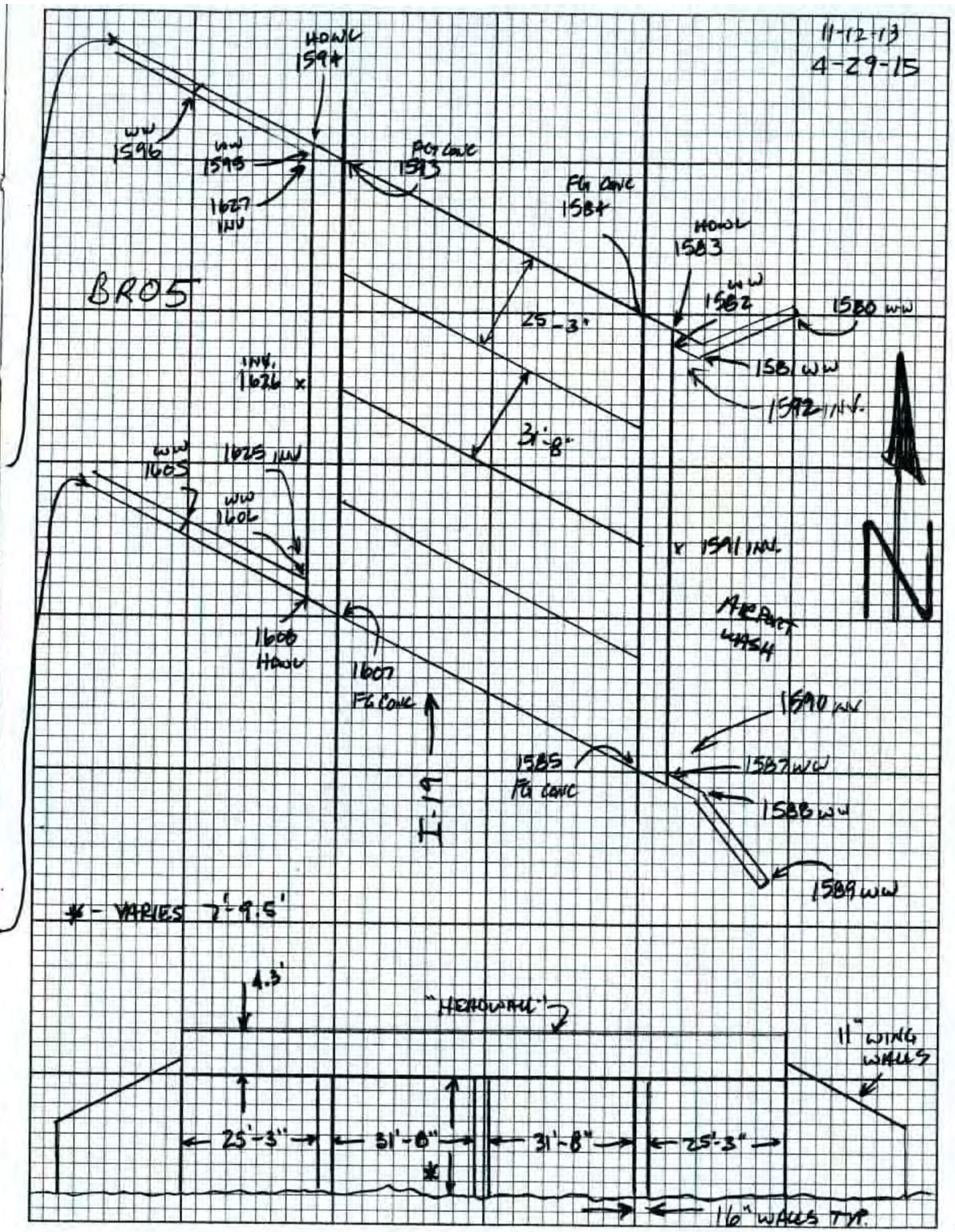
DRAINAGE STRUCTURES

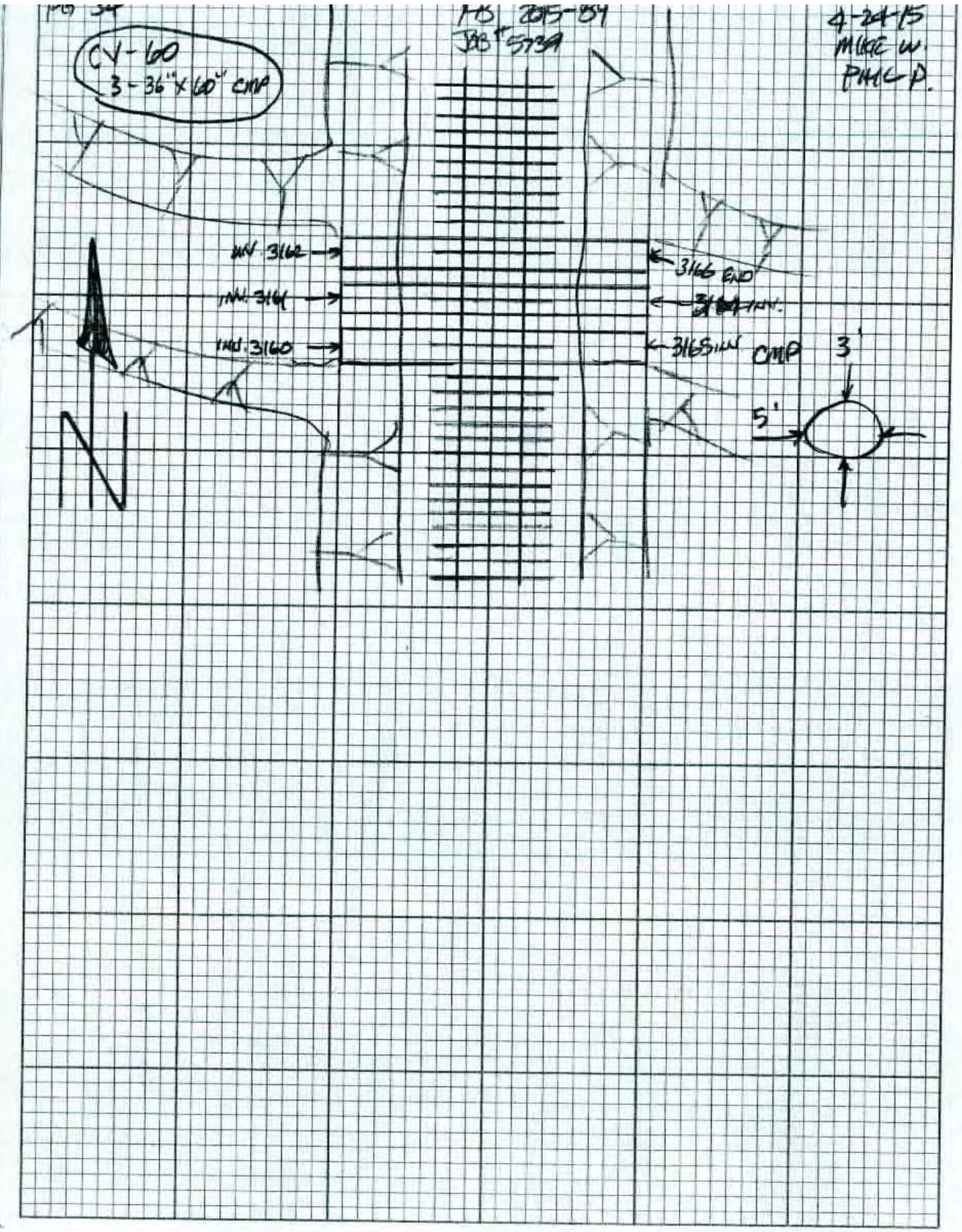
ON I-19

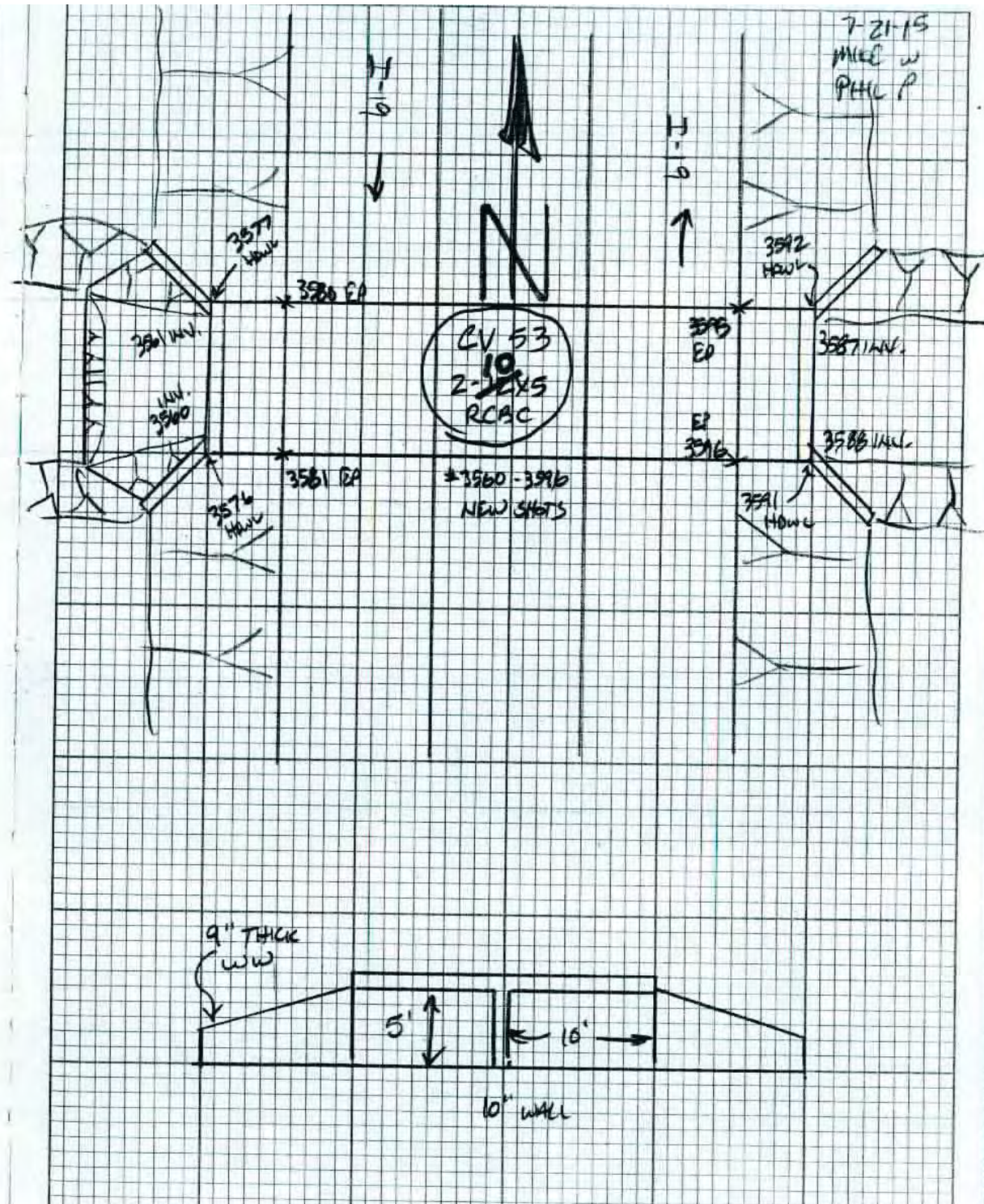
FOR

CULVERT IDs:
BR04, BR05, CV53


PG 40
FB 2013-85
JOB 5590 CONT.
11-12-13
4-29-15
MIKE W
ALL P
BR04
1609 WW
HDWL 1613
WW 1610
1612 FG CONC
1611 WW
1621 INV
FG CONC 1600
HDWL 1599
WW 1598
WW 1597
25'-3"
31'-8"
INV. 1620
1622 INV
11"
WW 1616
WW 1615
1619 INV
1623 INV.
WW 1614
AIRPORT WASH
1618 HDWL
1617 FG CONC
1624 INV
1603 WW
1601 FG CONC
1604 WW
1602 HDWL
7'-9.5'
* - VARIES FROM 7'-9.5'
4.3'
"HEADWALL"
11" WING WALLS
25'-3"
31'-8"
31'-8"
25'-3"
*
16" WALLS TYP.


11-12-13
4-29-15
HDWL 1594
WW 1596
WW 1595
FG CONC 1593
1627 INV
FG CONC 1584
HDWL 1583
BR05
WW 1582
1580 WW
25'-3"
INV. 1626
1581 WW
1592 INV.
31'-8"
WW 1605
1625 INV
WW 1606
1591 INV.
AIRPORT WASH
1608 HDWL
1607 FG CONC
1590 INV
1585 FG CONC
1587 WW
1588 WW
7'-9.5'
1589 WW
* - VARIES 7'-9.5'
4.3'
"HEADWALL"
11" WING WALLS
25'-3"
31'-8"
31'-8"
25'-3"
*
16" WALLS TYP.


CV-60
3-36"x60" CMP
4-24-15
MIKE W.
PHIL P.
INV 3162
INV. 3164
INV. 3160
3166 END
3164 INV.
3165 INV
CMP
3'
5'


7-21-15
MIKE W
PHIL P
H
O
3577 HDWL
3580 EP
3581 INV.
INV. 3580
3576 HDWL
CV 53
2-10'x5'
RCBC
3581 EP
*3560-3996
NEW SHOTS
3592 HDWL
3593 EP
3587 INV.
EP 3596
3588 INV.
3591 HDWL
9" THICK WW
5'
10'
10" WALL

PointNo.	Northing(Y)	Easting(X)	Elev(Z)	Description
1580	421531.92	988010.06	2451.46	.WW
1581	421523.34	987989.14	2455.86	.WW
1582	421523.82	987988.43	2455.84	..WW
1583	421525.93	987988.07	2458.55	.HDWL
1584	421527.83	987985.74	2455.96	FG CONC
1585	421381.63	987974.16	2456.14	FG CONC
1586	421379.91	987976.63	2458.79	..HDWL
1587	421380.73	987977.19	2456.10	.WW
1588	421379.72	987978.73	2456.08	.WW
1589	421349.52	987990.08	2451.57	..WW
1590	421381.61	987978.83	2447.42	INV
1591	421452.77	987982.80	2445.02	INV/DIRT
1592	421521.37	987989.42	2447.05	INV/DIRT
1593	421556.54	987949.90	2456.30	FG CONC
1594	421558.33	987947.62	2459.08	.HDWL
1595	421557.07	987947.33	2456.36	.WW
1596	421575.11	987925.06	2451.55	..WW
1597	421593.85	987901.76	2451.53	.WW
1598	421610.52	987880.48	2456.25	..WW
1599	421612.52	987880.43	2458.82	.HDWL1
1600	421614.24	987878.04	2456.23	FG CONC
1601	421467.99	987866.61	2456.31	FG CONC
1602	421466.25	987868.94	2458.95	..HDWL1
1603	421467.33	987869.21	2456.29	.WW
1604	421449.58	987891.50	2451.54	..WW
1605	421430.86	987914.84	2451.54	.WW
1606	421414.10	987936.08	2456.53	..WW
1607	421410.43	987938.45	2456.47	FG CONC
1608	421412.30	987936.11	2459.10	..HDWL
1609	421668.28	987829.01	2452.75	.WW
1610	421644.93	987837.72	2455.84	.WW
1611	421643.38	987839.77	2455.74	..WW
1612	421642.86	987842.24	2455.87	FG CONC
1613	421644.69	987839.90	2458.43	.HDWL
1614	421495.89	987814.22	2453.34	.WW
1615	421501.29	987827.44	2455.85	.WW
1616	421500.51	987828.69	2455.78	..WW
1617	421497.00	987831.03	2455.88	FG CONC
1618	421498.59	987828.62	2458.45	..HDWL
1619	421501.80	987827.36	2445.69	INV/DIRT
1620	421561.72	987831.84	2445.36	INV/DIRT
1621	421637.02	987837.59	2444.62	INV/DIRT
1622	421603.19	987881.04	2444.99	INV/DIRT
1623	421537.96	987880.24	2445.06	INV/DIRT
1624	421467.98	987869.95	2446.05	INV/DIRT
1625	421415.18	987935.60	2446.62	INV/DIRT
1626	421485.36	987941.18	2445.94	INV/DIRT
1627	421556.68	987946.84	2447.01	INV/DIRT
3400	421509.47	987816.04	2446.43	TOE/CONC
3401	421496.26	987814.93	2453.34	WW
3402	421496.77	987815.54	2453.29	TOP/CONC
3403	421581.17	987822.41	2445.11	NG
3404	421659.93	987826.75	2446.32	TOE/CONC
3405	421668.25	987829.00	2452.68	TOP/CONC/WW
3406	421531.97	988010.06	2451.37	WW
3407	421535.14	988011.09	2451.75	TOP
3408	421526.85	988010.42	2450.84	GB
3409	421516.62	988010.48	2448.19	TOE
3410	421440.05	987998.13	2445.74	NG
3411	421384.54	987995.57	2446.48	TOE
3412	421349.59	987990.20	2451.34	WW
3413	421342.87	987988.71	2453.33	TOP
3457	421523.95	987987.92	2453.83	LOW CHORD
3458	421519.46	987987.53	2454.30	LOW CHORD
3459	421498.41	987985.89	2454.32	LOW CHORD
3460	421493.66	987985.51	2453.87	LOW CHORD
3461	421492.00	987985.38	2453.86	LOW CHORD
3462	421487.16	987985.00	2454.27	LOW CHORD
3463	421458.55	987982.78	2454.31	LOW CHORD
3464	421453.77	987982.41	2453.81	LOW CHORD
3465	421452.16	987982.24	2453.74	LOW CHORD
3466	421447.34	987981.89	2454.32	LOW CHORD
3467	421418.67	987979.69	2454.40	LOW CHORD
3468	421413.84	987979.31	2453.96	LOW CHORD
3469	421412.25	987979.16	2453.95	LOW CHORD
3470	421407.47	987978.80	2454.38	LOW CHORD
3471	421386.37	987977.16	2454.46	LOW CHORD
3472	421381.69	987976.79	2454.06	LOW CHORD
3473	421381.76	987976.98	2447.28	NG
3474	421397.89	987977.90	2446.11	GB
3475	421411.91	987979.15	2445.85	NG
3476	421432.65	987981.46	2445.88	NG
3477	421452.78	987982.67	2445.48	NG
3478	421467.87	987984.02	2444.75	FLOWLINE
3479	421492.60	987985.60	2446.51	GB
3480	421509.20	987987.12	2446.85	NG
3481	421523.42	987988.42	2446.92	NG
3482	421556.49	987947.32	2454.24	LOW CHORD

REGISTERED LAND SURVEYOR
CERTIFICATE NO.
19316
T. WAYNE
ASHBY
Date Signed 06/26/2015
ARIZONA U.S.A.

EXPIRES 3/31/2017

Ashby
SURVEYING & DRAFTING, INC.
717 N. SWAN ROAD
TUCSON, ARIZONA 85711
TEL: (520) 325-1991 · FAX: (520) 325-2074

I-19
POINT LIST
PIMA COUNTY, ARIZONA

DATE: JUNE 26, 2015
JOB NO: 5739
SHEET: 1 / 3

PointNo.	Northing(Y)	Easting(X)	Elev(Z)	Description
3483	421551.86	987946.96	2454.70	LOW CHORD
3484	421530.83	987945.32	2454.65	LOW CHORD
3485	421526.05	987944.95	2454.25	LOW CHORD
3486	421524.36	987944.80	2454.22	LOW CHORD
3487	421519.62	987944.46	2454.60	LOW CHORD
3488	421490.99	987942.24	2454.71	LOW CHORD
3489	421486.21	987941.90	2454.18	LOW CHORD
3490	421484.55	987941.70	2454.20	LOW CHORD
3491	421479.88	987941.33	2454.80	LOW CHORD
3492	421451.11	987939.11	2454.78	LOW CHORD
3493	421446.30	987938.77	2454.36	LOW CHORD
3494	421444.56	987938.58	2454.39	LOW CHORD
3495	421439.92	987938.21	2454.81	LOW CHORD
3496	421418.88	987936.59	2454.79	LOW CHORD
3497	421414.39	987936.18	2454.44	LOW CHORD
3498	421414.50	987936.02	2446.26	NG
3499	421431.02	987937.29	2446.11	NG
3500	421445.10	987938.28	2445.85	NG
3501	421465.45	987940.22	2445.55	NG
3502	421485.12	987941.53	2446.37	NG
3503	421498.70	987942.69	2445.04	FLOWLINE
3504	421525.00	987944.56	2446.49	NG
3505	421540.67	987946.14	2446.20	NG
3506	421556.23	987947.47	2446.72	NG
3507	421610.40	987880.31	2454.24	LOW CHORD
3508	421605.85	987879.96	2454.61	LOW CHORD
3509	421584.79	987878.31	2454.62	LOW CHORD
3510	421580.06	987877.96	2454.15	LOW CHORD
3511	421578.31	987877.81	2454.16	LOW CHORD
3512	421573.55	987877.47	2454.61	LOW CHORD
3513	421544.97	987875.19	2454.59	LOW CHORD
3514	421540.22	987874.84	2454.13	LOW CHORD
3515	421538.53	987874.74	2454.15	LOW CHORD
3516	421533.71	987874.34	2454.57	LOW CHORD
3517	421505.10	987872.09	2454.63	LOW CHORD
3518	421500.33	987871.72	2454.18	LOW CHORD
3519	421498.69	987871.61	2454.17	LOW CHORD
3520	421493.89	987871.24	2454.64	LOW CHORD
3521	421472.80	987869.55	2454.64	LOW CHORD
3522	421468.06	987869.16	2454.28	LOW CHORD
3483	421551.86	987946.96	2454.70	LOW CHORD
3484	421530.83	987945.32	2454.65	LOW CHORD
3485	421526.05	987944.95	2454.25	LOW CHORD
3486	421524.36	987944.80	2454.22	LOW CHORD
3487	421519.62	987944.46	2454.60	LOW CHORD
3488	421490.99	987942.24	2454.71	LOW CHORD
3489	421486.21	987941.90	2454.18	LOW CHORD
3490	421484.55	987941.70	2454.20	LOW CHORD
3491	421479.88	987941.33	2454.80	LOW CHORD
3492	421451.11	987939.11	2454.78	LOW CHORD
3493	421446.30	987938.77	2454.36	LOW CHORD
3494	421444.56	987938.58	2454.39	LOW CHORD
3495	421439.92	987938.21	2454.81	LOW CHORD
3496	421418.88	987936.59	2454.79	LOW CHORD
3497	421414.39	987936.18	2454.44	LOW CHORD
3498	421414.50	987936.02	2446.26	NG
3499	421431.02	987937.29	2446.11	NG
3500	421445.10	987938.28	2445.85	NG
3501	421465.45	987940.22	2445.55	NG
3502	421485.12	987941.53	2446.37	NG
3503	421498.70	987942.69	2445.04	FLOWLINE
3504	421525.00	987944.56	2446.49	NG
3505	421540.67	987946.14	2446.20	NG
3506	421556.23	987947.47	2446.72	NG
3507	421610.40	987880.31	2454.24	LOW CHORD
3508	421605.85	987879.96	2454.61	LOW CHORD
3509	421584.79	987878.31	2454.62	LOW CHORD
3510	421580.06	987877.96	2454.15	LOW CHORD
3511	421578.31	987877.81	2454.16	LOW CHORD
3512	421573.55	987877.47	2454.61	LOW CHORD
3513	421544.97	987875.19	2454.59	LOW CHORD
3514	421540.22	987874.84	2454.13	LOW CHORD
3515	421538.53	987874.74	2454.15	LOW CHORD
3516	421533.71	987874.34	2454.57	LOW CHORD
3517	421505.10	987872.09	2454.63	LOW CHORD
3518	421500.33	987871.72	2454.18	LOW CHORD
3519	421498.69	987871.61	2454.17	LOW CHORD
3520	421493.89	987871.24	2454.64	LOW CHORD
3521	421472.80	987869.55	2454.64	LOW CHORD
3522	421468.06	987869.16	2454.28	LOW CHORD
3523	421468.48	987868.88	2445.75	NG
3524	421483.25	987870.58	2445.81	NG
3525	421499.47	987871.80	2445.54	NG
3526	421519.21	987873.32	2445.54	NG
3527	421539.05	987874.70	2445.88	NG
3528	421548.68	987876.00	2444.75	FLOWLINE
3529	421559.43	987876.01	2445.50	NG
3530	421578.86	987877.57	2444.72	NG
3531	421595.00	987879.20	2444.73	NG
3532	421610.19	987880.35	2444.78	NG
3533	421643.06	987839.76	2453.72	LOW CHORD

REGISTERED LAND SURVEYOR
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I-19
POINT LIST
PIMA COUNTY, ARIZONA

DATE: JUNE 26, 2015
JOB NO: 5739
SHEET: 2 / 3

PointNo.	Northing(Y)	Easting(X)	Elev(Z)	Description
3534	421638.39	987839.40	2454.15	LOW CHORD
3535	421617.32	987837.76	2454.14	LOW CHORD
3536	421612.54	987837.41	2453.70	LOW CHORD
3537	421610.84	987837.22	2453.72	LOW CHORD
3538	421606.08	987836.91	2454.15	LOW CHORD
3539	421577.44	987834.64	2454.11	LOW CHORD
3540	421572.69	987834.30	2453.74	LOW CHORD
3541	421571.02	987834.09	2453.75	LOW CHORD
3542	421566.28	987833.75	2454.12	LOW CHORD
3543	421537.59	987831.55	2454.15	LOW CHORD
3544	421532.80	987831.19	2453.78	LOW CHORD
3545	421531.17	987830.97	2453.77	LOW CHORD
3546	421526.44	987830.66	2454.17	LOW CHORD
3547	421505.28	987828.98	2454.16	LOW CHORD
3548	421500.71	987828.63	2453.80	LOW CHORD
3549	421501.07	987828.45	2445.53	NG
3550	421515.41	987829.47	2445.65	NG
3551	421531.87	987830.93	2445.72	NG
3552	421551.61	987832.83	2444.59	NG
3553	421571.83	987834.15	2445.56	NG
3554	421592.02	987835.49	2445.65	NG
3555	421607.80	987836.94	2444.85	FLOWLINE
3556	421611.59	987837.15	2445.62	NG
3557	421629.08	987838.61	2444.84	NG
3558	421637.45	987838.03	2444.30	GB
3559	421642.84	987839.74	2445.03	NG
3564	422199.09	987850.29	2445.608	INV
3565	422216.05	987851.91	2445.356	INV
3566	422226.73	987838.76	2445.194	.C
3567	422226.21	987837.41	2445.178	.C
3568	422224.01	987832.84	2443.768	.C
3569	422223.26	987831.81	2443.896	.C
3570	422211.93	987830.68	2443.882	.C
3571	422211.82	987830.64	2443.405	.C
3572	422210.94	987830.55	2443.368	.C
3573	422210.86	987830.53	2443.939	.C
3574	422199.71	987829.50	2444.018	.C
3575	422199.08	987829.99	2443.777	.C
3576	422195.45	987833.99	2445.439	.C
3577	422194.81	987834.76	2445.431	..C
3578	422194.99	987835.19	2448.012	.WW
3579	422198.82	987850.24	2451.529	..WW
3580	422198.23	987850.36	2452.048	.HDWL
3581	422220.68	987852.55	2451.766	..HDWL
3582	422220.17	987852.35	2451.292	.WW
3583	422226.60	987839.05	2447.838	..WW
3584	422220.24	987880.87	2457.628	EP
3585	422195.33	987879.24	2457.544	EP

PointNo.	Northing(Y)	Easting(X)	Elev(Z)	Description
3586	422186.78	987828.20	2448.364	TOP
3587	422237.99	987832.83	2447.181	TOP
3588	422229.60	987832.56	2443.162	TOE
3589	422211.74	987829.59	2441.990	FL
3590	422195.65	987828.32	2442.109	TOE
3591	422203.10	988062.23	2446.936	INV
3592	422182.67	988060.66	2446.831	INV
3593	422172.16	988069.05	2450.888	.WW
3594	422182.19	988060.64	2452.725	..WW
3595	422181.73	988060.39	2453.761	.HDWL
3596	422203.82	988062.04	2453.863	..HDWL
3597	422203.39	988062.20	2452.906	.WW
3598	422211.93	988072.17	2451.402	..WW
3599	422206.05	988040.20	2457.658	EP
3600	422182.73	988038.37	2457.506	EP
3601	422213.36	988072.25	2450.841	TOP
3602	422211.96	988072.17	2451.392	WW
3603	422203.26	988073.37	2447.834	TOE
3604	422193.07	988071.93	2445.412	FL
3605	422187.24	988070.18	2447.236	TOE
3606	422170.98	988069.10	2450.382	TOP
3607	422172.20	988069.08	2450.910	WW

REGISTERED LAND SURVEYOR
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I-19
POINT LIST
PIMA COUNTY, ARIZONA

DATE: JUNE 26, 2015
JOB NO: 5739
SHEET: 3 / 3

DRAINAGE STRUCTURES

FROM NOGALES HWY TO I-19

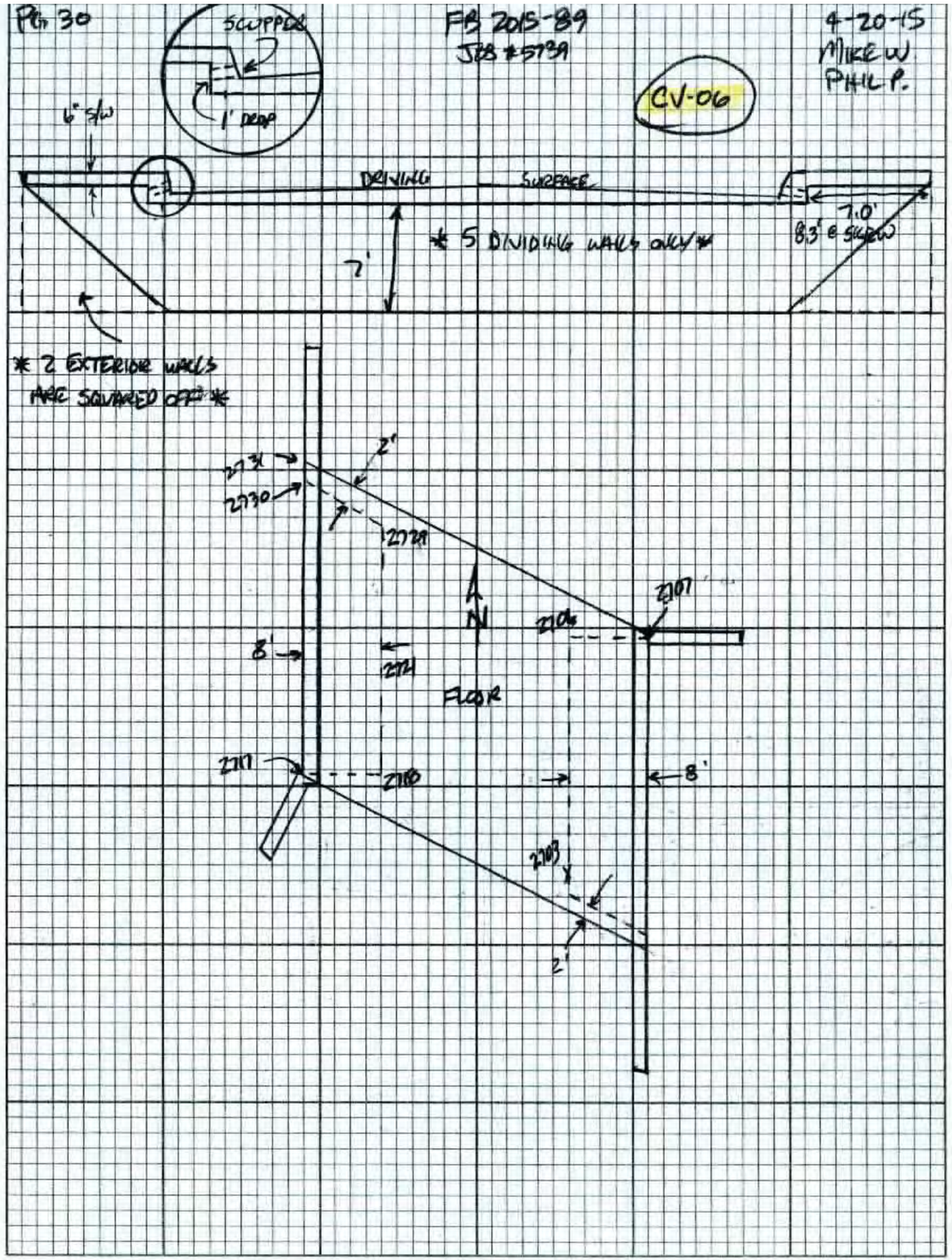
FOR

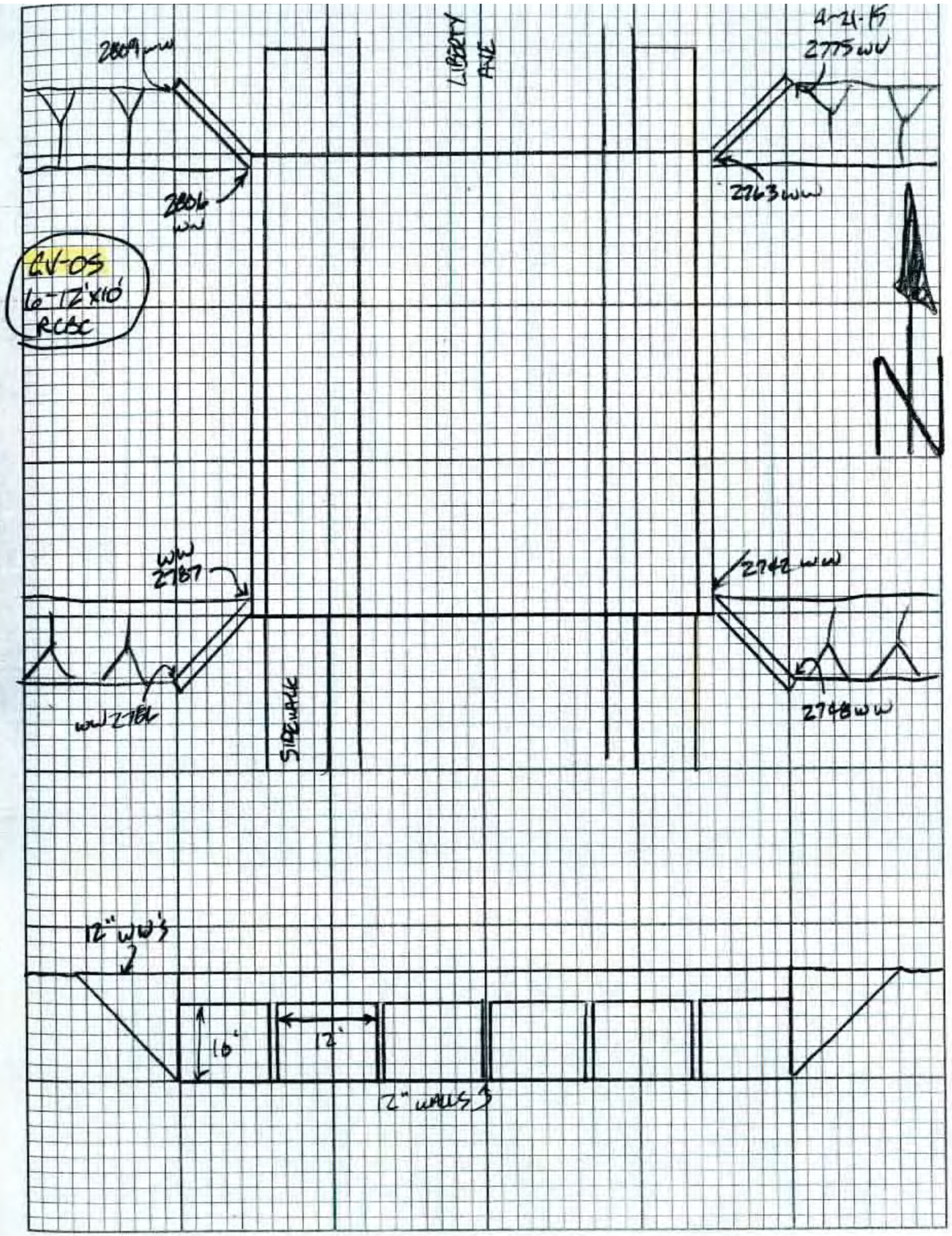
CULVERT IDs:
CV05, CV06, CV07, BR06 & BR07

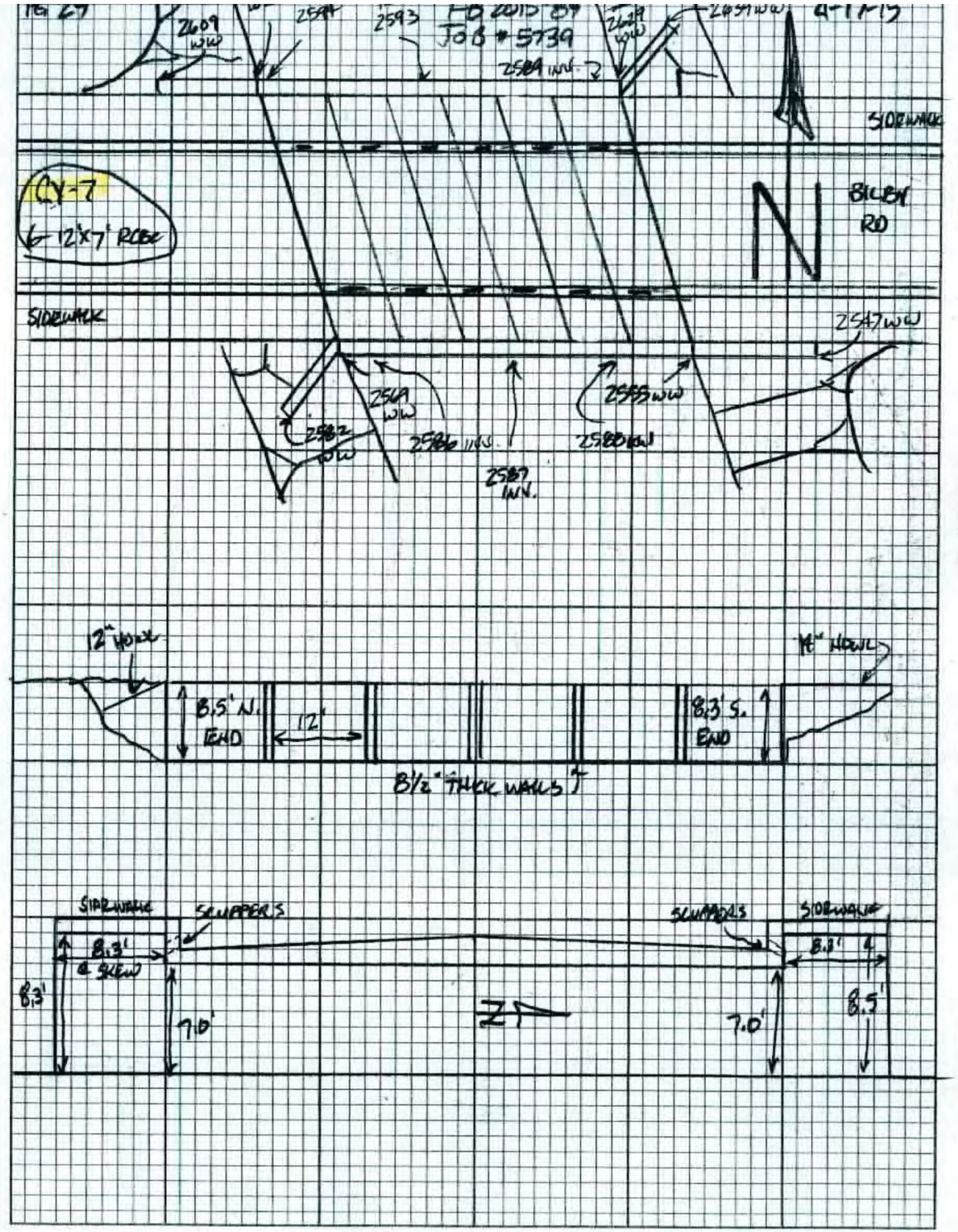
FB 2015-89
JOB #5739

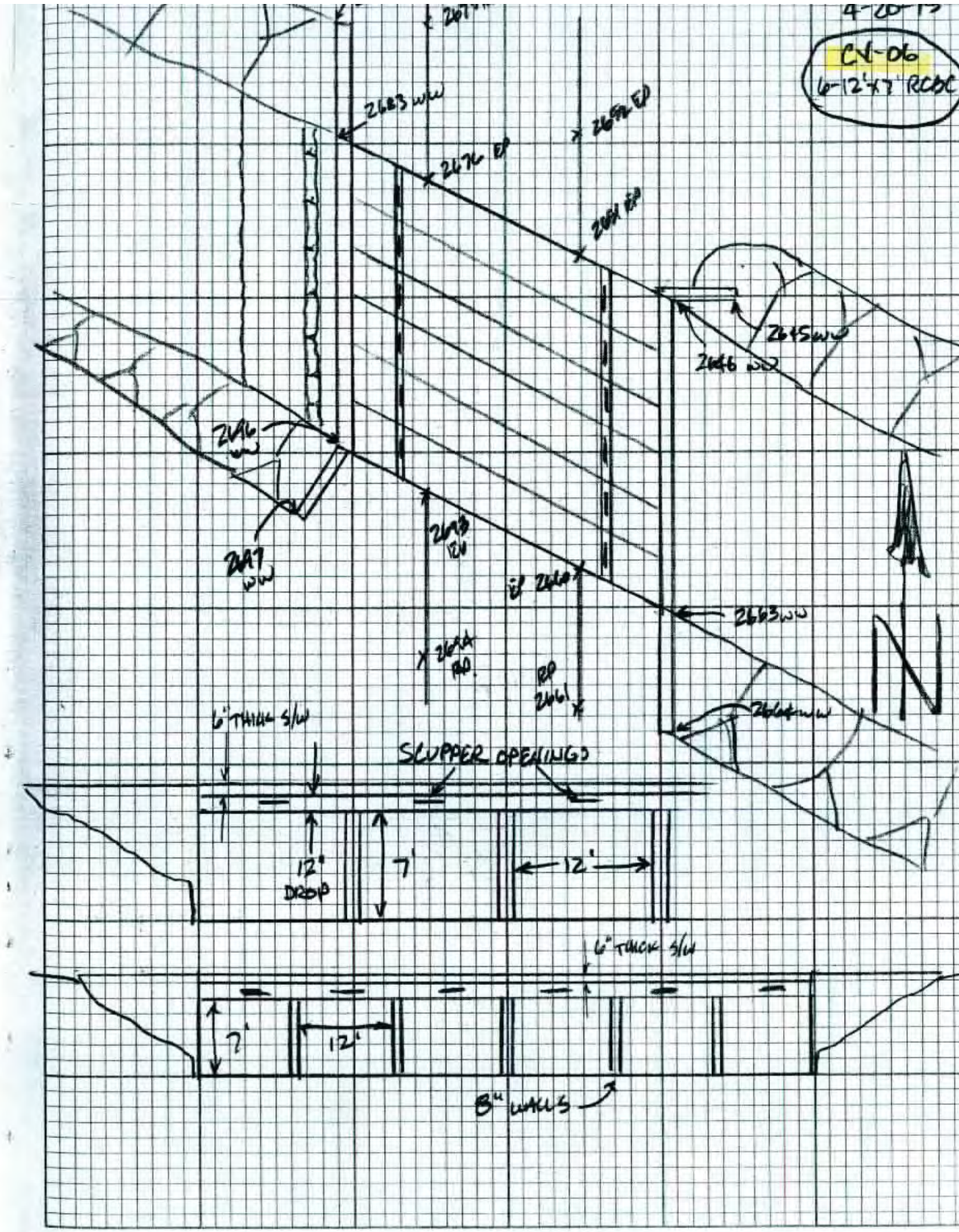
4-20-15
MIKE W
PHIL P.

CV-06



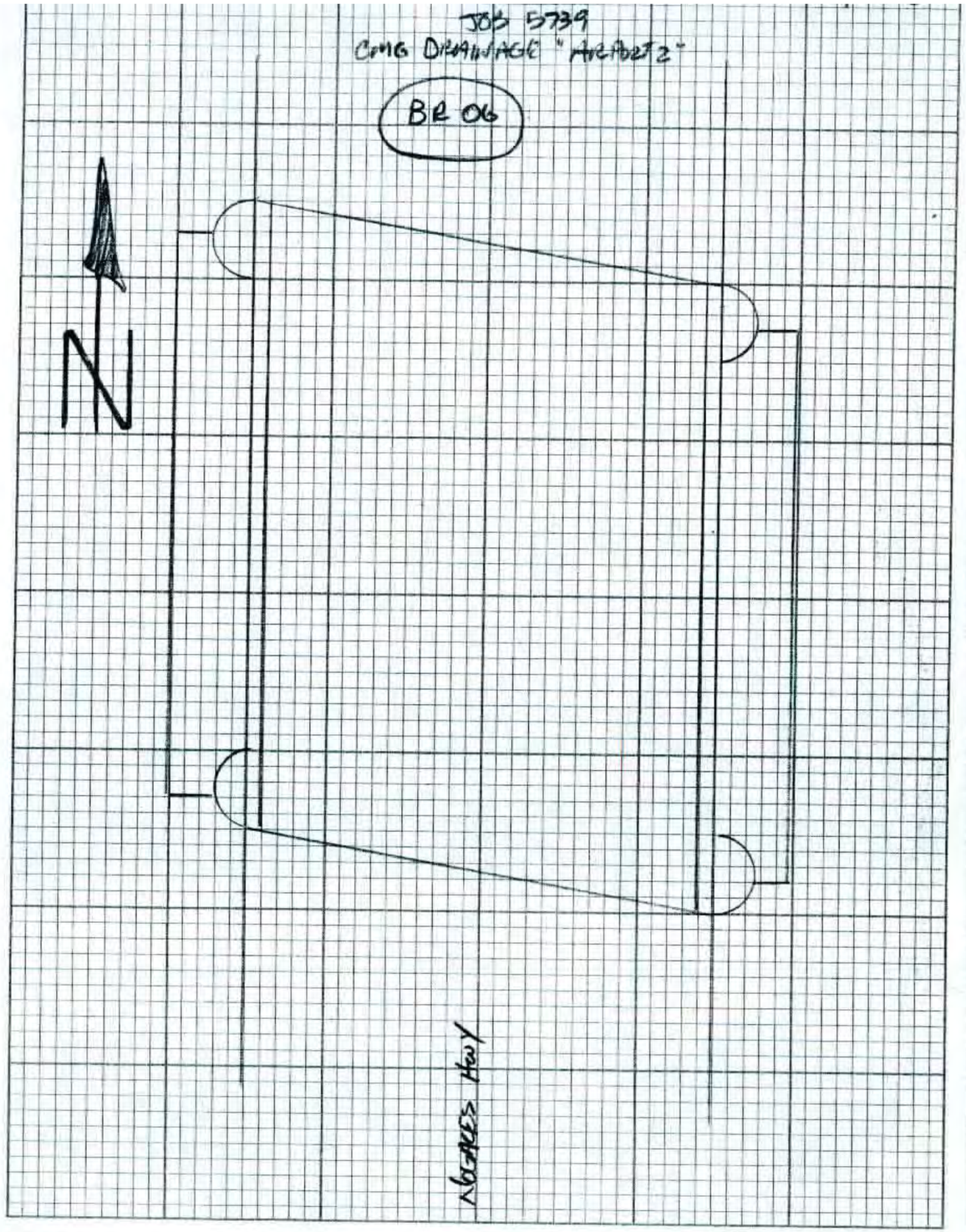


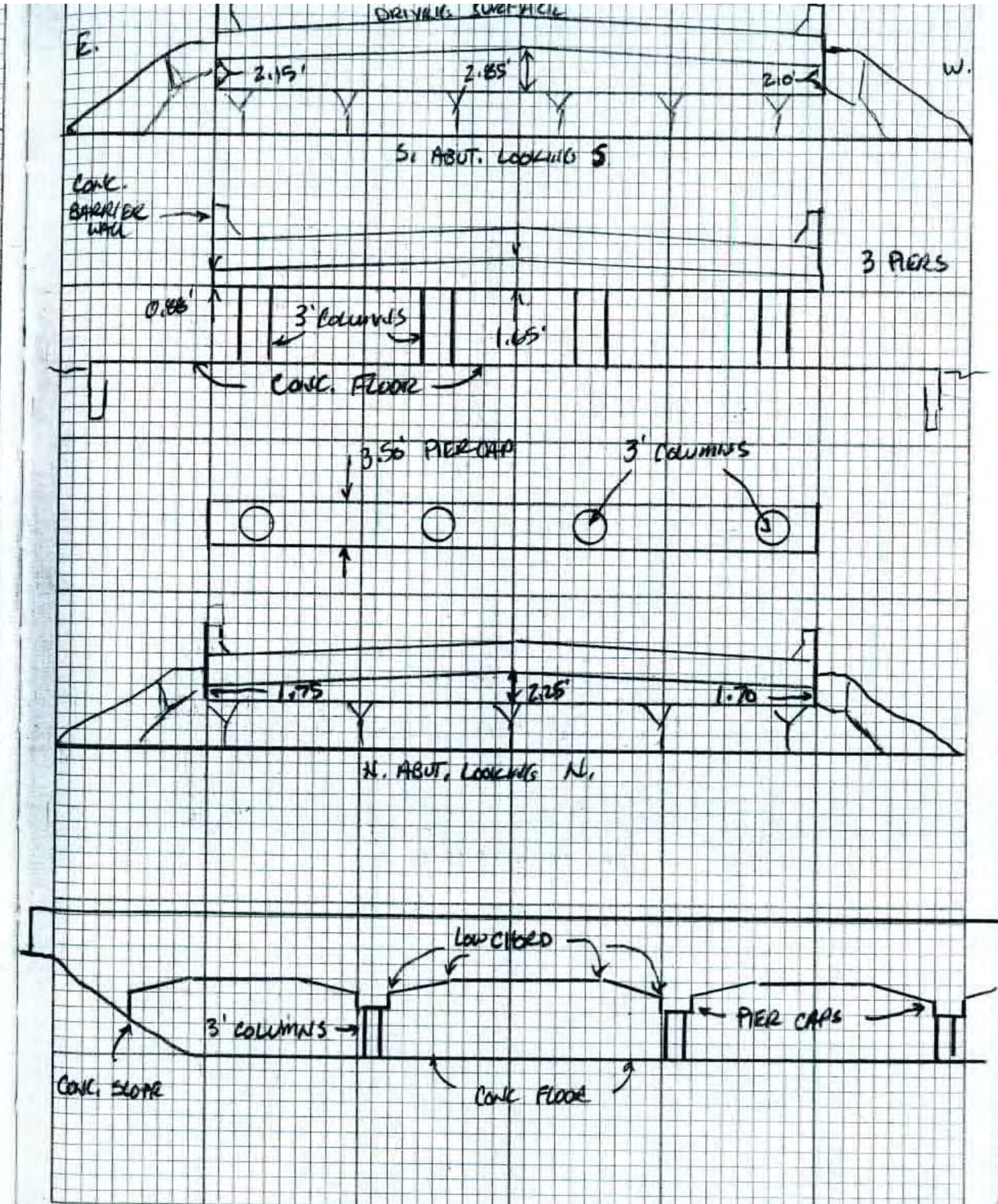

2609 WW
2593
Job # 5739
2589 WW
SIDEWALK
CY-7
6-12'x7' RCBC
BICBY RD
SIDEWALK
2547 WW
2569 WW
2582 WW
2586 WW
2587 WW
2585 WW
2580 WW
12" HOLE
8.5' N. END
12'
8.3' S. END
8½" THICK WALLS
SIDEWALK
SCUPPERS
8.3'
@ SKEW
8.3'
7.0'
SCUPPERS
SIDEWALK
8.3'
7.0'
8.5'


CY-06
6-12'x7' RCBC
2683 WW
2676 EP
2684 EP
2645 WW
2646 WW
2646 WW
2647 WW
2663 WW
2664 WW
6" THICK S/W
SCUPPER OPENINGS
12" DROP
7'
12'
6" THICK S/W
7'
12'
8" WALLS

JOB 5739
CONG DRAINAGE "AIRPORT 2"

BR 06





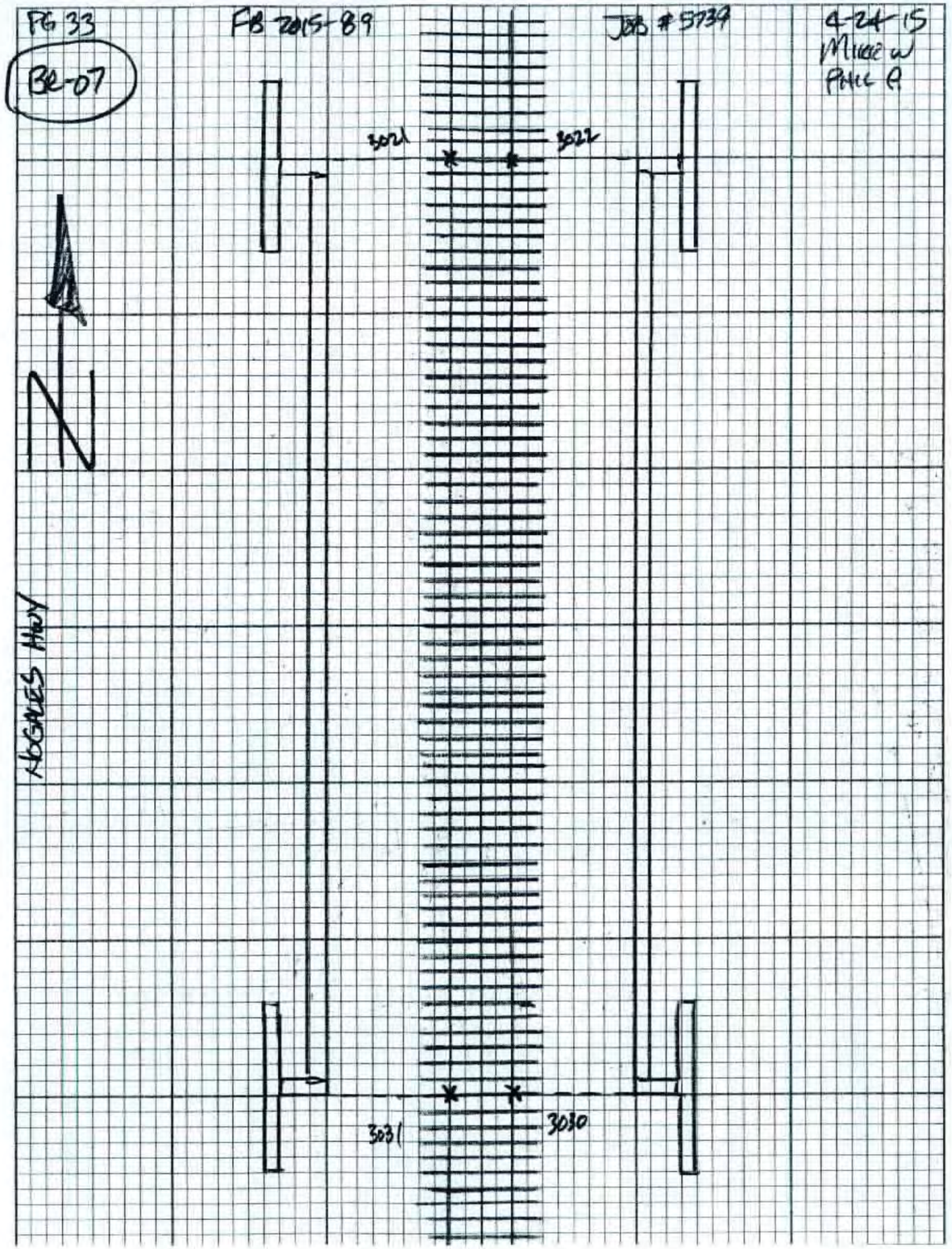
PG 33

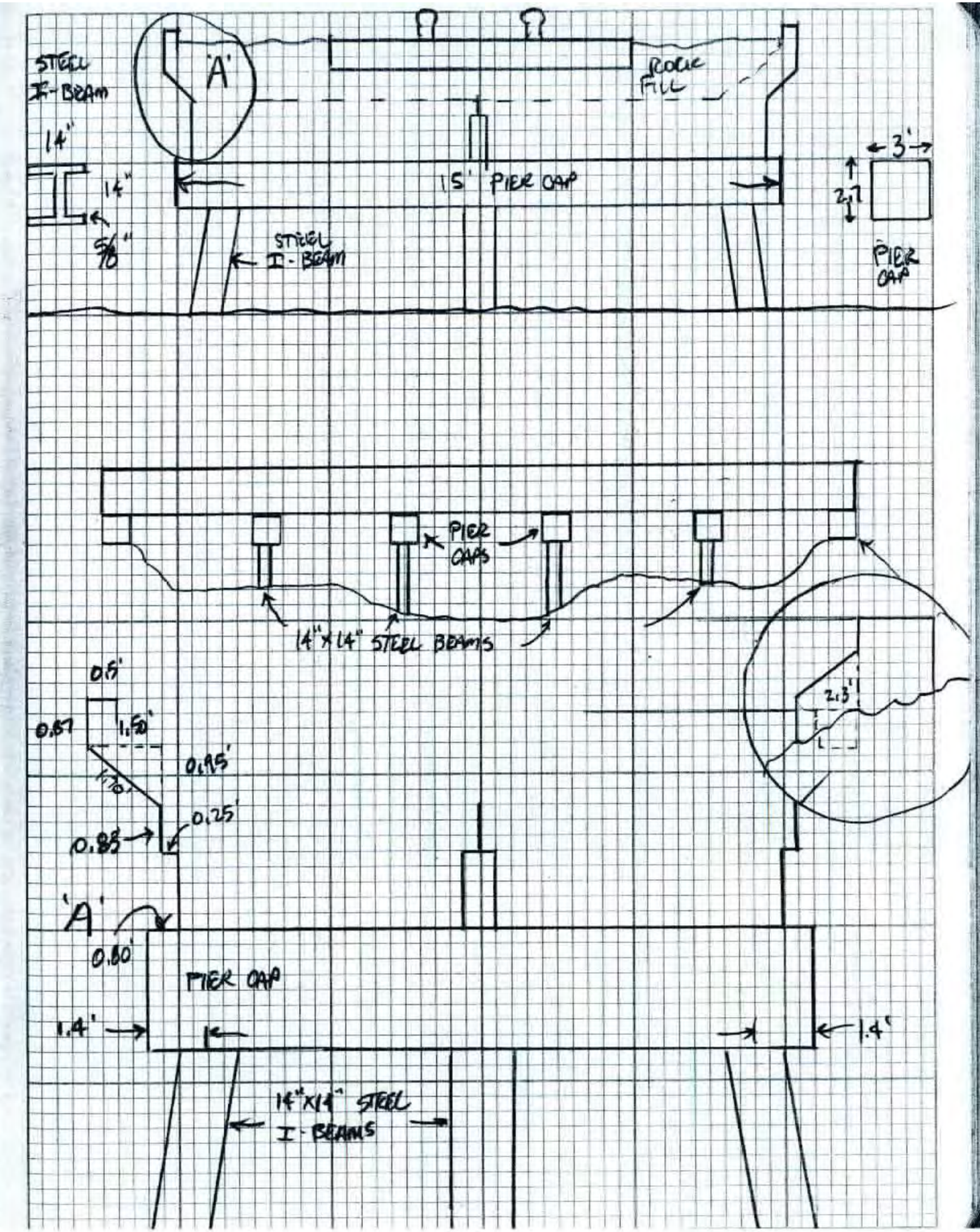
BR-07

FB 2015-89

JOB # 5739

4-24-15
Mike w
Pete P





PointNo.	Northing(Y)	Easting(X)	Elev(Z)	Description
3021	415520.19	995783.92	2528.79	RAIL
3022	415520.23	995788.94	2528.82	RAIL
3023	415519.94	995776.37	2528.51	.WW
3024	415515.16	995776.58	2528.52	.WW.HDWL
3025	415515.31	995778.17	2528.56	.HDWL
3026	415515.03	995776.57	2526.36	.WW
3027	415440.91	995779.11	2528.91	.HDWL
3028	415441.38	995785.21	2529.00	RAIL
3029	415441.48	995790.19	2529.00	RAIL
3030	415360.62	995791.38	2529.22	RAIL
3031	415360.55	995786.39	2529.18	RAIL
3032	415365.00	995780.42	2529.13	.HDWL
3033	415360.24	995779.00	2529.15	.WW1
3034	415365.02	995778.84	2529.15	.WW1..HDWL
3035	415365.16	995778.86	2526.95	.WW1
3036	415360.89	995798.91	2529.08	.WW2
3037	415365.62	995798.71	2529.15	.WW2.HDWL
3038	415365.87	995798.61	2526.97	.WW2
3039	415365.51	995797.22	2529.14	.HDWL
3040	415440.58	995796.08	2528.89	.HDWL
3041	415515.81	995794.94	2528.54	.HDWL
3042	415520.57	995796.27	2528.51	.WW3
3043	415515.81	995796.43	2528.54	.WW3..HDWL
3044	415515.67	995796.45	2526.37	.WW3
3045	415520.60	995796.43	2526.70	NG
3046	415532.65	995795.95	2526.78	NG
3047	415513.60	995795.70	2524.02	.ABUTMENT
3048	415512.08	995796.47	2524.05	..WW3
3049	415511.47	995776.71	2524.05	..WW
3050	415513.04	995777.42	2524.02	..ABUTMENT
3051	415519.95	995776.25	2526.13	NG
3052	415531.75	995775.94	2526.76	NG
3053	415533.16	995761.80	2526.68	NG
3054	415521.62	995761.43	2526.39	TOP
3055	415520.46	995811.70	2526.81	TOP
3056	415535.24	995812.38	2526.22	NG
3057	415360.76	995798.95	2526.83	NG
3058	415346.39	995799.05	2527.44	NG
3059	415345.54	995813.69	2526.45	NG
3060	415359.86	995814.85	2526.02	TOP
3061	415369.30	995798.58	2524.65	..WW2
3062	415367.75	995797.84	2524.59	.ABUTMENT
3063	415367.19	995779.56	2524.60	..ABUTMENT
3064	415368.69	995778.69	2524.62	..WW1
3065	415360.25	995778.90	2527.02	NG
3066	415346.28	995779.10	2526.96	NG
3067	415352.56	995765.07	2526.09	NG
3068	415362.25	995763.86	2525.92	TOP
3069	415390.04	995761.04	2517.27	TOE
3070	415387.78	995778.26	2517.61	TOE
3071	415427.91	995777.27	2517.04	TOP
3072	415429.63	995759.56	2516.61	TOP
3073	415438.91	995759.63	2514.96	TOE
3074	415438.29	995777.03	2514.94	TOE
3075	415453.53	995761.86	2513.29	FL
3076	415449.91	995774.50	2513.19	FL
3077	415454.69	995775.65	2513.15	TOE
3078	415458.73	995761.62	2513.57	TOE
3079	415466.32	995761.47	2516.04	TOP
3080	415461.53	995776.13	2515.05	TOP
3081	415476.93	995776.40	2514.64	GB
3082	415482.14	995762.21	2515.23	GB
3083	415495.97	995760.75	2517.53	TOE
3084	415492.67	995776.03	2517.20	TOE
3085	415485.74	995807.93	2517.59	TOE
3086	415488.49	995798.89	2517.56	TOE
3087	415468.04	995807.13	2517.17	TOP
3088	415474.22	995798.12	2517.04	TOP
3089	415448.25	995814.95	2513.44	FL
3090	415450.25	995801.85	2513.23	FL
3091	415434.69	995801.19	2514.68	TOE
3092	415427.16	995815.34	2514.82	TOE
3093	415403.04	995814.26	2517.25	GB
3094	415422.35	995802.65	2517.18	TOP
3095	415389.93	995798.64	2517.26	TOE
3096	415513.00	995779.74	2524.05	LOW CHORD
3097	415486.69	995779.44	2521.44	BOTTOM OF PIERCAP
3098	415483.81	995779.46	2521.41	BOTTOM OF PIERCAP
3099	415485.40	995780.01	2516.50	STEEL BEAM/NG
3100	415455.37	995780.04	2513.30	STEEL BEAM/NG
3101	415455.53	995787.18	2512.84	STEEL BEAM/NG
3102	415456.65	995779.89	2521.54	BOTTOM OF PIERCAP
3103	415453.79	995779.98	2521.53	BOTTOM OF PIERCAP
3104	415440.13	995780.92	2524.36	LOW CHORD
3105	415426.74	995780.40	2521.64	BOTTOM OF PIERCAP
3106	415423.77	995780.45	2521.65	BOTTOM OF PIERCAP
3107	415425.36	995781.66	2516.83	STEEL BEAM/NG
3108	415425.39	995787.83	2516.83	STEEL BEAM/NG

T. Wayne Ashby

REGISTERED LAND SURVEYOR
CERTIFICATE NO.
19316
T. WAYNE
ASHBY
Date Signed 06/26/2015
ARIZONA U.S.A.

EXPIRES 3/31/2017

Ashby
SURVEYING & DRAFTING, INC.
717 N. SWAN ROAD
TUCSON, ARIZONA 85711
TEL: (520) 325-1991 · FAX: (520) 325-2074

NOGALES HIGHWAY
POINT LIST
PIMA COUNTY, ARIZONA

DATE: JUNE 26, 2015
JOB NO: 5739
SHEET: 1 / 7

PointNo.	Northing(Y)	Easting(X)	Elev(Z)	Description
3109	415395.45	995788.32	2516.53	STEEL BEAM/NG
3110	415395.34	995781.25	2516.94	STEEL BEAM/NG
3111	415396.71	995780.79	2521.78	BOT OF PIERCAP
3112	415393.85	995780.87	2521.75	BOT OF PIERCAP
3113	415367.35	995781.97	2524.62	LOW CHORD
3114	415513.46	995793.31	2524.02	LOW CHORD
3115	415486.90	995794.44	2521.42	BOT OF PIERCAP
3116	415484.01	995794.50	2521.40	BOT OF PIERCAP
3117	415485.68	995794.22	2516.91	STEEL BEAM/NG
3118	415485.50	995787.19	2516.52	STEEL BEAM/NG
3119	415455.58	995794.47	2513.24	STEEL BEAM/NG
3120	415457.05	995794.93	2521.53	BOT OF PIERCAP
3121	415454.13	995794.94	2521.51	BOT OF PIERCAP
3122	415440.74	995794.40	2524.34	LOW CHORD
3123	415427.10	995795.35	2521.64	BOT OF PIERCAP
3124	415424.15	995795.45	2521.63	BOT OF PIERCAP
3125	415425.61	995794.95	2515.84	STEEL BEAM/NG
3126	415397.10	995795.82	2521.74	BOT OF PIERCAP
3127	415394.22	995795.84	2521.74	BOT OF PIERCAP
3128	415395.60	995795.46	2517.19	STEEL BEAM/NG
3129	415367.80	995795.56	2524.58	LOW CHORD
2401	415386.165	995659.387	2524.127	NG WALL
2402	415386.959	995659.218	2527.574	.HDWL
2403	415374.045	995660.257	2524.950	.EP
2404	415385.903	995658.167	2524.763	.EP
2405	415394.829	995621.152	2525.342	.EP
2406	415404.791	995585.291	2524.503	.EP
2407	415390.040	995584.784	2524.617	..EP
2408	415405.899	995583.707	2527.211	.HDWL1
2409	415404.759	995583.655	2524.154	NG WALL
2410	415411.938	995583.360	2524.049	.C
2411	415411.792	995581.412	2524.013	.C.C1
2412	415411.539	995575.948	2521.391	..C
2413	415415.036	995581.230	2523.979	.C1- TOP
2414	415416.642	995583.422	2523.934	..C1 TOP
2415	415379.776	995621.295	2525.404	PVMT
2416	415493.434	995583.977	2524.140	CONC
2417	415484.792	995619.388	2524.918	CONC
2418	415474.464	995656.210	2524.306	CONC
2419	415561.724	995656.363	2526.767	..HDWL
2420	415562.933	995656.414	2523.653	NG WALL
2421	415578.664	995654.947	2523.926	.EP
2422	415562.938	995654.791	2524.034	.EP
2423	415572.525	995619.074	2524.633	.EP
2424	415588.164	995618.263	2524.657	PVMT
2425	415581.878	995582.199	2523.963	.EP
2426	415581.773	995580.902	2523.631	NG WALL
2427	415580.642	995581.158	2526.795	..HDWL1
2428	415601.644	995580.217	2523.969	..EP
2429	415575.576	995581.033	2523.381	.C
2430	415575.320	995577.942	2523.233	.C.C1
2431	415574.434	995570.482	2520.124	..C
2432	415571.756	995578.395	2523.190	.C1- TOP
2433	415570.358	995581.072	2523.320	..C1 TOP
2434	415555.967	995656.795	2523.804	.C
2435	415555.721	995659.083	2523.404	.C.C1
2436	415552.847	995658.927	2523.310	.C1- TOP
2437	415551.586	995656.892	2523.415	..C1 TOP
2438	415555.718	995661.021	2522.567	.C
2439	415545.691	995660.276	2520.240	.C
2440	415540.373	995657.282	2518.529	..C
2441	415558.180	995674.636	2520.999	NG
2442	415523.740	995677.230	2517.094	NG
2443	415482.982	995677.599	2515.501	.C
2444	415431.717	995678.451	2515.610	..C
2445	415381.013	995679.345	2521.480	NG
2446	415398.654	995679.364	2520.863	GB
2447	415393.587	995659.418	2523.527	.C
2448	415393.374	995662.048	2523.313	.C.C1
2449	415396.600	995661.179	2523.286	.C1- TOP
2450	415397.483	995659.256	2523.519	..C1 TOP
2451	415404.230	995664.104	2519.554	.C
2452	415408.688	995659.444	2518.073	..C
2453	415404.087	995658.837	2520.401	CONC/ABUT
2454	415404.095	995658.839	2522.556	LOW CHORD
2455	415408.230	995658.749	2522.857	LOW CHORD
2456	415428.428	995658.475	2522.789	LOW CHORD
2457	415432.438	995658.419	2522.380	LOW CHORD
2458	415432.605	995658.357	2521.511	BOT OF PIERCAP
2459	415436.081	995658.260	2521.501	BOT OF PIERCAP
2460	415436.214	995658.349	2522.368	LOW CHORD
2461	415440.286	995658.258	2522.719	LOW CHORD
2462	415468.483	995657.822	2522.617	LOW CHORD
2463	415472.557	995657.784	2522.235	LOW CHORD
2464	415472.640	995657.718	2521.359	BOT OF PIERCAP
2465	415476.128	995657.708	2521.350	BOT OF PIERCAP
2466	415476.305	995657.732	2522.218	LOW CHORD
2467	415480.317	995657.669	2522.596	LOW CHORD

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NOGALES HIGHWAY
POINT LIST
PIMA COUNTY, ARIZONA

DATE: JUNE 26, 2015
JOB NO: 5739
SHEET: 2 / 7

PointNo.	Northing(Y)	Easting(X)	Elev(Z)	Description
2468	415508.437	995657.210	2522.503	LOW CHORD
2469	415512.543	995657.133	2522.059	LOW CHORD
2470	415512.582	995657.079	2521.185	BOT OF PIERCAP
2471	415516.126	995657.046	2521.205	BOT OF PIERCAP
2472	415516.280	995657.088	2522.092	LOW CHORD
2473	415520.288	995657.034	2522.458	LOW CHORD
2474	415540.618	995656.728	2522.400	LOW CHORD
2475	415544.703	995656.649	2521.926	LOW CHORD
2476	415544.705	995656.648	2520.255	CONC/ABUT
2477	415445.704	995620.635	2523.175	LOW CHORD
2478	415449.753	995620.587	2523.447	LOW CHORD
2479	415477.927	995620.127	2523.348	LOW CHORD
2480	415481.919	995620.050	2523.001	LOW CHORD
2481	415435.811	995652.058	2515.546	COLUMM 3.0
2482	415441.028	995631.936	2515.564	COLUMM 3.0
2483	415446.878	995609.454	2515.608	COLUMM 3.0
2484	415451.758	995589.317	2515.583	COLUMM 3.0
2485	415491.600	995588.769	2515.484	COLUMM 3.0
2486	415486.714	995608.593	2515.523	COLUMM 3.0
2487	415481.011	995631.323	2515.537	COLUMM 3.0
2488	415475.989	995651.420	2515.544	COLUMM 3.0
2489	415515.842	995650.889	2516.228	COLUMM 3.0
2490	415521.151	995630.701	2516.690	COLUMM 3.0
2491	415526.682	995608.154	2516.597	COLUMM 3.0
2492	415531.618	995588.133	2515.845	COLUMM 3.0
2493	415493.609	995657.224	2515.532	TOE
2494	415503.569	995657.313	2517.693	TOP
2495	415516.508	995620.060	2516.708	TOP
2496	415502.545	995619.901	2515.579	TOE
2497	415521.907	995619.430	2522.881	LOW CHORD
2498	415517.853	995619.459	2523.197	LOW CHORD
2499	415433.072	995658.517	2515.590	CONC
2500	415413.550	995621.192	2523.106	LOW CHORD
2501	415417.513	995621.183	2523.540	LOW CHORD
2502	415437.850	995620.840	2523.523	LOW CHORD
2503	415441.860	995620.743	2523.156	LOW CHORD
2504	415433.361	995583.577	2515.525	TOE/CONC
2505	415432.162	995575.472	2515.524	TOE/CONC-
2506	415425.866	995568.042	2515.284	TOE/CONC
2507	415430.898	995563.014	2515.380	.CONC
2508	415496.961	995562.354	2515.516	.CONC
2509	415529.176	995561.939	2515.484	..CONC
2510	415423.032	995583.453	2520.517	CONC/ABUT
2511	415422.974	995583.514	2522.357	LOW CHORD
2512	415427.009	995583.456	2522.767	LOW CHORD
2513	415447.414	995583.163	2522.675	LOW CHORD
2514	415451.408	995583.099	2522.336	LOW CHORD
2515	415451.544	995583.115	2521.456	BOT OF PIERCAP
2516	415455.072	995583.003	2521.424	BOT OF PIERCAP
2517	415455.272	995583.046	2522.294	LOW CHORD

PointNo.	Northing(Y)	Easting(X)	Elev(Z)	Description
2518	415459.262	995582.958	2522.614	LOW CHORD
2519	415487.282	995582.528	2522.514	LOW CHORD
2520	415491.404	995582.460	2522.178	LOW CHORD
2521	415491.486	995582.473	2521.322	BOT OF PIERCAP
2522	415494.938	995582.416	2521.269	BOT OF PIERCAP
2523	415495.090	995582.395	2522.127	LOW CHORD
2524	415499.089	995582.340	2522.456	LOW CHORD
2525	415527.288	995581.930	2522.389	LOW CHORD
2526	415531.427	995581.860	2522.071	LOW CHORD
2527	415531.510	995581.901	2521.203	BOT OF PIERCAP
2528	415534.970	995581.866	2521.135	BOT OF PIERCAP
2529	415535.092	995581.813	2522.011	LOW CHORD
2530	415539.155	995581.740	2522.354	LOW CHORD
2531	415559.596	995581.428	2522.316	LOW CHORD
2532	415563.709	995581.353	2521.852	LOW CHORD
2533	415563.807	995581.268	2520.143	CONC/ABUT
2534	415554.579	995581.252	2516.118	TOE/CONC
2535	415533.692	995581.626	2516.267	TOP
2536	415520.179	995581.290	2515.498	TOE
2537	415485.789	995620.039	2523.078	LOW CHORD
2538	415489.796	995619.942	2523.369	LOW CHORD
2539	415525.777	995619.346	2522.963	LOW CHORD
2540	415529.738	995619.232	2523.264	LOW CHORD
2541	415550.072	995618.900	2523.183	LOW CHORD
2542	415554.066	995618.857	2522.713	LOW CHORD
2543	415538.238	995561.587	2516.308	TOP
2544	415559.769	995562.989	2516.987	GB
2545	415563.986	995568.950	2517.388	TOE/CONC-
2546	416394.527	994366.032	2509.514	TOP
2547	416406.713	994368.202	2510.736	.WW
2548	416394.512	994380.910	2509.764	NG
2549	416408.214	994380.524	2510.650	.SW
2550	416414.366	994380.296	2510.506	.TBC
2551	416415.107	994380.435	2510.020	.EP
2552	416414.575	994350.124	2509.622	.EP
2553	416416.415	994348.824	2509.710	.EP
2554	416413.783	994350.422	2510.385	..TBC
2555	416406.601	994353.960	2510.588	.C.C1..WW

REGISTERED LAND SURVEYOR
CERTIFICATE NO.
19316
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ASHBY
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EXPIRES 3/31/2017

Ashby
SURVEYING & DRAFTING, INC.
717 N. SWAN ROAD
TUCSON, ARIZONA 85711
TEL: (520) 325-1991 · FAX: (520) 325-2074

NOGALES HIGHWAY
POINT LIST
PIMA COUNTY, ARIZONA

DATE: JUNE 26, 2015
JOB NO: 5739
SHEET: 3 / 7

PointNo.	Northing(Y)	Easting(X)	Elev(Z)	Description
2556	416414.179	994350.066	2510.389	.C1
2557	416407.689	994353.507	2510.571	..SW
2558	416414.545	994345.605	2509.452	GUT
2559	416415.750	994308.151	2509.537	.EP
2560	416413.911	994308.308	2509.366	GUT
2561	416405.872	994308.103	2510.423	.C
2562	416413.578	994308.315	2510.273	.C1
2563	416413.320	994269.171	2509.195	GUT
2564	416414.876	994263.641	2509.443	.EP
2565	416413.245	994264.184	2509.203	.EP
2566	416412.833	994264.374	2510.145	.C1
2567	416412.392	994264.626	2510.069	.TBC
2568	416405.147	994269.282	2510.214	.C
2569	416404.603	994268.726	2510.132	..C..C1.WW
2570	416407.193	994267.362	2510.182	.SW.C
2571	416407.079	994260.912	2510.223	.SW.C
2572	416406.467	994260.923	2510.211	.SW.C
2573	416406.236	994248.986	2510.153	..SW
2574	416412.173	994248.839	2510.126	..TBC
2575	416412.847	994248.811	2509.452	..EP
2576	416403.988	994261.107	2510.161	.C
2577	416403.856	994261.102	2509.617	.C TOP_GUNITE
2578	416403.091	994259.486	2509.742	.C- TOP_GUNITE
2579	416393.704	994249.756	2509.360	NG
2580	416397.391	994259.823	2509.238	.C TOP_GUNITE
2581	416387.942	994263.856	2508.514	..C TOP_GUNITE
2582	416399.392	994263.683	2506.502	..WW
2583	416387.362	994344.176	2502.183	TOE
2584	416382.611	994323.281	2502.567	NG
2585	416393.039	994275.217	2500.842	TOE/CONC
2586	416405.078	994269.628	2501.179	INV
2587	416405.422	994310.662	2501.319	INV
2588	416406.235	994341.811	2501.467	INV
2589	416469.908	994315.928	2500.737	INV
2590	416483.424	994315.816	2502.262	TOE/CONC
2591	416486.315	994269.994	2498.974	NG
2592	416470.098	994279.554	2498.850	NG
2593	416469.382	994279.694	2500.752	INV
2594	416468.756	994237.586	2500.455	INV
2595	416469.036	994237.039	2498.363	TOE CONC
2596	416468.744	994234.626	2501.896	GB
2597	416484.779	994226.846	2501.028	GB
2598	416485.300	994227.308	2498.849	TOE/CONC
2599	416438.529	994337.605	2509.981	PVMT
2600	416438.057	994289.126	2509.773	PVMT
2601	416437.132	994251.988	2509.706	PVMT
2602	416436.136	994224.349	2509.710	PVMT
2603	416460.045	994209.785	2509.063	.EP
2604	416460.746	994209.798	2509.571	.TBC
2605	416466.911	994211.445	2509.729	.SW
2606	416481.311	994203.345	2508.963	NG
2607	416481.364	994215.423	2508.774	TOP/CONC
2608	416468.541	994221.698	2509.186	TOE/CONC
2609	416468.237	994222.246	2509.625	.WW
2610	416467.293	994236.874	2509.618	..SW
2611	416468.332	994236.286	2509.667	.C.C1..WW
2612	416461.192	994239.924	2509.425	..TBC
2613	416460.830	994240.287	2509.514	.C1
2614	416460.474	994240.477	2508.923	.EP
2615	416458.625	994241.581	2508.845	.EP
2616	416460.463	994244.555	2508.700	GUT
2617	416459.323	994282.230	2509.039	.EP
2618	416461.052	994282.028	2508.836	GUT
2619	416461.498	994282.116	2509.683	.C1
2620	416469.190	994282.232	2509.924	.C
2621	416462.193	994325.832	2509.900	.C1
2622	416461.668	994321.163	2508.906	GUT
2623	416460.000	994326.993	2509.287	.EP
2624	416461.921	994326.028	2509.088	.EP
2625	416462.704	994325.750	2509.871	.TBC
2626	416462.126	994337.177	2509.399	..EP
2627	416462.802	994337.238	2509.933	..TBC
2628	416469.802	994320.989	2510.063	.C
2629	416470.500	994321.638	2509.774	..C..C1.WW
2630	416467.836	994323.071	2509.997	.SW.C
2631	416467.946	994329.461	2510.057	.SW.C
2632	416468.945	994329.316	2510.012	.SW.C
2633	416471.079	994329.267	2510.024	..C
2634	416471.042	994329.369	2509.547	TOP/CONC
2635	416468.841	994336.302	2510.057	..SW
2636	416474.831	994331.829	2509.107	TOP/CONC
2637	416485.353	994339.785	2509.818	NG
2638	416482.738	994327.305	2508.846	TOP/CONC
2639	416475.501	994326.445	2506.369	..WW
2640	416915.15	993669.83	2504.09	NG
2641	416907.15	993668.93	2504.28	CONC
2642	416906.49	993669.02	2504.26	.C TOP GUNITE
2643	416906.14	993663.00	2504.44	.C- TOP GUNITE
2644	416903.70	993660.34	2504.48	..C TOP GUNITE

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POINT LIST
PIMA COUNTY, ARIZONA

DATE: JUNE 26, 2015

JOB NO: 5739

SHEET: 4 / 7

PointNo.	Northing(Y)	Easting(X)	Elev(Z)	Description
2645	416902.81	993663.57	2504.75	.WW
2646	416902.70	993655.53	2504.78	..WW.C
2647	416903.71	993663.55	2504.69	.WW.C1
2648	416903.58	993655.59	2504.73	..WW.C1
2649	416907.85	993647.77	2504.62	.C1
2650	416908.08	993647.52	2504.10	.EP
2651	416911.18	993640.95	2504.12	.EP
2652	416928.26	993640.73	2503.97	..EP
2653	416902.07	993647.57	2504.01	GUT
2654	416863.57	993648.25	2504.13	GUT
2655	416863.62	993648.45	2504.69	.C1
2656	416862.92	993656.23	2504.79	.C
2657	416823.98	993648.80	2504.18	GUT
2658	416819.00	993649.08	2504.83	.C1
2659	416818.79	993649.00	2504.35	.EP
2660	416822.67	993642.52	2504.40	.EP
2661	416807.31	993642.96	2504.37	..EP
2662	416815.06	993656.08	2505.01	..C1.WW1
2663	416815.56	993656.92	2505.01	..C.WW
2664	416803.57	993657.12	2505.03	.WW
2665	416803.56	993656.27	2505.00	..WW..WW1
2666	416786.30	993669.40	2504.70	NG
2667	416797.22	993676.75	2504.14	TOP
2668	416801.55	993657.19	2504.69	TOP
2669	416787.13	993656.25	2504.52	NG
2670	416809.80	993625.54	2504.48	PVMT
2671	416830.57	993624.97	2504.49	PVMT
2672	416879.10	993624.02	2504.23	PVMT
2673	416921.99	993623.43	2504.19	PVMT
2674	416945.52	993623.06	2503.97	PVMT
2675	416949.43	993606.10	2503.63	.EP
2676	416931.70	993606.46	2503.86	.EP
2677	416929.95	993599.21	2503.50	GUT
2678	416950.40	993590.92	2504.01	.WW.WW1
2679	416950.42	993591.76	2504.09	.WW1
2680	416950.45	993590.89	2503.30	.C TOP GUNITE
2681	416952.25	993590.20	2503.39	.C TOP GUNITE
2682	416957.72	993576.89	2503.10	..C TOP GUNITE
2683	416938.32	993591.06	2504.10	..WW.C
2684	416938.38	993592.10	2504.20	.C1..WW1
2685	416935.25	993599.01	2503.68	..EP
2686	416935.17	993598.89	2504.18	.C1
2687	416889.97	993599.57	2504.37	.C1
2688	416890.05	993599.86	2503.70	GUT
2689	416890.93	993591.74	2504.34	.C
2690	416851.99	993600.43	2503.87	GUT
2691	416846.06	993600.33	2504.11	.EP
2692	416846.05	993600.24	2504.63	.C1
2693	416842.31	993608.22	2504.07	.EP
2694	416823.85	993608.63	2504.17	..EP
2695	416850.34	993592.83	2504.54	..C1.WW1

PointNo.	Northing(Y)	Easting(X)	Elev(Z)	Description
2696	416851.49	993592.44	2504.51	..C.WW
2697	416841.18	993586.56	2504.63	.WW
2698	416840.77	993587.40	2504.55	..WW..WW1
2699	416841.20	993586.47	2504.07	.C TOP GUNITE
2700	416847.18	993576.54	2503.96	..C TOP GUNITE
2701	416833.71	993572.47	2503.46	NG
2702	416827.54	993590.29	2504.25	NG
2703	416822.51	993648.72	2496.15	.FLOOR
2704	416820.30	993649.70	2503.24	LOW CHORD
2705	416905.95	993648.36	2502.95	LOW CHORD
2706	416902.65	993647.59	2495.86	.FLOOR
2707	416902.59	993655.34	2496.02	..FLOOR
2708	416897.51	993675.41	2498.02	TOE/CONC
2709	416851.97	993667.87	2495.46	NG
2710	416816.82	993668.99	2498.23	TOE
2711	416815.62	993656.99	2498.41	TOE
2712	416851.00	993591.88	2496.92	GB
2713	416852.21	993591.48	2494.18	CONC
2714	416852.97	993589.48	2494.46	.TOP/CONC
2715	416854.62	993588.82	2491.72	.TOE/CONC
2716	416848.08	993599.56	2502.95	LOW CHORD
2717	416851.58	993592.44	2495.79	.FLOOR
2718	416851.56	993600.37	2495.90	.FLOOR
2719	416852.79	993599.17	2494.53	CONC
2720	416892.06	993599.32	2493.94	CONC
2721	416889.96	993599.78	2495.71	.FLOOR
2722	416895.17	993590.03	2493.98	.TOP/CONC
2723	416895.19	993588.89	2491.08	.TOE/CONC
2724	416937.28	993588.55	2491.36	..TOE/CONC
2725	416937.99	993589.80	2493.82	..TOP/CONC
2726	416937.95	993590.72	2493.90	CONC
2727	416936.09	993590.55	2493.81	CONC
2728	416931.45	993598.90	2494.40	CONC
2729	416931.71	993599.16	2495.56	.FLOOR
2730	416936.20	993591.13	2495.50	.FLOOR
2731	416938.30	993591.05	2495.52	..FLOOR
2732	416933.78	993598.23	2502.54	LOW CHORD
2733	416938.60	993590.87	2496.44	GB
2734	416942.34	993580.29	2496.34	GB
2735	416939.95	993579.95	2490.62	.CONC

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PointNo.	Northing(Y)	Easting(X)	Elev(Z)	Description
2736	416902.74	993578.33	2490.66	.CONC
2737	416864.22	993576.80	2490.94	..CONC
2738	416862.08	993575.84	2495.67	GB
2739	418160.46	991982.93	2490.92	.SW
2740	418174.34	991978.85	2490.82	.SW
2741	418174.30	991980.02	2490.35	NG AT WALL
2742	418182.26	991980.11	2490.13	.WW
2743	418181.46	991980.02	2491.02	.HDWL
2744	418181.49	991978.79	2490.91	.SW
2745	418181.12	991974.78	2490.63	.TBC
2746	418162.68	991974.77	2490.63	..TBC
2747	418162.72	991972.85	2490.34	.EP
2748	418169.48	991993.19	2490.01	..WW
2749	418159.29	991993.28	2490.69	NG
2750	418181.35	991972.99	2490.22	.EP
2751	418181.37	991971.04	2490.23	.EP
2752	418181.23	991974.69	2490.92	.C
2753	418181.22	991973.17	2490.89	.C
2754	418184.04	991973.04	2490.10	GUT
2755	418205.43	991972.88	2490.10	GUT
2756	418210.13	991970.90	2490.23	.EP
2757	418210.34	991972.90	2490.17	.EP
2758	418220.81	991972.85	2490.22	.EP
2759	418220.86	991973.11	2490.91	.C
2760	418220.76	991978.60	2491.00	.SW
2761	418220.48	991979.89	2491.21	.HDWL
2762	418260.21	991979.73	2491.18	..HDWL
2763	418259.47	991979.89	2490.19	.WW
2764	418260.11	991978.48	2490.95	.SW
2765	418279.32	991978.52	2491.15	.SW
2766	418279.32	991974.61	2490.97	.SW
2767	418267.51	991974.58	2490.87	.SW
2768	418267.61	991972.78	2490.86	.SW
2769	418260.35	991972.94	2490.87	.C..SW
2770	418260.38	991974.53	2490.93	..C+
2771	418260.33	991972.89	2490.34	.EP
2772	418267.73	991973.32	2490.87	.TBC
2773	418279.26	991973.32	2491.08	..TBC
2774	418279.26	991972.66	2490.45	.EP
2775	418272.01	991992.32	2490.05	..WW
2776	418285.05	991992.80	2494.24	TOP
2777	418278.63	991955.05	2490.93	PVMT
2778	418260.61	991955.31	2490.70	PVMT
2779	418221.47	991955.20	2490.61	PVMT
2780	418181.60	991955.41	2490.59	PVMT
2781	418161.19	991955.51	2490.58	PVMT
2782	418163.07	991937.47	2490.37	.EP
2783	418163.12	991935.55	2490.80	.TBC
2784	418160.87	991927.16	2491.01	.SW
2785	418156.10	991916.42	2491.03	NG

PointNo.	Northing(Y)	Easting(X)	Elev(Z)	Description
2786	418169.04	991917.11	2490.02	.WW
2787	418181.93	991929.92	2490.02	..WW
2788	418181.18	991930.10	2491.23	.HDWL
2789	418174.10	991930.24	2490.81	NG AT WALL
2790	418174.15	991931.27	2490.82	.SW
2791	418181.24	991931.29	2490.99	.SW
2792	418181.10	991935.37	2490.86	.C
2793	418181.04	991935.31	2490.59	..TBC
2794	418181.11	991936.88	2490.88	.C
2795	418181.13	991937.14	2490.16	.EP
2796	418181.15	991939.11	2490.28	.EP
2797	418184.03	991937.06	2490.15	GUT
2798	418205.19	991937.04	2490.13	GUT
2799	418210.00	991939.02	2490.23	.EP
2800	418210.11	991936.96	2490.24	.EP
2801	418220.57	991936.88	2490.22	.EP
2802	418220.62	991936.79	2490.87	.C
2803	418220.68	991931.17	2490.98	.SW
2804	418220.19	991929.88	2491.21	.HDWL
2805	418260.04	991929.80	2491.21	..HDWL
2806	418259.14	991929.68	2490.08	.WW
2807	418278.94	991930.73	2490.83	.SW
2808	418260.21	991936.71	2490.33	.EP
2809	418272.14	991916.85	2489.98	..WW
2810	418286.04	991916.41	2490.34	NG
2811	418267.26	991979.59	2490.49	NG AT WALL
2812	418279.17	991934.68	2490.81	..SW.TBC
2813	418279.17	991936.67	2490.32	..EP
2814	418260.21	991936.57	2490.77	.C
2815	418260.16	991935.10	2490.88	..C+..TBC
2816	418258.64	991929.69	2478.87	INV
2817	418182.59	991929.93	2478.96	INV
2818	418183.06	991980.11	2479.16	INV
2819	418258.84	991979.99	2479.03	INV
2820	418178.56	991917.49	2499.50	TOE/CONC
2821	418220.68	991914.04	2498.89	NG
2822	418258.02	991915.07	2495.74	TOE/CONC
2823	418228.91	991929.27	2497.83	SILT
2824	418220.40	991929.37	2498.68	SILT

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DATE: JUNE 26, 2015
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PointNo.	Northing(Y)	Easting(X)	Elev(Z)	Description
2825	418207.54	991929.72	2499.62	SILT
2826	418182.62	991928.99	2499.25	SILT
2827	418188.64	991981.66	2499.77	SILT
2828	418195.33	991980.88	2499.18	SILT
2829	418207.78	991980.31	2499.53	SILT
2830	418223.96	991980.96	2498.74	SILT
2831	418233.96	991980.56	2497.11	SILT
2832	418258.11	991992.62	2496.66	TOE/CONC
2833	418220.82	991992.72	2499.09	NG
2834	418181.83	991998.32	2499.63	TOE/CONC
3131	421180.019	995722.563	2511.725	TOP
3132	421176.585	995714.675	2511.872	TOP
3133	421167.345	995724.482	2507.988	TOE
3134	421153.274	995723.610	2507.687	TOE
3135	421135.971	995721.566	2510.227	TOP
3136	421147.101	995714.724	2510.434	TOP
3137	421132.616	995713.563	2511.770	NG
3138	421125.040	995721.724	2510.812	NG
3139	421190.771	995714.150	2512.252	NG
3140	421191.861	995726.625	2511.493	NG
3141	421152.483	995701.813	2514.283	RAIL
3142	421152.569	995696.875	2514.264	RAIL
3143	421169.301	995696.553	2514.207	RAIL
3144	421169.416	995701.548	2514.256	RAIL
3145	421168.425	995703.409	2513.591	TOP
3146	421153.959	995703.812	2513.646	TOP
3147	421155.808	995694.785	2513.621	TOP
3148	421170.728	995694.605	2513.557	TOP
3149	421198.207	995668.796	2509.197	NG
3150	421196.641	995685.893	2512.485	GB
3151	421182.879	995667.534	2510.063	.TOP
3152	421179.638	995679.271	2511.063	.TOP-
3153	421162.361	995688.439	2511.988	.TOP
3154	421148.445	995685.804	2511.948	.TOP-
3155	421143.831	995673.512	2512.179	..TOP
3156	421130.247	995675.763	2511.832	NG
3157	421131.678	995687.968	2512.476	GB
3158	421156.961	995666.186	2507.302	TOE
3159	421170.274	995665.075	2506.643	TOE
3160	421154.829	995680.778	2506.334	INV
3161	421162.299	995680.628	2506.619	INV
3162	421169.395	995680.820	2506.453	INV
3163	421168.168	995712.494	2506.867	INV
3164	421161.061	995714.619	2506.796	INV
3165	421154.087	995714.784	2506.749	INV
3166	421168.334	995714.628	2508.983	END_PIPE
3167	421169.913	995680.349	2507.344	SILT
3168	421161.796	995680.279	2507.306	SILT
3169	421154.722	995680.633	2508.064	SILT
3170	421154.017	995715.388	2507.549	SILT
3171	421160.753	995715.244	2507.057	SILT
3172	421168.399	995715.163	2507.555	SILT

REGISTERED LAND SURVEYOR
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19316
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NOGALES HIGHWAY
POINT LIST
PIMA COUNTY, ARIZONA

DATE: JUNE 26, 2015

JOB NO: 5739

SHEET: 7 / 7

DRAINAGE STRUCTURES

FROM CAMPBELL AVE. TO NOGALES HWY

FOR

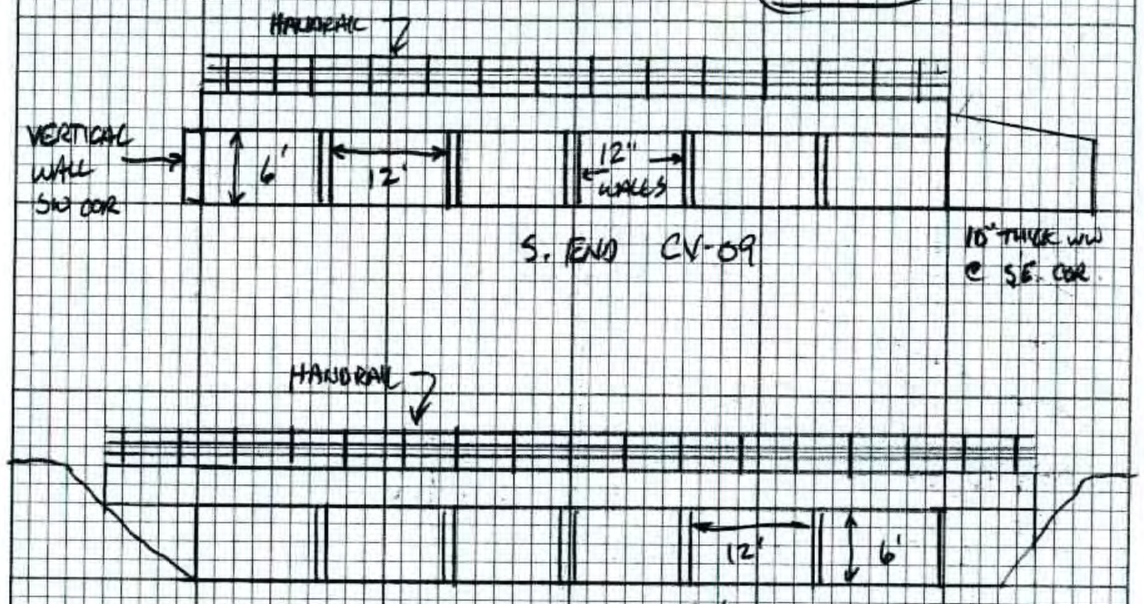
CULVERT IDs:
CV08, CV09, BR08, UPSTREAM & CV10

PG 23

FB 2015-89
JOB 5739
"AIRPORT 2"

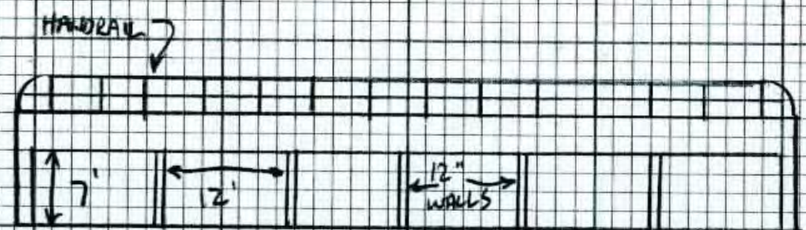
4-6-15

CV-09



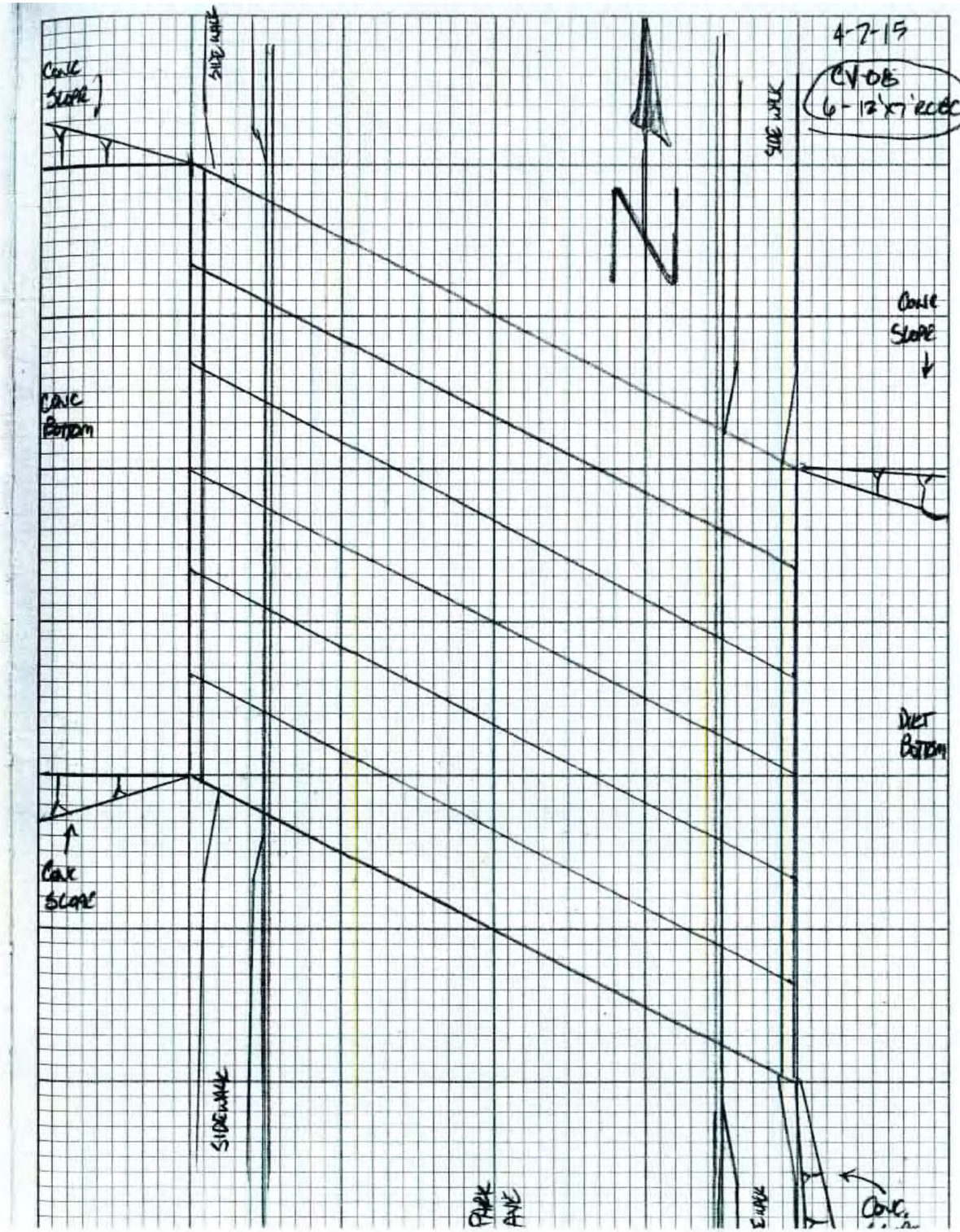
4-7-15

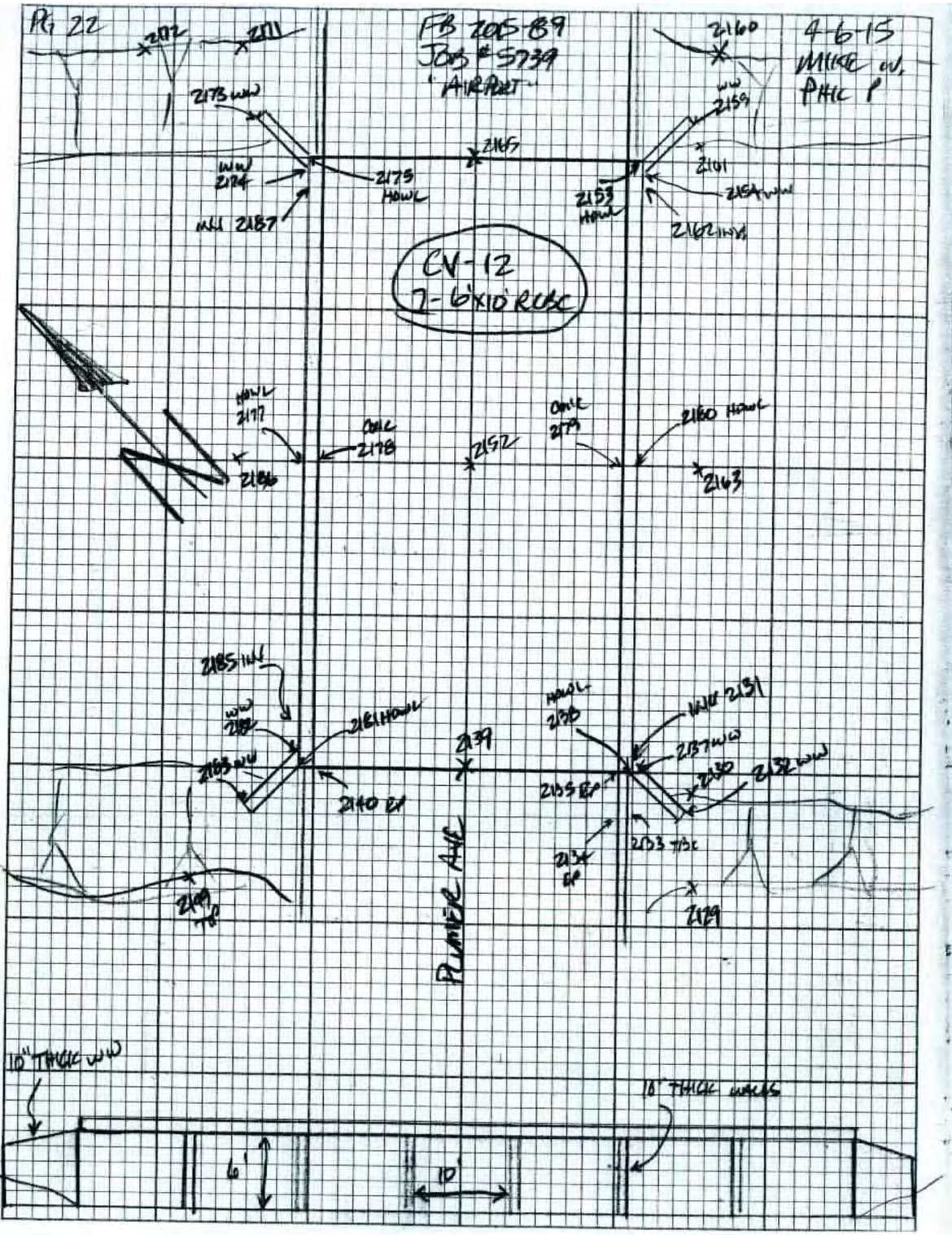
CV-08

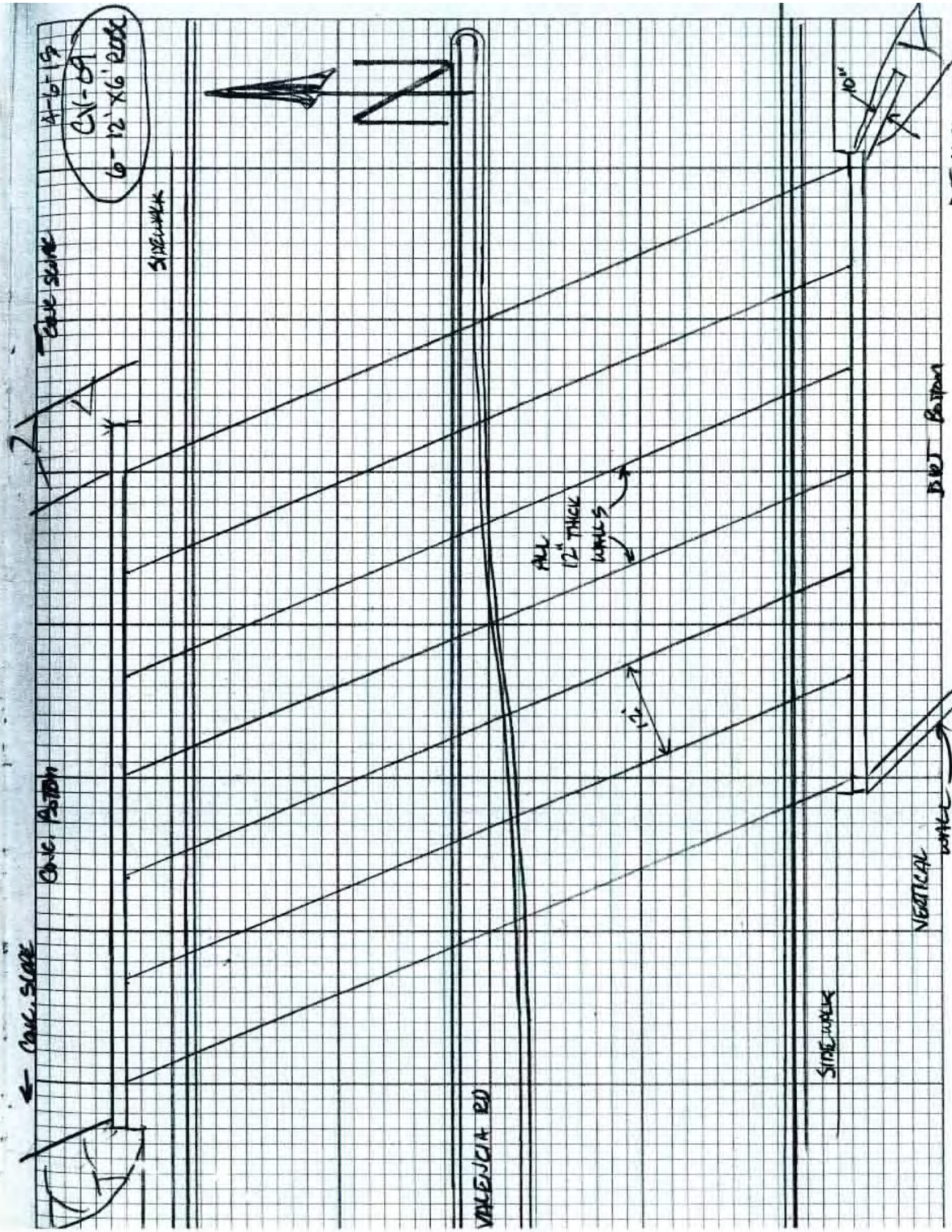


4-7-15

CV-08
6-12'x7' RCBC



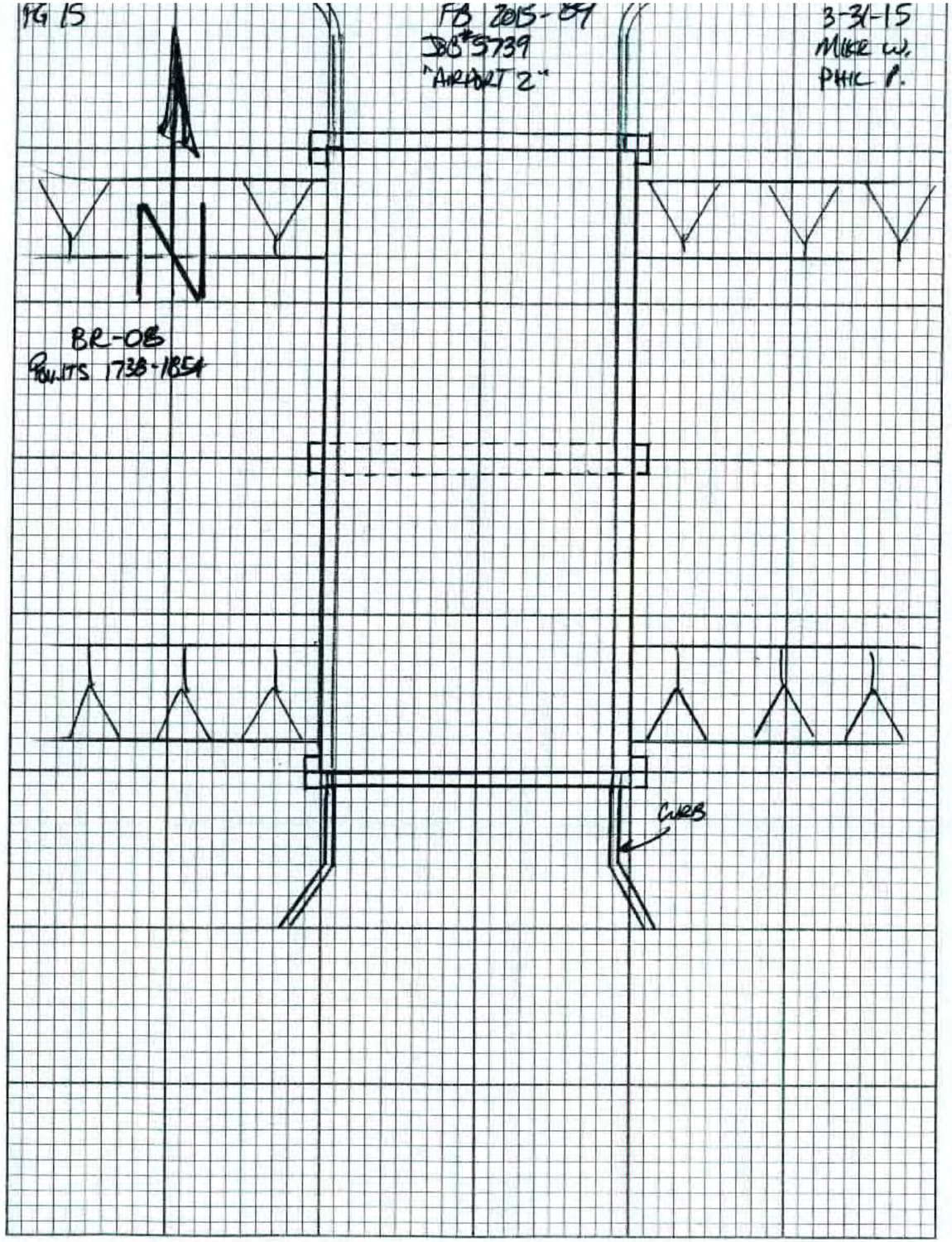

Pg 22
FB 2015-89
Job # 5739
"AIRPORT"
4-6-15
MIKE ov.
PHIL P
CV-12
7-6'x10' RCBC
PLUMBER AVE
10" THICK WW
10" THICK WALLS
6'
10'

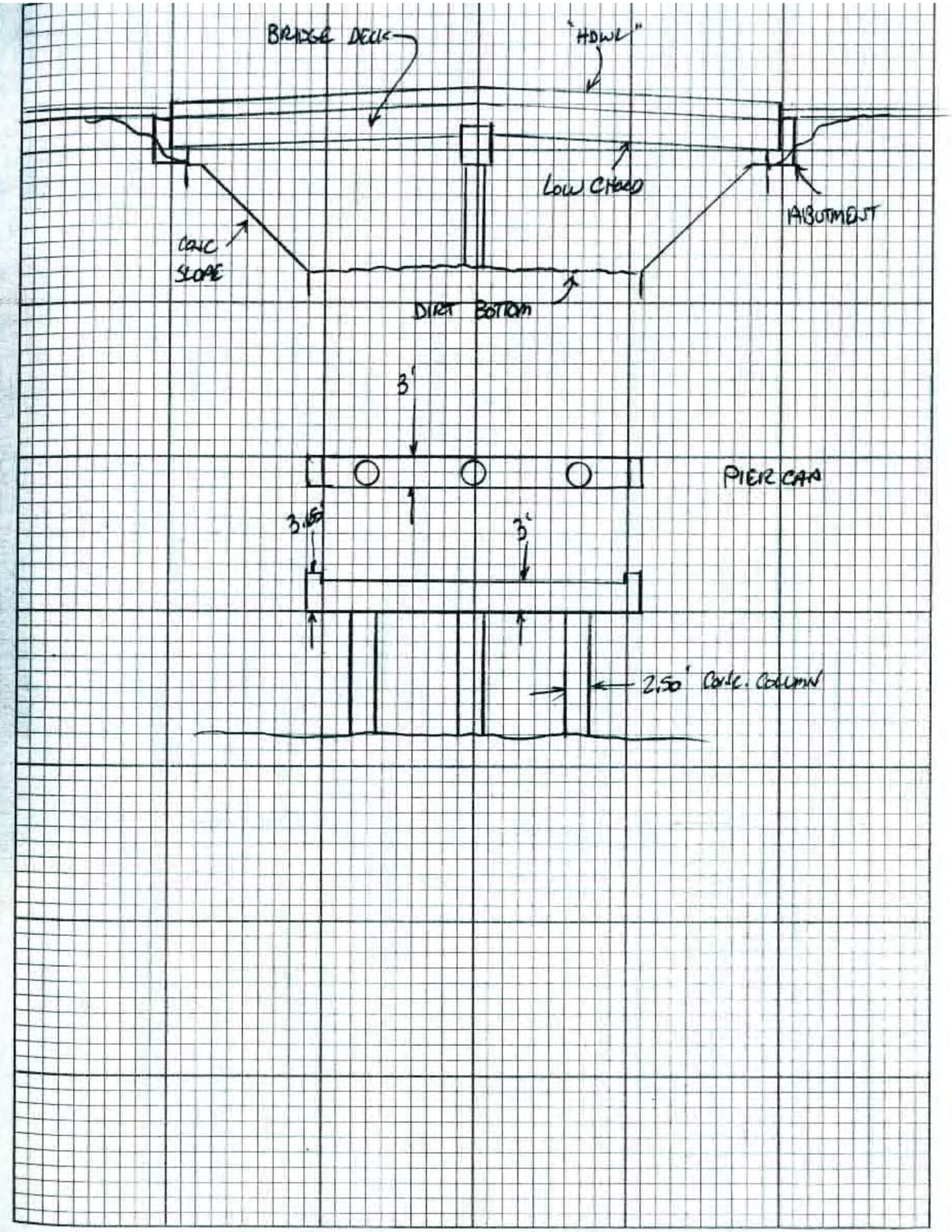

4-6-15
CV-89
6-12'x6' RCBC
FACE SCARE
SIDEWALK
DIRT SURE
BOT BOTTOM
ALL 12" THICK WALLS
CONC. SLOPE
CONC. PATION
VALENCIA RD
SIDEWALK
VERTICAL WALL

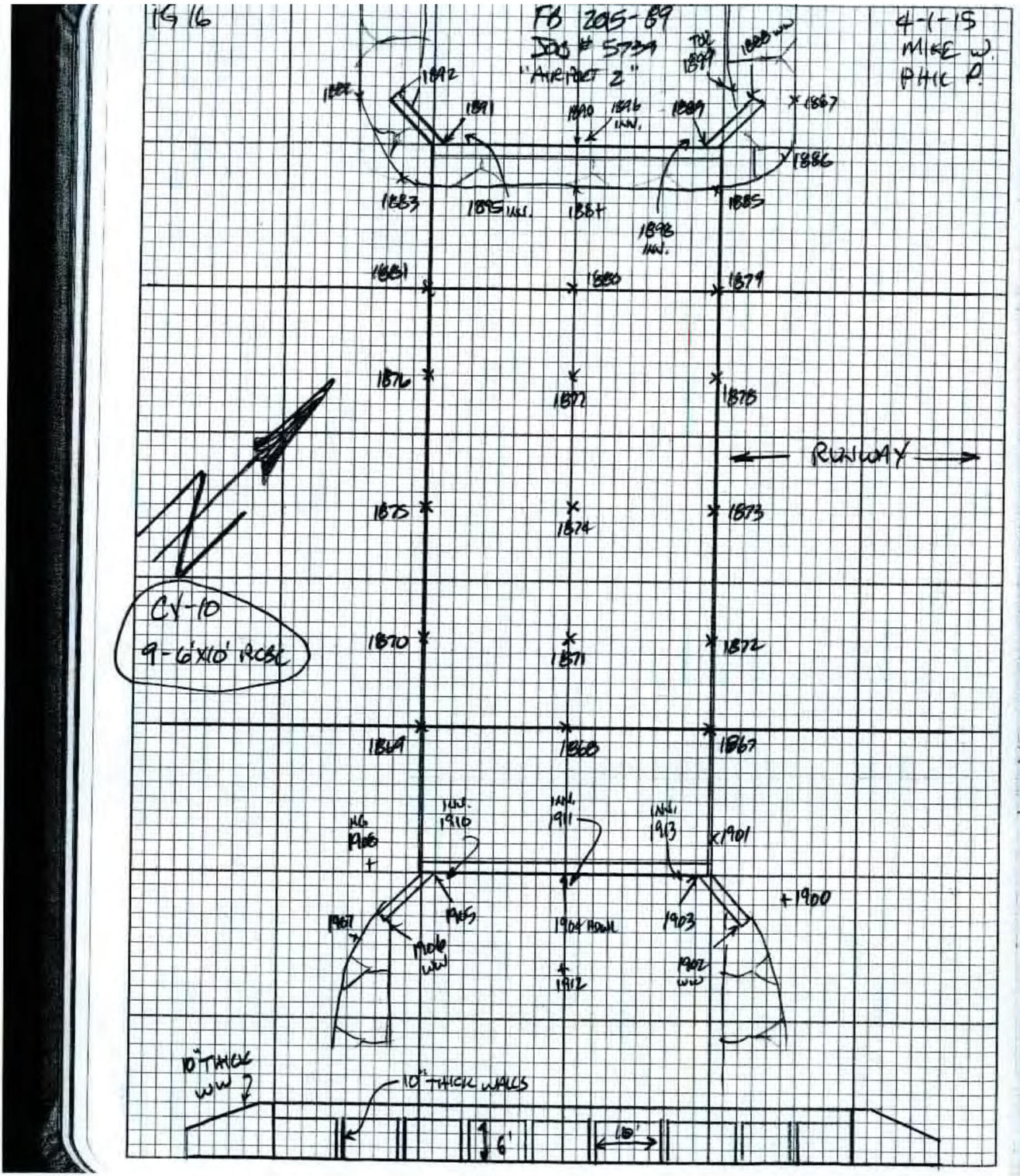
PG 15

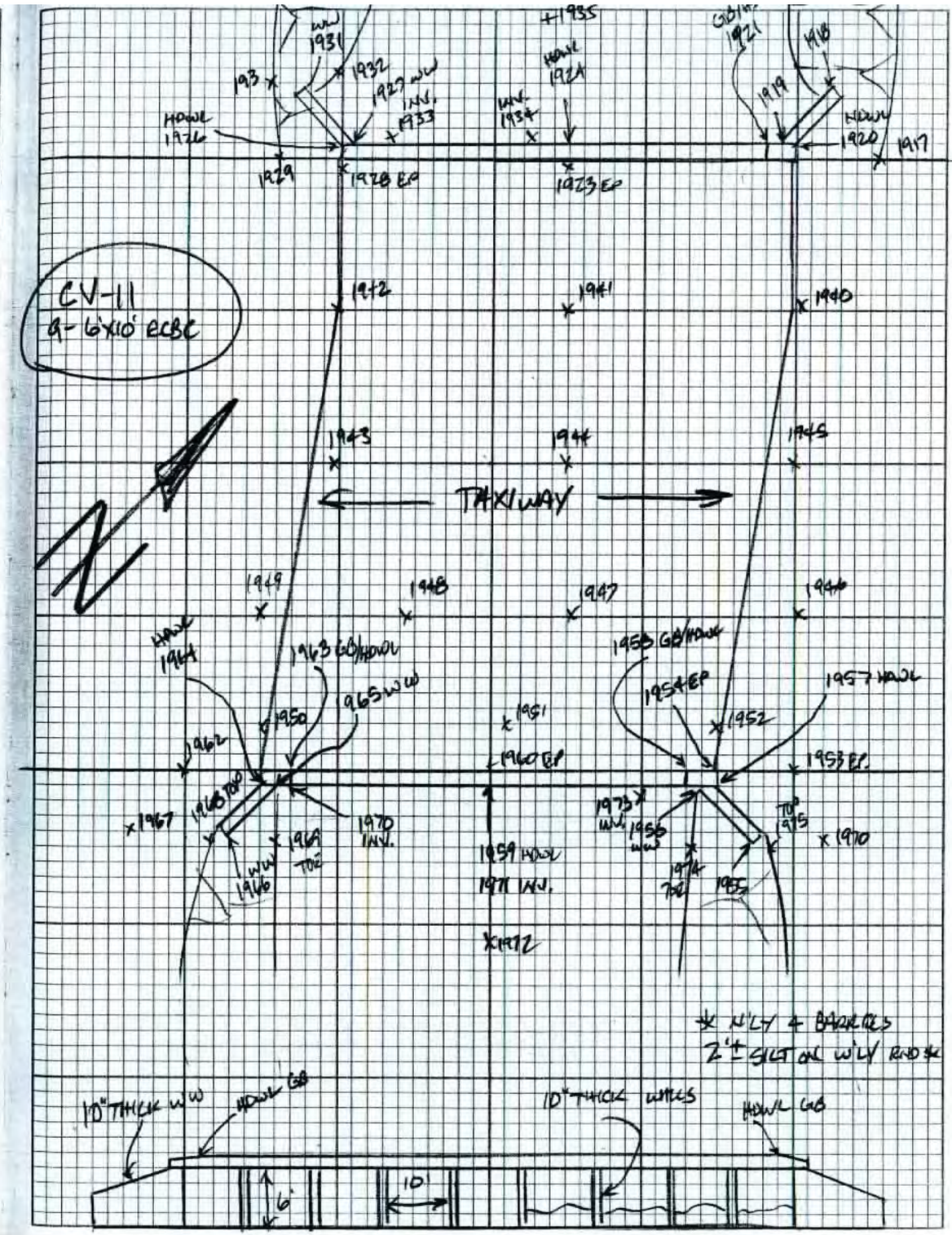
FB 2015-09
JOB #5739
"AIRPORT 2"

3-31-15
MIKE W.
PHIL P.






FB 205-69
DOG # 5739
"AIRFIRE 2"
4-1-15
MIKE W.
PHIL P.
CV-10
9-6'x10' RCBC
RUNWAY
10" THICK WW
10" THICK WALLS
6'
10'


CV-11
9-6'x10' RCBC
TAXIWAY
* N'LY 4 BARRICES
2'± SLOT ON W'LY END *
10" THICK WW
HDWL GB
10" THICK WALLS
HDWL GB
6'
10'

PointNo.	Northing(Y)	Easting(X)	Elev(Z)	Description
1867	412388.03	1001289.24	2566.69	EP
1868	412348.26	1001249.81	2566.61	EP
1869	412317.49	1001219.93	2566.51	EP
1870	412352.42	1001183.39	2567.84	PVMT
1871	412380.30	1001210.91	2567.86	PVMT
1872	412422.80	1001252.62	2567.96	PVMT
1873	412474.00	1001197.83	2568.77	PVMT
1874	412438.32	1001162.87	2568.74	PVMT
1875	412404.72	1001129.72	2568.69	PVMT
1876	412457.26	1001076.34	2567.84	PVMT
1877	412492.73	1001111.23	2567.88	PVMT
1878	412526.52	1001144.36	2567.90	PVMT
1879	412561.08	1001108.26	2566.78	EP
1880	412526.56	1001074.07	2566.80	EP
1881	412491.81	1001039.68	2566.72	EP
1882	412580.39	1000930.06	2564.23	TOP
1883	412570.43	1000962.99	2565.10	TOP
1884	412601.93	1000999.60	2565.09	TOP
1885	412639.82	1001031.88	2565.10	TOP
1886	412654.75	1001032.46	2565.03	TOP
1887	412672.09	1001022.11	2564.74	TOP
1888	412664.34	1001014.37	2558.82	.WW
1889	412649.97	1001021.12	2561.83	..WW.HDWL
1890	412616.17	1000988.02	2561.87	.HDWL
1891	412581.02	1000953.51	2561.81	..HDWL.WW
1892	412587.93	1000938.48	2558.82	..WW
1893	412588.48	1000938.55	2555.98	GB
1894	412593.38	1000942.09	2553.71	TOE
1895	412582.24	1000953.43	2554.75	INV
1896	412617.11	1000987.76	2554.74	INV
1897	412628.16	1000976.63	2554.67	NG
1898	412643.51	1001013.83	2554.79	INV
1899	412659.77	1001007.90	2555.57	TOE
1900	412305.77	1001393.59	2564.07	NG
1901	412305.38	1001373.73	2565.87	NG
1902	412299.69	1001388.41	2564.08	.WW
1903	412299.41	1001377.49	2565.83	..WW.HDWL
1904	412264.21	1001342.80	2565.83	.HDWL
1905	412230.66	1001309.80	2565.78	..HDWL.WW
1906	412219.63	1001309.66	2564.00	..WW
1907	412216.52	1001305.41	2566.48	TOP
1908	412231.96	1001305.64	2566.15	NG
1909	412227.62	1001318.09	2559.18	TOE
1910	412231.30	1001311.40	2558.76	INV
1911	412264.77	1001344.44	2558.75	INV
1912	412257.15	1001352.33	2558.63	NG
1913	412298.08	1001377.15	2558.73	INV
1914	412292.49	1001382.40	2558.30	TOE
1915	412299.60	1001388.47	2561.21	GB
1977	413000.07	1000913.41	2562.97	.EP
1978	412996.72	1000919.72	2562.91	.EP-

PointNo.	Northing(Y)	Easting(X)	Elev(Z)	Description
1979	412988.19	1000925.88	2562.60	.EP
1980	412986.11	1000945.72	2562.98	PVMT
1981	412978.61	1000956.07	2563.21	PVMT
1982	412970.12	1000964.67	2563.31	PVMT
1983	412958.61	1000972.14	2563.67	.EP1
1984	412962.43	1000965.22	2563.35	.EP1-
1985	412962.43	1000957.10	2562.99	.EP1
1986	412953.00	1000934.10	2561.94	.EP1-
1987	412963.02	1000927.66	2561.96	PVMT
1988	412974.99	1000916.56	2561.83	.EP
1989	412981.56	1000910.52	2562.24	NG
1990	412944.28	1000939.61	2561.01	NG
1991	412925.91	1000921.18	2560.30	NG
1992	412932.80	1000912.03	2560.84	.EP1-
1993	412940.04	1000902.64	2560.64	PVMT
1994	412947.68	1000893.49	2560.34	.EP
1995	412954.44	1000886.23	2560.76	NG
1996	412934.42	1000870.39	2559.71	NG
1997	412928.78	1000879.61	2559.22	.EP-
1998	412921.88	1000888.92	2559.48	PVMT
1999	412915.18	1000899.35	2559.70	.EP1
2000	412908.45	1000908.39	2559.21	NG
2001	412885.69	1000893.49	2557.79	NG
2002	412891.20	1000885.25	2558.43	.EP1
2003	412897.97	1000874.27	2558.21	PVMT
2004	412904.64	1000863.52	2558.02	.EP
2005	412911.06	1000853.88	2558.26	NG
2006	412889.38	1000839.21	2556.87	NG
2007	412883.26	1000848.98	2556.76	.EP/BEG HDR 1FT
2008	412876.41	1000861.27	2556.95	PVMT
2009	412869.38	1000873.42	2557.25	.EP1/BEG HDR 1FT
2010	412864.09	1000881.95	2556.68	NG
2011	412841.97	1000868.99	2555.35	NG
2012	412846.99	1000860.49	2555.77	.EP1
2013	412853.99	1000848.12	2555.57	PVMT
2014	412860.77	1000835.83	2555.39	.EP
2015	412860.51	1000834.67	2555.27	.C
2016	412868.41	1000826.68	2555.00	..C/CLF 6FT
2017	412845.83	1000813.53	2553.62	CONC/CLF
2018	412839.55	1000823.66	2554.09	.EP

REGISTERED LAND SURVEYOR
CERTIFICATE NO.
19316
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ASHBY
Date Signed 06/26/2015
ARIZONA U.S.A.

EXPIRES 3/31/2017

Ashby
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717 N. SWAN ROAD
TUCSON, ARIZONA 85711
TEL: (520) 325-1991 · FAX: (520) 325-2074

CAMPBELL AVE.
POINT LIST
PIMA COUNTY, ARIZONA

DATE: JUNE 26, 2015
JOB NO: 5739
SHEET: 1 / 5

PointNo.	Northing(Y)	Easting(X)	Elev(Z)	Description
2019	412832.54	1000835.80	2554.34	PVMT
2020	412825.18	1000847.92	2554.49	.EP1
2021	412818.38	1000858.18	2554.37	NG
2022	412796.16	1000845.25	2553.06	NG
2023	412802.19	1000834.45	2553.62	.EP1
2024	412809.26	1000822.23	2553.50	PVMT
2025	412816.21	1000810.08	2553.43	.EP
2026	412822.49	1000800.18	2553.02	CONC/CLF
2027	412800.48	1000787.24	2552.79	CONC/CLF
2028	412794.84	1000797.86	2553.17	.EP
2029	412787.96	1000810.00	2553.31	PVMT
2030	412780.66	1000822.11	2553.45	.EP1
2031	412773.07	1000832.59	2553.22	NG
2032	412751.25	1000818.37	2553.59	NG
2033	412757.17	1000808.59	2554.03	.EP1
2034	412764.66	1000796.46	2553.96	PVMT
2035	412771.67	1000784.32	2553.73	.EP
2036	412777.19	1000773.71	2553.65	CONC/CLF
2037	412757.78	1000762.53	2554.59	CONC/CLF
2038	412751.77	1000772.95	2554.63	.EP
2039	412744.96	1000784.89	2554.87	PVMT
2040	412737.74	1000797.36	2555.03	.EP1
2041	412730.62	1000807.03	2554.90	NG
2042	412699.42	1000787.74	2556.78	NG
2043	412704.99	1000778.31	2557.11	.EP1/END HDR 1FT
2044	412712.27	1000766.09	2557.02	PVMT
2045	412719.21	1000754.05	2556.97	.EP/END HDR 1FT
2046	412739.28	1000764.66	2555.41	.C
2047	412747.03	1000756.43	2555.13	..C/CLF 6FT
2048	412724.76	1000743.64	2557.32	NG/CLF
2049	412700.73	1000733.19	2557.50	NG
2050	412696.62	1000741.15	2558.44	.EP
2051	412689.46	1000752.74	2558.66	PVMT
2052	412682.81	1000764.34	2558.68	.EP1
2053	412676.58	1000773.89	2557.92	NG
2054	412654.77	1000760.17	2559.10	NG
2055	412661.06	1000750.45	2559.87	.EP1
2056	412667.84	1000739.94	2559.75	PVMT
2057	412674.02	1000729.45	2559.64	.EP
2058	412679.89	1000719.21	2558.40	NG
2059	412660.08	1000701.47	2559.05	NG
2060	412652.08	1000717.13	2560.48	.EP
2061	412645.62	1000727.08	2560.66	PVMT
2062	412639.47	1000737.58	2560.79	.EP1
2063	412633.05	1000746.59	2560.07	NG
2064	412612.23	1000734.16	2560.63	NG
2065	412618.34	1000724.92	2561.34	..EP1
2066	412624.46	1000714.47	2561.17	PVMT
2067	412630.14	1000703.74	2560.96	..EP
2068	412636.93	1000693.63	2559.61	NG
1738	413659.78	999526.58	2552.24	.TBC

PointNo.	Northing(Y)	Easting(X)	Elev(Z)	Description
1739	413659.63	999525.95	2552.23	.EP
1740	413667.68	999520.91	2552.66	.EP
1741	413667.82	999521.55	2553.18	.TBC
1742	413682.83	999521.31	2553.80	..TBC
1743	413682.00	999520.75	2553.25	.EP
1744	413681.85	999503.88	2553.27	.EP
1745	413681.65	999486.86	2553.28	.EP
1746	413682.52	999486.20	2553.71	.TBC
1747	413667.38	999486.43	2553.24	.TBC
1748	413667.35	999487.06	2552.70	.EP
1749	413674.95	999486.15	2553.55	.HR
1750	413681.60	999485.83	2553.24	.ABUTMENT
1751	413682.43	999485.83	2553.28	.ABUTMENT
1752	413682.62	999485.82	2554.38	.BRIDGE
1753	413682.65	999486.73	2554.38	HDWL
1754	413682.48	999486.86	2553.26	EP
1755	413733.36	999486.39	2553.79	EP
1756	413732.96	999486.24	2554.87	HDWL
1757	413732.96	999485.39	2554.85	.BRIDGE
1758	413731.70	999484.13	2552.49	.PIER
1759	413734.56	999484.14	2552.49	.PIER
1760	413783.15	999485.09	2554.49	..HR
1761	413783.52	999484.88	2554.41	.BRIDGE
1762	413783.54	999485.74	2554.37	HDWL
1763	413783.69	999485.84	2553.33	EP
1764	413783.70	999484.88	2553.32	.ABUTMENT1
1765	413784.49	999484.87	2553.32	.ABUTMENT1
1766	413789.61	999485.17	2553.69	.TBC1
1767	413789.68	999485.83	2553.20	.EP1
1768	413784.54	999485.82	2553.31	.EP1
1769	413783.69	999485.25	2553.84	..TBC1
1770	413790.12	999502.53	2553.11	PVMT
1771	413784.69	999502.52	2553.32	.EP1
1772	413783.89	999502.65	2553.28	EP
1773	413784.08	999519.74	2553.31	EP
1774	413784.88	999519.70	2553.31	.EP1
1775	413784.03	999520.43	2553.79	.TBC1
1776	413784.89	999520.70	2553.31	.ABUTMENT1
1777	413784.07	999520.71	2553.31	..ABUTMENT1+

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CAMPBELL AVE.
POINT LIST
PIMA COUNTY, ARIZONA

DATE: JUNE 26, 2015
JOB NO: 5739
SHEET: 2 / 5

PointNo.	Northing(Y)	Easting(X)	Elev(Z)	Description
1778	413783.88	999519.88	2554.38	HDWL
1779	413783.88	999520.72	2554.41	.BRIDGE
1780	413783.53	999520.49	2554.46	.HR
1781	413790.46	999519.59	2553.30	..EP1/GATE
1782	413790.42	999520.28	2553.79	..TBC1
1783	413733.71	999520.26	2553.76	EP
1784	413733.64	999520.39	2554.94	HDWL
1785	413733.58	999521.22	2554.92	.BRIDGE
1786	413734.85	999522.50	2552.50	.PIER
1787	413732.07	999522.53	2552.51	..PIER+
1788	413733.42	999503.39	2553.81	PVMT
1789	413683.03	999520.91	2554.39	HDWL
1790	413683.04	999521.76	2554.39	..BRIDGE+
1791	413682.93	999520.80	2553.30	EP
1792	413675.37	999521.65	2553.58	..HR
1793	413684.48	999485.73	2551.98	.C
1794	413684.47	999484.66	2552.00	.C
1795	413681.65	999484.62	2551.99	..C
1796	413678.39	999485.74	2553.03	TOP
1797	413676.93	999473.86	2552.72	TOP
1798	413684.17	999473.48	2550.80	GB/CONC
1799	413685.25	999473.45	2550.77	TOP/CONC
1800	413685.57	999485.64	2550.88	TOP/CONC
1801	413684.65	999485.72	2551.06	GB/CONC
1802	413685.59	999485.72	2551.43	LOW CHORD
1803	413787.06	999485.05	2553.15	TOP
1804	413785.55	999473.17	2552.28	TOP
1805	413780.14	999473.15	2550.78	TOP/CONC
1806	413780.20	999484.73	2550.78	TOP/CONC
1807	413781.52	999484.72	2550.86	GB/CONC
1808	413781.66	999484.71	2552.03	.C
1809	413781.68	999483.64	2552.06	.C
1810	413783.49	999483.52	2552.08	..C
1811	413780.20	999484.75	2551.48	LOW CHORD
1812	413692.78	999471.98	2543.85	TOE/CONC
1813	413693.48	999485.71	2543.48	TOE/CONC
1814	413733.32	999483.82	2543.08	NG
1815	413733.14	999470.44	2543.26	NG
1816	413731.61	999484.11	2548.82	BOT OF PIERCAP
1817	413734.52	999484.05	2548.81	BOT OF PIERCAP
1818	413731.56	999485.35	2551.87	LOW CHORD
1819	413733.13	999490.69	2542.68	COLUMM 2.50
1820	413733.32	999503.23	2541.98	COLUMM 2.50
1821	413771.06	999484.75	2543.27	TOE/CONC
1822	413771.54	999471.19	2543.61	TOE/CONC
1823	413659.04	999485.77	2552.40	..EP
1824	413658.37	999484.98	2552.73	..TBC
1825	413679.14	999521.92	2553.00	TOP
1826	413679.91	999535.07	2552.00	TOP
1827	413685.10	999536.63	2550.93	GB/CONC
1828	413686.01	999536.73	2550.88	TOP/CONC
1829	413685.85	999521.94	2550.92	TOP/CONC
1830	413685.86	999521.93	2551.44	LOW CHORD
1831	413685.05	999521.96	2551.15	GB/CONC
1832	413684.87	999521.97	2552.00	.C
1833	413684.87	999523.06	2552.00	.C
1834	413682.05	999523.07	2552.03	..C
1835	413785.16	999520.93	2553.03	TOP
1836	413788.50	999532.75	2552.55	TOP
1837	413782.17	999536.96	2551.02	GB/CONC
1838	413781.22	999536.87	2550.94	TOP/CONC
1839	413780.93	999520.95	2550.82	TOP/CONC
1840	413780.92	999520.95	2551.45	LOW CHORD
1841	413781.83	999520.90	2550.97	GB/CONC
1842	413782.08	999520.95	2552.03	.C
1843	413782.09	999522.04	2552.04	.C
1844	413782.77	999522.00	2552.04	..C
1845	413693.86	999521.86	2543.63	TOE/CONC
1846	413693.79	999535.82	2543.81	TOE/CONC
1847	413733.56	999536.96	2543.52	NG
1848	413772.33	999539.18	2543.93	TOE/CONC
1849	413772.04	999521.11	2543.68	TOE/CONC
1850	413733.65	999522.40	2543.34	NG
1851	413734.96	999522.57	2548.83	BOT OF PIERCAP
1852	413731.99	999522.61	2548.84	BOT OF PIERCAP
1853	413733.42	999515.86	2543.39	COLUMM 2.50
1854	413731.86	999521.37	2551.94	LOW CHORD
2189	413924.50	997781.39	2542.27	TOP/CONC
2190	413907.85	997792.20	2541.91	TOP/CONC
2191	413907.73	997780.42	2539.80	.WW
2192	413913.70	997785.16	2540.52	..WW
2193	413907.57	997786.66	2542.61	.HDWL
2194	413905.39	997799.40	2542.38	.SW
2195	413905.07	997786.77	2542.33	.SW
2196	413906.33	997786.74	2542.30	..SW
2197	413901.50	997799.51	2542.25	.SW
2198	413898.39	997799.55	2542.19	.TBC
2199	413897.46	997799.50	2541.61	.GUT
2200	413895.78	997799.37	2541.71	.EP
2201	413897.44	997779.17	2541.24	.GUT

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CAMPBELL AVE.
POINT LIST
PIMA COUNTY, ARIZONA

DATE: JUNE 26, 2015
JOB NO: 5739
SHEET: 3 / 5

PointNo.	Northing(Y)	Easting(X)	Elev(Z)	Description
2202	413895.58	997779.13	2541.71	.EP
2203	413898.22	997779.63	2542.14	..TBC.C
2204	413898.98	997779.56	2542.16	.C
2205	413895.15	997737.15	2541.56	.EP
2206	413896.89	997737.24	2541.23	.GUT
2207	413898.54	997737.25	2542.03	.C
2208	413900.88	997737.32	2542.11	.SW
2209	413905.79	997737.23	2542.25	CONC
2210	413907.09	997737.06	2542.52	.HDWL
2211	413906.47	997679.61	2542.27	..HDWL
2212	413905.27	997679.64	2542.03	.SW1
2213	413903.99	997679.59	2542.01	.SW1
2214	413898.08	997695.52	2541.92	.C
2215	413897.43	997695.42	2541.92	..C.TBC
2216	413896.59	997695.94	2541.12	.GUT
2217	413894.75	997695.93	2541.39	.EP
2218	413894.54	997665.14	2541.24	..EP
2219	413896.16	997664.99	2541.22	..GUT
2220	413897.03	997665.10	2541.80	..TBC
2221	413900.08	997665.61	2541.87	..SW
2222	413904.06	997665.60	2541.91	..SW1
2223	413905.24	997671.58	2542.21	.WW
2224	413905.63	997679.37	2542.03	..WW
2225	413905.66	997669.66	2541.64	TOP/CONC
2226	413917.17	997666.76	2541.51	TOP/CONC
2227	413855.81	997680.65	2542.78	.TBC
2228	413856.42	997680.63	2542.36	.EP
2229	413837.23	997680.99	2542.92	.TBC1
2230	413836.50	997680.85	2542.36	.EP1
2231	413837.90	997706.77	2542.53	.EP1-
2232	413838.64	997706.70	2543.06	.TBC1-
2233	413840.82	997730.50	2543.16	.TBC1
2234	413840.07	997730.50	2542.65	.EP1
2235	413857.30	997760.56	2542.63	.EP
2236	413856.58	997760.60	2543.06	.TBC
2237	413848.34	997795.51	2543.50	.TBC1
2238	413847.70	997795.66	2543.10	.EP1
2239	413849.37	997815.65	2543.07	.EP1-
2240	413850.15	997815.55	2543.59	.TBC1-
2241	413850.19	997835.09	2543.22	.EP1
2242	413850.82	997835.01	2543.67	.TBC1
2243	413850.26	997850.04	2543.24	..EP1
2244	413851.08	997850.06	2543.69	..TBC1
2245	413857.54	997850.24	2543.28	..TBC
2246	413858.13	997850.31	2542.97	..EP
2247	413799.98	997866.96	2542.03	.EP
2248	413798.49	997867.14	2541.98	.GUT
2249	413797.58	997866.86	2542.51	.TBC.SW
2250	413793.54	997867.68	2542.63	.SW1
2251	413791.01	997857.87	2542.59	.SW1
2252	413794.86	997856.85	2542.52	.SW

PointNo.	Northing(Y)	Easting(X)	Elev(Z)	Description
2253	413790.89	997848.94	2542.64	.SW1
2254	413789.52	997848.93	2542.68	.SW1
2255	413788.37	997848.93	2543.25	.HDWL
2256	413788.13	997847.44	2541.49	.WW
2257	413777.88	997859.95	2539.30	..WW
2258	413800.16	997839.06	2541.99	.EP
2259	413798.29	997839.08	2541.69	.GUT
2260	413797.48	997839.46	2542.47	..TBC.C
2261	413796.77	997839.39	2542.47	.C
2262	413799.69	997797.56	2541.89	.EP
2263	413798.09	997797.55	2541.59	.GUT
2264	413796.38	997797.53	2542.38	.C
2265	413794.27	997797.56	2542.50	.SW
2266	413788.88	997797.56	2542.60	.SW1
2267	413787.77	997797.04	2542.99	.HDWL
2268	413787.36	997756.97	2542.97	..HDWL
2269	413787.23	997758.80	2541.75	.WW
2270	413788.46	997756.78	2542.47	.SW1
2271	413789.77	997756.75	2542.40	.SW1
2272	413795.86	997755.51	2542.18	.C
2273	413796.62	997755.48	2542.16	..C.TBC
2274	413797.45	997755.99	2541.39	.GUT
2275	413798.99	997755.83	2541.75	.EP
2276	413799.08	997745.43	2541.74	..EP
2277	413797.41	997745.86	2541.65	..GUT
2278	413796.47	997745.89	2542.20	..TBC
2279	413793.71	997745.95	2542.21	..SW
2280	413789.64	997745.91	2542.39	..SW1
2281	413774.13	997766.40	2541.73	..WW
2282	413907.77	997683.49	2531.43	TOE/CONC
2283	413918.40	997683.32	2530.73	TOE/CONC
2284	413907.05	997690.31	2531.08	TOE/CONC
2285	413906.69	997688.36	2533.57	INV
2286	413907.23	997733.36	2533.63	INV
2287	413907.26	997733.48	2531.15	TOE/CONC
2288	413920.88	997724.97	2530.56	CONC
2289	413919.93	997766.19	2531.18	TOE/CONC
2290	413907.82	997777.29	2531.96	TOE/CONC
2291	413907.74	997776.76	2533.64	INV

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POINT LIST
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PointNo.	Northing(Y)	Easting(X)	Elev(Z)	Description
2292	413786.14	997842.72	2534.33	INV
2293	413778.54	997861.04	2541.37	TOP
2294	413777.98	997857.33	2538.24	GB
2295	413774.56	997841.11	2534.02	TOE
2296	413777.72	997809.07	2533.96	NG
2297	413785.77	997804.29	2534.25	INV
2298	413785.50	997759.87	2534.31	INV
2299	413776.54	997751.56	2543.38	NG
2300	414672.65	997308.17	2535.32	.EP
2301	414672.42	997308.88	2535.86	.TBC
2302	414672.31	997311.06	2535.86	.SW
2303	414671.65	997316.54	2536.07	.SW1
2304	414648.33	997315.56	2535.97	.SW1
2305	414647.39	997316.47	2535.98	.HDWL
2306	414645.86	997316.61	2534.02	.WW
2307	414654.64	997309.26	2535.75	..SW.TBC
2308	414655.34	997308.49	2535.27	.EP
2309	414601.06	997308.61	2535.23	.EP
2310	414600.64	997309.36	2535.77	.TBC
2311	414591.61	997315.83	2536.00	.SW1
2312	414591.50	997316.71	2536.05	.HDWL
2313	414658.37	997327.20	2535.70	NG
2314	414640.47	997324.73	2533.93	..WW
2315	414536.34	997317.02	2535.94	..HDWL
2316	414535.89	997316.02	2536.10	..HDWL
2317	414537.68	997314.40	2536.06	..HDWL
2318	414542.77	997309.64	2535.91	.TBC
2319	414543.70	997308.81	2535.40	.EP
2320	414527.14	997308.73	2535.48	..EP
2321	414527.06	997309.46	2535.97	..TBC
2322	414527.38	997314.39	2536.06	..SW1
2323	414535.47	997316.98	2534.26	.WW
2324	414524.18	997319.19	2533.99	..WW
2325	414567.53	997284.70	2535.97	PVMT
2326	414613.32	997284.60	2535.81	PVMT
2327	414678.96	997284.24	2535.81	PVMT
2328	414718.92	997260.40	2535.38	.EP
2329	414719.05	997259.68	2535.92	.TBC
2330	414719.57	997253.66	2536.06	.SW
2331	414709.16	997254.78	2536.00	.SW
2332	414710.70	997253.33	2535.99	..SW
2333	414710.83	997252.09	2535.33	.HDWL
2334	414709.29	997252.22	2536.03	.HDWL
2335	414709.87	997251.92	2533.25	.WW
2336	414720.37	997242.58	2535.81	TOP
2337	414713.74	997242.39	2533.36	..WW
2338	414654.87	997252.34	2535.95	.HDWL
2339	414651.91	997259.74	2535.70	.TBC
2340	414651.92	997260.48	2535.25	.EP
2341	414591.19	997260.54	2535.37	.EP
2342	414591.87	997259.87	2535.74	.TBC.SW1

PointNo.	Northing(Y)	Easting(X)	Elev(Z)	Description
2343	414581.07	997260.77	2535.49	..EP
2344	414581.08	997260.18	2535.77	..TBC
2345	414581.16	997258.06	2535.86	..SW1
2346	414581.24	997252.18	2535.95	.SW
2347	414597.63	997254.06	2535.82	.SW
2348	414598.08	997253.64	2535.88	..SW
2349	414599.15	997252.59	2535.89	..HDWL
2350	414600.47	997252.47	2533.43	.WW
2351	414593.46	997245.73	2535.36	TOP
2352	414596.95	997244.75	2533.46	..WW
2353	414709.77	997242.63	2526.76	TOE/CONC
2354	414704.39	997252.07	2526.47	INV
2355	414656.02	997252.16	2526.28	INV
2356	414664.08	997243.44	2526.17	CONC
2357	414600.03	997243.30	2526.51	TOE/CONC
2358	414600.97	997252.45	2526.22	INV
2359	414542.83	997317.14	2526.87	INV
2360	414588.99	997316.92	2526.66	INV
2361	414578.57	997328.54	2526.87	NG
2362	414638.59	997323.43	2527.02	TOE/CONC
2363	414645.31	997316.74	2526.87	INV
2364	414526.68	997320.67	2528.60	TOE

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CAMPBELL AVE.
POINT LIST
PIMA COUNTY, ARIZONA

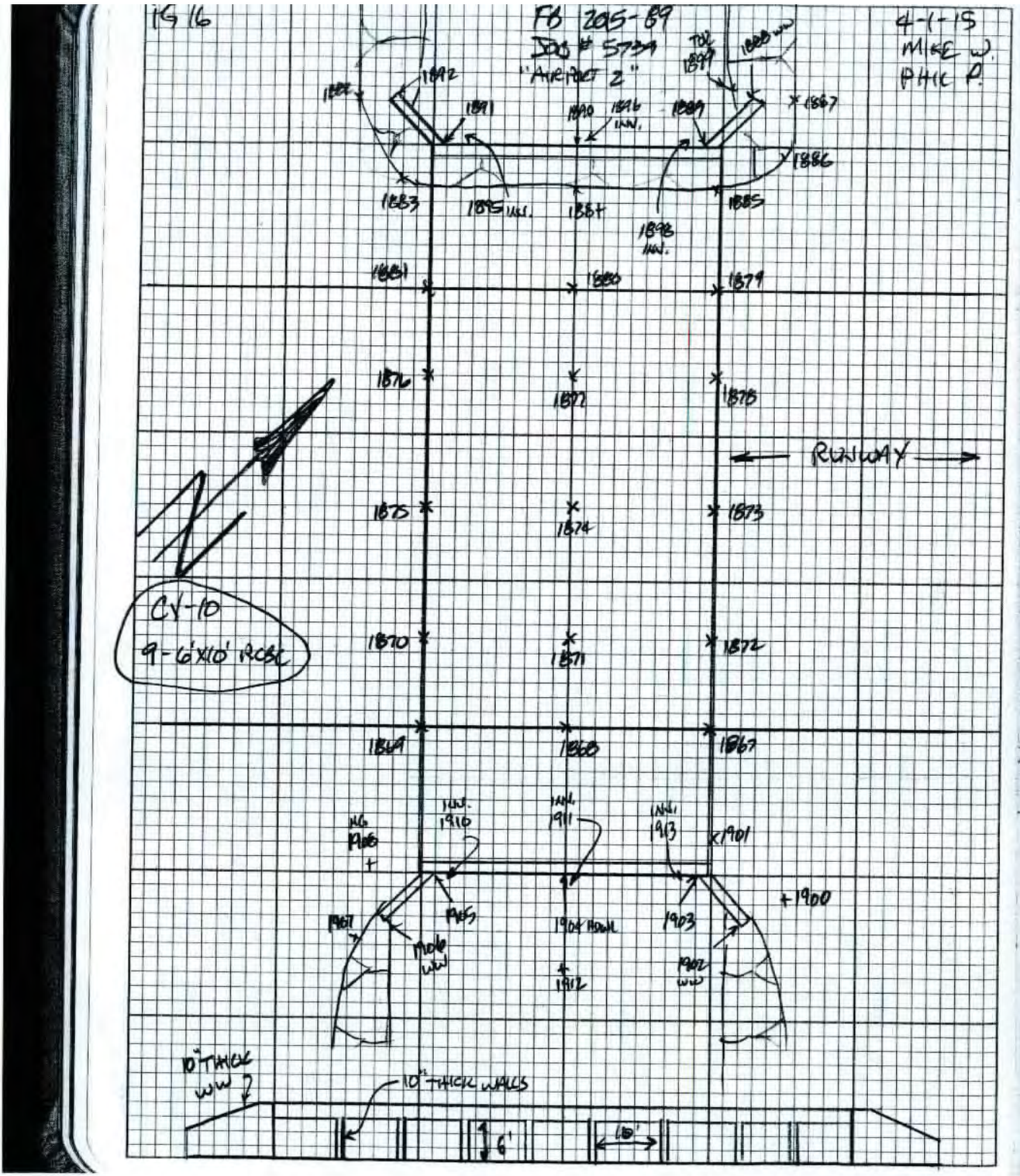
DATE: JUNE 26, 2015
JOB NO: 5739
SHEET: 5 / 5

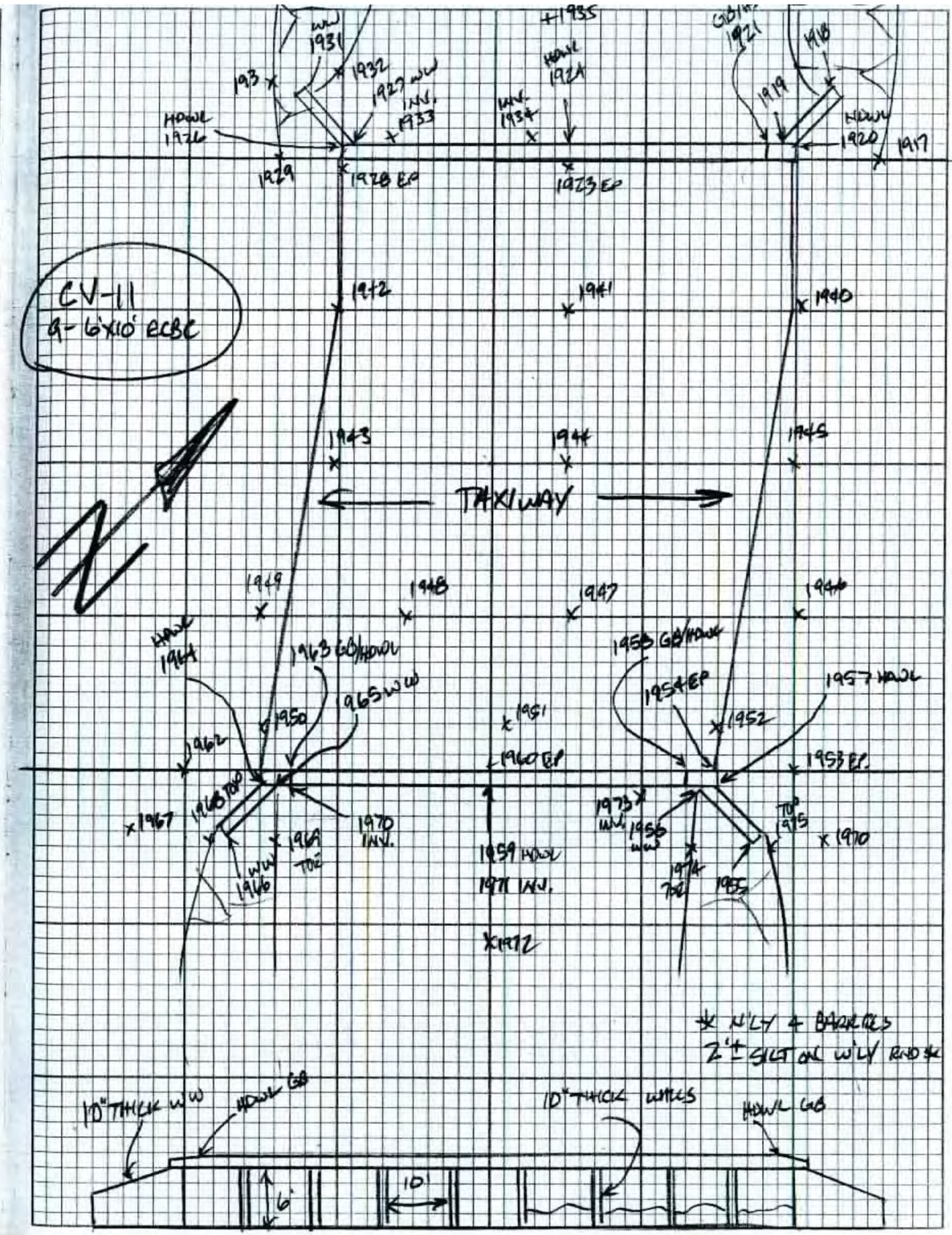
DRAINAGE STRUCTURES

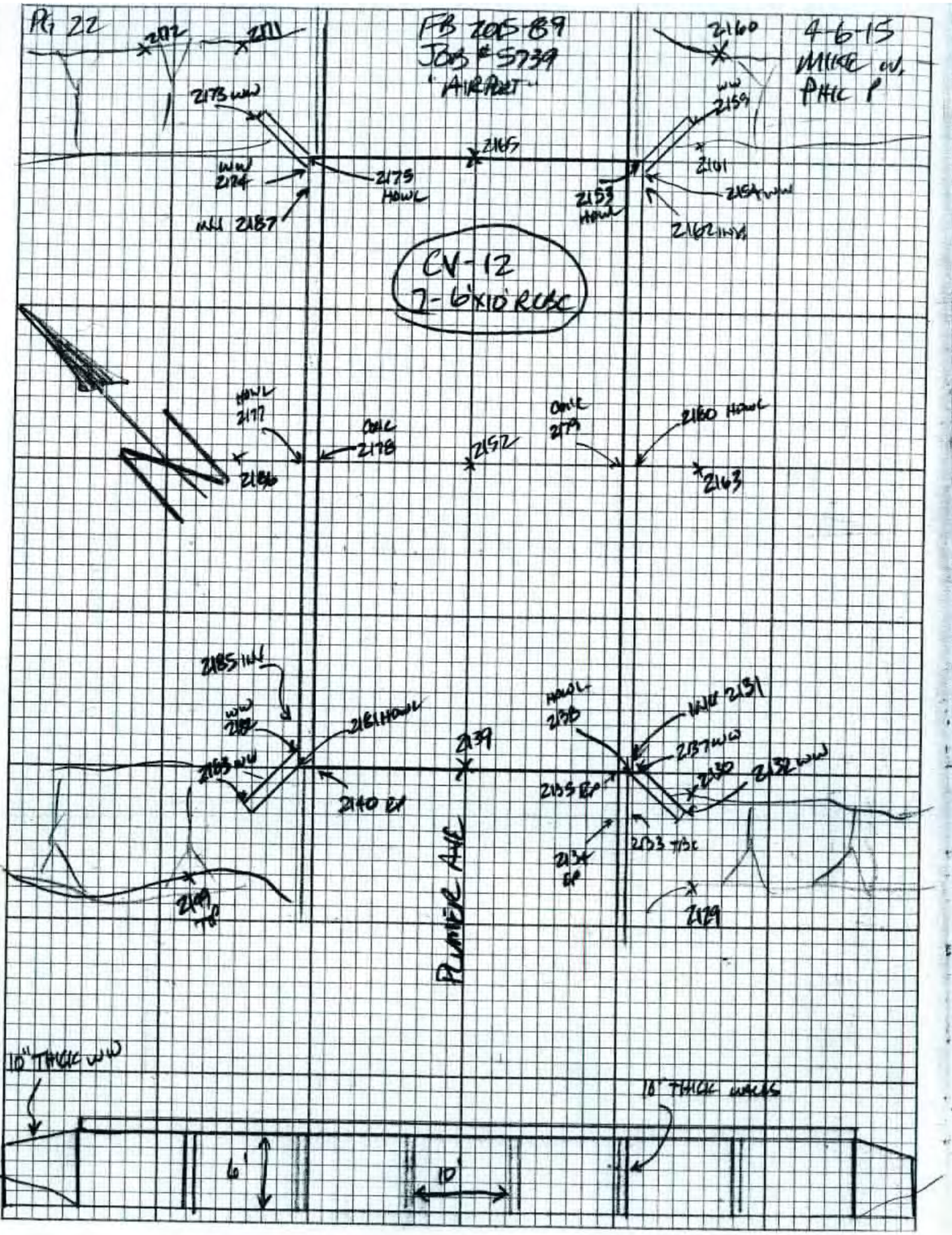
FROM COUNTRY CLUB RD. TO CAMPBELL AVE.

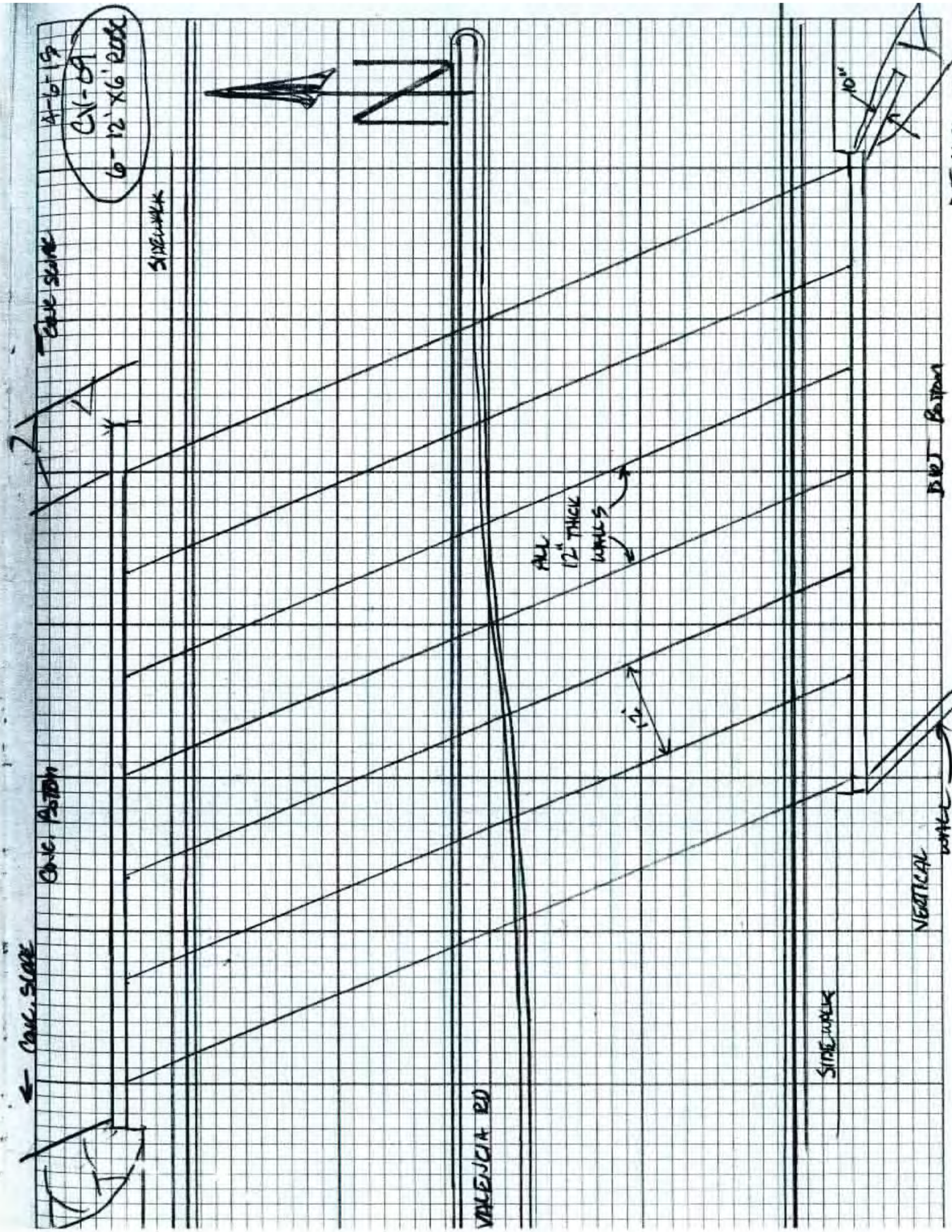
FOR

CULVERT IDs:
CV11, CV12, BR09, BR10, CV13 & CV14


FB 205-69
DOG # 5739
"AIRFIRE 2"
4-1-15
MIKE W.
PHIL P.
CV-10
9-6'x10' RCBC
RUNWAY
10" THICK WW
10" THICK WALLS
6'
10'


CV-11
9-6'x10' RCBC
TAXIWAY
* N'LY 4 BARRICES
2'± SLOT ON W'LY END *
10" THICK WW
HDWL GB
10" THICK WALLS
HDWL GB
6'
10'

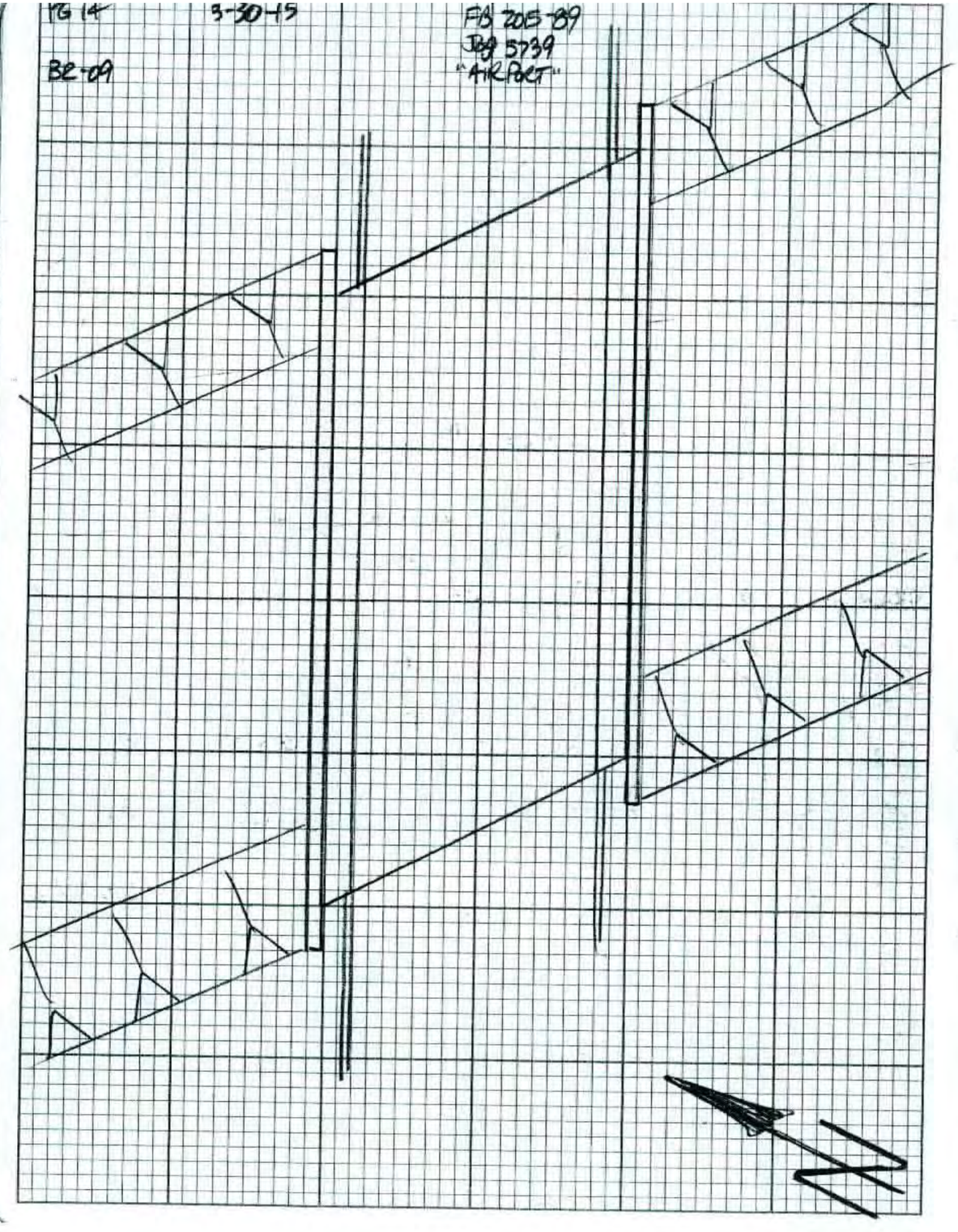

Pg 22
FB 2015-89
Job # 5739
"AIRPORT"
4-6-15
MIKE ov.
PHIL P
CV-12
7-6'x10' RCBC
PLUMBER AVE
10" THICK WW
10" THICK WALLS
6'
10'

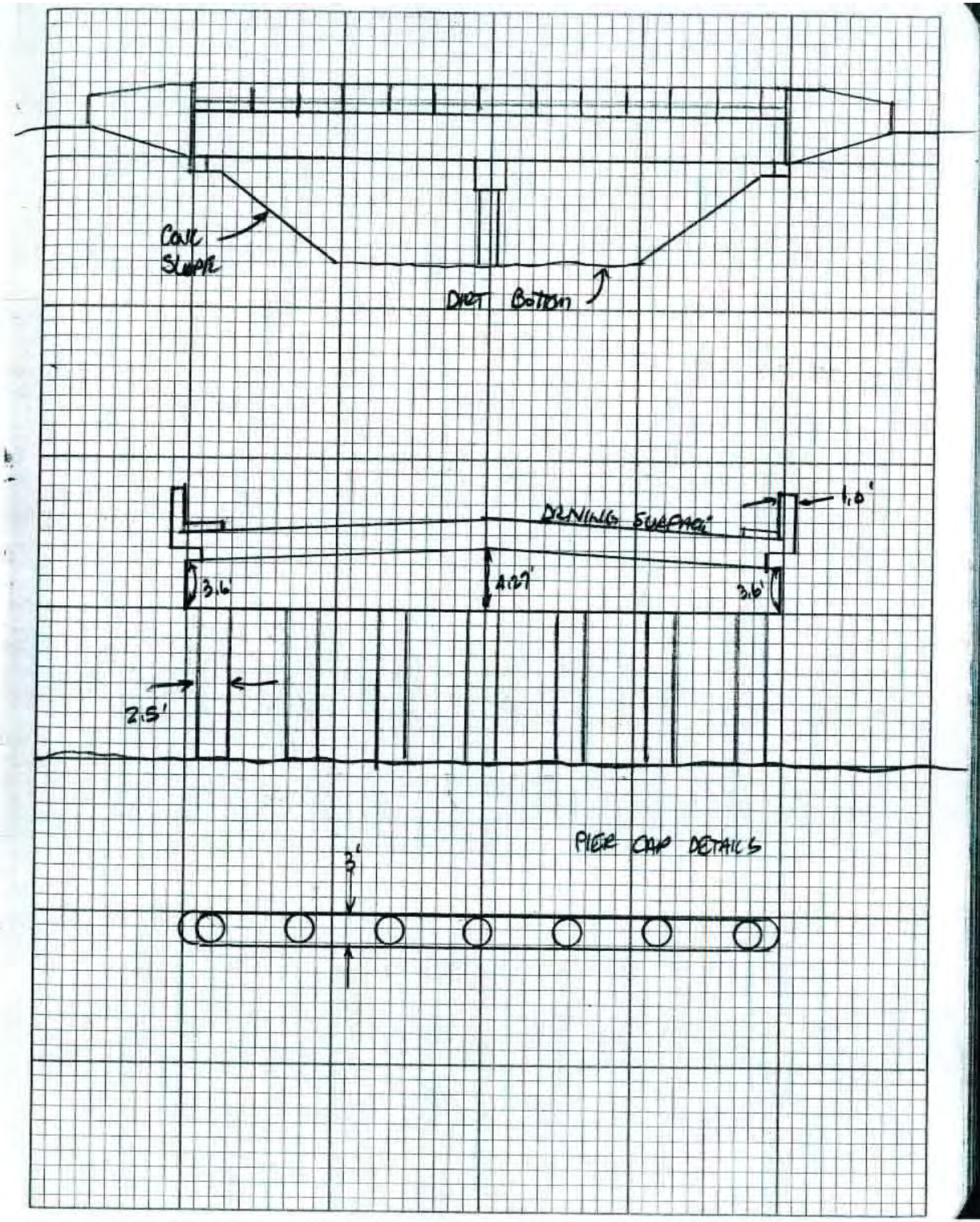

4-6-15
CV-89
6-12'x6' RCBC
FACE SCARE
SIDEWALK
DIRT SURE
BOT BOTTOM
ALL 12" THICK WALLS
CONC. SLOPE
CONC. PATION
VALENCIA RD
SIDEWALK
VERTICAL WALL

PG 14 3-30-15

BR-09

FB 205-89
JB 5739
"AIRPORT"



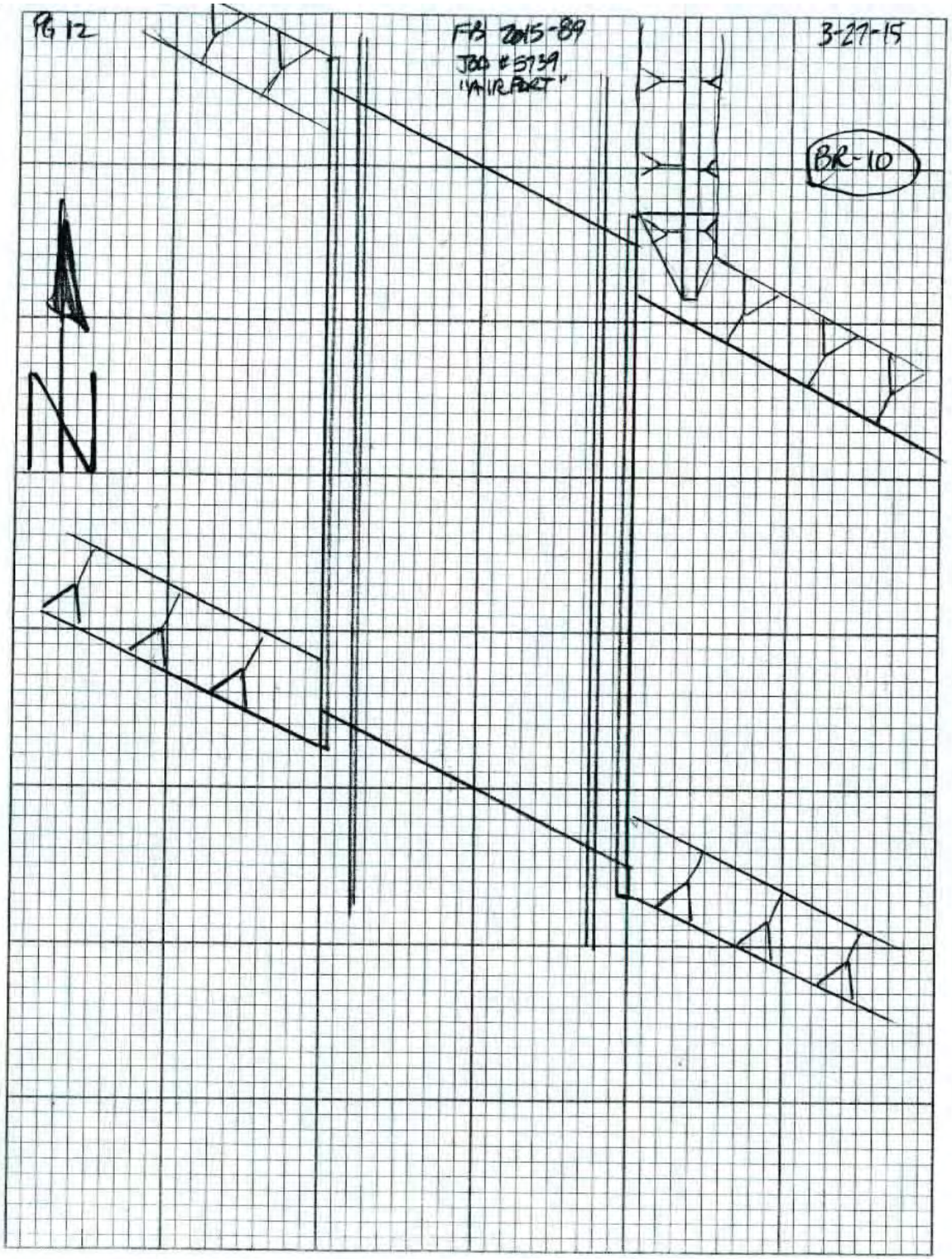


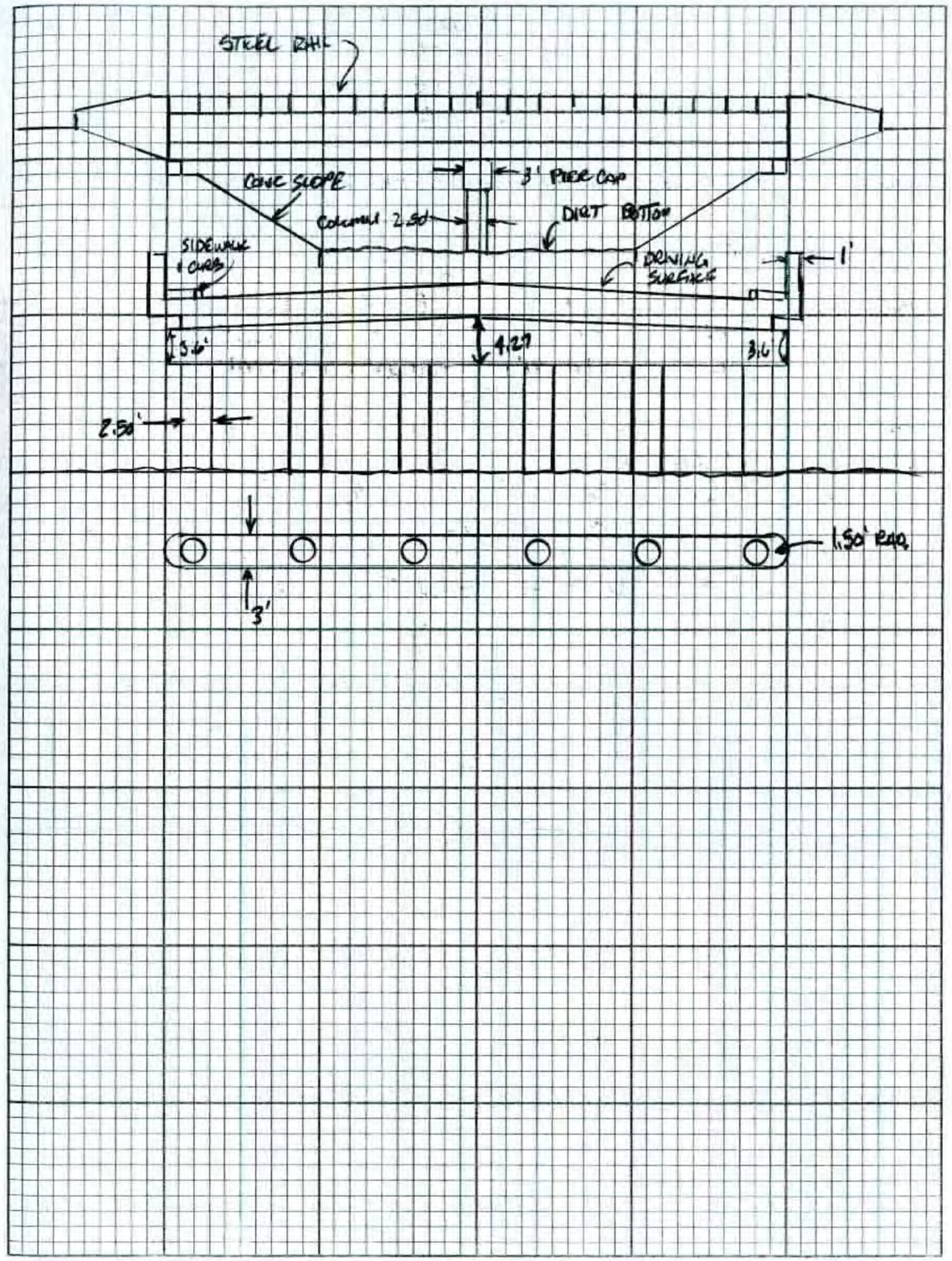
PG 12

FB 2015-89
JOB #5739
"AIRPORT"

3-27-15

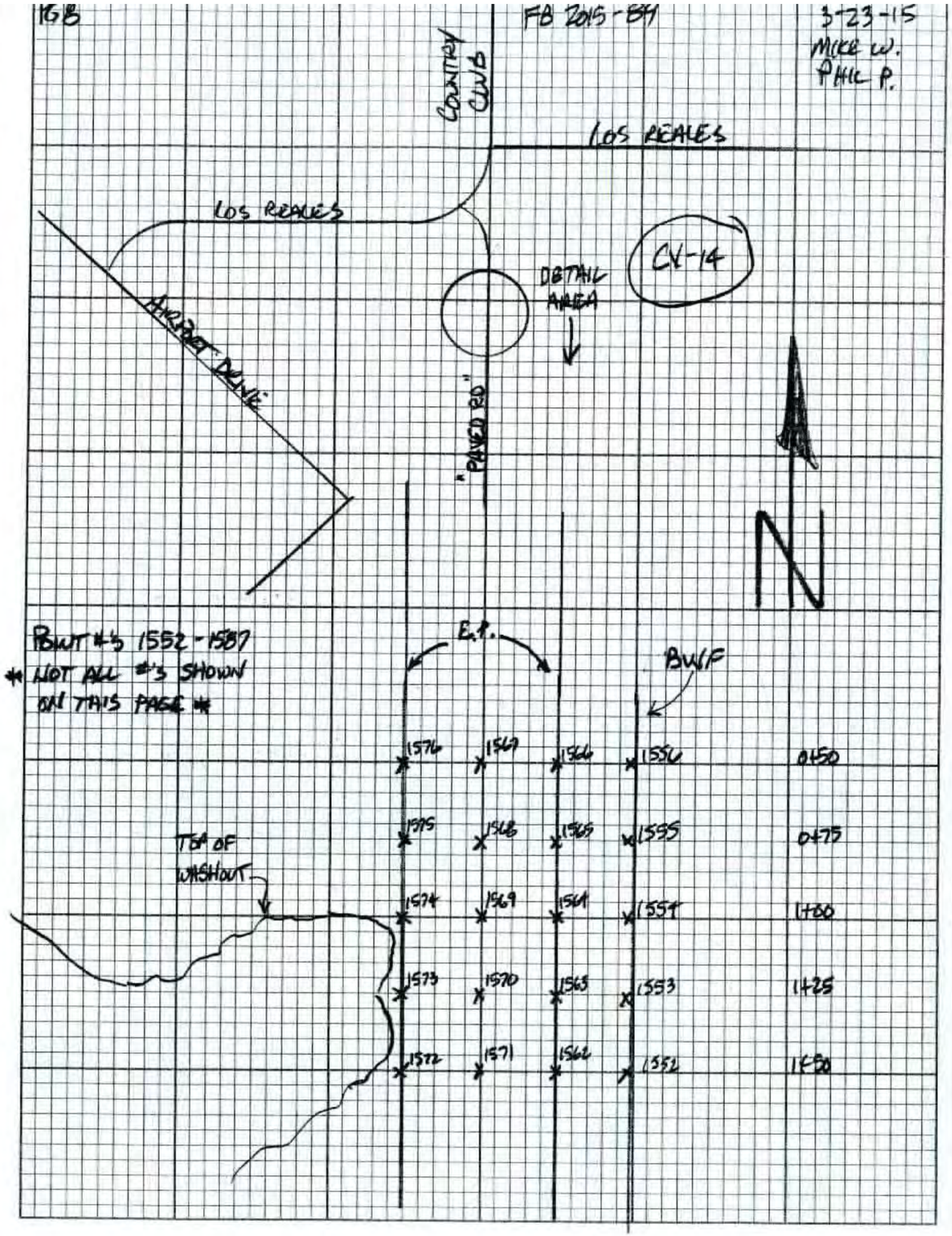
BR-10

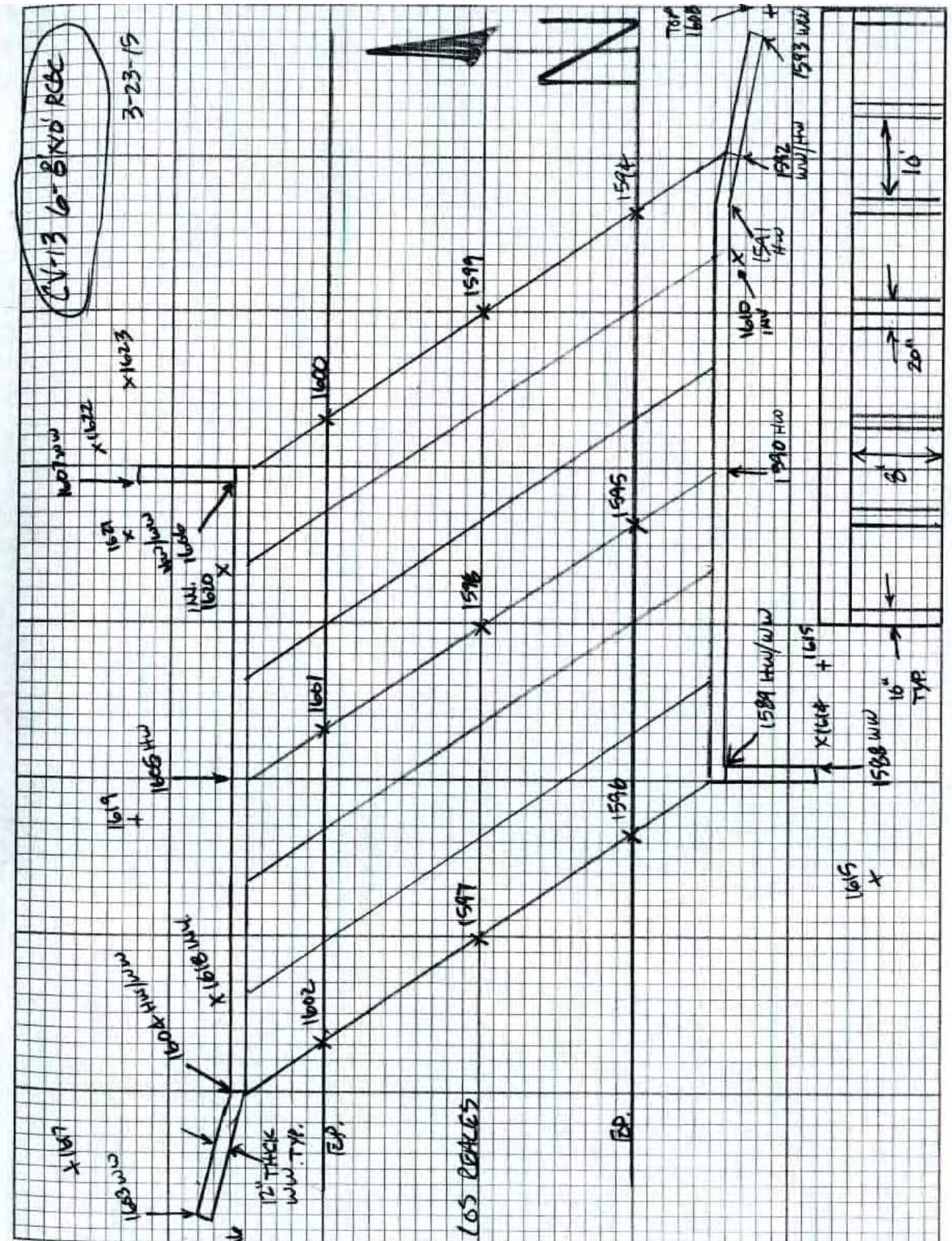




FB 2015-891

3-23-15
MIKE W.
PHIL P.





PointNo.	Northing(Y)	Easting(X)	Elev(Z)	Description
1553	407833.25	1006687.93	2611.77	NG AT BWF
1554	407858.12	1006687.99	2611.33	NG AT BWF
1555	407882.93	1006688.07	2611.57	NG AT BWF
1556	407907.91	1006688.15	2611.77	NG AT BWF
1557	407907.91	1006677.14	2611.68	GB
1558	407883.13	1006675.82	2611.56	GB
1559	407858.17	1006674.17	2610.96	GB
1560	407833.01	1006674.14	2611.36	GB
1561	407808.25	1006672.76	2611.39	GB
1562	407808.04	1006668.22	2611.80	EP
1563	407832.88	1006668.82	2611.72	EP
1564	407857.81	1006669.32	2611.71	EP
1565	407882.90	1006669.80	2612.08	EP
1566	407907.85	1006669.57	2612.31	EP
1567	407907.49	1006657.96	2612.56	PVMT
1568	407882.55	1006657.96	2612.43	PVMT
1569	407857.72	1006657.55	2612.25	PVMT
1570	407832.66	1006657.03	2612.11	PVMT
1571	407807.87	1006656.08	2612.12	PVMT
1572	407807.51	1006643.57	2611.82	EP
1573	407832.77	1006644.48	2611.90	EP
1574	407857.32	1006644.42	2612.03	EP
1575	407882.06	1006643.73	2612.08	EP
1576	407907.11	1006643.76	2612.11	EP
1577	407907.48	1006635.10	2611.25	NG
1578	407881.91	1006638.28	2610.61	NG
1579	407859.88	1006641.14	2610.72	TOP
1580	407858.61	1006641.13	2608.88	TOE
1581	407850.07	1006642.68	2605.07	FL
1582	407842.43	1006642.26	2604.61	TOE
1583	407841.78	1006642.26	2611.05	TOP
1584	407822.66	1006642.81	2611.38	TOP
1585	407820.55	1006642.72	2606.88	TOE
1586	407807.29	1006641.24	2606.21	TOE
1587	407806.33	1006641.35	2611.11	TOP
1588	408342.97	1005824.26	2603.95	.WINGWALL
1589	408358.62	1005824.06	2607.00	..WINGWALL
				.HEADWALL
1590	408359.08	1005880.51	2606.94	.HEADWALL
1591	408359.62	1005932.20	2606.96	.HEADWALL
1592	408358.39	1005939.86	2607.01	..HEADWALL
				.WINGWALL
1593	408352.86	1005977.33	2606.98	..WINGWALL
1594	408368.17	1005940.18	2606.48	EP
1595	408367.33	1005879.27	2606.02	EP
1596	408366.65	1005812.88	2605.85	EP
1597	408379.01	1005789.60	2605.97	PVMT
1598	408379.57	1005847.01	2606.19	PVMT
1599	408380.53	1005908.42	2606.60	PVMT
1600	408392.12	1005892.93	2606.30	EP
1601	408391.87	1005833.22	2605.88	EP
1602	408391.08	1005764.26	2605.56	EP

PointNo.	Northing(Y)	Easting(X)	Elev(Z)	Description
1603	408405.14	1005733.23	2603.96	.WINGWALL
1604	408399.80	1005764.61	2606.47	..WINGWALL
				.HEADWALL
1605	408400.31	1005821.79	2606.45	.HEADWALL
1606	408400.87	1005878.71	2606.45	..HEADWALL
				.WINGWALL
1607	408421.34	1005878.40	2606.34	..WINGWALL
1608	408352.01	1005981.62	2605.81	TOP
1609	408349.28	1005944.17	2596.67	TOE
1610	408358.73	1005907.44	2595.20	INV
1611	408344.99	1005901.26	2595.40	NG
1612	408358.27	1005863.38	2595.05	INV
1613	408345.97	1005839.16	2595.18	TOE
1614	408344.14	1005829.51	2601.96	TOP
1615	408336.58	1005814.32	2602.44	NG
1616	408404.77	1005723.51	2603.67	TOP
1617	408412.41	1005737.76	2595.65	TOE
1618	408400.49	1005778.95	2594.70	INV
1619	408409.68	1005808.69	2596.00	NG
1620	408401.03	1005858.18	2594.97	INV
1621	408419.22	1005863.15	2596.05	TOE
1622	408428.50	1005873.83	2603.83	TOP
1623	408423.48	1005891.37	2605.23	NG
1625	409444.16	1004082.05	2596.03	.BSW
1626	409444.17	1004077.06	2595.99	.TBC
1627	409444.02	1004076.42	2595.60	.EP
1628	409469.49	1004076.23	2595.86	.EP
1629	409484.41	1004053.18	2596.36	.EP
1630	409500.64	1004028.05	2595.98	.EP
1631	409487.92	1004028.17	2595.82	..EP
1632	409487.80	1004027.62	2596.40	.TBC1
1633	409500.79	1004027.47	2596.45	..TBC1
1634	409465.92	1004081.83	2596.25	.C..BSW
1635	409469.41	1004076.45	2596.21	.C
1636	409527.37	1004075.81	2596.62	.C
1637	409527.36	1004075.72	2596.08	GUT
1638	409584.75	1004075.17	2596.32	.C
1639	409580.56	1004080.56	2596.39	..C.BSW
1640	409600.40	1004080.34	2596.28	..BSW

REGISTERED LAND SURVEYOR
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ASHBY
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Ashby
SURVEYING & DRAFTING, INC.
717 N. SWAN ROAD
TUCSON, ARIZONA 85711
TEL: (520) 325-1991 · FAX: (520) 325-2074

COUNTRY CLUB RD.
POINT LIST
PIMA COUNTY, ARIZONA

DATE: JUNE 26, 2015

JOB NO: 5739

PointNo.	Northing(Y)	Easting(X)	Elev(Z)	Description
1641	409600.37	1004075.45	2596.17	.TBC1
1642	409600.39	1004074.74	2595.78	.EP
1643	409584.85	1004075.03	2595.89	.EP
1644	409584.84	1004075.57	2596.31	..TBC1
1645	409469.06	1004076.79	2596.28	..TBC
1646	409504.99	1004022.48	2596.61	.C
1647	409501.49	1004027.83	2596.54	.C
1648	409558.29	1004027.25	2596.54	.C
1649	409615.32	1004026.73	2595.96	.C
1650	409616.19	1004026.63	2595.99	.C
1651	409619.70	1004021.25	2596.10	..C
1652	409616.15	1004026.85	2595.55	.EP
1653	409616.53	1004026.10	2596.01	.TBC
1654	409635.48	1004026.12	2595.86	..TBC
1655	409635.64	1004026.81	2595.26	..EP
1656	409630.45	1004020.01	2595.61	COR CONC
1657	409631.27	1004012.95	2594.83	COR CONC
1658	409629.66	1004012.14	2594.83	TOP CONC
1659	409614.99	1004019.96	2591.45	TOP CONC
1660	409607.61	1004009.94	2585.46	TOE CONC
1661	409570.84	1004006.51	2585.96	NG
1662	409531.05	1004009.87	2585.60	TOE CONC
1663	409510.55	1004021.04	2591.81	TOP CONC
1664	409513.07	1004003.60	2595.44	TOP CONC
1665	409511.69	1004002.75	2595.43	COR CONC
1666	409502.12	1004010.68	2596.36	COR CONC
1667	409502.16	1004012.55	2596.26	TOP CONC
1668	409498.59	1004021.38	2595.72	TOP
1669	409495.17	1004021.48	2596.02	NG AT WALL
1670	409495.23	1004022.48	2596.34	NG AT WALL
1671	409500.81	1004022.45	2596.61	.C
1672	409500.90	1004027.95	2596.45	..C
1673	409542.59	1004051.97	2596.51	CONC
1674	409600.07	1004051.62	2596.11	EP
1675	409590.44	1004080.55	2596.30	CONC AT WALL
1676	409590.47	1004081.61	2596.22	CONC AT WALL
1677	409591.11	1004084.62	2596.28	TOP CONC
1678	409577.73	1004087.93	2593.86	TOP CONC
1679	409575.51	1004082.01	2591.80	TOP CONC
1680	409569.82	1004091.57	2592.13	TOP CONC-
1681	409560.79	1004098.69	2589.60	TOP CONC
1682	409553.33	1004095.05	2586.00	TOE CONC
1683	409514.40	1004094.87	2585.80	NG
1684	409480.32	1004093.10	2585.56	TOE CONC
1685	409470.87	1004083.17	2592.00	TOP CONC
1686	409455.80	1004083.04	2596.01	CONC AT WALL
1687	409455.50	1004095.69	2594.58	COR CONC
1688	409456.27	1004095.68	2594.82	TOP CONC
1689	409630.03	1004020.16	2595.57	CONC AT WALL
1690	409629.96	1004021.19	2595.42	NG AT WALL
2069	409483.95	1004082.59	2586.27	TOE CONC
2070	409470.30	1004080.31	2593.26	LOW CHORD
2071	409524.36	1004081.67	2585.75	NG
2072	409562.44	1004081.72	2586.50	TOE CONC
2073	409523.73	1004021.04	2586.06	TOE CONC
2074	409506.50	1004023.97	2593.58	LOW CHORD
2075	409488.47	1004052.03	2594.00	LOW CHORD
2076	409541.04	1004051.49	2594.16	LOW CHORD
2077	409559.19	1004023.50	2593.54	LOW CHORD
2078	409559.92	1004022.65	2589.99	BOT OF PIERCAP
2079	409560.36	1004024.90	2585.12	COLUMN
2080	409553.34	1004035.53	2584.73	COLUMN
2081	409546.47	1004046.23	2584.81	COLUMN
2082	409539.49	1004056.90	2584.02	COLUMN
2083	409532.48	1004067.70	2583.74	COLUMN
2084	409525.50	1004078.23	2584.03	COLUMN
2085	409523.33	1004078.94	2589.88	BOT OF PIERCAP
2086	409525.84	1004080.57	2589.84	BOT OF PIERCAP
2087	409523.06	1004079.75	2593.61	LOW CHORD
2088	409579.07	1004079.10	2593.39	LOW CHORD
2089	409597.37	1004050.81	2593.83	LOW CHORD
2090	409561.88	1004021.81	2585.39	NG
2091	409562.43	1004024.26	2590.02	BOT OF PIERCAP
2092	409600.50	1004020.60	2585.71	TOE CONC
2093	409615.48	1004022.82	2592.99	LOW CHORD
1691	409779.40	1003816.01	2594.70	.EP
1692	409778.87	1003816.10	2595.05	.TBC
1693	409771.74	1003807.34	2594.81	NG AT_WALL
1694	409770.71	1003807.51	2595.06	CONC AT_WALL
1695	409767.05	1003808.27	2594.81	COR CONC
1696	409760.82	1003812.64	2594.32	COR CONC
1697	409759.75	1003811.50	2594.32	TOP CONC
1698	409765.76	1003807.40	2594.69	TOP CONC-
1699	409767.06	1003794.98	2590.15	TOE CONC
1700	409766.63	1003792.37	2590.01	TOP CONC
1701	409772.83	1003791.27	2595.05	..TBC
1702	409773.24	1003790.47	2594.76	.EP

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COUNTRY CLUB RD.
POINT LIST
PIMA COUNTY, ARIZONA

DATE: JUNE 26, 2015
JOB NO: 5739
SHEET: 2 / 5

PointNo.	Northing(Y)	Easting(X)	Elev(Z)	Description
1690	409629.96	1004021.19	2595.42	NG AT WALL
2069	409483.95	1004082.59	2586.27	TOE CONC
2070	409470.30	1004080.31	2593.26	LOW CHORD
2071	409524.36	1004081.67	2585.75	NG
2072	409562.44	1004081.72	2586.50	TOE CONC
2073	409523.73	1004021.04	2586.06	TOE CONC
2074	409506.50	1004023.97	2593.58	LOW CHORD
2075	409488.47	1004052.03	2594.00	LOW CHORD
2076	409541.04	1004051.49	2594.16	LOW CHORD
2077	409559.19	1004023.50	2593.54	LOW CHORD
2078	409559.92	1004022.65	2589.99	BOT OF PIERCAP
2079	409560.36	1004024.90	2585.12	COLUMN
2080	409553.34	1004035.53	2584.73	COLUMN
2081	409546.47	1004046.23	2584.81	COLUMN
2082	409539.49	1004056.90	2584.02	COLUMN
2083	409532.48	1004067.70	2583.74	COLUMN
2084	409525.50	1004078.23	2584.03	COLUMN
2085	409523.33	1004078.94	2589.88	BOT OF PIERCAP
2086	409525.84	1004080.57	2589.84	BOT OF PIERCAP
2087	409523.06	1004079.75	2593.61	LOW CHORD
2088	409579.07	1004079.10	2593.39	LOW CHORD
2089	409597.37	1004050.81	2593.83	LOW CHORD
2090	409561.88	1004021.81	2585.39	NG
2091	409562.43	1004024.26	2590.02	BOT OF PIERCAP
2092	409600.50	1004020.60	2585.71	TOE CONC
2093	409615.48	1004022.82	2592.99	LOW CHORD
1691	409779.40	1003816.01	2594.70	.EP
1692	409778.87	1003816.10	2595.05	.TBC
1693	409771.74	1003807.34	2594.81	NG AT_WALL
1694	409770.71	1003807.51	2595.06	CONC AT_WALL
1695	409767.05	1003808.27	2594.81	COR CONC
1696	409760.82	1003812.64	2594.32	COR CONC
1697	409759.75	1003811.50	2594.32	TOP CONC
1698	409765.76	1003807.40	2594.69	TOP CONC-
1699	409767.06	1003794.98	2590.15	TOE CONC
1700	409766.63	1003792.37	2590.01	TOP CONC
1701	409772.83	1003791.27	2595.05	..TBC
1702	409773.24	1003790.47	2594.76	.EP
1703	409769.20	1003796.84	2595.23	.C
1704	409773.14	1003790.54	2595.10	.C
1705	409756.38	1003721.44	2595.58	.C
1706	409739.56	1003651.56	2595.32	.C
1707	409738.98	1003651.62	2595.29	.TBC
1708	409734.27	1003653.05	2595.48	..C
1709	409733.42	1003649.47	2595.22	NG AT_WALL
1710	409732.47	1003649.87	2595.05	CONC AT_WALL
1711	409732.63	1003650.70	2595.01	TOP CONC
1712	409729.15	1003653.96	2595.08	TOP CONC-
1713	409727.30	1003652.67	2595.11	TOP CONC-
1714	409725.50	1003658.85	2595.12	TOP CONC

PointNo.	Northing(Y)	Easting(X)	Elev(Z)	Description
1715	409727.25	1003659.51	2595.05	TOP CONC
1716	409734.38	1003632.39	2595.24	..TBC
1717	409735.05	1003632.29	2594.66	.EP1
1718	409739.65	1003651.63	2594.80	.EP1
1719	409735.33	1003663.16	2590.12	TOE CONC
1720	409736.05	1003666.16	2590.22	TOP CONC
1721	409758.02	1003623.37	2595.09	.EP1
1722	409775.40	1003596.39	2594.48	.EP1
1723	409775.82	1003595.73	2594.88	.TBC
1724	409779.56	1003589.95	2594.88	.C
1725	409775.54	1003596.29	2594.83	.C
1726	409771.09	1003576.13	2594.57	..TBC
1727	409770.49	1003576.24	2594.00	..EP1
1728	409777.04	1003579.50	2594.42	NG AT_WALL
1729	409778.05	1003579.22	2594.47	CONC AT_WALL
1730	409779.35	1003577.86	2594.45	COR CONC
1731	409780.09	1003578.46	2594.47	TOP CONC
1732	409786.93	1003574.19	2593.18	TOP
1733	409781.74	1003591.81	2590.24	TOE CONC
1734	409782.38	1003594.11	2590.18	TOP CONC
1735	409792.47	1003665.81	2595.58	.C
1736	409809.17	1003734.88	2595.36	.C
1737	409814.23	1003733.29	2595.43	..C
1855	409791.62	1003761.81	2595.08	.EP
1856	409774.66	1003692.96	2595.49	CONC
1857	409809.68	1003734.85	2595.25	.TBC
1858	409814.08	1003751.35	2595.00	..TBC
1859	409809.09	1003734.99	2594.84	.EP
1860	409814.50	1003754.81	2594.61	..EP
1861	409815.16	1003737.14	2595.19	NG AT_WALL
1862	409816.22	1003736.73	2595.09	NG AT_WALL
1863	409816.65	1003736.70	2595.19	TOP
1864	409824.39	1003717.16	2592.54	TOP
1865	409812.78	1003720.26	2590.24	TOP CONC
1866	409813.63	1003718.54	2590.26	COR CONC
2094	409741.76	1003684.82	2583.93	TOE CONC
2095	409737.61	1003659.99	2592.07	LOW CHORD
2096	409734.95	1003695.17	2583.81	TOE CONC

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SHEET: 3 / 5

PointNo.	Northing(Y)	Easting(X)	Elev(Z)	Description
2097	409745.74	1003737.26	2584.59	NG
2098	409752.26	1003727.13	2584.36	NG
2099	409752.31	1003725.18	2588.46	BOT OF_PIERCAP
2100	409754.72	1003726.76	2588.42	BOT OF_PIERCAP
2101	409752.94	1003723.79	2592.09	LOW CHORD
2102	409762.64	1003775.07	2584.30	TOE CONC
2103	409755.24	1003786.98	2584.37	TOE CONC
2104	409769.43	1003791.55	2591.50	LOW CHORD
2105	409758.59	1003627.35	2592.29	LOW CHORD
2106	409779.63	1003594.95	2591.39	LOW CHORD
2107	409786.57	1003613.96	2583.51	TOE CONC
2108	409795.19	1003601.13	2583.52	TOE CONC
2109	409796.40	1003659.71	2583.65	NG
2110	409804.71	1003647.75	2584.09	NG
2111	409795.93	1003663.26	2592.00	LOW CHORD
2112	409775.01	1003695.71	2592.60	LOW CHORD
2113	409790.39	1003759.23	2592.28	LOW CHORD
2114	409811.35	1003726.80	2591.98	LOW CHORD
2115	409813.27	1003723.47	2590.25	TOE CONC
2116	409812.54	1003720.50	2590.17	TOP CONC
2117	409813.73	1003718.53	2590.13	COR CONC
2118	409809.78	1003701.16	2584.56	TOE/COR CONC
2119	409807.73	1003703.10	2584.25	TOE CONC
2120	409817.30	1003688.86	2584.28	TOE
2121	409796.71	1003661.91	2588.36	BOT OF_PIERCAP
2122	409794.37	1003662.60	2583.16	COLUMN
2123	409787.83	1003672.94	2583.38	COLUMN
2124	409781.12	1003683.26	2583.43	COLUMN
2125	409774.49	1003693.48	2583.57	COLUMN
2126	409767.79	1003703.82	2583.08	COLUMN
2127	409761.22	1003714.05	2583.05	COLUMN
2128	409754.59	1003724.22	2583.90	COLUMN
2129	410718.86	1002574.94	2580.90	TOP
2130	410731.92	1002586.84	2575.63	TOE
2131	410738.58	1002586.27	2574.56	INV
2132	410726.79	1002582.15	2577.67	.WINGWALL
2133	410722.78	1002570.79	2582.23	.TBC
2134	410723.22	1002570.35	2581.71	.EP
2135	410735.46	1002580.84	2581.52	.EP
2136	410733.93	1002580.39	2582.27	..TBC
2137	410734.78	1002582.29	2581.29	..WINGWALL
2138	410734.71	1002581.74	2582.55	.HEADWALL
2139	410746.48	1002569.51	2581.55	.EP
2140	410757.64	1002558.11	2581.52	.EP
2141	410752.76	1002551.94	2581.57	.EP
2142	410757.88	1002557.68	2582.17	.TBC
2143	410753.44	1002551.57	2582.11	.TBC
2144	410751.42	1002547.83	2582.01	.TBC-
2145	410750.82	1002548.35	2581.54	.EP-
2146	410749.28	1002543.09	2581.51	..EP
2147	410749.82	1002542.95	2581.98	..TBC
2148	410753.12	1002550.44	2581.29	TOP CONC
2149	410761.06	1002542.42	2581.19	TOP CONC
2150	410755.81	1002537.69	2580.95	NG
2151	410734.53	1002557.91	2581.72	PVMT
2152	410773.83	1002596.35	2581.54	CONC
2153	410789.42	1002635.31	2582.49	..HEADWALL
2154	410788.85	1002634.97	2581.47	.WINGWALL
2155	410789.79	1002635.12	2581.96	.TBC
2156	410799.87	1002643.73	2582.28	..TBC
2157	410800.38	1002643.26	2581.78	.EP
2158	410790.17	1002634.67	2581.46	.EP
2159	410788.64	1002641.15	2578.62	..WINGWALL
2160	410793.85	1002646.35	2581.11	TOP
2161	410783.55	1002637.40	2575.66	TOE
2162	410784.88	1002631.76	2574.60	INV
2163	410754.51	1002614.92	2574.66	NG
2164	410813.75	1002634.01	2581.79	PVMT
2165	410801.53	1002622.96	2581.52	.EP
2166	410811.94	1002612.37	2581.43	.EP
2167	410812.19	1002611.75	2581.94	.TBC
2168	410821.51	1002619.99	2582.13	..TBC
2169	410821.19	1002620.51	2581.60	..EP
2170	410826.11	1002617.33	2581.53	NG
2171	410821.46	1002614.73	2581.32	TOP CONC
2172	410827.50	1002608.46	2581.37	TOP CONC
2173	410819.53	1002610.25	2578.23	.WINGWALL
2174	410812.66	1002610.63	2581.51	..WINGWALL
2175	410812.97	1002611.15	2582.48	.HEADWALL
2176	410812.06	1002611.64	2581.45	CONC
2177	410785.68	1002584.31	2582.50	CONC
2178	410784.83	1002585.07	2581.48	CONC
2179	410762.71	1002607.70	2581.48	CONC
2180	410762.00	1002608.47	2582.53	CONC
2181	410758.30	1002557.54	2582.53	..HEADWALL
2182	410758.82	1002557.84	2581.49	.WINGWALL

REGISTERED LAND SURVEYOR
CERTIFICATE NO.
19316
T. WAYNE
ASHBY
Date Signed 06/26/2015
ARIZONA U.S.A.

EXPIRES 3/31/2017

Ashby
SURVEYING & DRAFTING, INC.
717 N. SWAN ROAD
TUCSON, ARIZONA 85711
TEL: (520) 325-1991 · FAX: (520) 325-2074

COUNTRY CLUB RD.
POINT LIST
PIMA COUNTY, ARIZONA

DATE: JUNE 26, 2015
JOB NO: 5739
SHEET: 4 / 5

PointNo.	Northing(Y)	Easting(X)	Elev(Z)	Description
2183	410759.04	1002550.84	2578.31	..WINGWALL
2184	410761.84	1002553.45	2575.72	TOE CONC
2185	410762.78	1002561.42	2574.63	INV
2186	410792.77	1002577.17	2574.69	NG
2187	410809.15	1002606.87	2574.60	INV
2188	410817.23	1002606.94	2575.72	TOE CONC
1916	412176.17	1001521.92	2567.73	TOP
1917	412160.00	1001526.81	2567.59	TOP/EP
1918	412170.75	1001516.17	2563.45	.WW
1919	412156.55	1001522.87	2566.54	..WW
1920	412156.91	1001523.55	2566.88	.HDWL
1921	412154.81	1001521.58	2567.55	.HDWL
1922	412154.17	1001522.27	2567.56	EP
1923	412121.69	1001490.41	2567.48	EP
1924	412122.39	1001489.72	2567.43	.HDWL
1925	412088.51	1001456.56	2567.53	.HDWL
1926	412086.44	1001454.53	2566.87	..HDWL
1927	412087.17	1001454.92	2566.50	.WW
1928	412085.79	1001455.34	2567.54	EP
1929	412082.64	1001447.42	2567.39	TOP/EP
1930	412088.31	1001435.23	2567.96	TOP
1931	412093.47	1001440.90	2563.49	..WW
1932	412103.13	1001445.96	2560.88	TOE
1933	412093.94	1001461.45	2559.44	INV
1934	412118.06	1001484.01	2559.38	INV
1935	412135.20	1001475.52	2561.30	NG
1936	412166.41	1001510.38	2561.49	TOE
1937	412155.03	1001521.03	2561.32	SILT
1938	412153.57	1001520.01	2559.46	INV
1939	412129.48	1001495.67	2561.69	SILT
1940	412122.41	1001554.60	2569.69	PVMT
1941	412088.28	1001520.95	2569.57	PVMT
1942	412054.78	1001487.96	2569.61	PVMT
1943	412028.57	1001513.79	2569.98	PVMT
1944	412061.79	1001546.39	2569.98	PVMT
1945	412096.58	1001580.73	2570.14	PVMT
1946	412070.85	1001607.04	2569.70	PVMT
1947	412038.06	1001574.81	2569.54	PVMT
1948	412004.81	1001542.16	2569.55	PVMT
1949	411965.46	1001503.57	2569.60	PVMT
1950	411933.76	1001536.45	2568.90	PVMT
1951	411970.70	1001572.81	2568.67	PVMT
1952	412010.36	1001611.97	2568.92	PVMT
1953	412005.85	1001642.54	2568.45	EP
1954	411991.25	1001631.38	2568.32	EP
1955	411989.64	1001642.45	2565.75	.WW
1956	411989.53	1001631.23	2568.28	..WW
1957	411990.46	1001631.89	2568.57	.HDWL
1958	411988.39	1001629.84	2569.35	.HDWL
1959	411951.95	1001593.92	2569.30	.HDWL
1960	411952.59	1001593.24	2568.38	EP
1961	411915.51	1001556.59	2568.62	EP
1962	411909.57	1001548.94	2568.47	EP
1963	411916.54	1001559.05	2569.45	.HDWL
1964	411914.50	1001557.08	2568.77	..HDWL
1965	411915.06	1001557.91	2568.42	.WW
1966	411903.90	1001558.24	2566.48	..WW
1967	411895.09	1001551.71	2566.26	NG
1968	411903.53	1001558.02	2565.58	TOP
1969	411906.72	1001561.61	2561.33	TOE
1970	411914.89	1001558.88	2561.30	INV
1971	411951.01	1001594.46	2560.99	INV
1972	411940.20	1001599.09	2561.20	NG
1973	411988.25	1001631.09	2560.66	INV
1974	411984.73	1001638.70	2560.21	TOE
1975	411989.70	1001643.06	2564.69	TOP
1976	411997.58	1001651.85	2566.78	NG

T. Wayne Ashby

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COUNTRY CLUB RD.
POINT LIST
PIMA COUNTY, ARIZONA

DATE: JUNE 26, 2015

JOB NO: 5739

SHEET: 5 / 5

DRAINAGE STRUCTURES

FROM ALVERNON WAY TO COUNTRY CLUB RD.

FOR

CULVERT IDs:
CV15, CV16, CV17 & CV19

PG #

PD 2015-69
JOB # 5739
CMG DRAINAGE
"REVERION"

5-16-15
MIKE W
PHIL P.

LOCALIZATION: HELO # 30/130 FOR HORIZ & VERT, HELO # 33/133 FOR HORIZ. ONLY

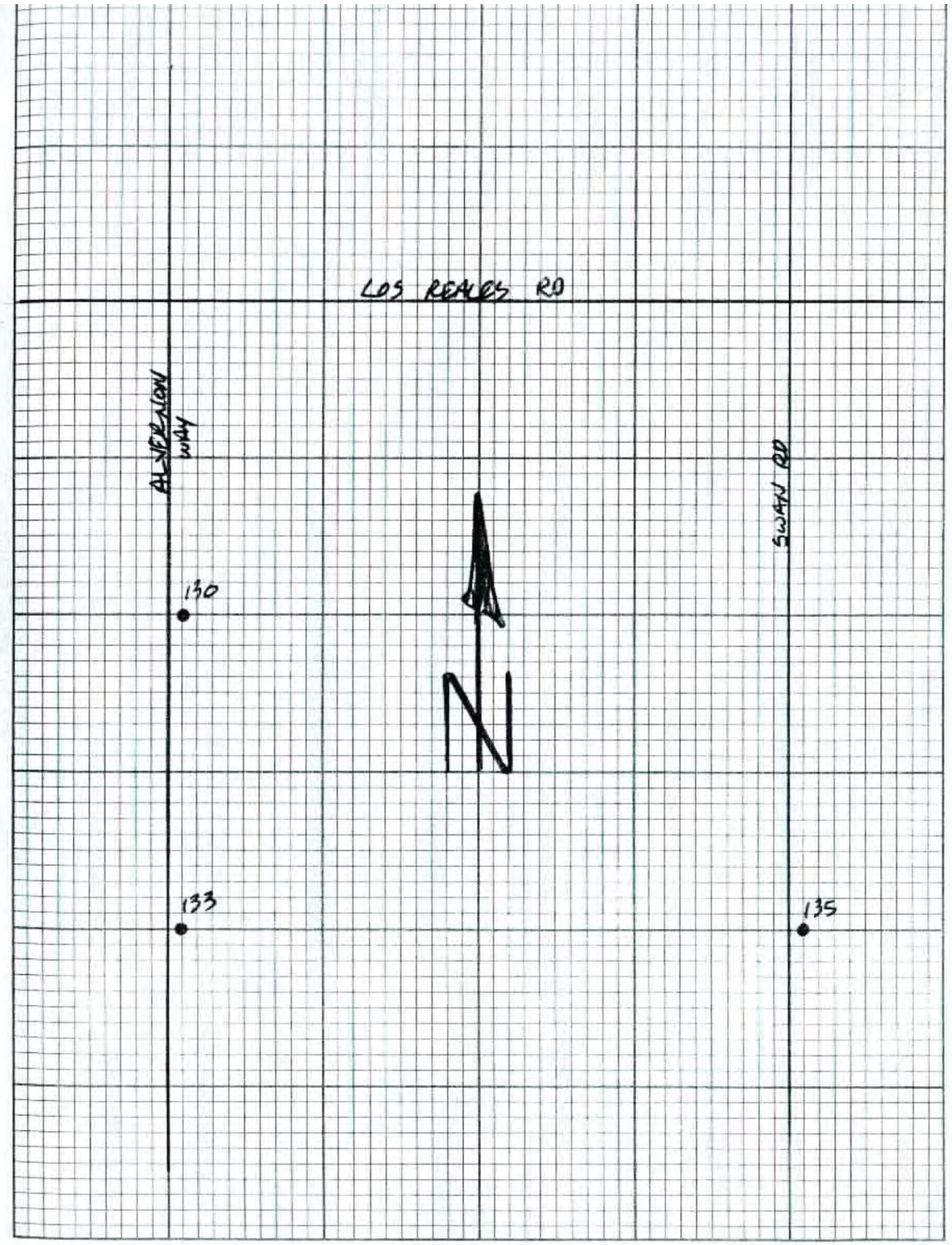
SCALE 1.00000485

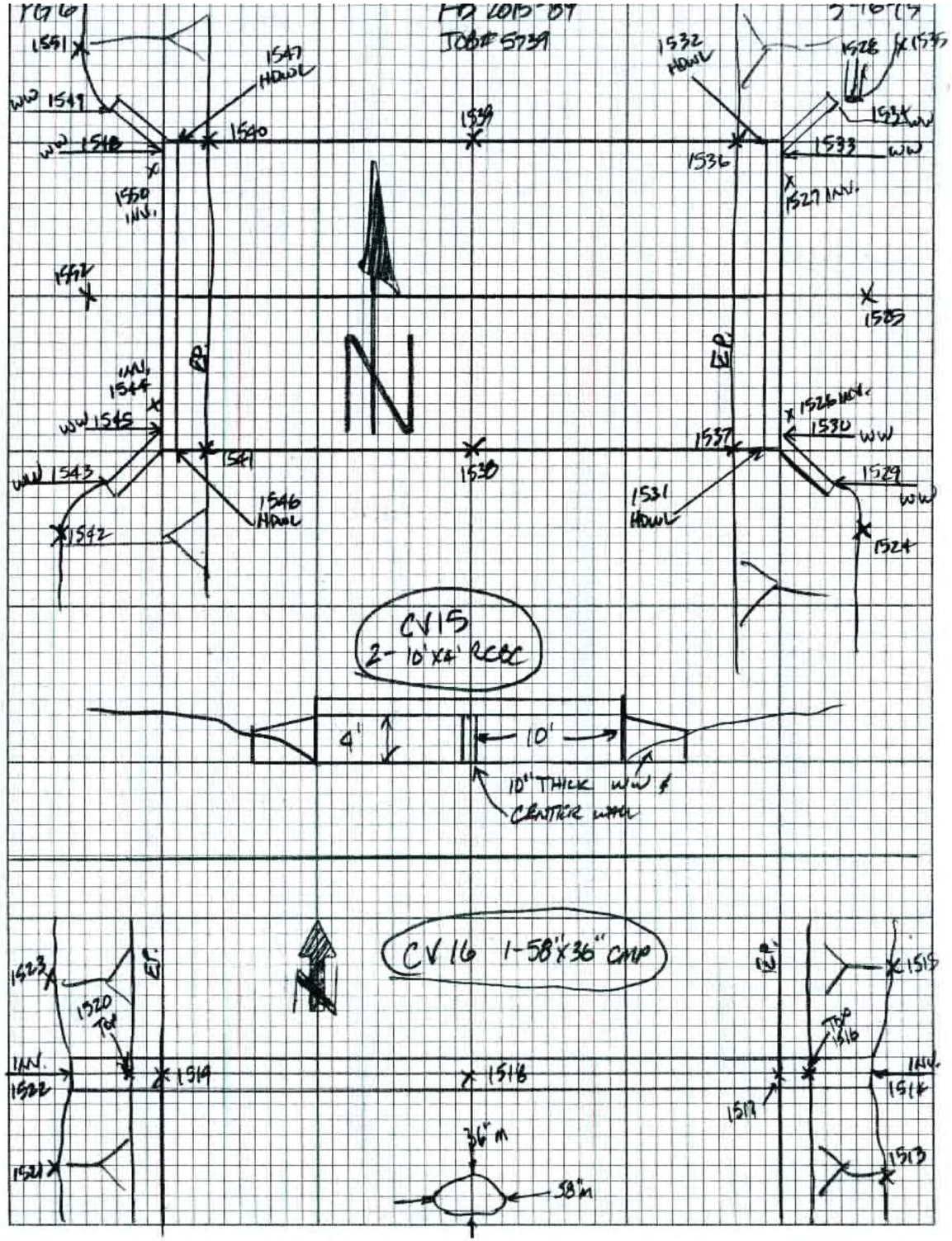
CHECK POINTS

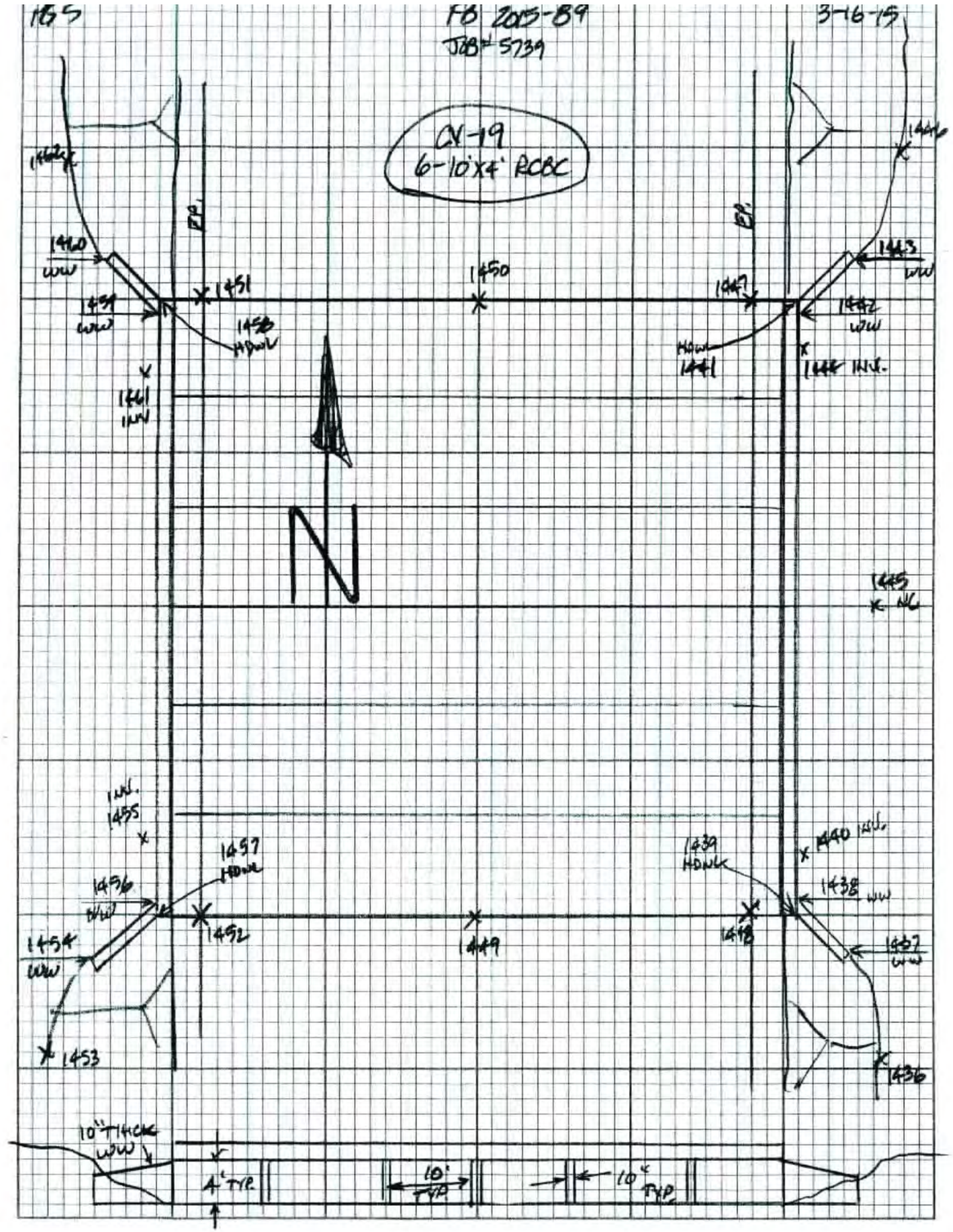
#	N	E	ELEV
33	0.00	0.00	+0.112
35	-0.143'	-0.115	-0.088'

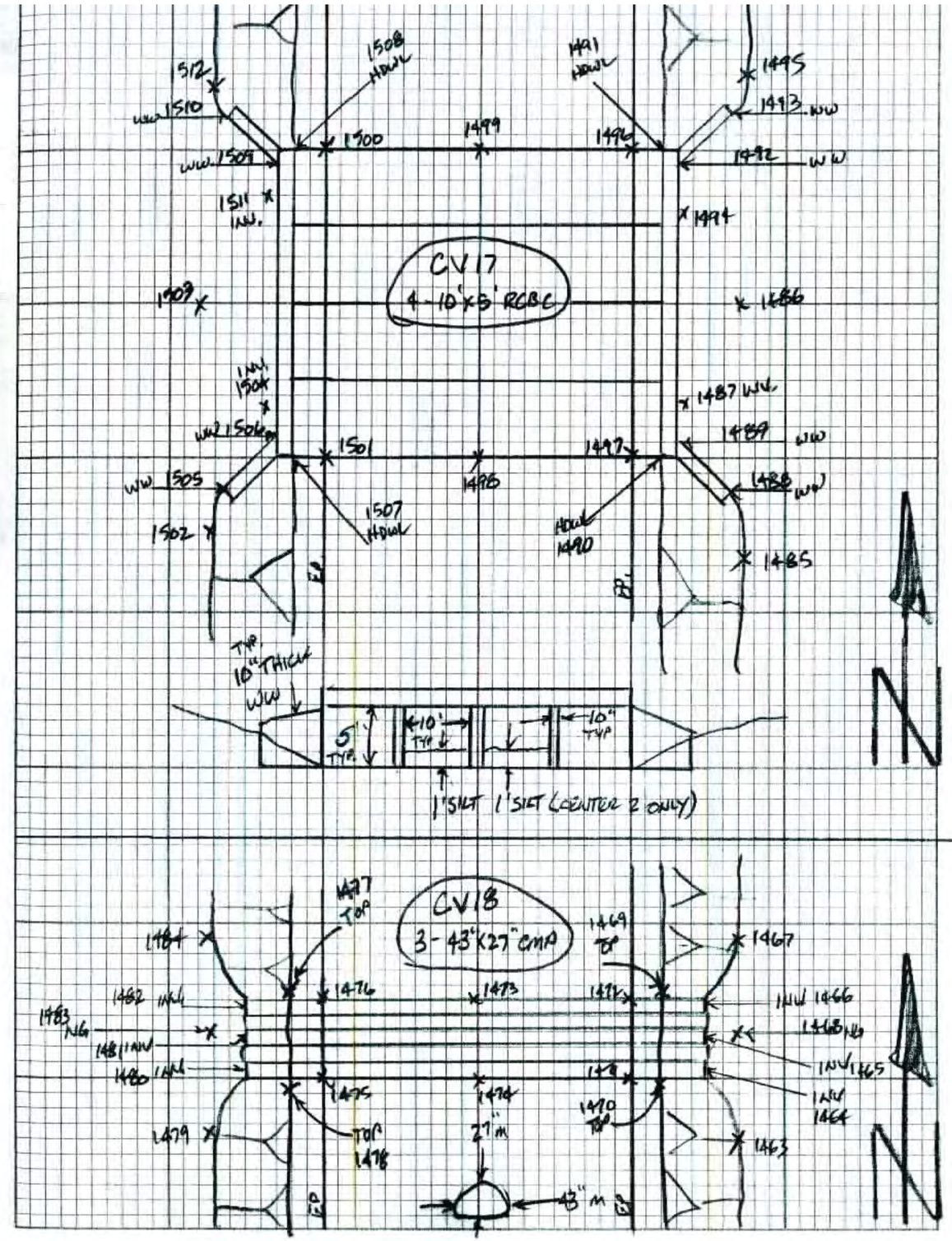
POINT #

CALC	FIELD	DESCRIPTION
	98	SET 60D NAIL FOR GPS CONTROL POINT
30	130	1 1/2" ACP RLS 20323 C.O.T. GPS IP13
33	133	1 1/2" ACP LS 8024 21/22/27/28
35	135	3 1/4" AC RLS 18219 22/23/26/27




JOB# 5739
1551
1547 HDWL
WW 1549
WW 1548
1540
1539
1532 HDWL
1528
1535
1534 WW
1533 WW
1536
1527 INV.
1550 INV.
1552
1585
INV. 1544
WW 1545
1541
1538
1537
1526 INV.
1530 WW
1529 WW
WW 1543
1546 HDWL
1531 HDWL
1542
1524
CV15
2-10'x4' RCBC
4'
10'
10" THICK W/W &
CENTER WALL
CV16 1-58"x36" CMP
1523
1520 TOP
INV. 1522
1521
1514
1516
1515
TOP 1516
INV. 1514
1517
1513
36" M
58" M


FB 2015-89
JOB# 5739
3-16-15
CV-19
6-10'x4' RCBC
EP
1460 WW
1459 WW
1458 HDWL
1461 INV
1451
1450
1449
1441
1442 WW
1443 WW
1444 INV.
1445 INV.
1455 INV.
1457 HDWL
1456 WW
1454 WW
1453
1452
1439 HDWL
1440 INV.
1438 WW
1437 WW
1436
10" THICK WW
4' TYP
10' TYP
10' TYP


1512
1510 WW
1509 WW
1508 HDWL
1500
1499
1496
1491 HDWL
1495
1493 WW
1492 WW
1511 INV.
1494
CV17
4-10'x5' RCBC
1509
1486
INV 1504
1506 WW
1487 INV.
1489 WW
1501
1497
1498
1505 WW
1488 WW
1507 HDWL
1502
1490 HDWL
1485
EP
TYP 10" THICK WW
5' TYP
10' TYP
10" TYP
1' SILT
1' SILT (CENTER 2 ONLY)

CV18
3-43"x27" CMA
1477 TOP
1469 TOP
1484
1467
1482 INV
1476
1473
1472
INV 1466
1483 INV
1468 INV
1481 INV
1480 INV
1475
1474
1470 TOP
INV 1465
INV 1464
1479
TOP 1478
27" M
43" M
1463

PointNo.	Northing(Y)	Easting(X)	Elev(Z)	Description
1436	402433.13	1011934.29	2661.56	NG
1437	402442.90	1011923.87	2662.80	.WINGWALL
1438	402447.34	1011919.51	2665.49	..WINGWALL
1439	402446.74	1011919.36	2666.47	.HEADWALL
1440	402450.84	1011919.51	2660.56	INV
1441	402512.35	1011918.94	2666.53	..HEADWALL
1442	402511.91	1011919.10	2665.55	.WINGWALL
1443	402516.03	1011923.60	2662.72	..WINGWALL
1444	402508.97	1011919.34	2660.81	INV
1445	402479.93	1011928.25	2661.60	NG
1446	402526.82	1011937.13	2662.09	NG
1447	402512.52	1011914.68	2666.90	EP
1448	402446.36	1011915.06	2666.88	EP
1449	402445.93	1011897.27	2667.11	PVMT
1450	402511.60	1011896.76	2667.11	PVMT
1451	402512.02	1011878.69	2666.78	EP
1452	402446.08	1011878.42	2666.66	EP
1453	402432.12	1011859.74	2662.59	NG
1454	402442.59	1011871.25	2662.94	.WINGWALL
1455	402456.83	1011874.96	2660.68	INV
1456	402446.72	1011875.49	2665.62	..WINGWALL
1457	402446.25	1011875.71	2666.59	.HEADWALL
1458	402511.78	1011875.20	2666.64	..HEADWALL
1459	402511.27	1011875.06	2665.67	.WINGWALL
1460	402515.70	1011870.66	2662.86	..WINGWALL
1461	402501.81	1011874.80	2660.80	INV
1462	402526.15	1011858.59	2661.68	NG
1463	404714.02	1011919.39	2655.60	NG
1464	404724.01	1011915.39	2654.61	INV
1465	404729.85	1011915.50	2654.50	INV
1466	404735.89	1011915.51	2654.67	INV
1467	404746.75	1011920.35	2655.02	NG
1468	404730.00	1011921.57	2654.85	NG
1469	404736.23	1011908.62	2658.05	TOP
1470	404723.48	1011908.34	2658.28	TOP
1471	404723.16	1011902.79	2658.86	EP
1472	404736.18	1011902.88	2658.77	EP
1473	404736.89	1011883.97	2659.08	PVMT
1474	404722.62	1011883.75	2659.16	PVMT
1475	404724.62	1011865.94	2658.66	EP
1476	404736.96	1011865.68	2658.54	EP
1477	404737.17	1011861.19	2657.67	TOP
1478	404724.18	1011861.10	2657.93	TOP
1479	404715.76	1011845.68	2654.44	NG
1480	404724.69	1011850.48	2654.24	INV
1481	404730.36	1011850.58	2654.20	INV
1482	404736.58	1011850.81	2654.08	INV
1483	404731.05	1011843.93	2653.74	NG
1484	404749.51	1011846.63	2654.43	NG
1485	405992.32	1011916.11	2648.38	NG
1486	406030.24	1011913.51	2648.69	NG
1487	406010.40	1011899.67	2647.09	INV
1488	406003.69	1011904.37	2649.94	.WINGWALL
1489	406008.56	1011899.48	2653.18	..WINGWALL
1490	406008.06	1011899.20	2654.16	.HEADWALL
1491	406051.98	1011898.99	2654.13	..HEADWALL
1492	406051.56	1011899.16	2653.24	.WINGWALL
1493	406056.51	1011903.97	2649.92	..WINGWALL
1494	406043.64	1011899.53	2647.25	INV
1495	406066.01	1011916.61	2649.14	NG
1496	406052.06	1011894.93	2654.32	EP
1497	406007.53	1011894.69	2654.54	EP
1498	406007.38	1011876.31	2654.84	PVMT
1499	406051.74	1011876.10	2654.73	PVMT
1500	406052.05	1011858.44	2654.47	EP
1501	406007.81	1011858.36	2654.28	EP
1502	405986.13	1011837.22	2648.52	NG
1503	406029.19	1011841.35	2647.71	NG
1504	406012.58	1011855.06	2647.21	INV
1505	406003.35	1011850.19	2649.91	.WINGWALL
1506	406008.27	1011855.18	2653.25	..WINGWALL
1507	406007.81	1011855.45	2654.20	.HEADWALL
1508	406051.77	1011855.17	2654.00	..HEADWALL
1509	406051.29	1011854.90	2653.09	.WINGWALL
1510	406056.26	1011849.93	2649.86	..WINGWALL
1511	406046.37	1011854.64	2647.13	INV
1512	406071.14	1011837.31	2648.78	NG

REGISTERED LAND SURVEYOR
CERTIFICATE NO.
19316
T. WAYNE
ASHBY
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ALVERNON WAY
POINT LIST
PIMA COUNTY, ARIZONA

DATE: JUNE 26, 2015
JOB NO: 5739
SHEET: 1 / 2

PointNo.	Northing(Y)	Easting(X)	Elev(Z)	Description
1513	406767.98	1011908.73	2647.47	NG
1514	406780.49	1011905.02	2646.48	INV
1515	406792.05	1011908.32	2647.29	NG
1516	406780.92	1011896.53	2651.13	TOP
1517	406780.40	1011890.17	2651.72	EP
1518	406780.83	1011871.50	2652.19	PVMT
1519	406779.45	1011853.20	2651.76	EP
1520	406779.68	1011845.31	2650.34	TOP
1521	406768.55	1011832.78	2646.34	NG
1522	406779.62	1011838.26	2646.00	INV
1523	406791.94	1011835.41	2646.94	NG
1524	407957.52	1011902.92	2646.47	NG
1525	407980.67	1011898.72	2645.30	NG
1526	407970.25	1011887.46	2645.24	INV
1527	407990.80	1011887.08	2645.29	INV
1528	407994.41	1011892.83	2645.35	INV 24IN RCP
1529	407965.67	1011891.63	2647.47	.WINGWALL
1530	407969.92	1011887.34	2650.20	..WINGWALL
1531	407969.49	1011887.13	2651.19	.HEADWALL
1532	407991.79	1011886.86	2651.23	..HEADWALL
1533	407991.23	1011887.08	2650.24	.WINGWALL
1534	407995.36	1011891.58	2647.49	..WINGWALL
1535	408005.72	1011908.44	2646.55	NG
1536	407991.76	1011883.76	2651.37	EP
1537	407969.17	1011883.60	2651.43	EP
1538	407969.32	1011865.28	2651.81	PVMT
1539	407991.56	1011865.08	2651.77	PVMT
1540	407991.83	1011847.29	2651.56	EP
1541	407968.87	1011847.54	2651.49	EP
1542	407951.73	1011825.25	2646.02	NG
1543	407965.28	1011838.90	2647.21	.WINGWALL
1544	407969.87	1011843.00	2644.91	INV
1545	407969.60	1011843.12	2649.96	..WINGWALL
1546	407969.11	1011843.37	2650.96	.HEADWALL
1547	407991.34	1011843.13	2650.91	..HEADWALL
1548	407990.93	1011842.88	2649.94	.WINGWALL
1549	407995.14	1011838.64	2647.17	..WINGWALL
1550	407990.44	1011842.88	2644.93	INV
1551	408007.52	1011826.86	2645.75	NG
1552	407980.43	1011827.13	2643.54	NG

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ALVERNON WAY
POINT LIST
PIMA COUNTY, ARIZONA

DATE: JUNE 26, 2015
JOB NO: 5739
SHEET: 2 / 2

DRAINAGE STRUCTURES

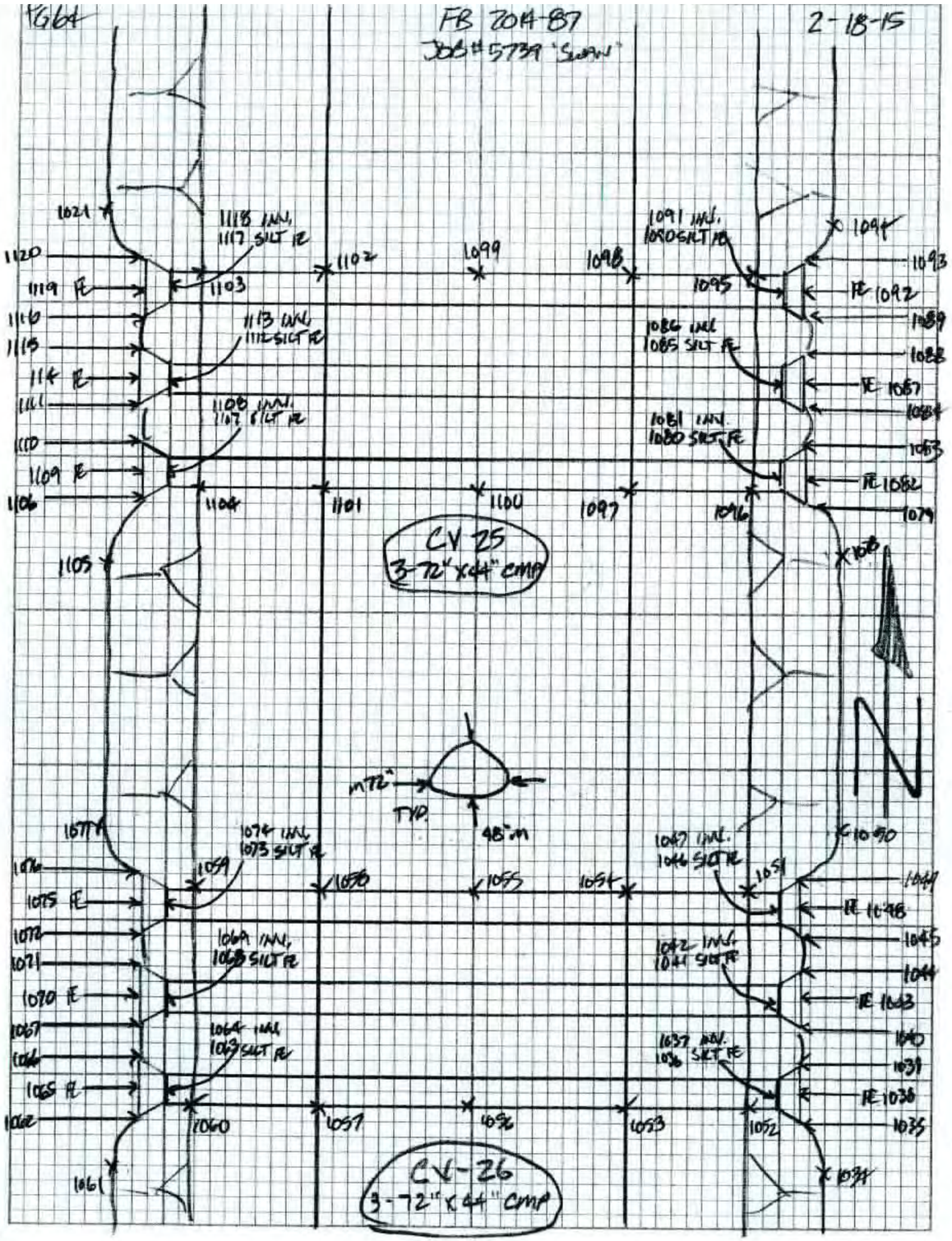
FROM SWAN RD TO ALVERNON WAY

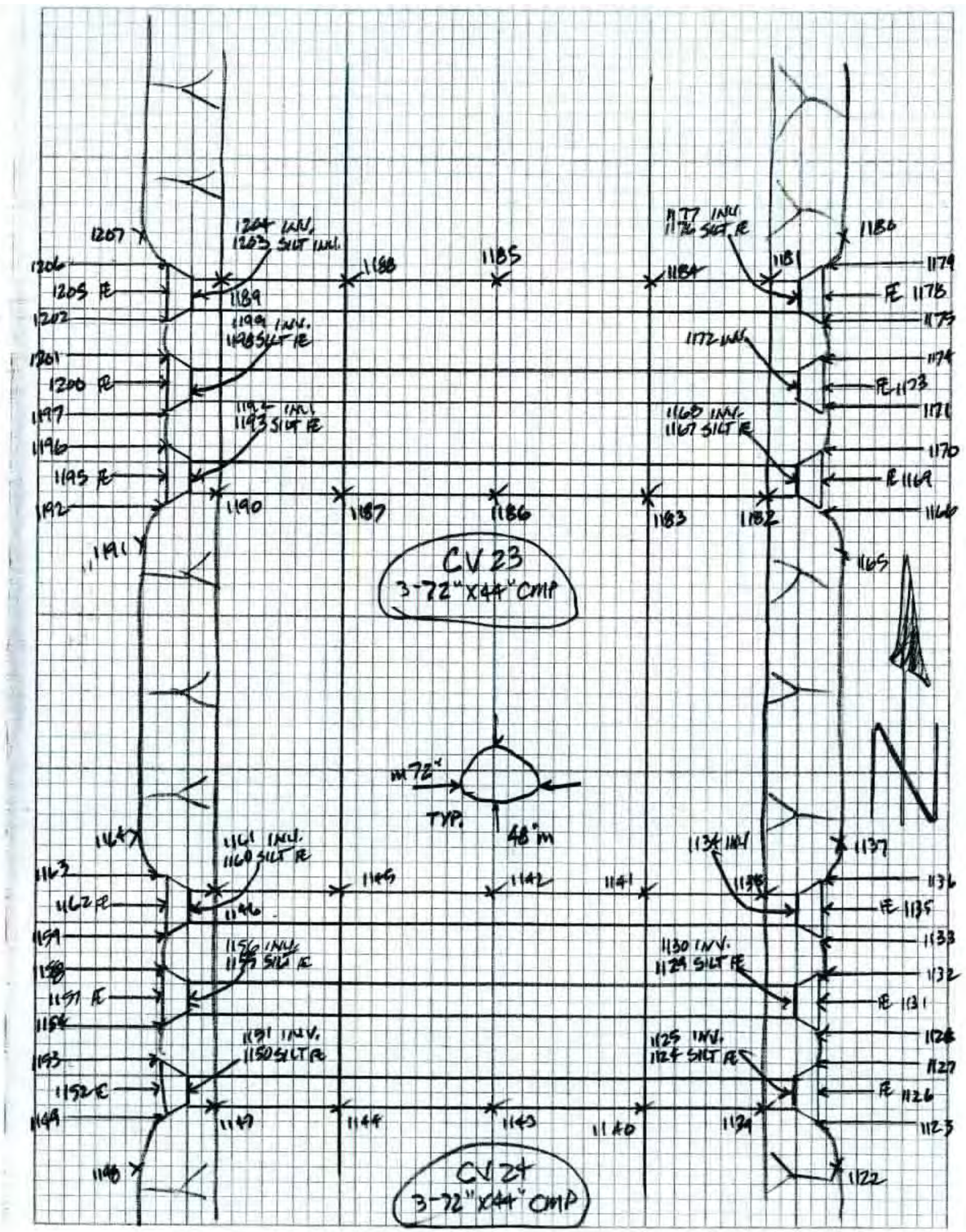
FOR

CULVERT IDs:
CV23 – CV40

FB 204-87
JOB #5739 "SLOAN"

2-18-15

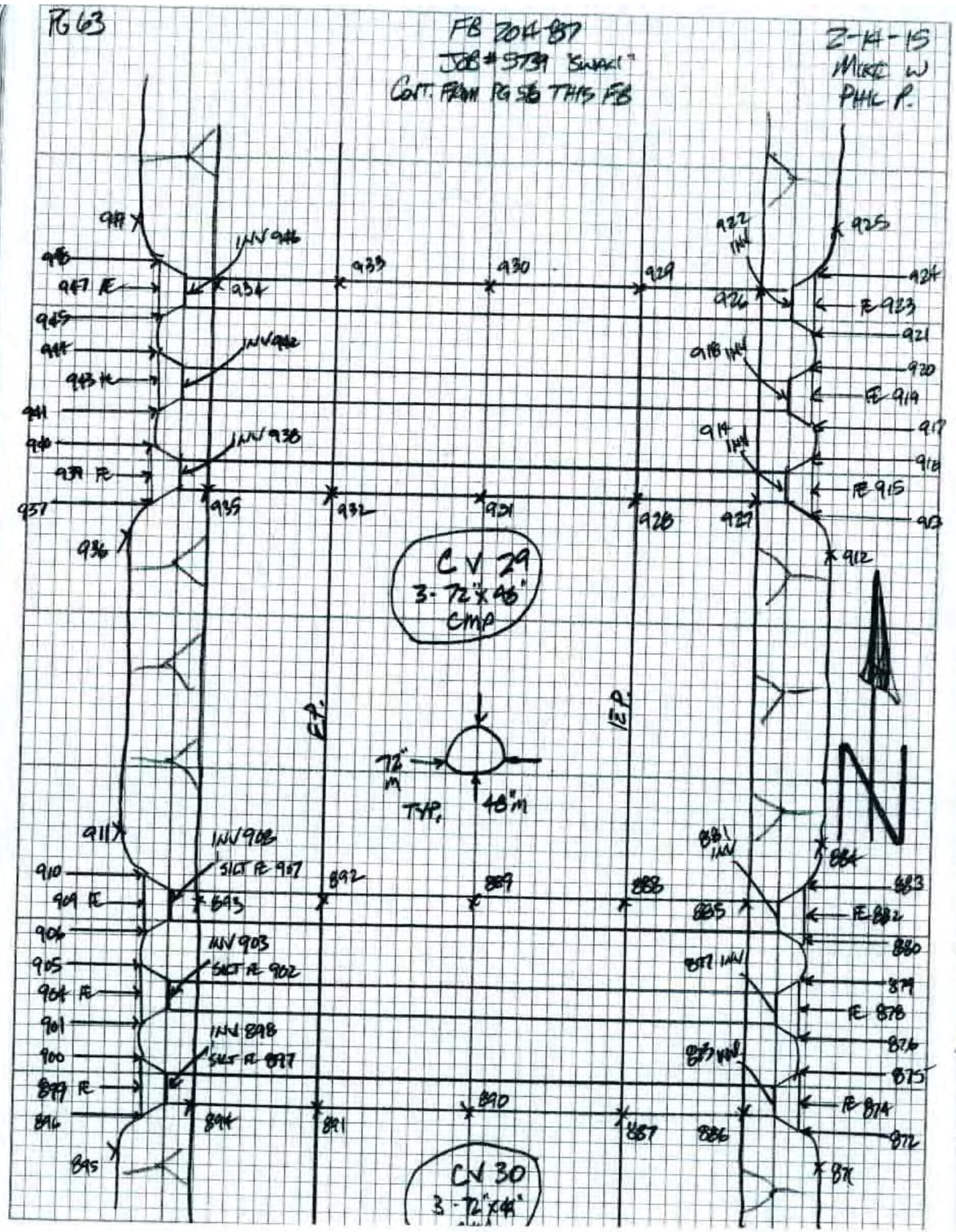


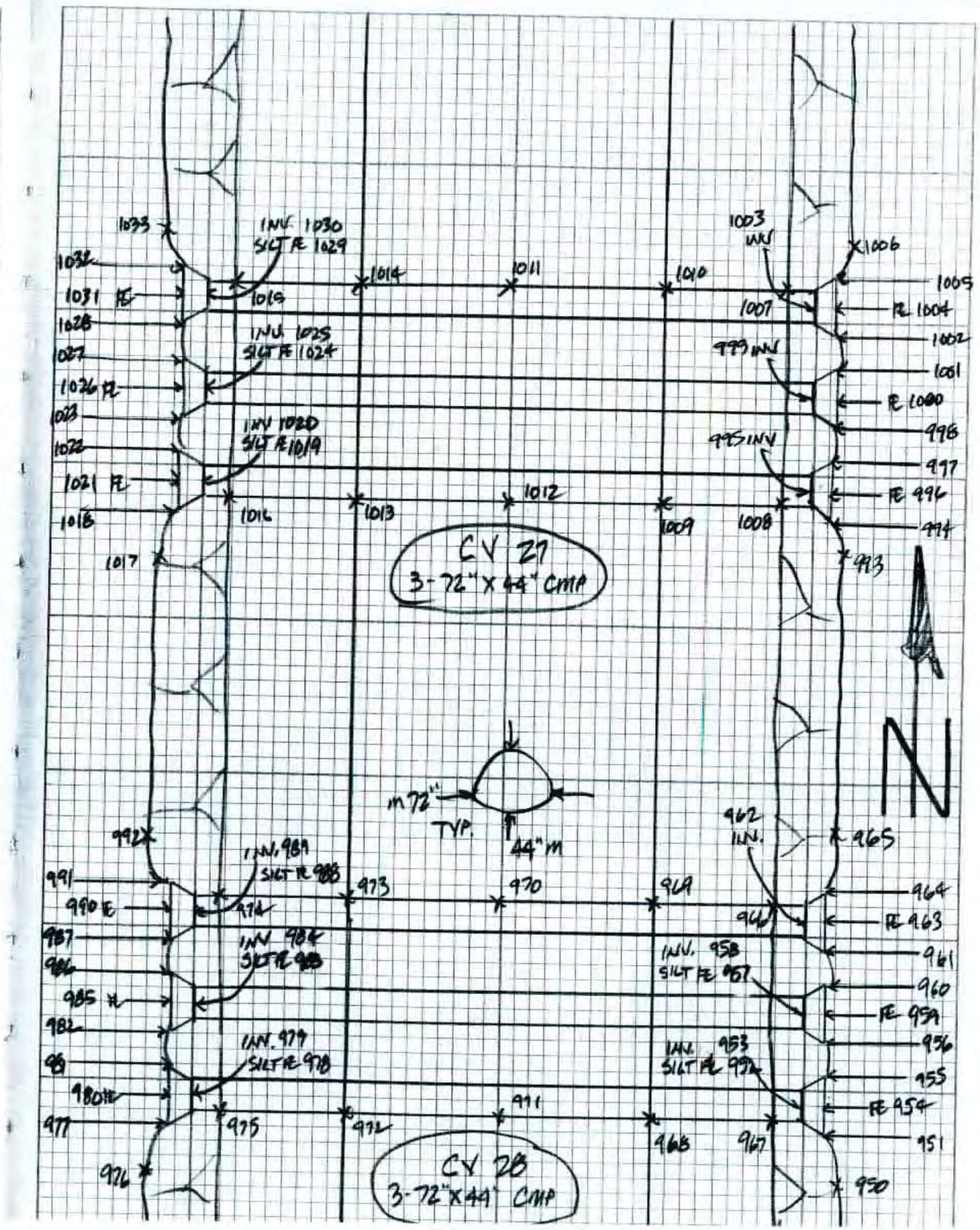


PG 63

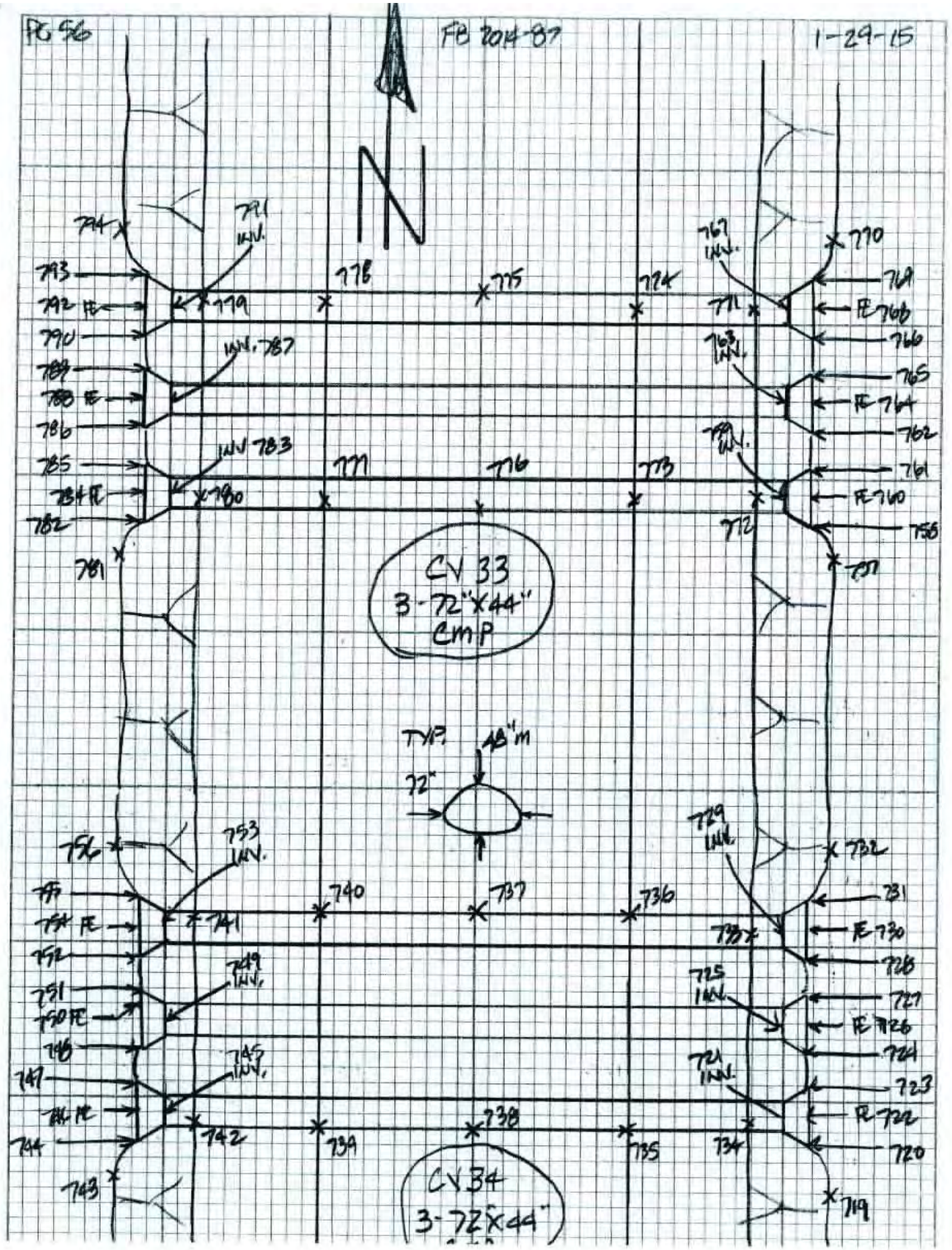
FB 2014-87
JOB # 5739 "SNACK"
CONT. FROM PG 56 THIS FB

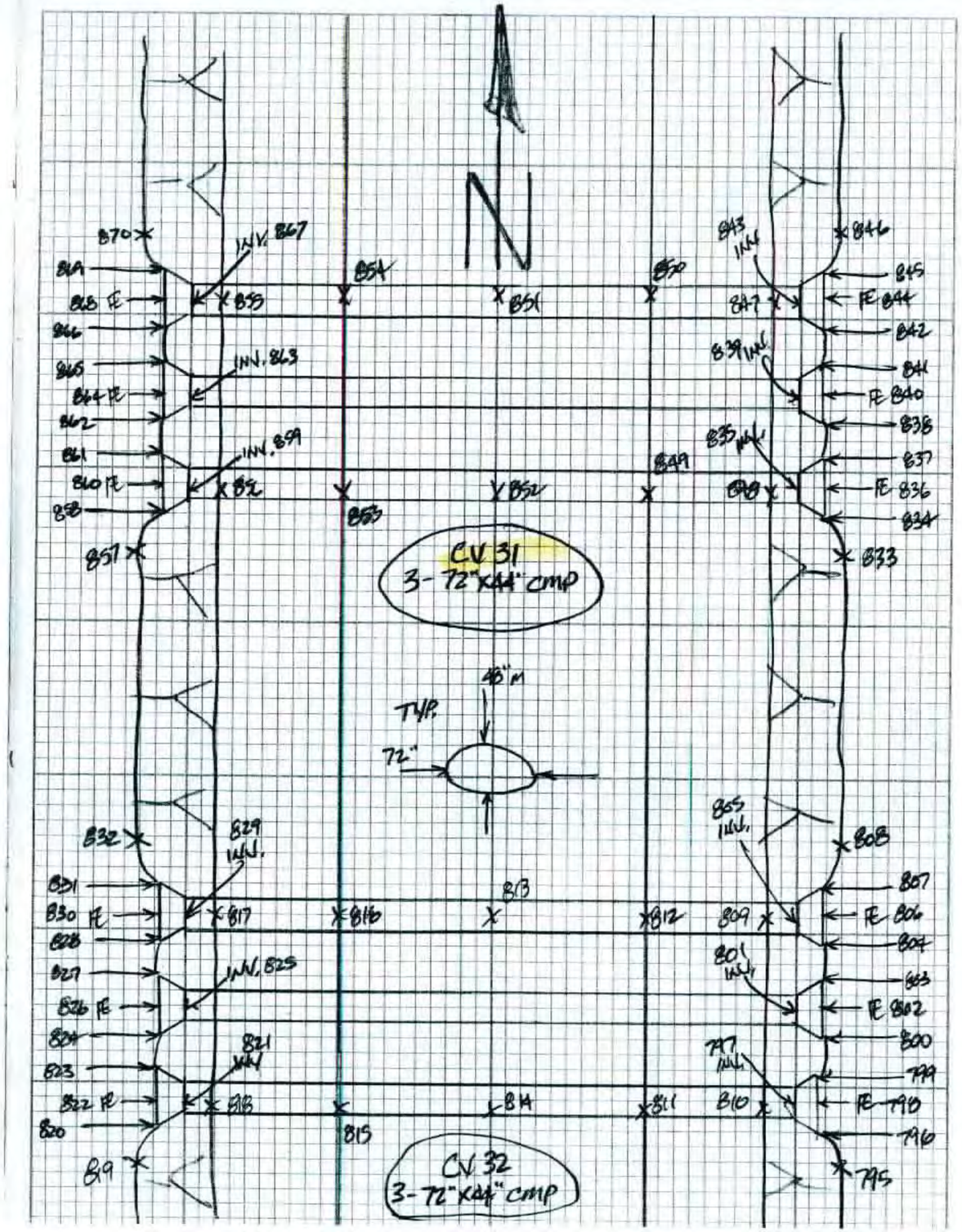
2-14-15
MEET W
PHIL P.





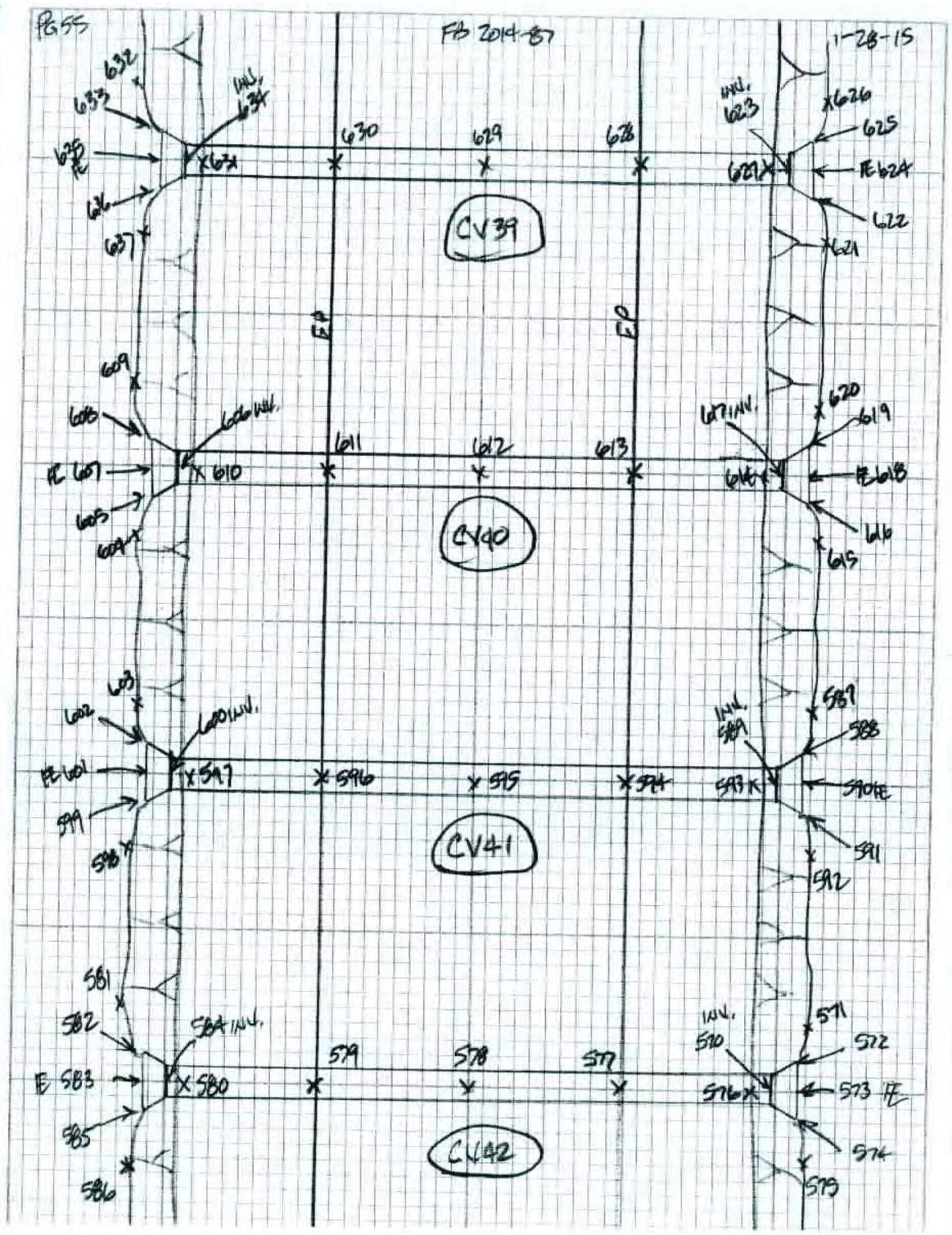
PG 56 FB 204-87 1-29-15

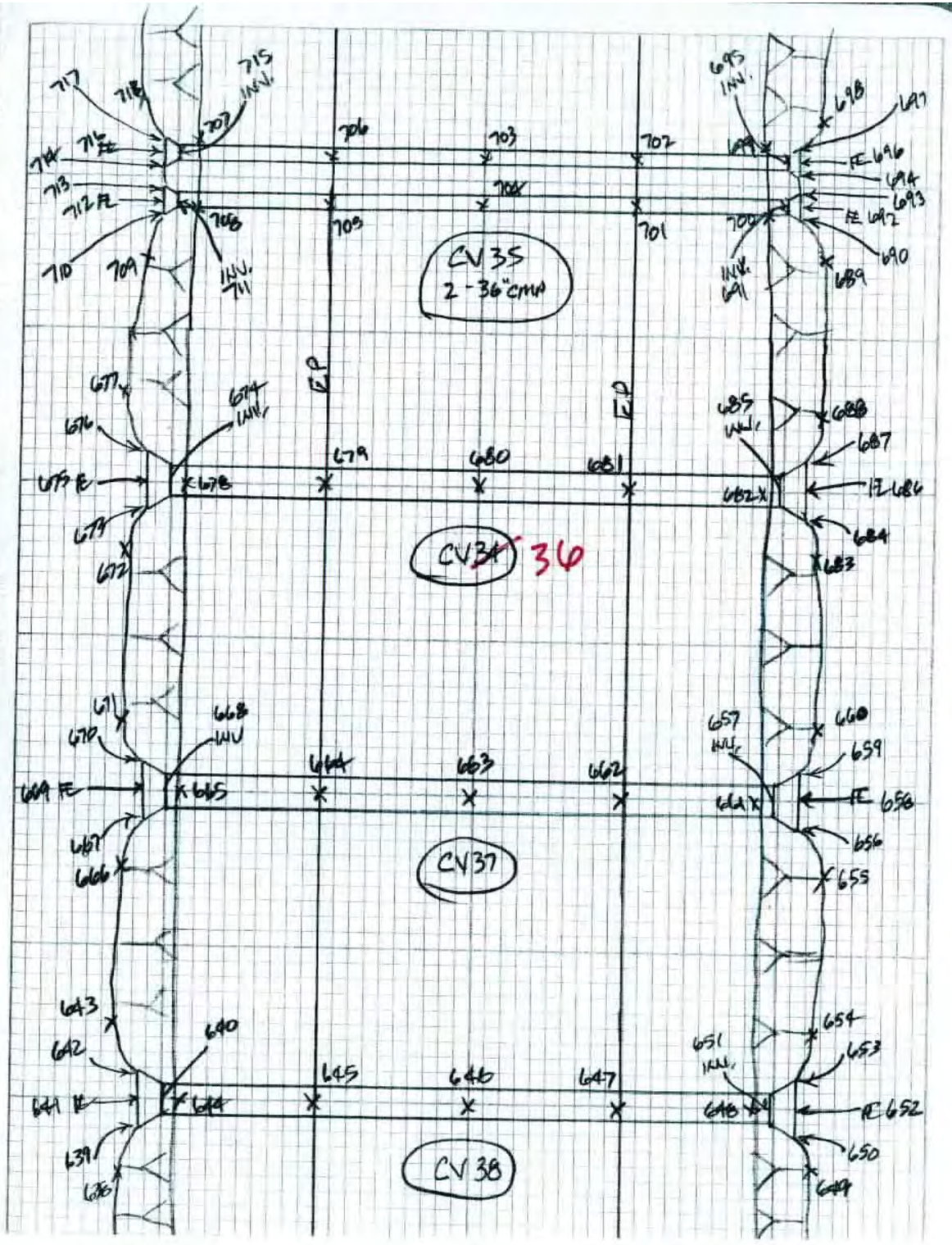




FB 2014-87

1-28-15





PointNo.	Northing(Y)	Easting(X)	Elev(Z)	Description
570	396190.71	1017309.55	2712.14	INV
571	396201.54	1017320.21	2713.24	NG
572	396195.56	1017315.08	2713.42	APRON
573	396190.76	1017315.85	2712.35	FL
574	396185.66	1017314.80	2713.48	APRON
575	396179.28	1017322.05	2712.61	NG
576	396191.08	1017306.60	2718.07	TOP
577	396190.00	1017288.52	2718.95	EP
578	396189.84	1017276.13	2719.16	PVMT
579	396189.76	1017264.68	2718.89	EP
580	396188.97	1017246.77	2717.18	TOP
581	396201.88	1017232.58	2712.95	NG
582	396193.94	1017237.35	2712.78	APRON
583	396189.19	1017237.36	2711.99	FL
584	396189.23	1017243.42	2711.88	INV
585	396184.02	1017237.69	2712.84	APRON
586	396175.82	1017231.72	2712.65	NG
587	396303.24	1017320.14	2712.93	NG
588	396295.15	1017313.16	2712.79	APRON
589	396290.29	1017307.63	2711.88	INV
590	396289.99	1017313.49	2712.04	FL
591	396285.20	1017312.92	2713.43	APRON
592	396276.45	1017320.40	2712.75	NG
593	396289.86	1017304.83	2717.93	TOP
594	396290.15	1017287.53	2718.87	EP
595	396290.30	1017275.09	2719.14	PVMT
596	396290.62	1017263.64	2718.79	EP
597	396289.90	1017246.43	2717.31	TOP
598	396274.94	1017232.59	2712.74	NG
599	396284.48	1017238.37	2712.58	APRON
600	396289.80	1017243.95	2711.84	INV
601	396288.86	1017237.56	2711.75	FL
602	396294.65	1017237.62	2712.70	APRON
603	396305.22	1017229.62	2712.12	NG
604	396375.20	1017231.45	2712.59	NG
605	396384.71	1017235.08	2712.03	APRON
606	396389.96	1017240.75	2710.88	INV
607	396390.20	1017234.36	2711.02	FL
608	396394.70	1017234.71	2711.66	APRON
609	396403.76	1017230.73	2712.18	NG
610	396389.72	1017242.86	2716.46	TOP
611	396389.76	1017262.75	2718.57	EP
612	396390.15	1017273.94	2718.93	PVMT
613	396390.28	1017286.56	2718.75	EP
614	396390.64	1017305.61	2717.39	TOP
615	396375.33	1017319.68	2712.69	NG
616	396385.72	1017315.12	2712.60	APRON
617	396390.72	1017309.15	2711.82	INV
618	396390.08	1017315.61	2711.81	FL
619	396395.58	1017314.77	2713.06	APRON
620	396403.95	1017319.87	2712.60	NG
621	396474.64	1017317.71	2712.33	NG
622	396485.15	1017314.41	2712.03	APRON
623	396489.89	1017308.31	2711.51	INV
624	396490.20	1017314.67	2711.73	FL
625	396494.75	1017314.56	2711.82	APRON
626	396505.43	1017316.90	2712.38	NG
627	396489.42	1017302.77	2717.67	TOP
628	396489.11	1017285.78	2718.70	EP
629	396488.95	1017273.38	2719.03	PVMT
630	396489.51	1017262.01	2718.71	EP
631	396489.77	1017242.81	2716.42	TOP
632	396506.05	1017229.05	2712.00	NG
633	396494.24	1017233.92	2711.55	APRON
634	396489.51	1017240.06	2710.90	INV
635	396490.52	1017233.78	2711.06	FL
636	396484.62	1017234.28	2711.66	APRON
637	396475.65	1017231.47	2712.36	NG
638	396575.01	1017229.23	2711.82	NG
639	396584.74	1017231.19	2710.96	APRON
640	396589.45	1017236.84	2710.84	INV
641	396589.68	1017230.79	2710.67	FL
642	396594.30	1017230.88	2710.86	APRON
643	396603.67	1017226.66	2711.61	NG
644	396589.67	1017240.83	2716.54	TOP
645	396590.11	1017261.33	2718.71	EP
646	396590.13	1017272.87	2718.90	PVMT
647	396590.36	1017285.27	2718.65	EP
648	396589.26	1017301.61	2717.46	TOP
649	396572.67	1017317.82	2712.07	NG
650	396585.87	1017314.45	2711.79	APRON
651	396590.20	1017308.31	2711.45	INV
652	396590.31	1017314.65	2711.40	FL
653	396595.19	1017313.99	2711.86	APRON
654	396608.27	1017319.90	2711.80	NG
655	396675.53	1017314.65	2712.42	NG
656	396686.18	1017313.50	2711.87	APRON
657	396690.57	1017307.10	2711.83	INV

REGISTERED LAND SURVEYOR
CERTIFICATE NO.
19316
T. WAYNE
ASHBY
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EXPIRES 3/31/2017

Ashby
SURVEYING & DRAFTING, INC.
717 N. SWAN ROAD
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TEL: (520) 325-1991 · FAX: (520) 325-2074

SWAN RD.
POINT LIST
PIMA COUNTY, ARIZONA

DATE: JUNE 26, 2015
JOB NO: 5739
SHEET: 1 / 10

PointNo.	Northing(Y)	Easting(X)	Elev(Z)	Description
658	396690.88	1017313.44	2711.54	FL
659	396695.50	1017312.88	2711.82	APRON
660	396706.32	1017316.97	2711.80	NG
661	396690.31	1017302.76	2717.54	TOP
662	396690.12	1017283.91	2718.74	EP
663	396689.74	1017271.71	2719.01	PVMT
664	396689.65	1017259.99	2718.74	EP
665	396689.60	1017239.69	2716.41	TOP
666	396669.62	1017225.48	2711.52	NG
667	396684.51	1017229.17	2710.73	APRON
668	396689.31	1017235.21	2710.76	INV
669	396689.46	1017228.95	2710.67	FL
670	396693.92	1017229.29	2710.66	APRON
671	396709.02	1017224.68	2711.18	NG
672	396774.23	1017225.53	2712.13	NG
673	396784.47	1017230.60	2711.74	APRON
674	396789.13	1017236.11	2710.97	INV
675	396789.29	1017230.13	2711.29	FL
676	396793.94	1017230.28	2712.21	APRON
677	396808.82	1017223.65	2711.64	NG
678	396789.30	1017241.70	2717.28	TOP
679	396790.41	1017259.04	2718.89	EP
680	396790.57	1017270.76	2719.16	PVMT
681	396789.89	1017282.82	2718.91	EP
682	396789.76	1017299.26	2717.71	TOP
683	396775.59	1017314.76	2712.52	NG
684	396785.26	1017310.88	2711.65	APRON
685	396789.77	1017304.51	2711.54	INV
686	396789.87	1017310.83	2711.90	FL
687	396794.74	1017310.25	2712.70	APRON
688	396803.61	1017313.85	2712.78	NG
689	397803.02	1017299.49	2716.19	NG
690	397812.23	1017298.45	2715.69	APRON
691	397815.16	1017293.76	2715.37	INV
692	397814.71	1017298.64	2715.67	FL
693	397818.04	1017297.99	2716.07	APRON
694	397822.52	1017298.56	2715.47	APRON
695	397825.09	1017293.72	2715.40	INV
696	397825.13	1017298.59	2715.46	FL
697	397828.23	1017298.31	2715.80	APRON
698	397838.56	1017299.31	2715.96	NG
699	397824.31	1017286.20	2719.27	TOP
700	397814.47	1017286.18	2719.40	TOP
701	397814.61	1017273.05	2719.95	EP
702	397822.67	1017272.80	2719.99	EP
703	397823.19	1017260.59	2720.21	PVMT
704	397814.00	1017261.08	2720.21	PVMT
705	397814.77	1017249.12	2719.79	EP
706	397824.25	1017249.03	2719.75	EP

PointNo.	Northing(Y)	Easting(X)	Elev(Z)	Description
707	397824.57	1017230.75	2718.02	TOP
708	397814.79	1017231.34	2718.14	TOP
709	397804.56	1017222.61	2715.40	NG
710	397812.03	1017224.27	2714.80	APRON
711	397814.80	1017229.32	2714.54	INV
712	397814.94	1017224.46	2714.65	FL
713	397817.94	1017224.53	2714.72	APRON
714	397821.54	1017224.34	2714.64	APRON
715	397824.56	1017229.15	2714.66	INV
716	397824.35	1017224.23	2714.56	FL
717	397827.43	1017224.12	2714.60	APRON
718	397837.98	1017223.02	2715.76	NG
719	399227.72	1017288.02	2704.45	NG
720	399241.07	1017281.89	2703.56	APRON
721	399245.72	1017275.51	2703.56	INV
722	399245.44	1017281.83	2703.54	FL
723	399250.58	1017281.41	2704.05	APRON
724	399255.94	1017281.79	2703.66	APRON
725	399260.40	1017275.74	2702.99	INV
726	399260.48	1017281.79	2703.44	FL
727	399265.32	1017281.33	2704.15	APRON
728	399271.53	1017281.96	2703.87	APRON
729	399276.07	1017275.57	2703.61	INV
730	399275.63	1017282.02	2703.69	FL
731	399280.95	1017281.36	2704.21	APRON
732	399293.27	1017283.47	2705.34	NG
733	399278.48	1017269.96	2708.06	TOP
734	399241.45	1017271.74	2708.04	TOP
735	399241.92	1017258.24	2708.93	EP
736	399278.41	1017258.11	2708.90	EP
737	399278.38	1017246.02	2709.07	PVMT
738	399241.66	1017246.14	2709.05	PVMT
739	399242.07	1017234.41	2708.80	EP
740	399276.92	1017234.27	2708.81	EP
741	399274.99	1017217.99	2708.04	TOP
742	399244.76	1017220.38	2707.83	TOP
743	399228.46	1017209.92	2705.20	NG
744	399240.01	1017213.84	2704.64	APRON

T. Wayne Ashby

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SWAN RD.
POINT LIST
PIMA COUNTY, ARIZONA

DATE: JUNE 26, 2015
JOB NO: 5739
SHEET: 2 / 10

PointNo.	Northing(Y)	Easting(X)	Elev(Z)	Description
745	399244.64	1017218.68	2702.96	INV
746	399245.02	1017212.78	2703.74	FL
747	399249.39	1017212.25	2703.64	APRON
748	399255.61	1017211.66	2704.62	APRON
749	399260.05	1017217.06	2703.03	INV
750	399262.75	1017211.04	2703.42	FL
751	399264.92	1017211.05	2703.36	APRON
752	399269.92	1017209.62	2703.24	APRON
753	399274.82	1017215.90	2702.90	INV
754	399274.87	1017209.41	2703.18	FL
755	399279.68	1017209.52	2703.41	APRON
756	399290.54	1017206.67	2702.22	NG
757	399411.69	1017288.11	2703.39	NG
758	399420.70	1017281.62	2703.68	APRON
759	399425.40	1017275.16	2703.49	INV
760	399424.65	1017281.60	2703.63	FL
761	399430.10	1017280.91	2704.59	APRON
762	399435.28	1017281.46	2704.11	APRON
763	399440.16	1017275.25	2703.61	INV
764	399441.29	1017281.97	2703.72	FL
765	399444.80	1017281.38	2704.13	APRON
766	399450.61	1017280.67	2704.08	APRON
767	399455.21	1017274.60	2703.59	INV
768	399455.81	1017281.04	2703.56	FL
769	399460.00	1017280.54	2704.29	APRON
770	399471.23	1017284.52	2704.84	NG
771	399455.10	1017272.21	2708.11	TOP
772	399425.28	1017274.84	2707.78	TOP
773	399425.80	1017256.62	2708.80	EP
774	399456.50	1017256.30	2708.88	EP
775	399456.54	1017244.27	2709.10	PVMT
776	399424.66	1017244.43	2708.99	PVMT
777	399424.07	1017232.76	2708.89	EP
778	399456.38	1017232.08	2708.83	EP
779	399455.05	1017217.44	2707.74	TOP
780	399424.59	1017216.63	2707.81	TOP
781	399407.73	1017204.91	2704.94	NG
782	399420.25	1017208.82	2704.50	APRON
783	399424.55	1017214.09	2703.04	INV
784	399426.03	1017208.20	2703.66	FL
785	399429.24	1017208.25	2703.87	APRON
786	399434.53	1017209.69	2704.36	APRON
787	399439.63	1017214.97	2702.92	INV
788	399439.38	1017208.99	2703.77	FL
789	399443.87	1017209.91	2704.59	APRON
790	399450.11	1017208.01	2704.07	APRON
791	399455.12	1017213.76	2702.90	INV
792	399455.32	1017207.74	2703.50	FL

PointNo.	Northing(Y)	Easting(X)	Elev(Z)	Description
793	399459.88	1017208.24	2704.09	APRON
794	399468.68	1017204.67	2704.25	NG
795	399613.53	1017289.81	2703.83	NG
796	399621.08	1017279.89	2704.19	APRON
797	399625.74	1017274.14	2703.33	INV
798	399625.83	1017280.18	2703.38	FL
799	399630.58	1017279.94	2704.08	APRON
800	399636.16	1017280.01	2704.06	APRON
801	399640.74	1017273.71	2703.33	INV
802	399640.89	1017280.26	2703.50	FL
803	399645.70	1017279.62	2704.04	APRON
804	399650.89	1017279.65	2703.84	APRON
805	399655.81	1017273.21	2703.48	INV
806	399655.57	1017279.69	2703.60	FL
807	399660.29	1017279.41	2703.89	APRON
808	399669.54	1017286.28	2703.70	NG
809	399655.53	1017270.89	2708.06	TOP
810	399625.36	1017272.10	2708.22	TOP
811	399624.41	1017254.83	2708.85	EP
812	399655.38	1017254.38	2708.81	EP
813	399655.21	1017242.45	2709.11	PVMT
814	399624.21	1017242.79	2709.02	PVMT
815	399624.35	1017230.76	2708.81	EP
816	399656.86	1017230.55	2708.86	EP
817	399654.69	1017212.15	2707.80	TOP
818	399625.02	1017213.50	2707.42	TOP
819	399606.33	1017200.45	2704.08	NG
820	399619.82	1017206.32	2704.03	APRON
821	399624.62	1017212.14	2702.72	INV
822	399624.01	1017205.67	2703.36	FL
823	399628.89	1017205.98	2703.37	APRON
824	399635.09	1017204.13	2703.67	APRON
825	399639.59	1017209.83	2702.81	INV
826	399639.57	1017203.65	2703.16	FL
827	399644.43	1017204.56	2704.38	APRON
828	399649.64	1017203.74	2703.57	APRON
829	399654.29	1017209.36	2702.82	INV

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POINT LIST
PIMA COUNTY, ARIZONA

DATE: JUNE 26, 2015
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SHEET: 3 / 10

PointNo.	Northing(Y)	Easting(X)	Elev(Z)	Description
830	399654.42	1017203.06	2702.58	FL
831	399659.33	1017203.41	2704.00	APRON
832	399668.38	1017197.87	2703.85	NG
833	399810.16	1017281.39	2704.16	NG
834	399820.15	1017277.74	2703.98	APRON
835	399824.96	1017271.38	2703.35	INV
836	399824.52	1017277.97	2703.49	FL
837	399829.80	1017277.36	2704.10	APRON
838	399834.71	1017277.82	2703.76	APRON
839	399839.58	1017271.79	2703.33	INV
840	399839.73	1017278.26	2703.25	FL
841	399844.22	1017277.85	2703.69	APRON
842	399850.11	1017277.46	2703.72	APRON
843	399854.89	1017271.31	2703.37	INV
844	399854.97	1017277.71	2703.49	FL
845	399859.54	1017276.91	2704.72	APRON
846	399868.22	1017280.55	2704.58	NG
847	399855.13	1017268.65	2708.24	TOP
848	399824.35	1017267.14	2708.25	TOP
849	399824.23	1017252.46	2708.79	EP
850	399854.68	1017252.20	2708.79	EP
851	399854.36	1017240.28	2709.04	PVMT
852	399824.99	1017240.46	2709.03	PVMT
853	399824.62	1017228.44	2708.78	EP
854	399855.24	1017228.04	2708.74	EP
855	399853.84	1017211.12	2707.85	TOP
856	399824.23	1017212.43	2708.15	TOP
857	399806.78	1017200.88	2704.30	NG
858	399819.34	1017202.45	2703.87	APRON
859	399824.14	1017208.38	2702.71	INV
860	399824.46	1017202.12	2703.11	FL
861	399828.92	1017202.23	2703.49	APRON
862	399833.83	1017203.61	2703.93	APRON
863	399838.39	1017209.55	2702.55	INV
864	399838.93	1017203.38	2702.71	FL
865	399843.59	1017203.39	2703.68	APRON
866	399849.47	1017202.75	2703.47	APRON
867	399853.91	1017208.64	2703.00	INV
868	399853.37	1017203.04	2702.82	FL
869	399858.43	1017203.54	2703.93	APRON
870	399869.44	1017195.98	2703.81	NG
871	400007.77	1017281.74	2704.06	NG
872	400020.00	1017275.41	2703.76	APRON
873	400024.71	1017269.37	2703.04	INV
874	400024.42	1017275.80	2703.21	FL
875	400029.32	1017275.23	2703.90	APRON
876	400035.45	1017275.39	2703.47	APRON
877	400039.97	1017269.16	2702.94	INV

PointNo.	Northing(Y)	Easting(X)	Elev(Z)	Description
878	400040.46	1017276.26	2702.95	FL
879	400044.98	1017275.07	2703.34	APRON
880	400050.17	1017274.64	2703.43	APRON
881	400054.72	1017269.04	2702.86	INV
882	400054.58	1017275.27	2703.07	FL
883	400059.59	1017274.78	2703.52	APRON
884	400067.69	1017283.50	2703.58	NG
885	400054.47	1017266.59	2708.05	TOP
886	400025.36	1017265.81	2708.42	TOP
887	400025.11	1017250.65	2708.89	EP
888	400055.27	1017250.12	2708.86	EP
889	400055.44	1017237.59	2709.10	PVMT
890	400025.69	1017238.50	2709.19	PVMT
891	400024.77	1017226.38	2708.95	EP
892	400055.50	1017226.11	2708.92	EP
893	400054.31	1017208.85	2707.67	TOP
894	400023.80	1017209.27	2707.42	TOP
895	400008.86	1017196.01	2703.80	NG
896	400019.10	1017201.56	2703.99	APRON
897	400023.91	1017206.69	2703.62	SILT_FL
898	400023.81	1017206.85	2702.36	INV
899	400023.42	1017200.38	2703.11	FL
900	400028.54	1017200.87	2702.97	APRON
901	400033.55	1017201.55	2703.27	APRON
902	400038.65	1017206.79	2703.40	SILT_FL
903	400038.85	1017207.19	2702.27	INV
904	400038.93	1017200.98	2702.71	FL
905	400042.97	1017200.93	2703.21	APRON
906	400049.28	1017200.19	2702.95	APRON
907	400053.82	1017205.84	2703.19	SILT_FL
908	400054.37	1017206.18	2702.39	INV
909	400053.80	1017199.48	2702.75	FL
910	400059.18	1017200.14	2703.72	APRON
911	400067.88	1017194.48	2703.24	NG
912	400580.01	1017280.04	2701.07	NG
913	400589.75	1017274.76	2701.13	APRON
914	400594.76	1017268.87	2700.45	INV
915	400594.58	1017275.09	2700.31	FL

REGISTERED LAND SURVEYOR
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19316
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ASHBY
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EXPIRES 3/31/2017

Ashby
SURVEYING & DRAFTING, INC.
717 N. SWAN ROAD
TUCSON, ARIZONA 85711
TEL: (520) 325-1991 · FAX: (520) 325-2074

SWAN RD.
POINT LIST
PIMA COUNTY, ARIZONA

DATE: JUNE 26, 2015
JOB NO: 5739
SHEET: 4 / 10

PointNo.	Northing(Y)	Easting(X)	Elev(Z)	Description
916	400599.16	1017274.96	2700.67	APRON
917	400604.50	1017274.74	2700.54	APRON
918	400609.72	1017268.89	2700.32	INV
919	400608.64	1017274.86	2700.21	FL
920	400614.08	1017275.06	2700.45	APRON
921	400619.97	1017274.70	2700.62	APRON
922	400624.74	1017268.30	2700.48	INV
923	400624.54	1017274.59	2700.56	FL
924	400629.53	1017274.20	2701.09	APRON
925	400639.77	1017281.13	2701.32	NG
926	400624.84	1017261.74	2707.24	TOP
927	400594.61	1017263.53	2707.24	TOP
928	400593.70	1017244.52	2708.91	EP
929	400626.49	1017244.09	2708.87	EP
930	400626.80	1017231.97	2709.16	PVMT
931	400595.31	1017232.51	2709.16	PVMT
932	400592.61	1017220.34	2708.83	EP
933	400626.32	1017220.34	2708.82	EP
934	400625.77	1017202.88	2707.57	TOP
935	400591.88	1017203.13	2707.88	TOP
936	400580.50	1017184.52	2701.02	NG
937	400589.75	1017190.62	2701.36	APRON
938	400594.36	1017195.68	2699.77	INV
939	400595.40	1017189.10	2700.01	FL
940	400599.07	1017189.84	2700.33	APRON
941	400605.22	1017189.91	2700.97	APRON
942	400609.76	1017195.57	2699.64	INV
943	400610.04	1017189.31	2699.91	FL
944	400614.63	1017190.50	2700.60	APRON
945	400620.29	1017189.56	2700.73	APRON
946	400624.74	1017195.51	2699.74	INV
947	400624.79	1017190.49	2699.90	FL
948	400629.95	1017189.81	2701.07	APRON
949	400639.29	1017186.51	2701.45	NG
950	402499.81	1017250.27	2693.55	NG
951	402510.12	1017247.11	2692.79	APRON
952	402514.14	1017240.97	2693.11	SILT_FL
953	402514.82	1017240.83	2692.35	INV
954	402514.27	1017246.28	2692.55	FL
955	402519.58	1017247.05	2692.34	APRON
956	402524.93	1017247.01	2692.53	APRON
957	402528.69	1017241.11	2692.99	SILT_FL
958	402529.62	1017240.87	2692.36	INV
959	402529.22	1017247.11	2693.32	FL
960	402534.26	1017246.62	2693.74	APRON
961	402539.23	1017246.50	2693.51	APRON
962	402544.23	1017240.60	2692.31	INV
963	402543.82	1017247.18	2692.59	FL
964	402548.68	1017246.69	2693.04	APRON
965	402558.67	1017251.58	2693.64	NG
966	402543.83	1017238.67	2697.56	TOP
967	402514.65	1017238.91	2697.18	TOP
968	402514.98	1017225.16	2697.94	EP
969	402544.07	1017224.98	2697.98	EP
970	402543.94	1017211.71	2698.15	PVMT
971	402515.28	1017212.05	2698.19	PVMT
972	402515.10	1017200.26	2697.93	EP
973	402539.52	1017200.03	2697.81	EP
974	402542.67	1017186.36	2697.34	TOP
975	402513.46	1017187.38	2697.14	TOP
976	402500.19	1017173.90	2694.58	NG
977	402509.24	1017180.21	2694.57	APRON
978	402513.90	1017184.21	2693.40	SILT_FL
979	402513.95	1017184.36	2691.73	INV
980	402513.95	1017179.28	2693.37	FL
981	402518.35	1017179.70	2693.62	APRON
982	402524.25	1017179.33	2693.34	APRON
983	402528.93	1017184.33	2693.10	SILT_FL
984	402528.92	1017184.74	2691.77	INV
985	402529.21	1017178.44	2692.64	FL
986	402533.58	1017179.44	2693.68	APRON
987	402537.48	1017177.63	2692.94	APRON
988	402542.51	1017182.96	2692.49	SILT_FL
989	402542.35	1017183.36	2692.03	INV
990	402542.23	1017177.94	2693.02	FL
991	402546.82	1017178.49	2693.73	APRON
992	402557.79	1017173.83	2693.90	NG
993	404054.59	1017234.22	2688.03	NG
994	404070.60	1017230.87	2688.06	APRON
995	404075.23	1017225.20	2686.60	INV
996	404074.49	1017231.38	2687.23	FL
997	404079.96	1017230.25	2688.12	APRON
998	404084.40	1017230.54	2687.93	APRON
999	404089.05	1017225.19	2686.52	INV

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SWAN RD.
POINT LIST
PIMA COUNTY, ARIZONA

DATE: JUNE 26, 2015
JOB NO: 5739
SHEET: 5 / 10

PointNo.	Northing(Y)	Easting(X)	Elev(Z)	Description
1000	404089.23	1017231.21	2687.66	FL
1001	404094.03	1017230.83	2687.56	APRON
1002	404099.22	1017230.43	2687.66	APRON
1003	404104.32	1017224.65	2686.59	INV
1004	404104.33	1017231.37	2687.22	FL
1005	404109.11	1017230.82	2687.67	APRON
1006	404121.06	1017235.08	2688.19	NG
1007	404104.01	1017222.83	2691.25	TOP
1008	404075.20	1017222.94	2691.17	TOP
1009	404075.37	1017210.61	2692.03	EP
1010	404104.24	1017210.62	2692.09	EP
1011	404104.33	1017197.64	2692.24	PVMT
1012	404073.98	1017198.02	2692.15	PVMT
1013	404074.48	1017186.33	2691.79	EP
1014	404105.20	1017185.65	2691.89	EP
1015	404104.15	1017169.41	2690.72	TOP
1016	404073.91	1017170.80	2690.84	TOP
1017	404063.38	1017162.48	2688.18	NG
1018	404069.41	1017163.56	2687.52	APRON
1019	404073.99	1017168.57	2687.42	SILT FL
1020	404074.24	1017168.76	2685.88	INV
1021	404074.17	1017163.23	2687.16	FL
1022	404078.23	1017163.39	2687.83	APRON
1023	404084.23	1017162.99	2687.76	APRON
1024	404088.96	1017167.87	2686.66	SILT FL
1025	404088.94	1017168.54	2686.06	INV
1026	404089.17	1017162.45	2686.82	FL
1027	404093.73	1017162.55	2687.27	APRON
1028	404099.23	1017162.28	2687.25	APRON
1029	404103.93	1017167.71	2686.71	SILT FL
1030	404103.95	1017167.99	2686.21	INV
1031	404104.15	1017161.56	2686.94	FL
1032	404108.50	1017162.70	2687.74	APRON
1033	404118.77	1017159.68	2688.11	NG
1034	404259.94	1017234.44	2687.72	NG
1035	404270.06	1017232.14	2687.42	APRON
1036	404274.45	1017225.54	2687.34	SILT FL
1037	404274.65	1017225.17	2686.49	INV
1038	404274.68	1017232.19	2687.58	FL
1039	404279.66	1017231.03	2687.91	APRON
1040	404284.97	1017230.84	2687.72	APRON
1041	404290.06	1017225.22	2687.57	SILT FL
1042	404289.77	1017224.77	2686.69	INV
1043	404289.57	1017231.11	2687.28	FL
1044	404294.61	1017230.77	2688.03	APRON
1045	404299.68	1017230.50	2687.80	APRON
1046	404304.40	1017225.20	2687.69	SILT FL
1047	404304.26	1017224.69	2686.58	INV
1048	404304.13	1017230.46	2687.22	FL
1049	404308.96	1017230.40	2687.97	APRON
1050	404320.04	1017237.56	2687.78	NG
1051	404304.23	1017223.18	2691.19	TOP
1052	404274.55	1017223.69	2691.21	TOP
1053	404274.41	1017208.81	2691.91	EP
1054	404305.82	1017208.70	2691.89	EP
1055	404305.13	1017196.14	2691.95	PVMT
1056	404275.95	1017196.22	2692.00	PVMT
1057	404273.75	1017184.39	2691.70	EP
1058	404304.74	1017184.17	2691.70	EP
1059	404303.95	1017169.73	2691.37	TOP
1060	404273.90	1017169.86	2691.10	TOP
1061	404240.17	1017156.82	2688.28	NG
1062	404269.65	1017164.21	2688.03	APRON
1063	404274.12	1017168.06	2687.45	SILT FL
1064	404273.72	1017168.47	2685.98	INV
1065	404275.20	1017162.52	2687.08	FL
1066	404278.80	1017162.82	2687.49	APRON
1067	404284.63	1017163.15	2687.34	APRON
1068	404289.16	1017168.46	2687.20	SILT FL
1069	404289.38	1017168.61	2686.06	INV
1070	404289.96	1017162.28	2687.14	FL
1071	404294.20	1017162.64	2687.11	APRON
1072	404299.45	1017161.83	2687.05	APRON
1073	404304.06	1017167.22	2687.26	SILT FL
1074	404304.06	1017167.69	2686.06	INV
1075	404303.92	1017161.49	2686.88	FL
1076	404308.00	1017161.96	2687.88	APRON
1077	404315.20	1017156.32	2687.63	NG

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SWAN RD.
POINT LIST
PIMA COUNTY, ARIZONA

DATE: JUNE 26, 2015
JOB NO: 5739
SHEET: 6 / 10

PointNo.	Northing(Y)	Easting(X)	Elev(Z)	Description
1078	404459.29	1017231.31	2689.15	NG
1079	404469.60	1017228.88	2688.30	APRON
1080	404474.69	1017224.16	2688.38	SILT FL
1081	404474.47	1017223.18	2686.61	INV
1082	404474.52	1017229.07	2687.73	FL
1083	404479.06	1017228.90	2687.94	APRON
1084	404484.85	1017228.99	2687.70	APRON
1085	404489.26	1017223.75	2687.49	SILT FL
1086	404489.16	1017223.25	2686.64	INV
1087	404489.37	1017228.97	2687.50	FL
1088	404494.13	1017228.98	2687.81	APRON
1089	404499.09	1017228.57	2687.59	APRON
1090	404503.96	1017223.67	2687.79	SILT FL
1091	404504.22	1017222.81	2686.53	INV
1092	404503.63	1017228.26	2687.17	FL
1093	404508.42	1017228.91	2687.88	APRON
1094	404519.80	1017233.35	2688.61	NG
1095	404503.70	1017220.96	2691.09	TOP
1096	404474.34	1017221.87	2691.09	TOP
1097	404473.99	1017207.38	2691.84	EP
1098	404503.74	1017207.06	2691.82	EP
1099	404502.93	1017194.49	2691.95	PVMT
1100	404475.39	1017194.42	2691.90	PVMT
1101	404474.39	1017182.76	2691.88	EP
1102	404503.59	1017182.68	2691.84	EP
1103	404503.77	1017168.91	2691.23	TOP
1104	404473.64	1017170.30	2691.37	TOP
1105	404458.92	1017156.12	2687.73	NG
1106	404469.02	1017161.44	2687.67	APRON
1107	404473.60	1017165.77	2688.58	SILT FL
1108	404473.64	1017166.97	2686.33	INV
1109	404473.60	1017160.86	2686.98	FL
1110	404478.56	1017161.00	2687.02	APRON
1111	404483.65	1017159.98	2686.88	APRON
1112	404488.27	1017165.18	2687.53	SILT FL
1113	404488.37	1017166.09	2686.14	INV
1114	404488.69	1017160.21	2686.51	FL
1115	404493.17	1017160.03	2686.91	APRON
1116	404499.13	1017160.97	2687.16	APRON
1117	404503.54	1017166.11	2688.39	SILT FL
1118	404503.97	1017166.85	2685.93	INV
1119	404503.70	1017160.52	2686.52	FL
1120	404507.84	1017161.67	2687.81	APRON
1121	404518.78	1017155.08	2687.87	NG
1122	404661.08	1017233.25	2687.96	NG
1123	404669.39	1017227.23	2688.13	APRON
1124	404673.95	1017222.60	2687.67	SILT_FL
1125	404674.81	1017221.27	2686.60	INV
1126	404676.07	1017227.74	2686.91	FL
1127	404679.30	1017227.89	2687.34	APRON

PointNo.	Northing(Y)	Easting(X)	Elev(Z)	Description
1128	404684.82	1017226.96	2687.53	APRON
1129	404689.50	1017221.28	2687.38	SILT_FL
1130	404689.41	1017220.73	2686.59	INV
1131	404689.77	1017226.64	2687.22	FL
1132	404694.19	1017226.57	2687.81	APRON
1133	404699.39	1017227.01	2687.65	APRON
1134	404704.10	1017220.97	2686.73	INV
1135	404703.61	1017227.44	2687.12	FL
1136	404708.68	1017226.93	2687.45	APRON
1137	404720.44	1017232.57	2687.90	NG
1138	404703.86	1017218.80	2691.40	TOP
1139	404674.54	1017219.57	2691.51	TOP
1140	404674.99	1017205.80	2691.93	EP
1141	404705.28	1017205.58	2692.18	EP
1142	404705.03	1017192.82	2692.18	PVMT
1143	404674.93	1017193.06	2692.13	PVMT
1144	404675.03	1017180.99	2691.99	EP
1145	404704.93	1017180.81	2692.02	EP
1146	404703.65	1017164.98	2690.63	TOP
1147	404674.07	1017166.89	2690.85	TOP
1148	404661.97	1017157.91	2689.08	NG
1149	404669.65	1017160.23	2687.59	APRON
1150	404674.18	1017164.64	2687.22	SILT_FL
1151	404674.03	1017164.98	2686.20	INV
1152	404674.28	1017160.20	2687.09	FL
1153	404678.38	1017159.96	2687.55	APRON
1154	404683.59	1017158.22	2687.41	APRON
1155	404688.50	1017163.47	2687.47	SILT_FL
1156	404688.51	1017163.79	2686.07	INV
1157	404688.20	1017158.28	2687.27	FL
1158	404692.88	1017158.10	2687.29	APRON
1159	404699.34	1017157.74	2687.65	APRON
1160	404703.65	1017163.14	2687.20	SILT_FL
1161	404703.61	1017163.44	2686.12	INV
1162	404703.91	1017157.34	2686.92	FL
1163	404708.44	1017158.08	2687.61	APRON
1164	404721.03	1017154.09	2687.79	NG

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SWAN RD.
POINT LIST
PIMA COUNTY, ARIZONA

DATE: JUNE 26, 2015
JOB NO: 5739
SHEET: 7 / 10

PointNo.	Northing(Y)	Easting(X)	Elev(Z)	Description
1165	404857.15	1017229.63	2688.41	NG
1166	404869.07	1017226.38	2687.79	APRON
1167	404873.79	1017220.88	2687.28	SILT_FL
1168	404873.76	1017220.20	2686.59	INV
1169	404873.70	1017226.89	2687.15	FL
1170	404878.71	1017226.25	2687.59	APRON
1171	404884.19	1017225.96	2687.50	APRON
1172	404888.78	1017220.03	2686.64	INV
1173	404888.67	1017225.70	2687.36	FL
1174	404893.80	1017225.57	2687.77	APRON
1175	404898.77	1017225.14	2687.46	APRON
1176	404903.73	1017219.94	2687.47	SILT_FL
1177	404903.38	1017219.85	2686.42	INV
1178	404903.23	1017225.96	2687.33	FL
1179	404907.91	1017226.11	2687.64	APRON
1180	404918.32	1017229.09	2688.26	NG
1181	404903.38	1017217.72	2691.26	TOP
1182	404874.00	1017218.48	2691.28	TOP
1183	404872.94	1017204.07	2691.95	EP
1184	404904.44	1017203.87	2692.05	EP
1185	404904.83	1017191.59	2692.29	PVMT
1186	404871.53	1017191.85	2692.22	PVMT
1187	404871.65	1017180.22	2692.07	EP
1188	404903.82	1017179.84	2692.12	EP
1189	404903.14	1017165.04	2691.31	TOP
1190	404872.96	1017167.63	2691.34	TOP
1191	404855.67	1017152.18	2687.85	NG
1192	404868.07	1017159.16	2687.26	APRON
1193	404872.94	1017164.26	2687.14	SILT_FL
1194	404872.76	1017164.67	2685.90	INV
1195	404872.60	1017158.55	2686.23	FL
1196	404877.61	1017157.78	2686.49	APRON
1197	404883.26	1017157.33	2686.52	APRON
1198	404887.61	1017163.13	2687.31	SILT_FL
1199	404887.80	1017163.78	2686.11	INV
1200	404888.06	1017157.46	2686.23	FL
1201	404892.85	1017157.56	2686.61	APRON
1202	404898.32	1017156.00	2686.45	APRON
1203	404903.65	1017161.19	2686.59	SILT_FL
1204	404903.25	1017161.89	2686.13	INV
1205	404902.89	1017155.71	2686.13	FL
1206	404907.62	1017155.43	2686.89	APRON
1207	404916.36	1017153.24	2687.44	NG
1208	405578.13	1017229.74	2685.07	NG
1209	405584.91	1017221.01	2685.66	APRON
1210	405589.45	1017216.87	2684.45	SILT_FL
1211	405589.53	1017216.81	2683.68	INV
1212	405587.87	1017222.64	2684.37	FL
1213	405593.86	1017222.32	2684.99	APRON
1214	405599.69	1017222.63	2684.51	APRON
1215	405604.64	1017217.03	2684.55	SILT_FL
1216	405604.44	1017216.70	2683.80	INV

PointNo.	Northing(Y)	Easting(X)	Elev(Z)	Description
1217	405603.63	1017222.49	2684.41	FL
1218	405608.31	1017221.74	2685.25	APRON
1219	405617.07	1017221.66	2684.90	APRON
1220	405619.64	1017217.06	2684.56	SILT_FL
1221	405619.38	1017216.44	2683.75	INV
1222	405619.61	1017221.96	2684.22	FL
1223	405623.78	1017221.83	2685.21	APRON
1224	405628.98	1017222.16	2684.67	APRON
1225	405633.84	1017216.86	2684.31	SILT_FL
1226	405633.67	1017216.50	2683.53	INV
1227	405633.29	1017222.56	2684.22	FL
1228	405638.70	1017222.66	2684.68	APRON
1229	405645.88	1017220.87	2684.70	APRON
1230	405649.07	1017217.09	2684.73	SILT_FL
1231	405648.69	1017216.80	2683.67	INV
1232	405649.06	1017222.27	2684.15	FL
1233	405652.94	1017223.06	2684.35	APRON
1234	405660.04	1017221.30	2684.95	APRON
1235	405664.24	1017216.76	2684.65	SILT_FL
1236	405664.20	1017216.30	2684.10	INV
1237	405663.41	1017221.81	2684.21	FL
1238	405668.78	1017222.05	2684.69	APRON
1239	405675.01	1017221.51	2684.68	APRON
1240	405679.65	1017216.18	2684.99	SILT_FL
1241	405679.53	1017215.87	2683.75	INV
1242	405679.21	1017221.79	2684.59	FL
1243	405684.23	1017221.84	2684.69	APRON
1244	405689.33	1017221.79	2684.45	APRON
1245	405694.12	1017216.08	2684.32	SILT_FL
1246	405694.15	1017215.78	2683.57	INV
1247	405693.21	1017220.60	2683.96	FL
1248	405698.66	1017221.47	2684.75	APRON
1249	405703.16	1017221.44	2684.72	APRON
1250	405708.16	1017216.54	2684.11	SILT_FL
1251	405708.05	1017216.18	2683.79	INV
1252	405707.49	1017221.06	2684.10	FL
1253	405712.48	1017222.05	2684.61	APRON
1254	405718.71	1017221.65	2684.62	APRON
1255	405723.69	1017216.11	2684.66	SILT_FL
1256	405723.35	1017215.72	2683.70	INV

T. Wayne Ashby

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PointNo.	Northing(Y)	Easting(X)	Elev(Z)	Description
1257	405723.11	1017222.11	2684.00	FL
1258	405728.06	1017221.77	2684.95	APRON
1259	405734.64	1017221.55	2684.78	APRON
1260	405739.32	1017216.11	2684.08	SILT_FL
1261	405739.24	1017215.72	2683.80	INV
1262	405739.06	1017222.19	2684.28	FL
1263	405743.97	1017221.36	2684.71	APRON
1264	405749.89	1017221.38	2684.74	APRON
1265	405754.24	1017216.01	2684.05	SILT_FL
1266	405754.10	1017215.60	2683.58	INV
1267	405754.15	1017221.76	2684.07	FL
1268	405758.71	1017220.88	2684.82	APRON
1269	405764.48	1017221.28	2684.60	APRON
1270	405769.50	1017216.42	2684.10	SILT_FL
1271	405769.31	1017215.79	2683.74	INV
1272	405768.63	1017221.85	2684.15	FL
1273	405773.85	1017221.31	2684.76	APRON
1274	405779.14	1017221.73	2684.54	APRON
1275	405783.76	1017215.95	2684.13	SILT_FL
1276	405783.57	1017215.38	2683.80	INV
1277	405783.82	1017221.48	2684.20	FL
1278	405788.46	1017221.19	2684.83	APRON
1279	405796.39	1017226.64	2684.92	NG
1280	405783.71	1017206.44	2691.97	TOP
1281	405686.13	1017206.54	2692.34	TOP
1282	405588.80	1017207.47	2692.14	TOP
1283	405588.58	1017198.92	2691.70	EP
1284	405686.46	1017198.69	2691.83	EP
1285	405784.38	1017197.73	2691.77	EP
1286	405784.75	1017185.53	2692.08	PVMT
1287	405686.96	1017185.87	2692.07	PVMT
1288	405589.71	1017186.76	2692.05	PVMT
1289	405589.95	1017174.51	2691.95	EP
1290	405686.91	1017173.73	2691.80	EP
1291	405784.86	1017173.14	2691.76	EP
1292	405784.72	1017164.60	2692.47	TOP
1293	405686.08	1017165.29	2692.27	TOP
1294	405589.46	1017165.85	2692.47	TOP
1295	405574.72	1017142.85	2685.23	NG
1296	405585.10	1017147.91	2684.76	APRON
1297	405589.64	1017152.25	2683.95	SILT_FL
1298	405589.58	1017152.61	2683.17	INV
1299	405589.94	1017146.33	2683.69	FL
1300	405594.25	1017146.90	2684.17	APRON
1301	405599.92	1017146.65	2683.98	APRON
1302	405604.96	1017151.98	2683.87	SILT_FL
1303	405605.38	1017152.49	2683.12	INV
1304	405605.32	1017146.01	2683.45	FL
1305	405609.45	1017146.64	2683.90	APRON
1306	405614.53	1017146.89	2684.10	APRON
1307	405618.98	1017151.81	2683.93	SILT_FL
1308	405618.83	1017152.53	2682.83	INV
1309	405619.35	1017146.49	2683.21	FL
1310	405623.82	1017146.05	2683.70	APRON
1311	405628.25	1017146.88	2683.79	APRON
1312	405633.36	1017152.24	2683.57	SILT_FL
1313	405633.25	1017152.64	2683.33	INV
1314	405633.51	1017146.04	2683.41	FL
1315	405637.68	1017146.64	2683.90	APRON
1316	405644.22	1017146.59	2683.79	APRON
1317	405649.03	1017151.67	2683.67	SILT_FL
1318	405649.13	1017152.42	2683.11	INV
1319	405649.54	1017146.50	2683.43	FL
1320	405653.71	1017146.42	2684.00	APRON
1321	405658.85	1017146.74	2684.15	APRON
1322	405663.95	1017152.12	2684.20	SILT_FL
1323	405664.24	1017152.47	2683.20	INV
1324	405664.36	1017147.11	2684.43	FL
1325	405668.21	1017147.64	2684.65	APRON
1326	405674.74	1017147.56	2684.55	APRON
1327	405679.07	1017151.60	2684.87	SILT_FL
1328	405679.10	1017151.93	2683.00	INV
1329	405678.90	1017146.30	2683.86	FL
1330	405682.60	1017147.34	2684.74	APRON
1331	405688.89	1017146.28	2684.56	APRON
1332	405693.35	1017151.29	2683.87	SILT_FL
1333	405693.41	1017151.86	2683.09	INV
1334	405693.94	1017145.99	2683.76	FL
1335	405697.96	1017146.30	2684.45	APRON
1336	405703.86	1017146.64	2684.33	APRON
1337	405708.37	1017151.70	2683.95	SILT_FL
1338	405708.42	1017152.43	2683.21	INV
1339	405709.02	1017146.10	2683.63	FL
1340	405713.35	1017146.43	2684.10	APRON
1341	405719.03	1017145.89	2684.26	APRON
1342	405723.45	1017151.59	2683.82	SILT_FL
1343	405723.55	1017152.17	2683.00	INV
1344	405723.79	1017145.76	2683.25	FL
1345	405728.17	1017146.16	2684.00	APRON
1346	405733.65	1017146.02	2683.70	APRON

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PointNo.	Northing(Y)	Easting(X)	Elev(Z)	Description
1347	405738.54	1017151.29	2683.79	SILT_FL
1348	405738.53	1017152.04	2683.12	INV
1349	405739.05	1017145.58	2683.11	FL
1350	405743.08	1017145.84	2683.54	APRON
1351	405749.85	1017147.32	2684.05	APRON
1352	405754.49	1017153.19	2683.87	SILT_FL
1353	405754.57	1017153.76	2682.86	INV
1354	405755.08	1017147.93	2683.25	FL
1355	405759.48	1017148.06	2683.99	APRON
1356	405764.68	1017147.94	2684.00	APRON
1357	405769.13	1017153.18	2684.47	SILT_FL
1358	405769.21	1017153.83	2682.95	INV
1359	405769.75	1017147.18	2683.21	FL
1360	405773.93	1017147.56	2683.36	APRON
1361	405778.29	1017147.86	2683.70	APRON
1362	405783.15	1017153.03	2684.27	SILT_FL
1363	405782.97	1017153.59	2683.25	INV
1364	405783.00	1017147.92	2683.23	FL
1365	405787.85	1017147.53	2684.30	APRON
1366	405795.85	1017141.30	2684.08	NG
1367	406247.20	1017217.47	2689.48	NG
1368	406255.15	1017216.01	2688.77	APRON
1369	406258.80	1017212.23	2687.73	SILT_FL
1370	406258.77	1017211.85	2686.66	INV
1371	406259.18	1017216.93	2688.09	FL
1372	406262.23	1017216.62	2688.43	APRON
1373	406271.02	1017216.27	2689.68	NG
1374	406258.41	1017207.63	2690.82	TOP
1375	406258.64	1017193.74	2691.93	EP
1376	406258.55	1017181.48	2692.16	PVMT
1377	406258.49	1017169.45	2691.90	EP
1378	406260.10	1017151.94	2690.60	TOP
1379	406247.55	1017139.33	2686.57	NG
1380	406255.71	1017143.86	2686.20	APRON
1381	406259.50	1017149.08	2686.11	SILT_FL
1382	406259.66	1017149.30	2685.93	INV
1383	406259.34	1017143.84	2685.60	FL
1384	406263.03	1017143.78	2686.46	APRON
1385	406270.77	1017139.33	2686.61	NG
1386	407216.79	1017212.74	2691.40	NG
1387	407225.62	1017210.56	2690.59	APRON
1388	407229.13	1017204.48	2689.97	INV
1389	407228.98	1017211.11	2690.30	FL
1390	407233.03	1017210.44	2690.53	APRON
1391	407240.67	1017210.50	2690.58	APRON
1392	407244.00	1017204.87	2689.99	INV
1393	407243.95	1017210.89	2690.37	FL
1394	407248.17	1017210.52	2690.77	APRON
1395	407256.10	1017210.50	2690.68	APRON
1396	407259.52	1017204.59	2690.04	INV

PointNo.	Northing(Y)	Easting(X)	Elev(Z)	Description
1397	407259.38	1017210.87	2690.29	FL
1398	407263.81	1017210.01	2690.93	APRON
1399	407270.40	1017210.18	2690.49	APRON
1400	407274.32	1017204.30	2690.05	INV
1401	407272.94	1017210.42	2690.05	FL
1402	407278.00	1017210.28	2690.95	APRON
1403	407283.78	1017212.60	2691.42	NG
1404	407274.27	1017203.15	2694.48	TOP
1405	407229.00	1017203.36	2694.49	TOP
1406	407229.07	1017186.34	2694.93	EP
1407	407273.50	1017186.13	2694.95	EP
1408	407274.03	1017173.90	2695.18	PVMT
1409	407228.45	1017174.29	2695.15	PVMT
1410	407228.92	1017162.30	2695.03	EP
1411	407274.52	1017162.09	2695.02	EP
1412	407273.81	1017145.52	2693.91	TOP
1413	407228.77	1017144.99	2693.76	TOP
1414	407215.30	1017136.13	2690.77	NG
1415	407224.99	1017138.70	2690.52	APRON
1416	407228.79	1017143.90	2690.27	SILT_FL
1417	407228.93	1017144.06	2689.63	INV
1418	407228.57	1017138.05	2689.58	FL
1419	407232.65	1017138.12	2690.21	APRON
1420	407240.07	1017138.20	2690.38	APRON
1421	407243.62	1017143.93	2690.28	SILT_FL
1422	407243.61	1017144.34	2689.40	INV
1423	407244.15	1017138.62	2689.59	FL
1424	407247.84	1017138.46	2690.00	APRON
1425	407255.01	1017138.29	2690.20	APRON
1426	407258.79	1017143.92	2689.84	SILT_FL
1427	407259.20	1017144.12	2689.54	INV
1428	407258.72	1017137.56	2689.65	FL
1429	407262.80	1017137.88	2689.96	APRON
1430	407269.86	1017138.35	2690.19	APRON
1431	407273.94	1017143.73	2690.30	SILT_FL
1432	407273.83	1017144.01	2689.52	INV
1433	407273.99	1017138.41	2689.94	FL
1434	407277.39	1017138.20	2690.51	APRON
1435	407285.33	1017135.71	2690.75	NG

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APPENDIX D

HYDROLOGIC ANALYSIS SUPPORTING DOCUMENTATION

D.1 - Precipitation Data
D.2 - Physical Parameter Calculations
D.3 - Hydrograph Routing Data
D.4 - Reservoir Routing Data
D.5 - Flow Splits and Diversions Data
D.6 - Hydrologic Calculations

D.1 – PRECIPITATION DATA

Includes:

- Time of Concentration Estimation
- Rainfall Data
- Areal Reduction Factor Computations

Time of Concentration for desert/mountain

(Highway Drainage Design Manual Hydrology, Arizona Department of Transportation, March, 1993)

$$T_C=(2.4)(A^{.1})(L^{.25})(L_{CA}^{.25})(S^{-.2})$$

Where:

Tc: time of concentration, in hours
A: area, in square miles
S: watercourse slope, in ft/mile
L: length of the watercourse to the hydraulically most distant point, in miles
Lca: length measured from the concentration point along L to a point on L that is perpendicular to the watershed centroid, in miles

Watershed	**A**	**L**	**Lca**	**Elevation Difference (ft)**	**S**	**Tc**
North Fork	7.36	8.7	4.4	380	43.7	***3.42***
South Fork	10.43	11.1	5.6	500	45.0	***3.98***
Airport Wash	22.87	16.2	8.8	700	43.2	***5.34***

NOAA Atlas 14, Volume 1, Version 5
Location name: Tucson, Arizona, US*
Latitude: 32.1424°, Longitude: -110.9608°
Elevation: 2526 ft*
* source: Google Maps

POINT PRECIPITATION FREQUENCY ESTIMATES

Sanja Perica, Sarah Dietz, Sarah Heim, Lillian Hiner, Kazungu Maitaria, Deborah Martin, Sandra Pavlovic, Ishani Roy, Carl Trypaluk, Dale Unruh, Fenglin Yan, Michael Yekta, Tan Zhao, Geoffrey Bonnin, Daniel Brewer, Li-Chuan Chen, Tye Parzybok, John Yarchoan

NOAA, National Weather Service, Silver Spring, Maryland

PF_tabular | PF_graphical | Maps_&_aerials

Rainfall ID #1

PF tabular

PDS-based point precipitation frequency estimates with 90% confidence intervals (in inches)[1]

Duration	Average recurrence interval (years)									
	1	2	5	10	25	50	100	200	500	1000
5-min	0.250 (0.225–0.282)	0.322 (0.290–0.364)	0.427 (0.381–0.479)	0.505 (0.448–0.566)	0.613 (0.536–0.683)	0.693 (0.598–0.775)	0.777 (0.660–0.873)	0.860 (0.717–0.971)	0.972 (0.789–1.11)	1.06 (0.841–1.21)
10-min	0.380 (0.343–0.430)	0.490 (0.441–0.555)	0.650 (0.579–0.728)	0.769 (0.681–0.862)	0.932 (0.815–1.04)	1.06 (0.910–1.18)	1.18 (1.00–1.33)	1.31 (1.09–1.48)	1.48 (1.20–1.68)	1.61 (1.28–1.84)
15-min	0.472 (0.425–0.533)	0.608 (0.547–0.688)	0.805 (0.718–0.903)	0.953 (0.845–1.07)	1.16 (1.01–1.29)	1.31 (1.13–1.46)	1.47 (1.24–1.65)	1.62 (1.35–1.83)	1.83 (1.49–2.09)	2.00 (1.59–2.29)
30-min	0.635 (0.572–0.718)	0.819 (0.737–0.926)	1.08 (0.967–1.22)	1.28 (1.14–1.44)	1.56 (1.36–1.74)	1.76 (1.52–1.97)	1.97 (1.68–2.22)	2.19 (1.82–2.47)	2.47 (2.01–2.81)	2.69 (2.14–3.08)
60-min	0.786 (0.708–0.888)	1.01 (0.912–1.15)	1.34 (1.20–1.51)	1.59 (1.41–1.78)	1.93 (1.68–2.15)	2.18 (1.88–2.44)	2.44 (2.07–2.75)	2.71 (2.26–3.05)	3.06 (2.48–3.48)	3.33 (2.64–3.81)
2-hr	0.913 (0.825–1.02)	1.17 (1.05–1.31)	1.52 (1.36–1.70)	1.79 (1.59–1.99)	2.16 (1.90–2.40)	2.45 (2.13–2.72)	2.75 (2.35–3.06)	3.05 (2.56–3.40)	3.46 (2.83–3.90)	3.78 (3.02–4.29)
3-hr	0.968 (0.873–1.09)	1.22 (1.10–1.37)	1.57 (1.41–1.76)	1.85 (1.65–2.06)	2.24 (1.97–2.49)	2.54 (2.21–2.82)	2.86 (2.44–3.20)	3.20 (2.67–3.59)	3.67 (2.96–4.16)	4.04 (3.18–4.62)
6-hr	1.10 (0.991–1.23)	1.37 (1.24–1.54)	1.72 (1.55–1.93)	2.02 (1.80–2.25)	2.42 (2.12–2.69)	2.73 (2.37–3.04)	3.07 (2.61–3.41)	3.41 (2.86–3.82)	3.89 (3.17–4.39)	4.29 (3.41–4.88)
12-hr	1.24 (1.12–1.38)	1.55 (1.40–1.72)	1.92 (1.73–2.14)	2.22 (1.99–2.47)	2.64 (2.34–2.93)	2.97 (2.59–3.30)	3.30 (2.84–3.69)	3.65 (3.09–4.10)	4.12 (3.40–4.67)	4.49 (3.63–5.14)
24-hr	1.39 (1.28–1.53)	1.74 (1.60–1.91)	2.18 (1.99–2.38)	2.52 (2.31–2.77)	3.01 (2.73–3.31)	3.39 (3.05–3.73)	3.78 (3.37–4.19)	4.19 (3.69–4.67)	4.75 (4.11–5.35)	5.19 (4.44–5.89)
2-day	1.52 (1.39–1.66)	1.90 (1.75–2.08)	2.37 (2.18–2.59)	2.75 (2.52–3.01)	3.28 (2.99–3.59)	3.70 (3.33–4.06)	4.14 (3.70–4.57)	4.59 (4.05–5.10)	5.20 (4.51–5.85)	5.68 (4.85–6.47)
3-day	1.61 (1.48–1.77)	2.01 (1.85–2.21)	2.52 (2.31–2.76)	2.94 (2.69–3.22)	3.54 (3.21–3.87)	4.02 (3.60–4.42)	4.52 (4.02–5.00)	5.06 (4.43–5.63)	5.80 (4.97–6.54)	6.40 (5.39–7.30)
4-day	1.71 (1.57–1.87)	2.13 (1.95–2.33)	2.67 (2.45–2.93)	3.14 (2.86–3.43)	3.80 (3.43–4.16)	4.33 (3.87–4.77)	4.91 (4.34–5.44)	5.53 (4.80–6.16)	6.41 (5.43–7.23)	7.13 (5.93–8.13)
7-day	1.96 (1.79–2.15)	2.45 (2.24–2.69)	3.08 (2.82–3.38)	3.62 (3.30–3.97)	4.41 (3.97–4.85)	5.05 (4.50–5.59)	5.75 (5.07–6.41)	6.50 (5.64–7.31)	7.58 (6.43–8.65)	8.48 (7.05–9.79)
10-day	2.19 (2.01–2.40)	2.73 (2.50–2.99)	3.42 (3.12–3.75)	4.01 (3.65–4.39)	4.84 (4.36–5.31)	5.52 (4.93–6.08)	6.26 (5.51–6.93)	7.04 (6.10–7.87)	8.15 (6.90–9.22)	9.07 (7.53–10.4)
20-day	2.85 (2.62–3.11)	3.56 (3.27–3.89)	4.47 (4.08–4.87)	5.20 (4.74–5.67)	6.22 (5.63–6.79)	7.03 (6.30–7.71)	7.88 (6.98–8.68)	8.77 (7.68–9.74)	10.0 (8.58–11.3)	11.0 (9.27–12.5)
30-day	3.46 (3.20–3.76)	4.32 (3.98–4.68)	5.32 (4.91–5.77)	6.13 (5.63–6.65)	7.21 (6.59–7.83)	8.05 (7.31–8.76)	8.90 (8.02–9.74)	9.77 (8.72–10.8)	10.9 (9.59–12.2)	11.8 (10.2–13.3)
45-day	4.22 (3.91–4.55)	5.25 (4.86–5.67)	6.41 (5.94–6.92)	7.29 (6.75–7.87)	8.43 (7.77–9.12)	9.26 (8.50–10.0)	10.1 (9.19–11.0)	10.9 (9.84–11.9)	11.9 (10.6–13.1)	12.6 (11.2–14.0)
60-day	4.78 (4.43–5.17)	5.95 (5.51–6.44)	7.26 (6.73–7.85)	8.26 (7.64–8.93)	9.56 (8.80–10.4)	10.5 (9.64–11.4)	11.4 (10.4–12.5)	12.3 (11.2–13.5)	13.5 (12.1–15.0)	14.3 (12.7–16.0)

[1] Precipitation frequency (PF) estimates in this table are based on frequency analysis of partial duration series (PDS).

Numbers in parenthesis are PF estimates at lower and upper bounds of the 90% confidence interval. The probability that precipitation frequency estimates (for a given duration and average recurrence interval) will be greater than the upper bound (or less than the lower bound) is 5%. Estimates at upper bounds are not checked against probable maximum precipitation (PMP) estimates and may be higher than currently valid PMP values.

Please refer to NOAA Atlas 14 document for more information.

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PF graphical

NOAA Atlas 14, Volume 1, Version 5
Location name: Tucson, Arizona, US*
Latitude: 32.1198°, Longitude: -110.9259°
Elevation: 2615 ft*
* source: Google Maps

POINT PRECIPITATION FREQUENCY ESTIMATES

Sanja Perica, Sarah Dietz, Sarah Heim, Lillian Hiner, Kazungu Maitaria, Deborah Martin, Sandra Pavlovic, Ishani Roy, Carl Trypaluk, Dale Unruh, Fenglin Yan, Michael Yekta, Tan Zhao, Geoffrey Bonnin, Daniel Brewer, Li-Chuan Chen, Tye Parzybok, John Yarchoan

NOAA, National Weather Service, Silver Spring, Maryland

Rainfall ID #2

PF_tabular | PF_graphical | Maps_&_aerials

PF tabular

PDS-based point precipitation frequency estimates with 90% confidence intervals (in inches)[1]

Duration	Average recurrence interval (years)									
	1	2	5	10	25	50	100	200	500	1000
5-min	0.252 (0.227–0.285)	0.325 (0.293–0.368)	0.430 (0.383–0.482)	0.509 (0.451–0.570)	0.616 (0.538–0.688)	0.697 (0.601–0.780)	0.781 (0.663–0.878)	0.864 (0.721–0.976)	0.976 (0.793–1.11)	1.06 (0.845–1.22)
10-min	0.384 (0.346–0.434)	0.495 (0.445–0.560)	0.655 (0.583–0.734)	0.774 (0.685–0.868)	0.938 (0.819–1.05)	1.06 (0.915–1.19)	1.19 (1.01–1.34)	1.32 (1.10–1.49)	1.49 (1.21–1.69)	1.62 (1.29–1.85)
15-min	0.477 (0.429–0.538)	0.614 (0.552–0.694)	0.812 (0.722–0.910)	0.960 (0.849–1.08)	1.16 (1.02–1.30)	1.32 (1.13–1.47)	1.47 (1.25–1.66)	1.63 (1.36–1.84)	1.84 (1.50–2.10)	2.00 (1.59–2.30)
30-min	0.642 (0.577–0.724)	0.826 (0.743–0.935)	1.09 (0.973–1.23)	1.29 (1.14–1.45)	1.57 (1.37–1.75)	1.77 (1.53–1.98)	1.98 (1.68–2.23)	2.20 (1.83–2.48)	2.48 (2.01–2.83)	2.70 (2.15–3.09)
60-min	0.794 (0.714–0.896)	1.02 (0.919–1.16)	1.35 (1.20–1.52)	1.60 (1.42–1.79)	1.94 (1.69–2.16)	2.19 (1.89–2.45)	2.46 (2.08–2.76)	2.72 (2.27–3.07)	3.07 (2.49–3.50)	3.34 (2.66–3.83)
2-hr	0.920 (0.830–1.03)	1.18 (1.06–1.32)	1.53 (1.37–1.71)	1.80 (1.60–2.01)	2.17 (1.91–2.42)	2.47 (2.14–2.74)	2.76 (2.37–3.08)	3.07 (2.58–3.43)	3.48 (2.85–3.93)	3.80 (3.05–4.33)
3-hr	0.976 (0.880–1.09)	1.23 (1.11–1.39)	1.58 (1.42–1.77)	1.86 (1.66–2.08)	2.25 (1.99–2.51)	2.56 (2.22–2.85)	2.88 (2.46–3.23)	3.22 (2.69–3.62)	3.69 (2.99–4.19)	4.07 (3.21–4.66)
6-hr	1.11 (0.996–1.24)	1.38 (1.25–1.55)	1.74 (1.56–1.94)	2.03 (1.81–2.27)	2.44 (2.14–2.71)	2.76 (2.39–3.07)	3.10 (2.64–3.45)	3.45 (2.89–3.86)	3.94 (3.20–4.45)	4.34 (3.45–4.95)
12-hr	1.25 (1.13–1.39)	1.56 (1.41–1.74)	1.94 (1.74–2.16)	2.24 (2.01–2.49)	2.67 (2.36–2.96)	3.00 (2.62–3.34)	3.34 (2.87–3.73)	3.69 (3.12–4.15)	4.17 (3.44–4.73)	4.55 (3.68–5.21)
24-hr	1.40 (1.28–1.53)	1.75 (1.60–1.92)	2.18 (2.00–2.39)	2.53 (2.31–2.78)	3.01 (2.73–3.31)	3.40 (3.05–3.74)	3.79 (3.37–4.20)	4.20 (3.70–4.67)	4.76 (4.12–5.35)	5.19 (4.44–5.89)
2-day	1.53 (1.40–1.67)	1.91 (1.76–2.09)	2.39 (2.19–2.61)	2.77 (2.54–3.03)	3.30 (3.00–3.61)	3.72 (3.35–4.09)	4.16 (3.71–4.59)	4.61 (4.07–5.13)	5.22 (4.53–5.88)	5.71 (4.88–6.49)
3-day	1.62 (1.49–1.78)	2.03 (1.86–2.23)	2.54 (2.33–2.78)	2.96 (2.71–3.25)	3.56 (3.23–3.90)	4.04 (3.62–4.45)	4.55 (4.04–5.04)	5.08 (4.45–5.67)	5.83 (5.00–6.58)	6.43 (5.42–7.33)
4-day	1.72 (1.58–1.89)	2.15 (1.97–2.36)	2.69 (2.46–2.96)	3.16 (2.88–3.46)	3.82 (3.45–4.19)	4.36 (3.90–4.81)	4.94 (4.36–5.48)	5.56 (4.83–6.21)	6.44 (5.46–7.28)	7.16 (5.96–8.17)
7-day	1.98 (1.82–2.18)	2.48 (2.26–2.73)	3.12 (2.85–3.43)	3.66 (3.33–4.02)	4.45 (4.01–4.90)	5.10 (4.54–5.64)	5.80 (5.11–6.47)	6.55 (5.68–7.36)	7.63 (6.48–8.70)	8.52 (7.10–9.83)
10-day	2.22 (2.03–2.44)	2.77 (2.53–3.04)	3.47 (3.17–3.81)	4.06 (3.69–4.45)	4.91 (4.41–5.38)	5.59 (4.98–6.16)	6.33 (5.57–7.00)	7.11 (6.17–7.94)	8.23 (6.97–9.30)	9.14 (7.60–10.5)
20-day	2.91 (2.67–3.17)	3.63 (3.33–3.97)	4.55 (4.15–4.97)	5.29 (4.82–5.78)	6.32 (5.72–6.91)	7.14 (6.40–7.83)	7.99 (7.09–8.82)	8.89 (7.79–9.88)	10.1 (8.70–11.4)	11.1 (9.39–12.7)
30-day	3.53 (3.26–3.83)	4.40 (4.06–4.78)	5.43 (5.00–5.89)	6.24 (5.74–6.78)	7.34 (6.71–7.99)	8.19 (7.43–8.92)	9.05 (8.15–9.91)	9.92 (8.86–10.9)	11.1 (9.74–12.4)	12.0 (10.4–13.5)
45-day	4.30 (3.98–4.64)	5.35 (4.96–5.79)	6.53 (6.05–7.07)	7.43 (6.87–8.03)	8.58 (7.91–9.29)	9.42 (8.64–10.2)	10.2 (9.35–11.2)	11.0 (10.0–12.1)	12.0 (10.8–13.3)	12.8 (11.4–14.2)
60-day	4.87 (4.51–5.27)	6.06 (5.61–6.58)	7.40 (6.85–8.01)	8.41 (7.77–9.11)	9.72 (8.95–10.6)	10.7 (9.80–11.6)	11.6 (10.6–12.7)	12.5 (11.4–13.8)	13.7 (12.3–15.2)	14.5 (12.9–16.3)

[1] Precipitation frequency (PF) estimates in this table are based on frequency analysis of partial duration series (PDS).

Numbers in parenthesis are PF estimates at lower and upper bounds of the 90% confidence interval. The probability that precipitation frequency estimates (for a given duration and average recurrence interval) will be greater than the upper bound (or less than the lower bound) is 5%. Estimates at upper bounds are not checked against probable maximum precipitation (PMP) estimates and may be higher than currently valid PMP values.

Please refer to NOAA Atlas 14 document for more information.

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PF graphical

NOAA Atlas 14, Volume 1, Version 5
Location name: Tucson, Arizona, US*
Latitude: 32.0957°, Longitude: -110.8750°
Elevation: 2748 ft*
* source: Google Maps

POINT PRECIPITATION FREQUENCY ESTIMATES

Sanja Perica, Sarah Dietz, Sarah Heim, Lillian Hiner, Kazungu Maitaria, Deborah Martin, Sandra Pavlovic, Ishani Roy, Carl Trypaluk, Dale Unruh, Fenglin Yan, Michael Yekta, Tan Zhao, Geoffrey Bonnin, Daniel Brewer, Li-Chuan Chen, Tye Parzybok, John Yarchoan

NOAA, National Weather Service, Silver Spring, Maryland

Rainfall ID #3

PF_tabular | PF_graphical | Maps_&_aerials

PF tabular

PDS-based point precipitation frequency estimates with 90% confidence intervals (in inches)[1]

Duration	Average recurrence interval (years)									
	1	2	5	10	25	50	100	200	500	1000
5-min	0.256 (0.229–0.290)	0.330 (0.295–0.373)	0.435 (0.386–0.489)	0.514 (0.454–0.578)	0.622 (0.542–0.697)	0.703 (0.606–0.790)	0.787 (0.668–0.889)	0.871 (0.727–0.988)	0.983 (0.800–1.13)	1.07 (0.853–1.23)
10-min	0.390 (0.349–0.440)	0.502 (0.449–0.568)	0.662 (0.588–0.745)	0.782 (0.691–0.879)	0.946 (0.825–1.06)	1.07 (0.921–1.20)	1.20 (1.02–1.35)	1.33 (1.11–1.50)	1.50 (1.22–1.71)	1.63 (1.30–1.87)
15-min	0.483 (0.433–0.546)	0.623 (0.557–0.704)	0.821 (0.729–0.923)	0.969 (0.856–1.09)	1.17 (1.02–1.32)	1.33 (1.14–1.49)	1.49 (1.26–1.68)	1.64 (1.37–1.86)	1.86 (1.51–2.12)	2.02 (1.61–2.32)
30-min	0.650 (0.583–0.736)	0.838 (0.750–0.948)	1.11 (0.981–1.24)	1.31 (1.15–1.47)	1.58 (1.38–1.77)	1.79 (1.54–2.01)	2.00 (1.70–2.26)	2.21 (1.85–2.51)	2.50 (2.03–2.86)	2.72 (2.17–3.13)
60-min	0.805 (0.721–0.910)	1.04 (0.928–1.17)	1.37 (1.21–1.54)	1.62 (1.43–1.82)	1.96 (1.70–2.19)	2.21 (1.90–2.49)	2.48 (2.10–2.80)	2.74 (2.29–3.11)	3.09 (2.52–3.54)	3.36 (2.68–3.87)
2-hr	0.931 (0.836–1.05)	1.19 (1.07–1.34)	1.54 (1.38–1.73)	1.82 (1.61–2.03)	2.19 (1.93–2.45)	2.49 (2.16–2.78)	2.79 (2.39–3.12)	3.10 (2.60–3.48)	3.52 (2.88–3.99)	3.85 (3.08–4.40)
3-hr	0.984 (0.885–1.10)	1.24 (1.12–1.40)	1.59 (1.43–1.79)	1.88 (1.67–2.10)	2.27 (2.00–2.53)	2.58 (2.24–2.88)	2.90 (2.48–3.26)	3.24 (2.71–3.66)	3.72 (3.02–4.24)	4.10 (3.24–4.71)
6-hr	1.12 (1.01–1.26)	1.40 (1.26–1.57)	1.76 (1.57–1.98)	2.06 (1.83–2.31)	2.48 (2.17–2.77)	2.81 (2.43–3.14)	3.15 (2.68–3.54)	3.52 (2.94–3.96)	4.02 (3.27–4.57)	4.43 (3.53–5.09)
12-hr	1.27 (1.14–1.41)	1.58 (1.43–1.77)	1.97 (1.77–2.20)	2.29 (2.04–2.55)	2.72 (2.40–3.03)	3.06 (2.67–3.42)	3.42 (2.94–3.82)	3.78 (3.20–4.26)	4.28 (3.53–4.87)	4.68 (3.79–5.37)
24-hr	1.40 (1.29–1.54)	1.75 (1.61–1.92)	2.19 (2.00–2.40)	2.54 (2.32–2.78)	3.02 (2.74–3.32)	3.40 (3.06–3.74)	3.79 (3.38–4.20)	4.20 (3.70–4.67)	4.76 (4.13–5.35)	5.19 (4.45–5.88)
2-day	1.55 (1.42–1.69)	1.93 (1.78–2.12)	2.41 (2.21–2.64)	2.80 (2.56–3.06)	3.33 (3.03–3.65)	3.76 (3.38–4.13)	4.20 (3.75–4.64)	4.65 (4.11–5.18)	5.27 (4.58–5.94)	5.76 (4.93–6.56)
3-day	1.65 (1.51–1.81)	2.06 (1.89–2.26)	2.57 (2.36–2.82)	3.00 (2.74–3.29)	3.61 (3.26–3.96)	4.09 (3.67–4.51)	4.61 (4.09–5.11)	5.14 (4.50–5.74)	5.90 (5.06–6.66)	6.51 (5.49–7.42)
4-day	1.75 (1.61–1.92)	2.18 (2.00–2.40)	2.74 (2.50–3.01)	3.21 (2.92–3.52)	3.88 (3.50–4.27)	4.43 (3.95–4.89)	5.01 (4.42–5.57)	5.64 (4.90–6.30)	6.52 (5.54–7.38)	7.25 (6.05–8.29)
7-day	2.03 (1.85–2.24)	2.53 (2.31–2.79)	3.19 (2.90–3.51)	3.75 (3.40–4.12)	4.55 (4.09–5.01)	5.20 (4.64–5.76)	5.92 (5.21–6.60)	6.68 (5.80–7.51)	7.77 (6.60–8.86)	8.68 (7.23–10.0)
10-day	2.28 (2.09–2.51)	2.85 (2.60–3.13)	3.57 (3.25–3.93)	4.18 (3.79–4.59)	5.04 (4.53–5.55)	5.74 (5.11–6.34)	6.50 (5.71–7.21)	7.30 (6.32–8.17)	8.44 (7.14–9.56)	9.37 (7.78–10.7)
20-day	3.01 (2.75–3.29)	3.76 (3.44–4.11)	4.70 (4.29–5.15)	5.47 (4.97–5.99)	6.53 (5.90–7.16)	7.37 (6.60–8.11)	8.25 (7.30–9.12)	9.17 (8.02–10.2)	10.4 (8.96–11.8)	11.5 (9.67–13.1)
30-day	3.66 (3.37–3.97)	4.56 (4.19–4.95)	5.61 (5.16–6.11)	6.46 (5.93–7.02)	7.59 (6.93–8.27)	8.46 (7.67–9.24)	9.34 (8.41–10.3)	10.2 (9.14–11.3)	11.4 (10.1–12.8)	12.4 (10.7–13.9)
45-day	4.45 (4.11–4.82)	5.54 (5.12–6.01)	6.76 (6.25–7.33)	7.68 (7.10–8.32)	8.87 (8.16–9.63)	9.74 (8.92–10.6)	10.6 (9.65–11.6)	11.4 (10.3–12.5)	12.4 (11.2–13.8)	13.2 (11.7–14.7)
60-day	5.04 (4.66–5.45)	6.27 (5.79–6.80)	7.65 (7.07–8.29)	8.69 (8.02–9.42)	10.0 (9.23–10.9)	11.0 (10.1–12.0)	12.0 (10.9–13.1)	12.9 (11.7–14.2)	14.1 (12.6–15.7)	15.0 (13.3–16.8)

[1] Precipitation frequency (PF) estimates in this table are based on frequency analysis of partial duration series (PDS).

Numbers in parenthesis are PF estimates at lower and upper bounds of the 90% confidence interval. The probability that precipitation frequency estimates (for a given duration and average recurrence interval) will be greater than the upper bound (or less than the lower bound) is 5%. Estimates at upper bounds are not checked against probable maximum precipitation (PMP) estimates and may be higher than currently valid PMP values.

Please refer to NOAA Atlas 14 document for more information.

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PF graphical

NOAA Atlas 14, Volume 1, Version 5
Location name: Tucson, Arizona, US*
Latitude: 32.0845°, Longitude: -110.8410°
Elevation: 2830 ft*
* source: Google Maps

POINT PRECIPITATION FREQUENCY ESTIMATES

Rainfall ID #4

Sanja Perica, Sarah Dietz, Sarah Heim, Lillian Hiner, Kazungu Maitaria, Deborah Martin, Sandra Pavlovic, Ishani Roy, Carl Trypaluk, Dale Unruh, Fenglin Yan, Michael Yekta, Tan Zhao, Geoffrey Bonnin, Daniel Brewer, Li-Chuan Chen, Tye Parzybok, John Yarchoan

NOAA, National Weather Service, Silver Spring, Maryland

PF_tabular | PF_graphical | Maps_&_aerials

PF tabular

PDS-based point precipitation frequency estimates with 90% confidence intervals (in inches)[1]

Duration	Average recurrence interval (years)									
	1	2	5	10	25	50	100	200	500	1000
5-min	0.259 (0.232–0.293)	0.334 (0.298–0.378)	0.439 (0.390–0.495)	0.519 (0.458–0.584)	0.627 (0.547–0.703)	0.709 (0.611–0.797)	0.793 (0.673–0.896)	0.878 (0.733–0.995)	0.990 (0.806–1.13)	1.08 (0.859–1.24)
10-min	0.394 (0.352–0.446)	0.507 (0.453–0.575)	0.668 (0.593–0.752)	0.789 (0.697–0.888)	0.955 (0.832–1.07)	1.08 (0.929–1.21)	1.21 (1.02–1.36)	1.34 (1.12–1.52)	1.51 (1.23–1.72)	1.64 (1.31–1.89)
15-min	0.489 (0.437–0.552)	0.629 (0.562–0.712)	0.828 (0.735–0.933)	0.978 (0.863–1.10)	1.18 (1.03–1.33)	1.34 (1.15–1.50)	1.50 (1.27–1.69)	1.66 (1.38–1.88)	1.87 (1.52–2.14)	2.03 (1.62–2.34)
30-min	0.658 (0.588–0.744)	0.847 (0.756–0.959)	1.12 (0.990–1.26)	1.32 (1.16–1.48)	1.59 (1.39–1.79)	1.80 (1.55–2.02)	2.02 (1.71–2.28)	2.23 (1.86–2.53)	2.52 (2.05–2.88)	2.73 (2.18–3.15)
60-min	0.814 (0.727–0.921)	1.05 (0.936–1.19)	1.38 (1.23–1.55)	1.63 (1.44–1.83)	1.97 (1.72–2.21)	2.23 (1.92–2.51)	2.50 (2.12–2.82)	2.76 (2.31–3.13)	3.11 (2.54–3.56)	3.38 (2.70–3.90)
2-hr	0.938 (0.842–1.06)	1.20 (1.07–1.35)	1.55 (1.39–1.74)	1.83 (1.62–2.05)	2.21 (1.94–2.46)	2.51 (2.17–2.80)	2.81 (2.40–3.15)	3.13 (2.62–3.51)	3.55 (2.90–4.02)	3.88 (3.11–4.44)
3-hr	0.991 (0.890–1.11)	1.25 (1.13–1.41)	1.60 (1.44–1.80)	1.89 (1.68–2.11)	2.28 (2.01–2.55)	2.59 (2.25–2.90)	2.92 (2.49–3.28)	3.26 (2.73–3.68)	3.74 (3.04–4.27)	4.12 (3.27–4.75)
6-hr	1.13 (1.01–1.27)	1.41 (1.27–1.59)	1.78 (1.59–2.00)	2.08 (1.85–2.34)	2.50 (2.19–2.80)	2.84 (2.45–3.18)	3.19 (2.71–3.59)	3.56 (2.97–4.02)	4.07 (3.31–4.64)	4.49 (3.57–5.17)
12-hr	1.28 (1.16–1.43)	1.60 (1.45–1.79)	1.99 (1.79–2.23)	2.32 (2.06–2.58)	2.76 (2.43–3.07)	3.11 (2.71–3.47)	3.47 (2.98–3.88)	3.84 (3.25–4.33)	4.35 (3.59–4.96)	4.76 (3.85–5.47)
24-hr	1.41 (1.30–1.55)	1.76 (1.62–1.93)	2.20 (2.01–2.41)	2.55 (2.33–2.79)	3.04 (2.76–3.34)	3.42 (3.08–3.76)	3.82 (3.40–4.22)	4.23 (3.73–4.70)	4.79 (4.16–5.38)	5.23 (4.48–5.92)
2-day	1.56 (1.43–1.71)	1.95 (1.79–2.13)	2.43 (2.23–2.66)	2.82 (2.58–3.09)	3.37 (3.06–3.69)	3.80 (3.42–4.17)	4.24 (3.78–4.69)	4.70 (4.14–5.23)	5.33 (4.62–6.00)	5.83 (4.98–6.63)
3-day	1.67 (1.53–1.83)	2.08 (1.91–2.28)	2.60 (2.39–2.86)	3.04 (2.77–3.33)	3.65 (3.30–4.01)	4.14 (3.71–4.56)	4.66 (4.14–5.17)	5.21 (4.56–5.82)	5.98 (5.13–6.75)	6.59 (5.56–7.52)
4-day	1.77 (1.63–1.95)	2.21 (2.03–2.43)	2.77 (2.54–3.05)	3.25 (2.96–3.57)	3.93 (3.55–4.33)	4.49 (4.01–4.96)	5.09 (4.49–5.65)	5.72 (4.98–6.40)	6.62 (5.63–7.50)	7.36 (6.14–8.42)
7-day	2.06 (1.89–2.27)	2.58 (2.35–2.84)	3.25 (2.96–3.57)	3.81 (3.46–4.19)	4.63 (4.17–5.11)	5.31 (4.72–5.87)	6.03 (5.31–6.73)	6.81 (5.91–7.66)	7.94 (6.74–9.04)	8.87 (7.38–10.2)
10-day	2.33 (2.13–2.56)	2.91 (2.66–3.20)	3.65 (3.33–4.02)	4.27 (3.88–4.70)	5.16 (4.64–5.68)	5.88 (5.24–6.50)	6.65 (5.86–7.39)	7.48 (6.49–8.38)	8.65 (7.33–9.81)	9.61 (7.99–11.0)
20-day	3.08 (2.83–3.38)	3.86 (3.53–4.23)	4.83 (4.41–5.30)	5.62 (5.11–6.16)	6.71 (6.07–7.37)	7.58 (6.79–8.35)	8.49 (7.52–9.39)	9.44 (8.26–10.5)	10.8 (9.23–12.1)	11.8 (9.97–13.5)
30-day	3.75 (3.46–4.08)	4.68 (4.31–5.09)	5.77 (5.30–6.28)	6.64 (6.09–7.23)	7.81 (7.12–8.52)	8.71 (7.90–9.52)	9.62 (8.66–10.6)	10.6 (9.41–11.7)	11.8 (10.4–13.2)	12.8 (11.1–14.4)
45-day	4.57 (4.23–4.95)	5.69 (5.26–6.18)	6.95 (6.43–7.54)	7.90 (7.30–8.57)	9.13 (8.39–9.92)	10.0 (9.18–10.9)	10.9 (9.93–11.9)	11.8 (10.6–12.9)	12.8 (11.5–14.2)	13.6 (12.1–15.2)
60-day	5.18 (4.79–5.61)	6.45 (5.96–7.00)	7.87 (7.28–8.53)	8.95 (8.26–9.70)	10.3 (9.51–11.2)	11.4 (10.4–12.4)	12.4 (11.3–13.5)	13.3 (12.1–14.7)	14.6 (13.1–16.2)	15.5 (13.7–17.3)

[1] Precipitation frequency (PF) estimates in this table are based on frequency analysis of partial duration series (PDS).

Numbers in parenthesis are PF estimates at lower and upper bounds of the 90% confidence interval. The probability that precipitation frequency estimates (for a given duration and average recurrence interval) will be greater than the upper bound (or less than the lower bound) is 5%. Estimates at upper bounds are not checked against probable maximum precipitation (PMP) estimates and may be higher than currently valid PMP values.

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PF graphical

NOAA Atlas 14, Volume 1, Version 5
Location name: Tucson, Arizona, US*
Latitude: 32.0704°, Longitude: -110.8081°
Elevation: 2933 ft*
* source: Google Maps

POINT PRECIPITATION FREQUENCY ESTIMATES

Sanja Perica, Sarah Dietz, Sarah Heim, Lillian Hiner, Kazungu Maitaria, Deborah Martin, Sandra Pavlovic, Ishani Roy, Carl Trypaluk, Dale Unruh, Fenglin Yan, Michael Yekta, Tan Zhao, Geoffrey Bonnin, Daniel Brewer, Li-Chuan Chen, Tye Parzybok, John Yarchoan

NOAA, National Weather Service, Silver Spring, Maryland

Rainfall ID #5

PF_tabular | PF_graphical | Maps_&_aerials

PF tabular

PDS-based point precipitation frequency estimates with 90% confidence intervals (in inches)[1]

Duration	Average recurrence interval (years)									
	1	2	5	10	25	50	100	200	500	1000
5-min	0.262 (0.235-0.296)	0.337 (0.302-0.381)	0.443 (0.394-0.498)	0.523 (0.463-0.586)	0.631 (0.552-0.706)	0.713 (0.615-0.800)	0.797 (0.679-0.899)	0.882 (0.739-0.999)	0.993 (0.813-1.14)	1.08 (0.866-1.24)
10-min	0.399 (0.357-0.450)	0.513 (0.459-0.579)	0.674 (0.599-0.758)	0.796 (0.704-0.892)	0.961 (0.840-1.08)	1.09 (0.937-1.22)	1.21 (1.03-1.37)	1.34 (1.12-1.52)	1.51 (1.24-1.73)	1.64 (1.32-1.89)
15-min	0.494 (0.443-0.558)	0.636 (0.569-0.718)	0.836 (0.743-0.939)	0.986 (0.873-1.11)	1.19 (1.04-1.33)	1.35 (1.16-1.51)	1.50 (1.28-1.70)	1.66 (1.39-1.88)	1.88 (1.53-2.14)	2.04 (1.63-2.35)
30-min	0.665 (0.596-0.751)	0.856 (0.766-0.967)	1.13 (1.00-1.27)	1.33 (1.18-1.49)	1.60 (1.40-1.80)	1.81 (1.56-2.03)	2.02 (1.73-2.28)	2.24 (1.88-2.54)	2.52 (2.07-2.89)	2.74 (2.20-3.16)
60-min	0.823 (0.738-0.929)	1.06 (0.948-1.20)	1.39 (1.24-1.57)	1.64 (1.45-1.84)	1.99 (1.74-2.22)	2.24 (1.94-2.52)	2.51 (2.13-2.83)	2.77 (2.32-3.14)	3.12 (2.56-3.57)	3.39 (2.72-3.91)
2-hr	0.947 (0.851-1.06)	1.21 (1.08-1.36)	1.56 (1.40-1.75)	1.84 (1.63-2.05)	2.22 (1.95-2.47)	2.52 (2.19-2.81)	2.82 (2.42-3.16)	3.13 (2.64-3.53)	3.56 (2.93-4.05)	3.89 (3.14-4.47)
3-hr	0.997 (0.898-1.12)	1.26 (1.14-1.41)	1.61 (1.45-1.80)	1.89 (1.69-2.11)	2.29 (2.02-2.55)	2.60 (2.27-2.90)	2.93 (2.51-3.29)	3.27 (2.75-3.69)	3.75 (3.06-4.28)	4.13 (3.30-4.76)
6-hr	1.14 (1.02-1.28)	1.43 (1.28-1.60)	1.80 (1.61-2.01)	2.10 (1.87-2.35)	2.53 (2.22-2.82)	2.87 (2.49-3.21)	3.23 (2.76-3.62)	3.60 (3.02-4.07)	4.13 (3.37-4.70)	4.56 (3.64-5.24)
12-hr	1.30 (1.17-1.45)	1.62 (1.46-1.81)	2.02 (1.81-2.25)	2.35 (2.09-2.61)	2.80 (2.47-3.11)	3.15 (2.75-3.51)	3.52 (3.03-3.94)	3.91 (3.30-4.40)	4.43 (3.66-5.05)	4.85 (3.93-5.58)
24-hr	1.42 (1.31-1.56)	1.78 (1.64-1.95)	2.22 (2.03-2.42)	2.58 (2.35-2.82)	3.06 (2.78-3.36)	3.45 (3.11-3.79)	3.85 (3.44-4.25)	4.26 (3.77-4.73)	4.82 (4.20-5.40)	5.26 (4.53-5.94)
2-day	1.58 (1.45-1.72)	1.97 (1.81-2.16)	2.46 (2.26-2.69)	2.85 (2.62-3.12)	3.40 (3.10-3.72)	3.84 (3.46-4.21)	4.29 (3.83-4.73)	4.75 (4.20-5.28)	5.39 (4.68-6.06)	5.89 (5.04-6.69)
3-day	1.69 (1.55-1.85)	2.11 (1.94-2.31)	2.64 (2.42-2.89)	3.08 (2.81-3.38)	3.70 (3.35-4.06)	4.19 (3.77-4.62)	4.72 (4.20-5.23)	5.28 (4.63-5.89)	6.05 (5.20-6.83)	6.67 (5.64-7.61)
4-day	1.80 (1.65-1.98)	2.24 (2.06-2.47)	2.82 (2.58-3.10)	3.30 (3.01-3.63)	3.99 (3.60-4.40)	4.55 (4.07-5.04)	5.16 (4.56-5.73)	5.80 (5.06-6.49)	6.71 (5.72-7.61)	7.46 (6.24-8.53)
7-day	2.10 (1.93-2.32)	2.63 (2.40-2.89)	3.31 (3.02-3.64)	3.89 (3.54-4.28)	4.73 (4.25-5.20)	5.41 (4.82-5.98)	6.15 (5.42-6.84)	6.94 (6.03-7.79)	8.08 (6.87-9.18)	9.01 (7.52-10.4)
10-day	2.39 (2.19-2.63)	2.99 (2.73-3.29)	3.75 (3.41-4.12)	4.38 (3.98-4.82)	5.28 (4.76-5.82)	6.02 (5.37-6.65)	6.81 (6.00-7.56)	7.64 (6.64-8.56)	8.83 (7.50-10.0)	9.80 (8.18-11.2)
20-day	3.18 (2.92-3.49)	3.98 (3.64-4.36)	4.99 (4.55-5.47)	5.80 (5.27-6.35)	6.92 (6.25-7.60)	7.81 (6.99-8.60)	8.74 (7.74-9.66)	9.71 (8.50-10.8)	11.0 (9.49-12.5)	12.1 (10.2-13.8)
30-day	3.88 (3.57-4.22)	4.83 (4.45-5.26)	5.96 (5.48-6.49)	6.86 (6.29-7.47)	8.06 (7.35-8.80)	8.98 (8.14-9.83)	9.93 (8.93-10.9)	10.9 (9.70-12.0)	12.2 (10.7-13.6)	13.1 (11.4-14.8)
45-day	4.72 (4.37-5.12)	5.88 (5.44-6.39)	7.19 (6.64-7.80)	8.17 (7.54-8.86)	9.43 (8.67-10.3)	10.4 (9.48-11.3)	11.3 (10.2-12.3)	12.2 (11.0-13.4)	13.3 (11.9-14.7)	14.1 (12.5-15.7)
60-day	5.37 (4.96-5.81)	6.68 (6.17-7.25)	8.16 (7.53-8.84)	9.27 (8.54-10.0)	10.7 (9.83-11.6)	11.8 (10.8-12.8)	12.8 (11.6-14.0)	13.8 (12.5-15.1)	15.1 (13.5-16.7)	16.0 (14.2-17.9)

[1] Precipitation frequency (PF) estimates in this table are based on frequency analysis of partial duration series (PDS).

Numbers in parenthesis are PF estimates at lower and upper bounds of the 90% confidence interval. The probability that precipitation frequency estimates (for a given duration and average recurrence interval) will be greater than the upper bound (or less than the lower bound) is 5%. Estimates at upper bounds are not checked against probable maximum precipitation (PMP) estimates and may be higher than currently valid PMP values.

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PF graphical

Area (sq mile)	Areal Reduction Factor East 3-hr	24-hr
0	1	1
1	0.972	0.986
2	0.944	0.972
3	0.916	0.958
4	0.888	0.944
5	0.860	0.930
6	0.848	0.922
7	0.836	0.914
8	0.824	0.906
9	0.812	0.898
10	0.800	0.890
11	0.794	0.886
12	0.788	0.882
13	0.782	0.878
14	0.776	0.874
15	0.770	0.870
16	0.764	0.866
17	0.758	0.862
18	0.752	0.858
19	0.746	0.854
20	0.740	0.850

Areal Reduction Factor for Airport Wash

Area (sq mile)	**Representative Area (sq mile)**	**Areal Reduction Factor East 3-hr**	**24-hr**
<=1	0	1	1
1~5	3	0.916	0.958
5~10	7.5	0.830	0.910
10~15	12.5	0.785	0.880
15~20	17.5	0.755	0.860
20~25	20	0.740	0.850

D.2 – PHYSICAL PARAMETERS CALCULATIONS

Includes:

- Watershed Characters Summary Table
- Supporting documents for Tc & CN computations were included in the CD (electronic)

Airport Wash Watershed Characters Summary Table

Watershed ID	WaterShed Area (Local Only)	Time of Concentration	Lag Time	Vegetation Cover	Vegetation Cover Density	Curve Number	Impervious Cover (%)
	(sq mile)	(min)	(min)	(ft)			
AW002	0.081	32.6	19.6	Desert Brush	20%	84.6	5
AW004	0.254	41.9	25.1	Desert Brush	20%	85.7	5
AW006	0.350	55.0	33.0	Desert Brush	20%	86.5	5
AW008	0.513	67.3	40.4	Desert Brush	20%	86.2	5
AW010	0.174	16.8	10.1	Desert Brush	20%	86.9	35
AW012	0.218	54.1	32.5	Desert Brush	20%	87.1	5
AW014	0.166	72.1	43.3	Desert Brush	20%	86.4	35
AW016	0.152	19.9	11.9	Desert Brush	20%	85.8	35
AW018	0.420	57.1	34.3	Desert Brush	20%	86.6	5
AW020	0.482	60.6	36.4	Desert Brush	20%	85.1	20
AW022	0.341	58.6	35.2	Desert Brush	20%	84.7	5
AW024	0.285	66.6	39.9	Desert Brush	20%	86.3	15
AW026	0.133	25.3	15.2	Desert Brush	20%	84.6	5
AW028	0.522	71.2	42.7	Desert Brush	20%	85.3	5
AW030	0.387	57.1	34.3	Desert Brush	20%	86.0	5
AW032	0.377	62.4	37.5	Desert Brush	20%	89.0	5
AW034	0.312	75.2	45.1	Desert Brush	20%	84.1	5
AW036	0.078	28.7	17.2	Desert Brush	20%	84.9	5
AW038	0.330	66.3	39.8	Desert Brush	20%	85.9	35
AW040	0.083	36.1	21.6	Desert Brush	20%	88.2	10
AW042	0.144	43.0	25.8	Desert Brush	20%	83.8	5
AW044	0.269	56.1	33.7	Desert Brush	20%	85.5	10
AW046	0.240	31.8	19.1	Desert Brush	20%	85.2	5
AW048	0.335	49.6	29.8	Desert Brush	20%	85.6	10
AW050	0.218	49.2	29.5	Desert Brush	20%	87.1	5
AW052	0.074	36.6	22.0	Desert Brush	20%	87.9	5
AW054	0.290	54.4	32.7	Desert Brush	20%	88.2	5
AW056	0.136	40.1	24.1	Desert Brush	20%	91.0	5
AW058	0.440	61.4	36.8	Desert Brush	20%	89.8	5
AW060	0.059	28.8	17.3	Desert Brush	20%	91.0	5
AW062	0.217	56.8	34.1	Desert Brush	20%	91.0	5
AW064	0.223	54.6	32.8	Desert Brush	20%	89.8	5
AW066	0.212	55.0	33.0	Desert Brush	20%	91.0	5
AW068	0.073	30.2	18.1	Desert Brush	20%	91.0	5
AW070	0.230	44.3	26.6	Desert Brush	20%	91.0	5
AW202	0.440	58.2	34.9	Desert Brush	20%	84.8	5
AW204	0.620	61.0	36.6	Desert Brush	20%	85.1	5
AW206	0.718	71.5	42.9	Desert Brush	20%	85.2	5
AW208	0.388	63.3	38.0	Desert Brush	20%	85.9	5
AW210	0.207	54.9	33.0	Desert Brush	20%	85.3	5
AW212	0.712	78.9	47.3	Desert Brush	20%	85.7	5
AW214	0.200	40.1	24.1	Desert Brush	20%	85.0	5
AW216	0.163	35.1	21.0	Desert Brush	20%	86.1	5
AW218	0.095	41.9	25.1	Desert Brush	20%	84.3	5
AW220	0.135	26.7	16.0	Desert Brush	20%	85.2	5
AW222	0.209	31.4	18.9	Desert Brush	20%	85.6	10
AW224	0.587	81.7	49.0	Desert Brush	20%	85.9	10
AW226	0.283	54.7	32.8	Desert Brush	20%	84.9	5
AW228	0.995	66.3	39.8	Desert Brush	20%	86.1	5
AW230	0.572	66.7	40.0	Desert Brush	20%	86.6	10
AW232	0.351	56.8	34.1	Desert Brush	20%	84.6	10
AW234	0.669	76.0	45.6	Desert Brush	20%	84.6	10
AW236	0.309	58.5	35.1	Desert Brush	20%	83.5	10
AW238	0.410	51.5	30.9	Desert Brush	20%	87.9	5
AW240	0.280	54.3	32.6	Desert Brush	20%	85.3	5
AW242	0.336	23.5	14.1	Desert Brush	20%	89.5	5
AW244	0.356	44.0	26.4	Desert Brush	20%	84.7	5
AW246	0.519	69.4	41.7	Desert Brush	20%	82.2	5
AW248	0.205	35.8	21.5	Desert Brush	20%	91.0	5
AW250	0.673	86.6	51.9	Desert Brush	20%	90.1	5
AW402	0.218	44.6	26.7	Desert Brush	20%	91.0	5
AW404	0.362	51.6	31.0	Desert Brush	20%	91.0	5
AW406	0.409	37.1	22.3	Desert Brush	20%	88.3	40
AW408	0.030	24.1	14.5	Desert Brush	20%	87.9	50
AW410	0.489	29.6	17.8	Desert Brush	20%	88.0	50
AW412	0.508	64.7	38.8	Desert Brush	20%	88.4	75
AW414	0.659	68.7	41.2	Desert Brush	20%	85.4	60
AW416	0.497	53.1	31.9	Desert Brush	20%	86.4	35
AW418	0.248	16.0	9.6	Desert Brush	20%	85.8	35
AW420	0.290	43.3	26.0	Desert Brush	20%	85.6	40
AW422	0.144	38.0	22.8	Desert Brush	20%	83.7	40
AW424	0.296	29.4	17.6	Desert Brush	20%	86.0	40
AW426	0.213	29.3	17.6	Desert Brush	20%	85.1	40
AW428	0.120	20.4	12.2	Desert Brush	20%	86.7	35
AW430	0.067	36.2	21.7	Desert Brush	20%	86.5	35
AW432	0.269	41.9	25.2	Desert Brush	20%	85.3	25
AW434	0.119	20.4	12.2	Desert Brush	20%	87.1	35
AW436	0.044	7.3	4.4	Desert Brush	20%	86.5	25
AW438	0.094	14.3	8.6	Desert Brush	20%	86.0	65
AW440	0.607	65.9	39.5	Desert Brush	20%	87.1	30

* Curve Number does not include impervious cover

D.3 – HYDROGRAPH ROUTING DATA

Includes: (in electronic format in the attached CD)

- Routing Reach Storage-Discharge Computation
- # of Routing Steps Computation
- HEC-RAS Support Routing Reach Computation

D.4 – RESERVOIR ROUTING DATA

Includes:

- Los Reales Landfill East Basin Stage Storage Computations

Project: **14-063 RCFD-Airport Wash Basin Management Study -Phase II**
Basin Description: **Los Reales Landfill East Basin**
Date: 2015.02.23

Contour Elevation	Cumulative Area (sq. ft)	Depth (ft)	Incremental Volume Avg. End (cu. ft)	Cumulative Volume Avg. End (cu. ft)	Cumulative Volume (AC-FT)
2710	117.07	0	0	0	0.0
2711	2932.35	1	1524.7	762.355	0.0
2712	16871.9	1	9902.1	6475.7725	0.1
2713	40970.16	1	28921.0	25887.35	0.6
2714	79635.51	1	60302.8	70499.2825	1.6
2715	105239.01	1	92437.3	146869.33	3.4
2716	134385.62	1	119812.3	252994.1175	5.8
2717	194433.93	1	164409.8	395105.1625	9.1
2718	303194.04	1	248814.0	601717.0425	13.8
2719	489782.03	1	396488.0	924368.0525	21.2
2720	553104.82	1	521443.4	1383333.783	31.8
2721	703184.08	1	628144.5	1958127.72	45.0
2722	824435.8	1	763809.9	2654104.915	60.9
2723	930988.28	1	877712.0	3474865.905	79.8
2724	1037472.98	1	984230.6	4405837.24	101.1
2725	1107589.6	1	1072531.3	5434218.2	124.8
2726	1166897.83	1	1137243.7	6539105.703	150.1
2727	1235419.29	1	1201158.6	7708306.84	177.0
2728	1306923.6	1	1271171.4	8944471.843	205.3
2729	1332143.4	1	1319533.5	10239824.32	235.1
2730	1383032.91	1	1357588.2	11578385.14	265.8
2731	1454826.12	1	1418929.5	12966643.98	297.7
2732	1557219.1	1	1506022.6	14429120.04	331.2
2733	1599465.33	1	1578342.2	15971302.45	366.7
2734	1630110.35	1	1614787.8	17567867.48	403.3
2735	1669250.86	1	1649680.6	19200101.7	440.8
2736	1706197.46	1	1687724.2	20868804.09	479.1
2737	1759726.21	1	1732961.8	22579147.08	**518.3**
2742	1662.94	5	880694.6	23885975.29	548.3

D.5 – FLOW SPLITS AND DIVERSIONS DATA

Includes:

The following locations were evaluated for possible flow split

- AW036
- AW440
- AW012 (provided by Kimley Horn)

HY-8 Culvert Analysis Report

Crossing Discharge Data

Discharge Selection Method: Specify Minimum, Design, and Maximum Flow

Minimum Flow: 0 cfs

Design Flow: 288 cfs

Maximum Flow: 288 cfs

For Subwatershed Split Flow Analysis @ AW036

Table 1 - Summary of Culvert Flows at Crossing: CV79

Headwater Elevation (ft)	Total Discharge (cfs)	2-6x3 RCBC Discharge (cfs)	Roadway Discharge (cfs)	Iterations
2789.17	0.00	0.00	0.00	1
2790.05	28.80	28.80	0.00	1
2790.56	57.60	57.60	0.00	1
2791.00	86.40	86.40	0.00	1
2791.38	115.20	115.20	0.00	1
2791.73	144.00	144.00	0.00	1
2792.06	172.80	172.80	0.00	1
2792.37	201.60	201.60	0.00	1
2792.69	230.40	230.40	0.00	1
2793.01	259.20	258.88	0.10	10
2793.19	288.00	274.58	13.13	6
2793.00	258.20	258.20	0.00	Overtopping

Rating Curve Plot for Crossing: CV79

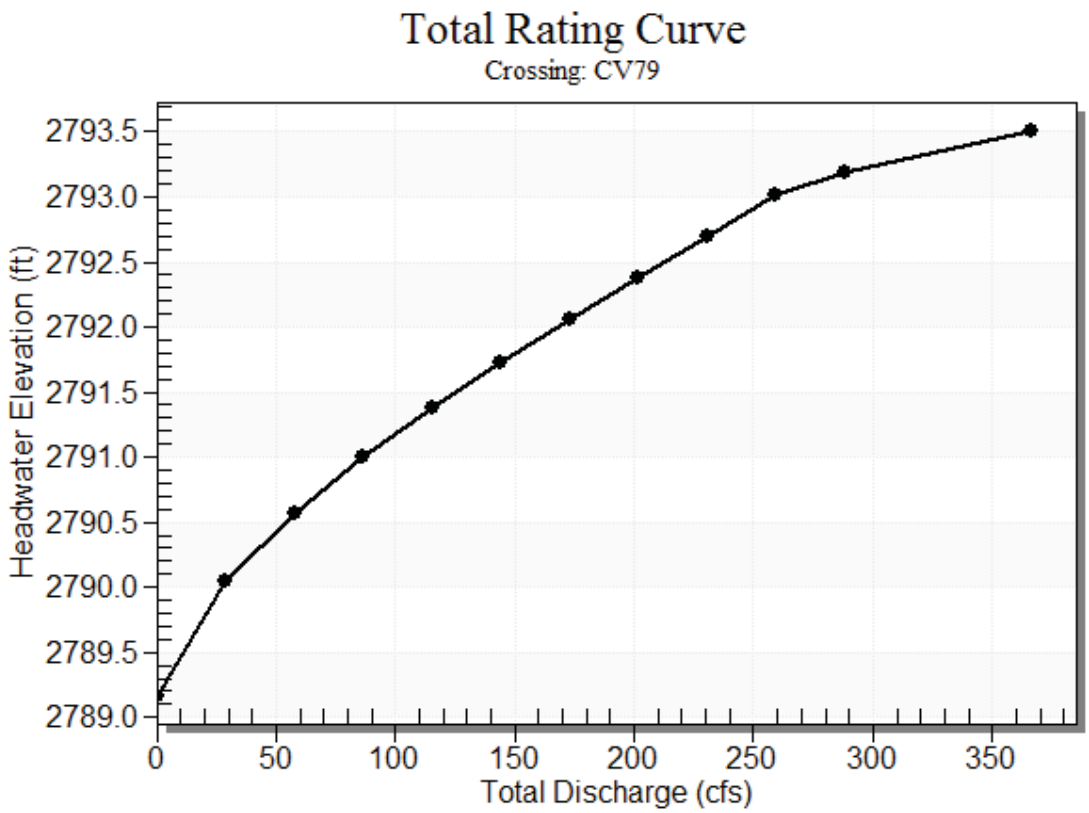


Table 2 - Culvert Summary Table: 2-6x3 RCBC

Total Discharge (cfs)	Culvert Discharge (cfs)	Headwater Elevation (ft)	Inlet Control Depth (ft)	Outlet Control Depth (ft)	Flow Type	Normal Depth (ft)	Critical Depth (ft)	Outlet Depth (ft)	Tailwater Depth (ft)	Outlet Velocity (ft/s)	Tailwater Velocity (ft/s)
0.00	0.00	2789.17	0.000	0.000	0-NF	0.000	0.000	0.000	0.000	0.000	0.000
28.80	28.80	2790.05	0.877	0.0*	1-JS1t	0.459	0.563	0.714	0.724	3.360	2.168
57.60	57.60	2790.56	1.392	0.017	1-S2n	0.726	0.894	0.733	1.057	6.547	2.679
86.40	86.40	2791.00	1.825	0.370	1-S2n	0.951	1.172	0.951	1.310	7.567	3.017
115.20	115.20	2791.38	2.209	0.722	1-S2n	1.156	1.420	1.156	1.521	8.301	3.276
144.00	144.00	2791.73	2.559	1.086	1-S2n	1.348	1.648	1.358	1.704	8.833	3.488
172.80	172.80	2792.06	2.886	1.473	1-S2n	1.527	1.860	1.542	1.868	9.340	3.669
201.60	201.60	2792.37	3.203	1.935	5-S2n	1.701	2.062	1.719	2.018	9.775	3.827
230.40	230.40	2792.69	3.519	2.801	5-S2n	1.870	2.254	1.890	2.155	10.160	3.969
259.20	258.88	2793.01	3.838	3.229	5-S2n	2.031	2.436	2.054	2.283	10.504	4.098
288.00	274.58	2793.19	4.018	3.480	5-S2n	2.119	2.533	2.144	2.404	10.670	4.216

* Full Flow Headwater elevation is below inlet invert.

****

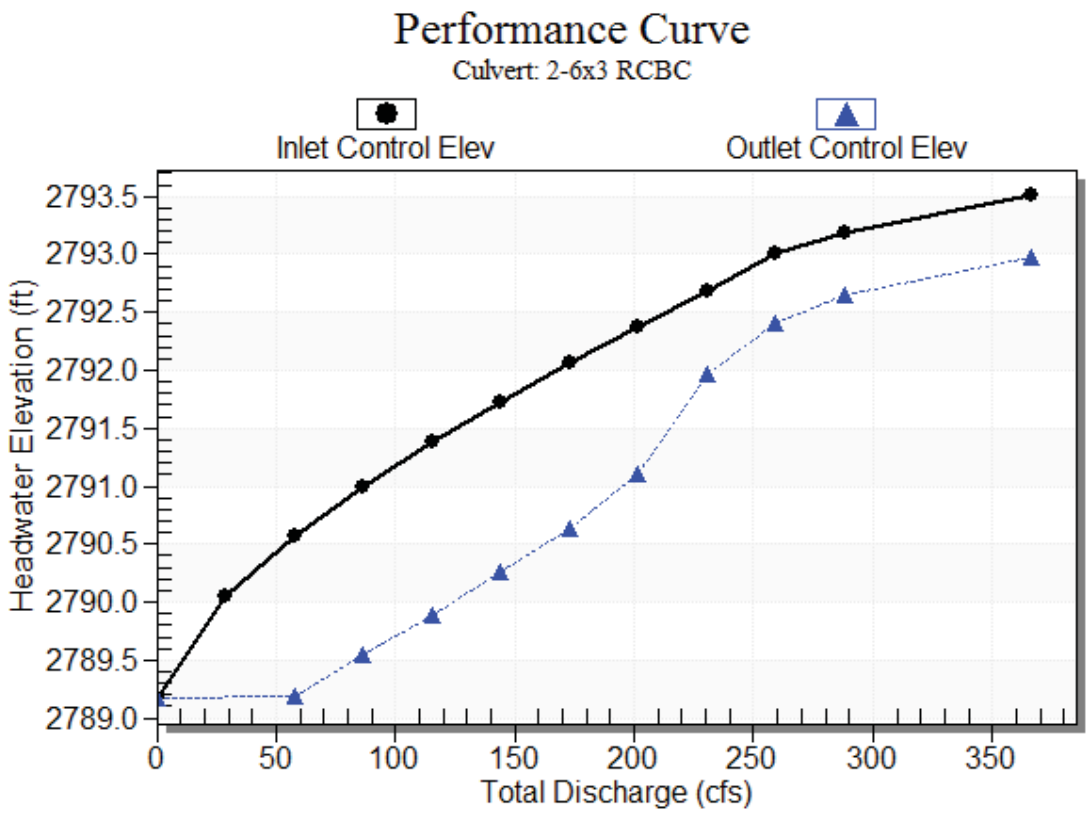
Straight Culvert

Inlet Elevation (invert): 2789.17 ft, Outlet Elevation (invert): 2788.06 ft

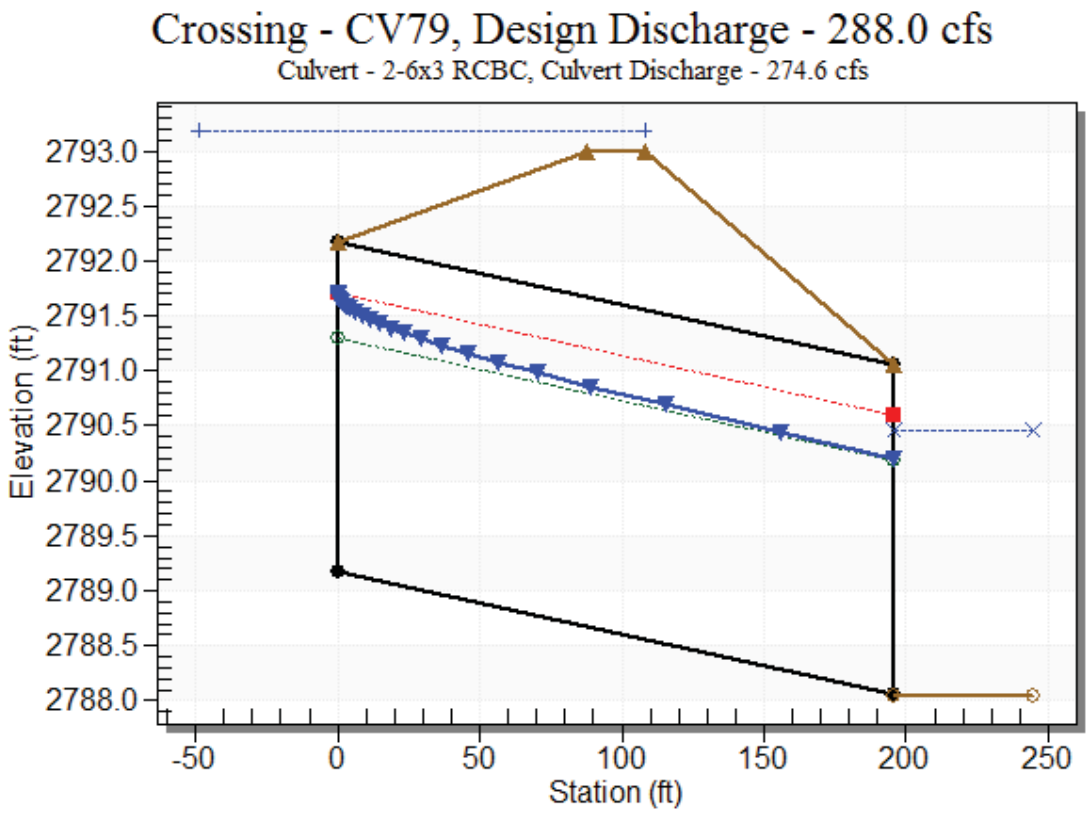
Culvert Length: 196.00 ft, Culvert Slope: 0.0057

****

Culvert Performance Curve Plot: 2-6x3 RCBC



Water Surface Profile Plot for Culvert: 2-6x3 RCBC



Site Data - 2-6x3 RCBC

Site Data Option: Culvert Invert Data

Inlet Station: 0.00 ft

Inlet Elevation: 2789.17 ft

Outlet Station: 196.00 ft

Outlet Elevation: 2788.06 ft

Number of Barrels: 2

Culvert Data Summary - 2-6x3 RCBC

Barrel Shape: Concrete Box

Barrel Span: 6.00 ft

Barrel Rise: 3.00 ft

Barrel Material: Concrete

Embedment: 0.00 in

Barrel Manning's n: 0.0120

Culvert Type: Straight

Inlet Configuration: 1.5:1 Bevel (18-34º flare) Wingwall

Inlet Depression: NONE

Table 3 - Downstream Channel Rating Curve (Crossing: CV79)

Flow (cfs)	Water Surface Elev (ft)	Depth (ft)	Velocity (ft/s)	Shear (psf)	Froude Number
0.00	2788.05	0.00	0.00	0.00	0.00
28.80	2788.77	0.72	2.17	0.32	0.50
57.60	2789.11	1.06	2.68	0.46	0.53
86.40	2789.36	1.31	3.02	0.57	0.54
115.20	2789.57	1.52	3.28	0.66	0.55
144.00	2789.75	1.70	3.49	0.74	0.56
172.80	2789.92	1.87	3.67	0.82	0.57
201.60	2790.07	2.02	3.83	0.88	0.57
230.40	2790.21	2.16	3.97	0.94	0.58
259.20	2790.33	2.28	4.10	1.00	0.58
288.00	2790.45	2.40	4.22	1.05	0.59

Tailwater Channel Data - CV79

Tailwater Channel Option: Trapezoidal Channel

Bottom Width: 14.00 ft

Side Slope (H:V): 6.00 (_:1)

Channel Slope: 0.0070

Channel Manning's n: 0.0400

Channel Invert Elevation: 2788.05 ft

Roadway Data for Crossing: CV79

Roadway Profile Shape: Irregular Roadway Shape (coordinates)

Roadway Surface: Gravel

Roadway Top Width: 20.00 ft

Hydraulic Analysis Report

Project Data

Project Title:

Designer:

Project Date: Friday, February 20, 2015

Project Units: U.S. Customary Units

Notes:

For Subwatershed Split Flow Analysis @ AW440

Channel Analysis: Nebraska Wash Channel near UPRR

Notes:

Input Parameters

Channel Type: Trapezoidal

Side Slope 1 (Z1): 3.0000 (ft/ft)

Side Slope 2 (Z2): 3.0000 (ft/ft)

Channel Width: 20.0000 (ft)

Longitudinal Slope: 0.0050 (ft/ft)

Manning's n: 0.0120

Depth: 2.5500 (ft)

Result Parameters

Flow: 964.1736 (cfs)

Area of Flow: 70.5075 (ft^2)

Wetted Perimeter: 36.1276 (ft)

Hydraulic Radius: 1.9516 (ft)

Average Velocity: 13.6748 (ft/s)

Top Width: 35.3000 (ft)

Froude Number: 1.7051

Critical Depth: 3.4734 (ft)

Critical Velocity: 9.1252 (ft/s)

Critical Slope: 0.0016 (ft/ft)

Critical Top Width: 40.8403 (ft)

Calculated Max Shear Stress: 0.7956 (lb/ft^2)

Calculated Avg Shear Stress: 0.6089 (lb/ft^2)

Jiankang Wang

From: Kevin.Payne@kimley-horn.com
Sent: Tuesday, June 02, 2015 4:54 PM
To: Jiankang Wang; Jerry Curless
Cc: bryan.yurs@kimley-horn.com; Scott.Altherr@kimley-horn.com; Janice.Hughes@pima.gov
Subject: RE: Airport Wash BMS Ph2 - Split Flow

For Subwatershed Split Flow Analysis @ AW012

Jiankang,
See below for an updated rating table through 2000 cfs.

North Fork US (cfs)	North Fork DS (cfs)	Split Flow (cfs)
0	0	0
50	44	6
100	86	14
150	127	23
200	165	35
250	207	43
300	238	62
350	278	72
400	314	86
450	350	100
500	392	108
550	427	123
600	461	139
650	498	152
700	533	167
750	568	182
800	603	197
850	637	213
900	673	227
950	709	241
1000	749	251
1050	789	261
1100	826	274
1150	856	294
1200	895	305
1250	935	315
1300	966	334
1350	999	351
1400	1036	364
1450	1070	380
1500	1105	395

1550	1143	407
1600	1177	423
1650	1219	431
1700	1248	452
1750	1285	465
1800	1320	480
1850	1358	492
1900	1399	501
1950	1431	519
2000	1467	533

Kevin W. Payne, P.E., CFM
Kimley-Horn | 333 East Wetmore Road, Suite 280, Tucson, AZ 85705
Direct: (520) 352-8624 | Mobile: (520) 237-3783

From: Jiankang Wang [mailto:jwang@cmgdrainage.com]
Sent: Thursday, May 28, 2015 2:04 PM
To: Payne, Kevin; Jerry Curless
Cc: Yurs, Bryan; Altherr, Scott; Janice.Hughes@pima.gov
Subject: RE: Airport Wash BMS Ph2 - Split Flow

Thanks Kevin. Could you please run 2000 cfs through the split flow area and provide similar rating table to me? Reason being is that I need to generate 500-year discharges for the FEMA floodplain mapping area.

Jiankang Wang
Senior Hydrologist, Ph.D., P.E.
CMG Drainage Engineering, Inc.
3555 N. Mountain Ave.
Tucson, AZ 85719
Phone: (520) 882-4244 ext. 7003
Fax: (520) 888-1421
jwang@cmgdrainage.com

From: Kevin.Payne@kimley-horn.com [mailto:Kevin.Payne@kimley-horn.com]
Sent: Thursday, May 28, 2015 12:13 PM
To: Jerry Curless; Jiankang Wang
Cc: bryan.yurs@kimley-horn.com; Scott.Altherr@kimley-horn.com; Janice.Hughes@pima.gov
Subject: Airport Wash BMS Ph2 - Split Flow

- Split_Exhibit.pdf (17.3 MB)
- Split_Table.pdf (4.9 kB)

Download the attachments by clicking here.

Jerry / Jiankang,
Attached is an updated exhibit for the geometry of how we are modeling the split flow. We have added cross-sections 14092 and 497 and now each reach has the full-length cross-sections with ineffective flow placed in the portion of the

cross-section conveying flow in the opposite reach. The results didn't change much from what we showed in the progress meeting, slightly more flow breaking out. I've attached a hec-ras table showing the discharge in the different reaches. Below is a rating table for the split. Let us know if you need additional info.

North Fork US (cfs)	North Fork DS (cfs)	Split Flow (cfs)
0	0	0
50	44	6
100	86	14
150	127	23
200	165	35
250	207	43
300	238	62
350	278	72
400	314	86
450	350	100
500	392	108
550	427	123
600	461	139
650	498	152
700	533	167
750	568	182
800	603	197
850	637	213
900	673	227
950	709	241
1000	749	251

Right-click here to download pictures. To help protect your privacy, Outlook prevented automatic download of this picture from the Internet.
http://www.kimley-horn.com/communication/signature/KimleyHorn_LG_LOGO_RGB_PRIMARY_96dpi.jpg

Kevin W. Payne, P.E., CFM
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Direct: (520) 352-8624 | Mobile: (520) 237-3783

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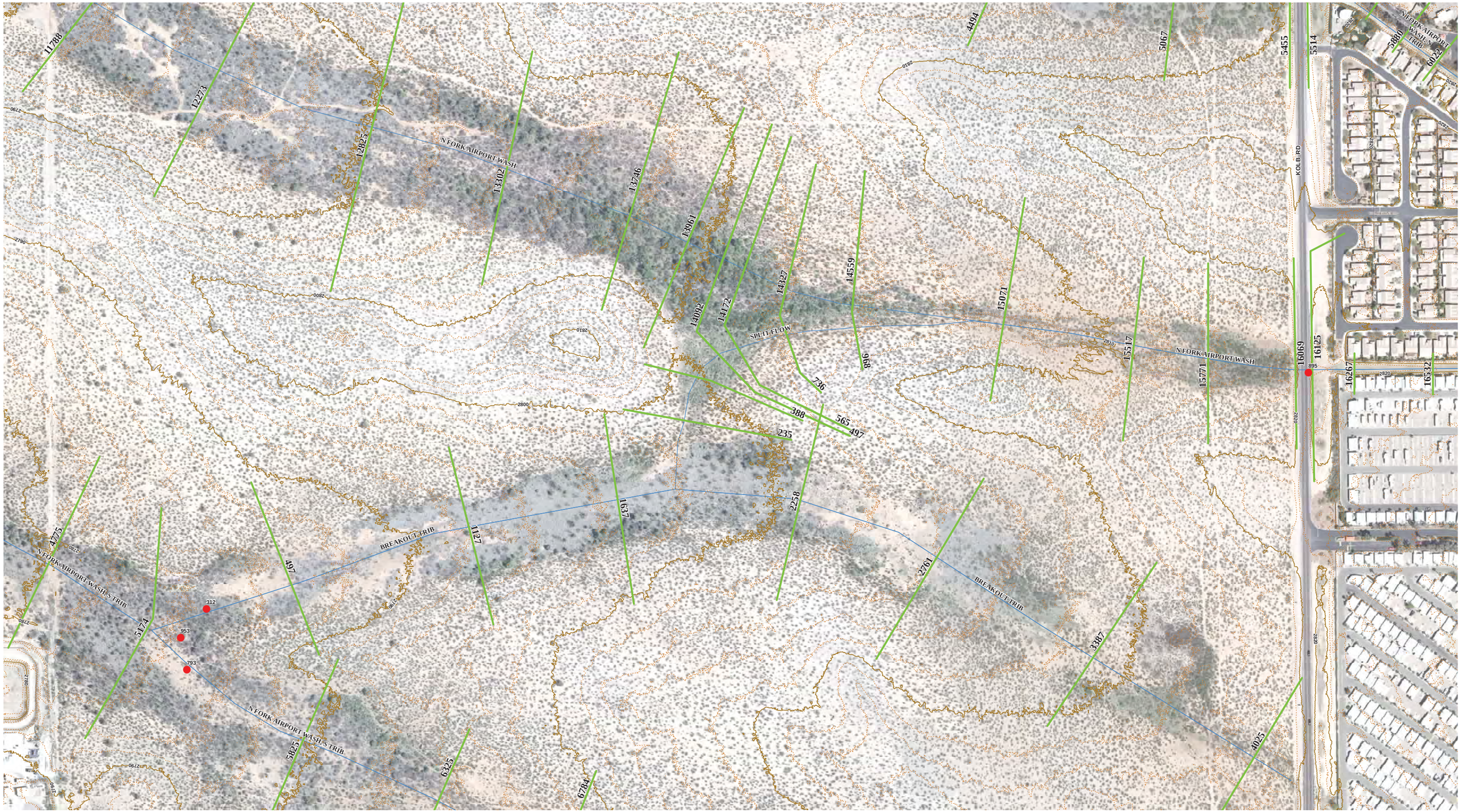
HEC-RAS Plan: Split_EntXS Locations: User Defined Profile: 100-Yr

River	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)	
N Fork Airport	4	15517	100-Yr	920.00	2809.06	2812.56	2811.92	2812.67	0.009251	2.85	362.31	397.09	0.40
N Fork Airport	4	15071	100-Yr	920.00	2805.61	2808.80	2808.17	2808.91	0.007707	3.02	367.85	359.92	0.38
N Fork Airport	3	14559	100-Yr	687.00	2802.86	2804.69	2804.28	2804.77	0.008542	2.09	300.02	503.10	0.34
N Fork Airport	3	14327	100-Yr	687.00	2801.28	2803.09	2802.59	2803.14	0.006671	1.73	381.47	676.09	0.30
N Fork Airport	3	14172	100-Yr	687.00	2800.60	2802.01	2801.60	2802.06	0.008169	1.75	387.32	929.73	0.32
N Fork Airport	3	14092	100-Yr	687.00	2800.08	2801.31	2800.96	2801.35	0.009274	1.61	420.88	1103.18	0.33
N Fork Airport	3	13961	100-Yr	687.00	2799.09	2800.20	2799.84	2800.23	0.008225	1.53	437.00	690.82	0.31
N Fork Airport	3	13746	100-Yr	687.00	2797.14	2798.68	2798.16	2798.71	0.005563	1.35	460.06	566.06	0.26
N Fork Airport	3	13302	100-Yr	687.00	2793.85	2795.18	2794.79	2795.23	0.011625	1.91	362.74	482.25	0.38
N Fork Airport	3	12825	100-Yr	687.00	2789.65	2791.11	2790.65	2791.15	0.006538	1.49	456.06	587.03	0.29
Split	Split	968	100-Yr	233.10	2802.86	2804.72	2804.29	2804.78	0.008374	1.86	121.10	509.15	0.33
Split	Split	736	100-Yr	233.10	2801.28	2802.85	2802.54	2802.90	0.008418	1.58	132.93	630.08	0.32
Split	Split	565	100-Yr	233.10	2800.60	2801.59	2801.36	2801.62	0.007813	0.98	172.00	846.48	0.27
Split	Split	497	100-Yr	233.10	2800.08	2801.24	2800.98	2801.27	0.006782	1.10	196.64	1084.05	0.27
Split	Split	388	100-Yr	233.10	2799.51	2800.79	2800.28	2800.81	0.003663	1.09	221.40	443.08	0.21
Split	Split	235	100-Yr	233.10	2798.32	2799.61	2799.44	2799.68	0.021988	2.04	110.08	284.90	0.49
Breakout	2	4025	100-Yr	312.00	2813.91	2815.80	2815.41	2815.84	0.007586	1.54	206.45	338.61	0.33
Breakout	2	3387	100-Yr	312.00	2808.63	2809.77	2809.50	2809.81	0.011999	1.57	199.17	427.81	0.39
Breakout	2	2761	100-Yr	312.00	2803.90	2804.93	2804.56	2804.95	0.005404	1.26	253.94	438.35	0.28
Breakout	2	2258	100-Yr	312.00	2800.26	2801.18	2800.87	2801.22	0.010720	1.57	202.61	365.05	0.35
Breakout	1	1637	100-Yr	545.00	2796.21	2797.69	2797.03	2797.72	0.004210	1.44	384.58	400.52	0.24
Breakout	1	1127	100-Yr	545.00	2790.73	2792.99	2792.83	2793.13	0.030929	2.95	186.75	318.11	0.65
Breakout	1	497	100-Yr	545.00	2786.27	2788.01	2787.36	2788.04	0.003584	1.42	389.33	420.65	0.24

For Subwatershed Split
Flow Analysis @ AW012



Kimley»Horn

Split Flow

D.6 – HYDROLOGIC CALCULATION

Includes:

- HEC-HMS model (electronic)

APPENDIX E

HYDRAULIC ANALYSIS SUPPORTING DOCUMENTATION

E.1 - Roughness Coefficient Estimation
E.2 - Cross Section Plots
E.3 - Expansion and Contraction Coefficients
E.4 - Analysis of Structure
E.5 - Hydraulic Calculations

E.1 – ROUGHNESS COEFFICIENT ESTIMATION

Includes:

- Roughness Coefficient Summary Table
- Selected Photos of Channels and Structures

Table 7: Summary of Manning's "n" Roughness Coefficients

Upstream Cross Section	Downstream Cross Section	Manning's n		
		Left Overbank	Channel	Right Overbank
Main Channel				
0.001	0.022	0.04	0.033	0.04
0.033	0.163	0.04	0.025	0.03
0.174	0.380	0.045	0.015	0.045
0.412	0.478	0.045	0.030	0.045
0.487	0.761	0.055	0.030	0.055
0.775	0.801	0.055	0.015	0.055
0.839	0.915	0.055	0.027	0.055
0.946	1.471	0.055	0.030	0.055
1.509	1.570	0.055	0.027	0.055
1.598	1.979	0.055	0.030	0.055
2.017	2.135	0.055	0.030	0.055
2.165	3.031	0.05	0.032	0.055
3.069	3.175	0.05	0.027	0.055
3.209	3.587	0.055	0.025	0.045
3.616	4.278	0.045	0.027	0.045
4.316	4.411	0.045	0.030	0.045
4.432	4.531	0.045	0.025	0.045
4.552	4.938	0.045	0.030	0.045
4.964	5.078	0.045	0.035	0.045
5.112	5.112	0.045	0.020	0.045
5.166	5.205	0.03	0.065	0.05
South Fork				
6.000	6.135	0.03	0.065	0.05
6.220	9.606	0.05	0.065	0.05
10.000	10.107	0.05	0.030	0.05
10.196	10.477	0.05	0.065	0.05
10.541	10.756	0.05	0.050	0.05
10.851	11.172	0.05	0.065	0.05
12.000	12.297	0.05	0.065	0.05
North Fork				
20.000	22.620	0.05	0.065	0.05
23.000	23.358	0.05	0.065	0.05
24.000	24.073	0.05	0.065	0.05
24.169	24.302	0.05	0.050	0.05
24.315	25.089	0.05	0.065	0.05
Split Flow Channel Along I-19				
30.000	30.091	0.055	0.032	0.055
30.144	30.091	0.04	0.055	0.045
30.195	30.195	0.04	0.055	0.025

Manning's n Calculation

Project Name: Airport Wash Basin Management Study Phase II

CMG Job#: 14-063 Design By: JW Date: 9/21/2015

References

1. HEC-RAS v4.1 Reference Manual (Table 3-1)
2. Selection of Manning's Roughness Coefficient for Natural and Constructed Vegetated and Non-Vegetated Channel, and Vegetation Maintenance Plan Guidelines for Vegetated Channels in Central Arizona

ID	Source	Description	n
		Channel	
1	Ref 1: Channel B.1.b	conc	0.015
2	Ref 1: Channel B.3.a	conc side with earthen bottom	0.025
3	Ref 1: Channel B.3.c	gravel bottom with sides of riprap	0.033
4	Ref 1: Channel C.1.d	earth, straight and uniform, with short grass, few weeds	0.027 ~ 0.032
5	Ref 1: Channel C.2.c	earth, winding and sluggish, dense weeds or aquatic plants in deep channels	0.035
6	Ref 1: Channel B.6.b	asphalt, dip sections	0.02
7	Ref 1: Channel A.1.g	natural channels, sluggish reaches, weedy,	0.065
8	Ref 1: Channel A.1.g	natural channels, sluggish reaches, with some vegetation	0.05 ~ 0.055
		Overbank	
9	Ref 1: Channel A.2.c.1	Scattered brush, heavy weeds	0.05
10	Ref 2	Overbank along constructed channels, with appreciable obstructions & vegetations	0.045~0.055
11	Ref 2	Overbank along constructed channels, with minor obstructions & vegetations	0.03 ~ 0.04

Table 3-1 Manning's 'n' Values

Type of Channel and Description	Minimum	Normal	Maximum
A. *Natural Streams*			
1. **Main Channels**			
a. Clean, straight, full, no rifts or deep pools	0.025	0.030	0.033
b. Same as above, but more stones and weeds	0.030	0.035	0.040
c. Clean, winding, some pools and shoals	0.033	0.040	0.045
d. Same as above, but some weeds and stones	0.035	0.045	0.050
e. Same as above, lower stages, more ineffective slopes and sections	0.040	0.048	0.055
f. Same as "d" but more stones	0.045	0.050	0.060
g. Sluggish reaches, weedy. deep pools	0.050	0.070	0.080
h. Very weedy reaches, deep pools, or floodways with heavy stands of timber and brush	0.070	0.100	0.150
2. **Flood Plains**			
a. Pasture no brush			
1. Short grass	0.025	0.030	0.035
2. High grass	0.030	0.035	0.050
b. Cultivated areas			
1. No crop	0.020	0.030	0.040
2. Mature row crops	0.025	0.035	0.045
3. Mature field crops	0.030	0.040	0.050
c. Brush			
1. Scattered brush, heavy weeds	0.035	0.050	0.070
2. Light brush and trees, in winter	0.035	0.050	0.060
3. Light brush and trees, in summer	0.040	0.060	0.080
4. Medium to dense brush, in winter	0.045	0.070	0.110
5. Medium to dense brush, in summer	0.070	0.100	0.160
d. Trees			
1. Cleared land with tree stumps, no sprouts	0.030	0.040	0.050
2. Same as above, but heavy sprouts	0.050	0.060	0.080
3. Heavy stand of timber, few down trees, little undergrowth, flow below branches	0.080	0.100	0.120
4. Same as above, but with flow into branches	0.100	0.120	0.160
5. Dense willows, summer, straight	0.110	0.150	0.200
3. **Mountain Streams, no vegetation in channel, banks usually steep, with trees and brush on banks submerged**			
a. Bottom: gravels, cobbles, and few boulders	0.030	0.040	0.050
b. Bottom: cobbles with large boulders	0.040	0.050	0.070

Table 3-1 (Continued) Manning's 'n' Values

Type of Channel and Description	Minimum	Normal	Maximum
B. *Lined or Built-Up Channels*			
1. **Concrete**			
a. Trowel finish	0.011	0.013	0.015
b. Float Finish	0.013	0.015	0.016
c. Finished, with gravel bottom	0.015	0.017	0.020
d. Unfinished	0.014	0.017	0.020
e. Gunite, good section	0.016	0.019	0.023
f. Gunite, wavy section	0.018	0.022	0.025
g. On good excavated rock	0.017	0.020	
h. On irregular excavated rock	0.022	0.027	
2. **Concrete bottom float finished with sides of:**			
a. Dressed stone in mortar	0.015	0.017	0.020
b. Random stone in mortar	0.017	0.020	0.024
c. Cement rubble masonry, plastered	0.016	0.020	0.024
d. Cement rubble masonry	0.020	0.025	0.030
e. Dry rubble on riprap	0.020	0.030	0.035
3. **Gravel bottom with sides of:**			
a. Formed concrete	0.017	0.020	0.025
b. Random stone in mortar	0.020	0.023	0.026
c. Dry rubble or riprap	0.023	0.033	0.036
4. **Brick**			
a. Glazed	0.011	0.013	0.015
b. In cement mortar	0.012	0.015	0.018
5. **Metal**			
a. Smooth steel surfaces	0.011	0.012	0.014
b. Corrugated metal	0.021	0.025	0.030
6. **Asphalt**			
a. Smooth	0.013	0.013	
b. Rough	0.016	0.016	
7. **Vegetal lining**	0.030		0.500

Table 3-1 (Continued) Manning's 'n' Values

Type of Channel and Description	Minimum	Normal	Maximum
C. *Excavated or Dredged Channels*			
1. **Earth, straight and uniform**			
a. Clean, recently completed	0.016	0.018	0.020
b. Clean, after weathering	0.018	0.022	0.025
c. Gravel, uniform section, clean	0.022	0.025	0.030
d. With short grass, few weeds	0.022	0.027	0.033
2. **Earth, winding and sluggish**			
a. No vegetation	0.023	0.025	0.030
b. Grass, some weeds	0.025	0.030	0.033
c. Dense weeds or aquatic plants in deep channels	0.030	0.035	0.040
d. Earth bottom and rubble side	0.028	0.030	0.035
e. Stony bottom and weedy banks	0.025	0.035	0.040
f. Cobble bottom and clean sides	0.030	0.040	0.050
3. **Dragline-excavated or dredged**			
a. No vegetation	0.025	0.028	0.033
b. Light brush on banks	0.035	0.050	0.060
4. **Rock cuts**			
a. Smooth and uniform	0.025	0.035	0.040
b. Jagged and irregular	0.035	0.040	0.050
5. **Channels not maintained, weeds and brush**			
a. Clean bottom, brush on sides	0.040	0.050	0.080
b. Same as above, highest stage of flow	0.045	0.070	0.110
c. Dense weeds, high as flow depth	0.050	0.080	0.120
d. Dense brush, high stage	0.080	0.100	0.140

Other sources that include pictures of selected streams as a guide to n value determination are available (Fasken, 1963; Barnes, 1967; and Hicks and Mason, 1991). In general, these references provide color photos with tables of calibrated n values for a range of flows.

Although there are many factors that affect the selection of the n value for the channel, some of the most important factors are the type and size of materials that compose the bed and banks of a channel, and the shape of the channel. Cowan (1956) developed a procedure for estimating the effects of these factors to determine the value of Manning's n of a channel. In Cowan's procedure, the value of n is computed by the following equation:

Table 3. Adjustment factors or component ranges for various channel conditions used to determine Manning's *n* values.

[Adjustment to degree of meandering values apply to flow confined in the channel and does not apply where flow crosses meanders; Modified from Cowen, 1956; and Chow, 1959]

Channel conditions	Manning's *n* adjustment	Example
		Degree of irregularity
Smooth	0.000	Smoothest channel attainable in a given bed material.
Minor	.001–.005	Channels with slightly scoured or eroded side slopes.
Moderate	.006–.010	Channels with moderately sloughed or eroded side slopes.
Severe	.011–.020	Channels with badly sloughed banks; unshaped, jagged, and irregular surfaces of channels in rock.
		Variation in channel cross section
Gradual	.000	Size and shape of channel cross sections change gradually.
Alternating occasionally	.001–.005	Large and small cross sections alternate occasionally, or the main flow occasionally shifts from side to side owing to changes in cross-section shape.
Alternating frequently	.010–.015	Large and small cross sections alternate frequently, or the main flow frequently shifts from side to side owing to changes in cross-section shape.
		Effect of obstructions
Negligible	.000–.004	A few scattered obstructions, which include debris deposits, stumps, exposed roots, logs, piers, or isolated boulders, which occupy less than 5 percent of the channel.
Minor	.005–.015	Obstructions occupy from 5 to 15 percent of the cross-section area and spacing between obstructions is such that the sphere of influence around one obstruction does not extend to the sphere of influence around another obstruction. Smaller adjustments are used for curved, smooth-surfaced objects than are used for sharp-edged, angular objects.
Appreciable	.020–.030	Obstructions occupy from 15 to 50 percent of the cross-section area, or the space between obstructions is small enough to cause the effects of severe obstructions to be additive, thereby blocking an equivalent part of a cross section.
Severe	.040–.060	Obstructions occupy more than 50 percent of the cross-section area, or the space between obstructions is small enough to cause turbulence across most of the cross section.
		Amount of vegetation
Negligible	.000–.002	Grass, shrubs, or weeds were permanently laid over during flow.
Small	.002–.010	Dense growths of flexible turf grass, such as Bermuda, or weeds growing where the average depth of flow is at least two times the height of the vegetation where the vegetation is not laid over. Trees, such as willow, cottonwood, or saltcedar, growing where the average depth of flow is at least three times the height of the vegetation. Flow depth is about two times the tree height, and the trees are laid over.
Medium	.010–.025	Moderately dense grass, weeds, or tree seedlings growing where the average depth of flow is from two to three times the height of vegetation; brushy, moderately dense vegetation, similar to 1- to 2-year-old willow trees growing along the banks. A few 8 to 10-year old willow, cottonwood, mesquite, or palo verde, which blocks flow by approximately 1 to 10 percent, and spheres of influence or turbulence do not overlap.
Large	.025–.050	8- to 10-year-old willow, cottonwood, mesquite or palo verde trees (block flow by approximately 10 to 30 percent where the sphere's of influence overlap) intergrown with some weeds and brush where the hydraulic radius exceeds 2 feet.
Very large	.050–.100	Bushy willow trees about 1-year old intergrown with weeds alongside slopes or dense cattails growing along the channel bottom; trees intergrown with weeds and brush. Moderately dense (blocks flow by approximately 30 to 50 percent and the sphere's of influence overlap) 8- to 10-year old trees spaced randomly throughout channel where depth of flow approximates height of vegetation.
Extremely large	.100–.200	Mature (greater than 10 years old) willow trees and tamarisk intergrown with brush and blocking flow by more than 70 percent of the flow area, causing turbulence across most of the section. Depth of flow is less than average height of the vegetation. Dense stands of palo verde or mesquite that block flow by 70 percent or more and hydraulic radius is about equal to or greater than average height of vegetation.
		Degree of meandering
Minor	1.00	Ratio of the channel length to valley length is 1.0 to 1.2.
Appreciable	1.15	Ratio of the channel length to valley length is 1.2 to 1.5.
Severe	1.30	Ratio of the channel length to valley length is greater than 1.5.

RAS Xsect: 0.001 ~ 0.022; **Photo Location:** West of Calle Santa Cruz; **Description:** Channel with side of Riprap; **Roughness:** Channel "n"=0.033

RAS Xsect: 0.033 ~ 0.163; **Photo Location:** East of Calle Santa Cruz; **Description:** Channel with conc. side and earthen bottom; **Roughness:** Channel "n"=0.025

RAS Xsect: 0.174 ~ 0.380; **Photo Location:** West of I-19; **Description:** Conc. Channel; **Roughness:** Channel "n"=0.015

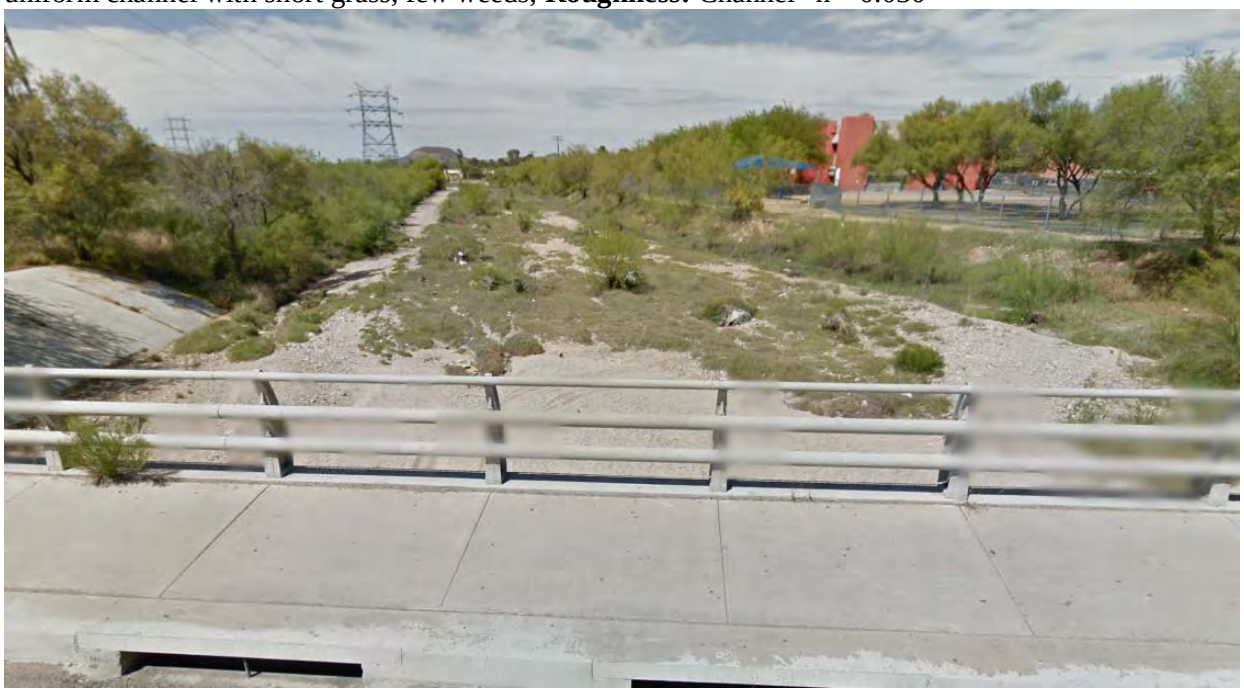
RAS Xsect: 0.412 ~ 0.478; **Photo Location:** Vicinity of I-19; **Description:** Earth, straight and uniform channel with short grass, few weeds; **Roughness:** Channel "n"=0.030

RAS Xsect: 0.487 ~ 0.761; **Photo Location:** East of I-19; **Description:** Earth, straight and uniform channel with short grass, few weeds; **Roughness:** Channel "n"=0.030

RAS Xsect: 0.775 ~ 0.801; **Photo Location:** Vicinity of Santa Clara Ave; **Description:** Conc. Channel; **Roughness:** Channel "n"=0.015

RAS Xsect: 0.839 ~ 0.915; **Photo Location:** East of Santa Clara Ave; **Description:** Earth, straight and uniform channel with short grass, few weeds; **Roughness:** Channel "n"=0.027

RAS Xsect: 0.916 ~ 1.471; **Photo Location:** North of Drexel Rd; **Description:** Earth, straight and uniform channel with short grass, few weeds; **Roughness:** Channel "n"=0.030

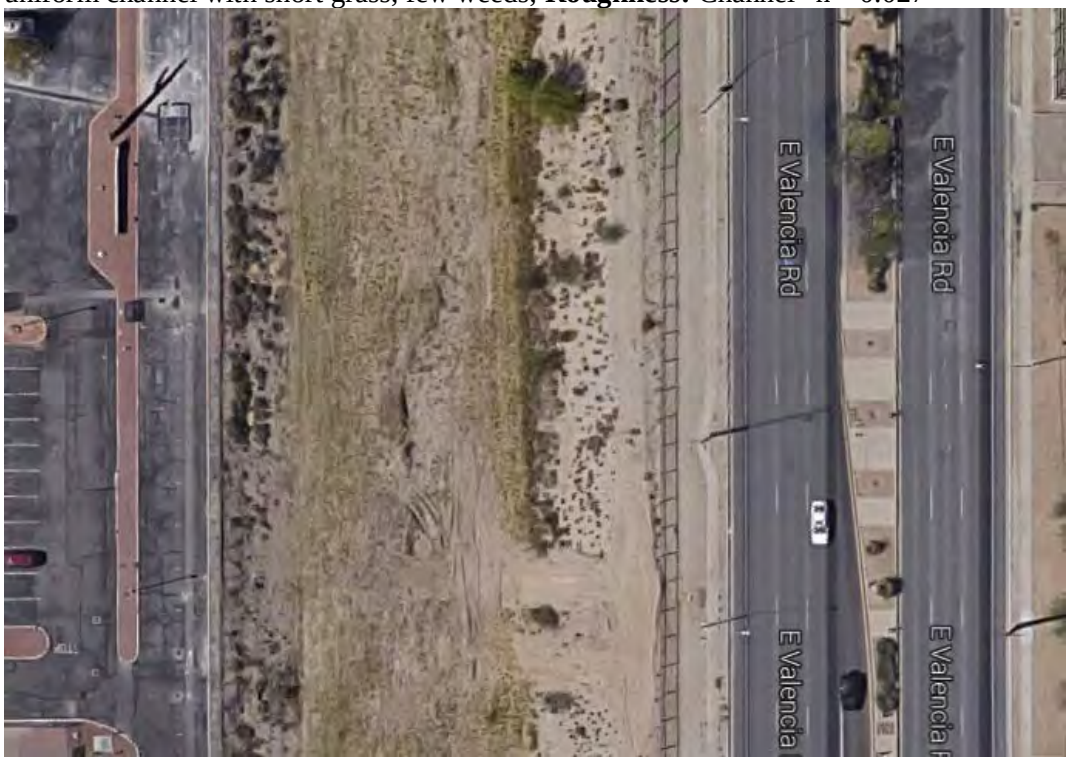


RAS Xsect: 1.509 ~ 1.570; **Photo Location:** Vicinity of Liberty Ave; **Description:** Earth, straight and uniform channel with short grass, few weeds; **Roughness:** Channel "n"=0.027

RAS Xsect: 1.598 ~ 2.135; **Photo Location:** East of 6th Ave; **Description:** Earth, straight and uniform channel with short grass, few weeds; **Roughness:** Channel "n"=0.030

RAS Xsect: 2.165 ~ 3.031; **Photo Location:** West of Nogales Hwy; **Description:** Earth, straight and uniform channel with short grass, few weeds; **Roughness:** Channel "n"=0.032

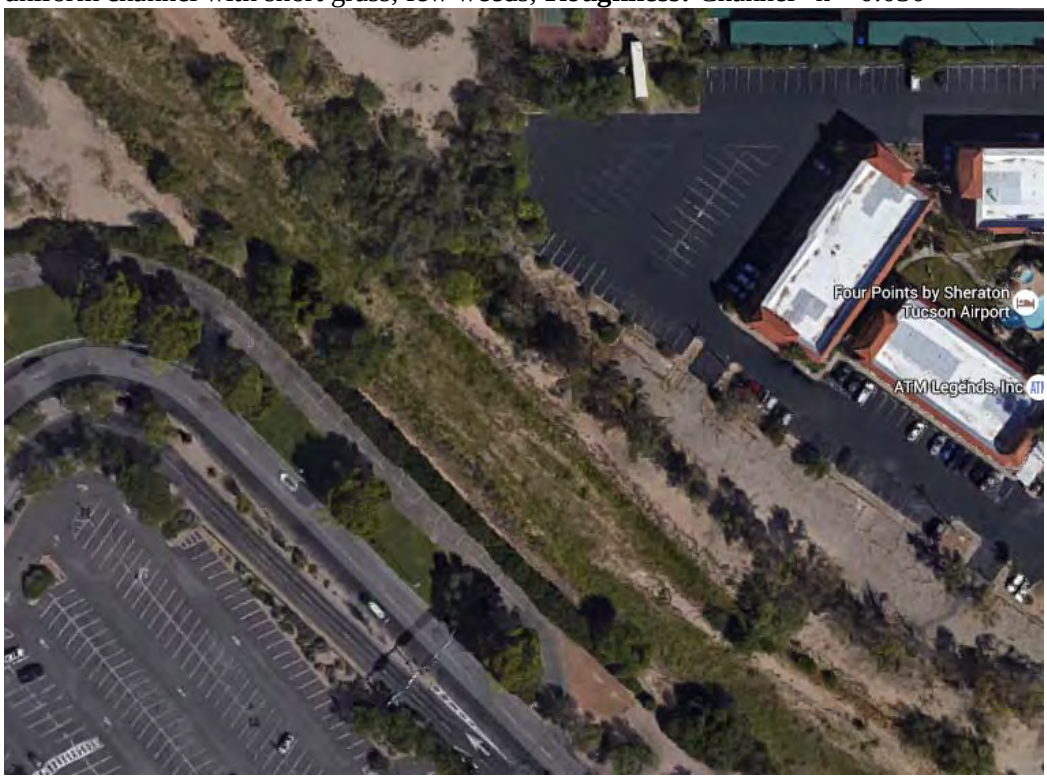
RAS Xsect: 3.069 ~ 3.175; **Photo Location:** South of Valencia Rd; **Description:** Earth, straight and uniform channel with short grass, few weeds; **Roughness:** Channel "n"=0.027



RAS Xsect: 3.209 ~ 3.587; **Photo Location:** South of Valencia Rd; **Description:** Channel with conc. side and earthen bottom; **Roughness:** Channel "n"=0.025

RAS Xsect: 3.616 ~ 4.278; **Photo Location:** Vicinity of Plumer Ave; **Description:** Earth, straight and uniform channel with short grass, few weeds; **Roughness:** Channel "n"=0.027

RAS Xsect: 4.316 ~ 4.411; **Photo Location:** North of Tucson Blvd; **Description:** Earth, straight and uniform channel with short grass, few weeds; **Roughness:** Channel "n"=0.030



RAS Xsect: 4.432 ~ 4.531; **Photo Location:** South of Tucson Blvd; **Description:** Channel with conc. side and earthen bottom; **Roughness:** Channel "n"=0.025

RAS Xsect: 4.552 ~ 4.938; **Photo Location:** Vicinity of Los Reales Rd; **Description:** Earth, straight and uniform channel with short grass, few weeds; **Roughness:** Channel "n"=0.030

RAS Xsect: 4.964 ~ 5.078; **Photo Location:** West of Country Club Rd; **Description:** earth, winding and sluggish, dense weeds or aquatic plants in deep channels; **Roughness:** Channel "n"=0.035

RAS Xsect: 5.112; **Photo Location:** Country Club Rd; **Description:** Asphalt; **Roughness:** Dip Section "n"=0.020

RAS Xsect: 5.166 ~ 5.205; **Photo Location:** East of Country Club Rd; **Description:** Natural channels, sluggish reaches, weedy; **Roughness:** Channel "n"=0.065

RAS Xsect: majority of South Fork and North Fork channels; **Photo Location:** Alvernon Way @ Culvert CV19; **Description:** Natural channels, sluggish reaches, weedy; **Roughness:** Channel "n"=0.065

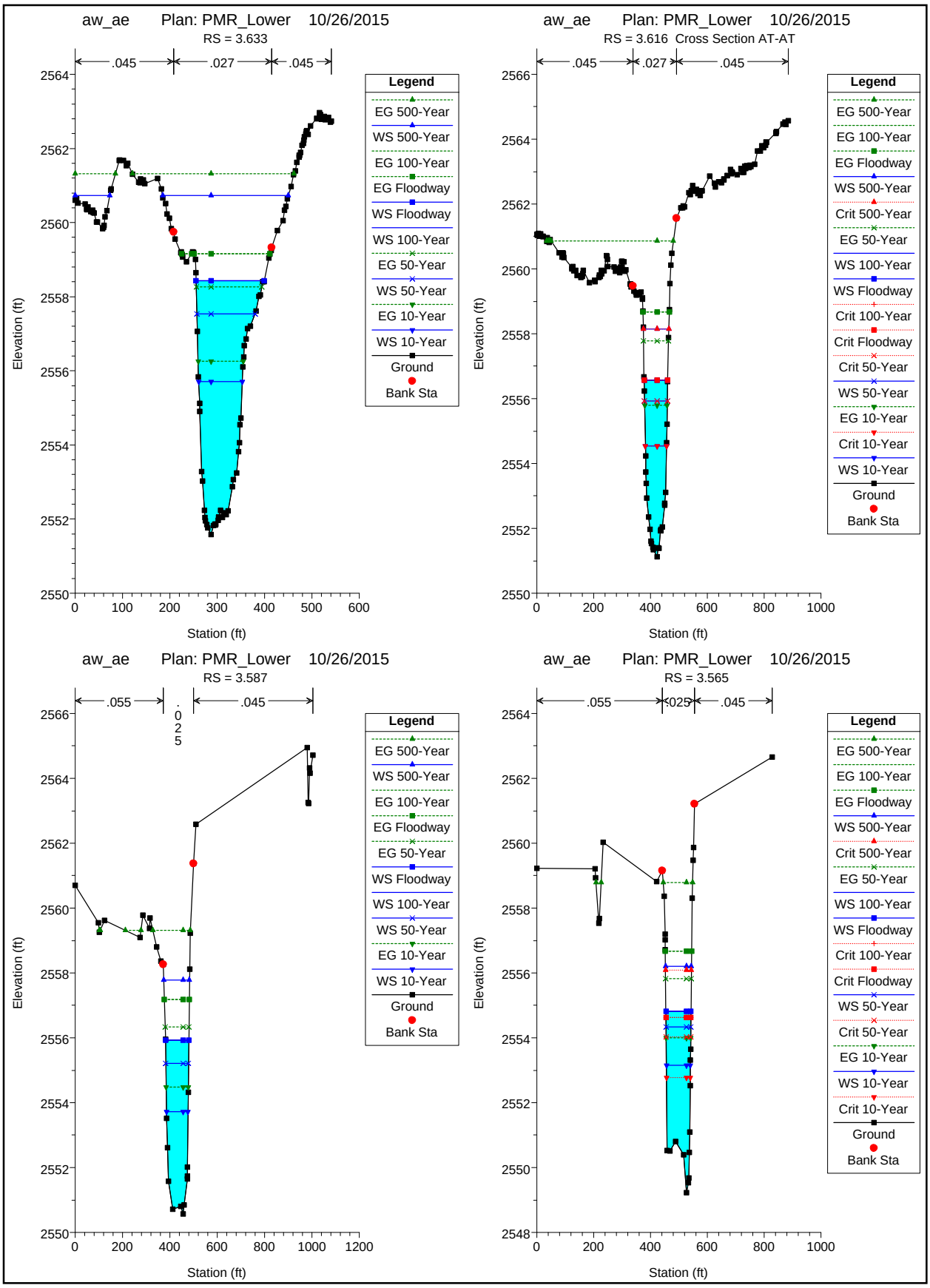
RAS Xsect: 10.541~ 10.756 & 24.169 ~ 24.302; **Photo Location:** Xsect 10.541~ 10.756; **Description:** Natural channels, sluggish reaches, with some vegetation; **Roughness:** Channel "n"=0.050; Overbank "n" = 0.05

RAS Xsect: 10 ~ 10.107; **Photo Location:** Xsect 10 ~ 10.107; **Description:** Earth, straight and uniform channel with short grass, few weeds; **Roughness:** Channel "n"=0.030

E.2 – CROSS SECTION PLOT

Includes:

- Cross Sections for the HEC-HMS model in Effective FEMA Zone AE
- Cross Sections for the HEC-HMS model in Effective FEMA Zone A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EG Floodway
WS Floodway
WS 100-Year
EG 50-Year
WS 50-Year
EG 10-Year
WS 10-Year
Ground
Bank Sta
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Elevation (ft)
Station (ft)
Legend
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Crit 500-Year
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WS 100-Year
WS Floodway
Crit 100-Year
Crit Floodway
Crit 50-Year
WS 50-Year
EG 10-Year
Crit 10-Year
WS 10-Year
Ground
Bank Sta
aw_ae Plan: PMR_Lower 10/26/2015
RS = 3.587
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Elevation (ft)
Station (ft)
Legend
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WS 500-Year
EG 100-Year
EG Floodway
EG 50-Year
WS Floodway
WS 100-Year
WS 50-Year
EG 10-Year
WS 10-Year
Ground
Bank Sta
aw_ae Plan: PMR_Lower 10/26/2015
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Elevation (ft)
Station (ft)
Legend
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EG 100-Year
EG Floodway
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Crit 500-Year
EG 50-Year
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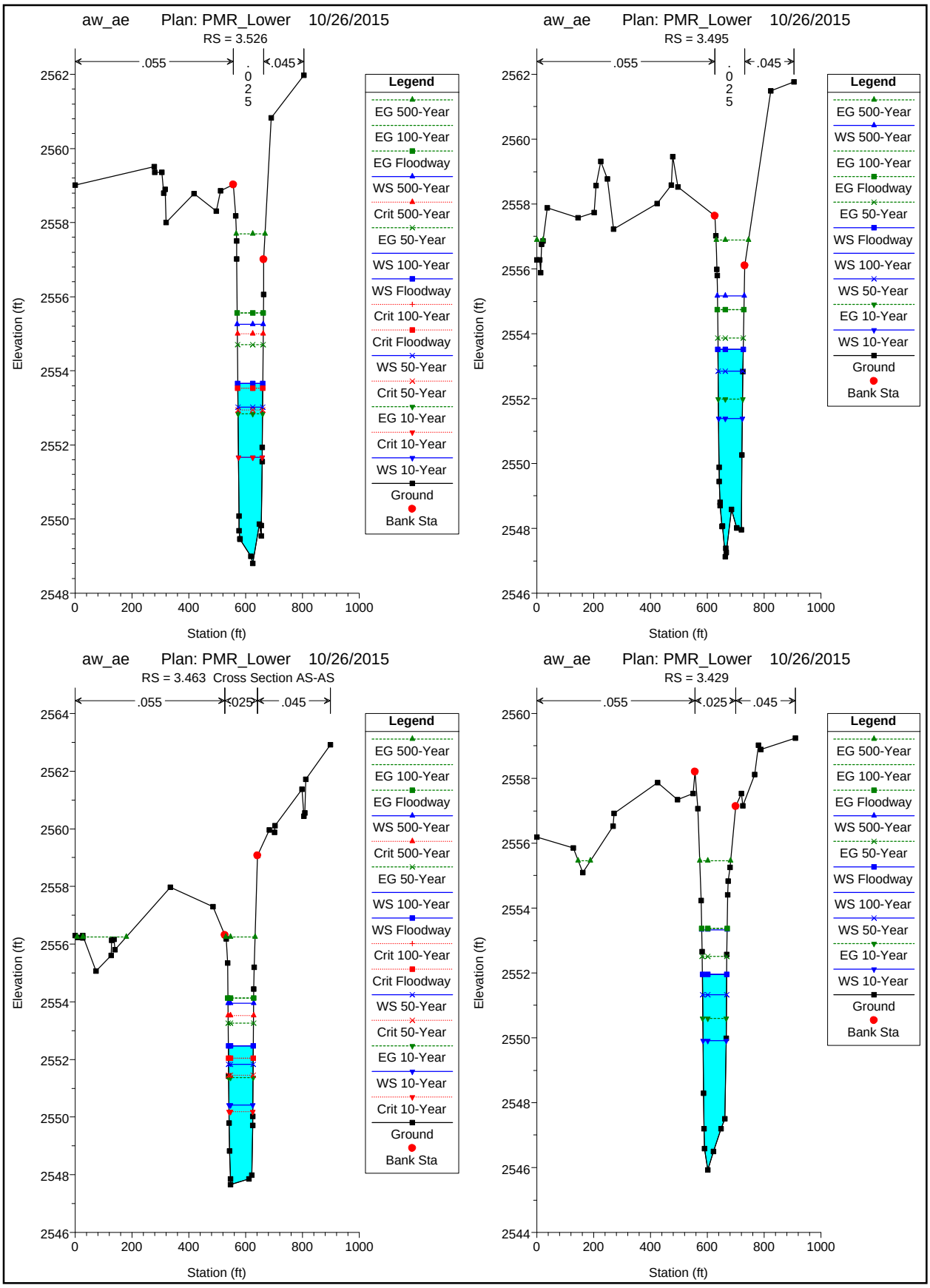
Crit 10-Year
Ground
Bank Sta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WS 100-Year
WS Floodway
Crit 100-Year
Crit Floodway
WS 50-Year
Crit 50-Year
EG 10-Year
Crit 10-Year
WS 10-Year
Ground
Bank Sta
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.045
Elevation (ft)
Station (ft)
Legend
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WS 500-Year
EG 100-Year
EG Floodway
EG 50-Year
WS Floodway
WS 100-Year
WS 50-Year
EG 10-Year
WS 10-Year
Ground
Bank Sta
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Elevation (ft)
Station (ft)
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WS Floodway
Crit 100-Year
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WS 50-Year
Crit 50-Year
EG 10-Year
WS 10-Year
Crit 10-Year
Ground
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Station (ft)
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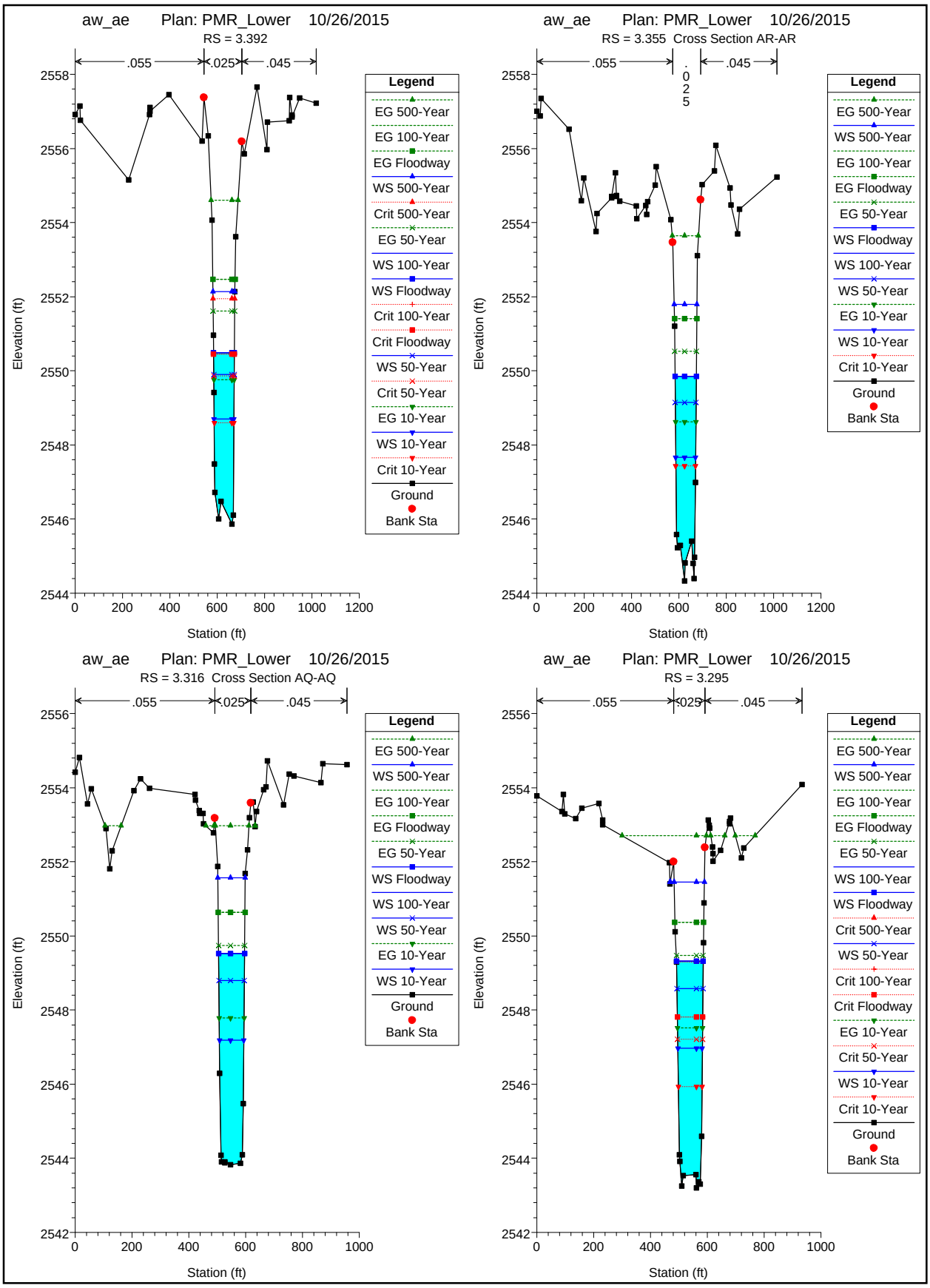
Ground
Bank Sta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Crit 50-Year
EG 10-Year
WS 10-Year
Crit 10-Year
Ground
Bank Sta
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Elevation (ft)
Station (ft)
Legend
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WS Floodway
WS 100-Year
WS 50-Year
EG 10-Year
WS 10-Year
Crit 10-Year
Ground
Bank Sta
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Station (ft)
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EG Floodway
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WS Floodway
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WS 50-Year
EG 10-Year
WS 10-Year
Ground
Bank Sta
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Station (ft)
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Crit Floodway
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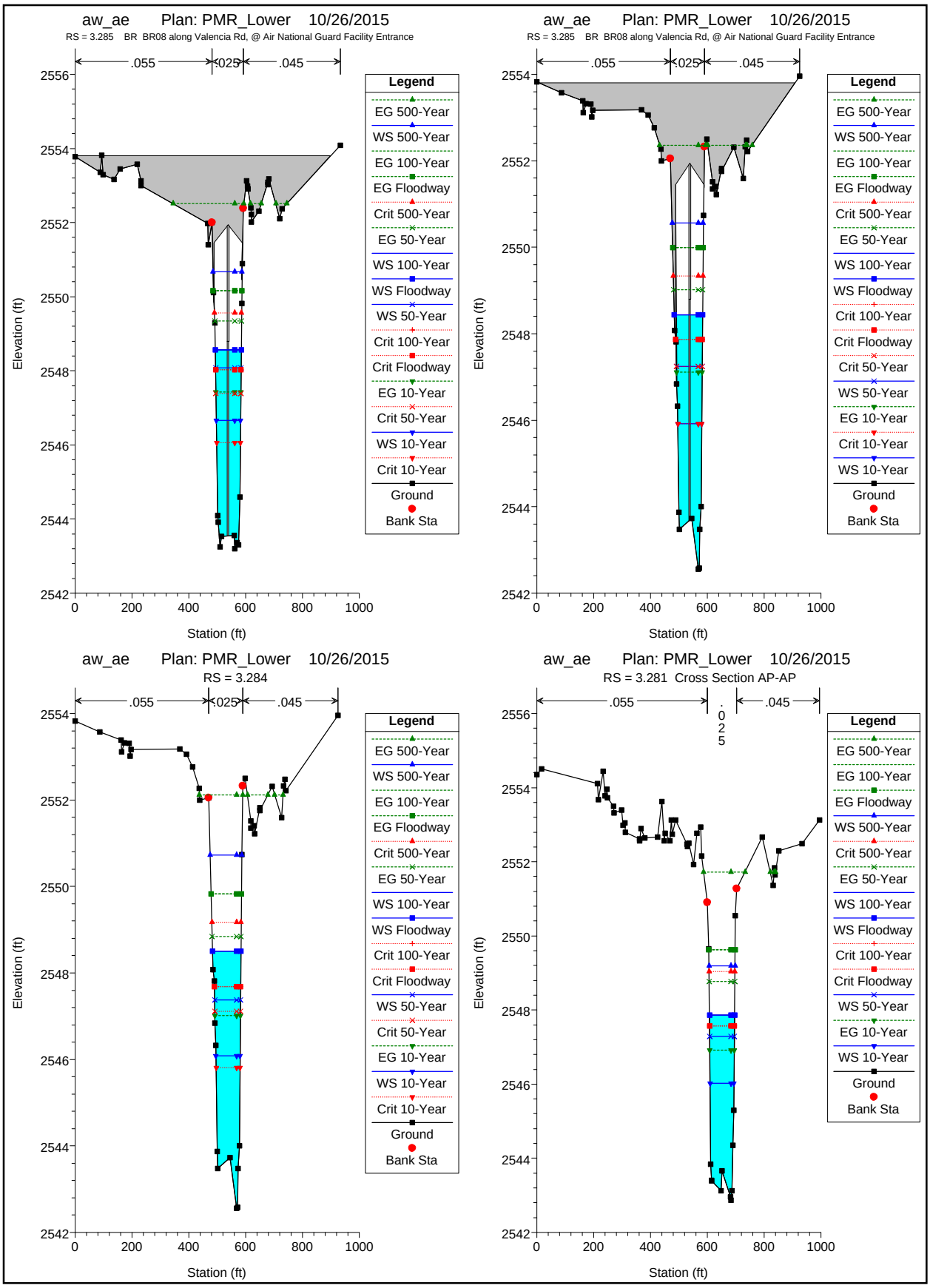
Crit 10-Year
Ground
Bank Sta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Crit 500-Year
EG 50-Year
WS 100-Year
WS Floodway
WS 50-Year
Crit 100-Year
Crit Floodway
EG 10-Year
Crit 50-Year
WS 10-Year
Crit 10-Year
Ground
Bank Sta
aw_ae Plan: PMR_Lower 10/26/2015
RS = 3.285 BR BR08 along Valencia Rd, @ Air National Guard Facility Entrance
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.025
.045
Elevation (ft)
Station (ft)
Legend
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WS 500-Year
EG 100-Year
EG Floodway
Crit 500-Year
EG 50-Year
WS 100-Year
WS Floodway
Crit 100-Year
Crit Floodway
Crit 50-Year
WS 50-Year
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Crit 10-Year
WS 10-Year
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Bank Sta
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Elevation (ft)
Station (ft)
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Crit 500-Year
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WS 100-Year
WS Floodway
Crit 100-Year
Crit Floodway
WS 50-Year
Crit 50-Year
EG 10-Year
WS 10-Year
Crit 10-Year
Ground
Bank Sta
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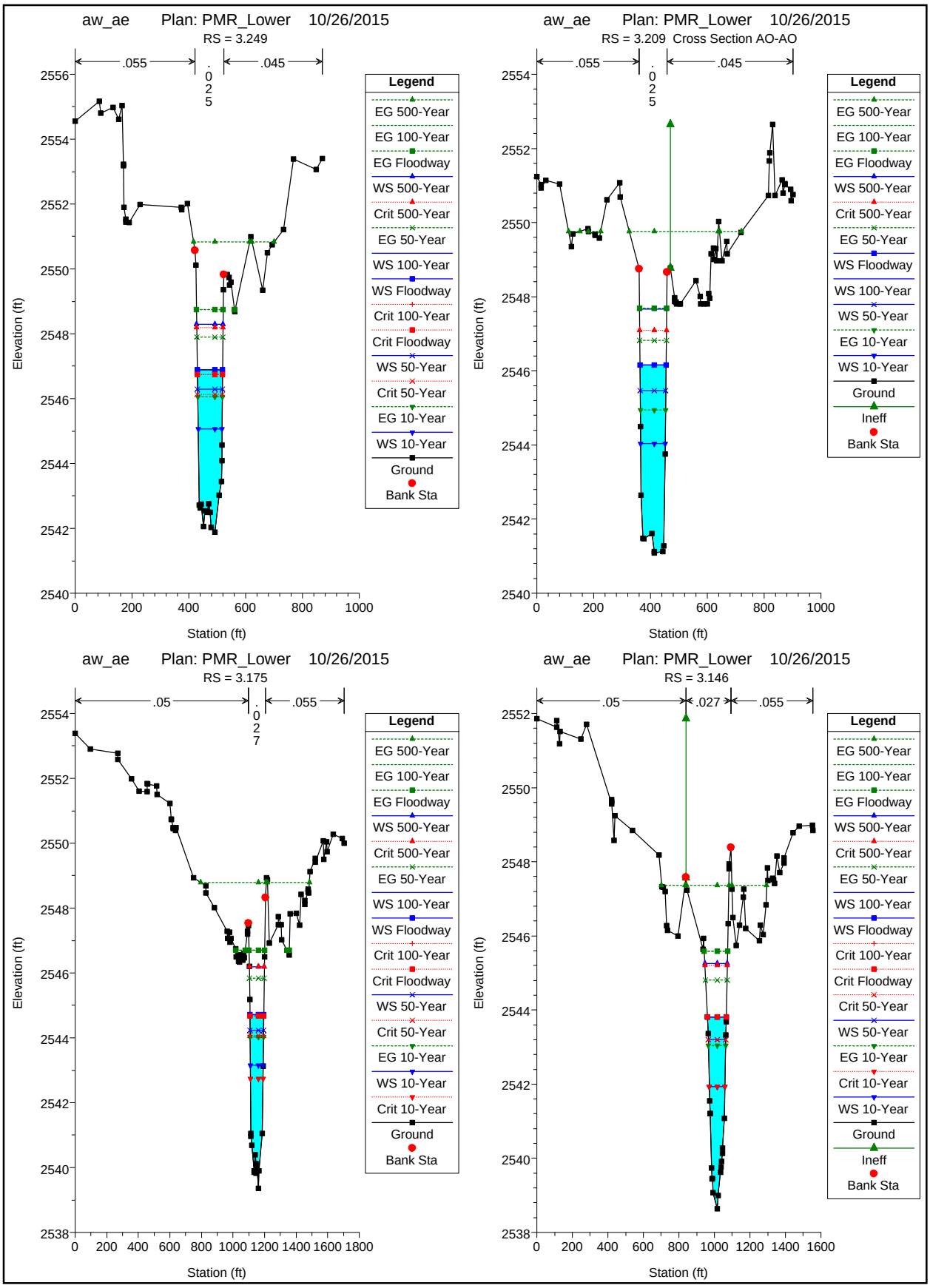
WS 50-Year
EG 10-Year
WS 10-Year
Ground
Bank Sta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WS Floodway
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Crit Floodway
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Crit 50-Year
EG 10-Year
WS 10-Year
Ground
Bank Sta
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Station (ft)
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EG Floodway
WS 500-Year
Crit 500-Year
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WS Floodway
WS 100-Year
WS 50-Year
EG 10-Year
WS 10-Year
Ground
Ineff
Bank Sta
aw_ae Plan: PMR_Lower 10/26/2015
RS = 3.175
.05
.027
.055
Elevation (ft)
Station (ft)
Legend
EG 500-Year
EG 100-Year
EG Floodway
WS 500-Year
Crit 500-Year
EG 50-Year
WS 100-Year
WS Floodway
Crit 100-Year
Crit Floodway
WS 50-Year
Crit 50-Year
EG 10-Year
WS 10-Year
Crit 10-Year
Ground
Bank Sta
aw_ae Plan: PMR_Lower 10/26/2015
RS = 3.146
.05
.027
.055
Elevation (ft)
Station (ft)
Legend
EG 500-Year
EG 100-Year
EG Floodway
WS 500-Year
Crit 500-Year
EG 50-Year
WS 100-Year
WS Floodway
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Crit Floodway
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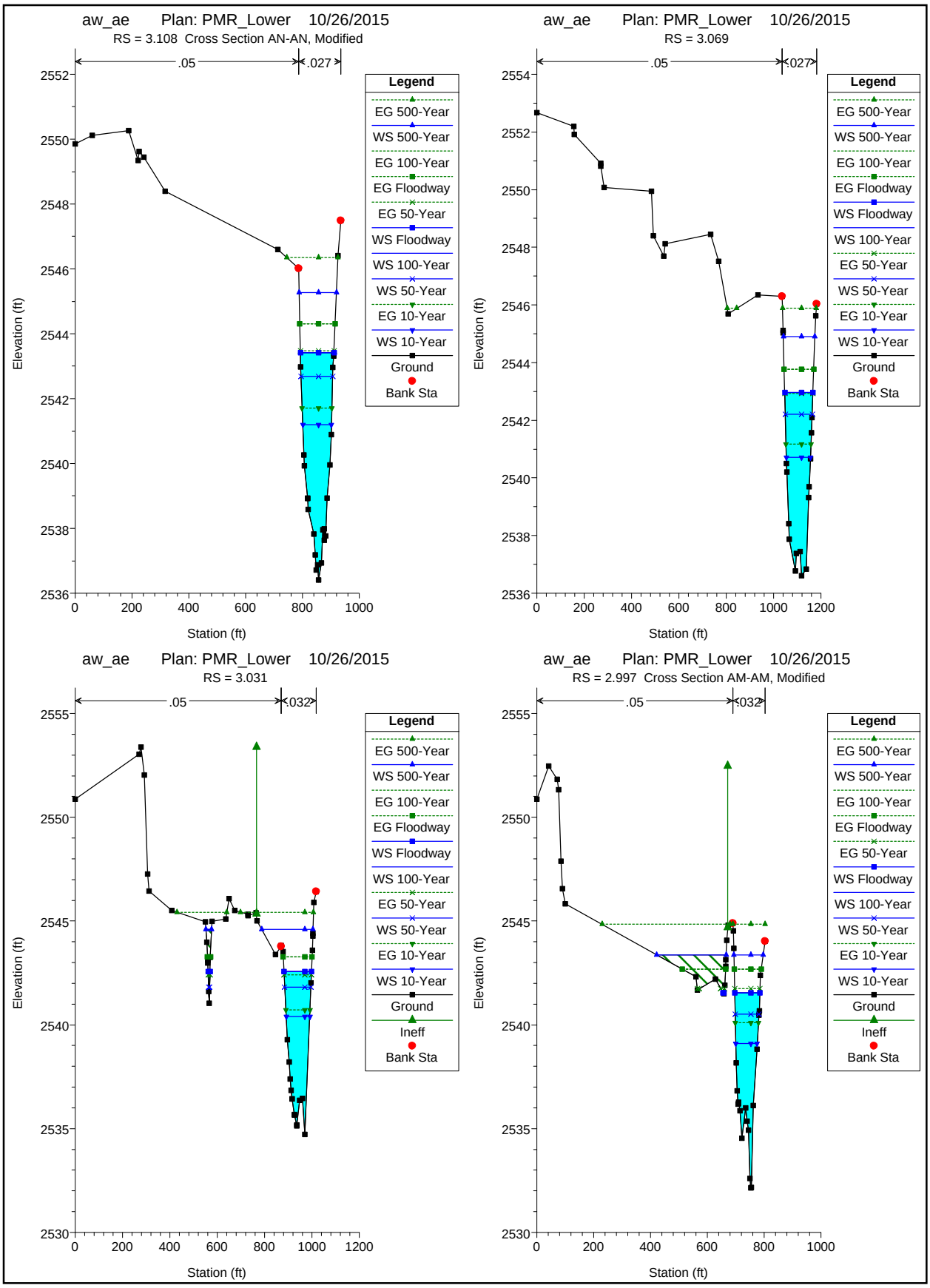
WS 50-Year
EG 10-Year
Crit 10-Year
WS 10-Year
Ground
Ineff
Bank Sta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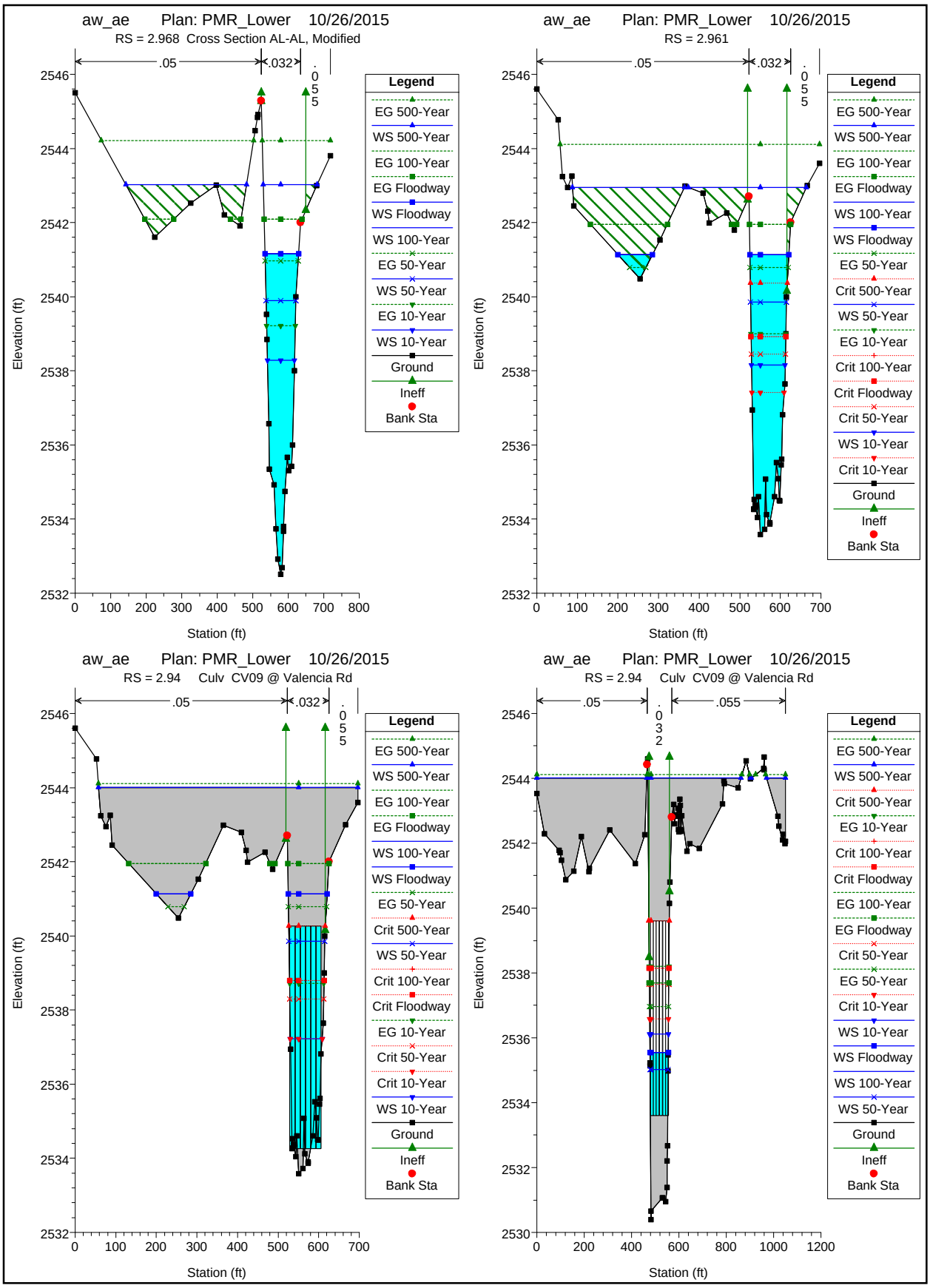
RS = 3.108 Cross Section AN-AN, Modified
.05
.027
Elevation (ft)
Station (ft)
Legend
EG 500-Year
WS 500-Year
EG 100-Year
EG Floodway
EG 50-Year
WS Floodway
WS 100-Year
WS 50-Year
EG 10-Year
WS 10-Year
Ground
Bank Sta
aw_ae Plan: PMR_Lower 10/26/2015
RS = 3.069
.05
.027
Elevation (ft)
Station (ft)
Legend
EG 500-Year
WS 500-Year
EG 100-Year
EG Floodway
WS Floodway
WS 100-Year
EG 50-Year
WS 50-Year
EG 10-Year
WS 10-Year
Ground
Bank Sta
aw_ae Plan: PMR_Lower 10/26/2015
RS = 3.031
.05
.032
Elevation (ft)
Station (ft)
Legend
EG 500-Year
WS 500-Year
EG 100-Year
EG Floodway
WS Floodway
WS 100-Year
EG 50-Year
WS 50-Year
EG 10-Year
WS 10-Year
Ground
Ineff
Bank Sta
aw_ae Plan: PMR_Lower 10/26/2015
RS = 2.997 Cross Section AM-AM, Modified
.05
.032
Elevation (ft)
Station (ft)
Legend
EG 500-Year
WS 500-Year
EG 100-Year
EG Floodway
EG 50-Year
WS Floodway
WS 100-Year
WS 50-Year
EG 10-Year
WS 10-Year
Ground
Ineff
Bank Sta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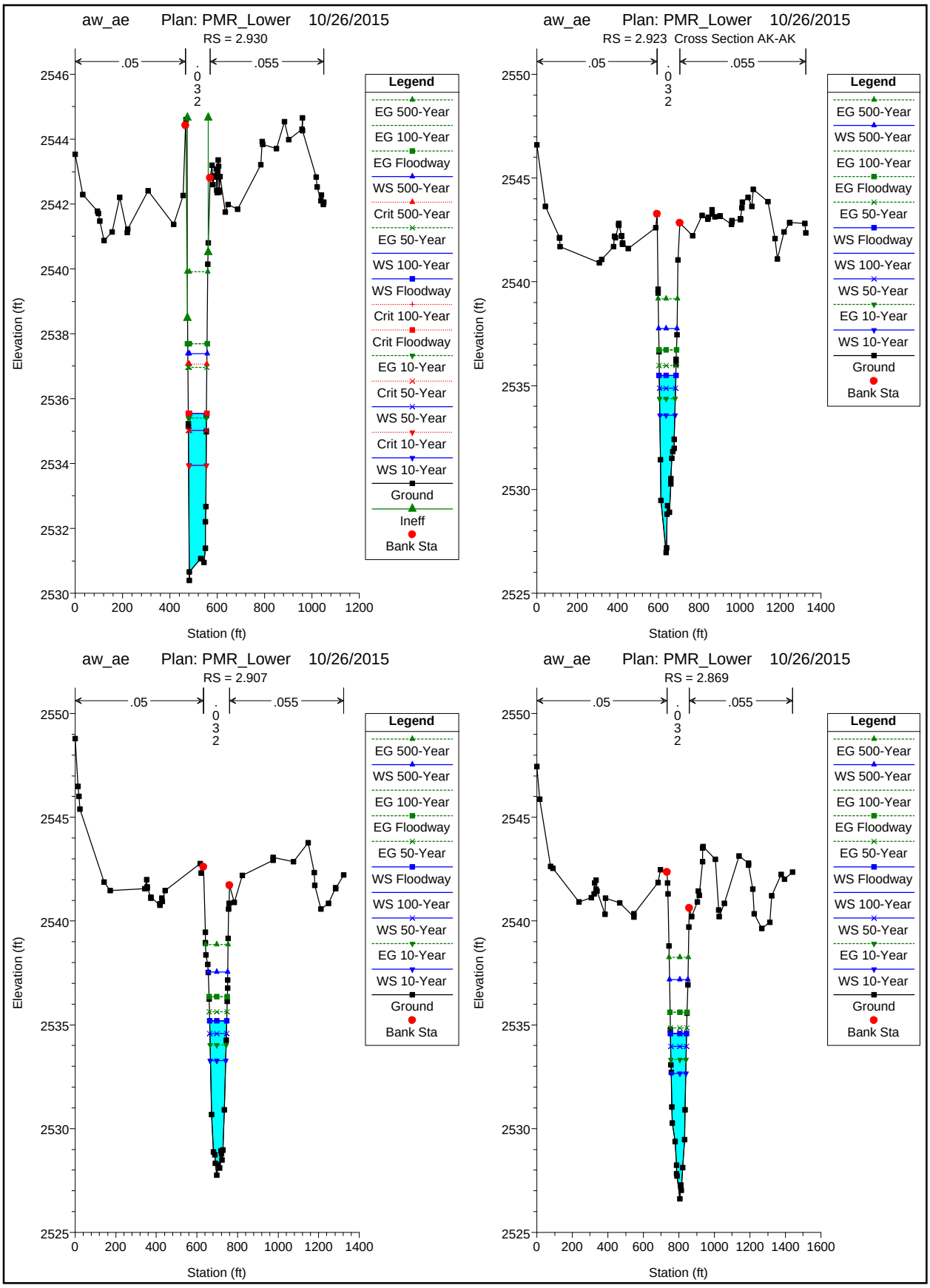
RS = 2.968 Cross Section AL-AL, Modified
.05
.032
.055
Legend
EG 500-Year
WS 500-Year
EG 100-Year
EG Floodway
WS Floodway
WS 100-Year
EG 50-Year
WS 50-Year
EG 10-Year
WS 10-Year
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)
aw_ae Plan: PMR_Lower 10/26/2015
RS = 2.961
.05
.032
.055
Legend
EG 500-Year
WS 500-Year
EG 100-Year
EG Floodway
WS 100-Year
WS Floodway
EG 50-Year
Crit 500-Year
WS 50-Year
EG 10-Year
Crit 100-Year
Crit Floodway
Crit 50-Year
WS 10-Year
Crit 10-Year
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)
aw_ae Plan: PMR_Lower 10/26/2015
RS = 2.94 Culv CV09 @ Valencia Rd
.05
.032
.055
Legend
EG 500-Year
WS 500-Year
EG 100-Year
EG Floodway
WS 100-Year
WS Floodway
EG 50-Year
Crit 500-Year
WS 50-Year
Crit 100-Year
Crit Floodway
EG 10-Year
Crit 50-Year
Crit 10-Year
WS 10-Year
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)
aw_ae Plan: PMR_Lower 10/26/2015
RS = 2.94 Culv CV09 @ Valencia Rd
.05
.032
.055
Legend
EG 500-Year
WS 500-Year
Crit 500-Year
EG 10-Year
Crit 100-Year
Crit Floodway
EG 100-Year
EG Floodway
Crit 50-Year
EG 50-Year
Crit 10-Year
WS 10-Year
WS Floodway
WS 100-Year
WS 50-Year
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)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RS = 2.930
.05
.032
.055
Elevation (ft)
Station (ft)
Legend
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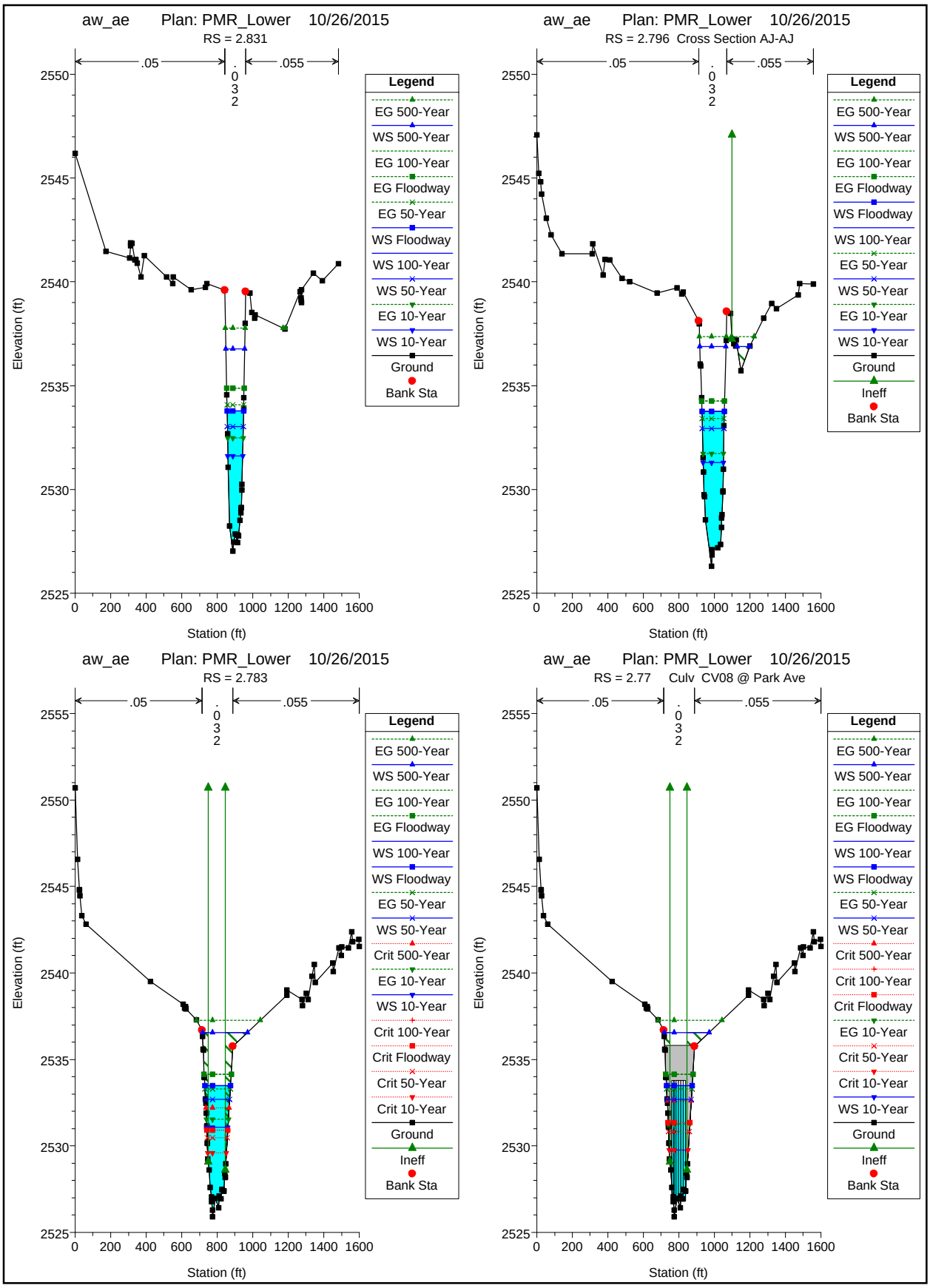
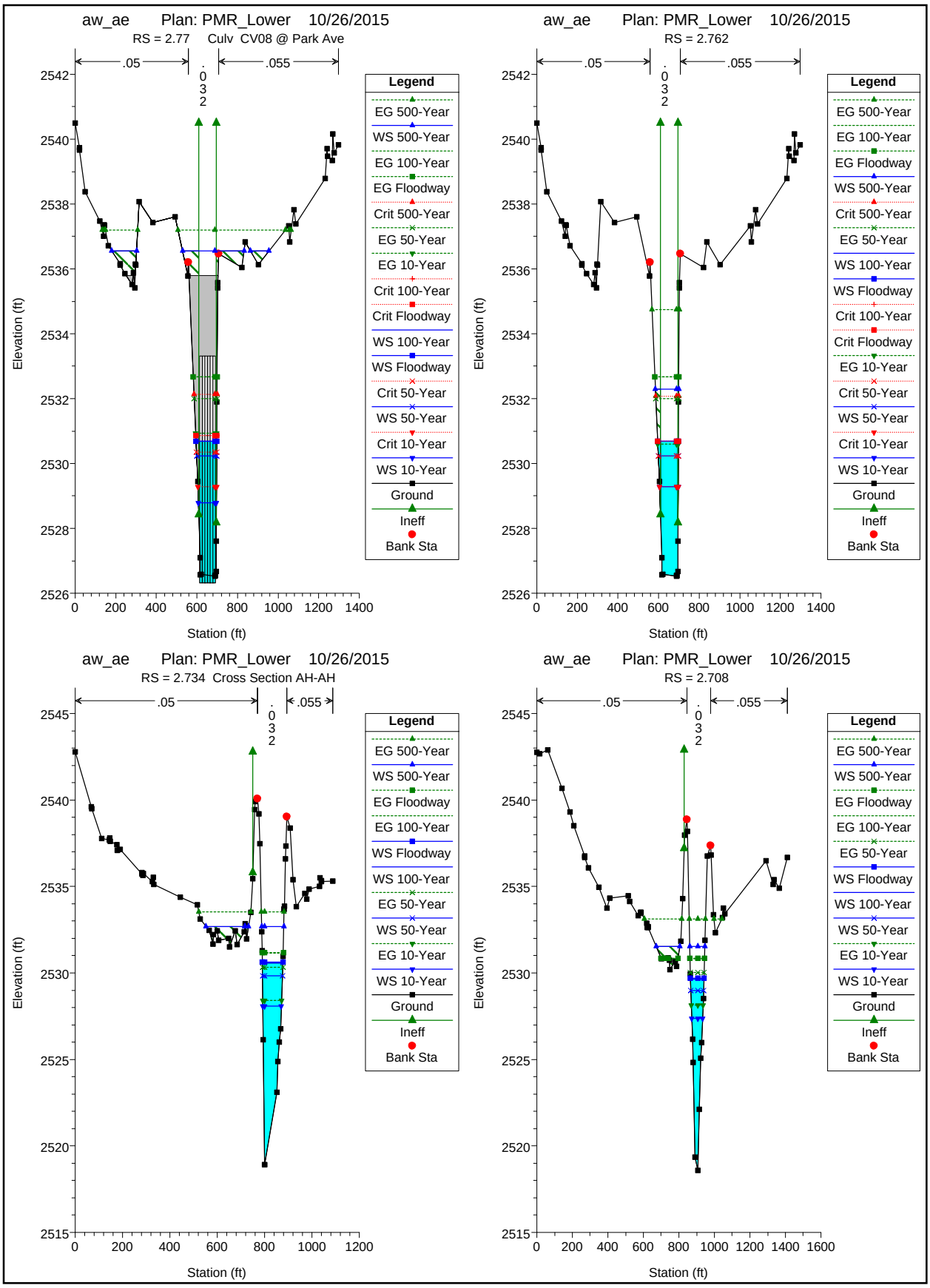
EG Floodway
WS 500-Year
Crit 500-Year
EG 50-Year
WS 100-Year
WS Floodway
Crit 100-Year
Crit Floodway
EG 10-Year
Crit 50-Year
WS 50-Year
Crit 10-Year
WS 10-Year
Ground
Ineff
Bank Sta
aw_ae Plan: PMR_Lower 10/26/2015
RS = 2.923 Cross Section AK-AK
.05
.032
.055
Elevation (ft)
Station (ft)
Legend
EG 500-Year
WS 500-Year
EG 100-Year
EG Floodway
EG 50-Year
WS Floodway
WS 100-Year
WS 50-Year
EG 10-Year
WS 10-Year
Ground
Bank Sta
aw_ae Plan: PMR_Lower 10/26/2015
RS = 2.907
.05
.032
.055
Elevation (ft)
Station (ft)
Legend
EG 500-Year
WS 500-Year
EG 100-Year
EG Floodway
EG 50-Year
WS Floodway
WS 100-Year
WS 50-Year
EG 10-Year
WS 10-Year
Ground
Bank Sta
aw_ae Plan: PMR_Lower 10/26/2015
RS = 2.869
.05
.032
.055
Elevation (ft)
Station (ft)
Legend
EG 500-Year
WS 500-Year
EG 100-Year
EG Floodway
EG 50-Year
WS Floodway
WS 100-Year
WS 50-Year
EG 10-Year
WS 10-Year
Ground
Bank Sta


aw_ae Plan: PMR_Lower 10/26/2015
RS = 2.831
.05
.032
.055
Legend
EG 500-Year
WS 500-Year
EG 100-Year
EG Floodway
EG 50-Year
WS Floodway
WS 100-Year
WS 50-Year
EG 10-Year
WS 10-Year
Ground
Bank Sta
Elevation (ft)
Station (ft)
aw_ae Plan: PMR_Lower 10/26/2015
RS = 2.796 Cross Section AJ-AJ
.05
.032
.055
Legend
EG 500-Year
WS 500-Year
EG 100-Year
EG Floodway
WS Floodway
WS 100-Year
EG 50-Year
WS 50-Year
EG 10-Year
WS 10-Year
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)
aw_ae Plan: PMR_Lower 10/26/2015
RS = 2.783
.05
.032
.055
Legend
EG 500-Year
WS 500-Year
EG 100-Year
EG Floodway
WS 100-Year
WS Floodway
EG 50-Year
WS 50-Year
Crit 500-Year
EG 10-Year
WS 10-Year
Crit 100-Year
Crit Floodway
Crit 50-Year
Crit 10-Year
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)
aw_ae Plan: PMR_Lower 10/26/2015
RS = 2.77 Culv CV08 @ Park Ave
.05
.032
.055
Legend
EG 500-Year
WS 500-Year
EG 100-Year
EG Floodway
WS 100-Year
WS Floodway
EG 50-Year
WS 50-Year
Crit 500-Year
Crit 100-Year
Crit Floodway
EG 10-Year
Crit 50-Year
Crit 10-Year
WS 10-Year
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)


aw_ae Plan: PMR_Lower 10/26/2015
RS = 2.77 Culv CV08 @ Park Ave
.05
.032
.055
Elevation (ft)
Station (ft)
Legend
EG 500-Year
WS 500-Year
EG 100-Year
EG Floodway
Crit 500-Year
EG 50-Year
EG 10-Year
Crit 100-Year
Crit Floodway
WS 100-Year
WS Floodway
Crit 50-Year
WS 50-Year
Crit 10-Year
WS 10-Year
Ground
Ineff
Bank Sta
aw_ae Plan: PMR_Lower 10/26/2015
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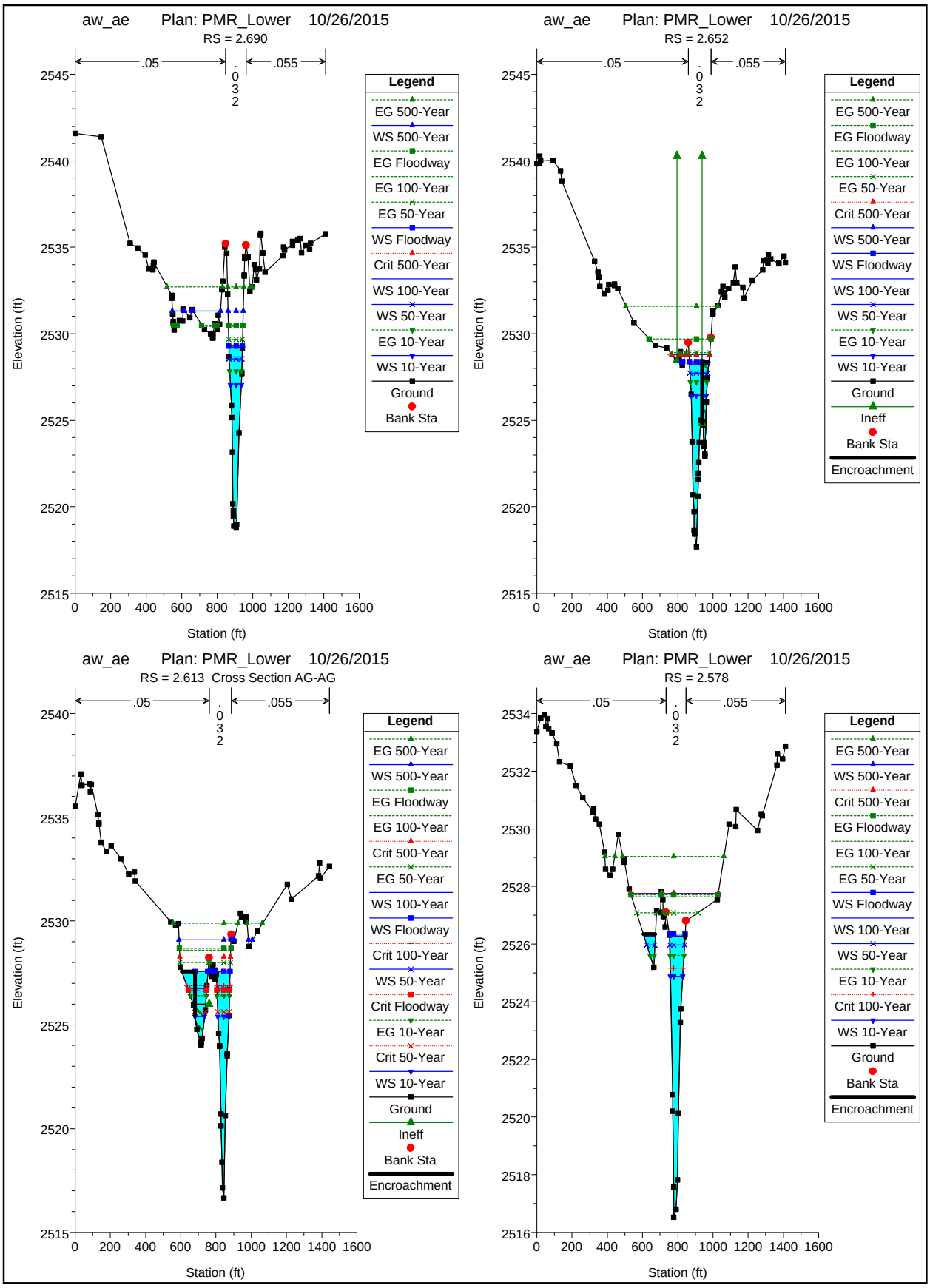
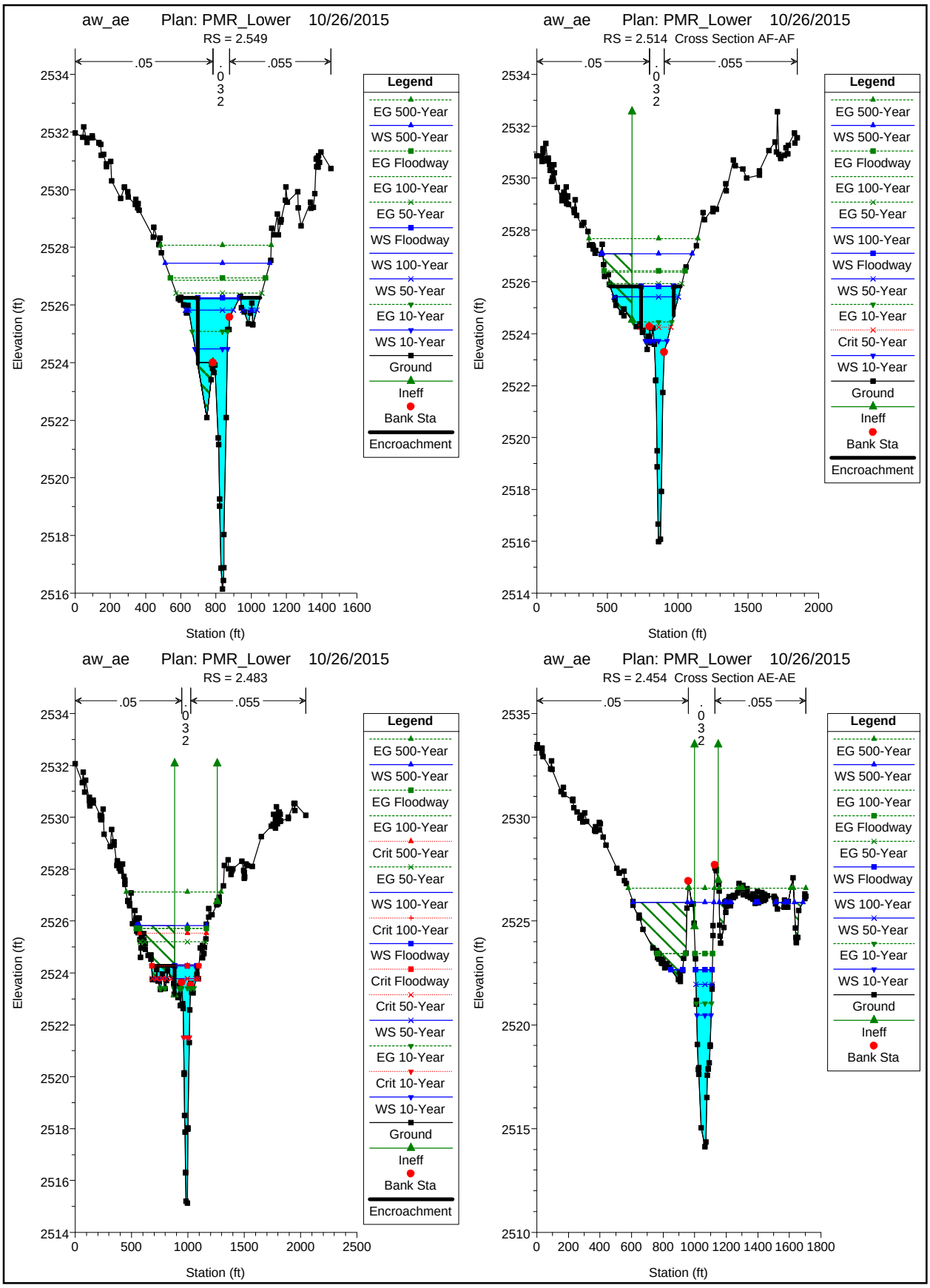
RS = 2.734 Cross Section AH-AH
aw_ae Plan: PMR_Lower 10/26/2015
RS = 2.708


aw_ae Plan: PMR_Lower 10/26/2015
RS = 2.690
.05
.032
.055
Legend
EG 500-Year
WS 500-Year
EG Floodway
EG 100-Year
EG 50-Year
WS Floodway
Crit 500-Year
WS 100-Year
WS 50-Year
EG 10-Year
WS 10-Year
Ground
Bank Sta
Elevation (ft)
Station (ft)
aw_ae Plan: PMR_Lower 10/26/2015
RS = 2.652
.05
.032
.055
Legend
EG 500-Year
EG Floodway
EG 100-Year
EG 50-Year
Crit 500-Year
WS 500-Year
WS Floodway
WS 100-Year
WS 50-Year
EG 10-Year
WS 10-Year
Ground
Ineff
Bank Sta
Encroachment
Elevation (ft)
Station (ft)
aw_ae Plan: PMR_Lower 10/26/2015
RS = 2.613 Cross Section AG-AG
.05
.032
.055
Legend
EG 500-Year
WS 500-Year
EG Floodway
EG 100-Year
Crit 500-Year
EG 50-Year
WS 100-Year
WS Floodway
Crit 100-Year
WS 50-Year
Crit Floodway
EG 10-Year
Crit 50-Year
WS 10-Year
Ground
Ineff
Bank Sta
Encroachment
Elevation (ft)
Station (ft)
aw_ae Plan: PMR_Lower 10/26/2015
RS = 2.578
.05
.032
.055
Legend
EG 500-Year
WS 500-Year
Crit 500-Year
EG Floodway
EG 100-Year
EG 50-Year
WS Floodway
WS 100-Year
WS 50-Year
EG 10-Year
Crit 100-Year
WS 10-Year
Ground
Bank Sta
Encroachment
Elevation (ft)
Station (ft)


aw_ae Plan: PMR_Lower 10/26/2015
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.05
.032
.055
Elevation (ft)
Station (ft)
Legend
EG 500-Year
WS 500-Year
EG Floodway
EG 100-Year
EG 50-Year
WS Floodway
WS 100-Year
WS 50-Year
EG 10-Year
WS 10-Year
Ground
Ineff
Bank Sta
Encroachment
aw_ae Plan: PMR_Lower 10/26/2015
RS = 2.514 Cross Section AF-AF
.05
.032
.055
Elevation (ft)
Station (ft)
Legend
EG 500-Year
WS 500-Year
EG Floodway
EG 100-Year
EG 50-Year
WS 100-Year
WS Floodway
WS 50-Year
EG 10-Year
Crit 50-Year
WS 10-Year
Ground
Ineff
Bank Sta
Encroachment
aw_ae Plan: PMR_Lower 10/26/2015
RS = 2.483
.05
.032
.055
Elevation (ft)
Station (ft)
Legend
EG 500-Year
WS 500-Year
EG Floodway
EG 100-Year
Crit 500-Year
EG 50-Year
WS 100-Year
Crit 100-Year
WS Floodway
Crit Floodway
Crit 50-Year
WS 50-Year
EG 10-Year
Crit 10-Year
WS 10-Year
Ground
Ineff
Bank Sta
Encroachment
aw_ae Plan: PMR_Lower 10/26/2015
RS = 2.454 Cross Section AE-AE
.05
.032
.055
Elevation (ft)
Station (ft)
Legend
EG 500-Year
WS 500-Year
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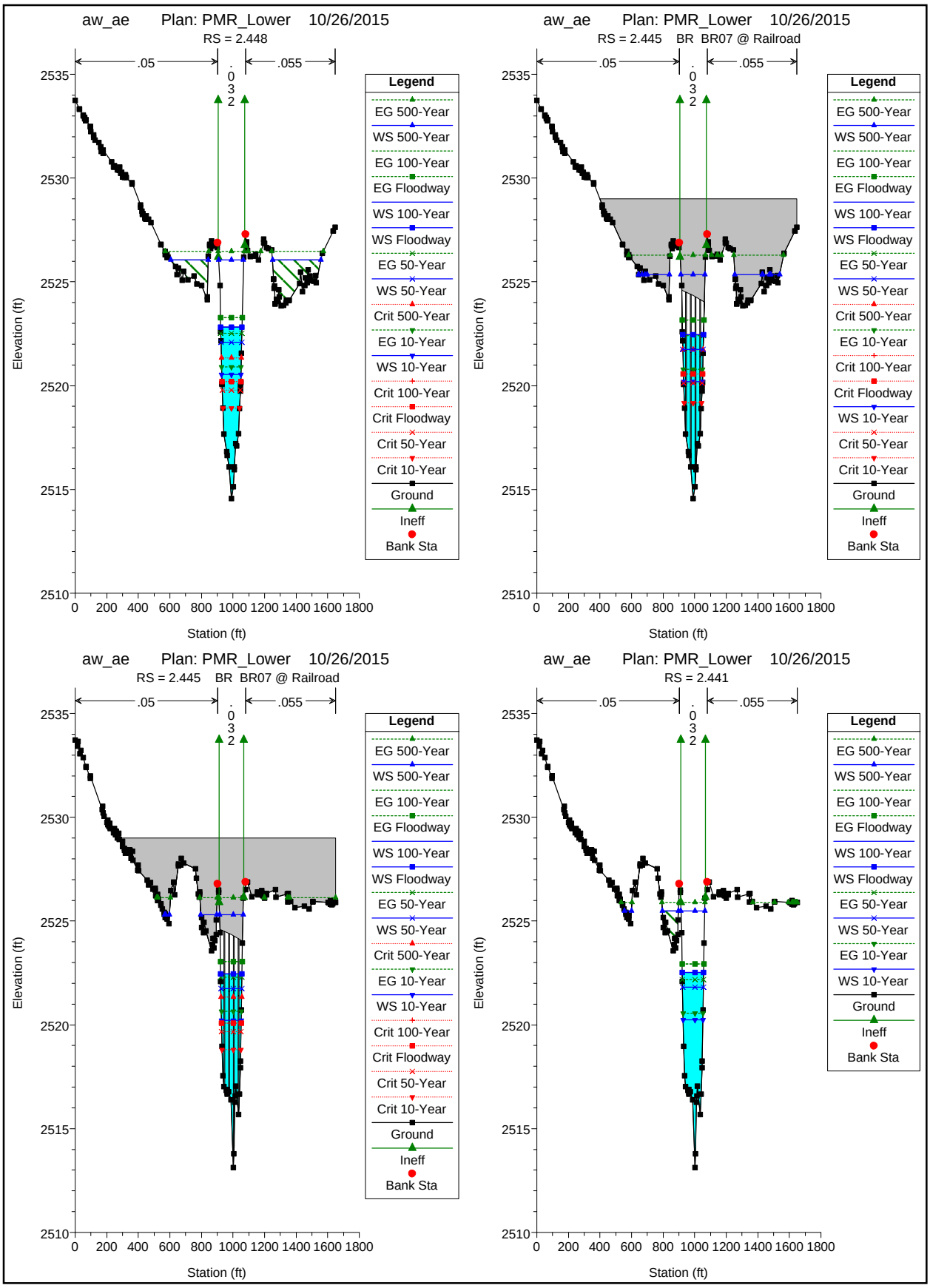
EG Floodway
EG 50-Year
WS Floodway
WS 100-Year
WS 50-Year
EG 10-Year
WS 10-Year
Ground
Ineff
Bank Sta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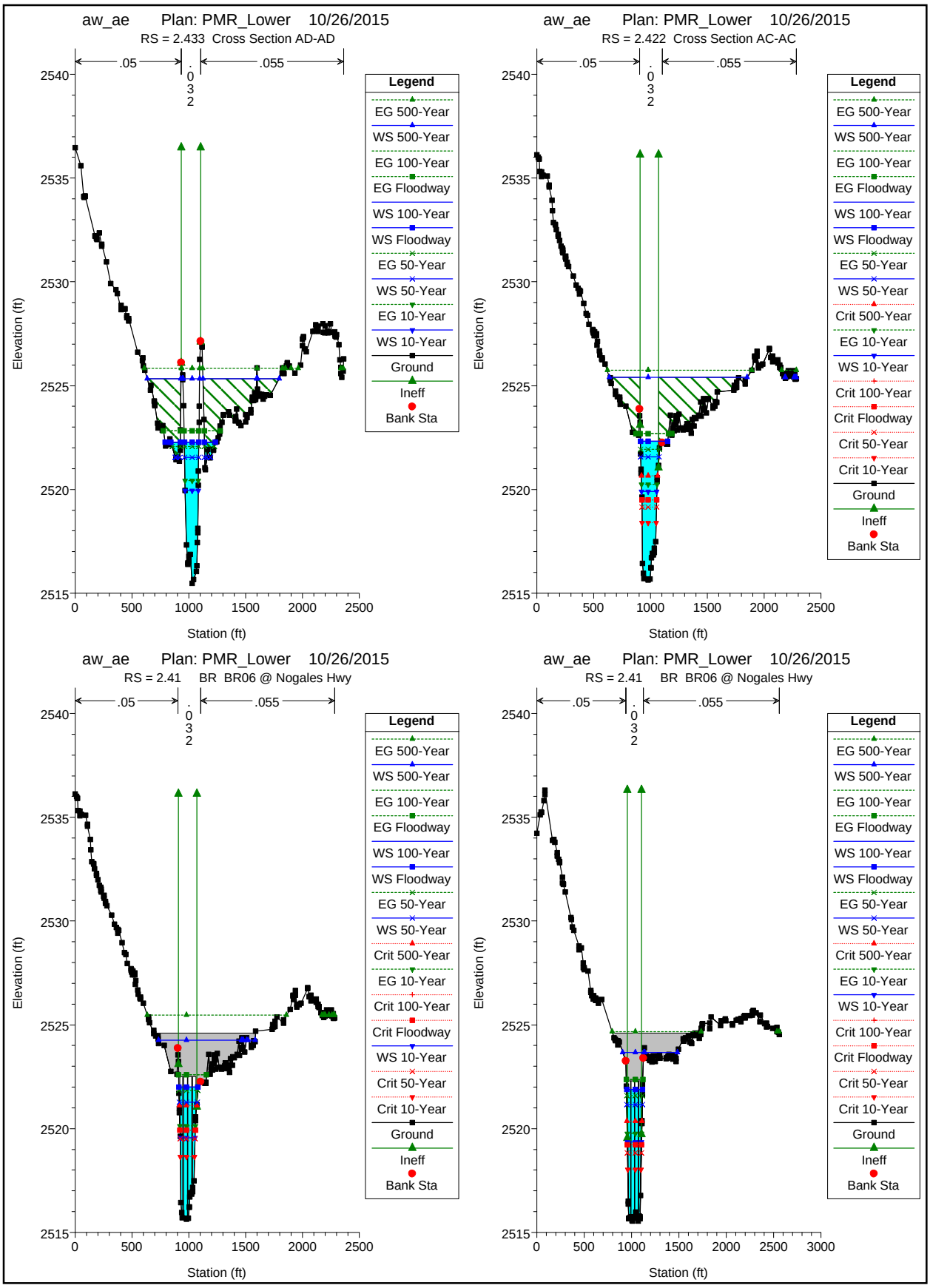
RS = 2.448
RS = 2.445 BR BR07 @ Railroad
RS = 2.445 BR BR07 @ Railroad
RS = 2.441
.05
.032
.055
Elevation (ft)
Station (ft)
Legend
EG 500-Year
WS 500-Year
EG 100-Year
EG Floodway
WS 100-Year
WS Floodway
EG 50-Year
WS 50-Year
Crit 500-Year
EG 10-Year
WS 10-Year
Crit 100-Year
Crit Floodway
Crit 50-Year
Crit 10-Year
Ground
Ineff
Bank Sta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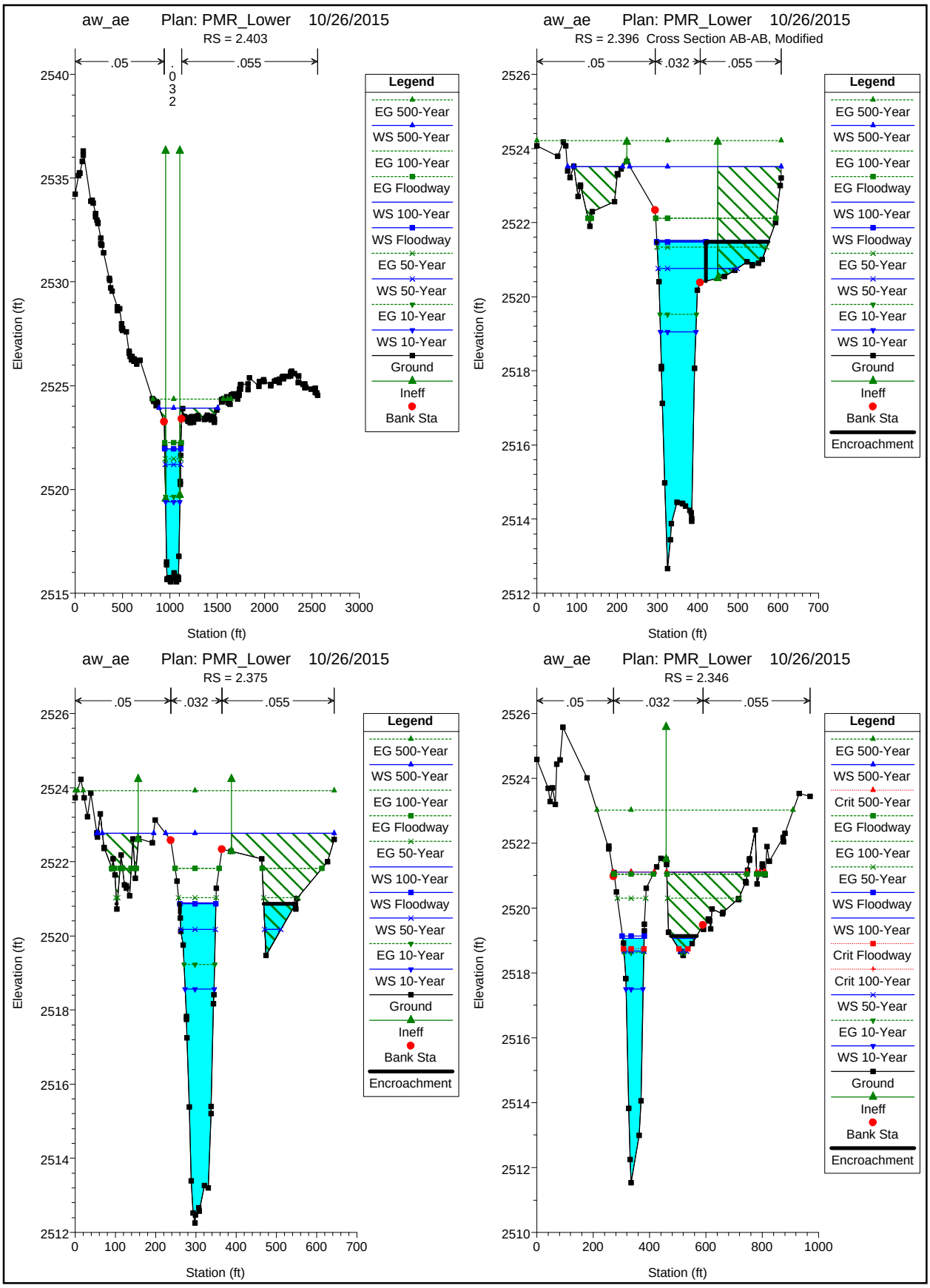
RS = 2.433 Cross Section AD-AD
aw_ae Plan: PMR_Lower 10/26/2015
RS = 2.422 Cross Section AC-AC
aw_ae Plan: PMR_Lower 10/26/2015
RS = 2.41 BR BR06 @ Nogales Hwy
aw_ae Plan: PMR_Lower 10/26/2015
RS = 2.41 BR BR06 @ Nogales Hwy
.05
.032
.055
Elevation (ft)
Station (ft)
Legend
EG 500-Year
WS 500-Year
EG 100-Year
EG Floodway
WS 100-Year
WS Floodway
EG 50-Year
WS 50-Year
Crit 500-Year
EG 10-Year
WS 10-Year
Crit 100-Year
Crit Floodway
Crit 50-Year
Crit 10-Year
Ground
Ineff
Bank Sta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RS = 2.403
.05
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.055
Elevation (ft)
Station (ft)
Legend
EG 500-Year
WS 500-Year
EG 100-Year
EG Floodway
WS 100-Year
WS Floodway
EG 50-Year
WS 50-Year
EG 10-Year
WS 10-Year
Ground
Ineff
Bank Sta
aw_ae Plan: PMR_Lower 10/26/2015
RS = 2.396 Cross Section AB-AB, Modified
.05
.032
.055
Elevation (ft)
Station (ft)
Legend
EG 500-Year
WS 500-Year
EG 100-Year
EG Floodway
WS 100-Year
WS Floodway
EG 50-Year
WS 50-Year
EG 10-Year
WS 10-Year
Ground
Ineff
Bank Sta
Encroachment
aw_ae Plan: PMR_Lower 10/26/2015
RS = 2.375
.05
.032
.055
Elevation (ft)
Station (ft)
Legend
EG 500-Year
WS 500-Year
EG 100-Year
EG Floodway
EG 50-Year
WS 100-Year
WS Floodway
WS 50-Year
EG 10-Year
WS 10-Year
Ground
Ineff
Bank Sta
Encroachment
aw_ae Plan: PMR_Lower 10/26/2015
RS = 2.346
.05
.032
.055
Elevation (ft)
Station (ft)
Legend
EG 500-Year
WS 500-Year
Crit 500-Year
EG Floodway
EG 100-Year
EG 50-Year
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Crit 100-Year
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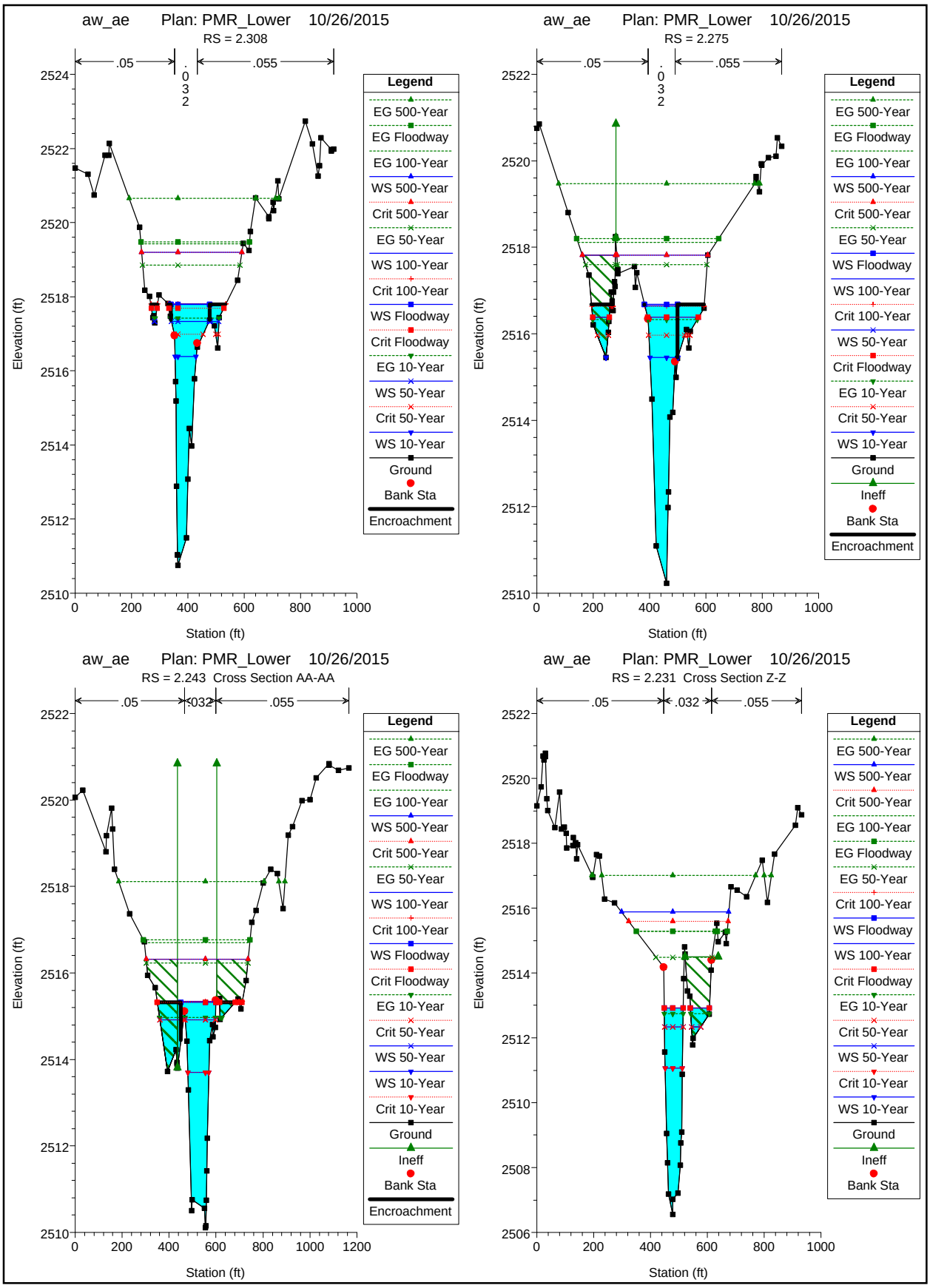
WS 10-Year
Ground
Ineff
Bank Sta
Encroachment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.05
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.055
Elevation (ft)
Station (ft)
Legend
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EG Floodway
EG 100-Year
WS 500-Year
Crit 500-Year
EG 50-Year
WS 100-Year
Crit 100-Year
WS Floodway
Crit Floodway
EG 10-Year
WS 50-Year
Crit 50-Year
WS 10-Year
Ground
Bank Sta
Encroachment
aw_ae Plan: PMR_Lower 10/26/2015
RS = 2.275
.05
.032
.055
Elevation (ft)
Station (ft)
Legend
EG 500-Year
EG Floodway
EG 100-Year
WS 500-Year
Crit 500-Year
EG 50-Year
WS Floodway
WS 100-Year
Crit 100-Year
WS 50-Year
Crit Floodway
EG 10-Year
Crit 50-Year
WS 10-Year
Ground
Ineff
Bank Sta
Encroachment
aw_ae Plan: PMR_Lower 10/26/2015
RS = 2.243 Cross Section AA-AA
.05
.032
.055
Elevation (ft)
Station (ft)
Legend
EG 500-Year
EG Floodway
EG 100-Year
WS 500-Year
Crit 500-Year
EG 50-Year
WS 100-Year
Crit 100-Year
WS Floodway
Crit Floodway
EG 10-Year
Crit 50-Year
WS 50-Year
WS 10-Year
Crit 10-Year
Ground
Ineff
Bank Sta
Encroachment
aw_ae Plan: PMR_Lower 10/26/2015
RS = 2.231 Cross Section Z-Z
.05
.032
.055
Elevation (ft)
Station (ft)
Legend
EG 500-Year
WS 500-Year
Crit 500-Year
EG 100-Year
EG Floodway
EG 50-Year
Crit 100-Year
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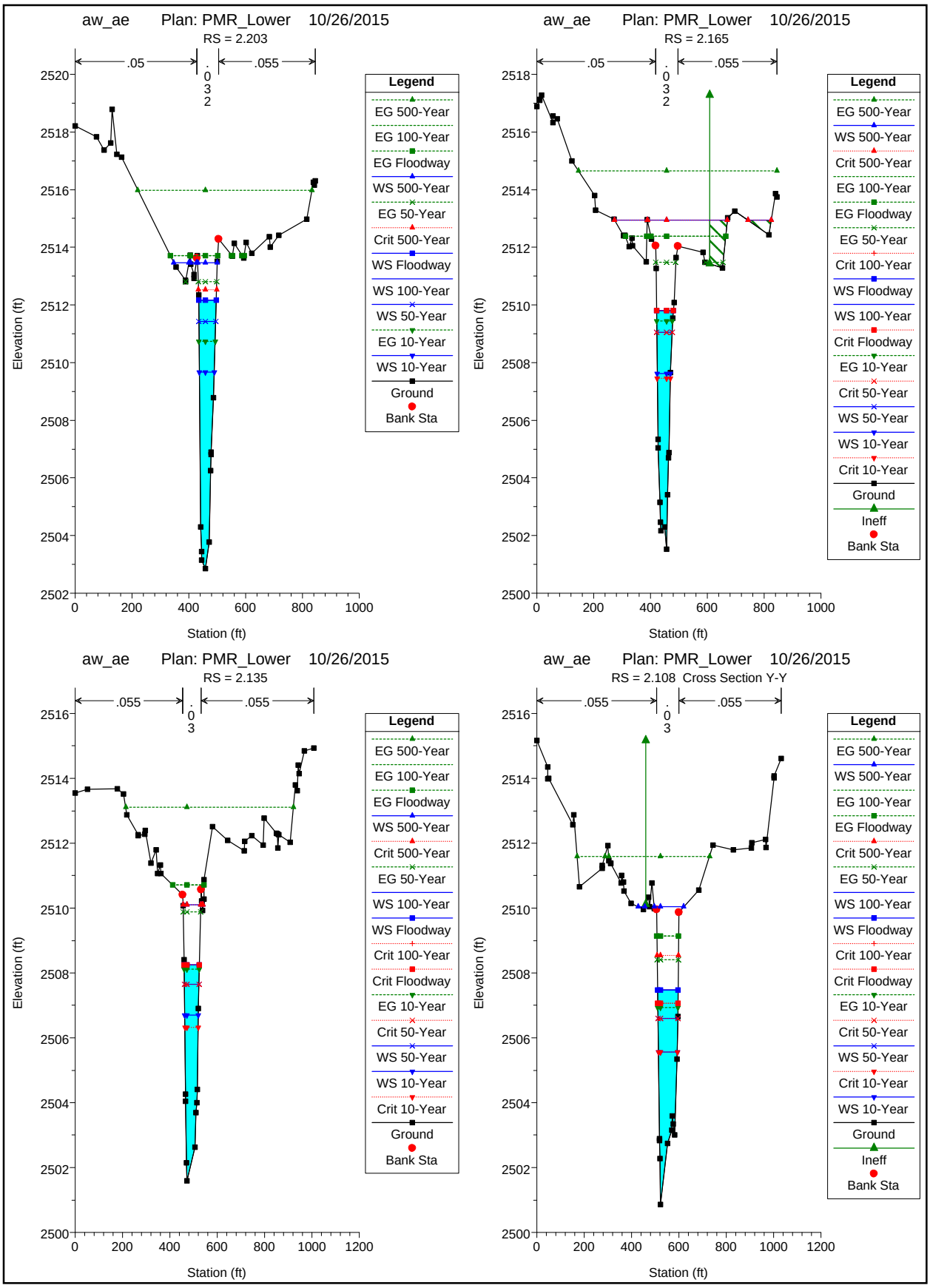
WS 10-Year
Ground
Ineff
Bank Sta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.032
.055
Legend
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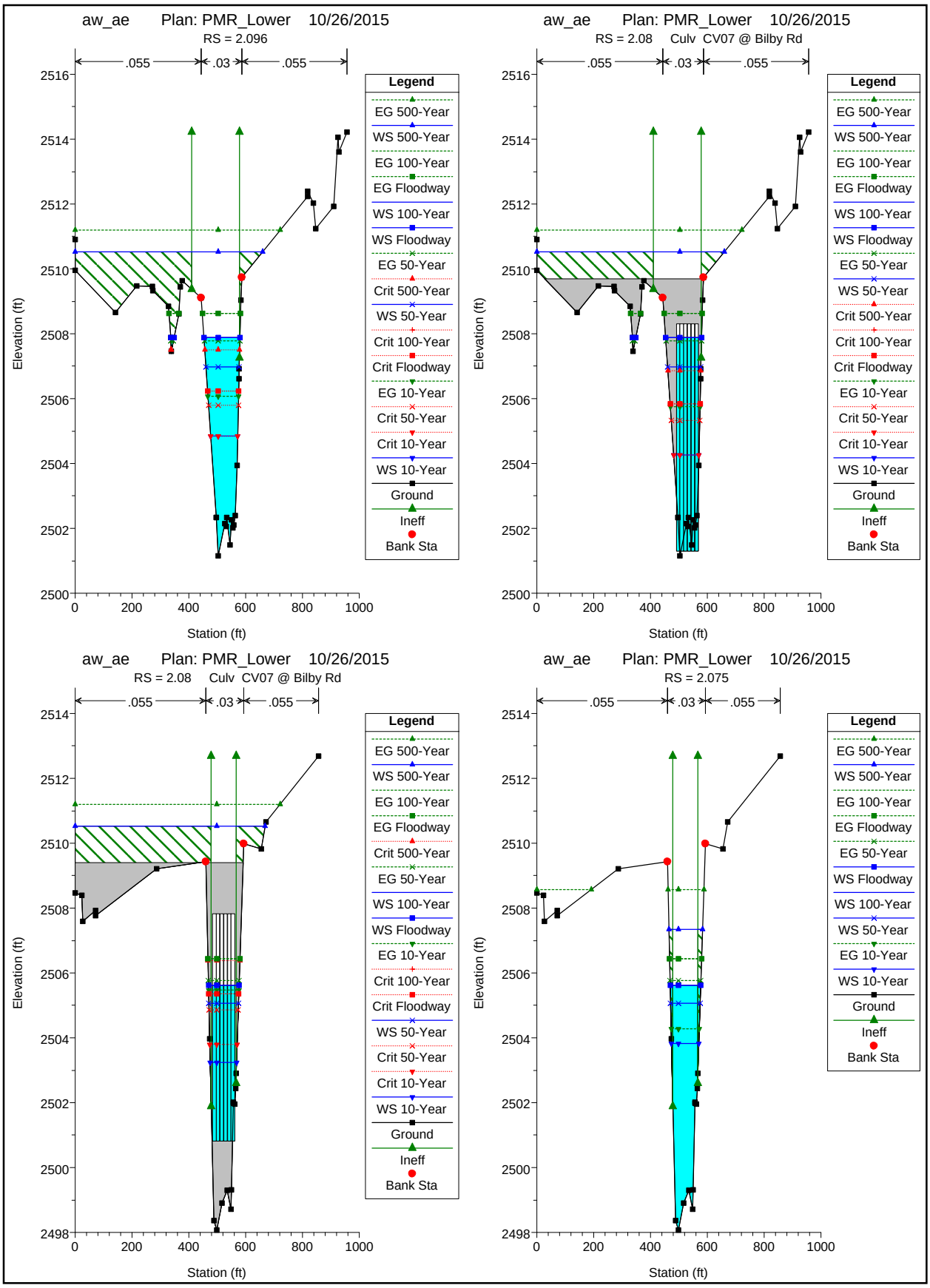
EG 100-Year
EG Floodway
WS 500-Year
EG 50-Year
Crit 500-Year
WS Floodway
WS 100-Year
WS 50-Year
EG 10-Year
WS 10-Year
Ground
Bank Sta
Elevation (ft)
Station (ft)
aw_ae Plan: PMR_Lower 10/26/2015
RS = 2.165
.05
.032
.055
Legend
EG 500-Year
WS 500-Year
Crit 500-Year
EG 100-Year
EG Floodway
EG 50-Year
Crit 100-Year
WS Floodway
WS 100-Year
Crit Floodway
EG 10-Year
Crit 50-Year
WS 50-Year
WS 10-Year
Crit 10-Year
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)
aw_ae Plan: PMR_Lower 10/26/2015
RS = 2.135
.055
.03
.055
Legend
EG 500-Year
EG 100-Year
EG Floodway
WS 500-Year
Crit 500-Year
EG 50-Year
WS 100-Year
WS Floodway
Crit 100-Year
Crit Floodway
EG 10-Year
Crit 50-Year
WS 50-Year
WS 10-Year
Crit 10-Year
Ground
Bank Sta
Elevation (ft)
Station (ft)
aw_ae Plan: PMR_Lower 10/26/2015
RS = 2.108 Cross Section Y-Y
.055
.03
.055
Legend
EG 500-Year
WS 500-Year
EG 100-Year
EG Floodway
Crit 500-Year
EG 50-Year
WS 100-Year
WS Floodway
Crit 100-Year
Crit Floodway
EG 10-Year
Crit 50-Year
WS 50-Year
Crit 10-Year
WS 10-Year
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)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.055
.03
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Elevation (ft)
Station (ft)
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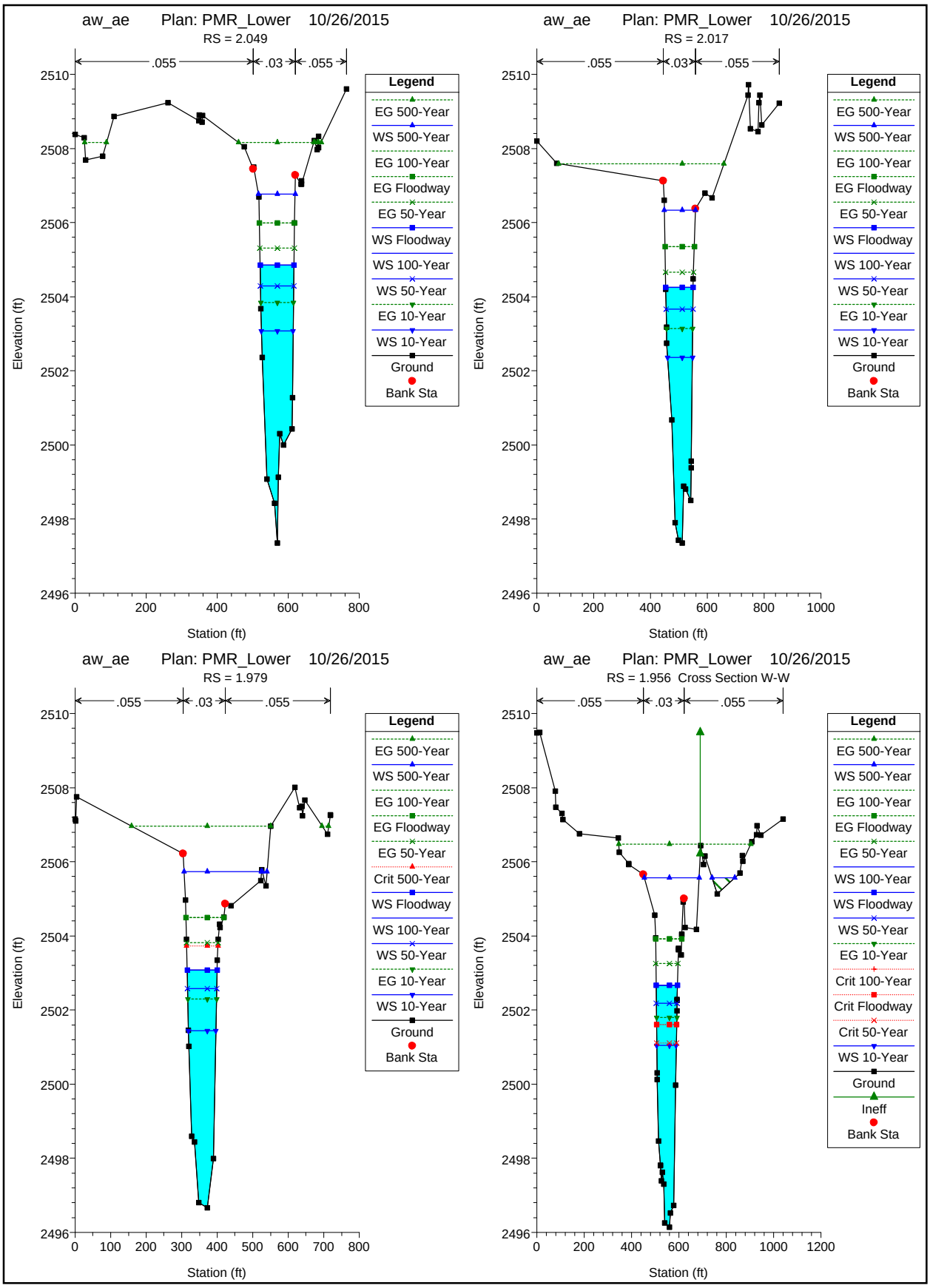
EG 100-Year
EG Floodway
WS 100-Year
WS Floodway
EG 50-Year
Crit 500-Year
WS 50-Year
Crit 100-Year
Crit Floodway
EG 10-Year
Crit 50-Year
Crit 10-Year
WS 10-Year
Ground
Ineff
Bank Sta
aw_ae Plan: PMR_Lower 10/26/2015
RS = 2.08 Culv CV07 @ Bilby Rd
aw_ae Plan: PMR_Lower 10/26/2015
RS = 2.08 Culv CV07 @ Bilby Rd
aw_ae Plan: PMR_Lower 10/26/2015
RS = 2.075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.055
.03
.055
Elevation (ft)
Station (ft)
Legend
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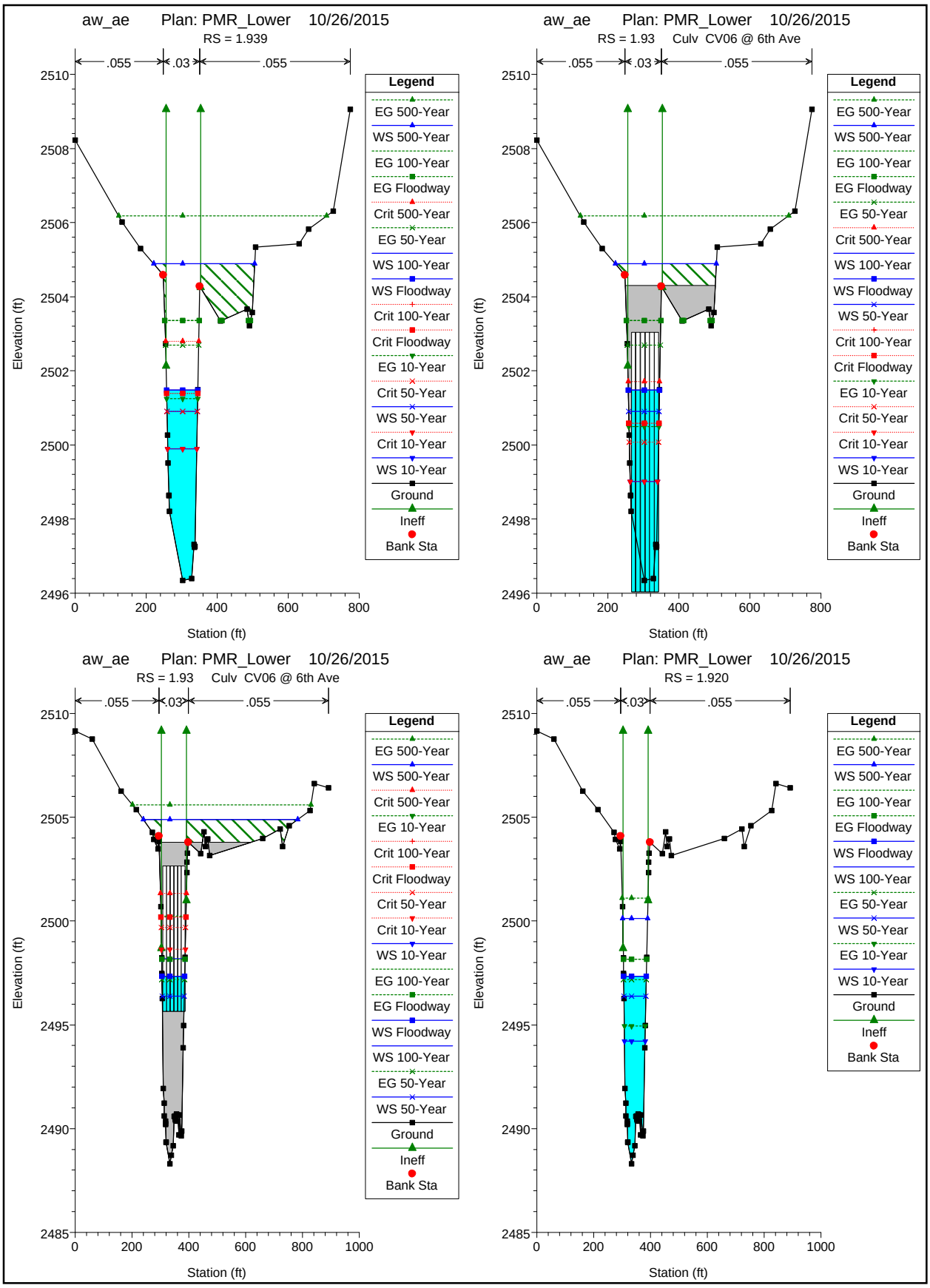
WS 500-Year
EG 100-Year
EG Floodway
EG 50-Year
WS Floodway
WS 100-Year
WS 50-Year
EG 10-Year
WS 10-Year
Ground
Bank Sta
aw_ae Plan: PMR_Lower 10/26/2015
RS = 2.017
.055
.03
.055
Elevation (ft)
Station (ft)
Legend
EG 500-Year
WS 500-Year
EG 100-Year
EG Floodway
EG 50-Year
WS Floodway
WS 100-Year
WS 50-Year
EG 10-Year
WS 10-Year
Ground
Bank Sta
aw_ae Plan: PMR_Lower 10/26/2015
RS = 1.979
.055
.03
.055
Elevation (ft)
Station (ft)
Legend
EG 500-Year
WS 500-Year
EG 100-Year
EG Floodway
EG 50-Year
Crit 500-Year
WS Floodway
WS 100-Year
WS 50-Year
EG 10-Year
WS 10-Year
Ground
Bank Sta
aw_ae Plan: PMR_Lower 10/26/2015
RS = 1.956 Cross Section W-W
.055
.03
.055
Elevation (ft)
Station (ft)
Legend
EG 500-Year
WS 500-Year
EG 100-Year
EG Floodway
EG 50-Year
WS 100-Year
WS Floodway
WS 50-Year
EG 10-Year
Crit 100-Year
Crit Floodway
Crit 50-Year
WS 10-Year
Ground
Ineff
Bank Sta


aw_ae Plan: PMR_Lower 10/26/2015
RS = 1.939
.055
.03
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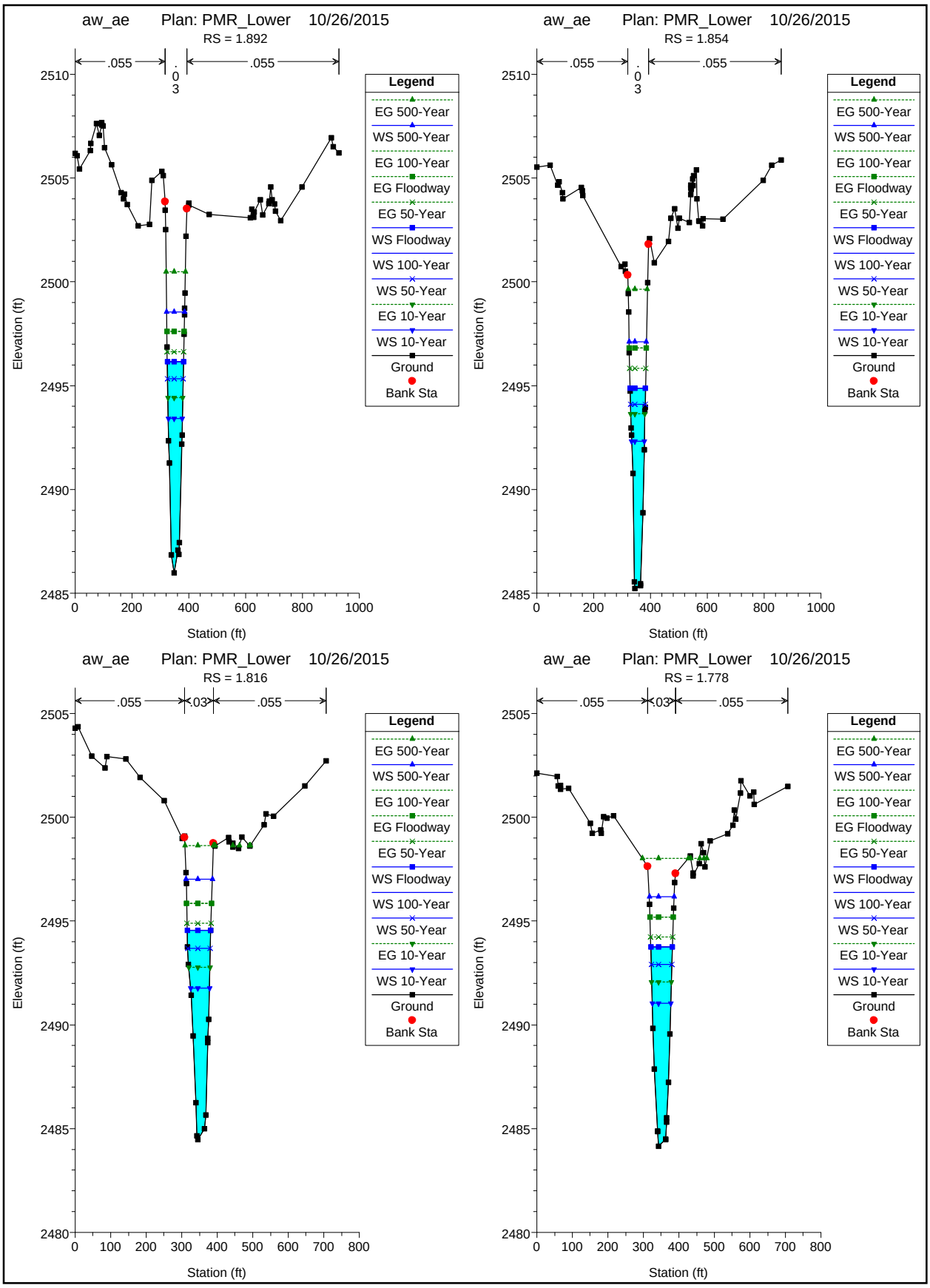
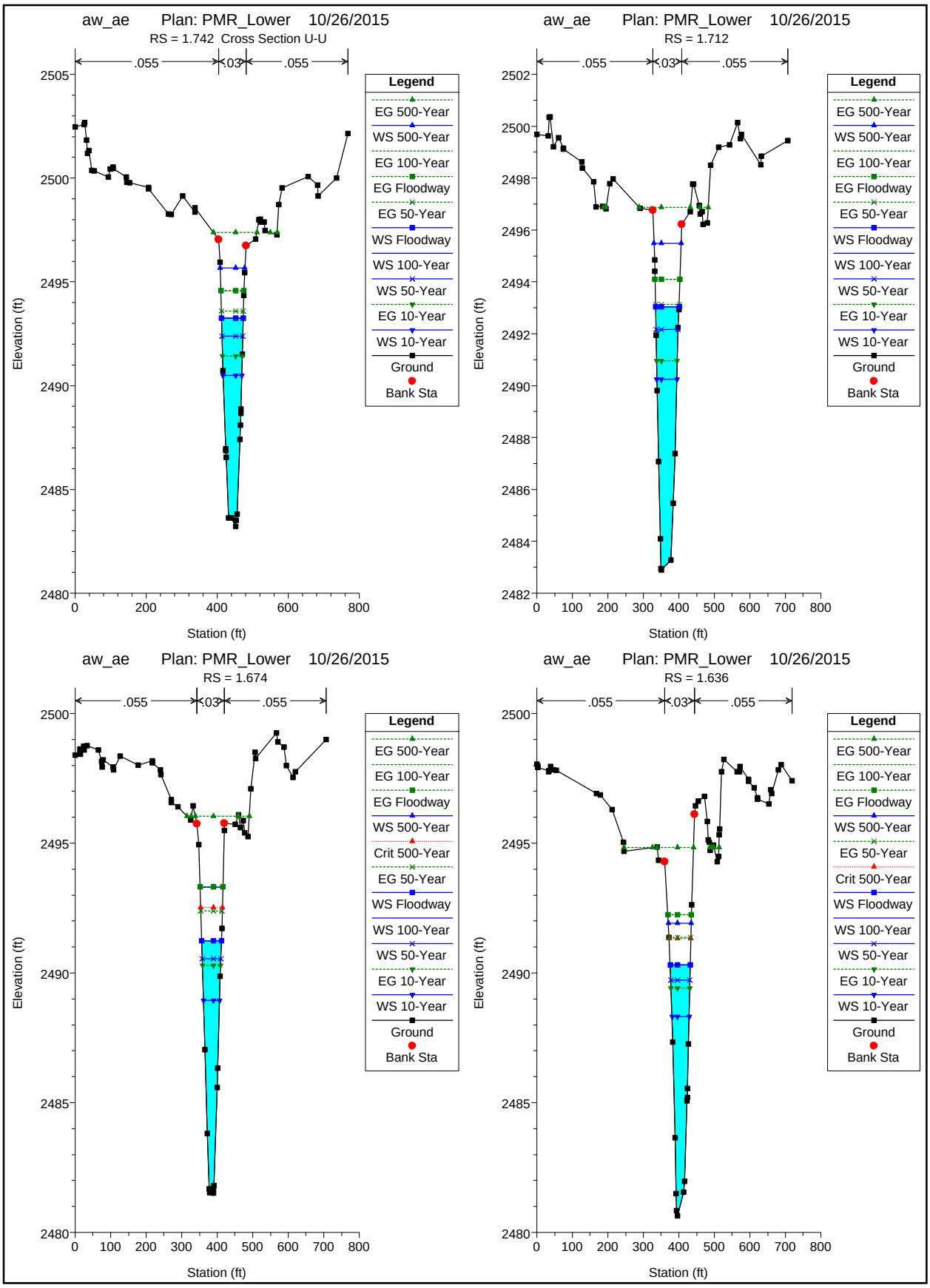
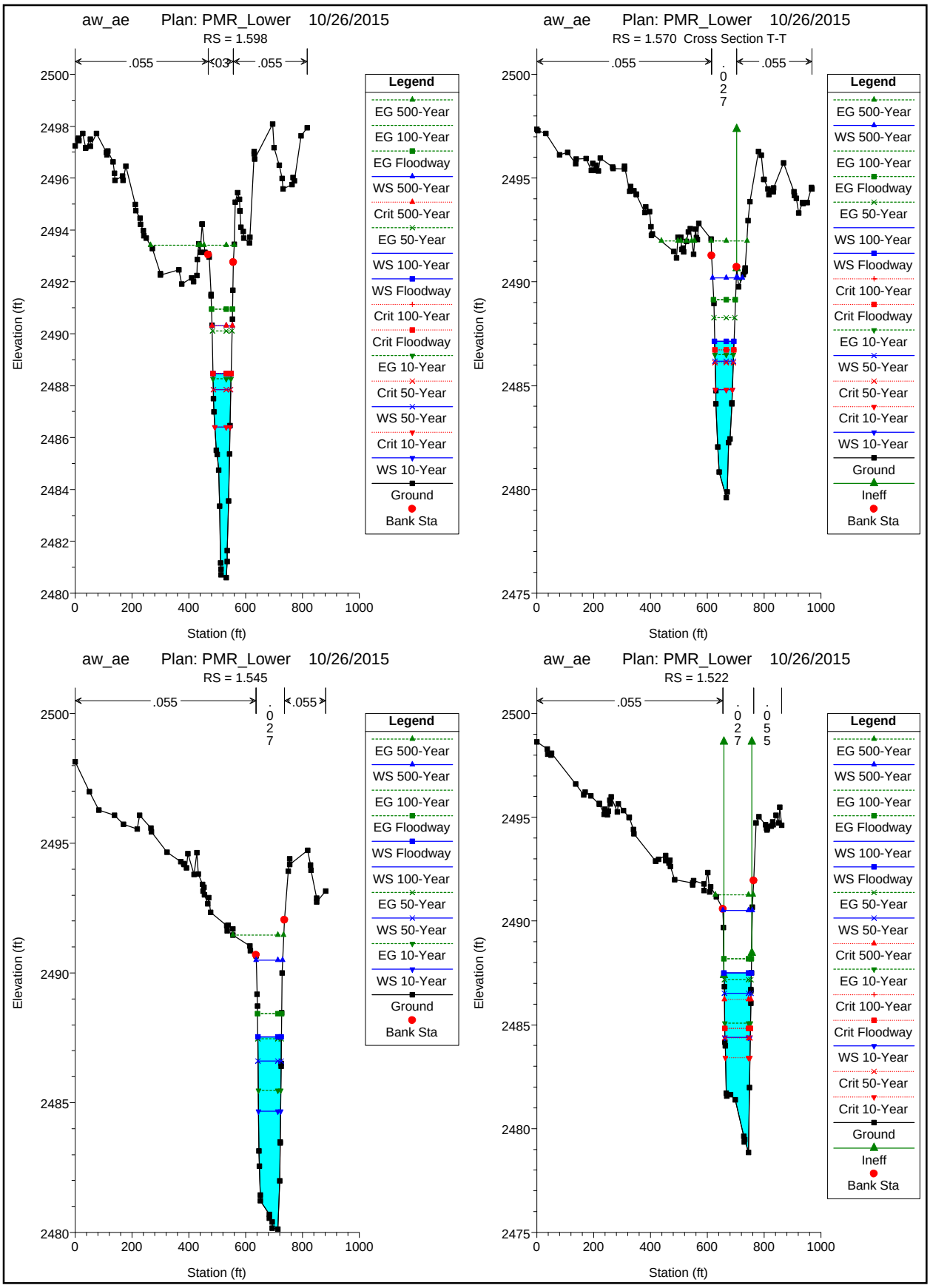
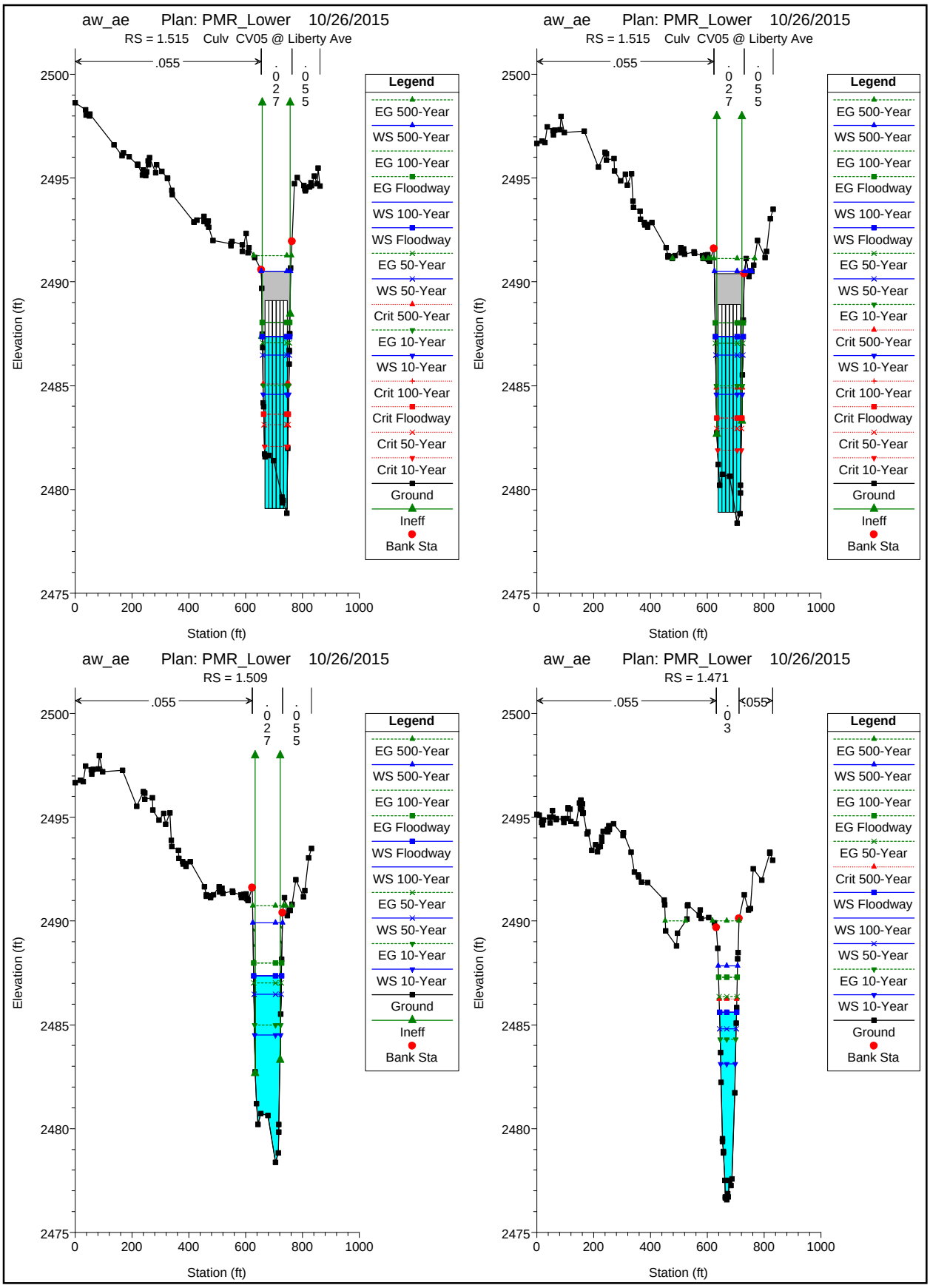
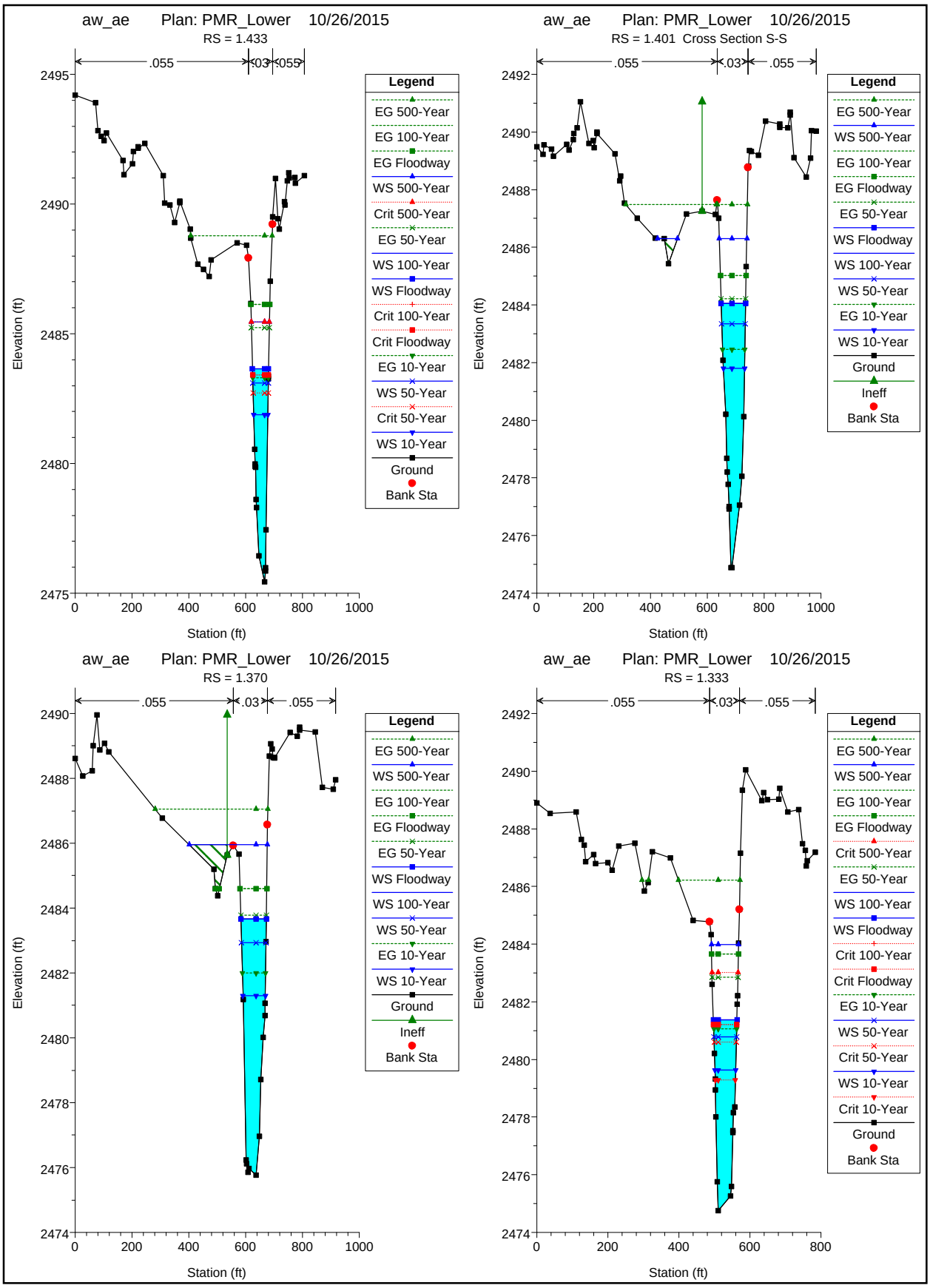
Elevation (ft)
Station (ft)
Legend
EG 500-Year
WS 500-Year
EG 100-Year
EG Floodway
Crit 500-Year
EG 50-Year
WS 100-Year
WS Floodway
Crit 100-Year
Crit Floodway
EG 10-Year
Crit 50-Year
WS 50-Year
Crit 10-Year
WS 10-Year
Ground
Ineff
Bank Sta
aw_ae Plan: PMR_Lower 10/26/2015
RS = 1.93 Culv CV06 @ 6th Ave
.055
.03
.055
Elevation (ft)
Station (ft)
Legend
EG 500-Year
WS 500-Year
EG 100-Year
EG Floodway
EG 50-Year
Crit 500-Year
WS 100-Year
WS Floodway
WS 50-Year
Crit 100-Year
Crit Floodway
EG 10-Year
Crit 50-Year
Crit 10-Year
WS 10-Year
Ground
Ineff
Bank Sta
aw_ae Plan: PMR_Lower 10/26/2015
RS = 1.93 Culv CV06 @ 6th Ave
.055
.03
.055
Elevation (ft)
Station (ft)
Legend
EG 500-Year
WS 500-Year
Crit 500-Year
EG 10-Year
Crit 100-Year
Crit Floodway
Crit 50-Year
Crit 10-Year
WS 10-Year
EG 100-Year
EG Floodway
WS Floodway
WS 100-Year
EG 50-Year
WS 50-Year
Ground
Ineff
Bank Sta
aw_ae Plan: PMR_Lower 10/26/2015
RS = 1.920
.055
.03
.055
Elevation (ft)
Station (ft)
Legend
EG 500-Year
WS 500-Year
EG 100-Year
EG Floodway
WS Floodway
WS 100-Year
EG 50-Year
WS 50-Year
EG 10-Year
WS 10-Year
Ground
Ineff
Bank Sta

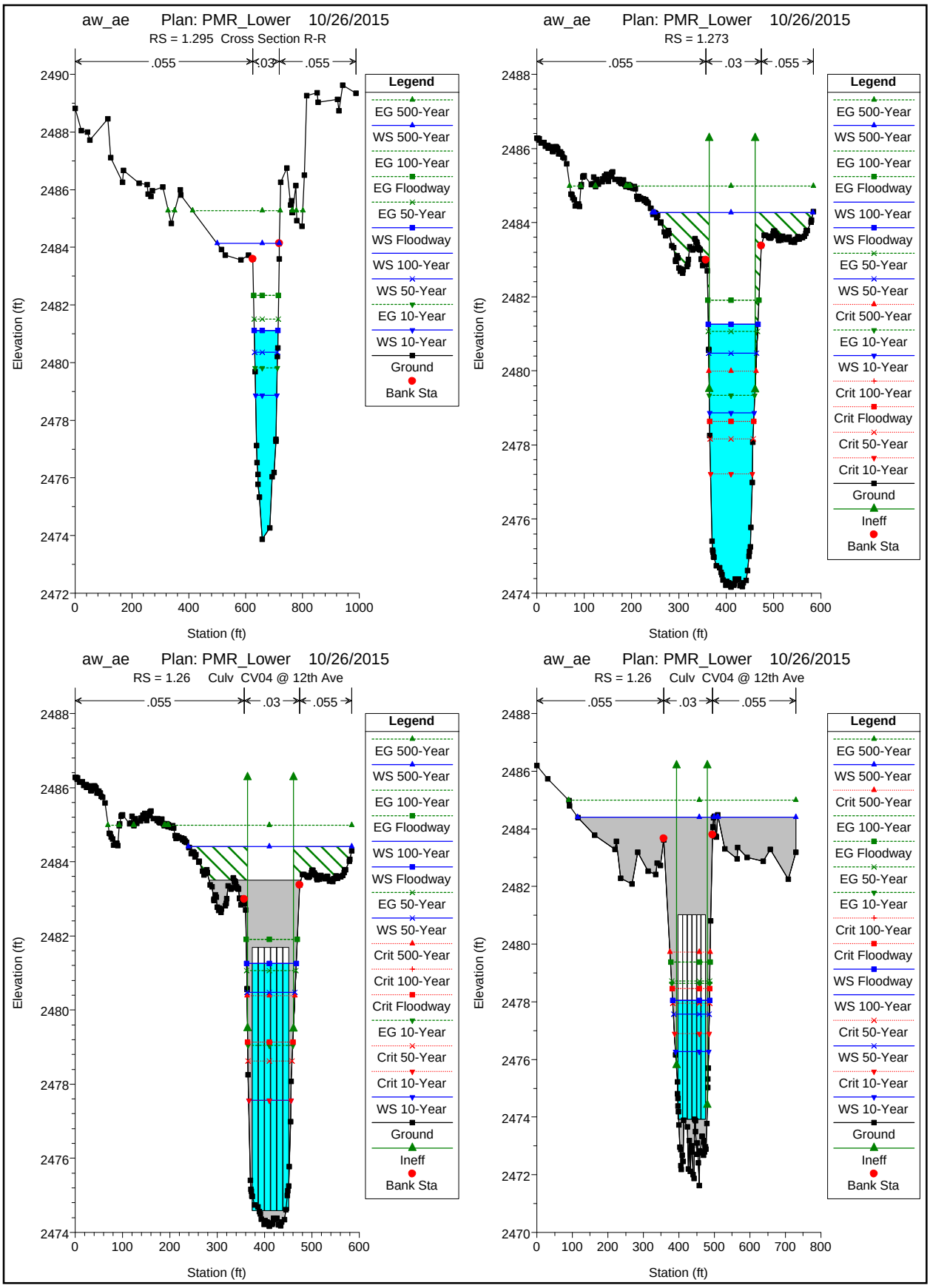

aw_ae Plan: PMR_Lower 10/26/2015
RS = 1.892
.055
.03
.055
Elevation (ft)
Station (ft)
aw_ae Plan: PMR_Lower 10/26/2015
RS = 1.854
.055
.03
.055
Elevation (ft)
Station (ft)
aw_ae Plan: PMR_Lower 10/26/2015
RS = 1.816
.055
.03
.055
Elevation (ft)
Station (ft)
aw_ae Plan: PMR_Lower 10/26/2015
RS = 1.778
.055
.03
.055
Elevation (ft)
Station (ft)
Legend
EG 500-Year
WS 500-Year
EG 100-Year
EG Floodway
EG 50-Year
WS Floodway
WS 100-Year
WS 50-Year
EG 10-Year
WS 10-Year
Ground
Bank Sta

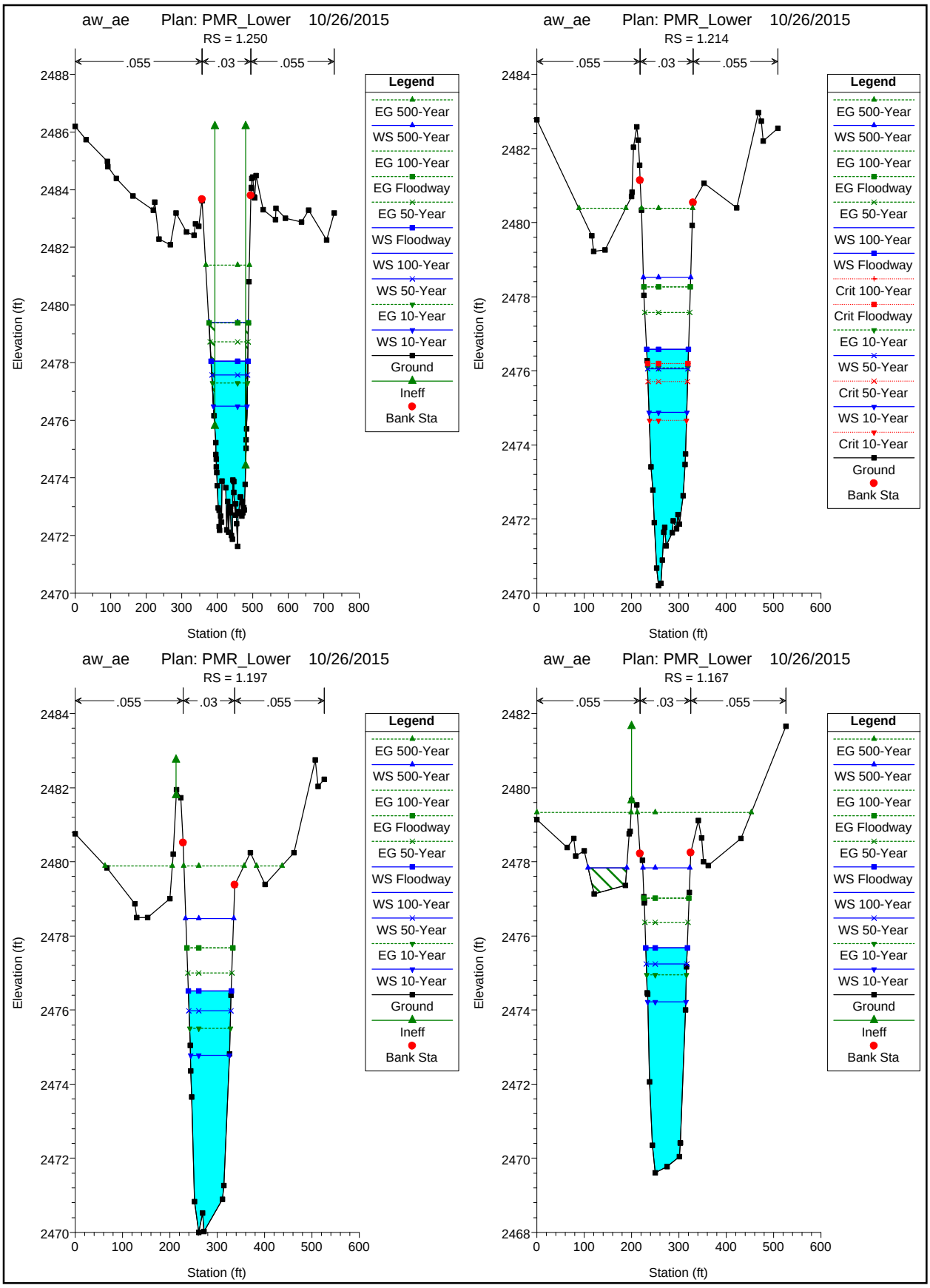

aw_ae Plan: PMR_Lower 10/26/2015
RS = 1.742 Cross Section U-U
.055
.03
.055
Elevation (ft)
Station (ft)
Legend
EG 500-Year
WS 500-Year
EG 100-Year
EG Floodway
EG 50-Year
WS Floodway
WS 100-Year
WS 50-Year
EG 10-Year
WS 10-Year
Ground
Bank Sta
aw_ae Plan: PMR_Lower 10/26/2015
RS = 1.712
aw_ae Plan: PMR_Lower 10/26/2015
RS = 1.674
Crit 500-Year
aw_ae Plan: PMR_Lower 10/26/2015
RS = 1.636

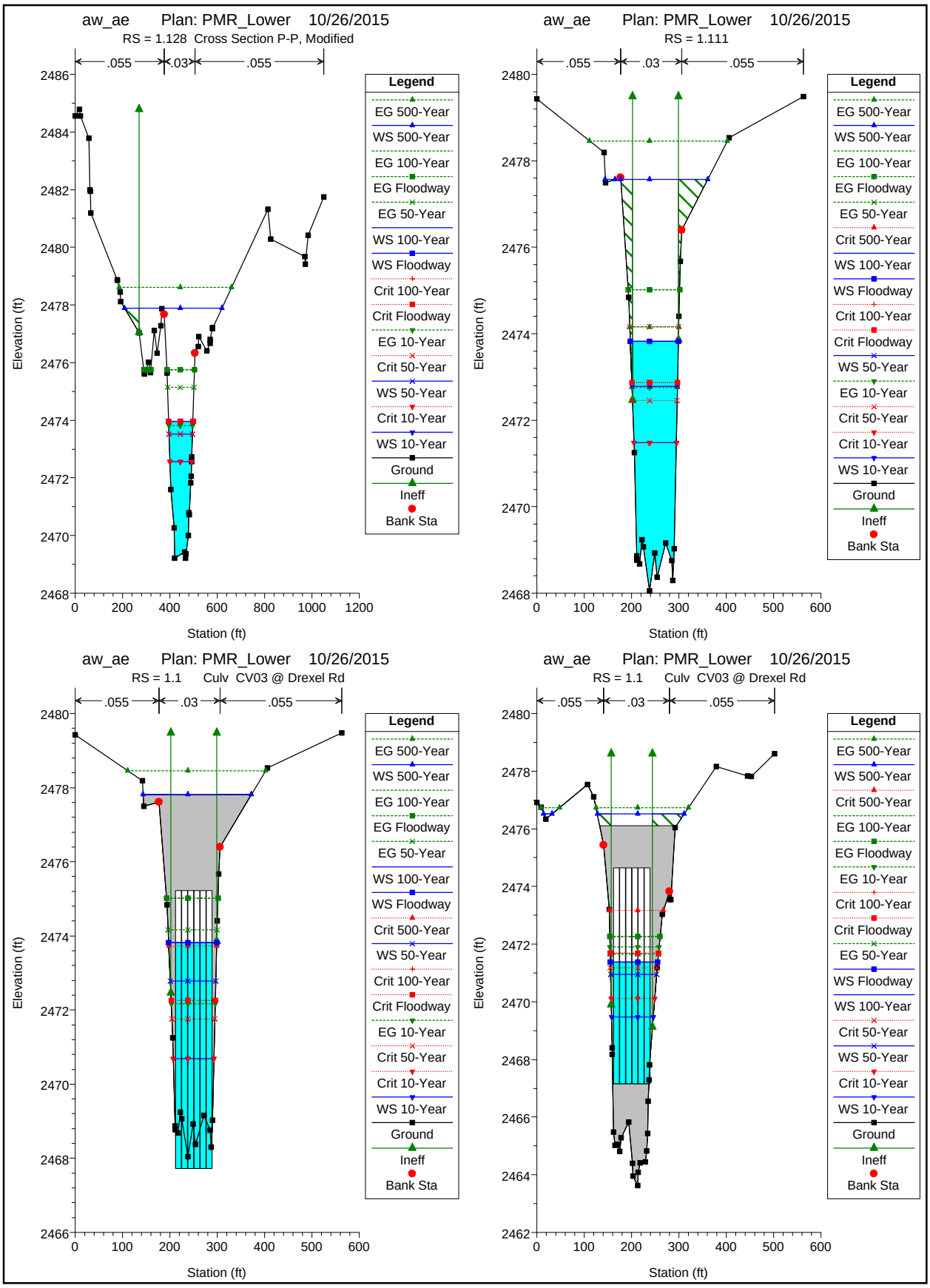

aw_ae Plan: PMR_Lower 10/26/2015
RS = 1.598
.055
.03
.055
Elevation (ft)
Station (ft)
Legend
EG 500-Year
EG 100-Year
EG Floodway
WS 500-Year
Crit 500-Year
EG 50-Year
WS 100-Year
WS Floodway
Crit 100-Year
Crit Floodway
EG 10-Year
Crit 50-Year
WS 50-Year
Crit 10-Year
WS 10-Year
Ground
Bank Sta
aw_ae Plan: PMR_Lower 10/26/2015
RS = 1.570 Cross Section T-T
.055
.027
.055
Elevation (ft)
Station (ft)
Legend
EG 500-Year
WS 500-Year
EG 100-Year
EG Floodway
EG 50-Year
WS 100-Year
WS Floodway
Crit 100-Year
Crit Floodway
EG 10-Year
WS 50-Year
Crit 50-Year
Crit 10-Year
WS 10-Year
Ground
Ineff
Bank Sta
aw_ae Plan: PMR_Lower 10/26/2015
RS = 1.545
.055
.027
.055
Elevation (ft)
Station (ft)
Legend
EG 500-Year
WS 500-Year
EG 100-Year
EG Floodway
WS Floodway
WS 100-Year
EG 50-Year
WS 50-Year
EG 10-Year
WS 10-Year
Ground
Bank Sta
aw_ae Plan: PMR_Lower 10/26/2015
RS = 1.522
.055
.027
.055
Elevation (ft)
Station (ft)
Legend
EG 500-Year
WS 500-Year
EG 100-Year
EG Floodway
WS 100-Year
WS Floodway
EG 50-Year
WS 50-Year
Crit 500-Year
EG 10-Year
Crit 100-Year
Crit Floodway
WS 10-Year
Crit 50-Year
Crit 10-Year
Ground
Ineff
Bank Sta

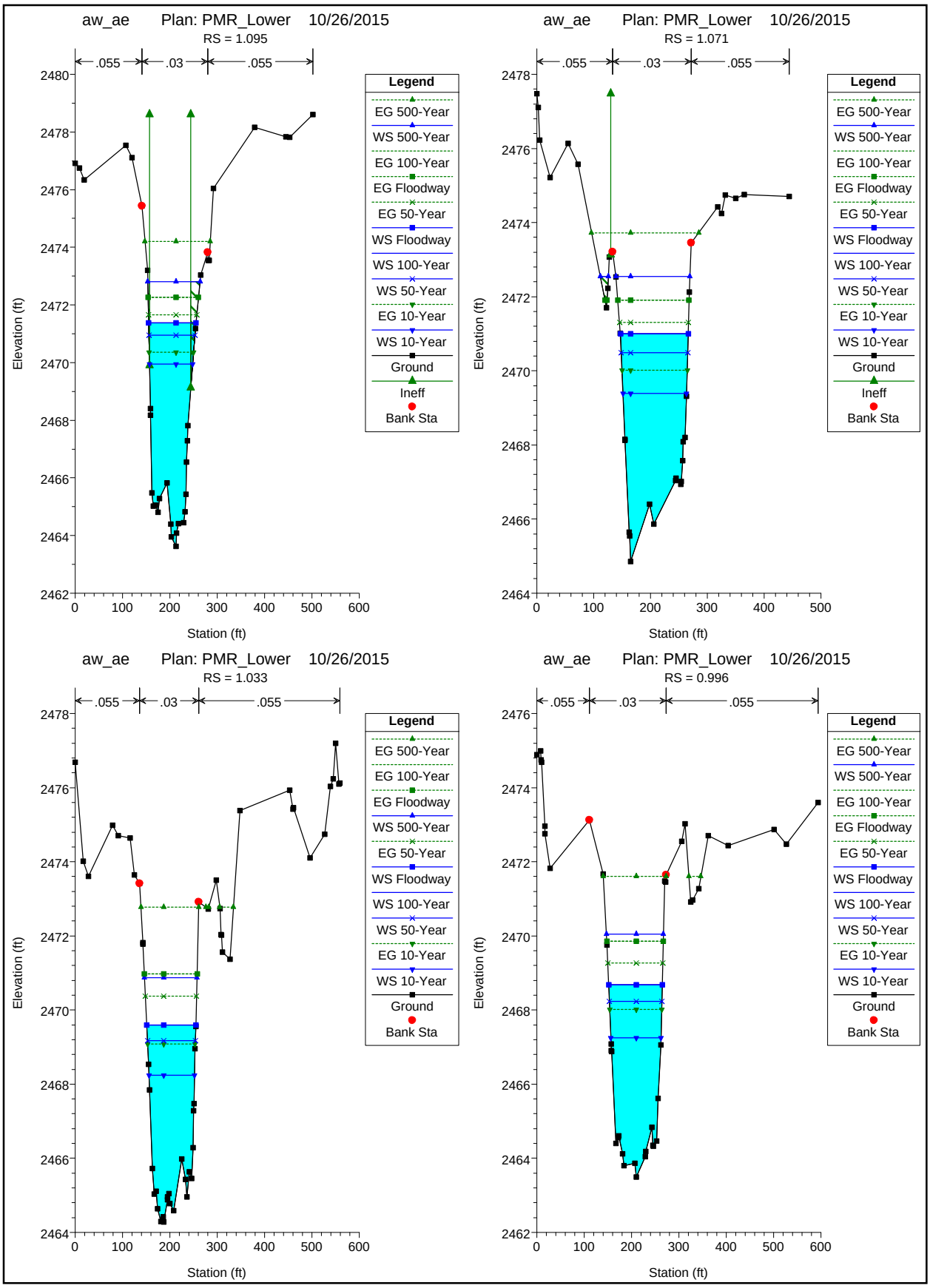

aw_ae Plan: PMR_Lower 10/26/2015
RS = 1.515 Culv CV05 @ Liberty Ave
.055
.027
.055
Elevation (ft)
Station (ft)
Legend
EG 500-Year
WS 500-Year
EG 100-Year
EG Floodway
WS 100-Year
WS Floodway
EG 50-Year
WS 50-Year
Crit 500-Year
EG 10-Year
WS 10-Year
Crit 100-Year
Crit Floodway
Crit 50-Year
Crit 10-Year
Ground
Ineff
Bank Sta
aw_ae Plan: PMR_Lower 10/26/2015
RS = 1.515 Culv CV05 @ Liberty Ave
.055
.027
.055
Elevation (ft)
Station (ft)
Legend
EG 500-Year
WS 500-Year
EG 100-Year
EG Floodway
WS 100-Year
WS Floodway
EG 50-Year
WS 50-Year
EG 10-Year
Crit 500-Year
WS 10-Year
Crit 100-Year
Crit Floodway
Crit 50-Year
Crit 10-Year
Ground
Ineff
Bank Sta
aw_ae Plan: PMR_Lower 10/26/2015
RS = 1.509
.055
.027
.055
Elevation (ft)
Station (ft)
Legend
EG 500-Year
WS 500-Year
EG 100-Year
EG Floodway
WS Floodway
WS 100-Year
EG 50-Year
WS 50-Year
EG 10-Year
WS 10-Year
Ground
Ineff
Bank Sta
aw_ae Plan: PMR_Lower 10/26/2015
RS = 1.471
.055
.03
<055
Elevation (ft)
Station (ft)
Legend
EG 500-Year
WS 500-Year
EG 100-Year
EG Floodway
EG 50-Year
Crit 500-Year
WS Floodway
WS 100-Year
WS 50-Year
EG 10-Year
WS 10-Year
Ground
Bank Sta

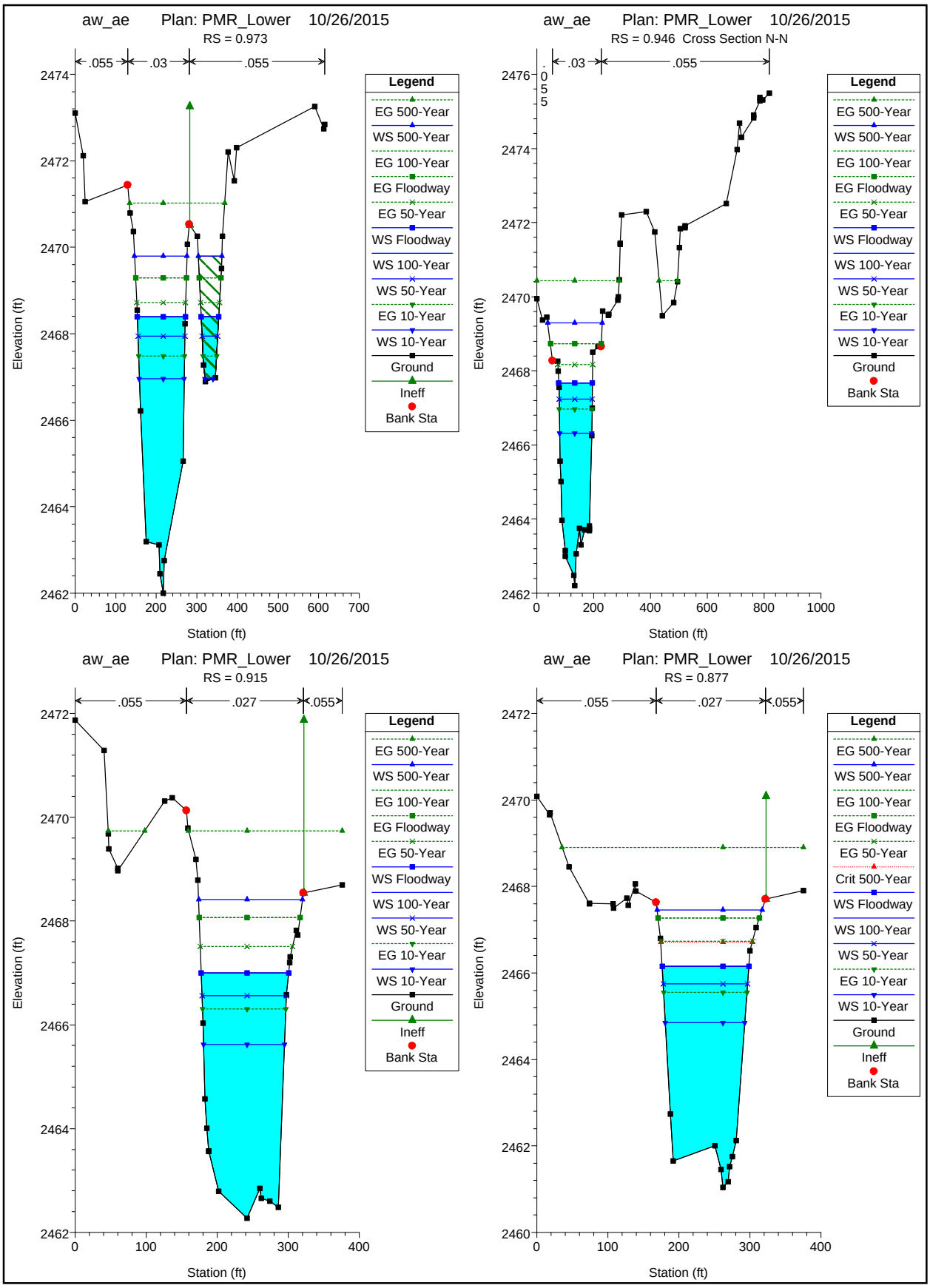

aw_ae Plan: PMR_Lower 10/26/2015
RS = 1.433
.055
.03
.055
Legend
EG 500-Year
EG 100-Year
EG Floodway
WS 500-Year
Crit 500-Year
EG 50-Year
WS 100-Year
WS Floodway
Crit 100-Year
Crit Floodway
EG 10-Year
WS 50-Year
Crit 50-Year
WS 10-Year
Ground
Bank Sta
Elevation (ft)
Station (ft)
aw_ae Plan: PMR_Lower 10/26/2015
RS = 1.401 Cross Section S-S
.055
.03
.055
Legend
EG 500-Year
WS 500-Year
EG 100-Year
EG Floodway
EG 50-Year
WS Floodway
WS 100-Year
WS 50-Year
EG 10-Year
WS 10-Year
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)
aw_ae Plan: PMR_Lower 10/26/2015
RS = 1.370
.055
.03
.055
Legend
EG 500-Year
WS 500-Year
EG 100-Year
EG Floodway
EG 50-Year
WS Floodway
WS 100-Year
WS 50-Year
EG 10-Year
WS 10-Year
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)
aw_ae Plan: PMR_Lower 10/26/2015
RS = 1.333
.055
.03
.055
Legend
EG 500-Year
WS 500-Year
EG 100-Year
EG Floodway
Crit 500-Year
EG 50-Year
WS 100-Year
WS Floodway
Crit 100-Year
Crit Floodway
EG 10-Year
WS 50-Year
Crit 50-Year
WS 10-Year
Crit 10-Year
Ground
Bank Sta
Elevation (ft)
Station (ft)

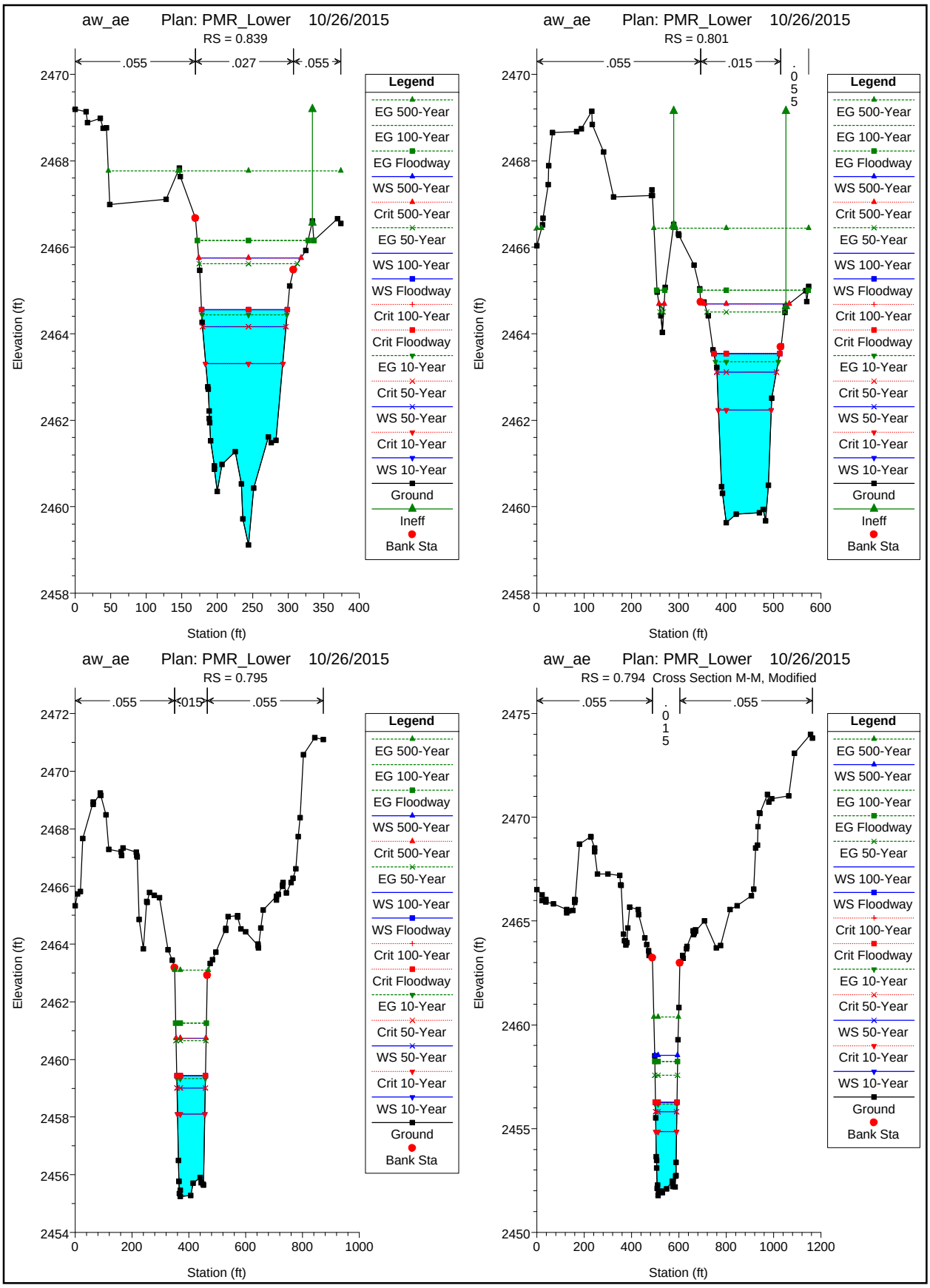

aw_ae Plan: PMR_Lower 10/26/2015
RS = 1.295 Cross Section R-R
.055
.03
.055
Elevation (ft)
Station (ft)
Legend
EG 500-Year
WS 500-Year
EG 100-Year
EG Floodway
EG 50-Year
WS Floodway
WS 100-Year
WS 50-Year
EG 10-Year
WS 10-Year
Ground
Bank Sta
aw_ae Plan: PMR_Lower 10/26/2015
RS = 1.273
.055
.03
.055
Elevation (ft)
Station (ft)
Legend
EG 500-Year
WS 500-Year
EG 100-Year
EG Floodway
WS 100-Year
WS Floodway
EG 50-Year
WS 50-Year
Crit 500-Year
EG 10-Year
WS 10-Year
Crit 100-Year
Crit Floodway
Crit 50-Year
Crit 10-Year
Ground
Ineff
Bank Sta
aw_ae Plan: PMR_Lower 10/26/2015
RS = 1.26 Culv CV04 @ 12th Ave
.055
.03
.055
Elevation (ft)
Station (ft)
Legend
EG 500-Year
WS 500-Year
EG 100-Year
EG Floodway
WS 100-Year
WS Floodway
EG 50-Year
WS 50-Year
Crit 500-Year
Crit 100-Year
Crit Floodway
EG 10-Year
Crit 50-Year
Crit 10-Year
WS 10-Year
Ground
Ineff
Bank Sta
aw_ae Plan: PMR_Lower 10/26/2015
RS = 1.26 Culv CV04 @ 12th Ave
.055
.03
.055
Elevation (ft)
Station (ft)
Legend
EG 500-Year
WS 500-Year
Crit 500-Year
EG 100-Year
EG Floodway
EG 50-Year
EG 10-Year
Crit 100-Year
Crit Floodway
WS Floodway
WS 100-Year
Crit 50-Year
WS 50-Year
Crit 10-Year
WS 10-Year
Ground
Ineff
Bank Sta


aw_ae Plan: PMR_Lower 10/26/2015
RS = 1.250
.055 .03 .055
Elevation (ft)
Station (ft)
Legend
EG 500-Year
WS 500-Year
EG 100-Year
EG Floodway
EG 50-Year
WS Floodway
WS 100-Year
WS 50-Year
EG 10-Year
WS 10-Year
Ground
Ineff
Bank Sta
aw_ae Plan: PMR_Lower 10/26/2015
RS = 1.214
.055 .03 .055
Elevation (ft)
Station (ft)
Legend
EG 500-Year
WS 500-Year
EG 100-Year
EG Floodway
EG 50-Year
WS 100-Year
WS Floodway
Crit 100-Year
Crit Floodway
EG 10-Year
WS 50-Year
Crit 50-Year
WS 10-Year
Crit 10-Year
Ground
Bank Sta
aw_ae Plan: PMR_Lower 10/26/2015
RS = 1.197
.055 .03 .055
Elevation (ft)
Station (ft)
Legend
EG 500-Year
WS 500-Year
EG 100-Year
EG Floodway
EG 50-Year
WS Floodway
WS 100-Year
WS 50-Year
EG 10-Year
WS 10-Year
Ground
Ineff
Bank Sta
aw_ae Plan: PMR_Lower 10/26/2015
RS = 1.167
.055 .03 .055
Elevation (ft)
Station (ft)
Legend
EG 500-Year
WS 500-Year
EG 100-Year
EG Floodway
EG 50-Year
WS Floodway
WS 100-Year
WS 50-Year
EG 10-Year
WS 10-Year
Ground
Ineff
Bank Sta


aw_ae Plan: PMR_Lower 10/26/2015
RS = 1.128 Cross Section P-P, Modified
.055
.03
.055
Elevation (ft)
Station (ft)
Legend
EG 500-Year
WS 500-Year
EG 100-Year
EG Floodway
EG 50-Year
WS 100-Year
WS Floodway
Crit 100-Year
Crit Floodway
EG 10-Year
Crit 50-Year
WS 50-Year
Crit 10-Year
WS 10-Year
Ground
Ineff
Bank Sta
aw_ae Plan: PMR_Lower 10/26/2015
RS = 1.111
.055
.03
.055
Elevation (ft)
Station (ft)
Legend
EG 500-Year
WS 500-Year
EG 100-Year
EG Floodway
EG 50-Year
Crit 500-Year
WS 100-Year
WS Floodway
Crit 100-Year
Crit Floodway
WS 50-Year
EG 10-Year
Crit 50-Year
Crit 10-Year
WS 10-Year
Ground
Ineff
Bank Sta
aw_ae Plan: PMR_Lower 10/26/2015
RS = 1.1 Culv CV03 @ Drexel Rd
.055
.03
.055
Elevation (ft)
Station (ft)
Legend
EG 500-Year
WS 500-Year
EG 100-Year
EG Floodway
EG 50-Year
WS 100-Year
WS Floodway
Crit 500-Year
WS 50-Year
Crit 100-Year
Crit Floodway
EG 10-Year
Crit 50-Year
Crit 10-Year
WS 10-Year
Ground
Ineff
Bank Sta
aw_ae Plan: PMR_Lower 10/26/2015
RS = 1.1 Culv CV03 @ Drexel Rd
.055
.03
.055
Elevation (ft)
Station (ft)
Legend
EG 500-Year
WS 500-Year
Crit 500-Year
EG 100-Year
EG Floodway
EG 10-Year
Crit 100-Year
Crit Floodway
EG 50-Year
WS Floodway
WS 100-Year
Crit 50-Year
WS 50-Year
Crit 10-Year
WS 10-Year
Ground
Ineff
Bank Sta


aw_ae Plan: PMR_Lower 10/26/2015
RS = 1.095
.055 .03 .055
Elevation (ft)
Station (ft)
Legend
EG 500-Year
WS 500-Year
EG 100-Year
EG Floodway
EG 50-Year
WS Floodway
WS 100-Year
WS 50-Year
EG 10-Year
WS 10-Year
Ground
Ineff
Bank Sta
aw_ae Plan: PMR_Lower 10/26/2015
RS = 1.071
.055 .03 .055
Elevation (ft)
Station (ft)
Legend
EG 500-Year
WS 500-Year
EG 100-Year
EG Floodway
EG 50-Year
WS Floodway
WS 100-Year
WS 50-Year
EG 10-Year
WS 10-Year
Ground
Ineff
Bank Sta
aw_ae Plan: PMR_Lower 10/26/2015
RS = 1.033
.055 .03 .055
Elevation (ft)
Station (ft)
Legend
EG 500-Year
EG 100-Year
EG Floodway
WS 500-Year
EG 50-Year
WS Floodway
WS 100-Year
WS 50-Year
EG 10-Year
WS 10-Year
Ground
Bank Sta
aw_ae Plan: PMR_Lower 10/26/2015
RS = 0.996
.055 .03 .055
Elevation (ft)
Station (ft)
Legend
EG 500-Year
WS 500-Year
EG 100-Year
EG Floodway
EG 50-Year
WS Floodway
WS 100-Year
WS 50-Year
EG 10-Year
WS 10-Year
Ground
Bank Sta


aw_ae Plan: PMR_Lower 10/26/2015
RS = 0.973
.055
.03
.055
Elevation (ft)
Station (ft)
Legend
EG 500-Year
WS 500-Year
EG 100-Year
EG Floodway
EG 50-Year
WS Floodway
WS 100-Year
WS 50-Year
EG 10-Year
WS 10-Year
Ground
Ineff
Bank Sta
aw_ae Plan: PMR_Lower 10/26/2015
RS = 0.946 Cross Section N-N
.055
.03
.055
Elevation (ft)
Station (ft)
Legend
EG 500-Year
WS 500-Year
EG 100-Year
EG Floodway
EG 50-Year
WS Floodway
WS 100-Year
WS 50-Year
EG 10-Year
WS 10-Year
Ground
Bank Sta
aw_ae Plan: PMR_Lower 10/26/2015
RS = 0.915
.055
.027
.055
Elevation (ft)
Station (ft)
Legend
EG 500-Year
WS 500-Year
EG 100-Year
EG Floodway
EG 50-Year
WS Floodway
WS 100-Year
WS 50-Year
EG 10-Year
WS 10-Year
Ground
Ineff
Bank Sta
aw_ae Plan: PMR_Lower 10/26/2015
RS = 0.877
.055
.027
.055
Elevation (ft)
Station (ft)
Legend
EG 500-Year
WS 500-Year
EG 100-Year
EG Floodway
EG 50-Year
Crit 500-Year
WS Floodway
WS 100-Year
WS 50-Year
EG 10-Year
WS 10-Year
Ground
Ineff
Bank Sta


aw_ae Plan: PMR_Lower 10/26/2015
RS = 0.839
.055
.027
.055
Elevation (ft)
Station (ft)
aw_ae Plan: PMR_Lower 10/26/2015
RS = 0.801
.055
.015
.055
Elevation (ft)
Station (ft)
aw_ae Plan: PMR_Lower 10/26/2015
RS = 0.795
.055
.015
.055
Elevation (ft)
Station (ft)
aw_ae Plan: PMR_Lower 10/26/2015
RS = 0.794 Cross Section M-M, Modified
.055
.015
.055
Elevation (ft)
Station (ft)
Legend
EG 500-Year
EG 100-Year
EG Floodway
WS 500-Year
Crit 500-Year
EG 50-Year
WS 100-Year
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Crit Floodway
EG 10-Year
Crit 50-Year
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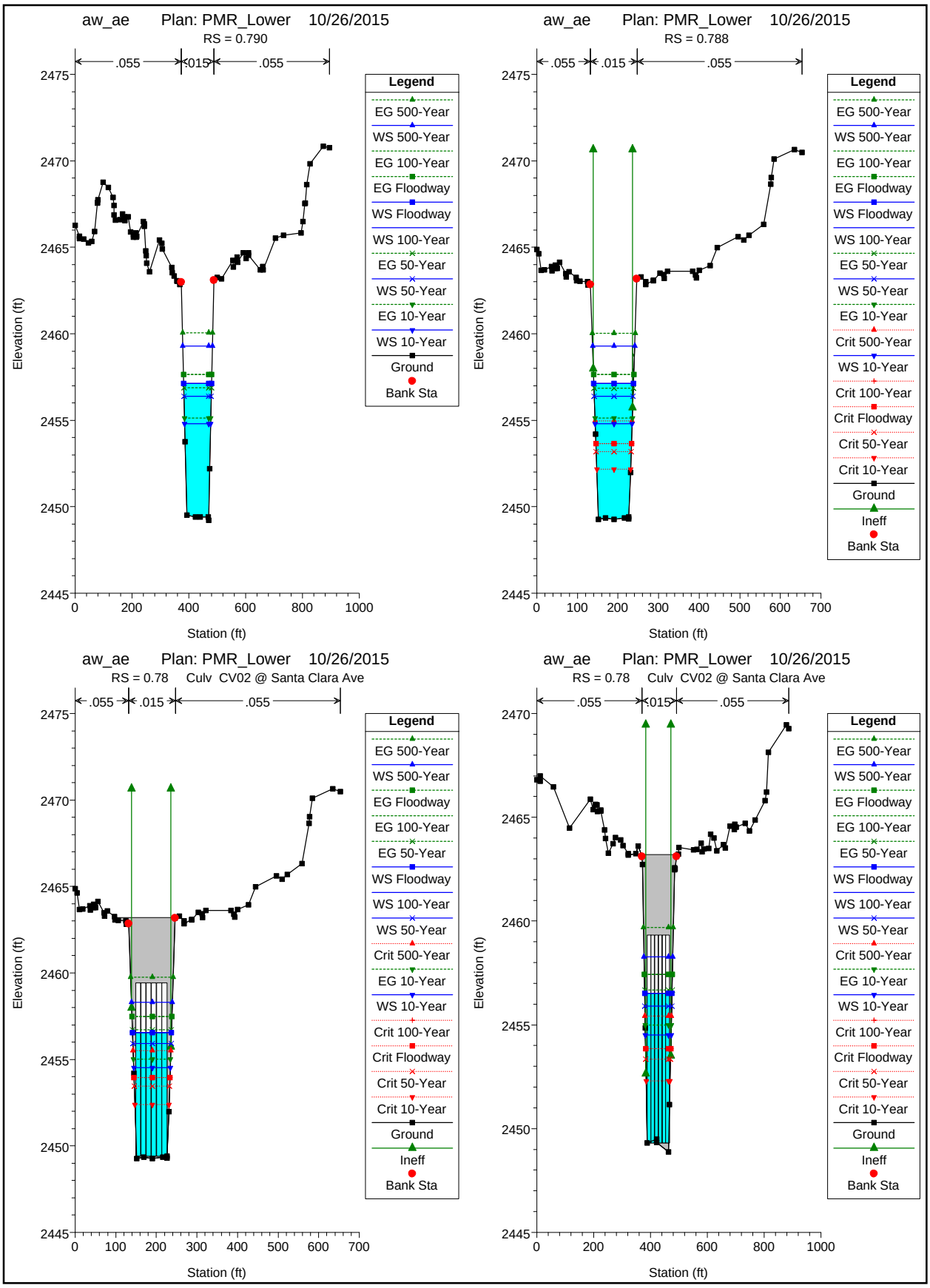
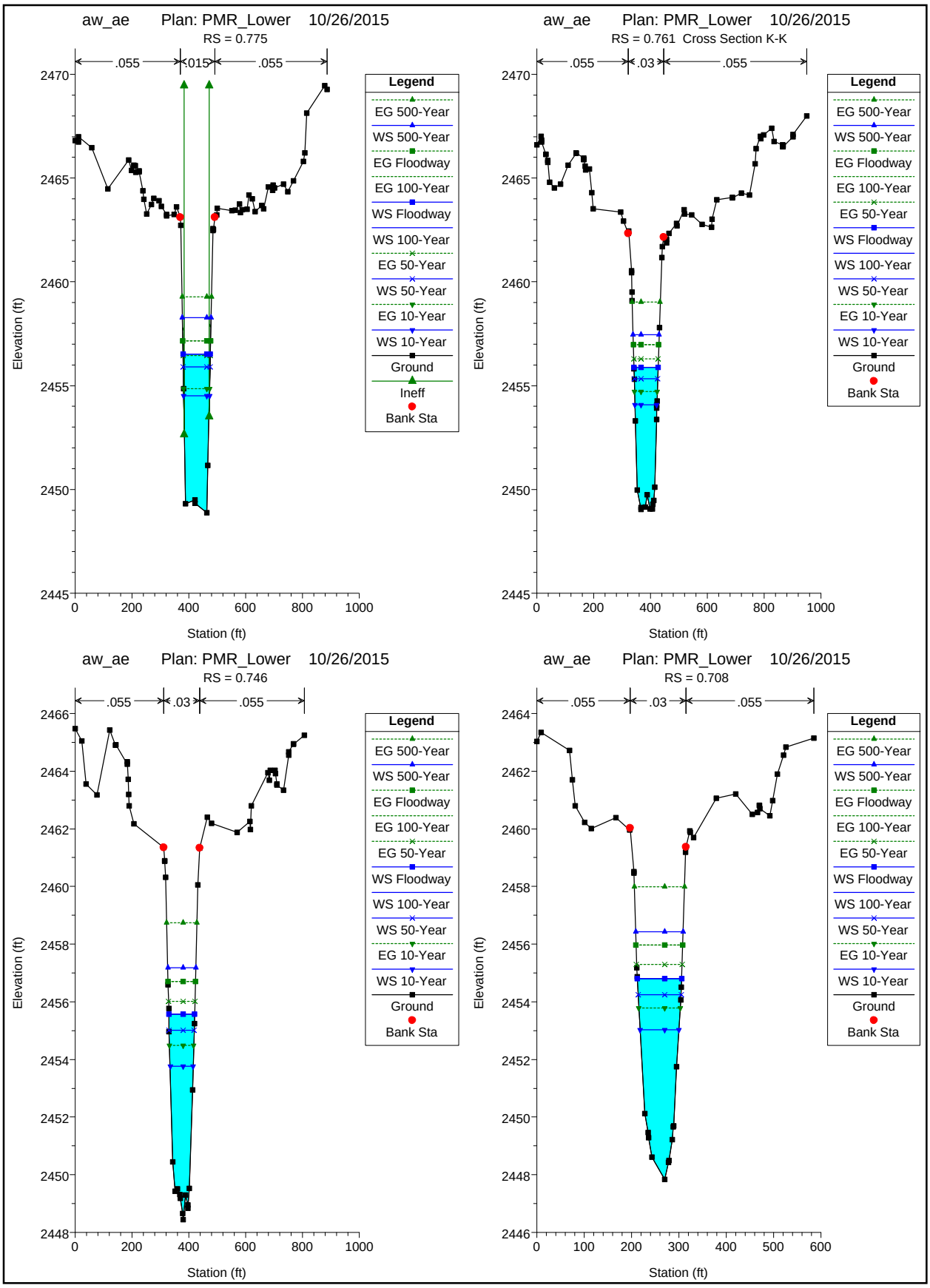
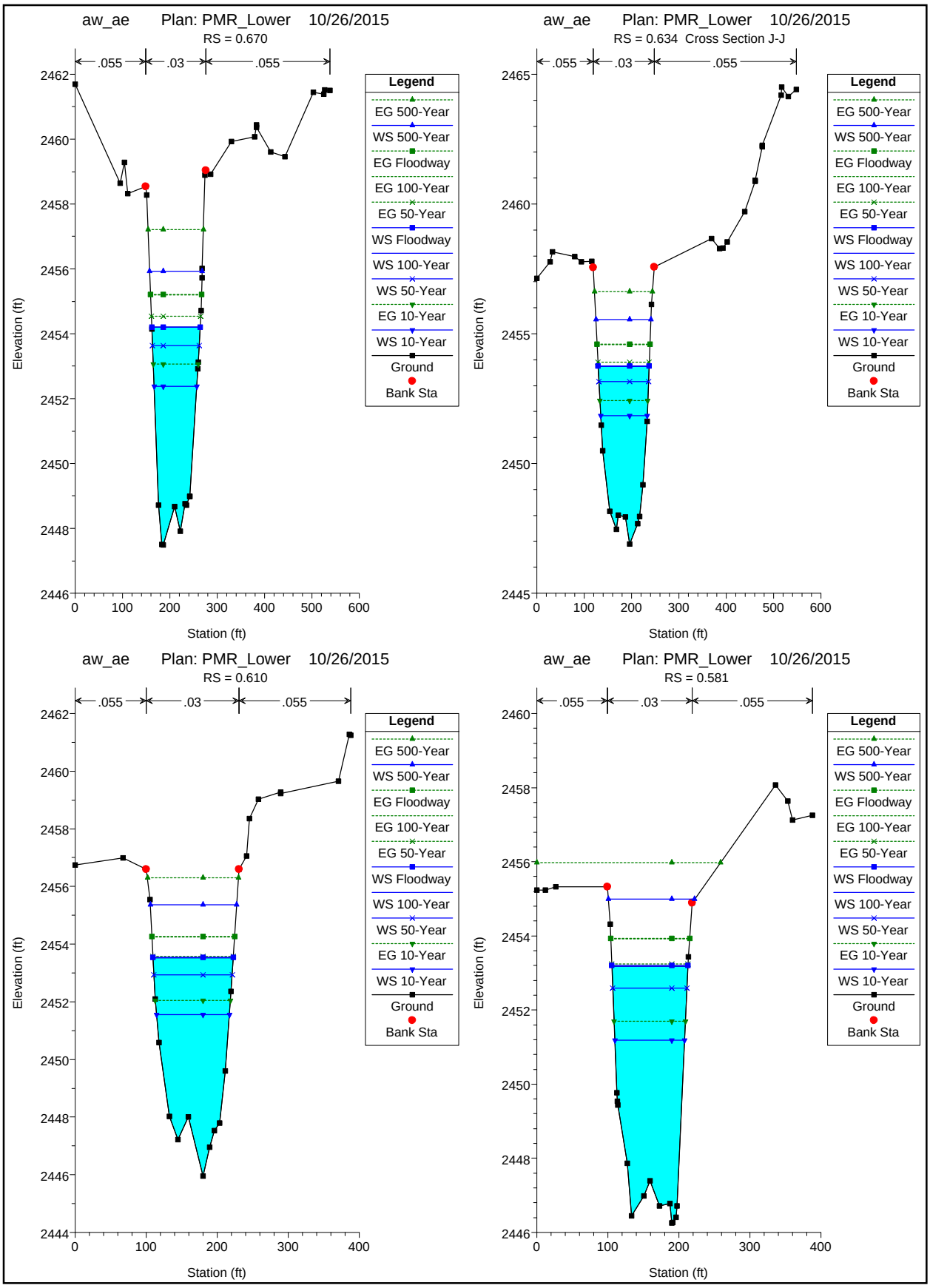
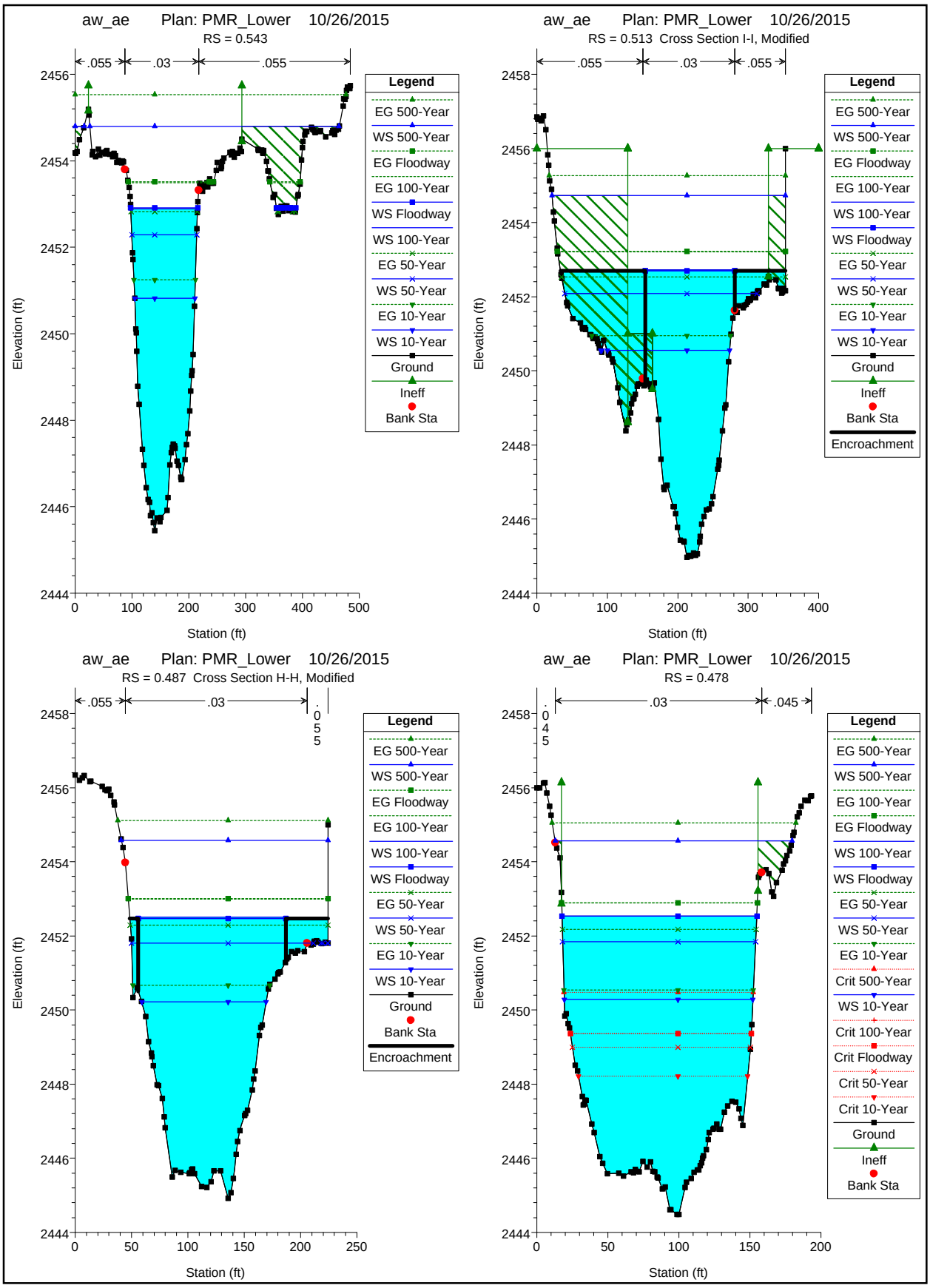
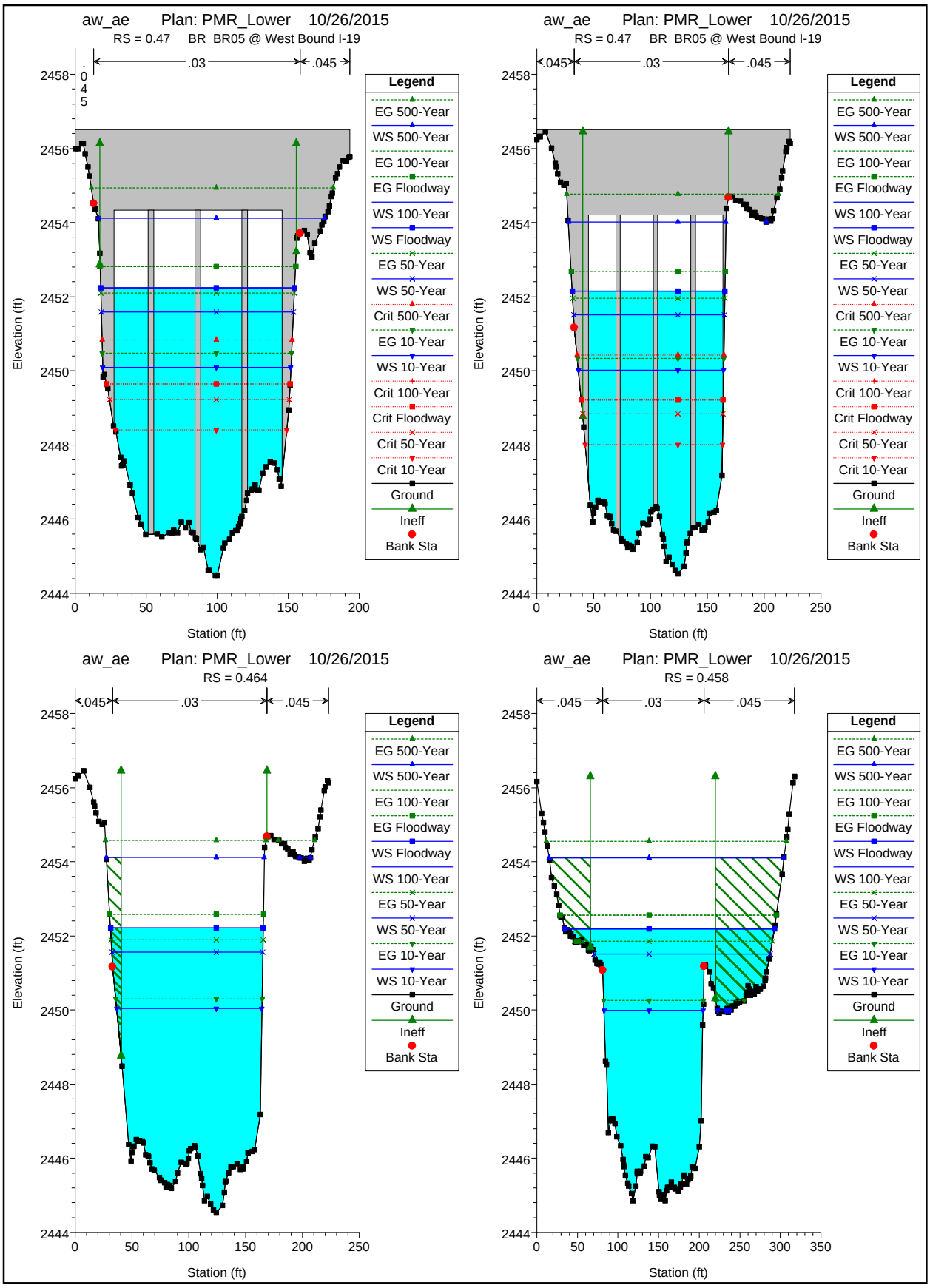
Crit 10-Year
WS 10-Year
Ground
Ineff
Bank Sta

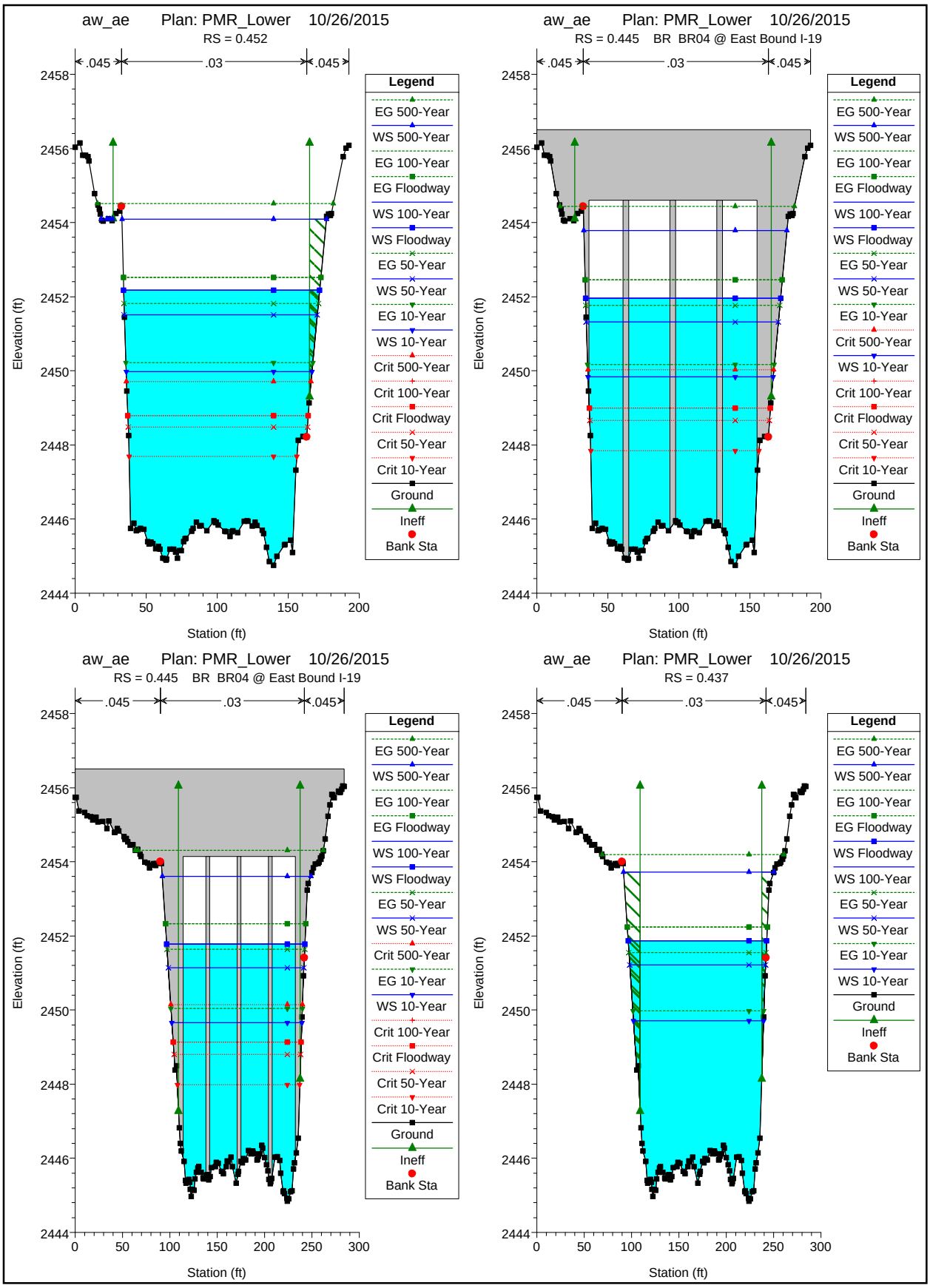

aw_ae Plan: PMR_Lower 10/26/2015
RS = 0.790
.055
.015
.055
Elevation (ft)
Station (ft)
Legend
EG 500-Year
WS 500-Year
EG 100-Year
EG Floodway
WS Floodway
WS 100-Year
EG 50-Year
WS 50-Year
EG 10-Year
WS 10-Year
Ground
Bank Sta
aw_ae Plan: PMR_Lower 10/26/2015
RS = 0.788
.055
.015
.055
Elevation (ft)
Station (ft)
Legend
EG 500-Year
WS 500-Year
EG 100-Year
EG Floodway
WS Floodway
WS 100-Year
EG 50-Year
WS 50-Year
EG 10-Year
Crit 500-Year
WS 10-Year
Crit 100-Year
Crit Floodway
Crit 50-Year
Crit 10-Year
Ground
Ineff
Bank Sta
aw_ae Plan: PMR_Lower 10/26/2015
RS = 0.78 Culv CV02 @ Santa Clara Ave
.055
.015
.055
Elevation (ft)
Station (ft)
Legend
EG 500-Year
WS 500-Year
EG Floodway
EG 100-Year
EG 50-Year
WS Floodway
WS 100-Year
WS 50-Year
Crit 500-Year
EG 10-Year
WS 10-Year
Crit 100-Year
Crit Floodway
Crit 50-Year
Crit 10-Year
Ground
Ineff
Bank Sta
aw_ae Plan: PMR_Lower 10/26/2015
RS = 0.78 Culv CV02 @ Santa Clara Ave
.055
.015
.055
Elevation (ft)
Station (ft)
Legend
EG 500-Year
WS 500-Year
EG Floodway
EG 100-Year
EG 50-Year
WS Floodway
WS 100-Year
WS 50-Year
Crit 500-Year
EG 10-Year
WS 10-Year
Crit 100-Year
Crit Floodway
Crit 50-Year
Crit 10-Year
Ground
Ineff
Bank Sta

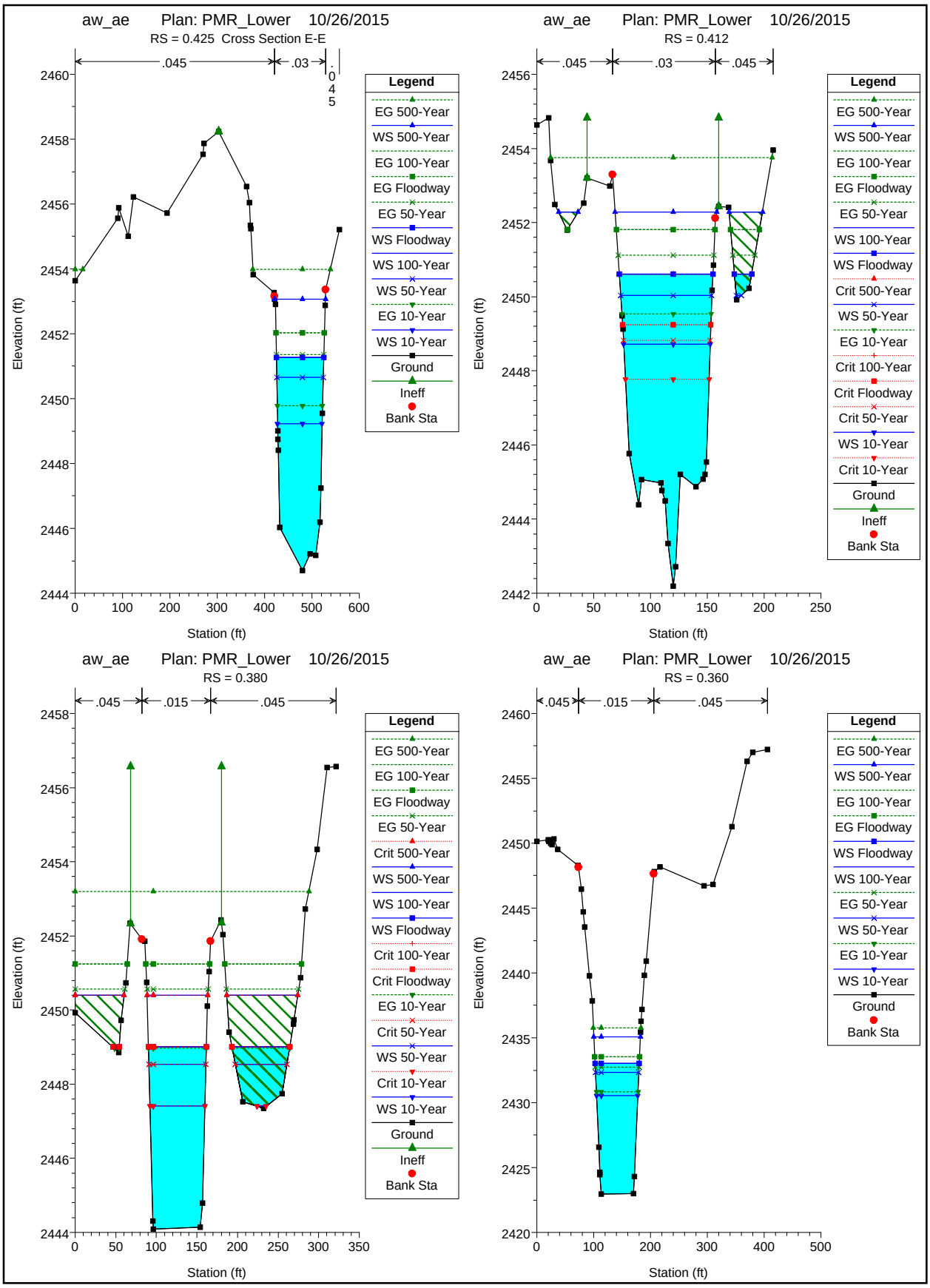

aw_ae Plan: PMR_Lower 10/26/2015
RS = 0.775
.055
.015
.055
Legend
EG 500-Year
WS 500-Year
EG Floodway
EG 100-Year
WS Floodway
WS 100-Year
EG 50-Year
WS 50-Year
EG 10-Year
WS 10-Year
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)
aw_ae Plan: PMR_Lower 10/26/2015
RS = 0.761 Cross Section K-K
.055
.03
.055
Legend
EG 500-Year
WS 500-Year
EG Floodway
EG 100-Year
EG 50-Year
WS Floodway
WS 100-Year
WS 50-Year
EG 10-Year
WS 10-Year
Ground
Bank Sta
Elevation (ft)
Station (ft)
aw_ae Plan: PMR_Lower 10/26/2015
RS = 0.746
.055
.03
.055
Legend
EG 500-Year
WS 500-Year
EG Floodway
EG 100-Year
EG 50-Year
WS Floodway
WS 100-Year
WS 50-Year
EG 10-Year
WS 10-Year
Ground
Bank Sta
Elevation (ft)
Station (ft)
aw_ae Plan: PMR_Lower 10/26/2015
RS = 0.708
.055
.03
.055
Legend
EG 500-Year
WS 500-Year
EG Floodway
EG 100-Year
EG 50-Year
WS Floodway
WS 100-Year
WS 50-Year
EG 10-Year
WS 10-Year
Ground
Bank Sta
Elevation (ft)
Station (ft)

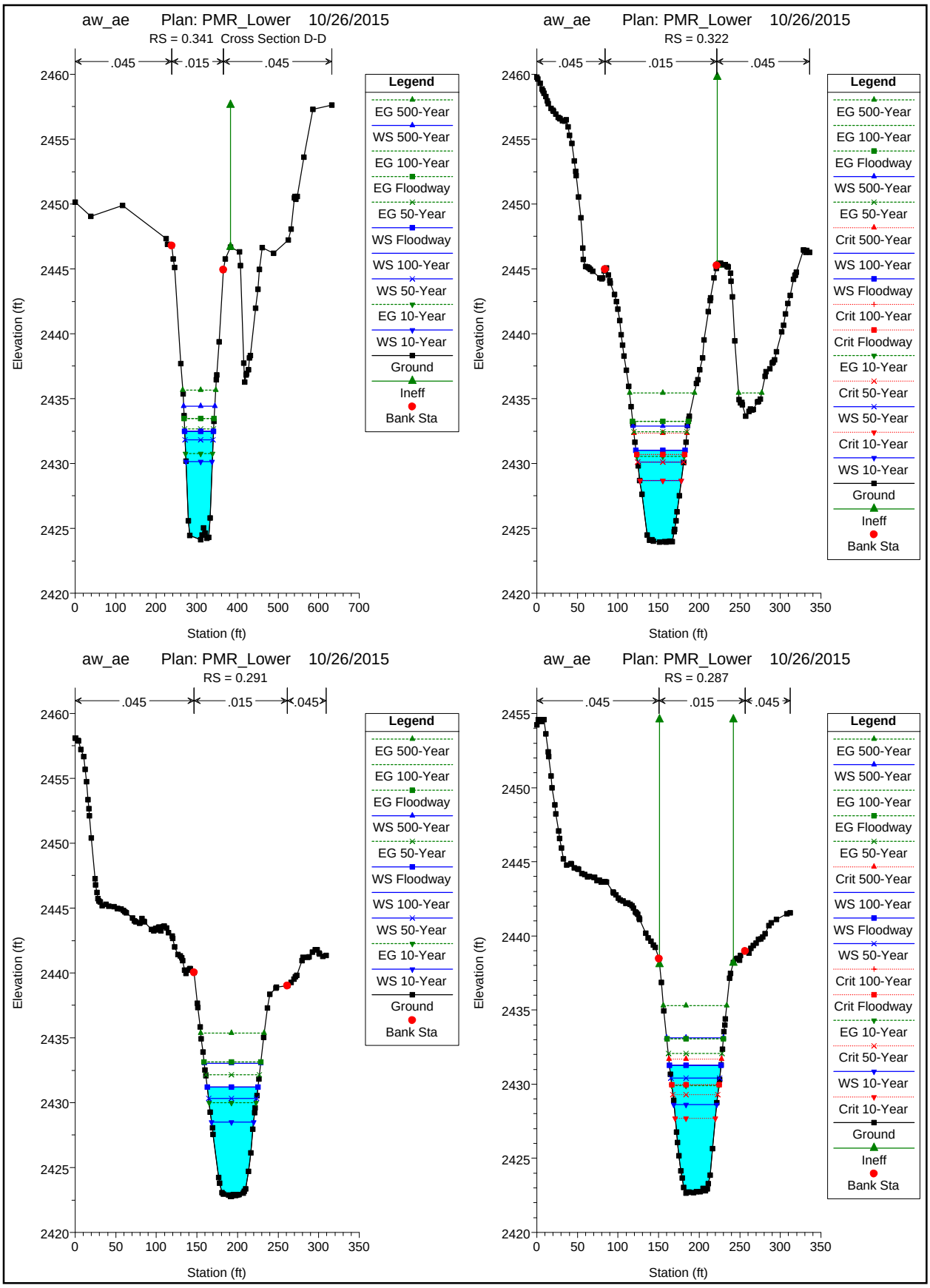

aw_ae Plan: PMR_Lower 10/26/2015
RS = 0.670
.055 .03 .055
Elevation (ft)
Station (ft)
aw_ae Plan: PMR_Lower 10/26/2015
RS = 0.634 Cross Section J-J
.055 .03 .055
Elevation (ft)
Station (ft)
aw_ae Plan: PMR_Lower 10/26/2015
RS = 0.610
.055 .03 .055
Elevation (ft)
Station (ft)
aw_ae Plan: PMR_Lower 10/26/2015
RS = 0.581
.055 .03 .055
Elevation (ft)
Station (ft)
Legend
EG 500-Year
WS 500-Year
EG Floodway
EG 100-Year
EG 50-Year
WS Floodway
WS 100-Year
WS 50-Year
EG 10-Year
WS 10-Year
Ground
Bank Sta

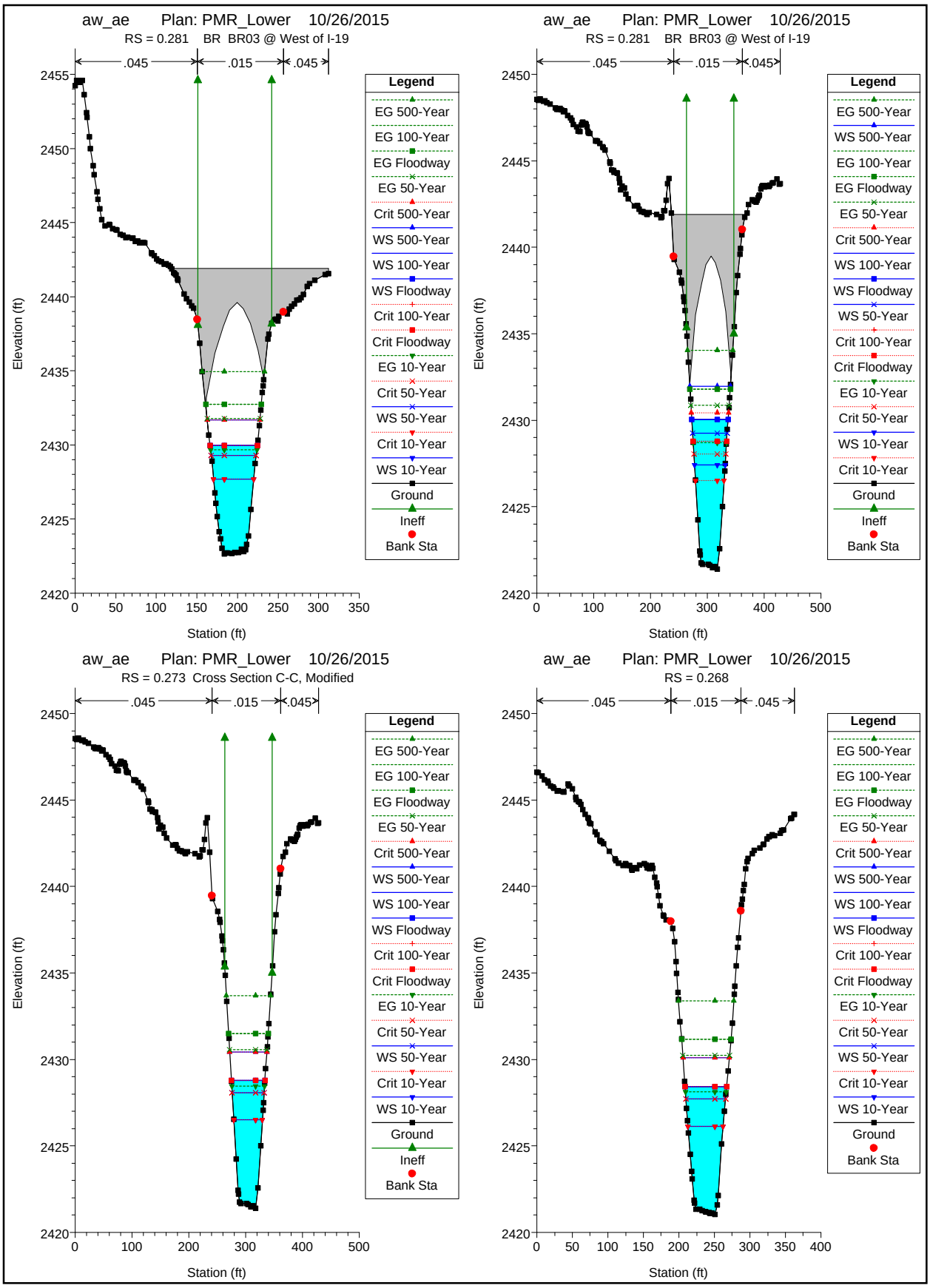

aw_ae Plan: PMR_Lower 10/26/2015
RS = 0.543
.055
.03
.055
Elevation (ft)
Station (ft)
Legend
EG 500-Year
WS 500-Year
EG Floodway
EG 100-Year
WS Floodway
WS 100-Year
EG 50-Year
WS 50-Year
EG 10-Year
WS 10-Year
Ground
Ineff
Bank Sta
aw_ae Plan: PMR_Lower 10/26/2015
RS = 0.513 Cross Section I-I, Modified
.055
.03
.055
Elevation (ft)
Station (ft)
Legend
EG 500-Year
WS 500-Year
EG Floodway
EG 100-Year
WS 100-Year
WS Floodway
EG 50-Year
WS 50-Year
EG 10-Year
WS 10-Year
Ground
Ineff
Bank Sta
Encroachment
aw_ae Plan: PMR_Lower 10/26/2015
RS = 0.487 Cross Section H-H, Modified
.055
.03
.055
Elevation (ft)
Station (ft)
Legend
EG 500-Year
WS 500-Year
EG Floodway
EG 100-Year
WS 100-Year
WS Floodway
EG 50-Year
WS 50-Year
EG 10-Year
WS 10-Year
Ground
Bank Sta
Encroachment
aw_ae Plan: PMR_Lower 10/26/2015
RS = 0.478
.045
.03
.045
Elevation (ft)
Station (ft)
Legend
EG 500-Year
WS 500-Year
EG 100-Year
EG Floodway
WS 100-Year
WS Floodway
EG 50-Year
WS 50-Year
EG 10-Year
Crit 500-Year
WS 10-Year
Crit 100-Year
Crit Floodway
Crit 50-Year
Crit 10-Year
Ground
Ineff
Bank Sta

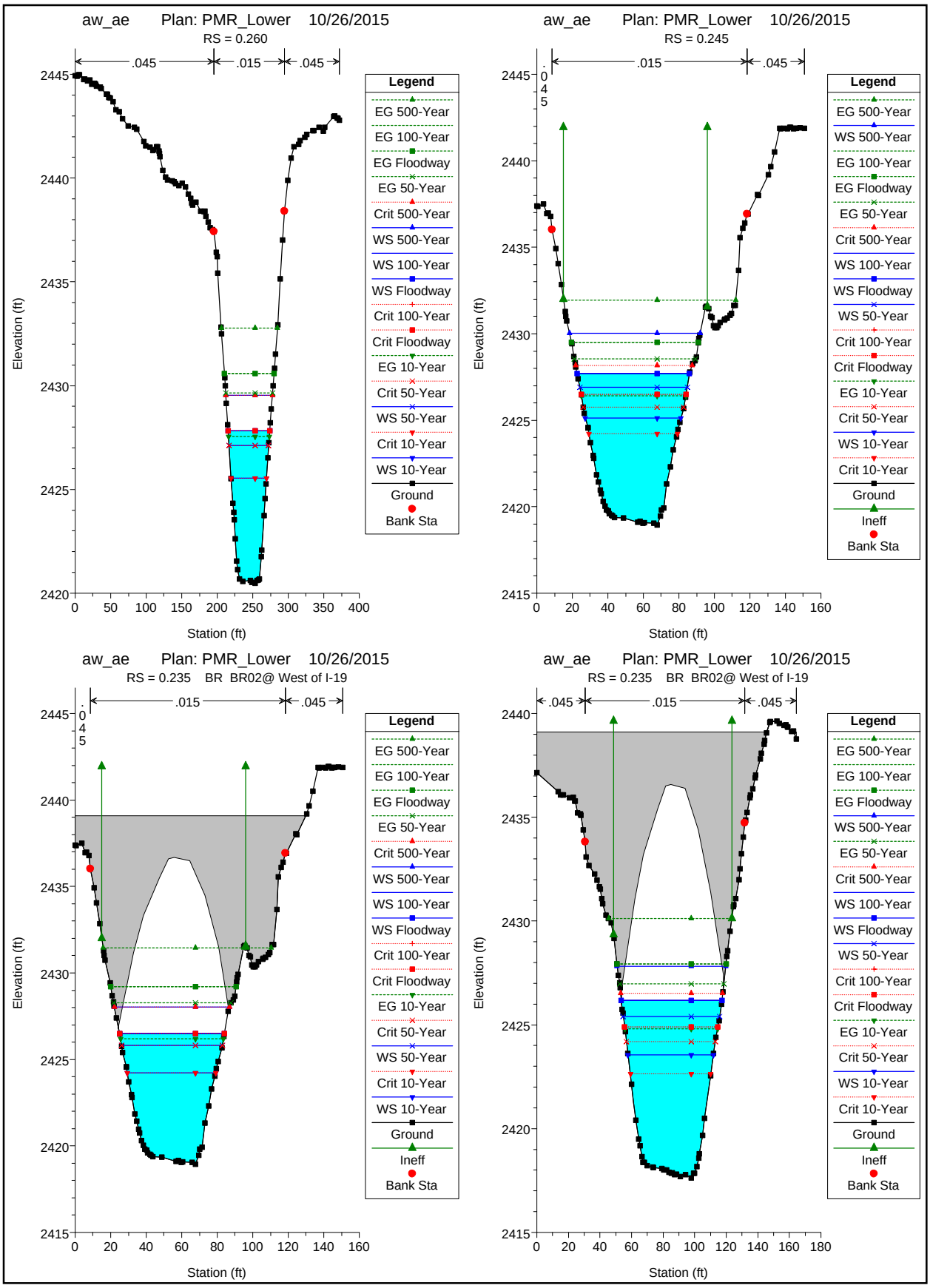

aw_ae Plan: PMR_Lower 10/26/2015
RS = 0.47 BR BR05 @ West Bound I-19
.045
.03
.045
Elevation (ft)
Station (ft)
Legend
EG 500-Year
WS 500-Year
EG 100-Year
EG Floodway
WS 100-Year
WS Floodway
EG 50-Year
WS 50-Year
Crit 500-Year
EG 10-Year
WS 10-Year
Crit 100-Year
Crit Floodway
Crit 50-Year
Crit 10-Year
Ground
Ineff
Bank Sta
aw_ae Plan: PMR_Lower 10/26/2015
RS = 0.47 BR BR05 @ West Bound I-19
aw_ae Plan: PMR_Lower 10/26/2015
RS = 0.464
aw_ae Plan: PMR_Lower 10/26/2015
RS = 0.458

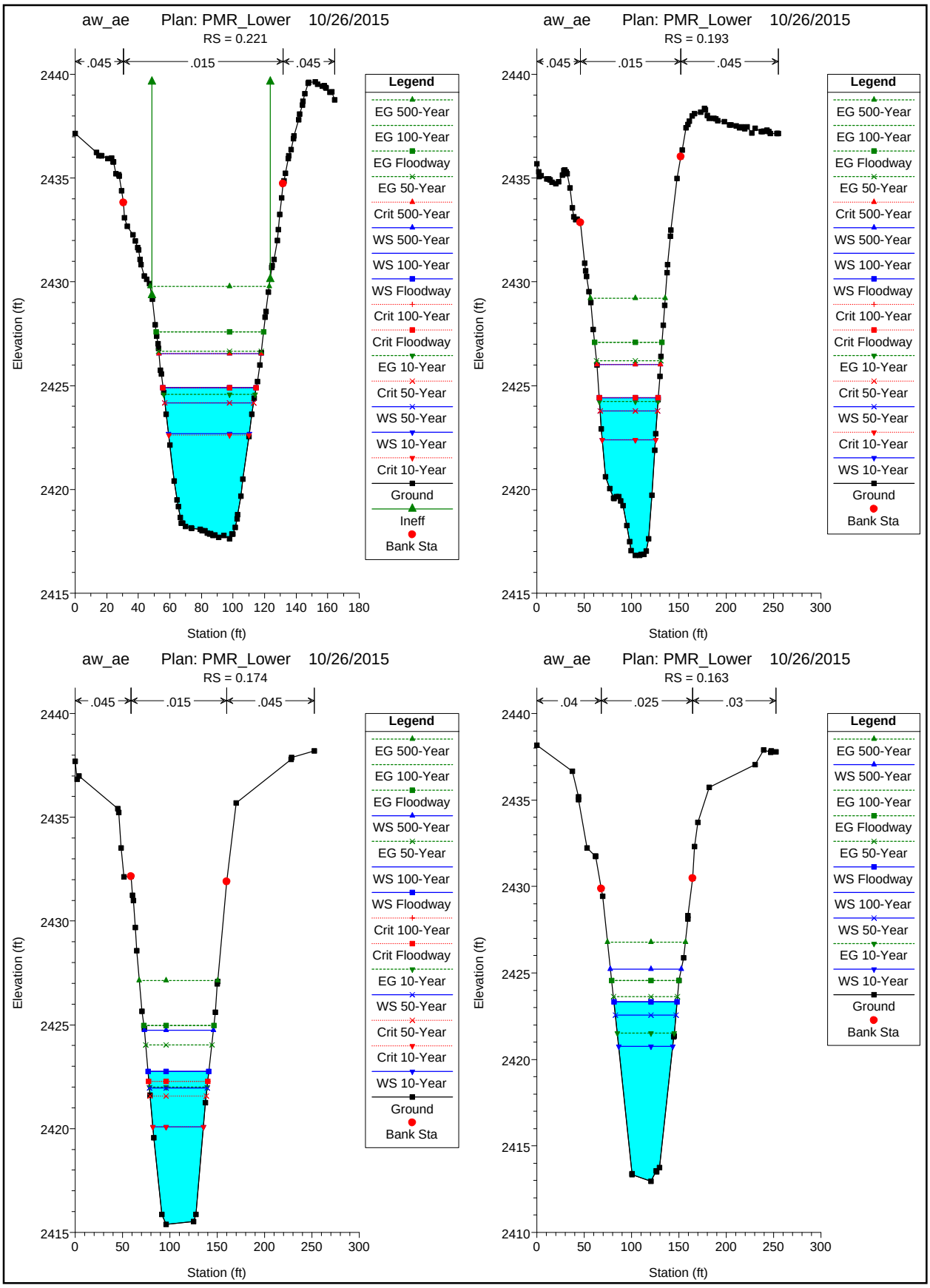

aw_ae Plan: PMR_Lower 10/26/2015
RS = 0.452
aw_ae Plan: PMR_Lower 10/26/2015
RS = 0.445 BR BR04 @ East Bound I-19
aw_ae Plan: PMR_Lower 10/26/2015
RS = 0.445 BR BR04 @ East Bound I-19
aw_ae Plan: PMR_Lower 10/26/2015
RS = 0.437
.045
.03
.045
Elevation (ft)
Station (ft)
Legend
EG 500-Year
WS 500-Year
EG 100-Year
EG Floodway
WS 100-Year
WS Floodway
EG 50-Year
WS 50-Year
EG 10-Year
WS 10-Year
Crit 500-Year
Crit 100-Year
Crit Floodway
Crit 50-Year
Crit 10-Year
Ground
Ineff
Bank Sta

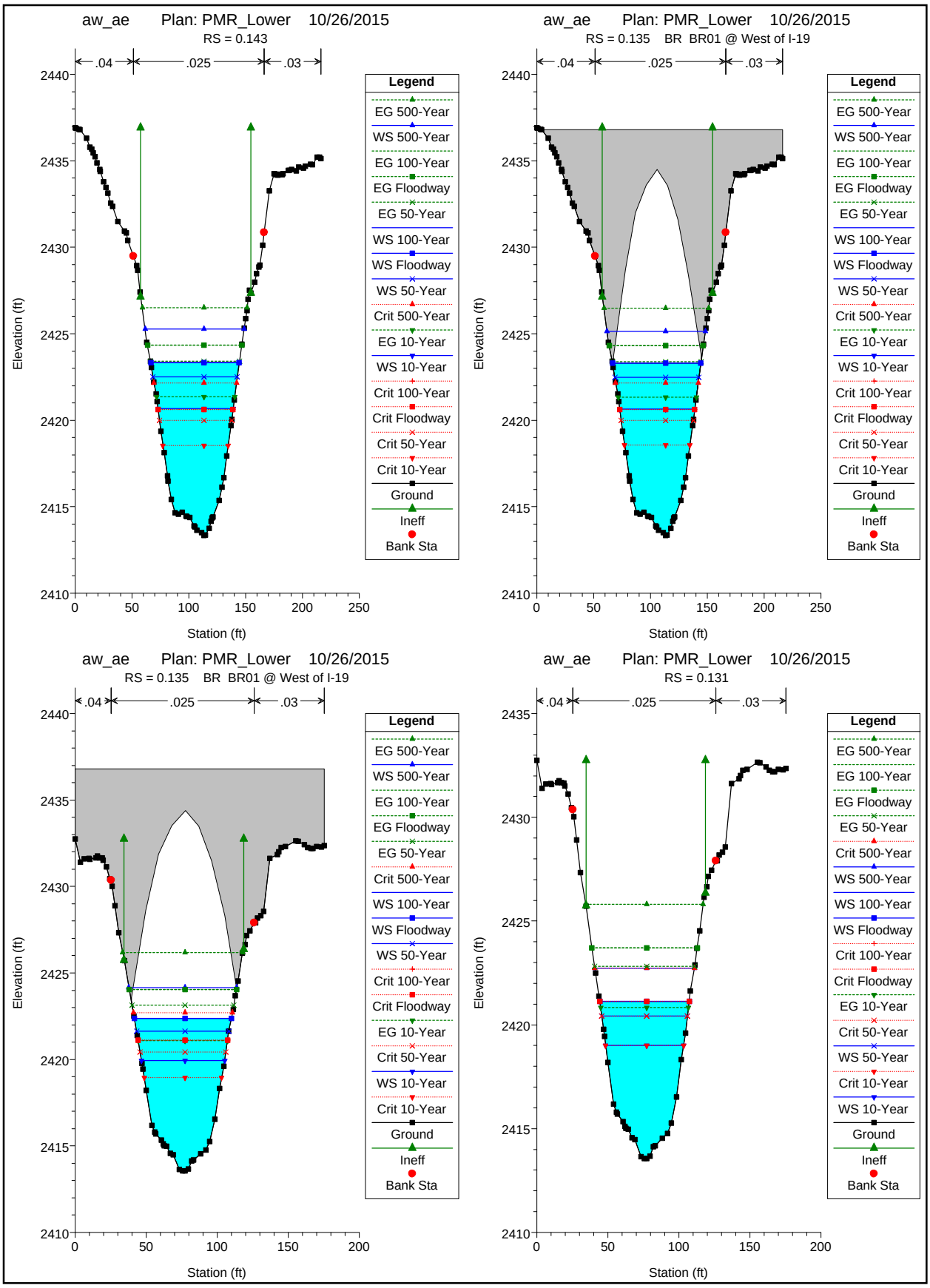

aw_ae Plan: PMR_Lower 10/26/2015
RS = 0.425 Cross Section E-E
.045
.03
.045
Elevation (ft)
Station (ft)
Legend
EG 500-Year
WS 500-Year
EG 100-Year
EG Floodway
EG 50-Year
WS Floodway
WS 100-Year
WS 50-Year
EG 10-Year
WS 10-Year
Ground
Ineff
Bank Sta
aw_ae Plan: PMR_Lower 10/26/2015
RS = 0.412
.045
.03
.045
Elevation (ft)
Station (ft)
Legend
EG 500-Year
WS 500-Year
EG 100-Year
EG Floodway
EG 50-Year
WS 100-Year
WS Floodway
Crit 500-Year
WS 50-Year
EG 10-Year
Crit 100-Year
Crit Floodway
Crit 50-Year
WS 10-Year
Crit 10-Year
Ground
Ineff
Bank Sta
aw_ae Plan: PMR_Lower 10/26/2015
RS = 0.380
.045
.015
.045
Elevation (ft)
Station (ft)
Legend
EG 500-Year
EG 100-Year
EG Floodway
EG 50-Year
Crit 500-Year
WS 500-Year
WS 100-Year
WS Floodway
Crit 100-Year
Crit Floodway
EG 10-Year
Crit 50-Year
WS 50-Year
Crit 10-Year
WS 10-Year
Ground
Ineff
Bank Sta
aw_ae Plan: PMR_Lower 10/26/2015
RS = 0.360
.045
.015
.045
Elevation (ft)
Station (ft)
Legend
EG 500-Year
WS 500-Year
EG 100-Year
EG Floodway
WS Floodway
WS 100-Year
EG 50-Year
WS 50-Year
EG 10-Year
WS 10-Year
Ground
Bank Sta

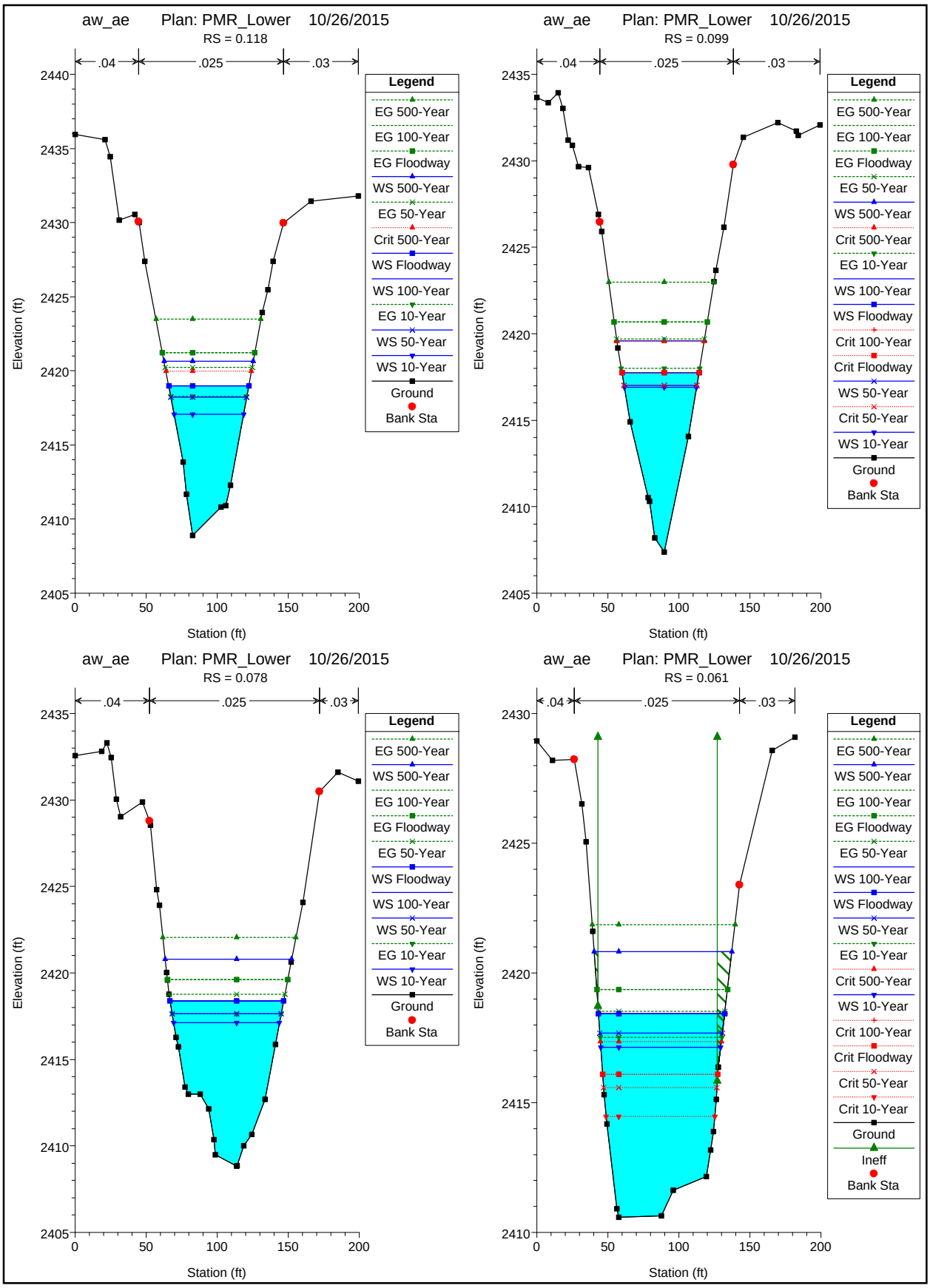

aw_ae Plan: PMR_Lower 10/26/2015
RS = 0.341 Cross Section D-D
.045
.015
.045
Legend
EG 500-Year
WS 500-Year
EG 100-Year
EG Floodway
EG 50-Year
WS Floodway
WS 100-Year
WS 50-Year
EG 10-Year
WS 10-Year
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)
aw_ae Plan: PMR_Lower 10/26/2015
RS = 0.322
.045
.015
.045
Legend
EG 500-Year
EG 100-Year
EG Floodway
WS 500-Year
EG 50-Year
Crit 500-Year
WS 100-Year
WS Floodway
Crit 100-Year
Crit Floodway
EG 10-Year
Crit 50-Year
WS 50-Year
Crit 10-Year
WS 10-Year
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)
aw_ae Plan: PMR_Lower 10/26/2015
RS = 0.291
.045
.015
.045
Legend
EG 500-Year
EG 100-Year
EG Floodway
WS 500-Year
EG 50-Year
WS Floodway
WS 100-Year
WS 50-Year
EG 10-Year
WS 10-Year
Ground
Bank Sta
Elevation (ft)
Station (ft)
aw_ae Plan: PMR_Lower 10/26/2015
RS = 0.287
.045
.015
.045
Legend
EG 500-Year
WS 500-Year
EG 100-Year
EG Floodway
EG 50-Year
Crit 500-Year
WS 100-Year
WS Floodway
WS 50-Year
Crit 100-Year
Crit Floodway
EG 10-Year
Crit 50-Year
WS 10-Year
Crit 10-Year
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)


aw_ae Plan: PMR_Lower 10/26/2015
RS = 0.281 BR BR03 @ West of I-19
.045 .015 .045
Elevation (ft)
Station (ft)
Legend
EG 500-Year
EG 100-Year
EG Floodway
EG 50-Year
Crit 500-Year
WS 500-Year
WS 100-Year
WS Floodway
Crit 100-Year
Crit Floodway
EG 10-Year
Crit 50-Year
WS 50-Year
Crit 10-Year
WS 10-Year
Ground
Ineff
Bank Sta
aw_ae Plan: PMR_Lower 10/26/2015
RS = 0.281 BR BR03 @ West of I-19
.045 .015 .045
Elevation (ft)
Station (ft)
Legend
EG 500-Year
WS 500-Year
EG 100-Year
EG Floodway
EG 50-Year
Crit 500-Year
WS 100-Year
WS Floodway
WS 50-Year
Crit 100-Year
Crit Floodway
EG 10-Year
Crit 50-Year
WS 10-Year
Crit 10-Year
Ground
Ineff
Bank Sta
aw_ae Plan: PMR_Lower 10/26/2015
RS = 0.273 Cross Section C-C, Modified
.045 .015 .045
Elevation (ft)
Station (ft)
Legend
EG 500-Year
EG 100-Year
EG Floodway
EG 50-Year
Crit 500-Year
WS 500-Year
WS 100-Year
WS Floodway
Crit 100-Year
Crit Floodway
EG 10-Year
Crit 50-Year
WS 50-Year
Crit 10-Year
WS 10-Year
Ground
Ineff
Bank Sta
aw_ae Plan: PMR_Lower 10/26/2015
RS = 0.268
.045 .015 .045
Elevation (ft)
Station (ft)
Legend
EG 500-Year
EG 100-Year
EG Floodway
EG 50-Year
Crit 500-Year
WS 500-Year
WS 100-Year
WS Floodway
Crit 100-Year
Crit Floodway
EG 10-Year
Crit 50-Year
WS 50-Year
Crit 10-Year
WS 10-Year
Ground
Bank Sta


aw_ae Plan: PMR_Lower 10/26/2015
RS = 0.260
.045
.015
.045
Elevation (ft)
Station (ft)
Legend
EG 500-Year
EG 100-Year
EG Floodway
EG 50-Year
Crit 500-Year
WS 500-Year
WS 100-Year
WS Floodway
Crit 100-Year
Crit Floodway
EG 10-Year
Crit 50-Year
WS 50-Year
Crit 10-Year
WS 10-Year
Ground
Bank Sta
aw_ae Plan: PMR_Lower 10/26/2015
RS = 0.245
.015
.045
Legend
EG 500-Year
WS 500-Year
EG 100-Year
EG Floodway
EG 50-Year
Crit 500-Year
WS 100-Year
WS Floodway
WS 50-Year
Crit 100-Year
Crit Floodway
EG 10-Year
Crit 50-Year
WS 10-Year
Crit 10-Year
Ground
Ineff
Bank Sta
aw_ae Plan: PMR_Lower 10/26/2015
RS = 0.235 BR BR02@ West of I-19
.015
.045
Legend
EG 500-Year
EG 100-Year
EG Floodway
EG 50-Year
Crit 500-Year
WS 500-Year
WS 100-Year
WS Floodway
Crit 100-Year
Crit Floodway
EG 10-Year
Crit 50-Year
WS 50-Year
Crit 10-Year
WS 10-Year
Ground
Ineff
Bank Sta
aw_ae Plan: PMR_Lower 10/26/2015
RS = 0.235 BR BR02@ West of I-19
.045
.015
.045
Legend
EG 500-Year
EG 100-Year
EG Floodway
WS 500-Year
EG 50-Year
Crit 500-Year
WS 100-Year
WS Floodway
WS 50-Year
Crit 100-Year
Crit Floodway
EG 10-Year
Crit 50-Year
WS 10-Year
Crit 10-Year
Ground
Ineff
Bank Sta


aw_ae Plan: PMR_Lower 10/26/2015
RS = 0.221
.045 .015 .045
Elevation (ft)
Station (ft)
Legend
EG 500-Year
EG 100-Year
EG Floodway
EG 50-Year
Crit 500-Year
WS 500-Year
WS 100-Year
WS Floodway
Crit 100-Year
Crit Floodway
EG 10-Year
Crit 50-Year
WS 50-Year
WS 10-Year
Crit 10-Year
Ground
Ineff
Bank Sta
aw_ae Plan: PMR_Lower 10/26/2015
RS = 0.193
.045 .015 .045
Elevation (ft)
Station (ft)
Legend
EG 500-Year
EG 100-Year
EG Floodway
EG 50-Year
Crit 500-Year
WS 500-Year
WS 100-Year
WS Floodway
Crit 100-Year
Crit Floodway
EG 10-Year
Crit 50-Year
WS 50-Year
Crit 10-Year
WS 10-Year
Ground
Bank Sta
aw_ae Plan: PMR_Lower 10/26/2015
RS = 0.174
.045 .015 .045
Elevation (ft)
Station (ft)
Legend
EG 500-Year
EG 100-Year
EG Floodway
WS 500-Year
EG 50-Year
WS 100-Year
WS Floodway
Crit 100-Year
Crit Floodway
EG 10-Year
WS 50-Year
Crit 50-Year
Crit 10-Year
WS 10-Year
Ground
Bank Sta
aw_ae Plan: PMR_Lower 10/26/2015
RS = 0.163
.04 .025 .03
Elevation (ft)
Station (ft)
Legend
EG 500-Year
WS 500-Year
EG 100-Year
EG Floodway
EG 50-Year
WS Floodway
WS 100-Year
WS 50-Year
EG 10-Year
WS 10-Year
Ground
Bank Sta


aw_ae Plan: PMR_Lower 10/26/2015
RS = 0.143
.04
.025
.03
Elevation (ft)
Station (ft)
Legend
EG 500-Year
WS 500-Year
EG 100-Year
EG Floodway
EG 50-Year
WS 100-Year
WS Floodway
WS 50-Year
Crit 500-Year
EG 10-Year
WS 10-Year
Crit 100-Year
Crit Floodway
Crit 50-Year
Crit 10-Year
Ground
Ineff
Bank Sta
aw_ae Plan: PMR_Lower 10/26/2015
RS = 0.135 BR BR01 @ West of I-19
aw_ae Plan: PMR_Lower 10/26/2015
RS = 0.135 BR BR01 @ West of I-19
aw_ae Plan: PMR_Lower 10/26/2015
RS = 0.131


aw_ae Plan: PMR_Lower 10/26/2015
RS = 0.118
.04
.025
.03
Legend
EG 500-Year
EG 100-Year
EG Floodway
WS 500-Year
EG 50-Year
Crit 500-Year
WS Floodway
WS 100-Year
EG 10-Year
WS 50-Year
WS 10-Year
Ground
Bank Sta
Elevation (ft)
Station (ft)
aw_ae Plan: PMR_Lower 10/26/2015
RS = 0.099
.04
.025
.03
Legend
EG 500-Year
EG 100-Year
EG Floodway
EG 50-Year
WS 500-Year
Crit 500-Year
EG 10-Year
WS 100-Year
WS Floodway
Crit 100-Year
Crit Floodway
WS 50-Year
Crit 50-Year
WS 10-Year
Ground
Bank Sta
Elevation (ft)
Station (ft)
aw_ae Plan: PMR_Lower 10/26/2015
RS = 0.078
.04
.025
.03
Legend
EG 500-Year
WS 500-Year
EG 100-Year
EG Floodway
EG 50-Year
WS Floodway
WS 100-Year
WS 50-Year
EG 10-Year
WS 10-Year
Ground
Bank Sta
Elevation (ft)
Station (ft)
aw_ae Plan: PMR_Lower 10/26/2015
RS = 0.061
.04
.025
.03
Legend
EG 500-Year
WS 500-Year
EG 100-Year
EG Floodway
EG 50-Year
WS 100-Year
WS Floodway
WS 50-Year
EG 10-Year
Crit 500-Year
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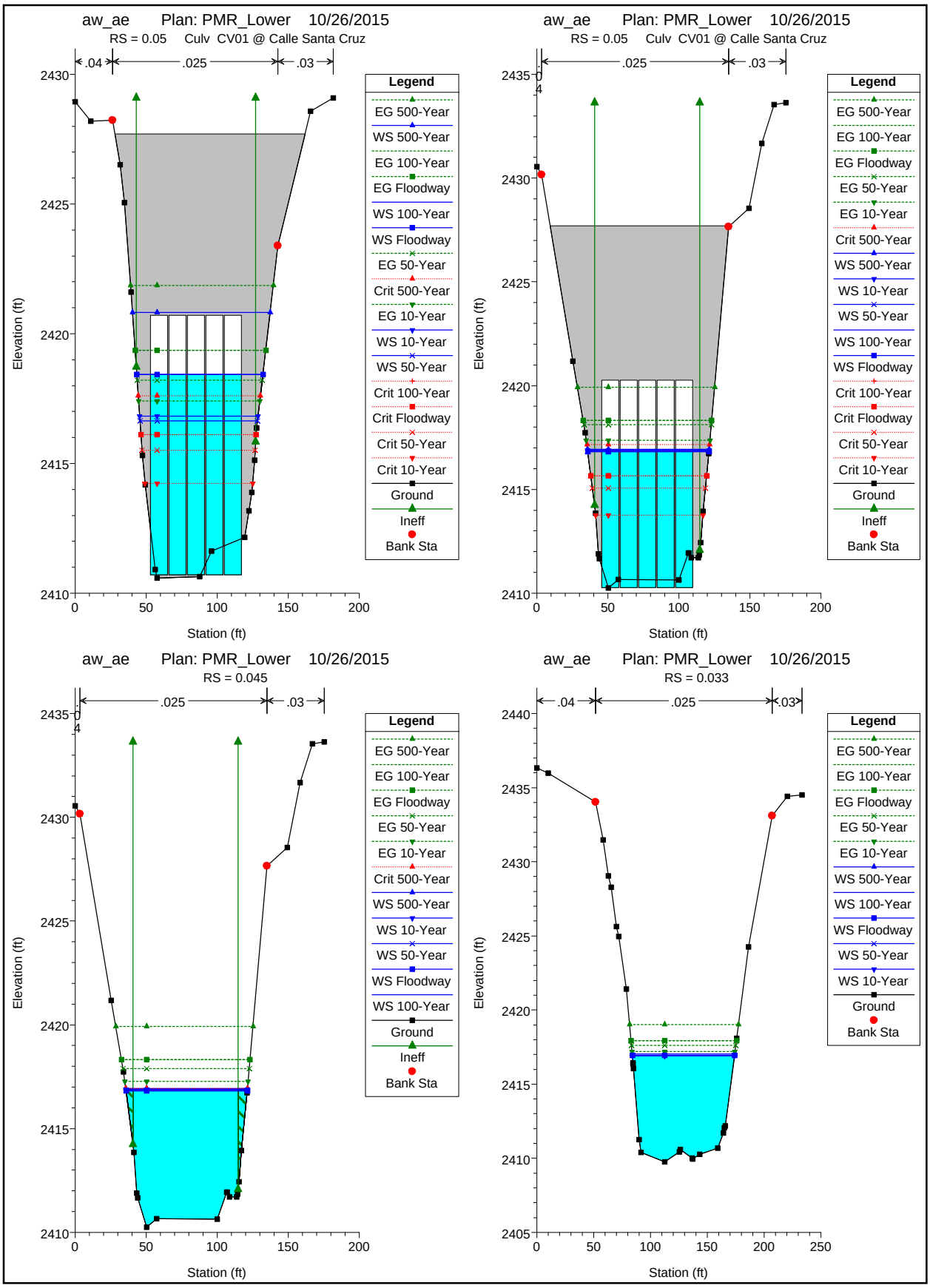
Crit 100-Year
Crit Floodway
Crit 50-Year
Crit 10-Year
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)


aw_ae Plan: PMR_Lower 10/26/2015
RS = 0.05 Culv CV01 @ Calle Santa Cruz
.04
.025
.03
Elevation (ft)
Station (ft)
Legend
EG 500-Year
WS 500-Year
EG 100-Year
EG Floodway
WS 100-Year
WS Floodway
EG 50-Year
Crit 500-Year
EG 10-Year
WS 10-Year
WS 50-Year
Crit 100-Year
Crit Floodway
Crit 50-Year
Crit 10-Year
Ground
Ineff
Bank Sta
aw_ae Plan: PMR_Lower 10/26/2015
RS = 0.05 Culv CV01 @ Calle Santa Cruz
.025
.03
Elevation (ft)
Station (ft)
Legend
EG 500-Year
EG 100-Year
EG Floodway
EG 50-Year
EG 10-Year
Crit 500-Year
WS 500-Year
WS 10-Year
WS 50-Year
WS 100-Year
WS Floodway
Crit 100-Year
Crit Floodway
Crit 50-Year
Crit 10-Year
Ground
Ineff
Bank Sta
aw_ae Plan: PMR_Lower 10/26/2015
RS = 0.045
.025
.03
Elevation (ft)
Station (ft)
Legend
EG 500-Year
EG 100-Year
EG Floodway
EG 50-Year
EG 10-Year
Crit 500-Year
WS 500-Year
WS 10-Year
WS 50-Year
WS Floodway
WS 100-Year
Ground
Ineff
Bank Sta
aw_ae Plan: PMR_Lower 10/26/2015
RS = 0.033
.04
.025
.03
Elevation (ft)
Station (ft)
Legend
EG 500-Year
EG 100-Year
EG Floodway
EG 50-Year
EG 10-Year
WS 500-Year
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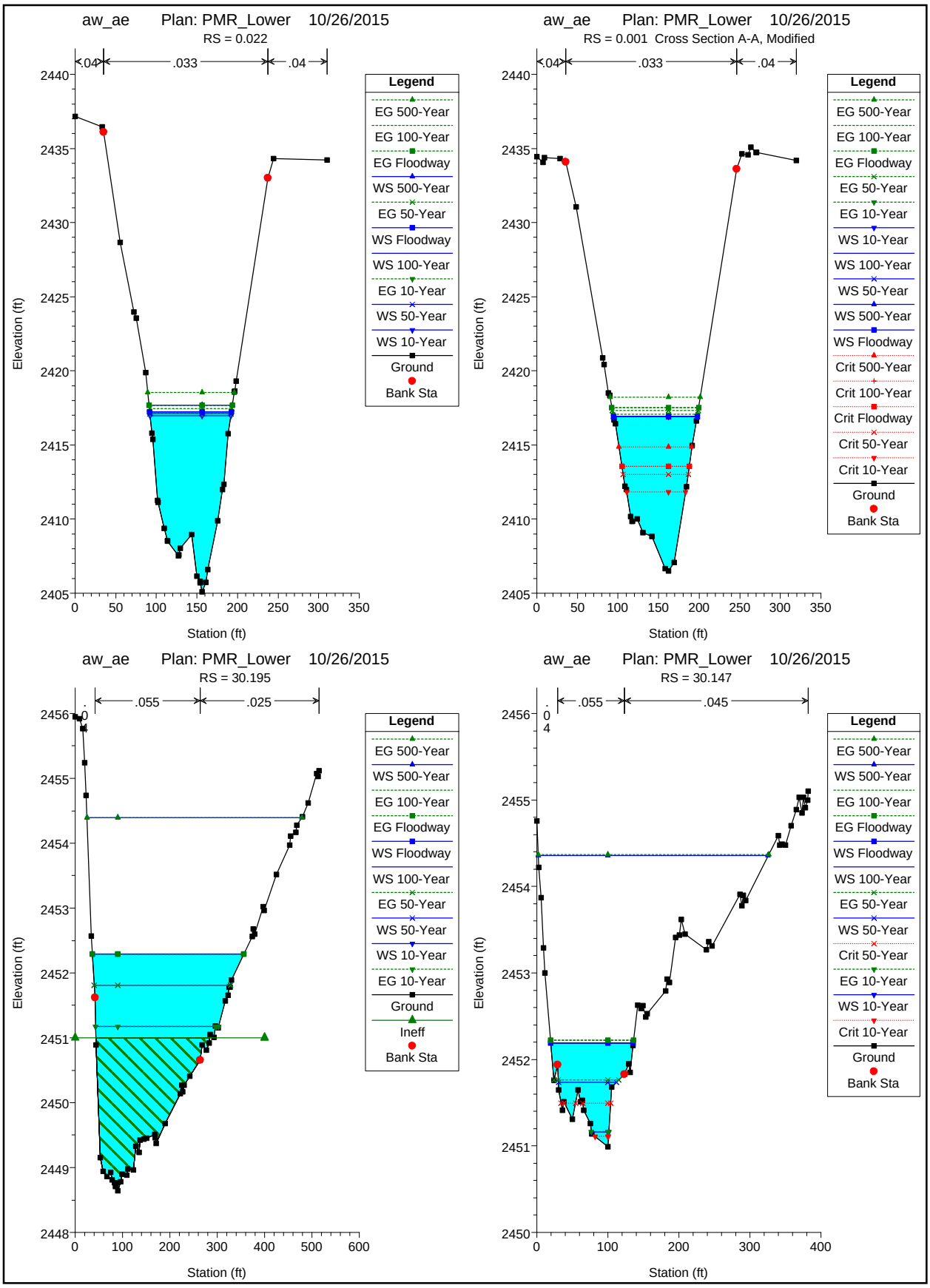
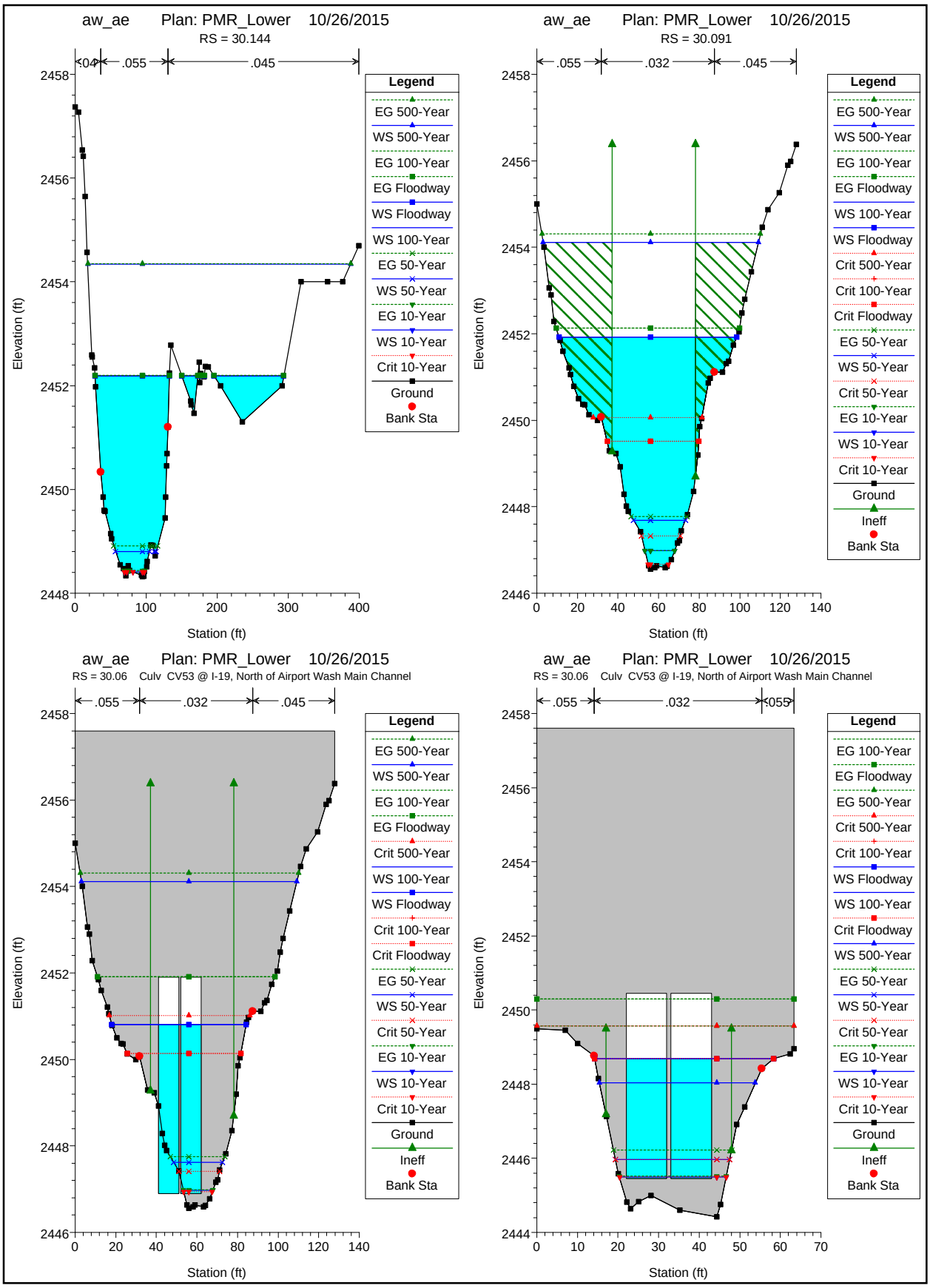
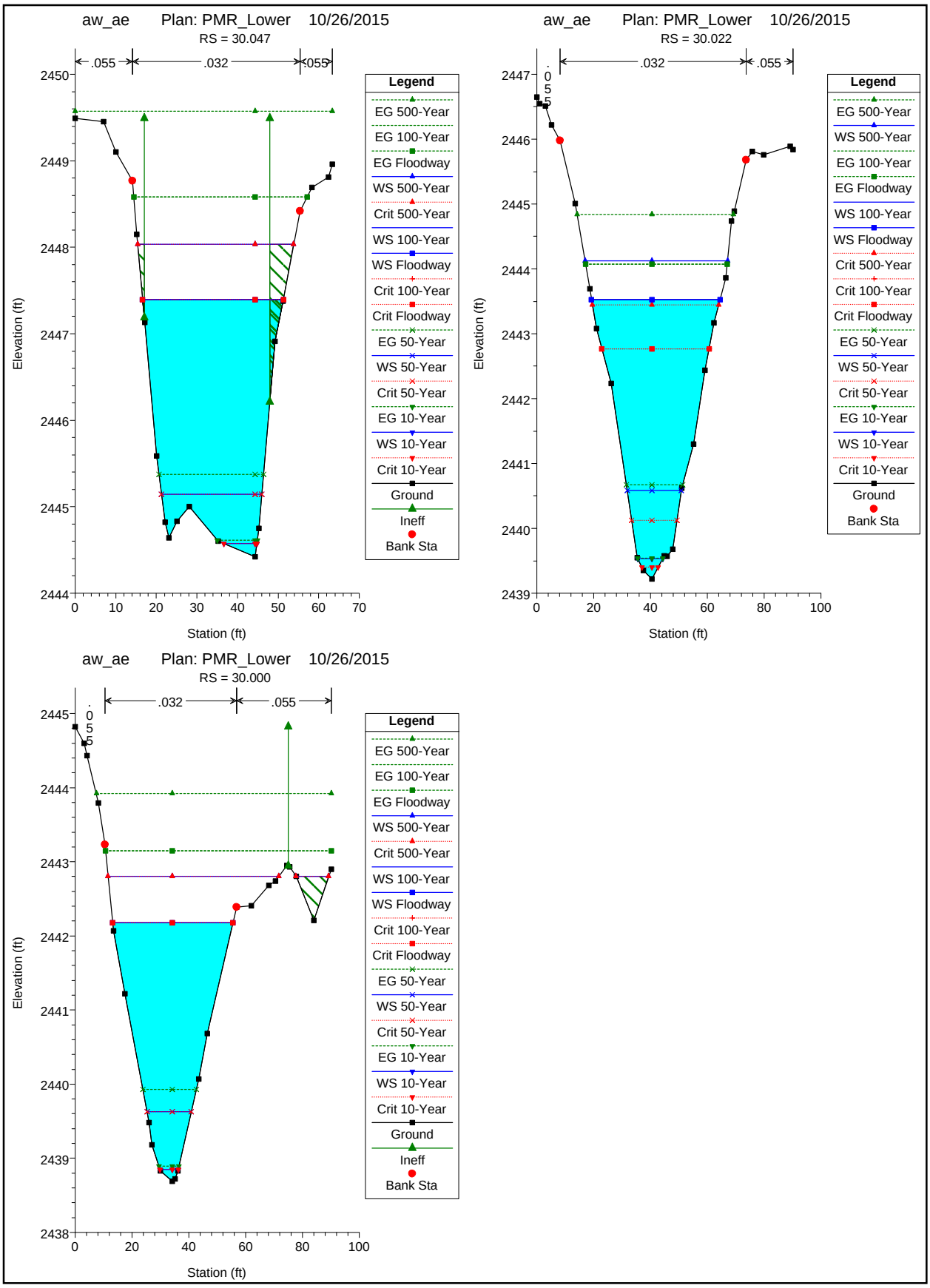
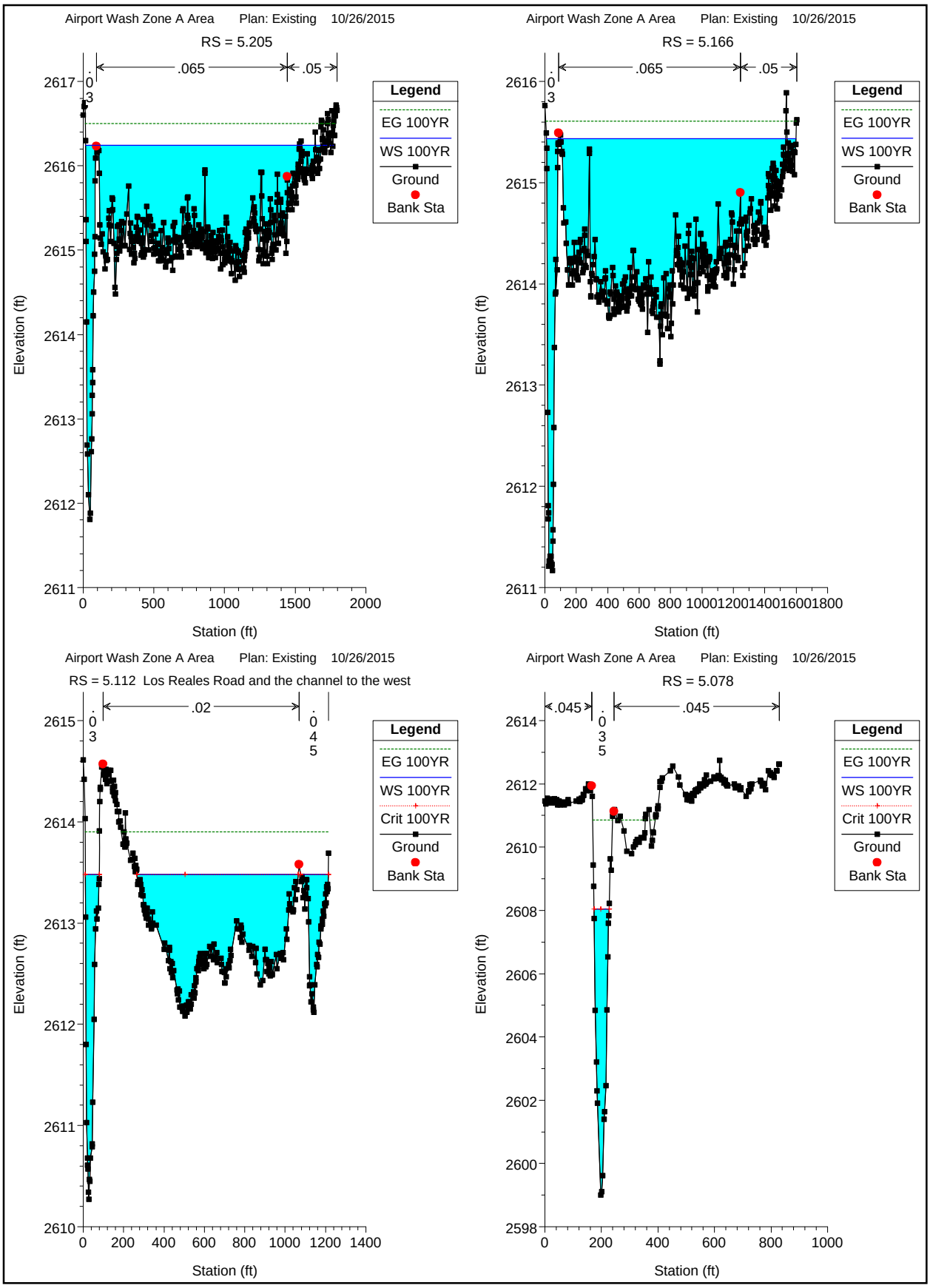
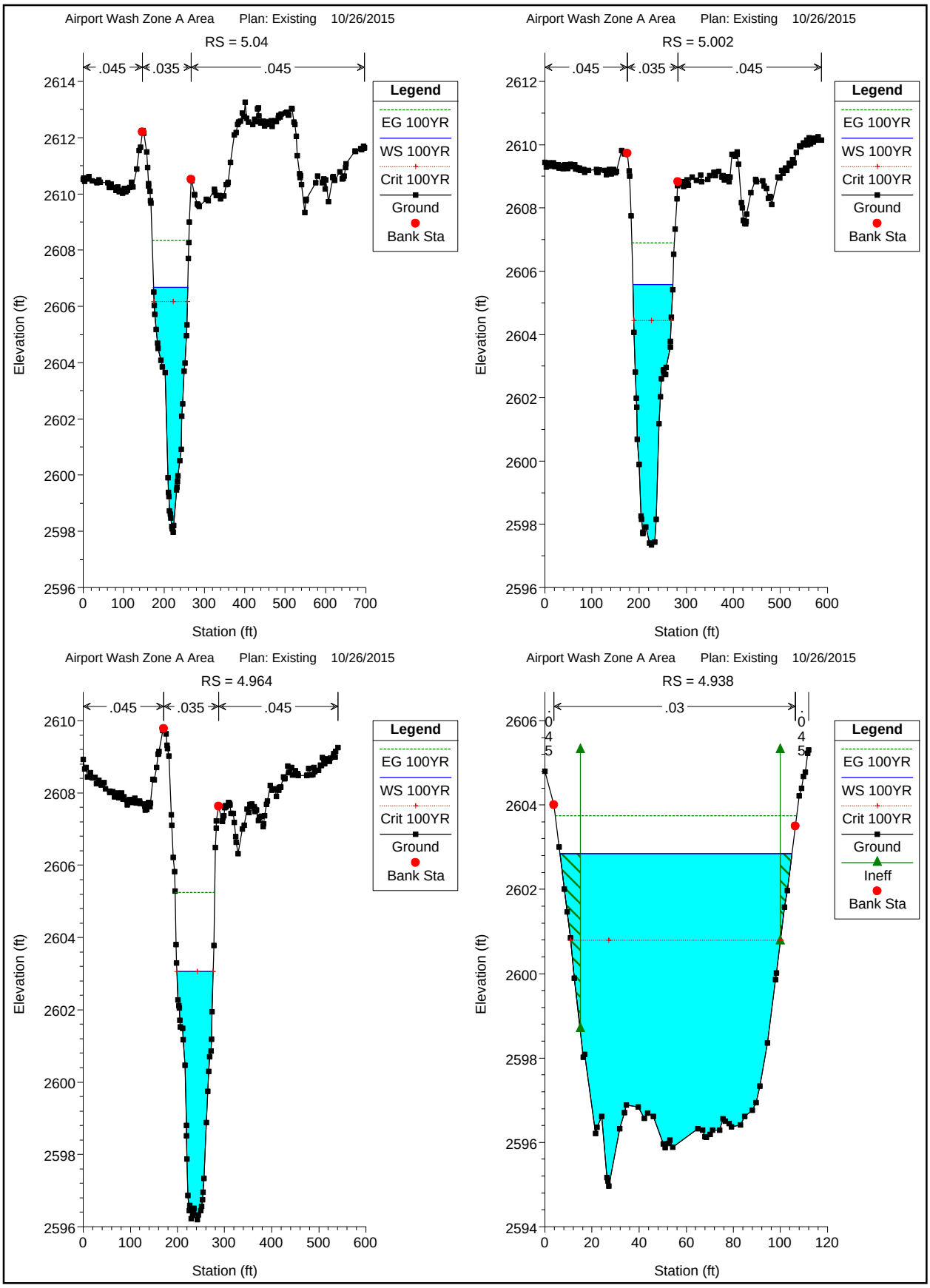
WS 50-Year
WS 10-Year
Ground
Bank Sta

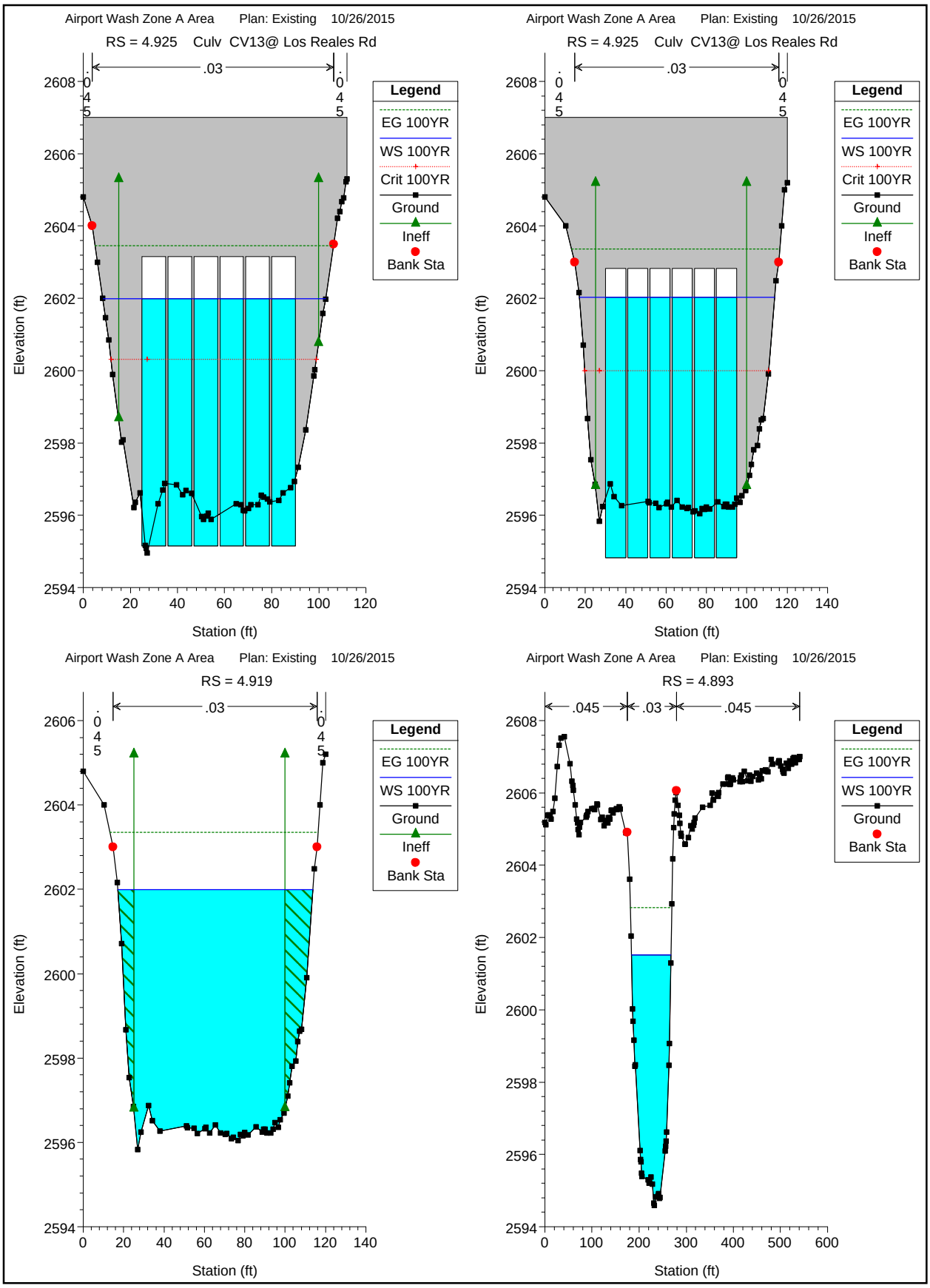

aw_ae Plan: PMR_Lower 10/26/2015
RS = 0.022
.04
.033
.04
Legend
EG 500-Year
EG 100-Year
EG Floodway
WS 500-Year
EG 50-Year
WS Floodway
WS 100-Year
EG 10-Year
WS 50-Year
WS 10-Year
Ground
Bank Sta
Elevation (ft)
Station (ft)
aw_ae Plan: PMR_Lower 10/26/2015
RS = 0.001 Cross Section A-A, Modified
.04
.033
.04
Legend
EG 500-Year
EG 100-Year
EG Floodway
EG 50-Year
EG 10-Year
WS 10-Year
WS 100-Year
WS 50-Year
WS 500-Year
WS Floodway
Crit 500-Year
Crit 100-Year
Crit Floodway
Crit 50-Year
Crit 10-Year
Ground
Bank Sta
Elevation (ft)
Station (ft)
aw_ae Plan: PMR_Lower 10/26/2015
RS = 30.195
.055
.025
Legend
EG 500-Year
WS 500-Year
EG 100-Year
EG Floodway
WS Floodway
WS 100-Year
EG 50-Year
WS 50-Year
WS 10-Year
EG 10-Year
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)
aw_ae Plan: PMR_Lower 10/26/2015
RS = 30.147
.055
.045
Legend
EG 500-Year
WS 500-Year
EG 100-Year
EG Floodway
WS Floodway
WS 100-Year
EG 50-Year
WS 50-Year
Crit 50-Year
EG 10-Year
WS 10-Year
Crit 10-Year
Ground
Bank Sta
Elevation (ft)
Station (ft)

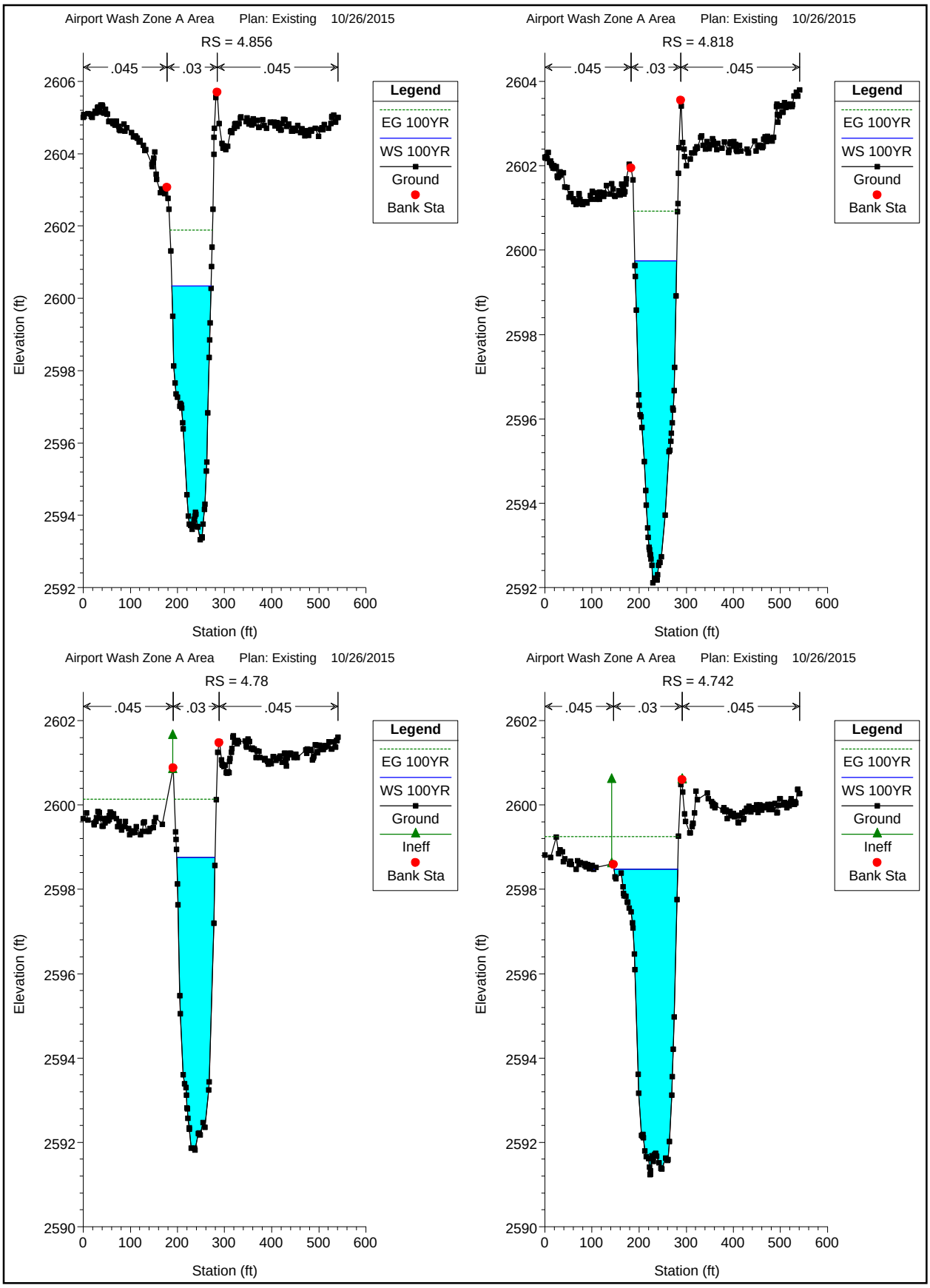

aw_ae Plan: PMR_Lower 10/26/2015
RS = 30.144
.04
.055
.045
Elevation (ft)
Station (ft)
Legend
EG 500-Year
WS 500-Year
EG 100-Year
EG Floodway
WS Floodway
WS 100-Year
EG 50-Year
WS 50-Year
EG 10-Year
WS 10-Year
Crit 10-Year
Ground
Bank Sta
aw_ae Plan: PMR_Lower 10/26/2015
RS = 30.091
.055
.032
.045
Elevation (ft)
Station (ft)
Legend
EG 500-Year
WS 500-Year
EG 100-Year
EG Floodway
WS 100-Year
WS Floodway
Crit 500-Year
Crit 100-Year
Crit Floodway
EG 50-Year
WS 50-Year
Crit 50-Year
EG 10-Year
WS 10-Year
Crit 10-Year
Ground
Ineff
Bank Sta
aw_ae Plan: PMR_Lower 10/26/2015
RS = 30.06 Culv CV53 @ I-19, North of Airport Wash Main Channel
.055
.032
.045
Elevation (ft)
Station (ft)
Legend
EG 500-Year
WS 500-Year
EG 100-Year
EG Floodway
Crit 500-Year
WS 100-Year
WS Floodway
Crit 100-Year
Crit Floodway
EG 50-Year
WS 50-Year
Crit 50-Year
EG 10-Year
WS 10-Year
Crit 10-Year
Ground
Ineff
Bank Sta
aw_ae Plan: PMR_Lower 10/26/2015
RS = 30.06 Culv CV53 @ I-19, North of Airport Wash Main Channel
.055
.032
.055
Elevation (ft)
Station (ft)
Legend
EG 100-Year
EG Floodway
EG 500-Year
Crit 500-Year
Crit 100-Year
WS Floodway
WS 100-Year
Crit Floodway
WS 500-Year
EG 50-Year
WS 50-Year
Crit 50-Year
EG 10-Year
WS 10-Year
Crit 10-Year
Ground
Ineff
Bank Sta

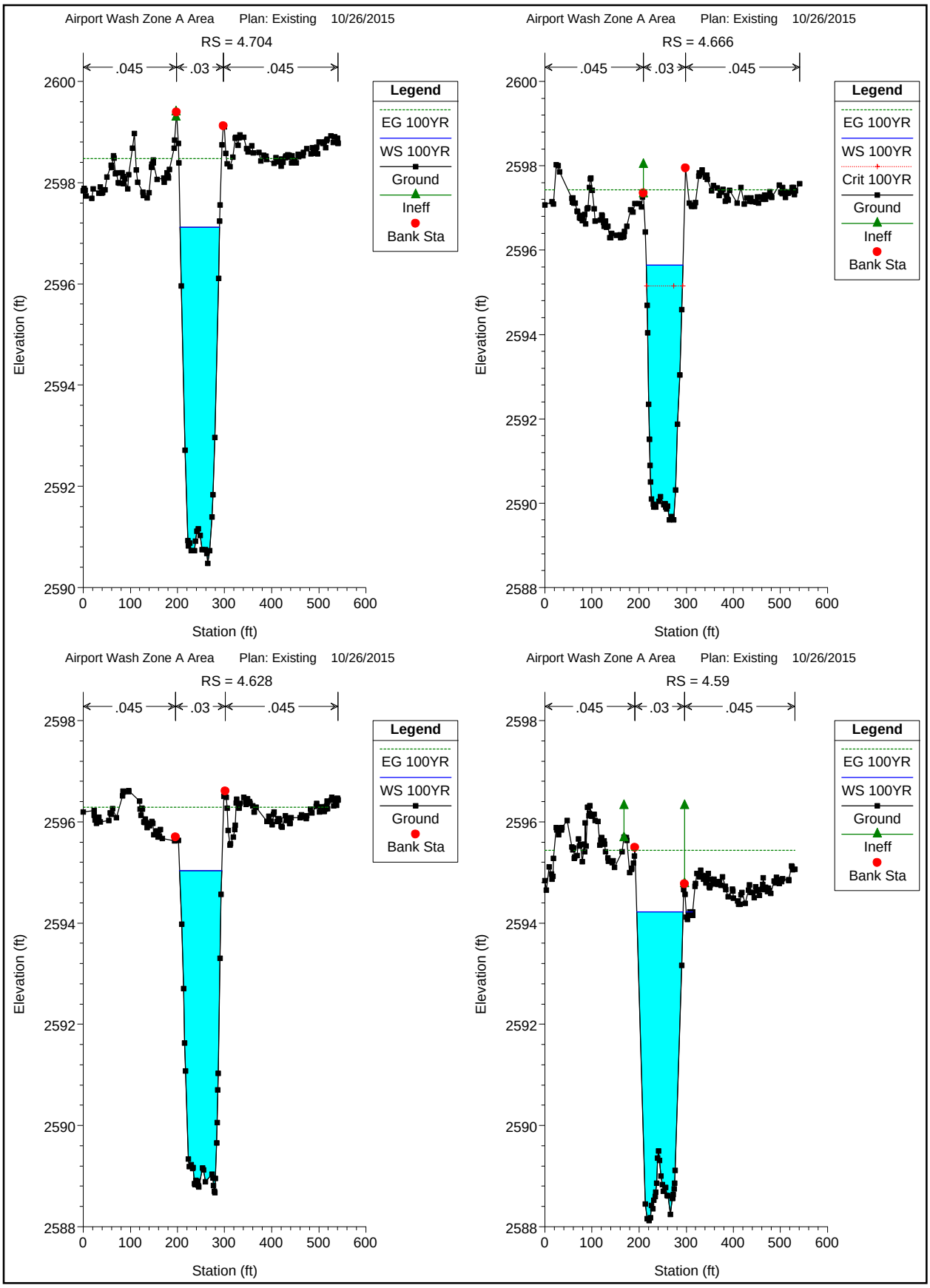

aw_ae Plan: PMR_Lower 10/26/2015
RS = 30.047
.055
.032
.055
Elevation (ft)
Station (ft)
Legend
EG 500-Year
EG 100-Year
EG Floodway
WS 500-Year
Crit 500-Year
WS 100-Year
WS Floodway
Crit 100-Year
Crit Floodway
EG 50-Year
WS 50-Year
Crit 50-Year
EG 10-Year
WS 10-Year
Crit 10-Year
Ground
Ineff
Bank Sta
aw_ae Plan: PMR_Lower 10/26/2015
RS = 30.022
.032
.055
Elevation (ft)
Station (ft)
Legend
EG 500-Year
WS 500-Year
EG 100-Year
EG Floodway
WS 100-Year
WS Floodway
Crit 500-Year
Crit 100-Year
Crit Floodway
EG 50-Year
WS 50-Year
Crit 50-Year
EG 10-Year
WS 10-Year
Crit 10-Year
Ground
Bank Sta
aw_ae Plan: PMR_Lower 10/26/2015
RS = 30.000
.032
.055
Elevation (ft)
Station (ft)
Legend
EG 500-Year
EG 100-Year
EG Floodway
WS 500-Year
Crit 500-Year
WS 100-Year
WS Floodway
Crit 100-Year
Crit Floodway
EG 50-Year
WS 50-Year
Crit 50-Year
EG 10-Year
WS 10-Year
Crit 10-Year
Ground
Ineff
Bank Sta

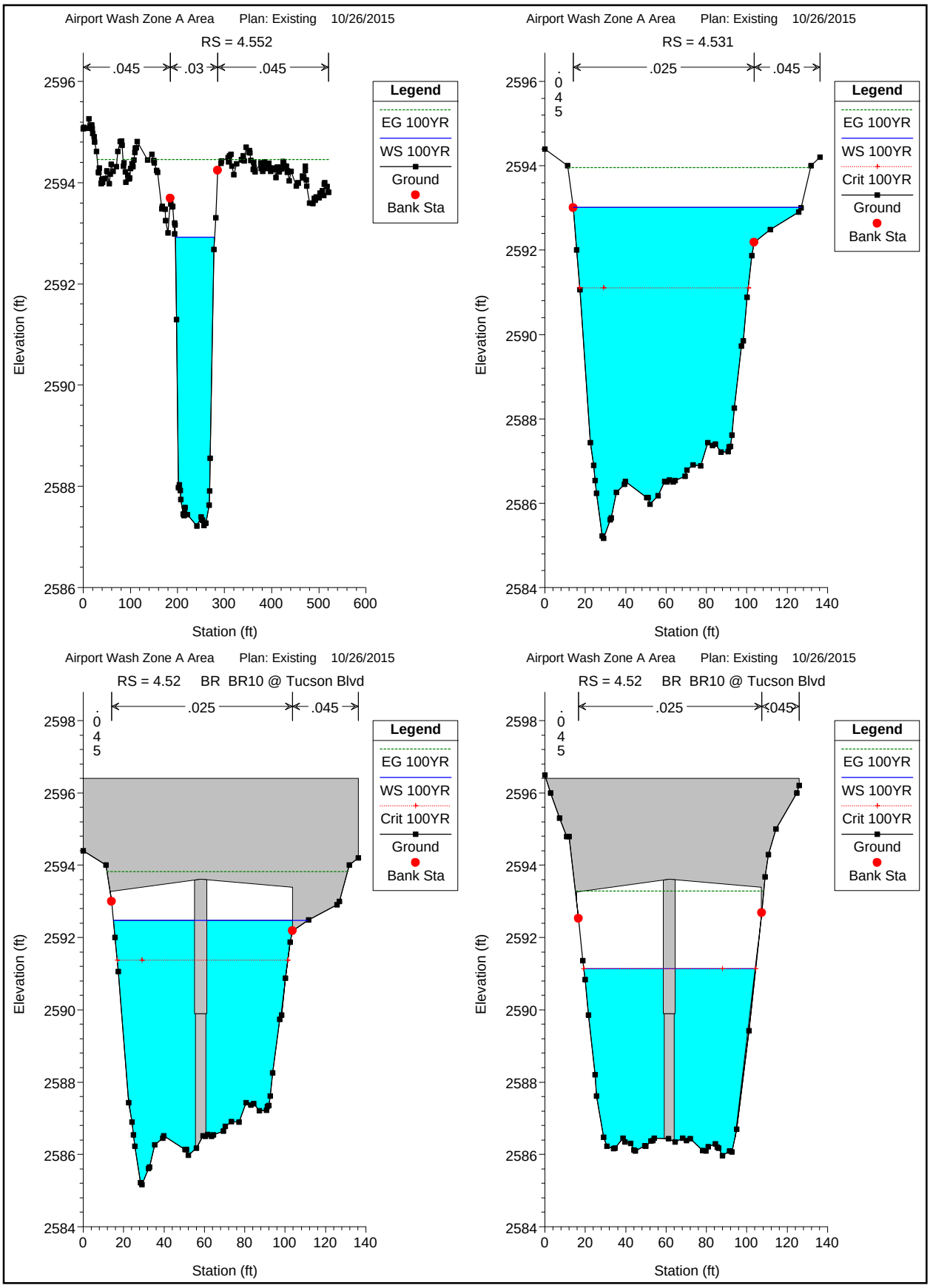

Airport Wash Zone A Area Plan: Existing 10/26/2015
RS = 5.205
.065
.05
.03
Legend
EG 100YR
WS 100YR
Ground
Bank Sta
Elevation (ft)
Station (ft)
Airport Wash Zone A Area Plan: Existing 10/26/2015
RS = 5.166
.065
.05
.03
Legend
EG 100YR
WS 100YR
Ground
Bank Sta
Elevation (ft)
Station (ft)
Airport Wash Zone A Area Plan: Existing 10/26/2015
RS = 5.112 Los Reales Road and the channel to the west
.02
.03
.045
Legend
EG 100YR
WS 100YR
Crit 100YR
Ground
Bank Sta
Elevation (ft)
Station (ft)
Airport Wash Zone A Area Plan: Existing 10/26/2015
RS = 5.078
.045
.045
.035
Legend
EG 100YR
WS 100YR
Crit 100YR
Ground
Bank Sta
Elevation (ft)
Station (ft)

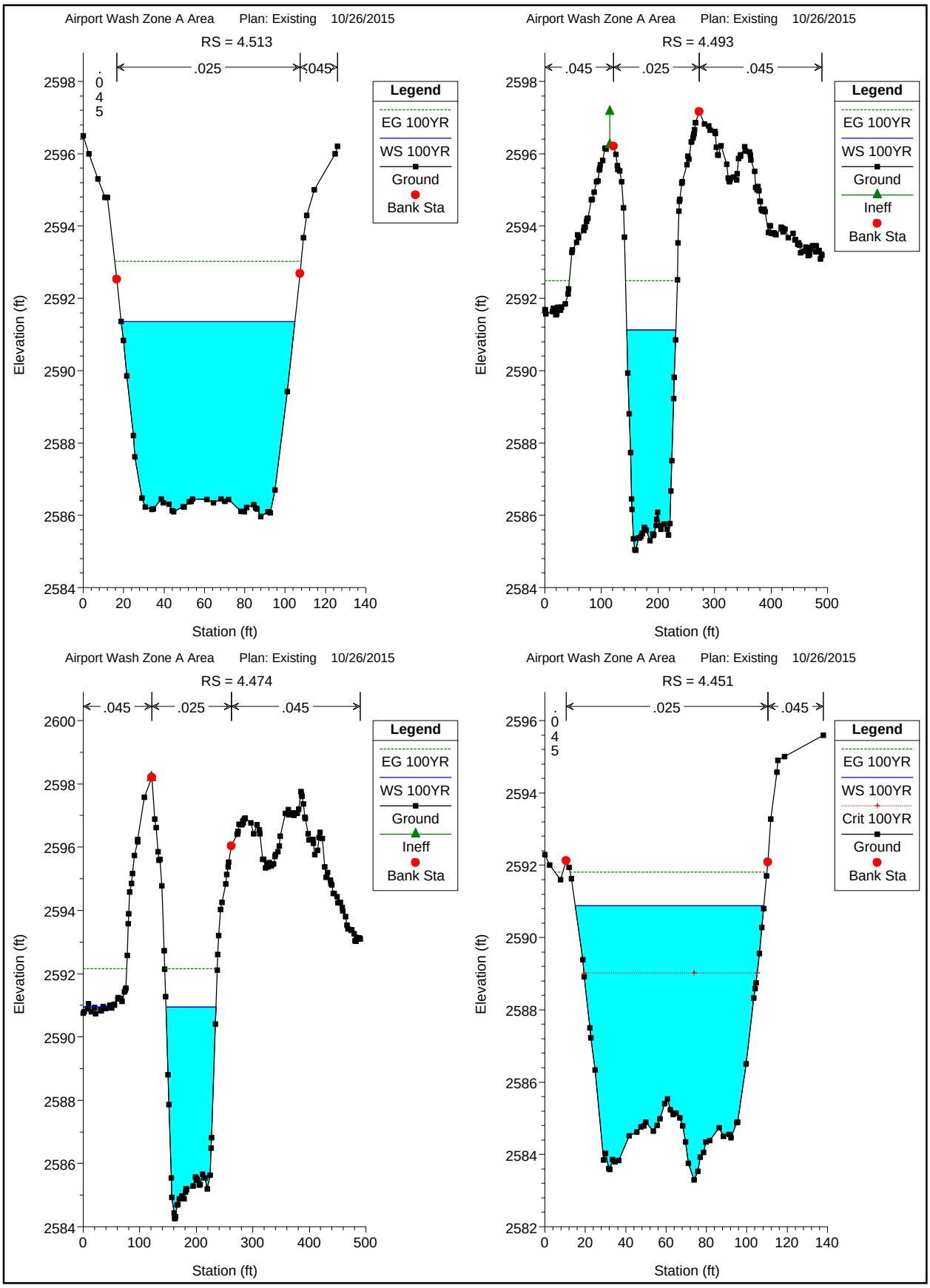

Airport Wash Zone A Area Plan: Existing 10/26/2015
RS = 5.04
.045
.035
.045
Legend
EG 100YR
WS 100YR
Crit 100YR
Ground
Bank Sta
Elevation (ft)
Station (ft)
Airport Wash Zone A Area Plan: Existing 10/26/2015
RS = 5.002
.045
.035
.045
Legend
EG 100YR
WS 100YR
Crit 100YR
Ground
Bank Sta
Elevation (ft)
Station (ft)
Airport Wash Zone A Area Plan: Existing 10/26/2015
RS = 4.964
.045
.035
.045
Legend
EG 100YR
WS 100YR
Crit 100YR
Ground
Bank Sta
Elevation (ft)
Station (ft)
Airport Wash Zone A Area Plan: Existing 10/26/2015
RS = 4.938
.045
.03
.045
Legend
EG 100YR
WS 100YR
Crit 100YR
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)


Airport Wash Zone A Area Plan: Existing 10/26/2015
RS = 4.925 Culv CV13@ Los Reales Rd
.03
.045
.045
Legend
EG 100YR
WS 100YR
Crit 100YR
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)
Airport Wash Zone A Area Plan: Existing 10/26/2015
RS = 4.925 Culv CV13@ Los Reales Rd
.03
.045
.045
Legend
EG 100YR
WS 100YR
Crit 100YR
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)
Airport Wash Zone A Area Plan: Existing 10/26/2015
RS = 4.919
.03
.045
.045
Legend
EG 100YR
WS 100YR
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)
Airport Wash Zone A Area Plan: Existing 10/26/2015
RS = 4.893
.045
.03
.045
Legend
EG 100YR
WS 100YR
Ground
Bank Sta
Elevation (ft)
Station (ft)


Airport Wash Zone A Area Plan: Existing 10/26/2015
RS = 4.856
.045
.03
.045
Legend
EG 100YR
WS 100YR
Ground
Bank Sta
Elevation (ft)
Station (ft)
Airport Wash Zone A Area Plan: Existing 10/26/2015
RS = 4.818
.045
.03
.045
Legend
EG 100YR
WS 100YR
Ground
Bank Sta
Elevation (ft)
Station (ft)
Airport Wash Zone A Area Plan: Existing 10/26/2015
RS = 4.78
.045
.03
.045
Legend
EG 100YR
WS 100YR
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)
Airport Wash Zone A Area Plan: Existing 10/26/2015
RS = 4.742
.045
.03
.045
Legend
EG 100YR
WS 100YR
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)


Airport Wash Zone A Area Plan: Existing 10/26/2015
RS = 4.704
.045 .03 .045
Legend
EG 100YR
WS 100YR
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)
Airport Wash Zone A Area Plan: Existing 10/26/2015
RS = 4.666
.045 .03 .045
Legend
EG 100YR
WS 100YR
Crit 100YR
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)
Airport Wash Zone A Area Plan: Existing 10/26/2015
RS = 4.628
.045 .03 .045
Legend
EG 100YR
WS 100YR
Ground
Bank Sta
Elevation (ft)
Station (ft)
Airport Wash Zone A Area Plan: Existing 10/26/2015
RS = 4.59
.045 .03 .045
Legend
EG 100YR
WS 100YR
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)


Airport Wash Zone A Area Plan: Existing 10/26/2015
RS = 4.552
.045
.03
.045
Legend
EG 100YR
WS 100YR
Ground
Bank Sta
Elevation (ft)
Station (ft)
Airport Wash Zone A Area Plan: Existing 10/26/2015
RS = 4.531
.045
.025
.045
Legend
EG 100YR
WS 100YR
Crit 100YR
Ground
Bank Sta
Elevation (ft)
Station (ft)
Airport Wash Zone A Area Plan: Existing 10/26/2015
RS = 4.52 BR BR10 @ Tucson Blvd
.045
.025
.045
Legend
EG 100YR
WS 100YR
Crit 100YR
Ground
Bank Sta
Elevation (ft)
Station (ft)
Airport Wash Zone A Area Plan: Existing 10/26/2015
RS = 4.52 BR BR10 @ Tucson Blvd
.045
.025
.045
Legend
EG 100YR
WS 100YR
Crit 100YR
Ground
Bank Sta
Elevation (ft)
Station (ft)


Airport Wash Zone A Area Plan: Existing 10/26/2015
RS = 4.513
.045
.025
.045
Legend
EG 100YR
WS 100YR
Ground
Bank Sta
Elevation (ft)
Station (ft)
Airport Wash Zone A Area Plan: Existing 10/26/2015
RS = 4.493
.045
.025
.045
Legend
EG 100YR
WS 100YR
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)
Airport Wash Zone A Area Plan: Existing 10/26/2015
RS = 4.474
.045
.025
.045
Legend
EG 100YR
WS 100YR
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)
Airport Wash Zone A Area Plan: Existing 10/26/2015
RS = 4.451
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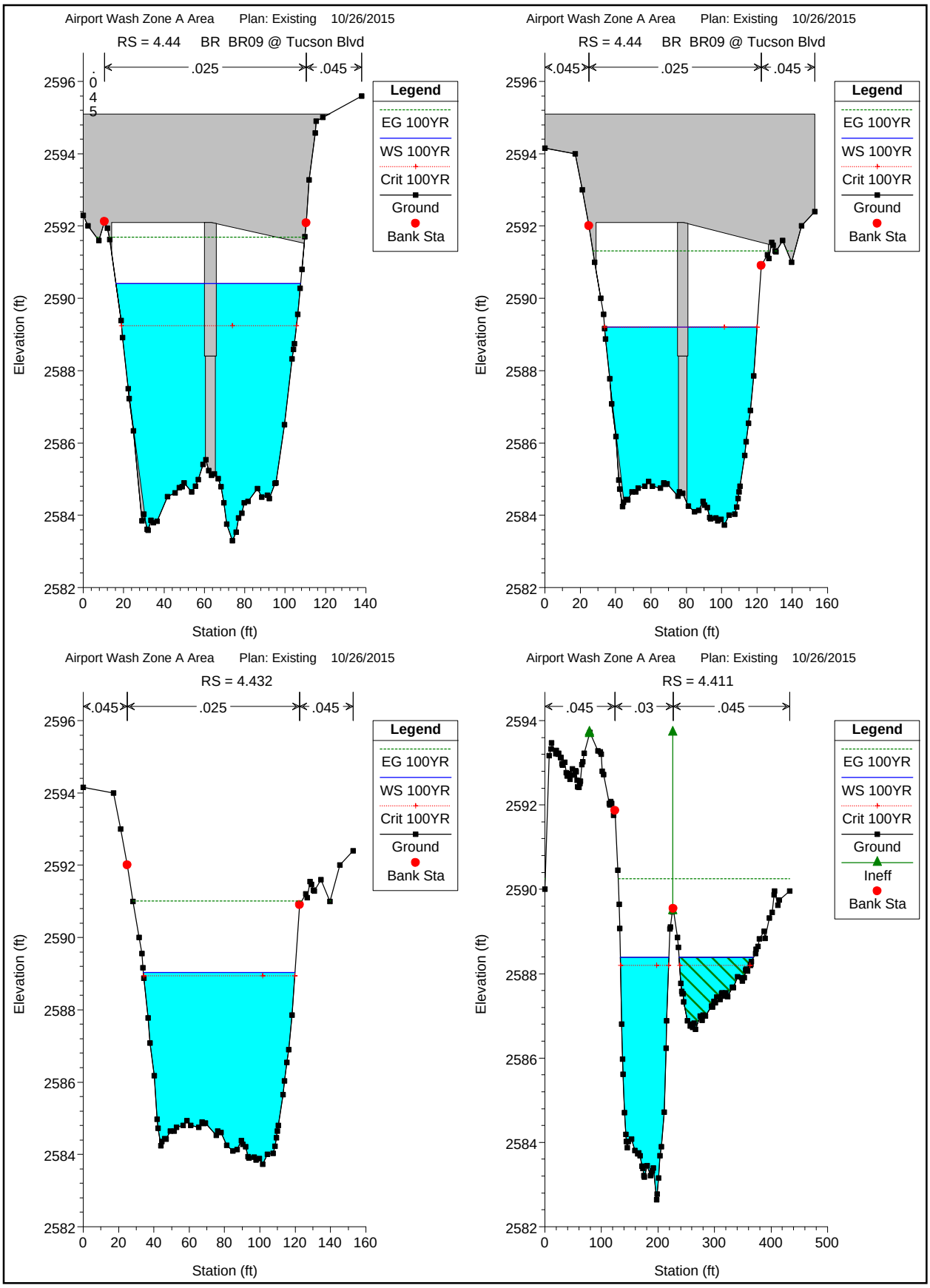
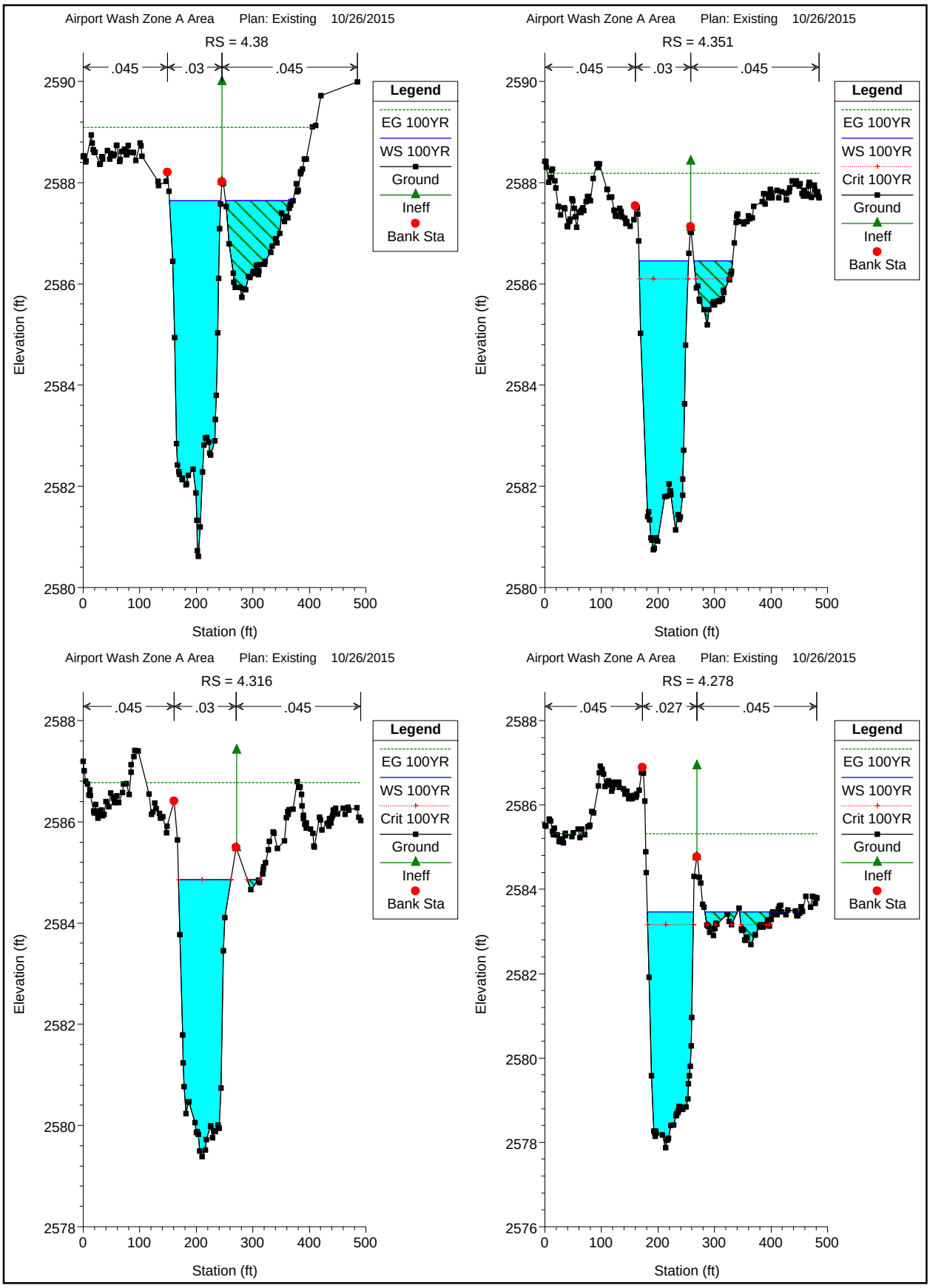
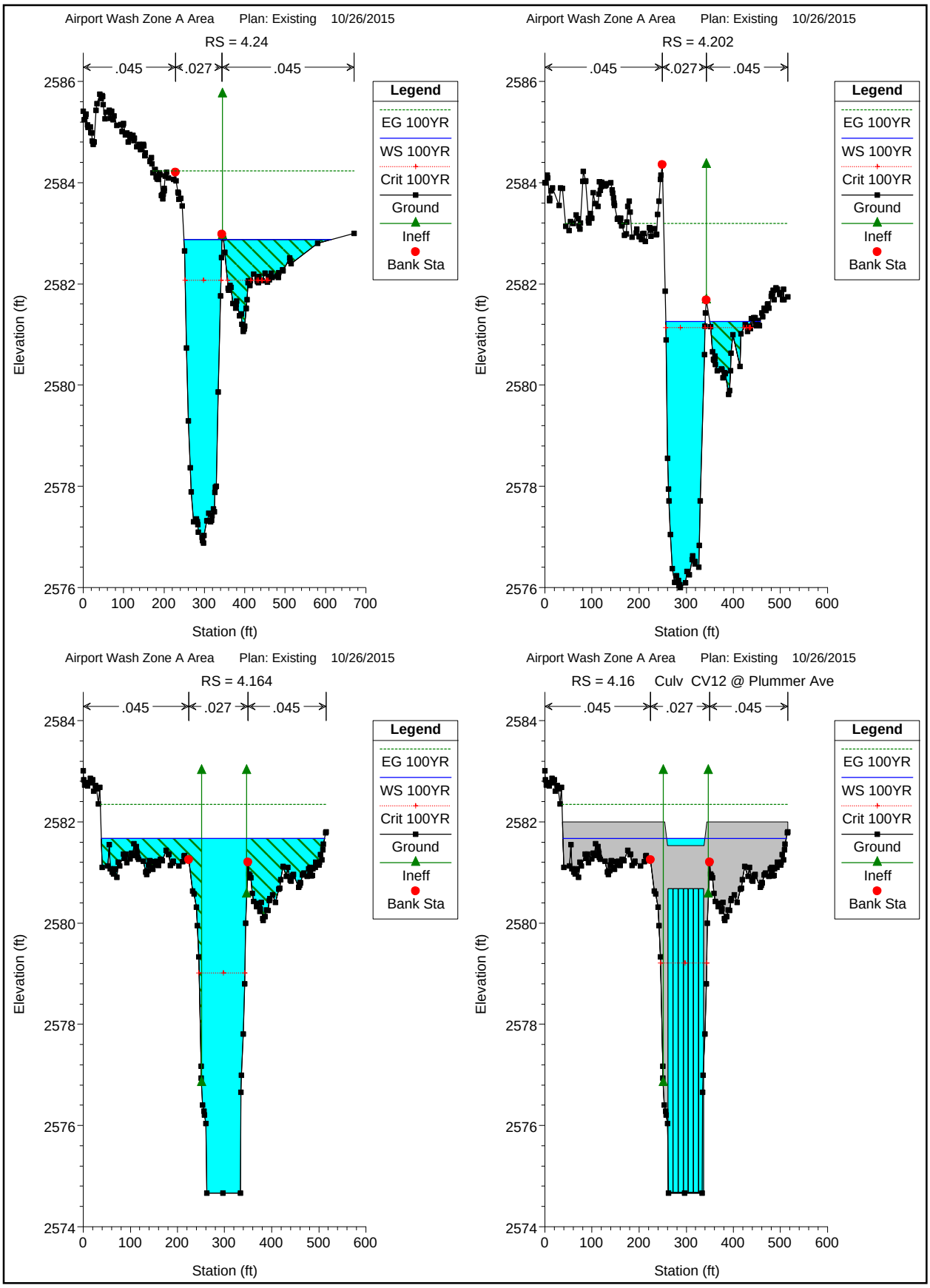
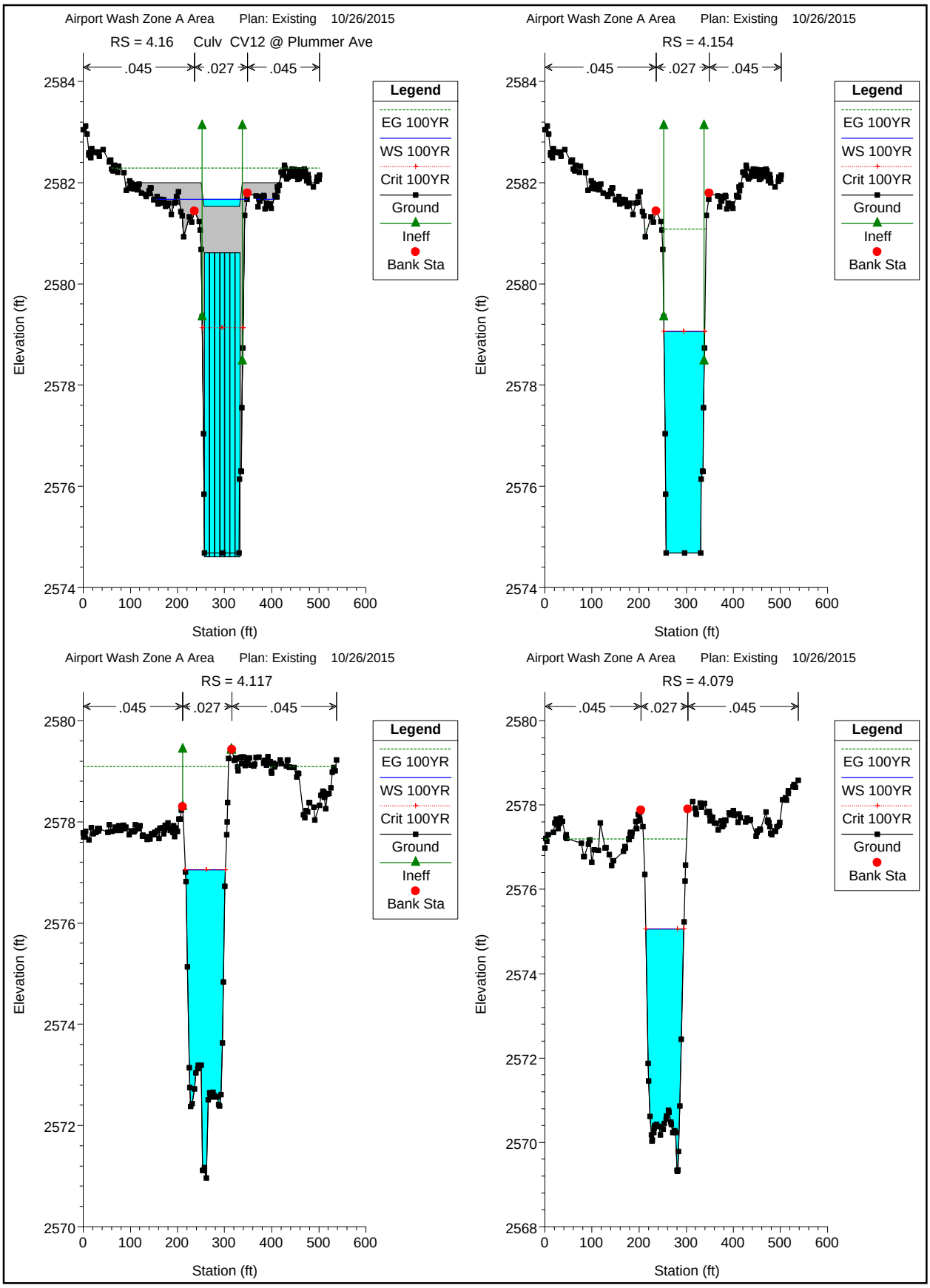
.025
.045
Legend
EG 100YR
WS 100YR
Crit 100YR
Ground
Bank Sta
Elevation (ft)
Station (ft)


Airport Wash Zone A Area Plan: Existing 10/26/2015
RS = 4.44 BR BR09 @ Tucson Blvd
.045
.025
.045
Legend
EG 100YR
WS 100YR
Crit 100YR
Ground
Bank Sta
Elevation (ft)
Station (ft)
Airport Wash Zone A Area Plan: Existing 10/26/2015
RS = 4.44 BR BR09 @ Tucson Blvd
.045
.025
.045
Legend
EG 100YR
WS 100YR
Crit 100YR
Ground
Bank Sta
Elevation (ft)
Station (ft)
Airport Wash Zone A Area Plan: Existing 10/26/2015
RS = 4.432
.045
.025
.045
Legend
EG 100YR
WS 100YR
Crit 100YR
Ground
Bank Sta
Elevation (ft)
Station (ft)
Airport Wash Zone A Area Plan: Existing 10/26/2015
RS = 4.411
.045
.03
.045
Legend
EG 100YR
WS 100YR
Crit 100YR
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)


Airport Wash Zone A Area Plan: Existing 10/26/2015
RS = 4.38
.045
.03
.045
Legend
EG 100YR
WS 100YR
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)
Airport Wash Zone A Area Plan: Existing 10/26/2015
RS = 4.351
.045
.03
.045
Legend
EG 100YR
WS 100YR
Crit 100YR
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)
Airport Wash Zone A Area Plan: Existing 10/26/2015
RS = 4.316
.045
.03
.045
Legend
EG 100YR
WS 100YR
Crit 100YR
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)
Airport Wash Zone A Area Plan: Existing 10/26/2015
RS = 4.278
.045
.027
.045
Legend
EG 100YR
WS 100YR
Crit 100YR
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)


Airport Wash Zone A Area Plan: Existing 10/26/2015
RS = 4.24
.045 .027 .045
Legend
EG 100YR
WS 100YR
Crit 100YR
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)
Airport Wash Zone A Area Plan: Existing 10/26/2015
RS = 4.202
.045 .027 .045
Legend
EG 100YR
WS 100YR
Crit 100YR
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)
Airport Wash Zone A Area Plan: Existing 10/26/2015
RS = 4.164
.045 .027 .045
Legend
EG 100YR
WS 100YR
Crit 100YR
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)
Airport Wash Zone A Area Plan: Existing 10/26/2015
RS = 4.16 Culv CV12 @ Plummer Ave
.045 .027 .045
Legend
EG 100YR
WS 100YR
Crit 100YR
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)


Airport Wash Zone A Area Plan: Existing 10/26/2015
RS = 4.16 Culv CV12 @ Plummer Ave
.045 .027 .045
Legend
EG 100YR
WS 100YR
Crit 100YR
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)
Airport Wash Zone A Area Plan: Existing 10/26/2015
RS = 4.154
.045 .027 .045
Legend
EG 100YR
WS 100YR
Crit 100YR
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)
Airport Wash Zone A Area Plan: Existing 10/26/2015
RS = 4.117
.045 .027 .045
Legend
EG 100YR
WS 100YR
Crit 100YR
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)
Airport Wash Zone A Area Plan: Existing 10/26/2015
RS = 4.079
.045 .027 .045
Legend
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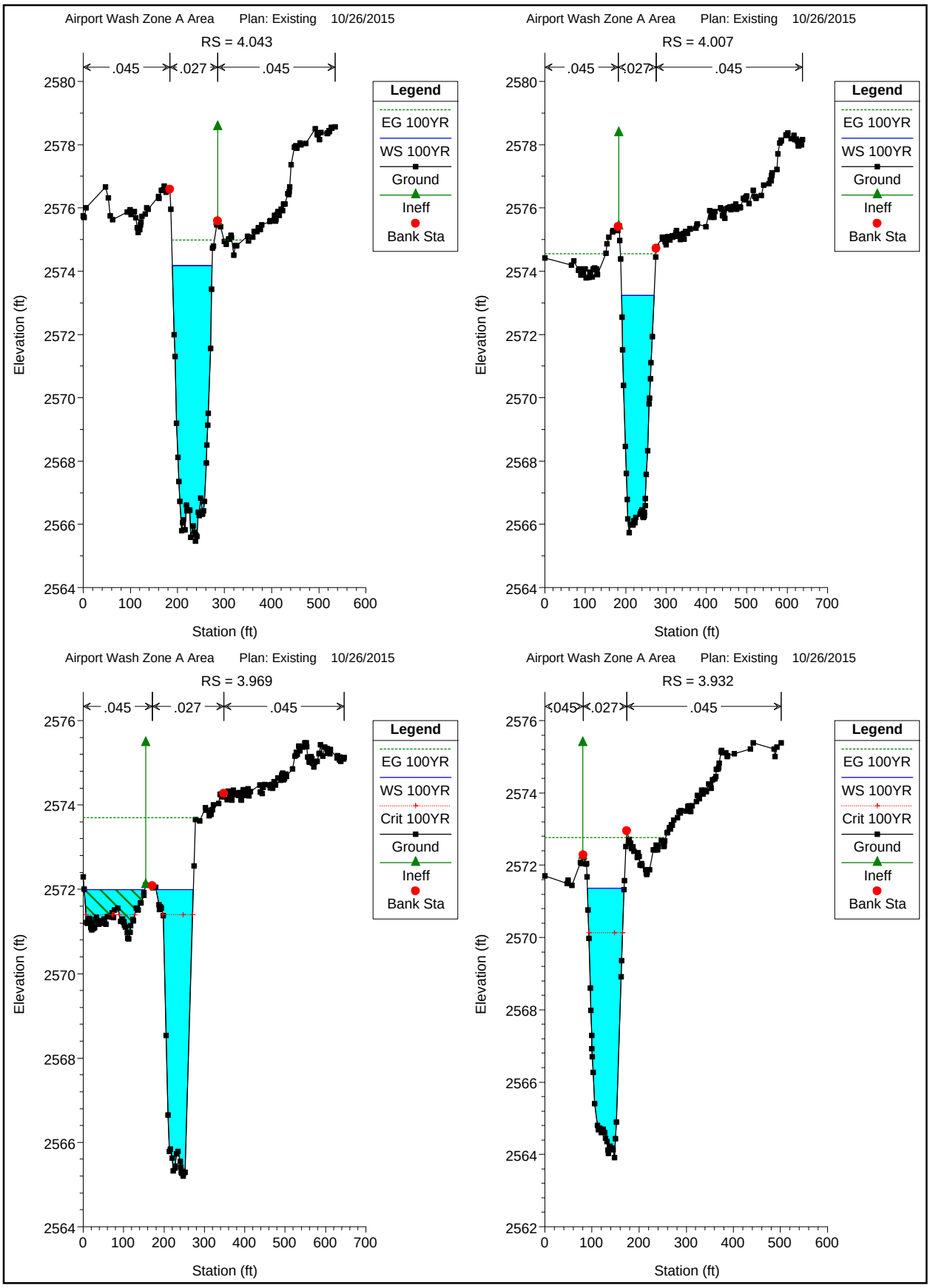
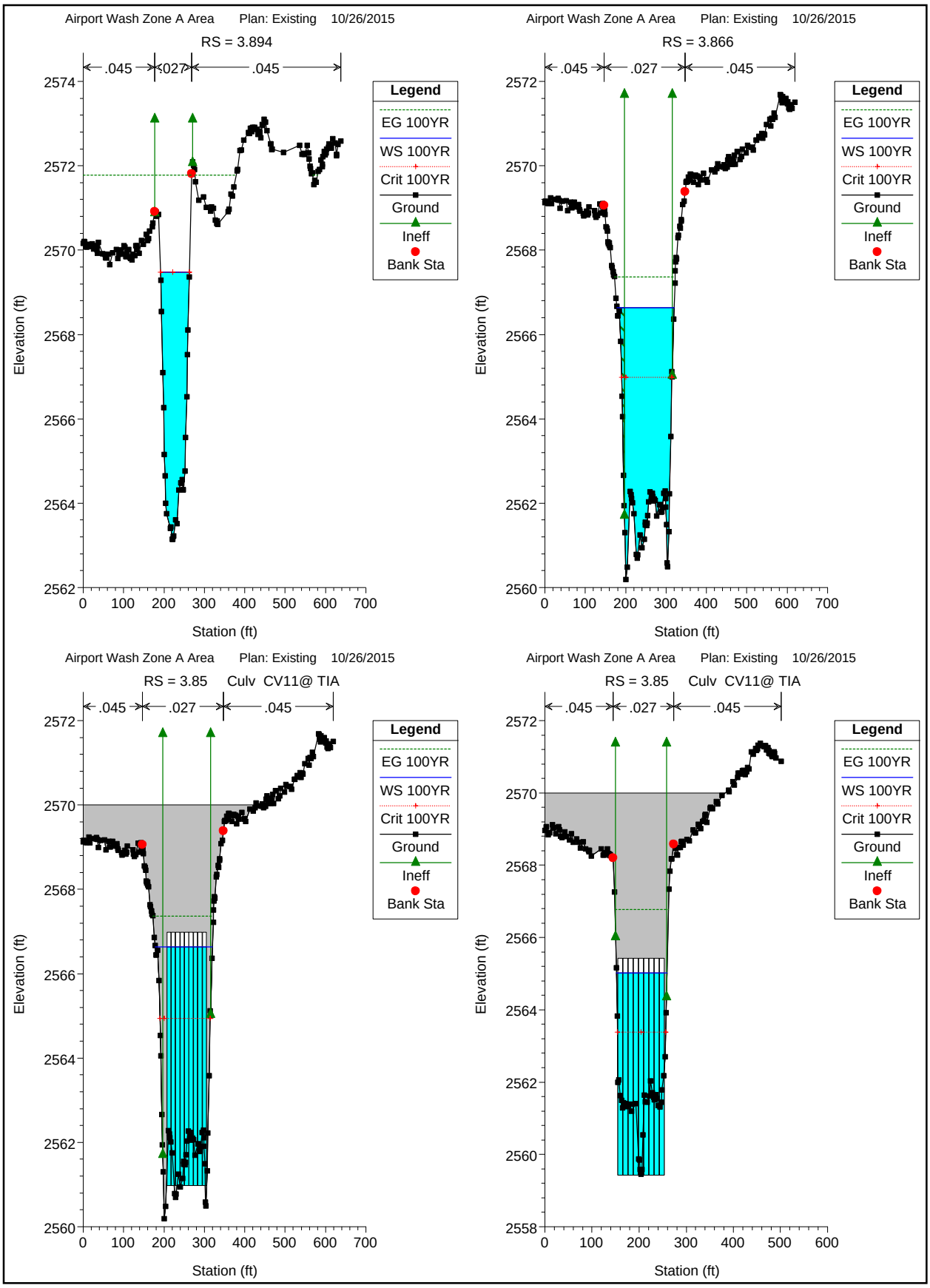
WS 100YR
Crit 100YR
Ground
Bank Sta
Elevation (ft)
Station (ft)


Airport Wash Zone A Area Plan: Existing 10/26/2015
RS = 4.043
.045
.027
.045
Legend
EG 100YR
WS 100YR
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)
Airport Wash Zone A Area Plan: Existing 10/26/2015
RS = 4.007
.045
.027
.045
Legend
EG 100YR
WS 100YR
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)
Airport Wash Zone A Area Plan: Existing 10/26/2015
RS = 3.969
.045
.027
.045
Legend
EG 100YR
WS 100YR
Crit 100YR
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)
Airport Wash Zone A Area Plan: Existing 10/26/2015
RS = 3.932
.045
.027
.045
Legend
EG 100YR
WS 100YR
Crit 100YR
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)


Airport Wash Zone A Area Plan: Existing 10/26/2015
RS = 3.894
.045 .027 .045
Legend
EG 100YR
WS 100YR
Crit 100YR
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)
Airport Wash Zone A Area Plan: Existing 10/26/2015
RS = 3.866
.045 .027 .045
Legend
EG 100YR
WS 100YR
Crit 100YR
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)
Airport Wash Zone A Area Plan: Existing 10/26/2015
RS = 3.85 Culv CV11@ TIA
.045 .027 .045
Legend
EG 100YR
WS 100YR
Crit 100YR
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)
Airport Wash Zone A Area Plan: Existing 10/26/2015
RS = 3.85 Culv CV11@ TIA
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Legend
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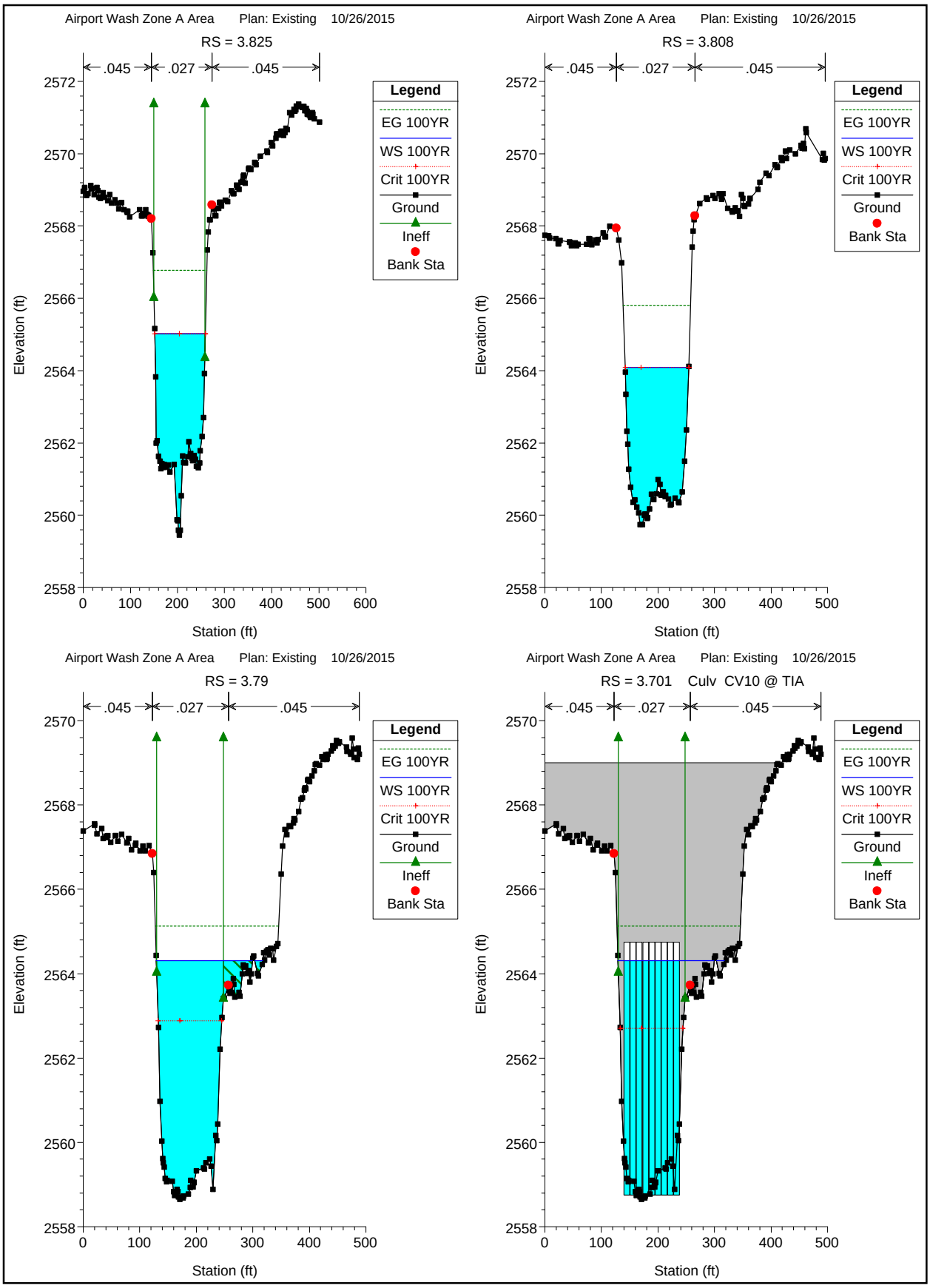
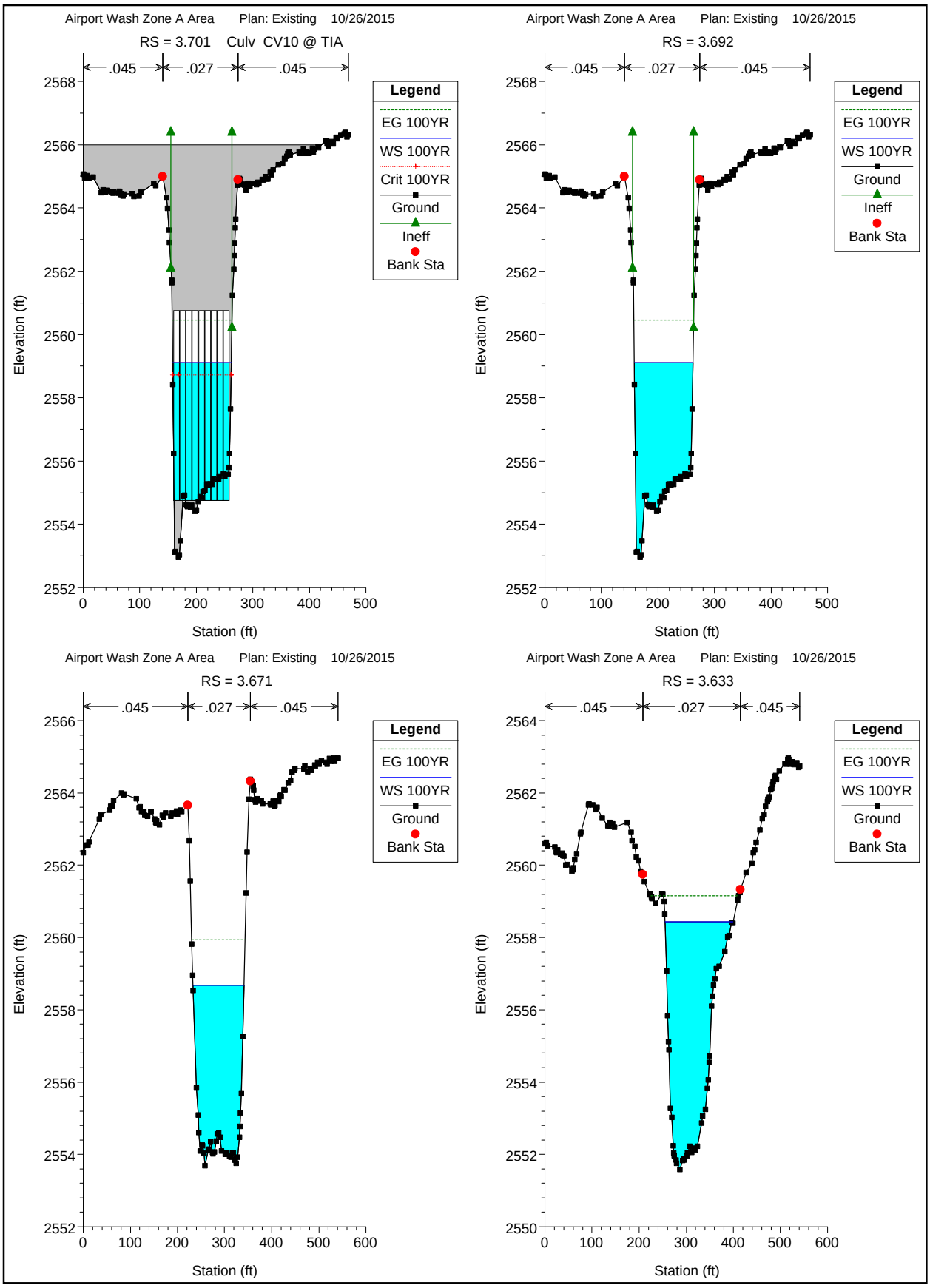
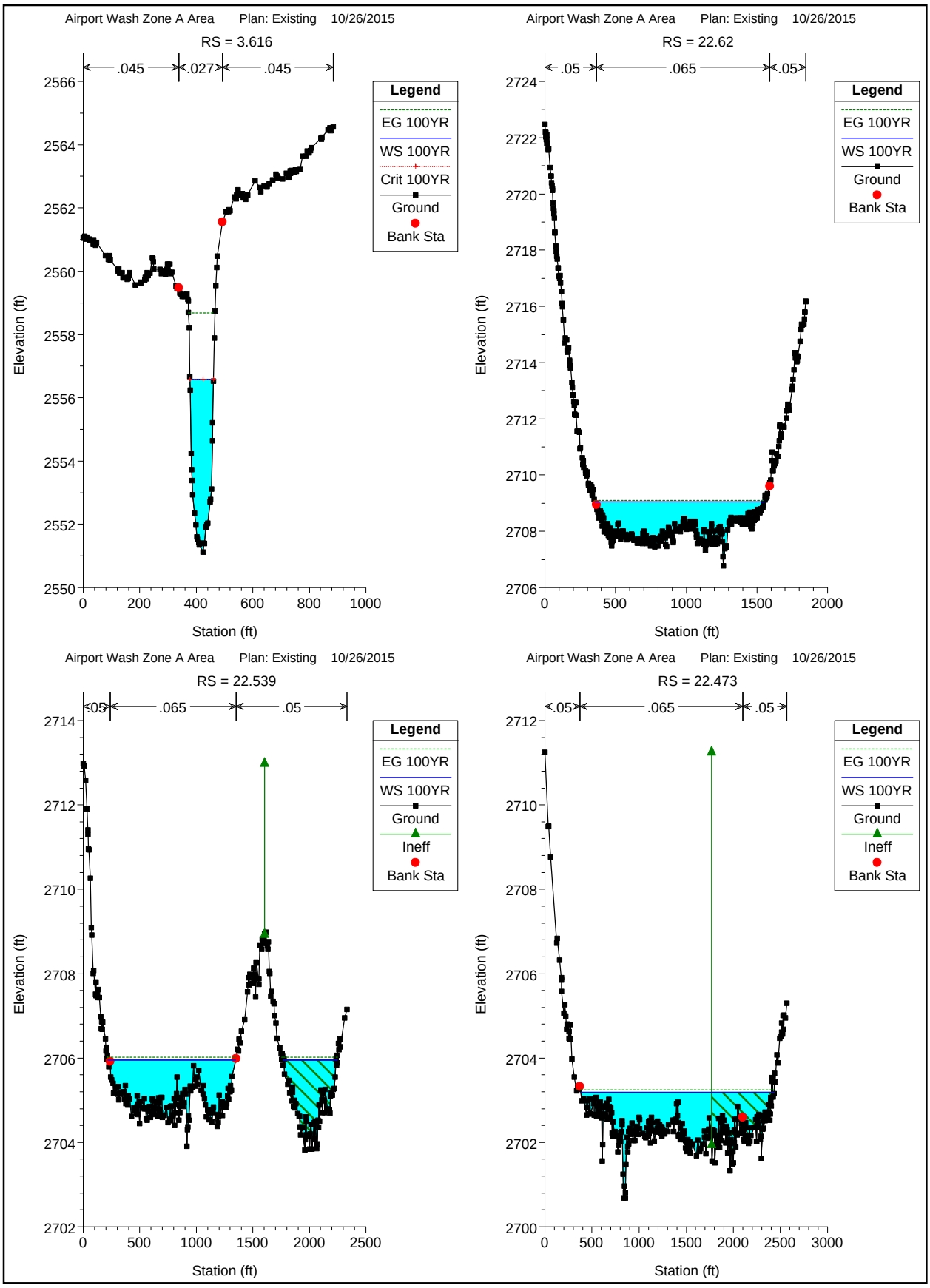
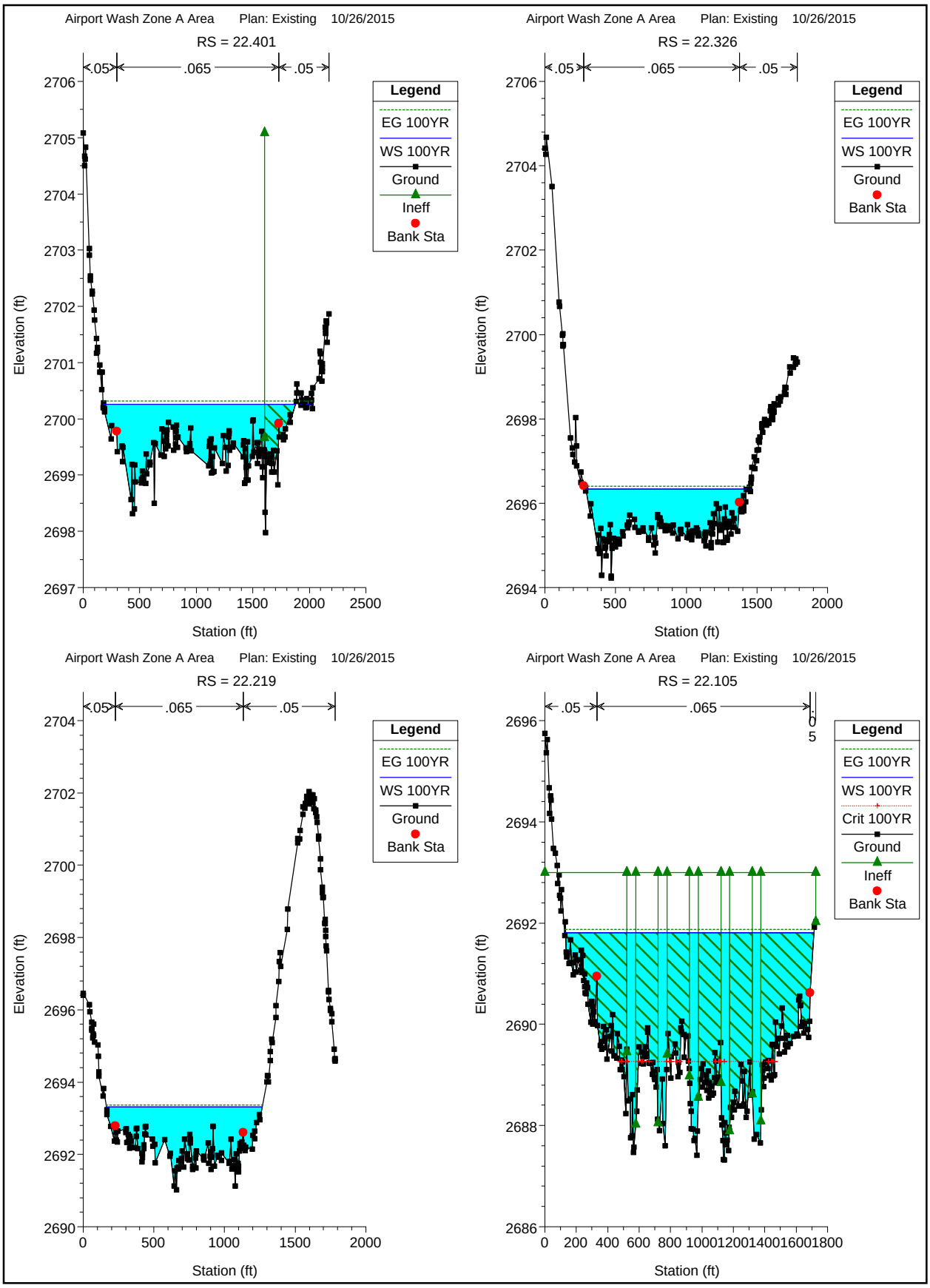
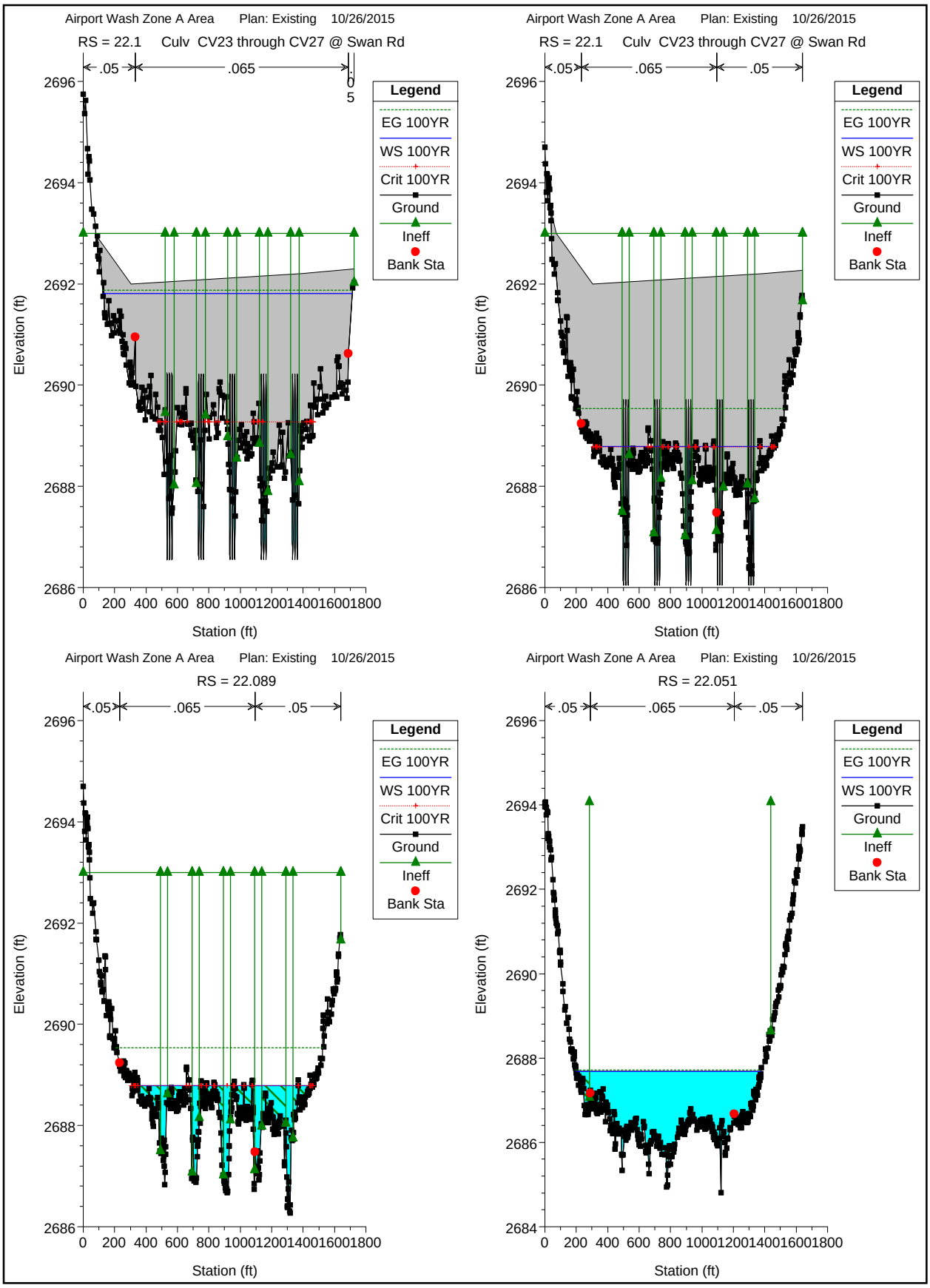
WS 100YR
Crit 100YR
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)

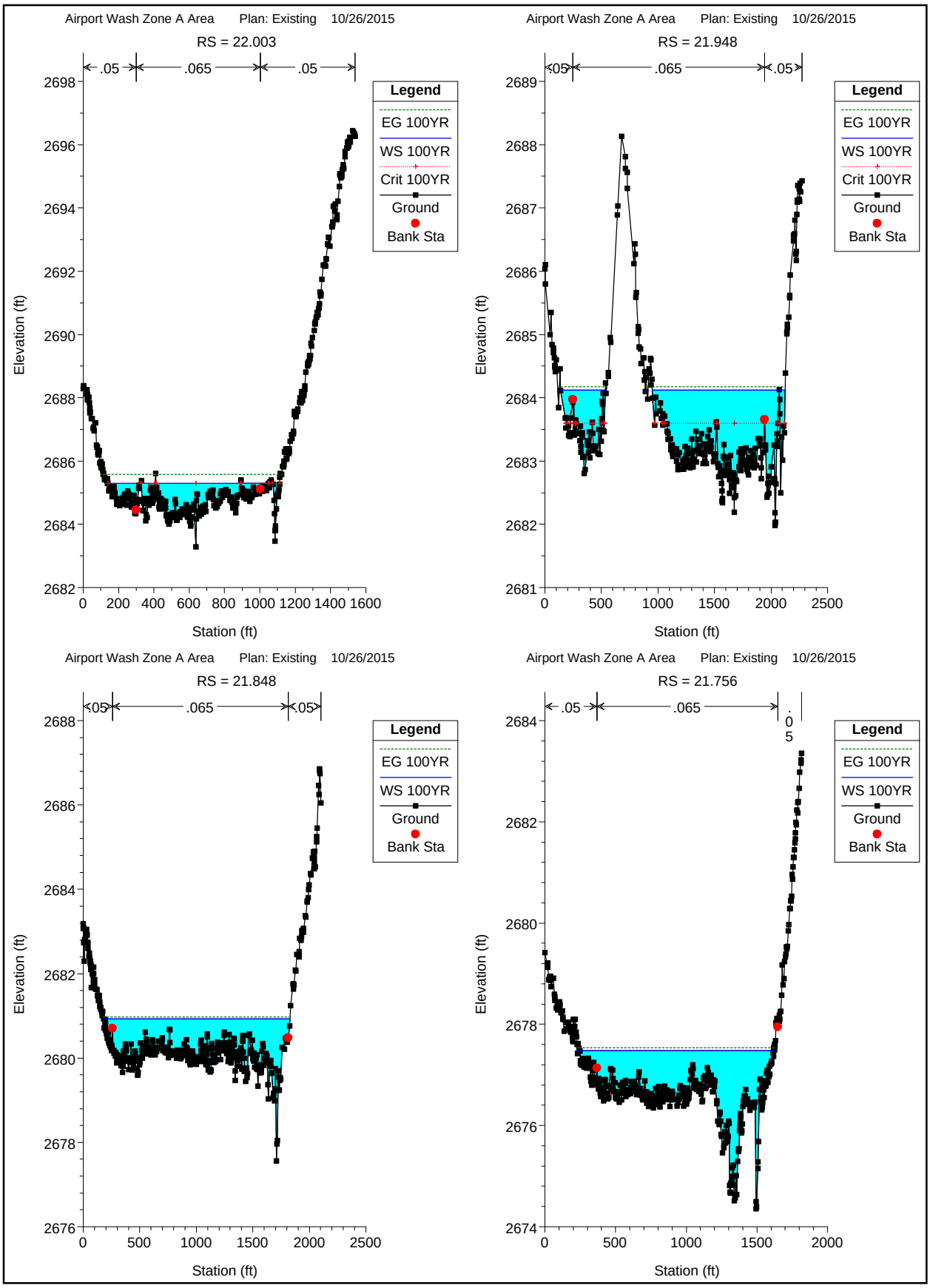

Airport Wash Zone A Area Plan: Existing 10/26/2015
RS = 3.825
.045 .027 .045
Legend
EG 100YR
WS 100YR
Crit 100YR
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)
Airport Wash Zone A Area Plan: Existing 10/26/2015
RS = 3.808
.045 .027 .045
Legend
EG 100YR
WS 100YR
Crit 100YR
Ground
Bank Sta
Elevation (ft)
Station (ft)
Airport Wash Zone A Area Plan: Existing 10/26/2015
RS = 3.79
.045 .027 .045
Legend
EG 100YR
WS 100YR
Crit 100YR
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)
Airport Wash Zone A Area Plan: Existing 10/26/2015
RS = 3.701 Culv CV10 @ TIA
.045 .027 .045
Legend
EG 100YR
WS 100YR
Crit 100YR
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)

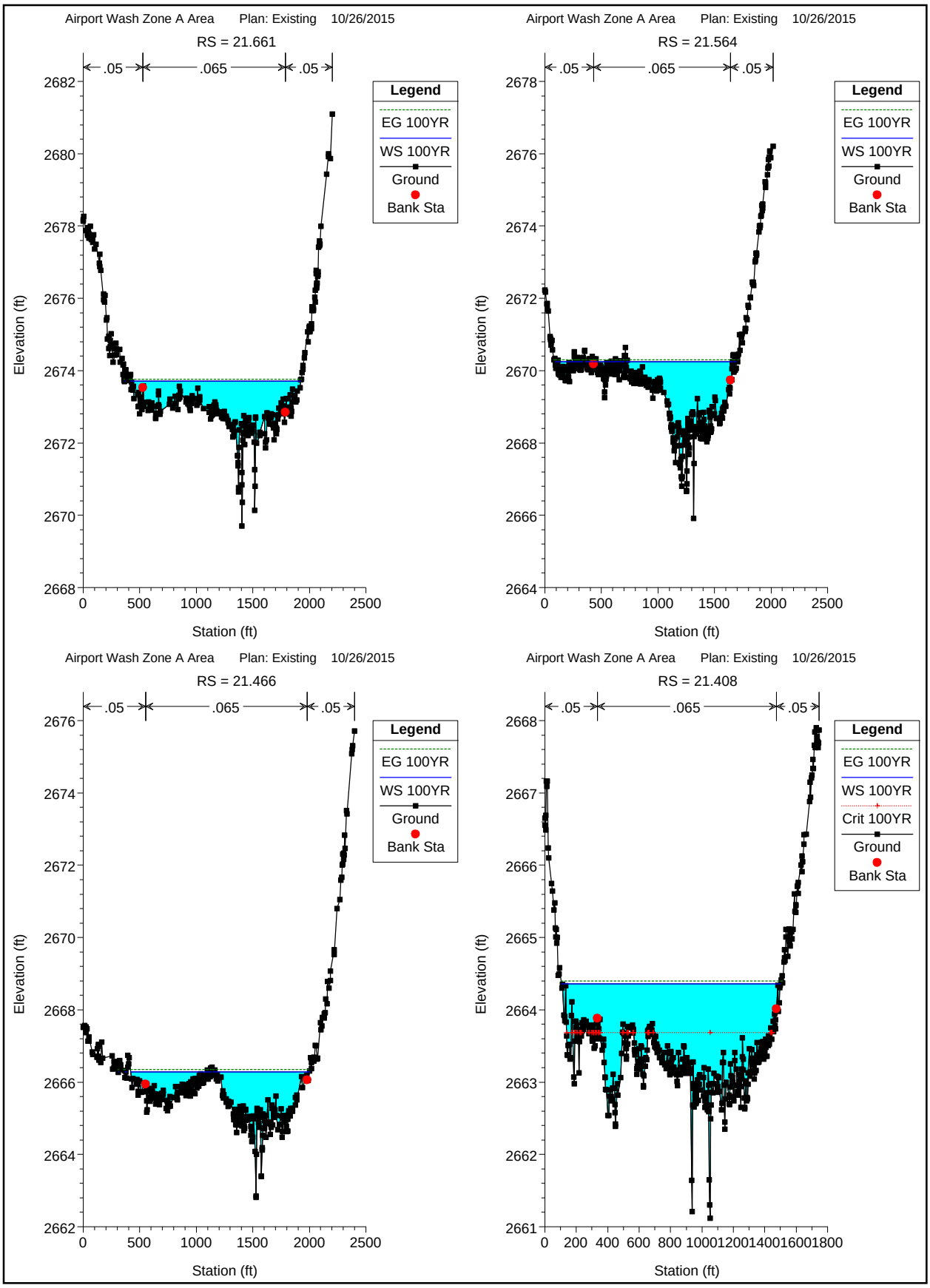

Airport Wash Zone A Area Plan: Existing 10/26/2015
RS = 3.701 Culv CV10 @ TIA
.045 .027 .045
Legend
EG 100YR
WS 100YR
Crit 100YR
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)
Airport Wash Zone A Area Plan: Existing 10/26/2015
RS = 3.692
.045 .027 .045
Legend
EG 100YR
WS 100YR
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)
Airport Wash Zone A Area Plan: Existing 10/26/2015
RS = 3.671
.045 .027 .045
Legend
EG 100YR
WS 100YR
Ground
Bank Sta
Elevation (ft)
Station (ft)
Airport Wash Zone A Area Plan: Existing 10/26/2015
RS = 3.633
.045 .027 .045
Legend
EG 100YR
WS 100YR
Ground
Bank Sta
Elevation (ft)
Station (ft)

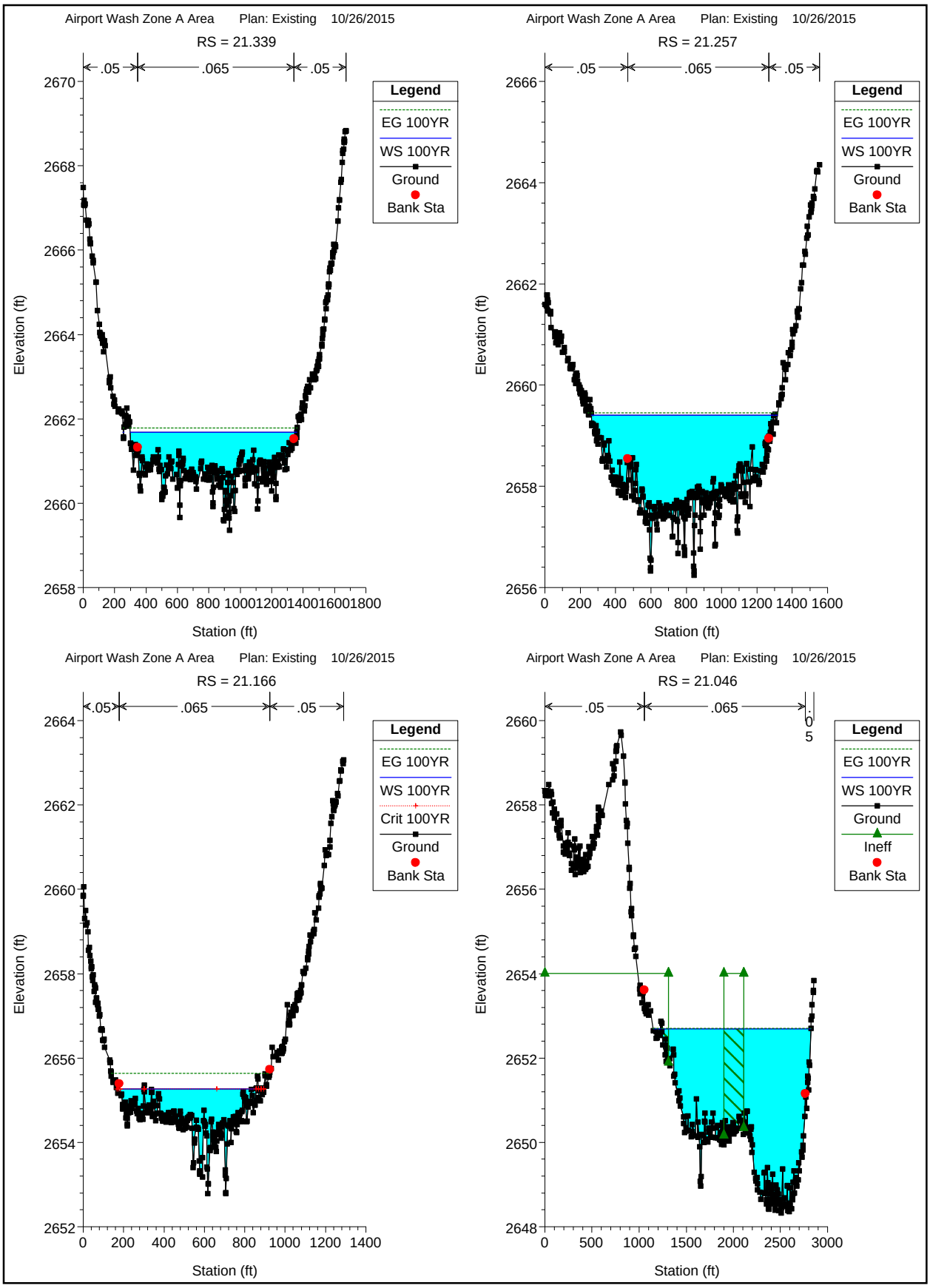

Airport Wash Zone A Area Plan: Existing 10/26/2015
RS = 3.616
.045
.027
.045
Legend
EG 100YR
WS 100YR
Crit 100YR
Ground
Bank Sta
Elevation (ft)
Station (ft)
Airport Wash Zone A Area Plan: Existing 10/26/2015
RS = 22.62
.05
.065
.05
Legend
EG 100YR
WS 100YR
Ground
Bank Sta
Elevation (ft)
Station (ft)
Airport Wash Zone A Area Plan: Existing 10/26/2015
RS = 22.539
.05
.065
.05
Legend
EG 100YR
WS 100YR
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)
Airport Wash Zone A Area Plan: Existing 10/26/2015
RS = 22.473
.05
.065
.05
Legend
EG 100YR
WS 100YR
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)

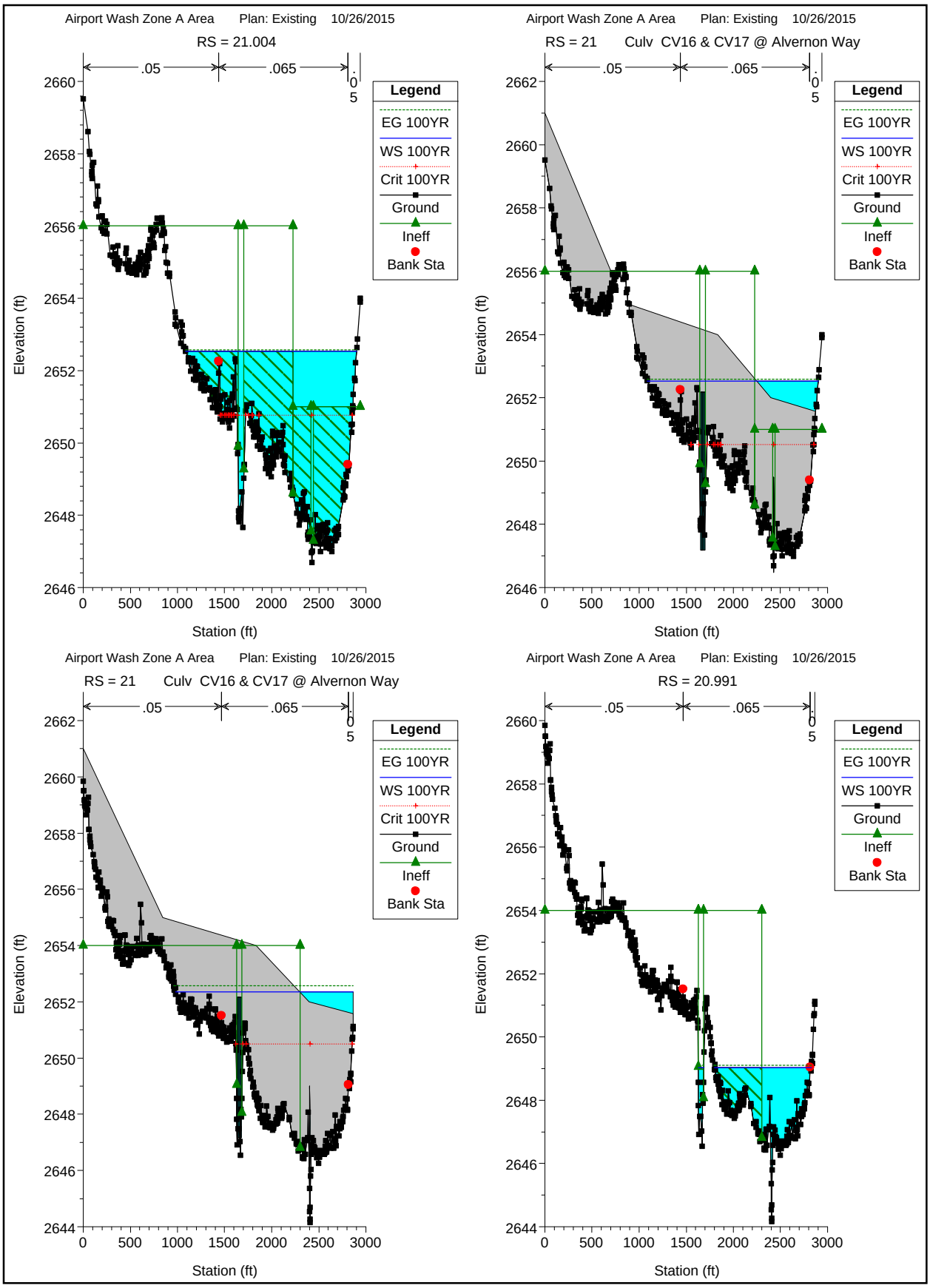

Airport Wash Zone A Area Plan: Existing 10/26/2015
RS = 22.401
.05
.065
.05
Legend
EG 100YR
WS 100YR
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)
Airport Wash Zone A Area Plan: Existing 10/26/2015
RS = 22.326
.05
.065
.05
Legend
EG 100YR
WS 100YR
Ground
Bank Sta
Elevation (ft)
Station (ft)
Airport Wash Zone A Area Plan: Existing 10/26/2015
RS = 22.219
.05
.065
.05
Legend
EG 100YR
WS 100YR
Ground
Bank Sta
Elevation (ft)
Station (ft)
Airport Wash Zone A Area Plan: Existing 10/26/2015
RS = 22.105
.05
.065
Legend
EG 100YR
WS 100YR
Crit 100YR
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)

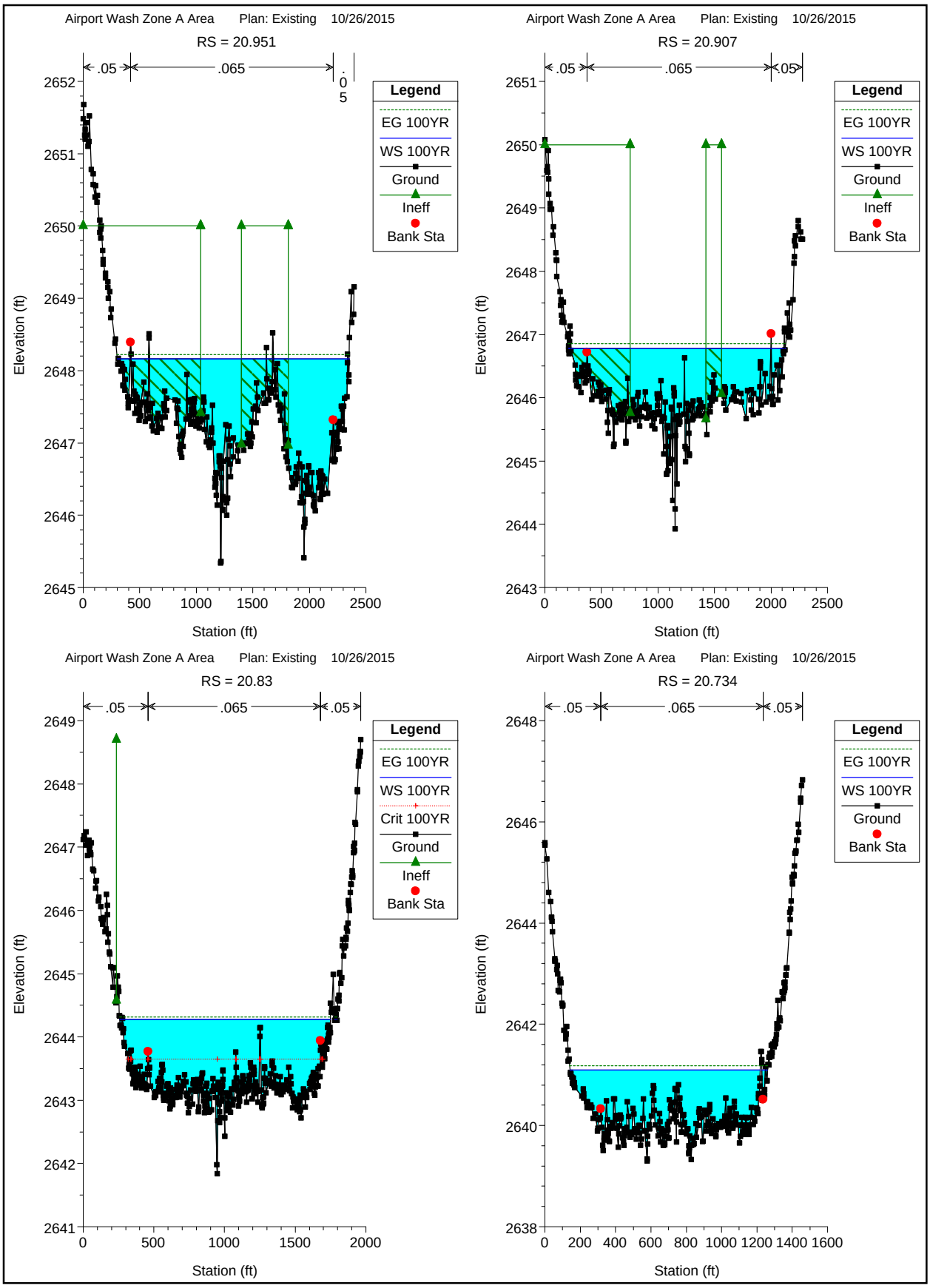

Airport Wash Zone A Area Plan: Existing 10/26/2015
RS = 22.1 Culv CV23 through CV27 @ Swan Rd
.05
.065
.05
Legend
EG 100YR
WS 100YR
Crit 100YR
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)
Airport Wash Zone A Area Plan: Existing 10/26/2015
RS = 22.1 Culv CV23 through CV27 @ Swan Rd
.05
.065
.05
Legend
EG 100YR
WS 100YR
Crit 100YR
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)
Airport Wash Zone A Area Plan: Existing 10/26/2015
RS = 22.089
.05
.065
.05
Legend
EG 100YR
WS 100YR
Crit 100YR
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)
Airport Wash Zone A Area Plan: Existing 10/26/2015
RS = 22.051
.05
.065
.05
Legend
EG 100YR
WS 100YR
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)

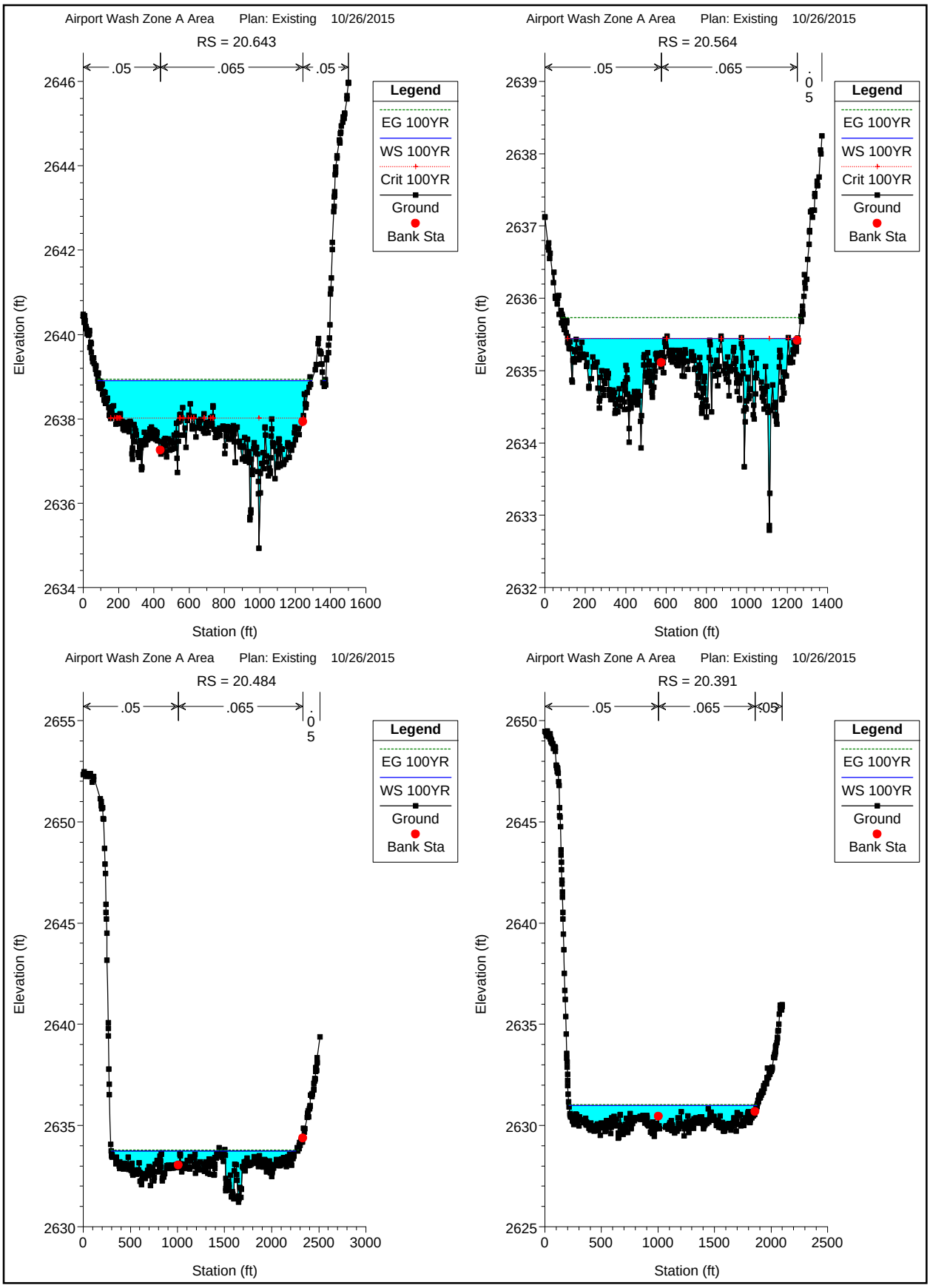

Airport Wash Zone A Area Plan: Existing 10/26/2015
RS = 22.003
.05
.065
.05
Legend
EG 100YR
WS 100YR
Crit 100YR
Ground
Bank Sta
Elevation (ft)
Station (ft)
Airport Wash Zone A Area Plan: Existing 10/26/2015
RS = 21.948
.05
.065
.05
Legend
EG 100YR
WS 100YR
Crit 100YR
Ground
Bank Sta
Elevation (ft)
Station (ft)
Airport Wash Zone A Area Plan: Existing 10/26/2015
RS = 21.848
.05
.065
.05
Legend
EG 100YR
WS 100YR
Ground
Bank Sta
Elevation (ft)
Station (ft)
Airport Wash Zone A Area Plan: Existing 10/26/2015
RS = 21.756
.05
.065
.05
Legend
EG 100YR
WS 100YR
Ground
Bank Sta
Elevation (ft)
Station (ft)

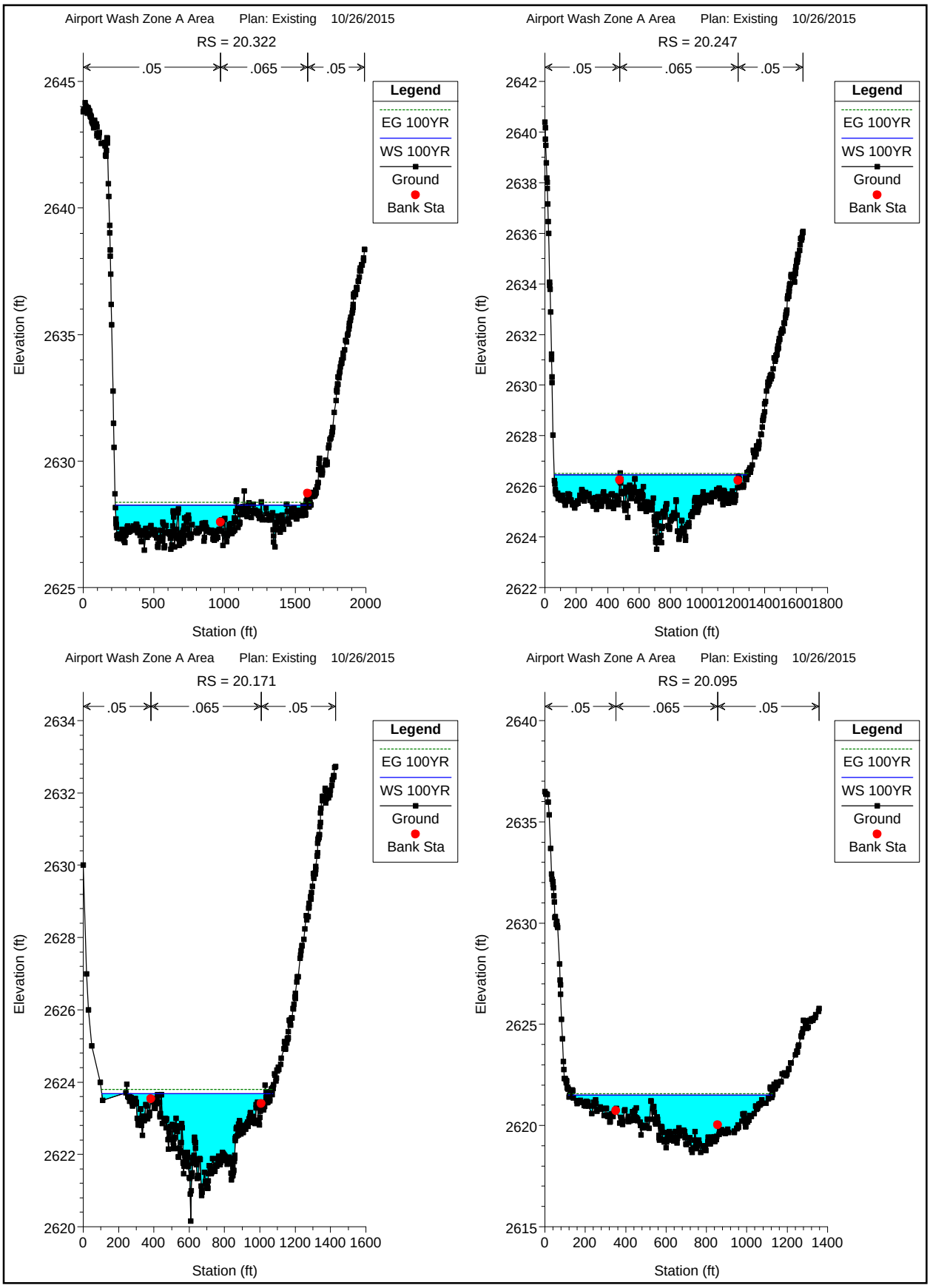

Airport Wash Zone A Area Plan: Existing 10/26/2015
RS = 21.661
.05
.065
.05
Legend
EG 100YR
WS 100YR
Ground
Bank Sta
Elevation (ft)
Station (ft)
Airport Wash Zone A Area Plan: Existing 10/26/2015
RS = 21.564
.05
.065
.05
Legend
EG 100YR
WS 100YR
Ground
Bank Sta
Elevation (ft)
Station (ft)
Airport Wash Zone A Area Plan: Existing 10/26/2015
RS = 21.466
.05
.065
.05
Legend
EG 100YR
WS 100YR
Ground
Bank Sta
Elevation (ft)
Station (ft)
Airport Wash Zone A Area Plan: Existing 10/26/2015
RS = 21.408
.05
.065
.05
Legend
EG 100YR
WS 100YR
Crit 100YR
Ground
Bank Sta
Elevation (ft)
Station (ft)

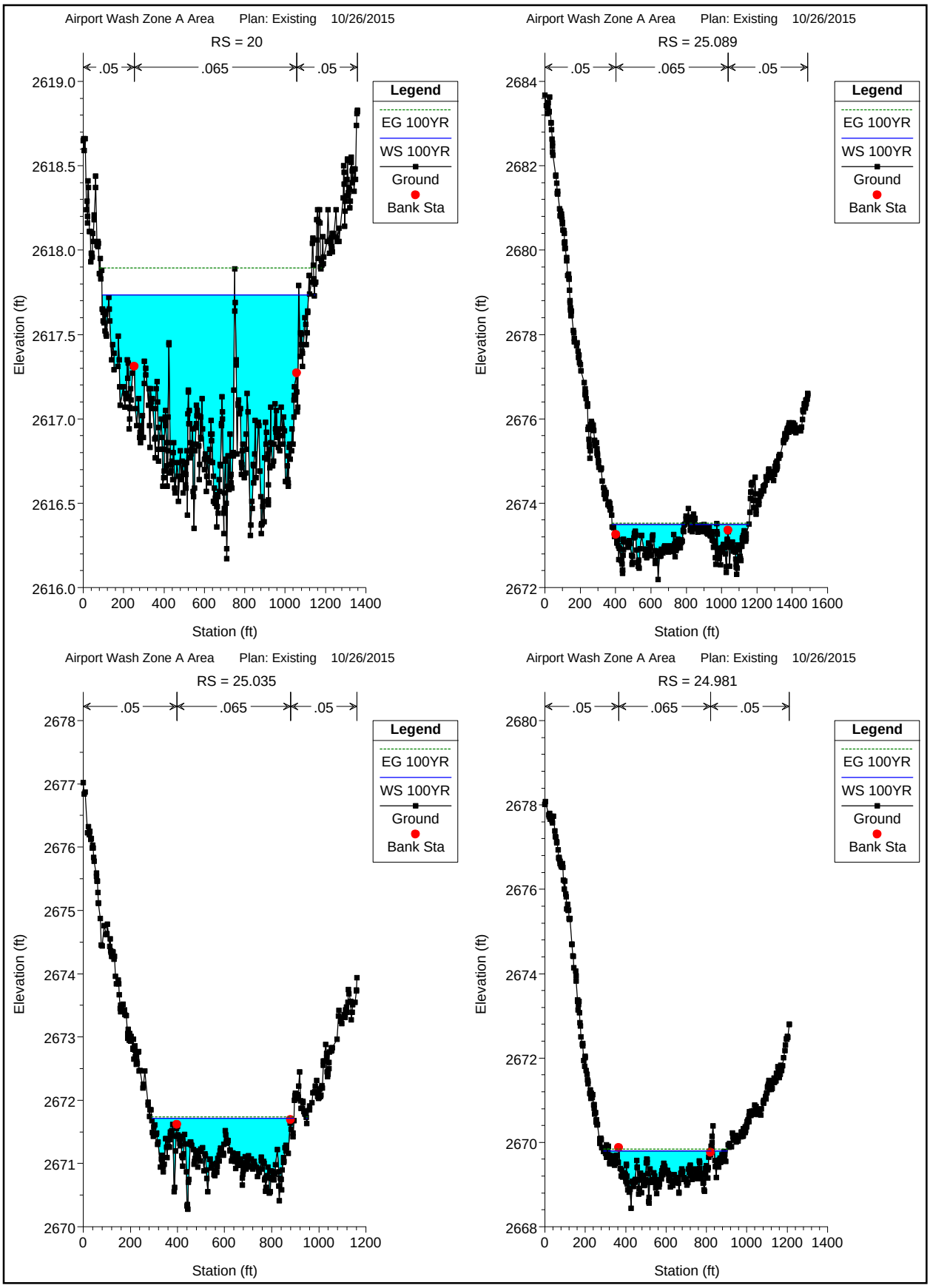

Airport Wash Zone A Area Plan: Existing 10/26/2015
RS = 21.339
.05
.065
.05
Legend
EG 100YR
WS 100YR
Ground
Bank Sta
Elevation (ft)
Station (ft)
Airport Wash Zone A Area Plan: Existing 10/26/2015
RS = 21.257
.05
.065
.05
Legend
EG 100YR
WS 100YR
Ground
Bank Sta
Elevation (ft)
Station (ft)
Airport Wash Zone A Area Plan: Existing 10/26/2015
RS = 21.166
.05
.065
.05
Legend
EG 100YR
WS 100YR
Crit 100YR
Ground
Bank Sta
Elevation (ft)
Station (ft)
Airport Wash Zone A Area Plan: Existing 10/26/2015
RS = 21.046
.05
.065
.05
Legend
EG 100YR
WS 100YR
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)

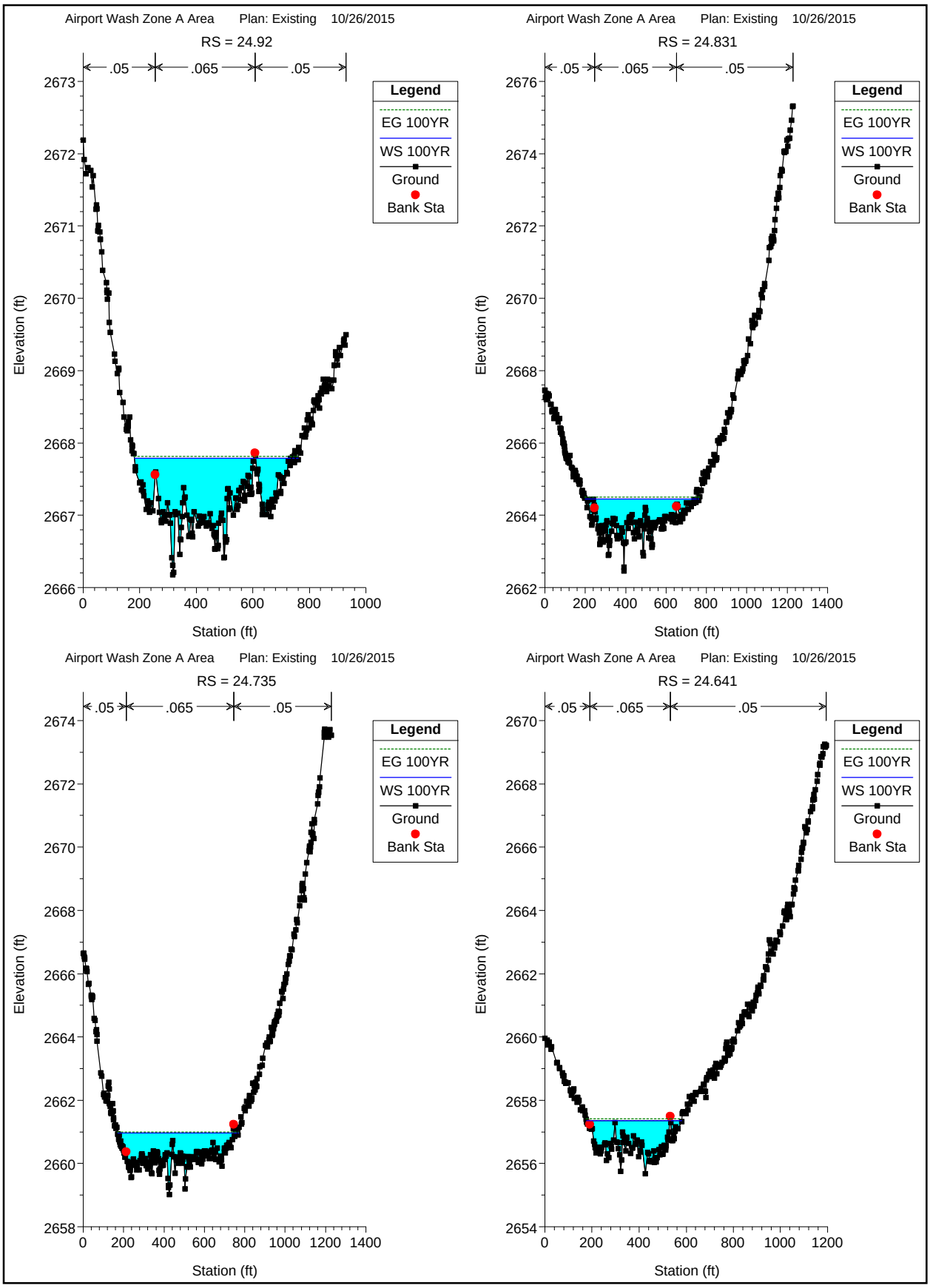

Airport Wash Zone A Area Plan: Existing 10/26/2015
RS = 21.004
.05
.065
.05
Legend
EG 100YR
WS 100YR
Crit 100YR
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)
Airport Wash Zone A Area Plan: Existing 10/26/2015
RS = 21 Culv CV16 & CV17 @ Alvernon Way
Airport Wash Zone A Area Plan: Existing 10/26/2015
RS = 21 Culv CV16 & CV17 @ Alvernon Way
Airport Wash Zone A Area Plan: Existing 10/26/2015
RS = 20.991

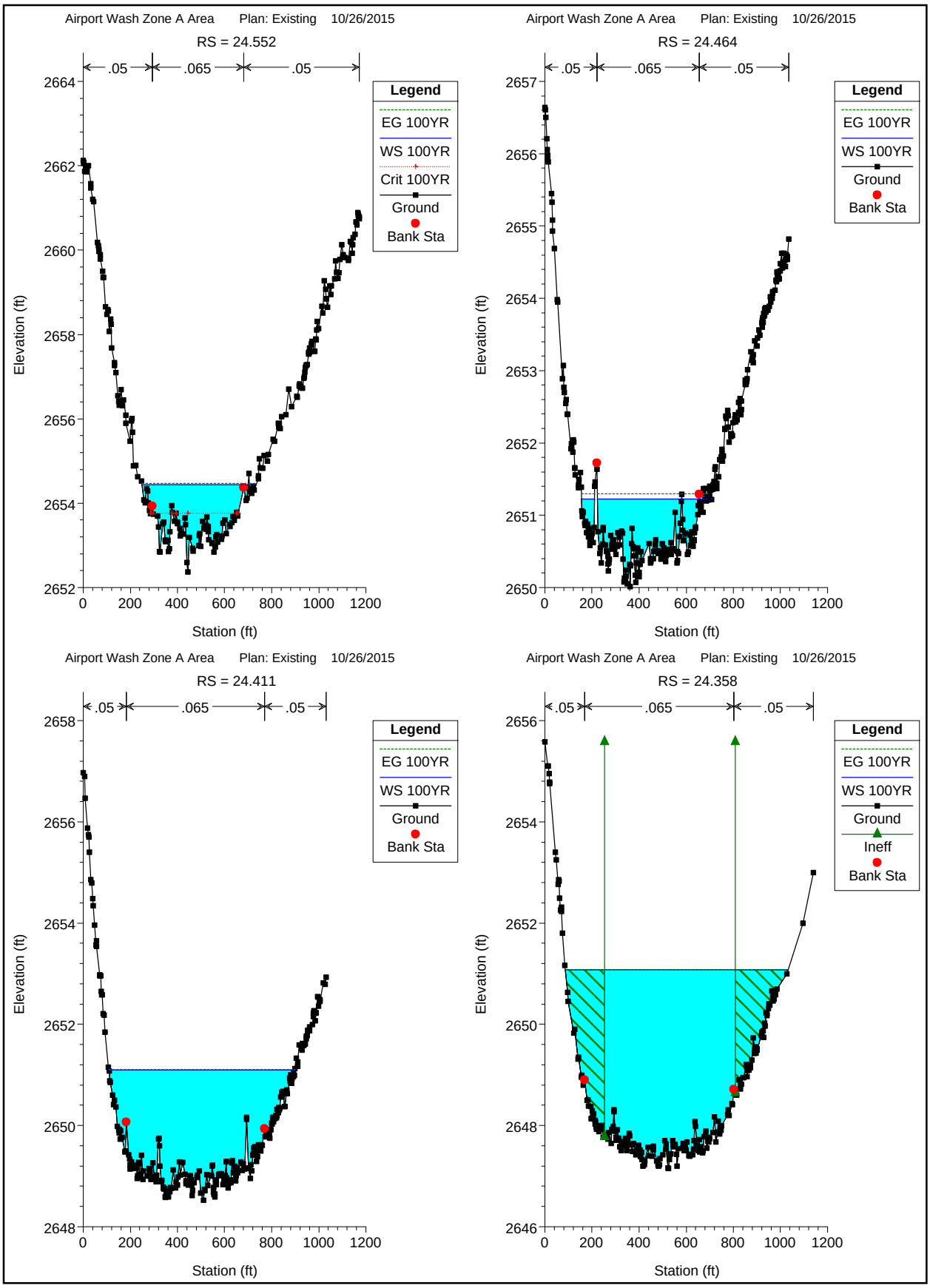

Airport Wash Zone A Area Plan: Existing 10/26/2015
RS = 20.951
.05
.065
.05
Legend
EG 100YR
WS 100YR
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)
Airport Wash Zone A Area Plan: Existing 10/26/2015
RS = 20.907
.05
.065
.05
Legend
EG 100YR
WS 100YR
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)
Airport Wash Zone A Area Plan: Existing 10/26/2015
RS = 20.83
.05
.065
.05
Legend
EG 100YR
WS 100YR
Crit 100YR
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)
Airport Wash Zone A Area Plan: Existing 10/26/2015
RS = 20.734
.05
.065
.05
Legend
EG 100YR
WS 100YR
Ground
Bank Sta
Elevation (ft)
Station (ft)

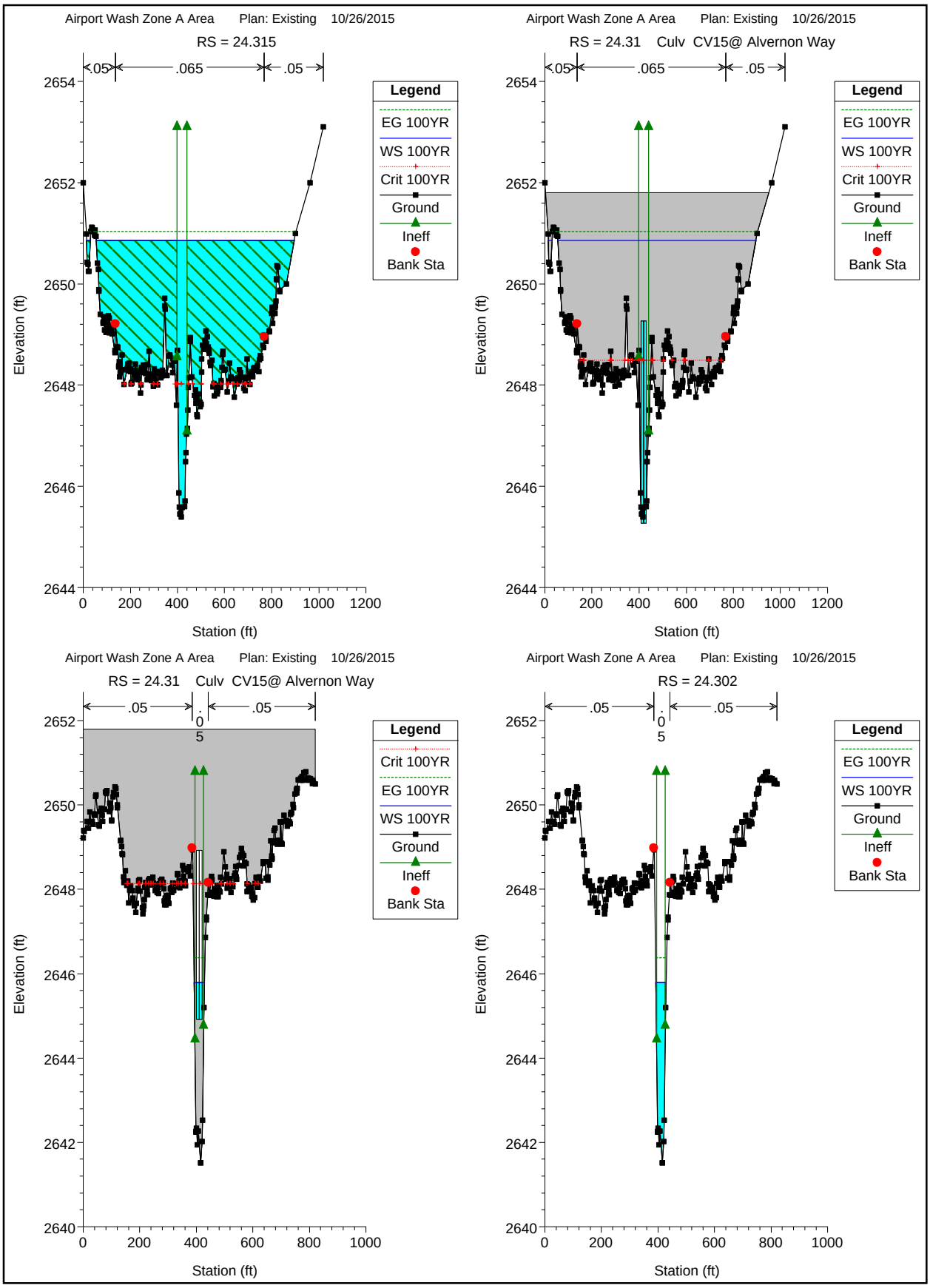

Airport Wash Zone A Area Plan: Existing 10/26/2015
RS = 20.643
.05
.065
.05
Legend
EG 100YR
WS 100YR
Crit 100YR
Ground
Bank Sta
Elevation (ft)
Station (ft)
Airport Wash Zone A Area Plan: Existing 10/26/2015
RS = 20.564
.05
.065
.05
Legend
EG 100YR
WS 100YR
Crit 100YR
Ground
Bank Sta
Elevation (ft)
Station (ft)
Airport Wash Zone A Area Plan: Existing 10/26/2015
RS = 20.484
.05
.065
.05
Legend
EG 100YR
WS 100YR
Ground
Bank Sta
Elevation (ft)
Station (ft)
Airport Wash Zone A Area Plan: Existing 10/26/2015
RS = 20.391
.05
.065
.05
Legend
EG 100YR
WS 100YR
Ground
Bank Sta
Elevation (ft)
Station (ft)

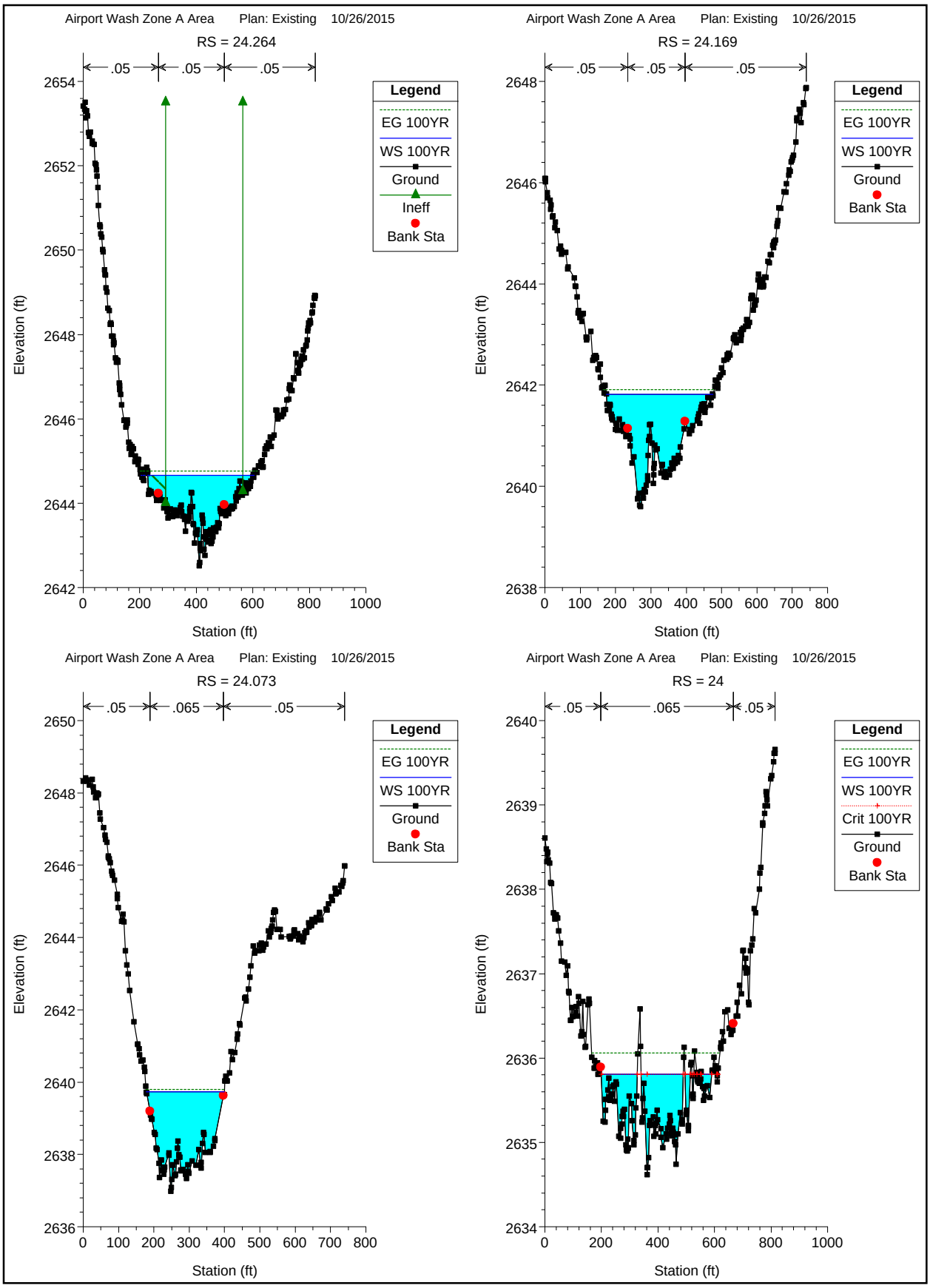

Airport Wash Zone A Area Plan: Existing 10/26/2015
RS = 20.322
.05
.065
.05
Legend
EG 100YR
WS 100YR
Ground
Bank Sta
Elevation (ft)
Station (ft)
Airport Wash Zone A Area Plan: Existing 10/26/2015
RS = 20.247
.05
.065
.05
Legend
EG 100YR
WS 100YR
Ground
Bank Sta
Elevation (ft)
Station (ft)
Airport Wash Zone A Area Plan: Existing 10/26/2015
RS = 20.171
.05
.065
.05
Legend
EG 100YR
WS 100YR
Ground
Bank Sta
Elevation (ft)
Station (ft)
Airport Wash Zone A Area Plan: Existing 10/26/2015
RS = 20.095
.05
.065
.05
Legend
EG 100YR
WS 100YR
Ground
Bank Sta
Elevation (ft)
Station (ft)

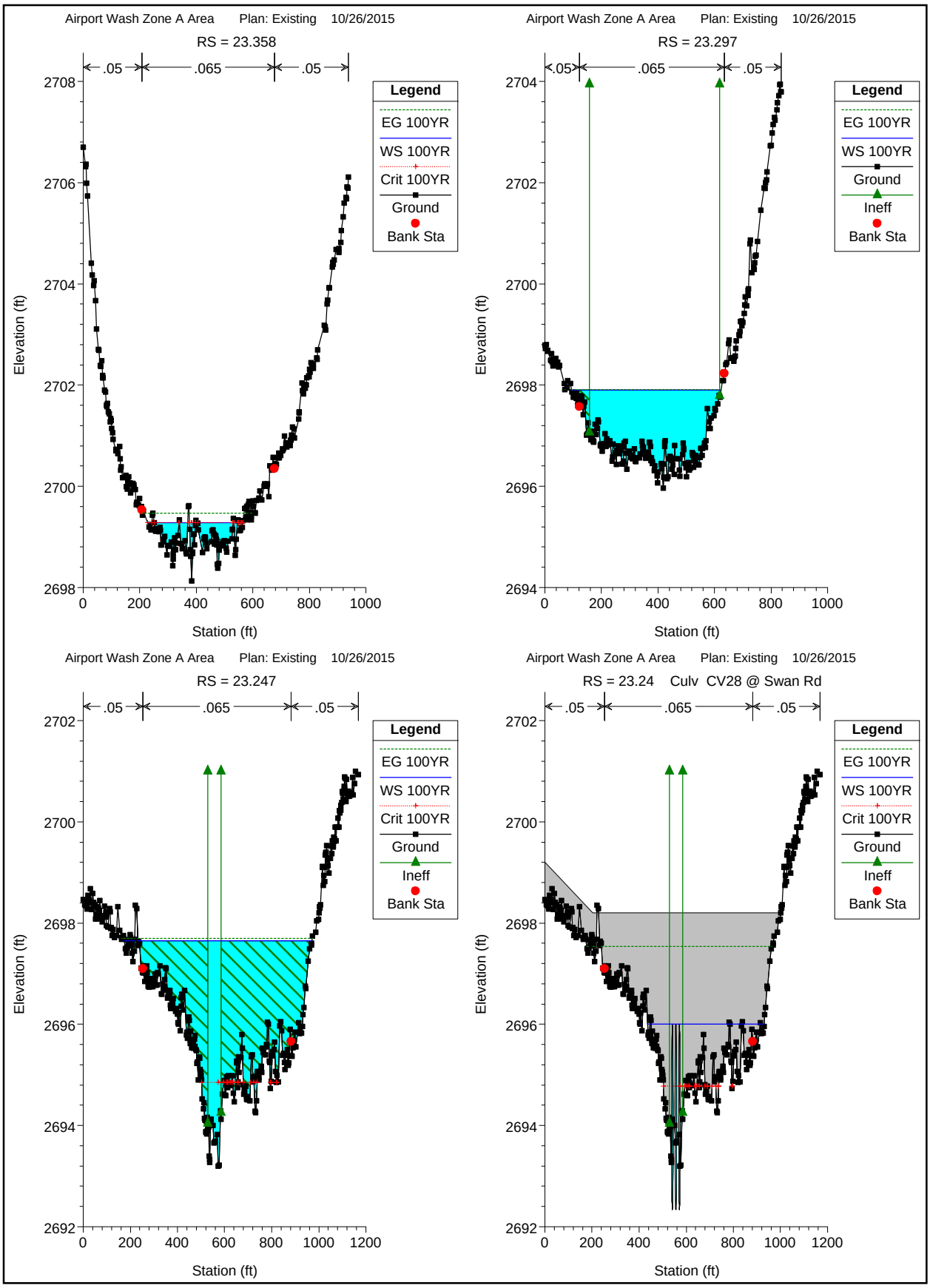

Airport Wash Zone A Area Plan: Existing 10/26/2015
RS = 20
.05
.065
.05
Legend
EG 100YR
WS 100YR
Ground
Bank Sta
Elevation (ft)
Station (ft)
Airport Wash Zone A Area Plan: Existing 10/26/2015
RS = 25.089
Airport Wash Zone A Area Plan: Existing 10/26/2015
RS = 25.035
Airport Wash Zone A Area Plan: Existing 10/26/2015
RS = 24.981

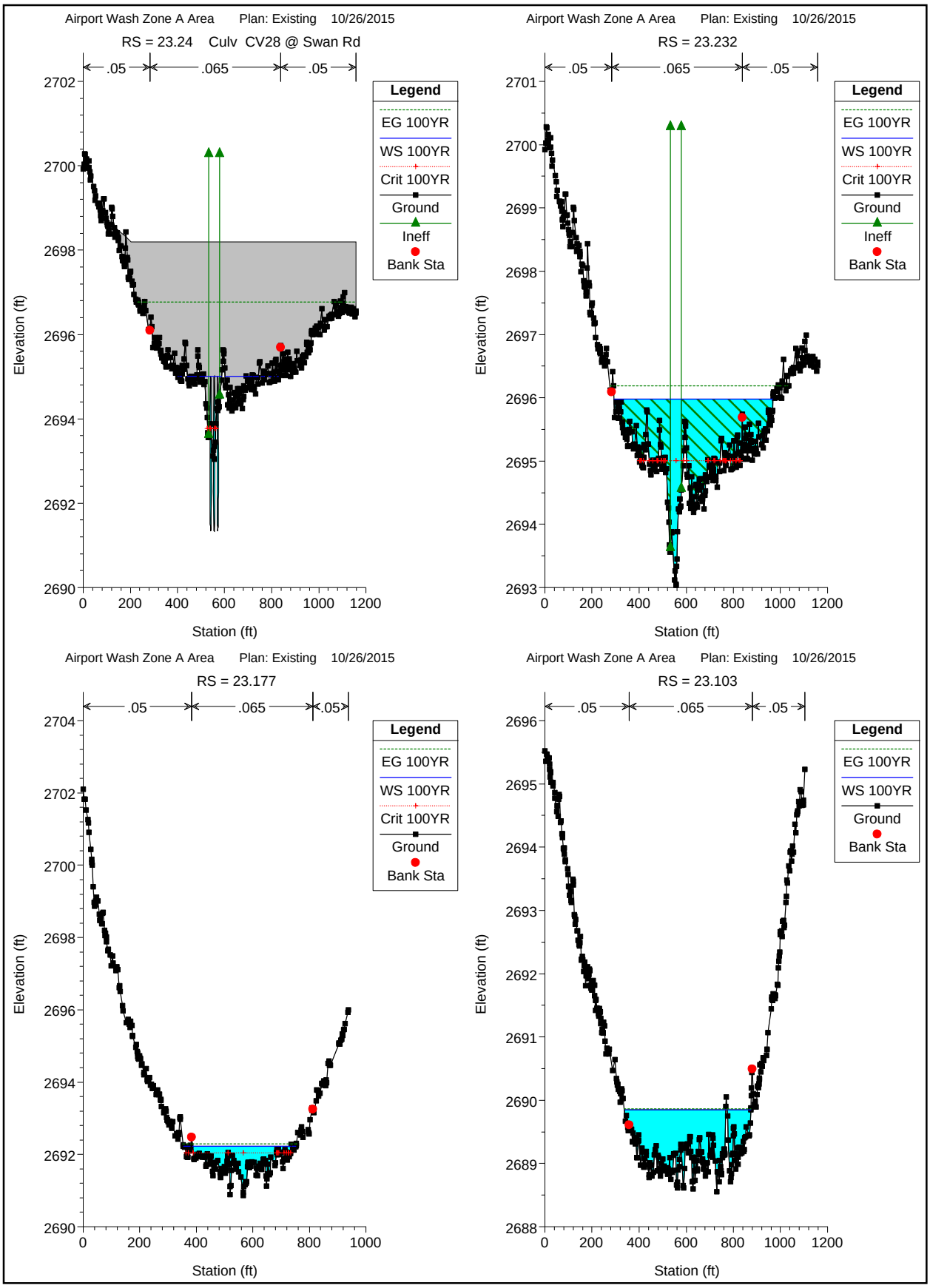

Airport Wash Zone A Area Plan: Existing 10/26/2015
RS = 24.92
.05
.065
.05
Legend
EG 100YR
WS 100YR
Ground
Bank Sta
Elevation (ft)
Station (ft)
Airport Wash Zone A Area Plan: Existing 10/26/2015
RS = 24.831
.05
.065
.05
Legend
EG 100YR
WS 100YR
Ground
Bank Sta
Elevation (ft)
Station (ft)
Airport Wash Zone A Area Plan: Existing 10/26/2015
RS = 24.735
.05
.065
.05
Legend
EG 100YR
WS 100YR
Ground
Bank Sta
Elevation (ft)
Station (ft)
Airport Wash Zone A Area Plan: Existing 10/26/2015
RS = 24.641
.05
.065
.05
Legend
EG 100YR
WS 100YR
Ground
Bank Sta
Elevation (ft)
Station (ft)

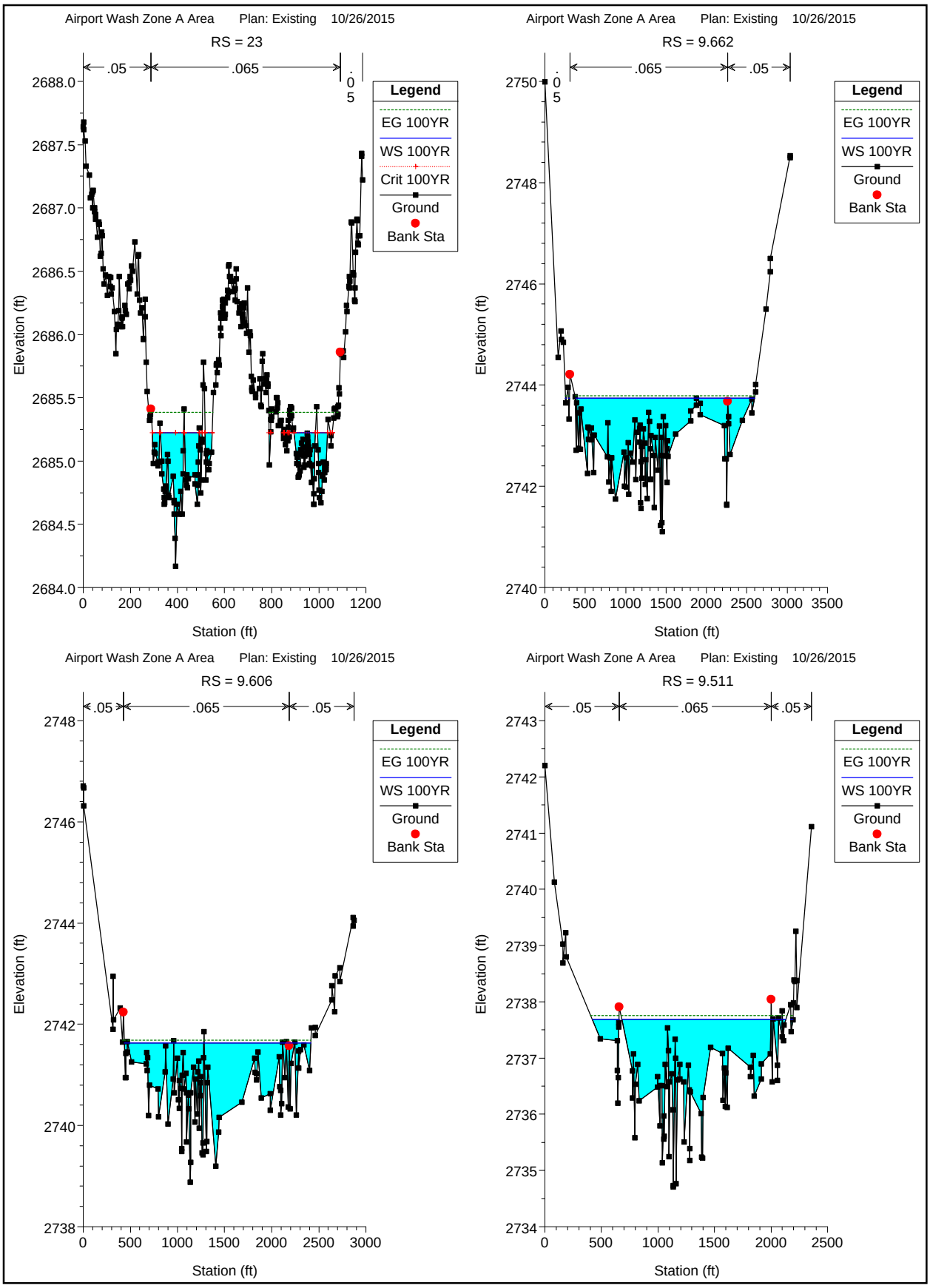

Airport Wash Zone A Area Plan: Existing 10/26/2015
RS = 24.552
.05
.065
.05
Legend
EG 100YR
WS 100YR
Crit 100YR
Ground
Bank Sta
Elevation (ft)
Station (ft)
Airport Wash Zone A Area Plan: Existing 10/26/2015
RS = 24.464
.05
.065
.05
Legend
EG 100YR
WS 100YR
Ground
Bank Sta
Elevation (ft)
Station (ft)
Airport Wash Zone A Area Plan: Existing 10/26/2015
RS = 24.411
.05
.065
.05
Legend
EG 100YR
WS 100YR
Ground
Bank Sta
Elevation (ft)
Station (ft)
Airport Wash Zone A Area Plan: Existing 10/26/2015
RS = 24.358
.05
.065
.05
Legend
EG 100YR
WS 100YR
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)

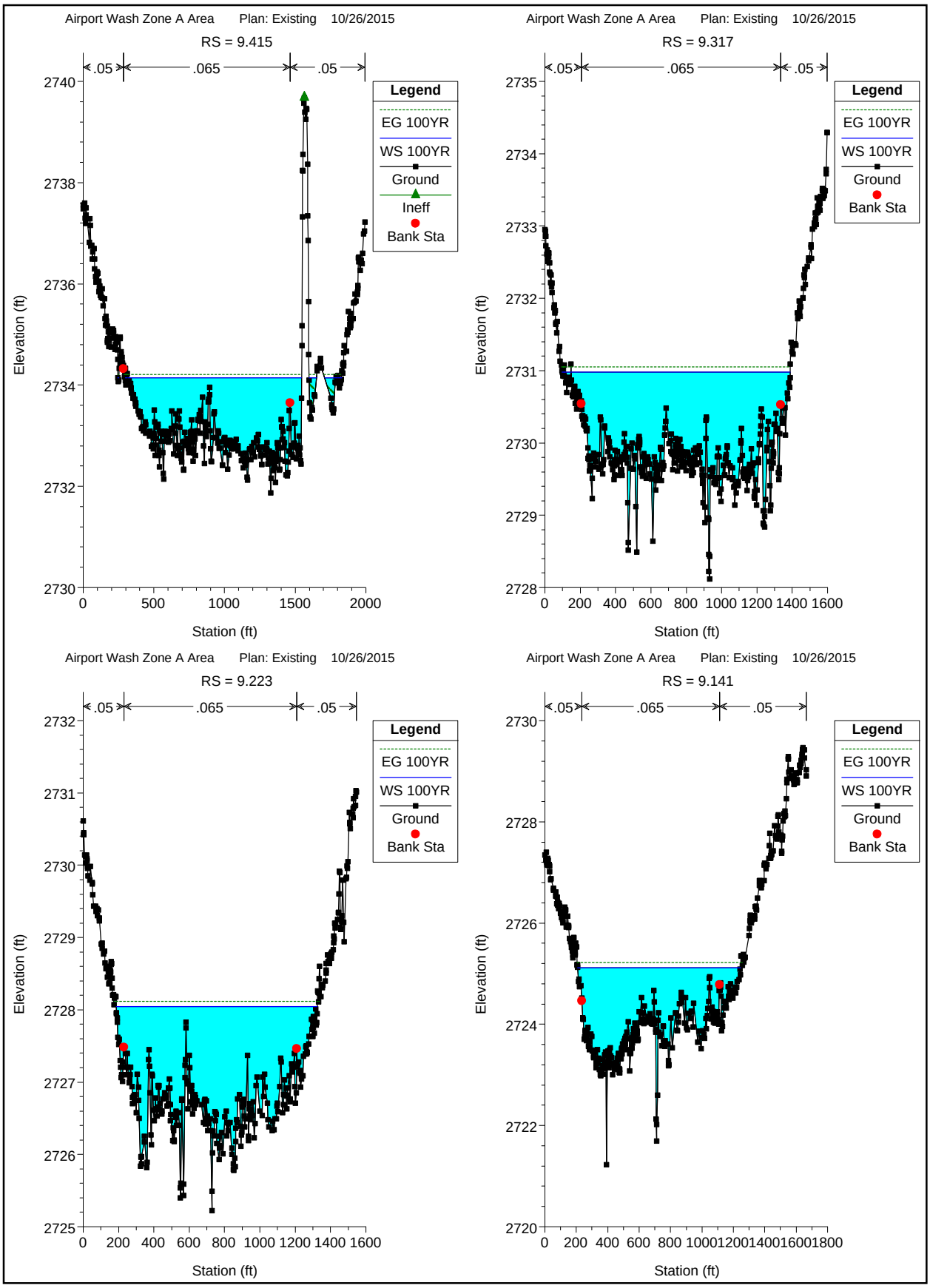

Airport Wash Zone A Area Plan: Existing 10/26/2015
RS = 24.315
.05
.065
.05
Legend
EG 100YR
WS 100YR
Crit 100YR
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)
Airport Wash Zone A Area Plan: Existing 10/26/2015
RS = 24.31 Culv CV15@ Alvernon Way
.05
.065
.05
Legend
EG 100YR
WS 100YR
Crit 100YR
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)
Airport Wash Zone A Area Plan: Existing 10/26/2015
RS = 24.31 Culv CV15@ Alvernon Way
.05
.05
.05
Legend
Crit 100YR
EG 100YR
WS 100YR
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)
Airport Wash Zone A Area Plan: Existing 10/26/2015
RS = 24.302
.05
.05
.05
Legend
EG 100YR
WS 100YR
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)

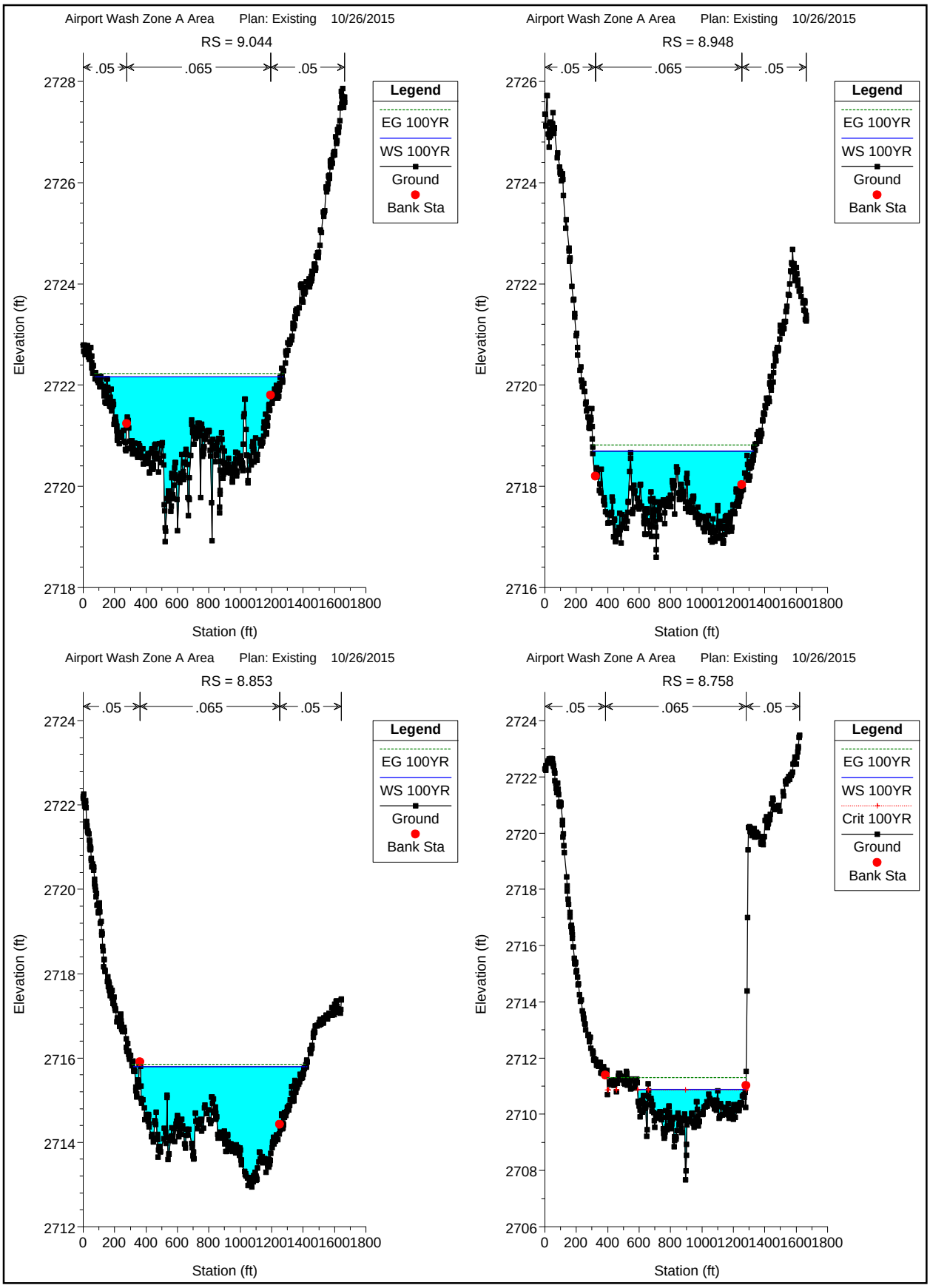

Airport Wash Zone A Area Plan: Existing 10/26/2015
RS = 24.264
.05 .05 .05
Legend
EG 100YR
WS 100YR
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)
Airport Wash Zone A Area Plan: Existing 10/26/2015
RS = 24.169
.05 .05 .05
Legend
EG 100YR
WS 100YR
Ground
Bank Sta
Elevation (ft)
Station (ft)
Airport Wash Zone A Area Plan: Existing 10/26/2015
RS = 24.073
.05 .065 .05
Legend
EG 100YR
WS 100YR
Ground
Bank Sta
Elevation (ft)
Station (ft)
Airport Wash Zone A Area Plan: Existing 10/26/2015
RS = 24
.05 .065 .05
Legend
EG 100YR
WS 100YR
Crit 100YR
Ground
Bank Sta
Elevation (ft)
Station (ft)


Airport Wash Zone A Area Plan: Existing 10/26/2015
RS = 23.358
.05
.065
.05
Legend
EG 100YR
WS 100YR
Crit 100YR
Ground
Bank Sta
Elevation (ft)
Station (ft)
Airport Wash Zone A Area Plan: Existing 10/26/2015
RS = 23.297
.05
.065
.05
Legend
EG 100YR
WS 100YR
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)
Airport Wash Zone A Area Plan: Existing 10/26/2015
RS = 23.247
.05
.065
.05
Legend
EG 100YR
WS 100YR
Crit 100YR
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)
Airport Wash Zone A Area Plan: Existing 10/26/2015
RS = 23.24 Culv CV28 @ Swan Rd
.05
.065
.05
Legend
EG 100YR
WS 100YR
Crit 100YR
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)


Airport Wash Zone A Area Plan: Existing 10/26/2015
RS = 23.24 Culv CV28 @ Swan Rd
.05 .065 .05
Legend
EG 100YR
WS 100YR
Crit 100YR
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)
Airport Wash Zone A Area Plan: Existing 10/26/2015
RS = 23.232
.05 .065 .05
Legend
EG 100YR
WS 100YR
Crit 100YR
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)
Airport Wash Zone A Area Plan: Existing 10/26/2015
RS = 23.177
.05 .065 .05
Legend
EG 100YR
WS 100YR
Crit 100YR
Ground
Bank Sta
Elevation (ft)
Station (ft)
Airport Wash Zone A Area Plan: Existing 10/26/2015
RS = 23.103
.05 .065 .05
Legend
EG 100YR
WS 100YR
Ground
Bank Sta
Elevation (ft)
Station (ft)


Airport Wash Zone A Area Plan: Existing 10/26/2015
RS = 23
.05
.065
.05
Legend
EG 100YR
WS 100YR
Crit 100YR
Ground
Bank Sta
Elevation (ft)
Station (ft)
Airport Wash Zone A Area Plan: Existing 10/26/2015
RS = 9.662
.05
.065
.05
Legend
EG 100YR
WS 100YR
Ground
Bank Sta
Elevation (ft)
Station (ft)
Airport Wash Zone A Area Plan: Existing 10/26/2015
RS = 9.606
.05
.065
.05
Legend
EG 100YR
WS 100YR
Ground
Bank Sta
Elevation (ft)
Station (ft)
Airport Wash Zone A Area Plan: Existing 10/26/2015
RS = 9.511
.05
.065
.05
Legend
EG 100YR
WS 100YR
Ground
Bank Sta
Elevation (ft)
Station (ft)


Airport Wash Zone A Area Plan: Existing 10/26/2015
RS = 9.415
.05
.065
.05
Legend
EG 100YR
WS 100YR
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)
Airport Wash Zone A Area Plan: Existing 10/26/2015
RS = 9.317
.05
.065
.05
Legend
EG 100YR
WS 100YR
Ground
Bank Sta
Elevation (ft)
Station (ft)
Airport Wash Zone A Area Plan: Existing 10/26/2015
RS = 9.223
.05
.065
.05
Legend
EG 100YR
WS 100YR
Ground
Bank Sta
Elevation (ft)
Station (ft)
Airport Wash Zone A Area Plan: Existing 10/26/2015
RS = 9.141
.05
.065
.05
Legend
EG 100YR
WS 100YR
Ground
Bank Sta
Elevation (ft)
Station (ft)


Airport Wash Zone A Area Plan: Existing 10/26/2015
RS = 9.044
.05
.065
.05
Legend
EG 100YR
WS 100YR
Ground
Bank Sta
Elevation (ft)
Station (ft)
Airport Wash Zone A Area Plan: Existing 10/26/2015
RS = 8.948
.05
.065
.05
Legend
EG 100YR
WS 100YR
Ground
Bank Sta
Elevation (ft)
Station (ft)
Airport Wash Zone A Area Plan: Existing 10/26/2015
RS = 8.853
.05
.065
.05
Legend
EG 100YR
WS 100YR
Ground
Bank Sta
Elevation (ft)
Station (ft)
Airport Wash Zone A Area Plan: Existing 10/26/2015
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.065
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Legend
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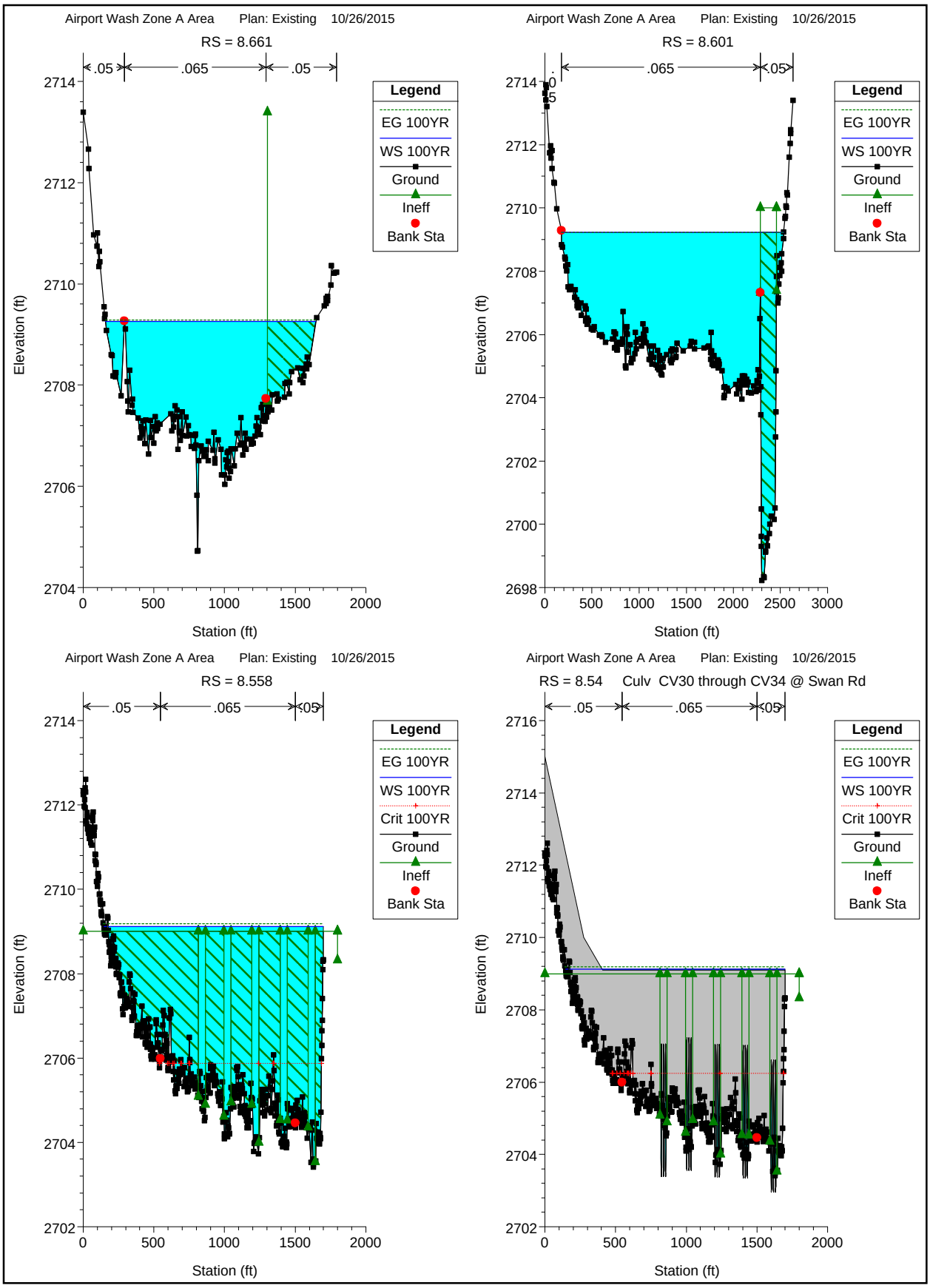
WS 100YR
Crit 100YR
Ground
Bank Sta
Elevation (ft)
Station (ft)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Ground
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Bank Sta
Elevation (ft)
Station (ft)
Airport Wash Zone A Area Plan: Existing 10/26/2015
RS = 8.601
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Legend
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WS 100YR
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)
Airport Wash Zone A Area Plan: Existing 10/26/2015
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.065
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WS 100YR
Crit 100YR
Ground
Ineff
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Elevation (ft)
Station (ft)
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Crit 100YR
Ground
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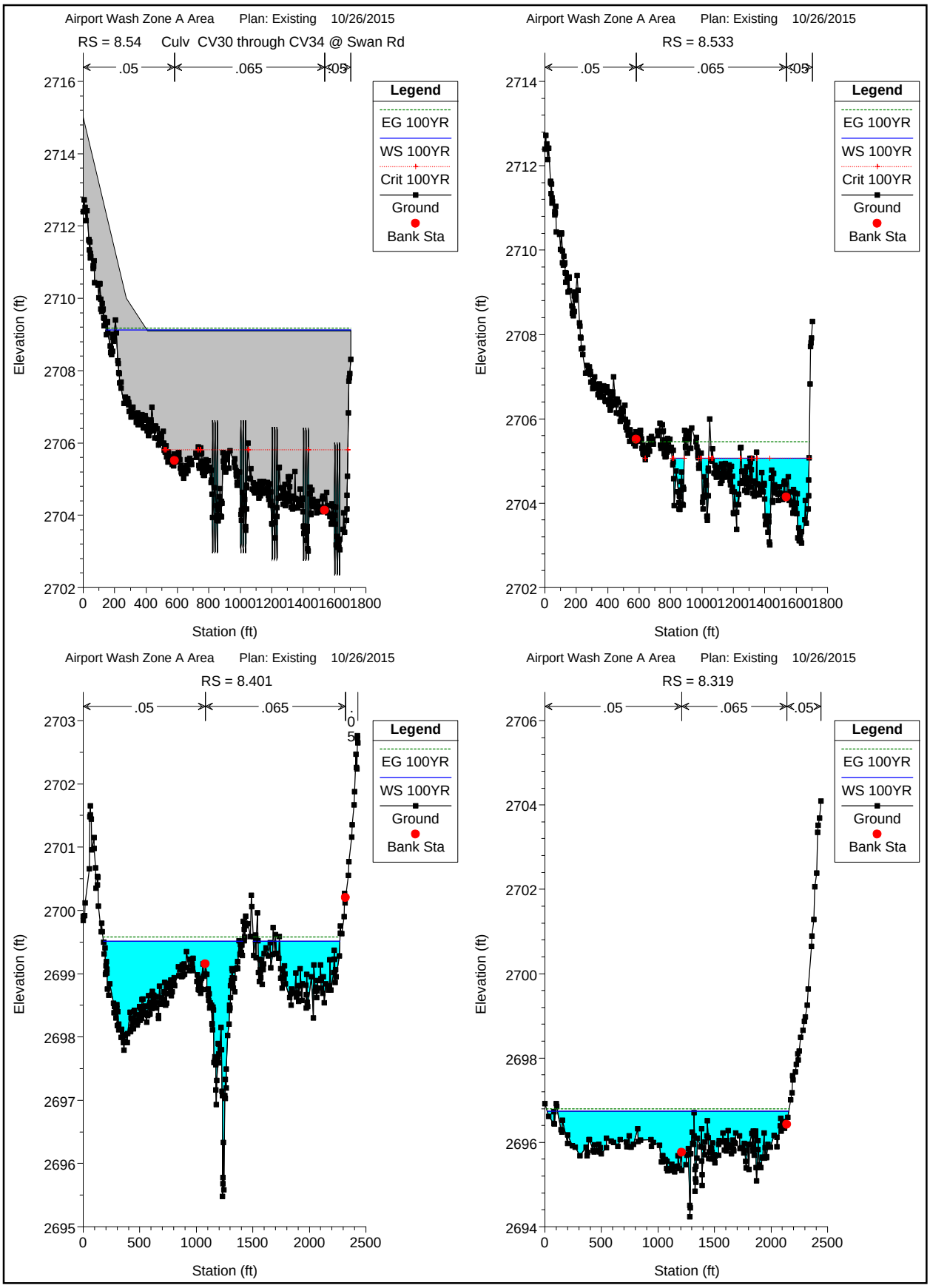
Elevation (ft)
Station (ft)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WS 100YR
Crit 100YR
Ground
Bank Sta
Elevation (ft)
Station (ft)
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Airport Wash Zone A Area Plan: Existing 10/26/2015
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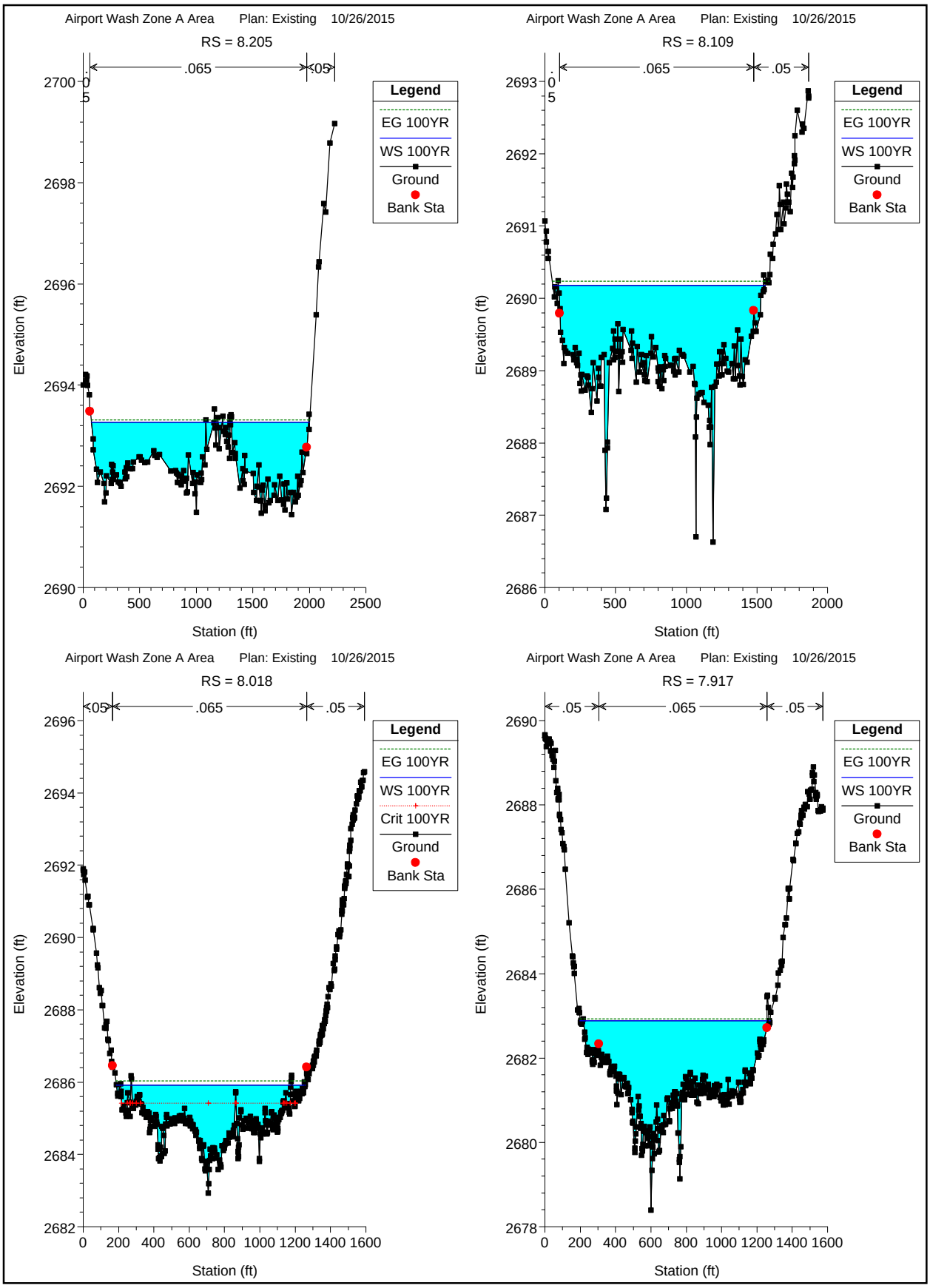
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Station (ft)
Airport Wash Zone A Area Plan: Existing 10/26/2015
RS = 8.109
.065
.05
Legend
EG 100YR
WS 100YR
Ground
Bank Sta
Elevation (ft)
Station (ft)
Airport Wash Zone A Area Plan: Existing 10/26/2015
RS = 8.018
.05
.065
.05
Legend
EG 100YR
WS 100YR
Crit 100YR
Ground
Bank Sta
Elevation (ft)
Station (ft)
Airport Wash Zone A Area Plan: Existing 10/26/2015
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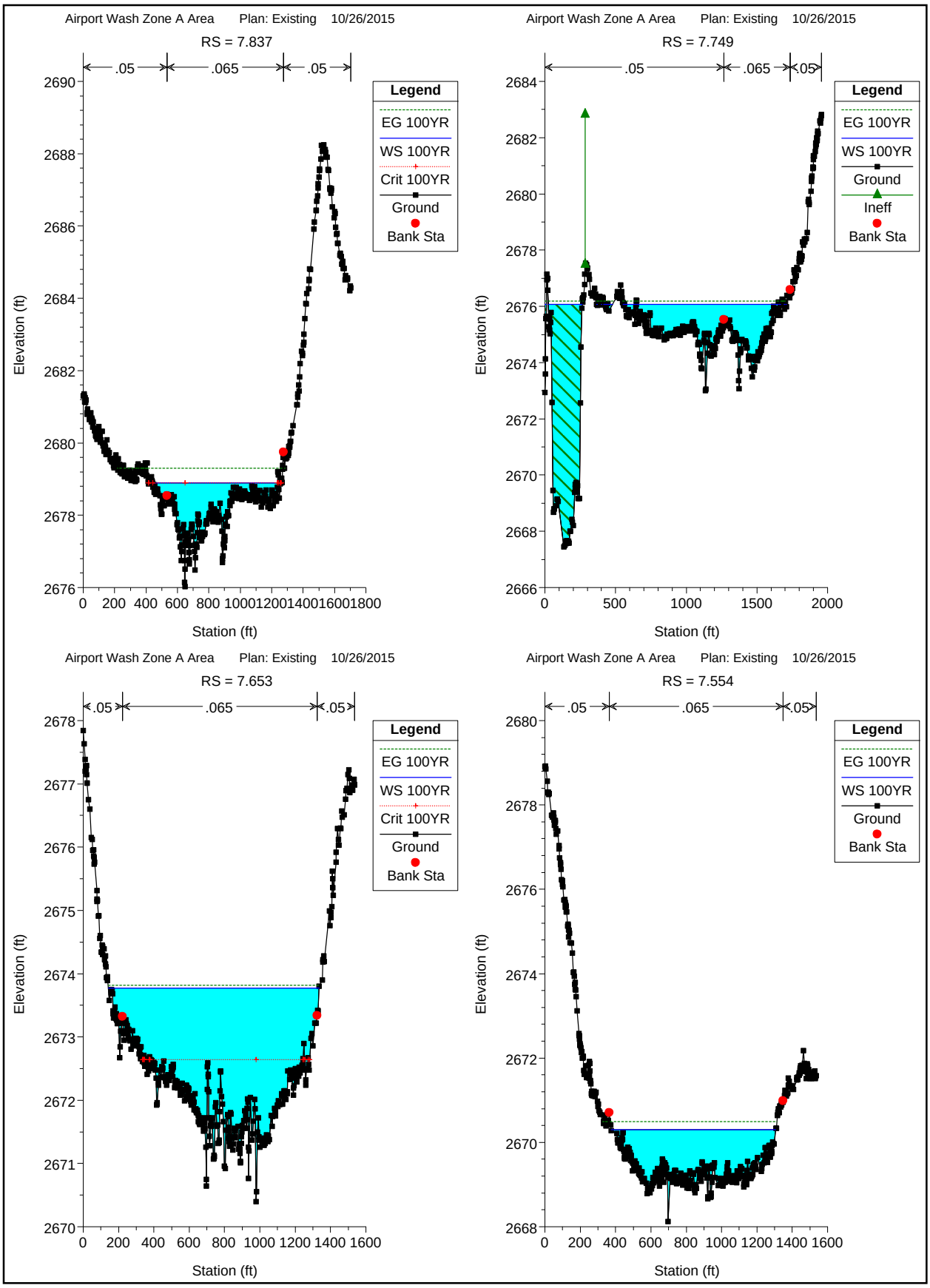
WS 100YR
Ground
Bank Sta
Elevation (ft)
Station (ft)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Elevation (ft)
Station (ft)
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RS = 7.749
.05
.065
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Legend
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WS 100YR
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)
Airport Wash Zone A Area Plan: Existing 10/26/2015
RS = 7.653
.05
.065
.05
Legend
EG 100YR
WS 100YR
Crit 100YR
Ground
Bank Sta
Elevation (ft)
Station (ft)
Airport Wash Zone A Area Plan: Existing 10/26/2015
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.065
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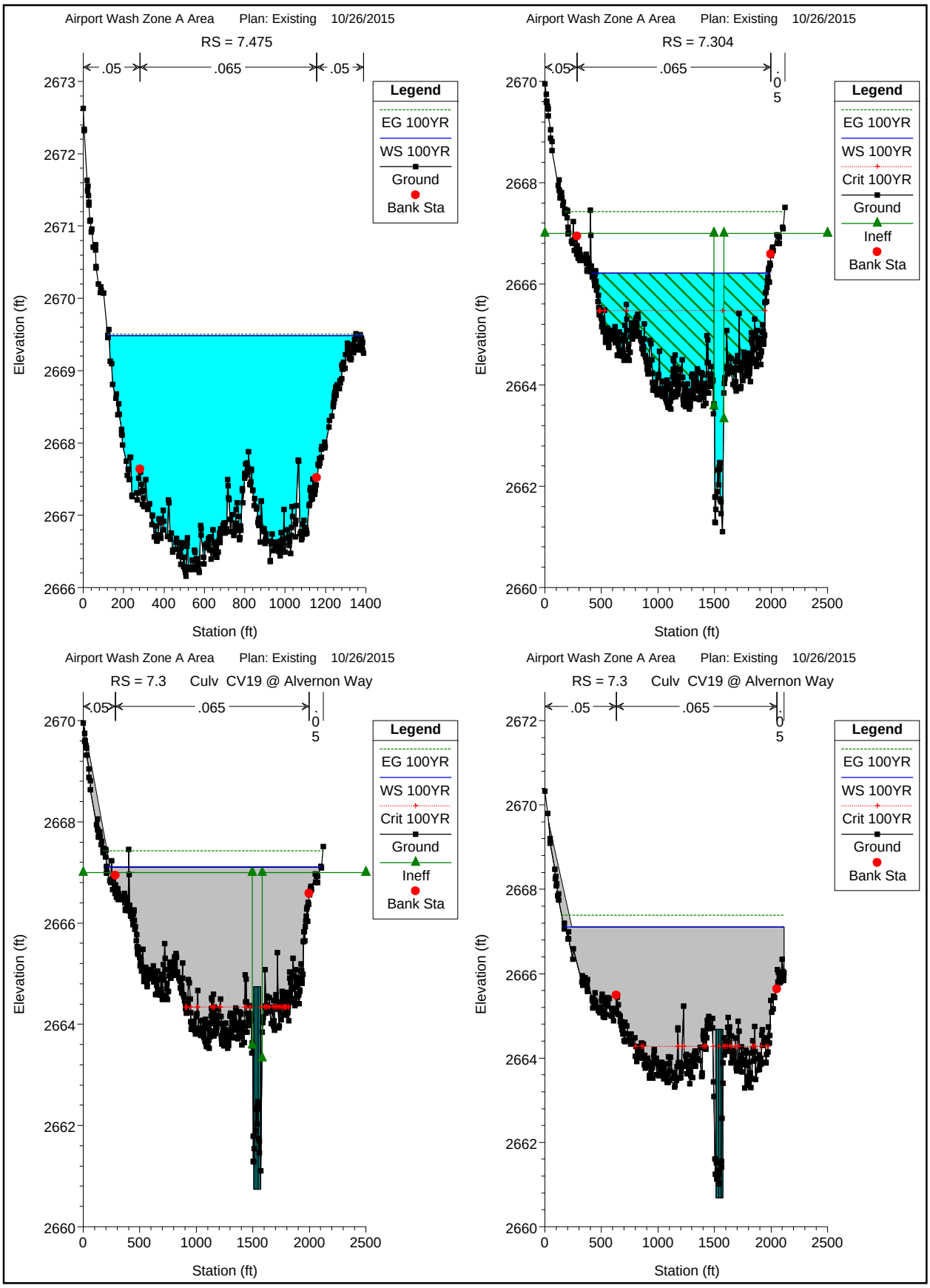
WS 100YR
Ground
Bank Sta
Elevation (ft)
Station (ft)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Legend
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WS 100YR
Ground
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Elevation (ft)
Station (ft)
Airport Wash Zone A Area Plan: Existing 10/26/2015
RS = 7.304
.05
.065
Legend
EG 100YR
WS 100YR
Crit 100YR
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)
Airport Wash Zone A Area Plan: Existing 10/26/2015
RS = 7.3 Culv CV19 @ Alvernon Way
.05
.065
Legend
EG 100YR
WS 100YR
Crit 100YR
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)
Airport Wash Zone A Area Plan: Existing 10/26/2015
RS = 7.3 Culv CV19 @ Alvernon Way
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Crit 100YR
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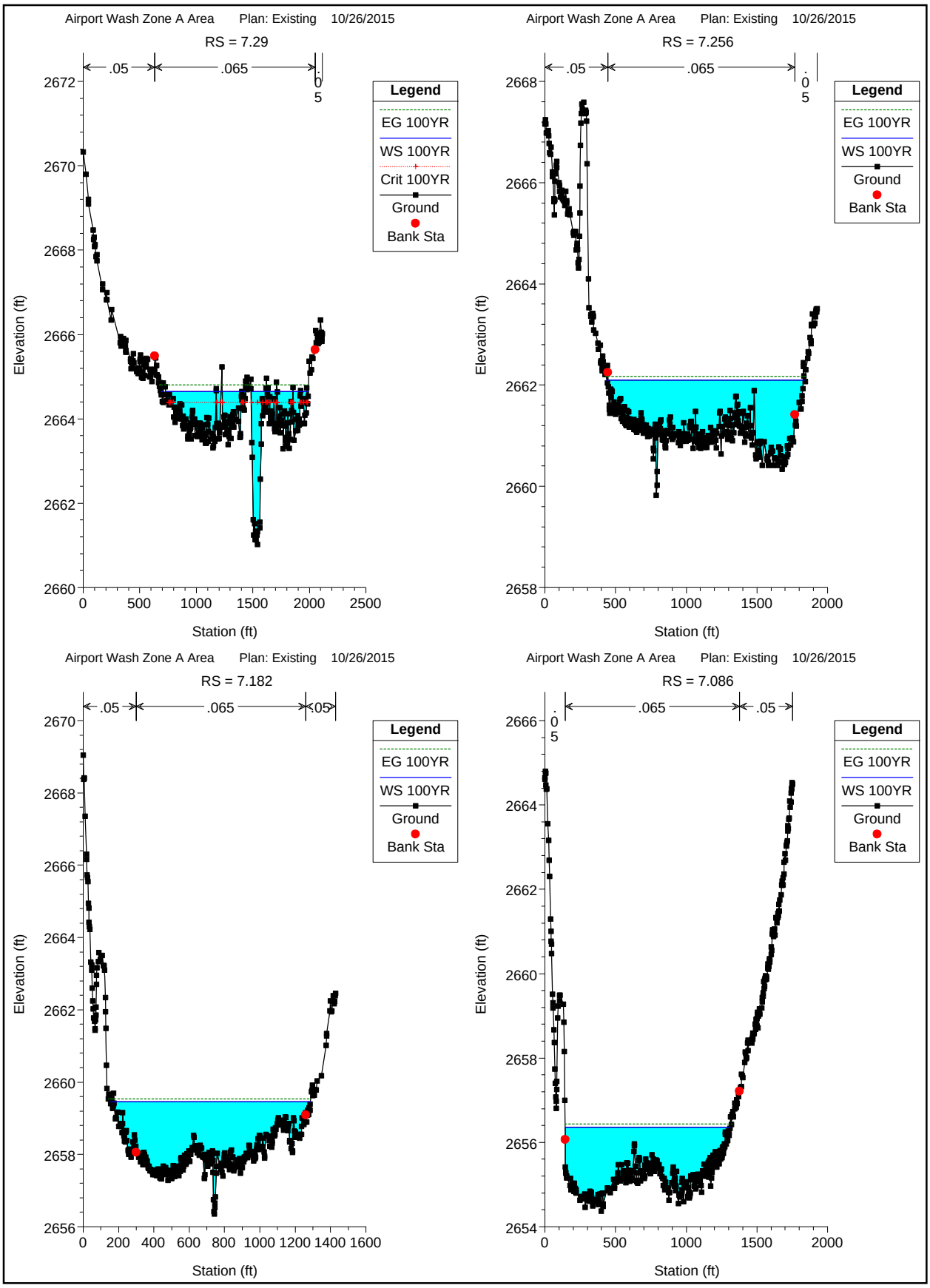
Station (ft)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Legend
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Crit 100YR
Ground
Bank Sta
Elevation (ft)
Station (ft)
Airport Wash Zone A Area Plan: Existing 10/26/2015
RS = 7.256
.05
.065
.05
Legend
EG 100YR
WS 100YR
Ground
Bank Sta
Elevation (ft)
Station (ft)
Airport Wash Zone A Area Plan: Existing 10/26/2015
RS = 7.182
.05
.065
.05
Legend
EG 100YR
WS 100YR
Ground
Bank Sta
Elevation (ft)
Station (ft)
Airport Wash Zone A Area Plan: Existing 10/26/2015
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Legend
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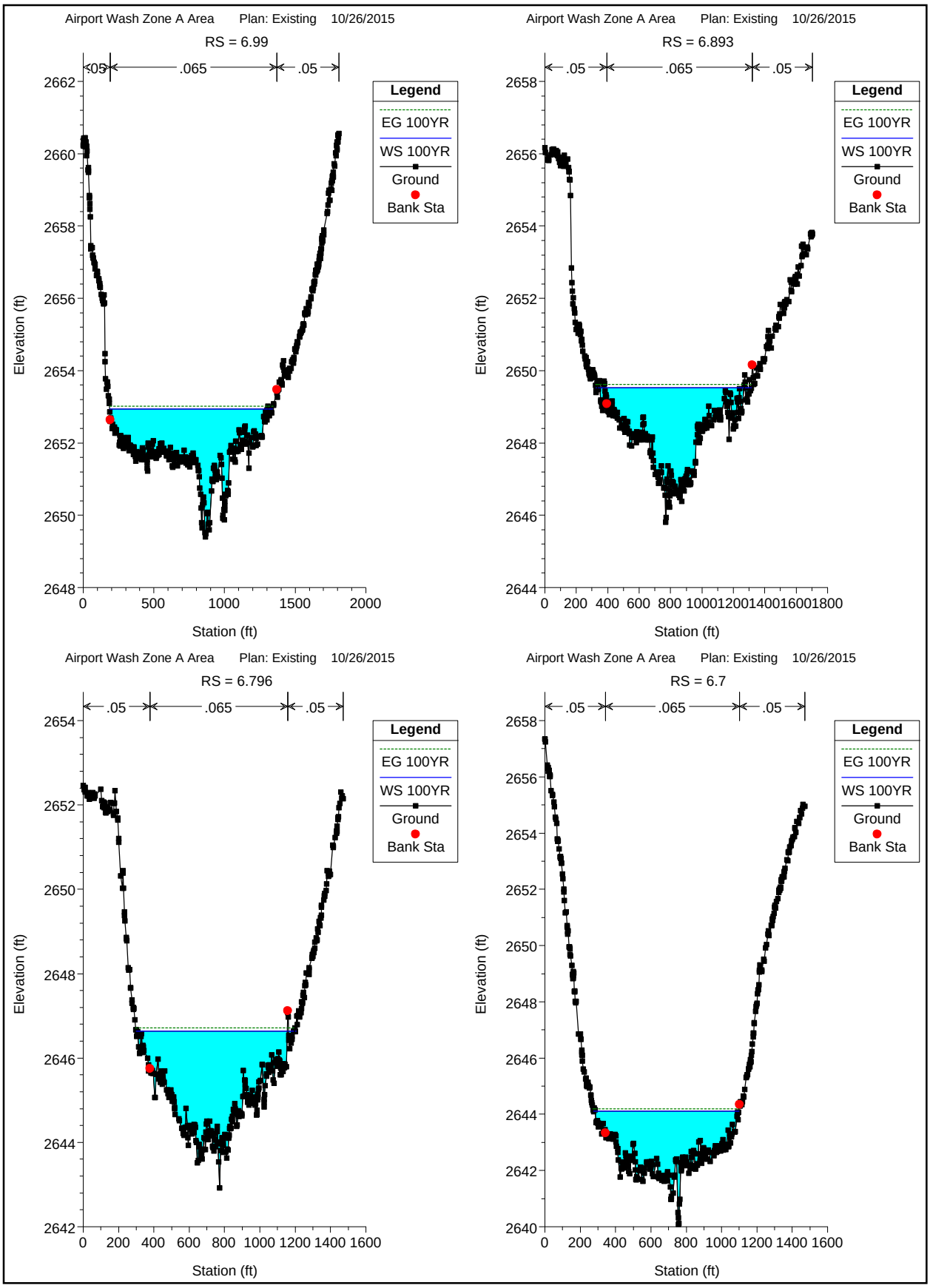
WS 100YR
Ground
Bank Sta
Elevation (ft)
Station (ft)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Legend
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WS 100YR
Ground
Bank Sta
Elevation (ft)
Station (ft)
Airport Wash Zone A Area Plan: Existing 10/26/2015
RS = 6.893
.05
.065
.05
Legend
EG 100YR
WS 100YR
Ground
Bank Sta
Elevation (ft)
Station (ft)
Airport Wash Zone A Area Plan: Existing 10/26/2015
RS = 6.796
.05
.065
.05
Legend
EG 100YR
WS 100YR
Ground
Bank Sta
Elevation (ft)
Station (ft)
Airport Wash Zone A Area Plan: Existing 10/26/2015
RS = 6.7
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Legend
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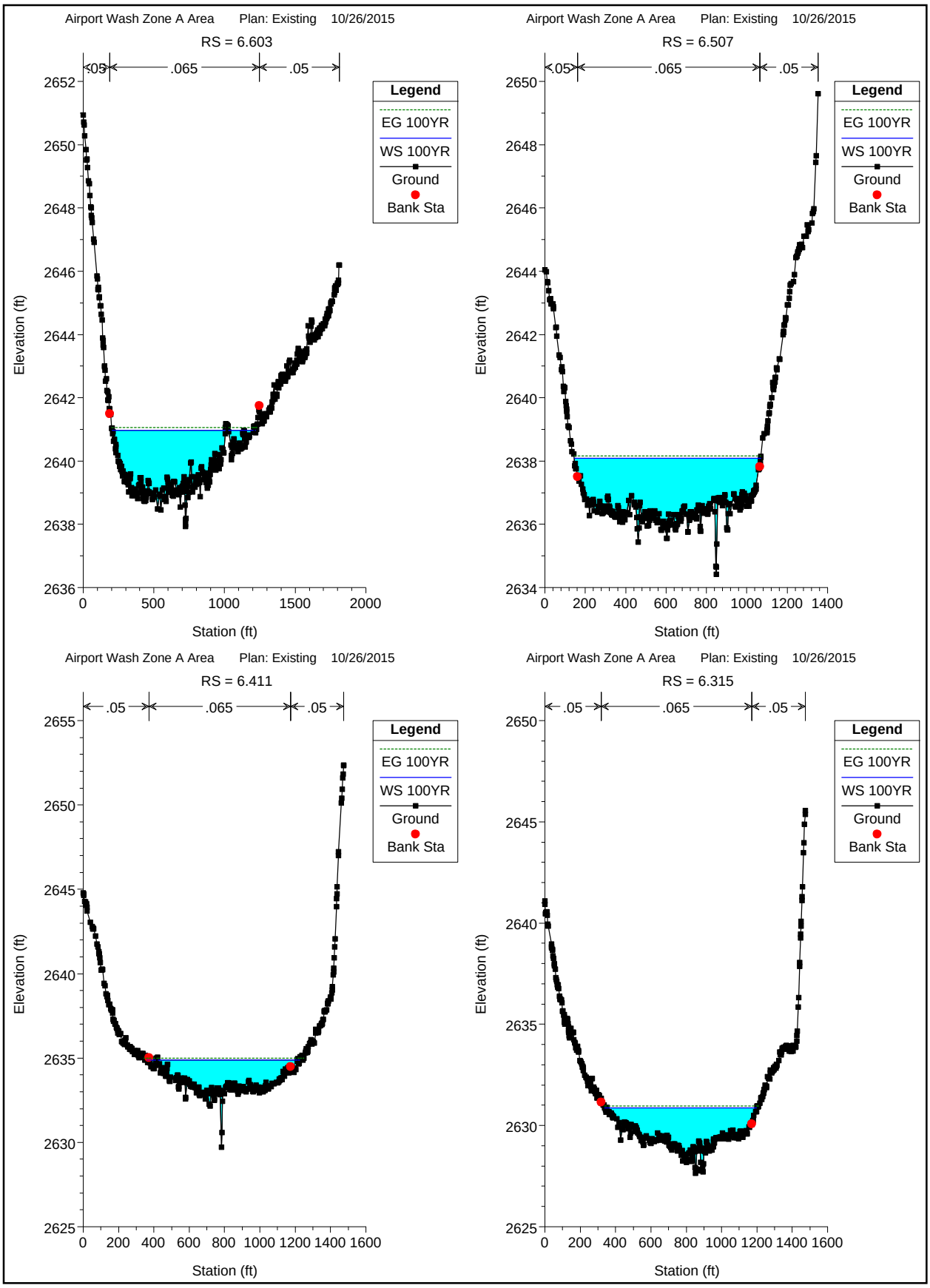
WS 100YR
Ground
Bank Sta
Elevation (ft)
Station (ft)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Legend
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WS 100YR
Ground
Bank Sta
Elevation (ft)
Station (ft)
Airport Wash Zone A Area Plan: Existing 10/26/2015
RS = 6.507
.05
.065
.05
Legend
EG 100YR
WS 100YR
Ground
Bank Sta
Elevation (ft)
Station (ft)
Airport Wash Zone A Area Plan: Existing 10/26/2015
RS = 6.411
.05
.065
.05
Legend
EG 100YR
WS 100YR
Ground
Bank Sta
Elevation (ft)
Station (ft)
Airport Wash Zone A Area Plan: Existing 10/26/2015
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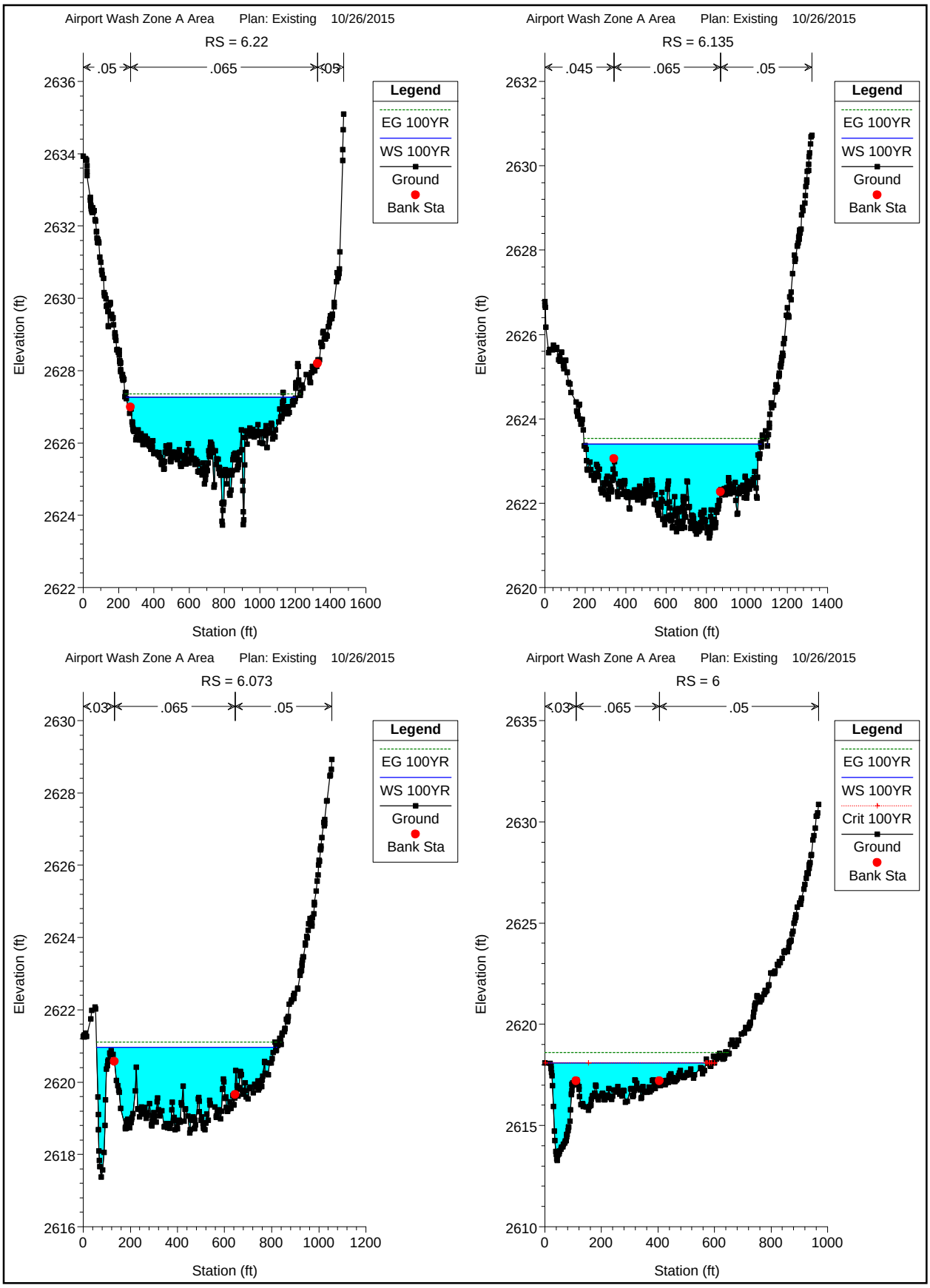
WS 100YR
Ground
Bank Sta
Elevation (ft)
Station (ft)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Legend
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WS 100YR
Ground
Bank Sta
Elevation (ft)
Station (ft)
Airport Wash Zone A Area Plan: Existing 10/26/2015
RS = 6.135
.045
.065
.05
Legend
EG 100YR
WS 100YR
Ground
Bank Sta
Elevation (ft)
Station (ft)
Airport Wash Zone A Area Plan: Existing 10/26/2015
RS = 6.073
.03
.065
.05
Legend
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WS 100YR
Ground
Bank Sta
Elevation (ft)
Station (ft)
Airport Wash Zone A Area Plan: Existing 10/26/2015
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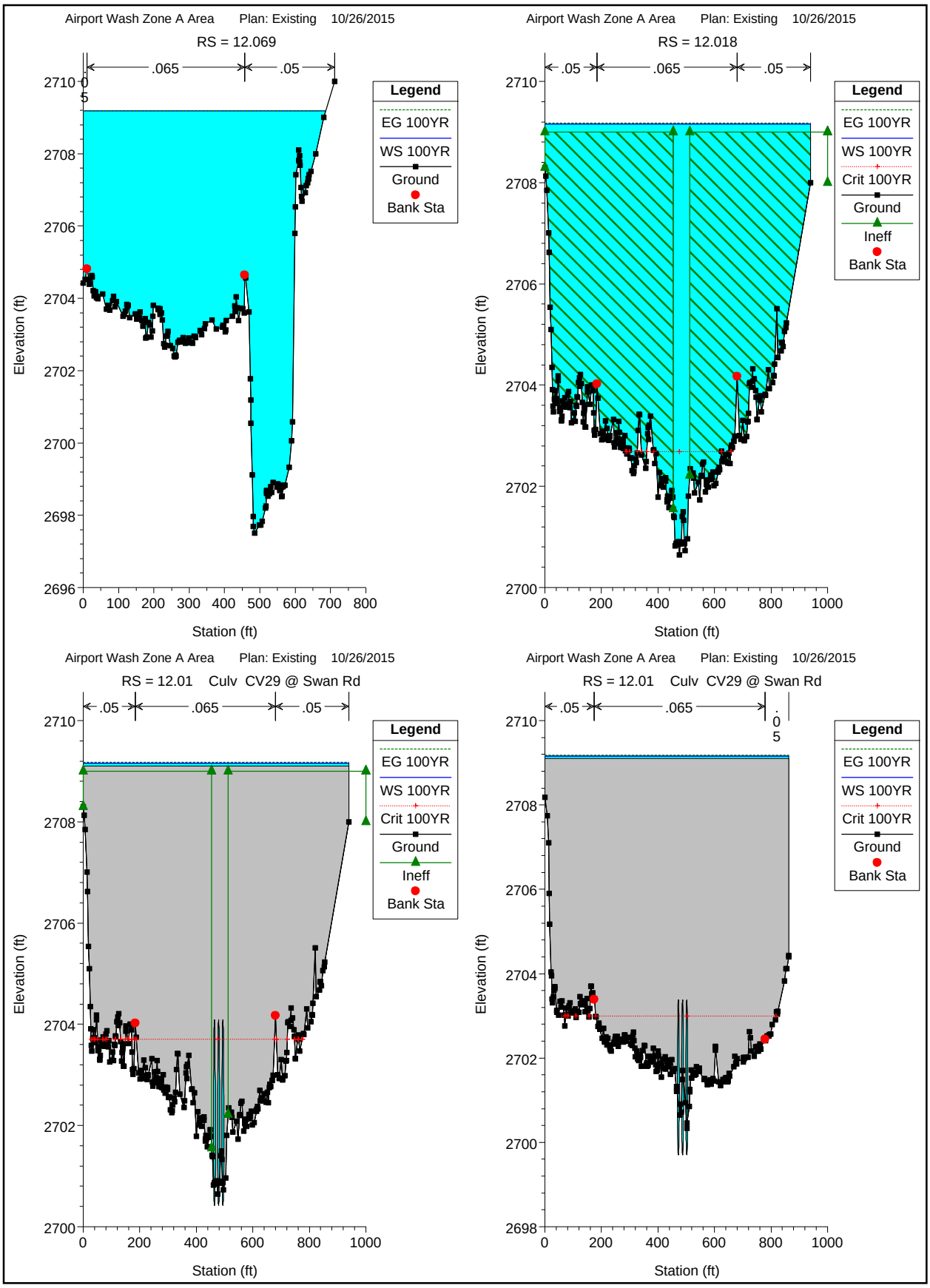
WS 100YR
Crit 100YR
Ground
Bank Sta
Elevation (ft)
Station (ft)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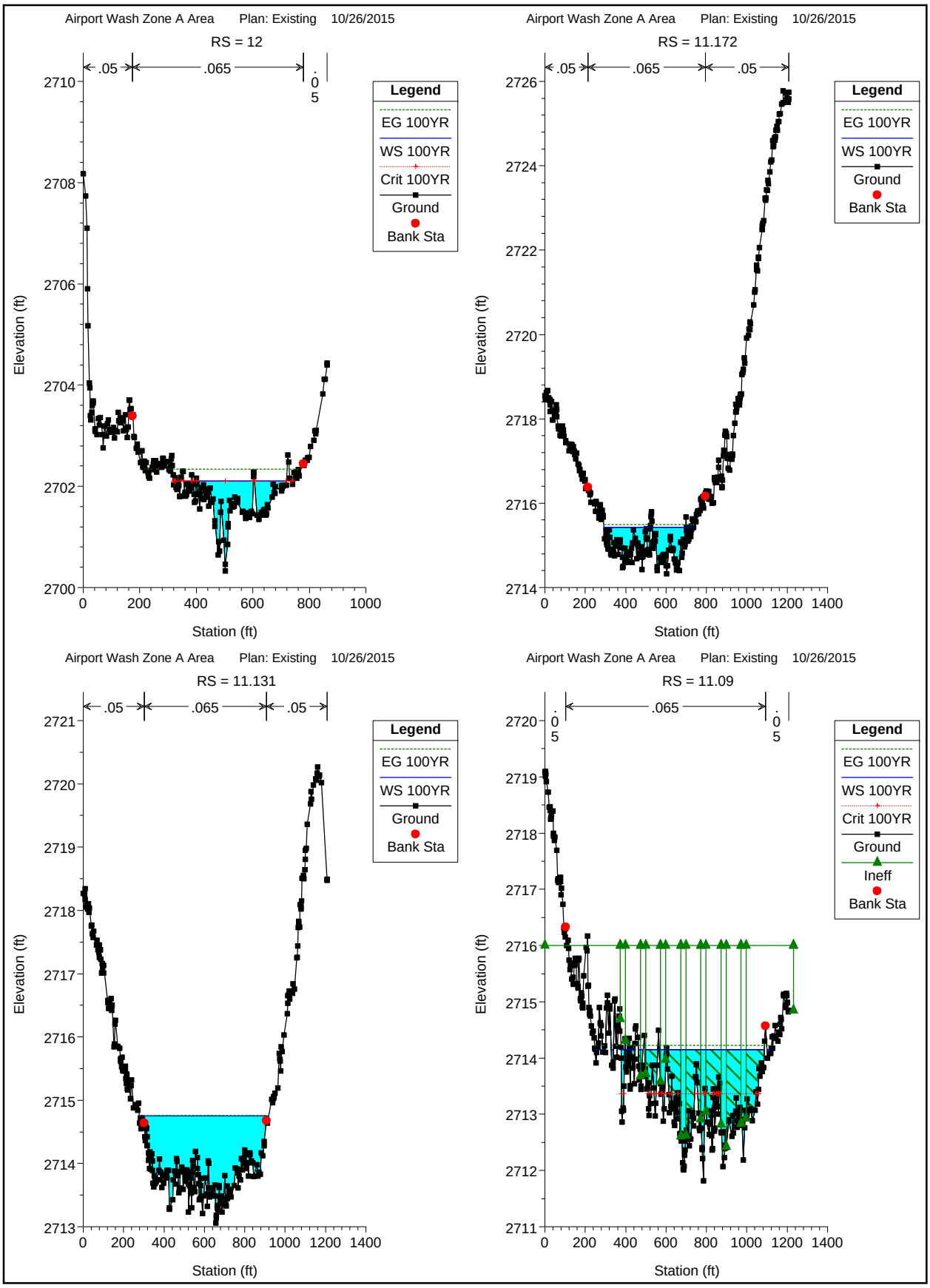
RS = 12.069
.065
.05
Legend
EG 100YR
WS 100YR
Ground
Bank Sta
Elevation (ft)
Station (ft)
Airport Wash Zone A Area Plan: Existing 10/26/2015
RS = 12.018
.05
.065
.05
Legend
EG 100YR
WS 100YR
Crit 100YR
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)
Airport Wash Zone A Area Plan: Existing 10/26/2015
RS = 12.01 Culv CV29 @ Swan Rd
.05
.065
.05
Legend
EG 100YR
WS 100YR
Crit 100YR
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)
Airport Wash Zone A Area Plan: Existing 10/26/2015
RS = 12.01 Culv CV29 @ Swan Rd
.05
.065
Legend
EG 100YR
WS 100YR
Crit 100YR
Ground
Bank Sta
Elevation (ft)
Station (ft)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.05
Legend
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WS 100YR
Crit 100YR
Ground
Bank Sta
Elevation (ft)
Station (ft)
Airport Wash Zone A Area Plan: Existing 10/26/2015
RS = 11.172
.05
.065
.05
Legend
EG 100YR
WS 100YR
Ground
Bank Sta
Elevation (ft)
Station (ft)
Airport Wash Zone A Area Plan: Existing 10/26/2015
RS = 11.131
.05
.065
.05
Legend
EG 100YR
WS 100YR
Ground
Bank Sta
Elevation (ft)
Station (ft)
Airport Wash Zone A Area Plan: Existing 10/26/2015
RS = 11.09
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.065
.05
Legend
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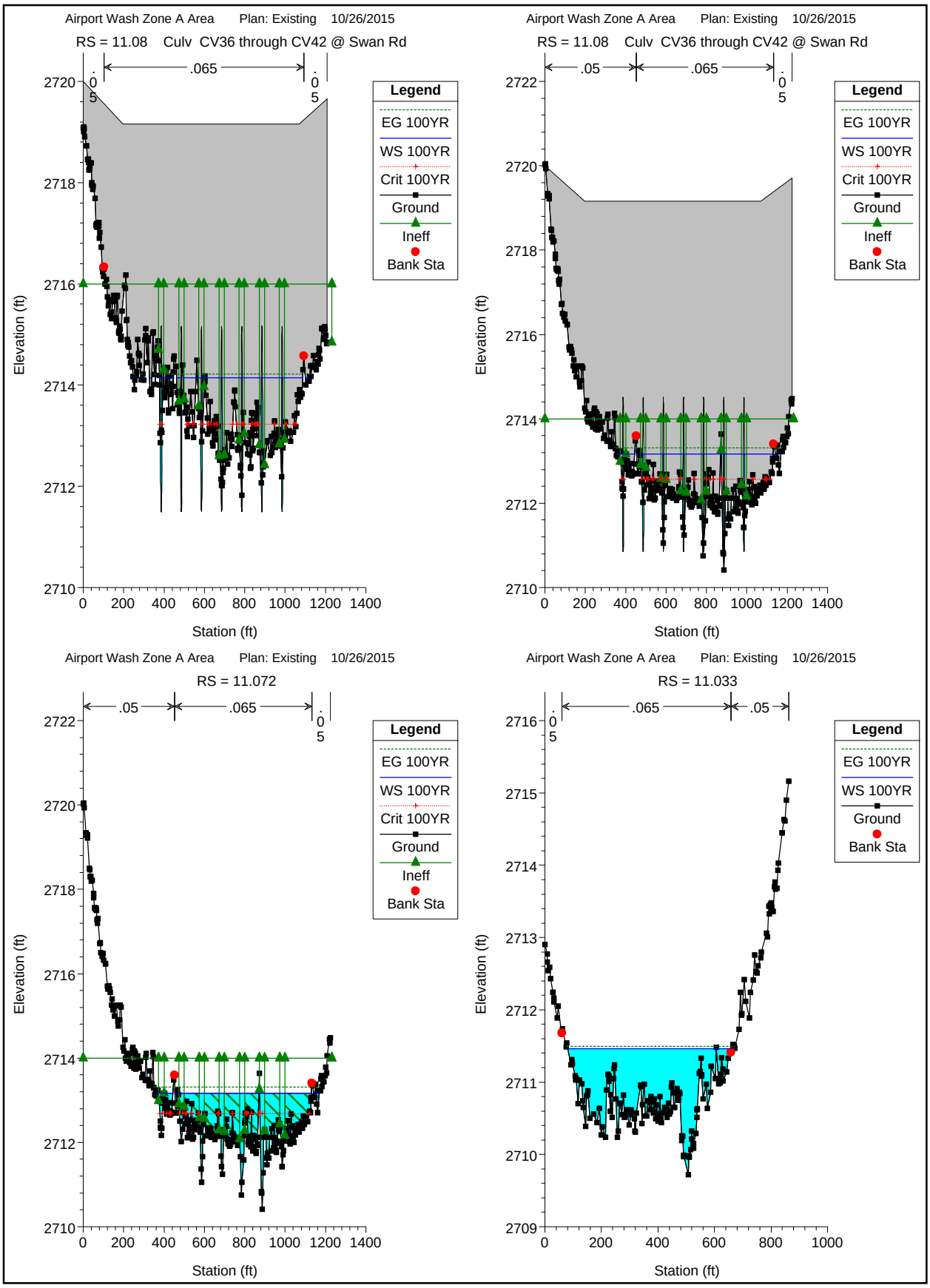
WS 100YR
Crit 100YR
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)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Crit 100YR
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)
Airport Wash Zone A Area Plan: Existing 10/26/2015
RS = 11.08 Culv CV36 through CV42 @ Swan Rd
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.065
.05
Legend
EG 100YR
WS 100YR
Crit 100YR
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)
Airport Wash Zone A Area Plan: Existing 10/26/2015
RS = 11.072
.05
.065
.05
Legend
EG 100YR
WS 100YR
Crit 100YR
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)
Airport Wash Zone A Area Plan: Existing 10/26/2015
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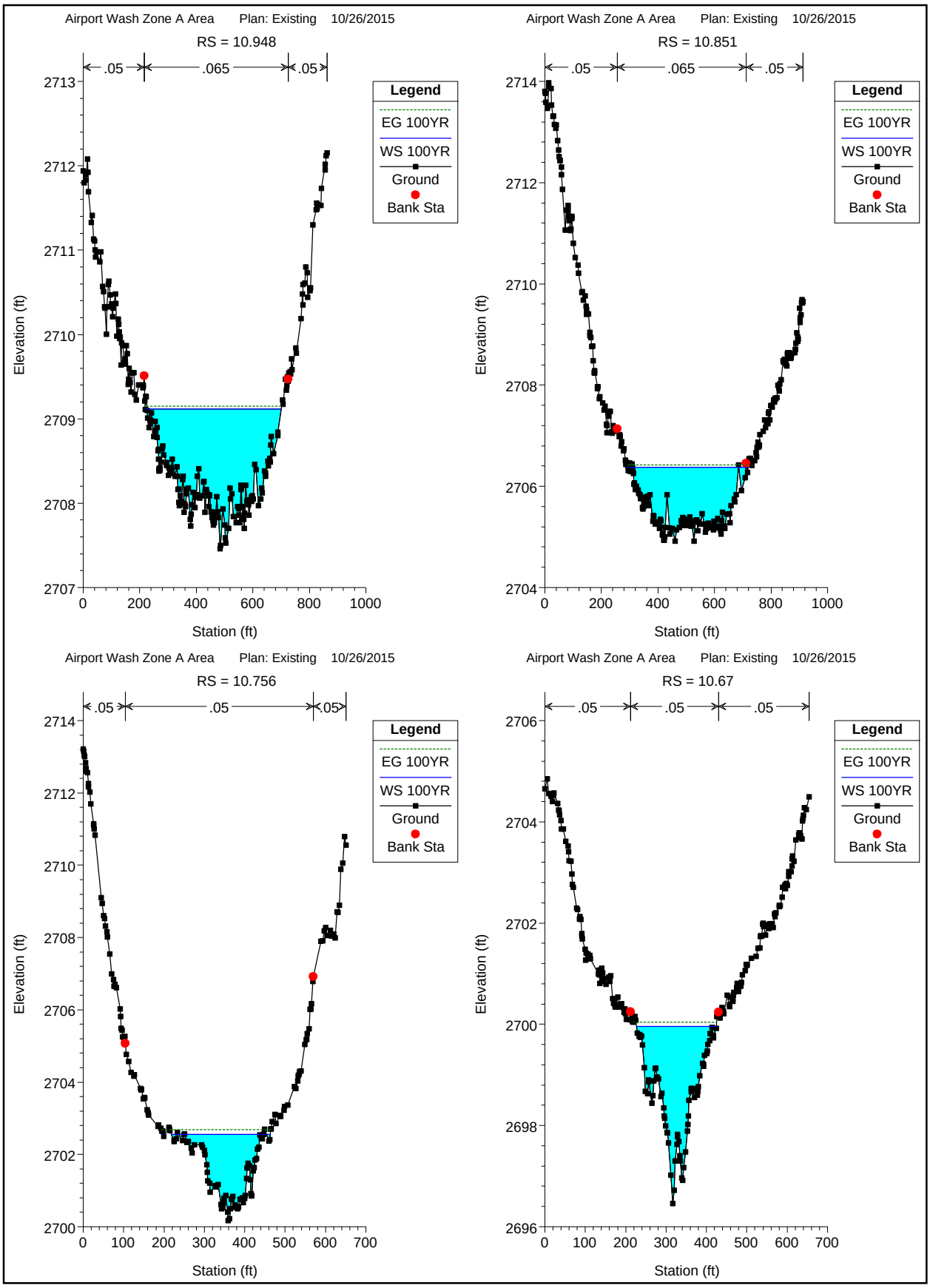
.065
.05
Legend
EG 100YR
WS 100YR
Ground
Bank Sta
Elevation (ft)
Station (ft)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WS 100YR
Ground
Bank Sta
Elevation (ft)
Station (ft)
Airport Wash Zone A Area Plan: Existing 10/26/2015
RS = 10.851
.05
.065
.05
Legend
EG 100YR
WS 100YR
Ground
Bank Sta
Elevation (ft)
Station (ft)
Airport Wash Zone A Area Plan: Existing 10/26/2015
RS = 10.756
.05
.05
.05
Legend
EG 100YR
WS 100YR
Ground
Bank Sta
Elevation (ft)
Station (ft)
Airport Wash Zone A Area Plan: Existing 10/26/2015
RS = 10.67
.05
.05
.05
Legend
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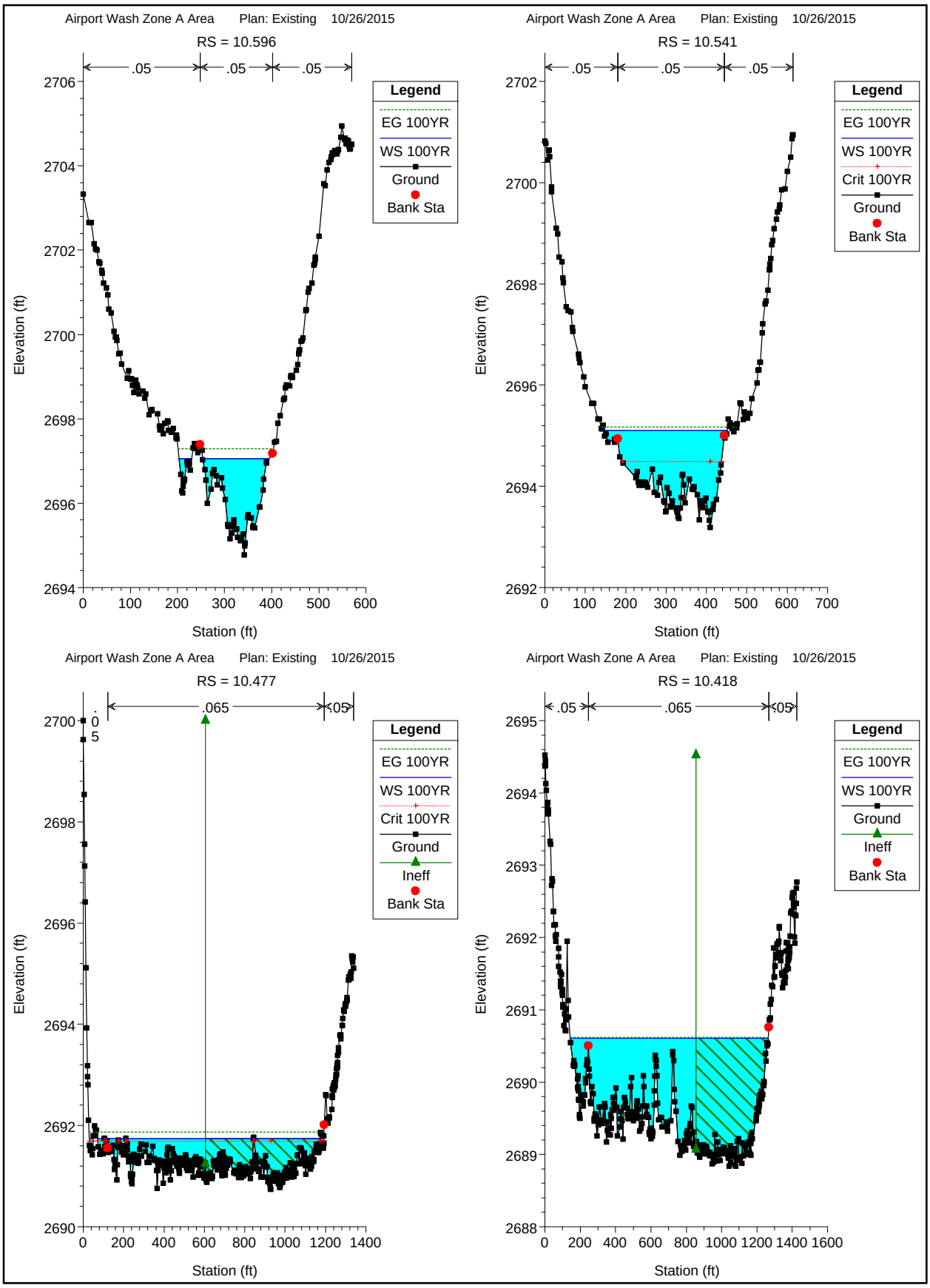
WS 100YR
Ground
Bank Sta
Elevation (ft)
Station (ft)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RS = 10.596
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WS 100YR
Ground
Bank Sta
Elevation (ft)
Station (ft)
Airport Wash Zone A Area Plan: Existing 10/26/2015
RS = 10.541
.05 .05 .05
Legend
EG 100YR
WS 100YR
Crit 100YR
Ground
Bank Sta
Elevation (ft)
Station (ft)
Airport Wash Zone A Area Plan: Existing 10/26/2015
RS = 10.477
.05 .065 .05
Legend
EG 100YR
WS 100YR
Crit 100YR
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)
Airport Wash Zone A Area Plan: Existing 10/26/2015
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Legend
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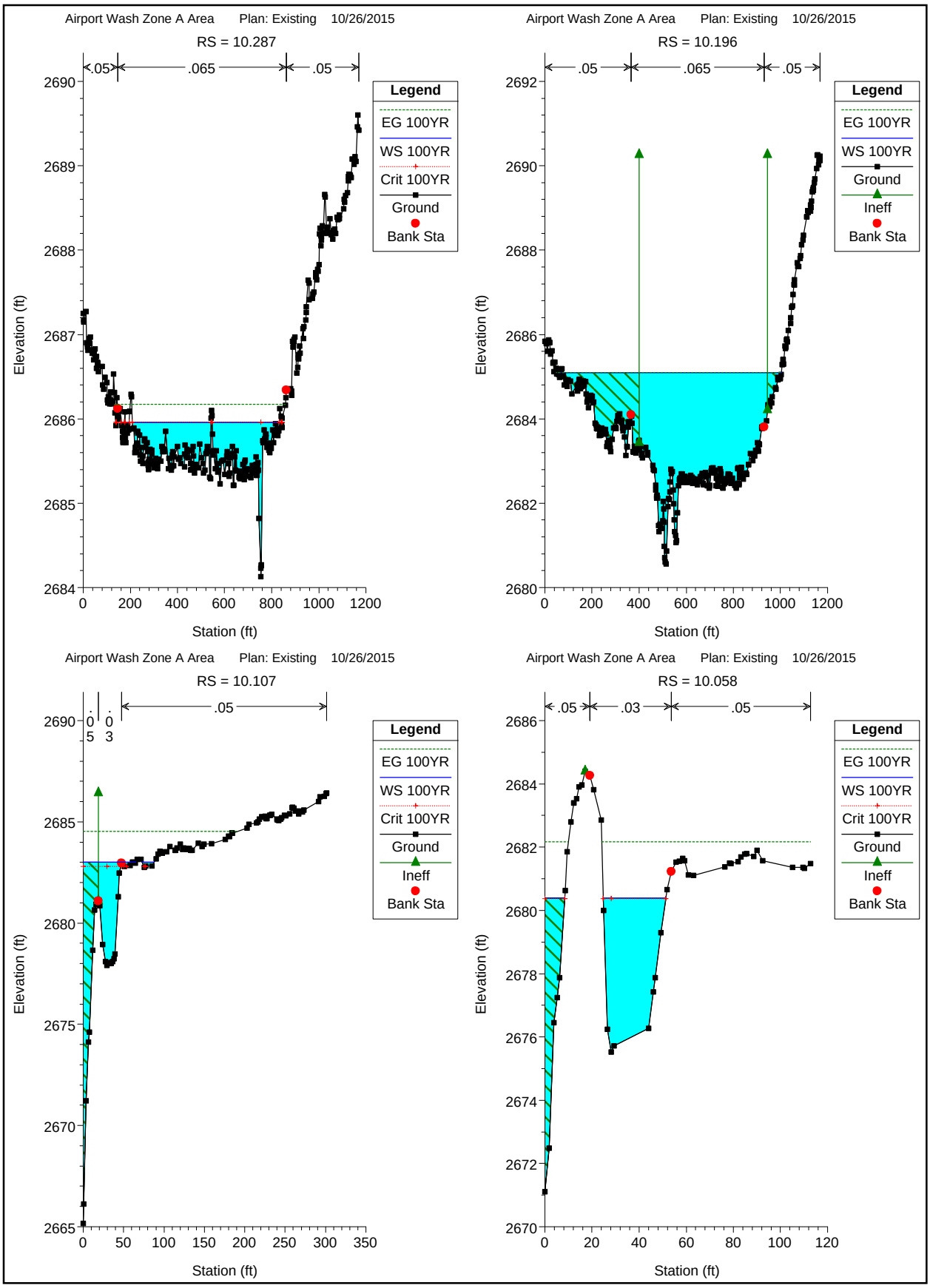
WS 100YR
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)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.065
.05
Legend
EG 100YR
WS 100YR
Crit 100YR
Ground
Bank Sta
Elevation (ft)
Station (ft)
Airport Wash Zone A Area Plan: Existing 10/26/2015
RS = 10.196
.05
.065
.05
Legend
EG 100YR
WS 100YR
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)
Airport Wash Zone A Area Plan: Existing 10/26/2015
RS = 10.107
.05
Legend
EG 100YR
WS 100YR
Crit 100YR
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)
Airport Wash Zone A Area Plan: Existing 10/26/2015
RS = 10.058
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.03
.05
Legend
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WS 100YR
Crit 100YR
Ground
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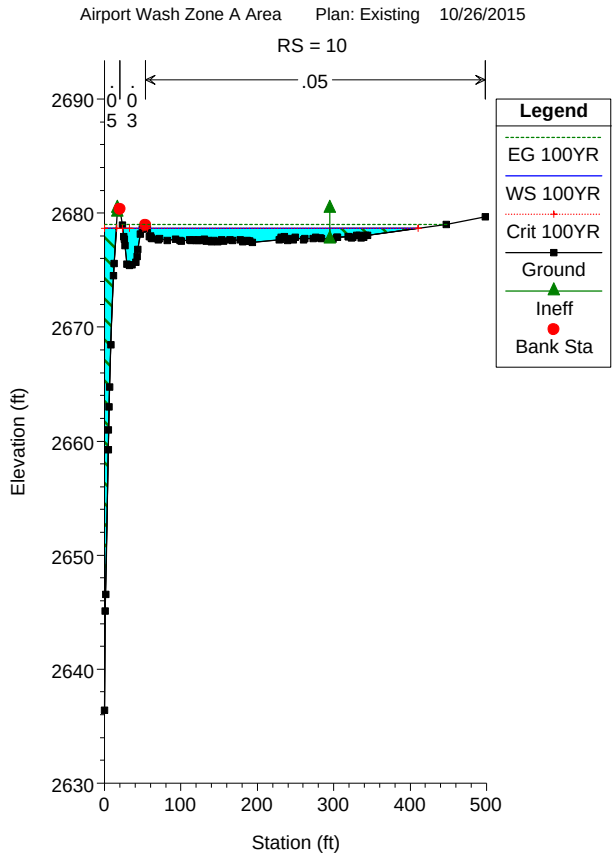
Station (ft)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0.05
0.03
Legend
EG 100YR
WS 100YR
Crit 100YR
Ground
Ineff
Bank Sta
Elevation (ft)
2690
2680
2670
2660
2650
2640
2630
0
100
200
300
400
500
Station (ft)

E.3 – EXPANSION AND CONTRACTION COEFFICIENTS

Summary of Expansion and Contraction Coefficients

Description	Contraction	Expansion
Typical Cross Sections	0.1	0.3
Cross Sections immediately Upstream and Downstream of Drainage Structures	0.3	0.5

E.4 – ANALYSIS OF STRUCTURES

(See Attached HEC-RAS Models)

E.5 – HYDRAULIC CALCULATIONS

Includes:

- FEMA Approved Negative Surcharge Limits for Floodway Modeling
- 10-yr Santa Cruz River Water Surface Elevation Determination
- Summary Table for the HEC-RAS model in Effective FEMA Zone AE
- Profiles for the HEC-RAS model in Effective FEMA Zone AE
- Summary Table for the HEC-RAS model in Effective FEMA Zone A
- Profiles for the HEC-RAS model in Effective FEMA Zone A

Jiankang Wang

From: Curtis, Edward <Edward.Curtis@dhs.gov>
Sent: Wednesday, March 25, 2009 9:53 AM
To: Jiankang Wang
Cc: Your Name; AlisaSauvageot@mapmodteam.com; Michael Skowronek
Subject: FW: Santa Cruz County - CMG Nogales Wash study

Jiankang –
Here's the response to the questions about the split floodway and negative surcharge. Please try to revise the Nogales Wash model to meet this limit before submitting the appeal.

Thanks – Ed Curtis

From: Wen Chen [mailto:WenChen@mapmodteam.com]
Sent: Monday, March 23, 2009 11:35 AM
To: Ed Curtis
Cc: Michael Skowronek
Subject: RE: Santa Cruz County - CMG Nogales Wash study

Ed,

I have talked to our LOMR group and it was confirmed that split flow approach is fine, but the maximum allowable negative surcharge is -0.04 ft.

Wen

From: Curtis, Edward [mailto:Edward.Curtis@dhs.gov]
Sent: Saturday, March 21, 2009 6:32 PM
To: Wen Chen
Cc: Michael Skowronek
Subject: Santa Cruz County - CMG Nogales Wash study

Wen –

Alisa and I met with Clint Glass and Jiankang Wang of CMG and John Hays and Scott Altherr of Santa Cruz County to review the results of CMG's restudy of Nogales Wash which will be submitted as an appeal. The original Stantec HEC-RAS model used ineffective flow areas to minimize the floodway widths which resulted in high BFEs. The CMG study uses blocked obstructions which results in wider floodways and lower BFEs.

In this upstream reach (flow is south to north), CMG used a split floodway which follows the two major roads through downtown Nogales. The Stantec model showed a floodway that followed the narrower road on the left side of the figure.

Is there a problem with using a split floodway? We will be getting the complete digital HEC-RAS model when the appeal is submitted next week to review the technical details, but I'd like to know if there is a problem with the approach.

Also, CMG showed some negative surcharges at a few cross sections. We discussed the maximum allowable negative surcharge for a FEMA flood study – we thought it was 0.09 feet. Can you confirm if that's correct and if it's <u>less than</u> 0.09 feet or <u>less than or equal to</u> 0.09 feet?

Thanks.

Ed

Ed Curtis, P.E., CFM
Risk Analysis Branch
FEMA Region IX
(510) 627-7207 - office
(510) 295-5249 - mobile

From: Jiankang Wang [mailto:jwang@cmgdrainage.com]
Sent: Wednesday, March 18, 2009 5:18 PM
To: 'Curtis, Edward'
Cc: 'Your Name'
Subject: RE: Tortolita Study

Ed,

Attached image file (JPG) shows the split floodway areas of the Nogales Wash near the international border. Thank you.

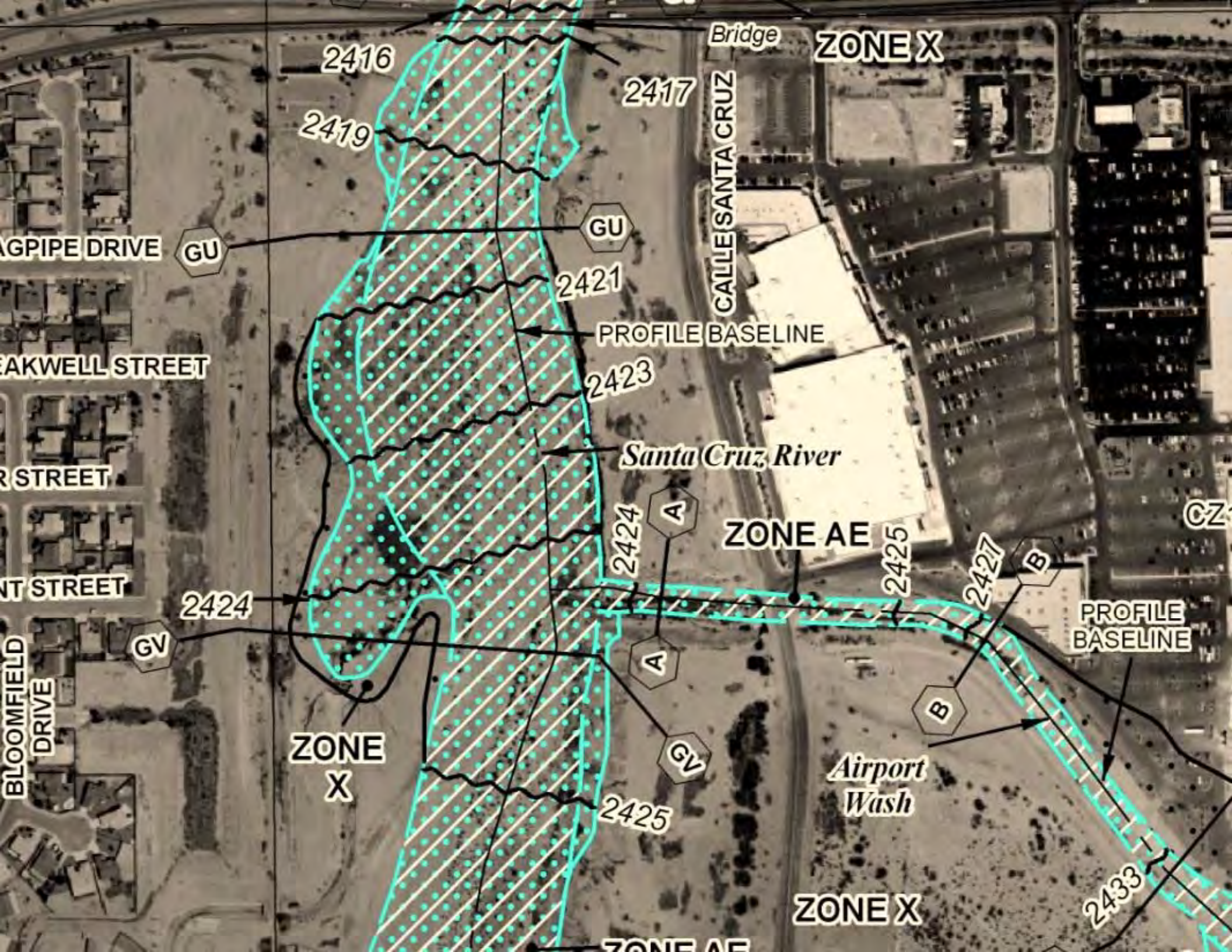
Jiankang

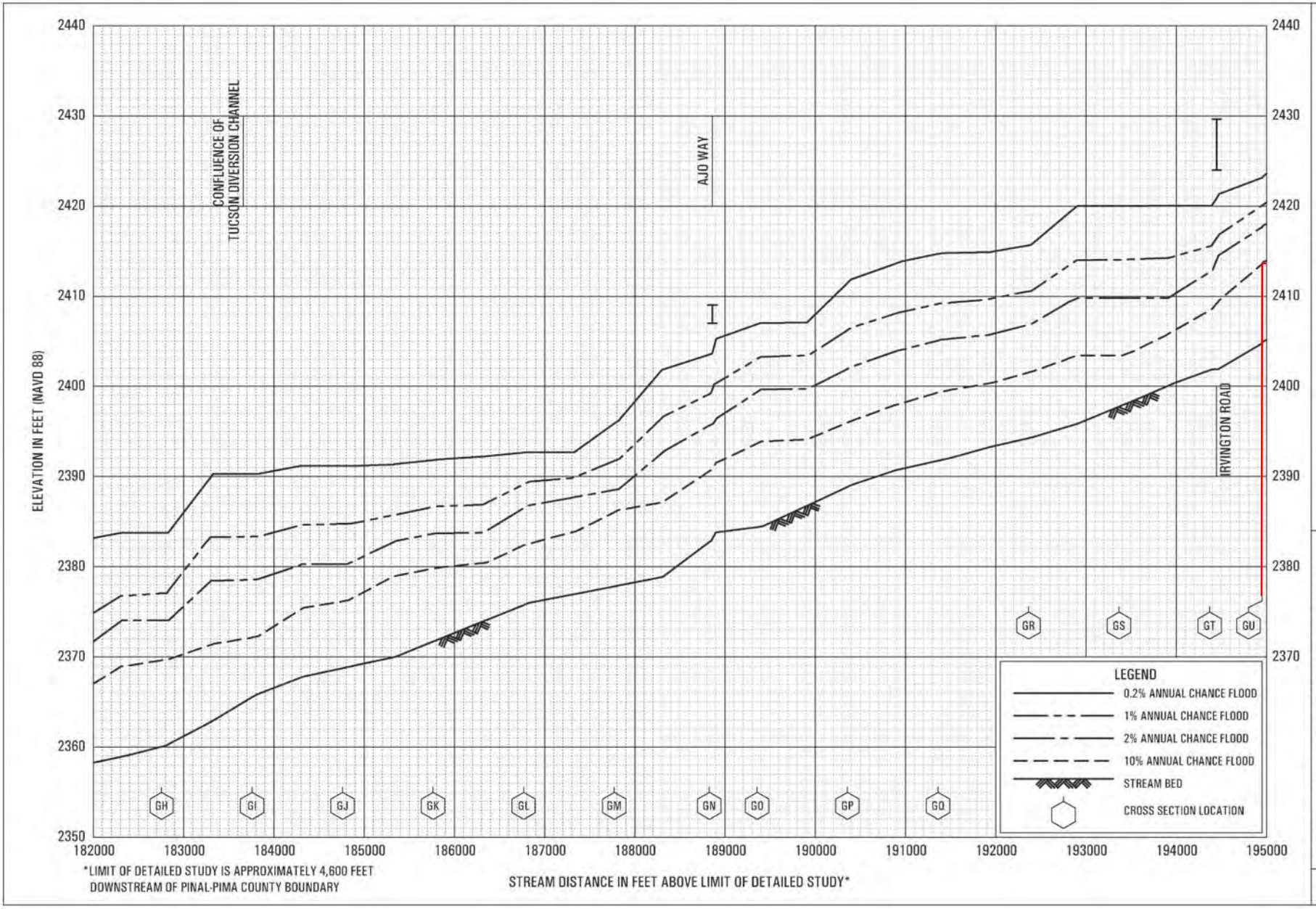
Jiankang Wang
Senior Hydrologist, P.E.
CMG Drainage Engineering, Inc.
3555 N. Mountain Ave.
Tucson, AZ 85719
Phone: (520) 882-4244
Fax: (520) 888-1421
Email: jwang@cmgdrainage.com

CMG Job#: 14-063
Project Name: Airport Wash Basin Management Study Phase 2

Santa Cruz River 10-year Water Surface Elevations

Location	10-Year WSE
Xsect GV on FIRM	2417.2
Xsect GU on FIRM	2413.7
Airport Wash	2416.9


Bridge
ZONE X
2416
2417
2419
CALLE SANTA CRUZ
GU
AGPIPE DRIVE
GU
2421
PROFILE BASELINE
EAKWELL STREET
2423
Santa Cruz River
R STREET
A
2424
ZONE AE
2425
2427
B
CZ
NT STREET
2424
GV
PROFILE
BASELINE
A
B
BLOOMFIELD
DRIVE
ZONE
X
GV
Airport
Wash
2425
2433
ZONE X
ZONE AE



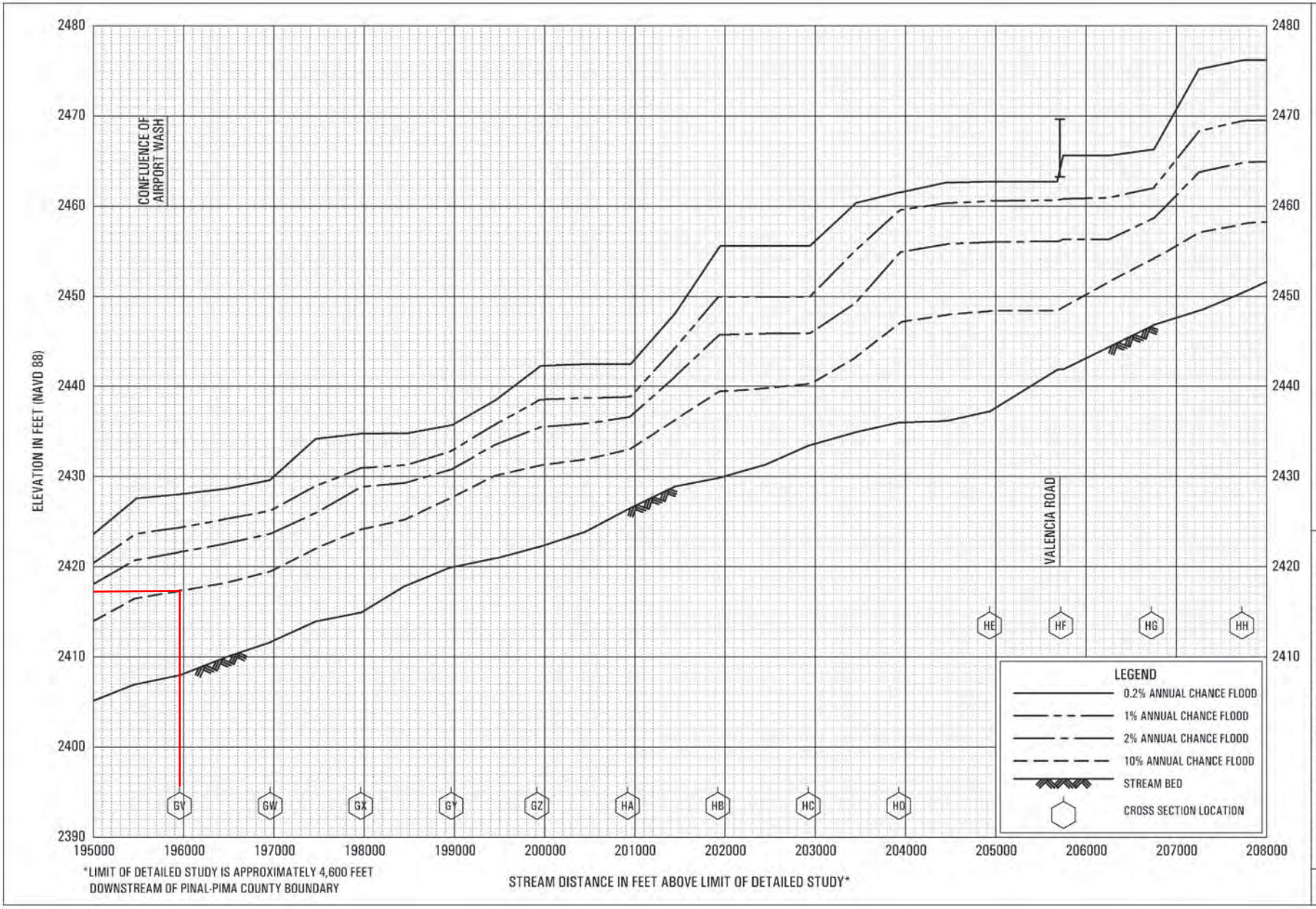
FLOOD PROFILES

SANTA CRUZ RIVER

FEDERAL EMERGENCY MANAGEMENT AGENCY

PIMA COUNTY, AZ

AND INCORPORATED AREAS



FLOOD PROFILES

SANTA CRUZ RIVER

FEDERAL EMERGENCY MANAGEMENT AGENCY

PIMA COUNTY, AZ

AND INCORPORATED AREAS

HEC-RAS Plan: PMR_Lower

River	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)	
Trib_I19	1	30.195	100-Year	119.00	2448.64	2452.29		2452.29	0.000084	0.29	362.49	319.70	0.05
Trib_I19	1	30.195	500-Year	515.00	2448.64	2454.39		2454.40	0.000039	0.38	1174.40	453.92	0.04
Trib_I19	1	30.195	10-Year	1.00	2448.64	2451.17		2451.17	0.000006	0.02	42.87	257.80	0.01
Trib_I19	1	30.195	50-Year	42.00	2448.64	2451.81		2451.81	0.000053	0.17	217.42	287.53	0.03
Trib_I19	1	30.195	Floodway	119.00	2448.64	2452.29		2452.29	0.000084	0.29	362.49	319.70	0.05
Trib_I19	1	30.147	100-Year	119.00	2450.99	2452.19		2452.22	0.004547	1.54	79.27	116.03	0.31
Trib_I19	1	30.147	500-Year	515.00	2450.99	2454.36		2454.37	0.000414	1.13	541.11	323.40	0.12
Trib_I19	1	30.147	10-Year	1.00	2450.99	2451.16	2451.11	2451.17	0.005627	0.42	2.36	24.63	0.24
Trib_I19	1	30.147	50-Year	42.00	2450.99	2451.74	2451.50	2451.76	0.008561	1.33	31.63	81.64	0.38
Trib_I19	1	30.147	Floodway	119.00	2450.99	2452.19		2452.22	0.004547	1.54	79.27	116.03	0.31
Trib_I19	1	30.144	100-Year	119.00	2448.32	2452.19		2452.19	0.000035	0.35	377.71	228.90	0.03
Trib_I19	1	30.144	500-Year	515.00	2448.32	2454.34		2454.35	0.000059	0.64	1008.14	370.04	0.05
Trib_I19	1	30.144	10-Year	1.00	2448.32	2448.41	2448.41	2448.44	0.149441	1.25	0.80	19.34	1.08
Trib_I19	1	30.144	50-Year	42.00	2448.32	2448.81		2448.91	0.043817	2.62	16.01	50.61	0.82
Trib_I19	1	30.144	Floodway	119.00	2448.32	2452.19		2452.19	0.000035	0.35	377.71	228.90	0.03
Trib_I19	1	30.091	100-Year	660.00	2446.56	2451.93	2449.51	2452.13	0.000856	3.64	181.53	87.64	0.30
Trib_I19	1	30.091	500-Year	949.00	2446.56	2454.12	2450.06	2454.31	0.000464	3.50	271.26	106.09	0.24
Trib_I19	1	30.091	10-Year	1.00	2446.56	2446.98	2446.67	2446.98	0.000110	0.22	4.51	14.58	0.07
Trib_I19	1	30.091	50-Year	42.00	2446.56	2447.69	2447.32	2447.77	0.003811	2.29	18.38	25.65	0.48
Trib_I19	1	30.091	Floodway	660.00	2446.56	2451.93	2449.51	2452.13	0.000856	3.64	181.53	87.64	0.30
Trib_I19	1	30.06		Culvert									
Trib_I19	1	30.047	100-Year	660.00	2444.42	2447.39	2447.39	2448.58	0.011316	8.75	75.43	34.68	0.99
Trib_I19	1	30.047	500-Year	949.00	2444.42	2448.04	2448.04	2449.57	0.010709	9.95	95.36	38.49	1.00
Trib_I19	1	30.047	10-Year	1.00	2444.42	2444.57	2444.57	2444.61	0.036884	1.61	0.62	8.12	1.02
Trib_I19	1	30.047	50-Year	42.00	2444.42	2445.14	2445.14	2445.37	0.020664	3.84	10.93	24.74	1.02
Trib_I19	1	30.047	Floodway	660.00	2444.42	2447.39	2447.39	2448.58	0.011316	8.75	75.43	34.68	0.99
Trib_I19	1	30.022	100-Year	660.00	2439.22	2443.53	2442.77	2444.08	0.005104	5.94	111.05	45.30	0.67
Trib_I19	1	30.022	500-Year	949.00	2439.22	2444.12	2443.45	2444.84	0.005637	6.79	139.72	50.22	0.72
Trib_I19	1	30.022	10-Year	1.00	2439.22	2439.53	2439.40	2439.54	0.002142	0.66	1.50	8.72	0.28
Trib_I19	1	30.022	50-Year	42.00	2439.22	2440.58	2440.12	2440.67	0.003031	2.39	17.54	19.04	0.44
Trib_I19	1	30.022	Floodway	660.00	2439.22	2443.53	2442.77	2444.08	0.005104	5.94	111.05	45.30	0.67
Trib_I19	1	30.000	100-Year	660.00	2438.69	2442.17	2442.17	2443.15	0.012092	7.93	83.23	42.36	1.00
Trib_I19	1	30.000	500-Year	949.00	2438.69	2442.80	2442.80	2443.92	0.010382	8.51	114.96	71.65	0.96
Trib_I19	1	30.000	10-Year	1.00	2438.69	2438.85	2438.85	2438.89	0.032025	1.69	0.59	6.44	0.98
Trib_I19	1	30.000	50-Year	42.00	2438.69	2439.63	2439.63	2439.93	0.017834	4.42	9.50	15.63	1.00
Trib_I19	1	30.000	Floodway	660.00	2438.69	2442.17	2442.17	2443.15	0.012092	7.93	83.23	42.36	1.00
MC	2	3.633	100-Year	4021.00	2551.58	2558.43		2559.16	0.002417	6.85	587.02	143.94	0.60
MC	2	3.633	500-Year	6347.00	2551.58	2560.73		2561.31	0.001514	6.16	1091.68	338.83	0.49
MC	2	3.633	10-Year	1668.00	2551.58	2555.72		2556.25	0.002610	5.89	283.05	92.33	0.59
MC	2	3.633	50-Year	3198.00	2551.58	2557.54		2558.26	0.002617	6.82	468.81	122.73	0.62
MC	2	3.633	Floodway	4021.00	2551.58	2558.43		2559.16	0.002417	6.85	587.02	143.94	0.60
MC	2	3.616	100-Year	4021.00	2551.13	2556.57	2556.57	2558.68	0.006877	11.65	345.17	82.92	1.01
MC	2	3.616	500-Year	6347.00	2551.13	2558.15	2558.15	2560.85	0.006312	13.20	480.79	89.15	1.00
MC	2	3.616	10-Year	1668.00	2551.13	2554.53	2554.53	2555.80	0.008079	9.01	185.04	74.43	1.01
MC	2	3.616	50-Year	3198.00	2551.13	2555.93	2555.93	2557.78	0.007152	10.91	293.00	80.16	1.01
MC	2	3.616	Floodway	4021.00	2551.13	2556.57	2556.57	2558.68	0.006877	11.65	345.17	82.92	1.01
MC	2	3.587	100-Year	4021.00	2550.57	2555.93		2557.19	0.003166	9.01	446.43	98.84	0.75
MC	2	3.587	500-Year	6347.00	2550.57	2557.78		2559.31	0.002734	9.95	637.61	108.24	0.72
MC	2	3.587	10-Year	1668.00	2550.57	2553.72		2554.49	0.003955	7.04	237.04	90.77	0.77
MC	2	3.587	50-Year	3198.00	2550.57	2555.21		2556.33	0.003412	8.51	375.85	96.16	0.76
MC	2	3.587	Floodway	4021.00	2550.57	2555.93		2557.19	0.003166	9.01	446.43	98.84	0.75
MC	2	3.565	100-Year	4021.00	2549.23	2554.82	2554.62	2556.67	0.005242	10.91	368.70	87.92	0.94
MC	2	3.565	500-Year	6347.00	2549.23	2556.20	2556.09	2558.78	0.005296	12.90	492.11	91.08	0.98
MC	2	3.565	10-Year	1668.00	2549.23	2553.15	2552.77	2554.00	0.004365	7.43	224.56	84.13	0.80
MC	2	3.565	50-Year	3198.00	2549.23	2554.33	2554.03	2555.83	0.004906	9.82	325.66	86.80	0.89
MC	2	3.565	Floodway	4021.00	2549.23	2554.82	2554.62	2556.67	0.005242	10.91	368.70	87.92	0.94
MC	2	3.526	100-Year	4021.00	2548.80	2553.67	2553.53	2555.56	0.005451	11.06	363.65	87.91	0.96
MC	2	3.526	500-Year	6347.00	2548.80	2555.26	2555.00	2557.70	0.004808	12.53	506.55	91.28	0.94
MC	2	3.526	10-Year	1668.00	2548.80	2551.67	2551.67	2552.84	0.007151	8.66	192.56	83.69	1.01
MC	2	3.526	50-Year	3198.00	2548.80	2553.02	2552.94	2554.70	0.005893	10.42	307.04	86.54	0.97
MC	2	3.526	Floodway	4021.00	2548.80	2553.67	2553.53	2555.56	0.005451	11.06	363.65	87.91	0.96
MC	2	3.495	100-Year	4021.00	2547.13	2553.51		2554.75	0.002723	8.90	451.76	89.32	0.70
MC	2	3.495	500-Year	6347.00	2547.13	2555.17		2556.89	0.002801	10.51	603.83	94.21	0.73
MC	2	3.495	10-Year	1668.00	2547.13	2551.38		2551.99	0.002434	6.24	267.23	83.96	0.62
MC	2	3.495	50-Year	3198.00	2547.13	2552.84		2553.87	0.002658	8.15	392.50	87.34	0.68
MC	2	3.495	Floodway	4021.00	2547.13	2553.51		2554.75	0.002723	8.90	451.76	89.32	0.70
MC	2	3.463	100-Year	4021.00	2547.66	2552.47	2552.04	2554.13	0.004413	10.36	388.25	88.04	0.87

HEC-RAS Plan: PMR_Lower (Continued)

River	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)	
MC	2	3.463	500-Year	6347.00	2547.66	2553.94	2553.52	2556.25	0.004395	12.19	520.65	91.14	0.90
MC	2	3.463	10-Year	1668.00	2547.66	2550.41	2550.18	2551.38	0.005235	7.87	211.92	83.95	0.87
MC	2	3.463	50-Year	3198.00	2547.66	2551.83	2551.45	2553.26	0.004556	9.62	332.45	86.70	0.87
MC	2	3.463	Floodway	4021.00	2547.66	2552.47	2552.04	2554.13	0.004413	10.36	388.25	88.04	0.87
MC	2	3.429	100-Year	4021.00	2545.93	2551.95		2553.37	0.003277	9.56	420.45	85.76	0.76
MC	2	3.429	500-Year	6347.00	2545.93	2553.33		2555.47	0.003770	11.73	541.16	89.55	0.84
MC	2	3.429	10-Year	1668.00	2545.93	2549.91		2550.60	0.002911	6.67	249.89	81.37	0.67
MC	2	3.429	50-Year	3198.00	2545.93	2551.33		2552.50	0.003156	8.70	367.57	84.44	0.73
MC	2	3.429	Floodway	4021.00	2545.93	2551.95		2553.37	0.003277	9.56	420.45	85.76	0.76
MC	2	3.392	100-Year	4021.00	2545.86	2550.49	2550.46	2552.47	0.005907	11.32	355.30	88.17	0.99
MC	2	3.392	500-Year	6347.00	2545.86	2552.14	2551.94	2554.60	0.004958	12.59	504.22	92.58	0.95
MC	2	3.392	10-Year	1668.00	2545.86	2548.70	2548.60	2549.77	0.006184	8.27	201.61	83.99	0.94
MC	2	3.392	50-Year	3198.00	2545.86	2549.91	2549.87	2551.62	0.006090	10.50	304.56	86.93	0.99
MC	2	3.392	Floodway	4021.00	2545.86	2550.49	2550.46	2552.47	0.005907	11.32	355.30	88.17	0.99
MC	2	3.355	100-Year	4021.00	2544.33	2549.84		2551.41	0.004042	10.02	401.18	89.74	0.84
MC	2	3.355	500-Year	6347.00	2544.33	2551.79		2553.64	0.003247	10.92	581.09	96.01	0.78
MC	2	3.355	10-Year	1668.00	2544.33	2547.66	2547.44	2548.63	0.005258	7.88	211.65	83.93	0.87
MC	2	3.355	50-Year	3198.00	2544.33	2549.15		2550.53	0.004319	9.42	339.34	87.88	0.85
MC	2	3.355	Floodway	4021.00	2544.33	2549.84		2551.41	0.004042	10.02	401.18	89.74	0.84
MC	2	3.316	100-Year	4021.00	2543.83	2549.52		2550.64	0.002385	8.48	473.95	91.36	0.66
MC	2	3.316	500-Year	6347.00	2543.83	2551.56		2552.98	0.002088	9.54	665.44	96.14	0.64
MC	2	3.316	10-Year	1668.00	2543.83	2547.18		2547.79	0.002511	6.25	266.68	85.89	0.63
MC	2	3.316	50-Year	3198.00	2543.83	2548.79		2549.75	0.002412	7.84	407.75	89.65	0.65
MC	2	3.316	Floodway	4021.00	2543.83	2549.52		2550.64	0.002385	8.48	473.95	91.36	0.66
MC	2	3.295	100-Year	4021.00	2543.20	2549.32	2547.81	2550.37	0.002179	8.20	490.27	93.09	0.63
MC	2	3.295	500-Year	6347.00	2543.20	2551.45	2549.30	2552.71	0.001950	9.00	705.12	108.00	0.62
MC	2	3.295	10-Year	1668.00	2543.20	2546.96	2545.93	2547.52	0.002163	5.97	279.31	86.06	0.58
MC	2	3.295	50-Year	3198.00	2543.20	2548.58	2547.22	2549.47	0.002177	7.57	422.45	90.75	0.62
MC	2	3.295	Floodway	4021.00	2543.20	2549.32	2547.81	2550.37	0.002179	8.20	490.27	93.09	0.63
MC	2	3.285		Bridge									
MC	2	3.284	100-Year	4021.00	2542.56	2548.50	2547.69	2549.82	0.003500	9.22	436.03	99.83	0.78
MC	2	3.284	500-Year	6347.00	2542.56	2550.73	2549.17	2552.12	0.002408	9.47	670.19	110.62	0.68
MC	2	3.284	10-Year	1668.00	2542.56	2546.09	2545.81	2547.02	0.005007	7.74	215.45	84.65	0.86
MC	2	3.284	50-Year	3198.00	2542.56	2547.38	2547.12	2548.85	0.004970	9.72	328.88	90.75	0.90
MC	2	3.284	Floodway	4021.00	2542.56	2548.50	2547.69	2549.82	0.003500	9.22	436.03	99.83	0.78
MC	2	3.281	100-Year	4021.00	2542.87	2547.86	2547.57	2549.62	0.004850	10.66	377.10	88.35	0.91
MC	2	3.281	500-Year	6347.00	2542.87	2549.19	2549.04	2551.72	0.005111	12.77	496.98	91.55	0.97
MC	2	3.281	10-Year	1668.00	2542.87	2546.02		2546.92	0.004676	7.61	219.11	83.94	0.83
MC	2	3.281	50-Year	3198.00	2542.87	2547.29		2548.77	0.004785	9.77	327.44	86.99	0.89
MC	2	3.281	Floodway	4021.00	2542.87	2547.86	2547.57	2549.62	0.004850	10.66	377.10	88.35	0.91
MC	2	3.249	100-Year	4021.00	2541.88	2546.89	2546.74	2548.74	0.005344	10.93	367.72	89.47	0.95
MC	2	3.249	500-Year	6347.00	2541.88	2548.29	2548.19	2550.83	0.005241	12.79	496.12	93.15	0.98
MC	2	3.249	10-Year	1668.00	2541.88	2545.07		2546.05	0.005500	7.97	209.27	84.70	0.89
MC	2	3.249	50-Year	3198.00	2541.88	2546.30	2546.14	2547.89	0.005463	10.13	315.69	87.93	0.94
MC	2	3.249	Floodway	4021.00	2541.88	2546.89	2546.74	2548.74	0.005344	10.93	367.72	89.47	0.95
MC	2	3.209	100-Year	4021.00	2541.09	2546.16		2547.69	0.003982	9.91	405.77	91.69	0.83
MC	2	3.209	500-Year	6347.00	2541.09	2547.67	2547.09	2549.76	0.003941	11.60	547.18	96.09	0.86
MC	2	3.209	10-Year	1668.00	2541.09	2544.04		2544.95	0.004907	7.67	217.60	85.68	0.85
MC	2	3.209	50-Year	3198.00	2541.09	2545.47		2546.82	0.004255	9.32	343.09	89.67	0.84
MC	2	3.209	Floodway	4021.00	2541.09	2546.16		2547.69	0.003982	9.91	405.77	91.69	0.83
MC	2	3.175	100-Year	4021.00	2539.36	2544.71	2544.67	2546.70	0.006757	11.30	355.70	88.11	0.99
MC	2	3.175	500-Year	6347.00	2539.36	2546.19	2546.19	2548.79	0.006419	12.93	490.68	95.09	1.00
MC	2	3.175	10-Year	1668.00	2539.36	2543.16	2542.75	2544.03	0.004962	7.47	223.28	82.32	0.80
MC	2	3.175	50-Year	3198.00	2539.36	2544.23	2544.08	2545.85	0.006321	10.20	313.40	86.31	0.94
MC	2	3.175	Floodway	4021.00	2539.36	2544.71	2544.67	2546.70	0.006757	11.30	355.70	88.11	0.99
MC	2	3.146	100-Year	4021.00	2538.64	2543.82	2543.82	2545.59	0.006980	10.68	376.63	105.57	1.00
MC	2	3.146	500-Year	6347.00	2538.64	2545.25	2545.21	2547.37	0.006570	11.67	543.89	127.45	1.00
MC	2	3.146	10-Year	1668.00	2538.64	2541.94	2541.94	2543.05	0.008088	8.46	197.20	87.83	0.99
MC	2	3.146	50-Year	3198.00	2538.64	2543.20	2543.20	2544.81	0.007277	10.17	314.43	97.85	1.00
MC	2	3.146	Floodway	4021.00	2538.64	2543.82	2543.82	2545.59	0.006980	10.68	376.63	105.57	1.00
MC	2	3.108	100-Year	4021.00	2536.41	2543.42		2544.31	0.002600	7.58	530.38	117.96	0.63
MC	2	3.108	500-Year	6347.00	2536.41	2545.27		2546.35	0.002247	8.34	760.94	131.05	0.61
MC	2	3.108	10-Year	1668.00	2536.41	2541.20		2541.71	0.002695	5.75	290.06	100.73	0.60
MC	2	3.108	50-Year	3198.00	2536.41	2542.69		2543.48	0.002663	7.15	447.44	110.77	0.63
MC	2	3.108	Floodway	4021.00	2536.41	2543.42		2544.31	0.002600	7.58	530.38	117.96	0.63
MC	2	3.069	100-Year	4021.00	2536.60	2542.96		2543.78	0.002268	7.25	554.84	119.16	0.59
MC	2	3.069	500-Year	6347.00	2536.60	2544.90		2545.88	0.001943	7.94	799.44	132.98	0.57

HEC-RAS Plan: PMR_Lower (Continued)

River	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)	
MC	2	3.069	10-Year	1668.00	2536.60	2540.71		2541.17	0.002322	5.46	305.62	102.63	0.56
MC	2	3.069	50-Year	3198.00	2536.60	2542.20		2542.93	0.002400	6.86	466.49	113.76	0.60
MC	2	3.069	Floodway	4021.00	2536.60	2542.96		2543.78	0.002268	7.25	554.84	119.16	0.59
MC	2	3.031	100-Year	4021.00	2534.72	2542.58		2543.27	0.002403	6.69	600.64	124.79	0.52
MC	2	3.031	500-Year	6347.00	2534.72	2544.60		2545.42	0.002169	7.33	916.52	241.52	0.51
MC	2	3.031	10-Year	1668.00	2534.72	2540.40		2540.73	0.001767	4.58	364.37	100.07	0.42
MC	2	3.031	50-Year	3198.00	2534.72	2541.81		2542.41	0.002396	6.23	513.06	114.82	0.51
MC	2	3.031	Floodway	4021.00	2534.72	2542.58		2543.27	0.002403	6.69	600.64	124.79	0.52
MC	2	2.997	100-Year	3953.00	2532.14	2541.55		2542.69	0.003973	8.56	461.62	91.41	0.66
MC	2	2.997	500-Year	6160.00	2532.14	2543.37		2544.84	0.004160	9.73	633.14	347.94	0.69
MC	2	2.997	10-Year	2091.00	2532.14	2539.11		2540.10	0.005850	7.99	261.76	74.72	0.75
MC	2	2.997	50-Year	3312.00	2532.14	2540.51		2541.74	0.005272	8.91	371.82	83.16	0.74
MC	2	2.997	Floodway	3953.00	2532.14	2541.55		2542.69	0.003973	8.56	461.62	91.41	0.66
MC	2	2.968	100-Year	3953.00	2532.51	2541.16		2542.09	0.003090	7.75	509.91	95.04	0.59
MC	2	2.968	500-Year	6160.00	2532.51	2543.03		2544.22	0.002976	8.77	713.28	491.90	0.60
MC	2	2.968	10-Year	2091.00	2532.51	2538.28		2539.22	0.005397	7.78	268.82	76.20	0.73
MC	2	2.968	50-Year	3312.00	2532.51	2539.89		2540.97	0.004213	8.34	397.18	83.75	0.67
MC	2	2.968	Floodway	3953.00	2532.51	2541.16		2542.09	0.003090	7.75	509.91	95.04	0.59
MC	2	2.961	100-Year	3953.00	2533.59	2541.14	2538.92	2541.96	0.002398	7.26	544.67	180.96	0.52
MC	2	2.961	500-Year	6160.00	2533.59	2542.95	2540.37	2544.11	0.002471	8.65	713.07	567.03	0.55
MC	2	2.961	10-Year	2091.00	2533.59	2538.16	2537.41	2539.00	0.005151	7.38	283.31	83.06	0.70
MC	2	2.961	50-Year	3312.00	2533.59	2539.86	2538.45	2540.78	0.003554	7.71	429.52	88.49	0.62
MC	2	2.961	Floodway	3953.00	2533.59	2541.14	2538.92	2541.96	0.002398	7.26	544.67	180.96	0.52
MC	2	2.94		Culvert									
MC	2	2.930	100-Year	3953.00	2530.39	2535.55	2535.55	2537.69	0.009752	11.73	336.96	77.82	0.99
MC	2	2.930	500-Year	6160.00	2530.39	2537.39	2537.07	2539.91	0.007747	12.74	483.59	81.98	0.92
MC	2	2.930	10-Year	2091.00	2530.39	2533.95	2533.95	2535.40	0.010984	9.68	215.91	73.85	1.00
MC	2	2.930	50-Year	3312.00	2530.39	2535.03	2535.03	2536.96	0.010030	11.17	296.55	75.52	0.99
MC	2	2.930	Floodway	3953.00	2530.39	2535.55	2535.55	2537.69	0.009752	11.73	336.96	77.82	0.99
MC	2	2.923	100-Year	3953.00	2526.96	2535.49		2536.73	0.004121	8.93	442.87	82.05	0.68
MC	2	2.923	500-Year	6160.00	2526.96	2537.74		2539.19	0.003430	9.67	637.24	90.48	0.64
MC	2	2.923	10-Year	2091.00	2526.96	2533.58		2534.37	0.003971	7.12	293.49	74.83	0.63
MC	2	2.923	50-Year	3312.00	2526.96	2534.89		2535.98	0.004096	8.40	394.08	79.77	0.67
MC	2	2.923	Floodway	3953.00	2526.96	2535.49		2536.73	0.004121	8.93	442.87	82.05	0.68
MC	2	2.907	100-Year	3953.00	2527.75	2535.19		2536.36	0.003843	8.67	455.80	84.72	0.66
MC	2	2.907	500-Year	6160.00	2527.75	2537.55		2538.87	0.003090	9.22	668.10	95.48	0.61
MC	2	2.907	10-Year	2091.00	2527.75	2533.29		2534.03	0.003603	6.90	302.85	76.06	0.61
MC	2	2.907	50-Year	3312.00	2527.75	2534.58		2535.62	0.003820	8.18	405.03	82.04	0.65
MC	2	2.907	Floodway	3953.00	2527.75	2535.19		2536.36	0.003843	8.67	455.80	84.72	0.66
MC	2	2.869	100-Year	3953.00	2526.62	2534.59		2535.60	0.003338	8.07	489.89	91.64	0.62
MC	2	2.869	500-Year	6160.00	2526.62	2537.19		2538.25	0.002395	8.28	743.57	103.47	0.54
MC	2	2.869	10-Year	2091.00	2526.62	2532.67		2533.32	0.003207	6.47	323.05	82.15	0.58
MC	2	2.869	50-Year	3312.00	2526.62	2533.95		2534.86	0.003383	7.65	432.88	88.80	0.61
MC	2	2.869	Floodway	3953.00	2526.62	2534.59		2535.60	0.003338	8.07	489.89	91.64	0.62
MC	2	2.831	100-Year	3953.00	2527.02	2533.77		2534.87	0.003921	8.40	470.72	93.81	0.66
MC	2	2.831	500-Year	6160.00	2527.02	2536.78		2537.77	0.002195	8.00	770.09	105.66	0.52
MC	2	2.831	10-Year	2091.00	2527.02	2531.62		2532.49	0.005344	7.49	279.09	83.98	0.72
MC	2	2.831	50-Year	3312.00	2527.02	2533.02		2534.08	0.004421	8.24	401.91	90.41	0.69
MC	2	2.831	Floodway	3953.00	2527.02	2533.77		2534.87	0.003921	8.40	470.72	93.81	0.66
MC	2	2.796	100-Year	3953.00	2526.31	2533.75		2534.26	0.001574	5.69	694.71	125.72	0.43
MC	2	2.796	500-Year	6160.00	2526.31	2536.89		2537.36	0.000961	5.49	1121.22	218.17	0.35
MC	2	2.796	10-Year	2091.00	2526.31	2531.30		2531.72	0.002424	5.23	400.08	114.62	0.49
MC	2	2.796	50-Year	3312.00	2526.31	2532.94		2533.42	0.001772	5.58	593.97	121.34	0.44
MC	2	2.796	Floodway	3953.00	2526.31	2533.75		2534.26	0.001574	5.69	694.71	125.72	0.43
MC	2	2.783	100-Year	3953.00	2525.91	2533.48	2530.92	2534.13	0.001681	6.47	611.28	144.29	0.45
MC	2	2.783	500-Year	6160.00	2525.91	2536.55	2532.20	2537.27	0.001087	6.78	909.10	253.39	0.39
MC	2	2.783	10-Year	2091.00	2525.91	2531.08	2529.60	2531.55	0.002336	5.53	377.94	118.33	0.49
MC	2	2.783	50-Year	3312.00	2525.91	2532.69	2530.48	2533.29	0.001847	6.20	534.43	135.52	0.47
MC	2	2.783	Floodway	3953.00	2525.91	2533.48	2530.92	2534.13	0.001681	6.47	611.28	144.29	0.45
MC	2	2.77		Culvert									
MC	2	2.762	100-Year	3953.00	2526.52	2530.69	2530.69	2532.67	0.009382	11.29	350.06	102.43	0.99
MC	2	2.762	500-Year	6160.00	2526.52	2532.30	2532.07	2534.75	0.007427	12.57	489.97	114.75	0.93
MC	2	2.762	10-Year	2091.00	2526.52	2529.28	2529.28	2530.59	0.011047	9.19	227.46	92.08	1.00
MC	2	2.762	50-Year	3312.00	2526.52	2530.24	2530.24	2532.00	0.009785	10.65	310.85	99.03	0.99
MC	2	2.762	Floodway	3953.00	2526.52	2530.69	2530.69	2532.67	0.009382	11.29	350.06	102.43	0.99
MC	2	2.734	100-Year	3953.00	2518.91	2530.58		2531.16	0.001290	6.07	650.82	86.73	0.39

HEC-RAS Plan: PMR_Lower (Continued)

River	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)	
MC	2	2.734	500-Year	6160.00	2518.91	2532.69		2533.52	0.001500	7.32	841.21	273.19	0.43
MC	2	2.734	10-Year	2091.00	2518.91	2528.08		2528.42	0.001097	4.70	444.67	77.94	0.35
MC	2	2.734	50-Year	3312.00	2518.91	2529.84		2530.33	0.001218	5.64	587.48	84.12	0.38
MC	2	2.734	Floodway	3953.00	2518.91	2530.62		2531.19	0.001273	6.05	653.88	86.85	0.39
MC	2	2.708	100-Year	3953.00	2518.58	2529.64		2530.82	0.003499	8.73	452.93	75.85	0.63
MC	2	2.708	500-Year	6160.00	2518.58	2531.52		2533.13	0.003779	10.18	604.88	217.70	0.67
MC	2	2.708	10-Year	2091.00	2518.58	2527.39		2528.15	0.002935	7.01	298.35	60.72	0.56
MC	2	2.708	50-Year	3312.00	2518.58	2528.98		2530.02	0.003340	8.19	404.18	71.85	0.61
MC	2	2.708	Floodway	3953.00	2518.58	2529.70		2530.86	0.003405	8.64	457.53	76.22	0.62
MC	2	2.690	100-Year	3953.00	2518.78	2529.21		2530.45	0.003824	8.95	441.53	76.19	0.66
MC	2	2.690	500-Year	6160.00	2518.78	2531.33	2529.28	2532.71	0.003347	9.64	790.69	340.93	0.63
MC	2	2.690	10-Year	2091.00	2518.78	2527.04		2527.84	0.003166	7.18	291.17	60.55	0.58
MC	2	2.690	50-Year	3312.00	2518.78	2528.56		2529.66	0.003724	8.42	393.23	72.99	0.64
MC	2	2.690	Floodway	3953.00	2518.78	2529.29		2530.50	0.003662	8.82	448.20	76.56	0.64
MC	2	2.652	100-Year	3953.00	2517.69	2528.24		2529.63	0.004203	9.47	417.35	111.29	0.69
MC	2	2.652	500-Year	6160.00	2517.69	2528.80	2528.80	2531.59	0.007873	13.42	469.14	187.00	0.96
MC	2	2.652	10-Year	2091.00	2517.69	2526.45		2527.21	0.003000	7.03	297.65	87.19	0.56
MC	2	2.652	50-Year	3312.00	2517.69	2527.74		2528.90	0.003768	8.67	381.85	102.24	0.65
MC	2	2.652	Floodway	3953.00	2517.69	2528.37		2529.70	0.004195	9.26	427.61	79.48	0.67
MC	2	2.613	100-Year	3953.00	2516.66	2527.59	2526.89	2528.60	0.004795	8.48	593.39	244.02	0.71
MC	2	2.613	500-Year	6160.00	2516.66	2529.09	2528.28	2529.89	0.003776	7.98	1022.75	324.00	0.64
MC	2	2.613	10-Year	2091.00	2516.66	2525.40		2526.41	0.004956	8.08	258.85	118.16	0.71
MC	2	2.613	50-Year	3312.00	2516.66	2526.75	2525.64	2528.00	0.005130	9.11	418.85	180.74	0.74
MC	2	2.613	Floodway	3953.00	2516.66	2527.57	2526.69	2528.70	0.005148	8.81	521.78	167.52	0.73
MC	2	2.578	100-Year	3953.00	2516.53	2526.29	2525.16	2527.64	0.005358	9.37	451.50	152.27	0.76
MC	2	2.578	500-Year	6160.00	2516.53	2527.75	2527.75	2529.04	0.005121	9.62	901.74	495.74	0.75
MC	2	2.578	10-Year	2091.00	2516.53	2524.88		2525.61	0.003188	6.84	305.64	69.38	0.57
MC	2	2.578	50-Year	3312.00	2516.53	2525.97		2527.08	0.004488	8.46	406.94	129.38	0.69
MC	2	2.578	Floodway	3953.00	2516.53	2526.35		2527.71	0.005315	9.39	421.03	87.60	0.75
MC	2	2.549	100-Year	3953.00	2516.14	2526.21		2526.86	0.002659	6.97	823.01	451.57	0.54
MC	2	2.549	500-Year	6160.00	2516.14	2527.45		2528.06	0.002210	7.34	1476.01	594.48	0.51
MC	2	2.549	10-Year	2091.00	2516.14	2524.48		2525.08	0.003100	6.30	370.17	183.73	0.56
MC	2	2.549	50-Year	3312.00	2516.14	2525.82		2526.41	0.002598	6.53	667.95	331.78	0.53
MC	2	2.549	Floodway	3953.00	2516.14	2526.25		2526.94	0.002732	7.09	696.23	237.60	0.55
MC	2	2.514	100-Year	3953.00	2515.98	2525.85		2526.38	0.002262	6.32	888.95	508.25	0.50
MC	2	2.514	500-Year	6160.00	2515.98	2527.08		2527.66	0.002067	7.01	1357.55	637.20	0.50
MC	2	2.514	10-Year	2091.00	2515.98	2523.73		2524.46	0.003584	6.89	310.54	114.99	0.61
MC	2	2.514	50-Year	3312.00	2515.98	2525.42	2524.26	2525.93	0.002380	6.10	741.73	456.54	0.51
MC	2	2.514	Floodway	3953.00	2515.98	2525.82		2526.43	0.002553	6.69	750.94	229.00	0.53
MC	2	2.483	100-Year	3953.00	2515.13	2524.31	2524.31	2525.71	0.006130	9.83	497.73	420.01	0.81
MC	2	2.483	500-Year	6160.00	2515.13	2525.83	2525.54	2527.12	0.004336	10.00	887.92	614.06	0.71
MC	2	2.483	10-Year	2091.00	2515.13	2521.51	2521.51	2523.42	0.009972	11.08	188.64	48.86	0.99
MC	2	2.483	50-Year	3312.00	2515.13	2523.78	2523.78	2525.21	0.007042	9.71	386.86	326.75	0.85
MC	2	2.483	Floodway	3953.00	2515.13	2524.27	2524.27	2525.72	0.006367	9.96	482.85	198.00	0.82
MC	2	2.454	100-Year	3953.00	2514.12	2522.65		2523.43	0.002541	7.05	560.57	179.84	0.54
MC	2	2.454	500-Year	6160.00	2514.12	2525.90		2526.57	0.001396	6.59	934.21	664.43	0.42
MC	2	2.454	10-Year	2091.00	2514.12	2520.47		2521.03	0.002918	6.05	345.37	90.74	0.55
MC	2	2.454	50-Year	3312.00	2514.12	2521.94		2522.66	0.002700	6.80	487.23	101.24	0.55
MC	2	2.454	Floodway	3953.00	2514.12	2522.65		2523.43	0.002541	7.05	560.57	179.84	0.54
MC	2	2.448	100-Year	3953.00	2514.57	2522.82	2520.19	2523.28	0.001494	5.44	726.01	135.72	0.41
MC	2	2.448	500-Year	6160.00	2514.57	2526.05	2521.35	2526.46	0.000849	5.15	1195.51	705.34	0.33
MC	2	2.448	10-Year	2091.00	2514.57	2520.54	2518.92	2520.90	0.002038	4.84	432.14	122.30	0.45
MC	2	2.448	50-Year	3312.00	2514.57	2522.08	2519.78	2522.51	0.001624	5.27	628.05	131.28	0.42
MC	2	2.448	Floodway	3953.00	2514.57	2522.82	2520.19	2523.28	0.001494	5.44	726.01	135.72	0.41
MC	2	2.445		Bridge									
MC	2	2.441	100-Year	3953.00	2513.12	2522.52		2522.94	0.001289	5.18	762.50	135.94	0.39
MC	2	2.441	500-Year	6160.00	2513.12	2525.49		2525.90	0.000834	5.19	1185.76	296.33	0.33
MC	2	2.441	10-Year	2091.00	2513.12	2520.25		2520.57	0.001669	4.49	465.26	125.43	0.41
MC	2	2.441	50-Year	3312.00	2513.12	2521.81		2522.19	0.001372	4.97	666.21	132.78	0.39
MC	2	2.441	Floodway	3953.00	2513.12	2522.52		2522.94	0.001289	5.18	762.46	135.94	0.39
MC	2	2.433	100-Year	3953.00	2515.49	2522.27		2522.83	0.001900	6.00	659.12	346.44	0.46
MC	2	2.433	500-Year	6160.00	2515.49	2525.32		2525.83	0.001107	5.73	1075.16	1108.74	0.37
MC	2	2.433	10-Year	2091.00	2515.49	2519.94		2520.42	0.002932	5.54	377.69	114.56	0.54
MC	2	2.433	50-Year	3312.00	2515.49	2521.54		2522.07	0.002091	5.83	568.17	182.86	0.48
MC	2	2.433	Floodway	3953.00	2515.49	2522.27		2522.83	0.001901	6.00	659.05	346.37	0.46
MC	2	2.422	100-Year	3953.00	2515.64	2522.32	2519.49	2522.69	0.001282	4.89	808.53	239.56	0.38
MC	2	2.422	500-Year	6160.00	2515.64	2525.39	2520.66	2525.74	0.000647	4.73	1303.05	1233.17	0.29

HEC-RAS Plan: PMR_Lower (Continued)

River	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)	
MC	2	2.422	10-Year	2091.00	2515.64	2519.91	2518.40	2520.24	0.002001	4.65	450.04	133.39	0.45
MC	2	2.422	50-Year	3312.00	2515.64	2521.57	2519.14	2521.92	0.001488	4.80	690.47	162.22	0.40
MC	2	2.422	Floodway	3953.00	2515.64	2522.32	2519.49	2522.69	0.001282	4.89	808.49	239.55	0.38
MC	2	2.41		Bridge									
MC	2	2.403	100-Year	3953.00	2515.55	2521.96		2522.26	0.000861	4.42	894.37	169.19	0.32
MC	2	2.403	500-Year	6160.00	2515.55	2523.93		2524.34	0.000798	5.16	1194.32	616.14	0.32
MC	2	2.403	10-Year	2091.00	2515.55	2519.40		2519.66	0.001593	4.14	505.32	150.39	0.40
MC	2	2.403	50-Year	3312.00	2515.55	2521.20		2521.48	0.000955	4.25	779.74	164.16	0.33
MC	2	2.403	Floodway	3953.00	2515.55	2521.96		2522.26	0.000862	4.42	894.29	169.19	0.32
MC	2	2.396	100-Year	3953.00	2512.67	2521.52		2522.12	0.001847	6.28	668.13	279.41	0.46
MC	2	2.396	500-Year	6160.00	2512.67	2523.51		2524.21	0.001569	6.92	1014.05	511.88	0.45
MC	2	2.396	10-Year	2091.00	2512.67	2519.05		2519.53	0.002112	5.54	377.54	87.73	0.47
MC	2	2.396	50-Year	3312.00	2512.67	2520.76		2521.34	0.002019	6.12	553.81	196.80	0.47
MC	2	2.396	Floodway	3953.00	2512.67	2521.48		2522.11	0.001917	6.38	631.99	122.00	0.47
MC	2	2.375	100-Year	3953.00	2512.26	2520.89		2521.83	0.003005	7.79	507.56	175.06	0.58
MC	2	2.375	500-Year	6160.00	2512.26	2522.77		2523.92	0.003531	8.60	734.08	549.18	0.64
MC	2	2.375	10-Year	2091.00	2512.26	2518.57		2519.23	0.002822	6.54	319.91	72.14	0.55
MC	2	2.375	50-Year	3312.00	2512.26	2520.18		2521.04	0.003010	7.45	444.47	126.14	0.58
MC	2	2.375	Floodway	3953.00	2512.26	2520.87		2521.82	0.002959	7.82	505.61	89.80	0.58
MC	2	2.346	100-Year	3953.00	2511.54	2519.07	2518.69	2521.04	0.007948	11.25	351.43	157.97	0.92
MC	2	2.346	500-Year	6160.00	2511.54	2521.11	2521.11	2523.02	0.009643	11.08	556.06	449.22	0.99
MC	2	2.346	10-Year	2091.00	2511.54	2517.51		2518.63	0.005299	8.47	246.85	60.35	0.74
MC	2	2.346	50-Year	3312.00	2511.54	2518.68		2520.31	0.006745	10.26	322.76	93.24	0.85
MC	2	2.346	Floodway	3953.00	2511.54	2519.15	2518.74	2521.05	0.007707	11.07	357.13	77.47	0.91
MC	2	2.308	100-Year	3953.00	2510.75	2517.80	2517.80	2519.43	0.006863	10.40	446.87	228.79	0.86
MC	2	2.308	500-Year	6160.00	2510.75	2519.20	2519.20	2520.65	0.004974	10.57	894.38	355.99	0.76
MC	2	2.308	10-Year	2091.00	2510.75	2516.39		2517.43	0.006296	8.18	255.70	75.19	0.78
MC	2	2.308	50-Year	3312.00	2510.75	2517.34	2516.99	2518.86	0.007227	9.93	354.82	163.73	0.86
MC	2	2.308	Floodway	3953.00	2510.75	2517.79	2517.69	2519.48	0.007082	10.54	409.73	137.00	0.87
MC	2	2.275	100-Year	3953.00	2510.23	2516.64	2516.64	2518.11	0.007108	9.85	457.33	278.47	0.86
MC	2	2.275	500-Year	6160.00	2510.23	2517.82	2517.82	2519.47	0.006180	10.89	759.92	440.14	0.84
MC	2	2.275	10-Year	2091.00	2510.23	2515.46		2516.33	0.005906	7.51	280.26	99.83	0.75
MC	2	2.275	50-Year	3312.00	2510.23	2516.39	2515.96	2517.60	0.006369	8.92	406.33	240.50	0.81
MC	2	2.275	Floodway	3953.00	2510.23	2516.68	2516.38	2518.20	0.007196	9.96	408.49	118.00	0.87
MC	2	2.243	100-Year	3953.00	2510.11	2515.34	2515.34	2516.71	0.009343	9.45	437.69	332.91	0.95
MC	2	2.243	500-Year	6160.00	2510.11	2516.32	2516.32	2518.11	0.008680	10.94	601.28	434.92	0.96
MC	2	2.243	10-Year	2091.00	2510.11	2513.70	2513.70	2514.97	0.010780	9.04	231.31	89.20	0.99
MC	2	2.243	50-Year	3312.00	2510.11	2514.92	2514.92	2516.24	0.010378	9.26	368.83	228.37	0.98
MC	2	2.243	Floodway	3953.00	2510.11	2515.32	2515.32	2516.76	0.009857	9.66	415.82	148.57	0.97
MC	2	2.231	100-Year	3953.00	2506.55	2512.91	2512.91	2515.29	0.009361	12.37	319.58	134.47	1.00
MC	2	2.231	500-Year	6160.00	2506.55	2515.88	2515.59	2517.01	0.005924	8.78	834.93	377.33	0.78
MC	2	2.231	10-Year	2091.00	2506.55	2511.07	2511.07	2512.74	0.010373	10.38	201.45	60.30	1.00
MC	2	2.231	50-Year	3312.00	2506.55	2512.33	2512.33	2514.49	0.009628	11.79	280.98	97.12	1.00
MC	2	2.231	Floodway	3953.00	2506.55	2512.91	2512.91	2515.29	0.009361	12.37	319.58	134.47	1.00
MC	2	2.203	100-Year	3953.00	2502.85	2512.17		2513.72	0.004382	9.98	395.94	62.25	0.70
MC	2	2.203	500-Year	6160.00	2502.85	2513.47	2512.52	2515.98	0.006354	12.74	504.06	142.39	0.85
MC	2	2.203	10-Year	2091.00	2502.85	2509.67		2510.74	0.004371	8.30	251.88	52.86	0.67
MC	2	2.203	50-Year	3312.00	2502.85	2511.43		2512.81	0.004304	9.44	351.01	59.48	0.68
MC	2	2.203	Floodway	3953.00	2502.85	2512.17		2513.72	0.004382	9.98	395.94	62.25	0.70
MC	2	2.165	100-Year	3953.00	2501.52	2509.81	2509.81	2512.38	0.009301	12.85	307.62	59.45	1.00
MC	2	2.165	500-Year	6160.00	2501.52	2512.94	2512.94	2514.66	0.004644	10.87	757.39	479.35	0.74
MC	2	2.165	10-Year	2091.00	2501.52	2507.62	2507.46	2509.44	0.008923	10.84	192.87	46.89	0.94
MC	2	2.165	50-Year	3312.00	2501.52	2509.05	2509.05	2511.48	0.009414	12.50	264.90	53.83	0.99
MC	2	2.165	Floodway	3953.00	2501.52	2509.81	2509.81	2512.38	0.009301	12.85	307.62	59.45	1.00
MC	2	2.135	100-Year	3953.00	2501.59	2508.25	2508.25	2510.72	0.008338	12.59	313.93	64.63	1.01
MC	2	2.135	500-Year	6160.00	2501.59	2510.11	2510.11	2513.10	0.007854	13.89	443.92	79.83	1.01
MC	2	2.135	10-Year	2091.00	2501.59	2506.70	2506.32	2508.12	0.006642	9.56	218.80	57.86	0.87
MC	2	2.135	50-Year	3312.00	2501.59	2507.64	2507.64	2509.89	0.008527	12.03	275.34	61.89	1.01
MC	2	2.135	Floodway	3953.00	2501.59	2508.25	2508.25	2510.72	0.008338	12.59	313.93	64.63	1.01
MC	2	2.108	100-Year	3953.00	2500.86	2507.47	2507.07	2509.14	0.006324	10.36	381.57	86.83	0.87
MC	2	2.108	500-Year	6160.00	2500.86	2510.04	2508.54	2511.60	0.003564	10.02	617.23	153.40	0.69
MC	2	2.108	10-Year	2091.00	2500.86	2505.56	2505.56	2506.94	0.009584	9.44	221.41	79.85	1.00
MC	2	2.108	50-Year	3312.00	2500.86	2506.60	2506.60	2508.41	0.008698	10.78	307.21	84.06	0.99
MC	2	2.108	Floodway	3953.00	2500.86	2507.47	2507.07	2509.14	0.006324	10.36	381.57	86.83	0.87
MC	2	2.096	100-Year	3953.00	2501.16	2507.88	2506.23	2508.63	0.002609	6.93	570.55	137.84	0.57
MC	2	2.096	500-Year	6160.00	2501.16	2510.52	2507.50	2511.20	0.001404	6.65	962.13	659.25	0.45
MC	2	2.096	10-Year	2091.00	2501.16	2504.85	2504.85	2506.07	0.009709	8.87	235.69	95.37	0.99

HEC-RAS Plan: PMR_Lower (Continued)

River	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)	
MC	2	2.096	50-Year	3312.00	2501.16	2506.98	2505.80	2507.78	0.003407	7.18	461.59	116.68	0.64
MC	2	2.096	Floodway	3953.00	2501.16	2507.88	2506.23	2508.63	0.002609	6.93	570.55	137.84	0.57
MC	2	2.08		Culvert									
MC	2	2.075	100-Year	3953.00	2498.08	2505.62		2506.45	0.001917	7.28	543.21	107.45	0.51
MC	2	2.075	500-Year	6160.00	2498.08	2507.34		2508.57	0.002069	8.89	692.85	118.35	0.56
MC	2	2.075	10-Year	2091.00	2498.08	2503.83		2504.28	0.001657	5.40	387.29	96.09	0.45
MC	2	2.075	50-Year	3312.00	2498.08	2505.07		2505.76	0.001835	6.69	494.93	103.94	0.49
MC	2	2.075	Floodway	3953.00	2498.08	2505.62		2506.45	0.001917	7.28	543.21	107.45	0.51
MC	2	2.049	100-Year	3953.00	2497.36	2504.85		2505.98	0.003793	8.55	462.33	95.27	0.68
MC	2	2.049	500-Year	6160.00	2497.36	2506.77		2508.16	0.003301	9.46	651.14	103.10	0.66
MC	2	2.049	10-Year	2091.00	2497.36	2503.08		2503.84	0.004140	7.00	298.78	89.62	0.68
MC	2	2.049	50-Year	3312.00	2497.36	2504.29		2505.31	0.003879	8.08	409.66	93.65	0.68
MC	2	2.049	Floodway	3953.00	2497.36	2504.85		2505.98	0.003793	8.55	462.33	95.27	0.68
MC	2	2.017	100-Year	3953.00	2497.35	2504.25		2505.35	0.003652	8.43	468.72	96.33	0.67
MC	2	2.017	500-Year	6160.00	2497.35	2506.33		2507.59	0.003032	9.02	682.82	110.03	0.64
MC	2	2.017	10-Year	2091.00	2497.35	2502.36		2503.15	0.004167	7.11	293.99	86.77	0.68
MC	2	2.017	50-Year	3312.00	2497.35	2503.66		2504.66	0.003794	8.03	412.70	94.29	0.68
MC	2	2.017	Floodway	3953.00	2497.35	2504.25		2505.35	0.003652	8.43	468.72	96.33	0.67
MC	2	1.979	100-Year	3953.00	2496.66	2503.08		2504.50	0.004640	9.56	413.54	84.53	0.76
MC	2	1.979	500-Year	6160.00	2496.66	2505.73	2503.73	2506.96	0.003169	8.94	746.99	231.91	0.65
MC	2	1.979	10-Year	2091.00	2496.66	2501.44		2502.30	0.004204	7.46	280.23	77.69	0.69
MC	2	1.979	50-Year	3312.00	2496.66	2502.58		2503.81	0.004478	8.91	371.85	82.46	0.74
MC	2	1.979	Floodway	3953.00	2496.66	2503.08		2504.50	0.004640	9.56	413.54	84.53	0.76
MC	2	1.956	100-Year	3953.00	2496.14	2502.67	2501.60	2503.92	0.004093	8.95	441.66	90.79	0.72
MC	2	1.956	500-Year	6160.00	2496.14	2505.57		2506.47	0.003213	7.70	859.83	328.54	0.63
MC	2	1.956	10-Year	2091.00	2496.14	2501.04		2501.79	0.003614	6.96	300.48	82.55	0.64
MC	2	1.956	50-Year	3312.00	2496.14	2502.18	2501.11	2503.26	0.003894	8.33	397.83	87.95	0.69
MC	2	1.956	Floodway	3953.00	2496.14	2502.67	2501.60	2503.92	0.004093	8.95	441.66	90.79	0.72
MC	2	1.939	100-Year	3953.00	2496.35	2501.47	2501.39	2503.36	0.007857	11.03	358.42	88.25	0.96
MC	2	1.939	500-Year	6160.00	2496.35	2504.89	2502.79	2506.18	0.002580	9.12	676.22	284.50	0.60
MC	2	1.939	10-Year	2091.00	2496.35	2499.90	2499.90	2501.25	0.009411	9.32	224.29	81.96	0.99
MC	2	1.939	50-Year	3312.00	2496.35	2500.90	2500.90	2502.69	0.008751	10.74	308.49	85.96	1.00
MC	2	1.939	Floodway	3953.00	2496.35	2501.47	2501.39	2503.36	0.007857	11.03	358.42	88.25	0.96
MC	2	1.93		Culvert									
MC	2	1.920	100-Year	3953.00	2488.31	2497.34		2498.17	0.001887	7.31	540.63	80.10	0.50
MC	2	1.920	500-Year	6160.00	2488.31	2500.11		2501.10	0.001553	7.98	771.89	87.50	0.47
MC	2	1.920	10-Year	2091.00	2488.31	2494.22		2494.95	0.003081	6.90	303.18	72.37	0.59
MC	2	1.920	50-Year	3312.00	2488.31	2496.38		2497.17	0.002074	7.12	465.37	77.47	0.51
MC	2	1.920	Floodway	3953.00	2488.31	2497.34		2498.17	0.001887	7.31	540.63	80.10	0.50
MC	2	1.892	100-Year	3953.00	2485.97	2496.16		2497.62	0.003150	9.71	407.21	56.98	0.64
MC	2	1.892	500-Year	6160.00	2485.97	2498.54		2500.49	0.003265	11.20	550.02	62.67	0.67
MC	2	1.892	10-Year	2091.00	2485.97	2493.42		2494.41	0.003112	8.00	261.48	49.48	0.61
MC	2	1.892	50-Year	3312.00	2485.97	2495.33		2496.64	0.003103	9.17	361.16	54.72	0.63
MC	2	1.892	Floodway	3953.00	2485.97	2496.16		2497.62	0.003150	9.71	407.21	56.98	0.64
MC	2	1.854	100-Year	3953.00	2485.22	2494.87		2496.81	0.004742	11.17	353.97	54.28	0.77
MC	2	1.854	500-Year	6160.00	2485.22	2497.12		2499.65	0.004785	12.75	483.20	60.36	0.79
MC	2	1.854	10-Year	2091.00	2485.22	2492.33		2493.64	0.004445	9.20	227.35	44.79	0.72
MC	2	1.854	50-Year	3312.00	2485.22	2494.11		2495.84	0.004663	10.57	313.37	51.70	0.76
MC	2	1.854	Floodway	3953.00	2485.22	2494.87		2496.81	0.004742	11.17	353.97	54.28	0.77
MC	2	1.816	100-Year	3953.00	2484.48	2494.55		2495.86	0.003122	9.19	429.95	66.28	0.64
MC	2	1.816	500-Year	6160.00	2484.48	2497.03		2498.65	0.002866	10.21	603.53	73.64	0.63
MC	2	1.816	10-Year	2091.00	2484.48	2491.78		2492.77	0.003388	8.01	261.20	53.17	0.64
MC	2	1.816	50-Year	3312.00	2484.48	2493.69		2494.91	0.003296	8.85	374.12	63.96	0.65
MC	2	1.816	Floodway	3953.00	2484.48	2494.55		2495.86	0.003122	9.19	429.95	66.28	0.64
MC	2	1.778	100-Year	3953.00	2484.16	2493.75		2495.20	0.003306	9.66	409.21	61.10	0.66
MC	2	1.778	500-Year	6160.00	2484.16	2496.18		2498.01	0.003269	10.85	567.77	70.03	0.67
MC	2	1.778	10-Year	2091.00	2484.16	2491.04		2492.08	0.003521	8.18	255.52	52.12	0.65
MC	2	1.778	50-Year	3312.00	2484.16	2492.90		2494.23	0.003369	9.24	358.46	58.29	0.66
MC	2	1.778	Floodway	3953.00	2484.16	2493.75		2495.20	0.003306	9.66	409.21	61.10	0.66
MC	2	1.742	100-Year	3953.00	2483.21	2493.26		2494.57	0.002852	9.20	429.70	61.42	0.61
MC	2	1.742	500-Year	6160.00	2483.21	2495.67		2497.38	0.002927	10.50	586.44	69.31	0.64
MC	2	1.742	10-Year	2091.00	2483.21	2490.49		2491.42	0.003012	7.73	270.45	53.27	0.60
MC	2	1.742	50-Year	3312.00	2483.21	2492.40		2493.59	0.002894	8.76	377.89	59.09	0.61
MC	2	1.742	Floodway	3953.00	2483.21	2493.26		2494.57	0.002852	9.20	429.70	61.42	0.61
MC	2	1.712	100-Year	3953.00	2482.89	2493.04		2494.10	0.002224	8.27	477.75	66.50	0.54
MC	2	1.712	500-Year	6160.00	2482.89	2495.49		2496.87	0.002316	9.43	653.12	76.68	0.57

HEC-RAS Plan: PMR_Lower (Continued)

River	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)	
MC	2	1.712	10-Year	2091.00	2482.89	2490.25		2490.96	0.002087	6.77	309.02	56.22	0.51
MC	2	1.712	50-Year	3312.00	2482.89	2492.17		2493.13	0.002136	7.84	422.35	61.82	0.53
MC	2	1.712	Floodway	3953.00	2482.89	2493.04		2494.10	0.002224	8.27	477.75	66.50	0.54
MC	2	1.674	100-Year	3953.00	2481.52	2491.23		2493.33	0.005409	11.62	340.22	55.51	0.83
MC	2	1.674	500-Year	6160.00	2481.52	2493.31	2492.51	2496.04	0.005648	13.27	464.23	63.77	0.87
MC	2	1.674	10-Year	2091.00	2481.52	2488.95		2490.29	0.004665	9.32	224.47	45.95	0.74
MC	2	1.674	50-Year	3312.00	2481.52	2490.54		2492.40	0.005183	10.93	302.90	52.49	0.80
MC	2	1.674	Floodway	3953.00	2481.52	2491.23		2493.33	0.005409	11.62	340.22	55.51	0.83
MC	2	1.636	100-Year	3953.00	2480.64	2490.32		2492.25	0.004875	11.16	354.08	56.45	0.79
MC	2	1.636	500-Year	6160.00	2480.64	2491.92	2491.34	2494.83	0.006296	13.68	450.41	64.05	0.91
MC	2	1.636	10-Year	2091.00	2480.64	2488.32		2489.41	0.003488	8.37	249.90	48.00	0.65
MC	2	1.636	50-Year	3312.00	2480.64	2489.73		2491.38	0.004431	10.30	321.67	53.96	0.74
MC	2	1.636	Floodway	3953.00	2480.64	2490.32		2492.25	0.004875	11.16	354.08	56.45	0.79
MC	2	1.598	100-Year	3953.00	2480.60	2488.48	2488.48	2490.95	0.008250	12.62	313.21	63.36	1.00
MC	2	1.598	500-Year	6160.00	2480.60	2490.31	2490.31	2493.41	0.007719	14.13	435.93	70.28	1.00
MC	2	1.598	10-Year	2091.00	2480.60	2486.41	2486.41	2488.26	0.009203	10.92	191.53	52.57	1.01
MC	2	1.598	50-Year	3312.00	2480.60	2487.86	2487.86	2490.11	0.008501	12.06	274.64	61.02	1.00
MC	2	1.598	Floodway	3953.00	2480.60	2488.48	2488.48	2490.95	0.008250	12.62	313.21	63.36	1.00
MC	2	1.570	100-Year	3953.00	2479.60	2487.13	2486.71	2489.14	0.005119	11.36	347.84	68.16	0.89
MC	2	1.570	500-Year	6160.00	2479.60	2490.19		2491.96	0.003012	10.69	576.09	98.77	0.71
MC	2	1.570	10-Year	2091.00	2479.60	2484.80	2484.80	2486.50	0.007309	10.46	199.98	58.71	1.00
MC	2	1.570	50-Year	3312.00	2479.60	2486.18	2486.11	2488.28	0.006449	11.64	284.61	64.29	0.97
MC	2	1.570	Floodway	3953.00	2479.60	2487.13	2486.71	2489.14	0.005119	11.36	347.84	68.16	0.89
MC	2	1.545	100-Year	3953.00	2480.12	2487.53		2488.44	0.001789	7.62	518.81	82.84	0.54
MC	2	1.545	500-Year	6160.00	2480.12	2490.49		2491.47	0.001354	7.93	776.96	93.82	0.49
MC	2	1.545	10-Year	2091.00	2480.12	2484.68		2485.48	0.003039	7.20	290.43	77.03	0.65
MC	2	1.545	50-Year	3312.00	2480.12	2486.60		2487.47	0.002054	7.49	442.11	80.95	0.56
MC	2	1.545	Floodway	3953.00	2480.12	2487.53		2488.44	0.001789	7.62	518.81	82.84	0.54
MC	2	1.522	100-Year	3953.00	2478.86	2487.50	2484.84	2488.18	0.001348	6.62	597.57	95.87	0.47
MC	2	1.522	500-Year	6160.00	2478.86	2490.52	2486.23	2491.27	0.000887	6.92	889.83	104.07	0.40
MC	2	1.522	10-Year	2091.00	2478.86	2484.40	2483.42	2485.09	0.002847	6.68	313.14	88.42	0.63
MC	2	1.522	50-Year	3312.00	2478.86	2486.52	2484.38	2487.19	0.001575	6.55	505.63	92.68	0.49
MC	2	1.522	Floodway	3953.00	2478.86	2487.50	2484.84	2488.18	0.001348	6.62	597.57	95.87	0.47
MC	2	1.515		Culvert									
MC	2	1.509	100-Year	3953.00	2478.38	2487.36		2487.98	0.000967	6.29	628.37	97.41	0.41
MC	2	1.509	500-Year	6160.00	2478.38	2489.92		2490.73	0.000856	7.24	850.50	103.78	0.41
MC	2	1.509	10-Year	2091.00	2478.38	2484.52		2484.99	0.001434	5.49	380.94	90.85	0.46
MC	2	1.509	50-Year	3312.00	2478.38	2486.47		2487.03	0.001053	6.01	550.76	95.42	0.42
MC	2	1.509	Floodway	3953.00	2478.38	2487.36		2487.98	0.000967	6.29	628.37	97.41	0.41
MC	2	1.471	100-Year	3953.00	2476.57	2485.61		2487.30	0.004186	10.43	379.06	60.39	0.73
MC	2	1.471	500-Year	6160.00	2476.57	2487.84	2486.25	2490.00	0.004134	11.79	522.52	67.95	0.75
MC	2	1.471	10-Year	2091.00	2476.57	2483.13		2484.31	0.004307	8.70	240.43	52.16	0.71
MC	2	1.471	50-Year	3312.00	2476.57	2484.82		2486.36	0.004226	9.96	332.63	57.39	0.73
MC	2	1.471	Floodway	3953.00	2476.57	2485.61		2487.30	0.004186	10.43	379.06	60.39	0.73
MC	2	1.433	100-Year	3953.00	2475.43	2483.65	2483.42	2486.13	0.007258	12.64	312.69	56.47	0.95
MC	2	1.433	500-Year	6160.00	2475.43	2485.46	2485.46	2488.78	0.007737	14.62	421.46	63.91	1.00
MC	2	1.433	10-Year	2091.00	2475.43	2481.88		2483.30	0.005602	9.57	218.55	49.80	0.80
MC	2	1.433	50-Year	3312.00	2475.43	2483.11	2482.73	2485.24	0.006763	11.72	282.61	54.35	0.91
MC	2	1.433	Floodway	3953.00	2475.43	2483.65	2483.42	2486.13	0.007258	12.64	312.69	56.47	0.95
MC	2	1.401	100-Year	3953.00	2474.88	2484.06		2485.01	0.002498	7.85	503.72	86.38	0.57
MC	2	1.401	500-Year	6160.00	2474.88	2486.31		2487.48	0.002274	8.68	710.05	167.58	0.57
MC	2	1.401	10-Year	2091.00	2474.88	2481.80		2482.46	0.002596	6.53	320.36	75.11	0.56
MC	2	1.401	50-Year	3312.00	2474.88	2483.34		2484.21	0.002542	7.47	443.28	83.08	0.57
MC	2	1.401	Floodway	3953.00	2474.88	2484.06		2485.01	0.002498	7.85	503.72	86.38	0.57
MC	2	1.370	100-Year	3953.00	2475.77	2483.67		2484.59	0.002478	7.71	512.92	90.07	0.57
MC	2	1.370	500-Year	6160.00	2475.77	2485.95		2487.05	0.002695	8.40	736.58	275.13	0.60
MC	2	1.370	10-Year	2091.00	2475.77	2481.30		2482.00	0.003007	6.70	312.20	78.92	0.59
MC	2	1.370	50-Year	3312.00	2475.77	2482.93		2483.78	0.002596	7.40	447.65	86.79	0.57
MC	2	1.370	Floodway	3953.00	2475.77	2483.67		2484.59	0.002478	7.71	512.92	90.07	0.57
MC	2	1.333	100-Year	3953.00	2474.75	2481.37	2481.22	2483.66	0.007621	12.16	325.19	66.04	0.97
MC	2	1.333	500-Year	6160.00	2474.75	2483.98	2483.01	2486.23	0.005007	12.01	512.84	76.61	0.82
MC	2	1.333	10-Year	2091.00	2474.75	2479.63	2479.28	2481.07	0.006795	9.60	217.80	58.20	0.87
MC	2	1.333	50-Year	3312.00	2474.75	2480.79	2480.60	2482.85	0.007590	11.52	287.52	63.21	0.95
MC	2	1.333	Floodway	3953.00	2474.75	2481.37	2481.22	2483.66	0.007621	12.16	325.19	66.04	0.97
MC	2	1.295	100-Year	3953.00	2473.87	2481.12		2482.34	0.003569	8.87	445.70	83.44	0.68
MC	2	1.295	500-Year	6160.00	2473.87	2484.14		2485.28	0.002100	8.57	767.75	219.50	0.55
MC	2	1.295	10-Year	2091.00	2473.87	2478.87		2479.82	0.004614	7.80	267.99	74.51	0.73

HEC-RAS Plan: PMR_Lower (Continued)

River	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)	
MC	2	1.295	50-Year	3312.00	2473.87	2480.36		2481.52	0.003932	8.64	383.36	80.56	0.70
MC	2	1.295	Floodway	3953.00	2473.87	2481.12		2482.34	0.003569	8.87	445.70	83.44	0.68
MC	2	1.273	100-Year	3953.00	2474.17	2481.26	2478.64	2481.91	0.001519	6.48	610.50	104.92	0.45
MC	2	1.273	500-Year	6160.00	2474.17	2484.27	2479.99	2484.99	0.001004	6.83	902.06	339.40	0.39
MC	2	1.273	10-Year	2091.00	2474.17	2478.87	2477.22	2479.34	0.001988	5.51	379.36	94.16	0.48
MC	2	1.273	50-Year	3312.00	2474.17	2480.47	2478.17	2481.07	0.001669	6.21	533.72	101.38	0.47
MC	2	1.273	Floodway	3953.00	2474.17	2481.26	2478.64	2481.91	0.001519	6.48	610.50	104.92	0.45
MC	2	1.26		Culvert									
MC	2	1.250	100-Year	3953.00	2471.62	2478.05		2479.38	0.004518	9.27	426.55	103.53	0.74
MC	2	1.250	500-Year	6160.00	2471.62	2479.39		2481.39	0.004902	11.34	543.16	111.26	0.80
MC	2	1.250	10-Year	2091.00	2471.62	2476.49		2477.29	0.004541	7.19	290.64	94.52	0.69
MC	2	1.250	50-Year	3312.00	2471.62	2477.56		2478.72	0.004491	8.62	384.29	100.73	0.72
MC	2	1.250	Floodway	3953.00	2471.62	2478.05		2479.38	0.004518	9.27	426.55	103.53	0.74
MC	2	1.214	100-Year	3953.00	2470.20	2476.58	2476.20	2478.27	0.006484	10.41	379.88	88.16	0.88
MC	2	1.214	500-Year	6160.00	2470.20	2478.52		2480.38	0.005046	10.97	561.64	99.37	0.81
MC	2	1.214	10-Year	2091.00	2470.20	2474.88	2474.66	2476.09	0.007511	8.81	237.44	79.49	0.90
MC	2	1.214	50-Year	3312.00	2470.20	2476.05	2475.71	2477.58	0.006681	9.93	333.68	85.14	0.88
MC	2	1.214	Floodway	3953.00	2470.20	2476.58	2476.20	2478.27	0.006484	10.41	379.88	88.16	0.88
MC	2	1.197	100-Year	3953.00	2470.00	2476.52		2477.68	0.003671	8.66	456.31	90.81	0.68
MC	2	1.197	500-Year	6160.00	2470.00	2478.47		2479.89	0.003295	9.57	643.82	101.37	0.67
MC	2	1.197	10-Year	2091.00	2470.00	2474.78		2475.51	0.003410	6.84	305.92	82.72	0.63
MC	2	1.197	50-Year	3312.00	2470.00	2475.98		2477.00	0.003589	8.12	408.02	88.17	0.66
MC	2	1.197	Floodway	3953.00	2470.00	2476.52		2477.68	0.003671	8.66	456.31	90.81	0.68
MC	2	1.167	100-Year	3953.00	2469.61	2475.68		2477.02	0.004390	9.28	426.01	87.50	0.74
MC	2	1.167	500-Year	6160.00	2469.61	2477.83		2479.33	0.003525	9.82	627.04	181.01	0.69
MC	2	1.167	10-Year	2091.00	2469.61	2474.22		2474.96	0.003375	6.89	303.42	80.38	0.63
MC	2	1.167	50-Year	3312.00	2469.61	2475.24		2476.37	0.004041	8.53	388.44	85.23	0.70
MC	2	1.167	Floodway	3953.00	2469.61	2475.68		2477.02	0.004390	9.28	426.01	87.50	0.74
MC	2	1.128	100-Year	3953.00	2469.22	2473.96	2473.96	2475.75	0.008671	10.73	368.29	102.72	1.00
MC	2	1.128	500-Year	6160.00	2469.22	2477.88		2478.61	0.001737	7.03	1082.36	411.25	0.49
MC	2	1.128	10-Year	2091.00	2469.22	2472.57	2472.57	2473.82	0.009548	8.99	232.67	91.27	0.99
MC	2	1.128	50-Year	3312.00	2469.22	2473.52	2473.52	2475.14	0.008954	10.24	323.50	99.30	1.00
MC	2	1.128	Floodway	3953.00	2469.22	2473.96	2473.96	2475.75	0.008671	10.73	368.29	102.72	1.00
MC	2	1.111	100-Year	3953.00	2468.05	2473.82	2472.87	2475.02	0.004175	8.78	450.40	101.47	0.72
MC	2	1.111	500-Year	6160.00	2468.05	2477.57	2474.16	2478.46	0.001413	7.57	813.77	204.56	0.46
MC	2	1.111	10-Year	2091.00	2468.05	2471.48	2471.48	2472.76	0.009802	9.10	229.77	89.38	1.00
MC	2	1.111	50-Year	3312.00	2468.05	2472.79	2472.45	2474.17	0.006531	9.43	351.09	96.13	0.86
MC	2	1.111	Floodway	3953.00	2468.05	2473.82	2472.87	2475.02	0.004175	8.78	450.40	101.47	0.72
MC	2	1.1		Culvert									
MC	2	1.095	100-Year	3953.00	2463.63	2471.38		2472.26	0.002193	7.53	525.28	99.91	0.54
MC	2	1.095	500-Year	6160.00	2463.63	2472.80		2474.20	0.002631	9.49	648.99	110.39	0.61
MC	2	1.095	10-Year	2091.00	2463.63	2469.94		2470.37	0.001520	5.23	400.09	90.92	0.43
MC	2	1.095	50-Year	3312.00	2463.63	2470.95		2471.66	0.001971	6.79	487.71	97.03	0.51
MC	2	1.095	Floodway	3953.00	2463.63	2471.38		2472.26	0.002193	7.53	525.28	99.91	0.54
MC	2	1.071	100-Year	3953.00	2464.85	2471.00		2471.91	0.003479	7.67	515.42	119.20	0.65
MC	2	1.071	500-Year	6160.00	2464.85	2472.55		2473.72	0.003292	8.69	708.59	144.54	0.66
MC	2	1.071	10-Year	2091.00	2464.85	2469.39		2470.02	0.003949	6.34	329.79	112.19	0.65
MC	2	1.071	50-Year	3312.00	2464.85	2470.49		2471.31	0.003595	7.28	455.23	116.97	0.65
MC	2	1.071	Floodway	3953.00	2464.85	2471.00		2471.91	0.003479	7.67	515.42	119.20	0.65
MC	2	1.033	100-Year	3953.00	2464.28	2469.60		2470.98	0.005775	9.43	419.13	103.74	0.83
MC	2	1.033	500-Year	6160.00	2464.28	2470.87		2472.78	0.006013	11.08	555.79	110.98	0.87
MC	2	1.033	10-Year	2091.00	2464.28	2468.24		2469.08	0.005316	7.37	283.86	96.02	0.76
MC	2	1.033	50-Year	3312.00	2464.28	2469.17		2470.38	0.005641	8.82	375.33	100.94	0.81
MC	2	1.033	Floodway	3953.00	2464.28	2469.60		2470.98	0.005775	9.43	419.13	103.74	0.83
MC	2	0.996	100-Year	3953.00	2463.49	2468.68		2469.85	0.004910	8.69	454.99	113.36	0.76
MC	2	0.996	500-Year	6160.00	2463.49	2470.05		2471.61	0.004771	10.02	614.86	120.63	0.78
MC	2	0.996	10-Year	2091.00	2463.49	2467.26		2468.02	0.005077	7.00	298.87	106.13	0.73
MC	2	0.996	50-Year	3312.00	2463.49	2468.23		2469.27	0.004949	8.18	404.69	111.08	0.76
MC	2	0.996	Floodway	3953.00	2463.49	2468.68		2469.85	0.004910	8.69	454.99	113.36	0.76
MC	2	0.973	100-Year	3953.00	2462.00	2468.40		2469.29	0.003292	7.57	522.15	161.46	0.64
MC	2	0.973	500-Year	6160.00	2462.00	2469.80		2471.02	0.003468	8.86	695.64	187.26	0.67
MC	2	0.973	10-Year	2091.00	2462.00	2466.96		2467.49	0.002977	5.86	357.13	129.93	0.57
MC	2	0.973	50-Year	3312.00	2462.00	2467.94		2468.72	0.003209	7.06	468.91	153.88	0.62
MC	2	0.973	Floodway	3953.00	2462.00	2468.40		2469.29	0.003292	7.57	522.15	161.46	0.64
MC	2	0.946	100-Year	3953.00	2462.20	2467.67		2468.73	0.004414	8.26	478.63	118.74	0.72
MC	2	0.946	500-Year	6160.00	2462.20	2469.29		2470.43	0.004553	8.59	725.68	192.21	0.74

HEC-RAS Plan: PMR_Lower (Continued)

River	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)	
MC	2	0.946	10-Year	2091.00	2462.20	2466.32		2466.97	0.004279	6.49	322.15	112.59	0.68
MC	2	0.946	50-Year	3312.00	2462.20	2467.24		2468.17	0.004381	7.74	428.10	116.65	0.71
MC	2	0.946	Floodway	3953.00	2462.20	2467.67		2468.73	0.004414	8.26	478.63	118.74	0.72
MC	2	0.915	100-Year	3953.00	2462.27	2467.00		2468.06	0.003786	8.29	477.04	123.22	0.74
MC	2	0.915	500-Year	6160.00	2462.27	2468.42		2469.74	0.003766	9.23	667.60	146.07	0.76
MC	2	0.915	10-Year	2091.00	2462.27	2465.62		2466.31	0.003826	6.65	314.55	114.35	0.71
MC	2	0.915	50-Year	3312.00	2462.27	2466.56		2467.51	0.003757	7.81	424.19	119.17	0.73
MC	2	0.915	Floodway	3953.00	2462.27	2467.00		2468.06	0.003786	8.29	477.04	123.22	0.74
MC	2	0.877	100-Year	3953.00	2461.04	2466.15		2467.27	0.004053	8.49	465.57	122.21	0.77
MC	2	0.877	500-Year	6160.00	2461.04	2467.46	2466.72	2468.91	0.004437	9.66	637.64	147.64	0.82
MC	2	0.877	10-Year	2091.00	2461.04	2464.86		2465.55	0.003775	6.67	313.42	112.22	0.70
MC	2	0.877	50-Year	3312.00	2461.04	2465.75		2466.73	0.003966	7.94	417.00	119.11	0.75
MC	2	0.877	Floodway	3953.00	2461.04	2466.15		2467.27	0.004053	8.49	465.57	122.21	0.77
MC	2	0.839	100-Year	3953.00	2459.12	2464.56	2464.56	2466.16	0.007273	10.16	388.93	120.90	1.00
MC	2	0.839	500-Year	6160.00	2459.12	2465.75	2465.75	2467.77	0.006696	11.39	542.28	143.89	1.00
MC	2	0.839	10-Year	2091.00	2459.12	2463.32	2463.32	2464.44	0.008109	8.50	246.10	108.74	1.00
MC	2	0.839	50-Year	3312.00	2459.12	2464.17	2464.17	2465.62	0.007499	9.67	342.62	117.55	1.00
MC	2	0.839	Floodway	3953.00	2459.12	2464.56	2464.56	2466.16	0.007273	10.16	388.93	120.90	1.00
MC	2	0.801	100-Year	3953.00	2459.63	2463.54	2463.54	2465.01	0.002321	9.72	406.72	139.17	1.00
MC	2	0.801	500-Year	6160.00	2459.63	2464.69	2464.69	2466.44	0.002111	10.62	584.76	190.06	0.99
MC	2	0.801	10-Year	2091.00	2459.63	2462.23	2462.23	2463.35	0.002567	8.48	246.71	111.85	1.01
MC	2	0.801	50-Year	3312.00	2459.63	2463.11	2463.11	2464.50	0.002362	9.47	349.62	125.94	1.00
MC	2	0.801	Floodway	3953.00	2459.63	2463.54	2463.54	2465.01	0.002321	9.72	406.72	139.17	1.00
MC	2	0.795	100-Year	3953.00	2455.25	2459.44	2459.44	2461.25	0.002196	10.81	365.61	100.77	1.00
MC	2	0.795	500-Year	6160.00	2455.25	2460.73	2460.73	2463.10	0.002029	12.34	499.14	105.81	1.00
MC	2	0.795	10-Year	2091.00	2455.25	2458.10	2458.10	2459.34	0.002511	8.93	234.11	95.55	1.01
MC	2	0.795	50-Year	3312.00	2455.25	2459.00	2459.00	2460.64	0.002295	10.28	322.06	99.07	1.01
MC	2	0.795	Floodway	3953.00	2455.25	2459.44	2459.44	2461.25	0.002196	10.81	365.61	100.77	1.00
MC	2	0.794	100-Year	3953.00	2451.77	2456.28	2456.28	2458.23	0.002197	11.23	352.05	90.84	1.01
MC	2	0.794	500-Year	6160.00	2451.77	2458.53		2460.39	0.001230	10.92	564.34	97.10	0.80
MC	2	0.794	10-Year	2091.00	2451.77	2454.87	2454.87	2456.19	0.002473	9.21	227.03	86.96	1.00
MC	2	0.794	50-Year	3312.00	2451.77	2455.82	2455.82	2457.58	0.002275	10.64	311.19	89.59	1.01
MC	2	0.794	Floodway	3953.00	2451.77	2456.28	2456.28	2458.23	0.002197	11.23	352.05	90.84	1.01
MC	2	0.790	100-Year	3953.00	2449.22	2457.11		2457.66	0.000295	5.92	667.32	97.68	0.40
MC	2	0.790	500-Year	6160.00	2449.22	2459.29		2460.04	0.000305	6.94	887.08	103.85	0.42
MC	2	0.790	10-Year	2091.00	2449.22	2454.79		2455.13	0.000279	4.66	448.28	91.12	0.37
MC	2	0.790	50-Year	3312.00	2449.22	2456.39		2456.87	0.000289	5.54	597.51	95.64	0.39
MC	2	0.790	Floodway	3953.00	2449.22	2457.11		2457.66	0.000295	5.92	667.32	97.68	0.40
MC	2	0.788	100-Year	3953.00	2449.27	2457.11	2453.64	2457.65	0.000280	5.90	670.52	97.71	0.39
MC	2	0.788	500-Year	6160.00	2449.27	2459.28	2454.96	2460.04	0.000280	7.00	879.95	104.03	0.41
MC	2	0.788	10-Year	2091.00	2449.27	2454.79	2452.17	2455.13	0.000267	4.61	453.19	90.94	0.36
MC	2	0.788	50-Year	3312.00	2449.27	2456.39	2453.18	2456.86	0.000277	5.50	601.89	95.60	0.38
MC	2	0.788	Floodway	3953.00	2449.27	2457.11	2453.64	2457.65	0.000280	5.90	670.54	97.71	0.39
MC	2	0.78		Culvert									
MC	2	0.775	100-Year	3953.00	2448.87	2456.52		2457.17	0.000326	6.45	612.89	96.29	0.43
MC	2	0.775	500-Year	6160.00	2448.87	2458.27		2459.28	0.000378	8.05	765.25	101.15	0.48
MC	2	0.775	10-Year	2091.00	2448.87	2454.51		2454.86	0.000281	4.78	437.64	90.72	0.38
MC	2	0.775	50-Year	3312.00	2448.87	2455.91		2456.46	0.000310	5.92	559.79	94.60	0.41
MC	2	0.775	Floodway	3953.00	2448.87	2456.52		2457.17	0.000326	6.45	612.91	96.29	0.43
MC	2	0.761	100-Year	3953.00	2449.03	2455.88		2456.98	0.003070	8.40	470.76	84.87	0.63
MC	2	0.761	500-Year	6160.00	2449.03	2457.45		2459.04	0.003518	10.11	609.02	91.55	0.69
MC	2	0.761	10-Year	2091.00	2449.03	2454.08		2454.73	0.002569	6.44	324.83	76.83	0.55
MC	2	0.761	50-Year	3312.00	2449.03	2455.34		2456.28	0.002914	7.78	425.48	82.86	0.61
MC	2	0.761	Floodway	3953.00	2449.03	2455.88		2456.98	0.003069	8.40	470.83	84.87	0.63
MC	2	0.746	100-Year	3953.00	2448.44	2455.57		2456.71	0.003527	8.58	460.95	90.47	0.67
MC	2	0.746	500-Year	6160.00	2448.44	2457.17		2458.74	0.003733	10.06	612.59	98.36	0.71
MC	2	0.746	10-Year	2091.00	2448.44	2453.76		2454.49	0.003314	6.84	305.65	80.80	0.62
MC	2	0.746	50-Year	3312.00	2448.44	2455.02		2456.02	0.003466	8.04	412.01	88.14	0.66
MC	2	0.746	Floodway	3953.00	2448.44	2455.57		2456.71	0.003525	8.57	461.04	90.48	0.67
MC	2	0.708	100-Year	3953.00	2447.84	2454.80		2455.97	0.003848	8.68	455.18	94.13	0.70
MC	2	0.708	500-Year	6160.00	2447.84	2456.42		2457.99	0.003798	10.04	613.80	100.52	0.72
MC	2	0.708	10-Year	2091.00	2447.84	2453.03		2453.79	0.003619	6.99	299.04	82.07	0.65
MC	2	0.708	50-Year	3312.00	2447.84	2454.25		2455.29	0.003818	8.19	404.43	90.95	0.68
MC	2	0.708	Floodway	3953.00	2447.84	2454.80		2455.97	0.003838	8.68	455.57	94.15	0.70
MC	2	0.670	100-Year	3953.00	2447.49	2454.20		2455.20	0.003334	8.05	491.11	102.19	0.65
MC	2	0.670	500-Year	6160.00	2447.49	2455.93		2457.22	0.003122	9.12	675.77	110.49	0.65
MC	2	0.670	10-Year	2091.00	2447.49	2452.38		2453.06	0.003441	6.62	315.86	90.58	0.62

HEC-RAS Plan: PMR_Lower (Continued)

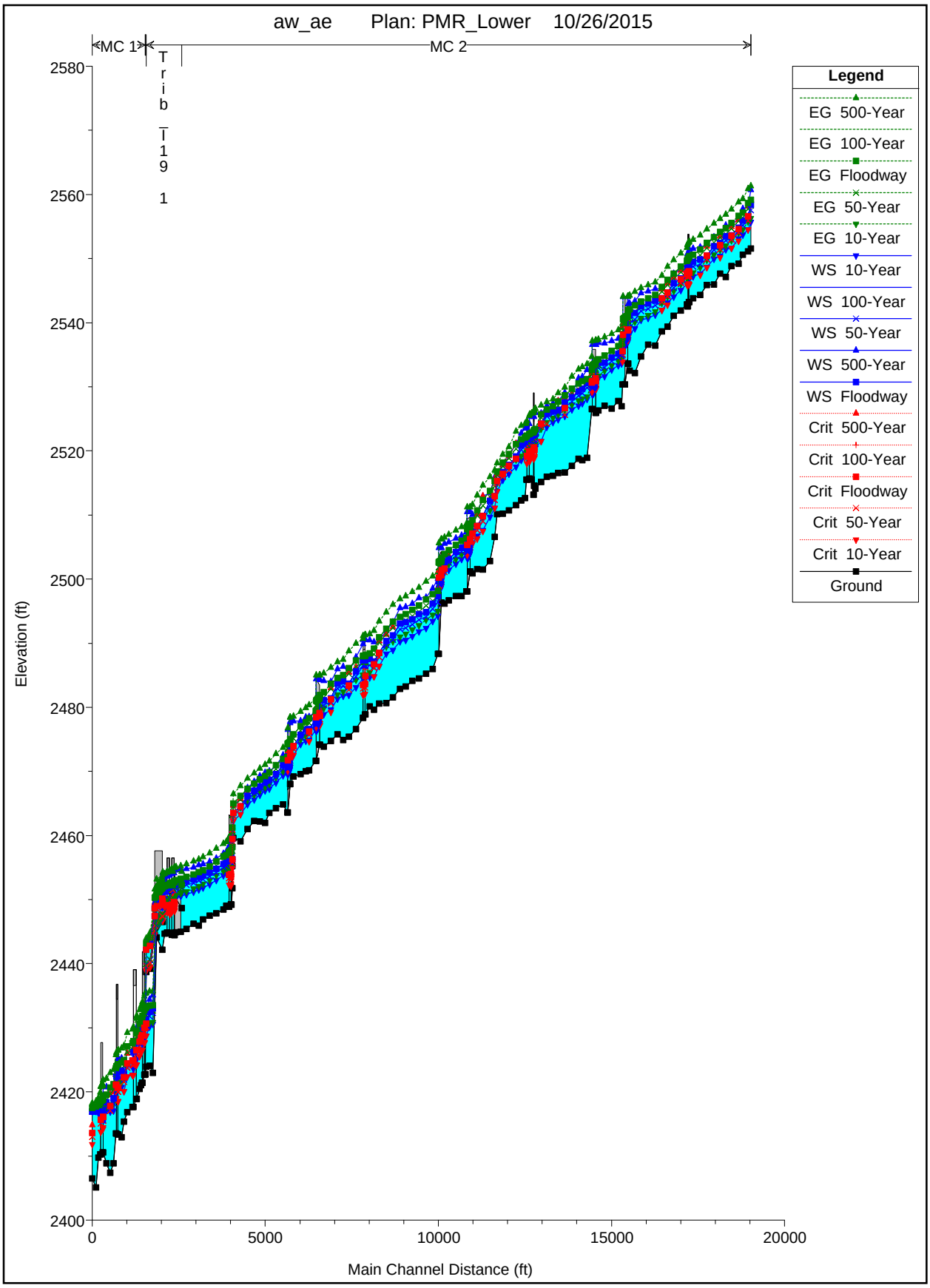
River	Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
				(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
MC	2	0.670	50-Year	3312.00	2447.49	2453.63		2454.53	0.003361	7.63	434.10	98.59	0.64
MC	2	0.670	Floodway	3953.00	2447.49	2454.21		2455.21	0.003319	8.04	491.88	102.24	0.65
MC	2	0.634	100-Year	3953.00	2446.89	2453.75		2454.59	0.002631	7.35	538.07	107.63	0.58
MC	2	0.634	500-Year	6160.00	2446.89	2455.54		2456.62	0.002474	8.33	739.06	116.23	0.58
MC	2	0.634	10-Year	2091.00	2446.89	2451.84		2452.42	0.002969	6.13	340.92	98.48	0.58
MC	2	0.634	50-Year	3312.00	2446.89	2453.16		2453.91	0.002683	6.96	475.65	104.82	0.58
MC	2	0.634	Floodway	3953.00	2446.89	2453.76		2454.59	0.002614	7.33	539.28	107.69	0.58
MC	2	0.610	100-Year	3953.00	2445.96	2453.53		2454.25	0.002177	6.81	580.72	112.99	0.53
MC	2	0.610	500-Year	6160.00	2445.96	2455.36		2456.29	0.002051	7.74	795.72	121.47	0.53
MC	2	0.610	10-Year	2091.00	2445.96	2451.55		2452.05	0.002469	5.71	366.32	102.61	0.53
MC	2	0.610	50-Year	3312.00	2445.96	2452.93		2453.57	0.002221	6.45	513.56	110.21	0.53
MC	2	0.610	Floodway	3953.00	2445.96	2453.54		2454.26	0.002159	6.79	582.26	113.06	0.53
MC	2	0.581	100-Year	3953.00	2446.25	2453.18		2453.92	0.002145	6.91	572.42	107.07	0.53
MC	2	0.581	500-Year	6160.00	2446.25	2454.99		2455.97	0.002163	7.94	775.66	121.77	0.55
MC	2	0.581	10-Year	2091.00	2446.25	2451.19		2451.69	0.002315	5.68	368.08	98.36	0.52
MC	2	0.581	50-Year	3312.00	2446.25	2452.59		2453.25	0.002139	6.50	509.82	104.48	0.52
MC	2	0.581	Floodway	3953.00	2446.25	2453.20		2453.94	0.002124	6.88	574.27	107.15	0.52
MC	2	0.543	100-Year	3953.00	2445.45	2452.89		2453.50	0.001747	6.27	630.82	136.20	0.48
MC	2	0.543	500-Year	6160.00	2445.45	2454.80		2455.53	0.001583	6.94	984.76	454.29	0.47
MC	2	0.543	10-Year	2091.00	2445.45	2450.82		2451.25	0.001925	5.23	400.16	106.00	0.47
MC	2	0.543	50-Year	3312.00	2445.45	2452.28		2452.83	0.001741	5.90	560.98	114.32	0.47
MC	2	0.543	Floodway	3953.00	2445.45	2452.91		2453.51	0.001727	6.24	633.35	141.05	0.47
MC	2	0.513	100-Year	3953.00	2444.97	2452.73		2453.20	0.001401	5.60	763.40	319.60	0.43
MC	2	0.513	500-Year	6160.00	2444.97	2454.73		2455.26	0.001068	6.06	1163.25	331.41	0.40
MC	2	0.513	10-Year	2091.00	2444.97	2450.55		2450.94	0.001731	5.00	418.04	175.45	0.45
MC	2	0.513	50-Year	3312.00	2444.97	2452.08		2452.53	0.001554	5.41	637.59	272.61	0.44
MC	2	0.513	Floodway	3953.00	2444.97	2452.70		2453.23	0.001519	5.80	682.37	127.50	0.44
MC	2	0.51		Lat Struct									
MC	2	0.487	100-Year	3953.00	2444.92	2452.51		2452.99	0.001761	5.59	717.40	175.96	0.47
MC	2	0.487	500-Year	6160.00	2444.92	2454.58		2455.11	0.001195	5.86	1088.25	183.37	0.41
MC	2	0.487	10-Year	2091.00	2444.92	2450.22		2450.67	0.002271	5.41	386.57	110.37	0.51
MC	2	0.487	50-Year	3312.00	2444.92	2451.80		2452.29	0.002166	5.58	593.88	163.51	0.50
MC	2	0.487	Floodway	3953.00	2444.92	2452.47		2453.01	0.001685	5.91	669.38	131.00	0.46
MC	2	0.478	100-Year	3953.00	2444.49	2452.54	2449.37	2452.90	0.000908	4.82	819.35	137.21	0.35
MC	2	0.478	500-Year	6160.00	2444.49	2454.56	2450.48	2455.05	0.000840	5.60	1099.21	166.69	0.35
MC	2	0.478	10-Year	2091.00	2444.49	2450.28	2448.22	2450.54	0.001122	4.06	515.07	132.73	0.36
MC	2	0.478	50-Year	3312.00	2444.49	2451.85	2448.99	2452.17	0.000940	4.57	725.32	135.84	0.35
MC	2	0.478	Floodway	3953.00	2444.49	2452.54	2449.37	2452.90	0.000908	4.82	819.35	137.21	0.35
MC	2	0.47		Bridge									
MC	2	0.464	100-Year	3834.00	2444.53	2452.22		2452.58	0.000854	4.85	790.99	134.36	0.34
MC	2	0.464	500-Year	5645.00	2444.53	2454.12		2454.58	0.000787	5.49	1029.04	148.82	0.34
MC	2	0.464	10-Year	2091.00	2444.53	2450.05		2450.30	0.000996	4.01	521.02	127.82	0.34
MC	2	0.464	50-Year	3270.00	2444.53	2451.56		2451.89	0.000886	4.61	709.40	132.80	0.34
MC	2	0.464	Floodway	3834.00	2444.53	2452.22		2452.58	0.000854	4.85	790.99	134.36	0.34
MC	2	0.458	100-Year	3834.00	2444.86	2452.18		2452.55	0.000903	4.92	803.83	258.34	0.35
MC	2	0.458	500-Year	5645.00	2444.86	2454.10		2454.55	0.000763	5.41	1099.65	288.82	0.33
MC	2	0.458	10-Year	2091.00	2444.86	2449.99		2450.26	0.001118	4.17	501.23	135.26	0.36
MC	2	0.458	50-Year	3270.00	2444.86	2451.52		2451.86	0.000972	4.73	701.67	217.36	0.35
MC	2	0.458	Floodway	3834.00	2444.86	2452.18		2452.55	0.000903	4.92	803.83	258.34	0.35
MC	2	0.452	100-Year	3834.00	2444.76	2452.18	2448.79	2452.52	0.000788	4.66	826.55	138.04	0.33
MC	2	0.452	500-Year	5645.00	2444.76	2454.09	2449.71	2454.52	0.000724	5.27	1077.49	149.97	0.32
MC	2	0.452	10-Year	2091.00	2444.76	2449.98	2447.70	2450.22	0.000930	3.88	540.76	130.79	0.33
MC	2	0.452	50-Year	3270.00	2444.76	2451.52	2448.49	2451.82	0.000823	4.44	739.60	136.00	0.33
MC	2	0.452	Floodway	3834.00	2444.76	2452.18	2448.79	2452.52	0.000788	4.66	826.55	138.04	0.33
MC	2	0.445		Bridge									
MC	2	0.437	100-Year	3834.00	2444.84	2451.87		2452.24	0.000884	4.88	784.93	146.27	0.35
MC	2	0.437	500-Year	5645.00	2444.84	2453.72		2454.20	0.000793	5.52	1022.90	158.60	0.34
MC	2	0.437	10-Year	2091.00	2444.84	2449.71		2449.98	0.001119	4.11	508.38	137.33	0.36
MC	2	0.437	50-Year	3270.00	2444.84	2451.22		2451.55	0.000935	4.66	701.46	143.48	0.35
MC	2	0.437	Floodway	3834.00	2444.84	2451.87		2452.24	0.000884	4.88	784.93	146.27	0.35
MC	2	0.425	100-Year	3834.00	2444.70	2451.28		2452.04	0.002157	6.99	548.74	100.31	0.53
MC	2	0.425	500-Year	5645.00	2444.70	2453.06		2453.98	0.001973	7.70	732.85	107.52	0.52
MC	2	0.425	10-Year	2091.00	2444.70	2449.22		2449.78	0.002614	5.99	349.36	94.06	0.55
MC	2	0.425	50-Year	3270.00	2444.70	2450.65		2451.35	0.002269	6.72	486.79	98.33	0.53
MC	2	0.425	Floodway	3834.00	2444.70	2451.28		2452.04	0.002157	6.99	548.74	100.31	0.53

HEC-RAS Plan: PMR_Lower (Continued)

River	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)	
MC	2	0.412	100-Year	3834.00	2442.19	2450.61	2449.24	2451.81	0.003637	8.77	437.39	97.46	0.67
MC	2	0.412	500-Year	5645.00	2442.19	2452.29	2450.59	2453.76	0.003383	9.73	580.46	136.52	0.67
MC	2	0.412	10-Year	2091.00	2442.19	2448.72	2447.77	2449.54	0.003874	7.26	288.01	76.18	0.66
MC	2	0.412	50-Year	3270.00	2442.19	2450.03	2448.82	2451.12	0.003716	8.38	390.22	84.29	0.67
MC	2	0.412	Floodway	3834.00	2442.19	2450.61	2449.24	2451.81	0.003637	8.77	437.39	97.46	0.67
MC	2	0.380	100-Year	3834.00	2444.09	2449.00	2449.00	2451.24	0.002111	12.01	319.30	149.85	1.00
MC	2	0.380	500-Year	5645.00	2444.09	2450.40	2450.40	2453.19	0.001974	13.41	420.97	222.66	0.99
MC	2	0.380	10-Year	2091.00	2444.09	2447.41	2447.41	2448.96	0.002368	10.02	208.78	78.43	1.00
MC	2	0.380	50-Year	3270.00	2444.09	2448.54	2448.54	2450.56	0.002150	11.42	286.45	133.44	0.99
MC	2	0.380	Floodway	3834.00	2444.09	2449.00	2449.00	2451.24	0.002111	12.01	319.30	149.85	1.00
MC	2	0.360	100-Year	3834.00	2422.96	2433.04		2433.54	0.000204	5.62	681.74	77.91	0.34
MC	2	0.360	500-Year	5645.00	2422.96	2435.06		2435.76	0.000238	6.69	843.18	82.00	0.37
MC	2	0.360	10-Year	2091.00	2422.96	2430.56		2430.84	0.000158	4.23	494.47	72.88	0.29
MC	2	0.360	50-Year	3270.00	2422.96	2432.33		2432.75	0.000191	5.22	626.58	76.47	0.32
MC	2	0.360	Floodway	3834.00	2422.96	2433.04		2433.54	0.000204	5.62	681.74	77.91	0.34
MC	2	0.341	100-Year	3834.00	2424.11	2432.49		2433.46	0.000539	7.91	484.98	70.89	0.53
MC	2	0.341	500-Year	5645.00	2424.11	2434.41		2435.67	0.000559	9.01	626.54	76.60	0.56
MC	2	0.341	10-Year	2091.00	2424.11	2430.14		2430.78	0.000519	6.41	326.11	64.43	0.50
MC	2	0.341	50-Year	3270.00	2424.11	2431.81		2432.68	0.000529	7.47	437.89	69.04	0.52
MC	2	0.341	Floodway	3834.00	2424.11	2432.49		2433.46	0.000539	7.91	484.98	70.89	0.53
MC	2	0.322	100-Year	3834.00	2423.94	2431.01	2430.68	2433.24	0.001696	12.00	319.45	60.23	0.92
MC	2	0.322	500-Year	5645.00	2423.94	2432.90	2432.33	2435.45	0.001474	12.83	439.98	66.95	0.88
MC	2	0.322	10-Year	2091.00	2423.94	2428.70	2428.70	2430.56	0.002214	10.95	190.89	51.01	1.00
MC	2	0.322	50-Year	3270.00	2423.94	2430.11	2430.11	2432.44	0.002061	12.26	266.83	56.68	1.00
MC	2	0.322	Floodway	3834.00	2423.94	2431.01	2430.68	2433.24	0.001696	12.00	319.45	60.23	0.92
MC	1	0.291	100-Year	4267.00	2422.76	2431.19		2433.12	0.001223	11.16	382.44	62.38	0.79
MC	1	0.291	500-Year	6160.00	2422.76	2433.04		2435.36	0.001180	12.21	504.58	69.55	0.80
MC	1	0.291	10-Year	2234.00	2422.76	2428.52		2429.98	0.001406	9.71	230.02	51.91	0.81
MC	1	0.291	50-Year	3567.00	2422.76	2430.33		2432.14	0.001285	10.80	330.31	58.91	0.80
MC	1	0.291	Floodway	4267.00	2422.76	2431.19		2433.12	0.001223	11.16	382.44	62.38	0.79
MC	1	0.287	100-Year	4267.00	2422.66	2431.28	2429.97	2433.05	0.001087	10.70	398.92	63.36	0.75
MC	1	0.287	500-Year	6160.00	2422.66	2433.13	2431.69	2435.29	0.001064	11.80	522.22	69.94	0.76
MC	1	0.287	10-Year	2234.00	2422.66	2428.61	2427.71	2429.91	0.001183	9.16	243.99	52.71	0.75
MC	1	0.287	50-Year	3567.00	2422.66	2430.42	2429.28	2432.07	0.001130	10.31	346.00	59.96	0.76
MC	1	0.287	Floodway	4267.00	2422.66	2431.28	2429.97	2433.05	0.001087	10.70	398.92	63.36	0.75
MC	1	0.281		Bridge									
MC	1	0.273	100-Year	4267.00	2421.39	2428.78	2428.78	2431.49	0.001990	13.21	322.96	59.15	1.00
MC	1	0.273	500-Year	6160.00	2421.39	2430.44	2430.44	2433.68	0.001902	14.46	425.86	65.37	1.00
MC	1	0.273	10-Year	2234.00	2421.39	2426.51	2426.51	2428.47	0.002176	11.24	198.67	50.09	1.00
MC	1	0.273	50-Year	3567.00	2421.39	2428.07	2428.07	2430.56	0.002045	12.66	281.72	56.31	1.00
MC	1	0.273	Floodway	4267.00	2421.39	2428.78	2428.78	2431.49	0.001990	13.21	322.96	59.15	1.00
MC	1	0.268	100-Year	4267.00	2421.04	2428.42	2428.42	2431.18	0.002031	13.33	320.06	58.66	1.01
MC	1	0.268	500-Year	6160.00	2421.04	2430.09	2430.09	2433.38	0.001932	14.55	423.43	65.14	1.01
MC	1	0.268	10-Year	2234.00	2421.04	2426.13	2426.13	2428.14	0.002227	11.38	196.35	49.43	1.01
MC	1	0.268	50-Year	3567.00	2421.04	2427.71	2427.71	2430.24	0.002082	12.77	279.39	55.84	1.01
MC	1	0.268	Floodway	4267.00	2421.04	2428.42	2428.42	2431.18	0.002031	13.33	320.06	58.66	1.01
MC	1	0.260	100-Year	4267.00	2420.49	2427.83	2427.83	2430.59	0.002014	13.32	320.27	58.37	1.00
MC	1	0.260	500-Year	6160.00	2420.49	2429.53	2429.53	2432.78	0.001917	14.47	425.84	65.82	1.00
MC	1	0.260	10-Year	2234.00	2420.49	2425.54	2425.54	2427.54	0.002222	11.35	196.78	49.70	1.01
MC	1	0.260	50-Year	3567.00	2420.49	2427.12	2427.12	2429.64	0.002062	12.75	279.77	55.62	1.00
MC	1	0.260	Floodway	4267.00	2420.49	2427.83	2427.83	2430.59	0.002014	13.32	320.27	58.37	1.00
MC	1	0.245	100-Year	4267.00	2418.94	2427.70	2426.50	2429.50	0.001110	10.76	396.60	63.26	0.76
MC	1	0.245	500-Year	6160.00	2418.94	2430.03	2428.17	2431.93	0.000919	11.06	556.98	73.55	0.71
MC	1	0.245	10-Year	2234.00	2418.94	2425.12	2424.22	2426.42	0.001200	9.12	244.90	53.73	0.75
MC	1	0.245	50-Year	3567.00	2418.94	2426.90	2425.76	2428.54	0.001139	10.29	346.69	60.50	0.76
MC	1	0.245	Floodway	4267.00	2418.94	2427.70	2426.50	2429.50	0.001110	10.76	396.60	63.26	0.76
MC	1	0.235		Bridge									
MC	1	0.221	100-Year	4267.00	2417.63	2424.89	2424.89	2427.60	0.001988	13.20	323.17	59.07	0.99
MC	1	0.221	500-Year	6160.00	2417.63	2426.54	2426.54	2429.79	0.001885	14.46	425.94	64.71	0.99
MC	1	0.221	10-Year	2234.00	2417.63	2422.69	2422.63	2424.58	0.002112	11.06	202.03	51.08	0.98
MC	1	0.221	50-Year	3567.00	2417.63	2424.17	2424.17	2426.66	0.002052	12.67	281.47	56.23	1.00
MC	1	0.221	Floodway	4267.00	2417.63	2424.89	2424.89	2427.60	0.001988	13.20	323.17	59.07	0.99
MC	1	0.193	100-Year	4267.00	2416.82	2424.43	2424.43	2427.09	0.002064	13.08	326.25	62.34	1.01
MC	1	0.193	500-Year	6160.00	2416.82	2426.01	2426.01	2429.22	0.001938	14.37	428.63	67.19	1.00
MC	1	0.193	10-Year	2234.00	2416.82	2422.39	2422.39	2424.23	0.002251	10.87	205.47	56.10	1.00
MC	1	0.193	50-Year	3567.00	2416.82	2423.78	2423.78	2426.19	0.002123	12.46	286.35	60.38	1.01
MC	1	0.193	Floodway	4267.00	2416.82	2424.43	2424.43	2427.09	0.002064	13.08	326.25	62.34	1.01

HEC-RAS Plan: PMR_Lower (Continued)

River	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)	
MC	1	0.174	100-Year	4267.00	2415.39	2422.77	2422.27	2424.96	0.001552	11.88	359.23	64.44	0.89
MC	1	0.174	500-Year	6160.00	2415.39	2424.73		2427.14	0.001327	12.47	494.10	72.85	0.84
MC	1	0.174	10-Year	2234.00	2415.39	2420.08	2420.08	2421.99	0.002241	11.09	201.43	53.40	1.01
MC	1	0.174	50-Year	3567.00	2415.39	2421.95	2421.57	2424.03	0.001670	11.57	308.30	60.96	0.91
MC	1	0.174	Floodway	4267.00	2415.39	2422.77	2422.27	2424.96	0.001552	11.88	359.23	64.44	0.89
MC	1	0.163	100-Year	4267.00	2412.96	2423.34		2424.56	0.001755	8.86	481.35	66.81	0.58
MC	1	0.163	500-Year	6160.00	2412.96	2425.23		2426.79	0.001900	10.03	613.97	74.86	0.62
MC	1	0.163	10-Year	2234.00	2412.96	2420.77		2421.52	0.001489	6.95	321.28	57.36	0.52
MC	1	0.163	50-Year	3567.00	2412.96	2422.55		2423.62	0.001681	8.30	429.87	63.99	0.56
MC	1	0.163	Floodway	4267.00	2412.96	2423.34		2424.56	0.001755	8.86	481.35	66.81	0.58
MC	1	0.143	100-Year	4267.00	2413.35	2423.32	2420.61	2424.33	0.001528	8.08	528.25	77.74	0.55
MC	1	0.143	500-Year	6160.00	2413.35	2425.28	2422.16	2426.52	0.001530	8.93	690.14	87.22	0.56
MC	1	0.143	10-Year	2234.00	2413.35	2420.67	2418.55	2421.35	0.001480	6.62	337.69	66.02	0.52
MC	1	0.143	50-Year	3567.00	2413.35	2422.51	2420.00	2423.42	0.001515	7.65	466.29	74.17	0.54
MC	1	0.143	Floodway	4267.00	2413.35	2423.32	2420.61	2424.33	0.001528	8.08	528.25	77.74	0.55
MC	1	0.135		Bridge									
MC	1	0.131	100-Year	4267.00	2413.55	2421.12	2421.12	2423.71	0.005478	12.91	330.63	62.97	0.99
MC	1	0.131	500-Year	6160.00	2413.55	2422.73	2422.73	2425.81	0.005221	14.09	437.27	70.08	0.99
MC	1	0.131	10-Year	2234.00	2413.55	2419.00	2419.00	2420.84	0.006007	10.88	205.27	54.74	0.99
MC	1	0.131	50-Year	3567.00	2413.55	2420.43	2420.43	2422.82	0.005736	12.40	287.57	60.40	1.00
MC	1	0.131	Floodway	4267.00	2413.55	2421.12	2421.12	2423.71	0.005478	12.91	330.63	62.97	0.99
MC	1	0.118	100-Year	4267.00	2408.89	2418.99		2421.23	0.003911	12.00	355.54	56.32	0.84
MC	1	0.118	500-Year	6160.00	2408.89	2420.64	2419.99	2423.50	0.004191	13.57	453.96	62.78	0.89
MC	1	0.118	10-Year	2234.00	2408.89	2417.08		2418.27	0.002660	8.75	255.27	48.88	0.67
MC	1	0.118	50-Year	3567.00	2408.89	2418.22		2420.23	0.003859	11.38	313.41	53.32	0.83
MC	1	0.118	Floodway	4267.00	2408.89	2418.99		2421.23	0.003911	12.00	355.54	56.32	0.84
MC	1	0.099	100-Year	4267.00	2407.39	2417.77	2417.77	2420.69	0.005731	13.71	311.18	54.34	1.01
MC	1	0.099	500-Year	6160.00	2407.39	2419.60	2419.57	2422.98	0.005337	14.75	417.51	61.63	1.00
MC	1	0.099	10-Year	2234.00	2407.39	2416.89		2418.00	0.002438	8.42	265.17	50.78	0.65
MC	1	0.099	50-Year	3567.00	2407.39	2417.03	2417.03	2419.70	0.005800	13.12	271.93	51.32	1.00
MC	1	0.099	Floodway	4267.00	2407.39	2417.77	2417.77	2420.69	0.005731	13.71	311.18	54.34	1.01
MC	1	0.078	100-Year	4267.00	2408.84	2418.38		2419.61	0.002170	8.89	480.10	79.87	0.64
MC	1	0.078	500-Year	6160.00	2408.84	2420.79		2422.05	0.001626	9.01	683.78	88.98	0.57
MC	1	0.078	10-Year	2234.00	2408.84	2417.12		2417.65	0.001148	5.84	382.65	74.48	0.45
MC	1	0.078	50-Year	3567.00	2408.84	2417.66		2418.76	0.002179	8.42	423.50	76.79	0.63
MC	1	0.078	Floodway	4267.00	2408.84	2418.38		2419.61	0.002170	8.89	480.10	79.87	0.64
MC	1	0.061	100-Year	4267.00	2410.59	2418.43	2416.10	2419.36	0.001455	7.76	549.75	88.80	0.53
MC	1	0.061	500-Year	6160.00	2410.59	2420.82	2417.36	2421.87	0.001080	8.20	750.87	96.98	0.48
MC	1	0.061	10-Year	2234.00	2410.59	2417.13	2414.46	2417.52	0.000798	5.05	442.00	84.35	0.38
MC	1	0.061	50-Year	3567.00	2410.59	2417.69	2415.59	2418.52	0.001479	7.30	488.50	86.28	0.53
MC	1	0.061	Floodway	4267.00	2410.59	2418.43	2416.10	2419.36	0.001455	7.76	549.75	88.80	0.53
MC	1	0.05		Culvert									
MC	1	0.045	100-Year	4267.00	2410.25	2416.82		2418.32	0.002629	9.81	434.97	85.32	0.71
MC	1	0.045	500-Year	6160.00	2410.25	2416.94	2416.94	2419.93	0.005126	13.88	443.75	85.70	1.00
MC	1	0.045	10-Year	2234.00	2410.25	2416.88		2417.28	0.000696	5.08	439.45	85.52	0.37
MC	1	0.045	50-Year	3567.00	2410.25	2416.85		2417.88	0.001808	8.16	437.06	85.41	0.59
MC	1	0.045	Floodway	4267.00	2410.25	2416.82		2418.32	0.002629	9.81	434.97	85.32	0.71
MC	1	0.033	100-Year	4267.00	2409.75	2416.95		2417.93	0.001743	7.94	537.56	89.93	0.57
MC	1	0.033	500-Year	6160.00	2409.75	2417.05		2419.02	0.003451	11.27	546.76	90.23	0.81
MC	1	0.033	10-Year	2234.00	2409.75	2416.91		2417.18	0.000488	4.18	533.99	89.82	0.30
MC	1	0.033	50-Year	3567.00	2409.75	2416.93		2417.62	0.001229	6.65	536.00	89.88	0.48
MC	1	0.033	Floodway	4267.00	2409.75	2416.95		2417.93	0.001743	7.94	537.56	89.93	0.57
MC	1	0.022	100-Year	4267.00	2405.11	2417.22		2417.69	0.001048	5.50	775.40	100.60	0.35
MC	1	0.022	500-Year	6160.00	2405.11	2417.66		2418.54	0.001863	7.51	820.03	102.64	0.47
MC	1	0.022	10-Year	2234.00	2405.11	2416.98		2417.12	0.000314	2.97	751.17	99.48	0.19
MC	1	0.022	50-Year	3567.00	2405.11	2417.12		2417.46	0.000761	4.66	764.84	100.11	0.30
MC	1	0.022	Floodway	4267.00	2405.11	2417.22		2417.69	0.001048	5.50	775.40	100.60	0.35
MC	1	0.001	100-Year	4267.00	2406.50	2416.90	2413.56	2417.53	0.001734	6.39	668.07	103.21	0.44
MC	1	0.001	500-Year	6160.00	2406.50	2416.90	2414.87	2418.22	0.003613	9.22	668.07	103.21	0.64
MC	1	0.001	10-Year	2234.00	2406.50	2416.90	2411.82	2417.07	0.000475	3.34	668.07	103.21	0.23
MC	1	0.001	50-Year	3567.00	2406.50	2416.90	2413.03	2417.34	0.001212	5.34	668.07	103.21	0.37
MC	1	0.001	Floodway	4267.00	2406.50	2416.90	2413.56	2417.53	0.001734	6.39	668.07	103.21	0.44


aw_ae Plan: PMR_Lower 10/26/2015
MC 1
MC 2
Trib_T191
Elevation (ft)
Main Channel Distance (ft)
2580
2560
2540
2520
2500
2480
2460
2440
2420
2400
0
5000
10000
15000
20000
Legend
EG 500-Year
EG 100-Year
EG Floodway
EG 50-Year
EG 10-Year
WS 10-Year
WS 100-Year
WS 50-Year
WS 500-Year
WS Floodway
Crit 500-Year
Crit 100-Year
Crit Floodway
Crit 50-Year
Crit 10-Year
Ground

HEC-RAS Plan: Existing Profile: 100YR

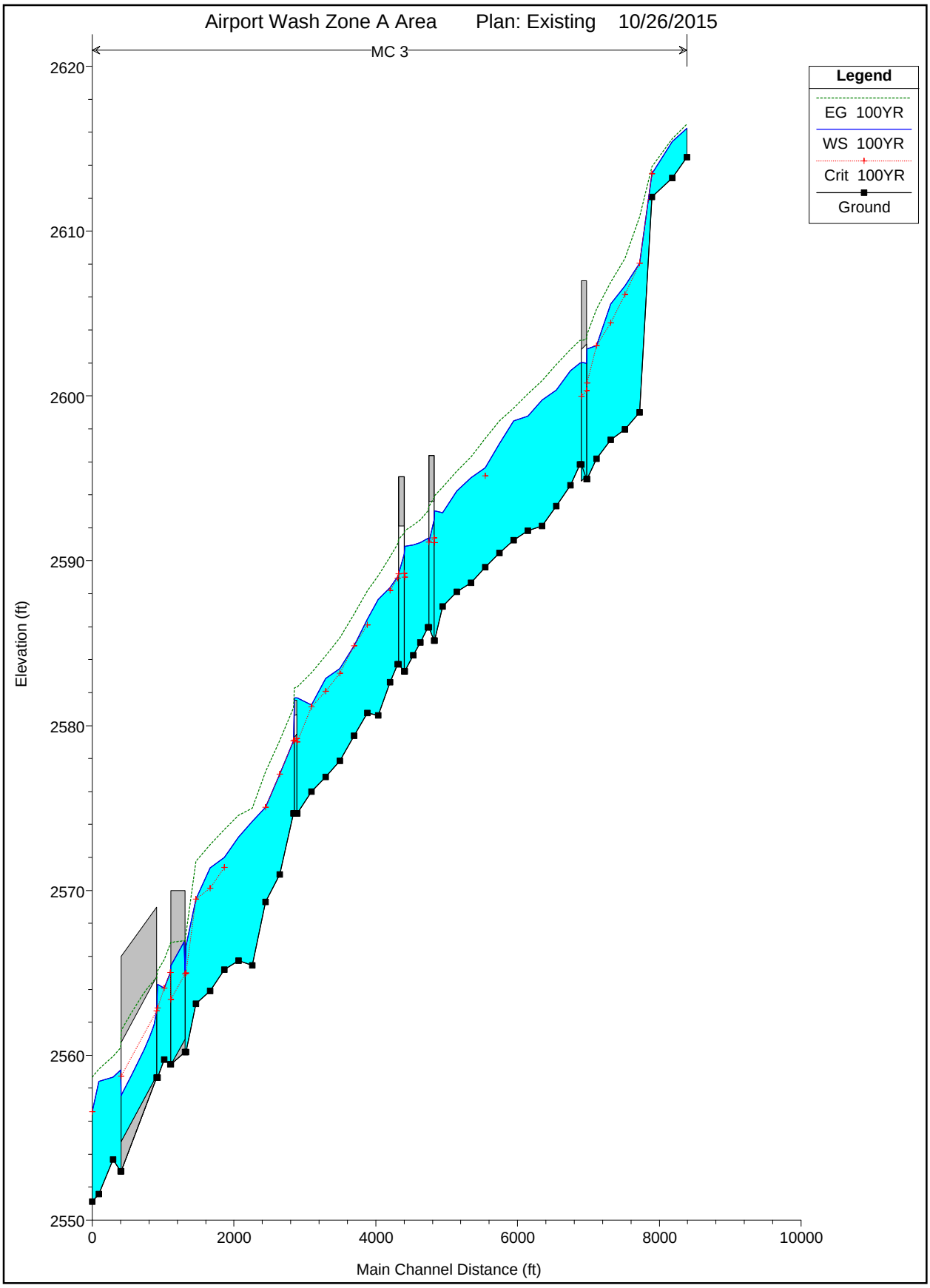
River	Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
				(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
SF Trib 2	1	11.172	100YR	467.00	2714.33	2715.42		2715.49	0.021446	2.15	217.08	420.53	0.53
SF Trib 2	1	11.131	100YR	467.00	2713.06	2714.75		2714.76	0.001245	0.79	592.83	641.60	0.14
SF Trib 2	1	11.09	100YR	467.00	2711.82	2714.15	2713.37	2714.22	0.006855	2.21	210.94	713.71	0.35
SF Trib 2	1	11.08		Culvert									
SF Trib 2	1	11.072	100YR	626.00	2710.41	2713.17	2712.68	2713.31	0.013327	3.07	208.07	769.08	0.48
SF Trib 2	1	11.033	100YR	626.00	2709.72	2711.47		2711.50	0.005779	1.44	435.48	581.64	0.29
SF Trib 2	1	10.948	100YR	626.00	2707.46	2709.12		2709.15	0.004764	1.47	426.52	474.90	0.27
SF Trib 2	1	10.851	100YR	626.00	2704.92	2706.38		2706.42	0.006006	1.68	373.58	409.06	0.31
SF Trib 2	1	10.756	100YR	626.00	2700.17	2702.56		2702.68	0.009497	2.78	224.89	238.14	0.50
SF Trib 2	1	10.67	100YR	626.00	2696.46	2699.96		2700.04	0.003944	2.30	271.67	197.47	0.35
SF Trib 2	1	10.596	100YR	626.00	2694.77	2697.06		2697.29	0.015664	3.93	164.08	169.59	0.66
SF Trib 2	1	10.541	100YR	626.00	2693.19	2695.11	2694.49	2695.17	0.004023	2.06	308.81	307.16	0.34
SF Trib 2	1	10.477	100YR	626.00	2690.74	2691.74	2691.69	2691.87	0.048546	2.87	220.84	1131.80	0.77
SF Trib 2	1	10.418	100YR	626.00	2688.84	2690.61		2690.62	0.001336	0.88	718.74	1121.15	0.15
SF Trib 2	1	10.287	100YR	1028.00	2684.13	2685.96	2685.96	2686.17	0.083856	3.72	276.20	655.83	1.01
SF Trib 2	1	10.196	100YR	1028.00	2680.56	2685.09		2685.10	0.000332	0.77	1344.12	942.67	0.09
SF Trib 2	1	10.107	100YR	1028.00	2677.91	2683.01	2682.81	2684.52	0.007971	9.89	108.01	79.10	0.92
SF Trib 2	1	10.058	100YR	1028.00	2675.53	2680.39	2680.37	2682.17	0.010132	10.69	96.13	35.03	0.99
SF Trib 2	1	10	100YR	1028.00	2675.39	2678.65	2678.65	2679.02	0.008117	7.09	293.33	396.42	0.86
SF Trib 1	1	12.069	100YR	673.00	2702.38	2709.19		2709.19	0.000004	0.14	4133.99	686.62	0.01
SF Trib 1	1	12.04		Lat Struct									
SF Trib 1	1	12.018	100YR	673.00	2700.65	2709.16	2702.68	2709.18	0.002461	1.19	608.16	939.00	0.20
SF Trib 1	1	12.01		Culvert									
SF Trib 1	1	12	100YR	673.00	2700.33	2702.10	2702.10	2702.34	0.083790	3.90	172.61	380.89	1.02
SF	3	9.662	100YR	3130.00	2741.10	2743.74		2743.79	0.006929	1.74	1817.86	2237.88	0.33
SF	3	9.606	100YR	3130.00	2738.88	2741.63		2741.69	0.007159	1.85	1716.87	1968.53	0.34
SF	3	9.511	100YR	3130.00	2734.71	2737.69		2737.76	0.008421	2.16	1496.50	1694.80	0.37
SF	3	9.415	100YR	3130.00	2731.87	2734.14		2734.21	0.005948	2.01	1516.68	1402.55	0.32
SF	3	9.317	100YR	3130.00	2728.12	2730.98		2731.05	0.006555	2.16	1472.21	1278.27	0.34
SF	3	9.223	100YR	3130.00	2725.22	2728.05		2728.12	0.005374	2.13	1496.81	1138.48	0.31
SF	3	9.141	100YR	3130.00	2721.23	2725.12		2725.22	0.008573	2.56	1248.92	1037.57	0.39
SF	3	9.044	100YR	3130.00	2718.91	2722.16		2722.22	0.004220	2.01	1595.20	1179.24	0.28
SF	3	8.948	100YR	3130.00	2716.60	2718.70		2718.82	0.012539	2.83	1120.83	1025.40	0.46
SF	3	8.853	100YR	3130.00	2712.94	2715.79		2715.85	0.003409	1.92	1664.91	1084.01	0.26
SF	3	8.758	100YR	3130.00	2707.66	2710.89	2710.86	2711.31	0.062668	5.19	603.63	697.53	0.98
SF	3	8.661	100YR	3130.00	2704.72	2709.26		2709.28	0.001196	1.35	2356.88	1486.84	0.16
SF	3	8.601	100YR	3130.00	2703.96	2709.23		2709.23	0.000057	0.41	7742.55	2359.60	0.04
SF	3	8.558	100YR	2500.00	2703.73	2709.12	2705.88	2709.19	0.004915	1.68	1360.54	1542.05	0.29
SF	3	8.54		Culvert									
SF	3	8.533	100YR	2500.00	2703.01	2705.07	2705.07	2705.46	0.035006	3.28	585.26	741.35	0.70
SF	2	8.401	100YR	3173.00	2695.48	2699.51		2699.58	0.007479	1.67	1595.86	1953.75	0.33
SF	2	8.319	100YR	3173.00	2694.24	2696.74		2696.79	0.005993	1.61	1736.92	2120.45	0.30
SF	2	8.205	100YR	3173.00	2691.44	2693.27		2693.31	0.006157	1.75	1811.62	1888.83	0.31
SF	2	8.15		Lat Struct									
SF	2	8.109	100YR	3173.00	2686.63	2690.18		2690.24	0.005895	1.95	1642.48	1496.64	0.32
SF	2	8.018	100YR	3173.00	2682.93	2685.91	2685.42	2686.04	0.014260	2.84	1115.89	1047.70	0.49
SF	2	7.917	100YR	3173.00	2678.39	2682.88		2682.93	0.003138	1.86	1726.77	1059.18	0.25
SF	2	7.837	100YR	3173.00	2676.02	2678.89	2678.89	2679.30	0.068065	5.19	619.32	811.72	1.01
SF	1	7.749	100YR	3193.00	2673.08	2676.07		2676.19	0.009138	2.46	1183.01	1439.68	0.40
SF	1	7.653	100YR	3193.00	2670.40	2673.77	2672.64	2673.82	0.002811	1.71	1885.77	1192.74	0.23
SF	1	7.554	100YR	3193.00	2668.12	2670.30		2670.50	0.024565	3.52	907.62	931.69	0.63
SF	1	7.475	100YR	3193.00	2666.16	2669.48		2669.50	0.000783	1.22	2707.76	1256.65	0.13
SF	1	7.304	100YR	3193.00	2661.10	2666.21	2665.47	2667.42	0.021914	8.83	361.53	1560.73	0.75
SF	1	7.3		Culvert									
SF	1	7.29	100YR	3193.00	2661.02	2664.64	2664.39	2664.81	0.026754	3.27	976.89	1191.95	0.64
SF	1	7.256	100YR	3193.00	2659.82	2662.10		2662.18	0.008927	2.24	1430.18	1386.77	0.38
SF	1	7.182	100YR	3193.00	2656.36	2659.46		2659.53	0.005176	2.11	1522.38	1123.54	0.31
SF	1	7.086	100YR	3193.00	2654.37	2656.36		2656.44	0.007312	2.24	1428.52	1167.75	0.36
SF	1	6.99	100YR	3193.00	2649.40	2652.94		2653.02	0.006187	2.14	1489.10	1144.94	0.33
SF	1	6.893	100YR	3193.00	2645.81	2649.52		2649.62	0.007221	2.46	1305.57	950.77	0.36
SF	1	6.796	100YR	3193.00	2642.92	2646.64		2646.72	0.004489	2.26	1434.35	883.64	0.30
SF	1	6.7	100YR	3193.00	2640.09	2644.11		2644.20	0.005503	2.43	1327.46	814.63	0.33
SF	1	6.603	100YR	3193.00	2637.93	2640.97		2641.06	0.006974	2.36	1351.04	979.38	0.35
SF	1	6.507	100YR	3193.00	2634.42	2638.09		2638.17	0.004721	2.17	1474.83	923.11	0.30
SF	1	6.411	100YR	3193.00	2629.71	2634.88		2634.99	0.008780	2.75	1168.10	838.29	0.40
SF	1	6.315	100YR	3193.00	2627.64	2630.87		2630.97	0.007177	2.54	1262.24	859.86	0.36
SF	1	6.22	100YR	3193.00	2623.73	2627.27		2627.36	0.007209	2.43	1315.40	954.70	0.36
SF	1	6.135	100YR	3193.00	2621.18	2623.40		2623.53	0.010075	2.96	1085.16	878.33	0.43
SF	1	6.073	100YR	3193.00	2618.59	2620.96		2621.10	0.005761	2.54	1176.12	755.71	0.34
SF	1	6	100YR	3193.00	2615.76	2618.10	2618.10	2618.61	0.006405	2.41	822.22	581.98	0.35
NF Trib 2	1	23.358	100YR	376.00	2698.13	2699.28	2699.28	2699.47	0.093602	3.49	107.87	305.93	1.03
NF Trib 2	1	23.297	100YR	376.00	2695.96	2697.90		2697.91	0.000699	0.68	551.68	529.17	0.11
NF Trib 2	1	23.247	100YR	376.00	2693.20	2697.65	2694.85	2697.70	0.000914	1.71	219.59	777.72	0.15
NF Trib 2	1	23.24		Culvert									
NF Trib 2	1	23.232	100YR	376.00	2693.04	2695.98	2695.00	2696.19	0.008618	3.63	103.46	674.83	0.43
NF Trib 2	1	23.177	100YR	376.00	2690.86	2692.22	2692.04	2692.29	0.022994	2.13	177.73	384.90	0.54
NF Trib 2	1	23.103	100YR	376.00	2688.55	2689.85		2689.86	0.002780	0.99	382.63	530.73	0.20
NF Trib 2	1	23	100YR	376.00	2684.17	2685.22	2685.22	2685.38	0.103530	3.23	116.54	400.67	1.05
NF Trib 1	1	25.089	100YR	472.00	2672.19	2673.49		2673.52	0.008252	1.28	348.36	724.43	0.32
NF Trib 1	1	25.035	100YR	472.00	2670.28	2671.71		2671.74	0.005143	1.26	376.37	609.14	0.27
NF Trib 1	1	24.981	100YR	472.00	2668.44	2669.80		2669.84	0.009064	1.58	307.67	583.72	0.35

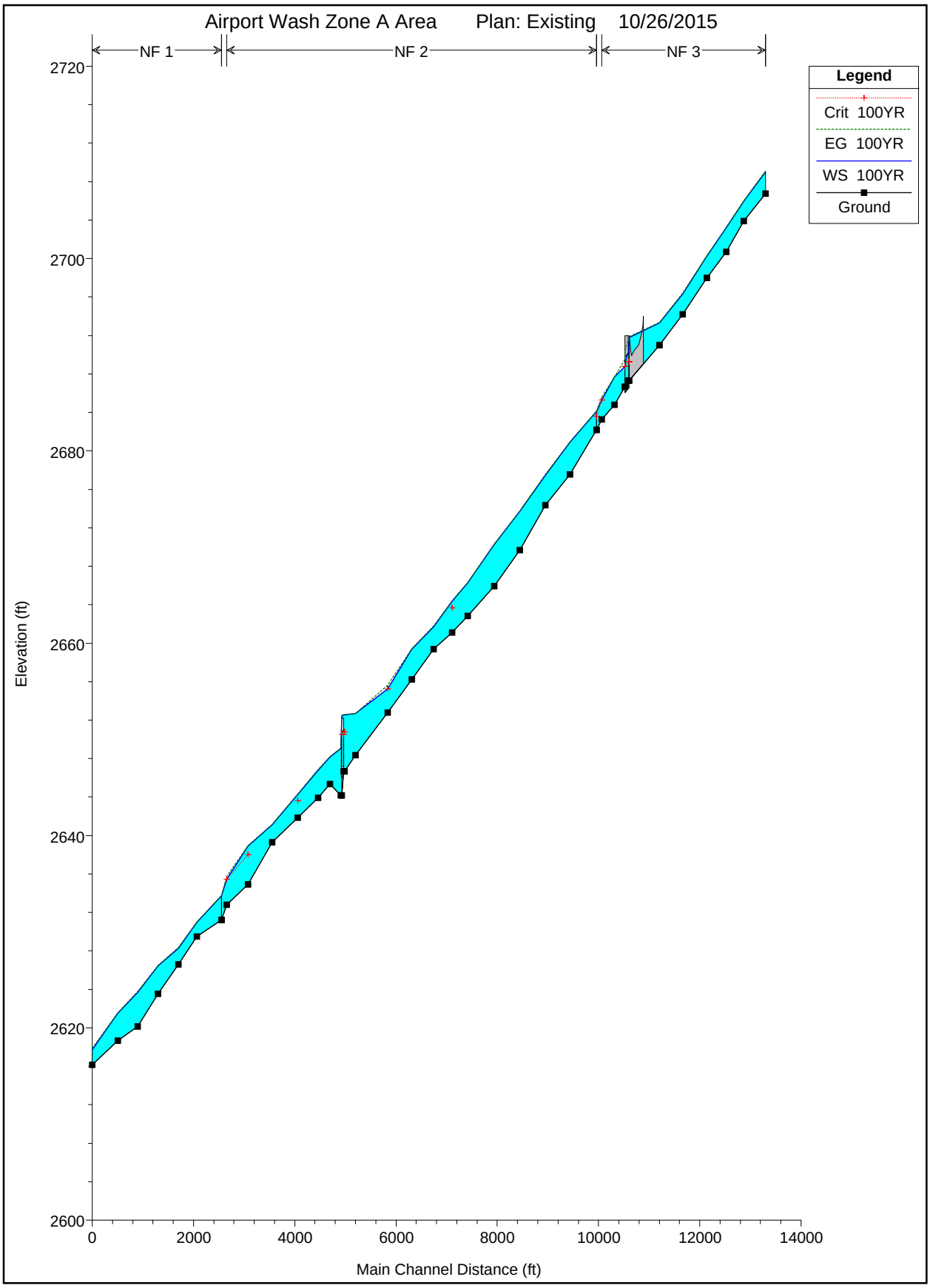
HEC-RAS Plan: Existing Profile: 100YR (Continued)

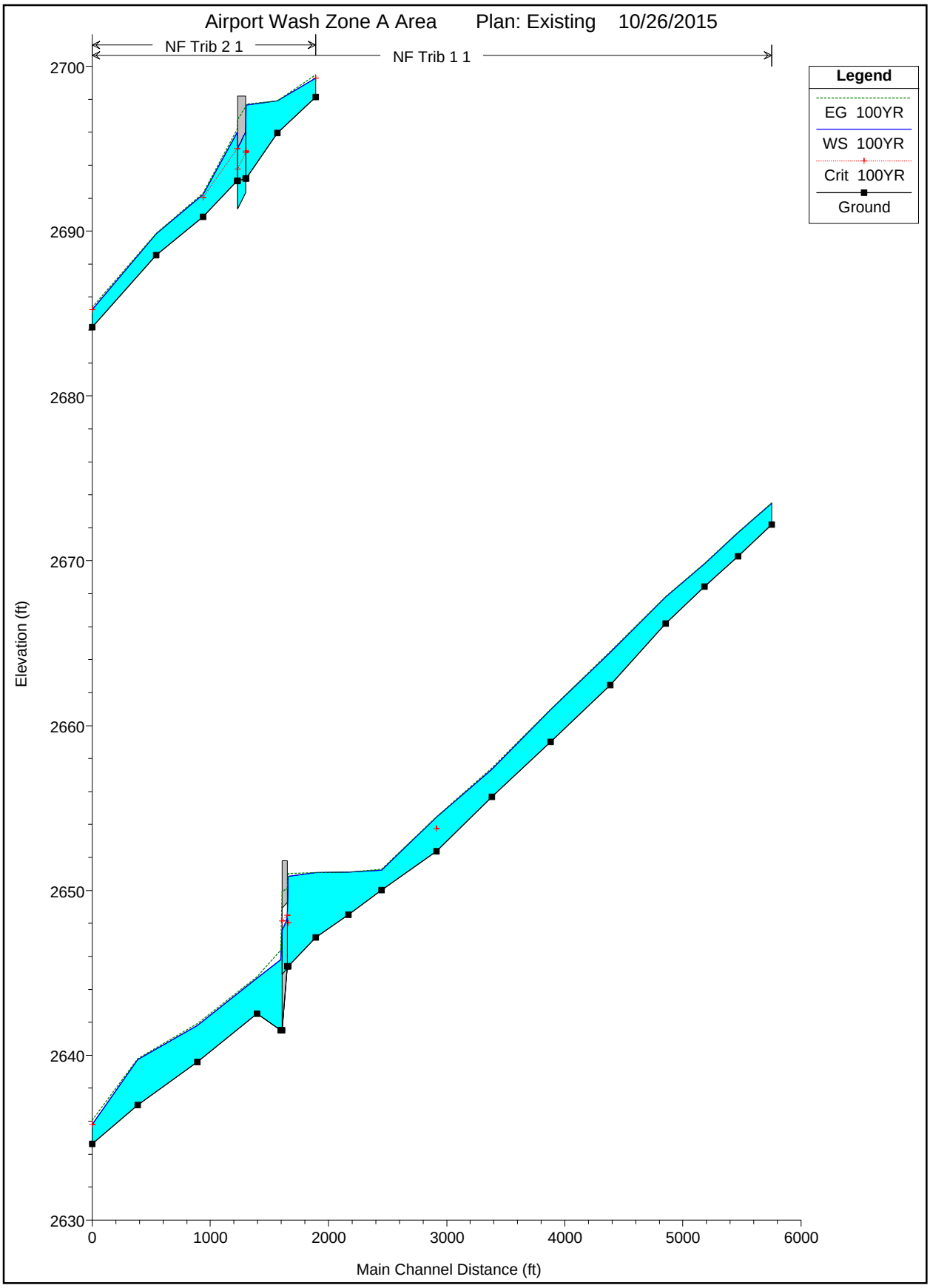
River	Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
				(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
NF Trib 1	1	24.92	100YR	472.00	2666.18	2667.79		2667.82	0.004834	1.34	360.55	559.66	0.27
NF Trib 1	1	24.831	100YR	657.00	2662.46	2664.44		2664.50	0.009741	1.92	356.90	555.46	0.38
NF Trib 1	1	24.735	100YR	657.00	2659.02	2660.96		2660.99	0.005168	1.45	456.94	583.85	0.28
NF Trib 1	1	24.641	100YR	657.00	2655.68	2657.35		2657.42	0.010690	2.16	310.70	400.08	0.41
NF Trib 1	1	24.552	100YR	657.00	2652.37	2654.43	2653.76	2654.47	0.004073	1.53	439.97	477.79	0.26
NF Trib 1	1	24.464	100YR	657.00	2650.01	2651.23		2651.29	0.013890	2.09	317.39	504.99	0.45
NF Trib 1	1	24.411	100YR	657.00	2648.52	2651.10		2651.10	0.000191	0.50	1349.48	788.98	0.06
NF Trib 1	1	24.358	100YR	657.00	2647.15	2651.08		2651.08	0.000045	0.35	1892.66	945.06	0.03
NF Trib 1	1	24.315	100YR	657.00	2645.39	2650.86	2648.03	2651.03	0.002760	3.36	195.55	857.11	0.27
NF Trib 1	1	24.31		Culvert									
NF Trib 1	1	24.302	100YR	657.00	2641.51	2645.80		2646.38	0.008635	6.13	107.19	36.05	0.58
NF Trib 1	1	24.264	100YR	679.00	2642.52	2644.67		2644.76	0.006375	2.57	277.33	386.92	0.43
NF Trib 1	1	24.169	100YR	679.00	2639.60	2641.81		2641.91	0.005094	2.64	290.46	300.80	0.39
NF Trib 1	1	24.073	100YR	679.00	2636.98	2639.74		2639.79	0.003491	1.92	355.48	221.08	0.26
NF Trib 1	1	24	100YR	679.00	2634.62	2635.81	2635.81	2636.06	0.083081	4.01	169.25	355.59	1.02
NF	3	22.62	100YR	2287.00	2706.77	2709.04		2709.10	0.006259	1.85	1234.15	1195.62	0.32
NF	3	22.539	100YR	2287.00	2703.91	2705.95		2706.02	0.008328	2.07	1104.10	1604.60	0.37
NF	3	22.473	100YR	2287.00	2700.69	2703.19		2703.24	0.007746	1.86	1232.76	2037.45	0.35
NF	3	22.401	100YR	2287.00	2697.98	2700.26		2700.31	0.007580	1.87	1235.53	1739.59	0.35
NF	3	22.326	100YR	2287.00	2694.22	2696.33		2696.41	0.008995	2.13	1080.42	1148.75	0.38
NF	3	22.219	100YR	2287.00	2691.02	2693.31		2693.37	0.004969	1.85	1251.00	1102.74	0.29
NF	3	22.15		Lat Struct									
NF	3	22.105	100YR	2287.00	2687.32	2691.81	2689.26	2691.88	0.001494	2.15	1064.83	1582.80	0.19
NF	3	22.1		Culvert									
NF	3	22.089	100YR	2287.00	2686.67	2688.79	2688.79	2689.54	0.040231	5.81	341.14	1075.11	0.86
NF	3	22.051	100YR	2287.00	2684.81	2687.68		2687.72	0.003057	1.59	1447.06	1176.22	0.24
NF	3	22.003	100YR	2287.00	2683.29	2685.29	2685.29	2685.58	0.066866	4.27	527.54	938.08	0.96
NF	2	21.948	100YR	2477.00	2682.19	2684.12	2683.60	2684.17	0.005727	1.64	1434.53	1597.37	0.30
NF	2	21.848	100YR	2477.00	2677.56	2680.93		2680.97	0.006569	1.73	1440.81	1648.52	0.32
NF	2	21.756	100YR	2477.00	2674.36	2677.48		2677.54	0.007482	1.96	1278.34	1374.28	0.35
NF	2	21.661	100YR	2477.00	2669.70	2673.71		2673.76	0.007491	1.91	1315.50	1500.60	0.35
NF	2	21.564	100YR	2477.00	2665.91	2670.25		2670.30	0.006198	1.89	1344.38	1510.33	0.32
NF	2	21.466	100YR	2477.00	2662.81	2666.29		2666.35	0.009522	2.01	1251.48	1579.68	0.38
NF	2	21.408	100YR	2477.00	2661.12	2664.36	2663.69	2664.40	0.004487	1.70	1482.45	1393.42	0.28
NF	2	21.339	100YR	2477.00	2659.36	2661.68		2661.78	0.013555	2.57	971.12	1067.88	0.46
NF	2	21.257	100YR	2477.00	2656.24	2659.41		2659.45	0.002836	1.68	1499.46	1049.00	0.23
NF	2	21.166	100YR	2477.00	2652.79	2655.26	2655.26	2655.63	0.070039	4.89	507.25	703.02	1.01
NF	2	21.046	100YR	2477.00	2648.33	2652.69		2652.70	0.000219	0.68	3641.87	1660.65	0.07
NF	2	21.004	100YR	2477.00	2646.69	2652.53	2650.77	2652.58	0.002626	1.82	1367.68	1815.75	0.23
NF	2	21		Culvert									
NF	2	20.991	100YR	2477.00	2644.16	2649.02		2649.10	0.004181	2.28	1085.14	1079.56	0.29
NF	2	20.951	100YR	2477.00	2645.34	2648.16		2648.22	0.004284	1.98	1265.47	2019.64	0.28
NF	2	20.907	100YR	2477.00	2643.93	2646.78		2646.85	0.009857	2.23	1124.04	1883.15	0.40
NF	2	20.83	100YR	2477.00	2641.84	2644.28	2643.65	2644.32	0.004327	1.62	1536.44	1487.34	0.27
NF	2	20.734	100YR	2477.00	2639.30	2641.10		2641.18	0.009468	2.32	1081.85	1106.06	0.40
NF	2	20.643	100YR	2477.00	2634.93	2638.90	2638.02	2638.94	0.002894	1.57	1560.64	1217.60	0.23
NF	2	20.564	100YR	2477.00	2632.79	2635.44	2635.44	2635.73	0.059321	3.54	599.30	1136.16	0.88
NF	1	20.484	100YR	2558.00	2631.22	2633.73		2633.78	0.005838	1.44	1527.45	1947.03	0.29
NF	1	20.391	100YR	2558.00	2629.50	2630.98		2631.03	0.005705	1.55	1424.61	1664.75	0.30
NF	1	20.322	100YR	2558.00	2626.60	2628.26		2628.36	0.007661	1.32	1102.02	1321.84	0.32
NF	1	20.247	100YR	2558.00	2623.52	2626.45		2626.50	0.005078	1.87	1338.55	1223.22	0.30
NF	1	20.171	100YR	2558.00	2620.16	2623.68		2623.80	0.009868	2.82	946.31	925.11	0.42
NF	1	20.095	100YR	2558.00	2618.68	2621.51		2621.57	0.003508	1.98	1337.78	984.82	0.26
NF	1	20	100YR	2558.00	2616.17	2617.73		2617.90	0.023540	3.27	803.34	1019.81	0.61
MC	3	5.205	100YR	3993.00	2614.48	2616.24		2616.50	0.005116	1.74	1755.27	1669.26	0.29
MC	3	5.166	100YR	3993.00	2613.21	2615.43		2615.61	0.003648	1.66	1941.01	1569.05	0.25
MC	3	5.112	100YR	3993.00	2612.08	2613.48	2613.48	2613.90	0.006882	5.16	807.07	1004.42	1.04
MC	3	5.078	100YR	3993.00	2599.01	2608.04	2608.04	2610.86	0.011206	13.48	296.29	53.04	1.00
MC	3	5.04	100YR	3993.00	2597.97	2606.68	2606.17	2608.34	0.008153	10.33	386.68	84.65	0.85
MC	3	5.002	100YR	3993.00	2597.35	2605.58	2604.44	2606.89	0.005603	9.21	433.70	84.79	0.72
MC	3	4.964	100YR	3993.00	2596.19	2603.06	2603.06	2605.25	0.011415	11.88	336.12	76.84	1.00
MC	3	4.938	100YR	3993.00	2594.96	2602.85	2600.80	2603.75	0.002174	7.63	523.37	98.40	0.54
MC	3	4.925		Culvert									
MC	3	4.919	100YR	3993.00	2595.83	2601.99		2603.36	0.003578	9.38	425.54	96.61	0.69
MC	3	4.893	100YR	3993.00	2594.59	2601.52		2602.82	0.003934	9.16	435.97	83.45	0.71
MC	3	4.856	100YR	3993.00	2593.32	2600.35		2601.89	0.005223	9.98	400.12	83.51	0.80
MC	3	4.818	100YR	3993.00	2592.11	2599.74		2600.92	0.003609	8.73	457.57	88.87	0.68
MC	3	4.78	100YR	3993.00	2591.82	2598.76		2600.13	0.004109	9.40	424.66	80.83	0.72
MC	3	4.742	100YR	3993.00	2591.24	2598.47		2599.25	0.003071	7.06	565.58	135.41	0.61
MC	3	4.704	100YR	3993.00	2590.48	2597.12		2598.47	0.004209	9.34	427.53	84.01	0.73
MC	3	4.666	100YR	3993.00	2589.60	2595.65	2595.15	2597.43	0.006068	10.71	372.91	78.23	0.86
MC	3	4.628	100YR	3993.00	2588.67	2595.03		2596.29	0.004059	9.00	443.73	89.77	0.71
MC	3	4.59	100YR	3993.00	2588.12	2594.22		2595.44	0.004323	8.86	450.90	112.79	0.73
MC	3	4.552	100YR	3993.00	2587.22	2592.92		2594.46	0.005215	9.97	400.64	83.08	0.80
MC	3	4.531	100YR	3993.00	2585.17	2593.02	2591.11	2593.96	0.001782	7.81	520.18	112.85	0.58
MC	3	4.52		Bridge									
MC	3	4.513	100YR	3993.00	2585.96	2591.36		2593.02	0.004244	10.34	386.02	86.03	0.86
MC	3	4.493	100YR	3993.00	2585.03	2591.12		2592.49	0.003125	9.40	424.95	86.49	0.75
MC	3	4.474	100YR	3993.00	2584.26	2590.95		2592.15	0.002610	8.81	453.16	130.40	0.69
MC	3	4.451	100YR	3993.00	2583.29	2590.87	2589.02	2591.81	0.001866	7.78	513.13	93.52	0.59
MC	3	4.44		Bridge									

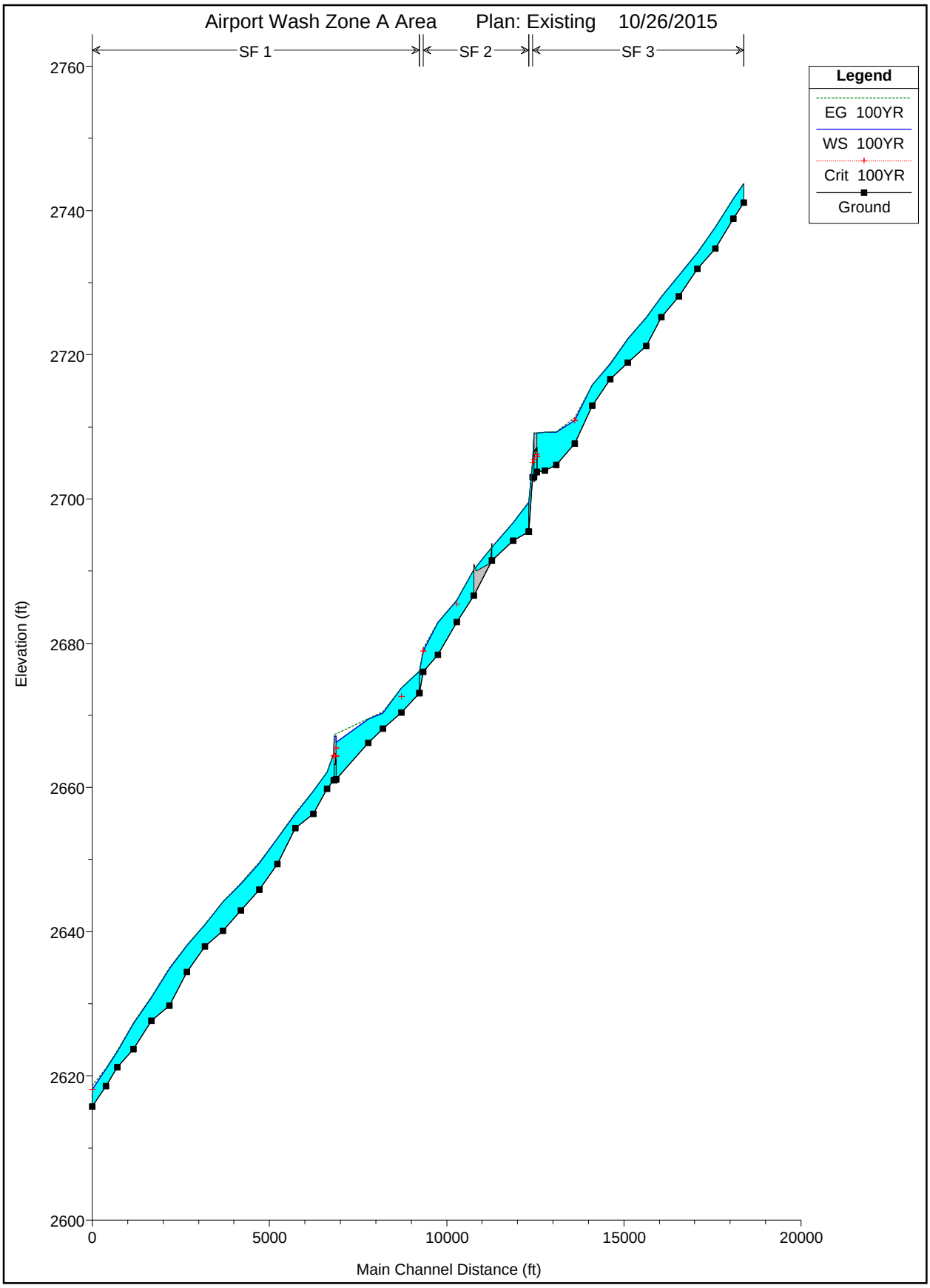
HEC-RAS Plan: Existing Profile: 100YR (Continued)

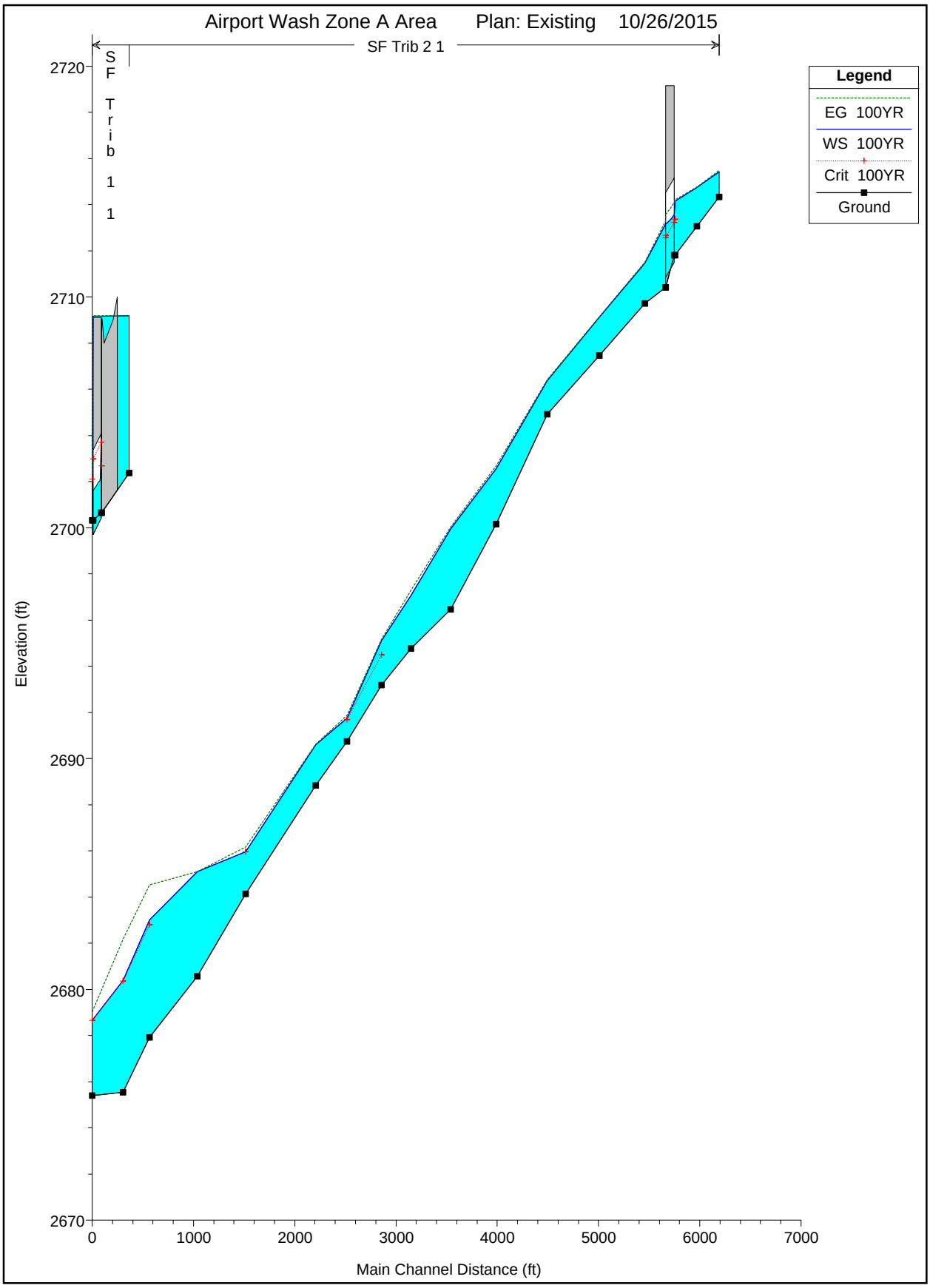
River	Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
				(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
MC	3	4.432	100YR	3993.00	2583.73	2589.04	2588.95	2591.01	0.005612	11.26	354.74	85.84	0.98
MC	3	4.411	100YR	3993.00	2582.64	2588.39	2588.20	2590.25	0.007353	10.95	364.51	217.43	0.94
MC	3	4.38	100YR	3993.00	2580.62	2587.64		2589.09	0.005235	9.66	413.35	210.03	0.80
MC	3	4.351	100YR	3993.00	2580.75	2586.46	2586.10	2588.19	0.006617	10.55	378.61	155.83	0.89
MC	3	4.316	100YR	3993.00	2579.38	2584.85	2584.85	2586.78	0.008569	11.12	358.98	116.47	1.00
MC	3	4.278	100YR	3993.00	2577.87	2583.46	2583.17	2585.32	0.005576	10.93	365.36	222.38	0.91
MC	3	4.24	100YR	3993.00	2576.88	2582.87	2582.07	2584.23	0.003969	9.36	426.68	361.02	0.78
MC	3	4.202	100YR	3993.00	2576.00	2581.26	2581.13	2583.20	0.006182	11.18	357.04	180.51	0.96
MC	3	4.164	100YR	3993.00	2574.66	2581.67	2579.02	2582.34	0.001241	6.55	609.42	473.53	0.46
MC	3	4.16		Culvert									
MC	3	4.154	100YR	3993.00	2574.68	2579.06	2579.06	2581.08	0.006900	11.40	350.32	86.44	0.99
MC	3	4.117	100YR	3993.00	2570.96	2577.05	2577.05	2579.09	0.006950	11.45	348.59	85.42	1.00
MC	3	4.079	100YR	3993.00	2569.31	2575.06	2575.06	2577.20	0.006962	11.73	340.43	80.86	1.01
MC	3	4.043	100YR	3993.00	2565.46	2574.18		2574.99	0.001489	7.21	553.65	84.20	0.50
MC	3	4.007	100YR	3993.00	2565.73	2573.23		2574.55	0.003093	9.20	434.15	80.68	0.70
MC	3	3.969	100YR	3993.00	2565.20	2572.00	2571.40	2573.70	0.005550	10.46	381.69	241.27	0.90
MC	3	3.932	100YR	3993.00	2563.91	2571.37	2570.14	2572.77	0.003267	9.50	420.50	77.49	0.72
MC	3	3.894	100YR	4021.00	2563.14	2569.47	2569.47	2571.78	0.006618	12.18	330.08	71.19	1.00
MC	3	3.866	100YR	4021.00	2560.19	2566.63	2564.99	2567.37	0.001893	6.87	585.10	141.01	0.54
MC	3	3.85		Culvert									
MC	3	3.825	100YR	4021.00	2559.46	2565.02	2565.02	2566.77	0.007051	10.61	378.89	107.49	0.99
MC	3	3.808	100YR	4021.00	2559.74	2564.08	2564.08	2565.81	0.007287	10.53	381.79	112.37	1.01
MC	3	3.79	100YR	4021.00	2558.65	2564.31	2562.88	2565.13	0.002291	7.29	551.61	184.25	0.59
MC	3	3.701		Culvert									
MC	3	3.692	100YR	4021.00	2552.96	2559.11		2560.46	0.004590	9.33	431.05	103.69	0.81
MC	3	3.671	100YR	4021.00	2553.69	2558.68		2559.94	0.004143	9.00	446.96	108.58	0.78
MC	3	3.633	100YR	4021.00	2551.58	2558.43		2559.16	0.002424	6.86	586.32	143.84	0.60
MC	3	3.616	100YR	4021.00	2551.13	2556.59	2556.59	2558.68	0.006788	11.60	346.66	83.00	1.00


Airport Wash Zone A Area Plan: Existing 10/26/2015
MC 3
Legend
EG 100YR
WS 100YR
Crit 100YR
Ground
Elevation (ft)
2620
2610
2600
2590
2580
2570
2560
2550
0
2000
4000
6000
8000
10000
Main Channel Distance (ft)


Airport Wash Zone A Area Plan: Existing 10/26/2015
NF 1
NF 2
NF 3
Legend
Crit 100YR
EG 100YR
WS 100YR
Ground
Elevation (ft)
2720
2700
2680
2660
2640
2620
2600
0
2000
4000
6000
8000
10000
12000
14000
Main Channel Distance (ft)


Airport Wash Zone A Area Plan: Existing 10/26/2015
NF Trib 2 1
NF Trib 1 1
Legend
EG 100YR
WS 100YR
Crit 100YR
Ground
Elevation (ft)
2700
2690
2680
2670
2660
2650
2640
2630
0
1000
2000
3000
4000
5000
6000
Main Channel Distance (ft)


Airport Wash Zone A Area Plan: Existing 10/26/2015
SF 1
SF 2
SF 3
Legend
EG 100YR
WS 100YR
Crit 100YR
Ground
Elevation (ft)
2760
2740
2720
2700
2680
2660
2640
2620
2600
0
5000
10000
15000
20000
Main Channel Distance (ft)


Airport Wash Zone A Area Plan: Existing 10/26/2015
SF Trib 2 1
SF Trib 1 1
Legend
EG 100YR
WS 100YR
Crit 100YR
Ground
Elevation (ft)
2720
2710
2700
2690
2680
2670
0
1000
2000
3000
4000
5000
6000
7000
Main Channel Distance (ft)

APPENDIX F

EROSION, SEDIMENT TRANSPORT, AND GEOMORPHIC ANALYSIS SUPPORTING DOCUMENTATION

(Not Applicable)

APPENDIX G

EXHIBIT MAPS

Figure 1 – Location Map
Figure 2 – FEMA FIRM Panels
Figure 3 – Rainfall Data Map
Figure 4 – Hydrologic Soil Map
Figure 5 – Existing Conditions Hydrology Map
Figure 6 – Hydraulic WorkMap Index
Figure 7 – Hydraulic Workmap
Figure 8 – Annotated Flood Insurance Rate Maps (FIRMs)

APPENDIX H

ELECTRONIC FILES ON COMPACT DISC

Include:

- HEC-HMS Model and Supporting Data – Folder Name: Hydrology
- HEC-RAS Model– Folder Name: Hydraulic
- TDN Report (text, all Appendices and Figures) (pdf format)

Digital Workmap:

- Shapefile of Hydrologic Watersheds
- Shapefile of Concentration Points
- Shapefile of HEC-RAS Cross Sections and Stream Centerlines
- Shapefile of Proposed Floodplain Limits
- Aerial Photos and Shapefile of Topographic Contours (2-ft interval).

APPENDIX I
MT-2 FORMS

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

OVERVIEW & CONCURRENCE FORM

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

PAPERWORK BURDEN DISCLOSURE NOTICE

Public reporting burden for this form is estimated to average 1 hours per response. The burden estimate includes the time for reviewing instructions, searching existing data sources, gathering and maintaining the needed data, and completing, reviewing, and submitting the form. You are not required to respond to this collection of information unless it displays a valid OMB control number. Send comments regarding the accuracy of the burden estimate and any suggestions for reducing this burden to: Information Collections Management, Department of Homeland Security, Federal Emergency Management Agency, 1800 South Bell Street, Arlington, VA 20958-3005, Paperwork Reduction Project (1660-0016). Submission of the form is required to obtain or retain benefits under the National Flood Insurance Program. **Please do not send your completed survey to the above address.**

PRIVACY ACT STATEMENT

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

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

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

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

A. REQUESTED RESPONSE FROM DHS-FEMA

This request is for a (check one):

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

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

B. OVERVIEW

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

Community No.	Community Name	State	Map No.	Panel No.	Effective Date
Example: 480301 480287	City of Katy Harris County	TX TX	48473C 48201C	0005D 0220G	02/08/83 09/28/90
040076	City of Tucson	AZ	04019C	2286L	06/16/11
040076	City of Tucson	AZ	04019C	2288L	06/16/11

2. a. Flooding Source: Airport Wash

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

3. Project Name/Identifier: Airport Wash PMR

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

5. Basis for Request and Type of Revision:

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

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

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

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

OVERVIEW & CONCURRENCE FORM

O.M.B No. 1660-0016
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Community No.	Community Name	State	Map No.	Panel No.	Effective Date
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040076	City of Tucson/Pima County	AZ	04019C	2289L	06/16/11
040076	City of Tucson/Pima County	AZ	04019C	2880L	06/16/11

2. a. Flooding Source: Airport Wash

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

3. Project Name/Identifier: Airport Wash PMR

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

5. Basis for Request and Type of Revision:

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

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

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

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

OVERVIEW & CONCURRENCE FORM

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

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040073	Pima County/City of Tucson	AZ	04019C	2900L	06/16/11

2. a. Flooding Source: Airport Wash

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

3. Project Name/Identifier: Airport Wash PMR

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

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

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

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

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

☐ Dam ☐ Fill ☐ Other (Attach Description)

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

C. REVIEW FEE

Has the review fee for the appropriate request category been included? ☐ Yes Fee amount: $_____

☒ No, Attach Explanation

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

D. SIGNATURE

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

Name: Jiankang Wang P.E.	Company: CMG Drainage Engineering, Inc.	
Mailing Address: PO Box 64880 Tucson, Arizona 85728	Daytime Telephone No.: 520-882-4244	Fax No.: 520-888-1421
	E-Mail Address: jwang@cmgdrainage.com	
Signature of Requester (required): Jiankang Wang	Date: 02/02/2016	

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

Community Official's Name and Title: Frederick Felix P.E., Engineering Administrator	Community Name: City of Tucson	
Mailing Address: City of Tucson Dept of Transportation 201 N. Stone Ave Tucson, AZ 85701	Daytime Telephone No.: 520-837-6620	Fax No.:
	E-Mail Address: Fred.Felix@tucsonaz.gov	
Community Official's Signature (required):	Date: 2/8/16	

CERTIFICATION BY REGISTERED PROFESSIONAL ENGINEER AND/OR LAND SURVEYOR

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

Certifier's Name: Jiankang Wang P.E.	License No.: 43851	Expiration Date: 3/31/2018
Company Name: CMG Drainage Engineering, Inc.	Telephone No.: 520-882-4244	Fax No.: 520-888-1421
Signature: Jiankang Wang	Date: 02/02/2016	E-Mail Address: jwang@cmgdrainage.com

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

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

☐ Dam ☐ Fill ☐ Other (Attach Description)

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

C. REVIEW FEE

Has the review fee for the appropriate request category been included? ☐ Yes Fee amount: $_____

☒ No, Attach Explanation

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

D. SIGNATURE

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

Name: Jiankang Wang P.E.	Company: CMG Drainage Engineering, Inc.	
Mailing Address: PO Box 64880 Tucson, Arizona 85728	Daytime Telephone No.: 520-882-4244	Fax No.: 520-888-1421
	E-Mail Address: jwang@cmgdrainage.com	
Signature of Requester (required): Jiankang Wang	Date: 02/01/2016	

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

Community Official's Name and Title: Suzanne Shields, P.E., Director	Community Name: Pima County Flood Control	
Mailing Address: 201 N Stone Avenue, 9th Floor Tucson, Arizona 85701	Daytime Telephone No.: 520-724-4600	Fax No.: 520-724-4621
	E-Mail Address: suzanne.shields@pima.gov	
Community Official's Signature (required): S Shields	Date: 2/3/16	

CERTIFICATION BY REGISTERED PROFESSIONAL ENGINEER AND/OR LAND SURVEYOR

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

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Signature: Jiankang Wang	Date: 02/01/2016	E-Mail Address: jwang@cmgdrainage.com

MT-2 FORM 1, OVERVIEW & CONCURRENCE FORM ATTACHMENT 1-1

PART C. REVIEW FEE – (Explanation Why No Fee Included)

This Map Change Request qualifies for a fee exemption, because it is based on more detailed data and improved hydrologic/hydraulic methodologies. In addition, it incorporates no manmade modifications within the SFHA.

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

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

Seal (Optional)

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

RIVERINE HYDROLOGY & HYDRAULICS FORM

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

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PRIVACY ACT STATEMENT

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

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

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

Flooding Source: Airport Wash

Note: Fill out one form for each flooding source studied

A. HYDROLOGY

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

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

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

Location	Drainage Area (Sq. Mi.)	Effective/FIS (cfs)	Revised (cfs)
Downstream End	22.87	8,100	4,267

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

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

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

4. Review/Approval of Analysis

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

5. Impacts of Sediment Transport on Hydrology

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

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

B. HYDRAULICS

1. Reach to be Revised

	Description	Cross Section	Water-Surface Elevations (ft.) Effective	Proposed/Revised
Downstream Limit*	its confluence with Santa Cruz River	0.001	2424.0	2416.9
Upstream Limit*	South of Valencia Rd	3.616	2557.0	2556.57

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

2. Hydraulic Method/Model Used: HEC-RAS V4.1.0

3. Pre-Submittal Review of Hydraulic Models*

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

4.

Models Submitted	Natural Run		Floodway Run		Datum
Duplicate Effective Model*	File Name: None	Plan Name:	File Name:	Plan Name:	
Corrected Effective Model*	File Name: None	Plan Name:	File Name:	Plan Name:	
Existing or Pre-Project Conditions Model	File Name: aw_ae_14063.prj	Plan Name: PMR_Lower	File Name: aw_ae_14063.prj	Plan Name: PMR_Lower	NAVD88
Revised or Post-Project Conditions Model	File Name:	Plan Name:	File Name:	Plan Name:	
Other - (attach description)	File Name:	Plan Name:	File Name:	Plan Name:	

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

☒ Digital Models Submitted? (Required)

C. MAPPING REQUIREMENTS

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

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

Topographic Information: Pima Association of Governments (PAG) 2008 LiDAR

Source: PAG Date: 2008

Accuracy: PAG 2008 LiDAR meets FEMA mapping standards

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

☒ Annotated FIRM and/or FBFM (Required)

B. HYDRAULICS

1. Reach to be Revised

	Description	Cross Section	Water-Surface Elevations (ft.) Effective	Proposed/Revised
Downstream Limit*	South of Valencia Rd	3.616	N/A	2556.57
Upstream Limit*	Craycroft Road	22.62	N/A	2709.04

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

2. Hydraulic Method/Model Used: HEC-RAS V4.1.0

3. Pre-Submittal Review of Hydraulic Models*

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

4.

Models Submitted	Natural Run		Floodway Run		Datum
Duplicate Effective Model*	File Name: None	Plan Name:	File Name:	Plan Name:	
Corrected Effective Model*	File Name: None	Plan Name:	File Name:	Plan Name:	
Existing or Pre-Project Conditions Model	File Name: AirportWashZoneA.prj	Plan Name: Existing	File Name: N/A	Plan Name: N/A	NAVD88
Revised or Post-Project Conditions Model	File Name:	Plan Name:	File Name:	Plan Name:	
Other - (attach description)	File Name:	Plan Name:	File Name:	Plan Name:	

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

☒ Digital Models Submitted? (Required)

C. MAPPING REQUIREMENTS

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

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

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☒ Annotated FIRM and/or FBFM (Required)

D. COMMON REGULATORY REQUIREMENTS*

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

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

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

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

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

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

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

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

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

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

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

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

DEPARTMENT OF HOMELAND SECURITY
FEDERAL EMERGENCY MANAGEMENT AGENCY

RIVERINE STRUCTURES FORM

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

PAPERWORK BURDEN DISCLOSURE NOTICE

Public reporting burden for this form is estimated to average 7 hours per response. The burden estimate includes the time for reviewing instructions, searching existing data sources, gathering and maintaining the needed data, and completing, reviewing, and submitting the form. You are not required to respond to this collection of information unless a valid OMB control number appears in the upper right corner of this form. Send comments regarding the accuracy of the burden estimate and any suggestions for reducing this burden to: Information Collections Management, Department of Homeland Security, Federal Emergency Management Agency, 1800 South Bell Street, Arlington, VA 20598-3005, Paperwork Reduction Project (1660-0016). Submission of the form is required to obtain or retain benefits under the National Flood Insurance Program. **Please do not send your completed survey to the above address.**

PRIVACY ACT STATEMENT

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

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Flooding Source: Airport Wash

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

A. GENERAL

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

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

See Table 8 in the TDN for all Drainage Structures.

Description Of Modeled Structure

1. Name of Structure: 5-12'x10' RCBC

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

Location of Structure: Calle Santa Cruz

Downstream Limit/Cross Section: 0.045

Upstream Limit/Cross Section: 0.061

2. Name of Structure: Arch

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

Location of Structure: West of I-19

Downstream Limit/Cross Section: 0.131

Upstream Limit/Cross Section: 0.143

3. Name of Structure: Arch

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

Location of Structure: West of I-19

Downstream Limit/Cross Section: 0.221

Upstream Limit/Cross Section: 0.245

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

B. CHANNELIZATION

Flooding Source: _____

Name of Structure: _____

1. Hydraulic Considerations

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

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

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

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

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

☐ Other locations (specify): _____

2. Channel Design Plans

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

3. Accessory Structures

The channelization includes (check one):

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

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

☐ Weir ☐ Other (Describe):

4. Sediment Transport Considerations

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

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

C. BRIDGE/CULVERT

Flooding Source: Airport Wash

Name of Structure: 5-12'x10' RCBC

See Table 8 in the TDN for all Drainage Structures.

1. This revision reflects (check one):

☐ Bridge/culvert not modeled in the FIS

☐ Modified bridge/culvert previously modeled in the FIS

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

2. Hydraulic model used to analyze the structure (e.g., HEC-2 with special bridge routine, WSPRO, HY8): HEC-RAS 4.1.0
If different than hydraulic analysis for the flooding source, justify why the hydraulic analysis used for the flooding source could not analyze the structures. Attach justification.

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

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

☒ Shape (culverts only)

☒ Material

☒ Beveling or Rounding

☒ Wing Wall Angle

☒ Skew Angle

☒ Distances Between Cross Sections

☐ Erosion Protection

☐ Low Chord Elevations – Upstream and Downstream

☒ Top of Road Elevations – Upstream and Downstream

☒ Structure Invert Elevations – Upstream and Downstream

☒ Stream Invert Elevations – Upstream and Downstream

☒ Cross-Section Locations

4. Sediment Transport Considerations

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

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