

**PRELIMINARY DRAINAGE REPORT
FOR
DESERT MOUNTAIN PARCEL 19**

May 25, 2017

WP# 164434

Prepared for:

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EXP. 3-31-2018

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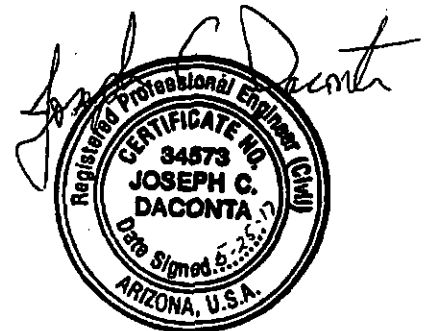
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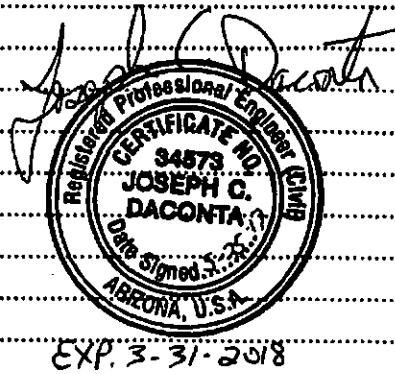


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APPENDICES

Appendix A Existing Condition Hydrologic Calculations

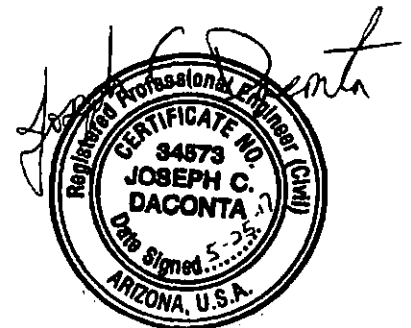
- DDMSW Output Data
- 2-year HEC-1 Model
- 10-year HEC-1 Model
- 100-year HEC-1 Model

Appendix B Developed Condition Hydrologic Calculations

- DDMSW Output Data
- 2-year HEC-1 Model
- 10-year HEC-1 Model
- 100-year HEC-1 Model

Appendix C Site Storm Water Storage Calculations

- Required First Flush Storm Water Calculations
- Provided Storm Water Calculations
- 100-Year, 2-Hour Storm Water Storage Volume Comparison
- Storm Water Storage Drain Times



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Appendix D

Hydraulic Calculations

- HEC-RAS Output Files Existing & Proposed Conditions
- FlowMaster Existing Wash Output Files
- Sill Scour Calculations & Exhibit
- Scour Calculations
- Erosion Hazard Setback Calculations

Appendix E

Supporting Documentation

- Master Drainage Report for Desert Mountain Parcel "C" - Desert Mountain Parcel C Masterplan Exhibit

Appendix F

Desert Mountain Parcel 19 Preliminary Grading Plan

Appendix G

Electronic Files:

- PDF of Report
- DDMSW DM 19 Existing & Proposed ZIP files,
- Existing & Proposed 2-year, 10-year & 100-year HEC-1 Files
- Existing & Proposed Galloway Wash & Wash A HEC-RAS Files

EXHIBITS

Exhibit 1	Vicinity Map
Exhibit 2	ESL Classification Map
Exhibit 3	Flood Insurance Rate Map (FIRM)
Exhibit 4	Soils Classification Map
Exhibit 5	Aerial Map
Exhibit 6	Developed Conditions Land Use Map
Exhibit 7	Existing Conditions Sub-Basin HEC-1 Map
Exhibit 8	Developed Conditions Sub-Basin HEC-1 Map
Exhibit 9	Existing Conditions Hydraulics Map
Exhibit 10	Developed Conditions Hydraulics Map
Exhibit 11	Preliminary Grading Plan



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1.0 INTRODUCTION

1.1 Project Description

Desert Mountain Parcel 19 (DM 19), herein referred to as the "Site", is an approximate 92-acre parcel of land located in north Scottsdale and is zoned R4 and OS (Open Space). The Site is located in Section 31, Township 6 North, Range 5 East, of the Gila and Salt River Base and Meridian. The Site is currently an undeveloped parcel, bound to the west by Pima Road and the Carefree Fore More Development (located within the Town of Carefree), to the east by the Desert Mountain Club Golf Course, to the north by the Gambel Quail Preserve 2 Development (both located in the City of Scottsdale), and to the south and southeast by the Velvet Shadows 3 Development and two churches (Christ the Lord Lutheran Church and Our Lady of Joy Roman Catholic Church; all within the Town of Carefree). The Site was originally part of the Desert Mountain Master Development Plan. Exhibit 1 – *Vicinity Map* shows the general location of the project and surrounding areas.

1.2 Type of Report

This Report is being prepared to support the DM 19 Preliminary Grading Plan and, as requested by the City of Scottsdale, is a 90% complete Preliminary Drainage Report. As documented within the Preliminary Grading Plan, a preliminary grading design which includes roadways and a golf course has been completed for the Site.

1.3 Purpose

The Preliminary Drainage Report for DM 19 has been prepared to meet the drainage design requirements outlined in Chapter 4 of the *City of Scottsdale Design Standards and Policies Manual (DS&PM)*, the *Flood Control District of Maricopa County (FCDMC)*, *Drainage Design Manual for Maricopa County, Arizona: Volume I – Hydrology*, and the *Flood Control District of Maricopa County, Drainage Design Manual for Maricopa County, Arizona: Volume II – Hydraulics*. This report presents the results of the hydrological and hydraulic modeling of the Site's proposed preliminary drainage systems.

The main purpose of this Report is to illustrate the following:

- Compliance with the City of Scottsdale's Floodplain Ordinance stormwater storage requirements for the property subject to the Environmentally Sensitive Land Ordinance (ESLO). The Site will provide the first flush stormwater storage for the first 0.5-inch of runoff and/or first flush treatment for the property's improved areas.
- Reduction of post-development flows to at or below the pre-development flows for 2-year, 10-year, and 100-year, 6-hour storm events using the *U.S. Army Corps of Engineers, HEC-1, Flood Hydrograph Package*. Hence, it is anticipated that the downstream properties shall be provided with similar or potentially better flood protection than the pre-development conditions.
- Maintaining the two main water courses traversing through the Site in their natural locations (the Galloway Wash and Wash A).
- Delineation of the pre- and post-development 100-year water surface inundation extents, along with determination of the 100-year water surface elevations for the two main drainage courses using the *U.S. Army Corps of Engineers, HEC-RAS (Version 5.3.0)*.
- Delineation of the 100-year water surface inundation extents for any on-site washes determined to have peak flows equal to or greater than 50 cfs using hydraulic analysis software such as Bentley *FlowMaster (Version 8i)*.
- Hydraulic analyses of the major preliminary drainage structures and two wash conveyance corridors which includes two off-line detention basins located along the Galloway Wash approximately 0.1 and 0.4 miles upstream of the Site.

2.0 EXISTING ON-SITE DRAINAGE CONDITIONS AND CHARACTERISTICS

2.1 On-Site Drainage

The Site lies in the northern planning section of the City of Scottsdale. The elevations range from 2,612 in the middle of the Site, to 2,650 feet in the east and 2,587 feet in the west. Based on the existing topography, the Site drains primarily from east to west with an approximate average slope of 2%. There are two primary outflow concentration points, one located at the northwest corner and one at the center of the western property boundary. There are several additional minor outflow concentration points along the southern and western property boundary.

Vegetation is typical Sonoran Desert type with creosote bush, jumping cholla, saguaro cacti, palo verde, ironwood, and mesquite trees. The Site lies within the areas identified as Environmentally Sensitive Lands (ESL) by the City of Scottsdale. The Site is further classified as 'Upper Desert' within the ESL areas as shown on Exhibit 2 – *ESL Classification Map*.

The USDA Natural Resources Conservation Service (NRCS), formerly known as the Soil Conservation Service (SCS), provides soils data for all of Maricopa County. This data is reproduced on Exhibit 4 – *Soils Classification Map*. Soils data is the basis of the rainfall loss parameters, as discussed in Section 5.2.3.

There is one wash, the Galloway Wash, that traverses the Site and is categorized as a 'Vista Corridor' or 'Major Wash', as the calculated 100-year, 6-hour flow is greater than 750 cfs. There is also one other significant watercourse traversing the Site that has a 100-year, 6-hour flow greater than 400 cfs and is referred to as "Wash A". The Galloway Wash and Wash A are identified on Exhibit 9 – *Existing Conditions Hydraulics Map*. Wash A was determined to have a 100-year flow of approximately 470 cfs. Both washes will be maintained in their natural locations and will not be re-aligned.

2.2 Existing On-Site Drainage Network

Existing on-site drainage sub-basin boundaries were identified using aerial mapped 1-foot contours; refer to Exhibit 7 – *Existing Conditions Sub-Basin HEC-1 Map*.

The on-site watersheds primarily drain east to west or southwest with only one wash with a 100-year peak flow greater than 50 cfs exiting the property along the southern boundary. This wash appears to enter the Velvet Shadows 3 Development and continues west combining with some additional runoff from the Site before flowing through the Our Lady of Joy Roman Catholic Parish Carefree church parking lot and ultimately over Pima Road by an at-grade drainage crossing. The flow exiting the Site has an estimated existing 100-year peak flow of 66 cfs.

Based on the results of the wash hydraulic analysis, a delineation of this wash's existing condition 100-year, 6-hour floodplain limits has been illustrated on Exhibit 9 – *Existing Conditions Hydraulic Map*. Pre-development sub-critical flow water surface elevations for each cross-section are included on Exhibit 9. The hydrologic and hydraulic analysis procedures are discussed in Section 5.0.

2.3 Off-Site Watersheds

The off-site drainage areas impacting the Site lay to the east and are in the northern planning section of the City of Scottsdale. The off-site watersheds contain primarily large rural lot single family residential subdivisions and are part of the Desert Mountain Master Development Plan community. These drainage areas are identified on Exhibit 7. The off-site areas are also classified as 'Upper Desert' ESL landform areas by the City of Scottsdale.

2.4 Existing Off-Site Drainage Network

The *Floodplain Delineation Study of Andora Hills & Galloway Washes Technical Data Notebook* (TDN), the *Master Drainage Report for Desert Mountain Parcel C Offsite Drainage Map*, the *Master Drainage Report for Desert Mountain Development Master Development Plan exhibit*, City of Scottsdale 2-foot contour interval topographic Quarter Section Maps and a visit to the Site were used to identify, confirm and/or update the off-site drainage areas impacting the Site. Refer to Exhibit 7 for the limits of the drainage areas and concentration points.

Off-site flows from the east enter the Site's eastern property boundary at four locations. Four of the concentration points are washes with 100-year peak discharges greater than 50 cfs and one location has a discharge of only 3 cfs. Starting at the northeast property

boundary and continuing south, the washes' approximate 100-year peak flows were determined to be: Wash A's flow is 460 cfs, one unnamed wash's flow is 72 cfs, and the Galloway Wash is 1,245 cfs.

Based on the results of the hydraulic wash analyses, a delineation of the existing condition 100-year, 6-hour floodplain limits for the Galloway Wash, Wash A and the unnamed wash have been illustrated on Exhibit 9 – *Exist Condition Hydraulics Map*. Pre-development subcritical flow water surface elevations for each cross-section are included on Exhibit 9. The hydrologic and hydraulic analysis procedures are discussed in Section 5.0.

2.5 Existing Drainage Relative to Adjacent Projects

Existing flows exit the Site at various concentration points located along the western and southern property boundary. As Wash A exits the Site it immediately combines with additional flow from the north and is conveyed over Pima Road by an at-grade drainage crossing. The Galloway Wash is also conveyed over Pima Road by an at-grade drainage crossing and the preliminary hydraulic results determined that the depth of flow over Pima Road is greater than one (1) foot. As detailed within the *Floodplain Delineation Study of Andora Hills & Galloway Washes* TDN, when the flow leaves Pima Road it splits around the existing single-family residence before recombining downstream and continuing to the west.

There are an additional six (6) concentrated flow exit locations along the western property boundary and three (3) concentrated flow exit locations along the southern property boundary. These 100-year peak flows vary from a maximum discharge of 66 cfs to only 4 cfs. Refer to Exhibit 7 for the exiting concentration point locations and discharges.

There is also a small piece of the Site that is not within the City of Scottsdale and is located at the southeast corner of the property. This portion of the Site is located within the Town of Carefree and also has two existing concentration points that exit the Site to the west.

2.6 FEMA Regulated Flood Zones

The Site is located within the Flood Insurance Rate Map (FIRM) for Maricopa County, Arizona and Incorporated Areas, Panel Number 04013C0884L, effective date October 16, 2013. The FIRM, published by the Federal Emergency Management Agency (FEMA), indicates that the Site is located within Special Flood Hazard Areas (SFHAs) Zone AE, Other Flood Areas Zone "X" (Shaded) and Other Areas Zone "X".

Zone "X" is defined by FEMA as follows:

"Areas determined to be outside 500-year floodplain."

Zone "X (Shaded)" is defined by FEMA as follows:

"Areas of 0.2% annual chance flood; areas of 1% annual chance flood with average depths of less than 1 foot or with drainage areas less than 1 square mile; and areas protected by levees from 1% annual chance floods."

Special Flood Hazard Areas (SFHAs) Subject To Inundation By the 1% Annual Chance Flood is defined as follows:

"The 1% annual chance flood (100-year flood), also known as the base flood, is the flood that has a 1% chance of being equaled or exceeded in any given year. The Special Flood Hazard Areas is the area subject to flooding by the 1% annual chance flood. Areas of Special Flood Hazard include Zones A, AE AH, AO, AR, A99, V and VE. The Base Flood Elevation is the water-surface elevation of the 1% annual chance flood."

Zone "AE" is defined as: *"Base Flood Elevations determined"*.

The approximate location of the Site relative to the FEMA FIRM panel is illustrated on Exhibit 3- *Flood Insurance Rate Map (FIRM)*.

The proposed Site's development will not alter the effective FEMA SFHA floodplain and/or floodway delineations. As can be seen from the results of the Galloway Wash

preliminary pre- and post-development hydraulic analyses included within Appendix D – *Hydraulic Calculations* and as detailed on the following table, the Site’s improvements do not increase the effective FEMA SFHA base flood elevations (BFEs). This will be documented in more detail as the Site progresses into the development phase.

GALLOWAY WASH FEMA BFEs COMPARISON				
Subcritical Flow Regime				
Cross Section ID	FEMA CS ID	Existing Conditions WSE	Developed Conditions WSE	Difference in WSE
1447	4.832	2611.02	2610.04	-0.98
1257	4.796	2606.31	2605.99	-0.32
1119	4.77	2603.94	2603.16	-0.78
918	4.732	2598.77	2598.48	-0.29
716	4.694	2594.02	2593.72	-0.30
518	4.656	2587.69	2587.55	-0.14
317	4.639	2584.88	2584.70	-0.18
197	4.618	2581.25	2581.00	-0.25
0	4.581	2576.05	2575.79	-0.26

3.0 PROPOSED DRAINAGE PLAN

3.1 General Description of Proposed Drainage System

The Site has been rezoned to approximately 44-acres of R4 zoning and approximately 48-acres of Open Space zoning. Preliminary site grading is shown on Exhibit 11 – *Preliminary Grading Plan*. The proposed drainage system is being designed to allow existing drainage patterns to be maintained in their natural location and condition where possible. Where the proposed development will disturb existing washes with 100-year peak discharges equal to or greater than 50 cfs, the washes will be modified to re-direct flow around and/or through the development to maintain historical flow patterns.

The off-site flow of the Galloway Wash will be conveyed through the Site with as little disturbance to the natural wash corridor as possible. The Galloway Wash will have two (2) proposed 3-barrel, 10-foot wide by 5-foot high box culvert roadway drainage crossings to pass the 100-year discharge under the streets without any backwater conditions occurring within the wash upstream of the roadways. One crossing is located near the eastern property boundary and one crossing is located within the middle of the Site. There is no anticipated disturbance to the Galloway Wash natural wash bottom between these proposed drainage crossings. Downstream of the middle box culvert roadway crossing to approximately 200-feet upstream of the western property boundary, the Galloway Wash will have a relatively small pilot shotcrete conveyance corridor (10-foot wide by 1-foot deep) to offset open space encroachment grading proposed within the existing FEMA SHFA. Any grading proposed within the existing FEMA 100-year floodplain will require an FCDMC floodplain use permit.

The off-site flow of Wash A will be conveyed through the Site. The post-development design is not anticipated to disturb the existing natural wash corridor. In addition, any post-development grading adjacent to the wash will have bank protection and is being designed to drain away from Wash A. Therefore, there is no anticipated modification to the wash and there was no increase to the existing 100-year peak flow of Wash A due to development.

3.2 Future Conditions

Currently, the majority of the upstream off-site watersheds located within Desert Mountain have been fully developed. The Desert Mountain development land uses were obtained from the *Floodplain Delineation Study of Andora Hills & Galloway Washes* TDN. Wood/Patel independently conducted a Site visit and with the addition of recent aerial photography of the upstream watersheds, has updated the HEC-1 hydrology model to more accurately represent the current development conditions. As a result, the size of the upstream watershed of the Galloway Wash has increased in size by approximately 60 acres and the degree of development density has also increased. The impact of these hydrologic changes has resulted in the Galloway Wash peak 100-year discharge increasing from the previous Preliminary Drainage Report from approximately 1,124 cfs to 1,260 cfs.

The drainage plan for the Site proposes to maintain the 2-year, 10-year, and 100-year, 6-hour storm event post-development peak discharges at or below the pre-development flows. In addition, the two significant drainage courses, Wash A and the Galloway Wash, will be maintained in their historic locations at the property boundary. No adverse impact is anticipated on the adjacent properties downstream of the project Site for the 2-year, 10-year, and 100-year, 6-hour storm events.

3.3 Stormwater Storage Requirements

According to the City of Scottsdale's Floodplain Ordinance for property located within the ESL, all runoff generated from the developed portion of the Site must be managed, and the peak discharges from the Site reduced to at least pre-development values during the 100-year, 10-year and 2-year storm frequencies. Proposed stormwater storage basins will be strategically located along several exiting flow locations and along the Galloway Wash which will attenuate the post-development peak discharges to at or below the pre-development values. Stormwater storage basins will also be designed to intercept flow from upstream proposed developed areas to retain the post-development required first flush retention volume and/or flow will be treated prior to exiting into the adjacent washes. 18-inch bleed-off pipes with removable 6-inch (or 9-inch) orifice plates are proposed for the dissipation of the detained/retained storm water.

Table 3.3 below summarizes the required first flush stormwater storage for the Site and Exhibit 8 and Exhibit 11 detail the on-site drainage areas and stormwater storage basin locations, respectively.

**Table 3.3
Required First Flush Stormwater Storage**

Drainage Area	Area (SF)	Area (ac)	Weighted Runoff Coefficient	First Flush Volume (ac-ft)	Basin Volume Provided (ac-ft)
B5	91661	2.10	1.00	0.09	Basin B5
TOTAL				0.09	0.10
B6	97738	2.24	1.00	0.09	Basin B6
TOTAL				0.09	0.62
B7	118168	2.71	1.00	0.11	Basin B7
TOTAL				0.11	0.31
B8	506941	11.64	1.00	0.48	Basin B8
B13	33440	0.77	1.00	0.03	
TOTAL				0.51	1.37
B9	34783	0.80	1.00	0.03	Basin B9 & B10
B10	653492	15.00	1.00	0.63	
TOTAL				0.66	1.99
B16	26198	0.60	1.00	0.03	Basin B16
TOTAL				0.03	0.39
B11	64650	1.48	1.00	0.06	Basin B18
B12	67749	1.56	1.00	0.06	
B14	75437	1.73	1.00	0.07	
B15	73089	1.68	1.00	0.07	
B17	16495	0.38	1.00	0.02	
B18	83765	1.92	1.00	0.08	
TOTAL				0.36	0.61
C2	347647	7.98	1.00	0.33	Basins C2, C2.1, C3, C3.1, C3A
C3	43513	1.00	1.00	0.04	
C3A	81060	1.86	1.00	0.08	
C4	136978	3.14	1.00	0.13	
C9	101013	2.32	1.00	0.10	
C10	67586	1.55	1.00	0.06	
TOTAL				0.74	3.19
C1	278495	6.39	1.00	0.27	Basin C1
C5	97132	2.23	1.00	0.09	
C6	12194	0.28	1.00	0.01	
C7	39250	0.90	1.00	0.04	
C8	77852	1.79	1.00	0.07	
TOTAL				0.48	1.57

3.4 Pre- and Post-Runoff Characteristics

The U.S. Army Corps of Engineers' HEC-1 computer program was used for hydrologic modeling, including routing of flow through storage basins and combining hydrographs. The HEC-1 model was also used to compare the pre- and post-development runoff at concentration points exiting the property. Runoff for each drainage sub-basin was computed and if required, hydrographs were then combined. Drainage basins were further divided into sub-basins to simulate the developed conditions. The parameters were selected per the guidelines provided in the *DS&PM*. The parameters selected and the inputs for the HEC-1 models are discussed in Section 5.1.

The HEC-1 input data and output files for the existing conditions are included in Appendix A. The developed conditions data is included in Appendix B. The data analysis procedures are discussed in Section 5.0.

Table 3.4-1 below provides the comparative peak flows for the pre- vs. post-developed conditions for 100-year, 10-year, and 2-year, 6-hour events at concentration point where flow leaves the property. For the location of these concentration points and corresponding 100-year, 6-hour flow values, refer to Exhibit 7 and Exhibit 8.

Table 3.4-1: Pre – vs. Post-Peak Flow Analysis

HEC-1 ID PRE/POST	100-yr, 6-hr Existing Condition Peak Flow (cfs)	100-yr, 6-hr Post- Dev. Condition Peak Flow (cfs)	100-yr, 6-hr Difference in Peak Flow (cfs)	10-yr, 6-hr Existing Condition Peak Flow (cfs)	10-yr, 6-hr Post- Dev. Condition Peak Flow (cfs)	10-yr, 6-hr Difference in Peak Flow (cfs)	2-yr, 6-hr Existing Condition Peak Flow (cfs)	2-yr, 6-hr Post-Dev. Condition Peak Flow (cfs)	2-yr, 6-hr Difference in Peak Flow (cfs)
CP-A2/CP-A2	472	460	-12	265	258	-7	137	132	-5
B1	36	0	-36	21	0	-21	10	0	-10
C1	26	0	-26	15	0	-15	7	0	-7
D1	7	0	-7	4	0	-4	2	0	-2
CP- E5/CPGAL	1260	1075	-185	639	633	-6	291	288	-3
F1	4	0	-4	2	0	-2	1	0	-1
G1/G1	7	3	-4	14	2	-12	8	1	-7
H1/H1	17	7	-10	10	4	-6	6	2	-4
I1/DETC3A	20	2	-18	12	1	-11	6	1	-5
J1	11	0	-11	6	0	-6	3	0	-3
K1/DETC1	66	4	-62	39	3	-36	21	2	-19
L1/L1	10	7	-3	6	4	-2	3	2	-1
M1/M1	3	3	0	2	2	0	1	1	0

3.5 Proposed Drainage Structures

3.5.1 On-site First Flush Storage Basins

On-site first flush storage basins will be used to capture the first 0.5-inch of runoff from the post-development disturbed areas. The design of the basins will be at a maximum depth of 3-feet and have 4:1 side slopes. 18-inch bleed-off pipes with 6-inch or 9-inch orifice plates will be used to drain the stormwater storage within a 36-hour period. Outlet weirs will be incorporated into the basin design for overflow conveyance. When the capacity of the basin is reached, the runoff will overtop the weir and be released at historic flow locations. Erosion protection will be incorporated within the design of the outlets.

3.5.2 Off-Site Galloway Wash Detention Basins

As detailed on Exhibit 11, there are two off-site off-line detention basins (Basin B4 and Basin B4A) proposed along the Galloway Wash. The two off-site off-line detention basins each will require approximately 300 linear feet of improved grouted riprap channel sections and erosion protected weir inlets to remove a portion of the 100-year peak flow from the wash. The runoff will enter the detention basin through lateral weirs between 50-feet and 75-feet in length and pond a maximum depth of 4-feet during the 100-year event. Basin B4 and B4A will have a 24-inch and 30-inch outflow pipe, respectively, that will detain the flow and drain the basin within a few hours. The proposed detention basins will have storage volume capacities of approximately 2.6 acre-feet (Basin B4) and 2.5 acre-feet (Basin B4A). Contractual agreements are being prepared with the upstream land owners to allow for the construction and maintenance of these off-line detention basins.

The two off-line detention basins were included in the post-development HEC-1 model. The hydrology results can be found within Appendix B. The Galloway Wash was hydraulically modeled within a mixed hydraulic regime due to the supercritical nature of the wash and the results are located within Appendix C.

3.5.3 Roadway Crossing Structures

There are currently two (2) proposed on-site roadway drainage crossing structures that have been designed to convey the anticipated post-development

100-year flow of the Galloway Wash. The flows were calculated at the box culvert locations using the results of the post-development HEC-1 model analysis. Refer to Appendix B for the flow calculations.

Both crossing locations will be designed with a 3-barrel, 10-foot wide by 5-foot high box culvert roadway drainage crossing. The roadway crossings were analyzed within the wash's hydraulic analysis using the U.S. Army Corps of Engineers *HEC-RAS (Version 5.0.3)*, such that the estimated upstream 100-year peak flow is contained within the wash and no backwatering of the flow before the roadway is anticipated. The box culverts will be designed with longitudinal slopes such that sediment deposition is not anticipated within the culverts.

Grouted rock riprap and/or erosion protection will be designed at the inlets and outlets of the box culverts to control velocities and prevent erosion. In several critical locations along the wash, bank protection is necessary to protect the proposed roadway improvements. The bank protection shall extend to a maximum calculated scour depth of 5 feet below the wash bottom. Refer to Exhibit 10 for bank protection locations and Appendix D for scour depth calculations.

For the Galloway Wash and Wash A Pima Road at-grade drainage crossings, sill scour analyses and an exhibit detailing the limits and required cut-off wall lengths and depths has been included within Appendix D.

3.5.4 On-site Roadway Drainage Structures

3.5.4.1 Street Flow

The Rational Method will be used to calculate the storm water runoff generated from the roadways and any on-site adjacent developments that drain into the residential roadways. The 100-year and 10-year flow will be calculated for the street flow based on the FCDMC Rational Method, as discussed in Section 5.1.3.

3.5.4.2 Street Capacity Hydraulics

There are no anticipated arterial, major and/or minor collector roadways proposed within the development. For all local interior streets, the street conveyance capacity will be calculated using Manning's Equation. The streets will be designed such that the 10-year peak flow is contained within the street curbs and the 100-year peak flow does not exceed a maximum depth of 8-inches. A Manning's "n" value of 0.015 will be used for the standard street cross-section. Roadway capacities will be calculated based on 4-inch and/or 6-inch roll curb (where necessary). The drainage for local residential roadways will be designed consistent with the City of Scottsdale Ordinance 37-42(4) for the allowable depth of water on the street when the street is being utilized as a water carrier. The methodology developed by the Federal Highway Administration will be used to calculate, in spreadsheet format, the allowable street cross-section capacities.

3.5.4.3 Curb Openings

Catch basins, scuppers and/or depressed curb openings will be designed to convey runoff from the streets such that street flow depths do not exceed 8-inches for the 100-year flow, and the 10-year flow is contained within the curbs. On-site storm water runoff generated by the residential roadways is planned to exit the street via on-grade and/or low point sump curb openings. Flow will then be directed within storm drain, roadside drainage swales and/or along natural grade to the closest receiving wash, retention basin, and/or culvert inlet. All scupper and catch basin curb openings will be designed to include a 0.80 reduction factor.

4.0 SPECIAL CONDITIONS

4.1 Section 404 Washes

To the best of our knowledge, the US Army Corps of Engineers (Corps) Section 404 of the Clean Water Act (CWA) Jurisdictional Waters of the United States has not yet been determined within the Site. Potential CWA Section 404 Jurisdictional Washes are under investigation and an approved jurisdictional determination submittal inclusive of a significant nexus analysis has been prepared for the Site by Del Sol Group to identify if any of the washes may be deemed jurisdictional. It is understood that an approved jurisdictional delineation of the Waters of the United States is required for the Site.

5.0 DATA ANALYSIS METHODS

5.1 Hydrologic Method Description

This section documents the engineering procedures and methodologies used to generate the existing and developed condition hydrologic models for the Site. The results of the hydrologic models were used in the conceptual design of drainage facilities and to assure compliance with current drainage design standards.

Precipitation was input by use of the FCDMC 6-hour local storm. Key rainfall statistics were obtained from the *NOAA Atlas 14*, Arizona. The FCDMC DDMSW program was used to develop the necessary point rainfall depth-duration-frequency statistics. Table 5.1 below provides a summary of the point rainfall depth-duration-frequency data. Rainfall losses were calculated by use of the Green and Ampt infiltration equation with an allowance for surface retention loss. Synthetic unit hydrographs for each sub-basin were developed using the Phoenix Desert/Rangeland unit hydrograph as was used within the approved *Floodplain Delineation Study of Andora Hills & Galloway Washes* TDN. Existing and proposed discharges for the 100-year, 10-year and 2-year, 6-hour storm events were modeled using HEC-1 at various concentration points as shown on Exhibit 7 and Exhibit 8, respectively. The HEC-1 results are provided within Appendix A and Appendix B for the existing and proposed condition watersheds, respectively.

Table 5.1
Point Rainfall Depth-Duration-Frequency Data

Frequency→	2-year	5-year	10-year	25-year	50-year	100-year
Duration↓	Rainfall (in)					
5 min	0.33	0.44	0.53	0.64	0.73	0.82
10 min	0.50	0.67	0.80	0.98	1.11	1.24
15 min	0.62	0.83	1.00	1.21	1.37	1.54
30 min	0.83	1.12	1.34	1.63	1.85	2.07
1 hour	1.03	1.39	1.66	2.02	2.29	2.56
2 hour	1.19	1.57	1.87	2.27	2.58	2.90
3 hour	1.26	1.64	1.94	2.36	2.70	3.04
6 hour	1.48	1.87	2.18	2.62	2.96	3.31
12 hour	1.78	2.23	2.59	3.08	3.45	3.84
24 hour	2.08	2.73	3.27	4.02	4.65	5.32

5.2 Parameter Estimation

The physical parameters of the sub-basins modeled by HEC-1 were estimated by the procedures in the *FCDMC Hydrology Manual*. The information and procedures used to estimate the aforementioned parameters are contained in the following sections. Parameter values are summarized for each sub-basin within the *FCDMC Drainage Design Management System for Windows* (DDMSW) software output located in Appendices A and Appendix B, for the existing and proposed conditions, respectively.

5.2.1 Drainage Area

For the existing conditions, the sub-basin drainage areas were determined for use in the HEC-1 model and are shown on Exhibit 7. For the proposed condition, the sub-basin drainage areas were determined for use in the HEC-1 model and are shown on Exhibit 8.

5.2.2 Precipitation

Due to the approximate one square mile size of the largest contributing watershed of the Galloway Wash, the 100-year, 6-hour storm frequency was used for the hydrology analysis. Rainfall distributions based on watershed area are furnished by the FCDMC. The contributing watershed area and corresponding precipitation pattern were determined and input into the HEC-1 model using the JD and PC record option.

Point precipitation values used in this study were derived from the isopluvial maps in the *FCDMC Hydrology Manual* which, in turn, were derived from the *NOAA Atlas XIV, Volume III*. The 100-year, 6-hour point rainfall depth used for the Site is 3.31 inches.

5.2.3 Soil Data

A description of the soils in the watershed is contained within the *NRCS Soil Survey of Aguila-Carefree Area, Parts of Maricopa and Pinal Counties, Arizona*. Based on the NRCS surveys, the Site's watersheds lie mainly within several soil

map units: Unit 93, 96, 34 and for the Galloway Wash Unit 6, with the upstream watersheds consisting of primarily Unit 33. According to the soil survey, the soil surface is primarily *gravely clay and sandy loam*. Exhibit 4 – *Soils Classification Map* depicts the contributing watersheds and soil designations.

5.2.4 Rainfall Losses

Rainfall losses were estimated using the Green and Ampt infiltration equation. The procedures used are described in the following paragraphs and were utilized for both existing and proposed condition HEC-1 modeling.

The composite (unadjusted) XKSAT parameter was calculated in the *FCDMC DDMSW* program using the log-average method for each sub-basin. This was accomplished by multiplying the total area of each soil map unit in the sub-basin by the common logarithm of the associated XKSAT value. The resultant products were then totaled and the sum was divided by the total area of the sub-basin. The result is the composite log-average bare ground XKSAT parameter. The log-average XKSAT parameter was then adjusted for the effects of vegetation cover using data from Figure 4.4 of the *FCDMC Hydrology Manual*. The volumetric soil moisture deficit at the start of rainfall (DTHETA) and wetting front capillary suction (PSIF) parameters are directly related to the composite bare ground hydraulic conductivity (XKSAT) by Figure 4.3 in the *FCDMC Hydrology Manual*.

The DTHETA parameters were read from lookup tables within the DDMSW program using the unadjusted XKSAT value calculated as described above. Two (2) DTHETA conditions are possible, dry and normal. The "dry" condition was used for all areas in the existing condition model for undeveloped desert areas only. The "normal" condition was used for all other land uses occurring within the project watershed for the proposed condition model. DTHETA values were read from the lookup tables corresponding to the unadjusted XKSAT value, and were averaged by land use area-weighting within the DDMSW program. The value of PSIF was also read from lookup tables based on the unadjusted XKSAT value.

Initial abstraction (IA) and percent impervious (RTIMP) values correlate to soil types and land use. The following section further discusses the hydrologic significance of the IA and RTIMP parameters.

5.2.5 Land Use Characteristics

Land use characteristics upstream of the study area were originally obtained from the *Floodplain Delineation Study of Andora Hills & Galloway Washes* TDN and were then updated by field visits and aerial photographs. Surface characteristics affecting the hydrology include terrain (land use classification), the proportion of impervious surfaces, and vegetative cover density. DDMSW values for initial abstraction (IA), percent impervious (RTIMP) were obtained from the FCDMC Hydrology Manual. The *Floodplain Delineation Study of Andora Hills & Galloway Washes* TDN was used to estimate the hydraulic efficiency (Kn) for the *Rural Density Residential* land use parameters. Assigned values for all parameters are shown in Appendices A and Appendix B for existing and proposed land use conditions, respectively.

5.2.6 Unit Hydrographs

To be consistent with the approved *Floodplain Delineation Study of Andora Hills & Galloway Washes* TDN, the *FCDMC Hydrology Manual* Phoenix Desert/Rangeland unit hydrograph was used for watersheds upstream of the Site and for the undeveloped on-site areas. The Phoenix Valley S-graph unit hydrograph was used for the post-development on-site conditions. Separate unit hydrographs are generated for each sub-basin by the use of the DDMSW program. This program calculates the basin lag time. Assigned values for all parameters are shown within the printouts of the FCDMC DDMSW located within Appendix A and Appendix B for the existing and proposed conditions, respectively.

5.2.7 Computation Time Interval

The computation time interval (NMIN) used in the HEC-1 models was based on guidelines in the *FCDMC Hydrology Manual*, which recommends an NMIN value of $0.15 * T_c$. Due to the small post-development on-site watershed areas, a

minimum NMIN value of 1 minute was used and a 15-minute hydrograph time interval was used for the entire study area. For comparison purposes, a 1-minute NMIN value and a 15-minute hydrograph time interval was also used for the existing condition model.

5.2.8 Routing Parameters

Routing of sub-basin hydrographs in the study area were performed utilizing the normal depth/storage channel routing option of HEC-1.

5.2 Rational Method

The Rational Method will be used to compute peak discharges to size on-site culverts with watersheds less than or equal to 160 acres. Parameters necessary for this procedure are the measurement of drainage sub-basin areas, runoff coefficient ("C" values), and calculation of rainfall intensity. Runoff coefficients will be calculated using the values based on Figure 4-5 "Runoff Coefficients for Use with Rational Method" in the *DS&PM*.

5.3 Storm Water Storage

Based on the City of Scottsdale's Drainage Ordinance stormwater storage requirements, on-site first flush storm water storage is proposed to be provided for the first 0.5-inch of runoff. The Rational Method is used to estimate the first flush stormwater storage volumes. The required volume is based on the areas of the proposed disturbances within the development. The equations used to calculate the required and provided retention volumes are presented below.

5.3.1 Required Stormwater Storage Volume

Stormwater storage volume required for the 100-year, 2-hour event is:

$$V_{\text{REQUIRED}} = C * \left(\frac{P}{12} \right) * A$$

Where:

- V is the required stormwater storage volume in acre-feet.
- C is the weighted "C" coefficient.
- P is the precipitation in inches for the 100-year, 2-hour rainfall; 2.70- inches for the proposed developed areas.
- A is the drainage area in acres.

5.3.2 Provided Stormwater Storage Volume

Stormwater storage volume provided for the 100-year, 2-hour event is:

$$V_{PROVIDED} = \left[\left(\frac{A_1 + A_2}{2} \right) * (ELEV_2 - ELEV_1) \right]$$

Where:

- V is the provided retention volume in acre-feet.
- A is the contour area in acres.
- ELEV is the contour elevation.

Section 3.3 of this Report describes the preliminary storm water storage proposed basin locations. Assumptions that were made when determining provided volume were maximum side slopes of 4:1. Refer to stormwater storage basin volume calculations in Appendix C.

As a result of the drainage requirement to decrease the post-development discharges to pre-development discharges for flows leaving the Site, stormwater storage basins were including throughout the Site's open space areas. As such, a comparison of the 100-year, 2-hour stormwater storage determined for the developed areas (10.7 acre-feet) and the 100-year, 2-hour provided within the stormwater storage basins (10.5 acre-feet) has been conducted and as can be seen within Appendix C, the proposed Site's stormwater storage basins successfully store almost all of the 100-year, 2- hour stormwater runoff from the majority of the developed areas of the Site.

5.4 Hydraulic Procedures

5.4.1 Hydraulic Analysis of Open Channels

Due to the fact that the Galloway Wash and Wash A have significant 100-year peak flows, the U.S. Army Corps of Engineers' HEC-RAS computer program was used for the hydraulic analysis of both washes. Washes that were determined to be less than a 100-year peak flow of 150 cfs used Bentley *FlowMaster* (Version V8i) hydraulic analysis software to determine their existing wash hydraulic conditions.

5.4.2 HEC-RAS Errors, Warnings, and Notes

The HEC-RAS cross sections were placed such that significant variations in the channel cross-sectional geometry are adequately represented. Due to the relatively steep slopes on the Site, it was not feasible to put enough cross-sections such that the difference in energy grade elevations is less than 1-foot between cross sections. The HEC-RAS computer program gives a warning message for a difference in energy grade elevation of greater than 1-foot between cross sections. Hence, a wash was analyzed at an elevation difference of 1-foot to demonstrate the impact of additional cross sections on the HEC-RAS analysis. It was found that increasing the number of cross-sections did not impact the flow depths, as long as adequate cross-sections representative of the geometry of the channel are included.

HEC-RAS gives multiple warning messages when the energy equation could not be balanced, resulting in the program using the critical depth for the water surface elevation. This is due to the fact that a sub-critical flow regime is required for the steady flow computations on a site regardless of the relatively steep slopes. The on-site washes are flowing super-critical, but a sub-critical flow regime was chosen because it results in the highest water surface elevations. A mixed flow condition was used within the design of the bank and erosion protection as well as for the design of the off-line upstream lateral weir detention basins.

Since the proposed culverts generally follow the same slope as the washes, the flow in the culverts is also flowing super-critical, as noted by HEC-RAS with a note for each culvert within the model. These warnings and notes are expected when running sub-critical flow regimes for a steady flow analysis on steep slopes.

HEC-RAS gives a warning message when the upstream conveyance ratio divided by the downstream conveyance ratio is less than 0.7 or greater than 1.4. Again, this is a result of the steep slopes on the Site, and it was not feasible to put enough cross-sections such that the difference in the conveyance ratio is less than 0.7 or greater than 1.4.

There are a number of warning messages generated by the HEC-RAS computer program for the hydraulic analysis of the project. These warnings do not affect the accuracy of the results and are intended to alert the user of any conditions outside of the expected norm. These warning messages, and notes for both the Developed Conditions and the Existing Conditions models were ignored, and the model was determined to be acceptable.

5.4.3 Hydraulic Analysis of Culverts

For analysis of anticipated additional culvert roadway crossings, the computer programs AutoCad Civil 3D *Hydroflow* (Version 10.5), CulvertMaster and/or HY-8 will be used for final design. Site characteristics and flow are entered into the program and the resulting pipe sizes, flow regime, headwater and tailwater values are calculated.

6.0 DRAINAGE PLAN REQUIREMENTS

6.1 Drainage System Requirements

The Site was rezoned to approximately 44-acres of R4 zoning and approximately 48-acres of Open Space (OS) zoning. There are specific drainage system requirements in order for the proposed drainage design to be approved for the Site by the City of Scottsdale and are as follows:

1. According to the City of Scottsdale's Floodplain Ordinance for property located within the ESL, storm water storage may be waived under certain conditions and peak discharges from the Site reduced to at least pre-development values during the 100-year, 10-year and 2-year storm frequencies. In addition, the Site must either provide first-flush treatment and/or first-flush stormwater storage for the first 0.5-inch of runoff from the property's developed areas.
2. The proposed drainage system is being designed to allow existing drainage patterns to be maintained in their natural condition and location where possible. When the proposed development will disturb existing washes with peak 100-year discharges of 50 cfs or more, the washes will be modified to re-direct flow around and/or through the development to maintain historical flow patterns. If necessary, the development will obtain a Wash Modification approval from the City of Scottsdale.
3. Any proposed development encroachment into the FEMA FIRM SFHAs must obtain an FCDMC Floodplain Use Permit.
4. The determination of the CWA Section 404 Jurisdictional Washes for the Site must be approved by the U.S. Army Corps.
5. Before any construction activities that will disturb one or more acres begin, these activities must be authorized by ADEQ under the Arizona Pollutant Discharge Elimination System (AZPDES) Construction General Permit. The City of Scottsdale also requires evidence of compliance before issuing development permits.

6.2 Easement Requirements

Where flows from the 100-year storm event are greater than 50 cfs, drainage easements will be required around the limits of the 100-year floodplain inundation. In addition, drainage easements will also be dedicated around the limits of the 100-year ponding for the detention basins.

6.3 Roadway Crossing Requirements

In all cases, the depth of flow over streets will be in accordance with the City of Scottsdale Floodplain Ordinance and Design Standards & Policies Manual (2010).

6.4 Lowest Floor Elevations

Lowest floor (LF) elevations are to be a minimum of 12-inches above the highest adjacent 100-year water surface elevation and 14-inches above the low-site outfall. Lowest floor elevations on the grading and drainage plans for residential units reflect slab on grade conditions and cannot be lowered without agency approval in locations where 'Special Flood Hazard Areas' exist. In non-flood hazard locations, to ensure that adequate residential lot drainage can be achieved, a professional engineer should be consulted if the lowest floor elevation for the slab is proposed to be lowered, or if a basement is to be constructed.

6.5 Maintenance

Ongoing maintenance of the designed or recommended drainage systems is required to preserve the design integrity and purpose of the drainage system. Failure to provide maintenance can prevent the drainage system from performing to its intended design purpose and can result in reduced performance. Maintenance within the public right-of-way is the responsibility of the governing municipality. However, it is the responsibility of private developers, homeowner associations, etc. for facilities on private property within drainage easements and includes private streets. A regular maintenance program is required so that drainage systems perform to the level of protection or service as presented in this report and the project's plans and specifications.

Regular maintenance must be performed on detention/retention basins that are designed with sediment pools and/or are susceptible to wash sediment loads. Observation is required annually and after major storm events to monitor basin sediment load. Basins should be maintained and cleaned out in order for the drainage system to function properly.

6.6 Bank Protection

Scour protection shall be provided at all locations where the wash banks are being modified, where development is encroaching within the wash's erosion hazard setback limits and where it is necessary to protect proposed stormwater storage basins. The bank protection considered may be one of a variety of choices: integrally colored soil cement and/or reinforced shotcrete/concrete, seated grouted rock riprap and/or gabion baskets. Bank protection will be designed to extend to a maximum calculated scour depth of 5 feet below the wash bottom. Refer to Exhibit 10 - *Developed Condition Hydraulics Map* for bank protection locations, and Appendix D for scour depth calculations.

6.7 Erosion Protection

Culverts that convey flow beneath roadways are to incorporate erosion protection at both the inlet and the outlet of the structures to dissipate energy and provide flow line scour protection. Stormwater storage basins that utilize weir inlet and/or outlet structures will require erosion protection to prevent scour when flows overtops the weir. Bleed-off pipes will also incorporate riprap protection at pipe outlets.

7.0 CONCLUSIONS

1. The Site is located within the Flood Insurance Rate Map (FIRM) for Maricopa County, Arizona and Incorporated Areas, Panel Number 04013C0884L, effective date October 16, 2013 and is located within Special Flood Hazard Areas (SFHAs) Zone AE, Other Flood Areas Zone "X" (Shaded) and Other Areas Zone "X".
2. The proposed Site development will not alter the effective FEMA SFHA floodplain and/or floodway delineations and will not increase the effective FEMA SFHA base flood elevations. This will be documented in more detail as the Site progresses into the development phase.
3. The Galloway Wash and Wash 'A' will be maintained in their natural location and condition where possible and will not be re-aligned. Where disturbance is considered within the Galloway Wash, a Wash Modification approval is required from the City of Scottsdale.
4. According to the City of Scottsdale Environmentally Sensitive Land (ESL) maps, the Site is located within ESL Upper Desert.
5. According to the City of Scottsdale's Floodplain Ordinance for ESL Upper Desert, the Site is required to have peak discharges from the Site reduced to at least pre-development values during the 100-year, 10-year and 2-year storm frequencies.
6. The Site will provide either first flush stormwater storage for the first 0.5-inch of runoff and/or first flush treatment for the property's developed areas.
7. The proposed drainage system is being designed to allow existing drainage patterns to be maintained in their natural location and condition where possible. Where the proposed development will disturb existing washes with peak 100-year discharges of 50 cfs or more, the washes will be modified to re-direct flow around and/or through the development to maintain historical flow patterns. If necessary, the development will obtain a Wash Modification approval from the City of Scottsdale.
8. Any proposed development encroachment into the FEMA FIRM SFHAs must obtain an FCDMC Floodplain Use Permit.
9. The determination of the CWA Section 404 Jurisdictional Washes for the Site must be approved by the U.S. Army Corps.

10. Before any construction activities that will disturb one or more acres begin, these activities must be authorized by ADEQ under the Arizona Pollutant Discharge Elimination System (AZPDES) Construction General Permit. The City of Scottsdale also requires evidence of compliance before issuing development permits.
11. The design of hydraulic structures is based on generally accepted engineering practices and in accordance with City of Scottsdale's requirements.
12. The drainage for the local residential roadways will be designed consistent with City of Scottsdale Ordinance 37-42(4) for the allowable depth of water on the street when the street is being utilized as a water carrier.
13. Ongoing maintenance is required for all drainage systems in order to assure design performance. Regular maintenance must be performed on detention/retention basins that are designed with sediment pools and/or are susceptible to wash sediment loads. Observation is required annually and after major storm events to monitor basin sediment load. Basins should be maintained and cleaned out in order for the drainage system to function properly.

8.0 WARNING & DISCLAIMER OF LIABILITY

Per the requirements outlined in Chapter 4 of the *City of Scottsdale Design Standards and Policies Manual (DS&PM)*, each drainage report must include a completed 'Warning and Disclaimer of Liability' as provided within the *DS&PM* Appendix 4-1C. As such, below is a City of Scottsdale 'Warning and Disclaimer of Liability' that will be completed as the Site progress into the development phase.



Appendix 4-1C WARNING & DISCLAIMER OF LIABILITY

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

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

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

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

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

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

Plan Check No.

Owner or Agent

Date

9.0 REFERENCES

1. *Design Standards and Policies Manual Chapter 4 Drainage*, City of Scottsdale, January 2010.
2. *Drainage Design Manual for Maricopa County, Arizona: Volume I – Hydrology*, Flood Control District of Maricopa County, revised August 15, 2013.
3. *Drainage Design Manual for Maricopa County, Arizona: Volume II – Hydraulics*, Flood Control District of Maricopa County, revised August 15, 2013.
4. *HEC-1, Flood Hydrograph Package*, U.S. Army Corps of Engineers, June 1998.
5. *HEC-RAS, Version 5.0.3*, U.S. Army Corps of Engineers, January 2010.
6. *Drainage Design Management System for Windows-Version 4.624d*, Flood Control District of Maricopa County, revised September 17, 2013, by KVL Consultants, Inc.

APPENDIX A

Existing Condition Hydrologic Calculations

DDMSW Output Data

2-year HEC-1 Model

10-year HEC-1 Model

100-year HEC-1 Model

DDMSW Output Data

ID	Method	Duration	2 Yr	5 Yr	10 Yr	25 Yr	50 Yr	100 Yr
DEFAULT	NOAA14	5 MIN	0.328	0.442	0.528	0.642	0.728	0.815
	NOAA14	10 MIN	0.500	0.673	0.803	0.977	1.108	1.240
	NOAA14	15 MIN	0.620	0.834	0.996	1.211	1.374	1.537
	NOAA14	30 MIN	0.834	1.123	1.341	1.630	1.850	2.070
	NOAA14	1 HOUR	1.032	1.390	1.660	2.018	2.289	2.562
	NOAA14	2 HOUR	1.187	1.573	1.871	2.273	2.579	2.896
	NOAA14	3 HOUR	1.263	1.641	1.944	2.364	2.697	3.043
	NOAA14	6 HOUR	1.475	1.867	2.182	2.617	2.958	3.313
	NOAA14	12 HOUR	1.783	2.233	2.592	3.079	3.454	3.841
	NOAA14	24 HOUR	2.084	2.733	3.265	4.024	4.650	5.318

Area ID	Book Number	Map Unit	Soil ID	Area (sq mi)	Area (%)	XKSAT	Rock Percent (%)	Effective Rock (%)	Comments
Major Basin ID: 01									
A1	645	33	64533	0.080	41.40	0.230	-	100	
	645	40	64540	0.083	43.40	0.170	-	100	
	645	93	64593	0.023	11.80	0.330	-	100	
	645	96	64596	0.007	3.40	0.070	-	100	
A2	645	93	64593	0.010	69.20	0.330	-	100	
	645	96	64596	0.005	30.80	0.070	-	100	
B1	645	33	64533	0.000	0.90	0.230	-	100	
	645	93	64593	0.011	99.10	0.330	-	100	
C1	645	93	64593	0.008	100.00	0.330	-	100	
D1	645	93	64593	0.002	100.00	0.330	-	100	
E1	645	33	64533	0.022	100.00	0.230	-	100	
E2	645	33	64533	0.001	100.00	0.230	-	100	
E3	645	33	64533	0.038	100.00	0.230	-	100	
E4	645	40	64540	0.010	1.00	0.170	-	100	
	645	63	64563	0.151	15.00	0.140	25.00	100	
	655	AnB	655204722	0.050	5.00	0.400	-	100	
	645	96	64596	0.081	8.00	0.070	-	100	
	645	33	64533	0.696	69.00	0.230	-	100	
	645	6	6456	0.020	2.00	0.620	-	100	
E4A	645	96	64596	0.001	2.60	0.070	-	100	
	645	34	64534	0.000	0.40	0.230	-	100	
	645	33	64533	0.015	55.20	0.230	-	100	
	645	6	6456	0.011	41.90	0.620	-	100	
E4B	645	6	6456	0.001	18.00	0.620	-	100	
	645	34	64534	0.000	6.00	0.230	-	100	
	645	33	64533	0.004	76.00	0.230	-	100	
E4C	645	6	6456	0.008	50.70	0.620	-	100	
	645	33	64533	0.003	19.30	0.230	-	100	
	645	34	64534	0.001	8.70	0.230	-	100	
	645	96	64596	0.003	21.30	0.070	-	100	
E5	645	6	6456	0.019	29.70	0.620	-	100	
	645	33	64533	0.013	21.40	0.230	-	100	
	645	93	64593	0.010	16.10	0.330	-	100	
	645	96	64596	0.021	32.70	0.070	-	100	
F1	645	96	64596	0.001	100.00	0.070	-	100	
G1	645	34	64534	0.007	94.40	0.230	-	100	
	645	96	64596	0.000	5.60	0.070	-	100	
H1	645	34	64534	0.005	100.00	0.230	-	100	
I1	645	34	64534	0.006	100.00	0.230	-	100	
J1	645	34	64534	0.003	94.30	0.230	-	100	
	645	96	64596	0.000	5.70	0.070	-	100	
K1	645	33	64533	0.004	17.50	0.230	-	100	
	645	34	64534	0.015	75.00	0.230	-	100	
	645	96	64596	0.002	7.50	0.070	-	100	
L1	645	33	64533	0.003	100.00	0.230	-	100	
M1	645	33	64533	0.002	100.00	0.230	-	100	

Flood Control District of Maricopa County
 Drainage Design Management System
LAND USE
 Project Reference: DM19 EX

Land Use Code	Area (sq mi)	Area (%)	Initial Loss (IA)	Percent Impervious (RTIMP)	Vegetation Cover (%)	DTHETA	Kn	Description
Basin ID: 01								
901	0.0124	6.5	0.20	0	75.0	NORMAL	0.030	Recreational Open Space
902	0.1796	93.5	0.20	0	30.0	NORMAL	0.040	Rural (1 dwelling unit per acre or less)
	0.1920	100.0						
730	0.0076	49.4	0.10	0	90.0	NORMAL	0.030	Passive Open Space (Includes mountain preserves and wa
902	0.0078	50.6	0.20	0	30.0	NORMAL	0.040	Rural (1 dwelling unit per acre or less)
	0.0154	100.0						
900	0.0115	100.0	0.20	0	35.0	NORMAL	0.045	Vacant (Existing land use database only)
	0.0115	100.0						
900	0.0084	100.0	0.20	0	35.0	NORMAL	0.045	Vacant (Existing land use database only)
	0.0084	100.0						
900	0.0024	100.0	0.20	0	35.0	NORMAL	0.045	Vacant (Existing land use database only)
	0.0024	100.0						
900	0.0018	8.3	0.20	0	35.0	NORMAL	0.045	Vacant (Existing land use database only)
901	0.0045	20.7	0.20	0	75.0	NORMAL	0.030	Recreational Open Space
902	0.0154	71.0	0.20	0	30.0	NORMAL	0.040	Rural (1 dwelling unit per acre or less)
	0.0217	100.0						
900	0.0012	100.0	0.20	0	35.0	NORMAL	0.045	Vacant (Existing land use database only)
	0.0012	100.0						
900	0.0038	10.0	0.20	0	35.0	NORMAL	0.045	Vacant (Existing land use database only)
901	0.0057	15.0	0.20	0	75.0	NORMAL	0.030	Recreational Open Space
902	0.0285	75.0	0.20	0	30.0	NORMAL	0.040	Rural (1 dwelling unit per acre or less)

* Non default value

Flood Control District of Maricopa County
 Drainage Design Management System
 LAND USE
 Project Reference: DM19 EX

Land Use Code	Area (sq mi)	Area (%)	Initial Loss (IA)	Percent Impervious (RTIMP)	Vegetation Cover (%)	DTHETA	Kn	Description
Basin ID: 01								
	0.0380	100.0						
170	0.1185	11.8	0.25	45	50.0	NORMAL	0.020	Medium Density Residential - Multi Family (5-10 du per acre)
180	0.0270	2.7	0.25	45	50.0	NORMAL	0.020	High Density Residential - Multi Family (10-15 du per acre)
220	0.0177	1.8	0.07	80	10.0	NORMAL	0.020	Neighborhood Retail Center
900	0.1769	17.6	0.20	0	35.0	NORMAL	0.045	Vacant (Existing land use database only)
901	0.2114	21.0	0.20	0	75.0	NORMAL	0.030	Recreational Open Space
902	0.4563	45.3	0.20	0	30.0	NORMAL	0.040	Rural (1 dwelling unit per acre or less)
	1.0078	100.2						
210	0.0024	8.9	0.10	80	65.0	NORMAL	0.020	Specialty Commercial (<=50,000 sq. ft.)
900	0.0110	40.7	0.20	0	35.0	NORMAL	0.045	Vacant (Existing land use database only)
901	0.0110	40.7	0.20	0	75.0	NORMAL	0.030	Recreational Open Space
902	0.0026	9.6	0.20	0	30.0	NORMAL	0.040	Rural (1 dwelling unit per acre or less)
	0.0270	99.9						
630	0.0047	100.0	0.10	80	75.0	NORMAL	0.020	Transportation
	0.0047	100.0						
210	0.0023	15.1	0.10	80	65.0	NORMAL	0.020	Specialty Commercial (<=50,000 sq. ft.)
900	0.0129	84.9	0.20	0	35.0	NORMAL	0.045	Vacant (Existing land use database only)
	0.0152	100.0						
900	0.0626	100.0	0.20	0	35.0	NORMAL	0.045	Vacant (Existing land use database only)
	0.0626	100.0						
900	0.0012	100.0	0.20	0	35.0	NORMAL	0.045	Vacant (Existing land use database only)

* Non default value

Flood Control District of Maricopa County
 Drainage Design Management System
LAND USE
 Project Reference: DM19 EX

Land Use Code	Area (sq mi)	Area (%)	Initial Loss (IA)	Percent Impervious (RTIMP)	Vegetation Cover (%)	DTHETA	Kn	Description
Basin ID: 01								
	0.0012	100.0						
900	0.0071	100.0	0.20	0	35.0	NORMAL	0.045	Vacant (Existing land use database only)
	0.0071	100.0						
900	0.0051	100.0	0.20	0	35.0	NORMAL	0.045	Vacant (Existing land use database only)
	0.0051	100.0						
900	0.0064	100.0	0.20	0	35.0	NORMAL	0.045	Vacant (Existing land use database only)
	0.0064	100.0						
900	0.0035	100.0	0.20	0	35.0	NORMAL	0.045	Vacant (Existing land use database only)
	0.0035	100.0						
900	0.0200	100.0	0.20	0	35.0	NORMAL	0.045	Vacant (Existing land use database only)
	0.0200	100.0						
900	0.0027	100.0	0.20	0	35.0	NORMAL	0.045	Vacant (Existing land use database only)
	0.0027	100.0						
900	0.0015	100.0	0.20	0	35.0	NORMAL	0.045	Vacant (Existing land use database only)
	0.0015	100.0						

* Non default value

Flood Control District of Maricopa County
 Drainage Design Management System
 SUB BASINS

Project Reference: DM19 EX

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Sub Basin ID	Sub Basin Parameters								Rainfall Losses				
	Area (sq mi)	Length (mi)	Slope (ft/mi)	S-Graph	Lca (mi)	Lag (min)	Velocity (f/s)	Kn	IA (in)	DTHETA	PSIF (in)	XKSAT (in/hr)	RTIMP (%)
Major Basin ID: 01													
	0.192	0.95	134.1	DESERT/RANGE	0.51	16.80	4.96	0.039	0.20	0.25	5.34	0.254	
	0.015	0.19	118.3	DESERT/RANGE	0.10	4.50	3.66	0.035	0.15	0.25	5.24	0.318	
	0.011	0.22	209.1	DESERT/RANGE	0.10	5.50	3.52	0.045	0.20	0.25	4.33	0.421	
	0.008	0.21	216.3	DESERT/RANGE	0.09	5.10	3.56	0.045	0.20	0.25	4.33	0.422	
	0.002	0.09	252.9	DESERT/RANGE	0.04	2.60	2.91	0.045	0.20	0.25	4.33	0.422	
	0.022	0.31	184.7	DESERT/RANGE	0.15	6.40	4.35	0.038	0.20	0.25	5.05	0.306	
	0.001	0.05	297.9	DESERT/RANGE	0.02	1.60	2.66	0.045	0.20	0.25	5.05	0.294	
	0.038	0.57	146.3	DESERT/RANGE	0.25	10.40	4.85	0.039	0.20	0.25	5.05	0.299	
	1.008	3.40	174.8	DESERT/RANGE	1.58	36.80	8.13	0.036	0.21	0.25	5.34	0.278	12
	0.063	0.39	123.7	DESERT/RANGE	0.23	10.40	3.30	0.045	0.20	0.25	5.14	0.285	
	0.027	0.25	121.5	DESERT/RANGE	0.17	6.20	3.48	0.036	0.19	0.25	4.28	0.500	7
	0.001	0.05	215.7	DESERT/RANGE	0.02	1.70	2.63	0.045	0.20	0.15	7.94	0.090	
	0.005	0.35	121.7	VALLEY	0.17	3.90	7.71	0.020	0.10	0.25	4.65	0.473	80
	0.007	0.24	167.4	DESERT/RANGE	0.09	5.70	3.69	0.045	0.20	0.25	5.14	0.276	
	0.015	0.16	140.2	DESERT/RANGE	0.11	5.00	2.88	0.041	0.18	0.25	4.51	0.394	12
	0.005	0.17	189.3	DESERT/RANGE	0.07	4.40	3.36	0.045	0.20	0.25	5.05	0.294	
	0.006	0.23	191.1	DESERT/RANGE	0.11	5.90	3.38	0.045	0.20	0.25	5.05	0.294	
	0.003	0.16	206.5	DESERT/RANGE	0.07	4.20	3.23	0.045	0.20	0.25	5.14	0.275	
	0.020	0.23	171.7	DESERT/RANGE	0.15	6.80	3.01	0.045	0.20	0.25	5.24	0.270	
	0.003	0.12	243.7	DESERT/RANGE	0.05	3.30	3.22	0.045	0.20	0.25	5.05	0.294	
	0.001	0.10	204.1	DESERT/RANGE	0.04	2.90	3.00	0.045	0.20	0.25	5.05	0.294	

* Non default value

(stSubBasSG.rp

Flood Control District of Maricopa County
 Drainage Design Management System
 SUB BASINS

Project Reference: DM19 EX

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Sub Basin ID	Sub Basin Parameters							Rainfall Losses				
	Area (sq mi)	Length (mi)	Slope (ft/mi)	S-Graph	Lca (mi)	Lag (min)	Velocity (f/s)	Kn	IA (in)	DTHETA	PSIF (in)	XKSAT (in/hr)

Major Basin ID: 01

* Non default value

(stSubBasSG.rpt)

Flood Control District of Maricopa County
 Drainage Design Management System
 HEC-1 ROUTING DATA
 Project Reference: DM19 EX

ge 1

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Route ID	LOB N	Chan N	ROB N	Length (ft)	Slope (ft/ft)	Max Elev (ft)		1.	2.	3.	4.	5.	6.	7.	8.
NORMAL DEPTH															
Major Basin 01															
R-A1	0.060	0.040	0.060	980.00	0.0224	2,613.00	X:	-	42.00	73.00	106.00	196.00	225.00	251.00	295.00
							Y:	20.00	15.00	10.00	7.00	6.00	5.00	13.00	19.00
R-B4	0.035	0.035	0.035	1,310.00	0.0200	-	X:	-	4.00	8.00	20.00	44.00	52.00	56.00	64.00
							Y:	2,680.00	2,679.00	2,678.00	2,675.00	2,675.00	2,678.00	2,679.00	2,680.00
R-B4A	0.050	0.035	0.050	870.00	0.2100	-	X:	-	6.00	12.00	24.00	74.00	82.00	86.00	90.00
							Y:	2,649.00	2,648.00	2,646.00	2,645.00	2,645.00	2,646.00	2,648.00	2,649.00
R-CPE4	0.060	0.040	0.060	2,050.00	0.0234	2,635.00	X:	-	33.00	50.00	130.00	345.00	390.00	447.00	530.00
							Y:	34.00	25.00	18.00	19.00	18.00	20.00	26.00	32.00

2-year HEC-1 Model

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

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

LINE	ID	1	2	3	4	5	6	7	8	9	10
1	ID	Flood Control District of Maricopa County									
2	ID	DML9 EK - Desert Mountain 19 Existing Condition									
3	ID	2 YEAR									
4	ID	6 Hour Storm									
5	ID	Unit Hydrograph: S-Graph									
6	ID	Storm: Multiple									
7	ID	03/04/2017									
	*DIAGRAM										
8	IT	1	1JAN99	0	2000						
9	IO	5									
10	IE	15									
	*										
11	JD	1.475	0.0001								
12	PC	0.000	0.008	0.016	0.025	0.033	0.041	0.050	0.058	0.066	0.074
13	PC	0.087	0.099	0.118	0.138	0.216	0.377	0.834	0.911	0.931	0.950
14	PC	0.962	0.972	0.983	0.991	1.000					
15	JD	1.466	0.5000								
16	PC	0.000	0.008	0.016	0.025	0.033	0.041	0.050	0.058	0.066	0.074
17	PC	0.087	0.099	0.118	0.138	0.216	0.377	0.834	0.911	0.931	0.950
18	PC	0.962	0.972	0.983	0.991	1.000					
19	JD	1.438	2.8								
20	PC	0.000	0.009	0.016	0.025	0.034	0.042	0.051	0.059	0.067	0.076
21	PC	0.087	0.100	0.120	0.163	0.252	0.451	0.694	0.837	0.900	0.938
22	PC	0.950	0.963	0.975	0.988	1.000					
	*										
23	EK	A1	BASIN								
24	BA	0.192									
25	LG	0.20	0.25	5.34	0.25	0					
26	UI	0	38	38	38	48	111	142	178	217	247
27	UI	272	315	335	346	364	369	369	360	348	329
28	UI	295	268	239	217	195	176	159	144	130	117
29	UI	105	92	86	73	73	60	59	52	41	41
30	UI	41	30	26	26	26	25	9	9	9	9
31	UI	9	9	9	9	9	9	9	9	9	9
32	UI	9	9	0	0	0	0	0	0	0	0
	*										
33	EK	R-A1	ROUTE								
34	RS	1	FLOW								
35	RC	0.060	0.040	0.060	980	0.0224	2613.00				
36	EK	0.00	42.00	73.00	106.00	196.00	225.00	251.00	295.00		
37	EY	20.00	15.00	10.00	7.00	6.00	5.00	13.00	19.00		
	*										
38	EK	A2	BASIN								
39	BA	0.015									
40	LG	0.15	0.25	5.24	0.32	0					
41	UI	0	11	43	80	103	103	78	53	36	24
42	UI	17	11	8	4	3	3	3	0	0	0
43	UI	0	0	0	0	0	0	0	0	0	0
44	UI	0	0	0	0	0	0	0	0	0	0
45	UI	0	0	0	0	0	0	0	0	0	0
	*										

LINE	ID	1	2	3	4	5	6	7	8	9	10
46	EK	CP-A2	COMBINE								
47	EC	2									
	*										
48	EK	B1	BASIN								
49	BA	0.011									
50	LG	0.20	0.25	4.33	0.42	0					

54	UI	0	0	0	0	0	0	0	0	0	
55	UI	0	0	0	0	0	0	0	0	0	
*											
56	EK	C1	BASIN								
57	BA	0.008									
58	LG	0.20	0.25	4.33	0.42	0					
59	UI	0	5	16	33	45	51	46	33	24	17
60	UI	12	9	6	4	3	1	1	1	1	0
61	UI	0	0	0	0	0	0	0	0	0	0
62	UI	0	0	0	0	0	0	0	0	0	0
63	UI	0	0	0	0	0	0	0	0	0	0
*											

64	EK	D1	BASIN								
65	BA	0.002									
66	LG	0.20	0.25	4.33	0.42	0					
67	UI	0	5	19	24	15	7	4	2	1	1
68	UI	0	0	0	0	0	0	0	0	0	0
69	UI	0	0	0	0	0	0	0	0	0	0
70	UI	0	0	0	0	0	0	0	0	0	0
71	UI	0	0	0	0	0	0	0	0	0	0
*											

72	EK	CLEAR	COMBINE								
73	EC	3									
*											

74	EK	E1	BASIN								
75	BA	0.022									
76	LG	0.20	0.25	5.05	0.31	0					
77	UI	0	12	23	55	81	101	111	106	88	66
78	UI	51	39	29	23	17	12	9	8	5	3
79	UI	3	3	3	3	0	0	0	0	0	0
80	UI	0	0	0	0	0	0	0	0	0	0
81	UI	0	0	0	0	0	0	0	0	0	0
*											

82	EK	E2	BASIN								
83	BA	0.001									
84	LG	0.20	0.25	5.05	0.29	0					
85	UI	0	6	18	8	3	1	0	0	0	0
86	UI	0	0	0	0	0	0	0	0	0	0
87	UI	0	0	0	0	0	0	0	0	0	0
*											

HBC-1 INPUT

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

88	UI	0	0	0	0	0	0	0	0	0	0
89	UI	0	0	0	0	0	0	0	0	0	0
*											

90	EK	E3	BASIN								
91	BA	0.038									
92	LG	0.20	0.25	5.05	0.30	0					
93	UI	0	12	12	24	47	66	83	99	110	117
94	UI	118	113	105	88	74	63	54	45	38	32
95	UI	27	23	19	17	13	13	8	8	8	5
96	UI	3	3	3	3	3	3	3	3	3	0
97	UI	0	0	0	0	0	0	0	0	0	0
*											

98	EK	E4	BASIN								
99	BA	1.008									
100	LG	0.21	0.25	5.34	0.28	12					
101	UI	0	92	92	92	92	92	92	92	92	185
102	UI	265	265	321	360	394	442	483	511	558	592
103	UI	630	658	646	758	758	785	815	818	844	828
104	UI	884	884	884	884	884	884	880	848	839	826
105	UI	823	786	763	715	676	643	643	589	561	544
106	UI	506	490	471	441	433	401	399	360	360	331
107	UI	326	306	283	283	261	253	253	224	206	206
108	UI	206	180	174	174	174	163	141	141	141	141
109	UI	141	106	98	98	98	98	98	98	98	69
110	UI	63	63	63	63	63	63	63	63	63	63
111	UI	63	44	22	22	22	22	22	22	22	22
112	UI	22	22	22	22	22	22	22	22	22	22
113	UI	22	22	22	22	22	22	22	22	22	22
114	UI	22	22	22	22	22	22	0	0	0	0
*											

115	EK	R-B4	ROUTE								
116	RS	2	FLOW								
117	RC	0.035	0.035	0.035	1310	0.0200	0.00				
118	RK	0.00	4.00	8.00	20.00	44.00	52.00	56.00	64.00		
119	RY	2680.0	2679.00	2678.00	2675.00	2675.00	2678.00	2679.00	2680.00		
*											

120	EK	E4A	BASIN								
121	BA	0.027									
122	LG	0.19	0.25	4.28	0.50	7					
123	UI	0	15	32	72	106	131	141	131	104	78
124	UI	59	45	33	25	19	15	10	10	4	4
125	UI	4	4	4	0	0	0	0	0	0	0
126	UI	0	0	0	0	0	0	0	0	0	0
127	UI	0	0	0	0	0	0	0	0	0	0
*											

HBC-1 INPUT

PAGE 4

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

128	EK	E4B	BASIN							
-----	----	-----	-------	--	--	--	--	--	--	--

131	UI	0	5	19	29	48	39	26	14	7	3
132	UI	1	1	0	0	0	0	0	0	0	0
133	UI	0	0	0	0	0	0	0	0	0	0
134	UI	0	0	0	0	0	0	0	0	0	0
135	UI	0	0	0	0	0	0	0	0	0	0

136 KK CPR4AB COMBINE
137 RC 2

138 KK R-B4A ROUTE
139 RS 1 FLOW
140 RC 0.050 0.035 0.050 870 0.2100 0.00
141 RK 0.00 6.00 12.00 24.00 74.00 82.00 86.00 90.00
142 RY 2649.0 2648.00 2646.00 2645.00 2645.00 2646.00 2648.00 2649.00

143 KK B4C BASIN
144 BA 0.015
145 LO 0.18 0.25 4.51 0.39 12
146 UI 0 10 32 63 88 96 85 61 43 31
147 UI 21 16 11 7 5 2 2 2 2 0
148 UI 0 0 0 0 0 0 0 0 0 0
149 UI 0 0 0 0 0 0 0 0 0 0
150 UI 0 0 0 0 0 0 0 0 0 0

151 KK CP-B4 COMBINE
152 RC 6

153 KK R-CPR4 ROUTE
154 RS 1 FLOW
155 RC 0.060 0.040 0.060 2050 0.0234 2635.00
156 RK 0.00 33.00 50.00 130.00 345.00 390.00 447.00 530.00
157 RY 34.00 25.00 18.00 19.00 18.00 20.00 26.00 32.00

158 KK B5 BASIN
159 BA 0.063
160 LO 0.20 0.25 5.14 0.29 0
161 UI 0 20 20 44 78 110 138 164 182 193
162 UI 195 187 173 146 123 104 89 75 63 53
163 UI 44 38 32 28 23 21 14 14 14 9
164 UI 5 5 5 5 5 5 5 5 5 0
165 UI 0 0 0 0 0 0 0 0 0 0

HRC-1 INPUT

PAGE 5

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

166 KK CP-B5 COMBINE
167 RC 2

168 KK F1 BASIN
169 BA 0.001
170 LO 0.20 0.15 7.94 0.09 0
171 UI 0 7 18 9 3 1 0 0 0 0
172 UI 0 0 0 0 0 0 0 0 0 0
173 UI 0 0 0 0 0 0 0 0 0 0
174 UI 0 0 0 0 0 0 0 0 0 0
175 UI 0 0 0 0 0 0 0 0 0 0

176 KK G1 BASIN
177 BA 0.007
178 LO 0.20 0.25 5.14 0.28 0
179 UI 0 4 10 22 33 38 39 33 24 18
180 UI 13 10 7 5 4 3 2 1 1 1
181 UI 1 0 0 0 0 0 0 0 0 0
182 UI 0 0 0 0 0 0 0 0 0 0
183 UI 0 0 0 0 0 0 0 0 0 0

184 KK H1 BASIN
185 BA 0.005
186 LO 0.20 0.25 5.05 0.29 0
187 UI 0 4 15 28 36 35 25 17 11 8
188 UI 5 3 3 1 1 1 1 0 0 0
189 UI 0 0 0 0 0 0 0 0 0 0
190 UI 0 0 0 0 0 0 0 0 0 0
191 UI 0 0 0 0 0 0 0 0 0 0

192 KK I1 BASIN
193 BA 0.006
194 LO 0.20 0.25 5.05 0.29 0
195 UI 0 3 8 18 26 31 32 29 22 16
196 UI 12 9 7 5 4 3 2 1 1 1
197 UI 1 1 0 0 0 0 0 0 0 0
198 UI 0 0 0 0 0 0 0 0 0 0
199 UI 0 0 0 0 0 0 0 0 0 0

200 KK CLR2 COMBINE
201 RC 4

202 KK J1 BASIN

206
207
208
209
210
211
212
213
214
215
216
217

UI 3 2 1 1 1 1 0 0 0 0 0
UI 0 0 0 0 0 0 0 0 0 0 0
*
KK K1 BASIN
BA 0.020
LG 0.20 0.25 5.24 0.27 0
UI 0 10 18 49 64 94 93 93 84 65
UI 51 39 30 23 18 14 10 8 7 5
UI 2 2 2 2 2 2 0 0 0 0
UI 0 0 0 0 0 0 0 0 0 0
UI 0 0 0 0 0 0 0 0 0 0
*

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PAGE 6

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

208 UI 0 0 0 0 0 0 0 0 0 0 0
209 UI 0 0 0 0 0 0 0 0 0 0 0
*

210
211
212
213
214
215
216
217
*
KK K1 BASIN
BA 0.020
LG 0.20 0.25 5.24 0.27 0
UI 0 10 18 49 64 94 93 93 84 65
UI 51 39 30 23 18 14 10 8 7 5
UI 2 2 2 2 2 2 0 0 0 0
UI 0 0 0 0 0 0 0 0 0 0
UI 0 0 0 0 0 0 0 0 0 0
*

218
219
220
221
222
223
224
225
*
KK L1 BASIN
BA 0.003
LG 0.20 0.25 5.05 0.29 0
UI 0 4 17 28 27 17 10 6 3 2
UI 1 1 1 0 0 0 0 0 0 0
UI 0 0 0 0 0 0 0 0 0 0
UI 0 0 0 0 0 0 0 0 0 0
UI 0 0 0 0 0 0 0 0 0 0
UI 0 0 0 0 0 0 0 0 0 0
*

226
227
228
229
230
231
232
233
*
KK M1 BASIN
BA 0.001
LG 0.20 0.25 5.05 0.29 0
UI 0 2 8 11 8 5 2 1 1 0
UI 0 0 0 0 0 0 0 0 0 0
UI 0 0 0 0 0 0 0 0 0 0
UI 0 0 0 0 0 0 0 0 0 0
UI 0 0 0 0 0 0 0 0 0 0
UI 0 0 0 0 0 0 0 0 0 0
*
234
ZZ

INPUT LINE	(V) ROUTING	(--->) DIVERSION OR PUMP FLOW
NO.	(.) CONNECTOR	(<---) RETURN OF DIVERTED OR PUMPED FLOW
23	A1	
	V	
	V	
33	R-A1	
	.	
38	A2	
	.	
46	CP-A2.....	
	.	
48	B1	
	.	
56	C1	
	.	
64	D1	
	.	
72	CLEAR.....	
	.	
74	E1	
	.	
82	E2	
	.	
90	E3	
	.	
98	E4	
	V	
	V	
115	R-B4	
	.	
120	E4A	
	.	
128	E4B	
	.	
136	CPE4AB.....	
	V	
	V	
138	R-B4A	
	.	
143	E4C	
	.	
151	CP-E4.....	
	V	
	V	
153	R-CPE4	
	.	
158	E5	
	.	
166	CP-E5.....	
	.	
168	F1	
	.	
176	G1	
	.	
184	H1	
	.	
192	I1	
	.	
200	CLR2.....	
	.	
202	J1	
	.	
210	K1	
	.	
218	L1	
	.	
226	M1	

(***) RUNOFF ALSO COMPUTED AT THIS LOCATION

FLOW IN CUBIC FEET PER SECOND
 TIME IN HOURS, AREA IN SQUARE MILES

OPERATION	STATION	PEAK FLOW	TIME OF PEAK	AVERAGE FLOW FOR MAXIMUM PERIOD			BASIN AREA	MAXIMUM STAGE	TIME OF MAX STAGE
				6-HOUR	24-HOUR	72-HOUR			
HYDROGRAPH AT	A1	135.	4.15	9.	2.	2.	0.19		
ROUTED TO	R-A1	135.	4.15	9.	2.	2.	0.19		
HYDROGRAPH AT	A2	16.	4.02	1.	0.	0.	0.01		
2 COMBINED AT	CP-A2	137.	4.13	10.	2.	2.	0.21		
HYDROGRAPH AT	B1	10.	4.03	0.	0.	0.	0.01		
HYDROGRAPH AT	C1	7.	4.03	0.	0.	0.	0.01		
HYDROGRAPH AT	D1	2.	4.02	0.	0.	0.	0.00		
3 COMBINED AT	CLEAR	20.	4.02	1.	0.	0.	0.02		
HYDROGRAPH AT	E1	22.	4.03	1.	0.	0.	0.02		
HYDROGRAPH AT	E2	1.	4.02	0.	0.	0.	0.00		
HYDROGRAPH AT	E3	33.	4.07	2.	0.	0.	0.04		
HYDROGRAPH AT	E4	303.	4.43	46.	12.	8.	1.01		
ROUTED TO	R-E4	303.	4.47	46.	12.	8.	1.01		
HYDROGRAPH AT	E4A	23.	4.03	1.	0.	0.	0.03		
HYDROGRAPH AT	E4B	8.	4.02	1.	0.	0.	0.00		
2 COMBINED AT	CPE4AB	31.	4.03	2.	0.	0.	0.03		
ROUTED TO	R-E4A	30.	4.05	2.	0.	0.	0.03		
HYDROGRAPH AT	E4C	16.	4.02	1.	0.	0.	0.01		
6 COMBINED AT	CP-E4	303.	4.47	50.	13.	9.	1.12		
ROUTED TO	R-CPE4	292.	4.47	49.	12.	9.	1.12		
HYDROGRAPH AT	E5	55.	4.07	3.	1.	0.	0.06		
2 COMBINED AT	CP-E5	291.	4.47	50.	13.	9.	1.18		
HYDROGRAPH AT	F1	1.	4.02	0.	0.	0.	0.00		
HYDROGRAPH AT	G1	8.	4.03	0.	0.	0.	0.01		
HYDROGRAPH AT	H1	6.	4.02	0.	0.	0.	0.00		
HYDROGRAPH AT	I1	6.	4.03	0.	0.	0.	0.01		
4 COMBINED AT	CLR2	21.	4.02	1.	0.	0.	0.02		
HYDROGRAPH AT	J1	3.	4.02	0.	0.	0.	0.00		
HYDROGRAPH AT	K1	21.	4.03	1.	0.	0.	0.02		
HYDROGRAPH AT	L1	3.	4.02	0.	0.	0.	0.00		
HYDROGRAPH AT	M1	1.	4.02	0.	0.	0.	0.00		

10-year HEC-1 Model

```

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

THIS PROGRAM REPLACES ALL PREVIOUS VERSIONS OF HRC-1 KNOWN AS HRC1 (JAN 73), HRC1G5, HRC1D5, AND HRC1EW.

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

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HRC-1 INPUT

PAGE 1

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LINE      ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10
1         ID      Flood Control District of Mexicopa County
2         ID      DM19 EX - Desert Mountain 19 Existing Condition
3         ID      10 YEAR
4         ID      6 Hour Storm
5         ID      Unit Hydrograph: S-Graph
6         ID      Storm: Multiple
7         ID      03/04/2017
          *DIAGRAM
8         IT      1 1JAN99      0 2000
9         IO      5
10        IH      15
          *
11        JD      2.182 0.0001
12        PC      0.000 0.008 0.016 0.025 0.033 0.041 0.050 0.058 0.066 0.074
13        PC      0.087 0.099 0.118 0.138 0.216 0.377 0.634 0.911 0.931 0.950
14        PC      0.962 0.972 0.983 0.991 1.000
15        JD      2.169 0.5000
16        PC      0.000 0.008 0.016 0.025 0.033 0.041 0.050 0.058 0.066 0.074
17        PC      0.087 0.099 0.118 0.138 0.216 0.377 0.634 0.911 0.931 0.950
18        PC      0.962 0.972 0.983 0.991 1.000
19        JD      2.127 2.8
20        PC      0.000 0.009 0.016 0.025 0.034 0.042 0.051 0.059 0.067 0.076
21        PC      0.087 0.100 0.120 0.163 0.252 0.451 0.694 0.837 0.900 0.938
22        PC      0.950 0.963 0.975 0.988 1.000
          *
23        KK      A1  BASIN
24        BA      0.192
25        LG      0.20 0.25 5.34 0.25 0
26        UI      0 38 38 38 48 111 142 178 217 247
27        UI      272 315 335 346 364 369 369 360 348 329
28        UI      295 268 239 217 195 176 159 144 130 117
29        UI      105 92 86 73 73 60 59 52 41 41
30        UI      41 30 26 26 26 26 25 9 9 9
31        UI      9 9 9 9 9 9 9 9 9 9
32        UI      9 9 0 0 0 0 0 0 0 0
          *
33        KK      R-A1 ROUTE
34        RS      1  FLOW
35        RC      0.060 0.040 0.060 980 0.0224 2613.00
36        RK      0.00 42.00 73.00 106.00 196.00 225.00 251.00 295.00
37        RY      20.00 15.00 10.00 7.00 6.00 5.00 13.00 19.00
          *
38        KK      A2  BASIN
39        BA      0.015
40        LG      0.15 0.25 5.24 0.32 0
41        UI      0 11 43 80 103 103 78 53 36 24
42        UI      17 11 8 4 3 3 3 0 0 0
43        UI      0 0 0 0 0 0 0 0 0 0
44        UI      0 0 0 0 0 0 0 0 0 0
45        UI      0 0 0 0 0 0 0 0 0 0
          *
  
```

1

HRC-1 INPUT

PAGE 2

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LINE      ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10
46        KK      CP-A2 COMBINE
47        HC      2
          *
48        KK      B1  BASIN
49        BA      0.011
50        LG      0.20 0.25 4.33 0.42 0
  
```

54	UI	0	0	0	0	0	0	0	0	0
55	UI	0	0	0	0	0	0	0	0	0
	*									
56	KK	C1	BASIN							
57	BA	0.008								
58	LG	0.20	0.25	4.33	0.42	0				
59	UI	0	5	16	33	45	51	46	33	24
60	UI	12	9	6	4	3	1	1	1	1
61	UI	0	0	0	0	0	0	0	0	0
62	UI	0	0	0	0	0	0	0	0	0
63	UI	0	0	0	0	0	0	0	0	0
	*									

64	KK	D1	BASIN							
65	BA	0.002								
66	LG	0.20	0.25	4.33	0.42	0				
67	UI	0	5	19	24	15	7	4	2	1
68	UI	0	0	0	0	0	0	0	0	0
69	UI	0	0	0	0	0	0	0	0	0
70	UI	0	0	0	0	0	0	0	0	0
71	UI	0	0	0	0	0	0	0	0	0
	*									

72	KK	CLEAR	COMBINE							
73	RC	3								
	*									

74	KK	E1	BASIN							
75	BA	0.022								
76	LG	0.20	0.25	5.05	0.31	0				
77	UI	0	12	23	55	81	101	111	106	88
78	UI	51	39	29	23	17	12	9	8	5
79	UI	3	3	3	3	0	0	0	0	0
80	UI	0	0	0	0	0	0	0	0	0
81	UI	0	0	0	0	0	0	0	0	0
	*									

82	KK	E2	BASIN							
83	BA	0.001								
84	LG	0.20	0.25	5.05	0.29	0				
85	UI	0	8	18	8	3	1	0	0	0
86	UI	0	0	0	0	0	0	0	0	0
87	UI	0	0	0	0	0	0	0	0	0
	*									

HRC-1 INPUT

PAGE 3

LINE	ID	1	2	3	4	5	6	7	8	9	10
88	UI	0	0	0	0	0	0	0	0	0	0
89	UI	0	0	0	0	0	0	0	0	0	0
	*										

90	KK	E3	BASIN								
91	BA	0.038									
92	LG	0.20	0.25	5.05	0.30	0					
93	UI	0	12	12	26	47	66	83	99	110	117
94	UI	118	113	105	88	74	63	54	45	38	32
95	UI	27	23	19	17	13	13	8	8	8	5
96	UI	3	3	3	3	3	3	3	3	3	0
97	UI	0	0	0	0	0	0	0	0	0	0
	*										

98	KK	E4	BASIN								
99	BA	1.008									
100	LG	0.21	0.25	5.34	0.28	12					
101	UI	0	92	92	92	92	92	92	92	92	185
102	UI	265	265	321	360	394	442	483	511	558	592
103	UI	830	858	846	798	798	785	815	818	844	828
104	UI	884	884	884	884	884	884	880	848	839	826
105	UI	823	786	763	715	676	643	643	589	561	544
106	UI	506	490	471	441	433	401	399	360	360	331
107	UI	326	306	283	283	261	253	253	224	206	206
108	UI	206	180	174	174	174	163	141	141	141	141
109	UI	141	106	98	98	98	98	98	98	98	69
110	UI	63	63	63	63	63	63	63	63	63	63
111	UI	63	44	22	22	22	22	22	22	22	22
112	UI	22	22	22	22	22	22	22	22	22	22
113	UI	22	22	22	22	22	22	22	22	22	22
114	UI	22	22	22	22	22	22	0	0	0	0
	*										

115	KK	R-B4	ROUTE								
116	RS	1	FLOW								
117	RC	0.035	0.035	0.035	1310	0.0200	0.00				
118	RK	0.00	4.00	8.00	20.00	44.00	52.00	56.00	64.00		
119	RY	2680.0	2679.00	2678.00	2675.00	2675.00	2678.00	2679.00	2680.00		
	*										

120	KK	E4A	BASIN								
121	BA	0.027									
122	LG	0.19	0.25	4.28	0.50	7					
123	UI	0	15	32	72	106	131	141	131	104	78
124	UI	59	45	33	25	19	15	10	10	4	4
125	UI	4	4	4	0	0	0	0	0	0	0
126	UI	0	0	0	0	0	0	0	0	0	0
127	UI	0	0	0	0	0	0	0	0	0	0
	*										

HRC-1 INPUT

PAGE 4

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

131	UI	0	5	19	29	48	39	26	14	7	3
132	UI	1	1	0	0	0	0	0	0	0	0
133	UI	0	0	0	0	0	0	0	0	0	0
134	UI	0	0	0	0	0	0	0	0	0	0
135	UI	0	0	0	0	0	0	0	0	0	0

136 KK CPE44B COMBINE
137 HC 2

138	KK	R-B4A	ROUTE								
139	RS	2	FLOW								
140	RC	0.050	0.035	0.050	870	0.2100	0.00				
141	RK	9.00	5.00	12.00	24.00	74.00	82.00	85.00	90.00		
142	RY	2649.0	2648.00	2646.00	2645.00	2645.00	2646.00	2648.00	2649.00		

143	KK	H4C	BASIN								
144	SA	0.015									
145	LG	0.18	0.25	4.51	0.39	12					
146	UI	0	10	32	63	88	96	85	61	49	31
147	UI	21	16	11	7	5	2	2	2	2	0
148	UI	0	0	0	0	0	0	0	0	0	0
149	UI	0	0	0	0	0	0	0	0	0	0
150	UI	0	0	0	0	0	0	0	0	0	0

151 KK CP-B4 COMBINE
152 HC 6

153	KK	R-CPB4	ROUTE								
154	RS	1	FLOW								
155	RC	0.060	0.040	0.060	2050	0.0234	2635.00				
156	RK	0.00	33.00	50.00	130.00	345.00	390.00	447.00	530.00		
157	RY	34.00	25.00	18.00	19.00	18.00	20.00	26.00	32.00		

158	KK	H5	BASIN								
159	SA	0.063									
160	LG	0.20	0.25	5.14	0.29	0					
161	UI	0	20	20	44	78	110	138	164	182	193
162	UI	195	187	173	146	123	104	89	75	63	53
163	UI	44	38	32	28	22	21	14	14	14	9
164	UI	5	5	5	5	5	5	5	5	5	0
165	UI	0	0	0	0	0	0	0	0	0	0

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PAGE 5

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

166 KK CP-B5 COMBINE
167 HC 2

168	KK	F1	BASIN								
169	SA	0.001									
170	LG	0.20	0.15	7.94	0.09	0					
171	UI	0	7	18	9	3	1	0	0	0	0
172	UI	0	0	0	0	0	0	0	0	0	0
173	UI	0	0	0	0	0	0	0	0	0	0
174	UI	0	0	0	0	0	0	0	0	0	0
175	UI	0	0	0	0	0	0	0	0	0	0

176 KK G1 BASIN
177 SA 0.007

178	LG	0.20	0.25	5.14	0.28	0					
179	UI	0	4	10	22	33	38	39	33	24	18
180	UI	13	10	7	9	4	3	2	1	1	1
181	UI	1	0	0	0	0	0	0	0	0	0
182	UI	0	0	0	0	0	0	0	0	0	0
183	UI	0	0	0	0	0	0	0	0	0	0

184 KK H1 BASIN
185 SA 0.005

186	LG	0.20	0.25	5.05	0.29	0					
187	UI	0	4	15	28	36	35	25	17	11	0
188	UI	5	3	3	1	1	1	1	0	0	0
189	UI	0	0	0	0	0	0	0	0	0	0
190	UI	0	0	0	0	0	0	0	0	0	0
191	UI	0	0	0	0	0	0	0	0	0	0

192 KK I1 BASIN
193 SA 0.006

194	LG	0.20	0.25	5.05	0.29	0					
195	UI	0	3	8	18	26	31	32	29	22	16
196	UI	12	9	7	5	4	3	2	1	1	1
197	UI	1	1	0	0	0	0	0	0	0	0
198	UI	0	0	0	0	0	0	0	0	0	0
199	UI	0	0	0	0	0	0	0	0	0	0

200 KK CUR3 COMBINE
201 HC 4

202 KK J1 BASIN

INPUT LINE	(V) ROUTING	(--->) DIVERSION OR PUMP FLOW
NO.	(.) CONNECTOR	(<---) RETURN OF DIVERTED OR PUMPED FLOW
23	A1	
	V	
	V	
33	R-A1	
	.	
38		A2
	.	.
46	CP-A2.....	
	.	
48		B1
	.	.
56		C1
	.	.
64		D1
	.	.
72	CLEAR.....	
	.	
74		E1
	.	.
82		E2
	.	.
90		E3
	.	.
98		E4
	.	V
	.	V
115		R-B4
	.	.
120		E4A
	.	.
128		E4B
	.	.
136		CPE4AB.....
	.	V
	.	V
138		R-B4A
	.	.
143		E4C
	.	.
151	CP-B4.....	
	V	
	V	
153	R-CPE4	
	.	
158		E5
	.	.
166	CP-B5.....	
	.	
168		F1
	.	.
176		G1
	.	.
184		H1
	.	.
192		I1
	.	.
200	CLE2.....	
	.	
202		J1
	.	.
210		K1
	.	.
218		L1
	.	.
226		M1

(***) RUNOFF ALSO COMPUTED AT THIS LOCATION

Flood Control District of Maricopa County
DM19 EX - Desert Mountain 19 Existing Condition
10 YEAR
5 Hour Storm
Unit Hydrograph: S-Graph
Storm: Multiple
03/04/2017

9 IO OUTPUT CONTROL VARIABLES
IPRST 5 PRINT CONTROL
IPLOT 0 PLOT CONTROL
QSCAL 0. HYDROGRAPH PLOT SCALE

17 HYDROGRAPH TIME DATA
MIN 1 MINUTES IN COMPUTATION INTERVAL
IDATE 1JAN99 STARTING DATE
ITIME 0000 STARTING TIME
NQ 2000 NUMBER OF HYDROGRAPH ORDINATES
EDDATE 12JAN99 ENDING DATE
EDTIME 0919 ENDING TIME
ICENT 19 CENTURY MARK
COMPUTATION INTERVAL 0.02 HOURS
TOTAL TIME BASE 33.32 HOURS

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

11 JD INDEX STORM NO. 1
STEM 2.18 PRECIPITATION DEPTH
TRDA 0.00 TRANSPOSITION DRAINAGE AREA

Table with 11 columns of precipitation pattern data for storm 1. Values are mostly 0.00, with a small increase starting at row 21 (0.01).

15 JD INDEX STORM NO. 2
STEM 2.17 PRECIPITATION DEPTH
TRDA 0.50 TRANSPOSITION DRAINAGE AREA

Table with 11 columns of precipitation pattern data for storm 2. Values are mostly 0.00, with a small increase starting at row 21 (0.01).

TABLE 1
FLOW IN CUBIC FEET PER SECOND
TIME IN HOURS, AREA IN SQUARE MILES

OPERATION	STATION	PEAK FLOW	TIME OF PEAK	AVERAGE FLOW FOR MAXIMUM PERIOD			BASIN AREA	MAXIMUM STAGE	TIME OF MAX STAGE
				6-HOUR	24-HOUR	72-HOUR			
HYDROGRAPH AT	A1	260.	4.13	18.	5.	3.	0.19		
ROUTED TO	R-A1	260.	4.13	18.	5.	3.	0.19		
HYDROGRAPH AT	A2	30.	4.02	1.	0.	0.	0.01		
2 COMBINED AT	CP-A2	265.	4.13	19.	5.	4.	0.21		
HYDROGRAPH AT	B1	21.	4.02	1.	0.	0.	0.01		
HYDROGRAPH AT	C1	15.	4.02	1.	0.	0.	0.01		
HYDROGRAPH AT	D1	4.	4.02	0.	0.	0.	0.00		
3 COMBINED AT	CLEAR	40.	4.02	2.	0.	0.	0.02		
HYDROGRAPH AT	H1	42.	4.02	2.	0.	0.	0.02		
HYDROGRAPH AT	H2	2.	4.02	0.	0.	0.	0.00		
HYDROGRAPH AT	H3	64.	4.07	3.	1.	1.	0.04		
HYDROGRAPH AT	H4	650.	4.43	98.	24.	18.	1.01		
ROUTED TO	R-B4	648.	4.45	98.	24.	18.	1.01		
HYDROGRAPH AT	B4A	48.	4.02	2.	1.	0.	0.03		
HYDROGRAPH AT	B4B	12.	4.02	1.	0.	0.	0.00		
2 COMBINED AT	CPE4AB	60.	4.02	3.	1.	1.	0.03		
ROUTED TO	R-B4A	59.	4.05	3.	1.	1.	0.03		
HYDROGRAPH AT	B4C	30.	4.02	2.	0.	0.	0.01		
6 COMBINED AT	CP-B4	648.	4.45	106.	27.	19.	1.12		
ROUTED TO	R-CPE4	639.	4.45	105.	26.	19.	1.12		
HYDROGRAPH AT	H5	107.	4.07	6.	1.	1.	0.06		
2 COMBINED AT	CP-H5	639.	4.43	109.	27.	20.	1.18		
HYDROGRAPH AT	F1	2.	4.02	0.	0.	0.	0.00		
HYDROGRAPH AT	G1	14.	4.02	1.	0.	0.	0.01		
HYDROGRAPH AT	H1	10.	4.02	0.	0.	0.	0.00		
HYDROGRAPH AT	I1	12.	4.02	1.	0.	0.	0.01		
4 COMBINED AT	CLR2	38.	4.02	2.	0.	0.	0.02		
HYDROGRAPH AT	J1	6.	4.02	0.	0.	0.	0.00		
HYDROGRAPH AT	K1	39.	4.03	2.	0.	0.	0.02		
HYDROGRAPH AT	L1	6.	4.02	0.	0.	0.	0.00		
HYDROGRAPH AT	M1	2.	4.02	0.	0.	0.	0.00		

100-year HEC-1 Model

```

X X XXXXXX XXXX X
X X X X X X XX
X X X X X X X
XXXXXX XXXX X XXXX X
X X X X X X X
X X X X X X X
X X XXXXXX XXXX XXX
  
```

THIS PROGRAM REPLACES ALL PREVIOUS VERSIONS OF HEC-1 KNOWN AS HEC1 (JAN 73), HEC1GS, HEC1DS, AND HEC1EW.

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

1

HEC-1 INPUT

PAGE 1

LINE	ID	1	2	3	4	5	6	7	8	9	10
1	ID	Flood Control District of Maricopa County									
2	ID	DM19 EK - Desert Mountain 19 Existing Condition									
3	ID	100 YEAR									
4	ID	6 Hour Storm									
5	ID	Unit Hydrograph: S-Graph									
6	ID	Storm: Multiple									
7	ID	03/04/2017									
	*DIAGRAM										
8	IT	1	1JAN99	0	2000						
9	IO	5									
10	IN	15									
	*										
11	JD	3.313	0.0001								
12	PC	0.000	0.008	0.016	0.025	0.033	0.041	0.050	0.058	0.066	0.074
13	PC	0.087	0.099	0.118	0.138	0.216	0.377	0.834	0.911	0.931	0.950
14	PC	0.962	0.972	0.983	0.991	1.000					
15	JD	3.293	0.5000								
16	PC	0.000	0.008	0.016	0.025	0.033	0.041	0.050	0.058	0.066	0.074
17	PC	0.087	0.099	0.118	0.138	0.216	0.377	0.834	0.911	0.931	0.950
18	PC	0.962	0.972	0.983	0.991	1.000					
19	JD	3.230	2.8								
20	PC	0.000	0.009	0.016	0.025	0.034	0.042	0.051	0.059	0.067	0.076
21	PC	0.087	0.100	0.120	0.163	0.252	0.451	0.694	0.837	0.900	0.938
22	PC	0.950	0.963	0.975	0.988	1.000					
	*										
23	EK	A1	BASIN								
24	BA	0.192									
25	LG	0.20	0.25	5.34	0.25	0					
26	UI	0	38	38	38	48	111	142	178	217	247
27	UI	272	315	335	346	364	369	369	360	348	329
28	UI	295	268	239	217	185	176	159	144	130	117
29	UI	105	92	86	73	73	60	59	52	41	41
30	UI	41	30	26	26	26	25	9	9	9	9
31	UI	9	9	9	9	9	9	9	9	9	9
32	UI	9	9	0	0	0	0	0	0	0	0
	*										
33	EK	R-A1	ROUTE								
34	RS	1	FLOW								
35	RC	0.060	0.040	0.060	980	0.0224	2613.00				
36	RK	0.00	42.00	73.00	106.00	196.00	229.00	251.00	295.00		
37	RY	20.00	15.00	10.00	7.00	6.00	5.00	13.00	19.00		
	*										
38	EK	A2	BASIN								
39	BA	0.015									
40	LG	0.15	0.25	5.24	0.32	0					
41	UI	0	11	43	80	103	103	78	53	36	24
42	UI	17	11	8	4	3	3	3	0	0	0
43	UI	0	0	0	0	0	0	0	0	0	0
44	UI	0	0	0	0	0	0	0	0	0	0
45	UI	0	0	0	0	0	0	0	0	0	0
	*										

1

HEC-1 INPUT

PAGE 2

LINE	ID	1	2	3	4	5	6	7	8	9	10
46	EK	CP-A2	COMBINE								
47	RC	2									
	*										
48	EK	B1	BASIN								
49	BA	0.011									
50	LG	0.20	0.25	4.33	0.42	0					
51	UI	0	7	18	32	44	62	62	50	32	22

54	UI	0	0	0	0	0	0	0	0	0	0
55	UI	0	0	0	0	0	0	0	0	0	0
* .											
56	KK	C1	BASIN								
57	BA	0.008									
58	LG	0.20	0.25	4.33	0.42	0					
59	UI	0	5	16	33	45	51	46	33	24	17
60	UI	12	9	6	4	3	1	1	1	1	0
61	UI	0	0	0	0	0	0	0	0	0	0
62	UI	0	0	0	0	0	0	0	0	0	0
63	UI	0	0	0	0	0	0	0	0	0	0
* .											

64	KK	D1	BASIN								
65	BA	0.002									
66	LG	0.20	0.25	4.33	0.42	0					
67	UI	0	5	19	24	15	7	4	2	1	1
68	UI	0	0	0	0	0	0	0	0	0	0
69	UI	0	0	0	0	0	0	0	0	0	0
70	UI	0	0	0	0	0	0	0	0	0	0
71	UI	0	0	0	0	0	0	0	0	0	0
* .											

72	KK	CLEAR	COMBINE								
73	RC	3									
* .											
74	KK	E1	BASIN								
75	BA	0.022									
76	LG	0.20	0.25	5.05	0.31	0					
77	UI	0	12	23	55	81	101	111	106	88	66
78	UI	51	39	29	23	17	12	9	8	5	3
79	UI	3	3	3	3	0	0	0	0	0	0
80	UI	0	0	0	0	0	0	0	0	0	0
81	UI	0	0	0	0	0	0	0	0	0	0
* .											

82	KK	E2	BASIN								
83	BA	0.001									
84	LG	0.20	0.25	5.05	0.29	0					
85	UI	0	8	18	8	3	1	0	0	0	0
86	UI	0	0	0	0	0	0	0	0	0	0
87	UI	0	0	0	0	0	0	0	0	0	0
* .											

HEC-1 INPUT

PAGE 3

LINE	ID	1	2	3	4	5	6	7	8	9	10
88	UI	0	0	0	0	0	0	0	0	0	0
89	UI	0	0	0	0	0	0	0	0	0	0
* .											

90	KK	E3	BASIN								
91	BA	0.038									
92	LG	0.20	0.25	5.05	0.30	0					
93	UI	0	12	12	26	47	66	83	99	110	117
94	UI	118	113	105	88	74	63	54	45	38	32
95	UI	27	23	19	17	13	13	8	8	8	5
96	UI	3	3	3	3	3	3	3	3	3	0
97	UI	0	0	0	0	0	0	0	0	0	0
* .											

98	KK	E4	BASIN								
99	BA	1.008									
100	LG	0.21	0.25	5.34	0.28	12					
101	UI	0	92	92	92	92	92	92	92	92	105
102	UI	265	265	321	360	394	442	483	511	558	592
103	UI	630	658	646	758	758	785	815	818	844	828
104	UI	884	884	884	884	884	884	880	848	839	826
105	UI	823	786	763	715	676	643	643	589	561	544
106	UI	506	490	471	441	433	401	399	360	360	331
107	UI	326	306	283	283	261	253	253	224	206	206
108	UI	206	180	174	174	174	163	141	141	141	141
109	UI	141	106	98	98	98	98	98	98	98	69
110	UI	63	63	63	63	63	63	63	63	63	63
111	UI	63	44	22	22	22	22	22	22	22	22
112	UI	22	22	22	22	22	22	22	22	22	22
113	UI	22	22	22	22	22	22	22	22	22	22
114	UI	22	22	22	22	22	22	0	0	0	0
* .											

115	KK	R-B4	ROUTE								
116	RS	1	FLOW								
117	RC	0.035	0.035	0.035	1310	0.0200	0.00				
118	RX	0.00	4.00	8.00	20.00	44.00	52.00	56.00	64.00		
119	RY	2680.0	2679.00	2678.00	2675.00	2675.00	2678.00	2679.00	2680.00		
* .											

120	KK	E4A	BASIN								
121	BA	0.027									
122	LG	0.19	0.25	4.28	0.50	7					
123	UI	0	15	32	72	106	131	141	131	104	78
124	UI	59	45	33	25	19	15	10	10	4	4
125	UI	4	4	4	0	0	0	0	0	0	0
126	UI	0	0	0	0	0	0	0	0	0	0
127	UI	0	0	0	0	0	0	0	0	0	0
* .											

HEC-1 INPUT

PAGE 4

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

128	KK	E4B	BASIN								
-----	----	-----	-------	--	--	--	--	--	--	--	--

INPUT LINE	(V) ROUTING	(--->) DIVERSION OR PUMP FLOW
NO.	(.) CONNECTOR	(<---) RETURN OF DIVERTED OR PUMPED FLOW
23	A1	
	V	
33	R-A1	
	.	
38	A2	
	.	
46	CP-A2.....	
	.	
48	B1	
	.	
56	C1	
	.	
64	D1	
	.	
72	CLEAR.....	
	.	
74	B1	
	.	
82	E2	
	.	
90	E3	
	.	
98	E4	
	V	
	V	
115	R-B4	
	.	
120	E4A	
	.	
128	E4B	
	.	
136	CPE4AB.....	
	V	
	V	
138	R-B4A	
	.	
143	E4C	
	.	
151	CP-B4.....	
	V	
	V	
153	R-CPE4	
	.	
158	E5	
	.	
166	CP-B5.....	
	.	
168	F1	
	.	
176	G1	
	.	
184	H1	
	.	
192	I1	
	.	
200	CLR2.....	
	.	
202	J1	
	.	
210	K1	
	.	
218	L1	
	.	
226	M1	

(***) RUNOFF ALSO COMPUTED AT THIS LOCATION

FLOW IN CUBIC FEET PER SECOND
 TIME IN HOURS, AREA IN SQUARE MILES

OPERATION	STATION	PEAK FLOW	TIME OF PEAK	AVERAGE FLOW FOR MAXIMUM PERIOD			BASIN AREA	MAXIMUM STAGE	TIME OF MAX STAGE
				6-HOUR	24-HOUR	72-HOUR			
HYDROGRAPH AT	A1	460.	4.13	37.	9.	7.	0.19		
ROUTED TO	R-A1	460.	4.13	37.	9.	7.	0.19		
HYDROGRAPH AT	A2	51.	4.02	3.	1.	0.	0.01		
2 COMBINED AT	CP-A2	472.	4.12	39.	10.	7.	0.21		
HYDROGRAPH AT	B1	36.	4.02	2.	0.	0.	0.01		
HYDROGRAPH AT	C1	26.	4.02	1.	0.	0.	0.01		
HYDROGRAPH AT	D1	7.	4.02	0.	0.	0.	0.00		
3 COMBINED AT	CLEAR	69.	4.02	4.	1.	1.	0.02		
HYDROGRAPH AT	E1	72.	4.02	4.	1.	1.	0.02		
HYDROGRAPH AT	E2	3.	4.02	0.	0.	0.	0.00		
HYDROGRAPH AT	E3	112.	4.07	7.	2.	1.	0.04		
HYDROGRAPH AT	E4	1240.	4.42	194.	49.	35.	1.01		
ROUTED TO	R-B4	1245.	4.43	194.	49.	35.	1.01		
HYDROGRAPH AT	E4A	86.	4.02	5.	1.	1.	0.03		
HYDROGRAPH AT	E4B	19.	4.02	2.	0.	0.	0.00		
2 COMBINED AT	CPE4AB	104.	4.02	6.	2.	1.	0.03		
ROUTED TO	R-B4A	104.	4.03	6.	2.	1.	0.03		
HYDROGRAPH AT	E4C	50.	4.02	3.	1.	1.	0.01		
6 COMBINED AT	CP-B4	1245.	4.42	211.	53.	38.	1.12		
ROUTED TO	R-CPE4	1245.	4.42	211.	53.	38.	1.12		
HYDROGRAPH AT	E5	185.	4.07	12.	3.	2.	0.06		
2 COMBINED AT	CP-E5	1260.	4.40	221.	55.	40.	1.18		
HYDROGRAPH AT	F1	4.	4.02	0.	0.	0.	0.00		
HYDROGRAPH AT	G1	23.	4.02	1.	0.	0.	0.01		
HYDROGRAPH AT	H1	17.	4.02	1.	0.	0.	0.00		
HYDROGRAPH AT	I1	20.	4.02	1.	0.	0.	0.01		
4 COMBINED AT	CLR2	64.	4.02	4.	1.	1.	0.02		
HYDROGRAPH AT	J1	11.	4.02	1.	0.	0.	0.00		
HYDROGRAPH AT	K1	66.	4.02	4.	1.	1.	0.02		
HYDROGRAPH AT	L1	10.	4.02	1.	0.	0.	0.00		
HYDROGRAPH AT	M1	3.	4.02	0.	0.	0.	0.00		

APPENDIX B

Developed Condition Hydrologic Calculations

DDMSW Output Data

2-year HEC-1 Model

10-year HEC-1 Model

100-year HEC-1 Model

DDMSW Output Data

ID	Method	Duration	2 Yr	5 Yr	10 Yr	25 Yr	50 Yr	100 Yr
DEFAULT	CUSTOM	5 MIN	0.328	0.442	0.528	0.642	0.728	0.815
	CUSTOM	10 MIN	0.500	0.673	0.803	0.977	1.108	1.240
	CUSTOM	15 MIN	0.620	0.834	0.996	1.211	1.374	1.537
	CUSTOM	30 MIN	0.834	1.123	1.341	1.630	1.850	2.070
	CUSTOM	1 HOUR	1.032	1.390	1.660	2.018	2.289	2.562
	CUSTOM	2 HOUR	1.187	1.573	1.871	2.273	2.579	2.896
	CUSTOM	3 HOUR	1.263	1.641	1.944	2.364	2.697	3.043
	CUSTOM	6 HOUR	1.475	1.867	2.182	2.617	2.958	3.313
	CUSTOM	12 HOUR	1.783	2.233	2.592	3.079	3.454	3.841
	CUSTOM	24 HOUR	2.084	2.733	3.265	4.024	4.650	5.318

Area ID	Book Number	Map Unit	Soil ID	Area (sq mi)	Area (%)	XKSAT	Rock Percent (%)	Effective Rock (%)	Comments
Major Basin ID: 01									
A1	645	33	64533	0.080	41.40	0.230	-	100	
	645	40	64540	0.083	43.40	0.170	-	100	
	645	93	64593	0.023	11.80	0.330	-	100	
	645	96	64596	0.007	3.40	0.070	-	100	
A2	645	93	64593	0.007	63.60	0.330	-	100	
	645	96	64596	0.004	36.40	0.070	-	100	
B1	645	33	64533	0.022	100.00	0.230	-	100	
B10	645	93	64593	0.023	100.00	0.330	-	100	
B11	645	96	64596	0.002	95.00	0.070	-	100	
	645	34	64534	0.000	5.00	0.230	-	100	
B12	645	6	6456	0.001	50.00	0.620	-	100	
	645	93	64593	0.001	50.00	0.330	-	100	
B13	645	93	64593	0.000	10.00	0.330	-	100	
	645	96	64596	0.000	10.00	0.070	-	100	
	645	6	6456	0.001	80.00	0.620	-	100	
B14	645	96	64596	0.003	96.70	0.070	-	100	
	645	34	64534	0.000	3.30	0.230	-	100	
B15	645	6	6456	0.000	3.30	0.620	-	100	
	645	96	64596	0.003	96.70	0.070	-	100	
B16	645	6	6456	0.001	56.50	0.620	-	100	
	645	96	64596	0.001	30.40	0.070	-	100	
	645	6	6456	0.000	13.00	0.620	-	100	
B17	645	96	64596	0.000	10.00	0.070	-	100	
	645	6	6456	0.001	90.00	0.620	-	100	
B18	645	6	6456	0.002	66.70	0.620	-	100	
	645	96	64596	0.001	33.30	0.070	-	100	
B19	645	93	64593	0.003	43.30	0.330	-	100	
	645	6	6456	0.003	56.70	0.620	-	100	
B3	645	33	64533	0.039	100.00	0.230	-	100	
B4	645	6	6456	0.020	2.00	0.620	-	100	
	645	33	64533	0.696	69.00	0.230	-	100	
	655	AnB	655204722	0.050	5.00	0.400	-	100	
	645	40	64540	0.010	1.00	0.170	-	100	
	645	63	64563	0.151	15.00	0.140	25.00	100	
	645	96	64596	0.081	8.00	0.070	-	100	
B4A	645	6	6456	0.011	41.90	0.620	-	100	
	645	96	64596	0.001	2.60	0.070	-	100	
	645	34	64534	0.000	0.40	0.230	-	100	
	645	33	64533	0.015	55.20	0.230	-	100	
B4B	645	34	64534	0.000	6.00	0.230	-	100	
	645	6	6456	0.001	18.00	0.620	-	100	
	645	33	64533	0.004	76.00	0.230	-	100	
B4C	645	6	6456	0.008	50.70	0.620	-	100	
	645	96	64596	0.003	21.30	0.070	-	100	
	645	34	64534	0.001	8.70	0.230	-	100	
	645	33	64533	0.003	19.30	0.230	-	100	
B5	645	6	6456	0.001	46.70	0.620	-	100	
	645	96	64596	0.002	53.30	0.070	-	100	
B6	645	6	6456	0.001	32.50	0.620	-	100	
	645	33	64533	0.003	67.50	0.230	-	100	
B6W	645	93	64593	0.000	2.50	0.330	-	100	
	645	33	64533	0.000	7.50	0.230	-	100	
	645	6	6456	0.004	90.00	0.620	-	100	
B7	645	6	6456	0.003	80.00	0.620	-	100	
	645	96	64596	0.000	10.00	0.070	-	100	
	645	93	64593	0.000	10.00	0.330	-	100	

Area ID	Book Number	Map Unit	Soil ID	Area (sq mi)	Area (%)	XKSAT	Rock Percent (%)	Effective Rock (%)	Comments
Major Basin ID: 01									
B8	645	93	64593	0.007	40.60	0.330	-	100	
	645	6	6456	0.000	1.70	0.620	-	100	
B9	645	93	64593	0.001	90.00	0.330	-	100	
	645	34	64534	0.000	10.00	0.230	-	100	
C1	645	33	64533	0.001	11.00	0.230	-	100	
	645	34	64534	0.009	88.00	0.230	-	100	
	645	96	64596	0.000	1.00	0.070	-	100	
C10	645	34	64534	0.000	5.00	0.230	-	100	
	645	96	64596	0.002	95.00	0.070	-	100	
C2	645	34	64534	0.012	100.00	0.230	-	100	
C3	645	34	64534	0.002	100.00	0.230	-	100	
C3A	645	34	64534	0.003	100.00	0.230	-	100	
C4	645	34	64534	0.002	32.00	0.230	-	100	
	645	96	64596	0.003	68.00	0.070	-	100	
C5	645	96	64596	0.000	13.30	0.070	-	100	
	645	33	64533	0.002	50.00	0.230	-	100	
	645	34	64534	0.001	36.70	0.230	-	100	
C5A	645	34	64534	0.001	36.70	0.230	-	100	
	645	33	64533	0.001	26.70	0.230	-	100	
	645	96	64596	0.001	36.70	0.070	-	100	
C6	645	34	64534	0.001	70.00	0.230	-	100	
	645	33	64533	0.000	30.00	0.230	-	100	
C7	645	34	64534	0.001	100.00	0.230	-	100	
C8	645	34	64534	0.002	76.70	0.230	-	100	
	645	96	64596	0.001	23.30	0.070	-	100	
C9	645	34	64534	0.003	67.50	0.230	-	100	
	645	96	64596	0.001	32.50	0.070	-	100	
L1	645	33	64533	0.003	100.00	0.230	-	100	
M1	645	33	64533	0.002	100.00	0.230	-	100	

Flood Control District of Maricopa County
 Drainage Design Management System
LAND USE
 Project Reference: DM-19 FUT WR BAS

Land Use Code	Area (sq mi)	Area (%)	Initial Loss (IA)	Percent Impervious (RTIMP)	Vegetation Cover (%)	DTHETA	Kn	Description
Basin ID: 01								
901	0.0124	6.5	0.20	0	75.0	NORMAL	0.030	Recreational Open Space
902	0.1796	93.5	0.20	0	30.0	NORMAL	0.040	Rural (1 dwelling unit per acre or less)
	0.1920	100.0						
730	0.0032	29.1	0.10	0	50.0	NORMAL	0.040	Passive Open Space (Includes mountain preserves and wa
902	0.0078	70.9	0.20	0	30.0	NORMAL	0.040	Rural (1 dwelling unit per acre or less)
	0.0110	100.0						
900	0.0018	8.3	0.20	0	30.0	NORMAL	0.045	Vacant (Existing land use database only)
901	0.0045	20.7	0.20	0	75.0	NORMAL	0.030	Recreational Open Space
902	0.0154	71.0	0.20	0	30.0	NORMAL	0.040	Rural (1 dwelling unit per acre or less)
	0.0217	100.0						
180	0.0132	56.2	0.25	45	50.0	NORMAL	0.020	High Density Residential - Multi Family (10-15 du per acre)
2001	0.0070	29.8	0.20	0	30.0	NORMAL	0.020	Landscaping w/o impervious under treatment
630	0.0005	2.1	0.10	80	75.0	NORMAL	0.020	Transportation
720	0.0028	11.9	0.10	5	90.0	NORMAL	0.020	Golf courses
	0.0235	100.0						
230	0.0005	25.0	0.10	80	30.0	NORMAL	0.020	Community Commercial (100,000 to 500,000 sq. ft.)
720	0.0013	65.0	0.10	5	90.0	NORMAL	0.020	Golf courses
740	0.0002	10.0	0.00	0	0.0	WET	0.020	Water
	0.0020	100.0						
720	0.0020	100.0	0.10	5	90.0	NORMAL	0.020	Golf courses
	0.0020	100.0						

* Non default value

Flood Control District of Maricopa County
 Drainage Design Management System
LAND USE
 Project Reference: DM-19 FUT WR BAS

Land Use Code	Area (sq mi)	Area (%)	Initial Loss (IA)	Percent Impervious (RTIMP)	Vegetation Cover (%)	DTHETA	Kn	Description
Basin ID: 01								
180	0.0007	70.0	0.25	45	50.0	NORMAL	0.020	High Density Residential - Multi Family (10-15 du per acre)
630	0.0003	30.0	0.10	80	75.0	NORMAL	0.020	Transportation
	0.0010	100.0						
180	0.0001	3.3	0.25	45	50.0	NORMAL	0.020	High Density Residential - Multi Family (10-15 du per acre)
2001	0.0010	33.3	0.20	0	30.0	NORMAL	0.020	Landscaping w/o impervious under treatment
630	0.0002	6.7	0.10	80	75.0	NORMAL	0.020	Transportation
720	0.0012	40.0	0.10	5	90.0	NORMAL	0.020	Golf courses
740	0.0005	16.7	0.00	0	0.0	WET	0.020	Water
	0.0030	100.0						
2001	0.0009	34.6	0.20	0	30.0	NORMAL	0.020	Landscaping w/o impervious under treatment
630	0.0002	7.7	0.10	80	75.0	NORMAL	0.020	Transportation
720	0.0009	34.6	0.10	5	90.0	NORMAL	0.020	Golf courses
740	0.0006	23.1	0.00	0	0.0	WET	0.020	Water
	0.0026	100.0						
2001	0.0008	80.0	0.20	0	30.0	NORMAL	0.020	Landscaping w/o impervious under treatment
630	0.0001	10.0	0.10	80	75.0	NORMAL	0.020	Transportation
720	0.0001	10.0	0.10	5	90.0	NORMAL	0.020	Golf courses
	0.0010	100.0						
740	0.0010	100.0	0.00	0	0.0	WET	0.020	Water
	0.0010	100.0						
2001	0.0012	40.0	0.20	0	30.0	NORMAL	0.020	Landscaping w/o impervious under treatment

* Non default value

Flood Control District of Maricopa County
 Drainage Design Management System
LAND USE
 Project Reference: DM-19 FUT WR BAS

Land Use Code	Area (sq mi)	Area (%)	Initial Loss (IA)	Percent Impervious (RTIMP)	Vegetation Cover (%)	DTHETA	Kn	Description
Basin ID: 01								
630	0.0001	3.3	0.10	80	75.0	NORMAL	0.020	Transportation
720	0.0017	56.7	0.10	5	90.0	NORMAL	0.020	Golf courses
	0.0030	100.0						
2001	0.0023	39.0	0.20	0	30.0	NORMAL	0.020	Landscaping w/o impervious under treatment
630	0.0001	1.7	0.10	80	75.0	NORMAL	0.020	Transportation
730	0.0035	59.3	0.10	0	50.0	NORMAL	0.040	Passive Open Space (Includes mountain preserves and wa
	0.0059	100.0						
210	0.0007	1.8	0.10	80	65.0	NORMAL	0.020	Specialty Commercial (<=50,000 sq. ft.)
900	0.0114	29.0	0.20	0	30.0	NORMAL	0.045	Vacant (Existing land use database only)
901	0.0065	16.5	0.20	0	75.0	NORMAL	0.030	Recreational Open Space
902	0.0207	52.7	0.20	0	30.0	NORMAL	0.040	Rural (1 dwelling unit per acre or less)
	0.0393	100.0						
170	0.1185	11.8	0.25	45	50.0	NORMAL	0.020	Medium Density Residential - Multi Family (5-10 du per acre)
180	0.0270	2.7	0.25	45	50.0	NORMAL	0.020	High Density Residential - Multi Family (10-15 du per acre)
220	0.0177	1.8	0.07	80	10.0	NORMAL	0.020	Neighborhood Retail Center
900	0.1769	17.6	0.20	0	30.0	NORMAL	0.045	Vacant (Existing land use database only)
901	0.2114	21.0	0.20	0	75.0	NORMAL	0.030	Recreational Open Space
902	0.4563	45.3	0.20	0	30.0	NORMAL	0.040	Rural (1 dwelling unit per acre or less)
	1.0078	100.2						
210	0.0024	8.9	0.10	80	65.0	NORMAL	0.020	Specialty Commercial (<=50,000 sq. ft.)
900	0.0110	40.7	0.20	0	30.0	NORMAL	0.045	Vacant (Existing land use database only)

* Non default value

Flood Control District of Maricopa County
 Drainage Design Management System
LAND USE
 Project Reference: DM-19 FUT WR BAS

Land Use Code	Area (sq mi)	Area (%)	Initial Loss (IA)	Percent Impervious (RTIMP)	Vegetation Cover (%)	DTHETA	Kn	Description
Basin ID: 01								
901	0.0110	40.7	0.20	0	75.0	NORMAL	0.030	Recreational Open Space
902	0.0026	9.6	0.20	0	30.0	NORMAL	0.040	Rural (1 dwelling unit per acre or less)
	0.0270	99.9						
630	0.0047	100.0	0.10	80	75.0	NORMAL	0.020	Transportation
	0.0047	100.0						
210	0.0023	15.1	0.10	80	65.0	NORMAL	0.020	Specialty Commercial (<=50,000 sq. ft.)
900	0.0129	84.9	0.20	0	30.0	NORMAL	0.045	Vacant (Existing land use database only)
	0.0152	100.0						
230	0.0033	100.0	0.10	80	30.0	NORMAL	0.020	Community Commercial (100,000 to 500,000 sq. ft.)
	0.0033	100.0						
180	0.0019	47.5	0.25	45	50.0	NORMAL	0.020	High Density Residential - Multi Family (10-15 du per acre)
2001	0.0010	25.0	0.20	0	30.0	NORMAL	0.020	Landscaping w/o impervious under treatment
630	0.0001	2.5	0.10	80	75.0	NORMAL	0.020	Transportation
720	0.0010	25.0	0.10	5	90.0	NORMAL	0.020	Golf courses
	0.0040	100.0						
2001	0.0011	27.5	0.20	0	30.0	NORMAL	0.020	Landscaping w/o impervious under treatment
720	0.0001	2.5	0.10	5	90.0	NORMAL	0.020	Golf courses
730	0.0028	70.0	0.10	0	50.0	NORMAL	0.040	Passive Open Space (Includes mountain preserves and wa
	0.0040	100.0						
180	0.0015	37.5	0.25	45	50.0	NORMAL	0.020	High Density Residential - Multi Family (10-15 du per acre)
2001	0.0013	32.5	0.20	0	30.0	NORMAL	0.020	Landscaping w/o impervious under treatment

* Non default value

Flood Control District of Maricopa County
 Drainage Design Management System
LAND USE
 Project Reference: DM-19 FUT WR BAS

Land Use Code	Area (sq mi)	Area (%)	Initial Loss (IA)	Percent Impervious (RTIMP)	Vegetation Cover (%)	DTHETA	Kn	Description
Basin ID: 01								
630	0.0001	2.5	0.10	80	75.0	NORMAL	0.020	Transportation
700	0.0002	5.0	0.10	5	90.0	NORMAL	0.025	General Open Space (Open space where no detail available)
720	0.0009	22.5	0.10	5	90.0	NORMAL	0.020	Golf courses
	0.0040	100.0						
180	0.0101	58.0	0.25	45	50.0	NORMAL	0.020	High Density Residential - Multi Family (10-15 du per acre)
2001	0.0050	28.7	0.20	0	30.0	NORMAL	0.020	Landscaping w/o impervious under treatment
630	0.0003	1.7	0.10	80	75.0	NORMAL	0.020	Transportation
720	0.0020	11.5	0.10	5	90.0	NORMAL	0.020	Golf courses
	0.0174	99.9						
180	0.0008	80.0	0.25	45	50.0	NORMAL	0.020	High Density Residential - Multi Family (10-15 du per acre)
2001	0.0002	20.0	0.20	0	30.0	NORMAL	0.020	Landscaping w/o impervious under treatment
	0.0010	100.0						
180	0.0021	21.0	0.25	45	50.0	NORMAL	0.020	High Density Residential - Multi Family (10-15 du per acre)
2001	0.0032	32.0	0.20	0	30.0	NORMAL	0.020	Landscaping w/o impervious under treatment
630	0.0001	1.0	0.10	80	75.0	NORMAL	0.020	Transportation
720	0.0046	46.0	0.10	5	90.0	NORMAL	0.020	Golf courses
	0.0100	100.0						
180	0.0015	75.0	0.25	45	50.0	NORMAL	0.020	High Density Residential - Multi Family (10-15 du per acre)
630	0.0005	25.0	0.10	80	75.0	NORMAL	0.020	Transportation
	0.0020	100.0						
180	0.0048	38.4	0.25	45	50.0	NORMAL	0.020	High Density Residential - Multi Family (10-15 du per acre)

* Non default value

Flood Control District of Maricopa County
 Drainage Design Management System
LAND USE
 Project Reference: DM-19 FUT WR BAS

Land Use Code	Area (sq mi)	Area (%)	Initial Loss (IA)	Percent Impervious (RTIMP)	Vegetation Cover (%)	DTHETA	Kn	Description
Basin ID: 01								
2001	0.0035	28.0	0.20	0	30.0	NORMAL	0.020	Landscaping w/o impervious under treatment
630	0.0005	4.0	0.10	80	75.0	NORMAL	0.020	Transportation
720	0.0037	29.6	0.10	5	90.0	NORMAL	0.020	Golf courses
	0.0125	100.0						
180	0.0011	57.9	0.25	45	50.0	NORMAL	0.020	High Density Residential - Multi Family (10-15 du per acre)
2001	0.0006	31.6	0.20	0	30.0	NORMAL	0.020	Landscaping w/o impervious under treatment
630	0.0001	5.3	0.10	80	75.0	NORMAL	0.020	Transportation
720	0.0001	5.3	0.10	5	90.0	NORMAL	0.020	Golf courses
	0.0019	100.1						
2001	0.0013	43.3	0.20	0	30.0	NORMAL	0.020	Landscaping w/o impervious under treatment
630	0.0002	6.7	0.10	80	75.0	NORMAL	0.020	Transportation
720	0.0015	50.0	0.10	5	90.0	NORMAL	0.020	Golf courses
	0.0030	100.0						
180	0.0050	100.0	0.25	45	50.0	NORMAL	0.020	High Density Residential - Multi Family (10-15 du per acre)
	0.0050	100.0						
630	0.0030	100.0	0.10	80	75.0	NORMAL	0.020	Transportation
	0.0030	100.0						
2001	0.0010	33.3	0.20	0	30.0	NORMAL	0.020	Landscaping w/o impervious under treatment
210	0.0014	46.7	0.10	80	65.0	NORMAL	0.020	Specialty Commercial (<=50,000 sq. ft.)
NDR	0.0006	20.0	0.35	0	30.0	DRY	0.025	Undeveloped Desert with Slopes < 5%
	0.0030	100.0						

* Non default value

Flood Control District of Maricopa County
 Drainage Design Management System
LAND USE
 Project Reference: DM-19 FUT WR BAS

Land Use Code	Area (sq mi)	Area (%)	Initial Loss (IA)	Percent Impervious (RTIMP)	Vegetation Cover (%)	DTHETA	Kn	Description
Basin ID: 01								
2001	0.0009	90.0	0.20	0	30.0	NORMAL	0.020	Landscaping w/o impervious under treatment
630	0.0001	10.0	0.10	80	75.0	NORMAL	0.020	Transportation
	0.0010	100.0						
2001	0.0003	27.3	0.20	0	30.0	NORMAL	0.020	Landscaping w/o impervious under treatment
630	0.0001	9.1	0.10	80	75.0	NORMAL	0.020	Transportation
720	0.0007	63.6	0.10	5	90.0	NORMAL	0.020	Golf courses
	0.0011	100.0						
180	0.0004	13.3	0.25	45	50.0	NORMAL	0.020	High Density Residential - Multi Family (10-15 du per acre)
2001	0.0005	16.7	0.20	0	30.0	NORMAL	0.020	Landscaping w/o impervious under treatment
720	0.0018	60.0	0.10	5	90.0	NORMAL	0.020	Golf courses
740	0.0003	10.0	0.00	0	0.0	WET	0.020	Water
	0.0030	100.0						
180	0.0040	100.0	0.25	45	50.0	NORMAL	0.020	High Density Residential - Multi Family (10-15 du per acre)
	0.0040	100.0						
900	0.0027	100.0	0.20	0	30.0	NORMAL	0.045	Vacant (Existing land use database only)
	0.0027	100.0						
900	0.0015	100.0	0.20	0	30.0	NORMAL	0.045	Vacant (Existing land use database only)
	0.0015	100.0						

* Non default value

Flood Control District of Maricopa County
 Drainage Design Management System
 SUB BASINS
 Project Reference: DM-19 FUT WR BAS

Sub Basin ID	Sub Basin Parameters								Rainfall Losses				
	Area (sq mi)	Length (mi)	Slope (ft/mi)	S-Graph	Lca (mi)	Lag (min)	Velocity (f/s)	Kn	IA (in)	DTHETA	PSIF (in)	XKSAT (in/hr)	RTIMP (%)
Major Basin ID: 01													
	0.192	0.95	134.1	DESERT/RANGE	0.51	16.80	4.96	0.039	0.20	0.25	5.34	0.254	
	0.004	0.17	126.5	DESERT/RANGE	0.08	3.80	3.87	0.034	0.13	0.27	3.42	0.788	
	0.011	0.19	118.3	DESERT/RANGE	0.10	5.10	3.20	0.040	0.17	0.25	5.46	0.243	
	0.003	0.09	94.1	VALLEY	0.04	1.40	5.34	0.020	0.10	0.25	5.46	0.237	80
	0.004	0.08	160.0	VALLEY	0.03	1.10	6.10	0.020	0.19	0.26	3.72	0.704	20
	0.004	0.06	145.5	VALLEY	0.02	.80	5.76	0.020	0.20	0.25	4.39	0.480	25
	0.018	0.35	81.2	VALLEY	0.20	4.50	6.71	0.020	0.22	0.25	4.72	0.390	28
	0.022	0.31	184.7	DESERT/RANGE	0.15	6.40	4.35	0.038	0.20	0.25	5.05	0.306	
	0.001	0.04	25.0	VALLEY	0.02	1.00	3.39	0.020	0.24	0.25	4.39	0.447	36
	0.023	0.23	160.0	VALLEY	0.10	2.60	7.62	0.020	0.21	0.25	4.33	0.475	28
	0.039	0.57	146.3	DESERT/RANGE	0.25	10.40	4.85	0.039	0.20	0.25	5.05	0.301	1
	0.002	0.06	293.1	VALLEY	0.02	.80	6.80	0.020	0.09	0.14	7.58	0.122	23
	1.008	3.40	174.8	DESERT/RANGE	1.58	36.80	8.13	0.036	0.21	0.25	5.34	0.276	12
	0.002	0.07	30.8	VALLEY	0.03	1.40	4.08	0.020	0.10	0.25	3.79	0.856	5
	0.001	0.08	102.6	VALLEY	0.05	1.50	4.73	0.020	0.21	0.26	3.72	0.718	56
	0.027	0.25	121.5	DESERT/RANGE	0.17	6.20	3.48	0.036	0.19	0.25	4.28	0.493	7
	0.003	0.09	159.1	VALLEY	0.04	1.30	6.03	0.020	0.12	0.12	7.94	0.107	9
	0.005	0.35	121.7	VALLEY	0.17	3.90	7.71	0.020	0.10	0.25	4.65	0.473	80
	0.010	0.12	292.7	VALLEY	0.05	1.40	7.65	0.020	0.16	0.25	5.05	0.360	13
	0.003	0.08	170.7	VALLEY	0.04	1.20	5.85	0.020	0.11	0.12	7.58	0.107	8
	0.015	0.16	140.2	DESERT/RANGE	0.11	5.00	2.88	0.041	0.18	0.25	4.51	0.379	12

* Non default value

Flood Control District of Maricopa County
 Drainage Design Management System
 SUB BASINS

Project Reference: DM-19 FUT WR BAS

3/9/20

Sub Basin ID	Sub Basin Parameters								Rainfall Losses				
	Area (sq mi)	Length (mi)	Slope (ft/mi)	S-Graph	Lca (mi)	Lag (min)	Velocity (f/s)	Kn	IA (in)	DTHETA	PSIF (in)	XKSAT (in/hr)	RTIMP (%)
Major Basin ID: 01													
	0.012	0.17	150.3	VALLEY	0.07	2.10	7.33	0.020	0.19	0.25	5.05	0.350	22
6	0.001	0.04	55.6	VALLEY	0.01	.70	4.80	0.020	0.18	0.25	4.39	0.429	9
	0.002	0.05	9.4	VALLEY	0.02	1.40	3.35	0.020	0.22	0.25	5.05	0.324	31
7	0.001	0.03	37.0	VALLEY	0.01	.60	3.72	0.020			3.62	0.499	
	0.005	0.09	109.9	VALLEY	0.03	1.30	6.40	0.020	0.25	0.15	7.00	0.148	45
B	0.003	0.08	259.7	VALLEY	0.02	.90	7.93	0.020	0.14	0.25	4.51	0.486	5
A	0.003	0.08	217.9	VALLEY	0.02	.90	7.73	0.020	0.14	0.25	5.05	0.366	8
D	0.006	0.13	150.4	VALLEY	0.07	3.00	3.89	0.032	0.14	0.26	3.72	0.642	1
	0.003	0.14	27.8	VALLEY	0.07	2.70	4.75	0.020	0.10	0.25	5.34	0.339	80
	0.002	0.08	243.6	DESERT/RANGE	0.04	2.50	2.70	0.045	0.20	0.25	5.05	0.281	
A	0.003	0.13	30.1	VALLEY	0.06	2.50	4.63	0.021	0.18	0.28	6.00	0.209	37
	0.001	0.08	202.4	DESERT/RANGE	0.04	2.70	2.72	0.045	0.20	0.25	5.05	0.281	
	0.001	0.03	240.0	VALLEY	0.01	.40	5.06	0.020	0.19	0.25	5.05	0.292	8
	0.001	0.04	256.4	VALLEY	0.02	.70	5.19	0.020	0.13	0.25	5.05	0.389	10
	0.003	0.04	314.3	VALLEY	0.02	.60	5.04	0.020	0.13	0.23	5.58	0.284	9
	0.004	0.10	144.2	VALLEY	0.06	1.60	5.63	0.020	0.25	0.25	5.85	0.226	45
D	0.002	0.12	111.1	VALLEY	0.08	2.00	5.16	0.020	0.21	0.15	7.58	0.113	54

* Non default value

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Flood Control District of Maricopa County
 Drainage Design Management System
 HEC-1 DIVERSIONS
 Project Reference: DM-19 FUT WR BAS

Version ID/ Card ID	Maximum Volume (ac-ft)	Maximum Diversion (cfs)	1.	2.	3.	4.	5.	6.	7.	8.	9.	10.
DVOC		158.0										
DTOC												
DVOD		110.0										
DTOD												

Flood Control District of Maricopa County
 Drainage Design Management System
 HEC-1 ROUTING DATA
 Project Reference: DM-19 FUT WR BAS

Route ID	LOB N	Chan N	ROB N	Length (ft)	Slope (ft/ft)	Max Elev (ft)		1.	2.	3.	4.	5.	6.	7.	8.
NORMAL DEPTH															
Major Basin 01															
R-A1	0.060	0.040	0.060	980.00	0.0224	19.00	X:	-	42.00	73.00	106.00	196.00	225.00	251.00	295.00
							Y:	20.00	15.00	10.00	7.00	6.00	5.00	13.00	19.00
R-B1	0.025	0.025	0.025	720.00	0.0030	-	X:	-	4.00	8.00	12.00	16.00	20.00	24.00	28.00
							Y:	2,640.00	2,639.00	2,638.00	2,637.00	2,637.00	2,638.00	2,639.00	2,640.00
R-B4	0.050	0.035	0.050	1,310.00	0.0200	-	X:	-	4.00	8.00	20.00	44.00	52.00	56.00	64.00
							Y:	2,680.00	2,679.00	2,678.00	2,675.00	2,675.00	2,678.00	2,679.00	2,680.00
R-B4A	0.050	0.035	0.050	870.00	0.0210	-	X:	-	6.00	12.00	24.00	74.00	82.00	86.00	90.00
							Y:	2,649.00	2,648.00	2,646.00	2,645.00	2,645.00	2,646.00	2,648.00	2,649.00
R-C8	0.035	0.025	0.035	650.00	0.0200	-	X:	-	4.00	8.00	12.00	22.00	26.00	30.00	34.00
							Y:	2,629.00	2,629.00	2,628.00	2,627.00	2,627.00	2,628.00	2,629.00	2,629.00
R-CPB4	0.060	0.040	0.060	300.00	0.0300	2,631.00	X:	-	18.90	43.80	54.80	81.50	91.60	120.00	160.00
							Y:	2,635.00	2,630.00	2,629.00	2,625.00	2,625.00	2,629.00	2,630.00	2,631.00
R-CPB5	0.060	0.040	0.060	650.00	0.0300	2,631.00	X:	-	18.90	43.80	54.80	81.50	91.60	120.00	160.00
							Y:	2,635.00	2,630.00	2,629.00	2,625.00	2,625.00	2,629.00	2,630.00	2,631.00
R-CPB7	0.060	0.040	0.060	750.00	0.0300	2,605.00	X:	-	55.30	123.80	129.00	141.80	146.00	155.20	188.60
							Y:	2,608.00	2,600.00	2,598.00	2,596.00	2,596.00	2,597.80	2,598.00	2,605.00

Flood Control District of Maricopa County
 Drainage Design Management System
 HEC-1 STORAGE FACILITIES

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Storage Basin ID: DET14A			<u>1</u>	<u>2</u>	<u>3</u>	<u>4</u>	<u>5</u>	<u>6</u>	<u>7</u>	<u>8</u>	<u>9</u>	
Spillway Characteristics (SS)												
Spillway Crest Elevation:	2,615.00	Volume (ac-ft)		0.2								
Spillway Length:	10.00	Discharge (cfs)	0	1	0	0	0	0	0	0	0	
Discharge Coefficient:	2.80	Elevation (ft)	2,615.0	2,616.0	-	-	-	-	-	-	-	
Weir Coefficient:	1.50											
Low-Level Outlet (SL)			<u>11</u>	<u>12</u>	<u>13</u>	<u>14</u>	<u>15</u>	<u>16</u>	<u>17</u>	<u>18</u>	<u>19</u>	
Centerline Elevation:	-NA-	Volume (ac-ft)	-	-	-	-	-	-	-	-	-	
Cross-Section Area:	-NA-	Discharge (cfs)	0	0	0	0	0	0	0	0	0	
Discharge Coefficient:	-NA-	Elevation (ft)	-	-	-	-	-	-	-	-	-	
Orifice Equation Exponent:	-NA-											
Top of Dam Overflow (ST)			<u>2 Yr</u>	<u>5 Yr</u>	<u>10 Yr</u>	<u>25 Yr</u>	<u>50 Yr</u>	<u>100 Yr</u>	Water Feature			
Elevation Top of Dam:	-NA-	Peak Volume (ac-ft)	0.00	0.00	0.00	0.00	0.00	0.00				
Length of Dam:	-NA-	Peak Stage (ft)	0.00	0.00	0.00	0.00	0.00	0.00				
Discharge Coefficient:	-NA-	Peak Discharge (cfs)	7	0	13	0	0	23				
Weir Coefficient:	-NA-											

Storage Basin ID: DET14B			<u>1</u>	<u>2</u>	<u>3</u>	<u>4</u>	<u>5</u>	<u>6</u>	<u>7</u>	<u>8</u>	<u>9</u>	
Spillway Characteristics (SS)												
Spillway Crest Elevation:	2,614.00	Volume (ac-ft)		0.1								
Spillway Length:	10.00	Discharge (cfs)	0	1	0	0	0	0	0	0	0	
Discharge Coefficient:	2.80	Elevation (ft)	2,614.0	2,615.0	-	-	-	-	-	-	-	
Weir Coefficient:	1.50											
Low-Level Outlet (SL)			<u>11</u>	<u>12</u>	<u>13</u>	<u>14</u>	<u>15</u>	<u>16</u>	<u>17</u>	<u>18</u>	<u>19</u>	
Centerline Elevation:	-NA-	Volume (ac-ft)	-	-	-	-	-	-	-	-	-	
Cross-Section Area:	-NA-	Discharge (cfs)	0	0	0	0	0	0	0	0	0	
Discharge Coefficient:	-NA-	Elevation (ft)	-	-	-	-	-	-	-	-	-	
Orifice Equation Exponent:	-NA-											
Top of Dam Overflow (ST)			<u>2 Yr</u>	<u>5 Yr</u>	<u>10 Yr</u>	<u>25 Yr</u>	<u>50 Yr</u>	<u>100 Yr</u>	Water Feature			
Elevation Top of Dam:	-NA-	Peak Volume (ac-ft)	0.00	0.00	0.00	0.00	0.00	0.00				
Length of Dam:	-NA-	Peak Stage (ft)	0.00	0.00	0.00	0.00	0.00	0.00				
Discharge Coefficient:	-NA-	Peak Discharge (cfs)	7	0	13	0	0	23				
Weir Coefficient:	-NA-											

Flood Control District of Maricopa County
 Drainage Design Management System
 HEC-1 STORAGE FACILITIES

Storage Basin ID: DETB10			<u>1</u>	<u>2</u>	<u>3</u>	<u>4</u>	<u>5</u>	<u>6</u>	<u>7</u>	<u>8</u>	<u>9</u>
Spillway Characteristics (SS)											
Spillway Crest Elevation:	2,694.50	Volume (ac-ft)		0.6	1.3	1.7	2.2				
Spillway Length:	20.00	Discharge (cfs)	0	1	1	2	0	0	0	0	0
Discharge Coefficient:	2.80	Elevation (ft)	2,692.0	2,693.0	2,694.0	2,694.5	2,695.0	-	-	-	-
Weir Coefficient:	1.50										
Low-Level Outlet (SL)			<u>11</u>	<u>12</u>	<u>13</u>	<u>14</u>	<u>15</u>	<u>16</u>	<u>17</u>	<u>18</u>	<u>19</u>
Centerline Elevation:	2,692.00	Volume (ac-ft)	-	-	-	-	-	-	-	-	-
Cross-Section Area:	0.20	Discharge (cfs)	0	0	0	0	0	0	0	0	0
Discharge Coefficient:	0.60	Elevation (ft)	-	-	-	-	-	-	-	-	-
Orifice Equation Exponent:	0.50										
Top of Dam Overflow (ST)			<u>2 Yr</u>	<u>5 Yr</u>	<u>10 Yr</u>	<u>25 Yr</u>	<u>50 Yr</u>	<u>100 Yr</u>	6" bleed-off pipe		
Elevation Top of Dam:	-NA-	Peak Volume (ac-ft)	0.57	0.00	0.57	0.00	0.00	0.00			
Length of Dam:	-NA-	Peak Stage (ft)	2,693.00	0.00	2,693.00	0.00	0.00	0.00			
Discharge Coefficient:	-NA-	Peak Discharge (cfs)	1	0	1	0	0	16			
Weir Coefficient:	-NA-										

Storage Basin ID: DETB11			<u>1</u>	<u>2</u>	<u>3</u>	<u>4</u>	<u>5</u>	<u>6</u>	<u>7</u>	<u>8</u>	<u>9</u>
Spillway Characteristics (SS)											
Spillway Crest Elevation:	2,627.00	Volume (ac-ft)		0.2							
Spillway Length:	10.00	Discharge (cfs)	0	1	0	0	0	0	0	0	0
Discharge Coefficient:	2.80	Elevation (ft)	2,627.0	2,628.0	-	-	-	-	-	-	-
Weir Coefficient:	1.50										
Low-Level Outlet (SL)			<u>11</u>	<u>12</u>	<u>13</u>	<u>14</u>	<u>15</u>	<u>16</u>	<u>17</u>	<u>18</u>	<u>19</u>
Centerline Elevation:	-NA-	Volume (ac-ft)	-	-	-	-	-	-	-	-	-
Cross-Section Area:	-NA-	Discharge (cfs)	0	0	0	0	0	0	0	0	0
Discharge Coefficient:	-NA-	Elevation (ft)	-	-	-	-	-	-	-	-	-
Orifice Equation Exponent:	-NA-										
Top of Dam Overflow (ST)			<u>2 Yr</u>	<u>5 Yr</u>	<u>10 Yr</u>	<u>25 Yr</u>	<u>50 Yr</u>	<u>100 Yr</u>	Water Feature		
Elevation Top of Dam:	-NA-	Peak Volume (ac-ft)	0.00	0.00	0.00	0.00	0.00	0.00			
Length of Dam:	-NA-	Peak Stage (ft)	0.00	0.00	0.00	0.00	0.00	0.00			
Discharge Coefficient:	-NA-	Peak Discharge (cfs)	2	0	4	0	0	7			
Weir Coefficient:	-NA-										

Flood Control District of Maricopa County
 Drainage Design Management System
 HEC-1 STORAGE FACILITIES

Storage Basin ID: DETB12			<u>1</u>	<u>2</u>	<u>3</u>	<u>4</u>	<u>5</u>	<u>6</u>	<u>7</u>	<u>8</u>	<u>9</u>	<u>10</u>
Spillway Characteristics (SS)												
Spillway Crest Elevation:	2,618.00	Volume (ac-ft)		0.1								
Spillway Length:	10.00	Discharge (cfs)	0	1	0	0	0	0	0	0	0	
Discharge Coefficient:	2.80	Elevation (ft)	2,618.0	2,619.0	-	-	-	-	-	-	-	
Weir Coefficient:	1.50											
Low-Level Outlet (SL)			<u>11</u>	<u>12</u>	<u>13</u>	<u>14</u>	<u>15</u>	<u>16</u>	<u>17</u>	<u>18</u>	<u>19</u>	<u>20</u>
Centerline Elevation:	-NA-	Volume (ac-ft)	-	-	-	-	-	-	-	-	-	-
Cross-Section Area:	-NA-	Discharge (cfs)	0	0	0	0	0	0	0	0	0	
Discharge Coefficient:	-NA-	Elevation (ft)	-	-	-	-	-	-	-	-	-	
Orifice Equation Exponent:	-NA-											
Top of Dam Overflow (ST)			<u>2 Yr</u>	<u>5 Yr</u>	<u>10 Yr</u>	<u>25 Yr</u>	<u>50 Yr</u>	<u>100 Yr</u>	Water Feature			
Elevation Top of Dam:	-NA-	Peak Volume (ac-ft)	0.07	0.00	0.00	0.00	0.00	0.00				
Length of Dam:	-NA-	Peak Stage (ft)	2,619.00	0.00	0.00	0.00	0.00	0.00				
Discharge Coefficient:	-NA-	Peak Discharge (cfs)	1	0	3	0	0	6				
Weir Coefficient:	-NA-											

Storage Basin ID: DETB15			<u>1</u>	<u>2</u>	<u>3</u>	<u>4</u>	<u>5</u>	<u>6</u>	<u>7</u>	<u>8</u>	<u>9</u>	<u>10</u>
Spillway Characteristics (SS)												
Spillway Crest Elevation:	2,600.00	Volume (ac-ft)		0.2								
Spillway Length:	15.00	Discharge (cfs)	0	1	0	0	0	0	0	0	0	
Discharge Coefficient:	2.80	Elevation (ft)	2,600.0	2,601.0	-	-	-	-	-	-	-	
Weir Coefficient:	1.50											
Low-Level Outlet (SL)			<u>11</u>	<u>12</u>	<u>13</u>	<u>14</u>	<u>15</u>	<u>16</u>	<u>17</u>	<u>18</u>	<u>19</u>	<u>20</u>
Centerline Elevation:	-NA-	Volume (ac-ft)	-	-	-	-	-	-	-	-	-	-
Cross-Section Area:	-NA-	Discharge (cfs)	0	0	0	0	0	0	0	0	0	
Discharge Coefficient:	-NA-	Elevation (ft)	-	-	-	-	-	-	-	-	-	
Orifice Equation Exponent:	-NA-											
Top of Dam Overflow (ST)			<u>2 Yr</u>	<u>5 Yr</u>	<u>10 Yr</u>	<u>25 Yr</u>	<u>50 Yr</u>	<u>100 Yr</u>	Water Feature			
Elevation Top of Dam:	-NA-	Peak Volume (ac-ft)	0.00	0.00	0.00	0.00	0.00	0.00				
Length of Dam:	-NA-	Peak Stage (ft)	0.00	0.00	0.00	0.00	0.00	0.00				
Discharge Coefficient:	-NA-	Peak Discharge (cfs)	10	0	18	0	0	32				
Weir Coefficient:	-NA-											

Flood Control District of Maricopa County
 Drainage Design Management System
 HEC-1 STORAGE FACILITIES

Storage Basin ID: DETB16			<u>1</u>	<u>2</u>	<u>3</u>	<u>4</u>	<u>5</u>	<u>6</u>	<u>7</u>	<u>8</u>	<u>9</u>
Spillway Characteristics (SS)											
Spillway Crest Elevation:	2,595.00	Volume (ac-ft)		0.1	0.2	0.4					
Spillway Length:	5.00	Discharge (cfs)	0	0	0	0	0	0	0	0	0
Discharge Coefficient:	2.80	Elevation (ft)	2,593.0	2,594.0	2,595.0	2,596.0	-	-	-	-	-
Weir Coefficient:	1.50										
Low-Level Outlet (SL)			<u>11</u>	<u>12</u>	<u>13</u>	<u>14</u>	<u>15</u>	<u>16</u>	<u>17</u>	<u>18</u>	<u>19</u>
Centerline Elevation:	2,593.00	Volume (ac-ft)	-	-	-	-	-	-	-	-	-
Cross-Section Area:	0.20	Discharge (cfs)	0	0	0	0	0	0	0	0	0
Discharge Coefficient:	0.60	Elevation (ft)	-	-	-	-	-	-	-	-	-
Orifice Equation Exponent:	0.50										
Top of Dam Overflow (ST)			<u>2 Yr</u>	<u>5 Yr</u>	<u>10 Yr</u>	<u>25 Yr</u>	<u>50 Yr</u>	<u>100 Yr</u>	6" bleed-off pipe		
Elevation Top of Dam:	-NA-	Peak Volume (ac-ft)	0.02	0.00	0.00	0.00	0.00	0.00			
Length of Dam:	-NA-	Peak Stage (ft)	2,593.20	0.00	0.00	0.00	0.00	0.00			
Discharge Coefficient:	-NA-	Peak Discharge (cfs)	0	0	1	0	0	1			
Weir Coefficient:	-NA-										

Storage Basin ID: DETB17			<u>1</u>	<u>2</u>	<u>3</u>	<u>4</u>	<u>5</u>	<u>6</u>	<u>7</u>	<u>8</u>	<u>9</u>
Spillway Characteristics (SS)											
Spillway Crest Elevation:	2,494.00	Volume (ac-ft)		0.3							
Spillway Length:	10.00	Discharge (cfs)	0	1	0	0	0	0	0	0	0
Discharge Coefficient:	2.80	Elevation (ft)	2,494.0	2,495.0	-	-	-	-	-	-	-
Weir Coefficient:	1.50										
Low-Level Outlet (SL)			<u>11</u>	<u>12</u>	<u>13</u>	<u>14</u>	<u>15</u>	<u>16</u>	<u>17</u>	<u>18</u>	<u>19</u>
Centerline Elevation:	-NA-	Volume (ac-ft)	-	-	-	-	-	-	-	-	-
Cross-Section Area:	-NA-	Discharge (cfs)	0	0	0	0	0	0	0	0	0
Discharge Coefficient:	-NA-	Elevation (ft)	-	-	-	-	-	-	-	-	-
Orifice Equation Exponent:	-NA-										
Top of Dam Overflow (ST)			<u>2 Yr</u>	<u>5 Yr</u>	<u>10 Yr</u>	<u>25 Yr</u>	<u>50 Yr</u>	<u>100 Yr</u>	6" bleed-off pipe		
Elevation Top of Dam:	-NA-	Peak Volume (ac-ft)	0.00	0.00	0.00	0.00	0.00	0.00			
Length of Dam:	-NA-	Peak Stage (ft)	0.00	0.00	0.00	0.00	0.00	0.00			
Discharge Coefficient:	-NA-	Peak Discharge (cfs)	7	0	15	0	0	28			
Weir Coefficient:	-NA-										

Flood Control District of Maricopa County
 Drainage Design Management System
 HEC-1 STORAGE FACILITIES

Storage Basin ID: DETB18			<u>1</u>	<u>2</u>	<u>3</u>	<u>4</u>	<u>5</u>	<u>6</u>	<u>7</u>	<u>8</u>	<u>9</u>
Spillway Characteristics (SS)											
Spillway Crest Elevation:	2,594.00	Volume (ac-ft)		0.2	0.4	0.6	0.9				
Spillway Length:	5.00	Discharge (cfs)	0	0	0	0	0	0	0	0	0
Discharge Coefficient:	2.80	Elevation (ft)	2,591.0	2,592.0	2,593.0	2,594.0	2,595.0	-	-	-	-
Weir Coefficient:	1.50										
Low-Level Outlet (SL)			<u>11</u>	<u>12</u>	<u>13</u>	<u>14</u>	<u>15</u>	<u>16</u>	<u>17</u>	<u>18</u>	<u>19</u>
Centerline Elevation:	2,591.00	Volume (ac-ft)	-	-	-	-	-	-	-	-	-
Cross-Section Area:	0.20	Discharge (cfs)	0	0	0	0	0	0	0	0	0
Discharge Coefficient:	0.60	Elevation (ft)	-	-	-	-	-	-	-	-	-
Orifice Equation Exponent:	0.50										
Top of Dam Overflow (ST)			<u>2 Yr</u>	<u>5 Yr</u>	<u>10 Yr</u>	<u>25 Yr</u>	<u>50 Yr</u>	<u>100 Yr</u>	6" bleed-off pipe		
Elevation Top of Dam:	-NA-	Peak Volume (ac-ft)	0.00	0.00	0.00	0.00	0.00	0.00			
Length of Dam:	-NA-	Peak Stage (ft)	0.00	0.00	0.00	0.00	0.00	0.00			
Discharge Coefficient:	-NA-	Peak Discharge (cfs)	1	0	2	0	0	14			
Weir Coefficient:	-NA-										

Storage Basin ID: DETB5			<u>1</u>	<u>2</u>	<u>3</u>	<u>4</u>	<u>5</u>	<u>6</u>	<u>7</u>	<u>8</u>	<u>9</u>
Spillway Characteristics (SS)											
Spillway Crest Elevation:	2,635.00	Volume (ac-ft)		-	-	0.1	0.1				
Spillway Length:	5.00	Discharge (cfs)	0	0	0	0	0	0	0	0	0
Discharge Coefficient:	2.80	Elevation (ft)	2,632.0	2,633.0	2,634.0	2,635.0	2,636.0	-	-	-	-
Weir Coefficient:	1.50										
Low-Level Outlet (SL)			<u>11</u>	<u>12</u>	<u>13</u>	<u>14</u>	<u>15</u>	<u>16</u>	<u>17</u>	<u>18</u>	<u>19</u>
Centerline Elevation:	2,632.00	Volume (ac-ft)	-	-	-	-	-	-	-	-	-
Cross-Section Area:	0.20	Discharge (cfs)	0	0	0	0	0	0	0	0	0
Discharge Coefficient:	0.60	Elevation (ft)	-	-	-	-	-	-	-	-	-
Orifice Equation Exponent:	0.50										
Top of Dam Overflow (ST)			<u>2 Yr</u>	<u>5 Yr</u>	<u>10 Yr</u>	<u>25 Yr</u>	<u>50 Yr</u>	<u>100 Yr</u>	6" bleed-off pipe		
Elevation Top of Dam:	-NA-	Peak Volume (ac-ft)	0.00	0.00	0.00	0.00	0.00	0.00			
Length of Dam:	-NA-	Peak Stage (ft)	0.00	0.00	0.00	0.00	0.00	0.00			
Discharge Coefficient:	-NA-	Peak Discharge (cfs)	5	0	7	0	0	11			
Weir Coefficient:	-NA-										

Flood Control District of Maricopa County
 Drainage Design Management System
 HEC-1 STORAGE FACILITIES

Storage Basin ID: DETB6			<u>1</u>	<u>2</u>	<u>3</u>	<u>4</u>	<u>5</u>	<u>6</u>	<u>7</u>	<u>8</u>	<u>9</u>
Spillway Characteristics (SS)											
Spillway Crest Elevation:	2,626.00	Volume (ac-ft)		0.2	0.4	0.6	0.9				
Spillway Length:	20.00	Discharge (cfs)	0	1	1	2	50	0	0	0	0
Discharge Coefficient:	2.80	Elevation (ft)	2,623.0	2,624.0	2,625.0	2,626.0	2,627.0	-	-	-	-
Weir Coefficient:	1.50										
Low-Level Outlet (SL)			<u>11</u>	<u>12</u>	<u>13</u>	<u>14</u>	<u>15</u>	<u>16</u>	<u>17</u>	<u>18</u>	<u>19</u>
Centerline Elevation:	2,623.00	Volume (ac-ft)	-	-	-	-	-	-	-	-	-
Cross-Section Area:	0.20	Discharge (cfs)	0	0	0	0	0	0	0	0	0
Discharge Coefficient:	0.60	Elevation (ft)	-	-	-	-	-	-	-	-	-
Orifice Equation Exponent:	0.50										
Top of Dam Overflow (ST)			<u>2 Yr</u>	<u>5 Yr</u>	<u>10 Yr</u>	<u>25 Yr</u>	<u>50 Yr</u>	<u>100 Yr</u>	6" bleed-off pipe		
Elevation Top of Dam:	-NA-	Peak Volume (ac-ft)	0.17	0.00	0.17	0.00	0.00	0.17			
Length of Dam:	-NA-	Peak Stage (ft)	2,624.00	0.00	2,624.00	0.00	0.00	2,624.00			
Discharge Coefficient:	-NA-	Peak Discharge (cfs)	1	0	1	0	0	1			
Weir Coefficient:	-NA-										

Storage Basin ID: DETB7			<u>1</u>	<u>2</u>	<u>3</u>	<u>4</u>	<u>5</u>	<u>6</u>	<u>7</u>	<u>8</u>	<u>9</u>
Spillway Characteristics (SS)											
Spillway Crest Elevation:	2,607.00	Volume (ac-ft)		0.1	0.2	0.3	0.6				
Spillway Length:	5.00	Discharge (cfs)	0	1	1	1	1	0	0	0	0
Discharge Coefficient:	2.80	Elevation (ft)	2,604.0	2,605.0	2,606.0	2,607.0	2,608.0	-	-	-	-
Weir Coefficient:	1.50										
Low-Level Outlet (SL)			<u>11</u>	<u>12</u>	<u>13</u>	<u>14</u>	<u>15</u>	<u>16</u>	<u>17</u>	<u>18</u>	<u>19</u>
Centerline Elevation:	2,604.00	Volume (ac-ft)	-	-	-	-	-	-	-	-	-
Cross-Section Area:	0.20	Discharge (cfs)	0	0	0	0	0	0	0	0	0
Discharge Coefficient:	0.60	Elevation (ft)	-	-	-	-	-	-	-	-	-
Orifice Equation Exponent:	0.50										
Top of Dam Overflow (ST)			<u>2 Yr</u>	<u>5 Yr</u>	<u>10 Yr</u>	<u>25 Yr</u>	<u>50 Yr</u>	<u>100 Yr</u>	6" bleed-off pipe		
Elevation Top of Dam:	-NA-	Peak Volume (ac-ft)	0.06	0.00	0.06	0.00	0.00	0.00			
Length of Dam:	-NA-	Peak Stage (ft)	2,605.00	0.00	2,605.00	0.00	0.00	0.00			
Discharge Coefficient:	-NA-	Peak Discharge (cfs)	1	0	1	0	0	2			
Weir Coefficient:	-NA-										

Flood Control District of Maricopa County
 Drainage Design Management System
 HEC-1 STORAGE FACILITIES

Storage Basin ID: DETB8			<u>1</u>	<u>2</u>	<u>3</u>	<u>4</u>	<u>5</u>	<u>6</u>	<u>7</u>	<u>8</u>	<u>9</u>
Spillway Characteristics (SS)											
Spillway Crest Elevation:	2,616.00	Volume (ac-ft)		0.4	0.9	1.4	2.0				
Spillway Length:	10.00	Discharge (cfs)	0	1	1	2	2	0	0	0	0
Discharge Coefficient:	2.80	Elevation (ft)	2,613.0	2,614.0	2,615.0	2,616.0	2,617.0	-	-	-	-
Weir Coefficient:	1.50										
Low-Level Outlet (SL)											
Centerline Elevation:	2,613.00	Volume (ac-ft)	-	-	-	-	-	-	-	-	-
Cross-Section Area:	0.44	Discharge (cfs)	0	0	0	0	0	0	0	0	0
Discharge Coefficient:	0.60	Elevation (ft)	-	-	-	-	-	-	-	-	-
Orifice Equation Exponent:	0.50										
Top of Dam Overflow (ST)											
			<u>2 Yr</u>	<u>5 Yr</u>	<u>10 Yr</u>	<u>25 Yr</u>	<u>50 Yr</u>	<u>100 Yr</u>	9" bleed-off pipe		
Elevation Top of Dam:	-NA-	Peak Volume (ac-ft)	1.37	0.00	0.00	0.00	0.00	0.00			
Length of Dam:	-NA-	Peak Stage (ft)	2,616.00	0.00	0.00	0.00	0.00	0.00			
Discharge Coefficient:	-NA-	Peak Discharge (cfs)	2	0	3	0	0	13			
Weir Coefficient:	-NA-										

Storage Basin ID: DETB9			<u>1</u>	<u>2</u>	<u>3</u>	<u>4</u>	<u>5</u>	<u>6</u>	<u>7</u>	<u>8</u>	<u>9</u>
Spillway Characteristics (SS)											
Spillway Crest Elevation:	2,599.00	Volume (ac-ft)		0.1	0.2	0.3					
Spillway Length:	5.00	Discharge (cfs)	0	1	1	2	0	0	0	0	0
Discharge Coefficient:	2.80	Elevation (ft)	2,597.0	2,598.0	2,599.0	2,600.0	-	-	-	-	-
Weir Coefficient:	1.50										
Low-Level Outlet (SL)											
Centerline Elevation:	2,597.00	Volume (ac-ft)	-	-	-	-	-	-	-	-	-
Cross-Section Area:	0.20	Discharge (cfs)	0	0	0	0	0	0	0	0	0
Discharge Coefficient:	0.60	Elevation (ft)	-	-	-	-	-	-	-	-	-
Orifice Equation Exponent:	0.50										
Top of Dam Overflow (ST)											
			<u>2 Yr</u>	<u>5 Yr</u>	<u>10 Yr</u>	<u>25 Yr</u>	<u>50 Yr</u>	<u>100 Yr</u>	6" bleed-off pipe		
Elevation Top of Dam:	-NA-	Peak Volume (ac-ft)	0.06	0.00	0.06	0.00	0.00	0.06			
Length of Dam:	-NA-	Peak Stage (ft)	2,598.00	0.00	2,598.00	0.00	0.00	2,598.00			
Discharge Coefficient:	-NA-	Peak Discharge (cfs)	1	0	1	0	0	1			
Weir Coefficient:	-NA-										

Flood Control District of Maricopa County
 Drainage Design Management System
 HEC-1 STORAGE FACILITIES

Storage Basin ID: DETC1			<u>1</u>	<u>2</u>	<u>3</u>	<u>4</u>	<u>5</u>	<u>6</u>	<u>7</u>	<u>8</u>	<u>9</u>
Spillway Characteristics (SS)											
Spillway Crest Elevation:	2,610.50	Volume (ac-ft)		0.4	0.9	1.6	2.4				
Spillway Length:	2.00	Discharge (cfs)	0	0	0	0	0	0	0	0	0
Discharge Coefficient:	2.80	Elevation (ft)	2,607.0	2,608.0	2,609.0	2,610.0	2,611.0	-	-	-	-
Weir Coefficient:	1.50										
Low-Level Outlet (SL)											
Centerline Elevation:	2,607.00	Volume (ac-ft)	-	-	-	-	-	-	-	-	-
Cross-Section Area:	0.44	Discharge (cfs)	0	0	0	0	0	0	0	0	0
Discharge Coefficient:	0.60	Elevation (ft)	-	-	-	-	-	-	-	-	-
Orifice Equation Exponent:	0.50										
Top of Dam Overflow (ST)											
			<u>2 Yr</u>	<u>5 Yr</u>	<u>10 Yr</u>	<u>25 Yr</u>	<u>50 Yr</u>	<u>100 Yr</u>	9" bleed-off pipe		
Elevation Top of Dam:	-NA-	Peak Volume (ac-ft)	0.00	0.00	0.00	0.00	0.00	0.00			
Length of Dam:	-NA-	Peak Stage (ft)	0.00	0.00	0.00	0.00	0.00	0.00			
Discharge Coefficient:	-NA-	Peak Discharge (cfs)	2	0	3	0	0	4			
Weir Coefficient:	-NA-										

Storage Basin ID: DETC2			<u>1</u>	<u>2</u>	<u>3</u>	<u>4</u>	<u>5</u>	<u>6</u>	<u>7</u>	<u>8</u>	<u>9</u>
Spillway Characteristics (SS)											
Spillway Crest Elevation:	2,599.00	Volume (ac-ft)		0.1	0.2	0.3	0.4				
Spillway Length:	20.00	Discharge (cfs)	0	0	0	0	0	0	0	0	0
Discharge Coefficient:	2.80	Elevation (ft)	2,596.0	2,597.0	2,598.0	2,599.0	2,600.0	-	-	-	-
Weir Coefficient:	1.50										
Low-Level Outlet (SL)											
Centerline Elevation:	2,596.00	Volume (ac-ft)	-	-	-	-	-	-	-	-	-
Cross-Section Area:	0.20	Discharge (cfs)	0	0	0	0	0	0	0	0	0
Discharge Coefficient:	0.60	Elevation (ft)	-	-	-	-	-	-	-	-	-
Orifice Equation Exponent:	0.50										
Top of Dam Overflow (ST)											
			<u>2 Yr</u>	<u>5 Yr</u>	<u>10 Yr</u>	<u>25 Yr</u>	<u>50 Yr</u>	<u>100 Yr</u>	6" bleed-off pipe		
Elevation Top of Dam:	-NA-	Peak Volume (ac-ft)	0.00	0.00	0.00	0.00	0.00	0.00			
Length of Dam:	-NA-	Peak Stage (ft)	0.00	0.00	0.00	0.00	0.00	0.00			
Discharge Coefficient:	-NA-	Peak Discharge (cfs)	15	0	27	0	0	43			
Weir Coefficient:	-NA-										

Flood Control District of Maricopa County
 Drainage Design Management System
 HEC-1 STORAGE FACILITIES

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Storage Basin ID: DETC21			<u>1</u>	<u>2</u>	<u>3</u>	<u>4</u>	<u>5</u>	<u>6</u>	<u>7</u>	<u>8</u>	<u>9</u>	
Spillway Characteristics (SS)												
Spillway Crest Elevation:	2,601.00	Volume (ac-ft)		0.2	0.4	0.8	1.3					
Spillway Length:	5.00	Discharge (cfs)	0	0	0	0	0	0	0	0	0	
Discharge Coefficient:	2.80	Elevation (ft)	2,598.0	2,599.0	2,600.0	2,601.0	2,602.0	-	-	-	-	
Weir Coefficient:	1.50											
Low-Level Outlet (SL)												
Centerline Elevation:	2,598.00	Volume (ac-ft)										
Cross-Section Area:	0.20	Discharge (cfs)	0	0	0	0	0	0	0	0	0	
Discharge Coefficient:	0.60	Elevation (ft)	-	-	-	-	-	-	-	-	-	
Orifice Equation Exponent:	0.50											
Top of Dam Overflow (ST)												
			<u>2 Yr</u>	<u>5 Yr</u>	<u>10 Yr</u>	<u>25 Yr</u>	<u>50 Yr</u>	<u>100 Yr</u>	6" bleed-off pipe			
Elevation Top of Dam:	-NA-	Peak Volume (ac-ft)	0.00	0.00	0.00	0.00	0.00	0.00				
Length of Dam:	-NA-	Peak Stage (ft)	0.00	0.00	0.00	0.00	0.00	0.00				
Discharge Coefficient:	-NA-	Peak Discharge (cfs)	1	0	1	0	0	6				
Weir Coefficient:	-NA-											

Storage Basin ID: DETC3			<u>1</u>	<u>2</u>	<u>3</u>	<u>4</u>	<u>5</u>	<u>6</u>	<u>7</u>	<u>8</u>	<u>9</u>	
Spillway Characteristics (SS)												
Spillway Crest Elevation:	2,599.50	Volume (ac-ft)		-	0.1	0.2	0.2	0.3				
Spillway Length:	20.00	Discharge (cfs)	0	0	0	0	0	0	0	0	0	
Discharge Coefficient:	2.80	Elevation (ft)	2,596.5	2,597.0	2,598.0	2,599.0	2,599.5	2,600.0	-	-	-	
Weir Coefficient:	1.50											
Low-Level Outlet (SL)												
Centerline Elevation:	2,596.50	Volume (ac-ft)	-	-	-	-	-	-	-	-	-	
Cross-Section Area:	0.20	Discharge (cfs)	0	0	0	0	0	0	0	0	0	
Discharge Coefficient:	0.60	Elevation (ft)	-	-	-	-	-	-	-	-	-	
Orifice Equation Exponent:	0.50											
Top of Dam Overflow (ST)												
			<u>2 Yr</u>	<u>5 Yr</u>	<u>10 Yr</u>	<u>25 Yr</u>	<u>50 Yr</u>	<u>100 Yr</u>	6" bleed-off pipe			
Elevation Top of Dam:	-NA-	Peak Volume (ac-ft)	0.00	0.00	0.00	0.00	0.00	0.00				
Length of Dam:	-NA-	Peak Stage (ft)	0.00	0.00	0.00	0.00	0.00	0.00				
Discharge Coefficient:	-NA-	Peak Discharge (cfs)	1	0	1	0	0	1				
Weir Coefficient:	-NA-											

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 HEC-1 STORAGE FACILITIES

Storage Basin ID: DETC31			<u>1</u>	<u>2</u>	<u>3</u>	<u>4</u>	<u>5</u>	<u>6</u>	<u>7</u>	<u>8</u>	<u>9</u>
Spillway Characteristics (SS)											
Spillway Crest Elevation:	2,599.00	Volume (ac-ft)		0.4	0.8	1.3	1.9				
Spillway Length:	5.00	Discharge (cfs)	0	0	0	0	0	0	0	0	0
Discharge Coefficient:	2.80	Elevation (ft)	2,596.0	2,597.0	2,598.0	2,599.0	2,600.0	-	-	-	-
Weir Coefficient:	1.50										
Low-Level Outlet (SL)			<u>11</u>	<u>12</u>	<u>13</u>	<u>14</u>	<u>15</u>	<u>16</u>	<u>17</u>	<u>18</u>	<u>19</u>
Centerline Elevation:	2,596.00	Volume (ac-ft)	-	-	-	-	-	-	-	-	-
Cross-Section Area:	0.20	Discharge (cfs)	0	0	0	0	0	0	0	0	0
Discharge Coefficient:	0.60	Elevation (ft)	-	-	-	-	-	-	-	-	-
Orifice Equation Exponent:	0.50										
Top of Dam Overflow (ST)			<u>2 Yr</u>	<u>5 Yr</u>	<u>10 Yr</u>	<u>25 Yr</u>	<u>50 Yr</u>	<u>100 Yr</u>	6" bleed-off pipe		
Elevation Top of Dam:	-NA-	Peak Volume (ac-ft)	0.00	0.00	0.00	0.00	0.00	0.00			
Length of Dam:	-NA-	Peak Stage (ft)	0.00	0.00	0.00	0.00	0.00	0.00			
Discharge Coefficient:	-NA-	Peak Discharge (cfs)	1	0	1	0	0	4			
Weir Coefficient:	-NA-										

Storage Basin ID: DETC3A			<u>1</u>	<u>2</u>	<u>3</u>	<u>4</u>	<u>5</u>	<u>6</u>	<u>7</u>	<u>8</u>	<u>9</u>
Spillway Characteristics (SS)											
Spillway Crest Elevation:	2,593.00	Volume (ac-ft)		0.2	0.4	0.7	1.0				
Spillway Length:	5.00	Discharge (cfs)	0	0	0	0	0	0	0	0	0
Discharge Coefficient:	2.80	Elevation (ft)	2,590.0	2,591.0	2,592.0	2,593.0	2,594.0	-	-	-	-
Weir Coefficient:	1.50										
Low-Level Outlet (SL)			<u>11</u>	<u>12</u>	<u>13</u>	<u>14</u>	<u>15</u>	<u>16</u>	<u>17</u>	<u>18</u>	<u>19</u>
Centerline Elevation:	2,590.00	Volume (ac-ft)	-	-	-	-	-	-	-	-	-
Cross-Section Area:	0.20	Discharge (cfs)	0	0	0	0	0	0	0	0	0
Discharge Coefficient:	0.60	Elevation (ft)	-	-	-	-	-	-	-	-	-
Orifice Equation Exponent:	0.50										
Top of Dam Overflow (ST)			<u>2 Yr</u>	<u>5 Yr</u>	<u>10 Yr</u>	<u>25 Yr</u>	<u>50 Yr</u>	<u>100 Yr</u>	6" bleed-off pipe		
Elevation Top of Dam:	-NA-	Peak Volume (ac-ft)	0.00	0.00	0.00	0.00	0.00	0.00			
Length of Dam:	-NA-	Peak Stage (ft)	0.00	0.00	0.00	0.00	0.00	0.00			
Discharge Coefficient:	-NA-	Peak Discharge (cfs)	1	0	1	0	0	2			
Weir Coefficient:	-NA-										

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 HEC-1 STORAGE FACILITIES

Storage Basin ID: DETC6			<u>1</u>	<u>2</u>	<u>3</u>	<u>4</u>	<u>5</u>	<u>6</u>	<u>7</u>	<u>8</u>	<u>9</u>
Spillway Characteristics (SS)											
Spillway Crest Elevation:	2,637.00	Volume (ac-ft)		0.1							
Spillway Length:	10.00	Discharge (cfs)	0	1	0	0	0	0	0	0	0
Discharge Coefficient:	2.80	Elevation (ft)	2,637.0	2,638.0	-	-	-	-	-	-	-
Weir Coefficient:	1.50										
Low-Level Outlet (SL)			<u>11</u>	<u>12</u>	<u>13</u>	<u>14</u>	<u>15</u>	<u>16</u>	<u>17</u>	<u>18</u>	<u>19</u>
Centerline Elevation:	-NA-	Volume (ac-ft)	-	-	-	-	-	-	-	-	-
Cross-Section Area:	-NA-	Discharge (cfs)	0	0	0	0	0	0	0	0	0
Discharge Coefficient:	-NA-	Elevation (ft)	-	-	-	-	-	-	-	-	-
Orifice Equation Exponent:	-NA-										
Top of Dam Overflow (ST)			<u>2 Yr</u>	<u>5 Yr</u>	<u>10 Yr</u>	<u>25 Yr</u>	<u>50 Yr</u>	<u>100 Yr</u>	Water Feature		
Elevation Top of Dam:	-NA-	Peak Volume (ac-ft)	0.07	0.00	0.00	0.00	0.00	0.00			
Length of Dam:	-NA-	Peak Stage (ft)	2,638.00	0.00	0.00	0.00	0.00	0.00			
Discharge Coefficient:	-NA-	Peak Discharge (cfs)	1	0	2	0	0	3			
Weir Coefficient:	-NA-										

Storage Basin ID: DETC7			<u>1</u>	<u>2</u>	<u>3</u>	<u>4</u>	<u>5</u>	<u>6</u>	<u>7</u>	<u>8</u>	<u>9</u>
Spillway Characteristics (SS)											
Spillway Crest Elevation:	2,634.00	Volume (ac-ft)		0.1							
Spillway Length:	10.00	Discharge (cfs)	0	1	0	0	0	0	0	0	0
Discharge Coefficient:	2.80	Elevation (ft)	2,634.0	2,635.0	-	-	-	-	-	-	-
Weir Coefficient:	1.50										
Low-Level Outlet (SL)			<u>11</u>	<u>12</u>	<u>13</u>	<u>14</u>	<u>15</u>	<u>16</u>	<u>17</u>	<u>18</u>	<u>19</u>
Centerline Elevation:	-NA-	Volume (ac-ft)	-	-	-	-	-	-	-	-	-
Cross-Section Area:	-NA-	Discharge (cfs)	0	0	0	0	0	0	0	0	0
Discharge Coefficient:	-NA-	Elevation (ft)	-	-	-	-	-	-	-	-	-
Orifice Equation Exponent:	-NA-										
Top of Dam Overflow (ST)			<u>2 Yr</u>	<u>5 Yr</u>	<u>10 Yr</u>	<u>25 Yr</u>	<u>50 Yr</u>	<u>100 Yr</u>	Water Feature		
Elevation Top of Dam:	-NA-	Peak Volume (ac-ft)	0.00	0.00	0.00	0.00	0.00	0.00			
Length of Dam:	-NA-	Peak Stage (ft)	0.00	0.00	0.00	0.00	0.00	0.00			
Discharge Coefficient:	-NA-	Peak Discharge (cfs)	2	0	4	0	0	7			
Weir Coefficient:	-NA-										

Flood Control District of Maricopa County
 Drainage Design Management System
 HEC-1 STORAGE FACILITIES

Storage Basin ID: DETC8			<u>1</u>	<u>2</u>	<u>3</u>	<u>4</u>	<u>5</u>	<u>6</u>	<u>7</u>	<u>8</u>	<u>9</u>
Spillway Characteristics (SS)											
Spillway Crest Elevation:	2,629.00	Volume (ac-ft)		0.1	0.2						
Spillway Length:	20.00	Discharge (cfs)	0	1	0	0	0	0	0	0	0
Discharge Coefficient:	2.80	Elevation (ft)	2,629.0	2,629.5	2,630.0	-	-	-	-	-	-
Weir Coefficient:	1.50										
Low-Level Outlet (SL)			<u>11</u>	<u>12</u>	<u>13</u>	<u>14</u>	<u>15</u>	<u>16</u>	<u>17</u>	<u>18</u>	<u>19</u>
Centerline Elevation:	-NA-	Volume (ac-ft)	-	-	-	-	-	-	-	-	-
Cross-Section Area:	-NA-	Discharge (cfs)	0	0	0	0	0	0	0	0	0
Discharge Coefficient:	-NA-	Elevation (ft)	-	-	-	-	-	-	-	-	-
Orifice Equation Exponent:	-NA-										
Top of Dam Overflow (ST)			<u>2 Yr</u>	<u>5 Yr</u>	<u>10 Yr</u>	<u>25 Yr</u>	<u>50 Yr</u>	<u>100 Yr</u>	Water Feature		
Elevation Top of Dam:	-NA-	Peak Volume (ac-ft)	0.00	0.00	0.00	0.00	0.00	0.00			
Length of Dam:	-NA-	Peak Stage (ft)	0.00	0.00	0.00	0.00	0.00	0.00			
Discharge Coefficient:	-NA-	Peak Discharge (cfs)	14	0	24	0	0	38			
Weir Coefficient:	-NA-										

Storage Basin ID: DETOC			<u>1</u>	<u>2</u>	<u>3</u>	<u>4</u>	<u>5</u>	<u>6</u>	<u>7</u>	<u>8</u>	<u>9</u>
Spillway Characteristics (SS)											
Spillway Crest Elevation:	-NA-	Volume (ac-ft)		0.4	0.9	1.5	2.2	2.6	3.0		
Spillway Length:	-NA-	Discharge (cfs)	0	1	9	19	26	29	72	0	0
Discharge Coefficient:	-NA-	Elevation (ft)	2,683.0	2,684.0	2,685.0	2,686.0	2,687.0	2,687.5	2,688.0	-	-
Weir Coefficient:	-NA-										
Low-Level Outlet (SL)			<u>11</u>	<u>12</u>	<u>13</u>	<u>14</u>	<u>15</u>	<u>16</u>	<u>17</u>	<u>18</u>	<u>19</u>
Centerline Elevation:	-NA-	Volume (ac-ft)	-	-	-	-	-	-	-	-	-
Cross-Section Area:	-NA-	Discharge (cfs)	0	0	0	0	0	0	0	0	0
Discharge Coefficient:	-NA-	Elevation (ft)	-	-	-	-	-	-	-	-	-
Orifice Equation Exponent:	-NA-										
Top of Dam Overflow (ST)			<u>2 Yr</u>	<u>5 Yr</u>	<u>10 Yr</u>	<u>25 Yr</u>	<u>50 Yr</u>	<u>100 Yr</u>	1-24" Pipe		
Elevation Top of Dam:	-NA-	Peak Volume (ac-ft)	0.00	0.00	0.00	0.00	0.00	2.46			
Length of Dam:	-NA-	Peak Stage (ft)	0.00	0.00	0.00	0.00	0.00	2,687.33			
Discharge Coefficient:	-NA-	Peak Discharge (cfs)	0	0	0	0	0	28			
Weir Coefficient:	-NA-										

Flood Control District of Maricopa County
 Drainage Design Management System
 HEC-1 STORAGE FACILITIES

Storage Basin ID:		DETOD									
Spillway Characteristics (SS)			<u>1</u>	<u>2</u>	<u>3</u>	<u>4</u>	<u>5</u>	<u>6</u>	<u>7</u>	<u>8</u>	<u>9</u>
Spillway Crest Elevation:	-NA-	Volume (ac-ft)		0.5	1.0	1.5	2.1	2.5	2.8		
Spillway Length:	-NA-	Discharge (cfs)	0	5	16	29	37	42	87	0	0
Discharge Coefficient:	-NA-	Elevation (ft)	2,653.0	2,654.0	2,655.0	2,656.0	2,657.0	2,657.5	2,658.0	-	-
Weir Coefficient:	-NA-										
Low-Level Outlet (SL)			<u>11</u>	<u>12</u>	<u>13</u>	<u>14</u>	<u>15</u>	<u>16</u>	<u>17</u>	<u>18</u>	<u>19</u>
Centerline Elevation:	-NA-	Volume (ac-ft)	-	-	-	-	-	-	-	-	-
Cross-Section Area:	-NA-	Discharge (cfs)	0	0	0	0	0	0	0	0	0
Discharge Coefficient:	-NA-	Elevation (ft)	-	-	-	-	-	-	-	-	-
Orifice Equation Exponent:	-NA-										
Top of Dam Overflow (ST)			<u>2 Yr</u>	<u>5 Yr</u>	<u>10 Yr</u>	<u>25 Yr</u>	<u>50 Yr</u>	<u>100 Yr</u>	1-30"		
Elevation Top of Dam:	-NA-	Peak Volume (ac-ft)	0.00	0.00	0.00	0.00	0.00	2.34			
Length of Dam:	-NA-	Peak Stage (ft)	0.00	0.00	0.00	0.00	0.00	2,657.30			
Discharge Coefficient:	-NA-	Peak Discharge (cfs)	0	0	0	0	0	40			
Weir Coefficient:	-NA-										

2-year HEC-1 Model

```

X   X   XXXXXX   XXXXX   X
X   X   X       X     X   XX
X   X   X       X     X   X
XXXXXX XXXX   X       XXXXX X
X   X   X       X     X   X
X   X   X       X     X   X
X   X   XXXXXX   XXXXX   XXX
    
```

THIS PROGRAM REPLACES ALL PREVIOUS VERSIONS OF HEC-1 KNOWN AS HRC1 (JAN 73), HEC1G, HEC1DB, AND HRC1KW.

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

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HEC-1 INPUT

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LINE      ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10
1          ID      Flood Control District of Maricopa County
2          ID      DM-19 FUT WR BAS - Desert Mountain 19 Post Online Det Basins
3          ID      2 YEAR
4          ID      6 Hour Storm
5          ID      Unit Hydrograph: S-Graph
6          ID      Storm: Multiple
7          ID      05/22/2017
          *DIAGRAM
8          IT      1 1JAN99      0      2000
9          IQ      3
10         IN      15
          *
11         JD      1.475 0.0001
12         PC      0.000 0.008 0.016 0.025 0.033 0.041 0.050 0.058 0.066 0.074
13         PC      0.087 0.099 0.118 0.138 0.216 0.377 0.834 0.911 0.931 0.950
14         PC      0.962 0.972 0.983 0.991 1.000
15         JD      1.466 0.5000
16         PC      0.000 0.008 0.016 0.025 0.033 0.041 0.050 0.058 0.066 0.074
17         PC      0.087 0.099 0.118 0.138 0.216 0.377 0.834 0.911 0.931 0.950
18         PC      0.962 0.972 0.983 0.991 1.000
19         JD      1.456 1.0
20         PC      0.000 0.008 0.016 0.025 0.033 0.041 0.050 0.058 0.066 0.075
21         PC      0.087 0.099 0.119 0.148 0.230 0.407 0.778 0.881 0.919 0.945
22         PC      0.957 0.968 0.980 0.990 1.000
23         JD      1.438 2.8
24         PC      0.000 0.009 0.016 0.023 0.034 0.042 0.051 0.059 0.067 0.076
25         PC      0.087 0.100 0.120 0.163 0.252 0.451 0.494 0.837 0.900 0.938
26         PC      0.950 0.963 0.975 0.988 1.000
          *
27         KK      A1  BASIN
28         BA      0.192
29         LQ      0.20 0.25 5.34 0.25 0
30         UI      0 38 38 38 48 111 142 178 217 247
31         UI      272 315 335 346 364 369 359 360 348 329
32         UI      295 268 239 217 195 176 159 144 130 117
33         UI      105 92 86 73 73 60 59 52 41 41
34         UI      41 30 26 26 26 26 25 9 9 9
35         UI      9 9 9 9 9 9 9 9 9 9
36         UI      9 9 0 0 0 0 0 0 0 0
          *
37         KK      R-A1 ROUTE
38         RB      4 FLOW
39         RC      0.060 0.040 0.060 980 0.0224 19.00
40         RK      0.00 42.00 73.00 106.00 196.00 225.00 291.00 295.00
41         RV      20.00 15.00 18.00 7.00 6.00 5.00 13.00 19.00
          *
42         KK      A2  BASIN
43         BA      0.011
44         LQ      0.17 0.25 5.46 0.24 0
45         UI      0 7 22 45 62 70 63 46 33 23
46         UI      16 12 8 6 5 2 2 2 2 0
47         UI      0 0 0 0 0 0 0 0 0 0
    
```

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HEC-1 INPUT

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LINE      ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10
48         UI      0 0 0 0 0 0 0 0 0 0
49         UI      0 0 0 0 0 0 0 0 0 0
          *
50         KK      CP-A2 COMBINE
51         RC      2
          *
52         KK      B1  BASIN
    
```

58	UI	0	0	0	0	0	0	0	0	0
59	UI	0	0	0	0	0	0	0	0	0

60	KK	R-B1	ROUTE							
61	RS	3	FLOW							
62	RC	0.025	0.025	0.025	720	0.0030	0.00			
63	KX	0.00	4.00	8.00	12.00	16.00	20.00	24.00	28.00	
64	XY	2640.0	2639.00	2638.00	2637.00	2637.00	2638.00	2639.00	2640.00	

65	KK	B3	BASIN							
66	BA	0.039								
67	LG	0.20	0.25	5.05	0.30	1				
68	UI	0	13	13	27	48	68	85	101	113
69	UI	121	116	107	90	75	65	55	47	39
70	UI	27	24	20	17	13	13	9	9	5
71	UI	3	3	3	3	3	3	3	3	0
72	UI	0	0	0	0	0	0	0	0	0

73	KK	B4	BASIN							
74	BA	1.008								
75	LG	0.21	0.25	5.34	0.28	12				
76	UI	0	92	92	92	92	92	92	92	185
77	UI	265	265	321	360	394	442	483	511	550
78	UI	630	658	646	758	758	785	815	818	844
79	UI	884	884	884	884	884	884	880	848	839
80	UI	823	786	763	719	676	643	643	589	561
81	UI	506	490	471	461	433	401	399	360	360
82	UI	326	306	283	283	261	253	253	224	206
83	UI	206	180	174	174	174	163	161	141	141
84	UI	141	106	98	98	98	98	98	98	69
85	UI	63	63	63	63	63	63	63	63	63
86	UI	63	44	22	22	22	22	22	22	22
87	UI	22	22	22	22	22	22	22	22	22
88	UI	22	22	22	22	22	22	22	22	22
89	UI	22	22	22	22	22	22	0	0	0

HEC-1 INPUT

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

90	KK	DVOC	DIVERT							
91	DT	DTOC	0.00	158.0						
92	DI	0.0	1090.0	1246.0	0.0	0.0	0.0	0.0	0.0	0.0
93	DQ	0.0	0.0	158.0	0.0	0.0	0.0	0.0	0.0	0.0

94	KK	DVOCSTRIPH								
95	DR	DTOC								

96	KK	DVOC	STORAGE							
97	EO									
98	RS	1	STOR							
99	EV	0.43	0.94	1.54	2.21	2.59	2.98			
100	SQ	1.00	9.00	19.00	26.00	29.00	72.00			
101	SE	2683.0	2684.00	2685.00	2686.00	2687.00	2687.50	2688.00		

102	KK	B4C	COMBINE							
103	HC	2								
104	KK	R-B4	ROUTE							
105	RS	2	FLOW							
106	RC	0.050	0.035	0.050	1310	0.0200	0.00			
107	KX	0.00	4.00	8.00	20.00	44.00	52.00	56.00	64.00	
108	XY	2680.0	2679.00	2678.00	2675.00	2675.00	2678.00	2679.00	2680.00	

109	KK	B4A	BASIN							
110	BA	0.027								
111	LG	0.19	0.25	4.28	0.49	7				
112	UI	0	15	32	72	106	131	141	131	104
113	UI	59	45	33	25	19	15	10	10	4
114	UI	4	4	4	0	0	0	0	0	0
115	UI	0	0	0	0	0	0	0	0	0
116	UI	0	0	0	0	0	0	0	0	0

117	KK	B4B	BASIN							
118	BA	0.005								
119	LG	0.10	0.25	4.65	0.47	80				
120	UI	0	5	19	29	48	39	26	14	7
121	UI	1	1	0	0	0	0	0	0	0
122	UI	0	0	0	0	0	0	0	0	0
123	UI	0	0	0	0	0	0	0	0	0
124	UI	0	0	0	0	0	0	0	0	0

HEC-1 INPUT

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

125	KK	CB4	COMBINE							
126	HC	3								

127	KK	DVOC	DIVERT							
128	DT	DTOC	0.00	110.0						

132 DK DTOD
*

133 KK DETOD STORAGE
134 KO
135 RS 1 STOR
136 SV 0.45 0.95 1.52 2.14 2.48 2.83
137 SQ 5.00 16.00 29.00 37.00 42.00 87.00
138 SE 2653.0 2654.00 2655.00 2656.00 2657.00 2657.50 2658.00
*

139 KK B4 COMBINE
140 HC 2
*

141 KK R-B4A ROUTE
142 RS 2 FLOW
143 RC 0.050 0.035 0.050 870 0.0210 0.00
144 RX 0.00 6.00 12.00 24.00 74.00 82.00 86.00 90.00
145 RY 2649.0 2649.00 2646.00 2645.00 2645.00 2646.00 2648.00 2649.00
*

146 KK B4C BASIN
147 BA 0.015
148 LG 0.18 0.25 4.31 0.38 12
149 UI 0 10 32 63 88 96 85 61 43 31
150 UI 21 16 11 7 5 2 2 2 2 0
151 UI 0 0 0 0 0 0 0 0 0 0
152 UI 0 0 0 0 0 0 0 0 0 0
153 UI 0 0 0 0 0 0 0 0 0 0
*

154 KK CP-B4C COMBINE
155 HC 4
*

156 KK R-CPB4 ROUTE
157 RS 1 FLOW
158 RC 0.060 0.040 0.060 300 0.0300 2631.00
159 RX 0.00 18.90 43.80 54.80 81.50 91.60 120.00 160.00
160 RY 2639.0 2630.00 2629.00 2625.00 2625.00 2629.00 2630.00 2631.00
*

HRC-1 INPUT

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

161 KK B5 BASIN
162 BA 0.004
163 LG 0.20 0.25 4.39 0.48 25
164 UI 0 109 44 0 0 0 0 0 0 0
165 UI 0 0 0 0 0 0 0 0 0 0
166 UI 0 0 0 0 0 0 0 0 0 0
167 UI 0 0 0 0 0 0 0 0 0 0
168 UI 0 0 0 0 0 0 0 0 0 0
*

169 KK DETB5 STORAGE
170 KO
171 RS 1 STOR
172 SV 0.17 0.38 0.62 0.89
173 SE 2623.0 2624.00 2623.00 2626.00 2627.00
174 SS 2626.0 20.00 2.80 1.50
175 SL 2623.0 0.20 0.60 0.50
*

176 KK B5 BASIN
177 BA 0.003
178 LG 0.10 0.25 5.46 0.24 80
179 UI 0 28 66 19 3 0 0 0 0 0
180 UI 0 0 0 0 0 0 0 0 0 0
181 UI 0 0 0 0 0 0 0 0 0 0
182 UI 0 0 0 0 0 0 0 0 0 0
183 UI 0 0 0 0 0 0 0 0 0 0
*

184 KK DETB5 STORAGE
185 KO
186 RS 1 STOR
187 SV 0.01 0.03 0.05 0.06
188 SE 2632.0 2633.00 2634.00 2635.00 2636.00
189 SS 2635.0 5.00 2.80 1.50
190 SL 2632.0 0.20 0.60 0.50
*

191 KK CP-B5 COMBINE
192 HC 3
*

193 KK R-CPB5 ROUTE
194 RS 1 FLOW
195 RC 0.060 0.040 0.060 650 0.0300 2631.00
196 RX 0.00 18.90 43.80 54.80 81.50 91.60 120.00 160.00
197 RY 2635.0 2630.00 2629.00 2625.00 2625.00 2629.00 2630.00 2631.00
*

HRC-1 INPUT

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

198 KK B8 BASIN
199 BA 0.018
200 LG 0.22 0.25 4.31 0.38 28

206 KK B13 BASIN
 207 BA 0.001
 208 LG 0.21 0.26 3.72 0.72 56
 209 UI 0 8 21 8 1 0 0 0 0 0
 210 UI 0 0 0 0 0 0 0 0 0 0
 211 UI 0 0 0 0 0 0 0 0 0 0
 212 UI 0 0 0 0 0 0 0 0 0 0
 213 UI 0 0 0 0 0 0 0 0 0 0
 *

214 KK CP8 COMBINE
 215 HC 2
 *

216 KK DET88 STORAGE
 217 KO
 218 RS 1 STOR
 219 SV 0.39 0.85 1.37 1.97
 220 SH 2613.0 2614.00 2615.00 2616.00 2617.00
 221 SS 2616.0 10.00 2.80 1.50
 222 SL 2613.0 0.44 0.60 0.50
 *

223 KK B6W BASIN
 224 BA 0.004
 225 LG 0.13 0.27 3.42 0.79 0
 226 UI 0 4 17 29 33 26 17 10 7 4
 227 UI 3 1 1 1 0 0 0 0 0 0
 228 UI 0 0 0 0 0 0 0 0 0 0
 229 UI 0 0 0 0 0 0 0 0 0 0
 230 UI 0 0 0 0 0 0 0 0 0 0
 *

231 KK CP-6W COMBINE
 232 HC 3
 *

233 KK B7 BASIN
 234 BA 0.004
 235 LG 0.19 0.26 3.72 0.70 20
 236 UI 0 62 83 9 0 0 0 0 0 0
 237 UI 0 0 0 0 0 0 0 0 0 0
 238 UI 0 0 0 0 0 0 0 0 0 0
 239 UI 0 0 0 0 0 0 0 0 0 0
 HEC-1 INPUT

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

240 UI 0 0 0 0 0 0 0 0 0 0
 *

241 KK DET87 STORAGE
 242 KO
 243 RS 1 STOR
 244 SV 0.06 0.16 0.31 0.56
 245 SH 2604.0 2605.00 2606.00 2607.00 2608.00
 246 SS 2607.0 5.00 2.80 1.50
 247 SL 2604.0 0.20 0.60 0.50
 *

248 KK CP87 COMBINE
 249 HC 2
 *

250 KK R-CP87 ROUTE
 251 RS 1 FLOW
 252 RC 0.060 0.040 0.060 750 0.0300 2605.00
 253 KK 0.00 55.30 123.80 129.00 141.80 146.00 155.20 188.60
 254 RY 2608.0 2600.00 2598.00 2596.00 2596.00 2597.80 2598.00 2605.00
 *

255 KK B9 BASIN
 256 BA 0.001
 257 LG 0.24 0.25 4.39 0.45 36
 258 UI 0 19 18 0 0 0 0 0 0 0
 259 UI 0 0 0 0 0 0 0 0 0 0
 260 UI 0 0 0 0 0 0 0 0 0 0
 261 UI 0 0 0 0 0 0 0 0 0 0
 262 UI 0 0 0 0 0 0 0 0 0 0
 *

263 KK DET89 STORAGE
 264 KO
 265 RS 1 STOR
 266 SV 0.06 0.16 0.30
 267 SH 2597.0 2598.00 2599.00 2600.00
 268 SS 2599.0 5.00 2.80 1.50
 269 SL 2597.0 0.20 0.60 0.50
 *

270 KK B10 BASIN
 271 BA 0.023
 272 LG 0.21 0.25 4.33 0.48 28
 273 UI 0 62 184 319 198 81 30 9 0 0
 274 UI 0 0 0 0 0 0 0 0 0 0
 275 UI 0 0 0 0 0 0 0 0 0 0
 276 UI 0 0 0 0 0 0 0 0 0 0
 277 UI 0 0 0 0 0 0 0 0 0 0
 *

280 KK DDTB10 STORAGE
 281 KO
 282 RS 1 STOR
 283 SV 0.57 1.28 1.69 2.17
 284 SE 2692.0 2693.00 2694.00 2694.50 2695.00
 285 SS 2694.5 20.00 2.80 1.50
 286 SL 2692.0 0.20 0.60 0.30
 *

287 KK B11 BASIN
 288 BA 0.002
 289 LG 0.09 0.14 7.58 0.12 23
 290 UI 0 54 22 0 0 0 0 0 0 0
 291 UI 0 0 0 0 0 0 0 0 0 0
 292 UI 0 0 0 0 0 0 0 0 0 0
 293 UI 0 0 0 0 0 0 0 0 0 0
 294 UI 0 0 0 0 0 0 0 0 0 0
 *

295 KK DDTB11 STORAGE
 296 KO
 297 RS 1 STOR
 298 SV 0.21
 299 SE 2627.0 2628.00
 300 SS 2627.0 10.00 2.80 1.50
 *

301 KK B12 BASIN
 302 BA 0.002
 303 LG 0.10 0.25 3.79 0.86 5
 304 UI 0 19 44 13 2 0 0 0 0 0
 305 UI 0 0 0 0 0 0 0 0 0 0
 306 UI 0 0 0 0 0 0 0 0 0 0
 307 UI 0 0 0 0 0 0 0 0 0 0
 308 UI 0 0 0 0 0 0 0 0 0 0
 *

309 KK DDTB12 STORAGE
 310 KO
 311 RS 1 STOR
 312 SV 0.07
 313 SE 2616.0 2619.00
 314 SS 2616.0 10.00 2.80 1.50
 *

HSC-1 INPUT

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

315 KK CPB12 COMBINE
 316 HC 2
 *

317 KK B14 BASIN
 318 BA 0.003
 319 LG 0.12 0.12 7.94 0.11 9
 320 UI 0 32 67 13 0 0 0 0 0 0
 321 UI 0 0 0 0 0 0 0 0 0 0
 322 UI 0 0 0 0 0 0 0 0 0 0
 323 UI 0 0 0 0 0 0 0 0 0 0
 324 UI 0 0 0 0 0 0 0 0 0 0
 *

325 KK CPB14 COMBINE
 326 HC 2
 *

327 KK DDT14A STORAGE
 328 KO
 329 RS 1 STOR
 330 SV 0.15
 331 SE 2615.0 2616.00
 332 SS 2615.0 10.00 2.80 1.50
 *

333 KK DDT14B STORAGE
 334 KO
 335 RS 1 STOR
 336 SV 0.05
 337 SE 2614.0 2615.00
 338 SS 2614.0 10.00 2.80 1.50
 *

339 KK B15 BASIN
 340 BA 0.003
 341 LG 0.11 0.12 7.58 0.11 8
 342 UI 0 38 67 10 0 0 0 0 0 0
 343 UI 0 0 0 0 0 0 0 0 0 0
 344 UI 0 0 0 0 0 0 0 0 0 0
 345 UI 0 0 0 0 0 0 0 0 0 0
 346 UI 0 0 0 0 0 0 0 0 0 0
 *

347 KK CPB15 COMBINE
 348 HC 2
 *

349 KK DDTB15 STORAGE
 350 KO
 351 RS 1 STOR
 352 SV 0.18

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

355 KK B16 BASIN
 356 BA 0.001
 357 LG 0.18 0.25 4.39 0.43 9
 358 UI 0 11 7 0 0 0 0 0 0 0
 359 UI 0 0 0 0 0 0 0 0 0 0
 360 UI 0 0 0 0 0 0 0 0 0 0
 361 UI 0 0 0 0 0 0 0 0 0 0
 362 UI 0 0 0 0 0 0 0 0 0 0
 *

363 KK DDTB16 STORAGE
 364 KO
 365 RS 1 STOR
 366 SV 0.10 0.23 0.39
 367 SE 2593.0 2594.00 2595.00 2596.00
 368 SS 2595.0 5.00 2.80 1.50
 369 SL 2593.0 0.20 0.60 0.50
 *

370 KK B17 BASIN
 371 BA 0.001
 372 LG 0.00 0.00 3.62 0.50 0
 373 UI 0 35 0 0 0 0 0 0 0 0
 374 UI 0 0 0 0 0 0 0 0 0 0
 375 UI 0 0 0 0 0 0 0 0 0 0
 376 UI 0 0 0 0 0 0 0 0 0 0
 377 UI 0 0 0 0 0 0 0 0 0 0
 *

378 KK CFB17 COMBINE
 379 HC 3
 *

380 KK DDTB17 STORAGE
 381 KO
 382 RS 1 STOR
 383 SV 0.33
 384 SE 2494.0 2495.00
 385 SS 2494.0 10.00 2.80 1.50
 *

386 KK B18 BASIN
 387 BA 0.003
 388 LG 0.14 0.25 4.51 0.49 5
 389 UI 0 70 44 0 0 0 0 0 0 0
 390 UI 0 0 0 0 0 0 0 0 0 0
 391 UI 0 0 0 0 0 0 0 0 0 0
 392 UI 0 0 0 0 0 0 0 0 0 0
 393 UI 0 0 0 0 0 0 0 0 0 0
 *

1 HEC-1 INPUT PAGE 11

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

394 KK CFB18 COMBINE
 395 HC 2
 *

396 KK DDTB18 STORAGE
 397 KO
 398 RS 1 STOR
 399 SV 0.15 0.35 0.61 0.93
 400 SE 2591.0 2592.00 2593.00 2594.00 2595.00
 401 SS 2594.0 5.00 2.80 1.50
 402 SL 2591.0 0.20 0.60 0.50
 *

403 KK B19 BASIN
 404 BA 0.006
 405 LG 0.14 0.26 3.72 0.64 1
 406 UI 0 12 37 68 59 34 13 5 2 0
 407 UI 0 0 0 0 0 0 0 0 0 0
 408 UI 0 0 0 0 0 0 0 0 0 0
 409 UI 0 0 0 0 0 0 0 0 0 0
 410 UI 0 0 0 0 0 0 0 0 0 0
 *

411 KK CPGAL COMBINE
 412 HC 4
 *

413 KK C5 BASIN
 414 BA 0.003
 415 LG 0.10 0.25 5.34 0.34 80
 416 UI 0 7 22 40 27 12 5 1 1 0
 417 UI 0 0 0 0 0 0 0 0 0 0
 418 UI 0 0 0 0 0 0 0 0 0 0
 419 UI 0 0 0 0 0 0 0 0 0 0
 420 UI 0 0 0 0 0 0 0 0 0 0
 *

421 KK CSA BASIN
 422 BA 0.003
 423 LG 0.18 0.28 6.00 0.21 37
 424 UI 0 9 26 43 25 9 3 1 0 0
 425 UI 0 0 0 0 0 0 0 0 0 0
 426 UI 0 0 0 0 0 0 0 0 0 0
 427 UI 0 0 0 0 0 0 0 0 0 0
 428 UI 0 0 0 0 0 0 0 0 0 0
 *

LINE	ID	1	2	3	4	5	6	7	8	9	10
431	KK	C6	BASIN								
432	BA	0.001									
433	LQ	0.19	0.25	5.05	0.29	9					
434	UI	0	38	0	0	0	0	0	0	0	0
435	UI	0	0	0	0	0	0	0	0	0	0
436	UI	0	0	0	0	0	0	0	0	0	0
437	UI	0	0	0	0	0	0	0	0	0	0
438	UI	0	0	0	0	0	0	0	0	0	0
439	KK	DSTC6 STORAGE									
440	KO										
441	RS	1	STOR								
442	SV	0.07									
443	SE	2637.0	2638.00								
444	SS	2637.0	10.00	2.80	1.50						
445	KK	C7	BASIN								
446	BA	0.001									
447	LQ	0.13	0.25	5.05	0.39	10					
448	UI	0	31	7	0	0	0	0	0	0	0
449	UI	0	0	0	0	0	0	0	0	0	0
450	UI	0	0	0	0	0	0	0	0	0	0
451	UI	0	0	0	0	0	0	0	0	0	0
452	UI	0	0	0	0	0	0	0	0	0	0
453	KK	CPC7 COMBINE									
454	HC	2									
455	KK	DSTC7 STORAGE									
456	KO										
457	RS	1	STOR								
458	SV	0.05									
459	SE	2634.0	2635.00								
460	SS	2634.0	10.00	2.80	1.50						
461	KK	C8	BASIN								
462	BA	0.003									
463	LQ	0.13	0.23	5.58	0.28	9					
464	UI	0	105	0	0	0	0	0	0	0	0
465	UI	0	0	0	0	0	0	0	0	0	0
466	UI	0	0	0	0	0	0	0	0	0	0
467	UI	0	0	0	0	0	0	0	0	0	0
468	UI	0	0	0	0	0	0	0	0	0	0

LINE	ID	1	2	3	4	5	6	7	8	9	10
469	KK	CPC8 COMBINE									
470	HC	3									
471	KK	DSTC8 STORAGE									
472	KO										
473	RS	1	STOR								
474	SV	0.08 0.18									
475	SE	2629.0	2629.50	2630.00							
476	SS	2629.0	20.00	2.80	1.50						
477	KK	R-C8	ROUTE								
478	RS	1	FLOW								
479	RC	0.035	0.025	0.035	650	0.0200	0.00				
480	RE	0.00	4.00	8.00	12.00	22.00	26.00	30.00	34.00		
481	RY	2629.0	2629.00	2628.00	2627.00	2628.00	2629.00	2629.00	2629.00		
482	KK	C1	BASIN								
483	BA	0.010									
484	LQ	0.16	0.25	5.05	0.36	13					
485	UI	0	92	220	64	10	0	0	0	0	0
486	UI	0	0	0	0	0	0	0	0	0	0
487	UI	0	0	0	0	0	0	0	0	0	0
488	UI	0	0	0	0	0	0	0	0	0	0
489	UI	0	0	0	0	0	0	0	0	0	0
490	KK	CPC1 COMBINE									
491	HC	2									
492	KK	DSTC1 STORAGE									
493	KO										
494	RS	1	STOR								
495	SV	0.37 0.90 1.57 2.37									
496	SE	2607.0	2608.00	2609.00	2610.00	2611.00					
497	SS	2610.5	2.00	2.80	1.50						
498	SL	2607.0	0.44	0.60	0.50						
499	KK	C10	BASIN								
500	BA	0.002									

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

507	KK	C9	BASIN							
508	RA	0.004								
509	LG	0.25	0.25	5.85	0.23	45				
510	UI	0	29	80	37	7	0	0	0	0
511	UI	0	0	0	0	0	0	0	0	0
512	UI	0	0	0	0	0	0	0	0	0
513	UI	0	0	0	0	0	0	0	0	0
514	UI	0	0	0	0	0	0	0	0	0

515	KK	CPC9	COMBINE							
516	RC	2								

517	KK	C4	BASIN							
518	RA	0.005								
519	LG	0.25	0.15	7.00	0.15	45				
520	UI	0	53	112	24	0	0	0	0	0
521	UI	0	0	0	0	0	0	0	0	0
522	UI	0	0	0	0	0	0	0	0	0
523	UI	0	0	0	0	0	0	0	0	0
524	UI	0	0	0	0	0	0	0	0	0

525	KK	C2	BASIN							
526	RA	0.012								
527	LG	0.19	0.25	5.05	0.35	22				
528	UI	0	51	157	167	64	18	6	0	0
529	UI	0	0	0	0	0	0	0	0	0
530	UI	0	0	0	0	0	0	0	0	0
531	UI	0	0	0	0	0	0	0	0	0
532	UI	0	0	0	0	0	0	0	0	0

533	KK	DBTC21 STORAGE								
534	KO									
535	RS	1	STOR							
536	SV		0.19	0.44	0.81	1.32				
537	SE	2598.0	2599.00	2600.00	2601.00	2602.00				
538	SS	2601.0	5.00	2.80	1.50					
539	SL	2598.0	0.20	0.60	0.50					

540	KK	CPC2	COMBINE							
541	RC	3								

542	KK	DBTC2 STORAGE								
543	KO									
544	RS	1	STOR							
545	SV		0.06	0.15	0.27	0.43				
546	SE	2596.0	2597.00	2598.00	2599.00	2600.00				
547	SS	2599.0	20.00	2.80	1.50					
548	SL	2596.0	0.20	0.60	0.50					

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

549	KK	C3	BASIN							
550	RA	0.002								
551	LG	0.22	0.25	5.05	0.32	31				
552	UI	0	19	44	13	2	0	0	0	0
553	UI	0	0	0	0	0	0	0	0	0
554	UI	0	0	0	0	0	0	0	0	0
555	UI	0	0	0	0	0	0	0	0	0
556	UI	0	0	0	0	0	0	0	0	0

557	KK	DBTC3 STORAGE								
558	KO									
559	RS	1	STOR							
560	SV		0.03	0.09	0.18	0.23	0.28			
561	SE	2596.5	2597.00	2598.00	2599.00	2599.50	2600.00			
562	SS	2599.5	20.00	2.80	1.50					
563	SL	2596.5	0.20	0.60	0.50					

564	KK	CPC3	COMBINE							
565	RC	2								

566	KK	DBTC31 STORAGE								
567	KO									
568	RS	1	STOR							
569	SV		0.36	0.78	1.28	1.85				
570	SE	2596.0	2597.00	2598.00	2599.00	2600.00				
571	SS	2599.0	5.00	2.80	1.50					
572	SL	2596.0	0.20	0.60	0.50					

573	KK	C3A	BASIN							
574	RA	0.003								
575	LG	0.14	0.25	5.05	0.37	8				
576	UI	0	72	44	8					

581	KK	CPCJA COMBINE									
582	EC	2									
		.									
583	KK	DETCJA STORAGE									
584	EC										
585	RS	1	STOR								
586	SV	0.17	0.39	0.66	0.98						
587	SB	2590.0	2591.00	2592.00	2593.00	2594.00					
588	SB	2593.0	5.00	2.80	1.50						
589	SL	2590.0	0.20	0.60	0.50						
		.									

LINE	ID	1	2	3	4	5	6	7	8	9	10
590	KK	G1	BASIN								
591	BA	0.001									
592	LG	0.17	0.15	7.94	0.10	27					
593	UI	0	35	0	0	0	0	0	0	0	0
594	UI	0	0	0	0	0	0	0	0	0	0
595	UI	0	0	0	0	0	0	0	0	0	0
596	UI	0	0	0	0	0	0	0	0	0	0
597	UI	0	0	0	0	0	0	0	0	0	0
		.									
598	KK	H1	BASIN								
599	BA	0.002									
600	LG	0.17	0.25	5.05	0.33	5					
601	UI	0	3	11	18	18	12	7	4	2	1
602	UI	1	0	0	0	0	0	0	0	0	0
603	UI	0	0	0	0	0	0	0	0	0	0
604	UI	0	0	0	0	0	0	0	0	0	0
605	UI	0	0	0	0	0	0	0	0	0	0
		.									
606	KK	L1	BASIN								
607	BA	0.002									
608	LG	0.20	0.25	5.05	0.28	0					
609	UI	0	6	20	24	14	7	3	2	1	1
610	UI	0	0	0	0	0	0	0	0	0	0
611	UI	0	0	0	0	0	0	0	0	0	0
612	UI	0	0	0	0	0	0	0	0	0	0
613	UI	0	0	0	0	0	0	0	0	0	0
		.									
614	KK	M1	BASIN								
615	BA	0.001									
616	LG	0.20	0.25	5.05	0.28	0					
617	UI	0	2	9	12	8	4	2	1	1	0
618	UI	0	0	0	0	0	0	0	0	0	0
619	UI	0	0	0	0	0	0	0	0	0	0
620	UI	0	0	0	0	0	0	0	0	0	0
621	UI	0	0	0	0	0	0	0	0	0	0
		.									
622	ZZ										

LINE NO.	(V) ROUTING (.) CONNECTOR	(--->) DIVERSION OR PUMP FLOW	(<---) RETURN OF DIVERTED OR PUMPED FLOW
27	A1		
	V		
	V		
37	R-A1		
	.		
42	.	A2	
	.		
50	CP-A2		
	.		
52	.	B1	
	.	V	
	.	V	
60	R-B1		
	.		
65	.	B3	
	.		
73	.	B4	
	.		
91	.		DTOC
90	.	DVOC	
	.		
95	.		DTOC
94	.	DVOC	
	.	V	
	.	V	
96	.	DTOC	
	.		
102	.	B4C	
	.	V	
	.	V	
104	.	R-B4	
	.		
109	.	B4A	
	.		
117	.		B4B
	.		
125	.	CB4	
	.		
128	.		DTOD
127	.	DVOD	
	.		
132	.		DTOD
131	.	DVOD	
	.	V	
	.	V	
133	.	DTOD	
	.		
139	.	B4	
	.	V	
	.	V	
141	.	R-B4A	
	.		
146	.	B4C	
	.		
154	CP-B4C		
	V		
	V		
156	R-CPB4		
	.		
161	.	B6	
	.	V	
	.	V	
169	.	DTB6	
	.		
176	.	B5	
	.	V	
	.	V	
184	.	DTB5	
	.		
191	CP-B5		
	V		
	V		
193	R-CPB5		
	.		
198	.	B8	
	.		
206	.	B13	

223	.	.	B6W	.
231	CP-6W	.....	.	.
233	.	B7	.	.
	.	V	.	.
241	.	DSTB7	.	.
248	CPB7	.....	.	.
	.	V	.	.
250	R-CPB7	.	.	.
255	.	B9	.	.
	.	V	.	.
263	.	DSTB9	.	.
270	.	.	B10	.
278	CPB10	.....	.	.
	.	V	.	.
280	DSTB10	.	.	.
287	.	B11	.	.
	.	V	.	.
295	.	DSTB11	.	.
301	.	.	B12	.
	.	.	V	.
309	.	.	DSTB12	.
315	.	CPB12	.....	.
317	.	.	B14	.
325	.	CPB14	.....	.
	.	V	.	.
327	.	DST14A	.	.
	.	V	.	.
333	.	DST14B	.	.
339	.	.	B15	.
347	.	CPB15	.....	.
	.	V	.	.
349	.	DSTB15	.	.
355	.	.	B16	.
	.	.	V	.
363	.	.	DSTB16	.
370	.	.	.	B17
378	.	CPB17	.....	.
	.	V	.	.
380	.	DSTB17	.	.
386	.	.	B18	.
394	.	CPB18	.....	.
	.	V	.	.
396	.	DSTB18	.	.
403	.	.	B19	.
411	CPGAL	.....	.	.
413	.	CS	.	.

431	.	.	.	C6	.	.	.	.	.
	.	.	.	V	.	.	.	.	.
439	.	.	.	V	.	.	.	.	.
	.	.	.	DBTC6	.	.	.	.	.

445	.	.	.	.	.	.	C7	.	.

453	.	.	.	CPC7	.	.	.	.	.
	.	.	.	V	.	.	.	.	.
	.	.	.	V	.	.	.	.	.
455	.	.	.	DBTC7	.	.	.	.	.

461	.	.	.	.	.	.	C8	.	.

469	.	.	.	CPC8	.	.	.	.	.
	.	.	.	V	.	.	.	.	.
	.	.	.	V	.	.	.	.	.
471	.	.	.	DBTC8	.	.	.	.	.
	.	.	.	V	.	.	.	.	.
	.	.	.	V	.	.	.	.	.
477	.	.	.	R-C8	.	.	.	.	.

482	.	.	.	.	.	.	C1	.	.

490	.	.	.	CPC1	.	.	.	.	.
	.	.	.	V	.	.	.	.	.
	.	.	.	V	.	.	.	.	.
492	.	.	.	DBTC1	.	.	.	.	.

499	.	.	.	.	.	.	C10	.	.

507	.	.	.	.	.	.	C9	.	.

515	.	.	.	CPC9	.	.	.	.	.

517	.	.	.	.	.	.	C4	.	.

525	.	.	.	.	.	.	.	.	C2
	.	.	.	.	.	.	.	.	V
	.	.	.	.	.	.	.	.	V
533	.	.	.	.	.	.	.	.	DBTC21

540	.	.	.	CPC2	.	.	.	.	.
	.	.	.	V	.	.	.	.	.
	.	.	.	V	.	.	.	.	.
542	.	.	.	DBTC2	.	.	.	.	.

549	.	.	.	.	.	.	C3	.	.
	.	.	.	.	.	.	V	.	.
	.	.	.	.	.	.	V	.	.
557	.	.	.	.	.	.	DBTC3	.	.

564	.	.	.	CPC3	.	.	.	.	.
	.	.	.	V	.	.	.	.	.
	.	.	.	V	.	.	.	.	.
566	.	.	.	DBTC31	.	.	.	.	.

573	.	.	.	.	.	.	C3A	.	.

581	.	.	.	CPC3A	.	.	.	.	.
	.	.	.	V	.	.	.	.	.
	.	.	.	V	.	.	.	.	.
583	.	.	.	DBTC3A	.	.	.	.	.

590	.	.	.	.	.	.	G1	.	.

598	.	.	.	.	.	.	.	.	H1

606	.	.	.	.	.	.	.	.	L1

614	.	.	.	.	.	.	.	.	.

(*** RUNOFF ALSO COMPUTED AT THIS LOCATION

H1

* * * * *
96 KK * DETOC * STORAGE
* * * * *

97 KO OUTPUT CONTROL VARIABLES
IPRNT 5 PRINT CONTROL
IPLOT 0 PLOT CONTROL
QSCAL 0. HYDROGRAPH PLOT SCALE

.....

* * * * *
133 KK * DETOD * STORAGE
* * * * *

134 KO OUTPUT CONTROL VARIABLES
IPRNT 5 PRINT CONTROL
IPLOT 0 PLOT CONTROL
QSCAL 0. HYDROGRAPH PLOT SCALE

.....

* * * * *
169 KK * DETBG * STORAGE
* * * * *

170 KO OUTPUT CONTROL VARIABLES
IPRNT 5 PRINT CONTROL
IPLOT 0 PLOT CONTROL
QSCAL 0. HYDROGRAPH PLOT SCALE

.....

* * * * *
184 KK * DETBS * STORAGE
* * * * *

185 KO OUTPUT CONTROL VARIABLES
IPRNT 5 PRINT CONTROL
IPLOT 0 PLOT CONTROL
QSCAL 0. HYDROGRAPH PLOT SCALE

.....

* * * * *
216 KK * DETBS * STORAGE
* * * * *

217 KO OUTPUT CONTROL VARIABLES
IPRNT 5 PRINT CONTROL
IPLOT 0 PLOT CONTROL
QSCAL 0. HYDROGRAPH PLOT SCALE

.....

* * * * *
241 KK * DETB7 * STORAGE
* * * * *

242 KO OUTPUT CONTROL VARIABLES
IPRNT 5 PRINT CONTROL
IPLOT 0 PLOT CONTROL
QSCAL 0. HYDROGRAPH PLOT SCALE

.....

* * * * *
263 KK * DETB9 * STORAGE
* * * * *

*
280 KK * DETB10 * STORAGE
*

OUTPUT CONTROL VARIABLES
IFRST 5 PRINT CONTROL
IFLOT 0 PLOT CONTROL
QSCAL 0. HYDROGRAPH PLOT SCALE

*
295 KK * DETB11 * STORAGE
*

OUTPUT CONTROL VARIABLES
IFRST 5 PRINT CONTROL
IFLOT 0 PLOT CONTROL
QSCAL 0. HYDROGRAPH PLOT SCALE

*
309 KK * DETB12 * STORAGE
*

OUTPUT CONTROL VARIABLES
IFRST 5 PRINT CONTROL
IFLOT 0 PLOT CONTROL
QSCAL 0. HYDROGRAPH PLOT SCALE

*
327 KK * DET14A * STORAGE
*

OUTPUT CONTROL VARIABLES
IFRST 5 PRINT CONTROL
IFLOT 0 PLOT CONTROL
QSCAL 0. HYDROGRAPH PLOT SCALE

*
333 KK * DET14B * STORAGE
*

OUTPUT CONTROL VARIABLES
IFRST 5 PRINT CONTROL
IFLOT 0 PLOT CONTROL
QSCAL 0. HYDROGRAPH PLOT SCALE

*
349 KK * DETB15 * STORAGE
*

OUTPUT CONTROL VARIABLES
IFRST 5 PRINT CONTROL
IFLOT 0 PLOT CONTROL
QSCAL 0. HYDROGRAPH PLOT SCALE

TIME IN HOURS, AREA IN SQUARE MILES

OPERATION	STATION	PEAK FLOW	TIME OF PEAK	AVERAGE FLOW FOR MAXIMUM PERIOD			BASIN AREA	MAXIMUM STAGE	TIME OF MAX STAGE
				6-HOUR	24-HOUR	72-HOUR			
HYDROGRAPH AT	A1	135.	4.15	9.	2.	2.	0.19		
ROUTED TO	R-A1	131.	4.22	9.	2.	2.	0.19		
HYDROGRAPH AT	A2	13.	4.02	1.	0.	0.	0.01		
2 COMBINED AT	CP-A2	132.	4.22	9.	2.	2.	0.20		
HYDROGRAPH AT	B1	22.	4.03	1.	0.	0.	0.02		
ROUTED TO	R-B1	21.	4.08	1.	0.	0.	0.02		
HYDROGRAPH AT	B3	34.	4.07	2.	0.	0.	0.04		
HYDROGRAPH AT	B4	303.	4.43	46.	12.	8.	1.01		
DIVERSION TO	DTOC	0.	0.00	0.	0.	0.	1.01		
HYDROGRAPH AT	DVOC	303.	4.43	46.	12.	8.	1.01		
HYDROGRAPH AT	DVOC	0.	0.00	0.	0.	0.	1.01		
ROUTED TO	DETOC	0.	0.00	0.	0.	0.	1.01		
2 COMBINED AT	B4C	303.	4.43	46.	12.	8.	1.01		
ROUTED TO	R-B4	302.	4.47	46.	12.	8.	1.01		
HYDROGRAPH AT	B4A	24.	4.03	1.	0.	0.	0.03		
HYDROGRAPH AT	B4B	8.	4.02	1.	0.	0.	0.00		
3 COMBINED AT	CB4	302.	4.47	47.	12.	9.	1.04		
DIVERSION TO	DTOD	0.	0.00	0.	0.	0.	1.04		
HYDROGRAPH AT	DVOD	298.	4.47	47.	12.	8.	1.04		
HYDROGRAPH AT	DVOD	0.	0.00	0.	0.	0.	1.04		
ROUTED TO	DETOD	0.	0.00	0.	0.	0.	1.04		
2 COMBINED AT	B4	298.	4.47	47.	12.	8.	1.04		
ROUTED TO	R-B4A	298.	4.50	47.	12.	8.	1.04		
HYDROGRAPH AT	B4C	16.	4.02	1.	0.	0.	0.01		
4 COMBINED AT	CP-B4C	298.	4.50	49.	12.	9.	1.12		
ROUTED TO	R-CPB4	289.	4.50	48.	12.	9.	1.12		
HYDROGRAPH AT	B6	5.	4.02	0.	0.	0.	0.00		
ROUTED TO	DETB6	1.	4.05	0.	0.	0.	0.00		
HYDROGRAPH AT	B5	5.	4.02	0.	0.	0.	0.00		
ROUTED TO	DETB5	5.	4.02	0.	0.	0.	0.00		
3 COMBINED AT	CP-B5	290.	4.50	49.	12.	9.	1.12		
ROUTED TO	R-CPB5	290.	4.52	49.	12.	9.	1.12		

+	2 COMBINED AT	CP8	22.	4.02	1.	0.	0.	0.02
+	ROUTED TO	DETB8	2.	4.17	1.	0.	0.	0.02
+	HYDROGRAPH AT	B6W	2.	4.03	0.	0.	0.	0.00
+	3 COMBINED AT	CP-6W	290.	4.52	49.	12.	9.	1.15
+	HYDROGRAPH AT	B7	4.	4.02	0.	0.	0.	0.00
+	ROUTED TO	DETB7	1.	4.05	0.	0.	0.	0.00
+	2 COMBINED AT	CPB7	290.	4.52	49.	12.	9.	1.15
+	ROUTED TO	R-CPB7	289.	4.53	49.	12.	9.	1.15
+	HYDROGRAPH AT	B9	1.	4.02	0.	0.	0.	0.00
+	ROUTED TO	DETB9	1.	4.03	0.	0.	0.	0.00
+	HYDROGRAPH AT	B10	26.	4.02	2.	0.	0.	0.02
+	2 COMBINED AT	CPB10	27.	4.02	2.	0.	0.	0.02
+	ROUTED TO	DETB10	1.	4.30	1.	0.	0.	0.02
+	HYDROGRAPH AT	B11	3.	4.02	0.	0.	0.	0.00
+	ROUTED TO	DETB11	2.	4.02	0.	0.	0.	0.00
+	HYDROGRAPH AT	B12	1.	4.02	0.	0.	0.	0.00
+	ROUTED TO	DETB12	1.	4.03	0.	0.	0.	0.00
+	2 COMBINED AT	CPB12	4.	4.02	0.	0.	0.	0.00
+	HYDROGRAPH AT	B14	4.	4.02	0.	0.	0.	0.00
+	2 COMBINED AT	CPB14	8.	4.02	0.	0.	0.	0.01
+	ROUTED TO	DETB14A	7.	4.03	0.	0.	0.	0.01
+	ROUTED TO	DETB14B	7.	4.05	0.	0.	0.	0.01
+	HYDROGRAPH AT	B15	5.	4.02	0.	0.	0.	0.00
+	2 COMBINED AT	CPB15	11.	4.02	1.	0.	0.	0.01
+	ROUTED TO	DETB15	10.	4.03	1.	0.	0.	0.01
+	HYDROGRAPH AT	B16	1.	4.02	0.	0.	0.	0.00
+	ROUTED TO	DETB16	0.	4.03	0.	0.	0.	0.00
+	HYDROGRAPH AT	B17	1.	3.78	0.	0.	0.	0.00
+	3 COMBINED AT	CPB17	11.	4.02	1.	0.	0.	0.01
+	ROUTED TO	DETB17	7.	4.13	1.	0.	0.	0.01
+	HYDROGRAPH AT	B18	3.	4.02	0.	0.	0.	0.00
+	2 COMBINED AT	CPB18	8.	4.02	1.	0.	0.	0.02
+	ROUTED TO	DETB18	1.	4.85	1.	0.	0.	0.02
+	HYDROGRAPH AT	B19	5.	4.02	0.	0.	0.	0.01
+	4 COMBINED AT							

+	HYDROGRAPH AT	C5A	4.	4.02	0.	0.	0.	0.00
+	2 COMBINED AT	CPC5	9.	4.02	1.	0.	0.	0.01
+	HYDROGRAPH AT	C6	1.	4.02	0.	0.	0.	0.00
+	ROUTED TO	DETC6	1.	4.02	0.	0.	0.	0.00
+	HYDROGRAPH AT	C7	1.	4.02	0.	0.	0.	0.00
+	2 COMBINED AT	CPC7	2.	4.02	0.	0.	0.	0.00
+	ROUTED TO	DETC7	2.	4.02	0.	0.	0.	0.00
+	HYDROGRAPH AT	C8	3.	4.02	0.	0.	0.	0.00
+	3 COMBINED AT	CPC8	14.	4.02	1.	0.	0.	0.01
+	ROUTED TO	DETC8	14.	4.02	1.	0.	0.	0.01
+	ROUTED TO	R-C8	14.	4.03	1.	0.	0.	0.01
+	HYDROGRAPH AT	C1	11.	4.02	1.	0.	0.	0.01
+	2 COMBINED AT	CPC1	25.	4.02	1.	0.	0.	0.02
+	ROUTED TO	DETC1	2.	4.27	1.	0.	0.	0.02
+	HYDROGRAPH AT	C10	3.	4.02	0.	0.	0.	0.00
+	HYDROGRAPH AT	C9	6.	4.02	0.	0.	0.	0.00
+	2 COMBINED AT	CPC9	9.	4.02	1.	0.	0.	0.01
+	HYDROGRAPH AT	C4	8.	4.02	1.	0.	0.	0.00
+	HYDROGRAPH AT	C2	14.	4.02	1.	0.	0.	0.01
+	ROUTED TO	DETC21	1.	4.08	1.	0.	0.	0.01
+	3 COMBINED AT	CPC2	17.	4.02	2.	0.	0.	0.02
+	ROUTED TO	DETC2	15.	4.03	2.	0.	0.	0.02
+	HYDROGRAPH AT	C3	3.	4.02	0.	0.	0.	0.00
+	ROUTED TO	DETC3	1.	4.05	0.	0.	0.	0.00
+	2 COMBINED AT	CPC3	16.	4.03	2.	1.	0.	0.03
+	ROUTED TO	DETC31	1.	8.25	1.	1.	0.	0.03
+	HYDROGRAPH AT	C3A	3.	4.02	0.	0.	0.	0.00
+	2 COMBINED AT	CPC3A	4.	4.02	1.	1.	0.	0.03
+	ROUTED TO	DETC3A	1.	10.65	1.	1.	0.	0.03
+	HYDROGRAPH AT	G1	1.	4.02	0.	0.	0.	0.00
+	HYDROGRAPH AT	H1	2.	4.02	0.	0.	0.	0.00
+	HYDROGRAPH AT	L1	2.	4.02	0.	0.	0.	0.00
+	HYDROGRAPH AT	M1	1.	4.02	0.	0.	0.	0.00

10-year HEC-1 Model

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

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

LINE	ID	1	2	3	4	5	6	7	8	9	10
1	ID	Flood Control District of Maricopa County									
2	ID	DM-19 FUT WR BAS - Desert Mountain 19 Post Online Det Basins									
3	ID	10 YEAR									
4	ID	6 Hour Storm									
5	ID	Unit Hydrograph: S-Graph									
6	ID	Storm: Multiple									
7	ID	05/22/2017									
	*DIAGRAM										
8	IT	1	1JAN99	0	2000						
9	IO	5									
10	IN	15									
	*										
11	JD	2.182	0.0001								
12	PC	0.000	0.008	0.018	0.025	0.033	0.041	0.050	0.058	0.066	0.074
13	PC	0.087	0.099	0.118	0.138	0.216	0.377	0.634	0.911	0.931	0.950
14	PC	0.962	0.972	0.983	0.991	1.000					
15	JD	2.189	0.5000								
16	PC	0.000	0.008	0.016	0.025	0.033	0.041	0.050	0.058	0.066	0.074
17	PC	0.087	0.099	0.118	0.138	0.216	0.377	0.634	0.911	0.931	0.950
18	PC	0.962	0.972	0.983	0.991	1.000					
19	JD	2.154	1.0								
20	PC	0.000	0.008	0.016	0.025	0.033	0.041	0.050	0.058	0.066	0.075
21	PC	0.087	0.099	0.119	0.148	0.230	0.407	0.778	0.881	0.919	0.945
22	PC	0.957	0.968	0.980	0.990	1.000					
23	JD	2.127	2.8								
24	PC	0.000	0.009	0.016	0.025	0.034	0.042	0.051	0.059	0.067	0.076
25	PC	0.087	0.100	0.120	0.163	0.252	0.451	0.694	0.837	0.900	0.938
26	PC	0.950	0.963	0.975	0.988	1.000					
	*										
27	KK	A1	BASIN								
28	RA	0.192									
29	LG	0.20	0.25	5.34	0.25	0					
30	UI	0	38	30	30	48	111	142	178	217	247
31	UI	272	315	335	346	364	369	369	360	348	329
32	UI	295	268	239	217	195	176	159	144	130	117
33	UI	105	92	86	73	73	60	59	52	41	41
34	UI	41	30	26	26	26	25	9	9	9	9
35	UI	9	9	9	9	9	9	9	9	9	9
36	UI	9	9	0	0	0	0	0	0	0	0
	*										
37	KK	R-A1	ROUTE								
38	RS	1	FLOW								
39	RC	0.060	0.040	0.060	980	0.0224	19.00				
40	RX	0.00	42.00	73.00	106.00	196.00	225.00	251.00	295.00		
41	RY	20.00	15.00	10.00	7.00	6.00	5.00	13.00	19.00		
	*										
42	KK	A2	BASIN								
43	RA	0.011									
44	LG	0.17	0.25	5.46	0.24	0					
45	UI	0	7	22	45	62	70	63	46	33	23
46	UI	16	12	8	6	5	2	2	2	2	0
47	UI	0	0	0	0	0	0	0	0	0	0

LINE	ID	1	2	3	4	5	6	7	8	9	10
48	UI	0	0	0	0	0	0	0	0	0	0
49	UI	0	0	0	0	0	0	0	0	0	0
	*										
50	KK	CP-A2	COMBINE								
51	RC	2									
	*										
52	KK	A1	BASIN								

58	UI	0	0	0	0	0	0	0	0	0
59	UI	0	0	0	0	0	0	0	0	0
*										
60	KK	R-B1	ROUTE							
61	RS	3	FLOW							
62	RC	0.025	0.025	0.025	720	0.0030	0.00			
63	RK	0.00	4.00	8.00	12.00	16.00	20.00	24.00	28.00	
64	RY	2640.0	2639.00	2638.00	2637.00	2637.00	2638.00	2639.00	2640.00	
*										
65	KK	B3	BASIN							
66	BA	0.039								
67	LG	0.20	0.25	5.05	0.30	1				
68	UI	0	13	13	27	48	68	85	101	113
69	UI	121	116	107	90	76	65	55	47	39
70	UI	27	24	20	17	13	13	9	9	5
71	UI	3	3	3	3	3	3	3	3	0
72	UI	0	0	0	0	0	0	0	0	0
*										
73	KK	B4	BASIN							
74	BA	1.008								
75	LG	0.21	0.25	5.34	0.28	12				
76	UI	0	92	92	92	92	92	92	92	185
77	UI	265	265	321	360	394	442	483	511	558
78	UI	630	658	646	750	750	785	815	818	844
79	UI	884	884	884	884	884	884	880	848	839
80	UI	823	786	763	715	676	643	643	589	561
81	UI	506	490	471	441	433	401	399	360	360
82	UI	326	306	283	283	261	253	253	224	206
83	UI	206	180	174	174	174	163	141	141	141
84	UI	141	106	98	98	98	98	98	98	69
85	UI	63	63	63	63	63	63	63	63	63
86	UI	63	44	22	22	22	22	22	22	22
87	UI	22	22	22	22	22	22	22	22	22
88	UI	22	22	22	22	22	22	22	22	22
89	UI	22	22	22	22	22	22	0	0	0
*										

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PAGE 3

LINE	ID	1	2	3	4	5	6	7	8	9	10
90	KK	DVOC	DIVERT								
91	DT	DTOC	0.00	158.0							
92	DI	0.0	1090.0	1246.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
93	DQ	0.0	0.0	158.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
*											
94	KK	DVOC	RETRIVE								
95	DR	DTOC									
*											
96	KK	DFTOC	STORAGE								
97	EO										
98	RS	1	STOR								
99	SV	0.43	0.94	1.94	2.21	2.59	2.98				
100	SQ	1.00	9.00	19.00	26.00	29.00	72.00				
101	SB	2683.0	2684.00	2685.00	2686.00	2687.00	2687.50	2688.00			
*											
102	KK	B4C	COMBINE								
103	HC	2									
*											
104	KK	R-B4	ROUTE								
105	RS	1	FLOW								
106	RC	0.050	0.035	0.050	1310	0.0200	0.00				
107	RK	0.00	4.00	8.00	20.00	44.00	52.00	56.00	64.00		
108	RY	2680.0	2679.00	2678.00	2675.00	2675.00	2678.00	2679.00	2680.00		
*											
109	KK	B4A	BASIN								
110	BA	0.027									
111	LG	0.19	0.25	4.28	0.49	7					
112	UI	0	15	32	72	106	131	141	131	104	78
113	UI	59	45	33	25	19	15	10	10	4	4
114	UI	4	4	4	0	0	0	0	0	0	0
115	UI	0	0	0	0	0	0	0	0	0	0
116	UI	0	0	0	0	0	0	0	0	0	0
*											
117	KK	B4B	BASIN								
118	BA	0.005									
119	LG	0.10	0.25	4.65	0.47	80					
120	UI	0	5	19	29	48	39	26	14	7	3
121	UI	1	1	0	0	0	0	0	0	0	0
122	UI	0	0	0	0	0	0	0	0	0	0
123	UI	0	0	0	0	0	0	0	0	0	0
124	UI	0	0	0	0	0	0	0	0	0	0
*											

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HEC-1 INPUT

PAGE 4

LINE	ID	1	2	3	4	5	6	7	8	9	10
125	KK	CB4	COMBINE								
126	HC	3									
*											
127	KK	DVOC	DIVERT								
128	DT	DTOC	0.00	110.0							

132 DTOD
 *
 133 KK DETOD STORAGE
 134 KO
 135 RS 1 STOR
 136 SV 0.45 0.95 1.52 2.14 2.48 2.83
 137 SE 5.00 16.00 29.00 37.00 42.00 87.00
 138 SS 2653.0 2654.00 2655.00 2656.00 2657.00 2657.50 2658.00
 *

139 KK B4 COMBINE
 140 HC 2
 *

141 KK R-B4A ROUTE
 142 RS 1 FLOW
 143 RC 0.050 0.035 0.030 870 0.0210 0.00
 144 RK 0.00 6.00 12.00 24.00 74.00 82.00 86.00 90.00
 145 RY 2649.0 2648.00 2646.00 2645.00 2645.00 2646.00 2648.00 2649.00
 *

146 KK B4C BASIN
 147 BA 0.015
 148 LG 0.18 0.25 4.51 0.38 12
 149 UI 0 10 32 63 88 96 83 61 43 31
 150 UI 21 18 11 7 5 2 2 2 2 0
 151 UI 0 0 0 0 0 0 0 0 0 0
 152 UI 0 0 0 0 0 0 0 0 0 0
 153 UI 0 0 0 0 0 0 0 0 0 0
 *

154 KK CP-B4C COMBINE
 155 HC 4
 *

156 KK R-CPB4 ROUTE
 157 RS 1 FLOW
 158 RC 0.060 0.040 0.060 300 0.0300 2631.00
 159 RK 0.00 18.90 43.80 54.80 81.50 91.60 120.00 160.00
 160 RY 2635.0 2630.00 2629.00 2625.00 2625.00 2629.00 2630.00 2631.00
 *

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PAGE 5

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

161 KK B6 BASIN
 162 BA 0.004
 163 LG 0.20 0.25 4.39 0.48 25
 164 UI 0 109 44 0 0 0 0 0 0 0
 165 UI 0 0 0 0 0 0 0 0 0 0
 166 UI 0 0 0 0 0 0 0 0 0 0
 167 UI 0 0 0 0 0 0 0 0 0 0
 168 UI 0 0 0 0 0 0 0 0 0 0
 *

169 KK DETB6 STORAGE
 170 KO
 171 RS 1 STOR
 172 SV 0.17 0.38 0.62 0.89
 173 SE 2623.0 2624.00 2625.00 2626.00 2627.00
 174 SS 2626.0 20.00 2.80 1.50
 175 SL 2623.0 0.20 0.60 0.50
 *

176 KK B5 BASIN
 177 BA 0.003
 178 LG 0.10 0.25 5.46 0.24 80
 179 UI 0 28 66 19 3 0 0 0 0 0
 180 UI 0 0 0 0 0 0 0 0 0 0
 181 UI 0 0 0 0 0 0 0 0 0 0
 182 UI 0 0 0 0 0 0 0 0 0 0
 183 UI 0 0 0 0 0 0 0 0 0 0
 *

184 KK DETB5 STORAGE
 185 KO
 186 RS 1 STOR
 187 SV 0.01 0.03 0.05 0.06
 188 SE 2632.0 2633.00 2634.00 2635.00 2636.00
 189 SS 2635.0 5.00 2.80 1.50
 190 SL 2632.0 0.20 0.60 0.50
 *

191 KK CP-B5 COMBINE
 192 HC 3
 *

193 KK R-CPB5 ROUTE
 194 RS 1 FLOW
 195 RC 0.060 0.040 0.060 650 0.0300 2631.00
 196 RK 0.00 18.90 43.80 54.80 81.50 91.60 120.00 160.00
 197 RY 2635.0 2630.00 2629.00 2625.00 2625.00 2629.00 2630.00 2631.00
 *

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PAGE 6

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

198 KK B8 BASIN
 199 BA 0.018
 200 LG 0.22 0.25 4.72 0.39 28

206	KK	B13	BASIN							
207	BA	0.001								
208	LG	0.21	0.26	3.72	0.72	56				
209	UI	0	8	21	8	1	0	0	0	0
210	UI	0	0	0	0	0	0	0	0	0
211	UI	0	0	0	0	0	0	0	0	0
212	UI	0	0	0	0	0	0	0	0	0
213	UI	0	0	0	0	0	0	0	0	0

214	KK	CP8	COMBINE							
215	HC	2								

216	KK	DET88	STORAGE							
217	KO									
218	RS	1	STOR							
219	SV		0.39	0.85	1.37	1.97				
220	SE	2613.0	2614.00	2615.00	2616.00	2617.00				
221	SS	2616.0	10.00	2.80	1.50					
222	SL	2613.0	0.44	0.60	0.50					

223	KK	B6W	BASIN							
224	BA	0.004								
225	LG	0.13	0.27	3.42	0.78	0				
226	UI	0	4	17	29	33	26	17	10	7
227	UI	3	1	1	1	0	0	0	0	0
228	UI	0	0	0	0	0	0	0	0	0
229	UI	0	0	0	0	0	0	0	0	0
230	UI	0	0	0	0	0	0	0	0	0

231	KK	CP-6W	COMBINE							
232	HC	3								

233	KK	B7	BASIN							
234	BA	0.004								
235	LG	0.19	0.26	3.72	0.70	20				
236	UI	0	62	83	9	0	0	0	0	0
237	UI	0	0	0	0	0	0	0	0	0
238	UI	0	0	0	0	0	0	0	0	0
239	UI	0	0	0	0	0	0	0	0	0

HEC-1 INPUT

PAGE 7

LINE	ID	1	2	3	4	5	6	7	8	9	10
240	UI	0	0	0	0	0	0	0	0	0	0

241	KK	DET87	STORAGE							
242	KO									
243	RS	1	STOR							
244	SV		0.06	0.16	0.31	0.56				
245	SE	2604.0	2605.00	2606.00	2607.00	2608.00				
246	SS	2607.0	5.00	2.80	1.50					
247	SL	2604.0	0.20	0.60	0.50					

248	KK	CP87	COMBINE							
249	HC	2								

250	KK	R-CP87	ROUTE							
251	RS	1	FLOW							
252	RC	0.060	0.040	0.060	750	0.0300	2605.00			
253	KK	0.00	55.30	123.80	129.00	141.80	146.00	155.20	188.60	
254	RY	2608.0	2608.00	2598.00	2596.00	2596.00	2597.80	2598.00	2605.00	

255	KK	B9	BASIN							
256	BA	0.001								
257	LG	0.24	0.25	4.39	0.45	36				
258	UI	0	19	18	0	0	0	0	0	0
259	UI	0	0	0	0	0	0	0	0	0
260	UI	0	0	0	0	0	0	0	0	0
261	UI	0	0	0	0	0	0	0	0	0
262	UI	0	0	0	0	0	0	0	0	0

263	KK	DET89	STORAGE							
264	KO									
265	RS	1	STOR							
266	SV		0.06	0.16	0.30					
267	SE	2597.0	2598.00	2599.00	2600.00					
268	SS	2599.0	5.00	2.80	1.50					
269	SL	2597.0	0.20	0.60	0.50					

270	KK	B10	BASIN							
271	BA	0.023								
272	LG	0.21	0.25	4.33	0.48	28				
273	UI	0	62	184	319	198	81	30	9	0
274	UI	0	0	0	0	0	0	0	0	0
275	UI	0	0	0	0	0	0	0	0	0
276	UI	0	0	0	0	0	0	0	0	0
277	UI	0	0	0	0	0	0	0	0	0

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PAGE 8

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

355 KK B16 BASIN
 356 BA 0.001
 357 LG 0.18 0.25 4.39 0.43 9
 358 UI 0 31 7 0 0 0 0 0 0 0
 359 UI 0 0 0 0 0 0 0 0 0 0
 360 UI 0 0 0 0 0 0 0 0 0 0
 361 UI 0 0 0 0 0 0 0 0 0 0
 362 UI 0 0 0 0 0 0 0 0 0 0
 *

363 KK D5TB16 STORAGE
 364 KO
 365 RS 1 STOR
 366 SV 0.10 0.23 0.39
 367 SE 2593.0 2594.00 2595.00 2596.00
 368 SS 2595.0 5.00 2.80 1.50
 369 SL 2593.0 0.20 0.60 0.50
 *

370 KK B17 BASIN
 371 BA 0.001
 372 LG 0.00 0.00 3.62 0.50 0
 373 UI 0 35 0 0 0 0 0 0 0 0
 374 UI 0 0 0 0 0 0 0 0 0 0
 375 UI 0 0 0 0 0 0 0 0 0 0
 376 UI 0 0 0 0 0 0 0 0 0 0
 377 UI 0 0 0 0 0 0 0 0 0 0
 *

378 KK CFB17 COMBINE
 379 HC 3
 *

380 KK D5TB17 STORAGE
 381 KO
 382 RS 1 STOR
 383 SV 0.33
 384 SE 2494.0 2495.00
 385 SS 2494.0 10.00 2.80 1.50
 *

386 KK B18 BASIN
 387 BA 0.003
 388 LG 0.14 0.25 4.51 0.49 5
 389 UI 0 70 44 0 0 0 0 0 0 0
 390 UI 0 0 0 0 0 0 0 0 0 0
 391 UI 0 0 0 0 0 0 0 0 0 0
 392 UI 0 0 0 0 0 0 0 0 0 0
 393 UI 0 0 0 0 0 0 0 0 0 0
 *

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

394 KK CFB18 COMBINE
 395 HC 7
 *

396 KK D5TB18 STORAGE
 397 KO
 398 RS 1 STOR
 399 SV 0.15 0.35 0.61 0.93
 400 SE 2591.0 2592.00 2593.00 2594.00 2595.00
 401 SS 2594.0 5.00 2.80 1.50
 402 SL 2591.0 0.20 0.60 0.50
 *

403 KK B19 BASIN
 404 BA 0.006
 405 LG 0.14 0.26 3.72 0.64 1
 406 UI 0 12 37 68 59 34 13 5 2 0
 407 UI 0 0 0 0 0 0 0 0 0 0
 408 UI 0 0 0 0 0 0 0 0 0 0
 409 UI 0 0 0 0 0 0 0 0 0 0
 410 UI 0 0 0 0 0 0 0 0 0 0
 *

411 KK CPGAL COMBINE
 412 HC 4
 *

413 KK C5 BASIN
 414 BA 0.003
 415 LG 0.10 0.25 5.34 0.34 80
 416 UI 0 7 22 40 27 12 5 1 1 0
 417 UI 0 0 0 0 0 0 0 0 0 0
 418 UI 0 0 0 0 0 0 0 0 0 0
 419 UI 0 0 0 0 0 0 0 0 0 0
 420 UI 0 0 0 0 0 0 0 0 0 0
 *

421 KK C5A BASIN
 422 BA 0.003
 423 LG 0.18 0.28 6.00 0.21 37
 424 UI 0 9 26 43 25 9 3 1 0 0
 425 UI 0 0 0 0 0 0 0 0 0 0
 426 UI 0 0 0 0 0 0 0 0 0 0
 427 UI 0 0 0 0 0 0 0 0 0 0
 428 UI 0 0 0 0 0 0 0 0 0 0
 *

LINE	ID	1	2	3	4	5	6	7	8	9	10
431	KK	C6	BASIN								
432	BA	0.001									
433	LG	0.19	0.25	5.05	0.29	8					
434	UI	0	38	0	0	0	0	0	0	0	0
435	UI	0	0	0	0	0	0	0	0	0	0
436	UI	0	0	0	0	0	0	0	0	0	0
437	UI	0	0	0	0	0	0	0	0	0	0
438	UI	0	0	0	0	0	0	0	0	0	0
439	KK	DRTC6 STORAGE									
440	EO										
441	RS	1	STOR								
442	SV	0.07									
443	SE	2637.0	2638.00								
444	SS	2637.0	10.00	2.80	1.50						
445	KK	C7	BASIN								
446	BA	0.001									
447	LG	0.13	0.25	5.05	0.39	10					
448	UI	0	31	7	0	0	0	0	0	0	0
449	UI	0	0	0	0	0	0	0	0	0	0
450	UI	0	0	0	0	0	0	0	0	0	0
451	UI	0	0	0	0	0	0	0	0	0	0
452	UI	0	0	0	0	0	0	0	0	0	0
453	KK	CPC7 COMBINE									
454	HC	2									
455	KK	DRTC7 STORAGE									
456	EO										
457	RS	1	STOR								
458	SV	0.05									
459	SE	2634.0	2635.00								
460	SS	2634.0	10.00	2.80	1.50						
461	KK	C8	BASIN								
462	BA	0.001									
463	LG	0.13	0.23	5.58	0.28	9					
464	UI	0	105	0	0	0	0	0	0	0	0
465	UI	0	0	0	0	0	0	0	0	0	0
466	UI	0	0	0	0	0	0	0	0	0	0
467	UI	0	0	0	0	0	0	0	0	0	0
468	UI	0	0	0	0	0	0	0	0	0	0

LINE	ID	1	2	3	4	5	6	7	8	9	10
469	KK	CPC8 COMBINE									
470	HC	3									
471	KK	DRTC8 STORAGE									
472	EO										
473	RS	1	STOR								
474	SV	0.08 0.18									
475	SE	2629.0	2629.50	2630.00							
476	SS	2629.0	20.00	2.80	1.50						
477	KK	R-C8	ROUTE								
478	RS	1	FLOW								
479	RC	0.035	0.025	0.035	650	0.0200	0.00				
480	RK	0.00	4.00	8.00	12.00	22.00	26.00	30.00	34.00		
481	RY	2629.0	2629.00	2628.00	2627.00	2627.00	2628.00	2629.00	2629.00		
482	KK	C1	BASIN								
483	BA	0.010									
484	LG	0.16	0.25	5.05	0.36	13					
485	UI	0	92	220	64	10	0	0	0	0	0
486	UI	0	0	0	0	0	0	0	0	0	0
487	UI	0	0	0	0	0	0	0	0	0	0
488	UI	0	0	0	0	0	0	0	0	0	0
489	UI	0	0	0	0	0	0	0	0	0	0
490	KK	CPC1 COMBINE									
491	HC	2									
492	KK	DRTC1 STORAGE									
493	EO										
494	RS	1	STOR								
495	SV	0.37 0.90 1.57 2.37									
496	SE	2607.0	2608.00	2609.00	2610.00	2611.00					
497	SS	2610.5	2.00	2.80	1.50						
498	SL	2607.0	0.44	0.60	0.50						
499	KK	C10	BASIN								

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

507	KK	C9	BASIN							
508	BA	0.004								
509	LG	0.25	0.25	5.85	0.23	45				
510	UI	0	29	80	37	7	0	0	0	0
511	UI	0	0	0	0	0	0	0	0	0
512	UI	0	0	0	0	0	0	0	0	0
513	UI	0	0	0	0	0	0	0	0	0
514	UI	0	0	0	0	0	0	0	0	0

515	KK	CPC9 COMBINE								
516	HC	2								

517	KK	C4	BASIN							
518	BA	0.005								
519	LG	0.25	0.15	7.00	0.15	45				
520	UI	0	53	112	24	0	0	0	0	0
521	UI	0	0	0	0	0	0	0	0	0
522	UI	0	0	0	0	0	0	0	0	0
523	UI	0	0	0	0	0	0	0	0	0
524	UI	0	0	0	0	0	0	0	0	0

525	KK	C2	BASIN							
526	BA	0.012								
527	LG	0.19	0.25	5.05	0.35	22				
528	UI	0	51	157	167	54	18	6	0	0
529	UI	0	0	0	0	0	0	0	0	0
530	UI	0	0	0	0	0	0	0	0	0
531	UI	0	0	0	0	0	0	0	0	0
532	UI	0	0	0	0	0	0	0	0	0

533	KK	DBTC21 STORAGE								
534	KO									
535	RS	1 STOR								
536	SV	0.19 0.44 0.81 1.32								
537	SE	2596.0	2599.00	2600.00	2601.00	2602.00				
538	SS	2601.0	5.00	2.80	1.50					
539	SL	2598.0	0.20	0.60	0.50					

540	KK	CPC2 COMBINE								
541	HC	3								

542	KK	DBTC2 STORAGE								
543	KO									
544	RS	1 STOR								
545	SV	0.06 0.15 0.27 0.43								
546	SE	2596.0	2597.00	2598.00	2599.00	2600.00				
547	SS	2599.0	20.00	2.80	1.50					
548	SL	2596.0	0.20	0.60	0.50					

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

549	KK	C3	BASIN							
550	BA	0.002								
551	LG	0.22	0.25	5.05	0.32	31				
552	UI	0	19	44	13	2	0	0	0	0
553	UI	0	0	0	0	0	0	0	0	0
554	UI	0	0	0	0	0	0	0	0	0
555	UI	0	0	0	0	0	0	0	0	0
556	UI	0	0	0	0	0	0	0	0	0

557	KK	DBTC3 STORAGE								
558	KO									
559	RS	1 STOR								
560	SV	0.03 0.09 0.18 0.23 0.28								
561	SE	2596.5	2597.00	2598.00	2599.00	2599.50	2600.00			
562	SS	2599.5	20.00	2.80	1.50					
563	SL	2596.5	0.20	0.60	0.50					

564	KK	CPC3 COMBINE								
565	HC	2								

566	KK	DBTC31 STORAGE								
567	KO									
568	RS	1 STOR								
569	SV	0.36 0.78 1.28 1.85								
570	SE	2596.0	2597.00	2598.00	2599.00	2600.00				
571	SS	2599.0	5.00	2.80	1.50					
572	SL	2596.0	0.20	0.60	0.50					

573	KK	C3A	BASIN							
574	BA	0.003								
575	LG	0.14	0.25	5.05	0.37	8				
576	UI	0	70	44	0	0	0	0	0	0

581	KK	CPC3A COMBINE				
582	KC	2				
	*					
583	KK	DSTC3A STORAGE				
584	KO					
585	RS	1	STOR			
586	SV	0.17	0.39	0.66	0.98	
587	SR	2590.0	2591.00	2592.00	2593.00	2594.00
588	SS	2593.0	5.00	2.80	1.50	
589	SL	2590.0	0.20	0.60	0.50	
	*					

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1

LINE	ID	1	2	3	4	5	6	7	8	9	10
590	KK	Q1 BASIN									
591	BA	0.001									
592	LG	0.17	0.15	7.94	0.10	37					
593	UI	0	35	0	0	0	0	0	0	0	0
594	UI	0	0	0	0	0	0	0	0	0	0
595	UI	0	0	0	0	0	0	0	0	0	0
596	UI	0	0	0	0	0	0	0	0	0	0
597	UI	0	0	0	0	0	0	0	0	0	0
	*										
598	KK	H1 BASIN									
599	BA	0.002									
600	LG	0.17	0.25	5.05	0.33	5					
601	UI	0	3	11	18	18	12	7	4	2	1
602	UI	1	0	0	0	0	0	0	0	0	0
603	UI	0	0	0	0	0	0	0	0	0	0
604	UI	0	0	0	0	0	0	0	0	0	0
605	UI	0	0	0	0	0	0	0	0	0	0
	*										
606	KK	L1 BASIN									
607	BA	0.002									
608	LG	0.20	0.25	5.05	0.28	0					
609	UI	0	6	20	24	14	7	3	2	1	1
610	UI	0	0	0	0	0	0	0	0	0	0
611	UI	0	0	0	0	0	0	0	0	0	0
612	UI	0	0	0	0	0	0	0	0	0	0
613	UI	0	0	0	0	0	0	0	0	0	0
	*										
614	KK	M1 BASIN									
615	BA	0.001									
616	LG	0.20	0.25	5.05	0.28	0					
617	UI	0	2	9	12	8	4	2	1	1	0
618	UI	0	0	0	0	0	0	0	0	0	0
619	UI	0	0	0	0	0	0	0	0	0	0
620	UI	0	0	0	0	0	0	0	0	0	0
621	UI	0	0	0	0	0	0	0	0	0	0
	*										
622	ZK										

LINE	(V) ROUTING	(----) DIVERSION OR PUMP FLOW
NO.	(.) CONNECTOR	(<---) RETURN OF DIVERTED OR PUMPED FLOW
27	A1	
	V	
	V	
37	R-A1	
	.	
42	.	A2
	.	.
50	CP-A2	.
	.	.
52	.	B1
	.	V
	.	V
60	R-B1	.
	.	.
65	.	B3
	.	.
73	.	B4
	.	.
91	.	DVOC -----> DTOC
90	.	DVOC
	.	.
95	.	.
94	.	DVOC <----- DTOC
	.	V
	.	V
96	.	DTOC
	.	.
102	.	B4C
	.	V
	.	V
104	.	R-B4
	.	.
109	.	B4A
	.	.
117	.	.
	.	B4B
	.	.
125	.	CB4
	.	.
126	.	DVOD -----> DTOD
127	.	DVOD
	.	.
132	.	.
131	.	DVOD <----- DTOD
	.	V
	.	V
133	.	DTOD
	.	.
139	.	B4
	.	V
	.	V
141	.	R-B4A
	.	.
146	.	B4C
	.	.
154	CP-B4C	.
	V	.
	V	.
156	R-CPB4	.
	.	.
161	.	B6
	.	V
	.	V
169	.	DTB6
	.	.
176	.	B5
	.	V
	.	V
184	.	DTB5
	.	.
191	CP-B5	.
	V	.
	V	.
193	R-CPB5	.
	.	.
198	.	B8
	.	.
206	.	B13

223	.	.	B6W	.
231	CP-6W	.....	.	.
233	.	B7	.	.
	.	V	.	.
	.	V	.	.
241	.	DSTB7	.	.
248	CPB7	.....	.	.
	.	V	.	.
	.	V	.	.
250	R-CPB7	.	.	.
255	.	B9	.	.
	.	V	.	.
	.	V	.	.
263	.	DSTB9	.	.
270	.	.	B10	.
278	CPB10	.....	.	.
	.	V	.	.
	.	V	.	.
280	.	DSTB10	.	.
287	.	.	B11	.
	.	.	V	.
	.	.	V	.
295	.	DSTB11	.	.
301	.	.	.	B12
	.	.	.	V
	.	.	.	V
309	.	.	DSTB12	.
315	.	CPB12	.....	.
317	.	.	B14	.
325	.	CPB14	.....	.
	.	V	.	.
	.	V	.	.
327	.	DST14A	.	.
	.	V	.	.
	.	V	.	.
333	.	DST14B	.	.
339	.	.	B15	.
347	.	CPB15	.....	.
	.	V	.	.
	.	V	.	.
349	.	DSTB15	.	.
355	.	.	B16	.
	.	.	V	.
	.	.	V	.
363	.	.	DSTB16	.
370	.	.	.	B17
378	.	CPB17	.....	.
	.	V	.	.
	.	V	.	.
380	.	DSTB17	.	.
386	.	.	B18	.
394	.	CPB18	.....	.
	.	V	.	.
	.	V	.	.
396	.	DSTB18	.	.
403	.	.	B19	.
411	CPGAL	.....	.	.
413	.	CS	.	.

431	.	.	.	C6	.	.	.	.	.
	.	.	.	V	.	.	.	.	.
439	.	.	.	DSTC6	.	.	.	.	.

445	.	.	.	.	.	.	C7	.	.

453	.	.	.	CPC7	.....	.	.	.	.
	.	.	.	V	.	.	.	.	.
	.	.	.	V	.	.	.	.	.
455	.	.	.	DSTC7	.	.	.	.	.

461	.	.	.	.	.	.	C8	.	.

469	.	.	.	CPC8	.....	.	.	.	.
	.	.	.	V	.	.	.	.	.
	.	.	.	V	.	.	.	.	.
471	.	.	.	DSTC8	.	.	.	.	.
	.	.	.	V	.	.	.	.	.
	.	.	.	V	.	.	.	.	.
477	.	.	.	R-C8	.	.	.	.	.

482	.	.	.	.	.	.	C1	.	.

490	.	.	.	CPC1	.....	.	.	.	.
	.	.	.	V	.	.	.	.	.
	.	.	.	V	.	.	.	.	.
492	.	.	.	DSTC1	.	.	.	.	.

499	.	.	.	.	.	.	C10	.	.

507	.	.	.	.	.	.	.	C9	.

515	.	.	.	CPC9	.....	.	.	.	.

517	.	.	.	.	.	.	C4	.	.

525	.	.	.	.	.	.	.	.	C2
	.	.	.	.	.	.	.	.	V
	.	.	.	.	.	.	.	.	V
533	.	.	.	.	.	.	.	DSTC21	.

540	.	.	.	CPC2	.....	.	.	.	.
	.	.	.	V	.	.	.	.	.
	.	.	.	V	.	.	.	.	.
542	.	.	.	DSTC2	.	.	.	.	.

549	.	.	.	.	.	.	C3	.	.
	.	.	.	.	.	.	V	.	.
	.	.	.	.	.	.	V	.	.
557	.	.	.	.	.	.	DSTC3	.	.

564	.	.	.	CPC3	.....	.	.	.	.
	.	.	.	V	.	.	.	.	.
	.	.	.	V	.	.	.	.	.
566	.	.	.	DSTC31	.	.	.	.	.

573	.	.	.	.	.	.	C3A	.	.

581	.	.	.	CPC3A	.....	.	.	.	.
	.	.	.	V	.	.	.	.	.
	.	.	.	V	.	.	.	.	.
583	.	.	.	DSTC3A	.	.	.	.	.

590	.	.	.	.	.	.	G1	.	.

598	.	.	.	.	.	.	.	E1	.

606	.	.	.	.	.	.	.	.	L1

614	.	.	.	.	.	.	.	.	.
	.	.	.	.	.	.	.	.	M1

(*** RUNOFF ALSO COMPUTED AT THIS LOCATION

* *
96 KK * DETOC * STORAGE
* *

97 KO OUTPUT CONTROL VARIABLES
IPRNT 5 PRINT CONTROL
IPLOT 0 PLOT CONTROL
QSCAL 0. HYDROGRAPH PLOT SCALE

.....

* *
133 KK * DETOD * STORAGE
* *

134 KO OUTPUT CONTROL VARIABLES
IPRNT 5 PRINT CONTROL
IPLOT 0 PLOT CONTROL
QSCAL 0. HYDROGRAPH PLOT SCALE

.....

* *
169 KK * DETB6 * STORAGE
* *

170 KO OUTPUT CONTROL VARIABLES
IPRNT 5 PRINT CONTROL
IPLOT 0 PLOT CONTROL
QSCAL 0. HYDROGRAPH PLOT SCALE

.....

* *
184 KK * DETB5 * STORAGE
* *

185 KO OUTPUT CONTROL VARIABLES
IPRNT 5 PRINT CONTROL
IPLOT 0 PLOT CONTROL
QSCAL 0. HYDROGRAPH PLOT SCALE

.....

* *
216 KK * DETB8 * STORAGE
* *

217 KO OUTPUT CONTROL VARIABLES
IPRNT 5 PRINT CONTROL
IPLOT 0 PLOT CONTROL
QSCAL 0. HYDROGRAPH PLOT SCALE

.....

* *
241 KK * DETB7 * STORAGE
* *

242 KO OUTPUT CONTROL VARIABLES
IPRNT 5 PRINT CONTROL
IPLOT 0 PLOT CONTROL
QSCAL 0. HYDROGRAPH PLOT SCALE

.....

* *
263 KK * DETB9 * STORAGE
* *

* *
280 KK * DETB10 * STORAGE
* *

281 KO OUTPUT CONTROL VARIABLES
IPRNT 5 PRINT CONTROL
IPLOT 0 PLOT CONTROL
QSCAL 0. HYDROGRAPH PLOT SCALE

* *
295 KK * DETB11 * STORAGE
* *

296 KO OUTPUT CONTROL VARIABLES
IPRNT 5 PRINT CONTROL
IPLOT 0 PLOT CONTROL
QSCAL 0. HYDROGRAPH PLOT SCALE

* *
309 KK * DETB12 * STORAGE
* *

310 KO OUTPUT CONTROL VARIABLES
IPRNT 5 PRINT CONTROL
IPLOT 0 PLOT CONTROL
QSCAL 0. HYDROGRAPH PLOT SCALE

* *
327 KK * DET14A * STORAGE
* *

328 KO OUTPUT CONTROL VARIABLES
IPRNT 5 PRINT CONTROL
IPLOT 0 PLOT CONTROL
QSCAL 0. HYDROGRAPH PLOT SCALE

* *
333 KK * DET14B * STORAGE
* *

334 KO OUTPUT CONTROL VARIABLES
IPRNT 5 PRINT CONTROL
IPLOT 0 PLOT CONTROL
QSCAL 0. HYDROGRAPH PLOT SCALE

* *
349 KK * DETB15 * STORAGE
* *

350 KO OUTPUT CONTROL VARIABLES
IPRNT 5 PRINT CONTROL
IPLOT 0 PLOT CONTROL
QSCAL 0. HYDROGRAPH PLOT SCALE

364 KO OUTPUT CONTROL VARIABLES
 IPRT 5 PRINT CONTROL
 IPLOT 0 PLOT CONTROL
 QSCAL 0. HYDROGRAPH PLOT SCALE

.....

* *
380 KK * DETB17 * STORAGE
* *

381 KO OUTPUT CONTROL VARIABLES
 IPRT 5 PRINT CONTROL
 IPLOT 0 PLOT CONTROL
 QSCAL 0. HYDROGRAPH PLOT SCALE

.....

* *
396 KK * DETB18 * STORAGE
* *

397 KO OUTPUT CONTROL VARIABLES
 IPRT 5 PRINT CONTROL
 IPLOT 0 PLOT CONTROL
 QSCAL 0. HYDROGRAPH PLOT SCALE

.....

* *
439 KK * DETC6 * STORAGE
* *

440 KO OUTPUT CONTROL VARIABLES
 IPRT 5 PRINT CONTROL
 IPLOT 0 PLOT CONTROL
 QSCAL 0. HYDROGRAPH PLOT SCALE

.....

* *
455 KK * DETC7 * STORAGE
* *

456 KO OUTPUT CONTROL VARIABLES
 IPRT 5 PRINT CONTROL
 IPLOT 0 PLOT CONTROL
 QSCAL 0. HYDROGRAPH PLOT SCALE

.....

* *
471 KK * DETC8 * STORAGE
* *

472 KO OUTPUT CONTROL VARIABLES
 IPRT 5 PRINT CONTROL
 IPLOT 0 PLOT CONTROL
 QSCAL 0. HYDROGRAPH PLOT SCALE

.....

* *
492 KK * DETC1 * STORAGE
* *

493 KO OUTPUT CONTROL VARIABLES
 IPRT 5 PRINT CONTROL
 IPLOT 0 PLOT CONTROL
 QSCAL 0. HYDROGRAPH PLOT SCALE

+	2 COMBINED AT	CP8	40.	4.02	2.	1.	0.	0.02
+	ROUTED TO	DETB8	3.	4.17	2.	1.	0.	0.02
+	HYDROGRAPH AT	B6W	6.	4.02	0.	0.	0.	0.00
+	3 COMBINED AT	CP-6W	534.	4.48	107.	27.	19.	1.15
+	HYDROGRAPH AT	B7	7.	4.02	0.	0.	0.	0.00
+	ROUTED TO	DETB7	1.	4.05	0.	0.	0.	0.00
+	2 COMBINED AT	CPB7	635.	4.48	107.	27.	19.	1.15
+	ROUTED TO	R-CPB7	633.	4.50	107.	27.	19.	1.15
+	HYDROGRAPH AT	B9	2.	4.02	0.	0.	0.	0.00
+	ROUTED TO	DETB9	1.	4.03	0.	0.	0.	0.00
+	HYDROGRAPH AT	B10	47.	4.02	3.	1.	0.	0.02
+	2 COMBINED AT	CPB10	48.	4.02	3.	1.	1.	0.02
+	ROUTED TO	DETB10	1.	4.33	1.	1.	1.	0.02
+	HYDROGRAPH AT	B11	5.	4.02	0.	0.	0.	0.00
+	ROUTED TO	DETB11	4.	4.02	0.	0.	0.	0.00
+	HYDROGRAPH AT	B12	3.	4.02	0.	0.	0.	0.00
+	ROUTED TO	DETB12	3.	4.02	0.	0.	0.	0.00
+	2 COMBINED AT	CPB12	7.	4.02	0.	0.	0.	0.00
+	HYDROGRAPH AT	B14	7.	4.02	0.	0.	0.	0.00
+	2 COMBINED AT	CPB14	14.	4.02	1.	0.	0.	0.01
+	ROUTED TO	DETB14A	13.	4.03	1.	0.	0.	0.01
+	ROUTED TO	DETB14B	13.	4.03	1.	0.	0.	0.01
+	HYDROGRAPH AT	B13	7.	4.02	0.	0.	0.	0.00
+	2 COMBINED AT	CPB15	20.	4.02	1.	0.	0.	0.01
+	ROUTED TO	DETB15	18.	4.03	1.	0.	0.	0.01
+	HYDROGRAPH AT	B16	2.	4.02	0.	0.	0.	0.00
+	ROUTED TO	DETB16	1.	4.03	0.	0.	0.	0.00
+	HYDROGRAPH AT	B17	2.	3.78	0.	0.	0.	0.00
+	3 COMBINED AT	CPB17	21.	4.02	2.	0.	0.	0.01
+	ROUTED TO	DETB17	15.	4.10	2.	0.	0.	0.01
+	HYDROGRAPH AT	B18	6.	4.02	0.	0.	0.	0.00
+	2 COMBINED AT	CPB18	18.	4.02	1.	0.	0.	0.02
+	ROUTED TO	DETB18	2.	4.82	1.	0.	0.	0.02
+	HYDROGRAPH AT	B19	10.	4.02	0.	0.	0.	0.01
+	4 COMBINED AT							

+	HYDROGRAPH AT	C3A	7.	4.02	0.	0.	0.	0.00
+	2 COMBINED AT	CPC3	14.	4.02	1.	0.	0.	0.01
+	HYDROGRAPH AT	C6	2.	4.02	0.	0.	0.	0.00
+	ROUTED TO	DETC6	2.	4.02	0.	0.	0.	0.00
+	HYDROGRAPH AT	C7	2.	4.02	0.	0.	0.	0.00
+	2 COMBINED AT	CPC7	4.	4.02	0.	0.	0.	0.00
+	ROUTED TO	DETC7	4.	4.02	0.	0.	0.	0.00
+	HYDROGRAPH AT	C8	6.	4.02	0.	0.	0.	0.00
+	3 COMBINED AT	CPC8	24.	4.02	2.	0.	0.	0.01
+	ROUTED TO	DETC8	24.	4.02	2.	0.	0.	0.01
+	ROUTED TO	R-C8	23.	4.02	2.	0.	0.	0.01
+	HYDROGRAPH AT	C1	21.	4.02	1.	0.	0.	0.01
+	2 COMBINED AT	CPC1	44.	4.02	1.	1.	0.	0.02
+	ROUTED TO	DETC1	3.	4.28	2.	1.	0.	0.02
+	HYDROGRAPH AT	C10	5.	4.02	0.	0.	0.	0.00
+	HYDROGRAPH AT	C9	9.	4.02	1.	0.	0.	0.00
+	2 COMBINED AT	CPC9	14.	4.02	1.	0.	0.	0.01
+	HYDROGRAPH AT	C4	12.	4.02	1.	0.	0.	0.00
+	HYDROGRAPH AT	C2	25.	4.02	1.	0.	0.	0.01
+	ROUTED TO	DETC21	1.	4.08	1.	0.	0.	0.01
+	3 COMBINED AT	CPC2	27.	4.02	3.	1.	1.	0.02
+	ROUTED TO	DETC2	27.	4.02	3.	1.	1.	0.02
+	HYDROGRAPH AT	C3	4.	4.02	0.	0.	0.	0.00
+	ROUTED TO	DETC3	1.	4.05	0.	0.	0.	0.00
+	2 COMBINED AT	CPC3	28.	4.02	3.	1.	1.	0.03
+	ROUTED TO	DETC31	1.	8.48	1.	1.	1.	0.03
+	HYDROGRAPH AT	C3A	6.	4.02	0.	0.	0.	0.00
+	2 COMBINED AT	CPC3A	7.	4.02	2.	1.	1.	0.03
+	ROUTED TO	DETC3A	1.	12.78	1.	1.	1.	0.03
+	HYDROGRAPH AT	G1	2.	4.02	0.	0.	0.	0.00
+	HYDROGRAPH AT	H1	4.	4.02	0.	0.	0.	0.00
+	HYDROGRAPH AT	L1	4.	4.02	0.	0.	0.	0.00
+	HYDROGRAPH AT	M1	2.	4.02	0.	0.	0.	0.00

100-year HEC-1 Model

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X   X   XXXXXX   XXXXX   X
X   X   X       X   X   XX
X   X   X       X       X
XXXXXX   XXXX   X       XXXXX   X
X   X   X       X       X
X   X   X       X   X   X
X   X   XXXXXX   XXXXX   XXX
  
```

THIS PROGRAM REPLACES ALL PREVIOUS VERSIONS OF HEC-1 KNOWN AS HEC1 (JAN 73), HEC1G9, HEC1DB, AND HEC1KW.

THE DEFINITIONS OF VARIABLES -RTIME- AND -RTION- HAVE CHANGED FROM THOSE USED WITH THE 1973-STYLE INPUT STRUCTURE. THE DEFINITION OF -AMSKK- ON EM-CARD WAS CHANGED WITH REVISIONS DATED 28 SEP 81. THIS IS THE FORTRAN77 VERSION.

NEW OPTIONS: DAMBREAK OUTFLOW SUBMERGENCE, SINGLE EVENT DAMAGE CALCULATION, DSS:WRITE STAGE FREQUENCY, DSS:READ TIME SERIES AT DESIRED CALCULATION INTERVAL, LOSS RATE:GREEN AND AMPT INFILTRATION, KINEMATIC WAVE: NEW FINITE DIFFERENCE ALGORITHM

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LINE ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10
1 ID Flood Control District of Maricopa County
2 ID CM-19 FUT WR BAG - Desert Mountain 19 Post Online Det Basins
3 ID 100 YEAR
4 ID 6 Hour Storm
5 ID Unit Hydrograph: S-Graph
6 ID Storm: Multiple
7 ID 05/22/2017
  *DIAGRAM
8 IT 1 1JAN99 0 2000
9 IO 5
10 IN 15
  +
11 JD 3.313 0.0001
12 PC 0.000 0.008 0.016 0.025 0.033 0.041 0.050 0.058 0.066 0.074
13 PC 0.087 0.099 0.118 0.138 0.216 0.377 0.834 0.911 0.931 0.950
14 PC 0.962 0.972 0.983 0.991 1.000
15 JD 3.293 0.5800
16 PC 0.000 0.008 0.016 0.025 0.033 0.041 0.050 0.058 0.066 0.074
17 PC 0.087 0.099 0.118 0.138 0.216 0.377 0.834 0.911 0.931 0.950
18 PC 0.962 0.972 0.983 0.991 1.000
19 JD 3.270 1.0
20 PC 0.000 0.008 0.016 0.025 0.033 0.041 0.050 0.058 0.066 0.075
21 PC 0.087 0.099 0.119 0.148 0.230 0.407 0.778 0.881 0.919 0.945
22 PC 0.937 0.968 0.980 0.990 1.000
23 JD 3.230 2.8
24 PC 0.000 0.009 0.016 0.025 0.034 0.042 0.051 0.059 0.067 0.076
25 PC 0.087 0.100 0.120 0.163 0.252 0.451 0.694 0.837 0.900 0.938
26 PC 0.950 0.963 0.975 0.988 1.000
  *
27 EK A1 BASIN
28 BA 0.192
29 LG 0.20 0.25 5.34 0.25 0
30 UI 0 38 38 38 48 111 142 178 217 247
31 UI 272 315 335 346 364 369 369 360 348 329
32 UI 295 268 239 217 195 176 159 144 130 117
33 UI 105 92 86 73 73 60 59 52 41 41
34 UI 41 30 26 26 26 26 25 9 9 9
35 UI 9 9 9 9 9 9 9 9 9 9
36 UI 9 9 0 0 0 0 0 0 0 0
  *
37 EK R-A1 ROUTE
38 RS 3 FLOW
39 RC 0.060 0.040 0.060 980 0.0224 19.00
40 RK 0.00 42.00 73.00 106.00 196.00 225.00 251.00 295.00
41 RY 20.00 15.00 10.00 7.00 5.00 5.00 13.00 19.00
  *
42 EK A2 BASIN
43 BA 0.011
44 LG 0.17 0.25 5.46 0.24 0
45 UI 0 7 22 45 62 70 63 46 33 23
46 UI 16 12 8 6 5 2 2 2 2 0
47 UI 0 0 0 0 0 0 0 0 0 0
  
```

```

LINE ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10
48 UI 0 0 0 0 0 0 0 0 0 0
49 UI 0 0 0 0 0 0 0 0 0 0
  *
50 EK CP-A2 COMBINE
51 HC 2
  *
52 RT 21 BASIN
  
```

58	UI	0	0	0	0	0	0	0	0	0
59	UI	0	0	0	0	0	0	0	0	0
*										
60	KK	R-B1	ROUTE							
61	RS	2	FLOW							
62	RC	0.025	0.025	0.025	720	0.0030	0.00			
63	RX	0.00	4.00	8.00	12.00	16.00	20.00	24.00	28.00	
64	RY	2640.0	2639.00	2638.00	2637.00	2637.00	2638.00	2639.00	2640.00	
*										
65	KK	B3	BASIN							
66	BA	0.039								
67	LQ	0.20	0.25	5.05	0.30	1				
68	UI	0	13	13	27	48	69	85	101	113
69	UI	121	116	107	90	76	65	55	47	39
70	UI	27	24	20	17	13	13	9	9	5
71	UI	3	3	3	3	3	3	3	3	0
72	UI	0	0	0	0	0	0	0	0	0
*										
73	KK	B4	BASIN							
74	BA	1.008								
75	LQ	0.21	0.25	5.34	0.28	12				
76	UI	0	92	92	92	92	92	92	92	185
77	UI	265	265	321	360	394	442	483	511	558
78	UI	630	650	646	758	750	785	815	818	844
79	UI	884	884	884	884	884	884	880	848	839
80	UI	823	786	763	715	676	643	643	589	561
81	UI	506	490	471	441	433	401	399	360	360
82	UI	326	306	283	263	261	253	253	224	206
83	UI	206	180	174	174	174	163	141	141	141
84	UI	141	106	98	98	98	98	98	98	98
85	UI	63	63	63	63	63	63	63	63	63
86	UI	63	44	22	22	22	22	22	22	22
87	UI	22	22	22	22	22	22	22	22	22
88	UI	22	22	22	22	22	22	22	22	22
89	UI	22	22	22	22	22	22	0	0	0
*										

HEC-1 INPUT

PAGE 3

LINE	ID	1	2	3	4	5	6	7	8	9	10
90	KK	DVOC	DIVERT								
91	DT	DTOC	0.00	158.0							
92	DI	0.0	1090.0	1246.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
93	DQ	0.0	0.0	158.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
*											
94	KK	DVOCETRIBUTE									
95	DR	DTOC									
*											
96	KK	DTOC STORAGE									
97	EO										
98	RS	1	STOR								
99	SV	0.43	0.94	1.54	2.21	2.59	2.98				
100	SQ	1.00	9.00	19.00	26.00	29.00	72.00				
101	SE	2683.0	2684.00	2685.00	2686.00	2687.00	2687.50	2688.00			
*											
102	KK	B4C COMBINE									
103	HC	2									
*											
104	KK	R-B4	ROUTE								
105	RS	1	FLOW								
106	RC	0.050	0.035	0.050	1310	0.0200	0.00				
107	RX	0.00	4.00	8.00	20.00	44.00	52.00	56.00	64.00		
108	RY	2680.0	2679.00	2678.00	2675.00	2675.00	2678.00	2679.00	2680.00		
*											
109	KK	B4A	BASIN								
110	BA	0.027									
111	LQ	0.19	0.25	4.28	0.49	7					
112	UI	0	15	12	72	106	131	141	131	104	78
113	UI	59	45	33	25	19	15	10	10	4	4
114	UI	4	4	4	0	0	0	0	0	0	0
115	UI	0	0	0	0	0	0	0	0	0	0
116	UI	0	0	0	0	0	0	0	0	0	0
*											
117	KK	B4B	BASIN								
118	BA	0.005									
119	LQ	0.10	0.25	4.65	0.47	80					
120	UI	0	5	19	29	48	39	26	14	7	3
121	UI	1	1	0	0	0	0	0	0	0	0
122	UI	0	0	0	0	0	0	0	0	0	0
123	UI	0	0	0	0	0	0	0	0	0	0
124	UI	0	0	0	0	0	0	0	0	0	0
*											

HEC-1 INPUT

PAGE 4

LINE	ID	1	2	3	4	5	6	7	8	9	10
125	KK	CB4 COMBINE									
126	HC	3									
*											
127	KK	DVOC	DIVERT								
128	DT	DTOC	0.00	158.0							

132 DR DTOD
*

133 KK DETOD STORAGE
134 KO
135 RS 1 STOR
136 SV 0.45 0.95 1.52 2.14 2.48 2.83
137 SQ 5.00 16.00 29.00 37.00 42.00 87.00
138 SR 2653.0 2654.00 2655.00 2656.00 2657.00 2657.50 2658.00
*

139 KK B4 COMBINE
140 HC 2
*

141 KK R-B4A ROUTE
142 RS 1 FLOW
143 RC 0.050 0.035 0.050 870 0.0210 0.00
144 RX 0.00 6.00 12.00 24.00 74.00 82.00 86.00 90.00
145 RY 2649.0 2648.00 2646.00 2645.00 2645.00 2646.00 2648.00 2649.00
*

146 KK B4C BASIN
147 BA 0.015
148 LG 0.18 0.25 4.51 0.38 12
149 UI 0 10 12 63 88 96 85 61 43 31
150 UI 21 16 11 7 3 2 2 2 2 0
151 UI 0 0 0 0 0 0 0 0 0 0
152 UI 0 0 0 0 0 0 0 0 0 0
153 UI 0 0 0 0 0 0 0 0 0 0
*

154 KK CP-B4C COMBINE
155 HC 4
*

156 KK R-CPB4 ROUTE
157 RS 1 FLOW
158 RC 0.060 0.040 0.060 300 0.0300 2631.00
159 RX 0.00 18.90 43.80 54.80 81.50 91.60 120.00 160.00
160 RY 2635.0 2630.00 2629.00 2625.00 2625.00 2629.00 2630.00 2631.00
*

HCC-1 INPUT

PAGE 5

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

161 KK B6 BASIN
162 BA 0.004
163 LG 0.20 0.25 4.39 0.48 25
164 UI 0 109 44 0 0 0 0 0 0 0
165 UI 0 0 0 0 0 0 0 0 0 0
166 UI 0 0 0 0 0 0 0 0 0 0
167 UI 0 0 0 0 0 0 0 0 0 0
168 UI 0 0 0 0 0 0 0 0 0 0
*

169 KK DETB6 STORAGE
170 KO
171 RS 1 STOR
172 SV 0.17 0.38 0.62 0.89
173 SE 2623.0 2624.00 2625.00 2626.00 2627.00
174 SS 2626.0 20.00 2.80 1.50
175 SL 2623.0 0.20 0.60 0.50
*

176 KK B5 BASIN
177 BA 0.003
178 LG 0.10 0.25 5.46 0.24 80
179 UI 0 26 66 19 3 0 0 0 0 0
180 UI 0 0 0 0 0 0 0 0 0 0
181 UI 0 0 0 0 0 0 0 0 0 0
182 UI 0 0 0 0 0 0 0 0 0 0
183 UI 0 0 0 0 0 0 0 0 0 0
*

184 KK DETB5 STORAGE
185 KO
186 RS 1 STOR
187 SV 0.01 0.03 0.05 0.06
188 SE 2632.0 2633.00 2634.00 2635.00 2636.00
189 SS 2635.0 5.00 2.00 1.50
190 SL 2632.0 0.20 0.60 0.50
*

191 KK CP-B5 COMBINE
192 HC 3
*

193 KK R-CPB5 ROUTE
194 RS 1 FLOW
195 RC 0.060 0.040 0.060 650 0.0300 2631.00
196 RX 0.00 18.90 43.80 54.80 81.50 91.60 120.00 160.00
197 RY 2635.0 2630.00 2629.00 2625.00 2625.00 2629.00 2630.00 2631.00
*

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PAGE 6

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

198 KK B8 BASIN
199 BA 0.018
200 LG 0.22 0.25 4.72 0.18 28

206	KK	B13	BASIN							
207	BA	0.001								
208	LG	0.21	0.26	3.72	0.72	56				
209	UI	0	8	21	8	1	0	0	0	0
210	UI	0	0	0	0	0	0	0	0	0
211	UI	0	0	0	0	0	0	0	0	0
212	UI	0	0	0	0	0	0	0	0	0
213	UI	0	0	0	0	0	0	0	0	0

214	KK	CP8 COMBINE
215	RC	2

216	KK	DET88 STORAGE								
217	KO									
218	RS	1	STOR							
219	SV	0.39	0.85	1.37	1.97					
220	SE	2613.0	2614.00	2615.00	2616.00	2617.00				
221	SS	2616.0	10.00	2.80	1.50					
222	SL	2613.0	0.44	0.60	0.50					

223	KK	B6W	BASIN								
224	BA	0.004									
225	LG	0.13	0.27	3.42	0.79	0					
226	UI	0	4	17	29	33	26	17	10	7	4
227	UI	3	1	1	1	0	0	0	0	0	0
228	UI	0	0	0	0	0	0	0	0	0	0
229	UI	0	0	0	0	0	0	0	0	0	0
230	UI	0	0	0	0	0	0	0	0	0	0

231	KK	CP-6W COMBINE
232	RC	3

233	KK	B7	BASIN								
234	BA	0.004									
235	LG	0.19	0.26	3.72	0.70	20					
236	UI	0	62	89	9	0	0	0	0	0	0
237	UI	0	0	0	0	0	0	0	0	0	0
238	UI	0	0	0	0	0	0	0	0	0	0
239	UI	0	0	0	0	0	0	0	0	0	0

REC-1 INPUT

PAGE 7

LINE	ID	1	2	3	4	5	6	7	8	9	10
240	UI	0	0	0	0	0	0	0	0	0	0

241	KK	DET87 STORAGE								
242	KO									
243	RS	1	STOR							
244	SV	0.06	0.16	0.31	0.56					
245	SE	2604.0	2605.00	2606.00	2607.00	2608.00				
246	SS	2607.0	5.00	2.80	1.50					
247	SL	2604.0	0.20	0.60	0.50					

248	KK	CP87 COMBINE
249	RC	2

250	KK	R-CP87	ROUTE								
251	RS	2	FLOW								
252	RC	0.060	0.040	0.060	750	0.0300	2605.00				
253	KK	0.00	55.30	123.80	129.00	141.80	146.00	155.20	188.60		
254	KY	2608.0	2600.00	2598.00	2596.00	2596.00	2597.80	2598.00	2605.00		

255	KK	B9	BASIN							
256	BA	0.001								
257	LG	0.24	0.25	4.39	0.45	36				
258	UI	0	19	18	0	0	0	0	0	0
259	UI	0	0	0	0	0	0	0	0	0
260	UI	0	0	0	0	0	0	0	0	0
261	UI	0	0	0	0	0	0	0	0	0
262	UI	0	0	0	0	0	0	0	0	0

263	KK	DET89 STORAGE								
264	KO									
265	RS	1	STOR							
266	SV	0.06	0.16	0.30						
267	SE	2597.0	2598.00	2599.00	2600.00					
268	SS	2599.0	5.00	2.80	1.50					
269	SL	2597.0	0.20	0.60	0.50					

270	KK	B10	BASIN								
271	BA	0.023									
272	LG	0.21	0.25	4.33	0.48	28					
273	UI	0	62	184	119	198	81	30	9	0	0
274	UI	0	0	0	0	0	0	0	0	0	0
275	UI	0	0	0	0	0	0	0	0	0	0
276	UI	0	0	0	0	0	0	0	0	0	0
277	UI	0	0	0	0	0	0	0	0	0	0

REC-1 INPUT

PAGE 8

280 KK DFTB10 STORAGE
 281 EO
 282 RS 1 STOR
 283 SV 0.57 1.28 1.69 2.17
 284 SE 2692.0 2693.00 2694.00 2694.50 2695.00
 285 SS 2694.5 20.00 2.80 1.50
 286 SL 2692.0 0.20 0.60 0.50
 *

287 KK B11 BASIN
 288 BA 0.002
 289 LG 0.09 0.14 7.58 0.12 23
 290 UI 0 54 22 0 0 0 0 0 0 0
 291 UI 0 0 0 0 0 0 0 0 0 0
 292 UI 0 0 0 0 0 0 0 0 0 0
 293 UI 0 0 0 0 0 0 0 0 0 0
 294 UI 0 0 0 0 0 0 0 0 0 0
 *

295 KK DFTB11 STORAGE
 296 EO
 297 RS 1 STOR
 298 SV 0.21
 299 SE 2627.0 2628.00
 300 SS 2627.0 10.00 2.80 1.50
 *

301 KK B12 BASIN
 302 BA 0.002
 303 LG 0.10 0.25 3.79 0.86 5
 304 UI 0 19 44 13 2 0 0 0 0 0
 305 UI 0 0 0 0 0 0 0 0 0 0
 306 UI 0 0 0 0 0 0 0 0 0 0
 307 UI 0 0 0 0 0 0 0 0 0 0
 308 UI 0 0 0 0 0 0 0 0 0 0
 *

309 KK DFTB12 STORAGE
 310 EO
 311 RS 1 STOR
 312 SV 0.07
 313 SE 2618.0 2619.00
 314 SS 2618.0 10.00 2.80 1.50
 *

1

HRC-1 INPUT

PAGE 9

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

315 KK CFB12 COMBINE
 316 HC 2
 *

317 KK B14 BASIN
 318 BA 0.003
 319 LG 0.12 0.12 7.94 0.11 9
 320 UI 0 32 67 15 0 0 0 0 0 0
 321 UI 0 0 0 0 0 0 0 0 0 0
 322 UI 0 0 0 0 0 0 0 0 0 0
 323 UI 0 0 0 0 0 0 0 0 0 0
 324 UI 0 0 0 0 0 0 0 0 0 0
 *

325 KK CFB14 COMBINE
 326 HC 2
 *

327 KK DFT14A STORAGE
 328 EO
 329 RS 1 STOR
 330 SV 0.15
 331 SE 2615.0 2616.00
 332 SS 2615.0 10.00 2.80 1.50
 *

333 KK DFT14B STORAGE
 334 EO
 335 RS 1 STOR
 336 SV 0.09
 337 SE 2614.0 2615.00
 338 SS 2614.0 10.00 2.80 1.50
 *

339 KK B15 BASIN
 340 BA 0.003
 341 LG 0.11 0.12 7.58 0.11 8
 342 UI 0 38 67 10 0 0 0 0 0 0
 343 UI 0 0 0 0 0 0 0 0 0 0
 344 UI 0 0 0 0 0 0 0 0 0 0
 345 UI 0 0 0 0 0 0 0 0 0 0
 346 UI 0 0 0 0 0 0 0 0 0 0
 *

347 KK CFB15 COMBINE
 348 HC 2
 *

349 KK DFTB15 STORAGE
 350 EO
 351 RS 1 STOR
 352 SV 0.18

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

355 KK B16 BASIN
 356 BA 0.001
 357 LG 0.18 0.25 4.39 0.43 9
 358 UI 0 31 7 0 0 0 0 0 0 0
 359 UI 0 0 0 0 0 0 0 0 0 0
 360 UI 0 0 0 0 0 0 0 0 0 0
 361 UI 0 0 0 0 0 0 0 0 0 0
 362 UI 0 0 0 0 0 0 0 0 0 0
 *

363 KK DDTB16 STORAGE
 364 KO
 365 RS 1 STOR
 366 SV 0.10 0.23 0.39
 367 SE 2593.0 2594.00 2595.00 2596.00
 368 SS 2595.0 5.00 2.80 1.50
 369 SL 2593.0 0.20 0.60 0.50
 *

370 KK B17 BASIN
 371 BA 0.001
 372 LG 0.00 0.00 3.62 0.50 0
 373 UI 0 15 0 0 0 0 0 0 0 0
 374 UI 0 0 0 0 0 0 0 0 0 0
 375 UI 0 0 0 0 0 0 0 0 0 0
 376 UI 0 0 0 0 0 0 0 0 0 0
 377 UI 0 0 0 0 0 0 0 0 0 0
 *

378 KK CFB17 COMBINE
 379 HC 3
 *

380 KK DDTB17 STORAGE
 381 KO
 382 RS 1 STOR
 383 SV 0.33
 384 SE 2494.0 2495.00
 385 SS 2494.0 10.00 2.80 1.50
 *

386 KK B18 BASIN
 387 BA 0.003
 388 LG 0.14 0.25 4.51 0.49 5
 389 UI 0 70 44 0 0 0 0 0 0 0
 390 UI 0 0 0 0 0 0 0 0 0 0
 391 UI 0 0 0 0 0 0 0 0 0 0
 392 UI 0 0 0 0 0 0 0 0 0 0
 393 UI 0 0 0 0 0 0 0 0 0 0
 *

1

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

394 KK CFB18 COMBINE
 395 HC 2
 *

396 KK DDTB18 STORAGE
 397 KO
 398 RS 1 STOR
 399 SV 0.15 0.35 0.61 0.93
 400 SE 2591.0 2592.00 2593.00 2594.00 2595.00
 401 SS 2594.0 5.00 2.80 1.50
 402 SL 2591.0 0.20 0.60 0.50
 *

403 KK B19 BASIN
 404 BA 0.006
 405 LG 0.14 0.26 3.72 0.64 1
 406 UI 0 12 37 68 59 34 13 5 2 0
 407 UI 0 0 0 0 0 0 0 0 0 0
 408 UI 0 0 0 0 0 0 0 0 0 0
 409 UI 0 0 0 0 0 0 0 0 0 0
 410 UI 0 0 0 0 0 0 0 0 0 0
 *

411 KK CPGAL COMBINE
 412 HC 4
 *

413 KK C5 BASIN
 414 BA 0.003
 415 LG 0.10 0.25 5.34 0.34 80
 416 UI 0 7 22 40 27 12 5 1 1 0
 417 UI 0 0 0 0 0 0 0 0 0 0
 418 UI 0 0 0 0 0 0 0 0 0 0
 419 UI 0 0 0 0 0 0 0 0 0 0
 420 UI 0 0 0 0 0 0 0 0 0 0
 *

421 KK CSA BASIN
 422 BA 0.003
 423 LG 0.18 0.28 6.00 0.21 37
 424 UI 0 9 26 43 25 9 3 1 0 0
 425 UI 0 0 0 0 0 0 0 0 0 0
 426 UI 0 0 0 0 0 0 0 0 0 0
 427 UI 0 0 0 0 0 0 0 0 0 0
 428 UI 0 0 0 0 0 0 0 0 0 0
 429 UI 0 0 0 0 0 0 0 0 0 0
 *

LINE	ID	1	2	3	4	5	6	7	8	9	10
431	KK	C6	BASIN								
432	BA	0.001									
433	LG	0.19	0.25	5.05	0.29	8					
434	UI	0	38	0	0	0	0	0	0	0	0
435	UI	0	0	0	0	0	0	0	0	0	0
436	UI	0	0	0	0	0	0	0	0	0	0
437	UI	0	0	0	0	0	0	0	0	0	0
438	UI	0	0	0	0	0	0	0	0	0	0
	*										
439	KK	DETCS STORAGE									
440	KO										
441	RS	1	STOR								
442	SV	0.07									
443	SE	2637.0	2638.00								
444	SS	2637.0	10.00	2.80	1.50						
	*										
445	KK	C7	BASIN								
446	BA	0.001									
447	LG	0.13	0.25	5.05	0.39	10					
448	UI	0	31	7	0	0	0	0	0	0	0
449	UI	0	0	0	0	0	0	0	0	0	0
450	UI	0	0	0	0	0	0	0	0	0	0
451	UI	0	0	0	0	0	0	0	0	0	0
452	UI	0	0	0	0	0	0	0	0	0	0
	*										
453	KK	CPC7 COMBINE									
454	HC	2									
	*										
455	KK	DETCS STORAGE									
456	KO										
457	RS	1	STOR								
458	SV	0.05									
459	SE	2634.0	2635.00								
460	SS	2634.0	10.00	2.80	1.50						
	*										
461	KK	C8	BASIN								
462	BA	0.003									
463	LG	0.13	0.23	5.58	0.28	9					
464	UI	0	105	0	0	0	0	0	0	0	0
465	UI	0	0	0	0	0	0	0	0	0	0
466	UI	0	0	0	0	0	0	0	0	0	0
467	UI	0	0	0	0	0	0	0	0	0	0
468	UI	0	0	0	0	0	0	0	0	0	0
	*										

LINE	ID	1	2	3	4	5	6	7	8	9	10
469	KK	CPC8 COMBINE									
470	HC	3									
	*										
471	KK	DETCS STORAGE									
472	KO										
473	RS	1	STOR								
474	SV	0.08		0.18							
475	SE	2629.0	2629.80	2630.00							
476	SS	2629.0	20.00	2.80	1.50						
	*										
477	KK	R-C8	ROUTE								
478	RS	1	FLOW								
479	RC	0.035	0.025	0.035	650	0.0200	0.00				
480	RX	0.00	4.00	0.00	12.00	22.00	26.00	30.00	34.00		
481	RY	2629.0	2629.00	2628.00	2627.00	2627.00	2628.00	2629.00	2629.00		
	*										
482	KK	C1	BASIN								
483	BA	0.010									
484	LG	0.16	0.25	5.05	0.36	13					
485	UI	0	92	220	64	10	0	0	0	0	0
486	UI	0	0	0	0	0	0	0	0	0	0
487	UI	0	0	0	0	0	0	0	0	0	0
488	UI	0	0	0	0	0	0	0	0	0	0
489	UI	0	0	0	0	0	0	0	0	0	0
	*										
490	KK	CPC1 COMBINE									
491	HC	2									
	*										
492	KK	DETCS STORAGE									
493	KO										
494	RS	1	STOR								
495	SV	0.37									
496	SE	2607.0	2608.00	2609.00	2610.00	2611.00					
497	SS	2610.5	2.00	2.80	1.50						
498	SL	2607.0	0.44	0.60	0.50						
	*										
499	KK	C10	BASIN								
500	BA	0.002									

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

507 KK C9 BASIN
 508 BA 0.004
 509 LG 0.25 0.25 5.85 0.23 45
 510 UI 0 29 80 37 7 0 0 0 0 0
 511 UI 0 0 0 0 0 0 0 0 0 0
 512 UI 0 0 0 0 0 0 0 0 0 0
 513 UI 0 0 0 0 0 0 0 0 0 0
 514 UI 0 0 0 0 0 0 0 0 0 0
 *

515 KK CPC9 COMBINE
 516 HC 2
 *

517 KK C4 BASIN
 518 BA 0.005
 519 LG 0.25 0.15 7.00 0.15 45
 520 UI 0 53 112 24 0 0 0 0 0 0
 521 UI 0 0 0 0 0 0 0 0 0 0
 522 UI 0 0 0 0 0 0 0 0 0 0
 523 UI 0 0 0 0 0 0 0 0 0 0
 524 UI 0 0 0 0 0 0 0 0 0 0
 *

525 KK C2 BASIN
 526 BA 0.012
 527 LG 0.19 0.25 5.05 0.35 22
 528 UI 0 51 157 167 64 18 6 0 0 0
 529 UI 0 0 0 0 0 0 0 0 0 0
 530 UI 0 0 0 0 0 0 0 0 0 0
 531 UI 0 0 0 0 0 0 0 0 0 0
 532 UI 0 0 0 0 0 0 0 0 0 0
 *

533 KK DETC21 STORAGE
 534 KO
 535 RS 1 STOR
 536 SV 0.19 0.44 0.81 1.32
 537 SE 2598.0 2599.00 2600.00 2601.00 2602.00
 538 SS 2601.0 5.00 2.80 1.50
 539 SL 2598.0 0.20 0.60 0.50
 *

540 KK CPC2 COMBINE
 541 HC 3
 *

542 KK DETC2 STORAGE
 543 KO
 544 RS 1 STOR
 545 SV 0.06 0.15 0.27 0.43
 546 SE 2596.0 2597.00 2598.00 2599.00 2600.00
 547 SS 2599.0 10.00 2.80 1.50
 548 SL 2596.0 0.20 0.60 0.50
 *

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

549 KK C3 BASIN
 550 BA 0.002
 551 LG 0.22 0.25 5.05 0.32 31
 552 UI 0 19 44 13 2 0 0 0 0 0
 553 UI 0 0 0 0 0 0 0 0 0 0
 554 UI 0 0 0 0 0 0 0 0 0 0
 555 UI 0 0 0 0 0 0 0 0 0 0
 556 UI 0 0 0 0 0 0 0 0 0 0
 *

557 KK DETC3 STORAGE
 558 KO
 559 RS 1 STOR
 560 SV 0.03 0.09 0.18 0.23 0.28
 561 SE 2596.5 2597.00 2598.00 2599.00 2599.50 2600.00
 562 SS 2599.5 10.00 2.80 1.50
 563 SL 2596.5 0.20 0.60 0.50
 *

564 KK CPC3 COMBINE
 565 HC 2
 *

566 KK DETC31 STORAGE
 567 KO
 568 RS 1 STOR
 569 SV 0.36 0.78 1.28 1.85
 570 SE 2596.0 2597.00 2598.00 2599.00 2600.00
 571 SS 2599.0 5.00 2.80 1.50
 572 SL 2596.0 0.20 0.60 0.50
 *

573 KK C3A BASIN
 574 BA 0.003
 575 LG 0.14 0.25 5.05 0.37 8
 576 UI 0 20 44 0 0 0 0 0 0 0

581 KK CPC3A COMBINE
 582 RC 2
 *
 583 KK DETC3A STORAGE
 584 KO
 585 RS 1 STOR
 586 SV 0.17 0.39 0.66 0.98
 587 SE 2590.0 2591.00 2592.00 2593.00 2594.00
 588 SS 2593.0 5.00 2.00 1.30
 589 SL 2590.0 0.20 0.60 0.50
 *

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LINE	ID	1	2	3	4	5	6	7	8	9	10
590	KK	G1	BASIN								
591	BA	0.001									
592	LO	0.17	0.15	7.94	0.10	27					
593	UI	0	35	0	0	0	0	0	0	0	0
594	UI	0	0	0	0	0	0	0	0	0	0
595	UI	0	0	0	0	0	0	0	0	0	0
596	UI	0	0	0	0	0	0	0	0	0	0
597	UI	0	0	0	0	0	0	0	0	0	0
598	KK	H1	BASIN								
599	BA	0.002									
600	LO	0.17	0.25	5.05	0.33	5					
601	UI	0	3	11	18	18	13	7	4	2	1
602	UI	1	0	0	0	0	0	0	0	0	0
603	UI	0	0	0	0	0	0	0	0	0	0
604	UI	0	0	0	0	0	0	0	0	0	0
605	UI	0	0	0	0	0	0	0	0	0	0
606	KK	L1	BASIN								
607	BA	0.002									
608	LO	0.20	0.25	5.05	0.28	0					
609	UI	0	6	20	24	14	7	3	2	1	1
610	UI	0	0	0	0	0	0	0	0	0	0
611	UI	0	0	0	0	0	0	0	0	0	0
612	UI	0	0	0	0	0	0	0	0	0	0
613	UI	0	0	0	0	0	0	0	0	0	0
614	KK	M1	BASIN								
615	BA	0.001									
616	LO	0.20	0.25	5.05	0.28	0					
617	UI	0	2	9	12	8	4	2	1	1	0
618	UI	0	0	0	0	0	0	0	0	0	0
619	UI	0	0	0	0	0	0	0	0	0	0
620	UI	0	0	0	0	0	0	0	0	0	0
621	UI	0	0	0	0	0	0	0	0	0	0
622	ZZ										

LINE	(V) ROUTING	(---->) DIVERSION OR PUMP FLOW
NO.	(.) CONNECTOR	(<---) RETURN OF DIVERTED OR PUMPED FLOW
27	A1	
	V	
	V	
37	R-A1	
	.	
42		A2
	.	.
50	CP-A2	
	.	
52		B1
	.	V
	.	V
60		R-B1
	.	.
65		B3
	.	.
73		B4
	.	.
91		DTOC
90		DVOC
	.	.
95		DTOC
94		DVOC
	.	V
	.	V
96		DFTOC
	.	.
102		B4C
	.	V
	.	V
104		R-B4
	.	.
109		B4A
	.	.
117		B4B
	.	.
125		CB4
	.	.
128		DTOD
127		DVOD
	.	.
132		DTOD
131		DVOD
	.	V
	.	V
133		DFTOD
	.	.
139		B4
	.	V
	.	V
141		R-B4A
	.	.
146		B4C
	.	.
154	CP-B4C	
	V	
	V	
156	R-CPB4	
	.	
161		B6
	.	V
	.	V
169		DFTB6
	.	.
176		B5
	.	V
	.	V
184		DFTB5
	.	.
191	CP-B5	
	V	
	V	
193	R-CPB5	
	.	
198		B8
	.	.
206		B13

223	.	.	B6W	.
231	CP-6W	.....	.	.
233	.	B7	.	.
	.	V	.	.
241	.	V	.	.
	.	DTB7	.	.
248	CPB7	.....	.	.
	.	V	.	.
	.	V	.	.
250	R-CPB7	.	.	.
255	.	B9	.	.
	.	V	.	.
	.	V	.	.
263	.	DTB9	.	.
270	.	.	B10	.

278	CPB10	.....	.	.
	.	V	.	.
	.	V	.	.
280	.	DTB10	.	.
287	.	.	B11	.
	.	.	V	.
	.	.	V	.
295	.	DTB11	.	.
301	.	.	.	B12
	.	.	.	V
	.	.	.	V
309	.	.	DTB12	.
315	.	CPB12	.....	.
317	.	.	.	B14
325	.	CPB14	.....	.
	.	V	.	.
	.	V	.	.
327	.	DTB14A	.	.
	.	V	.	.
	.	V	.	.
333	.	DTB14B	.	.
339	.	.	.	B15
347	.	CPB15	.....	.
	.	V	.	.
	.	V	.	.
349	.	DTB15	.	.
355	.	.	.	B16
	.	.	.	V
	.	.	.	V
363	.	.	DTB16	.
370	.	.	.	B17
378	CPB17	.....	.	.
	.	V	.	.
	.	V	.	.
380	.	DTB17	.	.
386	.	.	.	B18
394	.	CPB18	.....	.
	.	V	.	.
	.	V	.	.
396	.	DTB18	.	.
403	.	.	.	B19
411	CPGAL	.....	.	.
413	.	CS	.	.

431	.	.	C5	.	.	.
	.	.	V	.	.	.
	.	.	V	.	.	.
439	.	.	DETC6	.	.	.

445	.	.	.	C7	.	.

453	.	.	CPC7	.	.	.
	.	.	V	.	.	.
	.	.	V	.	.	.
455	.	.	DETC7	.	.	.

461	.	.	.	C8	.	.

469	.	.	CPC8	.	.	.
	.	.	V	.	.	.
	.	.	V	.	.	.
471	.	.	DETC8	.	.	.
	.	.	V	.	.	.
	.	.	V	.	.	.
477	.	.	R-C8	.	.	.

482	.	.	C1	.	.	.

490	.	.	CPC1	.	.	.
	.	.	V	.	.	.
	.	.	V	.	.	.
492	.	.	DETC1	.	.	.

499	.	.	C10	.	.	.

507	.	.	.	C9	.	.

515	.	.	CPC9	.	.	.

517	.	.	.	C4	.	.

525	.	.	.	.	C2	.
	.	.	.	.	V	.
	.	.	.	.	V	.
533	.	.	.	.	DETC21	.

540	.	.	CPC2	.	.	.
	.	.	V	.	.	.
	.	.	V	.	.	.
542	.	.	DETC2	.	.	.

549	.	.	.	C3	.	.
	.	.	.	V	.	.
	.	.	.	V	.	.
557	.	.	.	DETC3	.	.

564	.	.	CPC3	.	.	.
	.	.	V	.	.	.
	.	.	V	.	.	.
566	.	.	DETC31	.	.	.

573	.	.	.	C3A	.	.

581	.	.	CPC3A	.	.	.
	.	.	V	.	.	.
	.	.	V	.	.	.
583	.	.	DETC3A	.	.	.

590	.	.	.	G1	.	.

598	.	.	.	.	E1	.

606	.	.	.	.	.	L1

614	.	.	.	.	.	M1

(***) RUBOFF ALSO COMPUTED AT THIS LOCATION

96 KK * DETOC * STORAGE

97 KO OUTPUT CONTROL VARIABLES
IPRNT 5 PRINT CONTROL
IPLOT 0 PLOT CONTROL
QSCAL 0. HYDROGRAPH PLOT SCALE

WARNING --- ROUTED OUTFLOW (81.) IS GREATER THAN MAXIMUM OUTFLOW (72.) IN STORAGE-OUTFLOW TABLE
WARNING --- ROUTED OUTFLOW (92.) IS GREATER THAN MAXIMUM OUTFLOW (72.) IN STORAGE-OUTFLOW TABLE
WARNING --- ROUTED OUTFLOW (101.) IS GREATER THAN MAXIMUM OUTFLOW (72.) IN STORAGE-OUTFLOW TABLE
WARNING --- ROUTED OUTFLOW (109.) IS GREATER THAN MAXIMUM OUTFLOW (72.) IN STORAGE-OUTFLOW TABLE
WARNING --- ROUTED OUTFLOW (116.) IS GREATER THAN MAXIMUM OUTFLOW (72.) IN STORAGE-OUTFLOW TABLE
WARNING --- ROUTED OUTFLOW (120.) IS GREATER THAN MAXIMUM OUTFLOW (72.) IN STORAGE-OUTFLOW TABLE
WARNING --- ROUTED OUTFLOW (119.) IS GREATER THAN MAXIMUM OUTFLOW (72.) IN STORAGE-OUTFLOW TABLE
WARNING --- ROUTED OUTFLOW (113.) IS GREATER THAN MAXIMUM OUTFLOW (72.) IN STORAGE-OUTFLOW TABLE
WARNING --- ROUTED OUTFLOW (102.) IS GREATER THAN MAXIMUM OUTFLOW (72.) IN STORAGE-OUTFLOW TABLE
WARNING --- ROUTED OUTFLOW (88.) IS GREATER THAN MAXIMUM OUTFLOW (72.) IN STORAGE-OUTFLOW TABLE
WARNING --- ROUTED OUTFLOW (76.) IS GREATER THAN MAXIMUM OUTFLOW (72.) IN STORAGE-OUTFLOW TABLE
WARNING --- ROUTED OUTFLOW (78.) IS GREATER THAN MAXIMUM OUTFLOW (72.) IN STORAGE-OUTFLOW TABLE
WARNING --- ROUTED OUTFLOW (89.) IS GREATER THAN MAXIMUM OUTFLOW (72.) IN STORAGE-OUTFLOW TABLE
WARNING --- ROUTED OUTFLOW (99.) IS GREATER THAN MAXIMUM OUTFLOW (72.) IN STORAGE-OUTFLOW TABLE
WARNING --- ROUTED OUTFLOW (107.) IS GREATER THAN MAXIMUM OUTFLOW (72.) IN STORAGE-OUTFLOW TABLE
WARNING --- ROUTED OUTFLOW (114.) IS GREATER THAN MAXIMUM OUTFLOW (72.) IN STORAGE-OUTFLOW TABLE
WARNING --- ROUTED OUTFLOW (118.) IS GREATER THAN MAXIMUM OUTFLOW (72.) IN STORAGE-OUTFLOW TABLE
WARNING --- ROUTED OUTFLOW (116.) IS GREATER THAN MAXIMUM OUTFLOW (72.) IN STORAGE-OUTFLOW TABLE
WARNING --- ROUTED OUTFLOW (108.) IS GREATER THAN MAXIMUM OUTFLOW (72.) IN STORAGE-OUTFLOW TABLE
WARNING --- ROUTED OUTFLOW (97.) IS GREATER THAN MAXIMUM OUTFLOW (72.) IN STORAGE-OUTFLOW TABLE
WARNING --- ROUTED OUTFLOW (83.) IS GREATER THAN MAXIMUM OUTFLOW (72.) IN STORAGE-OUTFLOW TABLE

133 KK * DETOD * STORAGE

134 KO OUTPUT CONTROL VARIABLES
IPRNT 5 PRINT CONTROL
IPLOT 0 PLOT CONTROL
QSCAL 0. HYDROGRAPH PLOT SCALE

WARNING --- ROUTED OUTFLOW (90.) IS GREATER THAN MAXIMUM OUTFLOW (87.) IN STORAGE-OUTFLOW TABLE
WARNING --- ROUTED OUTFLOW (89.) IS GREATER THAN MAXIMUM OUTFLOW (87.) IN STORAGE-OUTFLOW TABLE
WARNING --- ROUTED OUTFLOW (89.) IS GREATER THAN MAXIMUM OUTFLOW (87.) IN STORAGE-OUTFLOW TABLE

169 KK * DETB6 * STORAGE

170 KO OUTPUT CONTROL VARIABLES
IPRNT 5 PRINT CONTROL
IPLOT 0 PLOT CONTROL
QSCAL 0. HYDROGRAPH PLOT SCALE

184 KK * DETB5 * STORAGE

* * * * *
216 KK * DDTB8 * STORAGE
* * * * *

217 KO OUTPUT CONTROL VARIABLES
IPRNT 5 PRINT CONTROL
IPLOT 0 PLOT CONTROL
QSCAL 0. HYDROGRAPH PLOT SCALE

* * * * *
241 KK * DDTB7 * STORAGE
* * * * *

242 KO OUTPUT CONTROL VARIABLES
IPRNT 5 PRINT CONTROL
IPLOT 0 PLOT CONTROL
QSCAL 0. HYDROGRAPH PLOT SCALE

* * * * *
263 KK * DDTB9 * STORAGE
* * * * *

264 KO OUTPUT CONTROL VARIABLES
IPRNT 5 PRINT CONTROL
IPLOT 0 PLOT CONTROL
QSCAL 0. HYDROGRAPH PLOT SCALE

* * * * *
280 KK * DDTB10 * STORAGE
* * * * *

281 KO OUTPUT CONTROL VARIABLES
IPRNT 5 PRINT CONTROL
IPLOT 0 PLOT CONTROL
QSCAL 0. HYDROGRAPH PLOT SCALE

* * * * *
295 KK * DDTB11 * STORAGE
* * * * *

296 KO OUTPUT CONTROL VARIABLES
IPRNT 5 PRINT CONTROL
IPLOT 0 PLOT CONTROL
QSCAL 0. HYDROGRAPH PLOT SCALE

* * * * *
309 KK * DDTB12 * STORAGE
* * * * *

310 KO OUTPUT CONTROL VARIABLES
IPRNT 5 PRINT CONTROL
IPLOT 0 PLOT CONTROL
QSCAL 0. HYDROGRAPH PLOT SCALE

397 KO
OUTPUT CONTROL VARIABLES
PRINT CONTROL 5
PLOT CONTROL 0
HYDROGRAPH PLOT SCALE 0
DESCAL

396 KM
DETAILS
STORAGE

WARNING --- ROUTED OUTFLOW (28.) IS GREATER THAN MAXIMUM OUTFLOW (28.) IN STORAGE-OUTFLOW TABLE
WARNING --- ROUTED OUTFLOW (28.) IS GREATER THAN MAXIMUM OUTFLOW (28.) IN STORAGE-OUTFLOW TABLE
WARNING --- ROUTED OUTFLOW (28.) IS GREATER THAN MAXIMUM OUTFLOW (28.) IN STORAGE-OUTFLOW TABLE
WARNING --- ROUTED OUTFLOW (28.) IS GREATER THAN MAXIMUM OUTFLOW (28.) IN STORAGE-OUTFLOW TABLE
WARNING --- ROUTED OUTFLOW (28.) IS GREATER THAN MAXIMUM OUTFLOW (28.) IN STORAGE-OUTFLOW TABLE

381 KO
OUTPUT CONTROL VARIABLES
PRINT CONTROL 5
PLOT CONTROL 0
HYDROGRAPH PLOT SCALE 0
DESCAL

380 KM
DETAILS
STORAGE

364 KO
OUTPUT CONTROL VARIABLES
PRINT CONTROL 5
PLOT CONTROL 0
HYDROGRAPH PLOT SCALE 0
DESCAL

363 KM
DETAILS
STORAGE

350 KO
OUTPUT CONTROL VARIABLES
PRINT CONTROL 5
PLOT CONTROL 0
HYDROGRAPH PLOT SCALE 0
DESCAL

349 KM
DETAILS
STORAGE

334 KO
OUTPUT CONTROL VARIABLES
PRINT CONTROL 5
PLOT CONTROL 0
HYDROGRAPH PLOT SCALE 0
DESCAL

333 KM
DETAILS
STORAGE

328 KO
OUTPUT CONTROL VARIABLES
PRINT CONTROL 5
PLOT CONTROL 0
HYDROGRAPH PLOT SCALE 0
DESCAL

440 KO OUTPUT CONTROL VARIABLES
 IPRT 5 PRINT CONTROL
 IPLOT 0 PLOT CONTROL
 QSCAL 0. HYDROGRAPH PLOT SCALE

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* *
455 KK * DTTC7 * STORAGE
* *

456 KO OUTPUT CONTROL VARIABLES
 IPRT 5 PRINT CONTROL
 IPLOT 0 PLOT CONTROL
 QSCAL 0. HYDROGRAPH PLOT SCALE

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* *
471 KK * DTTC8 * STORAGE
* *

472 KO OUTPUT CONTROL VARIABLES
 IPRT 5 PRINT CONTROL
 IPLOT 0 PLOT CONTROL
 QSCAL 0. HYDROGRAPH PLOT SCALE

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* *
492 KK * DTTC1 * STORAGE
* *

493 KO OUTPUT CONTROL VARIABLES
 IPRT 5 PRINT CONTROL
 IPLOT 0 PLOT CONTROL
 QSCAL 0. HYDROGRAPH PLOT SCALE
WARNING EXCESS AT PONDING LESS THAN ZERO FOR PERIOD. EXCESS SET TO ZERO

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* *
533 KK * DTTC21 * STORAGE
* *

534 KO OUTPUT CONTROL VARIABLES
 IPRT 5 PRINT CONTROL
 IPLOT 0 PLOT CONTROL
 QSCAL 0. HYDROGRAPH PLOT SCALE

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* *
542 KK * DTTC2 * STORAGE
* *

543 KO OUTPUT CONTROL VARIABLES
 IPRT 5 PRINT CONTROL
 IPLOT 0 PLOT CONTROL
 QSCAL 0. HYDROGRAPH PLOT SCALE

.....

* *
557 KK * DTTC3 * STORAGE
* *

558 KO OUTPUT CONTROL VARIABLES
 IPRT 5 PRINT CONTROL
 IPLOT 0 PLOT CONTROL
 QSCAL 0. HYDROGRAPH PLOT SCALE

* *
566 KK * DTC31 * STORAGE
* *

567 KO OUTPUT CONTROL VARIABLES
IPRNT 5 PRINT CONTROL
IPLOT 0 PLOT CONTROL
QSCAL 0. HYDROGRAPH PLOT SCALE

* *
583 KK * DTC3A * STORAGE
* *

584 KO OUTPUT CONTROL VARIABLES
IPRNT 5 PRINT CONTROL
IPLOT 0 PLOT CONTROL
QSCAL 0. HYDROGRAPH PLOT SCALE

+	2 COMBINED AT	CP8	66.	4.02	4.	1.	1.	0.02
+	ROUTED TO	DETS8	13.	4.13	3.	1.	1.	0.02
+	HYDROGRAPH AT	B6W	12.	4.02	1.	0.	0.	0.00
+	3 COMBINED AT	CP-6W	1058.	4.32	212.	54.	39.	1.15
+	HYDROGRAPH AT	B7	13.	4.02	1.	0.	0.	0.00
+	ROUTED TO	DETS7	2.	4.05	1.	0.	0.	0.00
+	2 COMBINED AT	CPB7	1060.	4.32	212.	54.	39.	1.15
+	ROUTED TO	R-CPB7	1059.	4.35	212.	54.	39.	1.15
+	HYDROGRAPH AT	B9	3.	4.02	0.	0.	0.	0.00
+	ROUTED TO	DETS9	1.	4.03	0.	0.	0.	0.00
+	HYDROGRAPH AT	B10	78.	4.02	5.	1.	1.	0.02
+	2 COMBINED AT	CPB10	79.	4.02	5.	1.	1.	0.02
+	ROUTED TO	DETS10	16.	4.08	3.	1.	1.	0.02
+	HYDROGRAPH AT	B11	7.	4.02	1.	0.	0.	0.00
+	ROUTED TO	DETS11	7.	4.02	1.	0.	0.	0.00
+	HYDROGRAPH AT	B12	6.	4.02	0.	0.	0.	0.00
+	ROUTED TO	DETS12	6.	4.02	0.	0.	0.	0.00
+	2 COMBINED AT	CPB12	13.	4.02	1.	0.	0.	0.00
+	HYDROGRAPH AT	B14	11.	4.02	1.	0.	0.	0.00
+	2 COMBINED AT	CPB14	24.	4.02	2.	0.	0.	0.01
+	ROUTED TO	DETS14A	23.	4.02	2.	0.	0.	0.01
+	ROUTED TO	DETS14B	23.	4.03	2.	0.	0.	0.01
+	HYDROGRAPH AT	B15	11.	4.02	1.	0.	0.	0.00
+	2 COMBINED AT	CPB15	34.	4.02	2.	1.	0.	0.01
+	ROUTED TO	DETS15	32.	4.03	2.	1.	0.	0.01
+	HYDROGRAPH AT	B16	3.	4.02	0.	0.	0.	0.00
+	ROUTED TO	DETS16	1.	4.03	0.	0.	0.	0.00
+	HYDROGRAPH AT	B17	3.	3.78	0.	0.	0.	0.00
+	3 COMBINED AT	CPB17	36.	4.02	3.	1.	0.	0.01
+	ROUTED TO	DETS17	28.	4.07	3.	1.	0.	0.01
+	HYDROGRAPH AT	B18	10.	4.02	1.	0.	0.	0.00
+	2 COMBINED AT	CPB18	36.	4.02	3.	1.	1.	0.02
+	ROUTED TO	DETS18	14.	4.32	3.	1.	1.	0.02
+	HYDROGRAPH AT	B19	19.	4.02	1.	0.	0.	0.01
+	4 COMBINED AT							

+	HYDROGRAPH AT	C5A	11.	4.02	1.	0.	0.	0.00
+	2 COMBINED AT	CPC5	22.	4.02	2.	0.	0.	0.01
+	HYDROGRAPH AT	C6	3.	4.02	0.	0.	0.	0.00
+	ROUTED TO	DETC6	3.	4.02	0.	0.	0.	0.00
+	HYDROGRAPH AT	C7	3.	4.02	0.	0.	0.	0.00
+	2 COMBINED AT	CPC7	7.	4.02	0.	0.	0.	0.00
+	ROUTED TO	DETC7	7.	4.02	0.	0.	0.	0.00
+	HYDROGRAPH AT	C8	10.	4.02	1.	0.	0.	0.00
+	3 COMBINED AT	CPC8	38.	4.02	3.	1.	0.	0.01
+	ROUTED TO	DETC8	38.	4.02	3.	1.	0.	0.01
+	ROUTED TO	R-C8	38.	4.02	3.	1.	0.	0.01
+	HYDROGRAPH AT	C1	34.	4.02	2.	0.	0.	0.01
+	2 COMBINED AT	CPC1	72.	4.02	5.	1.	1.	0.02
+	ROUTED TO	DETC1	4.	4.35	3.	1.	1.	0.02
+	HYDROGRAPH AT	C10	7.	4.02	1.	0.	0.	0.00
+	HYDROGRAPH AT	C9	15.	4.02	1.	0.	0.	0.00
+	2 COMBINED AT	CPC9	22.	4.02	2.	0.	0.	0.01
+	HYDROGRAPH AT	C4	18.	4.02	1.	0.	0.	0.00
+	HYDROGRAPH AT	C2	42.	4.02	3.	1.	0.	0.01
+	ROUTED TO	DETC21	6.	4.08	2.	1.	0.	0.01
+	3 COMBINED AT	CPC2	44.	4.02	5.	1.	1.	0.02
+	ROUTED TO	DETC2	43.	4.02	4.	1.	1.	0.02
+	HYDROGRAPH AT	C3	7.	4.02	0.	0.	0.	0.00
+	ROUTED TO	DETC3	1.	4.05	0.	0.	0.	0.00
+	2 COMBINED AT	CPC3	44.	4.02	5.	2.	1.	0.03
+	ROUTED TO	DETC31	4.	5.03	2.	1.	1.	0.03
+	HYDROGRAPH AT	C3A	10.	4.02	1.	0.	0.	0.00
+	2 COMBINED AT	CPC3A	11.	4.02	3.	2.	1.	0.03
+	ROUTED TO	DETC3A	2.	5.67	2.	2.	1.	0.03
+	HYDROGRAPH AT	G1	3.	4.00	0.	0.	0.	0.00
+	HYDROGRAPH AT	H1	7.	4.02	0.	0.	0.	0.00
+	HYDROGRAPH AT	L1	7.	4.02	0.	0.	0.	0.00
+	HYDROGRAPH AT	M1	3.	4.02	0.	0.	0.	0.00

APPENDIX C

Site Storm Water Storage Calculations

Required First Flush Storm Water Calculations

Provided Storm Water Calculations

100-Year, 2-Hour Storm Water Storage Volume Comparison

Storm Water Storage Drain Times

Required First Flush Storm Water Calculations

First Flush Stormwater Storage Volume Required

Description: Calculation of First Flush Volume Required Using the Rational Method
Date: 05/22/17
Location: Desert Mountain Parcel 19
Reference: Drainage Design Manual for Maricopa County, Vol. I, Hydrology
 City of Scottsdale, *Design Standards and Policies Manual Chapter 4 Grading & Drainage*,
 January 2010.

Known Values: Design storm: First Flush
 Rainfall, D: 0.5 inches

Calc. Values: $V=(P/12)*A*C$

Where:
 V = Retention Volume Required
 C = Runoff Coefficient
 P = Precipitation amount = first flush rainfall
 A = Area of Watershed Contributing

Drainage Area	Area (SF)	Area (ac)	Weighted Runoff Coefficient	First Flush Volume (ac-ft)	Basin Volume Provided (ac-ft)
B5	91661	2.10	1.00	0.09	Basin B5
TOTAL				0.09	0.10
B6	97738	2.24	1.00	0.09	Basin B6
TOTAL				0.09	0.62
B7	118168	2.71	1.00	0.11	Basin B7
TOTAL				0.11	0.31
B8	506941	11.64	1.00	0.48	Basin B8
B13	33440	0.77	1.00	0.03	Basin B8
TOTAL				0.51	1.37
B9	34783	0.80	1.00	0.03	Basin B9 & B10
B10	653492	15.00	1.00	0.63	Basin B9 & B10
TOTAL				0.66	1.99
B16	26198	0.60	1.00	0.03	Basin B16
TOTAL				0.03	0.39
B11	64650	1.48	1.00	0.06	Basin B18
B12	67749	1.56	1.00	0.06	
B14	75437	1.73	1.00	0.07	
B15	73089	1.68	1.00	0.07	
B17	16495	0.38	1.00	0.02	
B18	83765	1.92	1.00	0.08	
TOTAL				0.36		0.61
C2	347647	7.98	1.00	0.33	Basins C2, C2.1, C3, C3.1, C3A
C3	43513	1.00	1.00	0.04	
C3A	81060	1.86	1.00	0.08	
C4	136978	3.14	1.00	0.13	
C9	101013	2.32	1.00	0.10	
C10	67586	1.55	1.00	0.06	
TOTAL				0.74	3.19
C1	278495	6.39	1.00	0.27	Basin C1
C5	97132	2.23	1.00	0.09	
C6	12194	0.28	1.00	0.01	
C7	39250	0.90	1.00	0.04	
C8	77852	1.79	1.00	0.07	
TOTAL				0.48	1.57

Provided Storm Water Calculations

Off-Site Stormwater Storage Basin Capacity

Description: Proposed Stormwater Storage Basin Capacities
Project: Desert Mountain Parcel 19
Reference: Drainage Design Manual for Maricopa County, Arizona - Hydrology (2013)
City of Scottsdale, Design Standards and Policies Manual
Chapter 4 Grading & Drainage , January 2010.

Basin IDs	Bottom Contour Area	Top Contour	Bottom Elevation	Top Elevation	Volume Provided	Volume Provided
B4A	18,371	20,748	2,653.0	2,654	0.45	2.5
	20,748	23,237	2,654.0	2,655	0.50	
	23,237	25,852	2,655.0	2,656	0.56	
	25,852	28,597	2,656.0	2,657	0.62	
	28,597	30,018	2,657.0	2,657.5	0.34	

Basin IDs	Bottom Contour Area	Top Contour	Bottom Elevation	Top Elevation	Volume Provided	Volume Provided
B4	17,077	20,492	2,683.0	2,684	0.43	2.6
	20,492	24,034	2,684.0	2,685	0.51	
	24,034	27,681	2,685.0	2,686	0.59	
	27,681	31,442	2,686.0	2,687	0.68	
	31,442	33,459	2,687.0	2,687.5	0.37	

On-Site Stormwater Storage Capacity

Description: Proposed Stormwater Storage Basin Capacities
 Project: Desert Mountain Parcel 19
 Reference: Drainage Design Manual for Maricopa County, Arizona - Hydrology
 City of Scottsdale, Design Standards and Policies Manual

Basin IDs	Bottom Contour	Top Contour Area	Bottom Elevation	Top Elevation	Volume Provided	Volume Provided
DET B5	800	1,200	2,632.0	2,633	0.02	0.10
	1,200	1,600	2,633.0	2,634	0.03	
	1,600	2,350	2,634.0	2,635.0	0.05	

Basin IDs	Bottom Contour	Top Contour Area	Bottom Elevation	Top Elevation	Volume Provided	Volume Provided
DET B6	6,824	8,165	2,623.0	2,624	0.17	0.62
	8,165	9,625	2,624.0	2,625	0.20	
	9,625	11,182	2,625.0	2,626.0	0.24	

Basin IDs	Bottom Contour	Top Contour Area	Bottom Elevation	Top Elevation	Volume Provided	Volume Provided
DET B7	2,235	3,426	2,604.0	2,605	0.06	0.31
	3,426	4,858	2,605.0	2,606	0.10	
	4,858	8,502	2,606.0	2,607.0	0.15	

Basin IDs	Bottom Contour	Top Contour Area	Bottom Elevation	Top Elevation	Volume Provided	Volume Provided
DET B8	15,480	18,372	2,612.0	2,613	0.39	1.37
	18,372	21,406	2,613.0	2,614	0.46	
	21,406	24,583	2,614.0	2,615.0	0.53	

Basin IDs	Bottom Contour	Top Contour Area	Bottom Elevation	Top Elevation	Volume Provided	Volume Provided
DET B9	2,115	3,465	2,597.0	2,598	0.06	0.30
	3,465	5,046	2,598.0	2,599	0.10	
	5,046	6,728	2,599.0	2,600.0	0.14	

Basin IDs	Bottom Contour	Top Contour Area	Bottom Elevation	Top Elevation	Volume Provided	Volume Provided
DET B10	22,338	27,161	2,592.0	2,593	0.57	1.69
	27,161	34,711	2,593.0	2,594	0.71	
	34,711	37,298	2,594.0	2,594.5	0.41	

Basin IDs	Bottom Contour	Top Contour Area	Bottom Elevation	Top Elevation	Volume Provided	Volume Provided
DET B16	3,853	4,825	2,593.0	2,594	0.10	0.39
	4,825	6,212	2,594.0	2,595	0.13	
	6,212	7,785	2,595.0	2,596.0	0.16	

Basin IDs	Bottom Contour	Top Contour Area	Bottom Elevation	Top Elevation	Volume Provided	Volume Provided
DET B18	5,402	7,619	2,591.0	2,592	0.15	0.61
	7,619	10,047	2,592.0	2,593	0.20	
	10,047	12,632	2,593.0	2,594.0	0.26	

Basin IDs	Bottom Contour	Top Contour Area	Bottom Elevation	Top Elevation	Volume Provided	Volume Provided
DET C1	11,802	20,622	2,607.0	2,608	0.37	1.57
	20,622	25,737	2,608.0	2,609	0.53	
	25,737	32,143	2,609.0	2,610.0	0.66	

Basin IDs	Bottom Contour	Top Contour Area	Bottom Elevation	Top Elevation	Volume Provided	Volume Provided
DET C2	1,654	3,428	2,596.0	2,597	0.06	0.27
	3,428	4,607	2,597.0	2,598	0.09	
	4,607	5,988	2,598.0	2,599.0	0.12	

Basin IDs	Bottom Contour	Top Contour Area	Bottom Elevation	Top Elevation	Volume Provided	Volume Provided
DET C2.1	7,174	9,459	2,598.0	2,599	0.19	0.81
	9,459	12,072	2,599.0	2,600	0.25	
	12,072	20,128	2,600.0	2,601.0	0.37	

Basin IDs	Bottom Contour	Top Contour Area	Bottom Elevation	Top Elevation	Volume Provided	Volume Provided
DET C3	2,036	2,418	2,596.5	2,597	0.03	0.18
	2,418	3,255	2,597.0	2,598	0.07	
	3,255	4,194	2,598.0	2,599.0	0.09	

Basin IDs	Bottom Contour	Top Contour Area	Bottom Elevation	Top Elevation	Volume Provided	Volume Provided
DET C3.1	14,213	16,967	2,596.0	2,597	0.36	1.28
	16,967	19,985	2,597.0	2,598	0.42	
	19,985	23,251	2,598.0	2,599.0	0.50	

Basin IDs	Bottom Contour	Top Contour Area	Bottom Elevation	Top Elevation	Volume Provided	Volume Provided
DET C3A	6,556	8,450	2,590.0	2,591	0.17	0.66
	8,450	10,536	2,591.0	2,592	0.22	
	10,536	12,744	2,592.0	2,593	0.27	

Total	10.15
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100-Year, 2-Hour Storm Water Storage Volume Comparison

WOOD/PATEL

100-Year, 2-hr Stormwater Storage Volume

Description: 100-Year, 2-hr Stormwater Storage Volume Comparison
Date: 05/22/17
Location: Desert Mountain Parcel 19
Reference: City of Scottsdale, *Design Standards and Policies Manual Chapter 4 Grading & Drainage*, January 2010.

Known Values:	100-YR, 2-HR	Land Use	Runoff 'C'
	2.84 inches		Coefficient
Calc. Values:	V=(P/12)*A*C	Golf Course	0.3
		Vacant Land	0.55
		Medium/High Density	0.75
		Commercial	0.9
		Cart Path	0.9
V = Retention Volume Required			
C = Runoff Coefficient			
P = Precipitation amount=100-year 2 hour rainfall			
A = Area of Watershed Contributing			

Drainage Area	Area (SF)	Area (ac)	Land Use	Weighted Runoff Coefficient	100-YR 2-HR Volume (ac-ft)	Provided 100-YR 2-HR (ac-ft)
B5	91661	2.10	Commercial	0.90	0.45	0.10
Total B5	91661	2.10		0.90	0.45	

B6	21980	0.50	Golf Course	0.30	0.04	0.61
	21994	0.50	Vacant Land	0.55	0.07	
	3907	0.09	Cart Path	0.90	0.02	
	49857	1.14	Medium/High Density	0.75	0.20	
Total B6	75758	2.24		0.61	0.32	

B7	31702	0.73	Golf Course	0.30	0.05	0.31
	36946	0.85	Vacant Land	0.55	0.11	
	3486	0.08	Cart Path	0.90	0.02	
	4773	0.11	Natural	0.00	0.00	
	41261	0.95	Medium/High Density	0.75	0.17	
Total B7	118168	2.71		0.54	0.35	

B8	73883	1.69	Golf Course	0.30	0.12	1.37
	88664	2.04	Vacant Land	0.55	0.26	
	7951	0.18	Cart Path	0.90	0.04	
	78269	0.43	Roadway	0.90	0.09	
	258374	5.93	Medium/High Density	0.75	1.05	
Total B8	506941	10.27		0.65	1.57	

B9	7793	0.18	Vacant Land	0.55	0.02	0.30
	26990	0.62	Medium/High Density	0.75	0.11	
Total C1	34783	0.80		0.71	0.13	

B10	78491	1.80	Golf Course	0.30	0.13	1.69
	194769	4.47	Vacant Land	0.55	0.58	
	12552	0.29	Cart Path	0.90	0.06	
	66280	1.52	Roadway	0.90	0.32	
	301440	6.92	Medium/High Density	0.75	1.23	
Total B10	653532	15.00		0.65	2.32	

B11	5255	0.12	Water	1.00	0.03	Conveyed into Basin B18
	38204	0.88	Golf Course	0.30	0.06	
	21191	0.49	Commercial	0.90	0.10	
Total B11	64650	1.48		0.55	0.19	

B12	57391	1.32	Golf Course	0.30	0.09	Conveyed into Basin B18
	6814	0.16	Cart Path	0.90	0.03	
	3544	0.08	Water	1.00	0.02	
Total B12	67749	1.56		0.40	0.15	

B13	12068	0.28	Roadway	0.90	0.06	Conveyed into Basin B8
	21372	0.49	Medium/High Density	0.75	0.09	
Total B13	33440	0.77		0.80	0.15	

B14	25393	0.58	Golf Course	0.30	0.04	Conveyed into Basin B18
	26782	0.61	Vacant Land	0.55	0.08	
	4826	0.11	Cart Path	0.90	0.02	
	14890	0.34	Water	1.00	0.08	
	3546	0.08	Medium/High Density	0.75	0.01	
Total B14	75437	1.73		0.59	0.24	

B15	25144	0.58	Golf Course	0.30	0.04	Conveyed into Basin B18
	26057	0.60	Vacant Land	0.55	0.08	
	4404	0.10	Cart Path	0.90	0.02	
	17484	0.40	Water	1.00	0.09	
Total B15	73089	1.68		0.59	0.24	

B16	2495	0.06	Golf Course	0.30	0.00	0.39
	21513	0.49	Vacant Land	0.55	0.06	
	2190	0.05	Cart Path	0.90	0.01	
Total B17	26198	0.60		0.56	0.08	

B17	16495	0.38	Water	1.00	0.09	Conveyed into Basin B18
Total B17	16495	0.38		1.00	0.09	

Drainage Area	Area (SF)	Area (ac)	Land Use	Weighted Runoff Coefficient	100-YR 2-HR Volume (ac-ft)	Provided 100-YR 2-HR (ac-ft)
B18	48977	1.08	Golf Course	0.30	0.08	0.61
	34173	0.78	Vacant Land	0.55	0.10	
	2615	0.06	Cart Path	0.90	0.01	
Total B18	83765	1.92		0.42	0.19	

C1	129344	2.97	Golf Course	0.30	0.21	1.56
	88739	2.04	Vacant Land	0.55	0.27	
	57870	1.33	Medium/High Density	0.75	0.24	
	2542	0.06	Cart Path	0.90	0.01	
Total C1	278495	6.39		0.48	0.72	

C2	102719	2.36	Golf Course	0.30	0.17	Basin C21 0.81
	98794	2.22	Vacant Land	0.55	0.29	
	13645	0.31	Cart Path	0.90	0.07	
	134489	3.09	Medium/High Density	0.75	0.55	
Total C2	347647	7.98		0.57	1.07	

C3	2790	0.06	Golf Course	0.30	0.00	0.19
	8193	0.19	Vacant Land	0.55	0.02	
	31717	0.73	Medium/High Density	0.75	0.13	
	813	0.02	Cart Path	0.90	0.00	
Total C3	43513	1.00		0.69	0.16	

C3A	40989	0.94	Golf Course	0.30	0.07	0.66
	35657	0.82	Vacant Land	0.55	0.11	
	4414	0.10	Medium/High Density	0.75	0.02	
Total C3A	81060	1.86		0.43	0.19	

C4	136978	3.14	Medium/High Density	0.75	0.56	Basin C2 & C31
Total C4	136978	3.14		0.75	0.56	1.55

C5	97132	2.23	Roadway	0.90	0.47	Conveyed into Basin C1
Total C5	97132	2.23		0.90	0.47	

C6	358	0.01	Cart Path	0.90	0.002	Conveyed into Basin C1
	11836	0.27	Vacant Land	0.55	0.035	
Total C6	12194	0.28		0.56	0.04	

C7	28185	0.65	Golf Course	0.30	0.05	Conveyed into Basin C1
	8704	0.20	Vacant Land	0.55	0.03	
	2361	0.05	Cart Path	0.90	0.01	
Total C7	39250	0.90		0.39	0.09	

C8	47856	1.10	Golf Course	0.30	0.08	Conveyed into Basin C1
	15298	0.35	Vacant Land	0.55	0.05	
	10501	0.24	Water	1.00	0.06	
	4199	0.10	Medium/High Density	0.75	0.02	
Total C8	77852	1.79		0.47	0.20	

C9	101013	2.32	Medium/High Density	0.75	0.41	Conveyed into Basin C1
Total C9	101013	2.32		0.75	0.41	

C10	21180	0.49	Roadway	0.90	0.10	Conveyed into Basin C1
	46406	1.07	Medium/High Density	0.75	0.19	
Total C10	67586	1.55		0.80	0.29	

Total	10.67	10.15				
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Storm Water Storage Drain Times

STORMWATER STORAGE BASIN TIME TO DRAIN CALCULATION

Site: Desert Mountain Parcel 19
 Location: City of Scottsdale
 Description: Time to Drain Calculations - Must be less than 36 hours
 References: City of Scottsdale, Grading & Drainage Design Standards & Policies Manual; January, 2010.
 Micheal R. Lindeburg, PE, *Civil Engineer Reference Manual*, 2001.
 Date: 3/14/2017

$$t = \frac{2 A_{bsn} (\sqrt{Z_1} - \sqrt{Z_2})}{C_d A_{orf} \sqrt{2g}}$$

DET C2			
Bottom Area	1654	ft ²	
Top Area	5988	ft ²	
Depth	3	ft	
C _d	0.6		
Outlet Diameter	0.5	ft	
Effective Area Needed	0.20	ft ²	
Depth [feet]	Time required to drain step [sec]	Discharge Rate [cfs]	
3.0	368.78	1.6	
2.9	366.14	1.6	
2.8	363.52	1.6	
2.7	360.93	1.6	
2.6	358.37	1.5	
2.5	355.85	1.5	
2.4	353.38	1.5	
2.3	350.96	1.4	
2.2	348.61	1.4	
2.1	346.34	1.4	
2.0	344.17	1.3	
1.9	342.11	1.3	
1.8	340.20	1.3	
1.7	338.47	1.2	
1.6	336.95	1.2	
1.5	335.69	1.2	
1.4	334.75	1.1	
1.3	334.22	1.1	
1.2	334.21	1.0	
1.1	334.86	1.0	
1.0	336.39	0.9	
0.9	339.07	0.9	
0.8	343.36	0.8	
0.7	349.93	0.8	
0.6	359.90	0.7	
0.5	375.28	0.7	
0.4	400.06	0.6	
0.3	443.83	0.5	
0.2	538.38	0.4	
0.1	665.07	0.3	
Total	11100	sec	
	3	Hours	
Max Discharge	1.6	cfs	
Average Discharge	1.1	cfs	

DET C1			
Bottom Area	11802	ft ²	
Top Area	32143	ft ²	
Depth	3	ft	
C _d	0.6		
Outlet Diameter	0.75	ft	
Effective Area Needed	0.44	ft ²	
Depth [feet]	Time required [sec]	Discharge Rate [cfs]	
3.0	879.80	3.7	
2.9	876.22	3.6	
2.8	872.79	3.6	
2.7	869.53	3.5	
2.6	866.46	3.4	
2.5	863.60	3.4	
2.4	861.00	3.3	
2.3	858.67	3.2	
2.2	856.68	3.2	
2.1	855.07	3.1	
2.0	853.90	3.0	
1.9	853.25	2.9	
1.8	853.20	2.9	
1.7	853.87	2.8	
1.6	855.39	2.7	
1.5	857.93	2.6	
1.4	861.72	2.5	
1.3	867.04	2.4	
1.2	874.25	2.3	
1.1	883.87	2.2	
1.0	896.57	2.1	
0.9	913.33	2.0	
0.8	935.61	1.9	
0.7	965.63	1.8	
0.6	1007.03	1.6	
0.5	1066.30	1.5	
0.4	1156.29	1.3	
0.3	1307.50	1.2	
0.2	1620.47	1.0	
0.1	2051.15	0.7	
Total	29194	sec	
	8	Hours	
Max Discharge	3.7	cfs	
Average Discharge	2.5	cfs	

STORMWATER STORAGE BASIN TIME TO DRAIN CALCULATION

Site: Desert Mountain Parcel 19
 Location: City of Scottsdale
 Description: Time to Drain Calculations - Must be less than 36 hours
 References: City of Scottsdale, Grading & Drainage Design Standards & Policies Manual; January, 2010.
 Micheal R. Lindeburg, PE, *Civil Engineer Reference Manual*, 2001.
 Date: 3/14/2017

$$t = \frac{2 A_{bsn} (\sqrt{Z_1} - \sqrt{Z_2})}{C_d A_{orf} \sqrt{2g}}$$

DET C3.1			
Bottom Area	14213	ft ²	
Top Area	23251	ft ²	
Depth	3	ft	
C _d	0.6		
Outlet Diameter	0.5	ft	
Effective Area Needed	0.20	ft ²	
Depth [feet]	Time required to drain step [sec]	Discharge Rate [cfs]	
3.0	1431.93	1.6	
2.9	1437.96	1.6	
2.8	1444.66	1.6	
2.7	1452.10	1.6	
2.6	1460.34	1.5	
2.5	1469.50	1.5	
2.4	1479.65	1.5	
2.3	1490.94	1.4	
2.2	1503.49	1.4	
2.1	1517.48	1.4	
2.0	1533.09	1.3	
1.9	1550.57	1.3	
1.8	1570.18	1.3	
1.7	1592.27	1.2	
1.6	1617.26	1.2	
1.5	1645.66	1.2	
1.4	1678.13	1.1	
1.3	1715.51	1.1	
1.2	1758.88	1.0	
1.1	1809.72	1.0	
1.0	1870.00	0.9	
0.9	1942.53	0.9	
0.8	2031.42	0.8	
0.7	2142.94	0.8	
0.6	2287.30	0.7	
0.5	2482.43	0.7	
0.4	2763.68	0.6	
0.3	3214.18	0.5	
0.2	4105.32	0.4	
0.1	5367.33	0.3	
Total	59366	sec	
	16	Hours	
Max Discharge	1.6	cfs	
Average Discharge	1.1	cfs	

DET C3			
Bottom Area	2036	ft ²	
Top Area	4194	ft ²	
Depth	3	ft	
C _d	0.6		
Outlet Diameter	0.5	ft	
Effective Area Needed	0.20	ft ²	
Depth [feet]	Time required to drain step [sec]	Discharge Rate [cfs]	
3.0	258.29	1.6	
2.9	258.28	1.6	
2.8	258.34	1.6	
2.7	258.50	1.6	
2.6	258.75	1.5	
2.5	259.12	1.5	
2.4	259.62	1.5	
2.3	260.25	1.4	
2.2	261.05	1.4	
2.1	262.03	1.4	
2.0	263.21	1.3	
1.9	264.64	1.3	
1.8	266.35	1.3	
1.7	268.38	1.2	
1.6	270.79	1.2	
1.5	273.66	1.2	
1.4	277.07	1.1	
1.3	281.14	1.1	
1.2	286.03	1.0	
1.1	291.92	1.0	
1.0	299.12	0.9	
0.9	307.99	0.9	
0.8	319.13	0.8	
0.7	333.42	0.8	
0.6	352.31	0.7	
0.5	378.33	0.7	
0.4	416.53	0.6	
0.3	478.78	0.5	
0.2	604.03	0.4	
0.1	779.51	0.3	
Total	9607	sec	
	3	Hours	
Max Discharge	1.6	cfs	
Average Discharge	1.1	cfs	

STORMWATER STORAGE BASIN TIME TO DRAIN CALCULATION

Site: Desert Mountain Parcel 19
 Location: City of Scottsdale
 Description: Time to Drain Calculations - Must be less than 36 hours
 References: City of Scottsdale, Grading & Drainage Design Standards & Policies Manual; January, 2010.
 Micheal R. Lindeburg, PE, *Civil Engineer Reference Manual*, 2001.
 Date: 3/14/2017

$$t = \frac{2 A_{bsn} (\sqrt{Z_1} - \sqrt{Z_2})}{C_d A_{orf} \sqrt{2g}}$$

DET B6		
Bottom Area	6821	ft ²
Top Area	11182	ft ²
Depth	3	ft
C _d	0.6	
Outlet Diameter	0.5	ft
Effective Area Needed	0.20	ft ²
Depth [feet]	Time required to drain step [sec]	Discharge Rate [cfs]
3.0	688.65	1.6
2.9	691.52	1.6
2.8	694.71	1.6
2.7	698.26	1.6
2.6	702.19	1.5
2.5	706.56	1.5
2.4	711.40	1.5
2.3	716.79	1.4
2.2	722.79	1.4
2.1	729.48	1.4
2.0	736.94	1.3
1.9	745.30	1.3
1.8	754.68	1.3
1.7	765.25	1.2
1.6	777.21	1.2
1.5	790.81	1.2
1.4	806.36	1.1
1.3	824.26	1.1
1.2	845.04	1.0
1.1	869.40	1.0
1.0	898.29	0.9
0.9	933.06	0.9
0.8	975.67	0.8
0.7	1029.15	0.8
0.6	1098.38	0.7
0.5	1191.97	0.7
0.4	1326.89	0.6
0.3	1543.03	0.5
0.2	1970.63	0.4
0.1	2576.14	0.3
Total	28521	sec
	8	Hours
Max Discharge	1.6	cfs
Average Discharge	1.1	cfs

DET B7		
Bottom Area	4953	ft ²
Top Area	9728	ft ²
Depth	3	ft
C _d	0.6	
Outlet Diameter	0.5	ft
Effective Area Needed	0.20	ft ²
Depth [feet]	Time required to drain step [sec]	Discharge Rate [cfs]
3.0	688.65	1.6
2.9	691.52	1.6
2.8	694.71	1.6
2.7	698.26	1.6
2.6	702.19	1.5
2.5	706.56	1.5
2.4	711.40	1.5
2.3	716.79	1.4
2.2	722.79	1.4
2.1	729.48	1.4
2.0	736.94	1.3
1.9	745.30	1.3
1.8	754.68	1.3
1.7	765.25	1.2
1.6	777.21	1.2
1.5	790.81	1.2
1.4	806.36	1.1
1.3	824.26	1.1
1.2	845.04	1.0
1.1	869.40	1.0
1.0	898.29	0.9
0.9	933.06	0.9
0.8	975.67	0.8
0.7	1029.15	0.8
0.6	1098.38	0.7
0.5	1191.97	0.7
0.4	1326.89	0.6
0.3	1543.03	0.5
0.2	1970.63	0.4
0.1	2576.14	0.3
Total	28521	sec
	8	Hours
Max Discharge	1.6	cfs
Average Discharge	1.1	cfs

STORMWATER STORAGE BASIN TIME TO DRAIN CALCULATION

Site: Desert Mountain Parcel 19
 Location: City of Scottsdale
 Description: Time to Drain Calculations - Must be less than 36 hours
 References: City of Scottsdale, Grading & Drainage Design Standards & Policies Manual; January, 2010.
 Micheal R. Lindeburg, PE, *Civil Engineer Reference Manual*, 2001.
 Date: 5/23/2017

$$t = \frac{2 A_{bsn} (\sqrt{Z_1} - \sqrt{Z_2})}{C_d A_{orf} \sqrt{2g}}$$

DET B5		
Bottom Area	700	ft ²
Top Area	2000	ft ²
Depth	3	ft
C _d	0.6	
Outlet Diameter	0.5	ft
Effective Area Needed	0.20	ft ²
Depth [feet]	Time required to drain step [sec]	Discharge Rate [cfs]
3.0	123.17	1.6
2.9	122.60	1.6
2.8	122.04	1.6
2.7	121.51	1.6
2.6	121.00	1.5
2.5	120.52	1.5
2.4	120.06	1.5
2.3	119.65	1.4
2.2	119.27	1.4
2.1	118.95	1.4
2.0	118.68	1.3
1.9	118.47	1.3
1.8	118.35	1.3
1.7	118.32	1.2
1.6	118.39	1.2
1.5	118.60	1.2
1.4	118.97	1.1
1.3	119.54	1.1
1.2	120.36	1.0
1.1	121.49	1.0
1.0	123.03	0.9
0.9	125.11	0.9
0.8	127.91	0.8
0.7	131.73	0.8
0.6	137.06	0.7
0.5	144.76	0.7
0.4	156.54	0.6
0.3	176.48	0.5
0.2	217.98	0.4
0.1	274.88	0.3
Total	4015	sec
	1	Hours
Max Discharge	1.6	cfs
Average Discharge	1.1	cfs

DET B8		
Bottom Area	12883	ft ²
Top Area	20420	ft ²
Depth	3	ft
C _d	0.6	
Outlet Diameter	0.75	ft
Effective Area Needed	0.44	ft ²
Depth [feet]	Time required to drain step [sec]	Discharge Rate [cfs]
3.0	558.93	3.7
2.9	561.65	3.6
2.8	564.65	3.6
2.7	567.95	3.5
2.6	571.59	3.4
2.5	575.59	3.4
2.4	580.01	3.3
2.3	584.89	3.2
2.2	590.28	3.2
2.1	596.26	3.1
2.0	602.91	3.0
1.9	610.31	2.9
1.8	618.58	2.9
1.7	627.86	2.8
1.6	638.32	2.7
1.5	650.17	2.6
1.4	663.67	2.5
1.3	679.16	2.4
1.2	697.08	2.3
1.1	718.03	2.2
1.0	742.80	2.1
0.9	772.53	2.0
0.8	808.88	1.9
0.7	854.37	1.8
0.6	913.13	1.6
0.5	992.39	1.5
0.4	1106.40	1.3
0.3	1288.66	1.2
0.2	1648.47	1.0
0.1	2158.67	0.7
Total	23544	sec
	7	Hours
Max Discharge	3.7	cfs
Average Discharge	2.5	cfs

STORMWATER STORAGE BASIN TIME TO DRAIN CALCULATION

Site: Desert Mountain Parcel 19
 Location: City of Scottsdale
 Description: Time to Drain Calculations - Must be less than 36 hours
 References: City of Scottsdale, Grading & Drainage Design Standards & Policies Manual; January, 2010.
 Micheal R. Lindeburg, PE, *Civil Engineer Reference Manual*, 2001.
 Date: 3/14/2017

$$t = \frac{2 A_{bsn} (\sqrt{Z_1} - \sqrt{Z_2})}{C_d A_{orf} \sqrt{2g}}$$

DET B10		
Bottom Area	22338	ft ²
Top Area	37298	ft ²
Depth	3	ft
C _d	0.6	
Outlet Diameter	0.5	ft
Effective Area Needed	0.20	ft ²
Depth [feet]	Time required to drain step [sec]	Discharge Rate [cfs]
3.0	2297.03	1.6
2.9	2305.74	1.6
2.8	2315.49	1.6
2.7	2326.37	1.6
2.6	2338.53	1.5
2.5	2352.08	1.5
2.4	2367.21	1.5
2.3	2384.09	1.4
2.2	2402.94	1.4
2.1	2424.03	1.4
2.0	2447.65	1.3
1.9	2474.17	1.3
1.8	2504.03	1.3
1.7	2537.76	1.2
1.6	2576.01	1.2
1.5	2619.60	1.2
1.4	2669.55	1.1
1.3	2727.17	1.1
1.2	2794.18	1.0
1.1	2872.85	1.0
1.0	2966.33	0.9
0.9	3079.01	0.9
0.8	3217.32	0.8
0.7	3391.12	0.8
0.6	3616.43	0.7
0.5	3921.42	0.7
0.4	4361.62	0.6
0.3	5067.66	0.5
0.2	6466.13	0.4
0.1	8444.93	0.3
Total	94268	sec
	26	Hours
Max Discharge	1.6	cfs
Average Discharge	1.1	cfs

DET B18		
Bottom Area	7020	ft ²
Top Area	14810	ft ²
Depth	3	ft
C _d	0.6	
Outlet Diameter	0.5	ft
Effective Area Needed	0.20	ft ²
Depth [feet]	Time required to drain step [sec]	Discharge Rate [cfs]
3.0	912.09	1.6
2.9	911.68	1.6
2.8	911.55	1.6
2.7	911.72	1.6
2.6	912.23	1.5
2.5	913.11	1.5
2.4	914.42	1.5
2.3	916.22	1.4
2.2	918.56	1.4
2.1	921.51	1.4
2.0	925.18	1.3
1.9	929.67	1.3
1.8	935.11	1.3
1.7	941.66	1.2
1.6	949.51	1.2
1.5	958.92	1.2
1.4	970.18	1.1
1.3	983.69	1.1
1.2	999.99	1.0
1.1	1019.77	1.0
1.0	1043.97	0.9
0.9	1073.97	0.9
0.8	1111.73	0.8
0.7	1160.32	0.8
0.6	1224.70	0.7
0.5	1313.65	0.7
0.4	1444.51	0.6
0.3	1658.25	0.5
0.2	2089.12	0.4
0.1	2692.00	0.3
Total	33569	sec
	9	Hours
Max Discharge	1.6	cfs
Average Discharge	1.1	cfs

STORMWATER STORAGE BASIN TIME TO DRAIN CALCULATION

Site: Desert Mountain Parcel 19
 Location: City of Scottsdale
 Description: Time to Drain Calculations - Must be less than 36 hours
 References: City of Scottsdale, Grading & Drainage Design Standards & Policies Manual; January, 2010.
 Micheal R. Lindeburg, PE, *Civil Engineer Reference Manual*, 2001.
 Date: 3/14/2017

$$t = \frac{2 A_{bsn} (\sqrt{Z_1} - \sqrt{Z_2})}{C_d A_{orf} \sqrt{2g}}$$

DET B16		
Bottom Area	3853	ft ²
Top Area	7785	ft ²
Depth	3	ft
C _d	0.6	
Outlet Diameter	0.5	ft
Effective Area Needed	0.20	ft ²
Depth [feet]	Time required to drain step [sec]	Discharge Rate [cfs]
3.0	479.45	1.6
2.9	479.57	1.6
2.8	479.86	1.6
2.7	480.31	1.6
2.6	480.96	1.5
2.5	481.82	1.5
2.4	482.92	1.5
2.3	484.30	1.4
2.2	485.98	1.4
2.1	488.01	1.4
2.0	490.44	1.3
1.9	493.34	1.3
1.8	496.76	1.3
1.7	500.80	1.2
1.6	505.58	1.2
1.5	511.22	1.2
1.4	517.89	1.1
1.3	525.82	1.1
1.2	535.30	1.0
1.1	546.70	1.0
1.0	560.56	0.9
0.9	577.63	0.9
0.8	598.99	0.8
0.7	626.33	0.8
0.6	662.38	0.7
0.5	711.97	0.7
0.4	784.62	0.6
0.3	902.84	0.5
0.2	1140.29	0.4
0.1	1473.30	0.3
Total	17986	sec
	5	Hours
Max Discharge	1.6	cfs
Average Discharge	1.1	cfs

APPENDIX D

Hydraulic Calculations

HEC-RAS Output Files Existing & Proposed Conditions

FlowMaster Existing Wash Output Files

Sill Scour Calculations

Scour Calculations

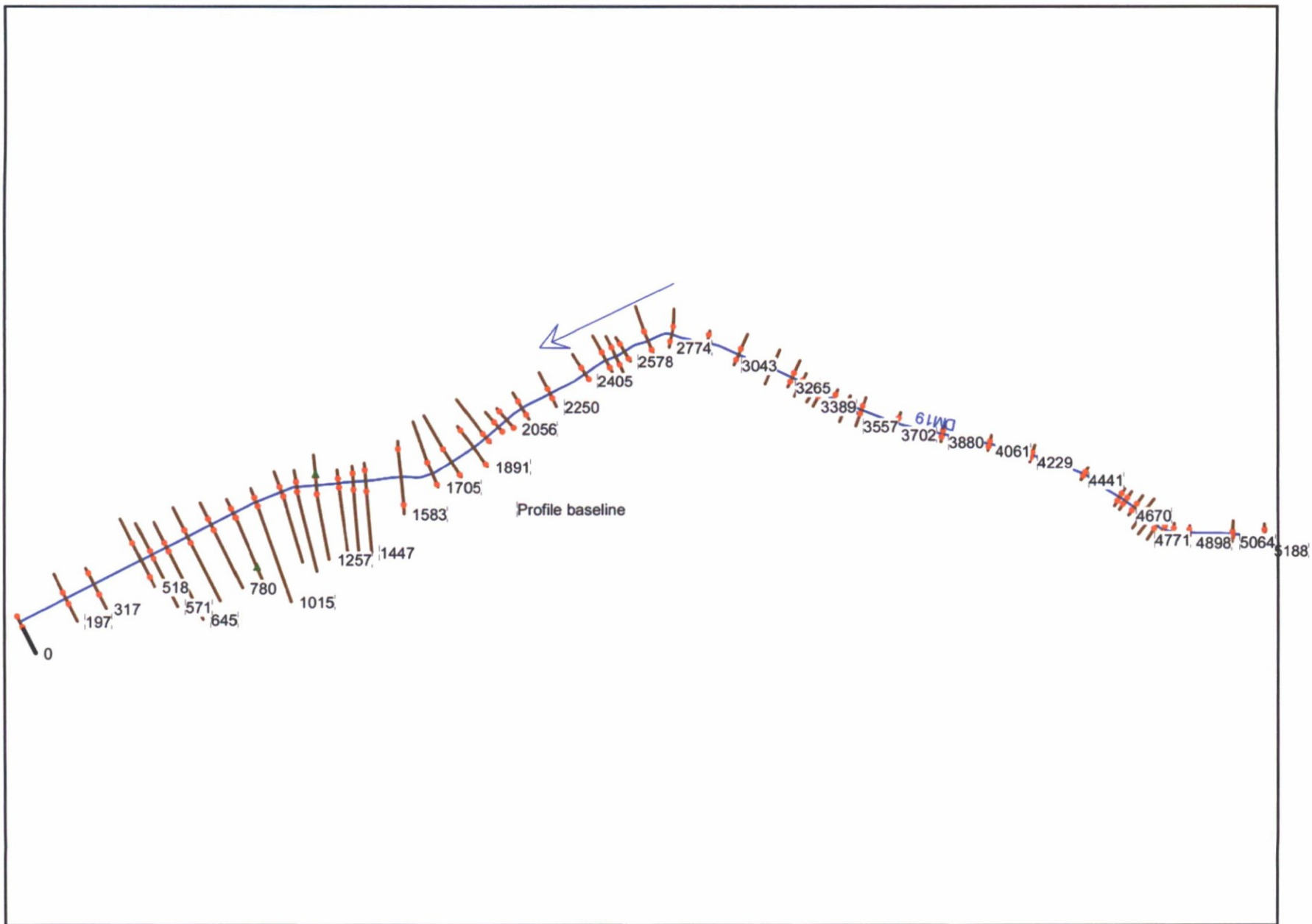
Erosion Hazard Setback Calculations

HEC-RAS Output Files Existing & Proposed Conditions

EXISTING

GALLOWAY WASH - SUBCRITICAL

SUBCRITICAL



SUBCRITICAL

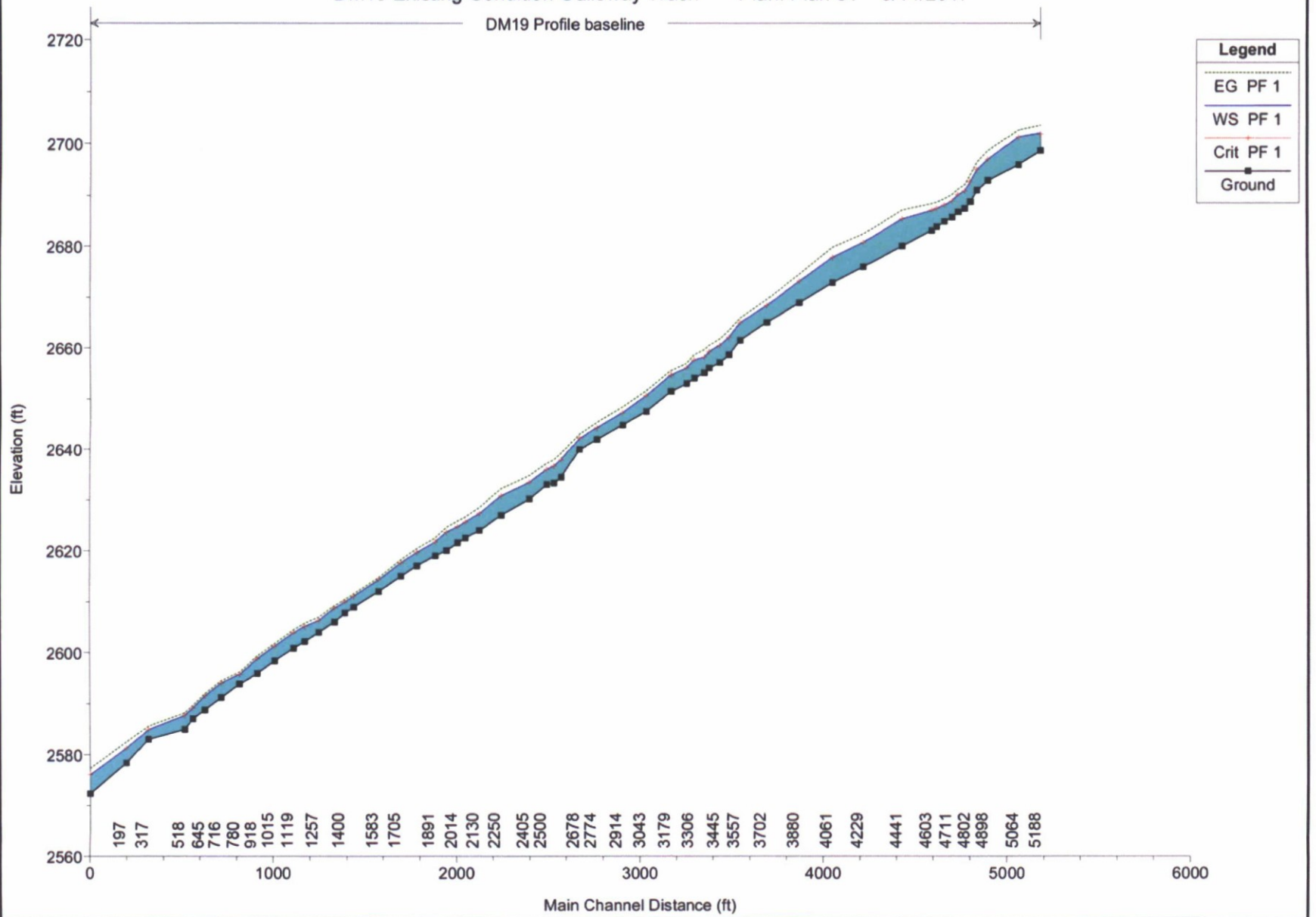
HEC-RAS Plan: Plan 01 River: DM10 Reach: Profile baseline Profile: PF 1

Reach	River Sta	Profile	Q Total (cfs)	Min Ch Elevation (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
Profile baseline	5188	PF 1	1248.00	2698.65	2702.02	2701.85	2703.53	0.006272	10.47	153.48	69.08	1.02
Profile baseline	5084	PF 1	1248.00	2695.95	2701.26	2701.26	2702.60	0.005803	11.06	207.94	76.77	0.88
Profile baseline	4898	PF 1	1248.00	2692.89	2696.99	2696.99	2699.68	0.008258	11.34	153.72	53.29	1.00
Profile baseline	4838	PF 1	1248.00	2690.99	2694.97	2694.97	2698.43	0.008030	10.68	163.58	58.26	0.97
Profile baseline	4602	PF 1	1248.00	2688.75	2692.60	2692.60	2693.94	0.007587	10.30	174.83	65.88	0.94
Profile baseline	4771	PF 1	1248.00	2687.45	2690.87	2690.87	2692.11	0.008121	9.69	177.94	80.08	0.85
Profile baseline	4745	PF 1	1248.00	2688.78	2690.12	2690.12	2691.25	0.007757	9.58	195.65	89.40	0.94
Profile baseline	4711	PF 1	1248.00	2685.74	2688.85	2688.85	2690.15	0.009118	9.77	185.50	72.90	1.00
Profile baseline	4670	PF 1	1248.00	2684.85	2688.05	2688.05	2689.33	0.008922	10.03	173.60	73.32	1.00
Profile baseline	4628	PF 1	1248.00	2683.86	2687.38	2687.38	2688.63	0.007720	9.95	184.10	79.03	0.94
Profile baseline	4603	PF 1	1248.00	2683.09	2687.03	2687.03	2688.39	0.007324	9.86	168.01	70.55	0.92
Profile baseline	4441	PF 1	1248.00	2680.00	2685.33	2685.33	2687.09	0.006485	12.00	166.14	52.44	0.82
Profile baseline	4229	PF 1	1248.00	2675.99	2680.89	2680.89	2682.35	0.008721	11.27	160.69	54.68	0.92
Profile baseline	4081	PF 1	1248.00	2672.84	2677.79	2677.79	2679.77	0.008947	11.80	136.78	42.68	0.94
Profile baseline	3880	PF 1	1248.00	2668.84	2673.07	2673.07	2674.50	0.008653	10.42	172.44	65.67	0.80
Profile baseline	3702	PF 1	1248.00	2665.00	2668.29	2668.29	2669.48	0.008362	9.34	173.68	78.42	0.86
Profile baseline	3557	PF 1	1248.00	2661.48	2664.83	2664.83	2665.79	0.007280	9.13	223.60	114.81	0.80
Profile baseline	3497	PF 1	1248.00	2658.58	2662.06	2662.06	2663.38	0.009093	10.68	169.75	65.37	1.02
Profile baseline	3445	PF 1	1248.00	2657.08	2660.45	2660.45	2661.69	0.008380	9.88	160.37	60.76	0.97
Profile baseline	3389	PF 1	1248.00	2655.93	2659.20	2659.20	2660.44	0.007965	9.71	161.31	64.84	0.95
Profile baseline	3362	PF 1	1248.00	2654.96	2658.09	2658.09	2659.59	0.011352	11.14	174.42	80.88	1.12
Profile baseline	3306	PF 1	1248.00	2653.93	2657.58	2657.58	2658.58	0.010565	11.95	226.10	99.29	1.11
Profile baseline	3265	PF 1	1248.00	2652.96	2655.88	2655.88	2656.83	0.007859	8.92	220.18	113.81	0.91
Profile baseline	3179	PF 1	1248.00	2651.37	2654.58	2654.58	2655.41	0.008938	9.76	245.09	141.48	0.89
Profile baseline	3043	PF 1	1248.00	2647.43	2650.51	2650.51	2651.48	0.007188	8.45	255.70	118.75	0.88
Profile baseline	2914	PF 1	1248.00	2644.79	2647.17	2647.17	2648.28	0.010003	8.50	153.72	73.02	1.00
Profile baseline	2774	PF 1	1245.00	2641.90	2644.24	2644.24	2645.26	0.009974	8.52	176.03	94.63	1.00
Profile baseline	2678	PF 1	1245.00	2639.82	2642.10	2642.10	2642.94	0.009100	7.54	187.97	154.00	0.94
Profile baseline	2578	PF 1	1245.00	2634.45	2637.88	2637.88	2639.08	0.010139	8.88	140.55	56.27	1.01
Profile baseline	2540	PF 1	1245.00	2633.32	2636.66	2636.66	2637.88	0.010989	8.81	141.37	59.37	1.01
Profile baseline	2500	PF 1	1245.00	2633.00	2635.99	2635.99	2637.14	0.010264	8.57	145.22	64.21	1.01
Profile baseline	2405	PF 1	1245.00	2630.14	2633.43	2633.43	2634.72	0.009701	9.14	138.97	56.89	1.00
Profile baseline	2250	PF 1	1245.00	2626.98	2630.74	2630.74	2632.20	0.008415	9.71	134.91	60.73	0.95
Profile baseline	2130	PF 1	1245.00	2624.00	2627.32	2627.32	2628.48	0.009814	8.63	146.10	73.25	0.98
Profile baseline	2056	PF 1	1245.00	2622.50	2625.68	2625.68	2626.64	0.011051	7.95	168.57	81.23	1.01
Profile baseline	2014	PF 1	1245.00	2621.50	2624.78	2624.78	2625.63	0.009298	8.72	154.27	71.67	0.97
Profile baseline	1952	PF 1	1245.00	2620.00	2623.67	2623.67	2624.58	0.007287	8.51	175.73	114.68	0.88
Profile baseline	1891	PF 1	1245.00	2619.00	2621.65	2621.65	2622.44	0.011344	7.17	173.72	110.63	1.01
Profile baseline	1791	PF 1	1245.00	2617.00	2619.61	2619.61	2620.39	0.010833	7.14	180.89	124.45	0.98
Profile baseline	1708	PF 1	1245.00	2615.00	2617.57	2617.57	2618.22	0.008146	6.72	240.74	231.93	0.87
Profile baseline	1583	PF 1	1245.00	2612.00	2614.20	2614.20	2614.70	0.013047	5.68	218.88	226.80	1.00
Profile baseline	1447	PF 1	1245.00	2608.94	2611.02	2611.02	2611.51	0.007694	6.35	294.03	288.82	0.84
Profile baseline	1400	PF 1	1245.00	2607.81	2609.97	2609.97	2610.48	0.007655	6.80	302.42	280.94	0.85
Profile baseline	1342	PF 1	1245.00	2606.00	2608.70	2608.70	2609.19	0.006789	7.44	332.45	291.00	0.83
Profile baseline	1257	PF 1	1245.00	2603.99	2608.31	2608.31	2608.98	0.007281	7.09	242.59	260.07	0.85
Profile baseline	1180	PF 1	1245.00	2602.23	2605.17	2605.17	2605.79	0.008635	7.71	288.80	257.31	0.84
Profile baseline	1119	PF 1	1245.00	2600.92	2603.94	2603.94	2604.49	0.004950	7.12	326.25	272.65	0.73
Profile baseline	1015	PF 1	1245.00	2598.45	2601.28	2601.28	2601.60	0.005760	7.94	333.23	304.48	0.78
Profile baseline	918	PF 1	1245.00	2595.82	2598.77	2598.77	2599.32	0.005941	7.39	316.40	316.39	0.79
Profile baseline	780	PF 1	1245.00	2593.83	2595.80	2595.80	2596.28	0.010461	7.32	300.17	279.21	0.88
Profile baseline	718	PF 1	1260.00	2591.19	2594.02	2594.02	2594.52	0.006443	6.85	323.20	293.06	0.80
Profile baseline	645	PF 1	1260.00	2588.78	2591.47	2591.47	2591.92	0.006491	7.18	356.28	373.02	0.81
Profile baseline	571	PF 1	1260.00	2587.04	2589.17	2589.17	2589.63	0.011204	7.97	297.08	258.49	1.02
Profile baseline	518	PF 1	1260.00	2585.00	2587.68	2587.68	2588.20	0.018031	5.97	242.81	228.87	0.91
Profile baseline	317	PF 1	1061.00	2563.05	2564.68	2564.68	2565.60	0.017734	6.91	183.53	123.13	0.85
Profile baseline	187	PF 1	1061.00	2578.39	2581.25	2581.25	2582.48	0.017382	6.89	120.41	51.91	1.00
Profile baseline	0	PF 1	1061.00	2572.39	2576.05	2576.05	2577.33	0.017735	9.09	116.88	47.71	1.01

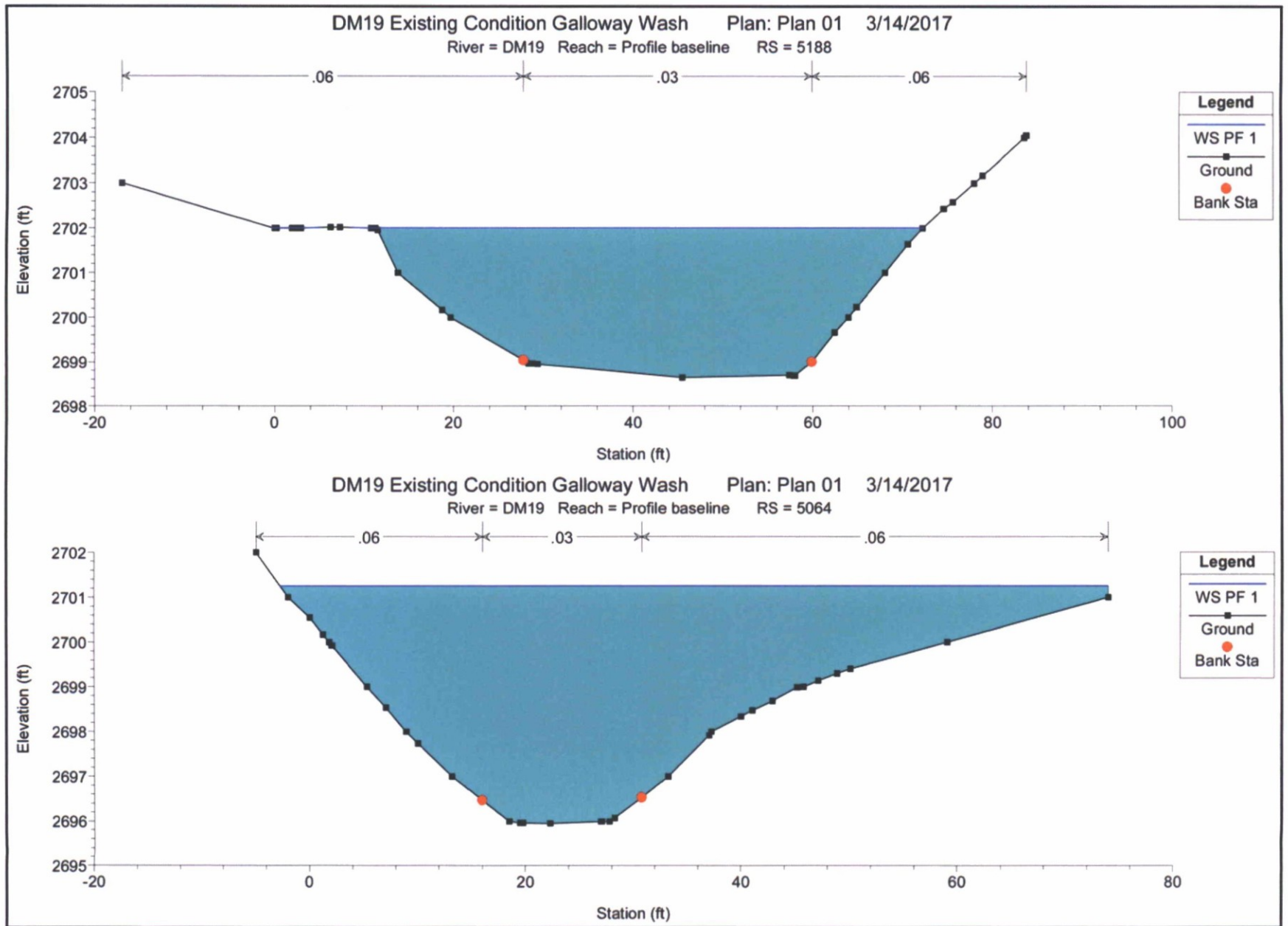
SUBCRITICAL

DM19 Existing Condition Galloway Wash Plan: Plan 01 3/14/2017

DM19 Profile baseline

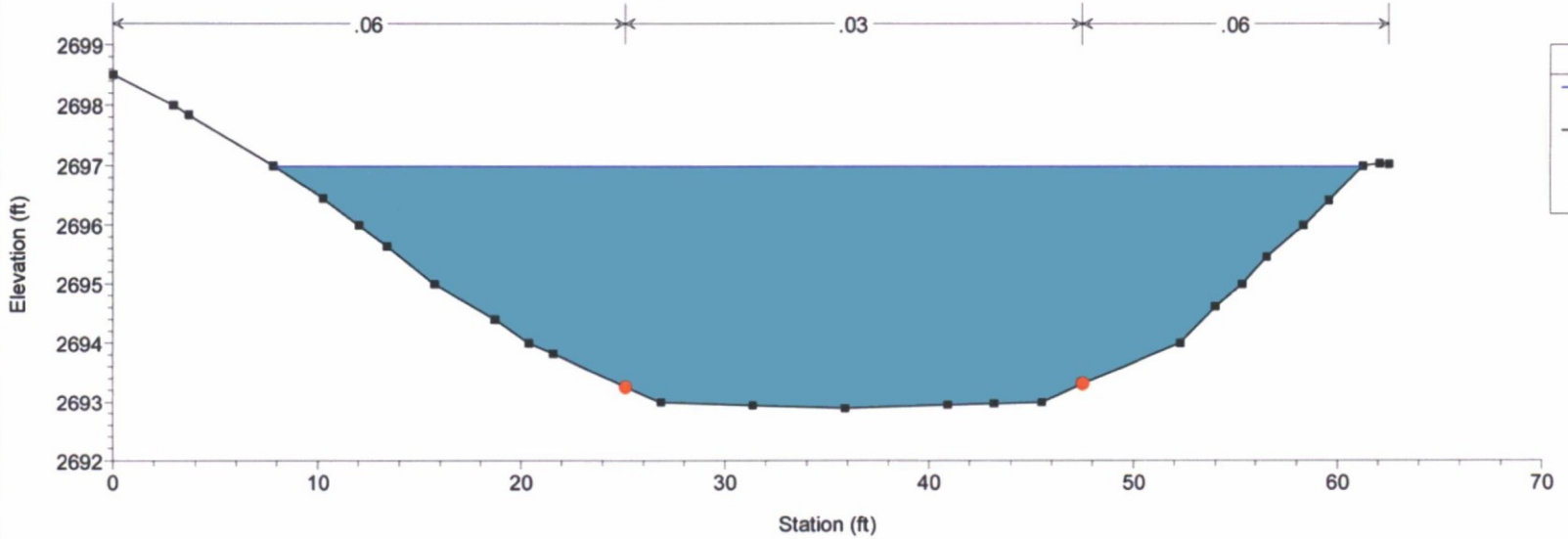


SUBCRITICAL



DM19 Existing Condition Galloway Wash Plan: Plan 01 3/14/2017

River = DM19 Reach = Profile baseline RS = 4898



Legend

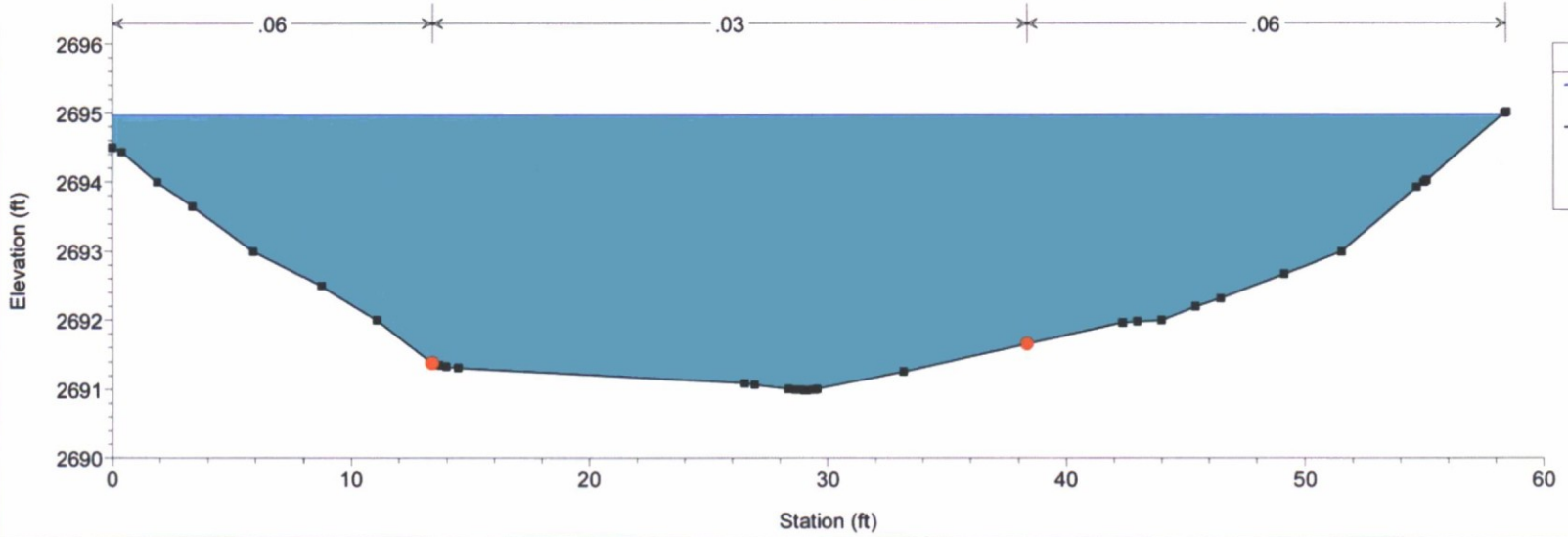
WS PF 1

Ground

Bank Sta

DM19 Existing Condition Galloway Wash Plan: Plan 01 3/14/2017

River = DM19 Reach = Profile baseline RS = 4839



Legend

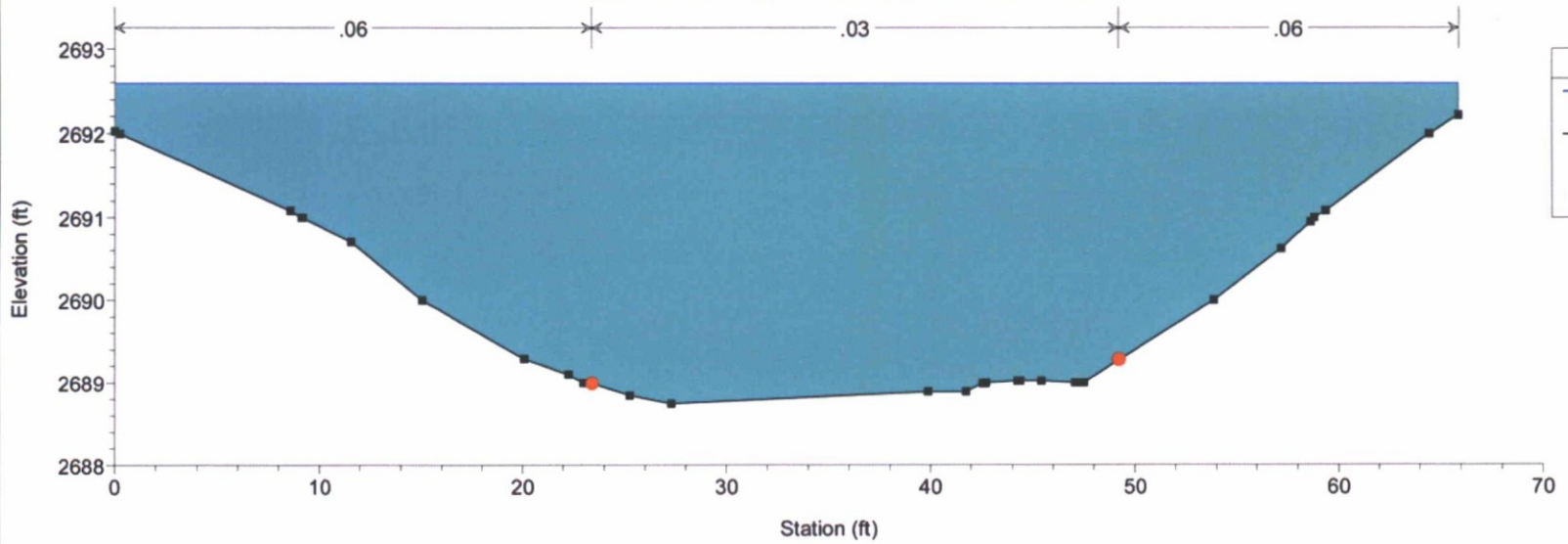
WS PF 1

Ground

Bank Sta

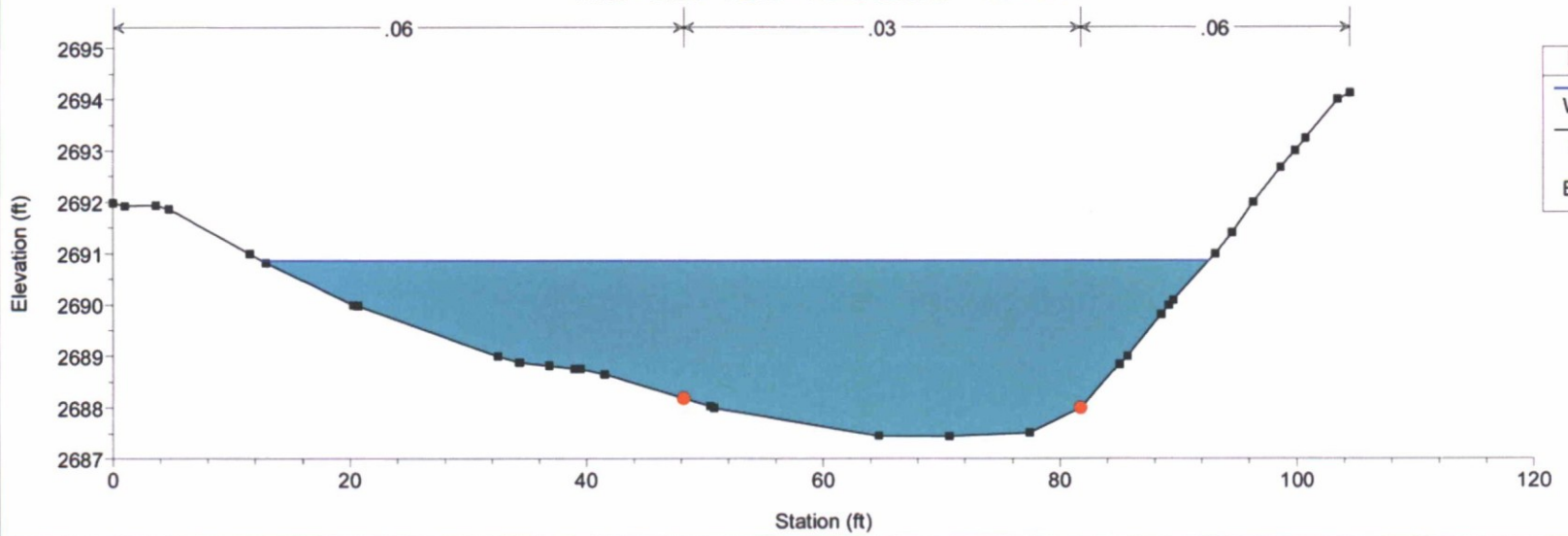
DM19 Existing Condition Galloway Wash Plan: Plan 01 3/14/2017

River = DM19 Reach = Profile baseline RS = 4802



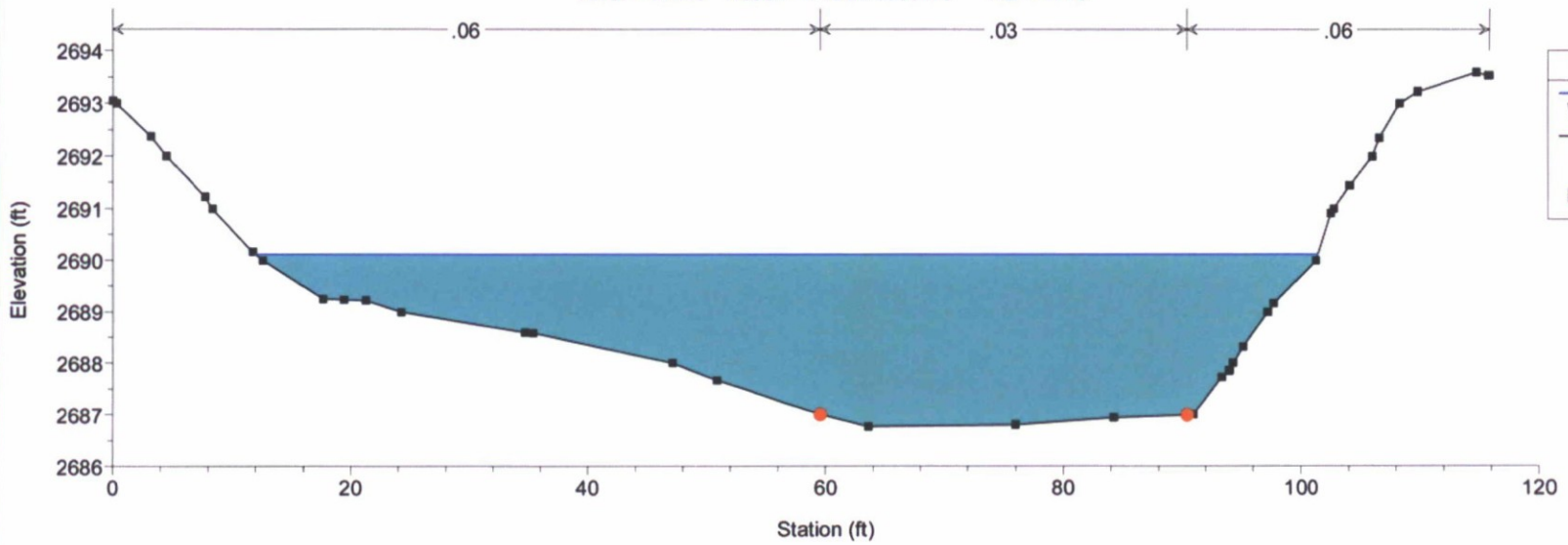
DM19 Existing Condition Galloway Wash Plan: Plan 01 3/14/2017

River = DM19 Reach = Profile baseline RS = 4771



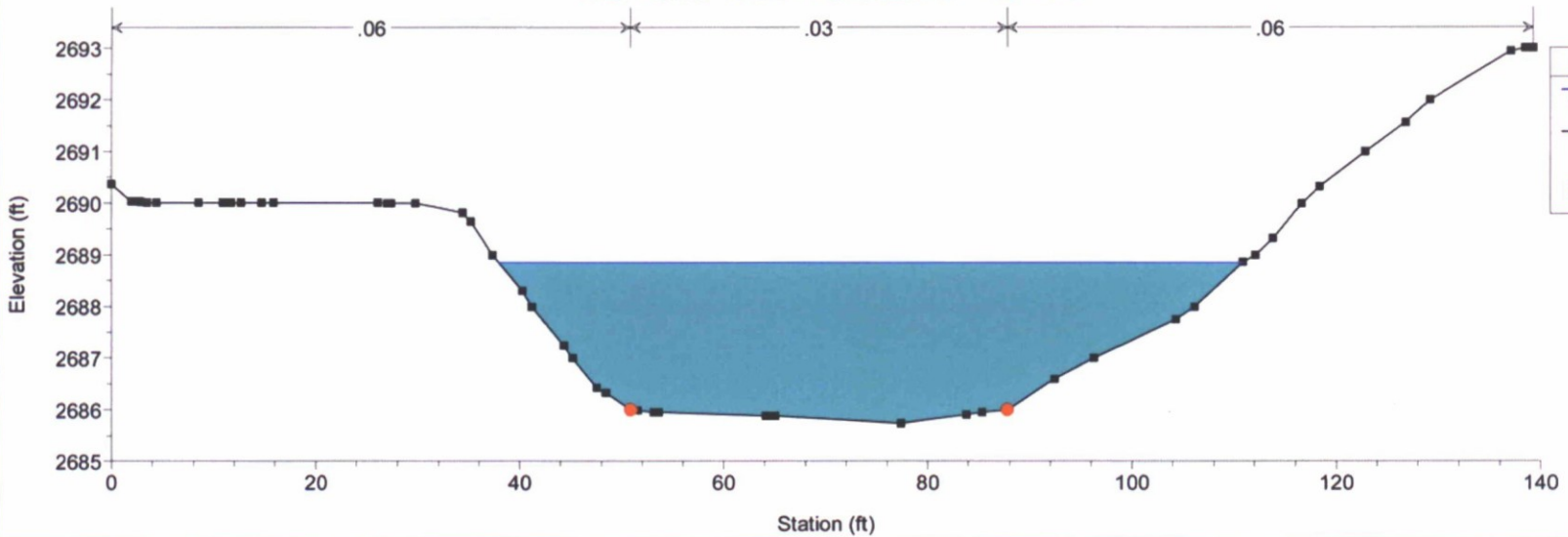
DM19 Existing Condition Galloway Wash Plan: Plan 01 3/14/2017

River = DM19 Reach = Profile baseline RS = 4745



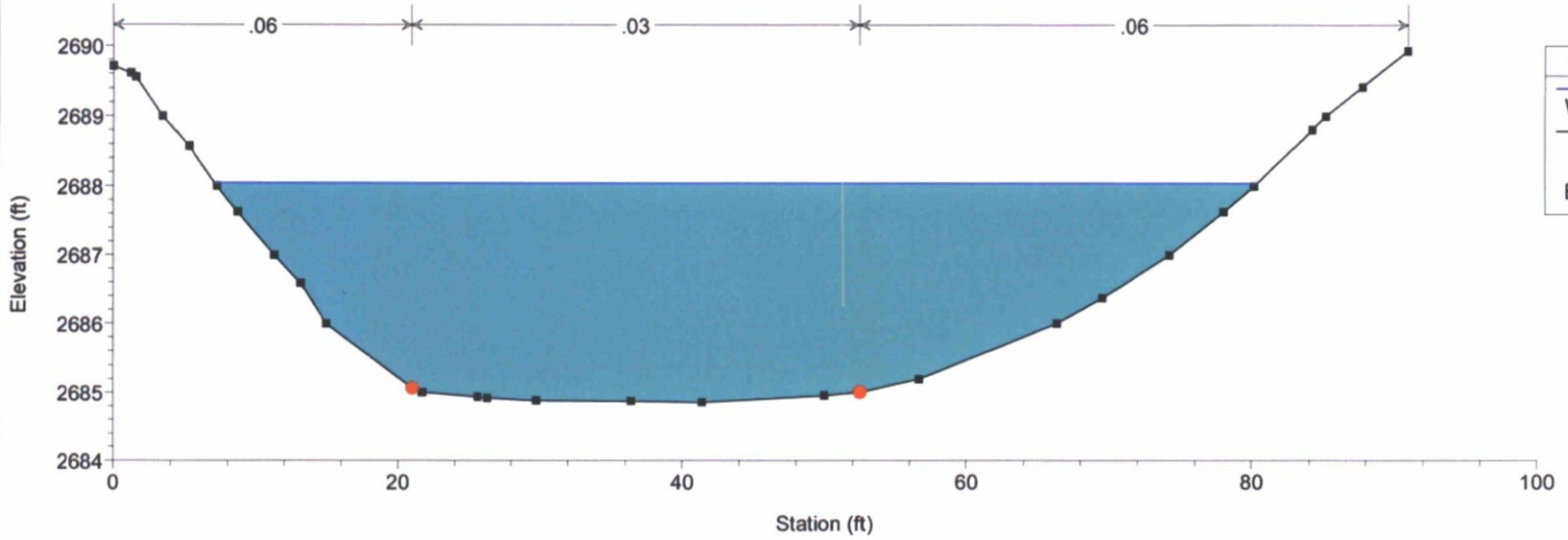
DM19 Existing Condition Galloway Wash Plan: Plan 01 3/14/2017

River = DM19 Reach = Profile baseline RS = 4711



DM19 Existing Condition Galloway Wash Plan: Plan 01 3/14/2017

River = DM19 Reach = Profile baseline RS = 4670

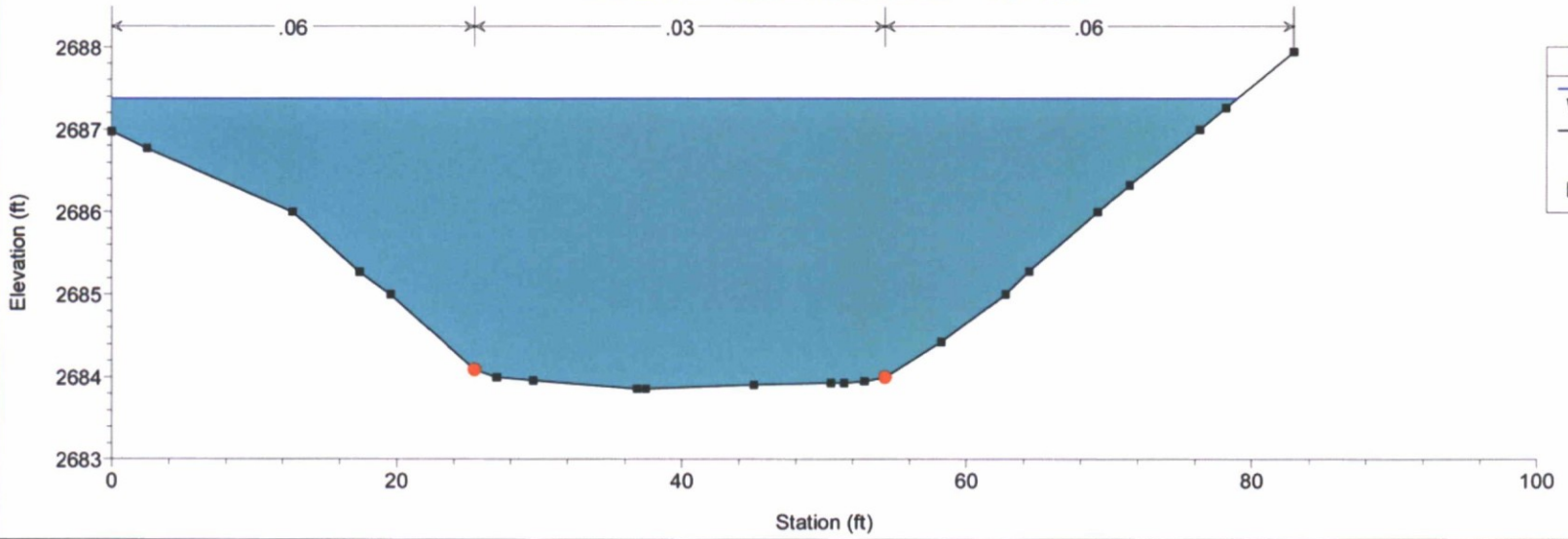


Legend

- WS PF 1
- Ground
- Bank Sta

DM19 Existing Condition Galloway Wash Plan: Plan 01 3/14/2017

River = DM19 Reach = Profile baseline RS = 4628

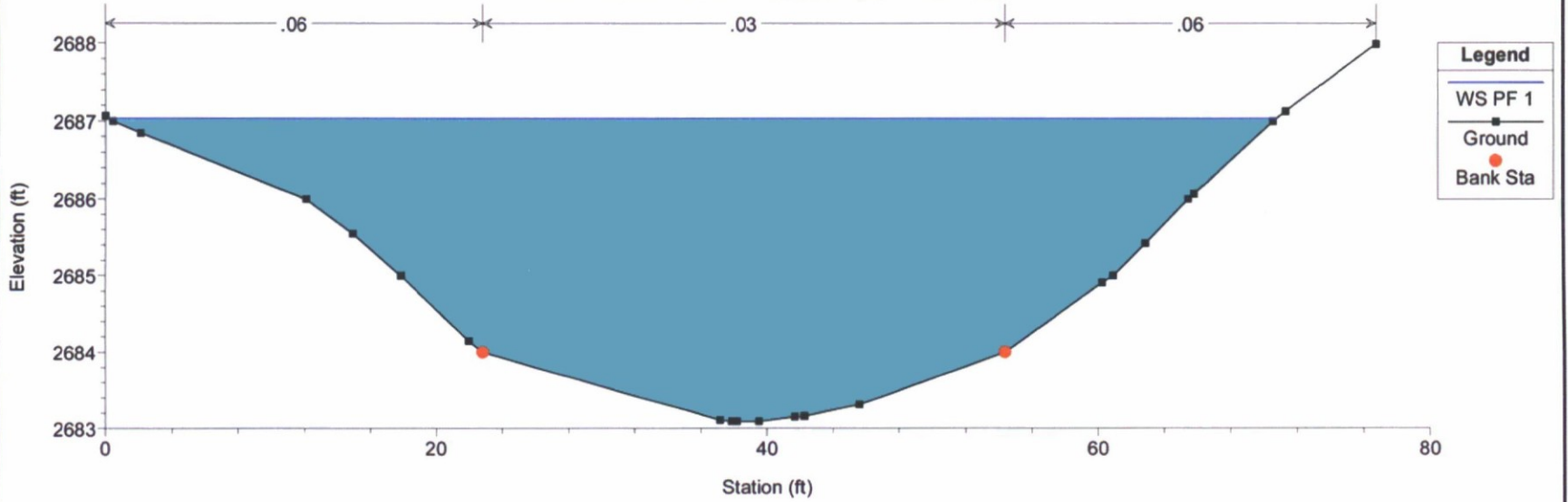


Legend

- WS PF 1
- Ground
- Bank Sta

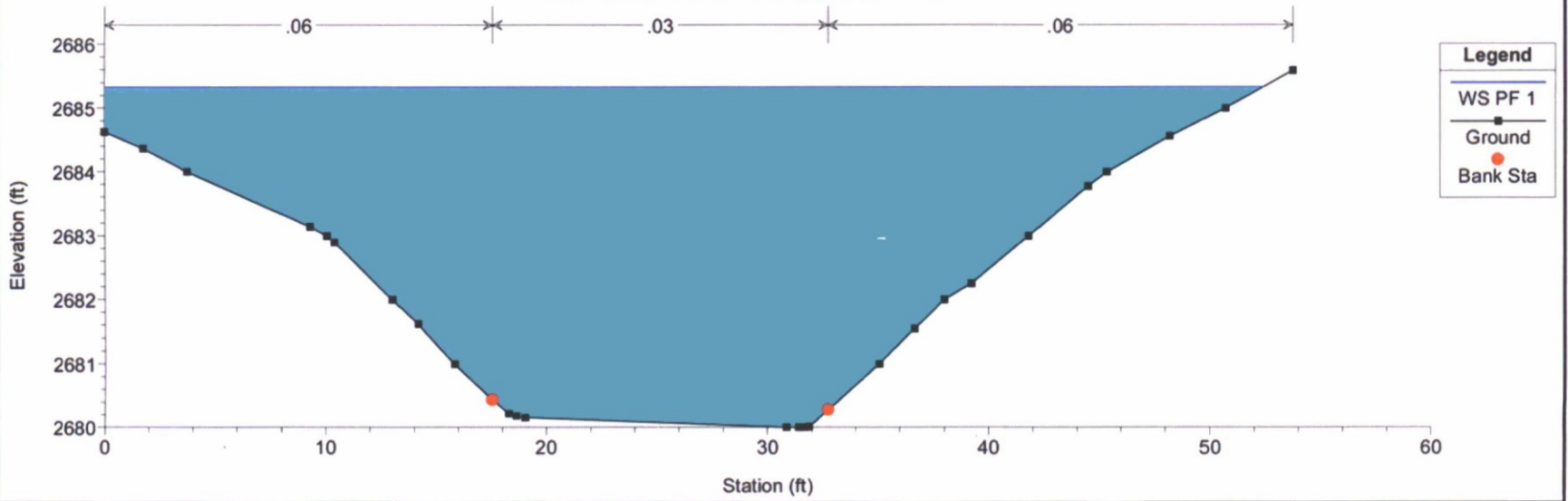
DM19 Existing Condition Galloway Wash Plan: Plan 01 3/14/2017

River = DM19 Reach = Profile baseline RS = 4603



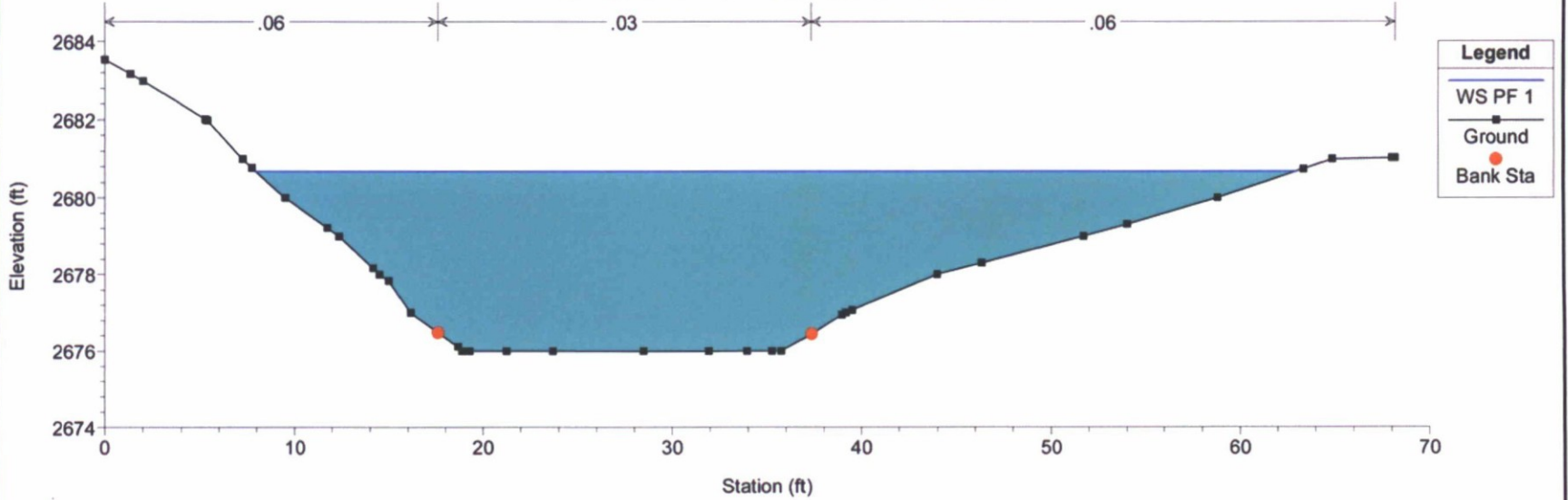
DM19 Existing Condition Galloway Wash Plan: Plan 01 3/14/2017

River = DM19 Reach = Profile baseline RS = 4441



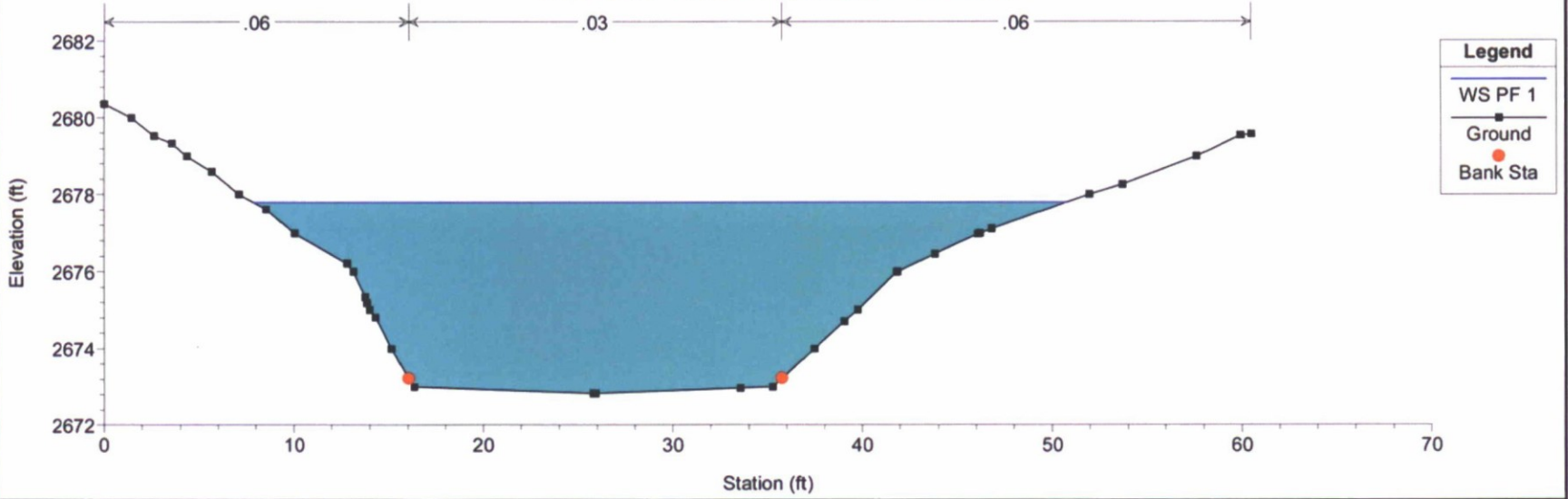
DM19 Existing Condition Galloway Wash Plan: Plan 01 3/14/2017

River = DM19 Reach = Profile baseline RS = 4229



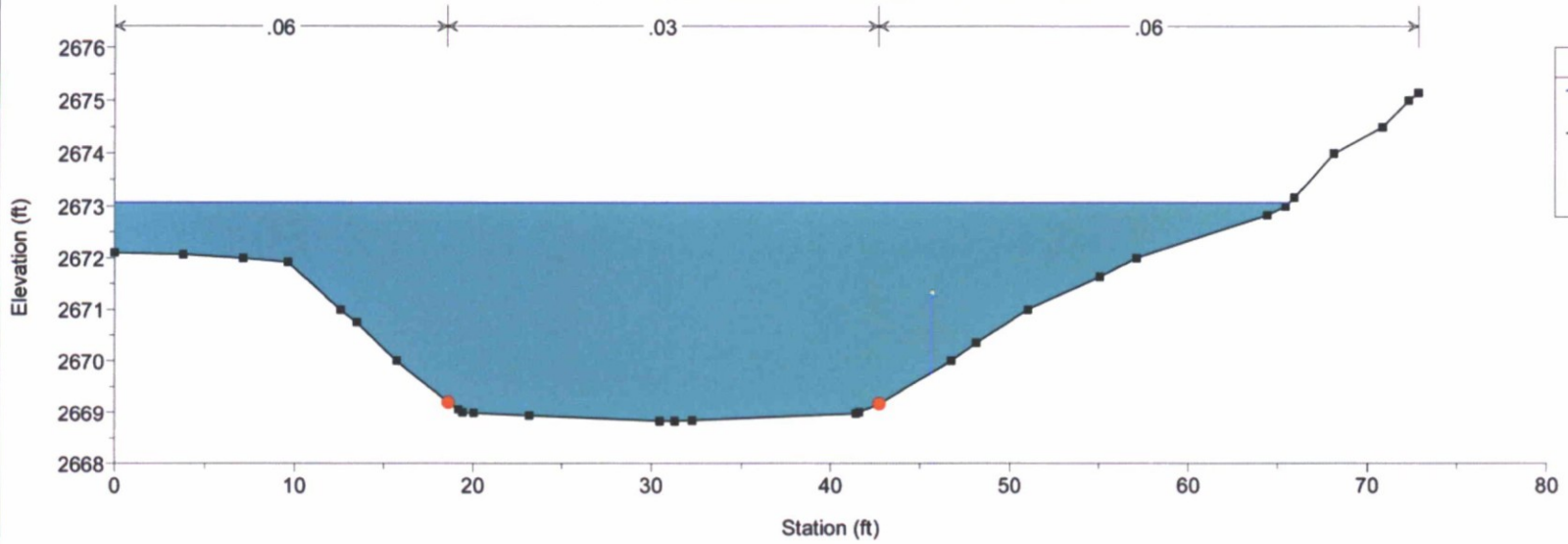
DM19 Existing Condition Galloway Wash Plan: Plan 01 3/14/2017

River = DM19 Reach = Profile baseline RS = 4061



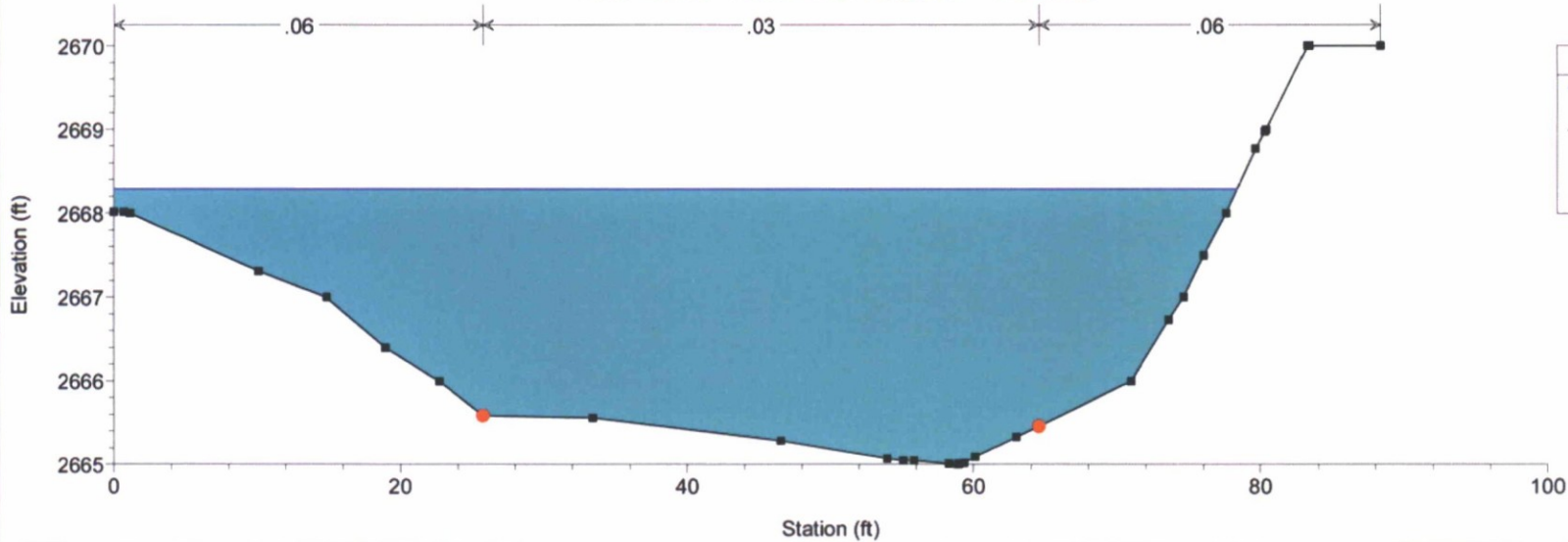
DM19 Existing Condition Galloway Wash Plan: Plan 01 3/14/2017

River = DM19 Reach = Profile baseline RS = 3880



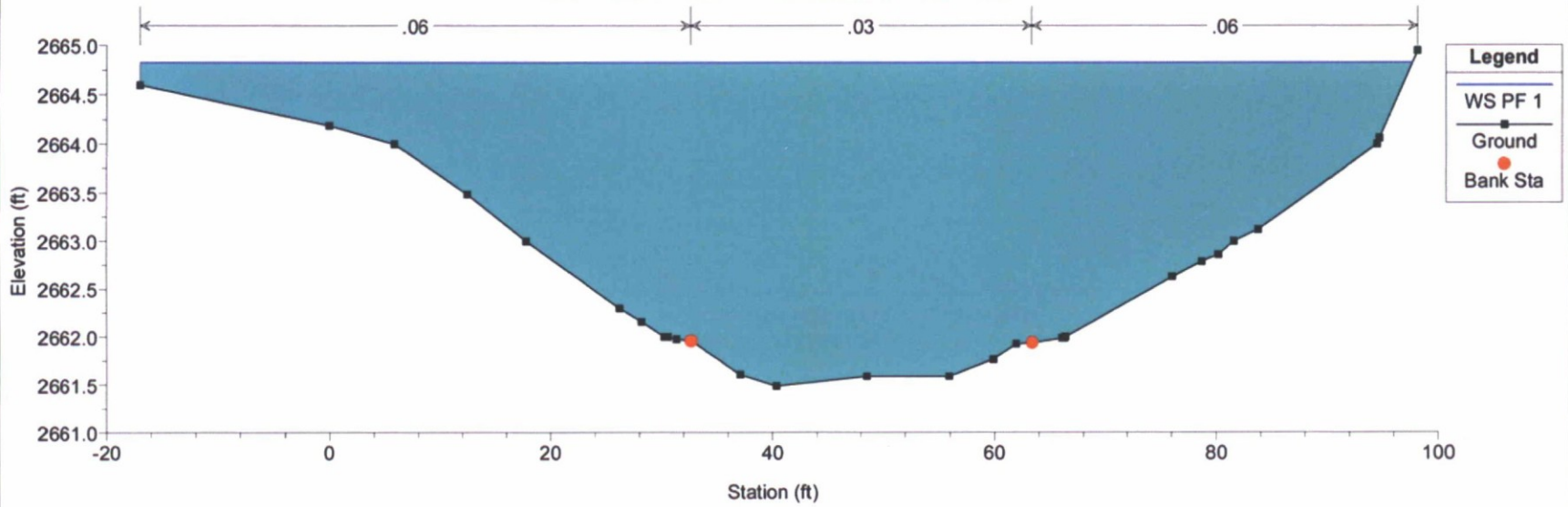
DM19 Existing Condition Galloway Wash Plan: Plan 01 3/14/2017

River = DM19 Reach = Profile baseline RS = 3702



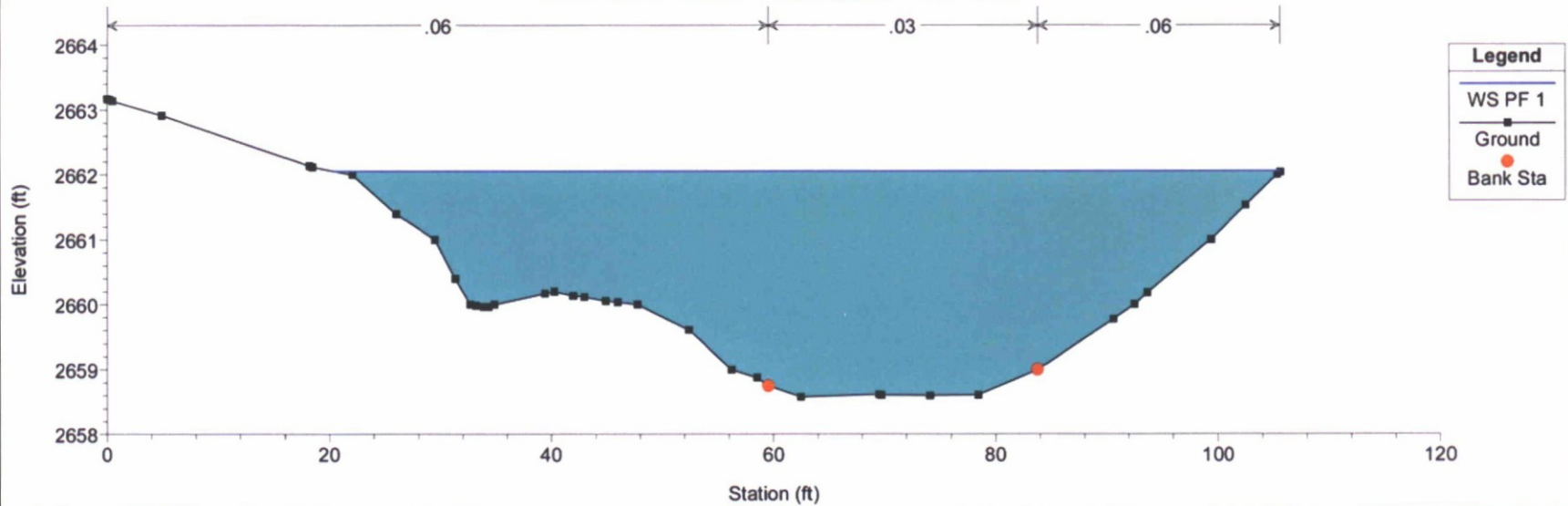
DM19 Existing Condition Galloway Wash Plan: Plan 01 3/14/2017

River = DM19 Reach = Profile baseline RS = 3557



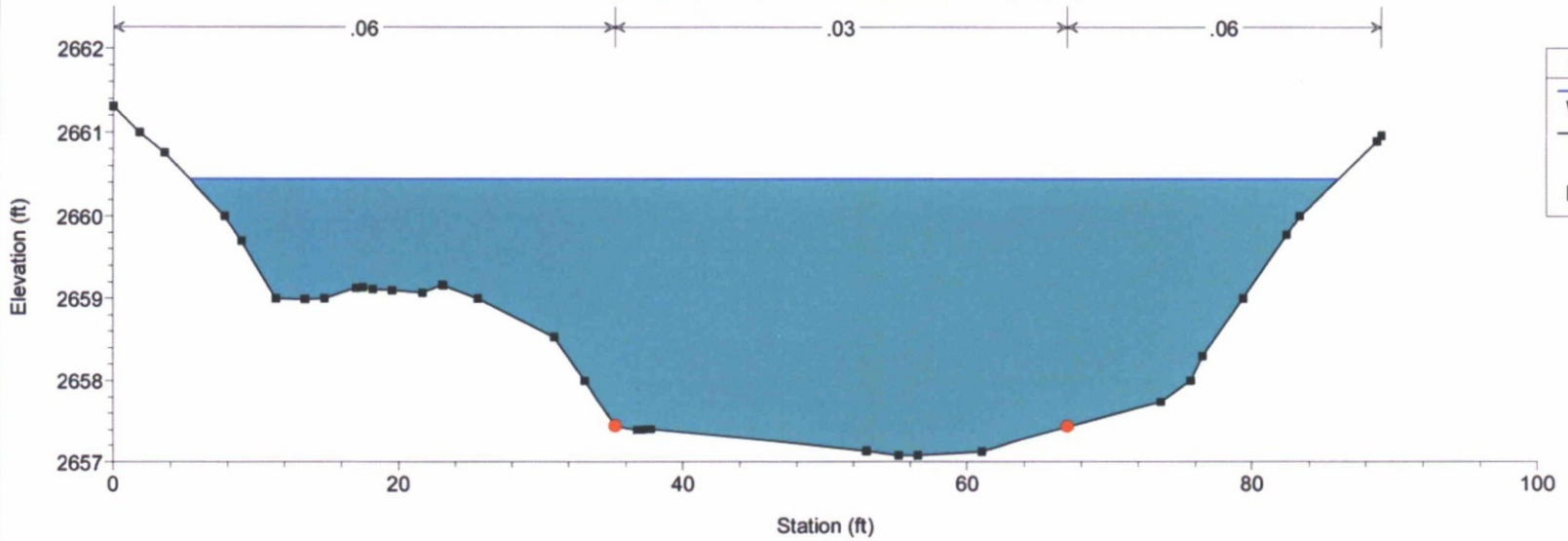
DM19 Existing Condition Galloway Wash Plan: Plan 01 3/14/2017

River = DM19 Reach = Profile baseline RS = 3497



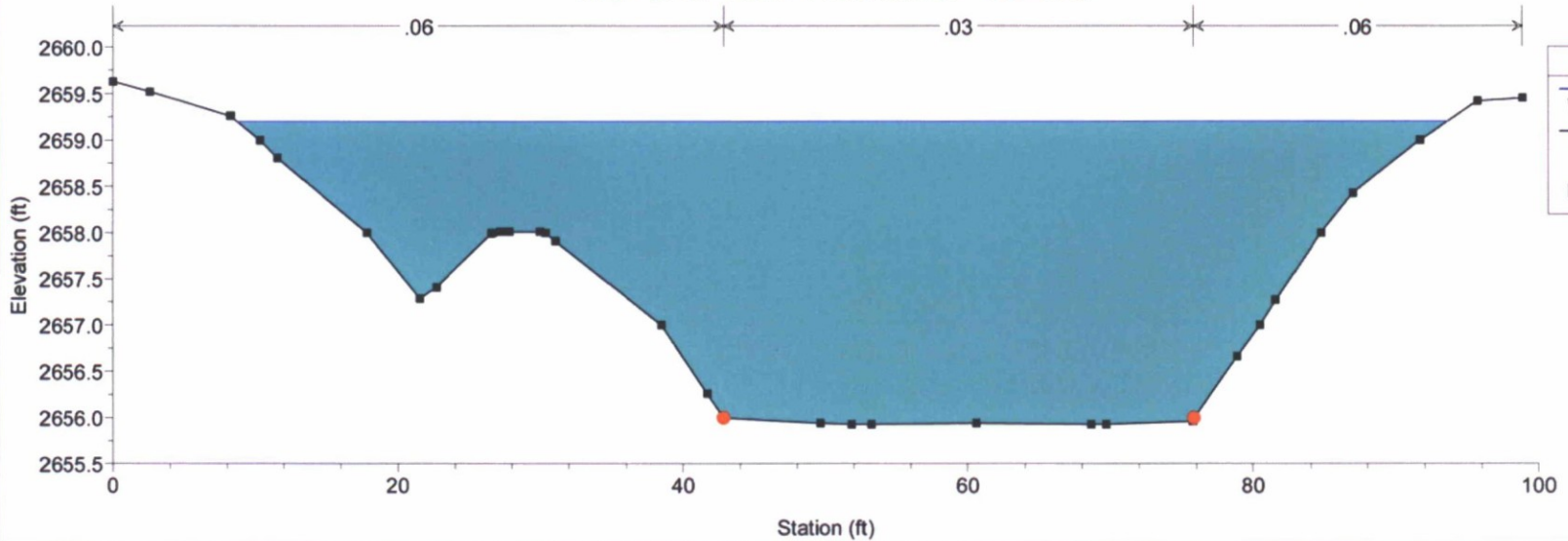
DM19 Existing Condition Galloway Wash Plan: Plan 01 3/14/2017

River = DM19 Reach = Profile baseline RS = 3445



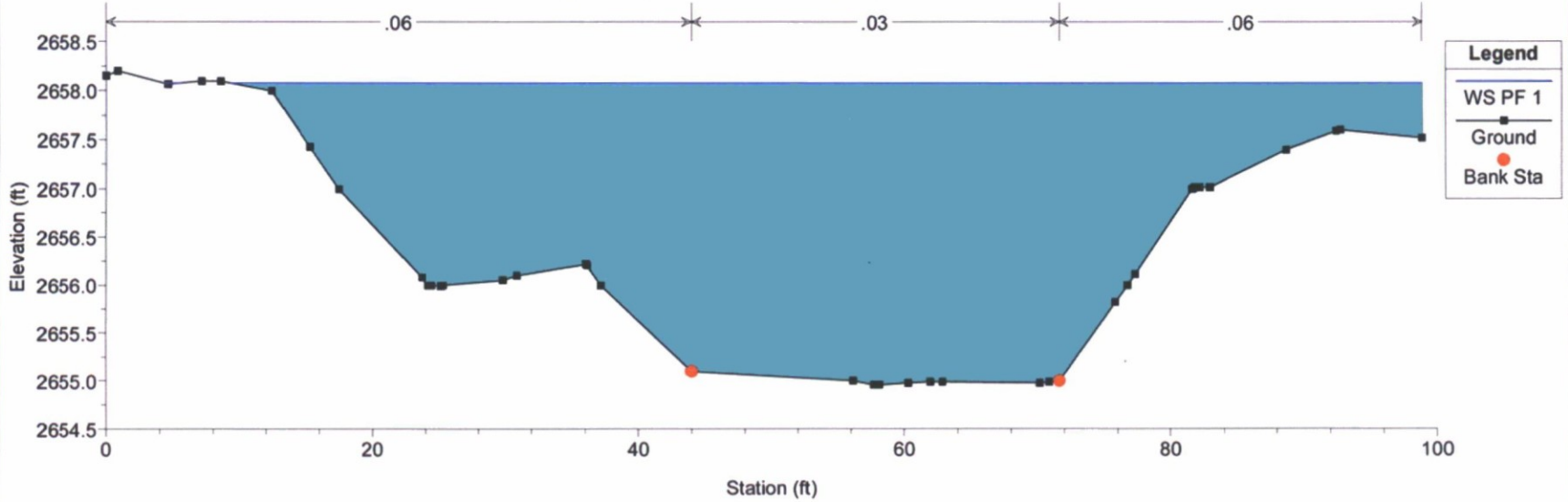
DM19 Existing Condition Galloway Wash Plan: Plan 01 3/14/2017

River = DM19 Reach = Profile baseline RS = 3389



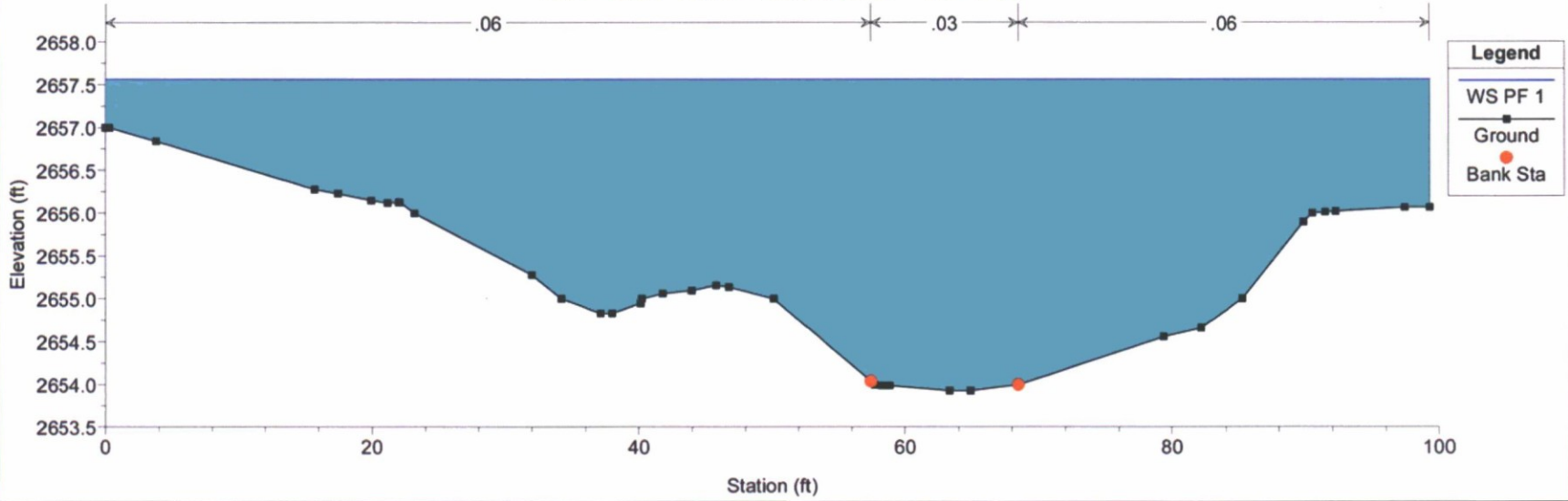
DM19 Existing Condition Galloway Wash Plan: Plan 01 3/14/2017

River = DM19 Reach = Profile baseline RS = 3362



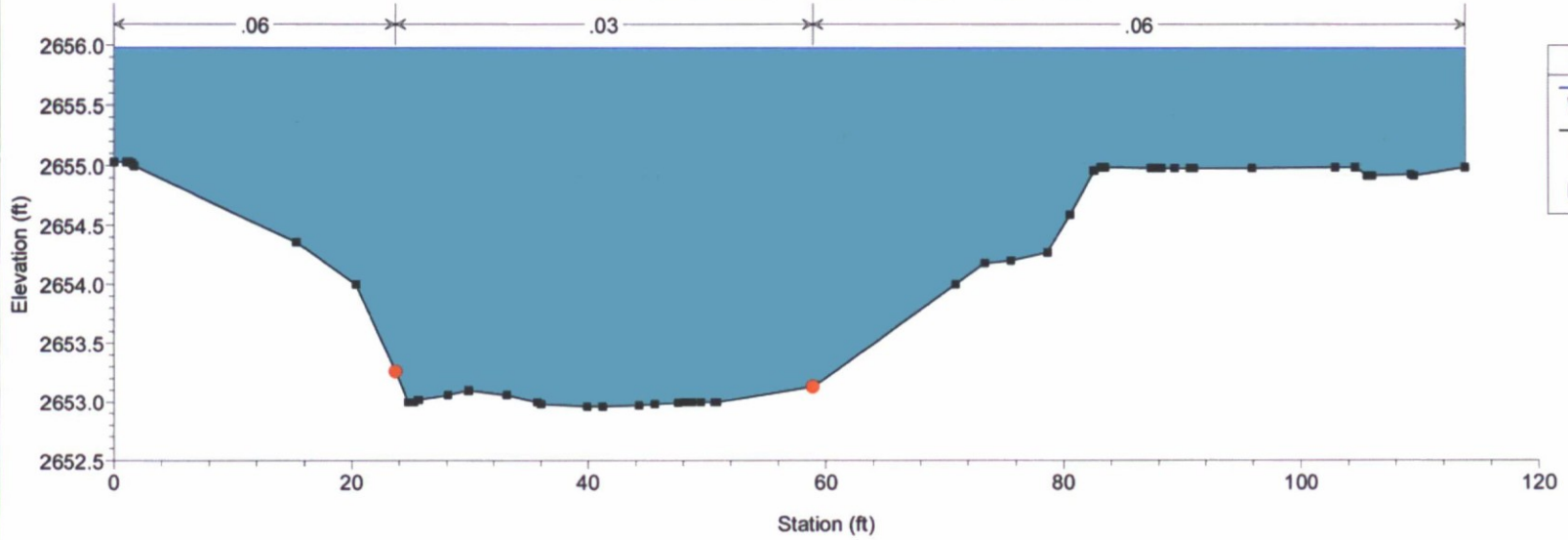
DM19 Existing Condition Galloway Wash Plan: Plan 01 3/14/2017

River = DM19 Reach = Profile baseline RS = 3306



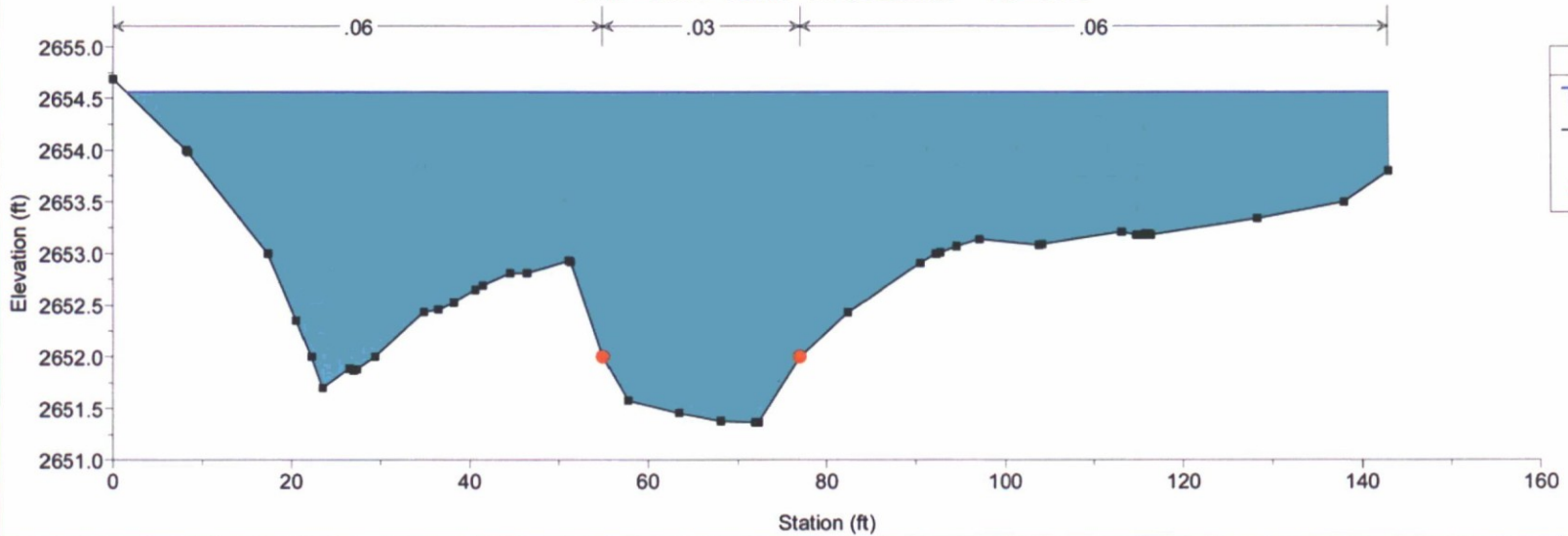
DM19 Existing Condition Galloway Wash Plan: Plan 01 3/14/2017

River = DM19 Reach = Profile baseline RS = 3265



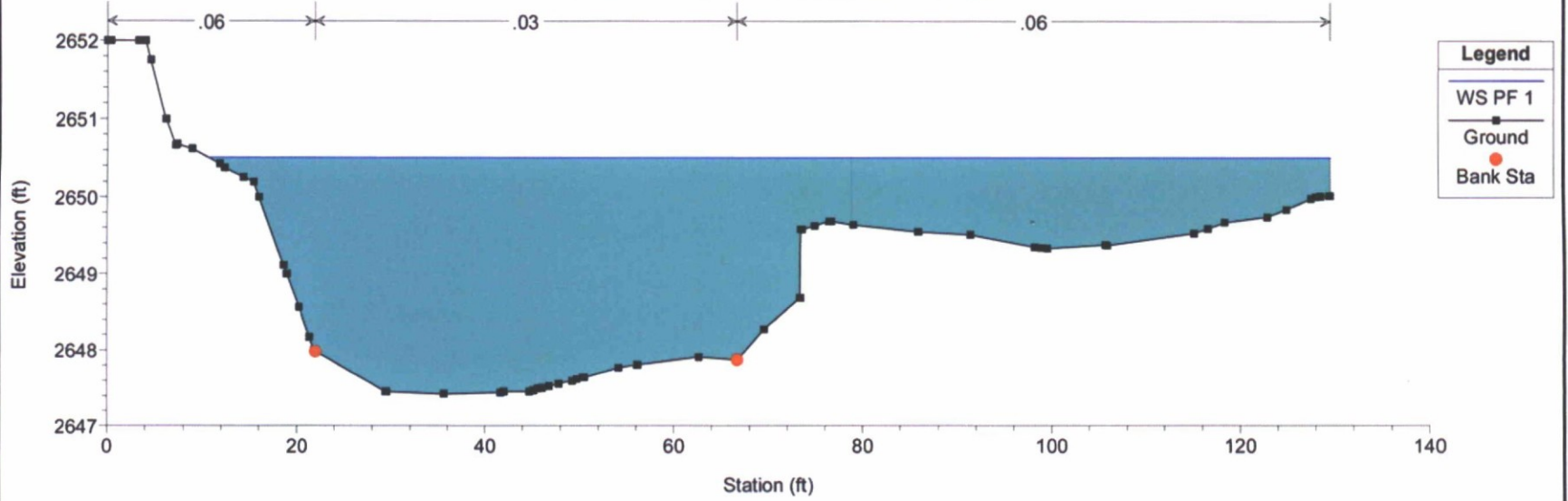
DM19 Existing Condition Galloway Wash Plan: Plan 01 3/14/2017

River = DM19 Reach = Profile baseline RS = 3179



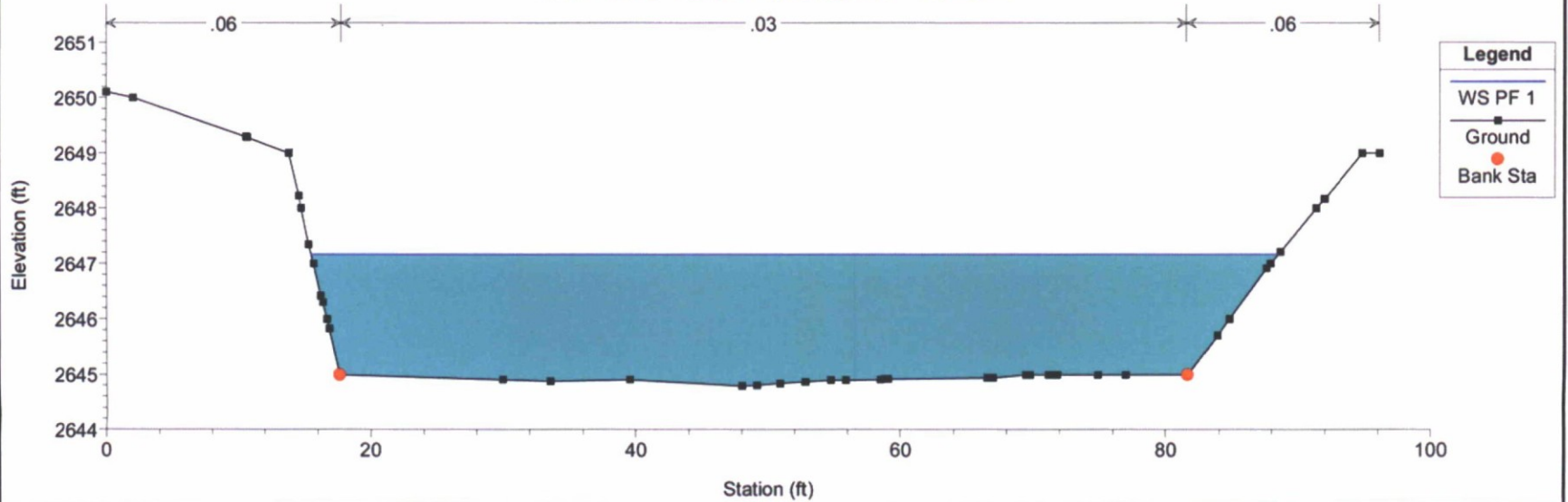
DM19 Existing Condition Galloway Wash Plan: Plan 01 3/14/2017

River = DM19 Reach = Profile baseline RS = 3043



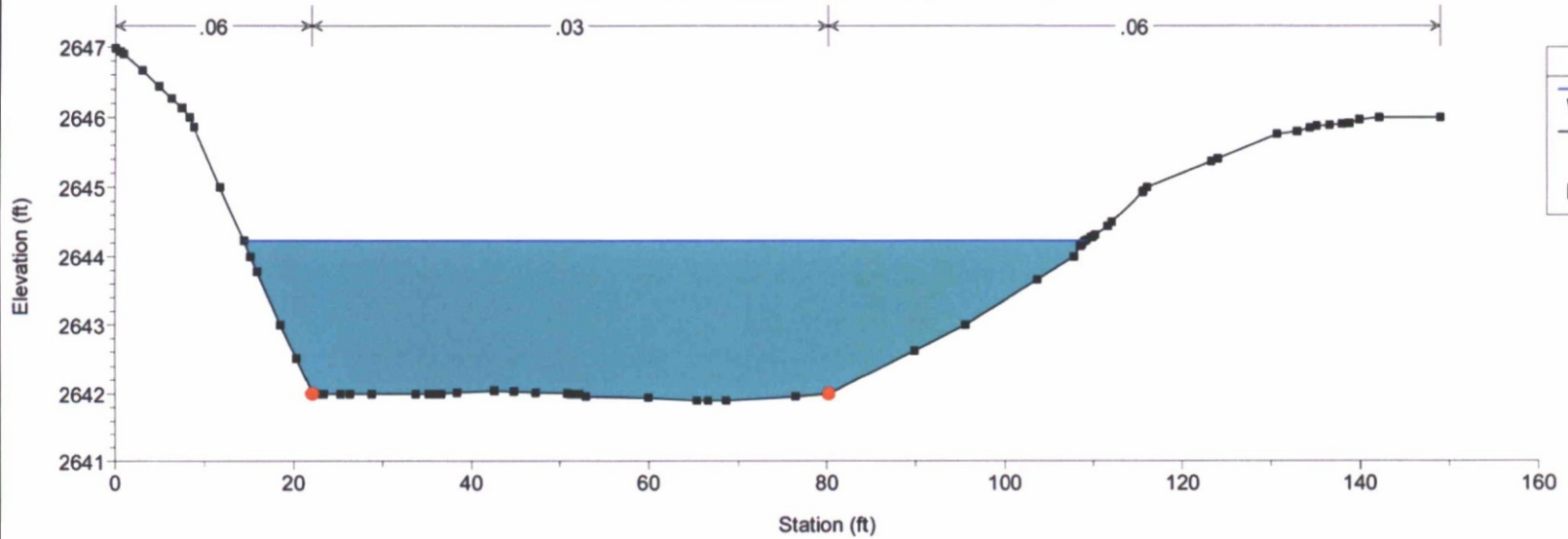
DM19 Existing Condition Galloway Wash Plan: Plan 01 3/14/2017

River = DM19 Reach = Profile baseline RS = 2914



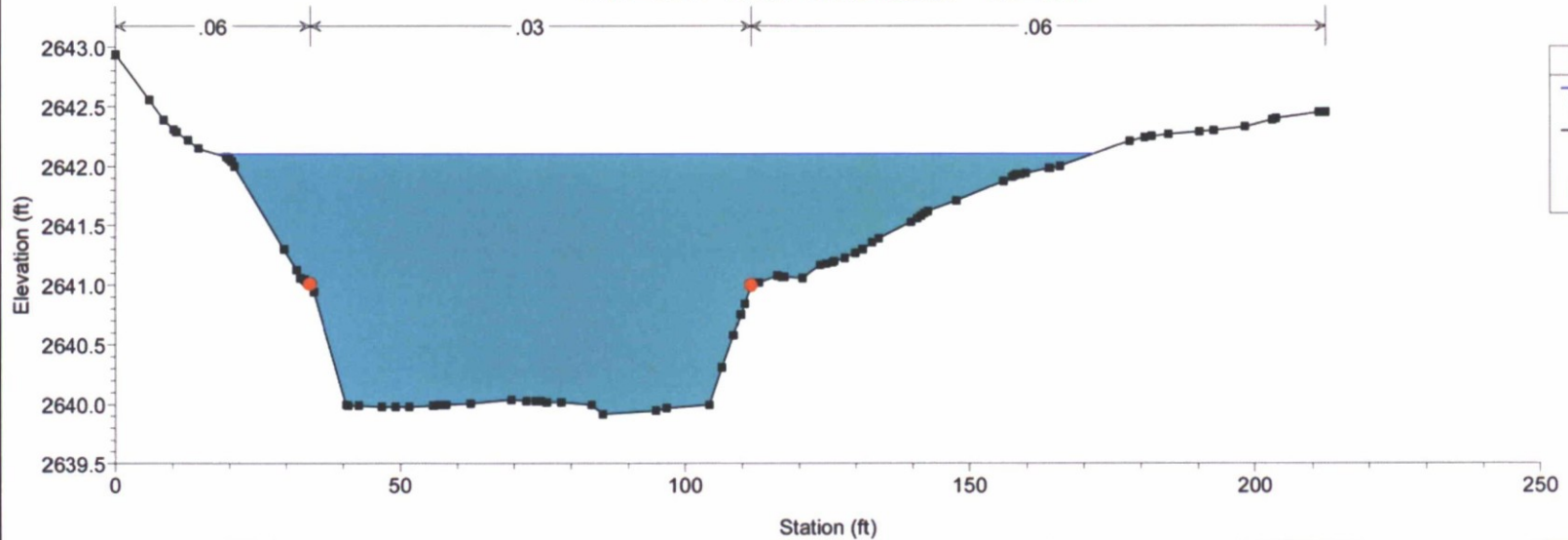
DM19 Existing Condition Galloway Wash Plan: Plan 01 3/14/2017

River = DM19 Reach = Profile baseline RS = 2774



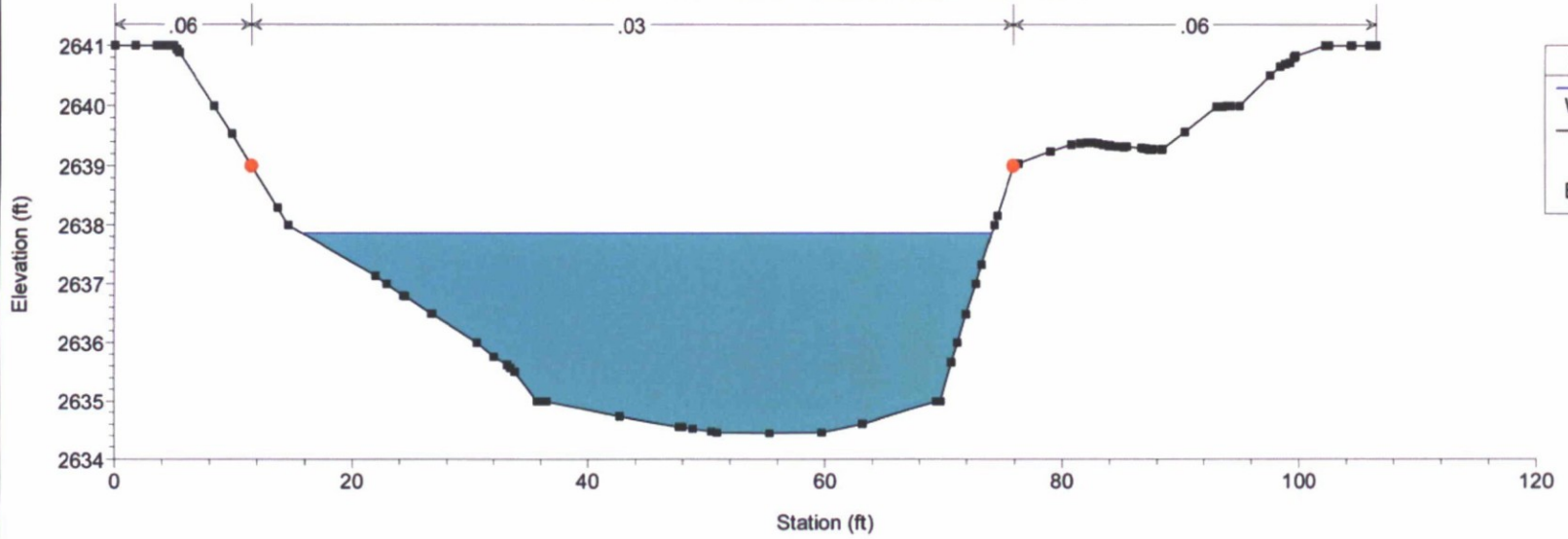
DM19 Existing Condition Galloway Wash Plan: Plan 01 3/14/2017

River = DM19 Reach = Profile baseline RS = 2678



DM19 Existing Condition Galloway Wash Plan: Plan 01 3/14/2017

River = DM19 Reach = Profile baseline RS = 2578

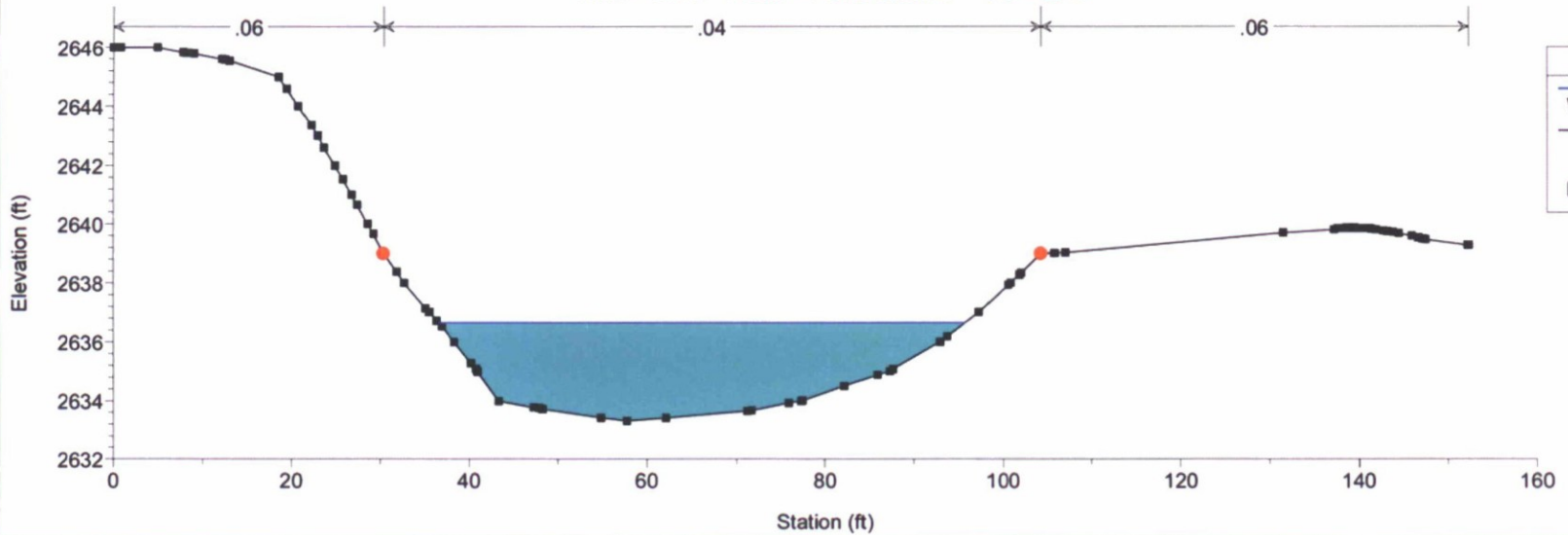


Legend

- WS PF 1
- Ground
- Bank Sta

DM19 Existing Condition Galloway Wash Plan: Plan 01 3/14/2017

River = DM19 Reach = Profile baseline RS = 2540

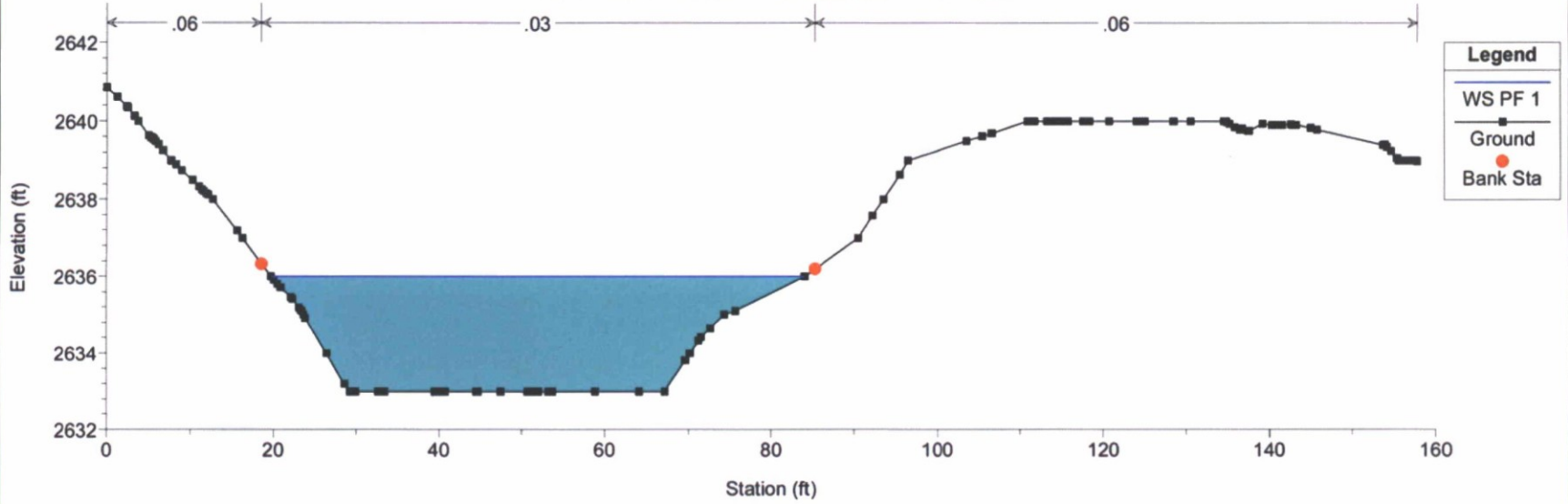


Legend

- WS PF 1
- Ground
- Bank Sta

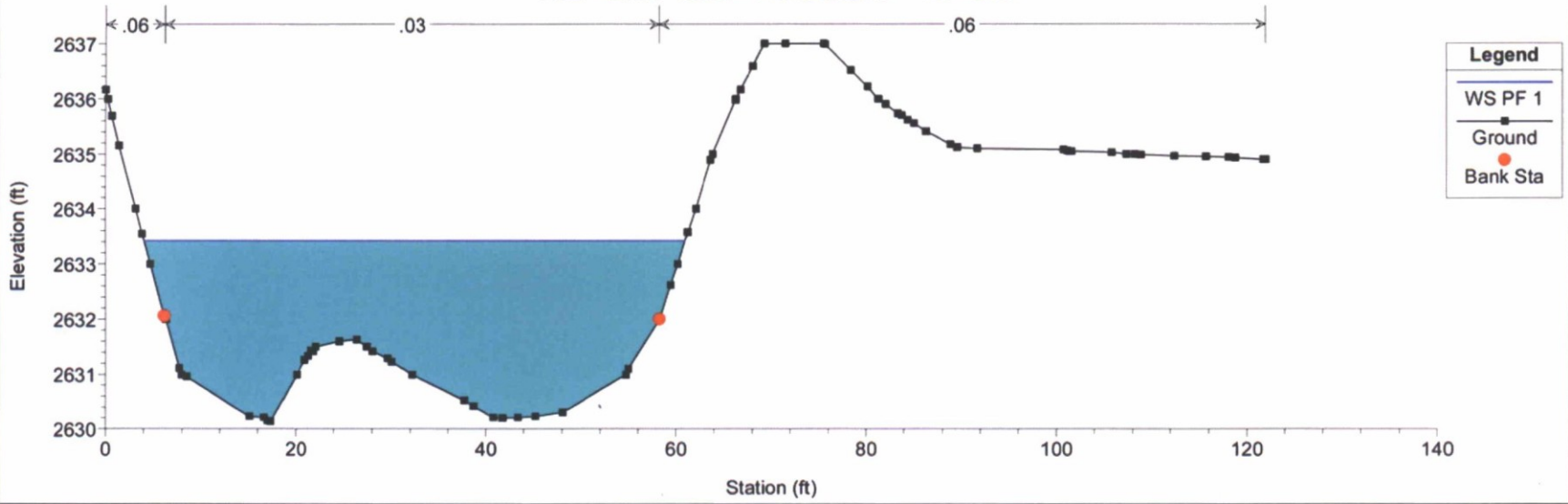
DM19 Existing Condition Galloway Wash Plan: Plan 01 3/14/2017

River = DM19 Reach = Profile baseline RS = 2500



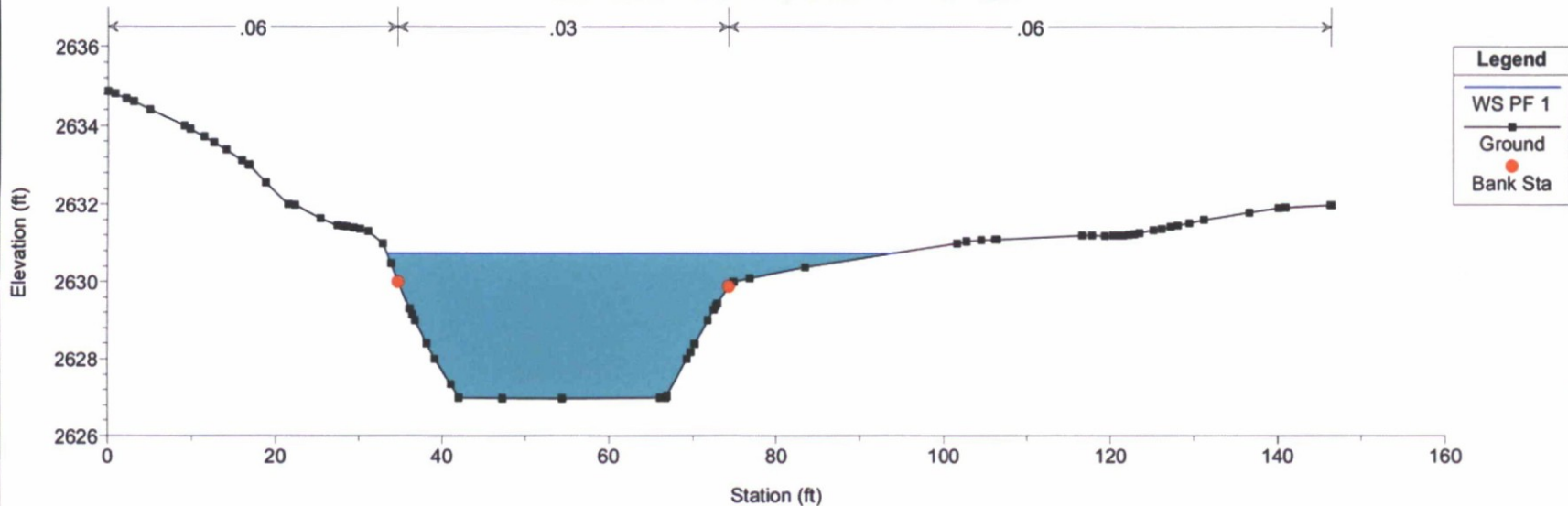
DM19 Existing Condition Galloway Wash Plan: Plan 01 3/14/2017

River = DM19 Reach = Profile baseline RS = 2405



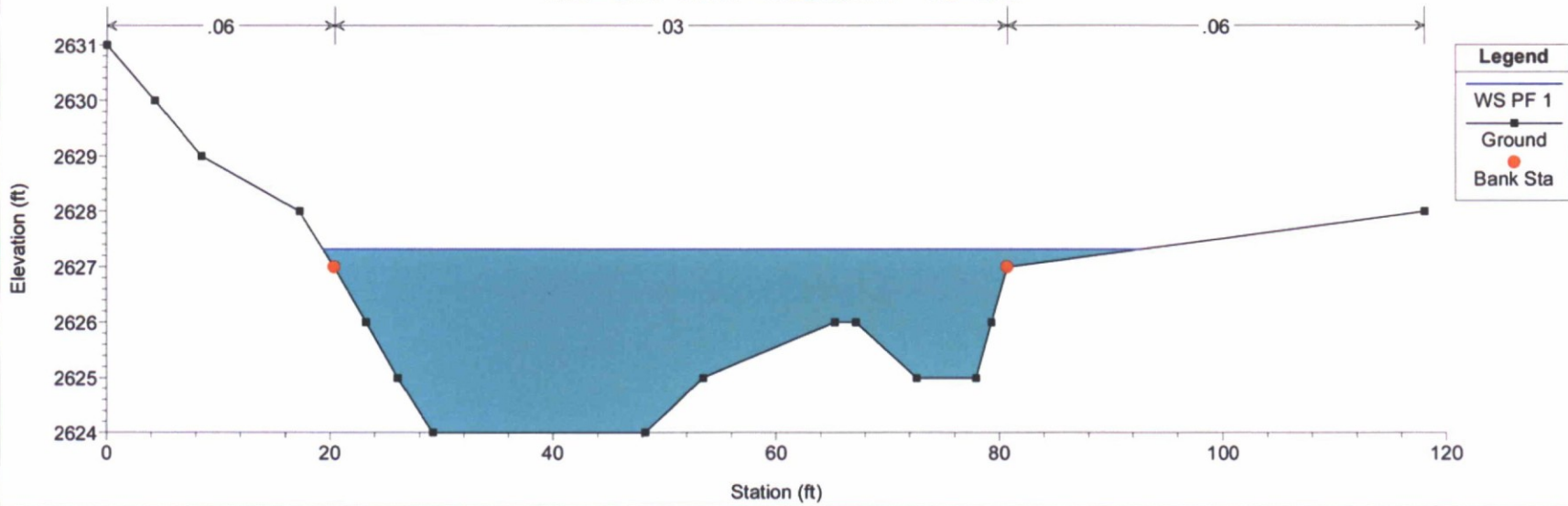
DM19 Existing Condition Galloway Wash Plan: Plan 01 3/14/2017

River = DM19 Reach = Profile baseline RS = 2250



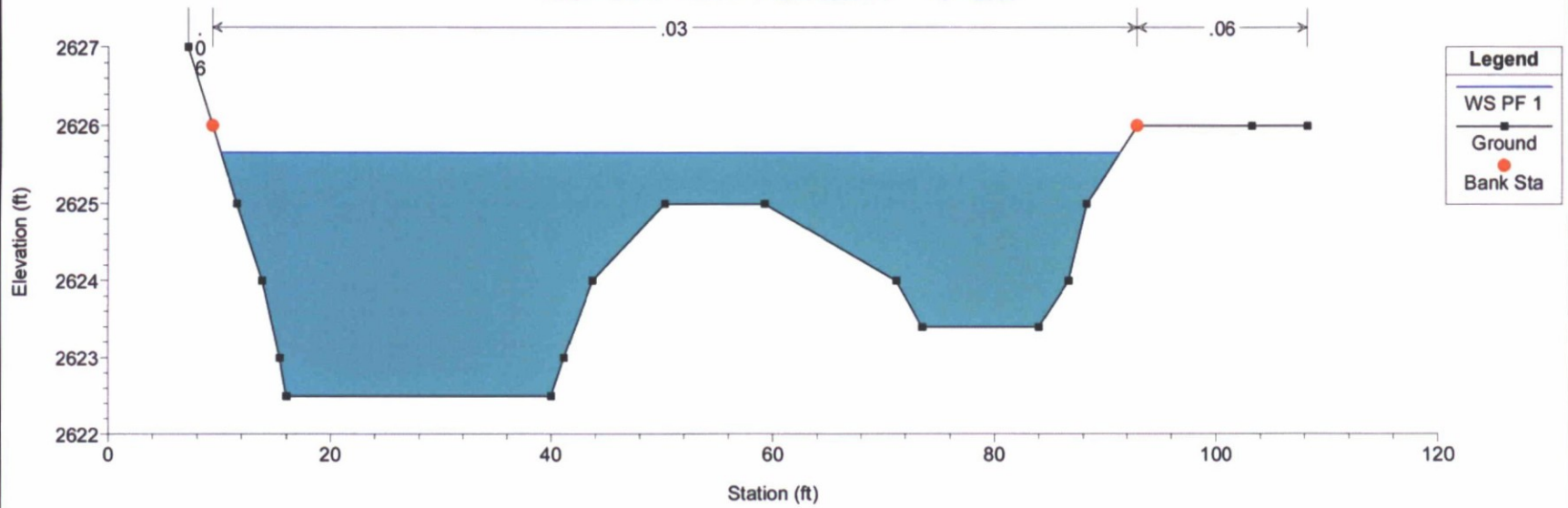
DM19 Existing Condition Galloway Wash Plan: Plan 01 3/14/2017

River = DM19 Reach = Profile baseline RS = 2130



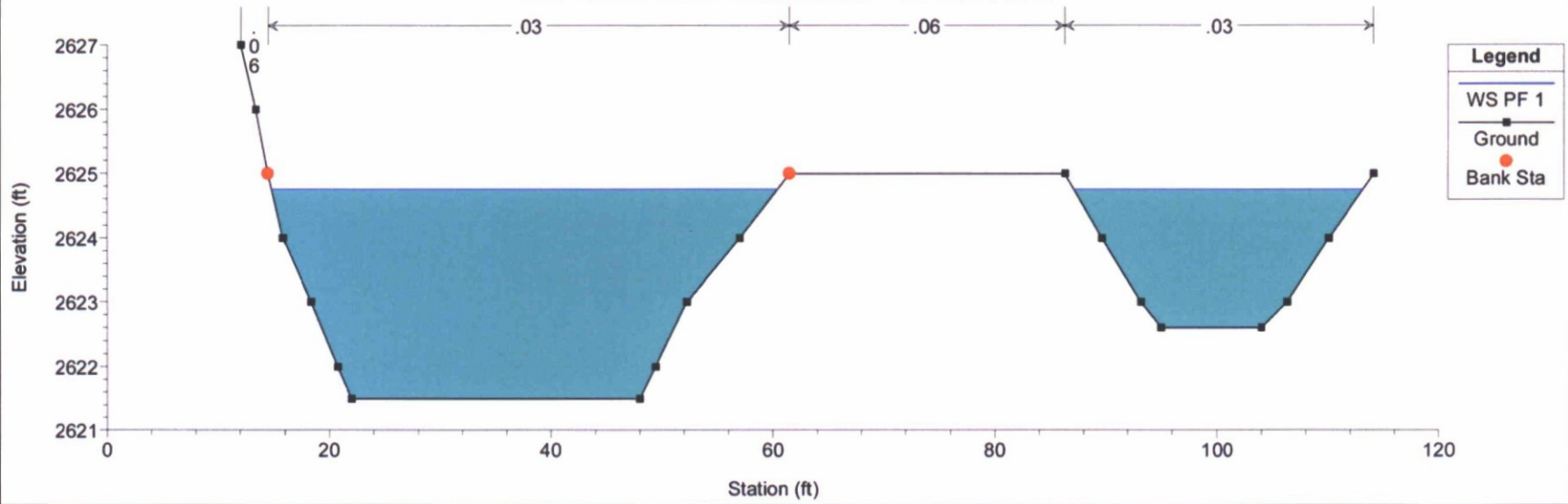
DM19 Existing Condition Galloway Wash Plan: Plan 01 3/14/2017

River = DM19 Reach = Profile baseline RS = 2056



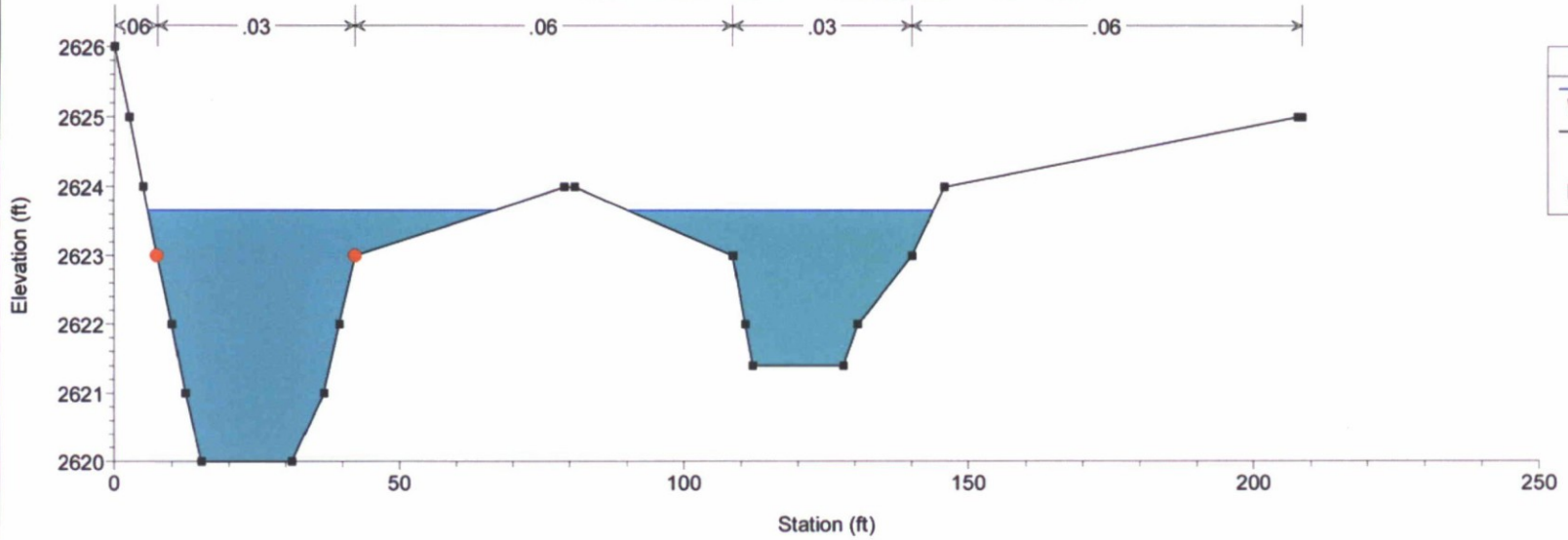
DM19 Existing Condition Galloway Wash Plan: Plan 01 3/14/2017

River = DM19 Reach = Profile baseline RS = 2014 cs 60



DM19 Existing Condition Galloway Wash Plan: Plan 01 3/14/2017

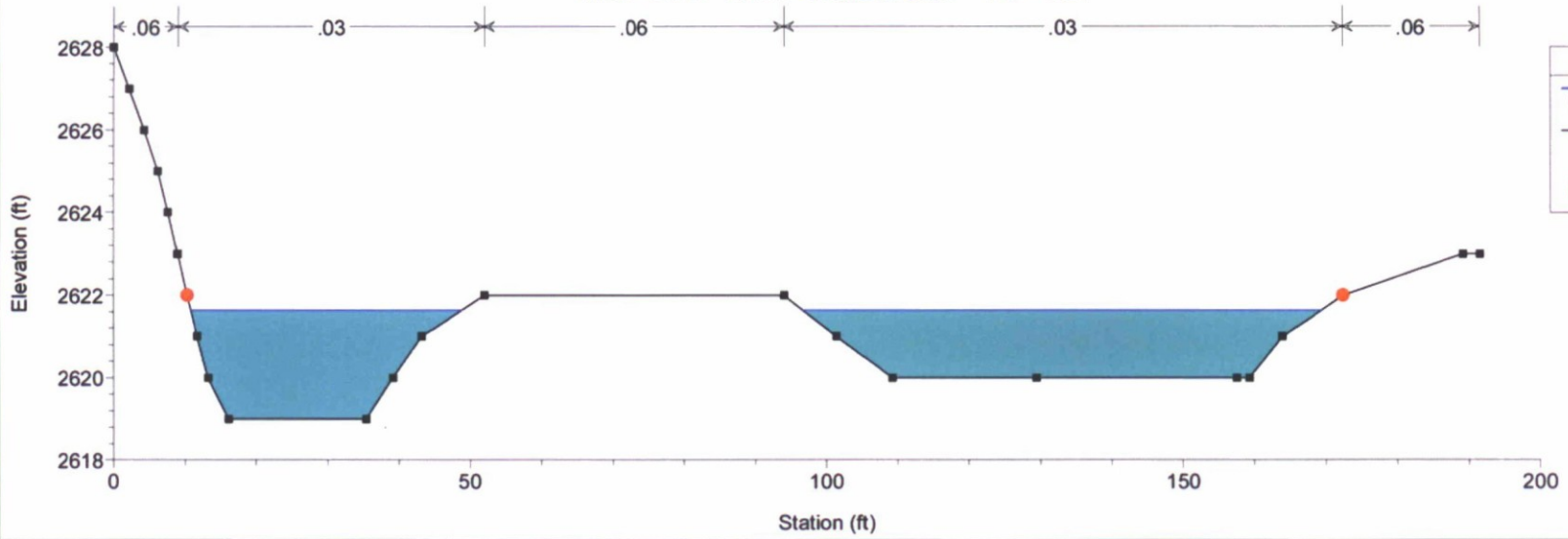
River = DM19 Reach = Profile baseline RS = 1952



Legend	
—	WS PF 1
■	Ground
●	Bank Sta

DM19 Existing Condition Galloway Wash Plan: Plan 01 3/14/2017

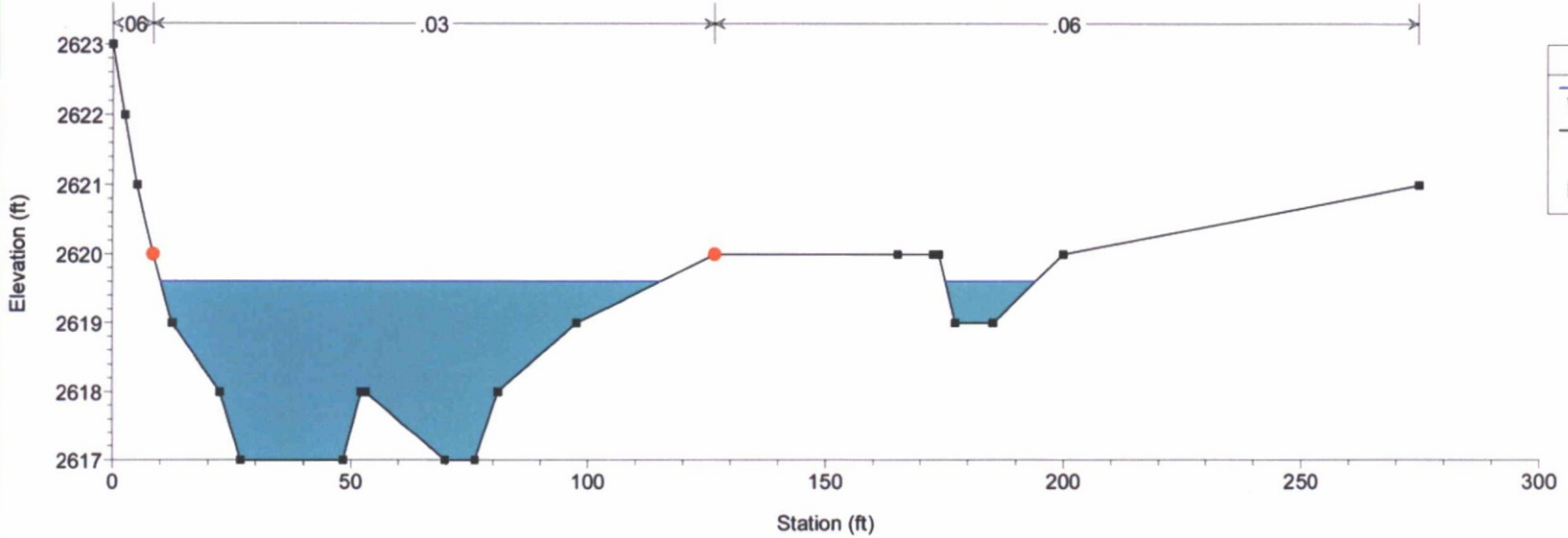
River = DM19 Reach = Profile baseline RS = 1891



Legend	
—	WS PF 1
■	Ground
●	Bank Sta

DM19 Existing Condition Galloway Wash Plan: Plan 01 3/14/2017

River = DM19 Reach = Profile baseline RS = 1791

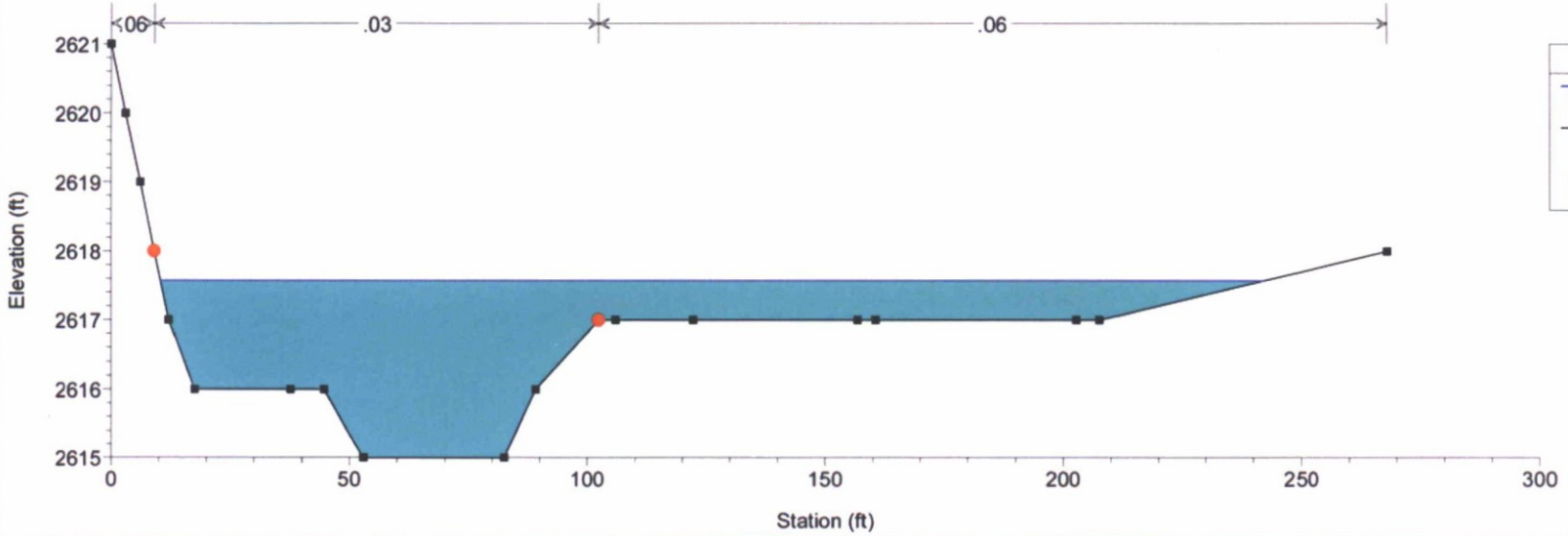


Legend

- WS PF 1
- Ground
- Bank Sta

DM19 Existing Condition Galloway Wash Plan: Plan 01 3/14/2017

River = DM19 Reach = Profile baseline RS = 1705

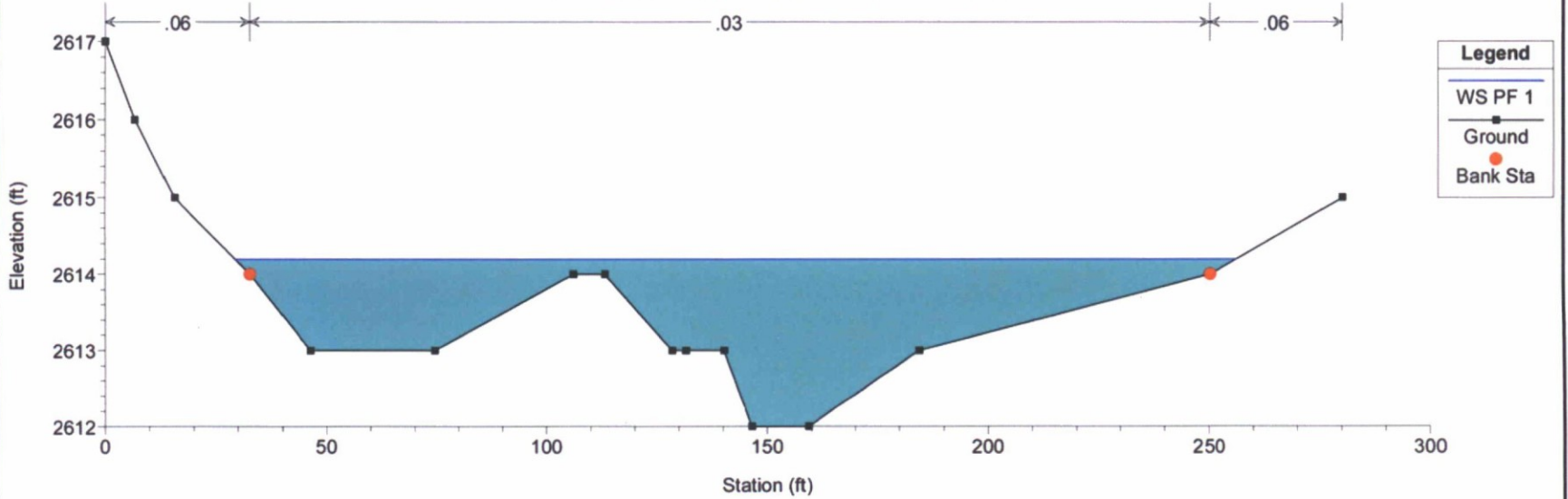


Legend

- WS PF 1
- Ground
- Bank Sta

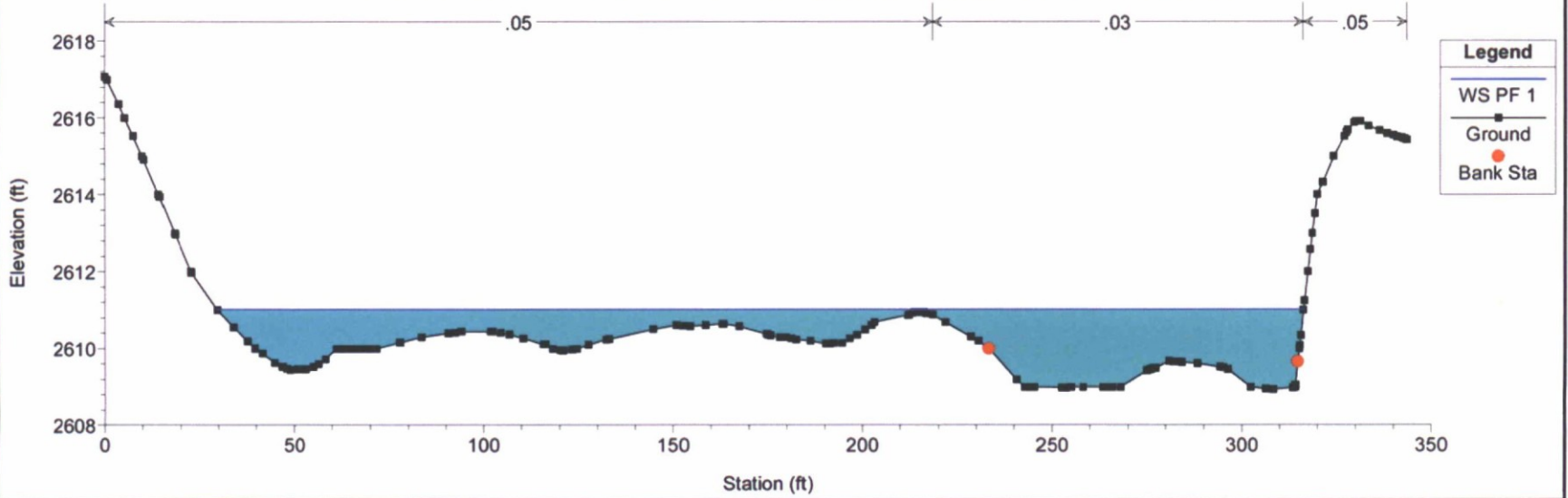
DM19 Existing Condition Galloway Wash Plan: Plan 01 3/14/2017

River = DM19 Reach = Profile baseline RS = 1583



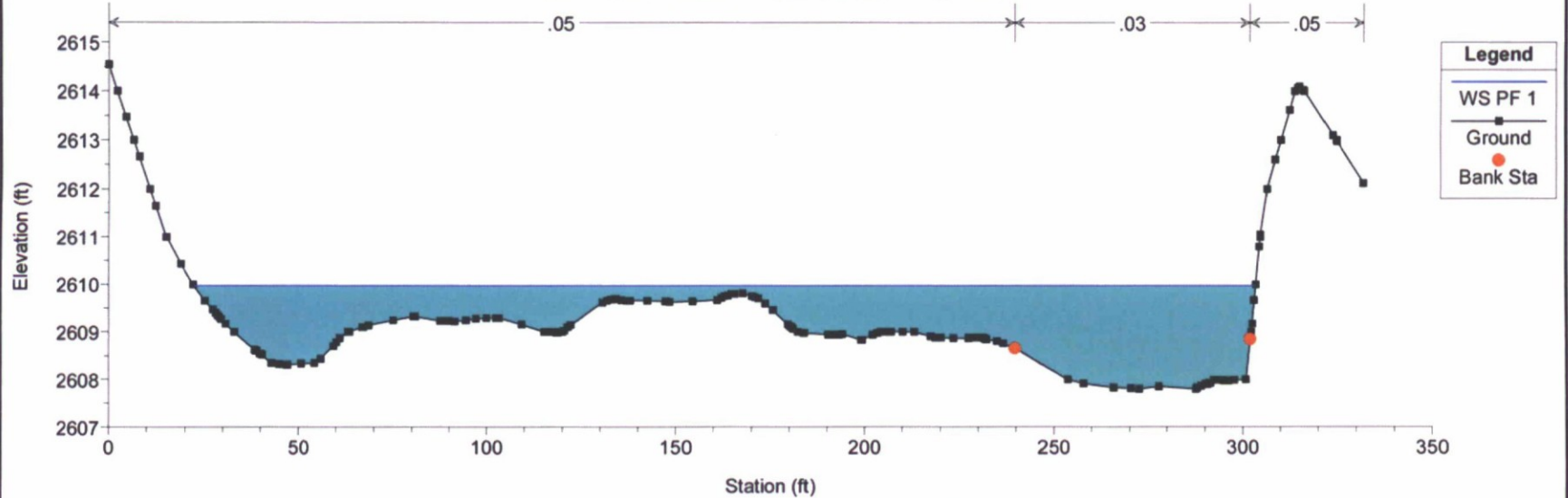
DM19 Existing Condition Galloway Wash Plan: Plan 01 3/14/2017

River = DM19 Reach = Profile baseline RS = 1447 Updated CS with new 1 ft topo = FEMA CS 4.832



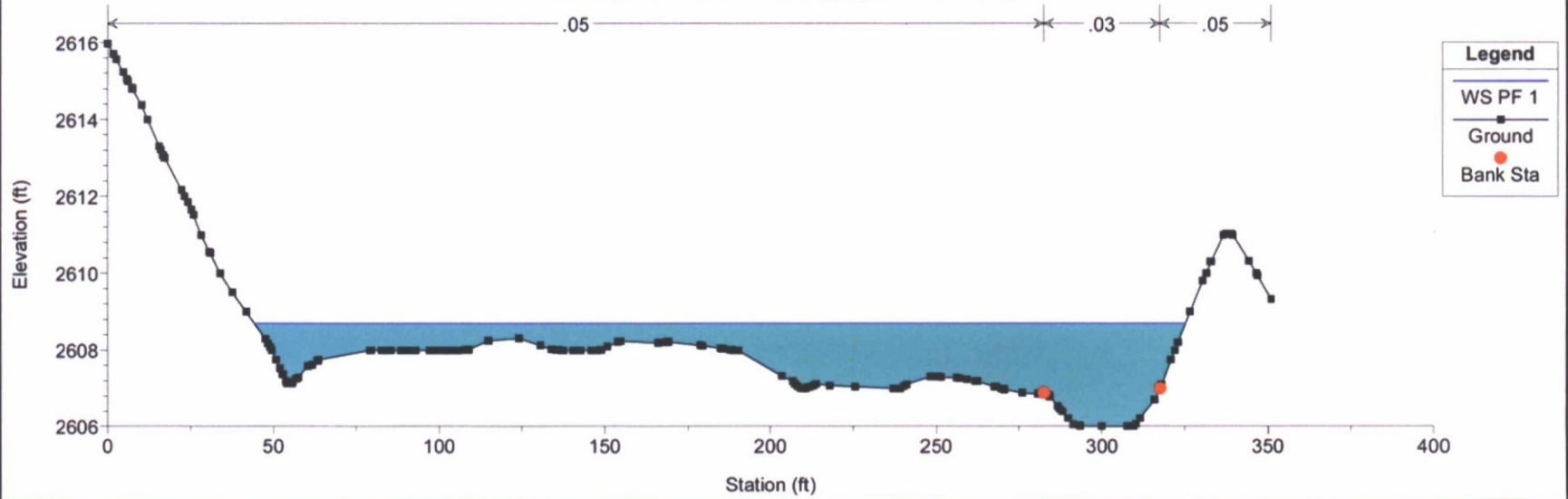
DM19 Existing Condition Galloway Wash Plan: Plan 01 3/14/2017

River = DM19 Reach = Profile baseline RS = 1400



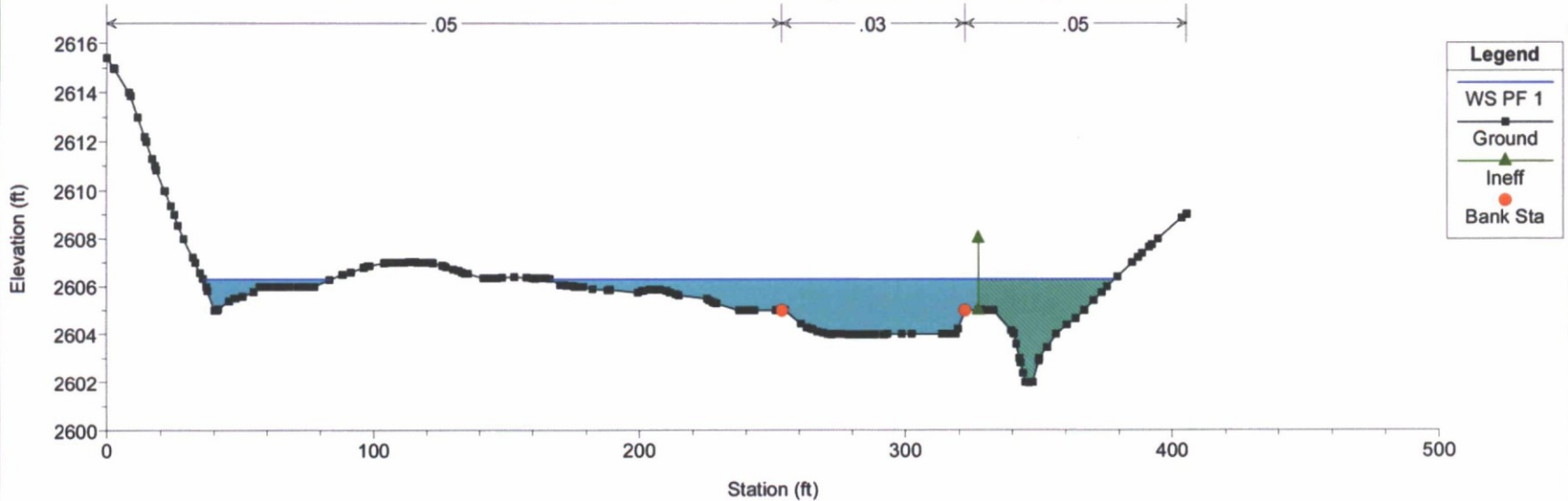
DM19 Existing Condition Galloway Wash Plan: Plan 01 3/14/2017

River = DM19 Reach = Profile baseline RS = 1342



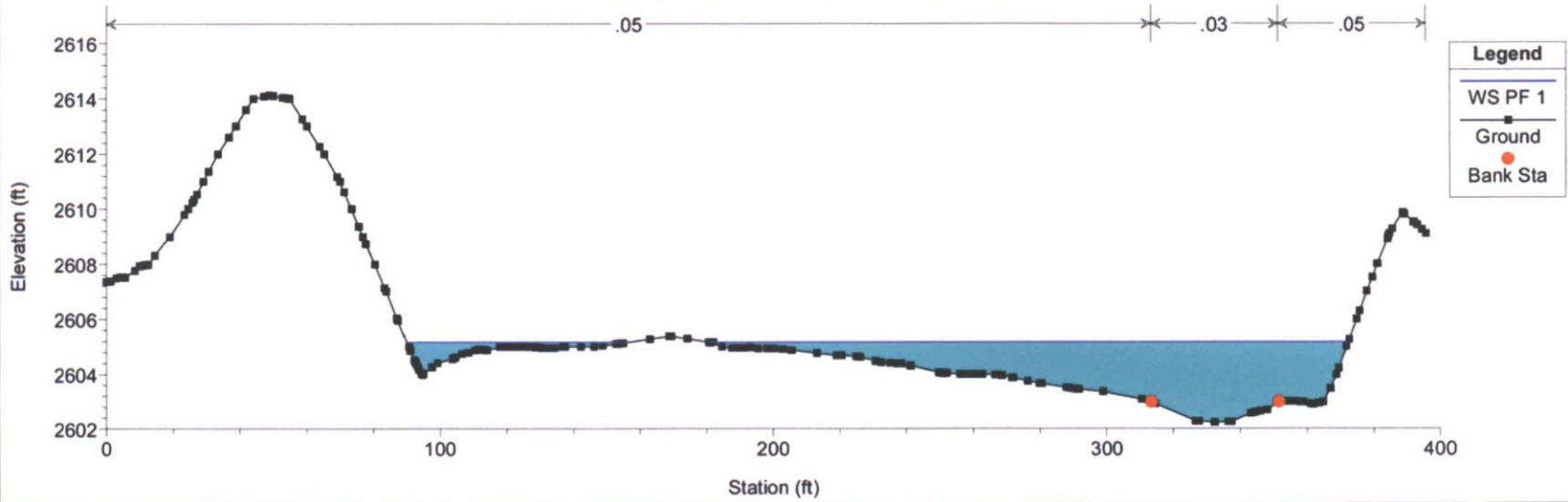
DM19 Existing Condition Galloway Wash Plan: Plan 01 3/14/2017

River = DM19 Reach = Profile baseline RS = 1257 Updated CS with new 1 ft topo = FEMA CS 4.796



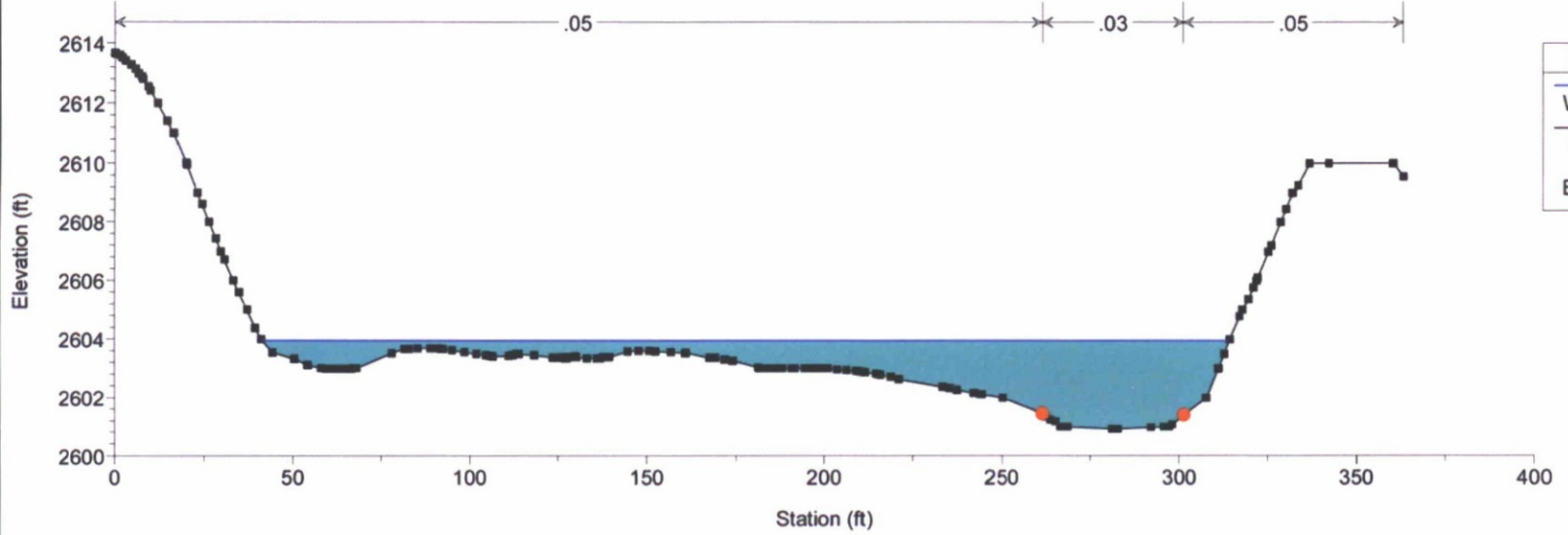
DM19 Existing Condition Galloway Wash Plan: Plan 01 3/14/2017

River = DM19 Reach = Profile baseline RS = 1180



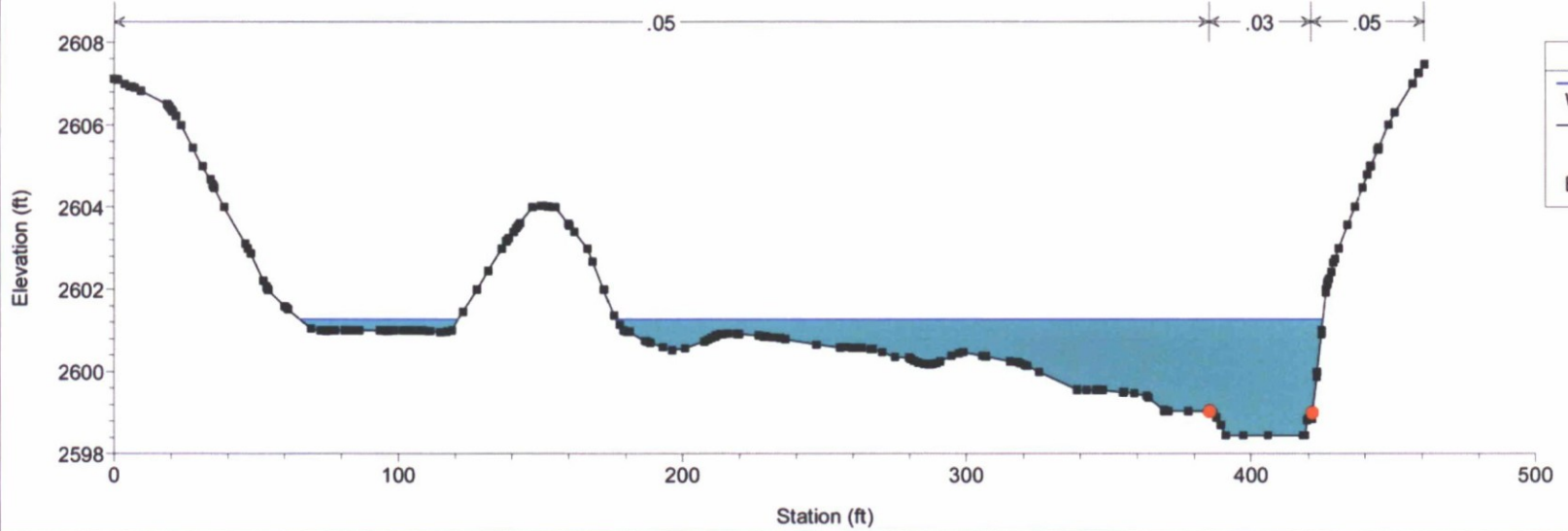
DM19 Existing Condition Galloway Wash Plan: Plan 01 3/14/2017

River = DM19 Reach = Profile baseline RS = 1119 Updated CS with new 1 ft topo = FEMA CS 4.770



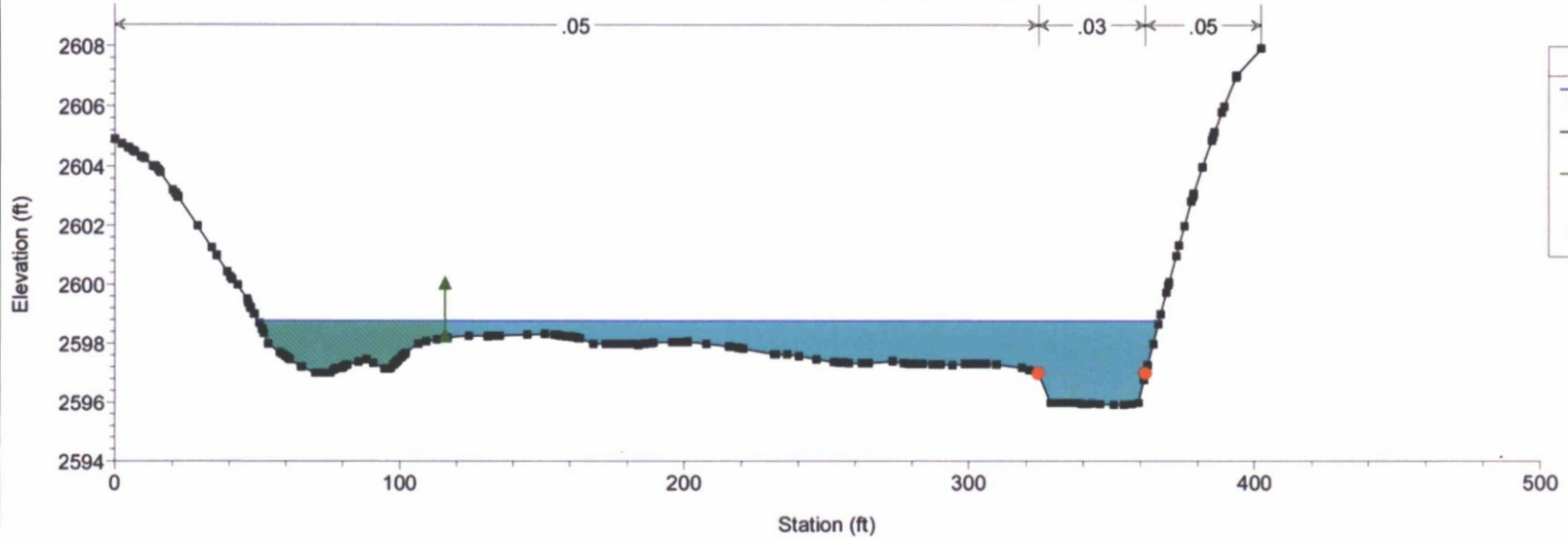
DM19 Existing Condition Galloway Wash Plan: Plan 01 3/14/2017

River = DM19 Reach = Profile baseline RS = 1015



DM19 Existing Condition Galloway Wash Plan: Plan 01 3/14/2017

River = DM19 Reach = Profile baseline RS = 918 Updated CS with new 1 ft topo = FEMA CS 4.732

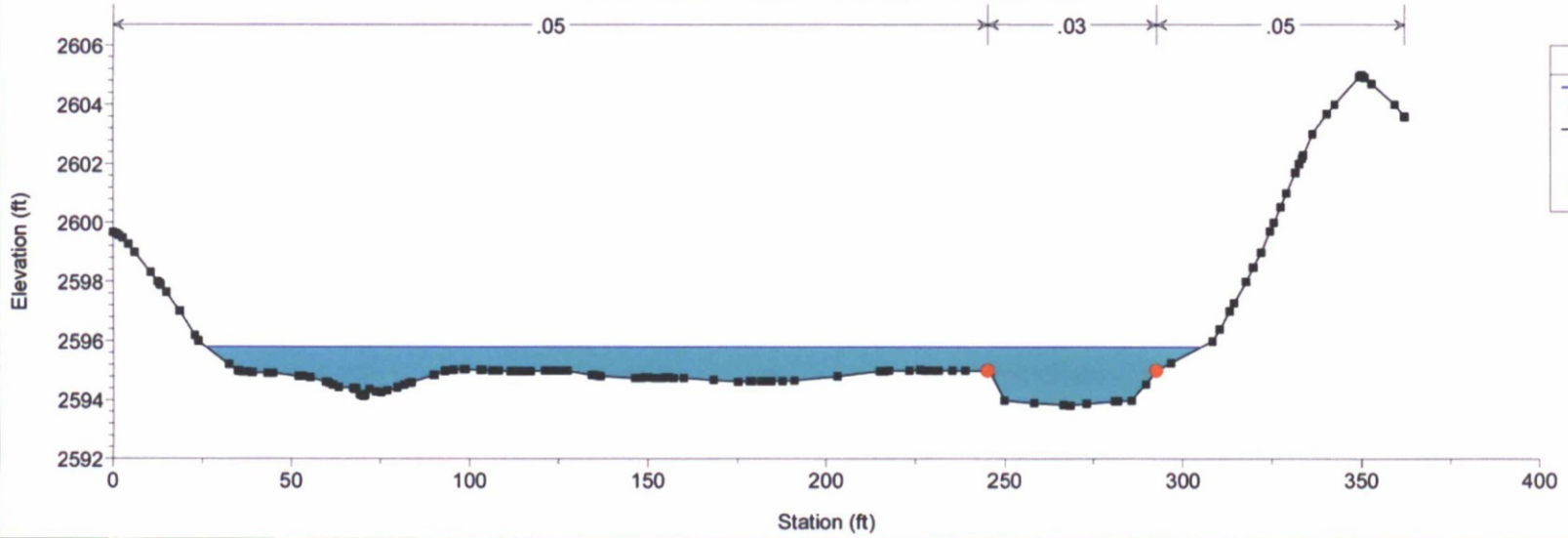


Legend

- WS PF 1
- Ground
- Ineff
- Bank Sta

DM19 Existing Condition Galloway Wash Plan: Plan 01 3/14/2017

River = DM19 Reach = Profile baseline RS = 780

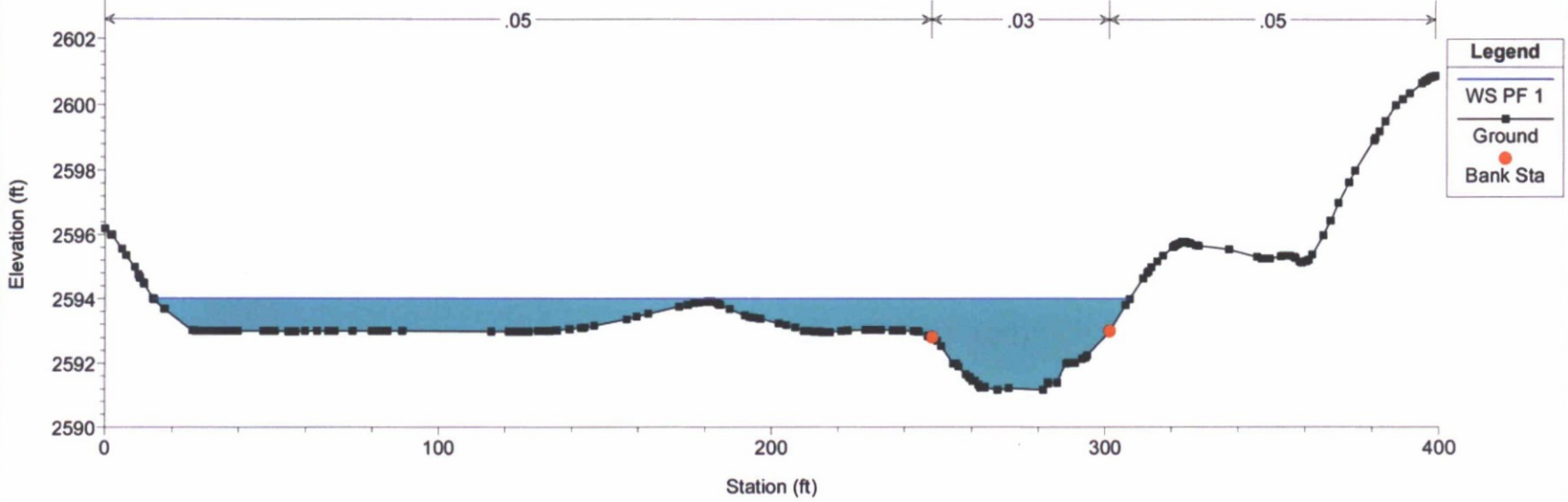


Legend

- WS PF 1
- Ground
- Bank Sta

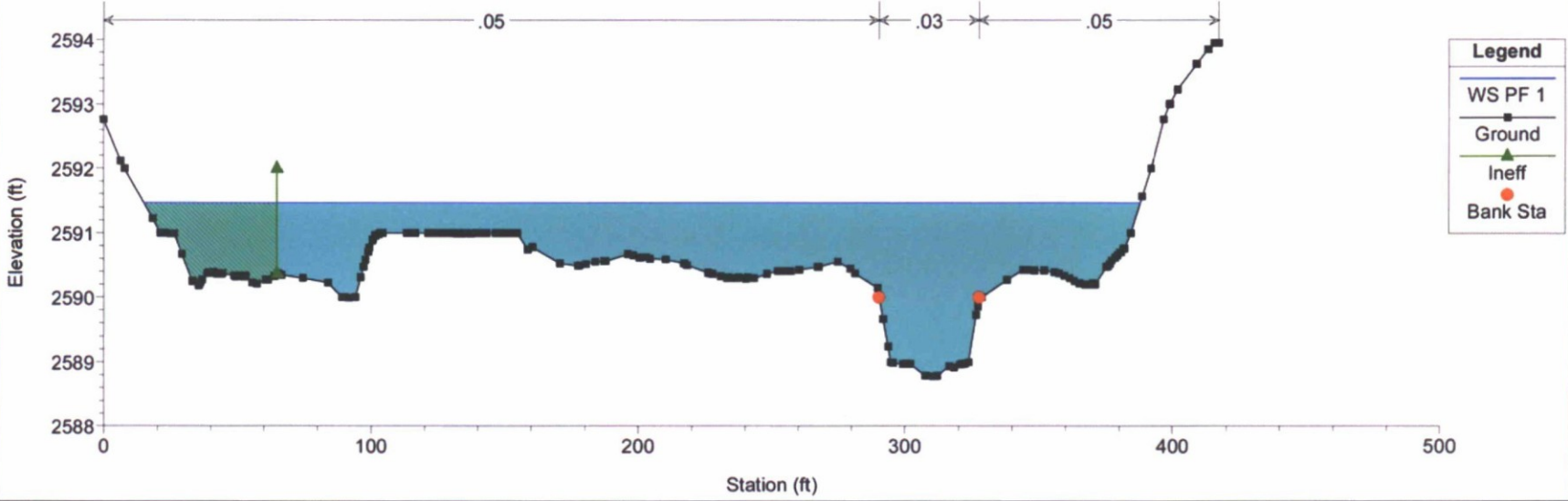
DM19 Existing Condition Galloway Wash Plan: Plan 01 3/14/2017

River = DM19 Reach = Profile baseline RS = 716 Updated CS with new 1 ft topo = FEMA CS 4.694



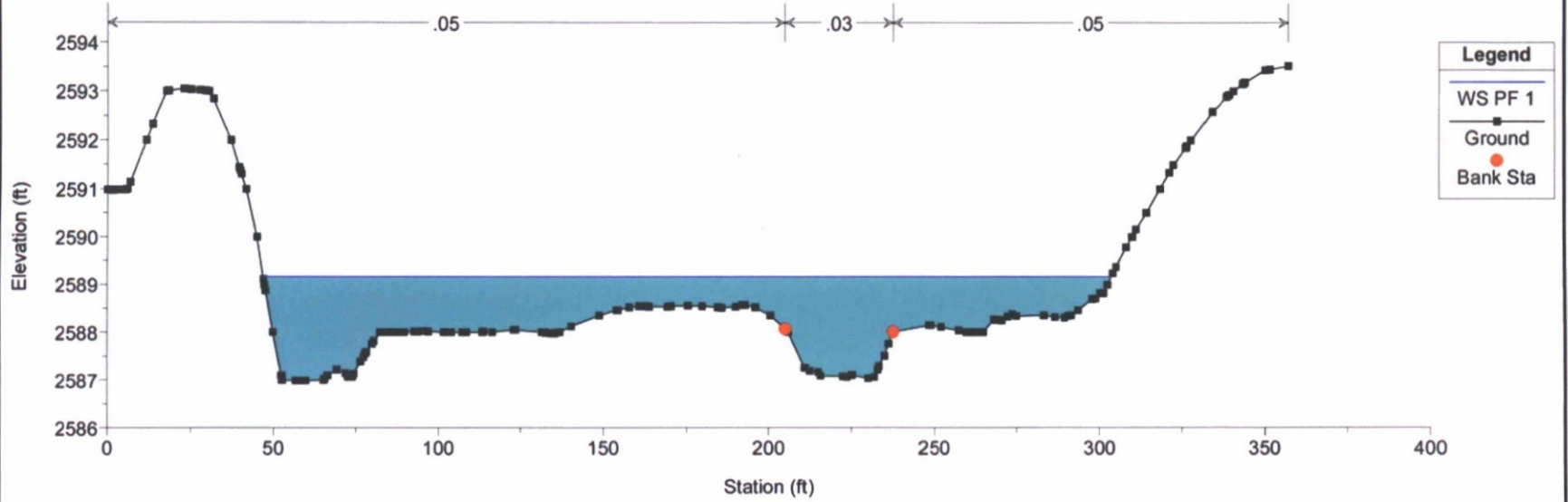
DM19 Existing Condition Galloway Wash Plan: Plan 01 3/14/2017

River = DM19 Reach = Profile baseline RS = 645 New Cross Section



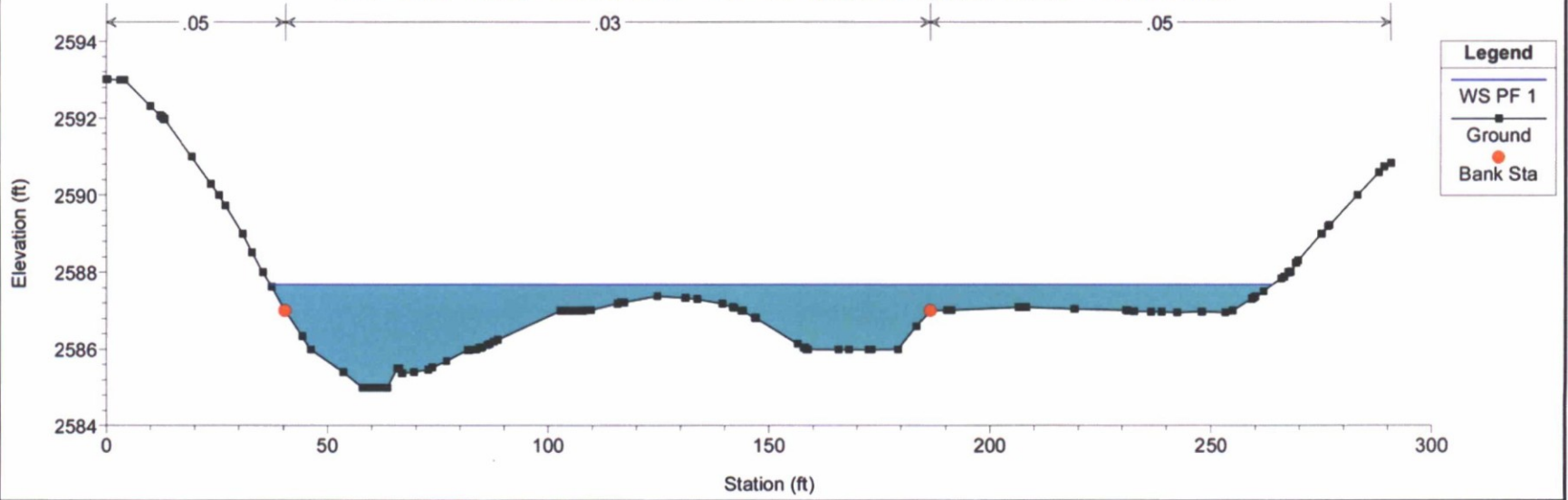
DM19 Existing Condition Galloway Wash Plan: Plan 01 3/14/2017

River = DM19 Reach = Profile baseline RS = 571



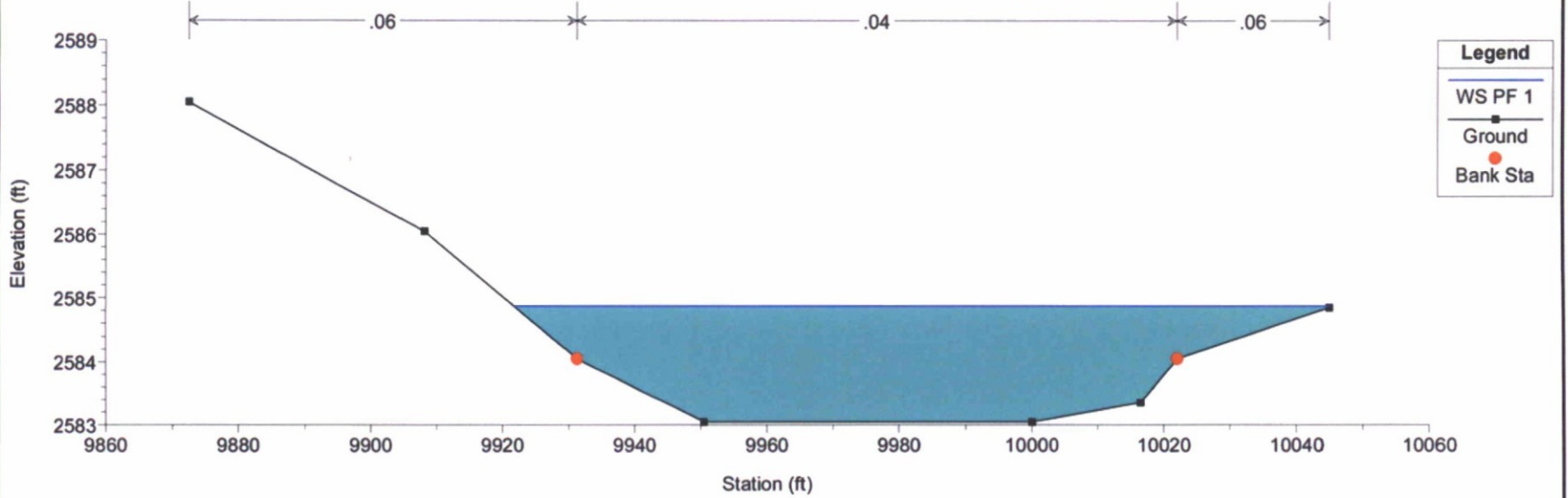
DM19 Existing Condition Galloway Wash Plan: Plan 01 3/14/2017

River = DM19 Reach = Profile baseline RS = 518 Updated CS with new 1 ft topo = FEMA CS 4.656



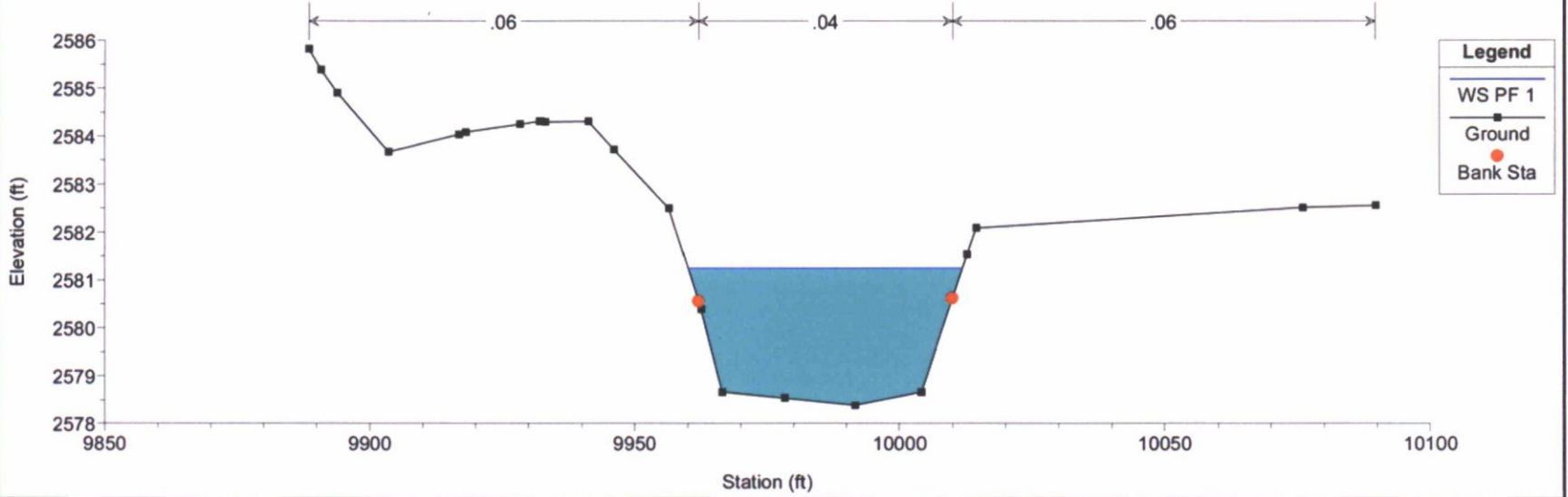
DM19 Existing Condition Galloway Wash Plan: Plan 01 3/14/2017

River = DM19 Reach = Profile baseline RS = 317 FEMA CS 4.639 - Adjust from NGVD +2.05

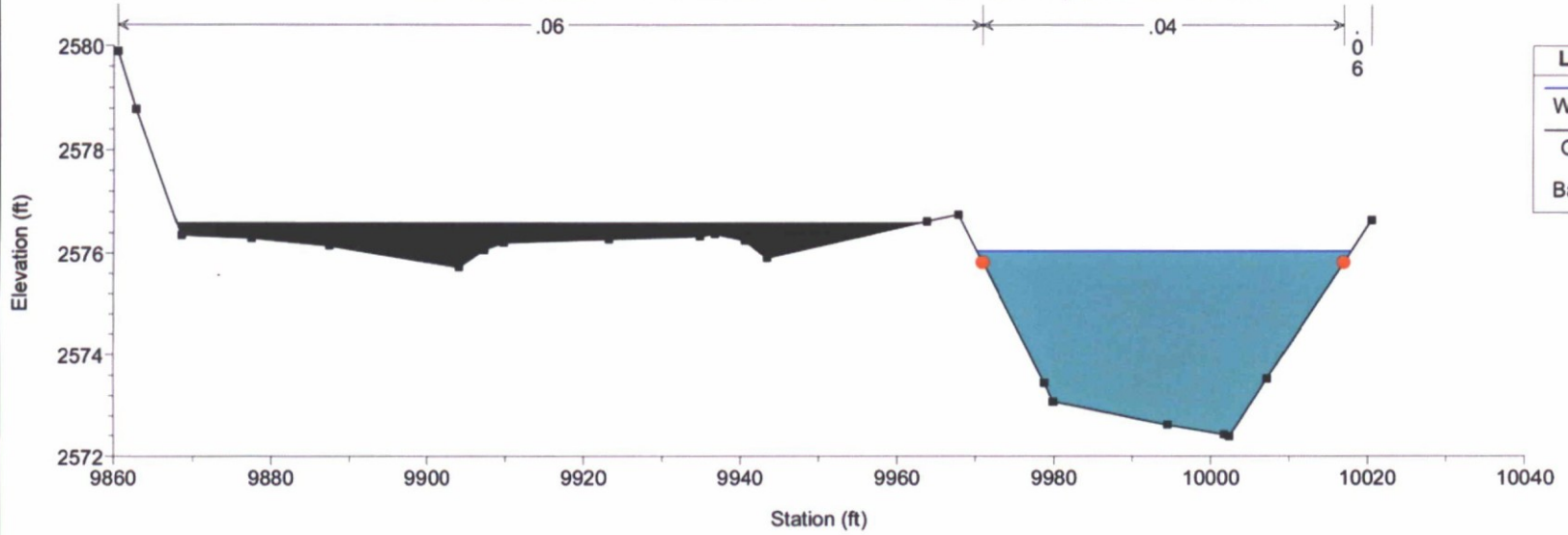


DM19 Existing Condition Galloway Wash Plan: Plan 01 3/14/2017

River = DM19 Reach = Profile baseline RS = 197 FEMA CS 4.618 - Adjust from NGVD +2.05



DM19 Existing Condition Galloway Wash Plan: Plan 01 3/14/2017
River = DM19 Reach = Profile baseline RS = 0 FEMA CS 4.581- Adjust from NGVD +2.05

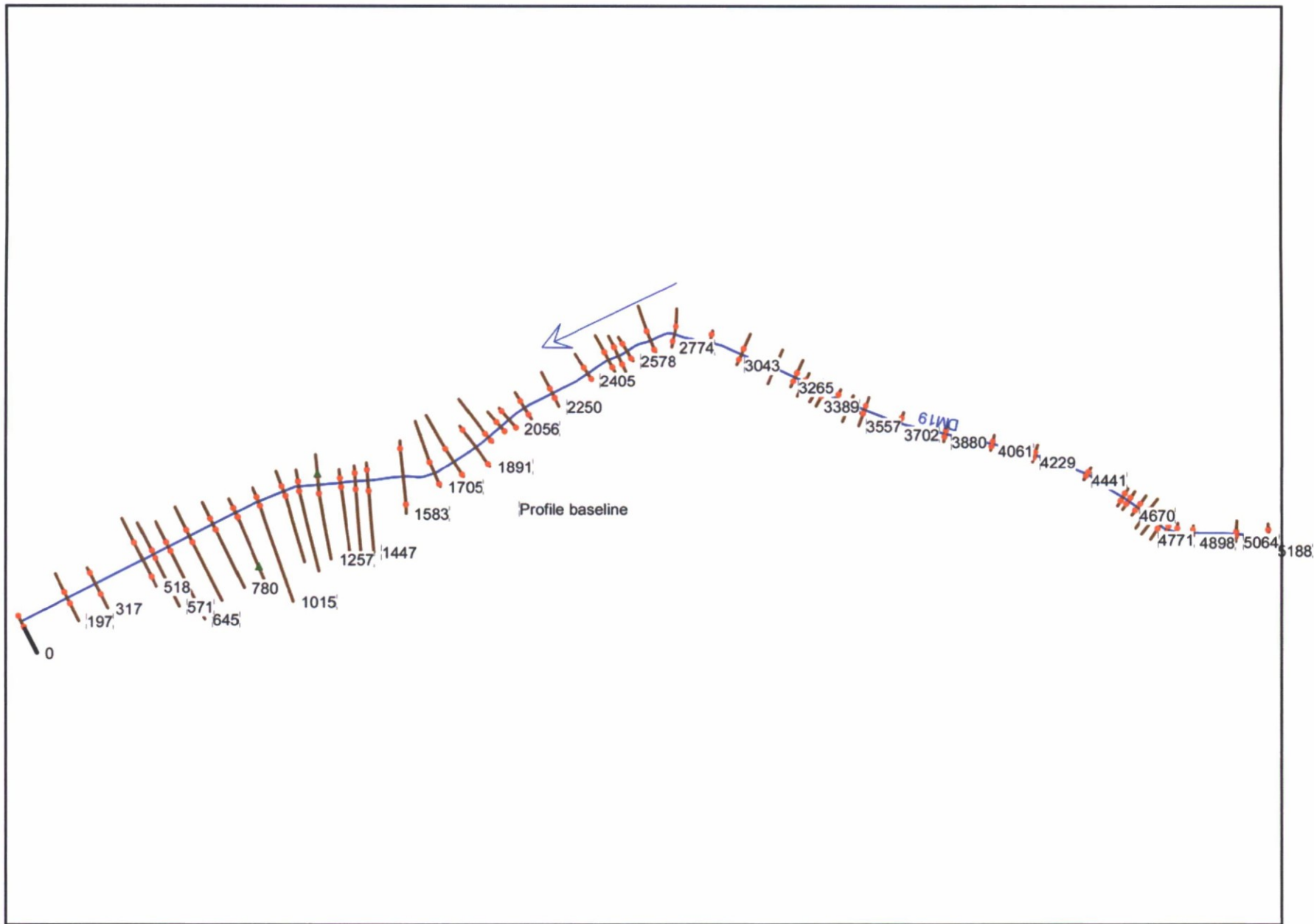


Legend
WS PF 1
Ground
Bank Sta

EXISTING

GALLOWAY WASH - SUPERCRITICAL

SUPERCritical

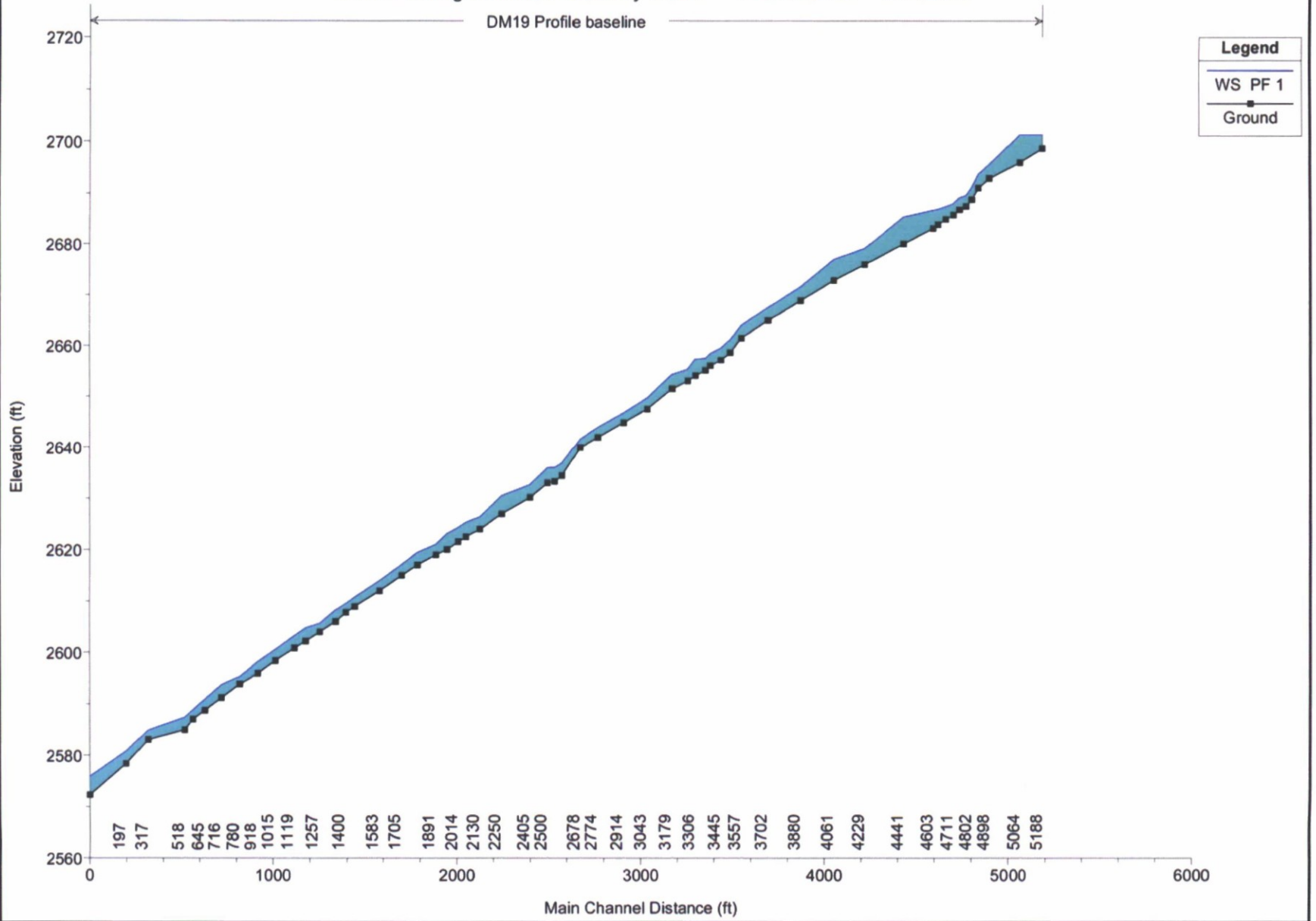


Reach	River Sta	Profile	Q Total (cfs)	Mn Ch El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/m)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
Profile baseline	5168	PF 1	1248.00	2698.65	2701.28	2701.85	2704.01	0.023004	13.89	110.21	55.98	1.54
Profile baseline	5064	PF 1	1248.00	2695.95	2701.28	2701.29	2702.60	0.005603	11.08	207.94	78.77	0.86
Profile baseline	4993	PF 1	1248.00	2692.69	2695.60	2696.09	2700.30	0.038830	16.52	88.52	43.32	2.02
Profile baseline	4839	PF 1	1248.00	2690.99	2693.68	2694.97	2697.68	0.038151	17.57	92.65	50.63	1.88
Profile baseline	4802	PF 1	1248.00	2688.75	2691.10	2692.60	2696.15	0.052332	19.17	83.67	50.83	2.28
Profile baseline	4771	PF 1	1248.00	2687.45	2689.54	2690.87	2694.35	0.058991	18.28	83.21	61.63	2.35
Profile baseline	4745	PF 1	1248.00	2686.78	2689.11	2690.12	2692.32	0.033029	15.43	110.79	74.87	1.82
Profile baseline	4711	PF 1	1248.00	2685.74	2687.90	2688.85	2691.13	0.038170	15.08	100.85	63.85	1.87
Profile baseline	4670	PF 1	1248.00	2684.85	2687.34	2688.05	2689.73	0.022559	13.48	124.18	86.42	1.52
Profile baseline	4629	PF 1	1248.00	2683.88	2686.81	2687.38	2688.88	0.015439	12.48	140.47	72.98	1.29
Profile baseline	4603	PF 1	1248.00	2683.09	2686.68	2687.03	2688.45	0.011071	11.25	140.47	64.40	1.11
Profile baseline	4441	PF 1	1248.00	2680.00	2685.31	2685.33	2687.09	0.006610	12.07	184.95	52.33	0.93
Profile baseline	4229	PF 1	1248.00	2675.99	2679.09	2680.69	2684.10	0.032634	16.77	84.21	40.28	1.89
Profile baseline	4081	PF 1	1248.00	2672.84	2676.92	2677.79	2680.09	0.014168	14.77	102.50	35.50	1.30
Profile baseline	3880	PF 1	1248.00	2668.84	2671.56	2673.07	2676.08	0.035799	17.84	88.28	43.79	1.94
Profile baseline	3702	PF 1	1248.00	2665.00	2667.48	2668.29	2670.03	0.026560	13.44	113.52	66.12	1.82
Profile baseline	3557	PF 1	1248.00	2661.49	2664.00	2664.83	2666.29	0.024031	13.58	137.09	88.54	1.58
Profile baseline	3497	PF 1	1248.00	2658.58	2661.08	2662.08	2664.47	0.034368	16.54	113.31	71.08	1.87
Profile baseline	3445	PF 1	1248.00	2657.08	2659.48	2660.45	2662.68	0.032410	15.29	107.24	71.53	1.80
Profile baseline	3389	PF 1	1248.00	2655.93	2658.42	2659.20	2660.89	0.022513	13.59	119.80	72.39	1.52
Profile baseline	3382	PF 1	1248.00	2654.98	2657.45	2658.08	2660.29	0.027726	14.82	120.98	74.29	1.69
Profile baseline	3308	PF 1	1248.00	2653.93	2657.24	2657.88	2659.89	0.018479	14.03	184.32	99.29	1.37
Profile baseline	3265	PF 1	1248.00	2652.98	2655.23	2655.98	2657.75	0.026932	13.74	134.21	113.81	1.63
Profile baseline	3178	PF 1	1248.00	2651.37	2654.18	2654.56	2655.81	0.017114	12.30	189.62	138.60	1.34
Profile baseline	3043	PF 1	1248.00	2647.43	2649.58	2650.51	2652.37	0.031768	13.72	103.34	89.02	1.74
Profile baseline	2914	PF 1	1248.00	2644.79	2646.65	2647.17	2648.55	0.024182	11.11	116.43	70.82	1.49
Profile baseline	2774	PF 1	1245.00	2641.80	2643.65	2644.25	2645.43	0.019424	10.48	139.80	90.28	1.35
Profile baseline	2678	PF 1	1245.00	2639.82	2641.58	2642.10	2643.28	0.028208	10.49	129.11	115.47	1.51
Profile baseline	2578	PF 1	1245.00	2634.45	2636.88	2637.87	2639.99	0.037914	14.16	87.94	48.68	1.86
Profile baseline	2540	PF 1	1245.00	2633.32	2636.04	2636.68	2638.18	0.042287	11.75	105.85	54.85	1.49
Profile baseline	2500	PF 1	1245.00	2633.00	2635.96	2635.96	2637.44	0.010871	8.70	143.17	63.80	1.02
Profile baseline	2405	PF 1	1245.00	2630.14	2632.63	2633.43	2635.34	0.032834	13.19	86.81	54.16	1.73
Profile baseline	2250	PF 1	1245.00	2626.98	2630.48	2630.74	2632.24	0.011587	10.70	118.69	51.88	1.10
Profile baseline	2130	PF 1	1245.00	2624.00	2626.35	2627.32	2629.58	0.040922	14.38	88.70	67.61	2.06
Profile baseline	2056	PF 1	1245.00	2622.50	2625.30	2625.66	2626.77	0.020875	9.71	126.16	78.83	1.34
Profile baseline	2014	PF 1	1245.00	2621.50	2624.33	2624.76	2625.87	0.018748	10.79	124.55	85.94	1.27
Profile baseline	1952	PF 1	1245.00	2620.00	2623.09	2623.87	2624.88	0.017999	11.55	121.38	72.47	1.33
Profile baseline	1891	PF 1	1245.00	2619.00	2620.97	2621.63	2623.15	0.045077	11.84	105.18	83.61	1.97
Profile baseline	1791	PF 1	1245.00	2617.00	2619.43	2619.81	2620.42	0.014652	8.01	159.64	115.34	1.13
Profile baseline	1705	PF 1	1245.00	2615.00	2617.04	2617.56	2618.85	0.029439	10.18	126.78	188.38	1.54
Profile baseline	1583	PF 1	1245.00	2612.00	2613.95	2614.21	2614.83	0.030731	7.54	185.10	203.80	1.48
Profile baseline	1447	PF 1	1245.00	2608.94	2610.70	2611.01	2611.69	0.018878	8.88	204.24	265.33	1.27
Profile baseline	1400	PF 1	1245.00	2607.81	2609.53	2609.99	2610.78	0.022855	10.00	189.46	231.05	1.42
Profile baseline	1342	PF 1	1245.00	2606.00	2608.18	2608.70	2609.83	0.023191	11.72	190.07	238.96	1.48
Profile baseline	1257	PF 1	1245.00	2603.99	2605.84	2606.31	2607.53	0.030230	11.33	127.39	171.41	1.82
Profile baseline	1180	PF 1	1245.00	2602.23	2604.78	2605.17	2605.87	0.013281	9.83	205.67	175.29	1.15
Profile baseline	1119	PF 1	1245.00	2600.92	2603.27	2603.94	2604.87	0.017419	11.20	188.40	160.00	1.32
Profile baseline	1015	PF 1	1245.00	2598.45	2600.57	2601.28	2602.48	0.025581	12.67	158.71	164.85	1.57
Profile baseline	918	PF 1	1245.00	2595.82	2598.20	2598.78	2599.82	0.021188	11.90	176.51	265.35	1.44
Profile baseline	780	PF 1	1245.00	2593.83	2595.37	2595.80	2596.87	0.042281	12.17	181.74	287.87	1.87
Profile baseline	716	PF 1	1280.00	2591.19	2593.71	2594.01	2594.87	0.013559	9.00	234.57	270.33	1.13
Profile baseline	645	PF 1	1280.00	2588.78	2590.92	2591.47	2592.75	0.028783	12.73	183.31	301.81	1.64
Profile baseline	571	PF 1	1280.00	2587.04	2588.88	2589.17	2589.87	0.027191	11.04	219.53	253.71	1.55
Profile baseline	519	PF 1	1280.00	2585.00	2587.40	2587.68	2588.32	0.024308	7.90	178.70	222.00	1.37
Profile baseline	317	PF 1	1081.00	2583.05	2584.88	2584.88	2585.60	0.017734	8.91	163.53	123.13	0.95
Profile baseline	187	PF 1	1081.00	2578.39	2580.81	2581.25	2582.84	0.033519	10.83	88.08	49.30	1.34
Profile baseline	0	PF 1	1081.00	2572.39	2575.92	2576.05	2577.34	0.021043	9.57	110.88	48.75	1.09

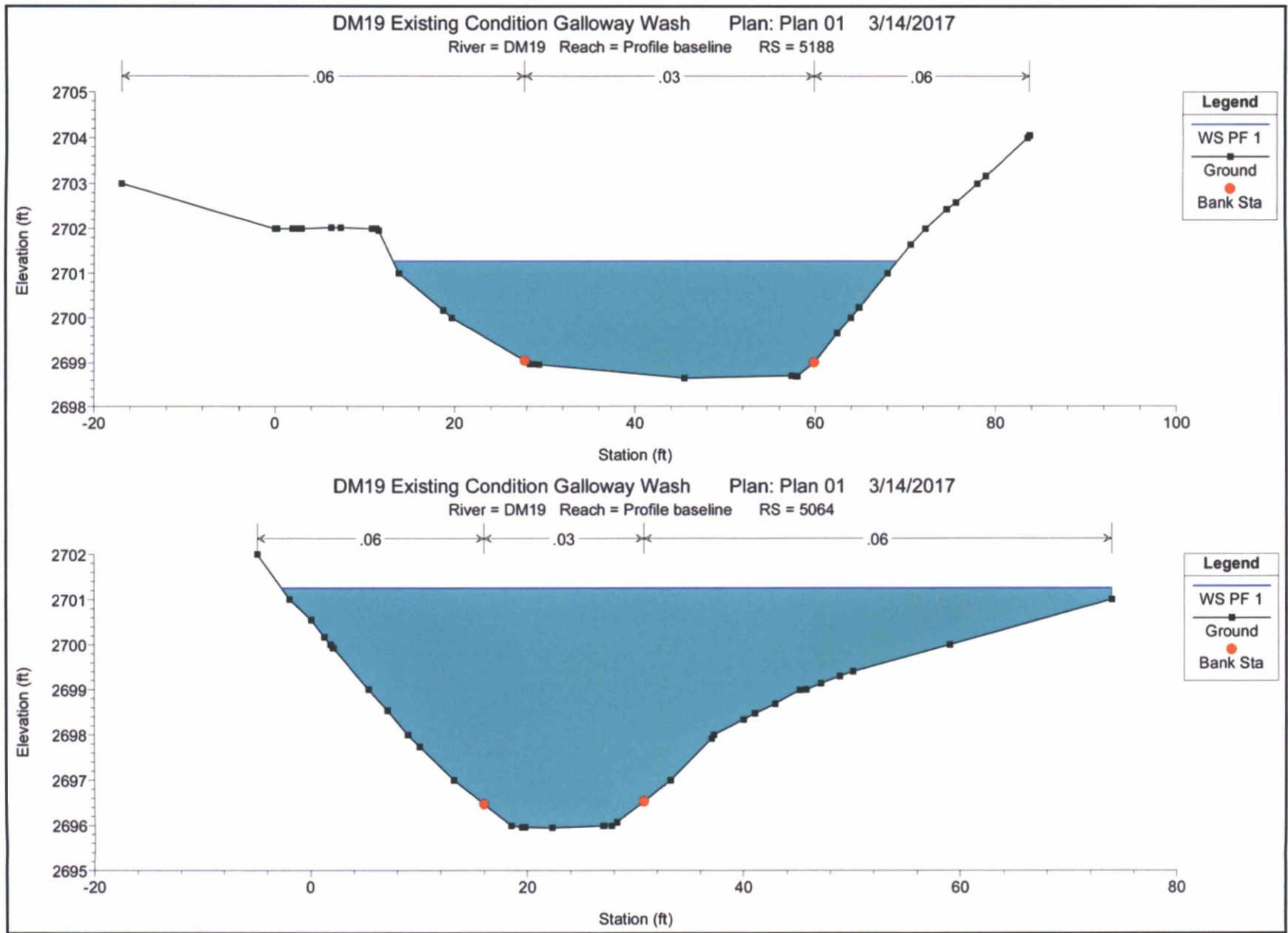
SUPERCritical

DM19 Existing Condition Galloway Wash Plan: Plan 01 3/14/2017

DM19 Profile baseline

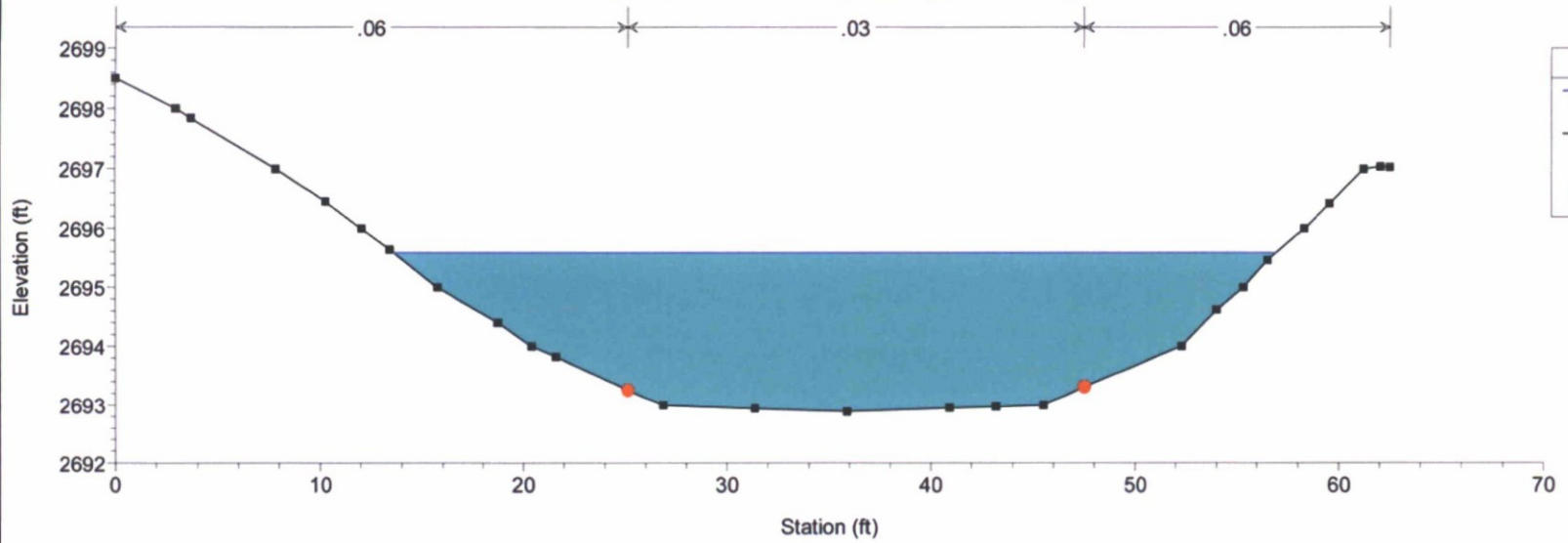


SUPERCritical



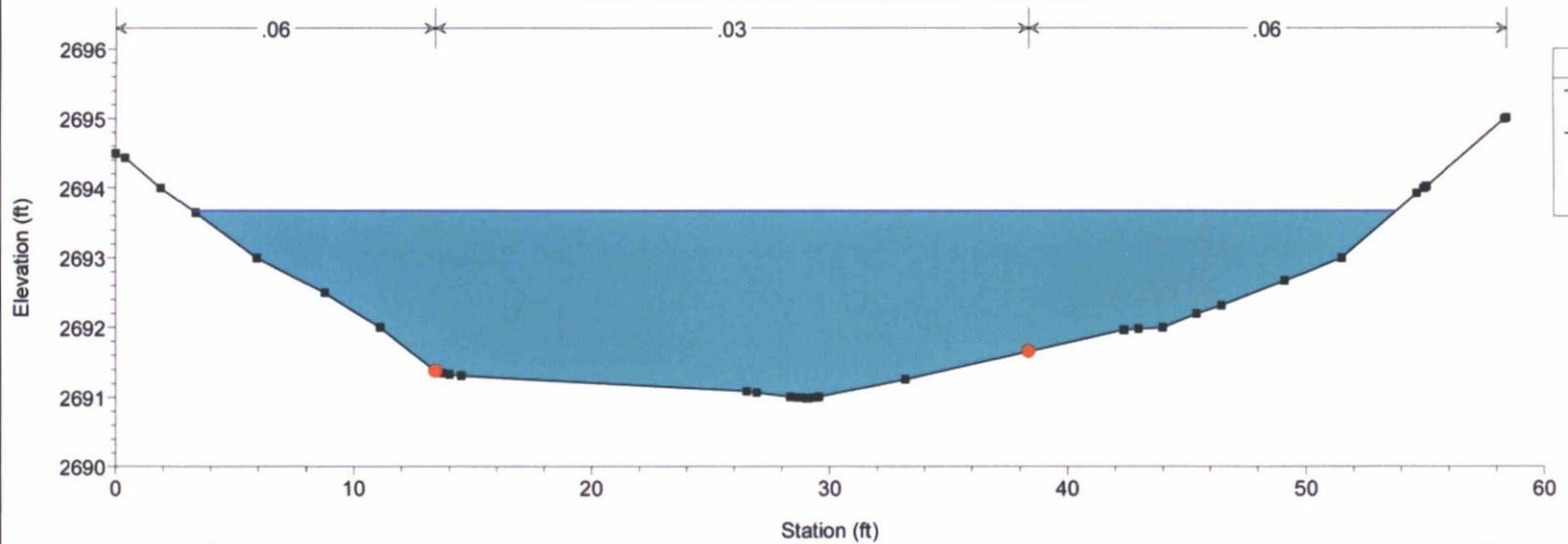
DM19 Existing Condition Galloway Wash Plan: Plan 01 3/14/2017

River = DM19 Reach = Profile baseline RS = 4898



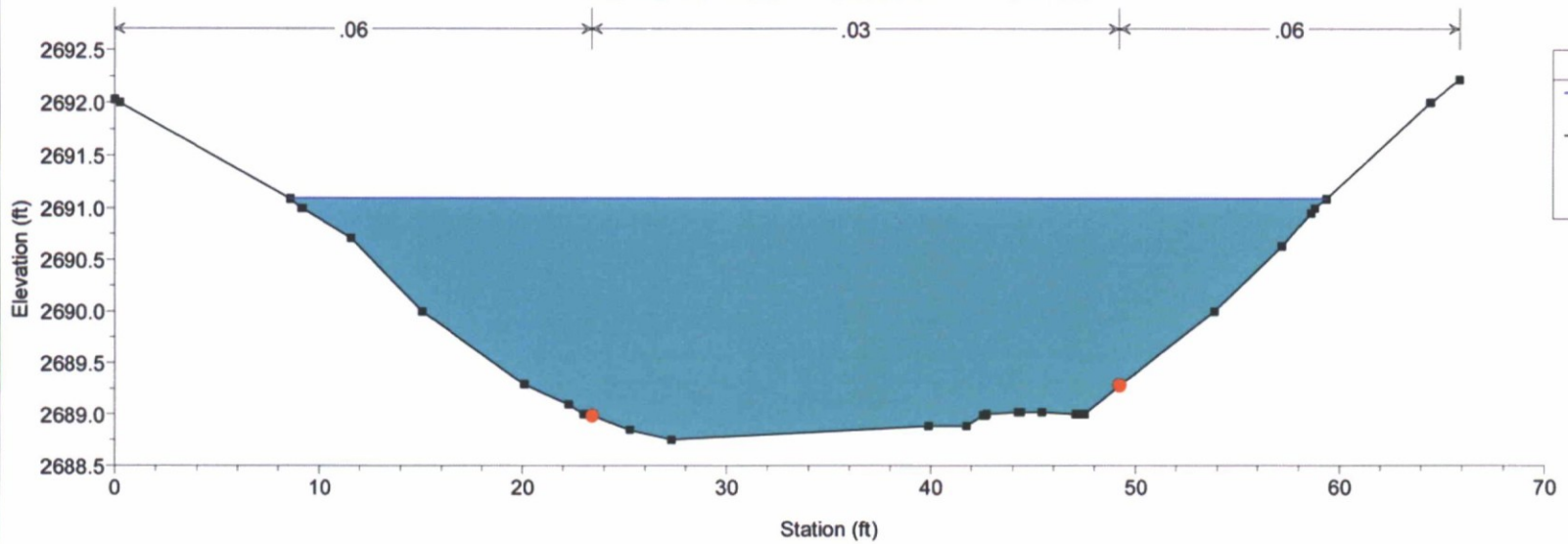
DM19 Existing Condition Galloway Wash Plan: Plan 01 3/14/2017

River = DM19 Reach = Profile baseline RS = 4839



DM19 Existing Condition Galloway Wash Plan: Plan 01 3/14/2017

River = DM19 Reach = Profile baseline RS = 4802



Legend

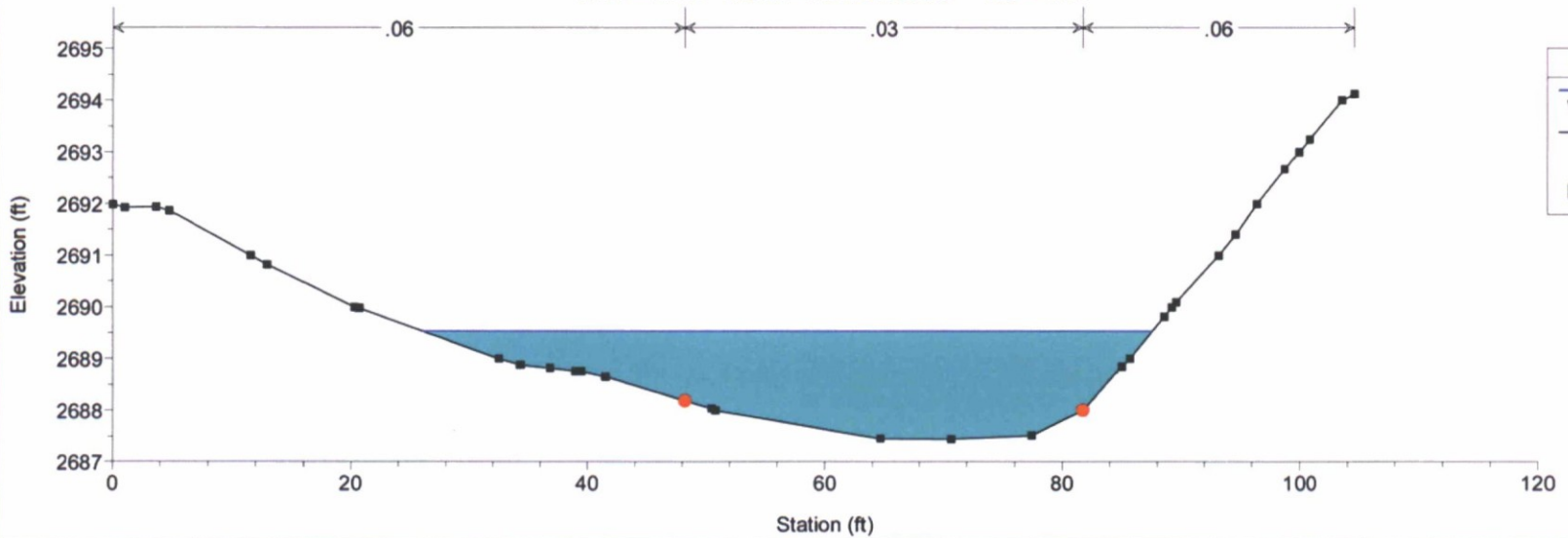
WS PF 1

Ground

Bank Sta

DM19 Existing Condition Galloway Wash Plan: Plan 01 3/14/2017

River = DM19 Reach = Profile baseline RS = 4771



Legend

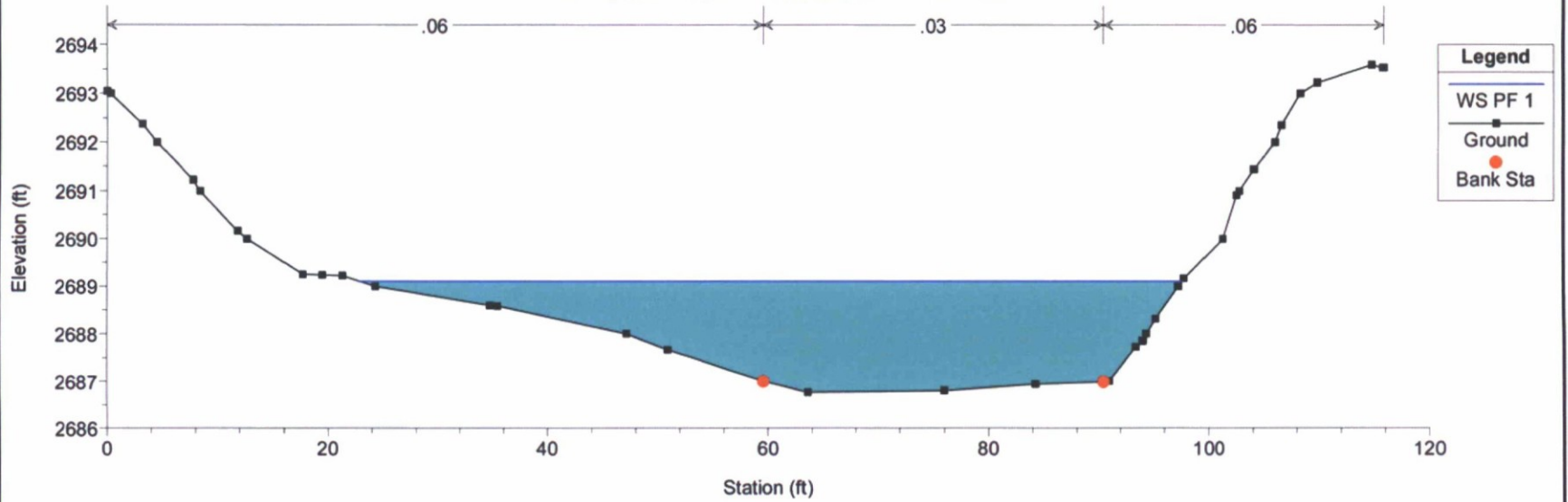
WS PF 1

Ground

Bank Sta

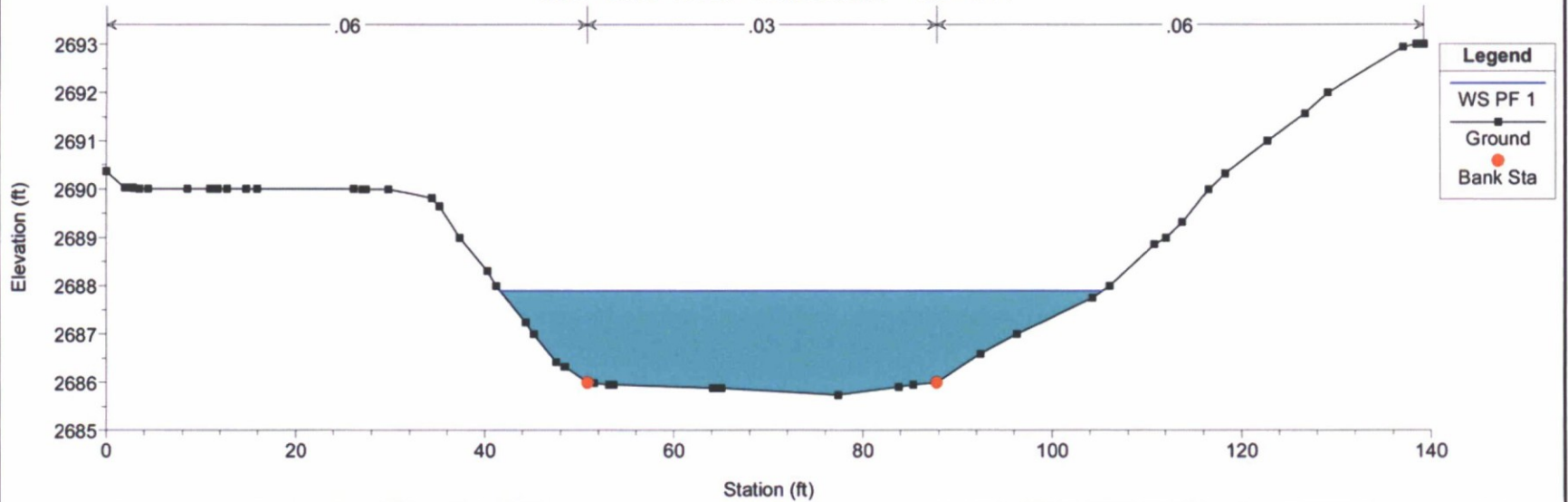
DM19 Existing Condition Galloway Wash Plan: Plan 01 3/14/2017

River = DM19 Reach = Profile baseline RS = 4745



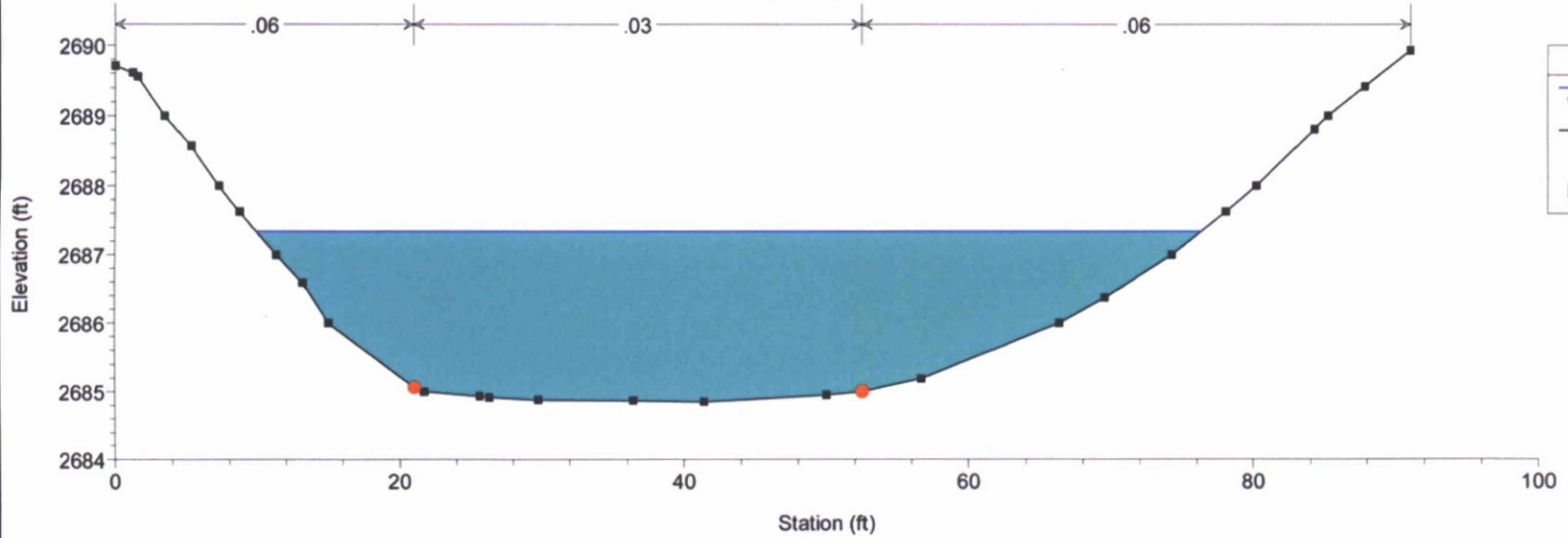
DM19 Existing Condition Galloway Wash Plan: Plan 01 3/14/2017

River = DM19 Reach = Profile baseline RS = 4711



DM19 Existing Condition Galloway Wash Plan: Plan 01 3/14/2017

River = DM19 Reach = Profile baseline RS = 4670

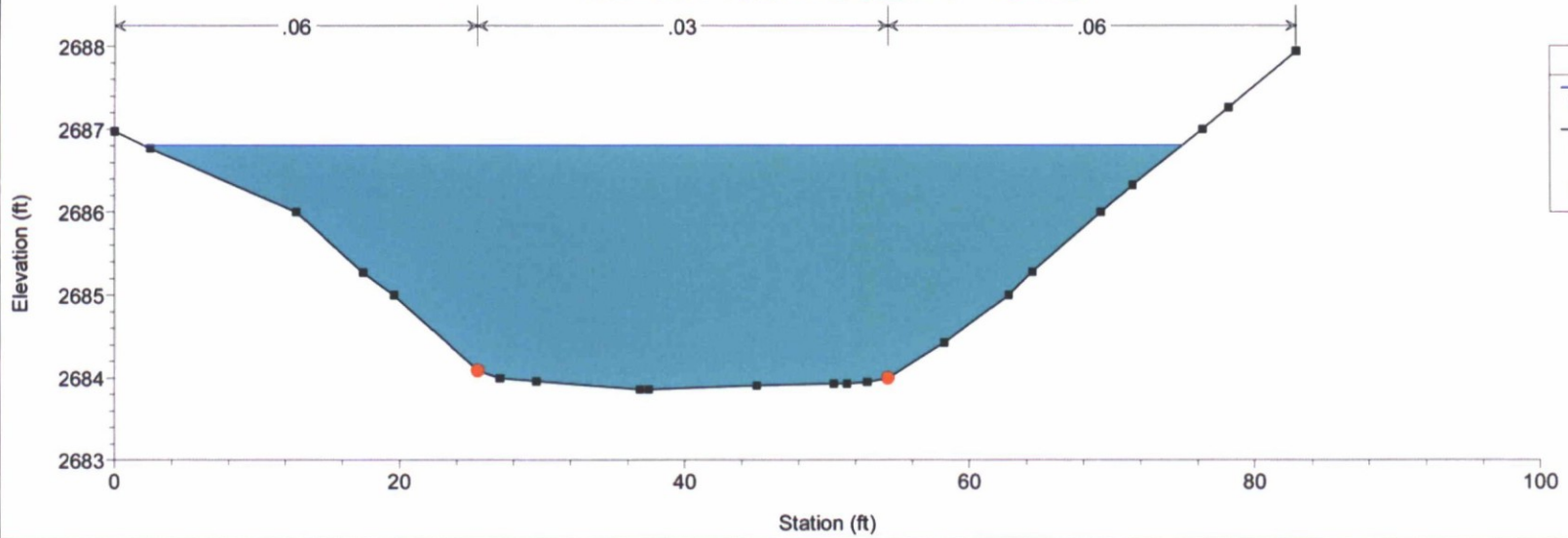


Legend

- WS PF 1
- Ground
- Bank Sta

DM19 Existing Condition Galloway Wash Plan: Plan 01 3/14/2017

River = DM19 Reach = Profile baseline RS = 4628

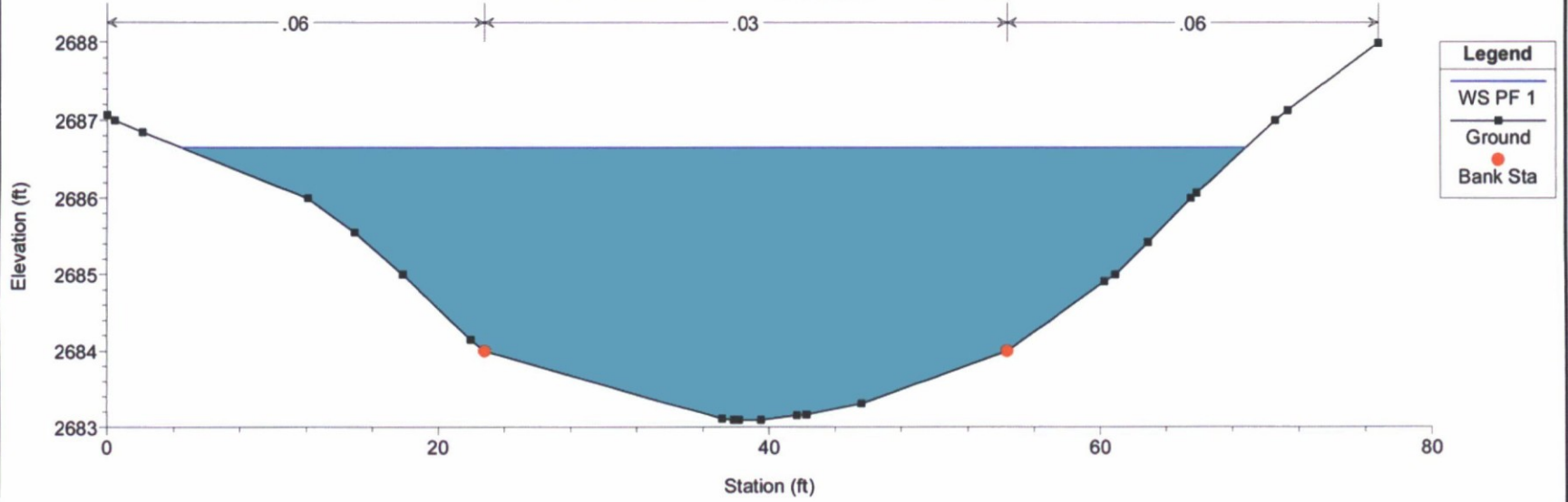


Legend

- WS PF 1
- Ground
- Bank Sta

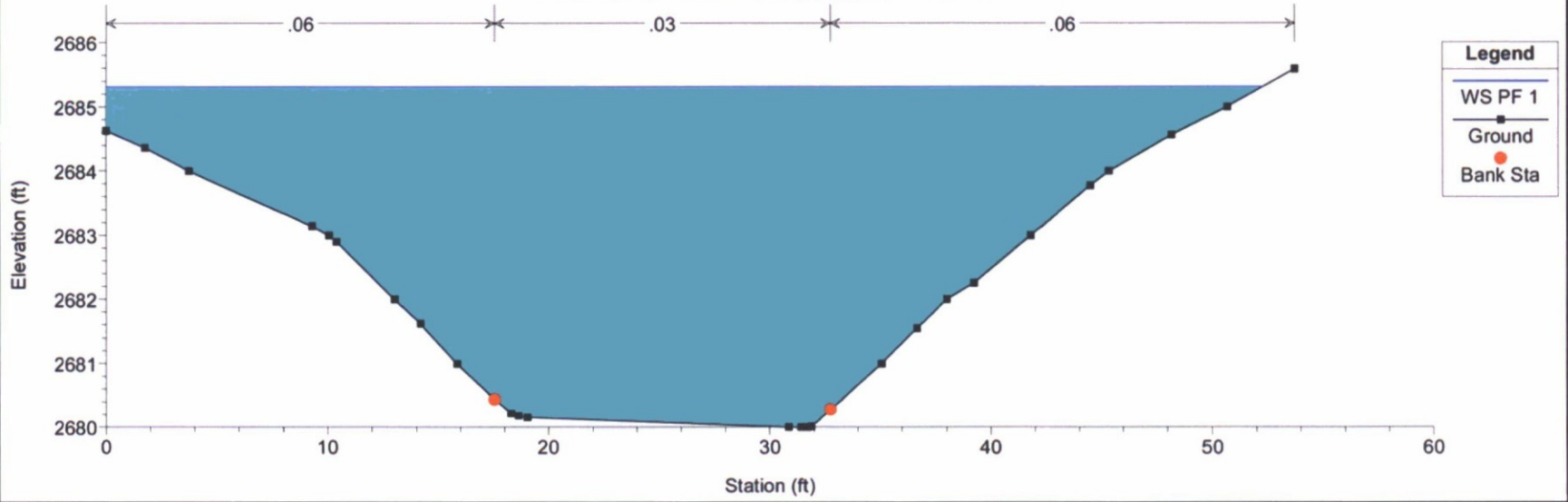
DM19 Existing Condition Galloway Wash Plan: Plan 01 3/14/2017

River = DM19 Reach = Profile baseline RS = 4603



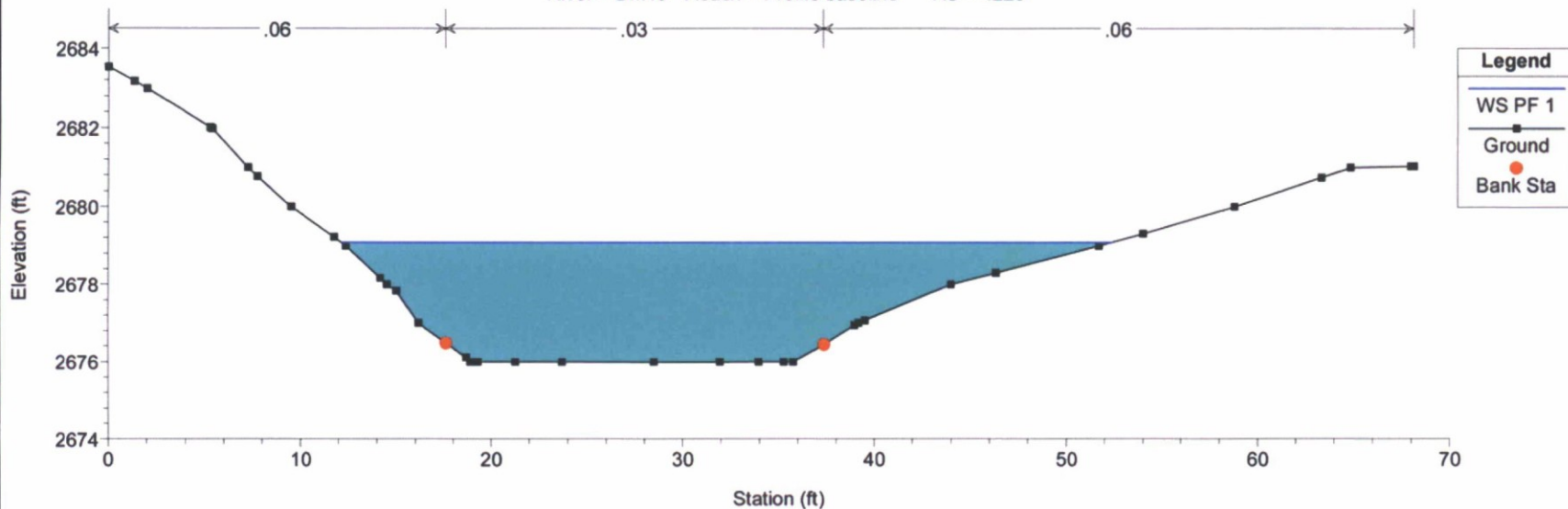
DM19 Existing Condition Galloway Wash Plan: Plan 01 3/14/2017

River = DM19 Reach = Profile baseline RS = 4441



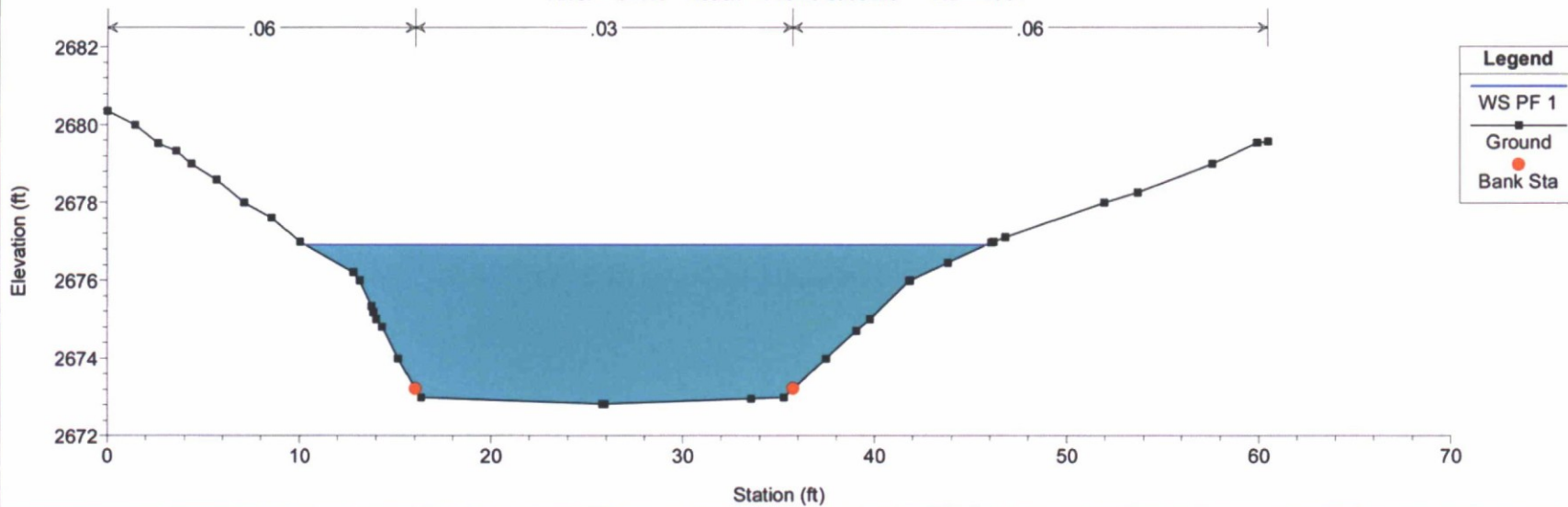
DM19 Existing Condition Galloway Wash Plan: Plan 01 3/14/2017

River = DM19 Reach = Profile baseline RS = 4229



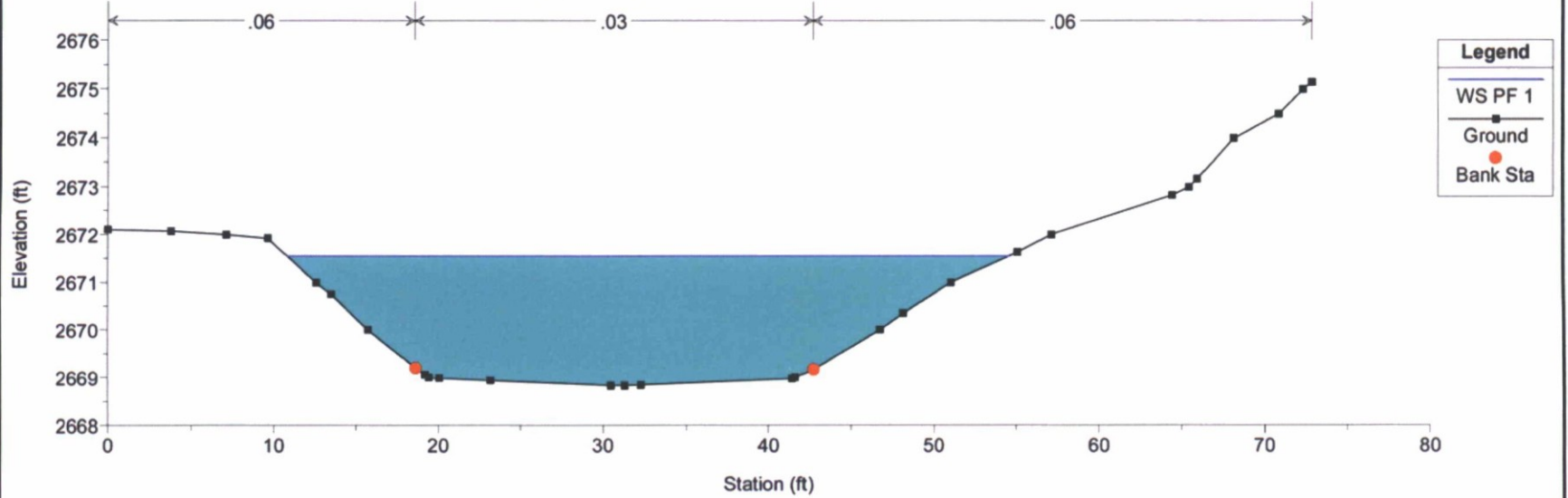
DM19 Existing Condition Galloway Wash Plan: Plan 01 3/14/2017

River = DM19 Reach = Profile baseline RS = 4061



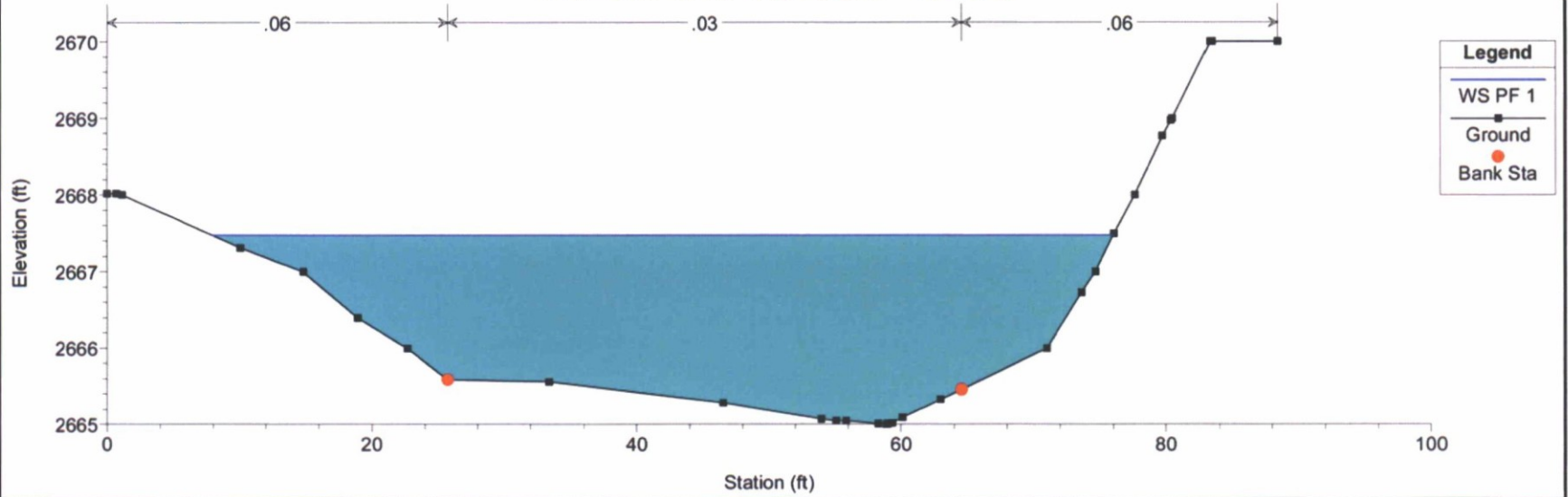
DM19 Existing Condition Galloway Wash Plan: Plan 01 3/14/2017

River = DM19 Reach = Profile baseline RS = 3880



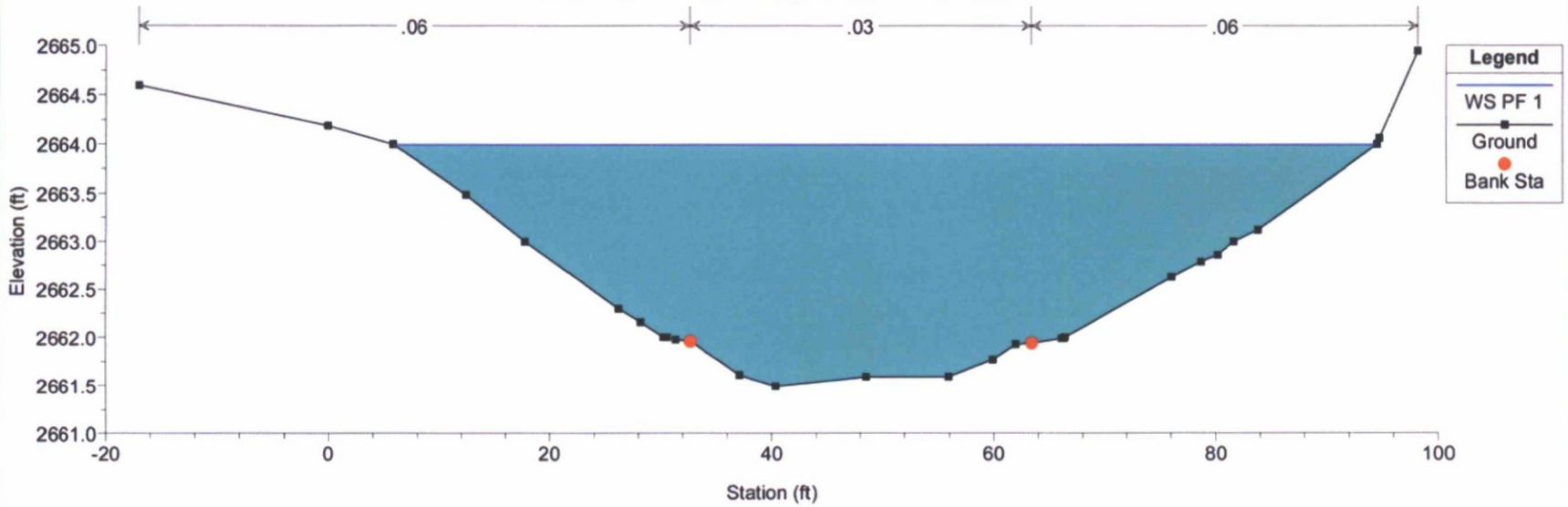
DM19 Existing Condition Galloway Wash Plan: Plan 01 3/14/2017

River = DM19 Reach = Profile baseline RS = 3702



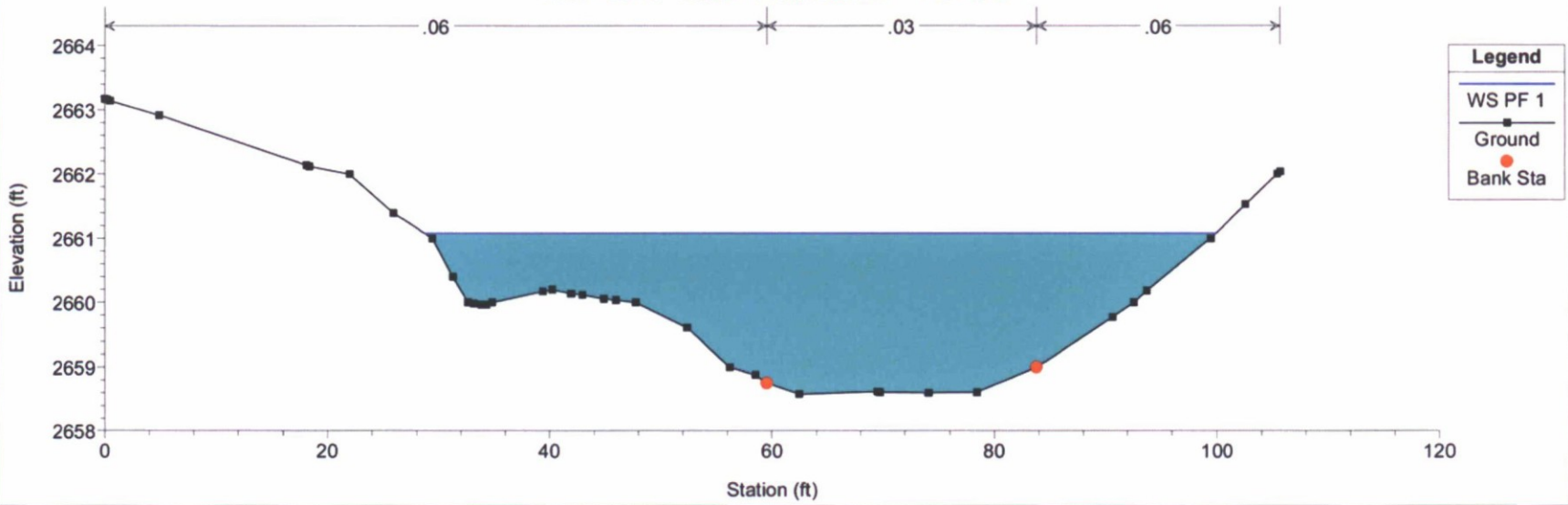
DM19 Existing Condition Galloway Wash Plan: Plan 01 3/14/2017

River = DM19 Reach = Profile baseline RS = 3557



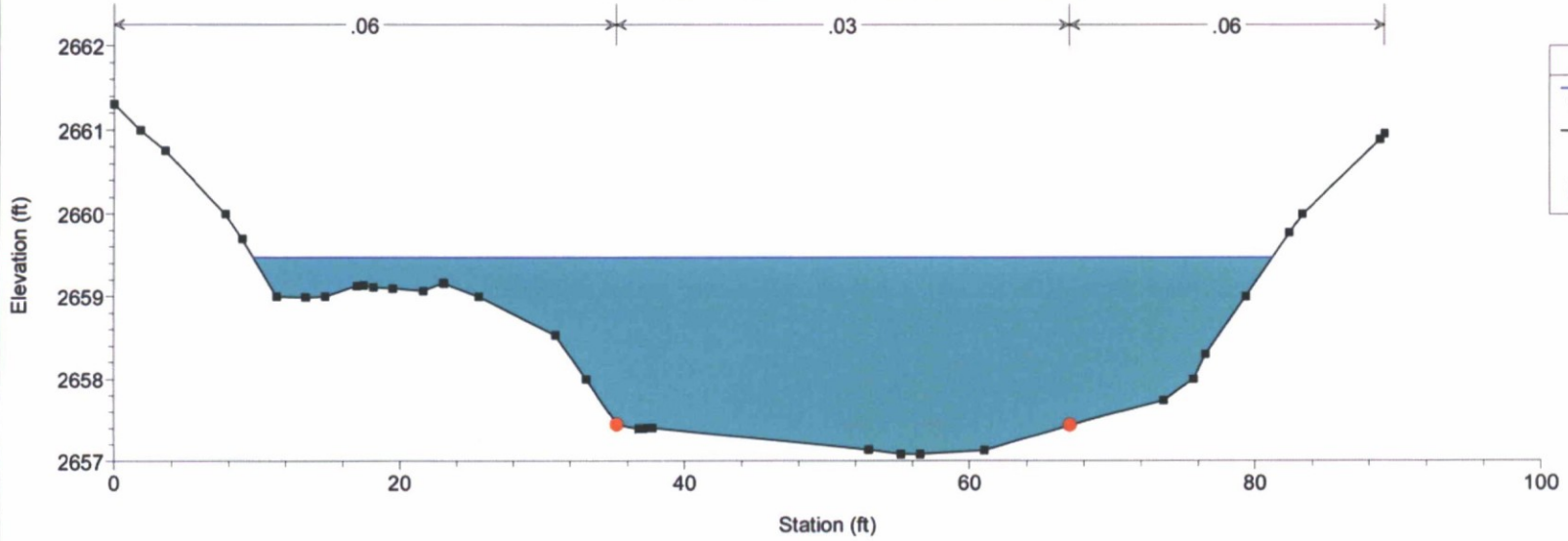
DM19 Existing Condition Galloway Wash Plan: Plan 01 3/14/2017

River = DM19 Reach = Profile baseline RS = 3497



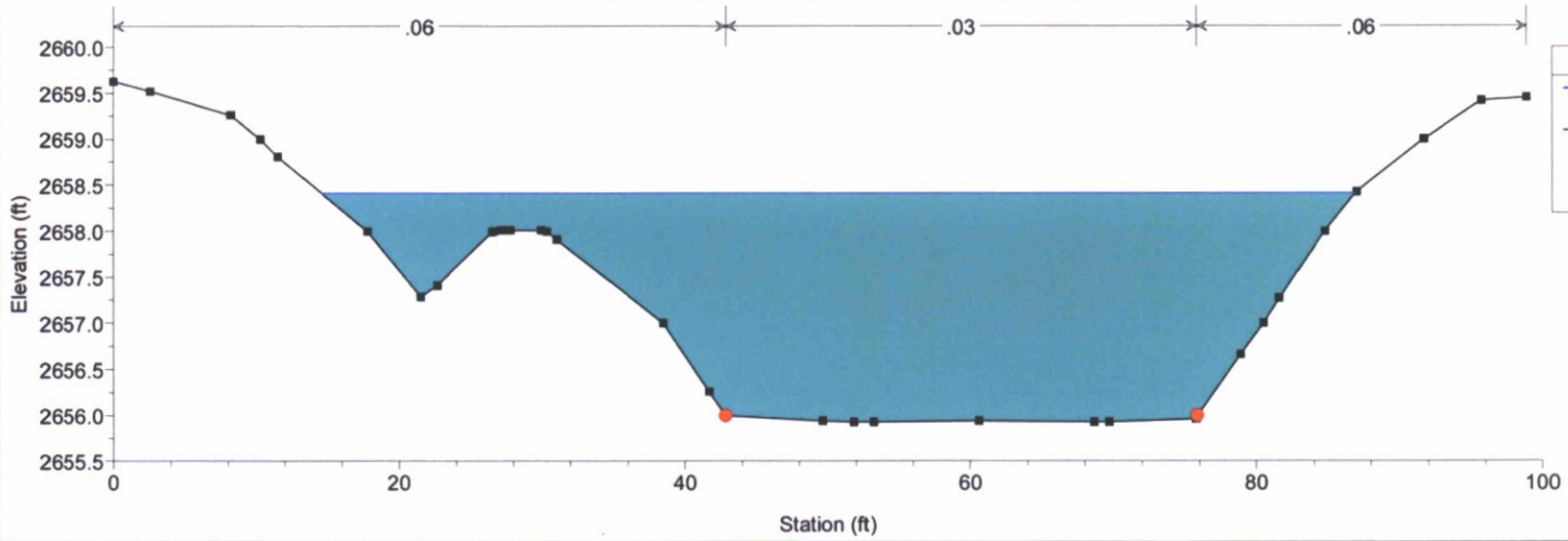
DM19 Existing Condition Galloway Wash Plan: Plan 01 3/14/2017

River = DM19 Reach = Profile baseline RS = 3445



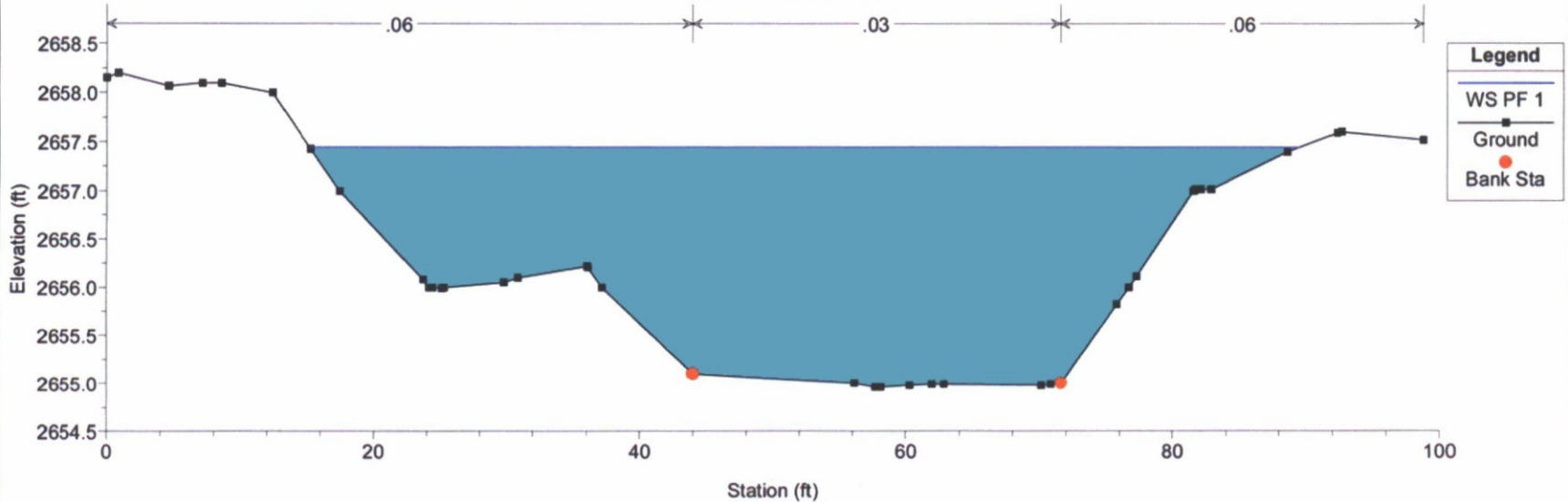
DM19 Existing Condition Galloway Wash Plan: Plan 01 3/14/2017

River = DM19 Reach = Profile baseline RS = 3389



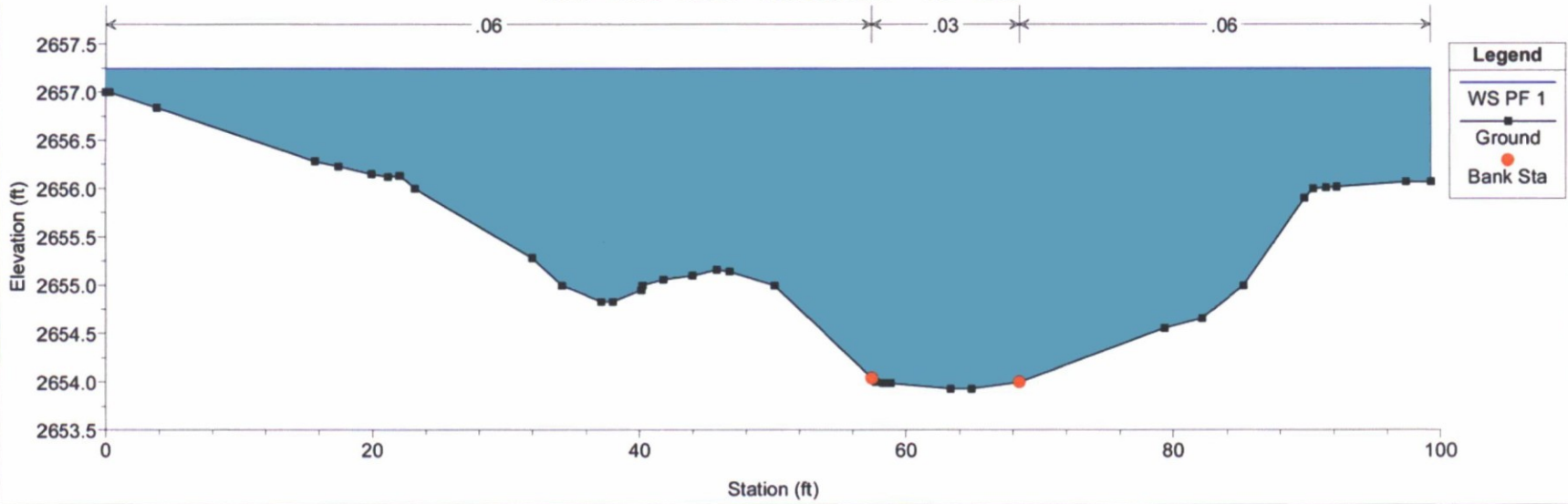
DM19 Existing Condition Galloway Wash Plan: Plan 01 3/14/2017

River = DM19 Reach = Profile baseline RS = 3362



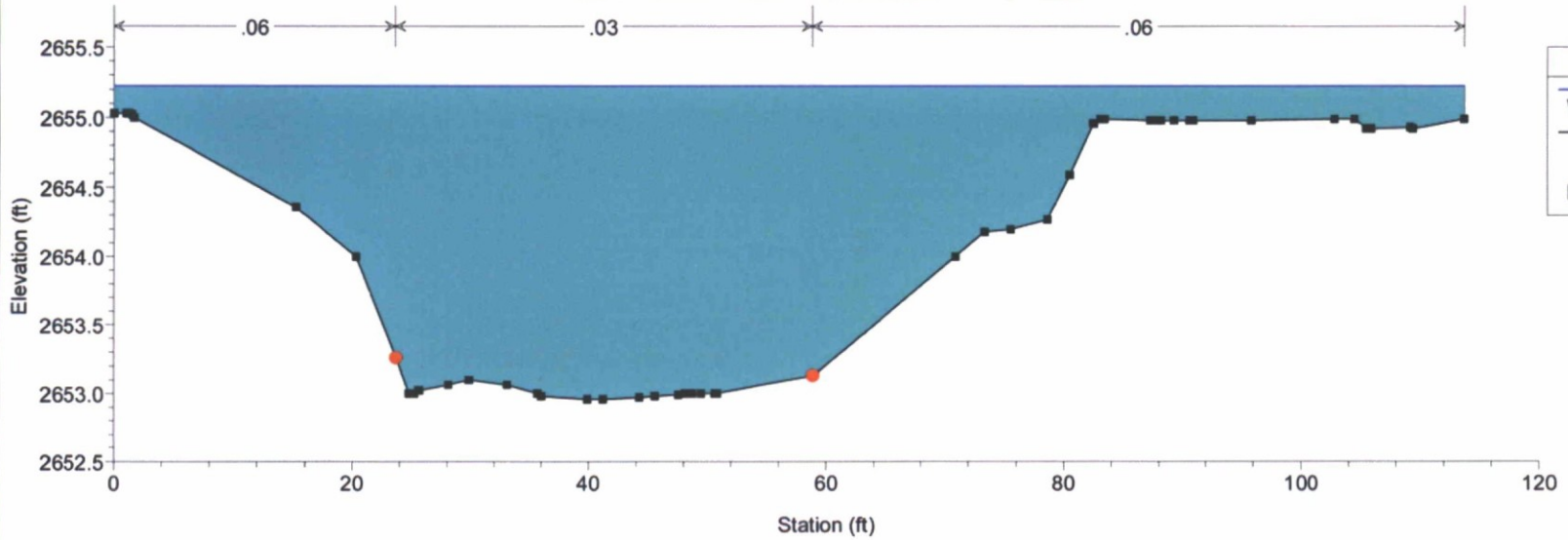
DM19 Existing Condition Galloway Wash Plan: Plan 01 3/14/2017

River = DM19 Reach = Profile baseline RS = 3306



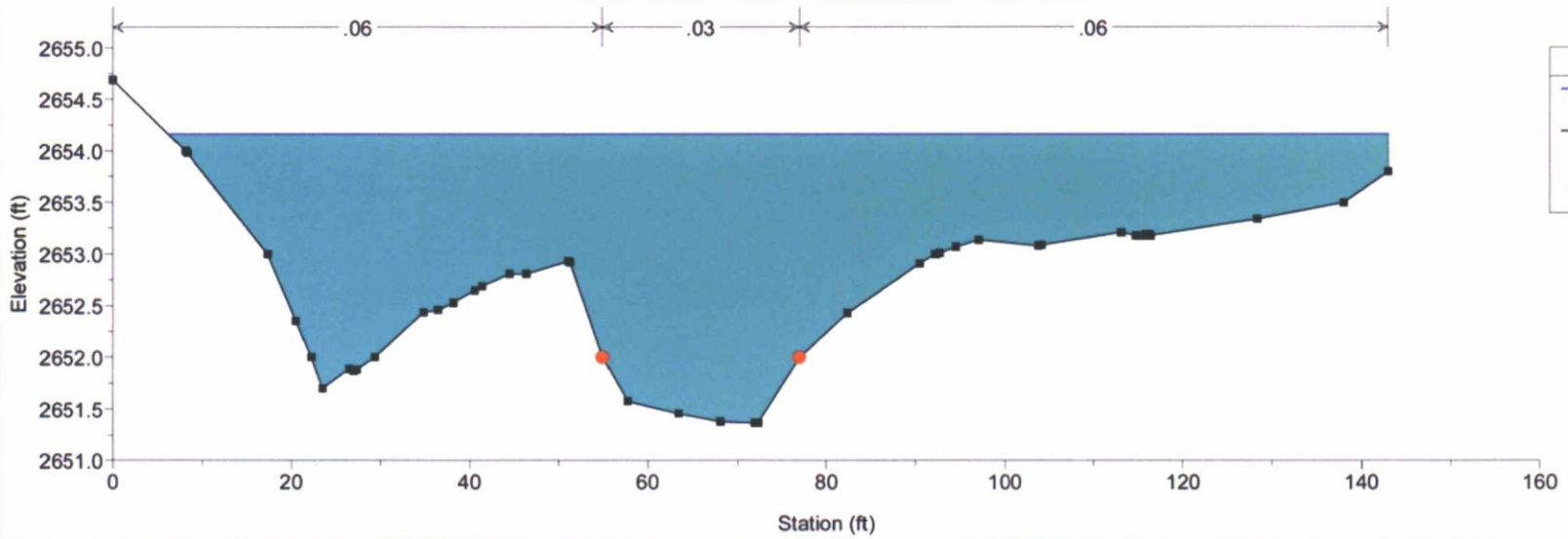
DM19 Existing Condition Galloway Wash Plan: Plan 01 3/14/2017

River = DM19 Reach = Profile baseline RS = 3265



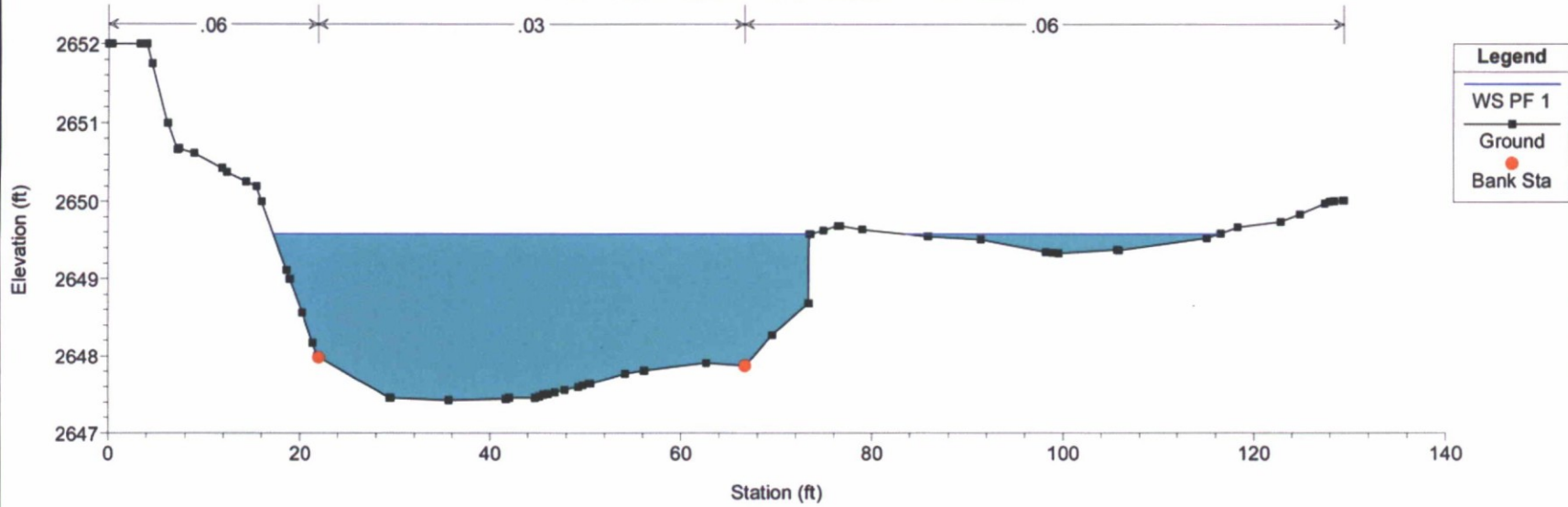
DM19 Existing Condition Galloway Wash Plan: Plan 01 3/14/2017

River = DM19 Reach = Profile baseline RS = 3179



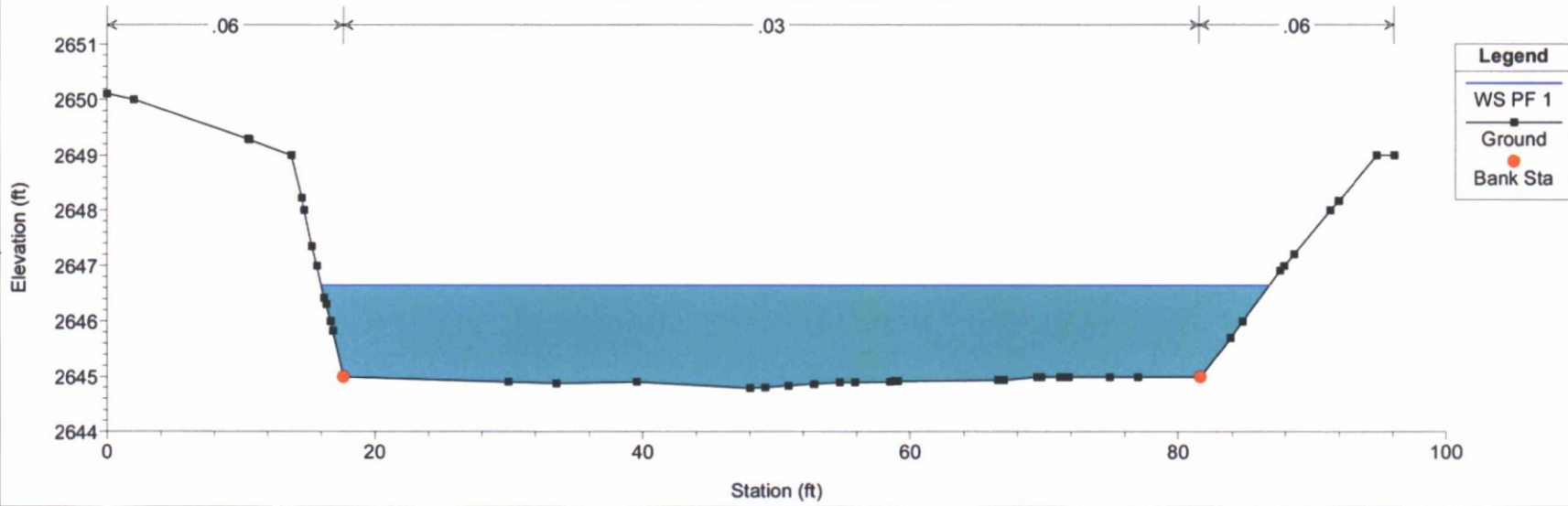
DM19 Existing Condition Galloway Wash Plan: Plan 01 3/14/2017

River = DM19 Reach = Profile baseline RS = 3043



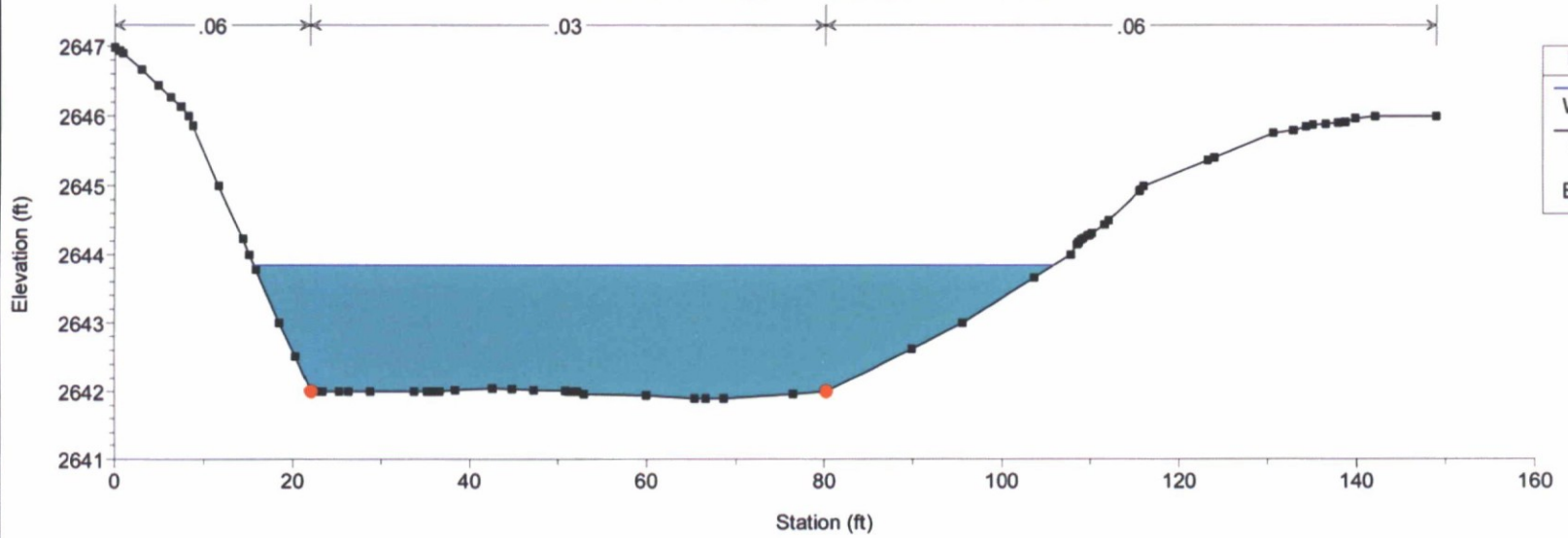
DM19 Existing Condition Galloway Wash Plan: Plan 01 3/14/2017

River = DM19 Reach = Profile baseline RS = 2914



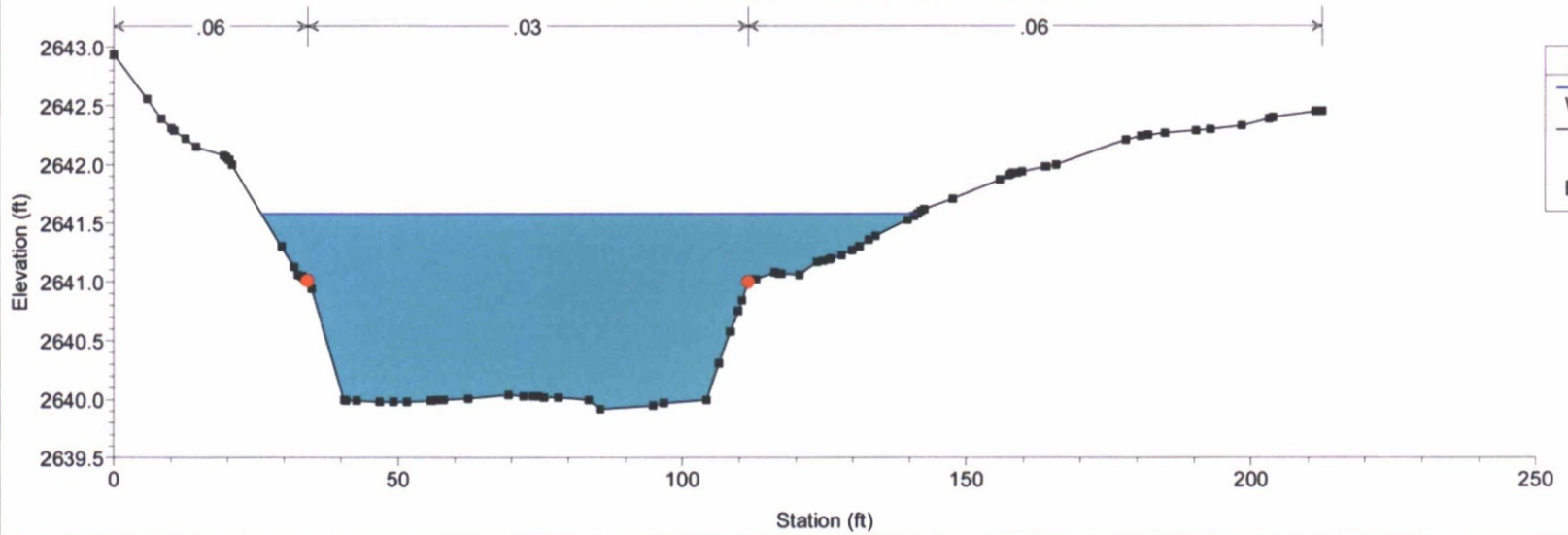
DM19 Existing Condition Galloway Wash Plan: Plan 01 3/14/2017

River = DM19 Reach = Profile baseline RS = 2774



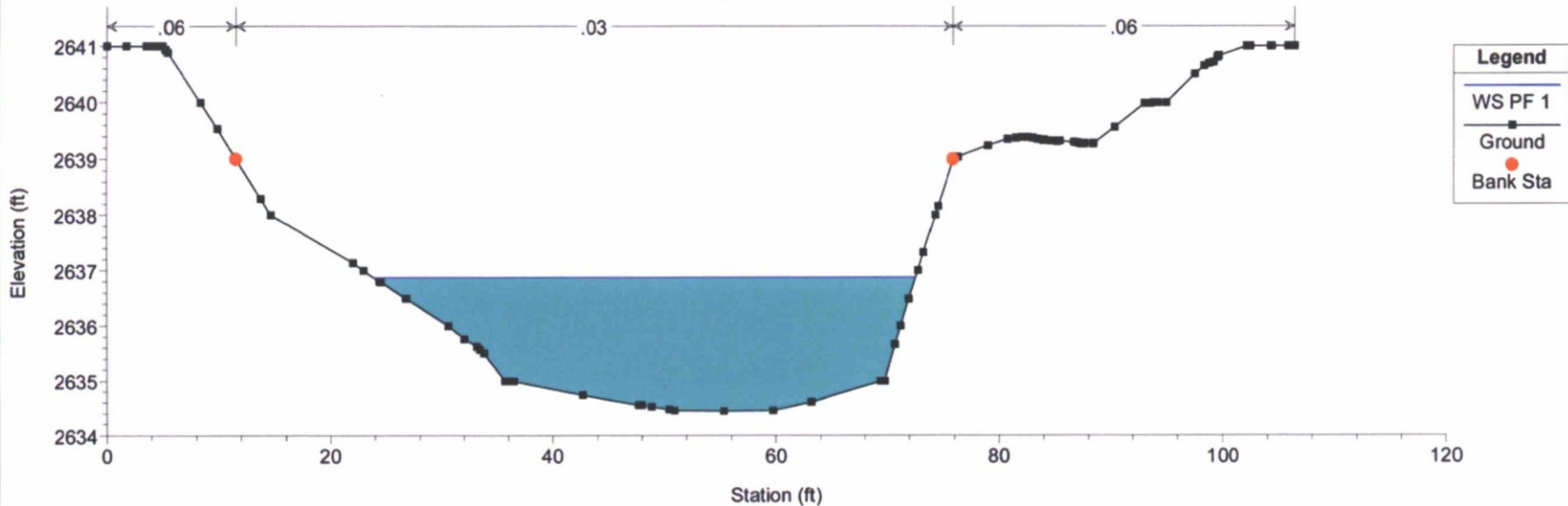
DM19 Existing Condition Galloway Wash Plan: Plan 01 3/14/2017

River = DM19 Reach = Profile baseline RS = 2678



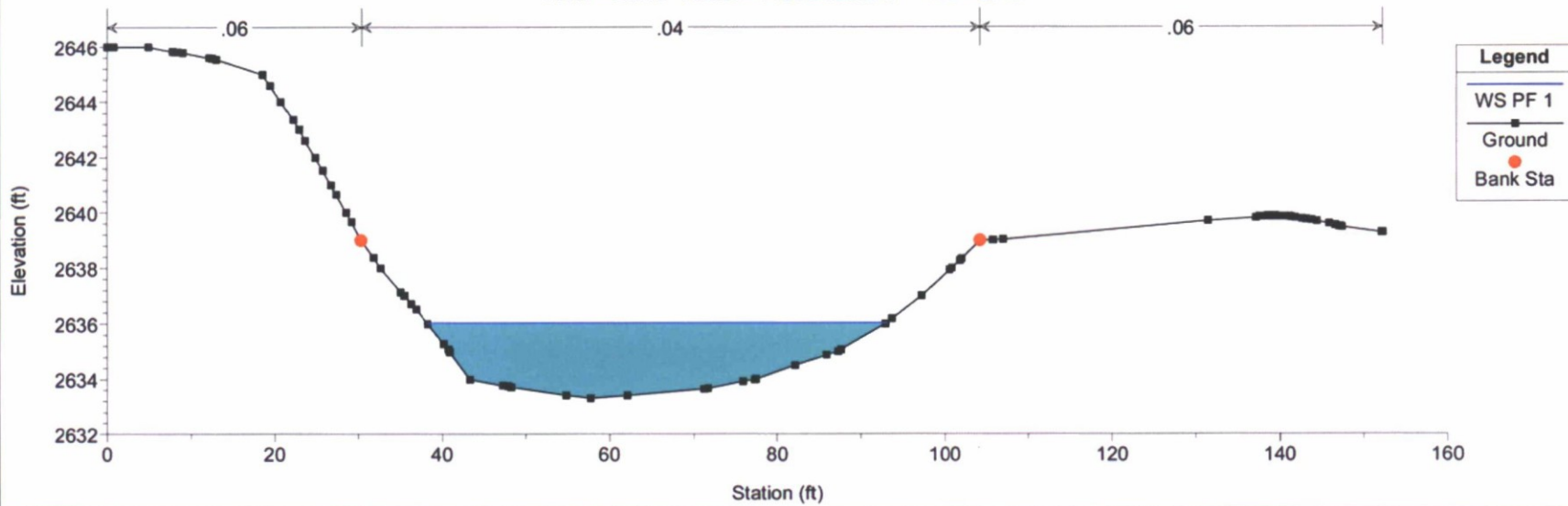
DM19 Existing Condition Galloway Wash Plan: Plan 01 3/14/2017

River = DM19 Reach = Profile baseline RS = 2578



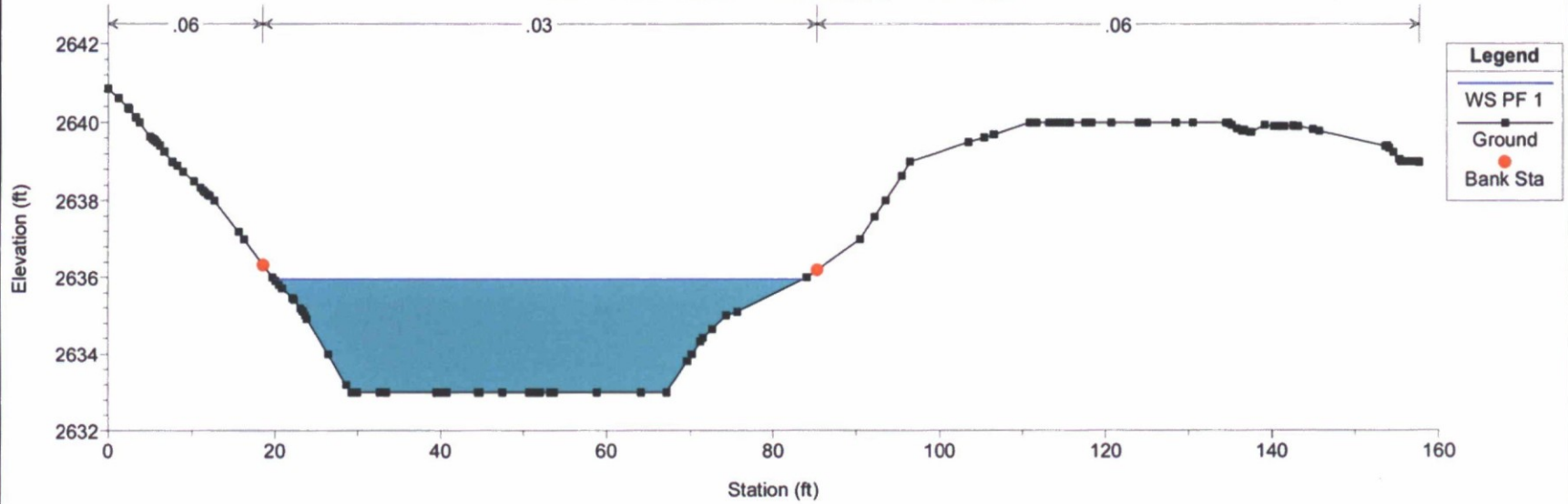
DM19 Existing Condition Galloway Wash Plan: Plan 01 3/14/2017

River = DM19 Reach = Profile baseline RS = 2540



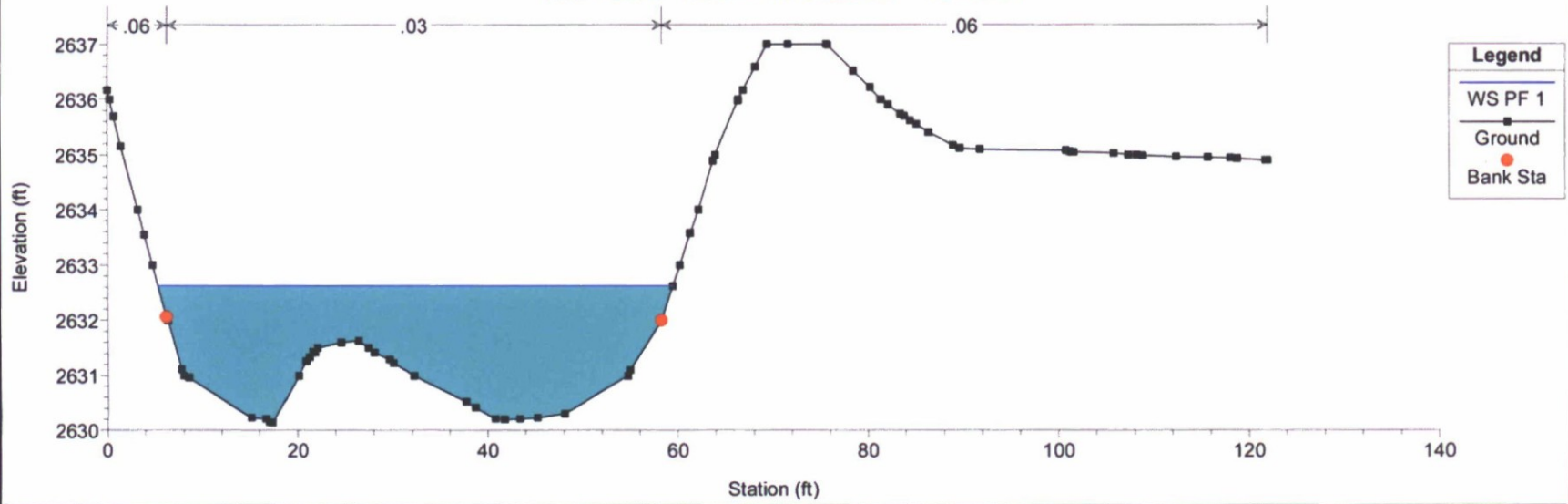
DM19 Existing Condition Galloway Wash Plan: Plan 01 3/14/2017

River = DM19 Reach = Profile baseline RS = 2500



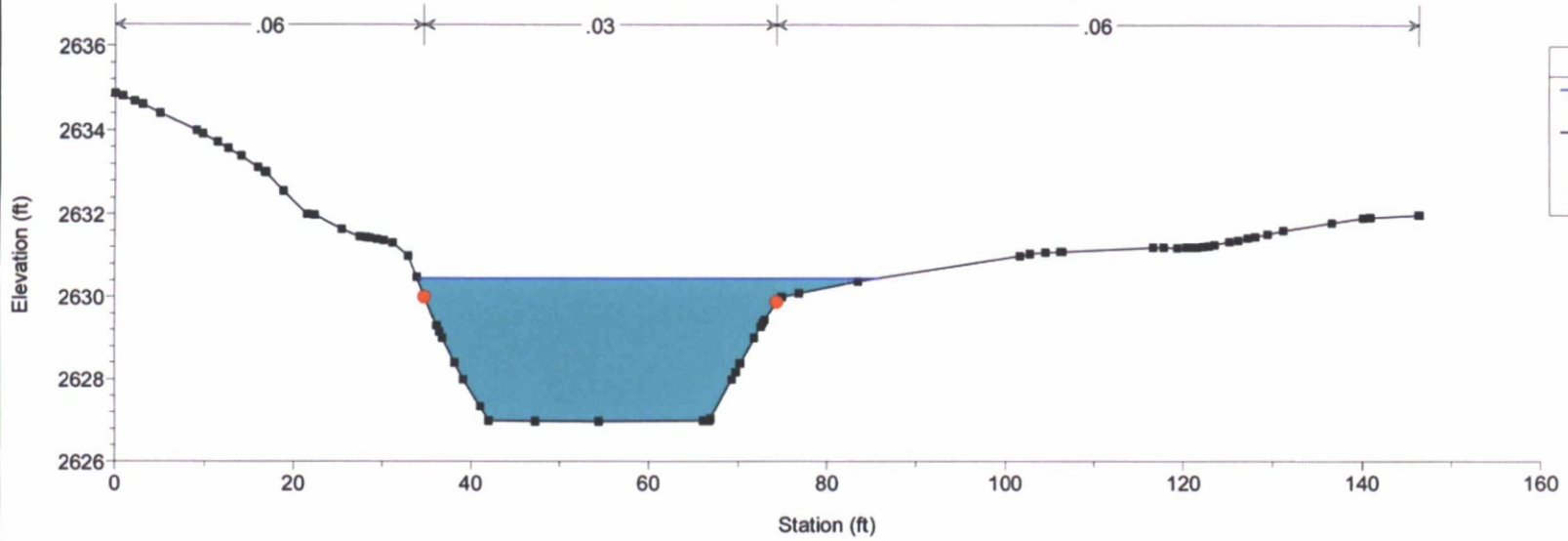
DM19 Existing Condition Galloway Wash Plan: Plan 01 3/14/2017

River = DM19 Reach = Profile baseline RS = 2405



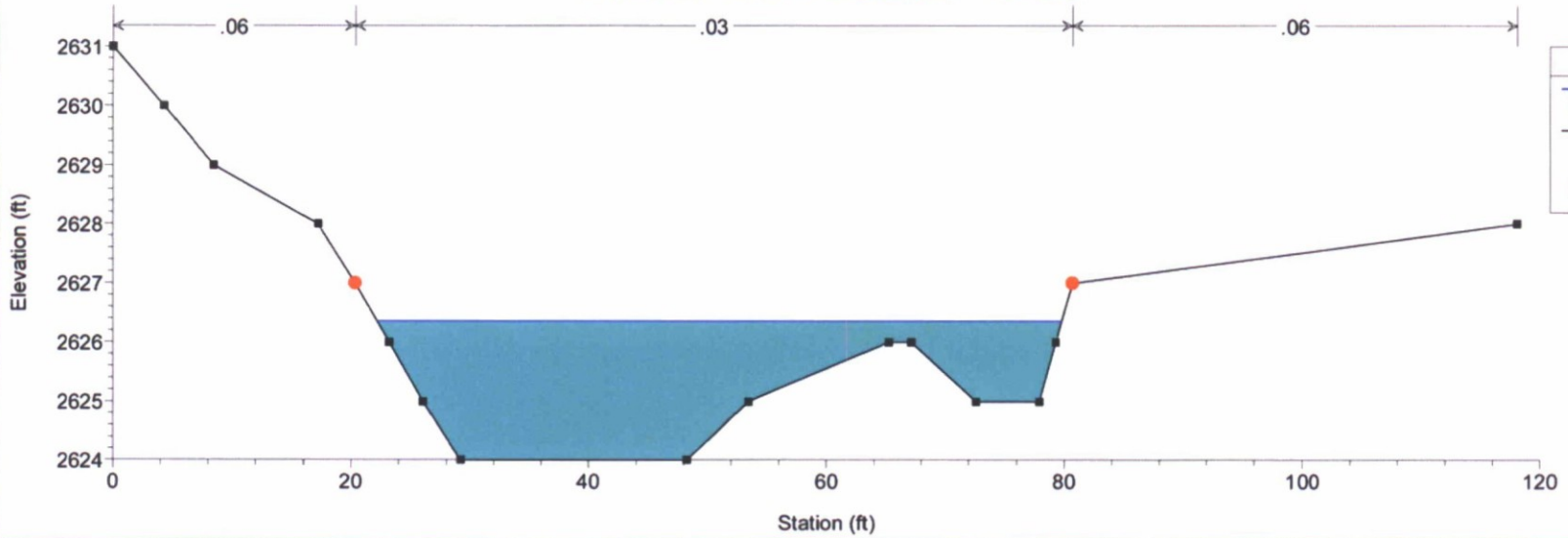
DM19 Existing Condition Galloway Wash Plan: Plan 01 3/14/2017

River = DM19 Reach = Profile baseline RS = 2250



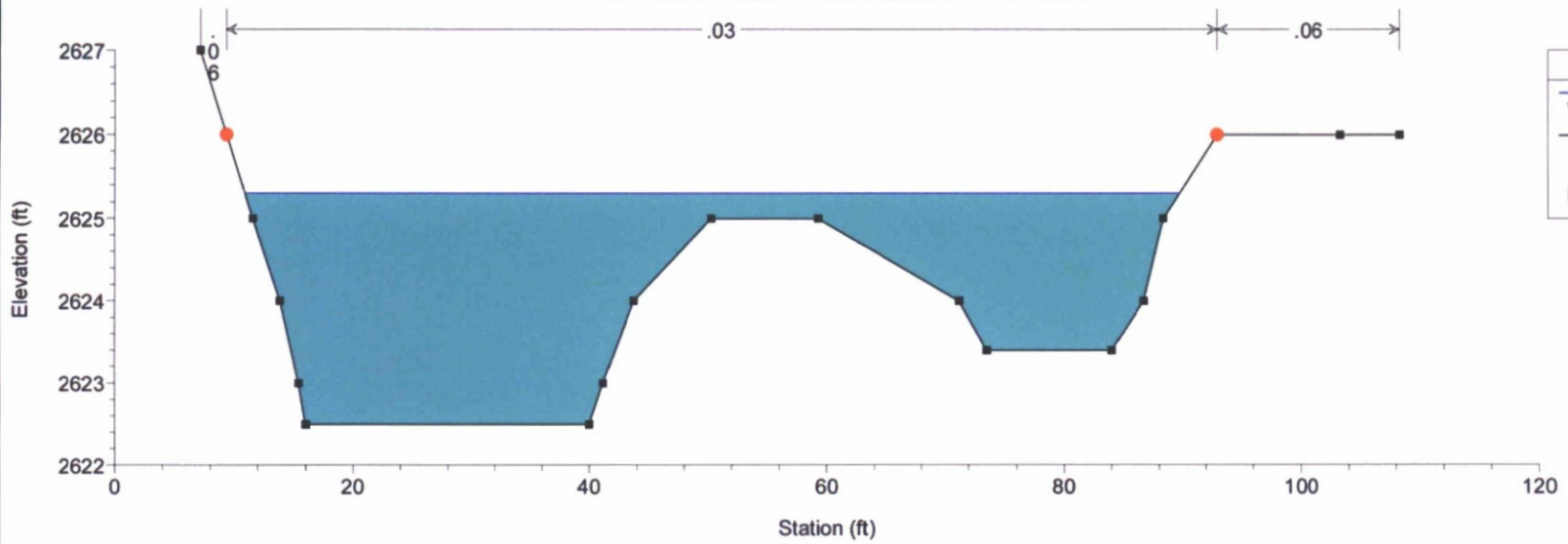
DM19 Existing Condition Galloway Wash Plan: Plan 01 3/14/2017

River = DM19 Reach = Profile baseline RS = 2130



DM19 Existing Condition Galloway Wash Plan: Plan 01 3/14/2017

River = DM19 Reach = Profile baseline RS = 2056

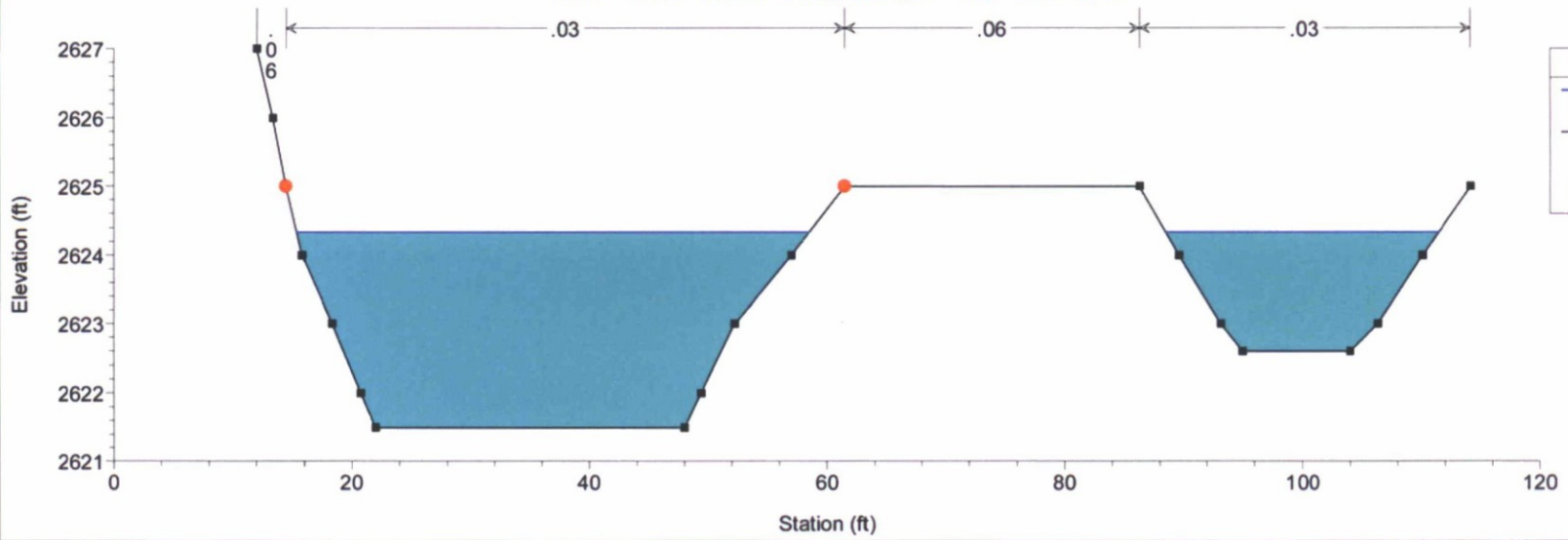


Legend

- WS PF 1
- Ground
- Bank Sta

DM19 Existing Condition Galloway Wash Plan: Plan 01 3/14/2017

River = DM19 Reach = Profile baseline RS = 2014 cs 60

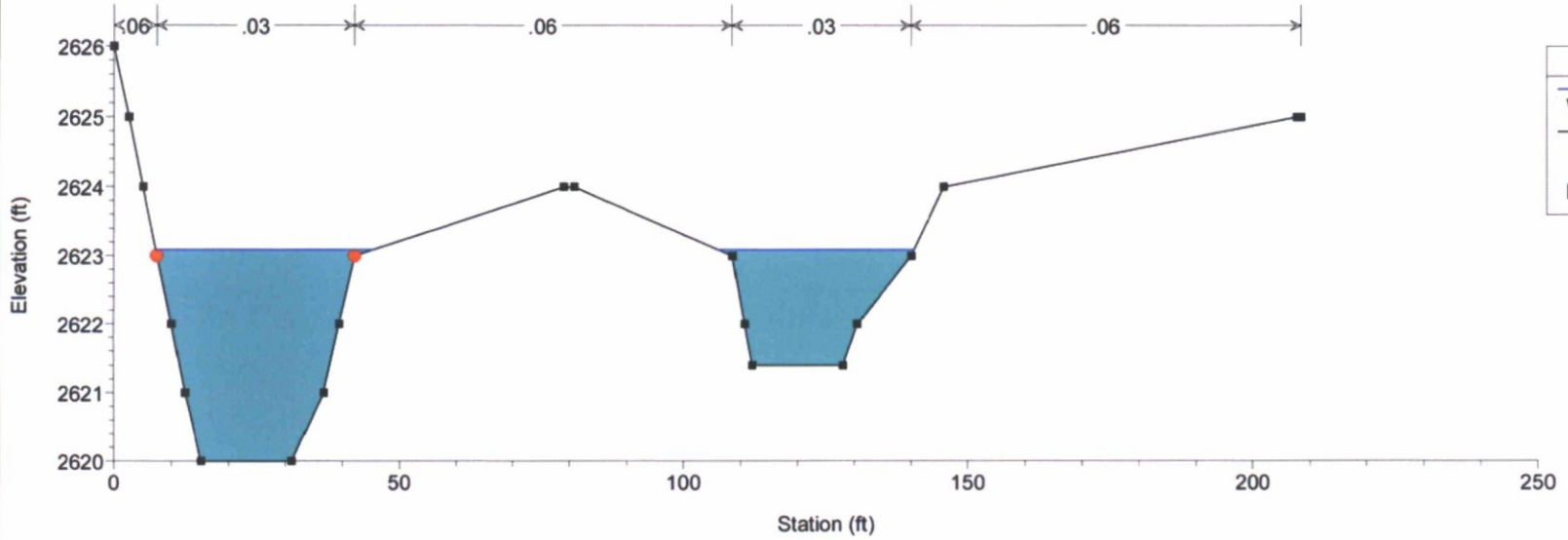


Legend

- WS PF 1
- Ground
- Bank Sta

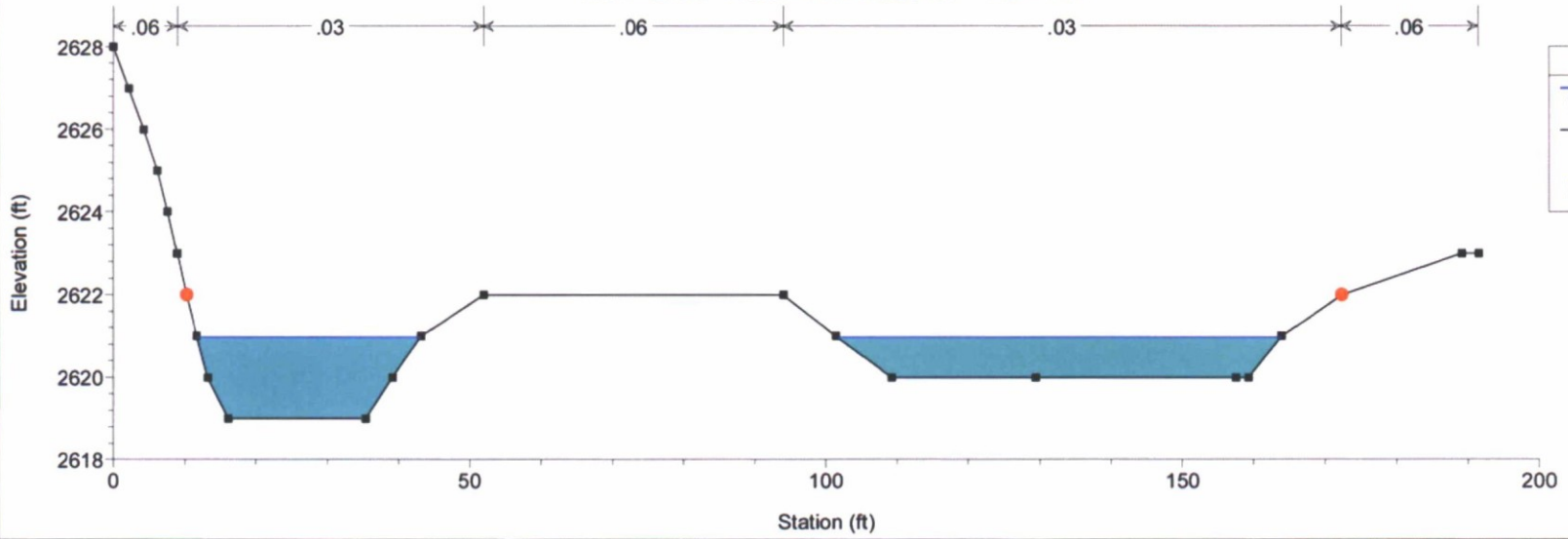
DM19 Existing Condition Galloway Wash Plan: Plan 01 3/14/2017

River = DM19 Reach = Profile baseline RS = 1952



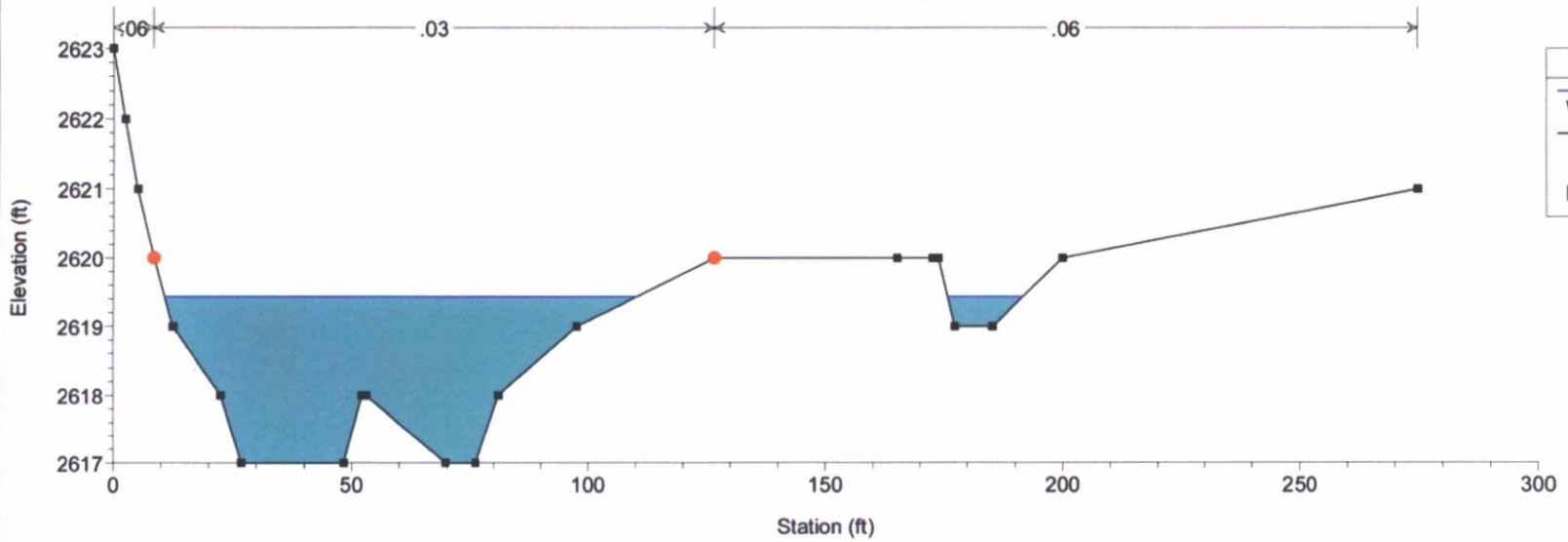
DM19 Existing Condition Galloway Wash Plan: Plan 01 3/14/2017

River = DM19 Reach = Profile baseline RS = 1891



DM19 Existing Condition Galloway Wash Plan: Plan 01 3/14/2017

River = DM19 Reach = Profile baseline RS = 1791

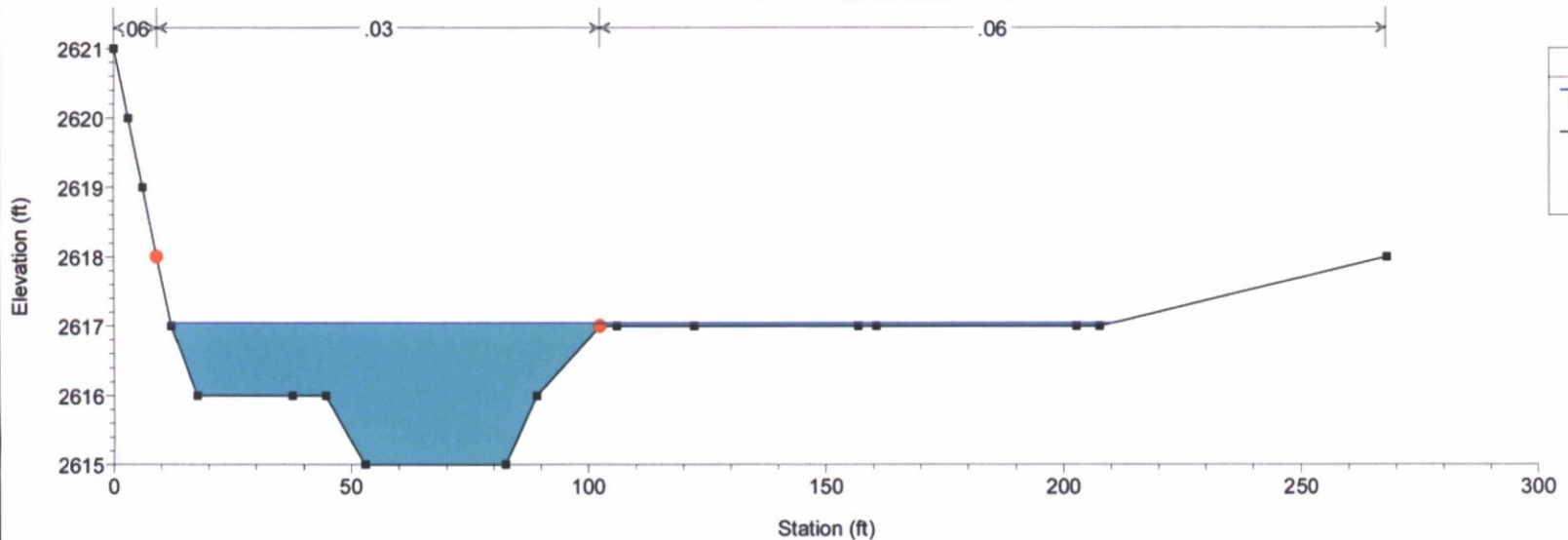


Legend

- WS PF 1
- Ground
- Bank Sta

DM19 Existing Condition Galloway Wash Plan: Plan 01 3/14/2017

River = DM19 Reach = Profile baseline RS = 1705

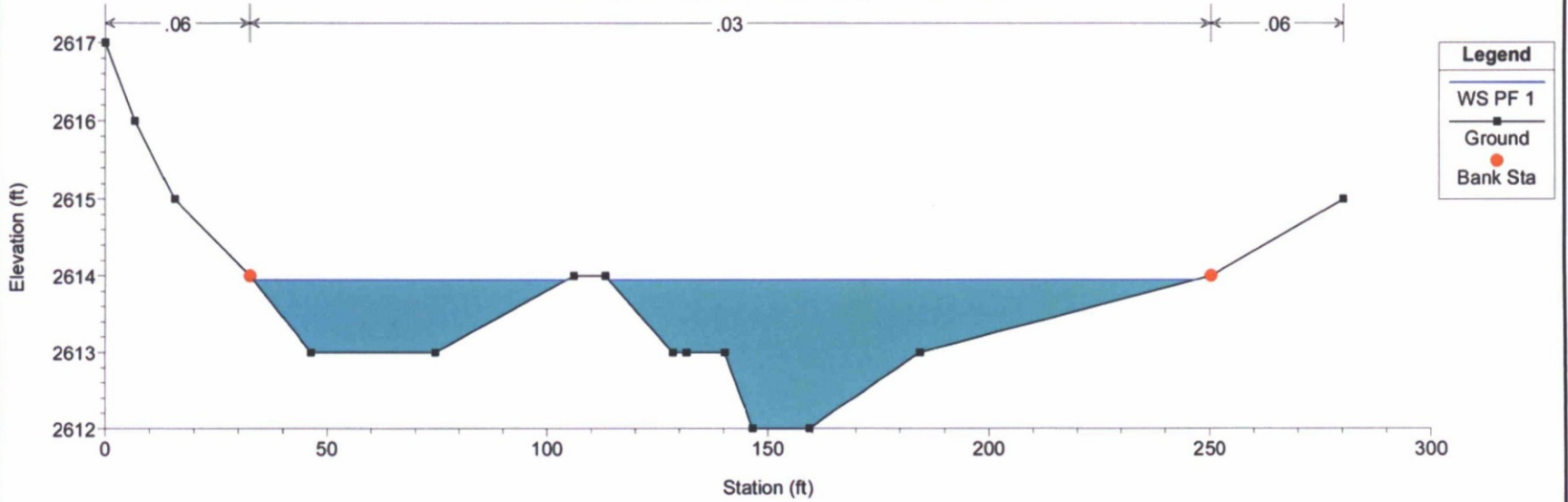


Legend

- WS PF 1
- Ground
- Bank Sta

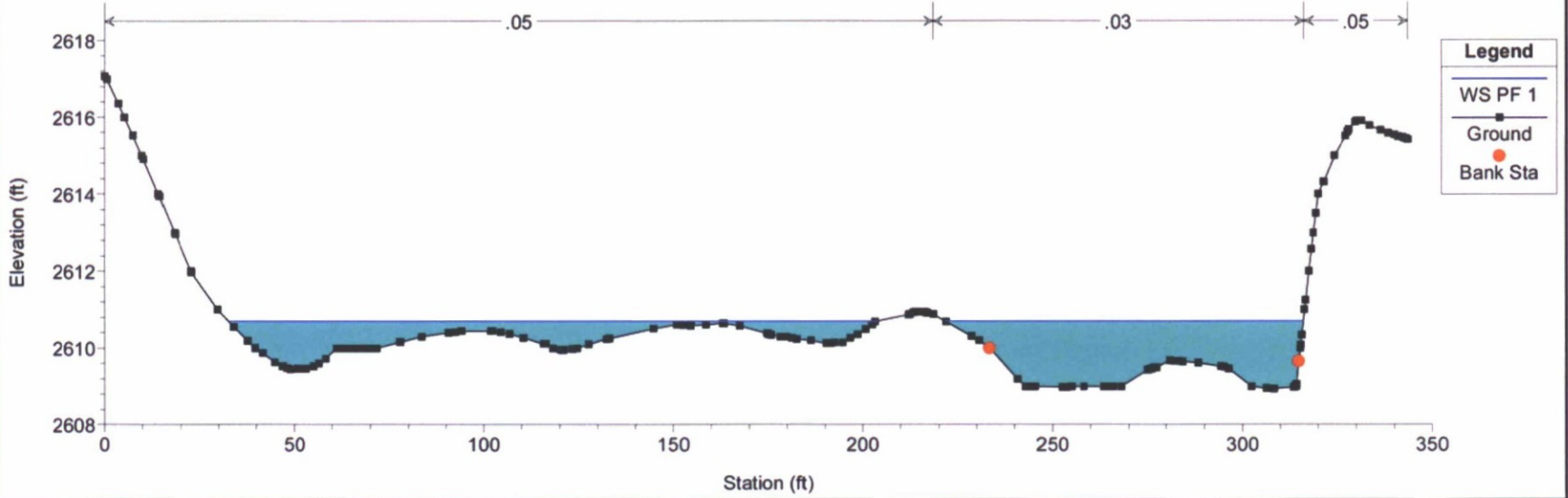
DM19 Existing Condition Galloway Wash Plan: Plan 01 3/14/2017

River = DM19 Reach = Profile baseline RS = 1583



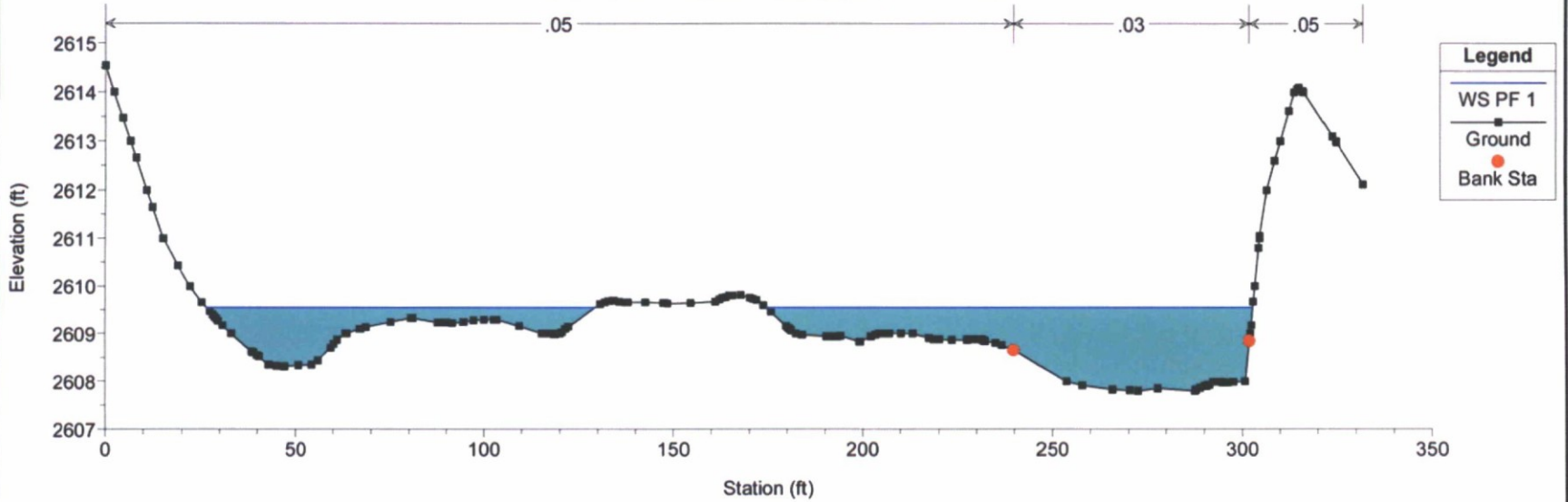
DM19 Existing Condition Galloway Wash Plan: Plan 01 3/14/2017

River = DM19 Reach = Profile baseline RS = 1447 Updated CS with new 1 ft topo = FEMA CS 4.832



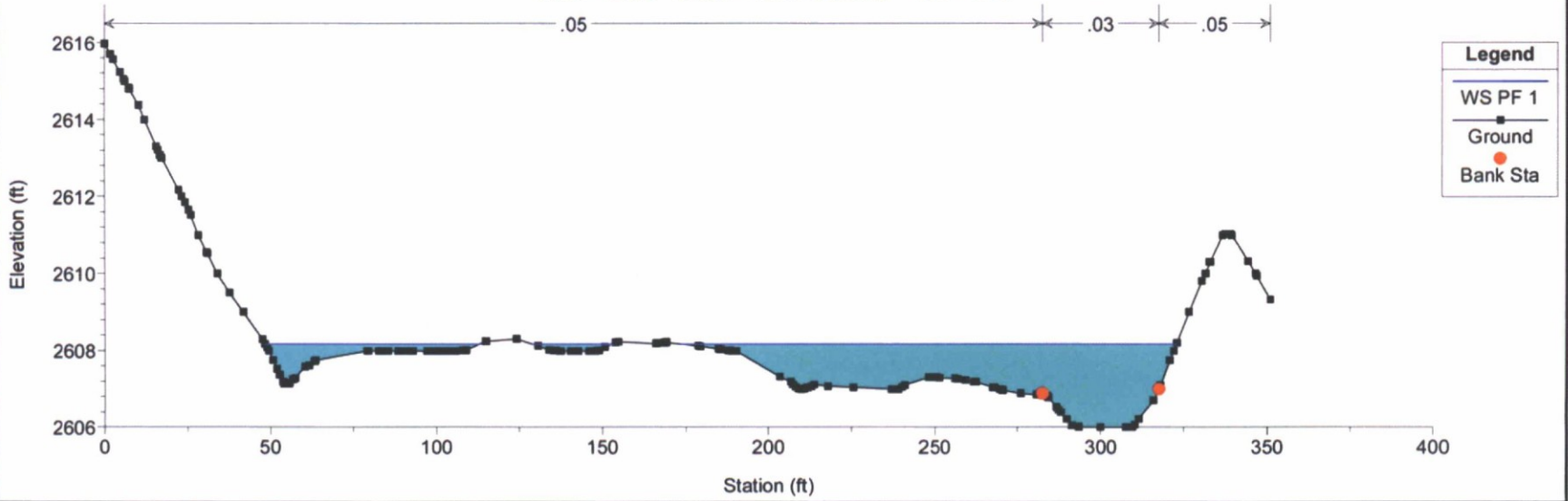
DM19 Existing Condition Galloway Wash Plan: Plan 01 3/14/2017

River = DM19 Reach = Profile baseline RS = 1400



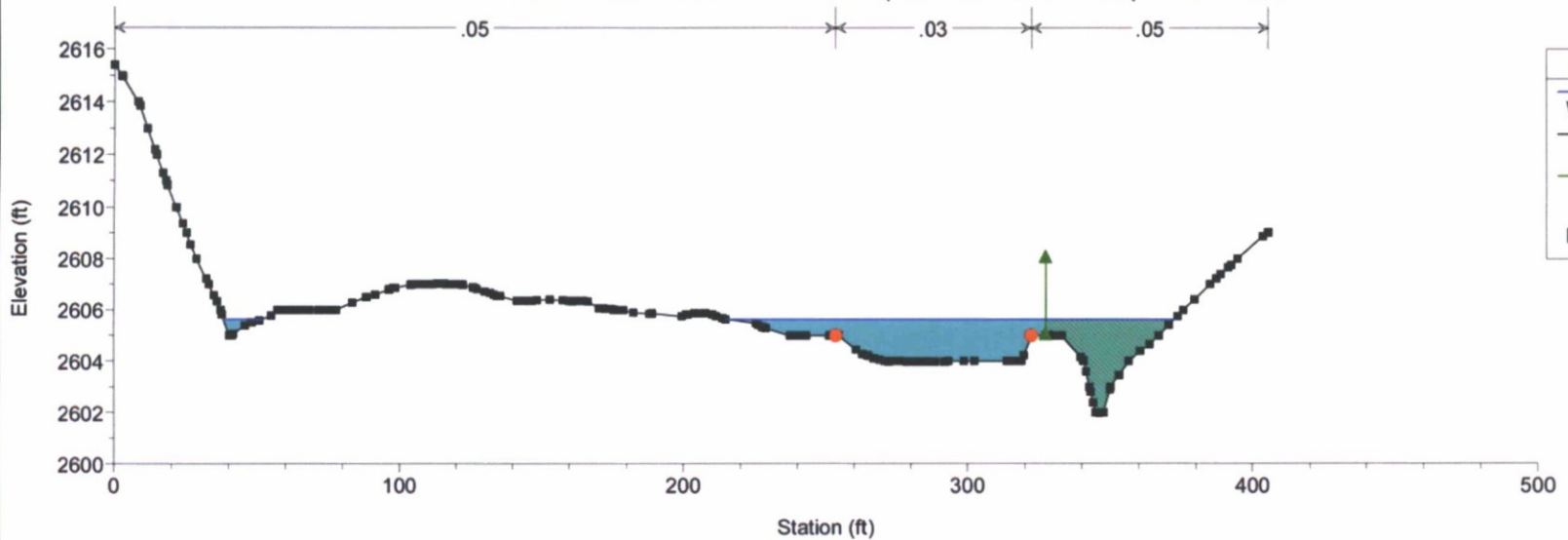
DM19 Existing Condition Galloway Wash Plan: Plan 01 3/14/2017

River = DM19 Reach = Profile baseline RS = 1342



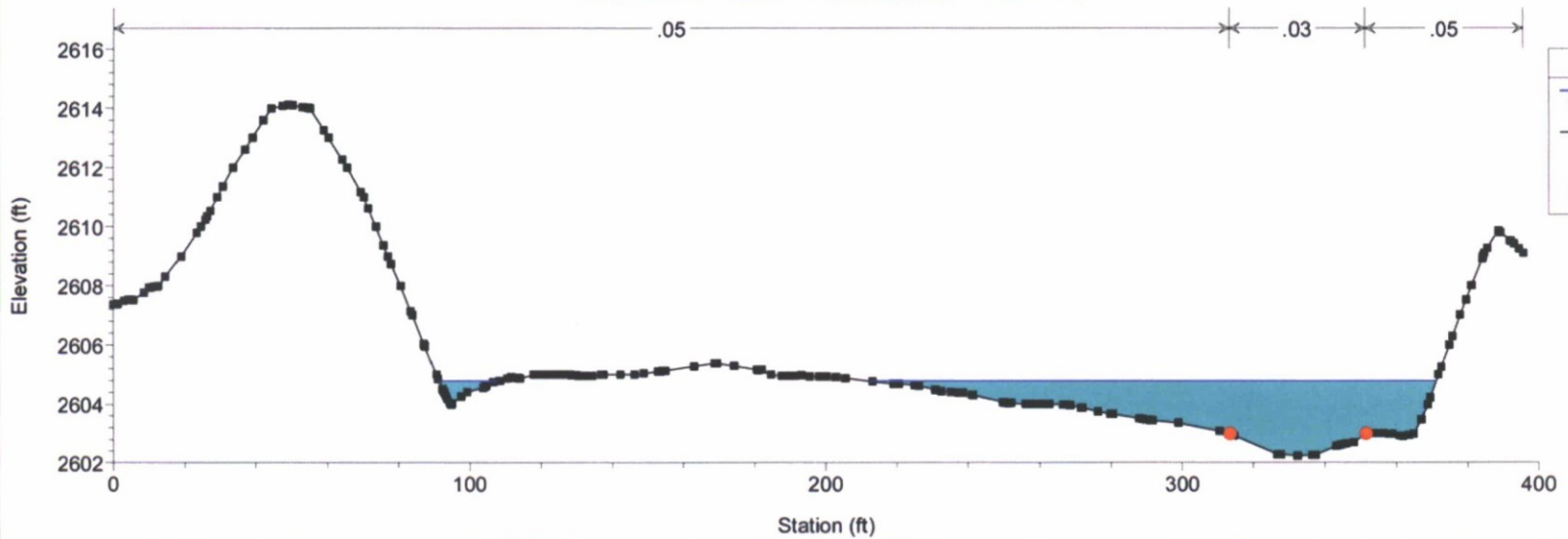
DM19 Existing Condition Galloway Wash Plan: Plan 01 3/14/2017

River = DM19 Reach = Profile baseline RS = 1257 Updated CS with new 1 ft topo = FEMA CS 4.796



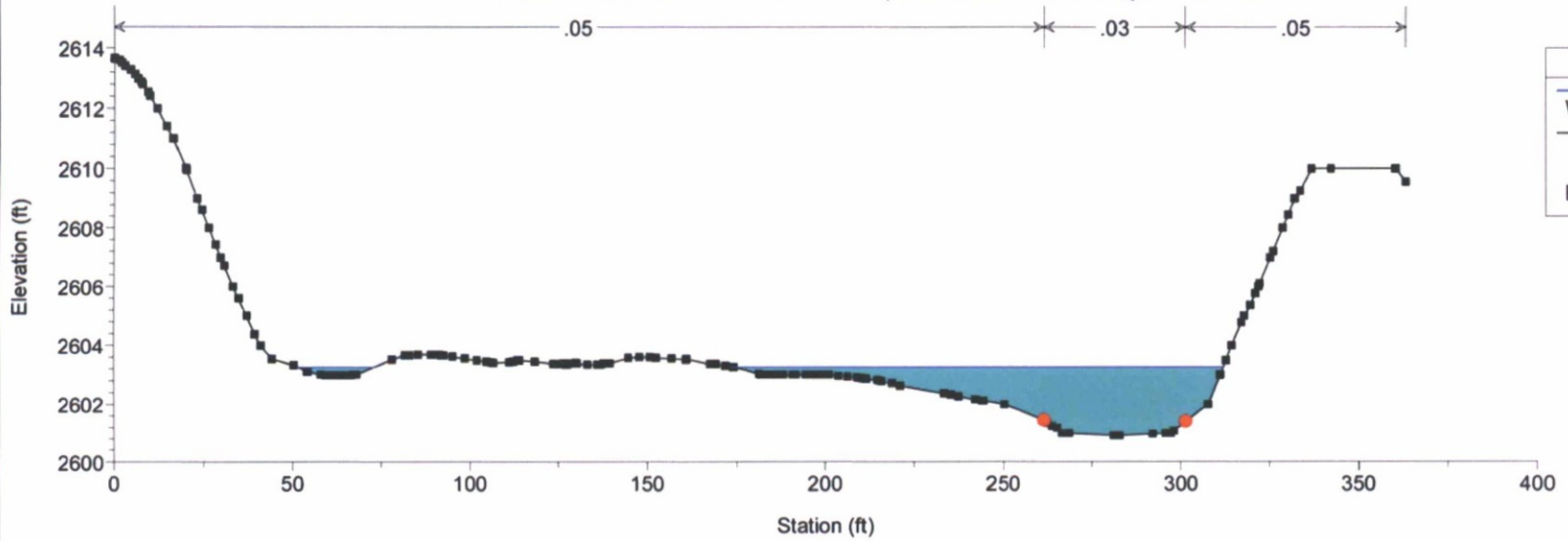
DM19 Existing Condition Galloway Wash Plan: Plan 01 3/14/2017

River = DM19 Reach = Profile baseline RS = 1180



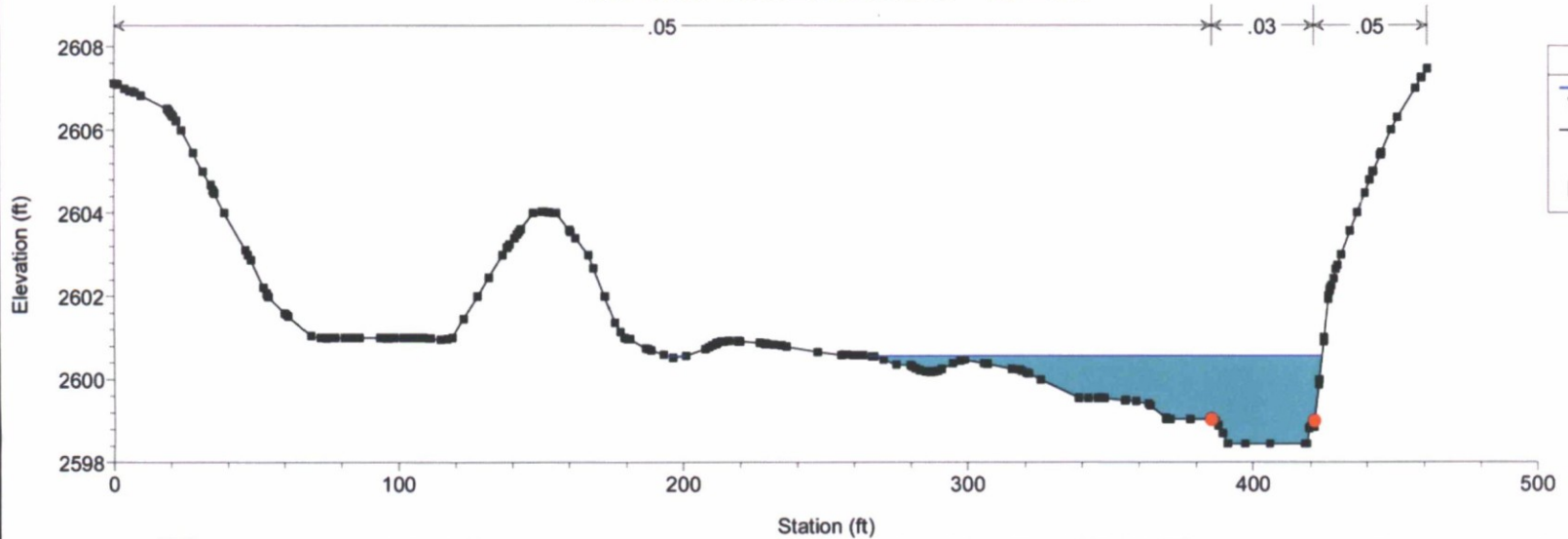
DM19 Existing Condition Galloway Wash Plan: Plan 01 3/14/2017

River = DM19 Reach = Profile baseline RS = 1119 Updated CS with new 1 ft topo = FEMA CS 4.770



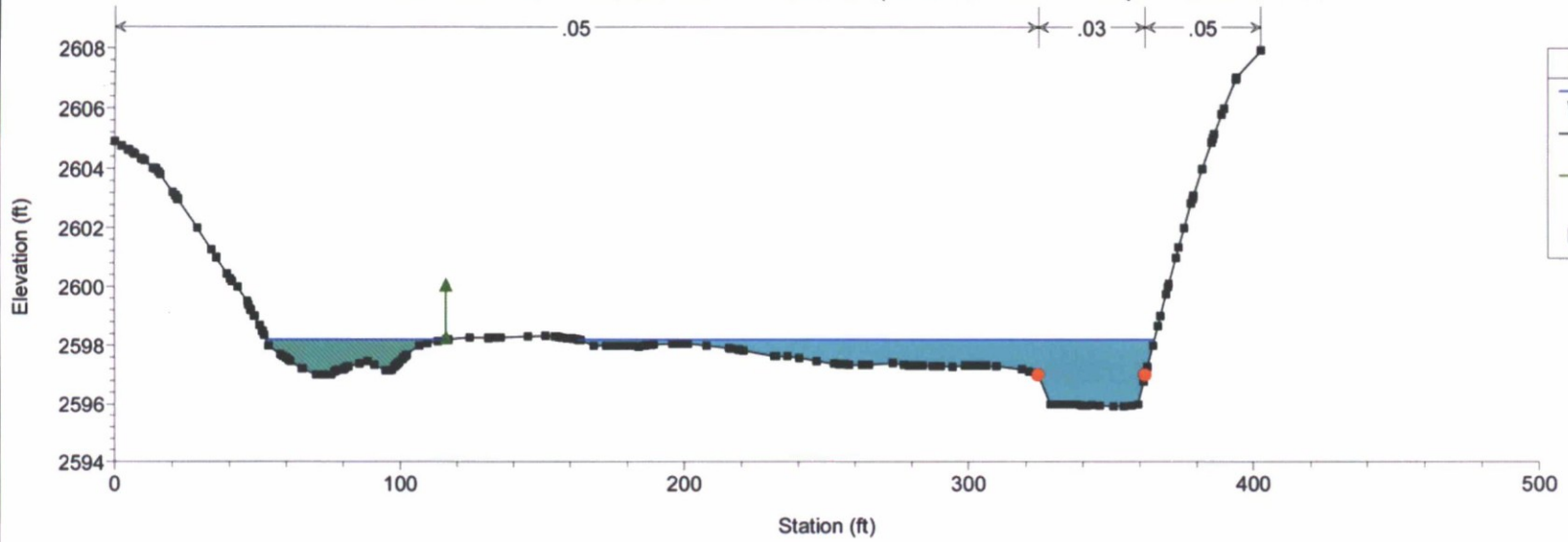
DM19 Existing Condition Galloway Wash Plan: Plan 01 3/14/2017

River = DM19 Reach = Profile baseline RS = 1015



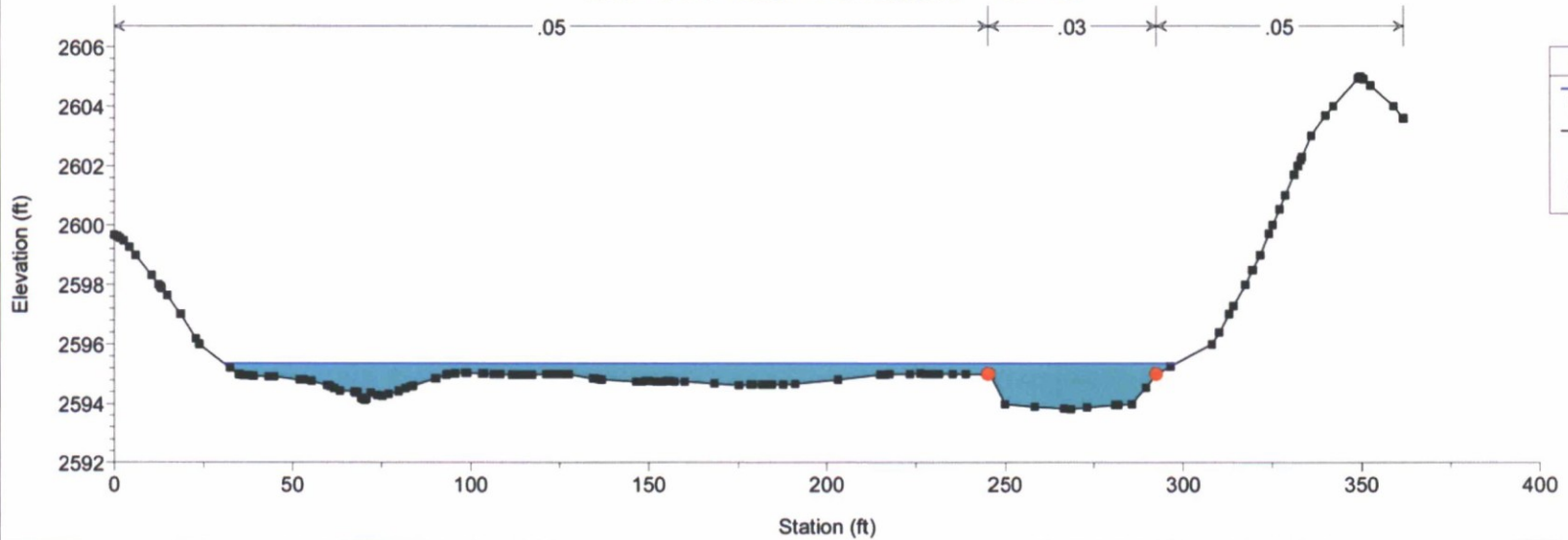
DM19 Existing Condition Galloway Wash Plan: Plan 01 3/14/2017

River = DM19 Reach = Profile baseline RS = 918 Updated CS with new 1 ft topo = FEMA CS 4.732



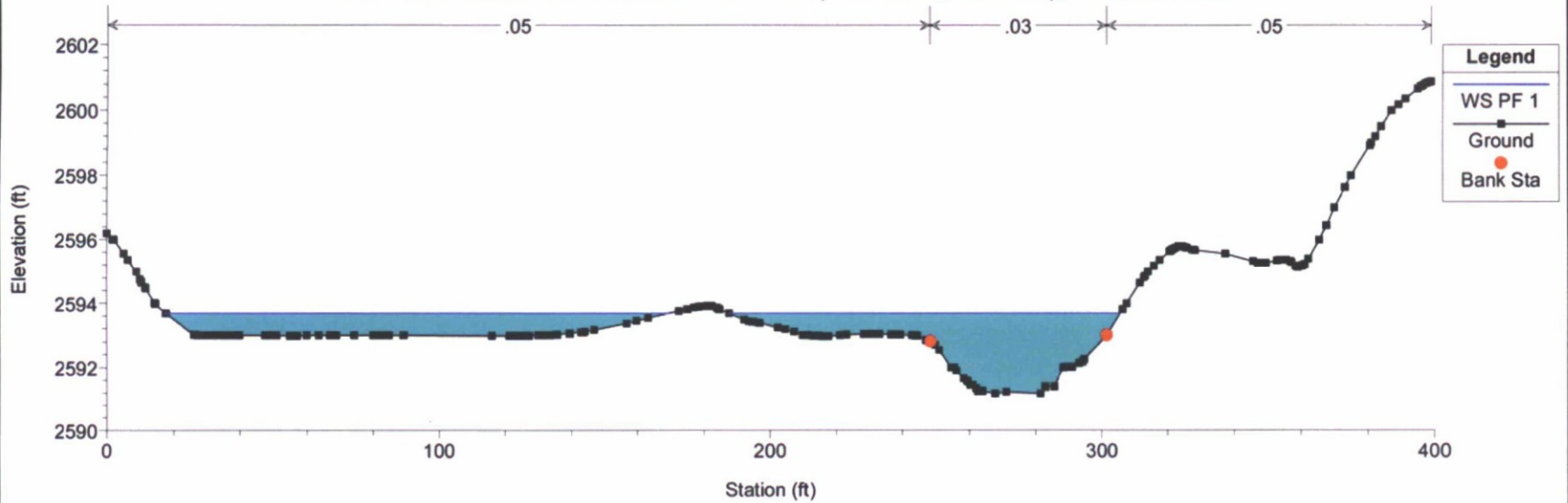
DM19 Existing Condition Galloway Wash Plan: Plan 01 3/14/2017

River = DM19 Reach = Profile baseline RS = 780



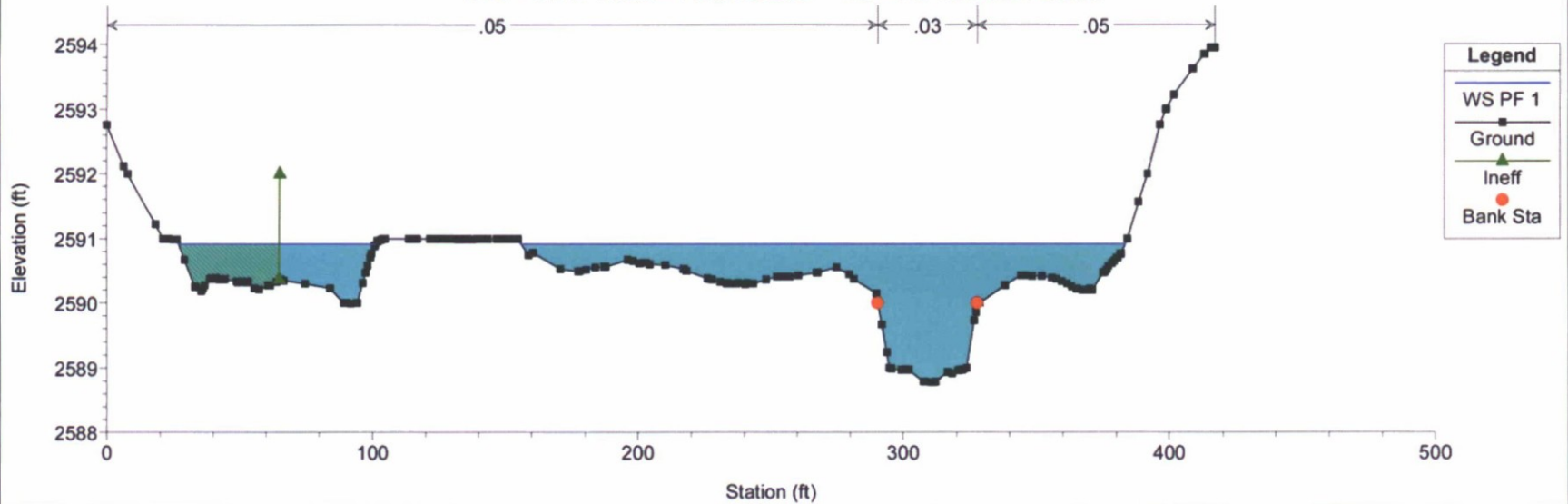
DM19 Existing Condition Galloway Wash Plan: Plan 01 3/14/2017

River = DM19 Reach = Profile baseline RS = 716 Updated CS with new 1 ft topo = FEMA CS 4.694



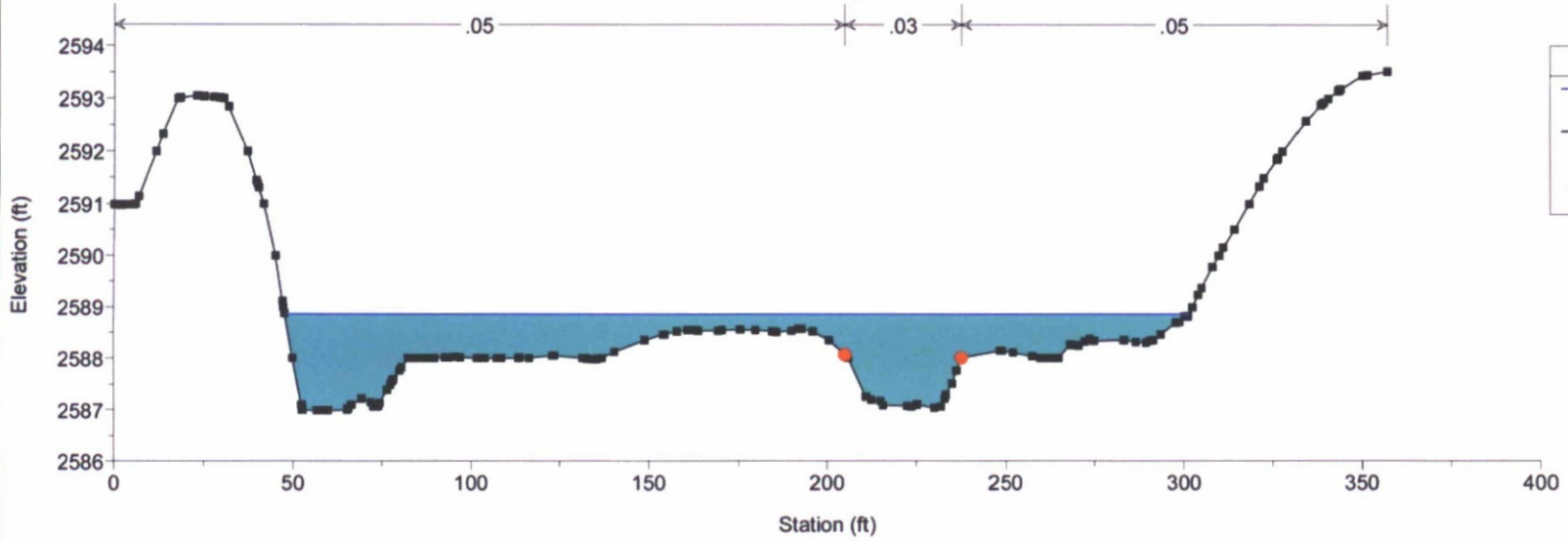
DM19 Existing Condition Galloway Wash Plan: Plan 01 3/14/2017

River = DM19 Reach = Profile baseline RS = 645 New Cross Section



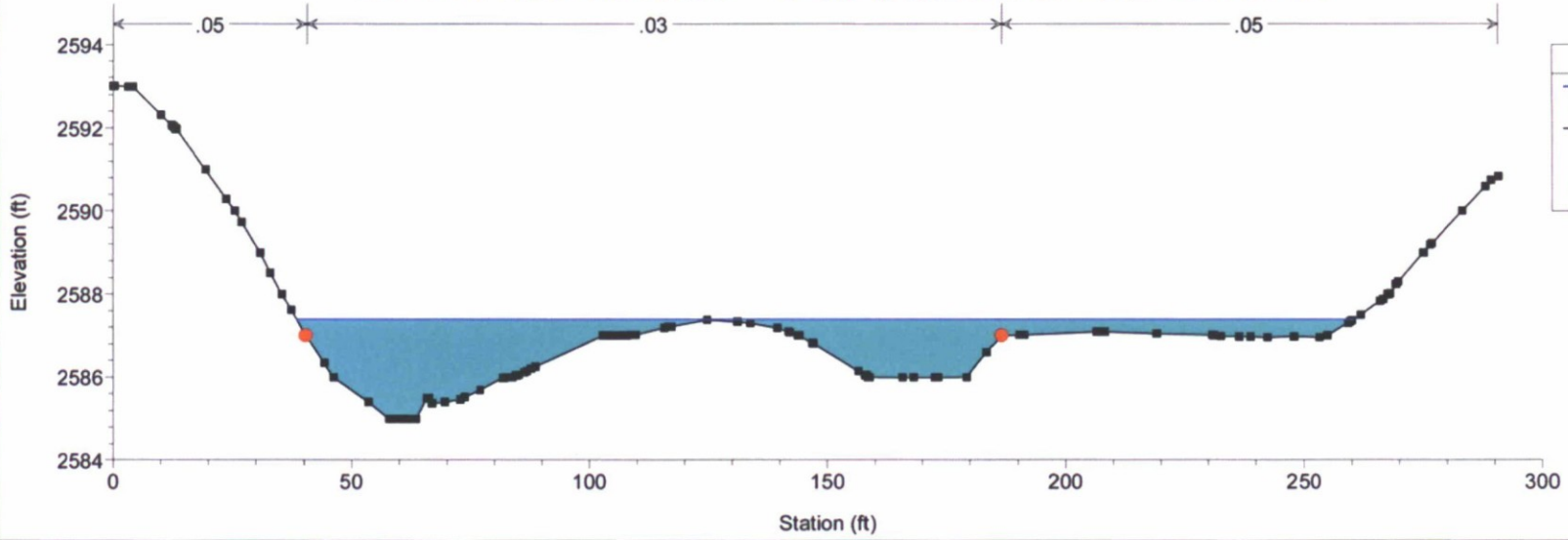
DM19 Existing Condition Galloway Wash Plan: Plan 01 3/14/2017

River = DM19 Reach = Profile baseline RS = 571



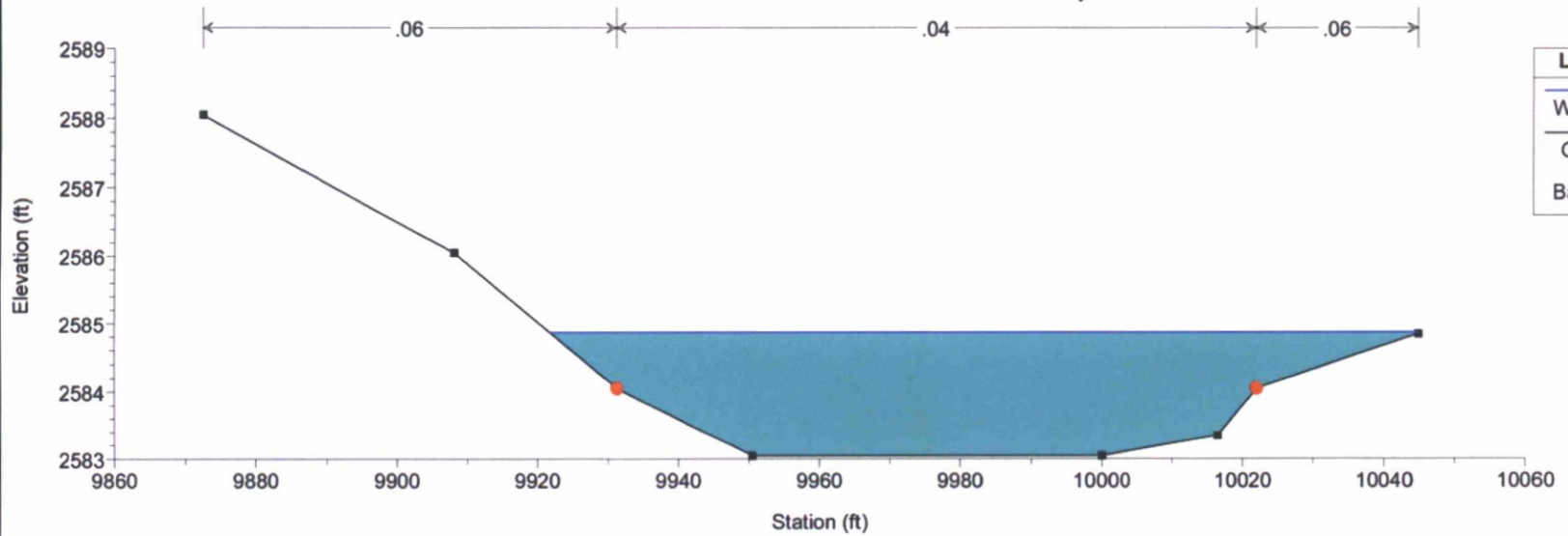
DM19 Existing Condition Galloway Wash Plan: Plan 01 3/14/2017

River = DM19 Reach = Profile baseline RS = 518 Updated CS with new 1 ft topo = FEMA CS 4.656



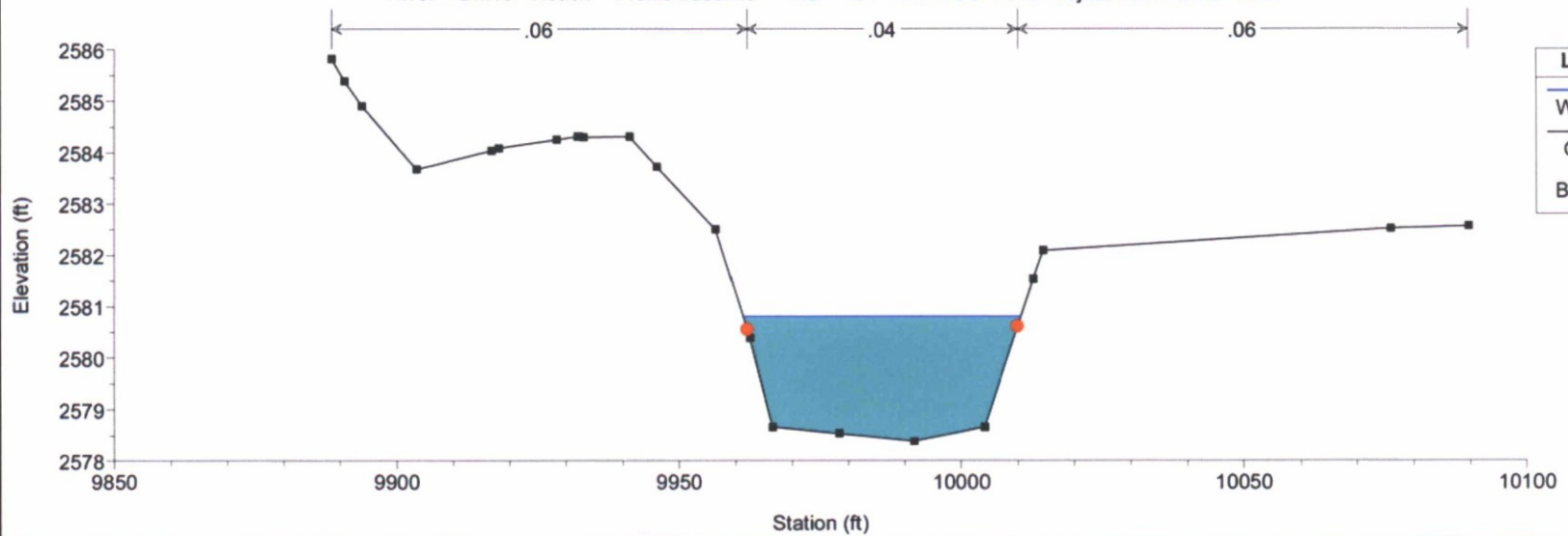
DM19 Existing Condition Galloway Wash Plan: Plan 01 3/14/2017

River = DM19 Reach = Profile baseline RS = 317 FEMA CS 4.639 - Adjust from NGVD +2.05

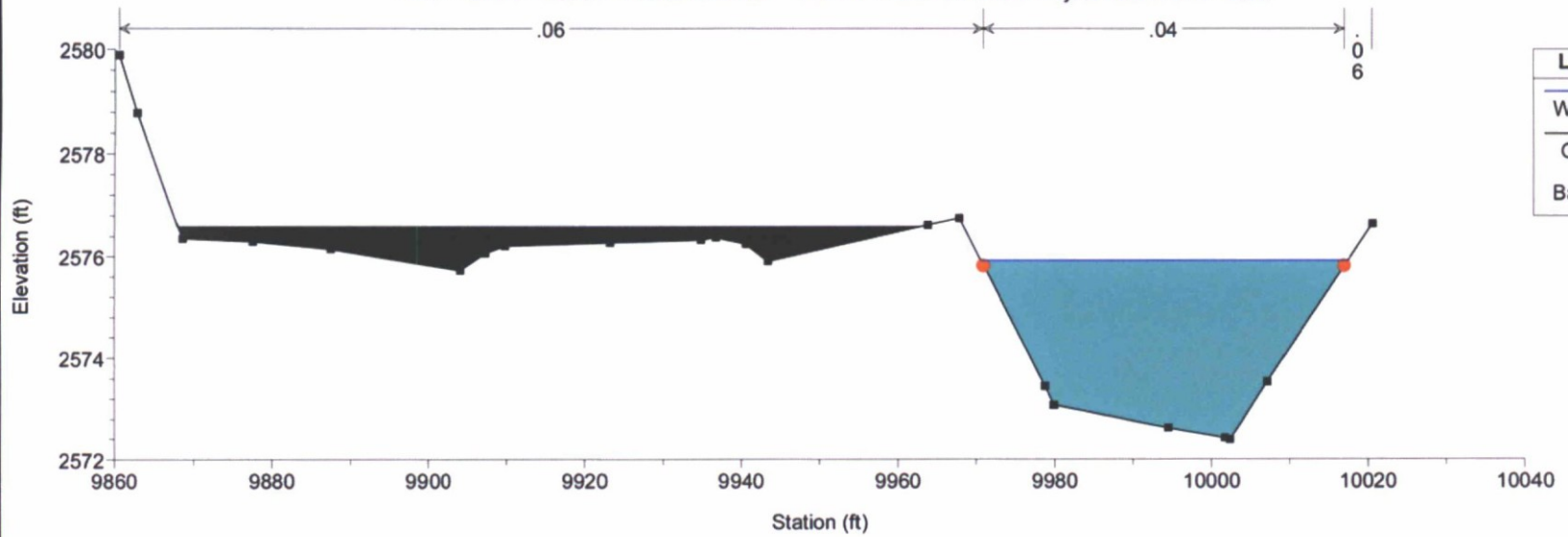


DM19 Existing Condition Galloway Wash Plan: Plan 01 3/14/2017

River = DM19 Reach = Profile baseline RS = 197 FEMA CS 4.618- Adjust from NGVD +2.05

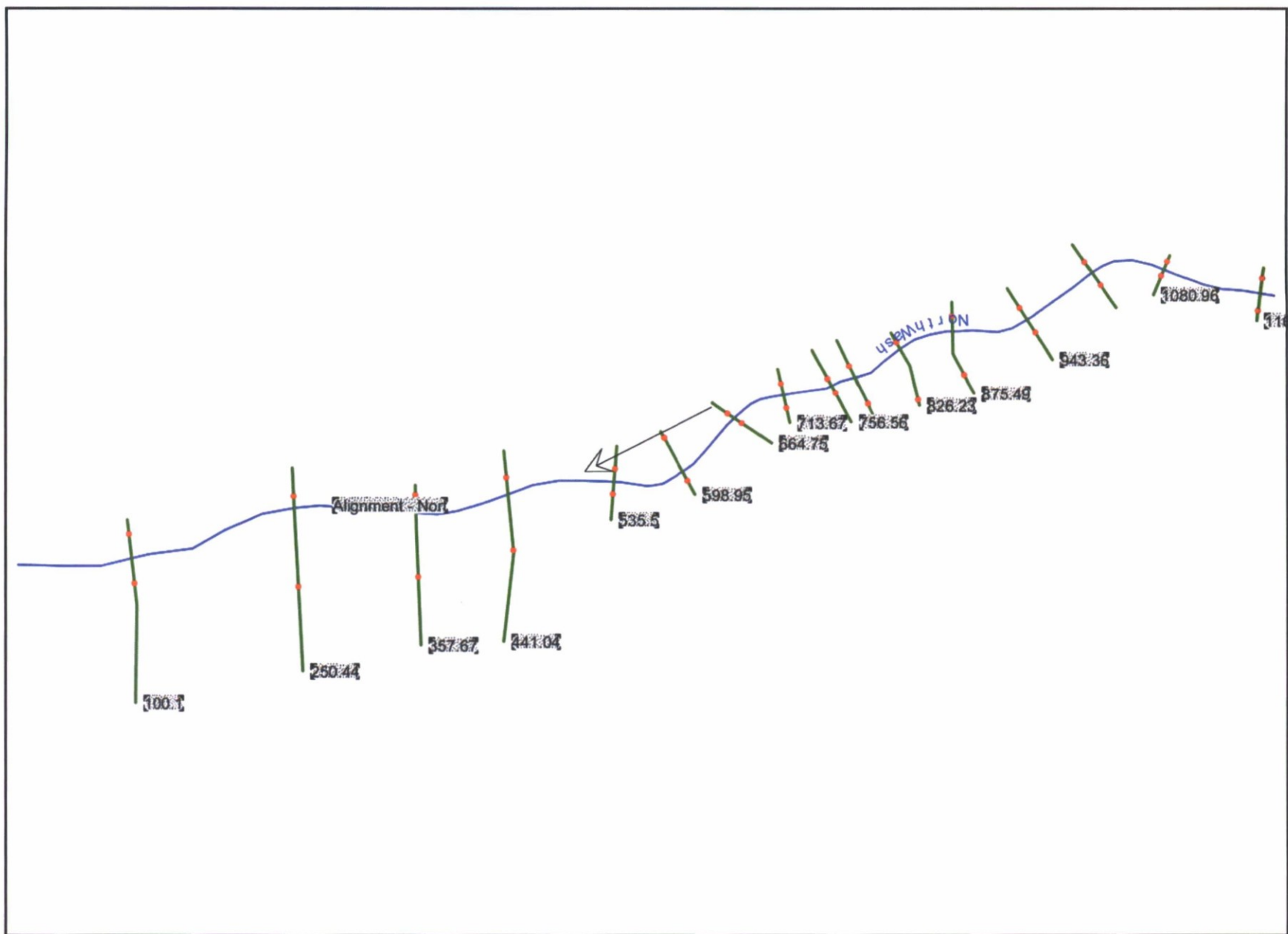


DM19 Existing Condition Galloway Wash Plan: Plan 01 3/14/2017
River = DM19 Reach = Profile baseline RS = 0 FEMA CS 4.581- Adjust from NGVD +2.05



EXISTING

WASH A

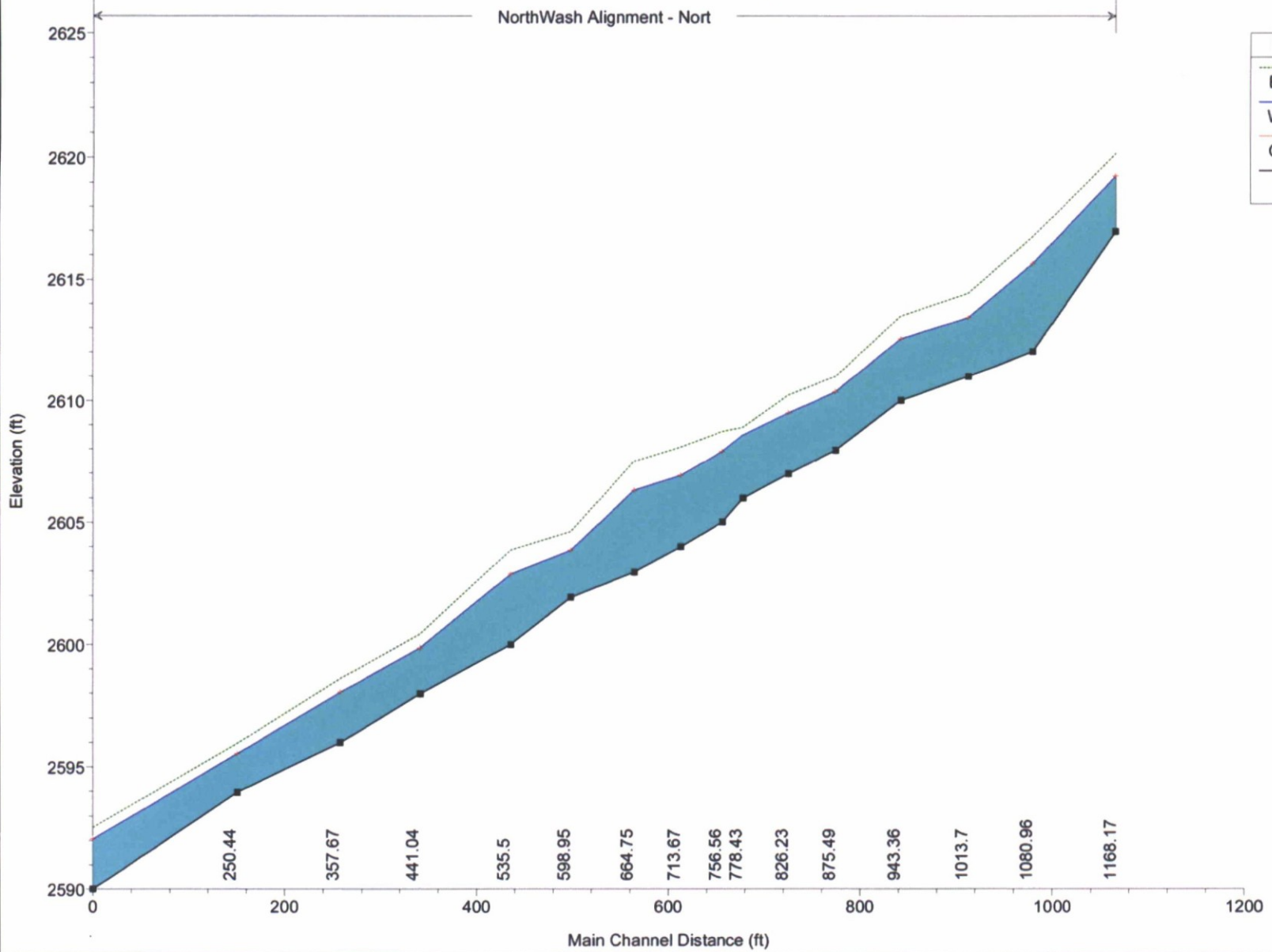


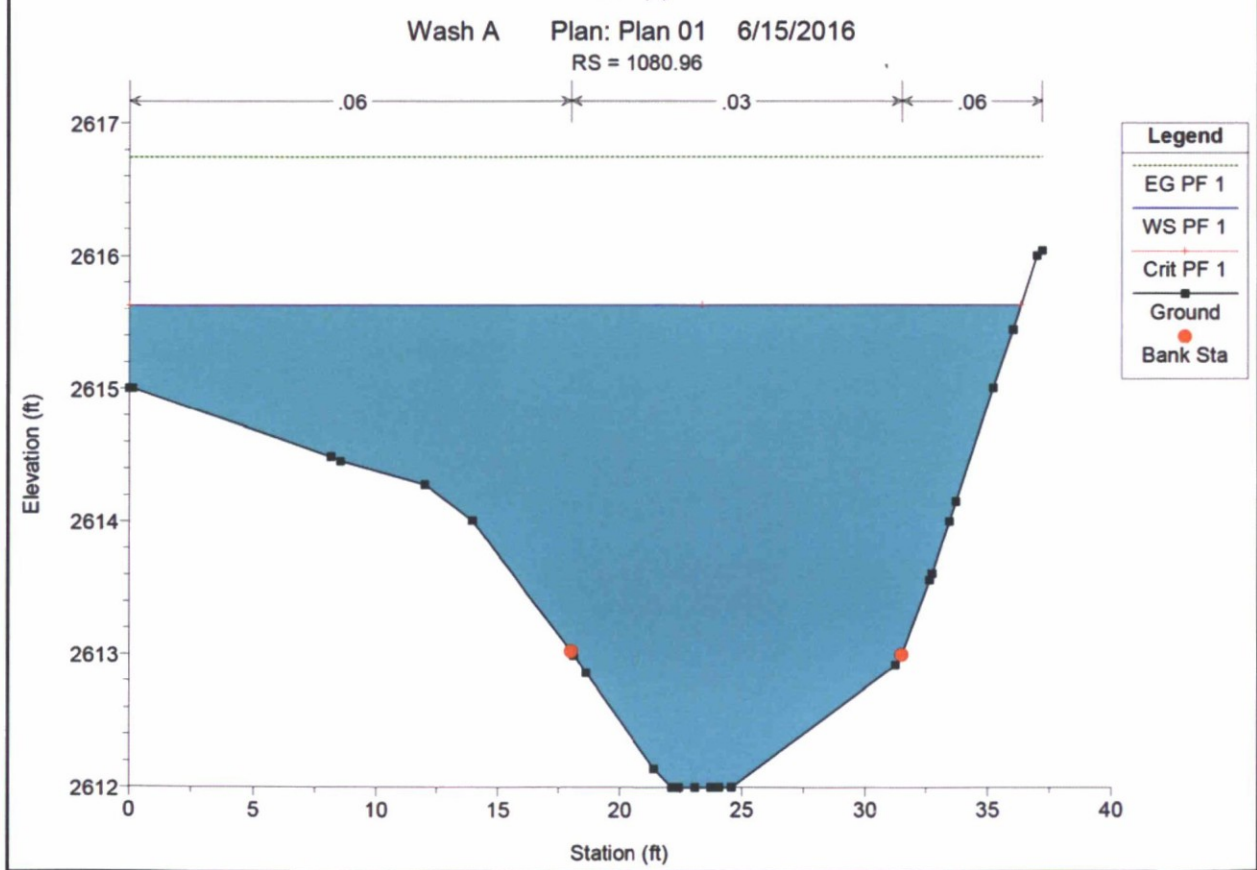
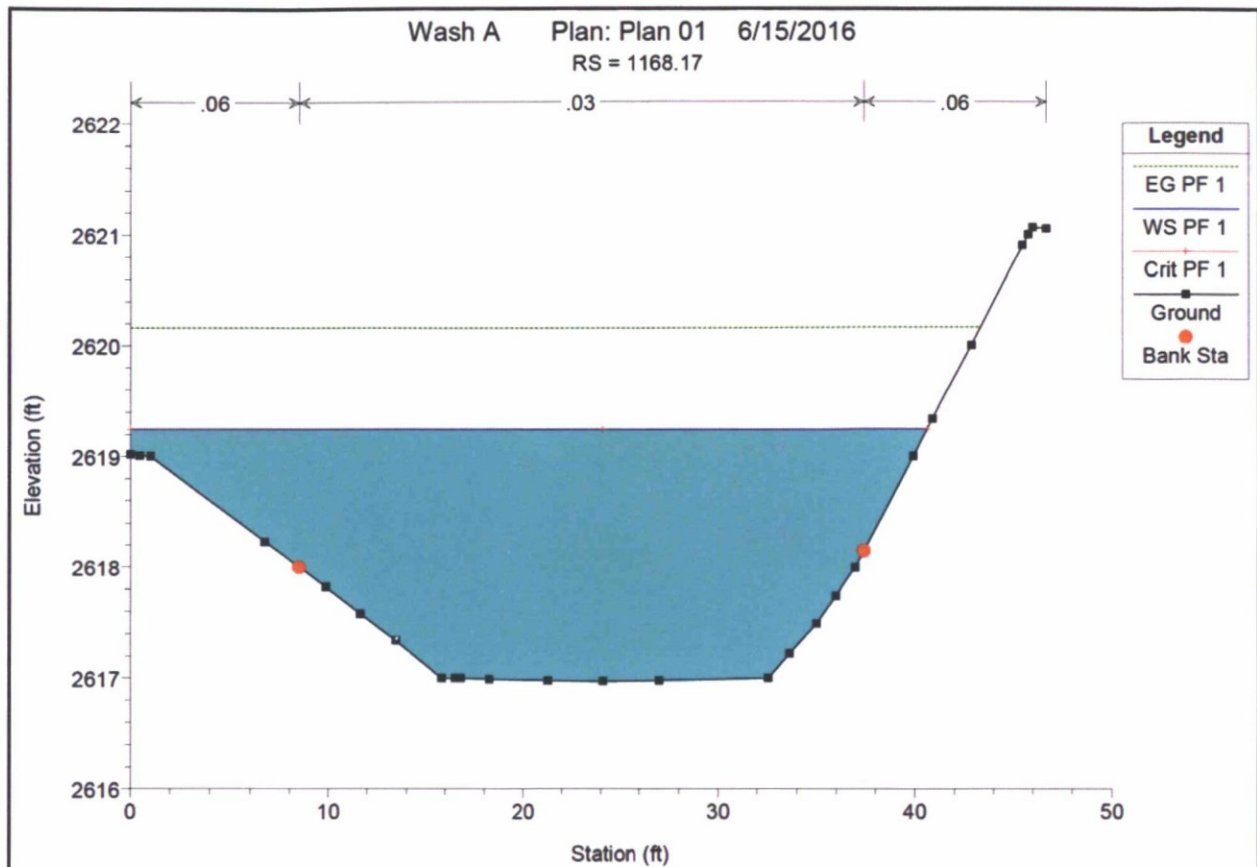
HEC-RAS Plan: Plan 01 River: NorthWash Reach: Alignment - Nort Profile: PF 1

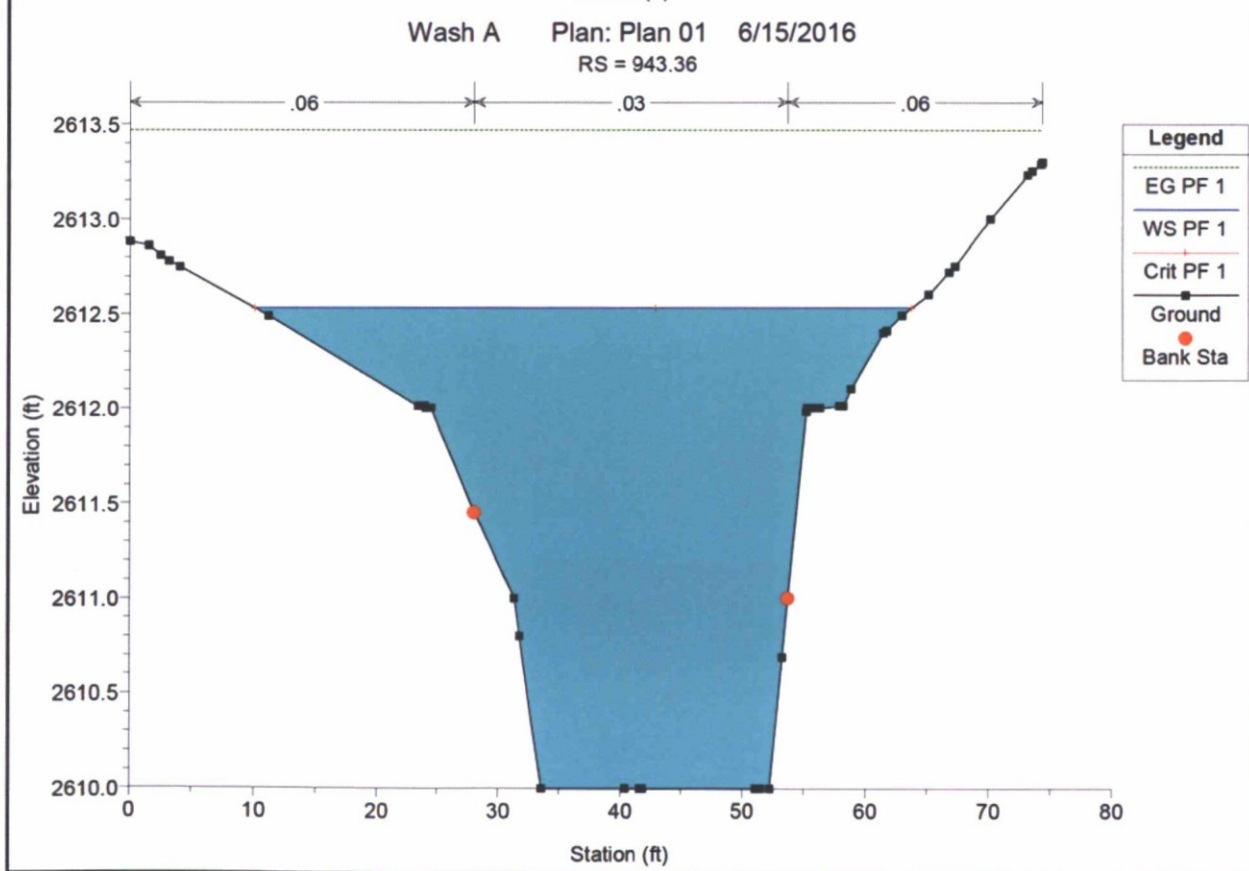
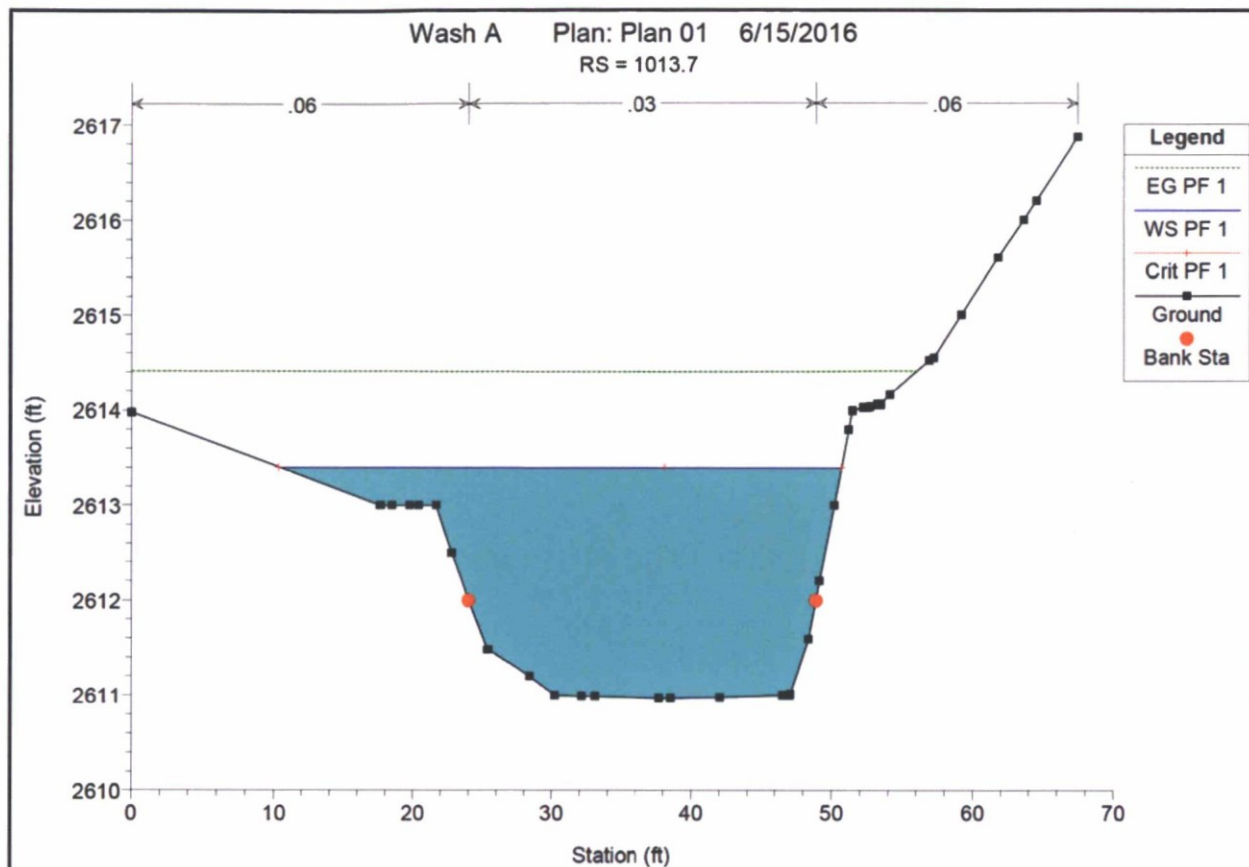
Reach	River Sta	Q Total (cfs)	Min Ch El. (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/m)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
Alignment - Nort	1168.17	472.00	2616.97	2619.25	2619.25	2620.16	0.006615	7.77	66.58	40.60	0.96
Alignment - Nort	1080.96	472.00	2612.00	2615.63	2615.63	2616.74	0.007289	9.15	73.61	36.33	0.90
Alignment - Nort	1013.7	472.00	2610.97	2613.40	2613.40	2614.41	0.009090	8.13	63.57	40.36	0.96
Alignment - Nort	943.36	480.00	2610.00	2612.53	2612.53	2613.47	0.008585	7.89	70.29	53.67	0.92
Alignment - Nort	875.49	480.00	2607.95	2610.34	2610.34	2610.97	0.011524	6.41	79.21	71.47	0.97
Alignment - Nort	826.23	480.00	2606.97	2609.47	2609.47	2610.22	0.011584	6.96	71.02	51.19	0.98
Alignment - Nort	778.43	480.00	2605.97	2608.56	2608.56	2608.88	0.002681	4.78	125.60	66.45	0.55
Alignment - Nort	756.56	480.00	2604.89	2607.89	2607.89	2608.72	0.008770	8.59	91.77	57.49	0.94
Alignment - Nort	713.67	485.00	2603.98	2606.90	2606.90	2608.08	0.006615	8.74	58.25	29.88	0.98
Alignment - Nort	664.75	485.00	2602.95	2606.28	2606.28	2607.48	0.007889	9.19	70.56	44.05	0.91
Alignment - Nort	598.95	485.00	2601.92	2603.83	2603.83	2604.61	0.011333	7.08	70.34	48.65	0.99
Alignment - Nort	535.5	485.00	2600.00	2602.85	2602.85	2603.84	0.008559	8.21	72.00	44.88	0.92
Alignment - Nort	441.04	480.00	2597.99	2599.88	2599.88	2600.43	0.011514	6.13	87.05	78.67	0.97
Alignment - Nort	357.67	480.00	2595.99	2598.05	2598.05	2598.61	0.012877	6.04	81.71	83.58	1.00
Alignment - Nort	250.44	495.00	2593.97	2595.54	2595.54	2595.97	0.011294	5.46	110.14	144.51	0.93
Alignment - Nort	100.1	495.00	2590.00	2592.05	2592.05	2592.55	0.008482	6.12	119.82	137.73	0.88

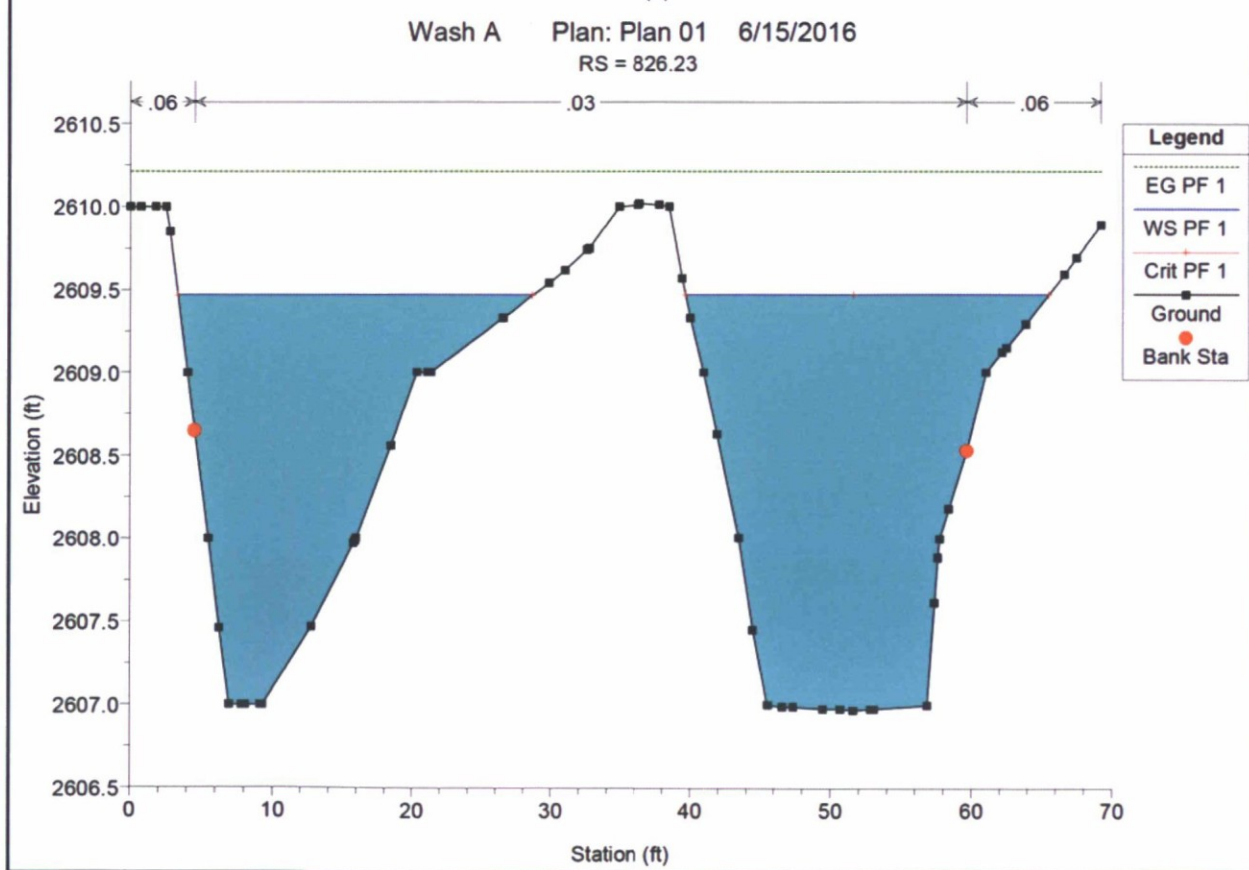
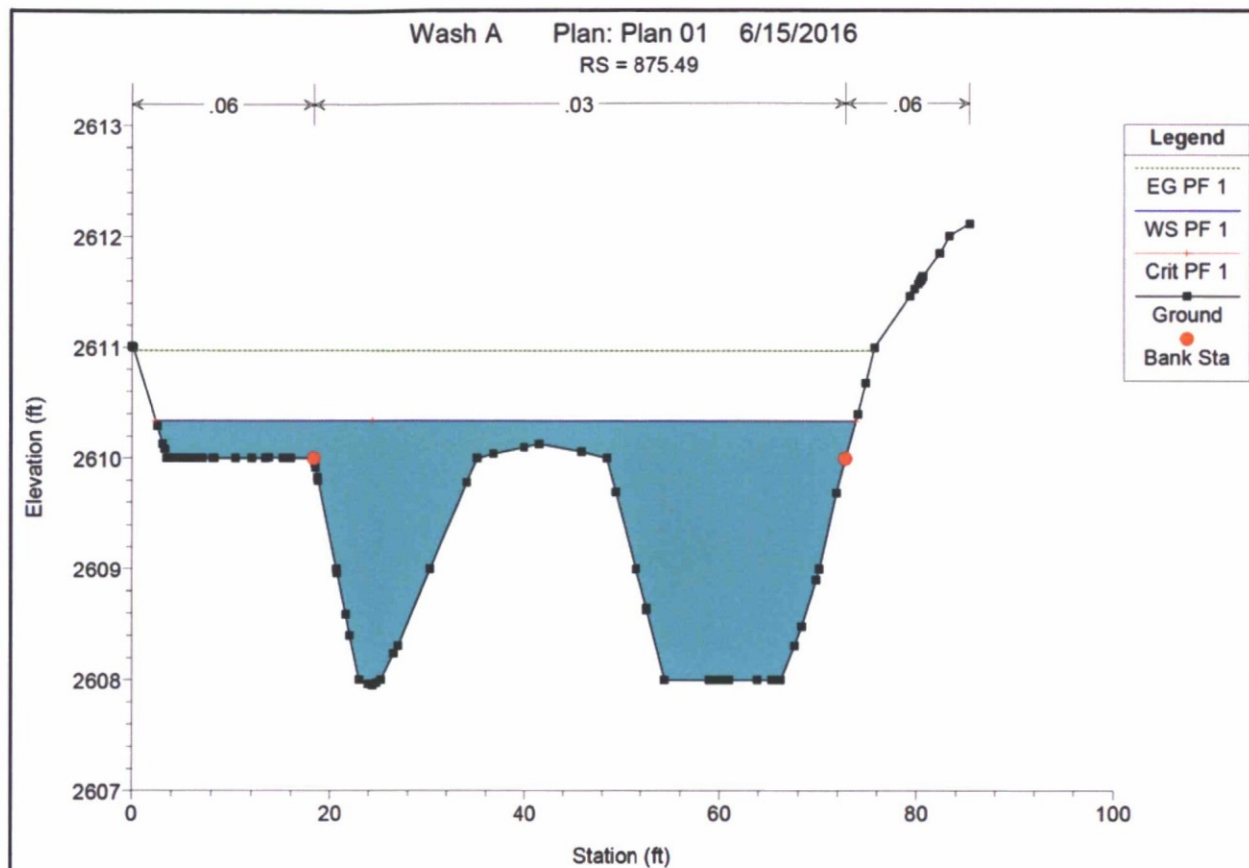
Wash A Plan: Plan 01 6/15/2016

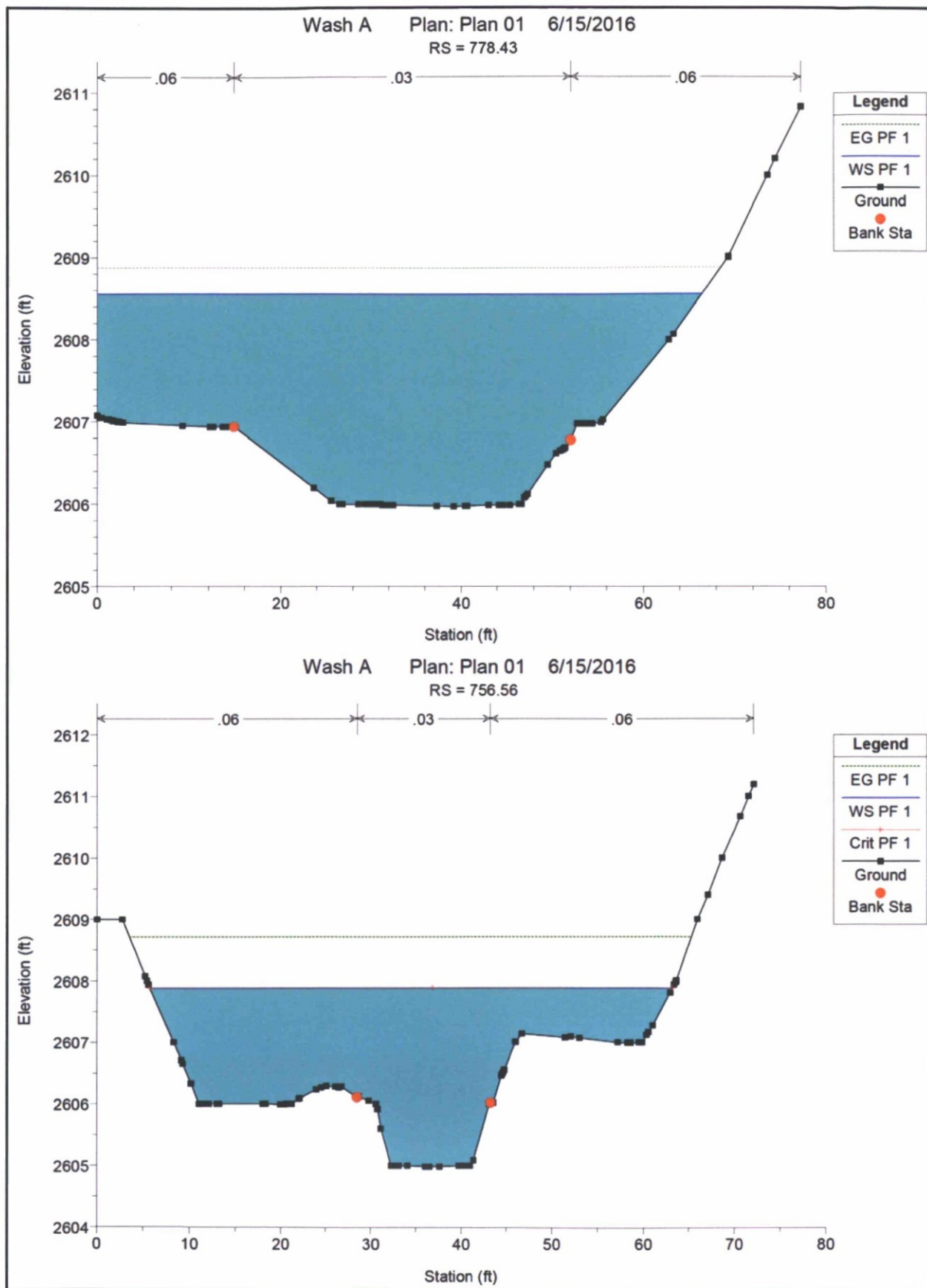
NorthWash Alignment - Nort

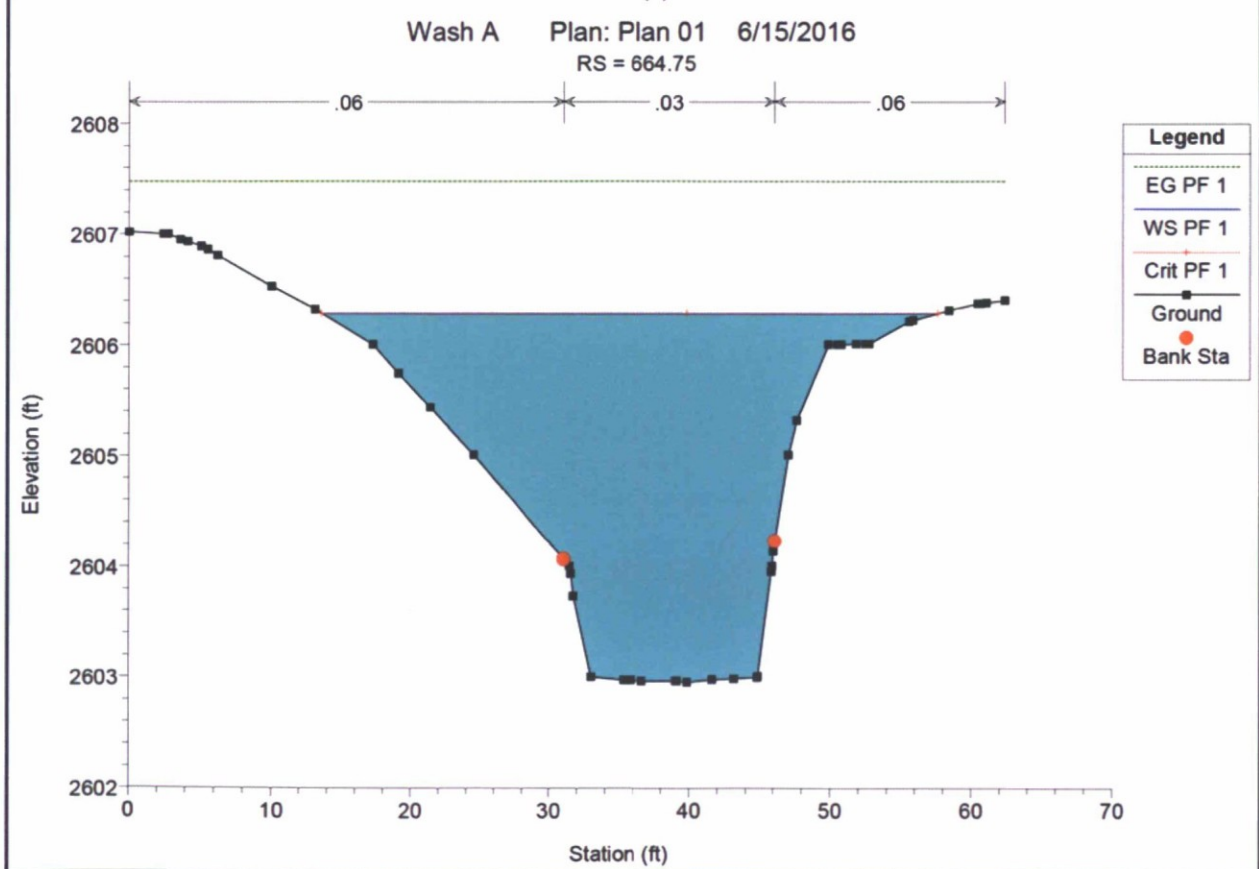
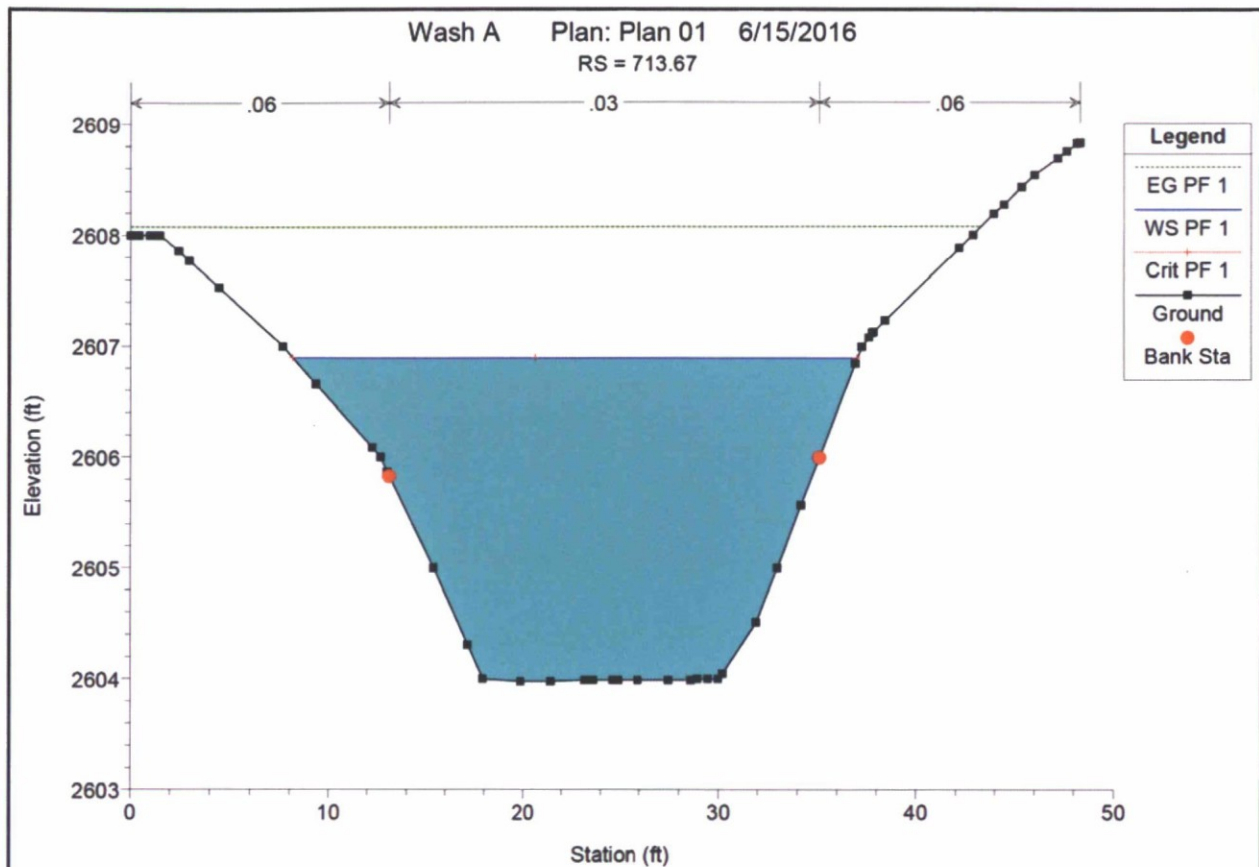


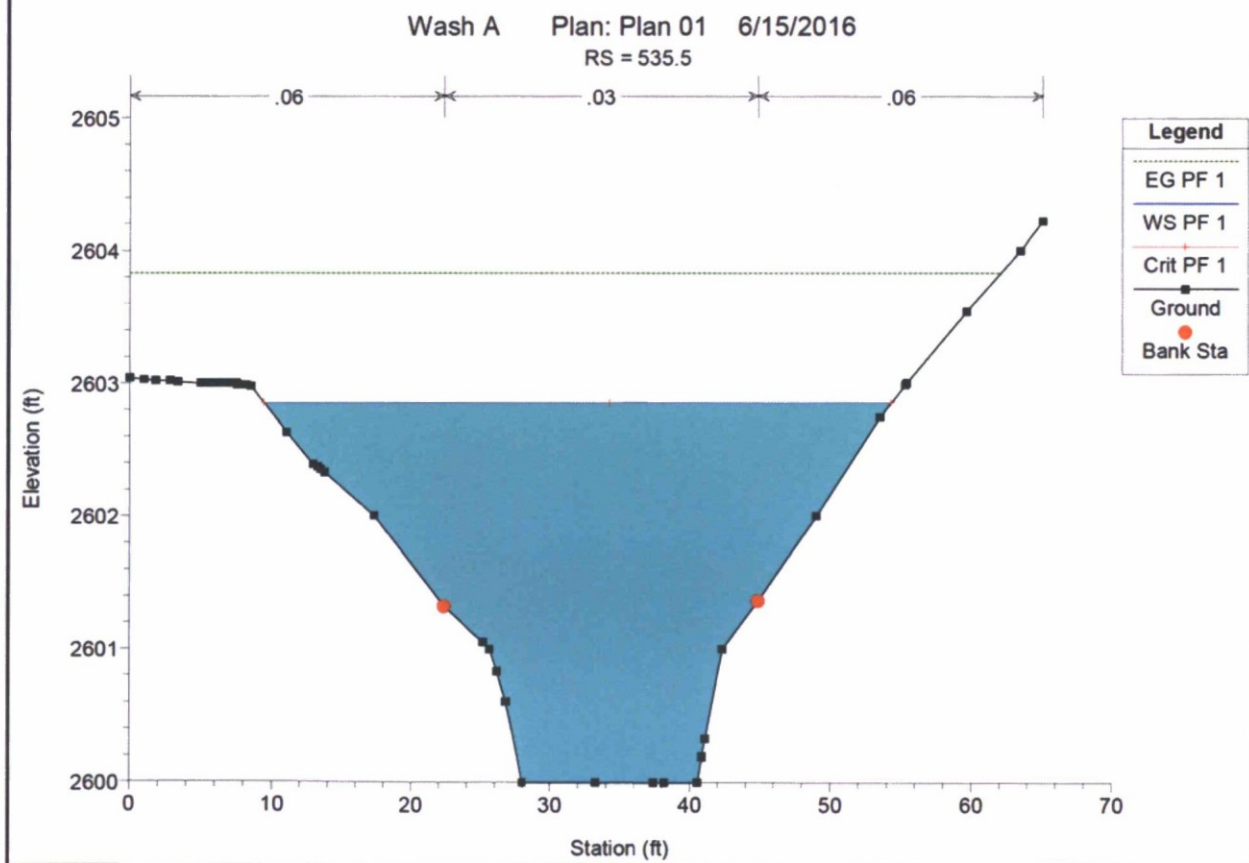
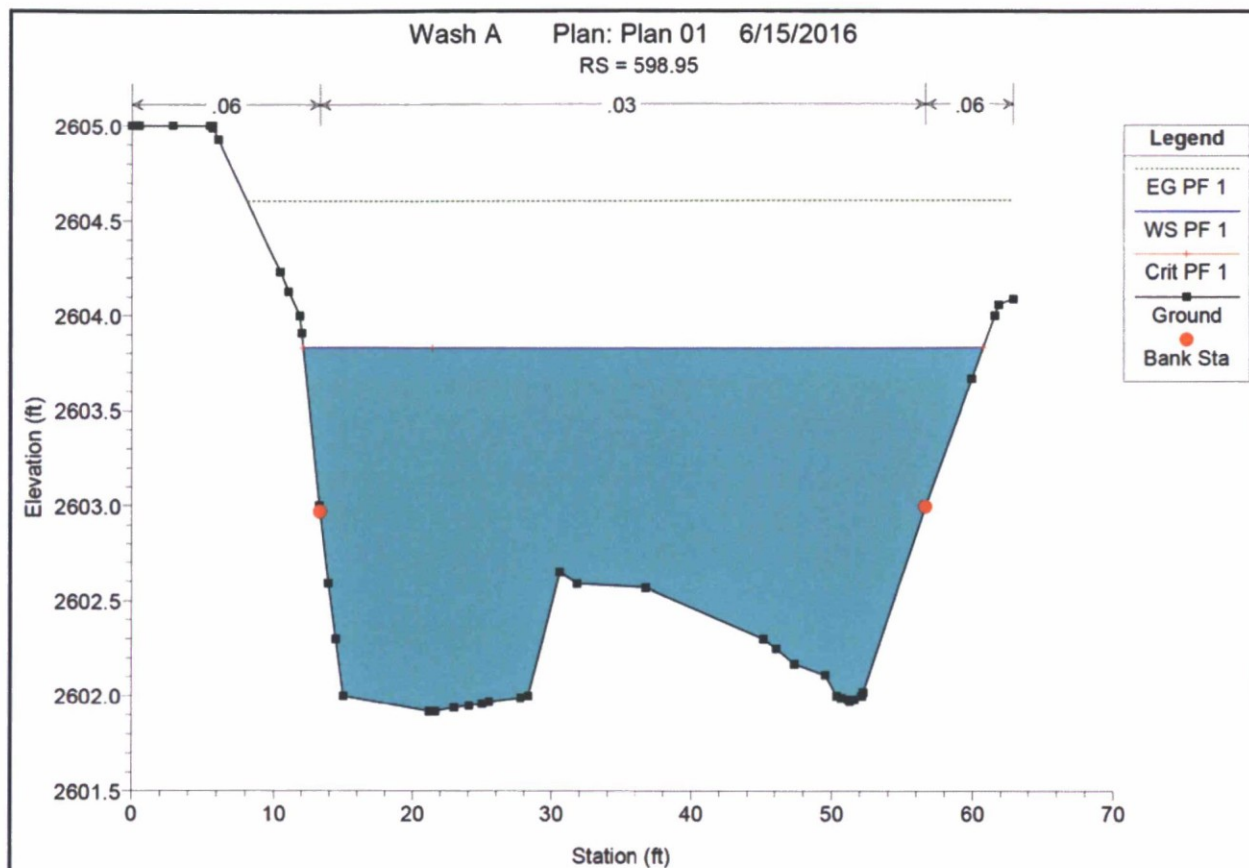


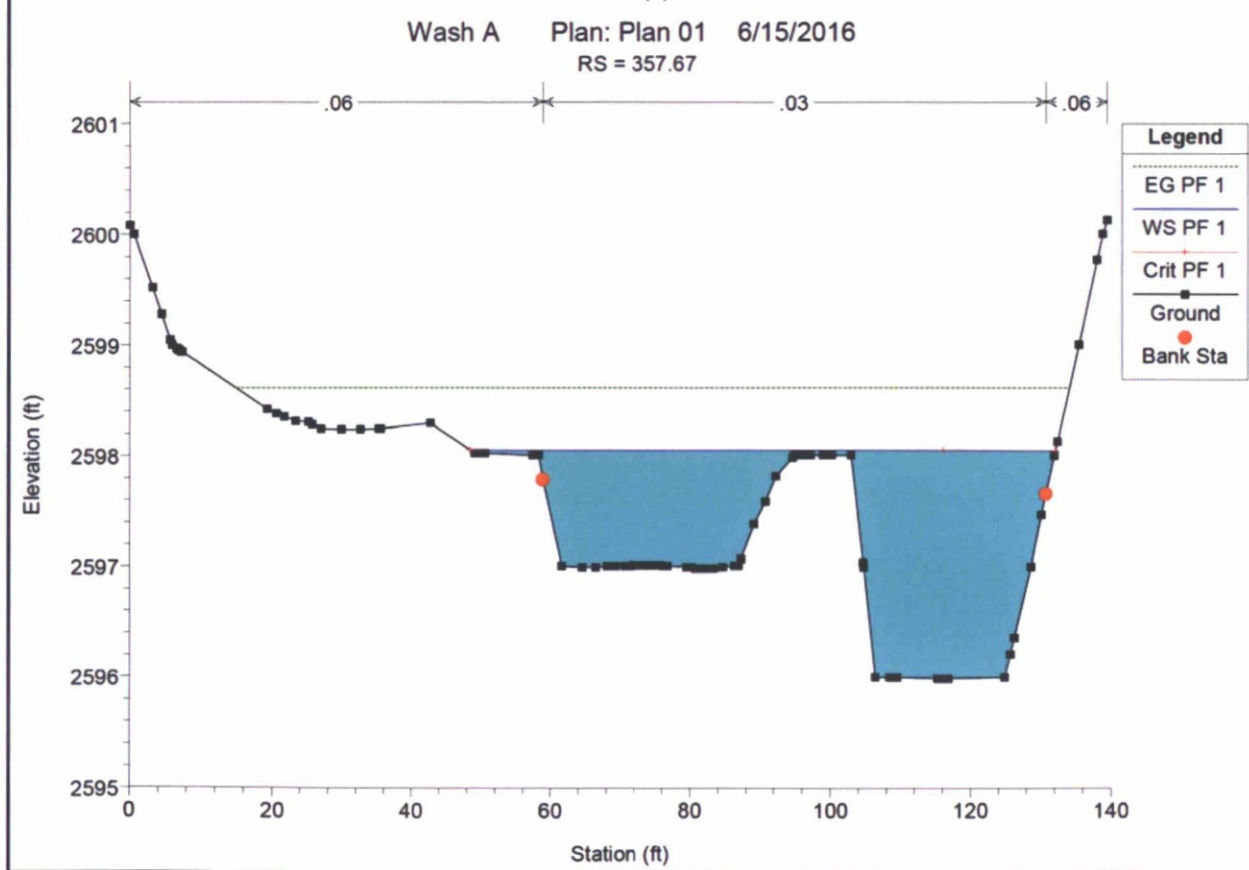
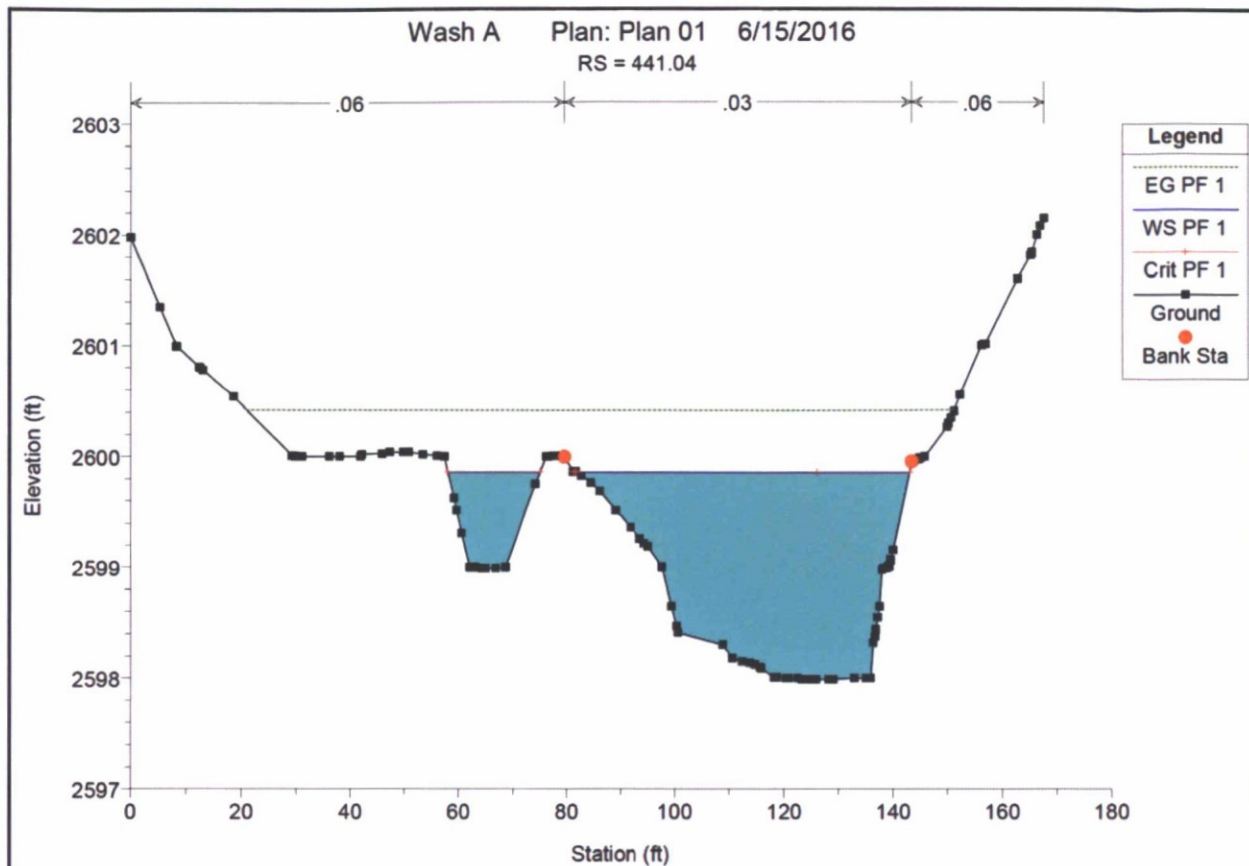


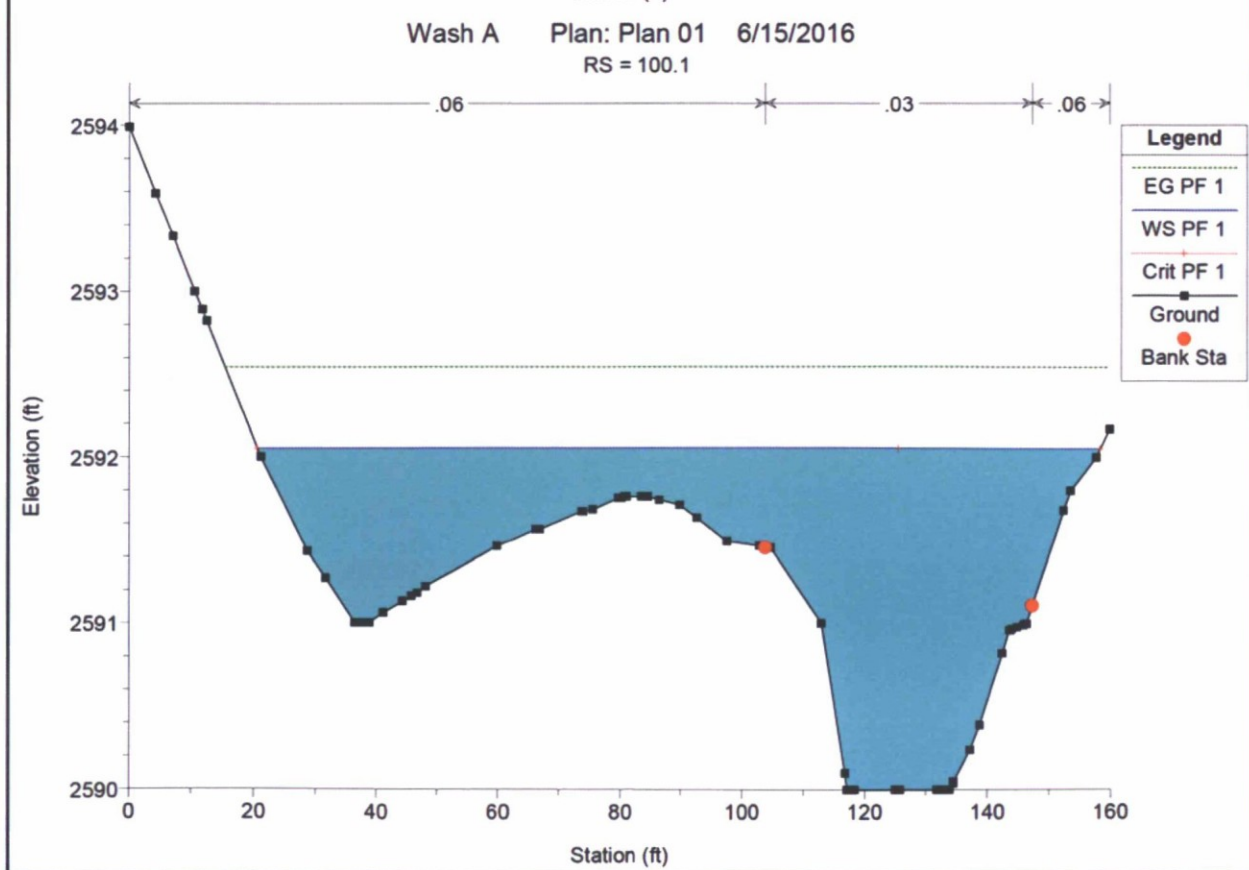
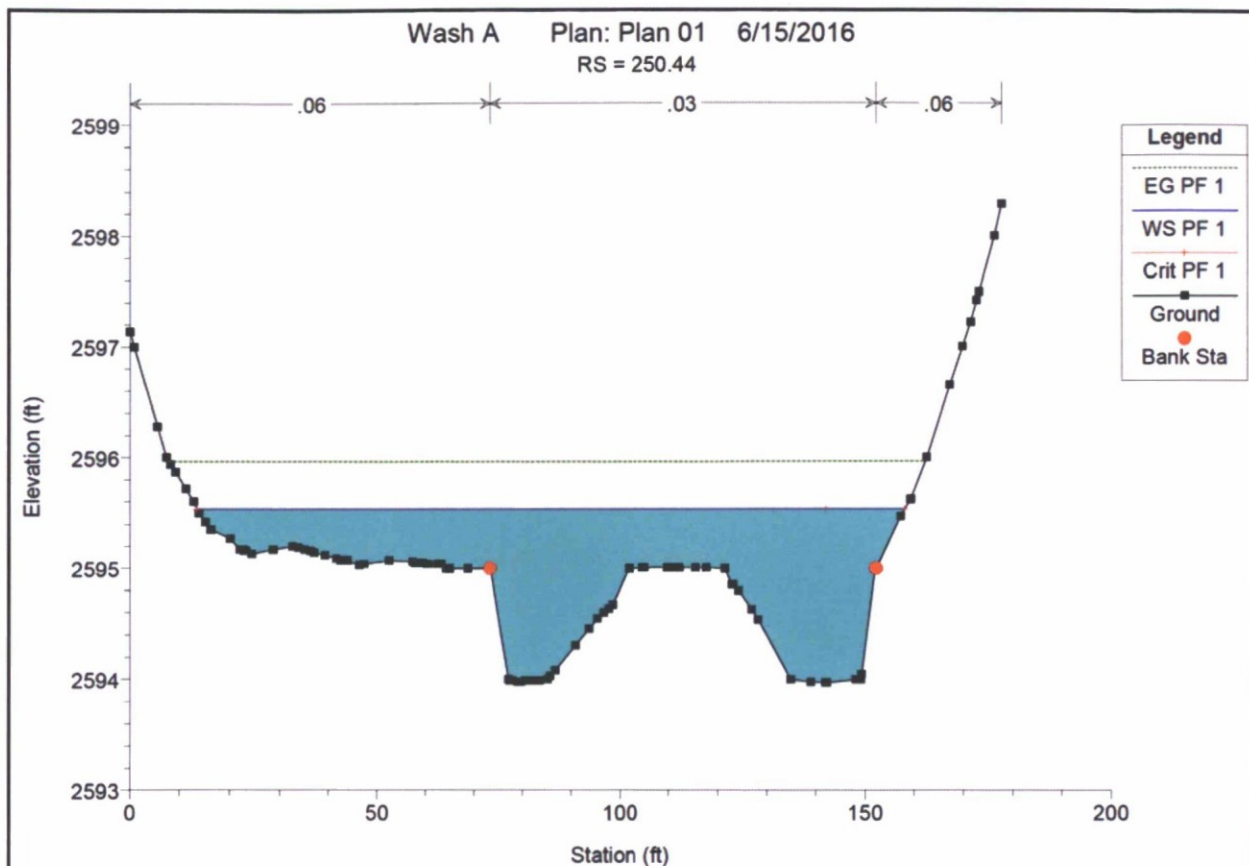








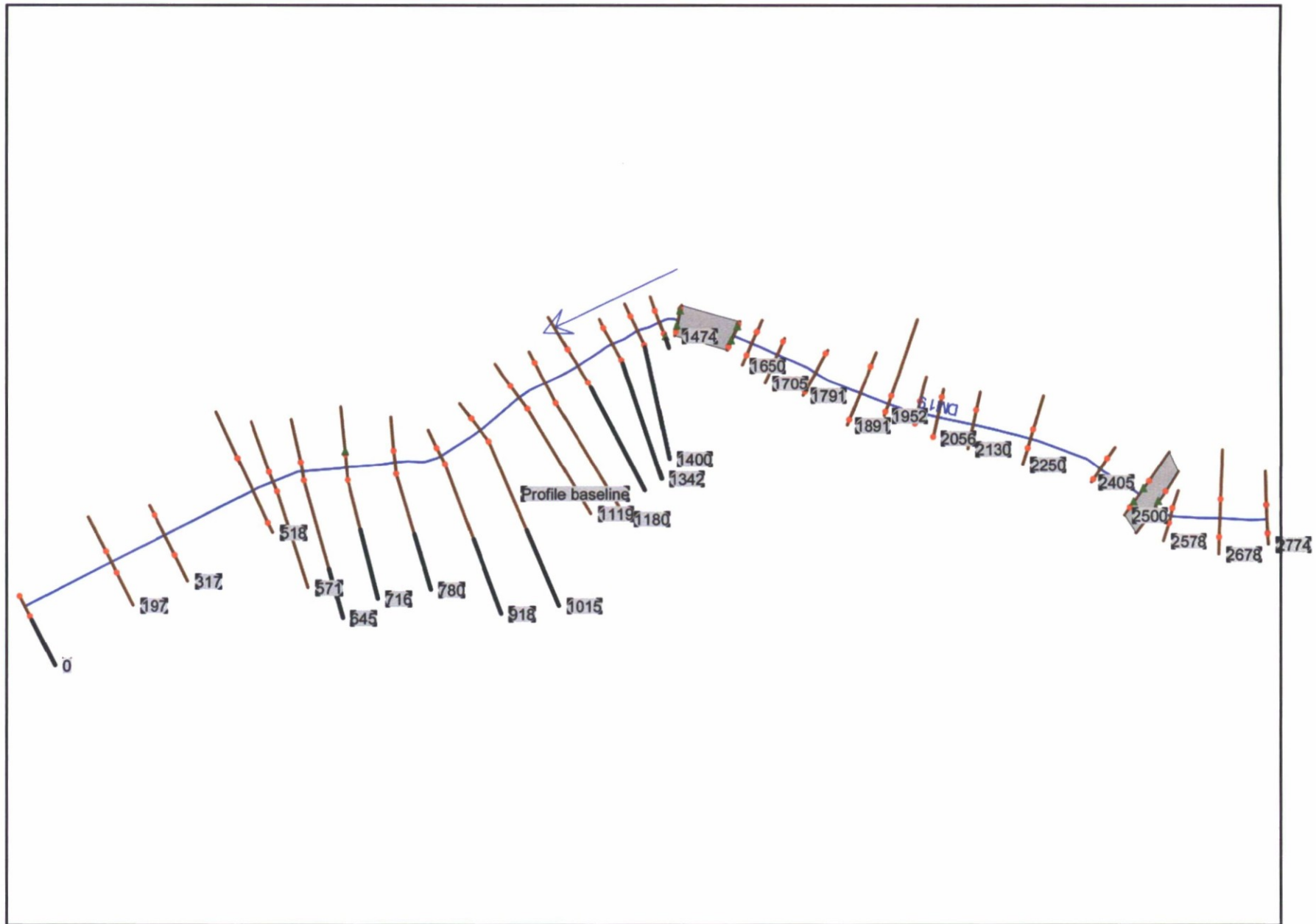




POST-DEVELOPMENT

GALLOWAY WASH - SUBCRITICAL

SUBCRITICAL



SUBCRITICAL

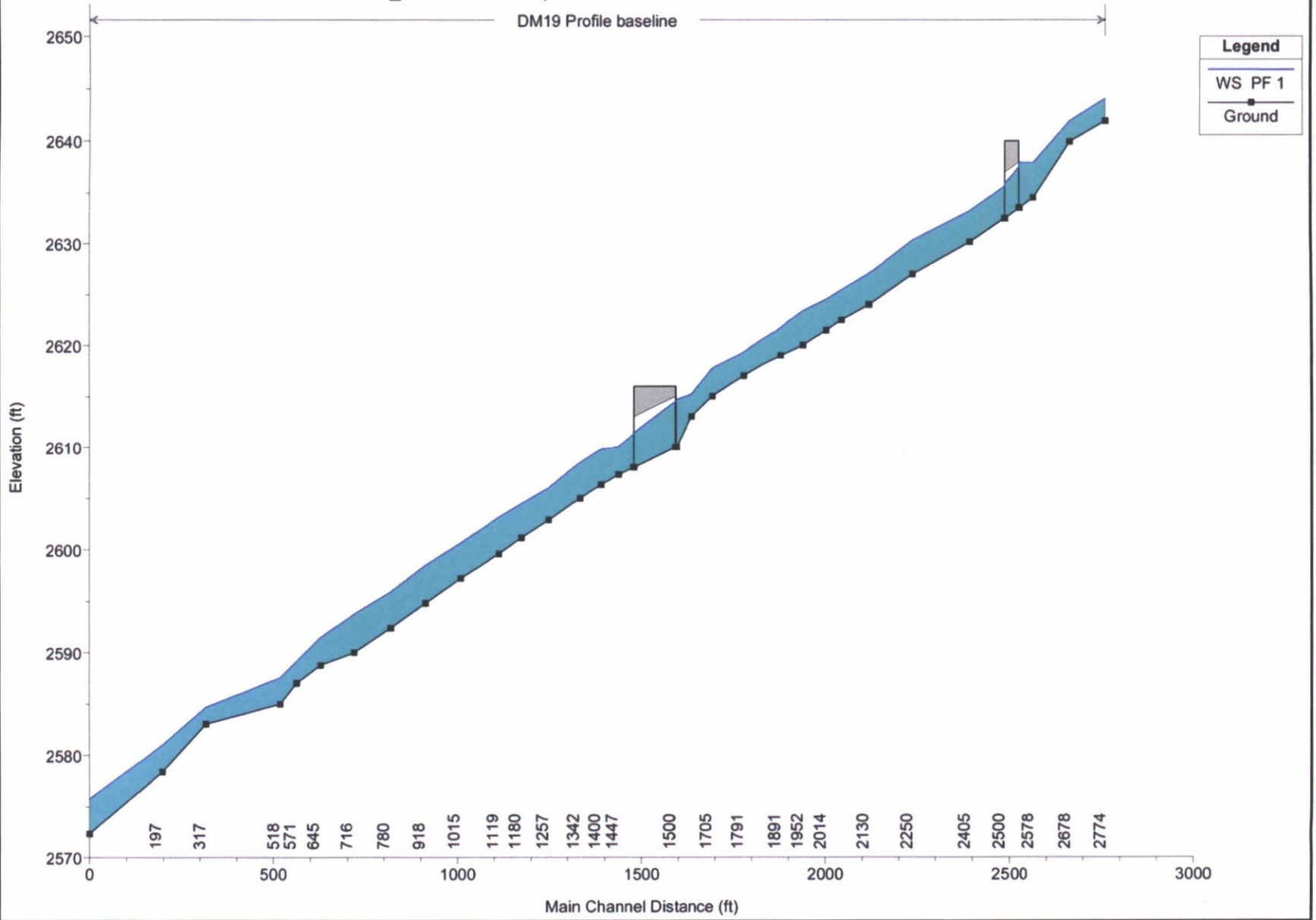
HEC-RAS Plan: Plan 01 River: DM19 Reach: Profile baseline Profile: PF 1

Reach	River Sta	Profile	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
Profile baseline	2774	PF 1	1052.00	2641.90	2644.05	2644.05	2644.94	0.009726	7.93	158.17	93.02	0.97
Profile baseline	2678	PF 1	1052.00	2639.92	2641.88	2641.88	2642.67	0.009788	7.25	166.67	134.18	0.95
Profile baseline	2578	PF 1	1052.00	2634.50	2637.89		2638.80	0.007326	8.19	146.36	58.51	0.79
Profile baseline	2540	PF 1	1052.00	2633.50	2637.91	2636.59	2638.68	0.000525	7.02	149.84	67.64	0.59
Profile baseline	2520		Bridge									
Profile baseline	2500	PF 1	1052.00	2632.50	2635.59	2635.59	2637.15	0.009092	10.02	105.02	58.76	1.00
Profile baseline	2405	PF 1	1052.00	2630.14	2633.20	2633.20	2634.37	0.010139	8.67	122.96	58.36	1.00
Profile baseline	2250	PF 1	1052.00	2626.98	2630.34	2630.34	2631.72	0.009477	9.43	113.04	48.47	0.99
Profile baseline	2130	PF 1	1052.00	2624.00	2627.03	2627.03	2628.10	0.010751	8.30	126.80	61.66	1.01
Profile baseline	2056	PF 1	1052.00	2622.50	2625.44	2625.44	2626.33	0.011447	7.57	138.98	79.76	1.01
Profile baseline	2014	PF 1	1052.00	2621.50	2624.48	2624.48	2625.48	0.009585	8.42	134.97	68.00	0.97
Profile baseline	1952	PF 1	1052.00	2620.00	2623.41	2623.41	2624.28	0.007660	8.20	148.18	95.64	0.88
Profile baseline	1891	PF 1	1052.00	2619.00	2621.74	2621.74	2622.54	0.010281	7.42	148.34	92.11	0.88
Profile baseline	1791	PF 1	1052.00	2617.00	2619.33	2619.33	2620.17	0.011345	7.34	143.50	87.93	1.01
Profile baseline	1705	PF 1	1052.00	2615.00	2617.66	2617.66	2618.73	0.013712	8.32	127.43	61.94	0.99
Profile baseline	1650	PF 1	1052.00	2613.00	2615.17	2615.17	2616.11	0.025091	7.89	135.71	72.77	0.94
Profile baseline	1610	PF 1	1058.00	2610.00	2614.66	2613.23	2615.44	0.000495	7.09	149.15	60.88	0.58
Profile baseline	1500		Bridge									
Profile baseline	1474	PF 1	1058.00	2608.00	2611.23	2611.23	2612.66	0.012194	10.24	103.31	54.46	1.00
Profile baseline	1447	PF 1	1058.00	2607.30	2610.04	2610.04	2611.23	0.008581	8.75	122.65	54.36	1.00
Profile baseline	1400	PF 1	1058.00	2606.30	2609.76	2609.76	2610.79	0.006815	8.13	130.13	66.33	1.01
Profile baseline	1342	PF 1	1058.00	2605.00	2608.49	2608.49	2609.45	0.024809	7.86	134.59	72.22	1.02
Profile baseline	1257	PF 1	1058.00	2602.90	2605.99	2605.99	2606.88	0.025132	7.57	139.78	79.93	1.01
Profile baseline	1180	PF 1	1058.00	2601.15	2604.46	2604.46	2605.16	0.009014	6.80	168.06	133.04	0.94
Profile baseline	1119	PF 1	1058.00	2599.60	2603.16	2603.16	2604.02	0.007086	7.62	162.66	104.05	0.89
Profile baseline	1015	PF 1	1058.00	2597.20	2600.64	2600.64	2601.45	0.007805	7.55	172.97	117.44	0.91
Profile baseline	918	PF 1	1058.00	2594.80	2598.48	2598.48	2599.15	0.004851	7.45	240.35	181.69	0.78
Profile baseline	780	PF 1	1058.00	2592.40	2595.88	2595.88	2596.50	0.005712	7.17	232.77	180.28	0.83
Profile baseline	716	PF 1	1075.00	2590.00	2593.72	2593.72	2594.62	0.004152	7.82	168.89	146.35	0.88
Profile baseline	645	PF 1	1075.00	2588.78	2591.51	2591.51	2592.19	0.007628	7.84	218.78	151.22	0.88
Profile baseline	571	PF 1	1075.00	2587.04	2589.20	2589.20	2589.67	0.009824	6.84	226.53	213.07	0.92
Profile baseline	518	PF 1	1075.00	2585.00	2587.55	2587.55	2588.04	0.008880	5.79	212.66	224.59	0.94
Profile baseline	317	PF 1	906.00	2583.05	2584.70	2584.70	2585.38	0.018281	6.67	142.11	116.68	0.97
Profile baseline	197	PF 1	906.00	2578.39	2581.00	2581.00	2582.11	0.018288	8.48	107.31	50.39	1.00
Profile baseline	0	PF 1	906.00	2572.39	2575.79	2575.79	2576.95	0.018413	8.65	104.70	45.74	1.01

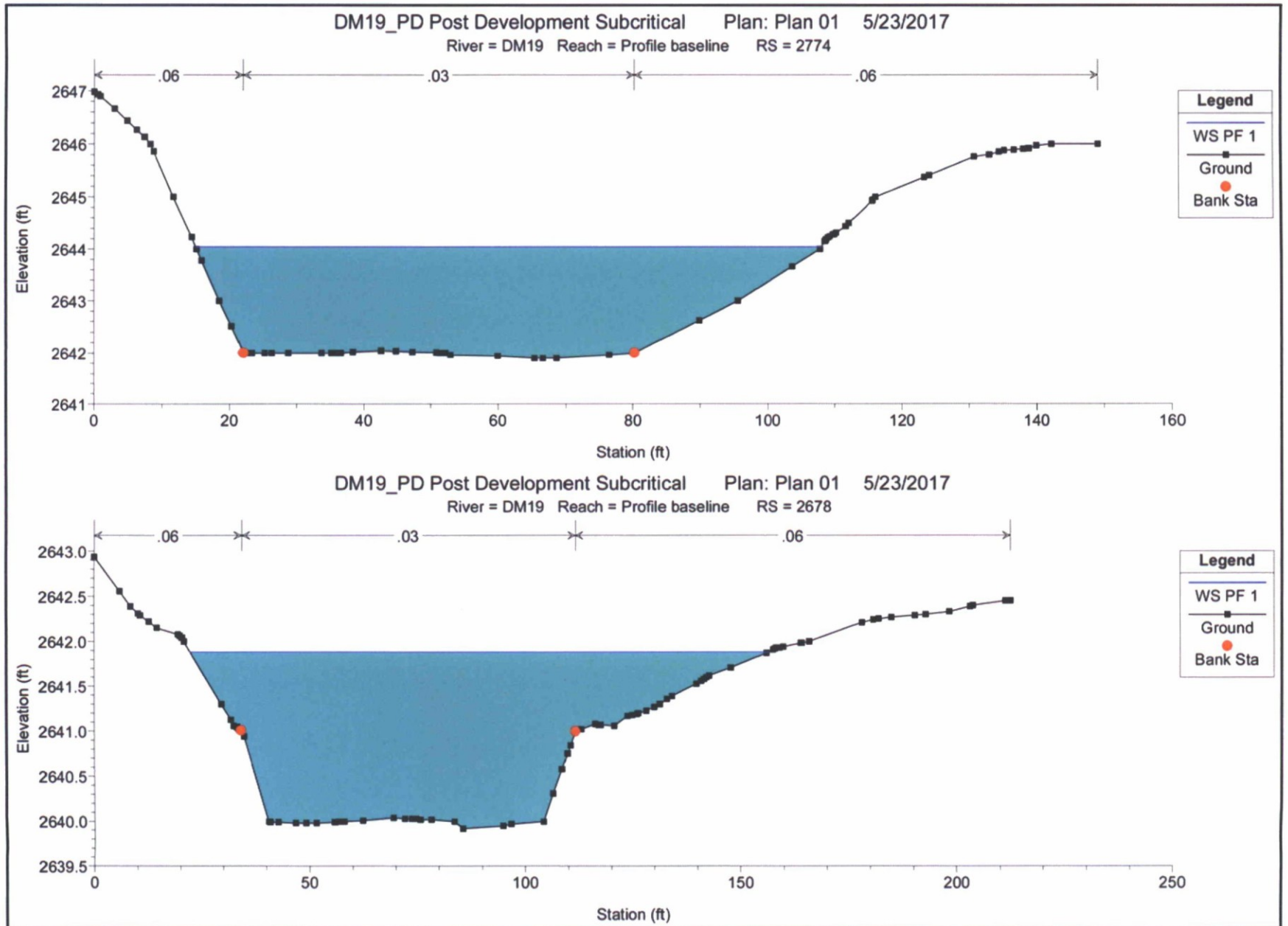
SUBCRITICAL

DM19_PD Post Development Subcritical Plan: Plan 01 5/23/2017

DM19 Profile baseline

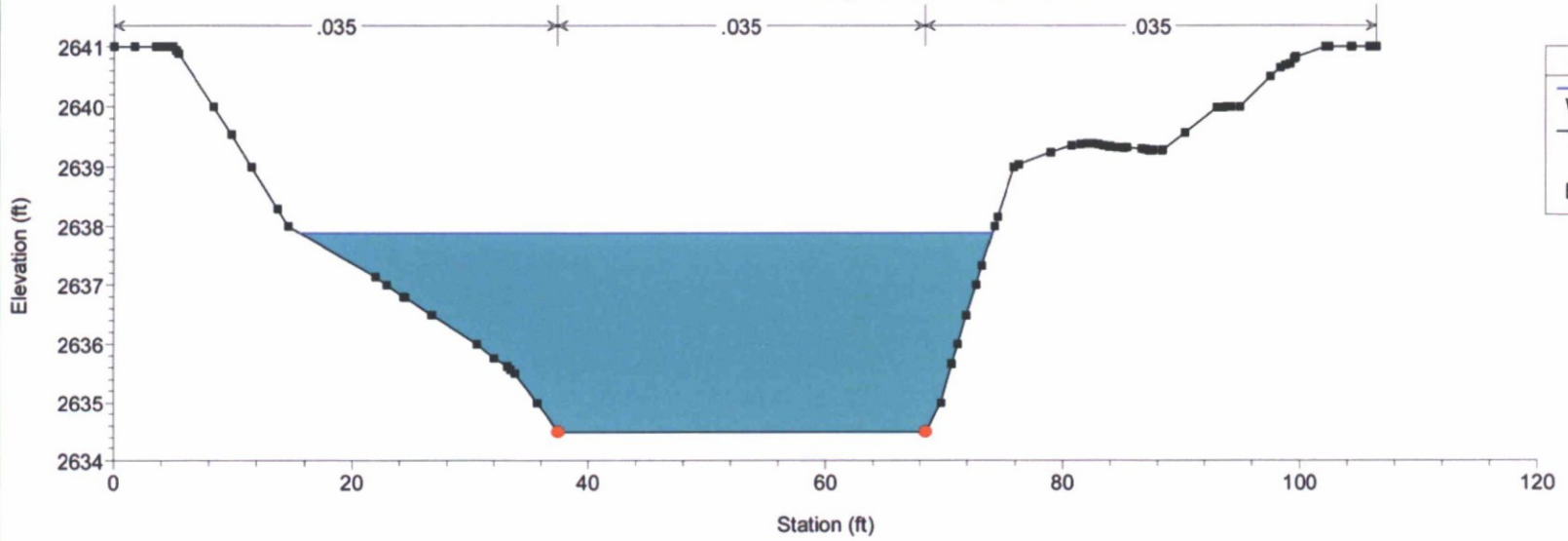


SUBCRITICAL



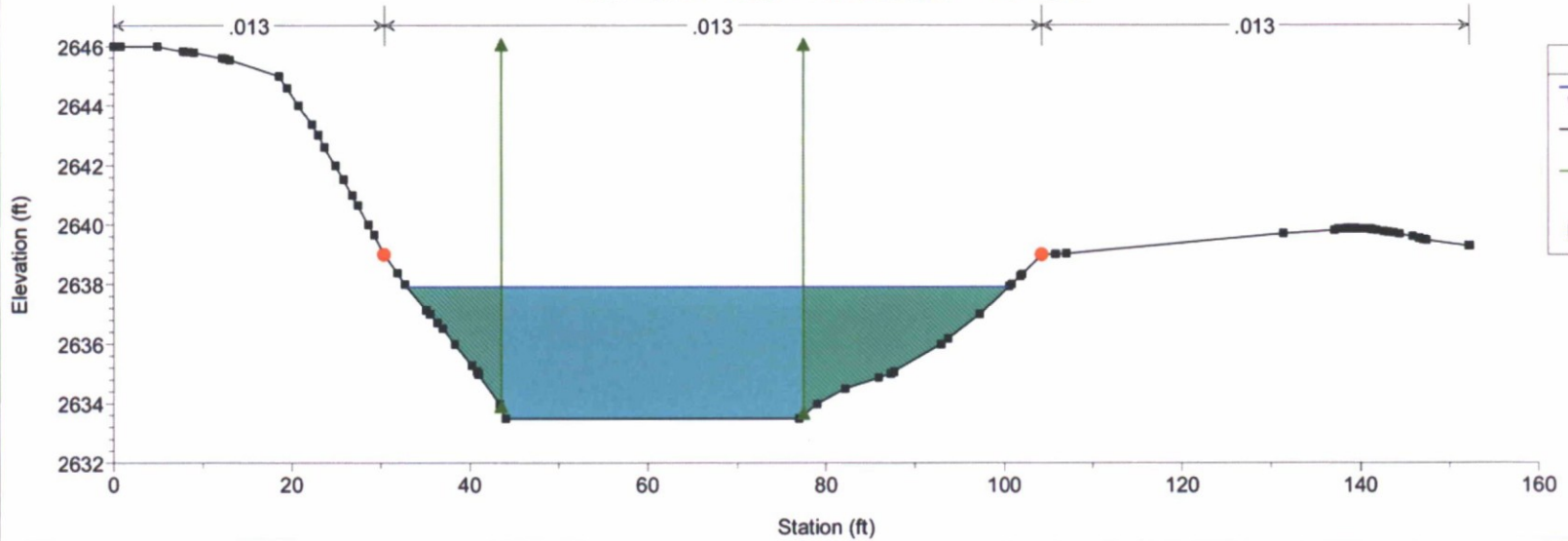
DM19_PD Post Development Subcritical Plan: Plan 01 5/23/2017

River = DM19 Reach = Profile baseline RS = 2578



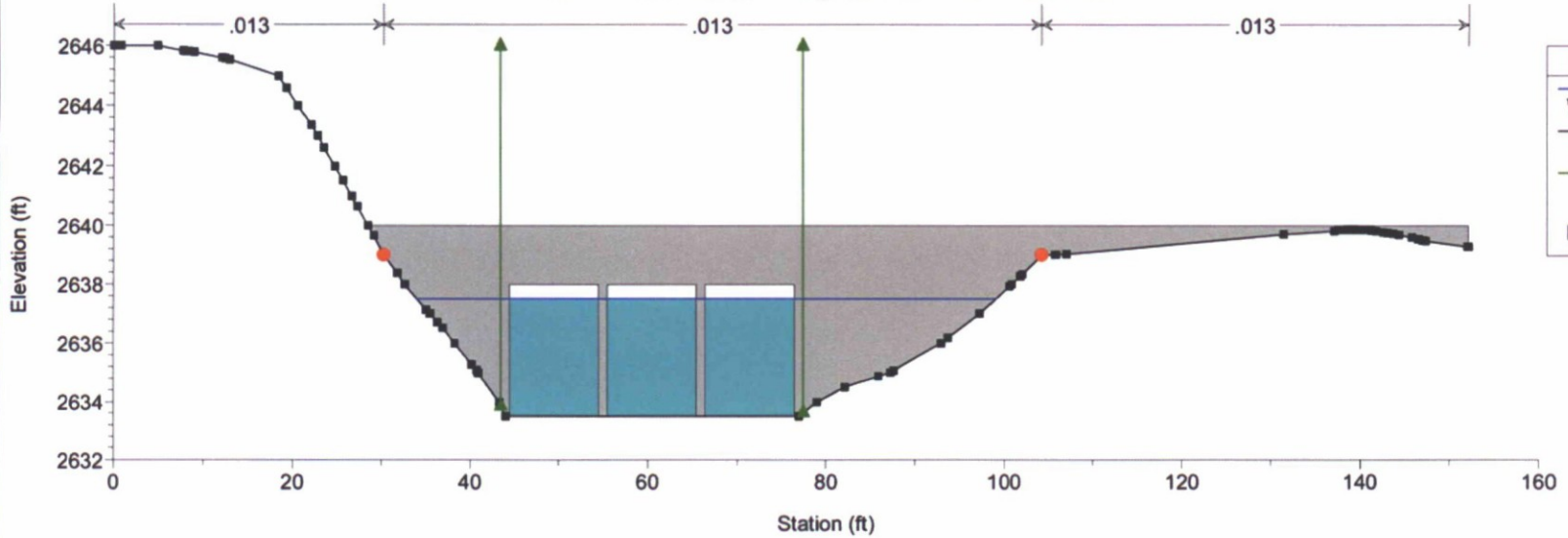
DM19_PD Post Development Subcritical Plan: Plan 01 5/23/2017

River = DM19 Reach = Profile baseline RS = 2540



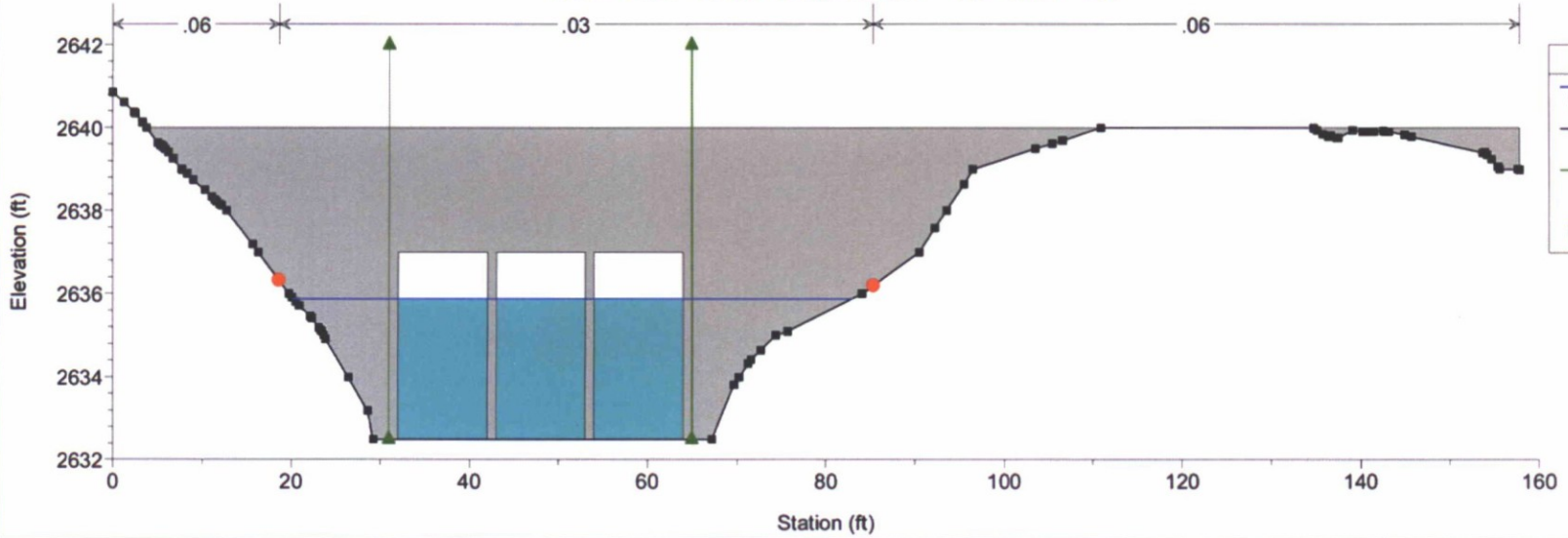
DM19_PD Post Development Subcritical Plan: Plan 01 5/23/2017

River = DM19 Reach = Profile baseline RS = 2520 BR



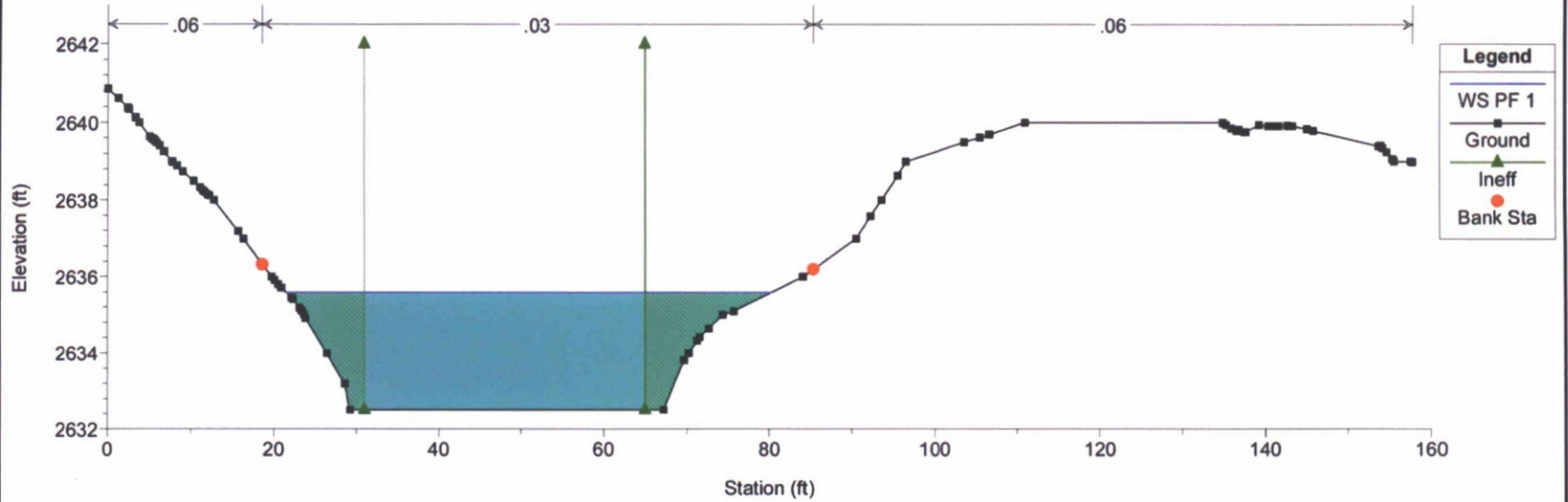
DM19_PD Post Development Subcritical Plan: Plan 01 5/23/2017

River = DM19 Reach = Profile baseline RS = 2520 BR



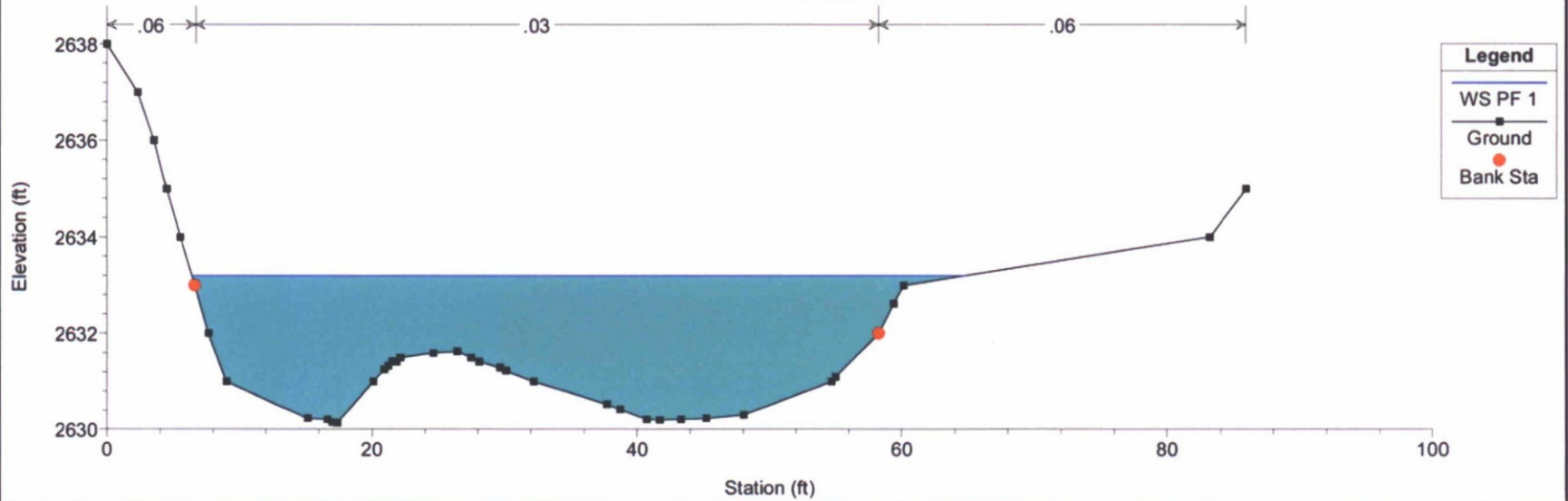
DM19_PD Post Development Subcritical Plan: Plan 01 5/23/2017

River = DM19 Reach = Profile baseline RS = 2500



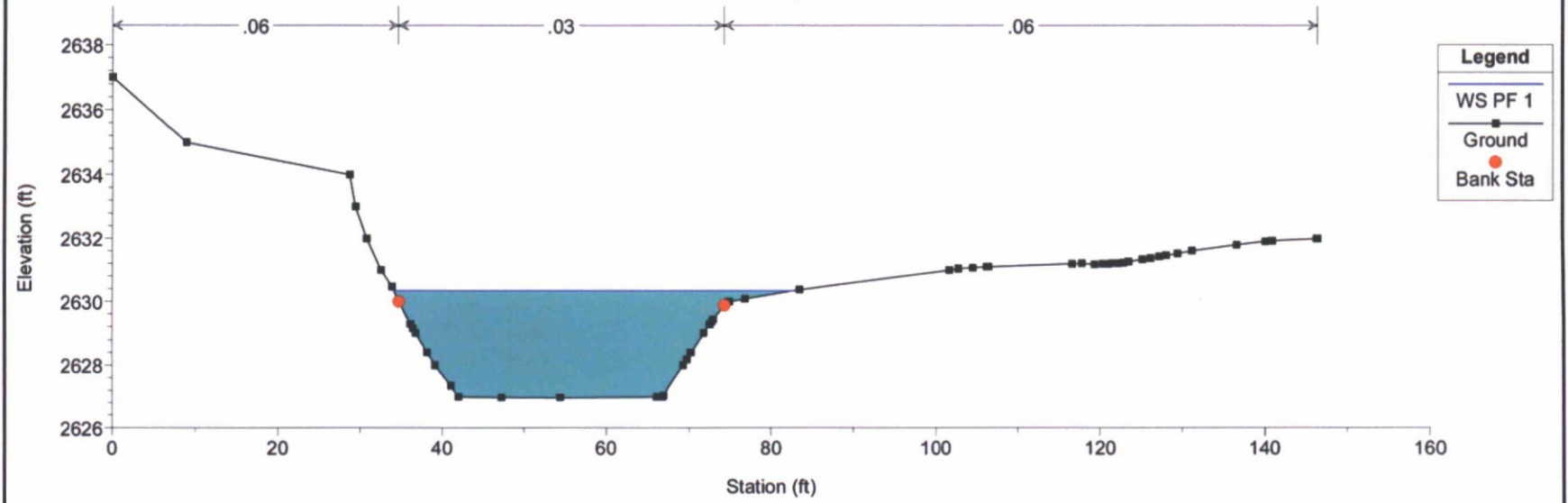
DM19_PD Post Development Subcritical Plan: Plan 01 5/23/2017

River = DM19 Reach = Profile baseline RS = 2405



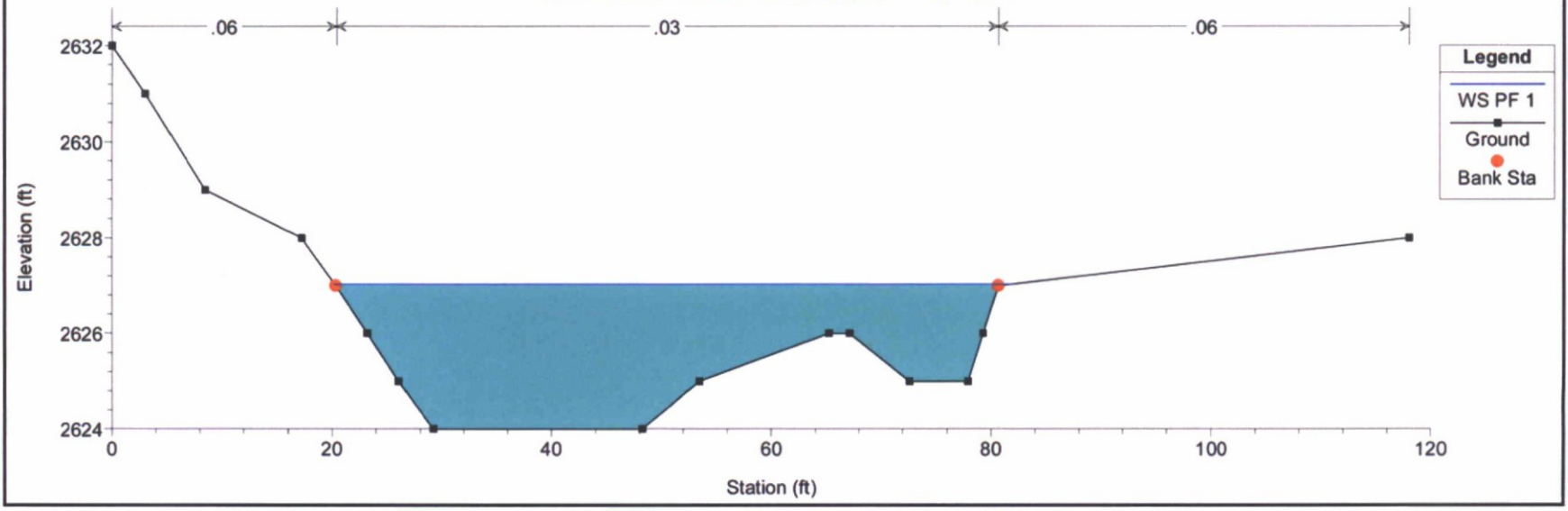
DM19_PD Post Development Subcritical Plan: Plan 01 5/23/2017

River = DM19 Reach = Profile baseline RS = 2250



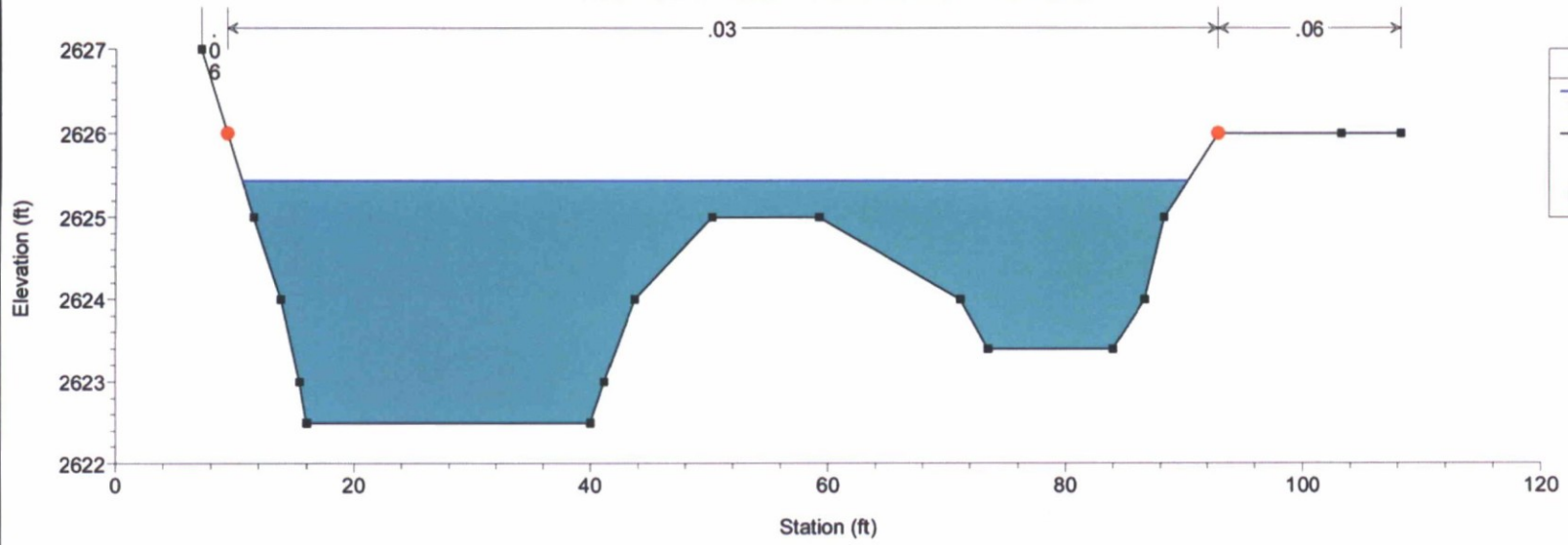
DM19_PD Post Development Subcritical Plan: Plan 01 5/23/2017

River = DM19 Reach = Profile baseline RS = 2130



DM19_PD Post Development Subcritical Plan: Plan 01 5/23/2017

River = DM19 Reach = Profile baseline RS = 2056

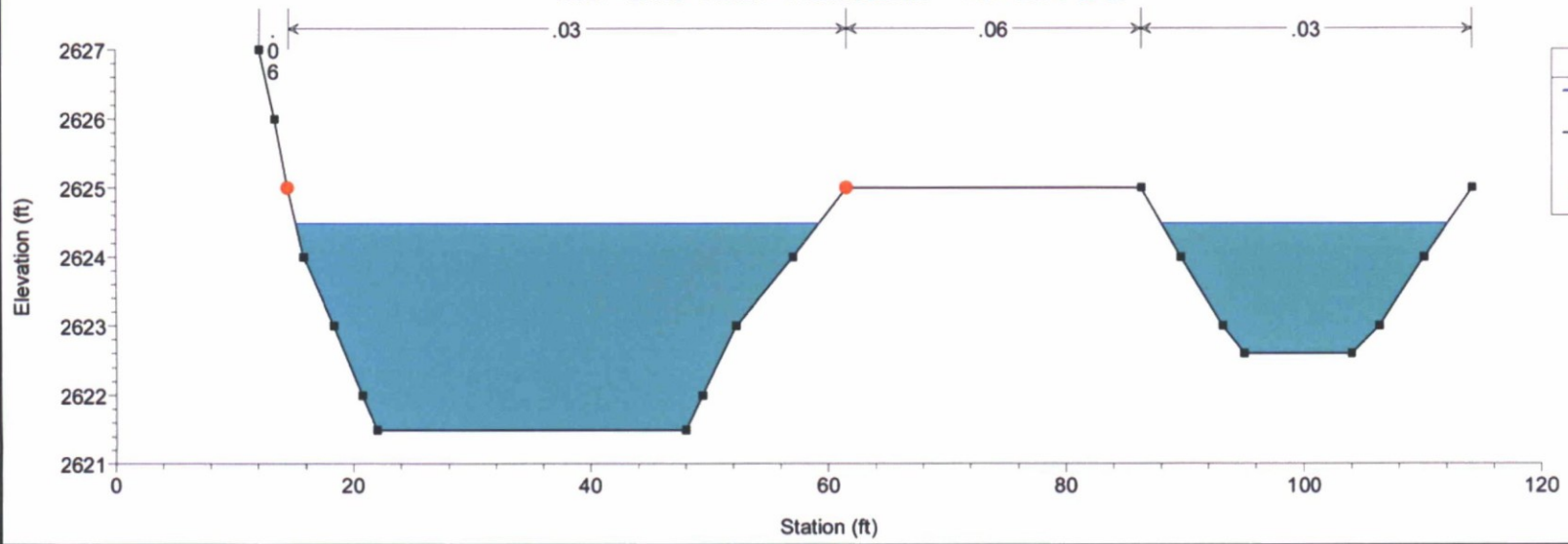


Legend

- WS PF 1
- Ground
- Bank Sta

DM19_PD Post Development Subcritical Plan: Plan 01 5/23/2017

River = DM19 Reach = Profile baseline RS = 2014 cs 60

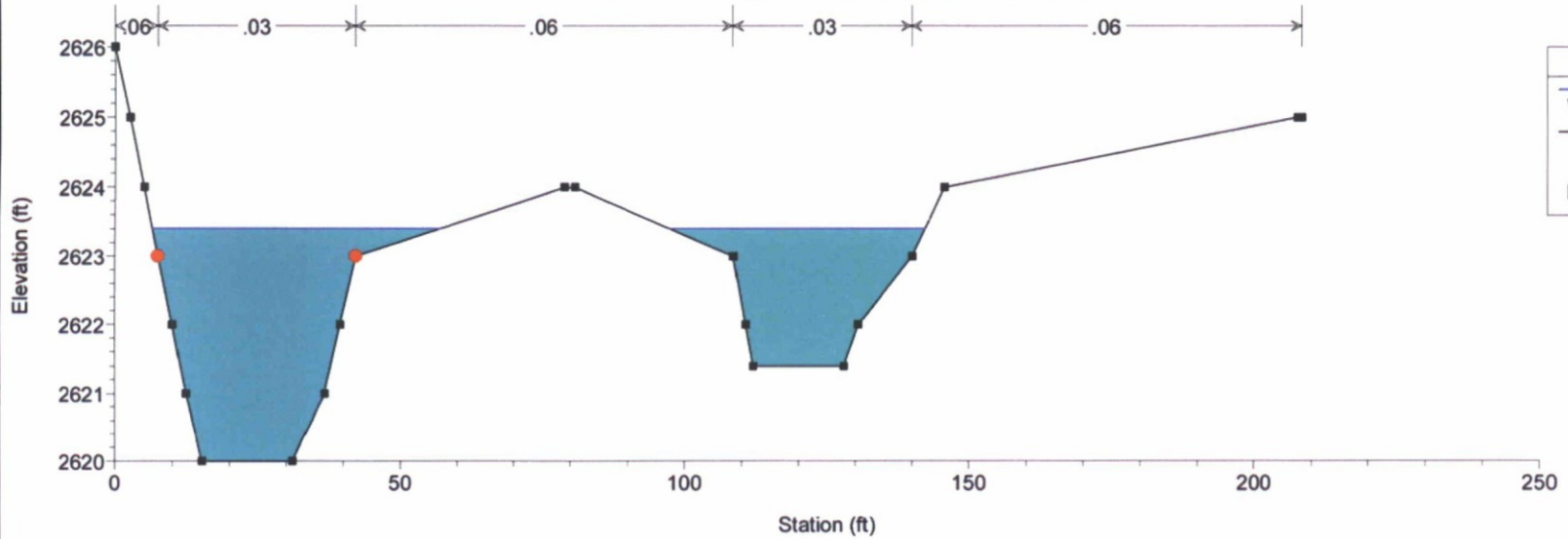


Legend

- WS PF 1
- Ground
- Bank Sta

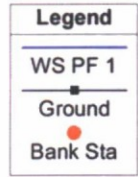
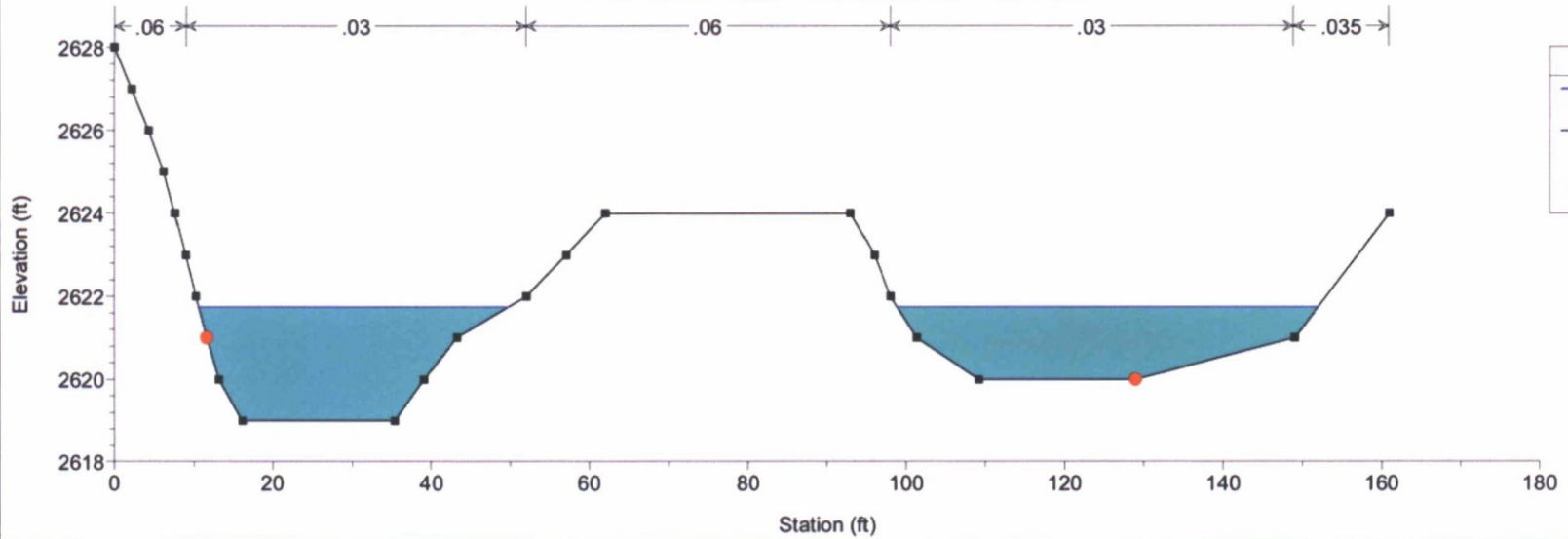
DM19_PD Post Development Subcritical Plan: Plan 01 5/23/2017

River = DM19 Reach = Profile baseline RS = 1952



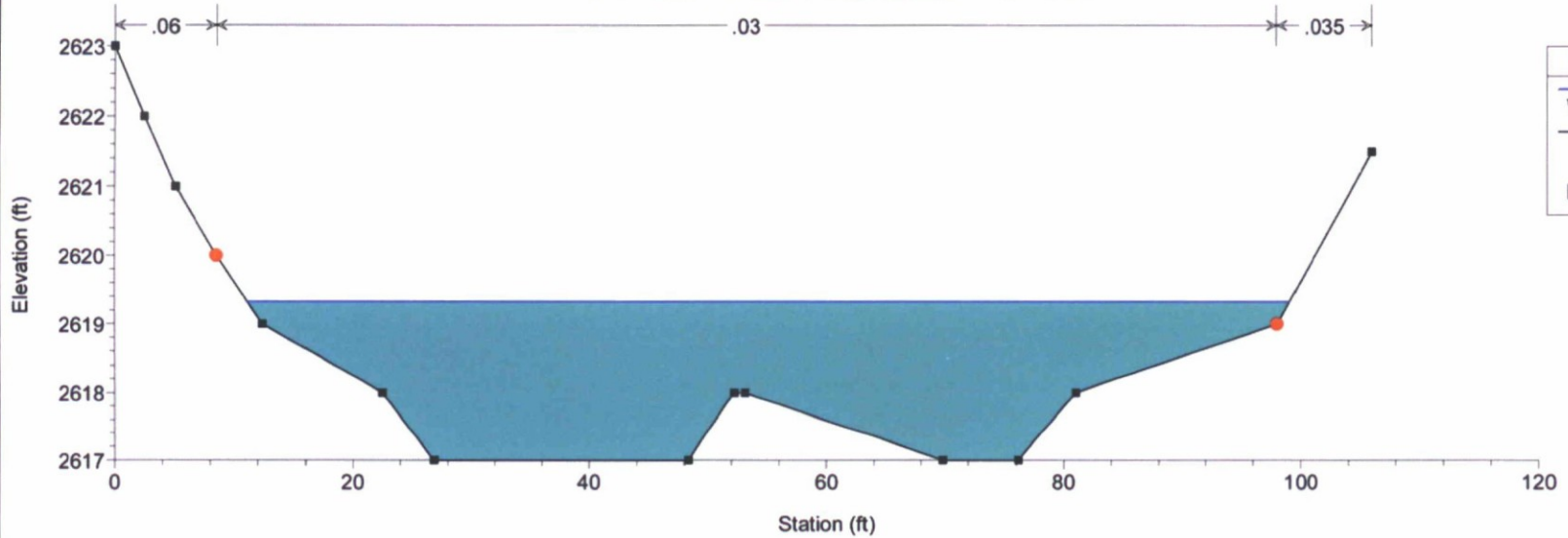
DM19_PD Post Development Subcritical Plan: Plan 01 5/23/2017

River = DM19 Reach = Profile baseline RS = 1891



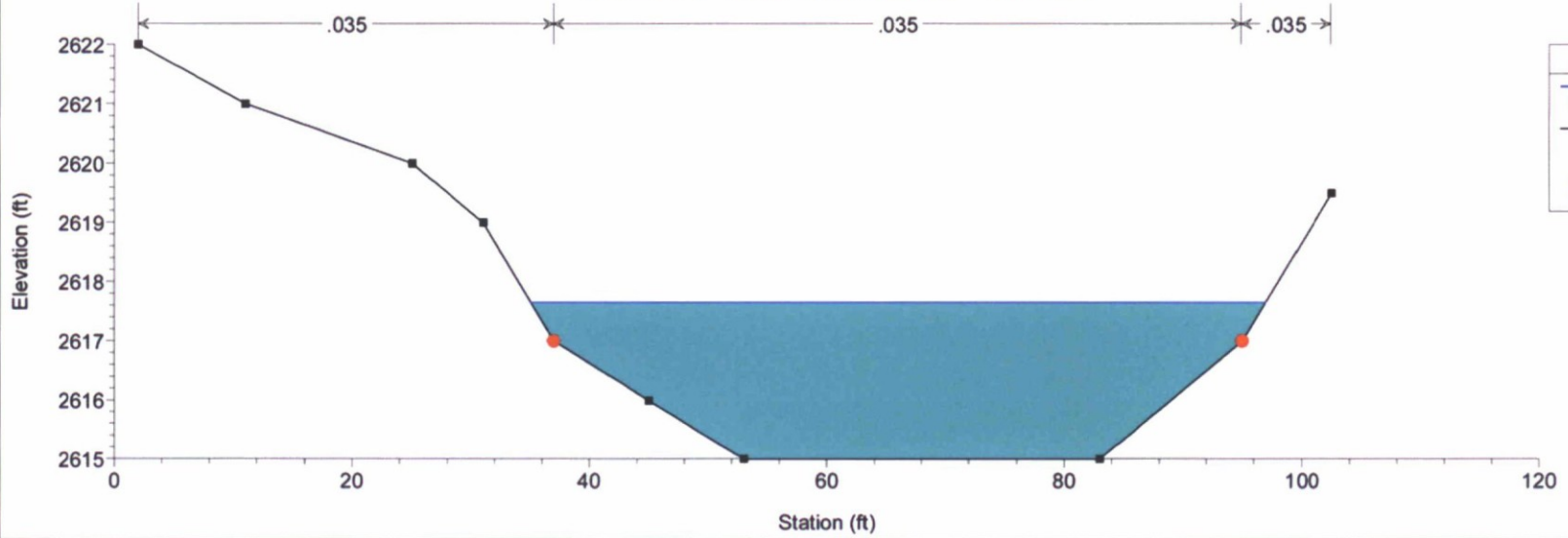
DM19_PD Post Development Subcritical Plan: Plan 01 5/23/2017

River = DM19 Reach = Profile baseline RS = 1791



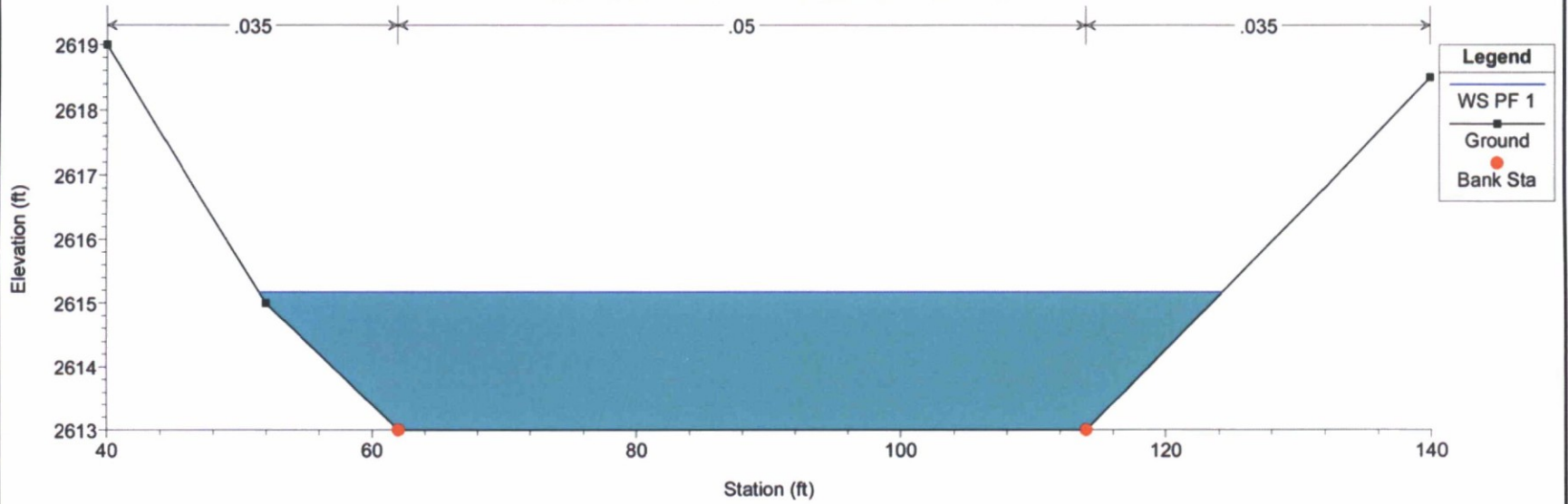
DM19_PD Post Development Subcritical Plan: Plan 01 5/23/2017

River = DM19 Reach = Profile baseline RS = 1705



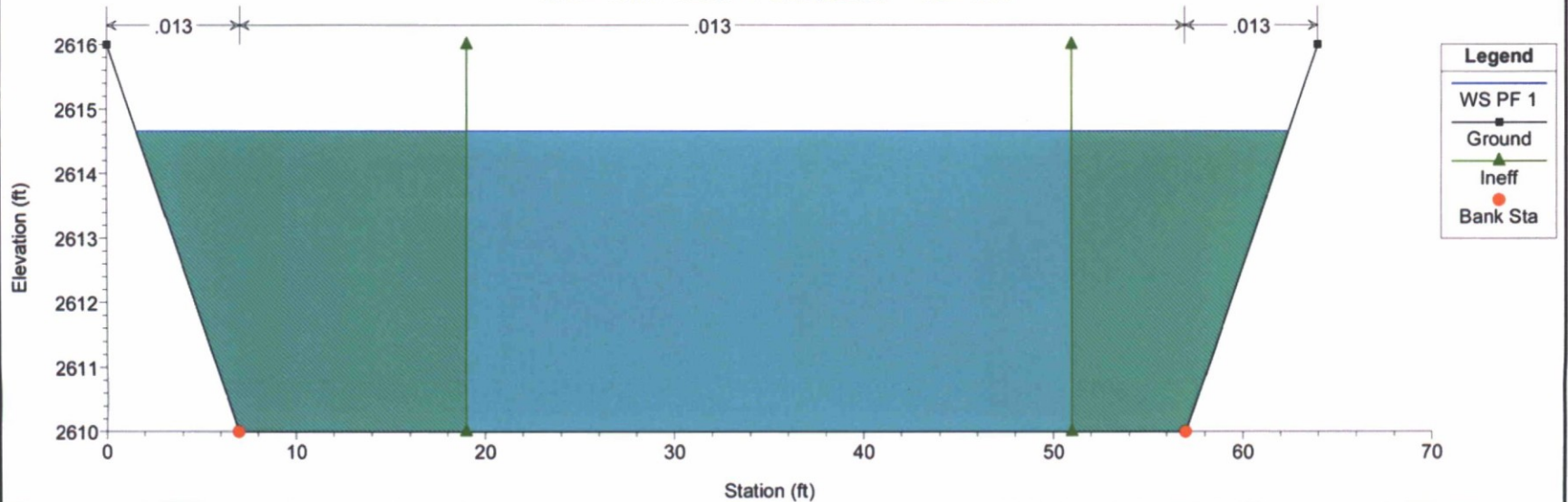
DM19_PD Post Development Subcritical Plan: Plan 01 5/23/2017

River = DM19 Reach = Profile baseline RS = 1650



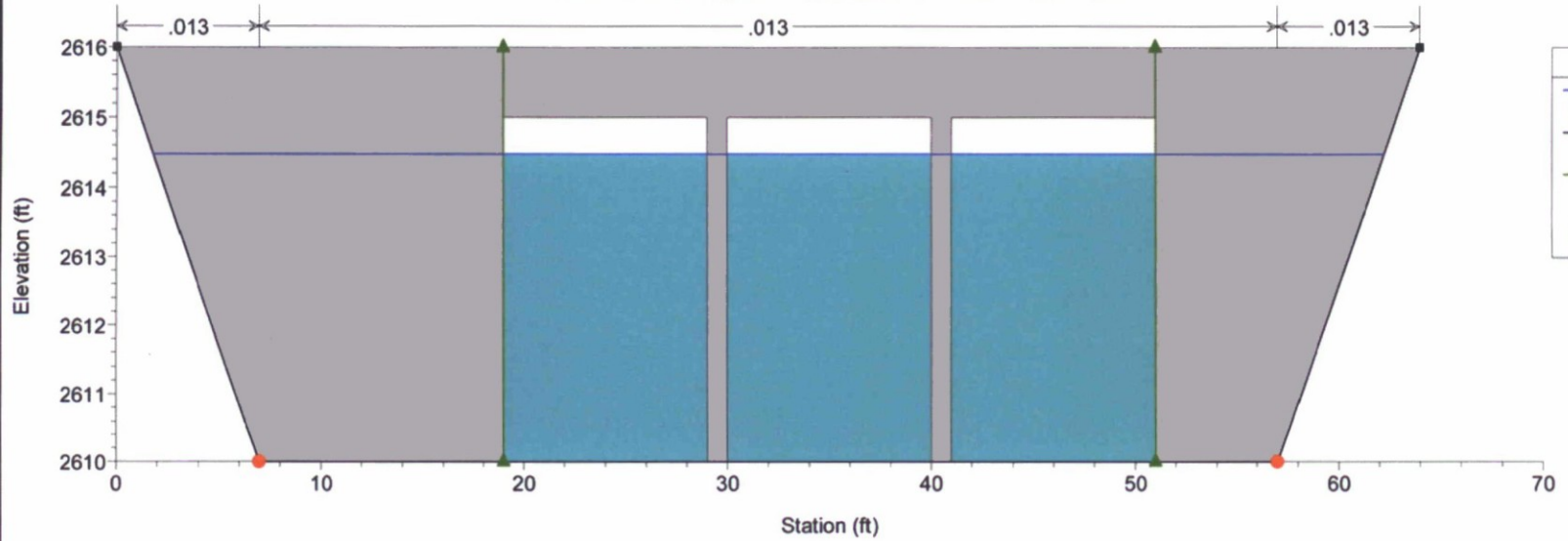
DM19_PD Post Development Subcritical Plan: Plan 01 5/23/2017

River = DM19 Reach = Profile baseline RS = 1610



DM19_PD Post Development Subcritical Plan: Plan 01 5/23/2017

River = DM19 Reach = Profile baseline RS = 1500 BR

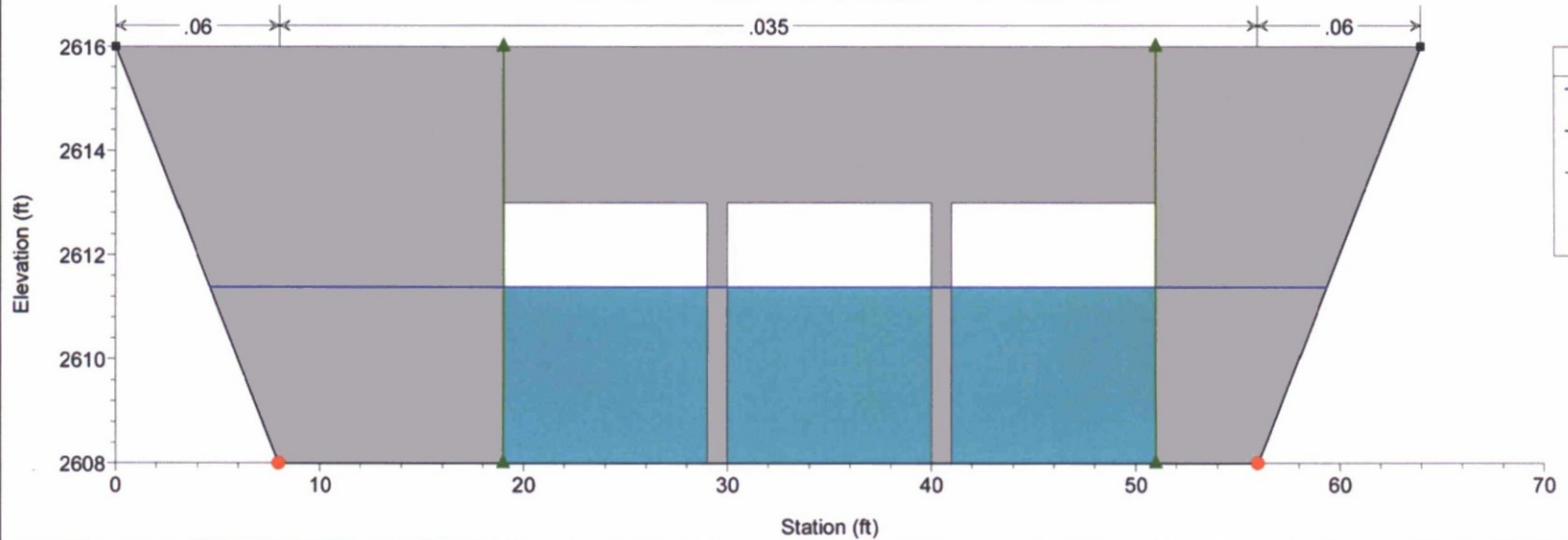


Legend

- WS PF 1
- Ground
- Ineff
- Bank Sta

DM19_PD Post Development Subcritical Plan: Plan 01 5/23/2017

River = DM19 Reach = Profile baseline RS = 1500 BR

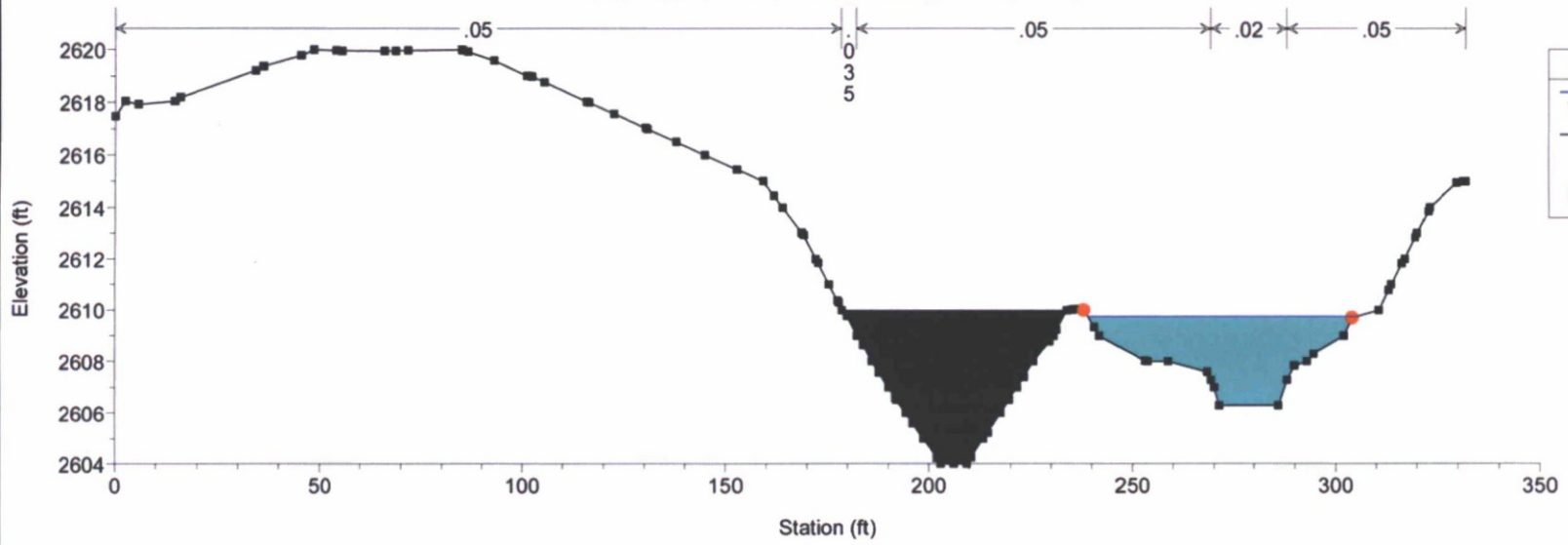


Legend

- WS PF 1
- Ground
- Ineff
- Bank Sta

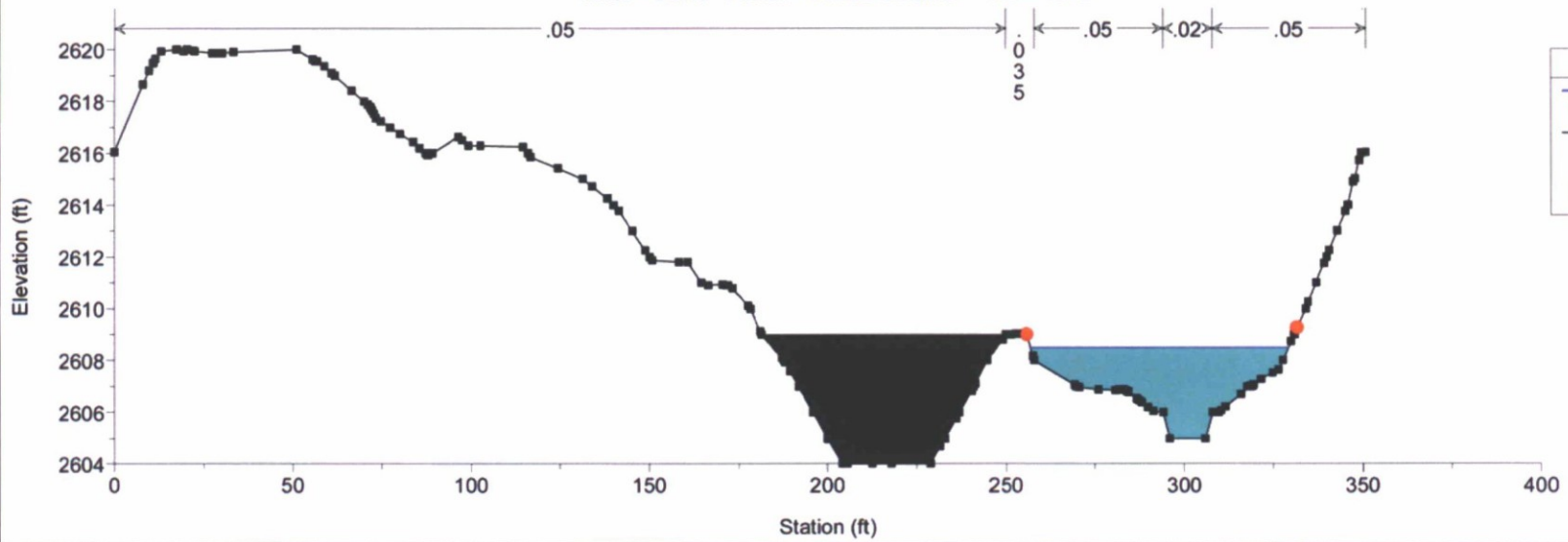
DM19_PD Post Development Subcritical Plan: Plan 01 5/23/2017

River = DM19 Reach = Profile baseline RS = 1400



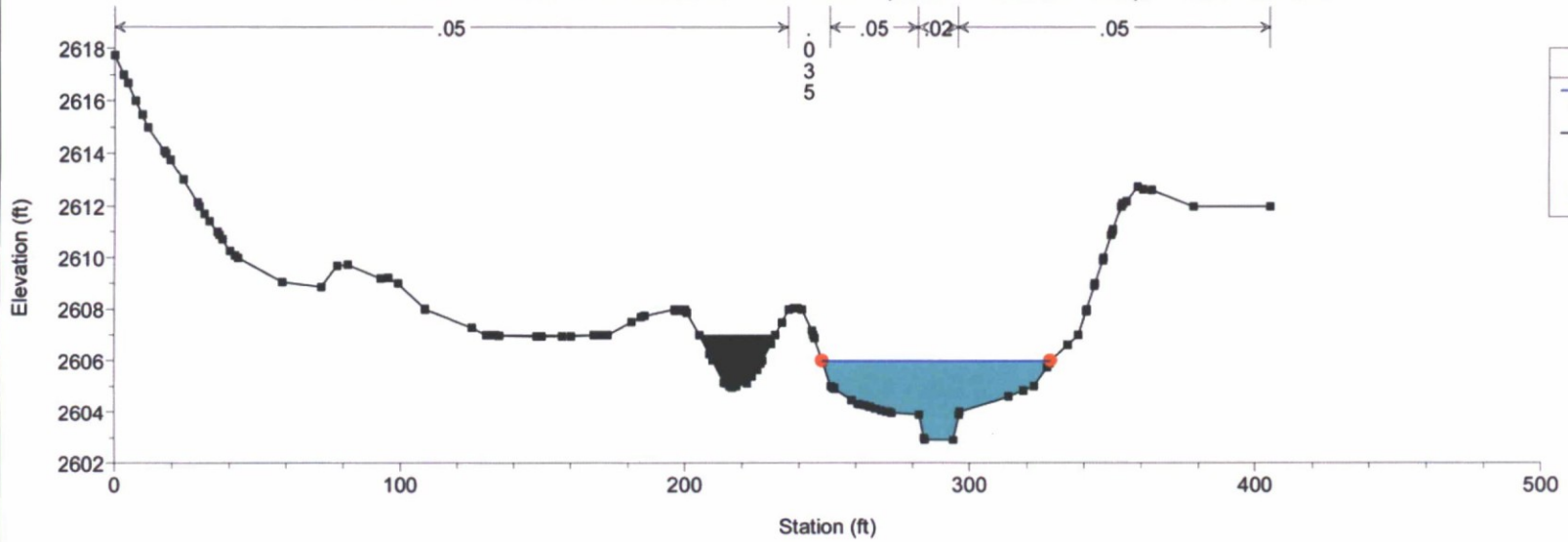
DM19_PD Post Development Subcritical Plan: Plan 01 5/23/2017

River = DM19 Reach = Profile baseline RS = 1342



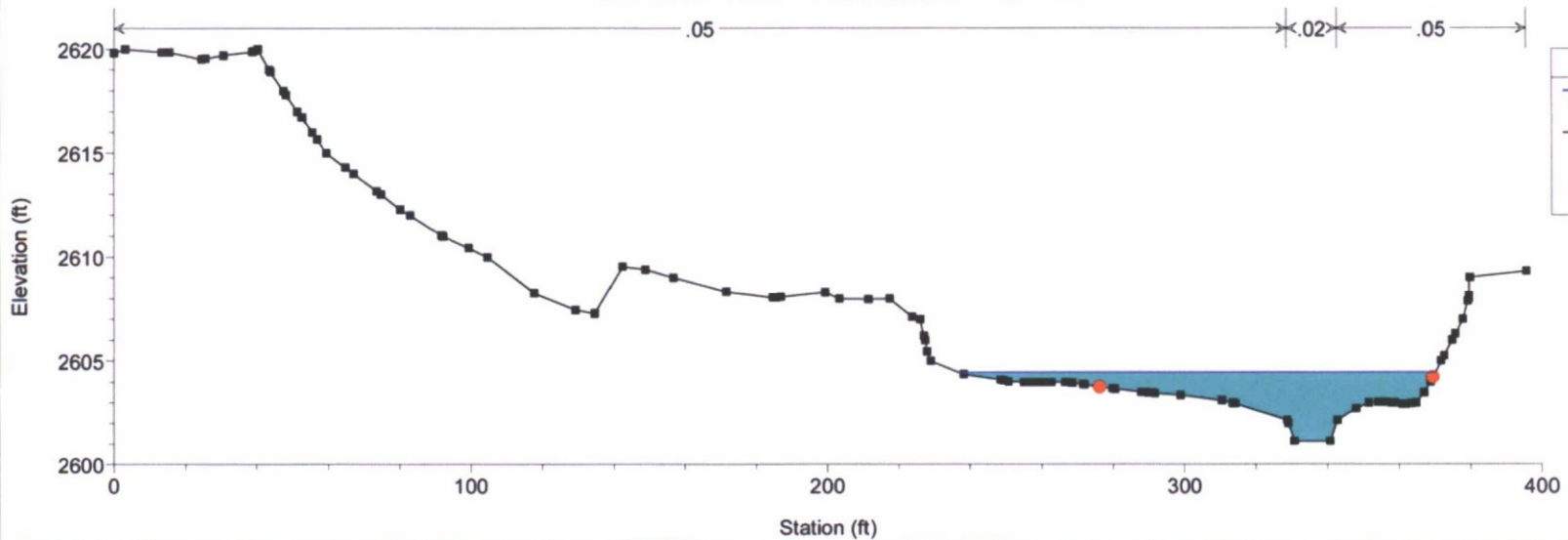
DM19_PD Post Development Subcritical Plan: Plan 01 5/23/2017

River = DM19 Reach = Profile baseline RS = 1257 Updated CS with new 1 ft topo = FEMA CS 4.796



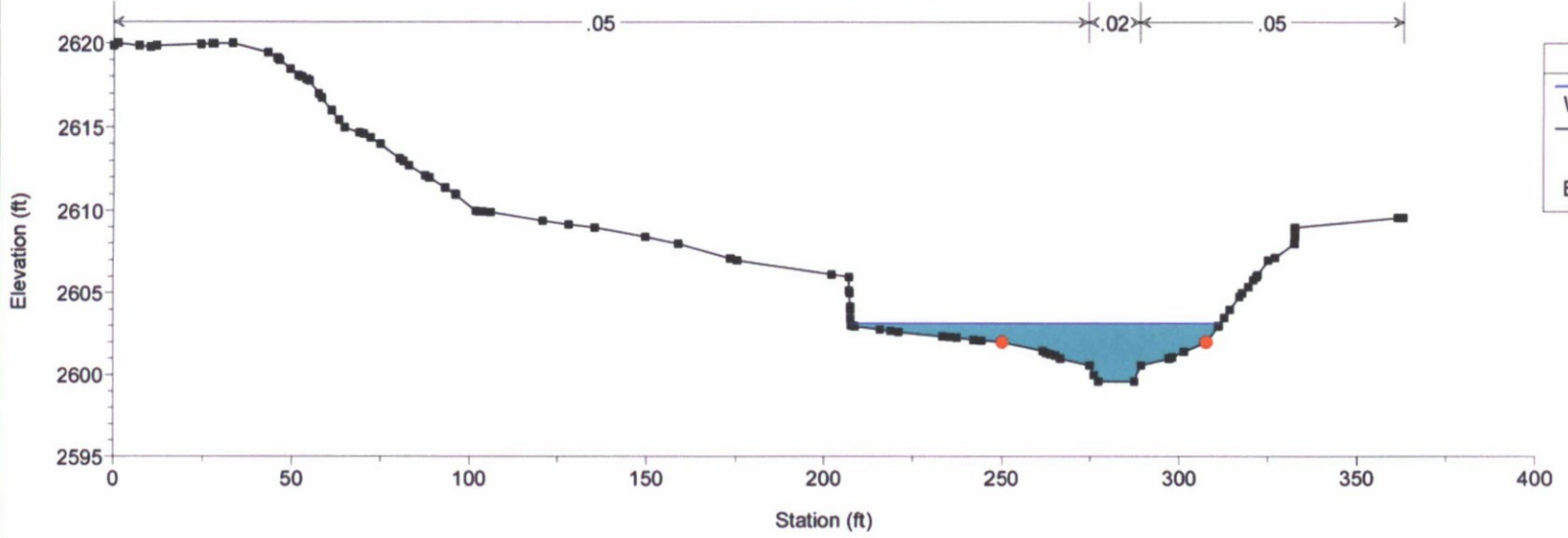
DM19_PD Post Development Subcritical Plan: Plan 01 5/23/2017

River = DM19 Reach = Profile baseline RS = 1180



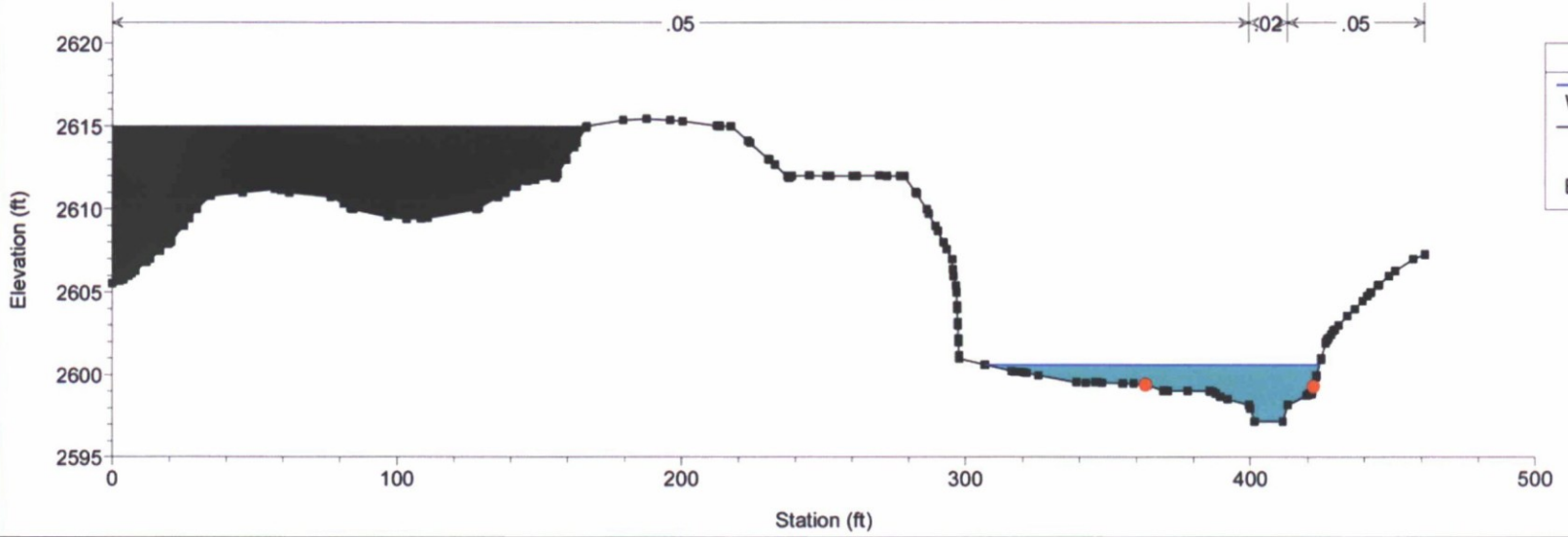
DM19_PD Post Development Subcritical Plan: Plan 01 5/23/2017

River = DM19 Reach = Profile baseline RS = 1119 Updated CS with new 1 ft topo = FEMA CS 4.770



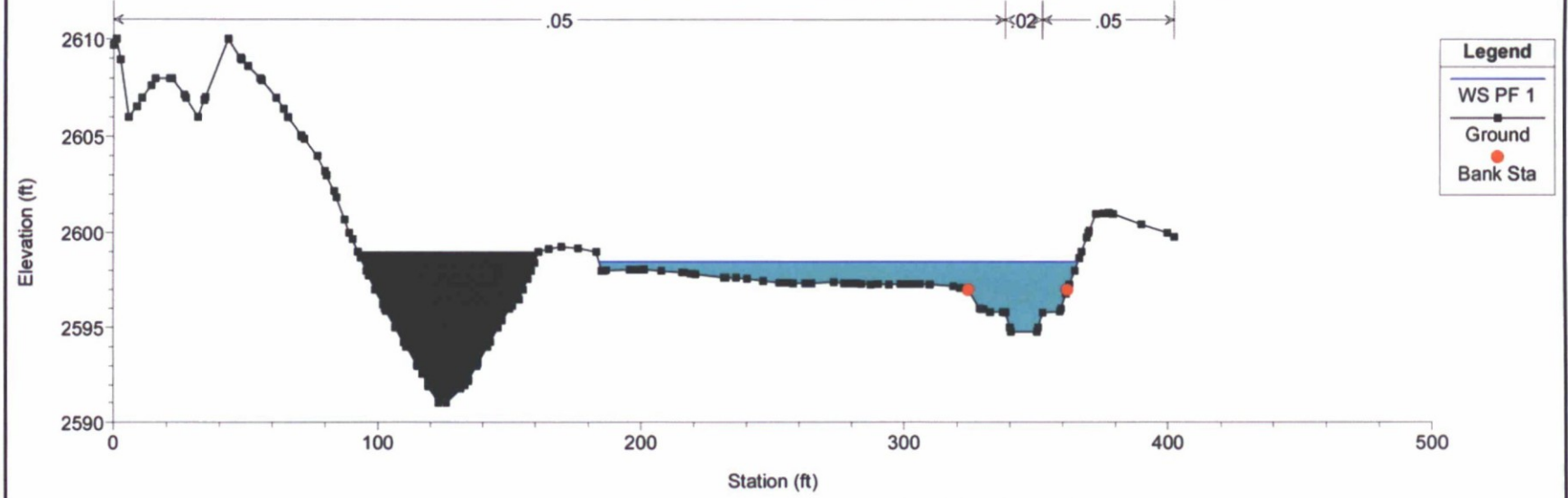
DM19_PD Post Development Subcritical Plan: Plan 01 5/23/2017

River = DM19 Reach = Profile baseline RS = 1015



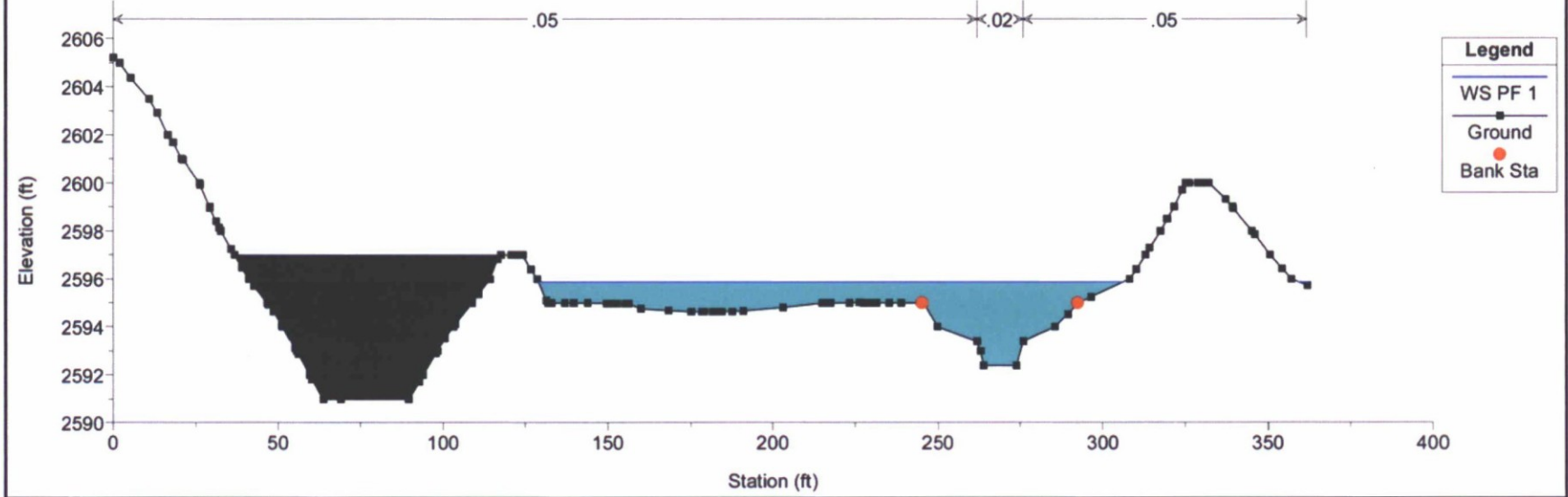
DM19_PD Post Development Subcritical Plan: Plan 01 5/23/2017

River = DM19 Reach = Profile baseline RS = 918 Updated CS with new 1 ft topo = FEMA CS 4.732



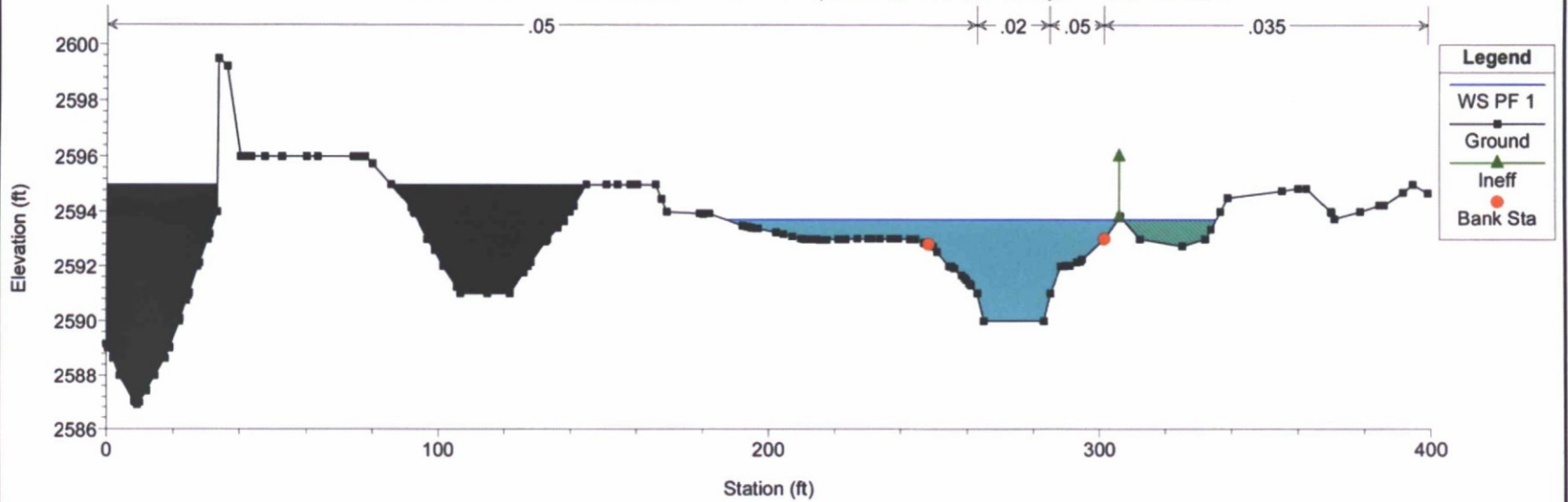
DM19_PD Post Development Subcritical Plan: Plan 01 5/23/2017

River = DM19 Reach = Profile baseline RS = 780 New CS



DM19_PD Post Development Subcritical Plan: Plan 01 5/23/2017

River = DM19 Reach = Profile baseline RS = 716 Updated CS with new 1 ft topo = FEMA CS 4.694

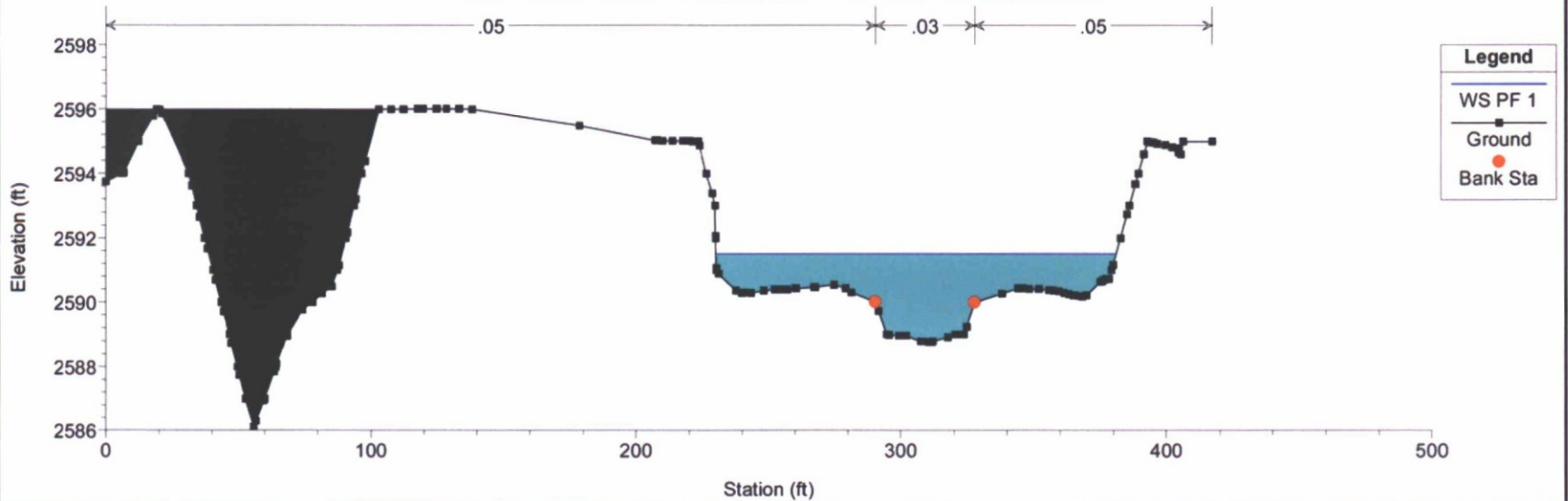


Legend

- WS PF 1
- Ground
- Ineff
- Bank Sta

DM19_PD Post Development Subcritical Plan: Plan 01 5/23/2017

River = DM19 Reach = Profile baseline RS = 645 New Cross Section

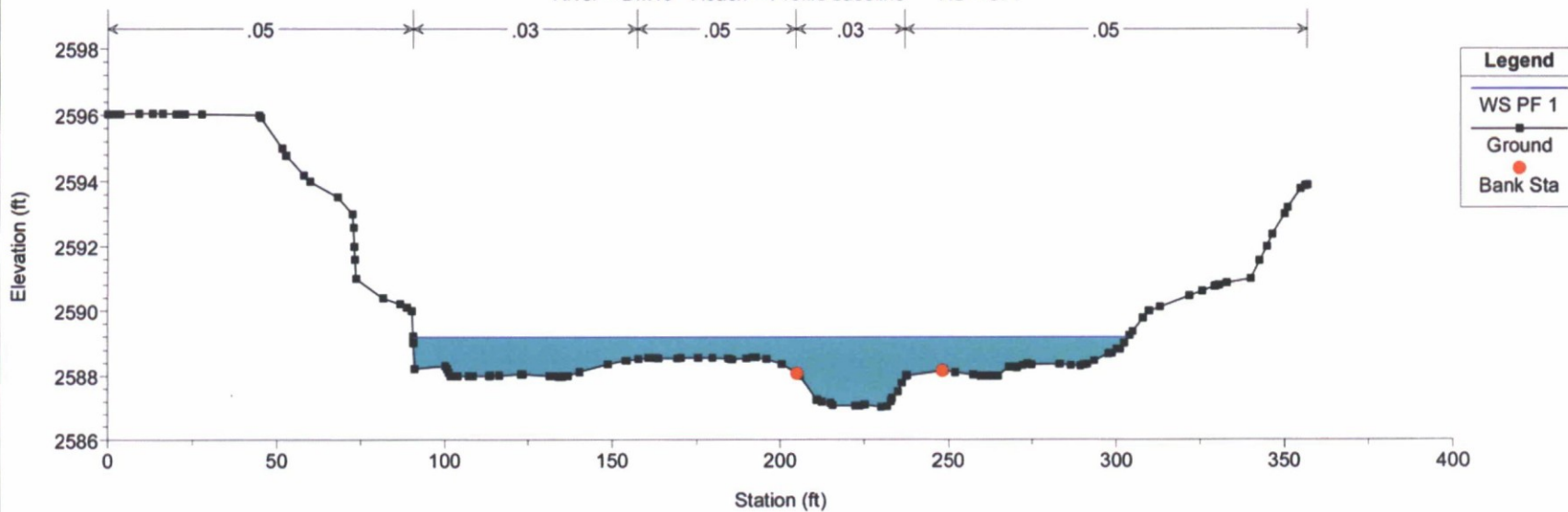


Legend

- WS PF 1
- Ground
- Bank Sta

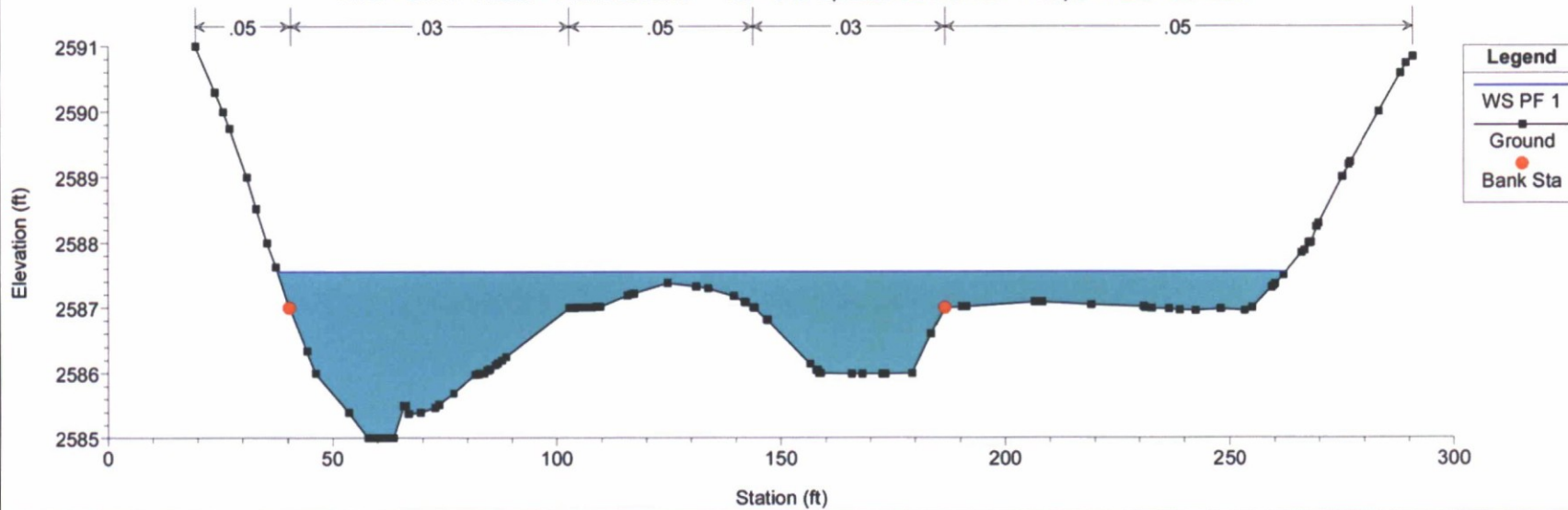
DM19_PD Post Development Subcritical Plan: Plan 01 5/23/2017

River = DM19 Reach = Profile baseline RS = 571



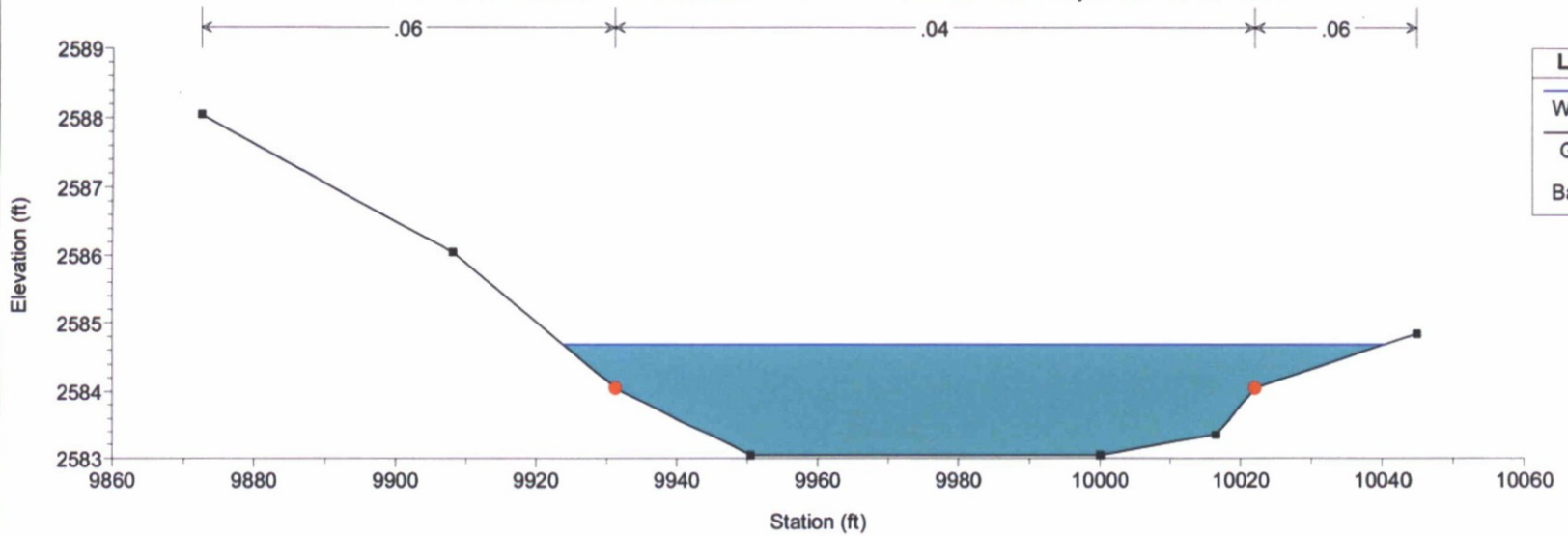
DM19_PD Post Development Subcritical Plan: Plan 01 5/23/2017

River = DM19 Reach = Profile baseline RS = 518 Updated CS with new 1 ft topo = FEMA CS 4.656



DM19_PD Post Development Subcritical Plan: Plan 01 5/23/2017

River = DM19 Reach = Profile baseline RS = 317 FEMA CS 4.639 - Adjust from NGVD +2.05



Legend

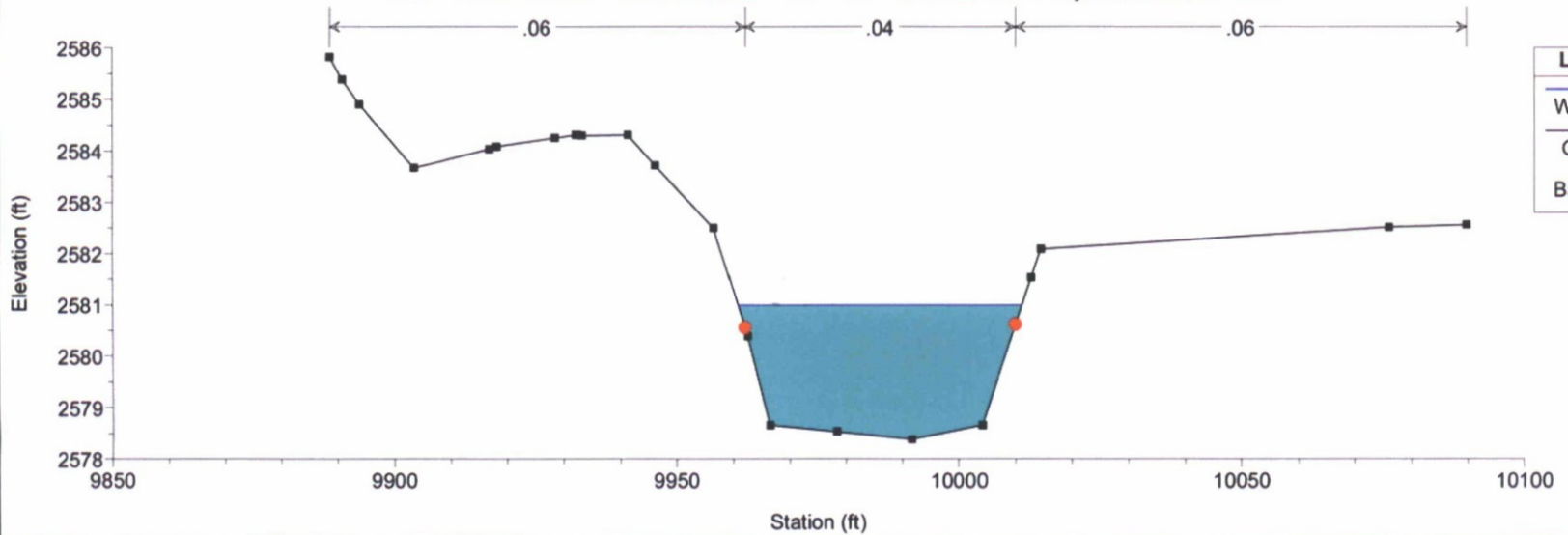
WS PF 1

Ground

Bank Sta

DM19_PD Post Development Subcritical Plan: Plan 01 5/23/2017

River = DM19 Reach = Profile baseline RS = 197 FEMA CS 4.618- Adjust from NGVD +2.05



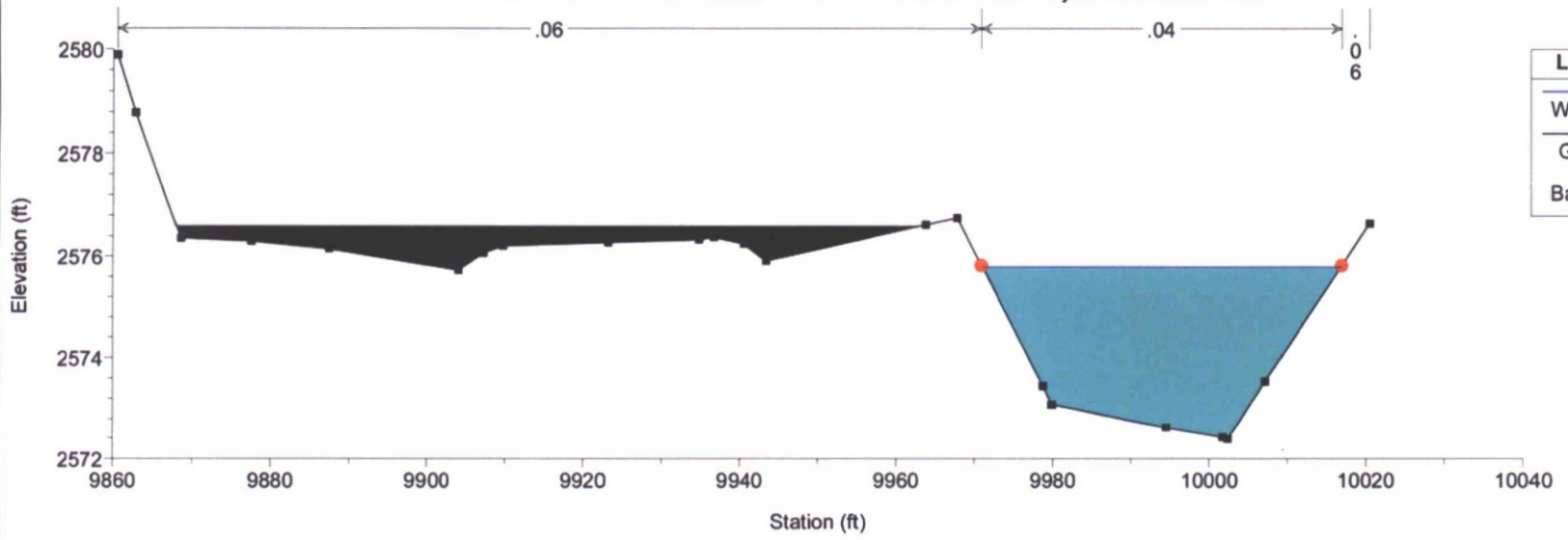
Legend

WS PF 1

Ground

Bank Sta

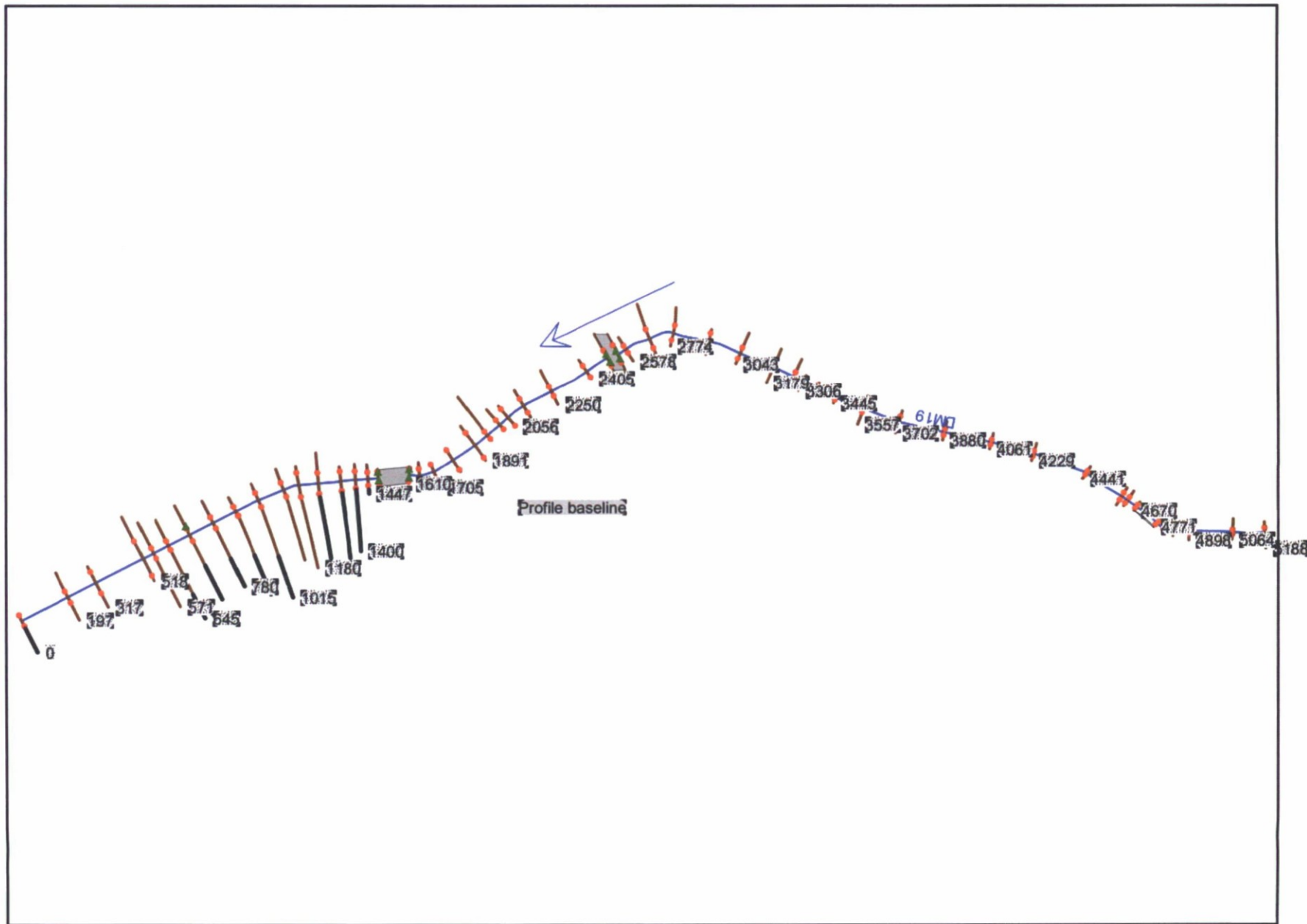
DM19_PD Post Development Subcritical Plan: Plan 01 5/23/2017
River = DM19 Reach = Profile baseline RS = 0 FEMA CS 4.581- Adjust from NGVD +2.05



POST-DEVELOPMENT

GALLOWAY WASH - SUPERCRITICAL

SUPERCritical



SUPERCritical

HEC-RAS Plan: Plan 01 River: DM19 Reach: Profile baseline Profile: PF 1

Reach	River Sta	Profile	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
Profile baseline	5188	PF 1	1246.00	2698.65	2701.28	2701.87	2704.00	0.023003	13.88	110.08	55.97	1.54
Profile baseline	5064	PF 1	1246.00	2695.95	2701.27	2701.27	2702.62	0.005588	11.06	207.45	76.81	0.88
Profile baseline	4898	PF 1	1246.00	2693.00	2695.35	2696.76	2700.07	0.063022	18.70	75.15	41.73	2.16
Profile baseline	4839	PF 1	1246.00	2689.70	2692.77	2694.10	2697.00	0.040093	17.96	80.47	35.42	1.81
Profile baseline	4802	PF 1	1246.00	2687.50	2690.83	2692.28	2695.48	0.039727	18.85	76.99	31.30	1.82
Profile baseline	4771	PF 1	1246.00	2687.00	2690.72	2691.79	2694.13	0.025591	16.30	90.31	33.59	1.49
Profile baseline	4770		Lat Struct									
Profile baseline	4711	PF 1	1120.33	2685.80	2689.24	2690.26	2692.51	0.027217	15.94	82.68	33.14	1.52
Profile baseline	4670	PF 1	1089.35	2684.20	2687.45	2688.64	2691.24	0.033367	17.00	74.47	30.90	1.66
Profile baseline	4628	PF 1	1089.35	2683.80	2685.86	2686.95	2689.39	0.054328	16.01	75.71	46.59	1.87
Profile baseline	4603	PF 1	1089.35	2683.09	2686.09	2686.70	2688.26	0.016980	12.23	106.85	54.88	1.33
Profile baseline	4441	PF 1	1117.35	2680.00	2685.06	2685.06	2686.72	0.006486	11.57	151.85	51.01	0.92
Profile baseline	4229	PF 1	1117.35	2675.99	2678.86	2680.38	2683.72	0.034674	18.38	75.28	36.00	1.92
Profile baseline	4061	PF 1	1117.35	2672.84	2676.68	2677.45	2679.60	0.014115	14.14	94.30	33.82	1.29
Profile baseline	3880	PF 1	1117.35	2668.84	2671.39	2672.82	2675.60	0.036020	17.15	79.27	42.23	1.92
Profile baseline	3702	PF 1	1117.35	2665.00	2667.37	2668.12	2669.68	0.025515	12.73	106.31	66.43	1.57
Profile baseline	3557	PF 1	1117.35	2661.49	2663.64	2664.31	2665.76	0.027823	13.09	107.52	79.70	1.63
Profile baseline	3497	PF 1	1117.35	2658.80	2661.52	2662.29	2664.07	0.026830	13.56	91.52	42.20	1.45
Profile baseline	3445	PF 1	1114.35	2656.80	2659.87	2660.70	2662.64	0.025589	14.34	88.29	37.54	1.44
Profile baseline	3400		Lat Struct									
Profile baseline	3385	PF 1	1007.25	2655.50	2658.43	2659.21	2661.07	0.025470	13.89	81.65	35.65	1.43
Profile baseline	3362	PF 1	1007.25	2655.00	2657.88	2658.66	2660.47	0.025880	13.83	82.58	37.30	1.44
Profile baseline	3306	PF 1	1007.25	2654.00	2655.93	2656.73	2658.68	0.039917	15.35	85.44	66.44	1.95
Profile baseline	3285	PF 1	1046.25	2652.96	2655.10	2655.76	2657.27	0.024329	12.57	120.12	113.81	1.54
Profile baseline	3179	PF 1	1046.25	2651.37	2653.99	2654.36	2655.31	0.016464	11.54	176.81	134.82	1.30
Profile baseline	3043	PF 1	1046.25	2647.43	2649.33	2650.24	2651.99	0.035833	13.30	85.24	56.09	1.80
Profile baseline	2914	PF 1	1046.25	2644.79	2646.53	2646.92	2648.08	0.021992	10.06	107.44	70.30	1.40
Profile baseline	2774	PF 1	1052.25	2641.90	2643.85	2644.05	2645.09	0.020329	9.97	122.67	87.26	1.36
Profile baseline	2678	PF 1	1052.25	2639.92	2641.46	2641.89	2642.81	0.025323	9.74	115.14	109.20	1.46
Profile baseline	2578	PF 1	1052.25	2634.50	2636.61	2637.53	2639.55	0.041945	14.31	79.78	46.25	1.74
Profile baseline	2540	PF 1	1052.25	2633.50	2635.62	2636.59	2638.95	0.006083	14.64	71.86	51.49	1.78
Profile baseline	2520		Bridge									
Profile baseline	2500	PF 1	1052.25	2632.50	2634.56	2635.59	2638.07	0.047808	15.03	70.03	47.42	1.85
Profile baseline	2405	PF 1	1052.25	2630.14	2632.70	2633.20	2634.59	0.022348	11.03	95.80	52.63	1.43
Profile baseline	2250	PF 1	1052.25	2626.98	2630.00	2630.35	2631.80	0.014581	10.74	98.03	40.25	1.20
Profile baseline	2130	PF 1	1052.25	2624.00	2626.25	2627.03	2628.88	0.044284	12.99	80.98	57.18	1.92
Profile baseline	2056	PF 1	1052.25	2622.50	2625.18	2625.44	2626.41	0.019020	8.90	118.26	77.98	1.27
Profile baseline	2014	PF 1	1052.25	2621.50	2624.10	2624.49	2625.62	0.016975	10.34	109.72	62.88	1.27
Profile baseline	1952	PF 1	1052.25	2620.00	2622.88	2623.41	2624.52	0.017971	11.01	107.62	64.17	1.31

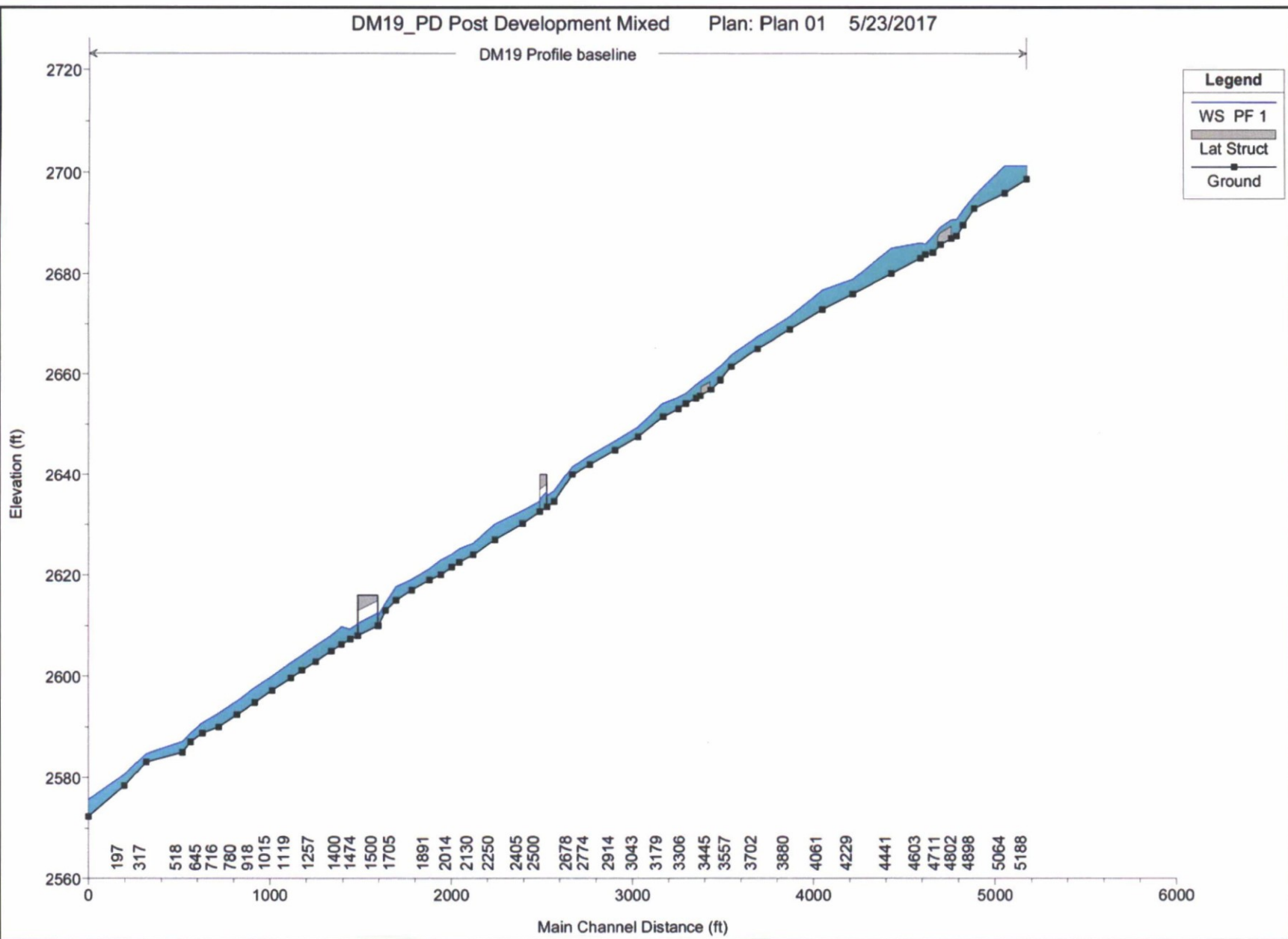
HEC-RAS Plan: Plan 01 River: DM19 Reach: Profile baseline Profile: PF 1 (Continued)

Reach	River Sta	Profile	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
Profile baseline	1891	PF 1	1052.25	2619.00	2621.19	2621.74	2623.00	0.030400	11.10	100.32	82.47	1.65
Profile baseline	1791	PF 1	1052.25	2617.00	2619.03	2619.33	2620.28	0.021673	8.96	117.41	85.81	1.35
Profile baseline	1705	PF 1	1052.25	2615.00	2617.62	2617.66	2618.73	0.014460	8.45	125.35	61.74	1.02
Profile baseline	1650	PF 1	1052.25	2613.00	2614.42	2615.20	2616.98	0.077897	13.12	83.92	65.85	1.94
Profile baseline	1610	PF 1	1058.25	2610.00	2612.05	2613.23	2616.11	0.007708	16.17	65.45	54.77	1.99
Profile baseline	1500	Bridge										
Profile baseline	1474	PF 1	1058.25	2608.00	2610.25	2611.23	2613.61	0.040710	14.70	71.97	52.50	1.73
Profile baseline	1447	PF 1	1058.25	2607.30	2609.30	2610.08	2611.80	0.029450	12.69	83.52	51.40	1.74
Profile baseline	1400	PF 1	1058.25	2606.30	2609.74	2609.77	2610.79	0.006980	8.21	128.87	65.84	1.03
Profile baseline	1342	PF 1	1058.25	2605.00	2607.97	2608.49	2609.79	0.067526	10.80	97.95	69.31	1.60
Profile baseline	1257	PF 1	1058.25	2602.90	2605.99	2605.99	2606.88	0.025266	7.58	139.56	79.91	1.01
Profile baseline	1180	PF 1	1058.25	2601.15	2604.11	2604.46	2605.32	0.016903	8.84	123.06	120.40	1.37
Profile baseline	1119	PF 1	1058.25	2599.60	2602.63	2603.16	2604.28	0.015753	10.37	110.56	89.21	1.38
Profile baseline	1015	PF 1	1058.25	2597.20	2599.94	2600.64	2602.16	0.025771	12.12	97.57	95.66	1.78
Profile baseline	918	PF 1	1058.25	2594.80	2597.72	2598.49	2600.05	0.018832	12.65	112.75	136.99	1.55
Profile baseline	780	PF 1	1058.25	2592.40	2595.12	2595.88	2597.84	0.026880	13.60	102.48	163.31	1.92
Profile baseline	716	PF 1	1075.25	2590.00	2592.69	2593.72	2595.74	0.016491	14.01	76.75	48.91	1.97
Profile baseline	645	PF 1	1075.25	2588.78	2590.79	2591.52	2593.45	0.038774	14.07	111.78	146.50	1.88
Profile baseline	571	PF 1	1075.25	2587.04	2588.72	2589.20	2590.43	0.046210	12.44	126.95	208.15	1.96
Profile baseline	518	PF 1	1075.25	2585.00	2587.11	2587.55	2588.48	0.032401	9.40	119.72	188.04	1.69
Profile baseline	317	PF 1	906.24	2583.05	2584.70	2584.70	2585.38	0.019216	6.67	142.25	116.73	0.97
Profile baseline	197	PF 1	906.24	2578.39	2580.61	2581.00	2582.25	0.034691	10.28	88.15	48.10	1.34
Profile baseline	0	PF 1	906.24	2572.39	2575.70	2575.79	2576.96	0.020556	9.00	100.71	45.07	1.06

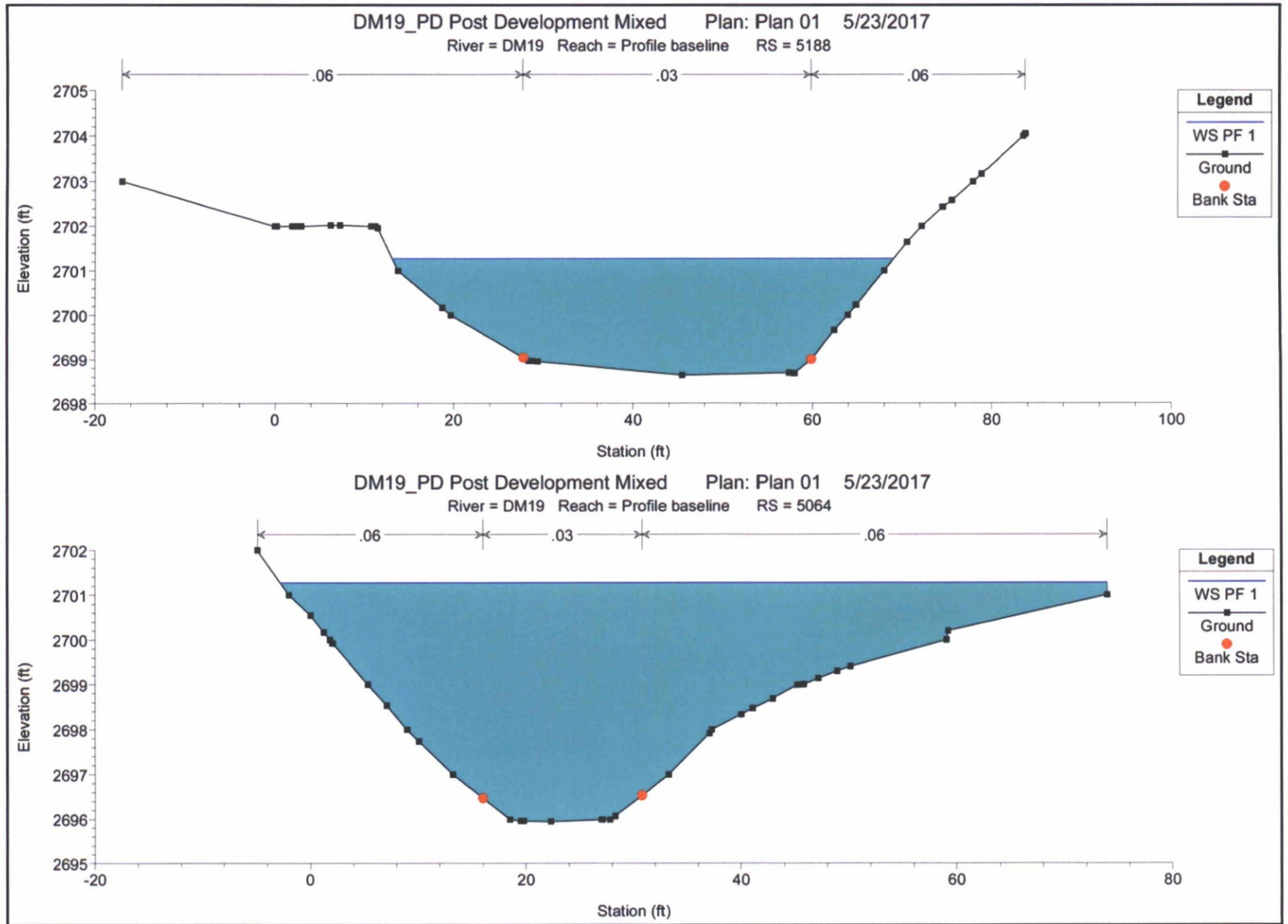
SUPERCritical

DM19_PD Post Development Mixed Plan: Plan 01 5/23/2017

DM19 Profile baseline

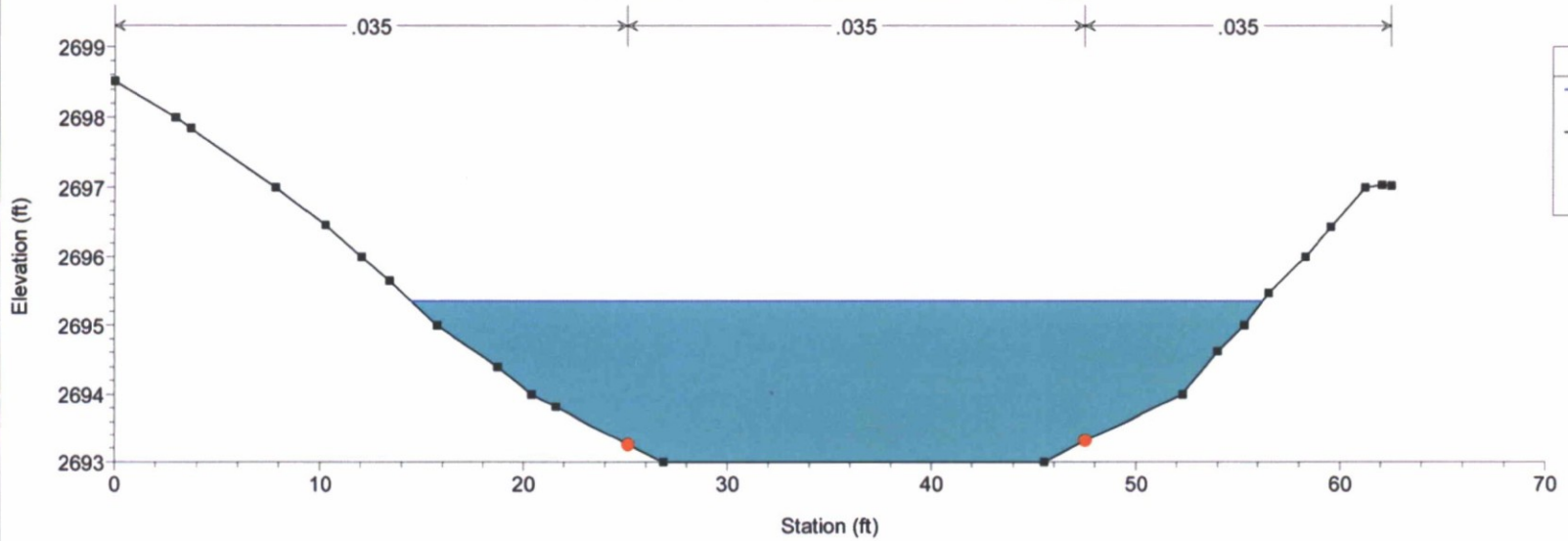


SUPERCRITICAL



DM19_PD Post Development Mixed Plan: Plan 01 5/23/2017

River = DM19 Reach = Profile baseline RS = 4898



Legend

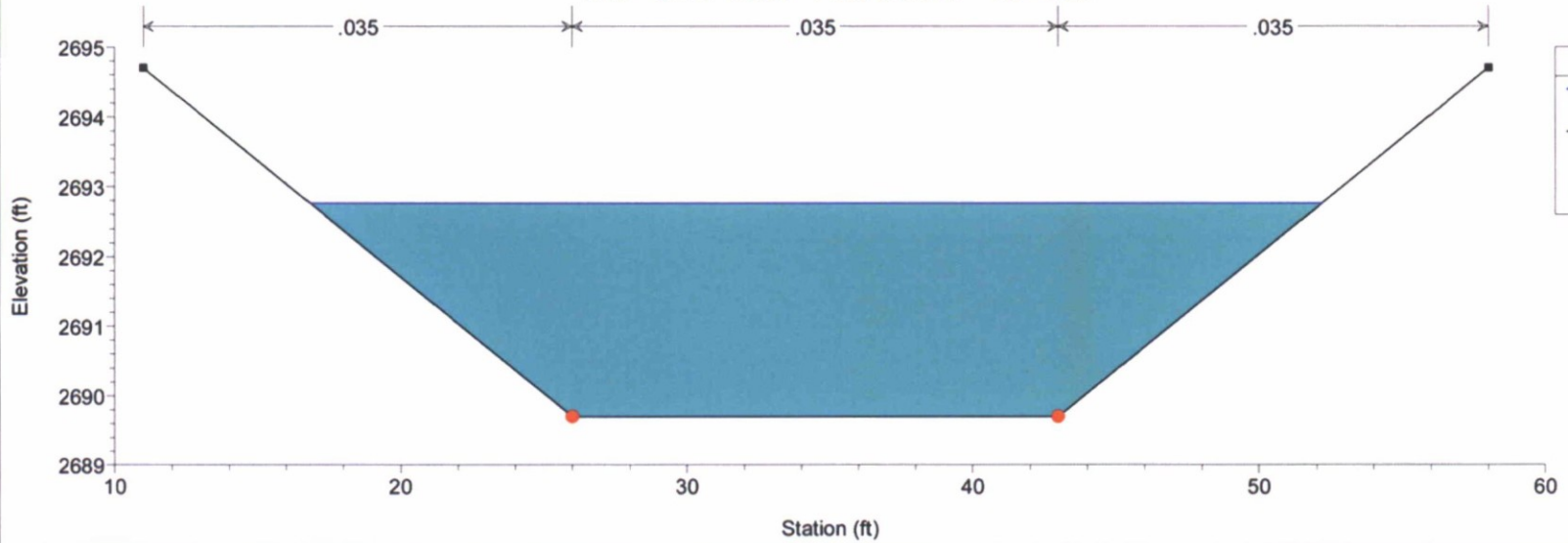
WS PF 1

Ground

Bank Sta

DM19_PD Post Development Mixed Plan: Plan 01 5/23/2017

River = DM19 Reach = Profile baseline RS = 4839



Legend

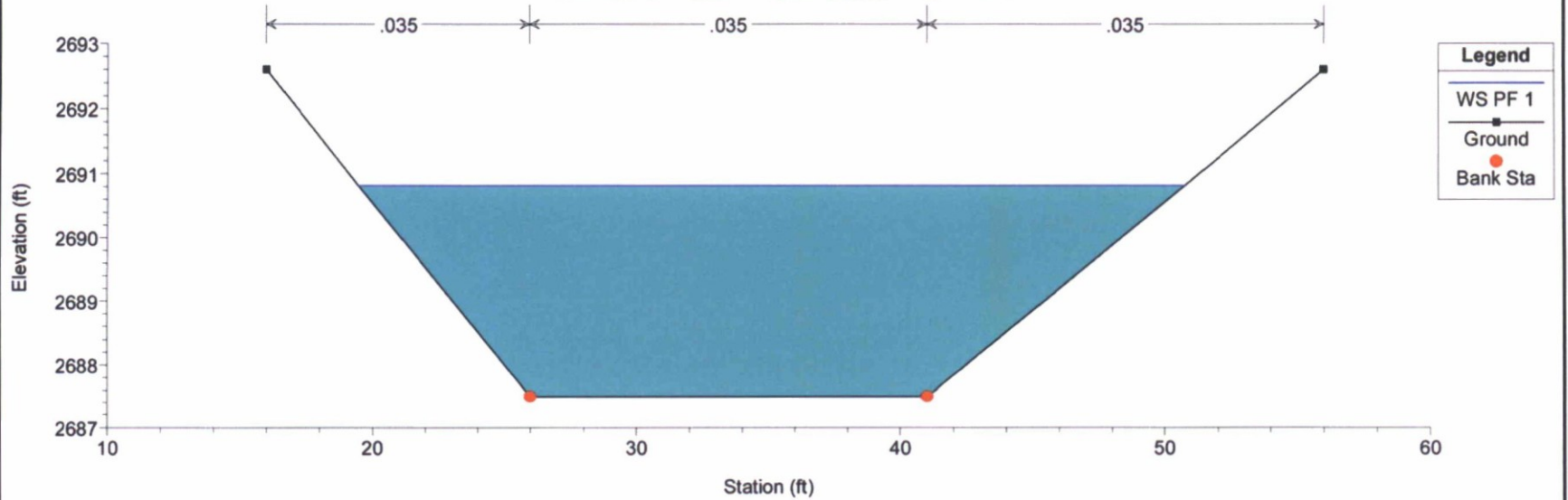
WS PF 1

Ground

Bank Sta

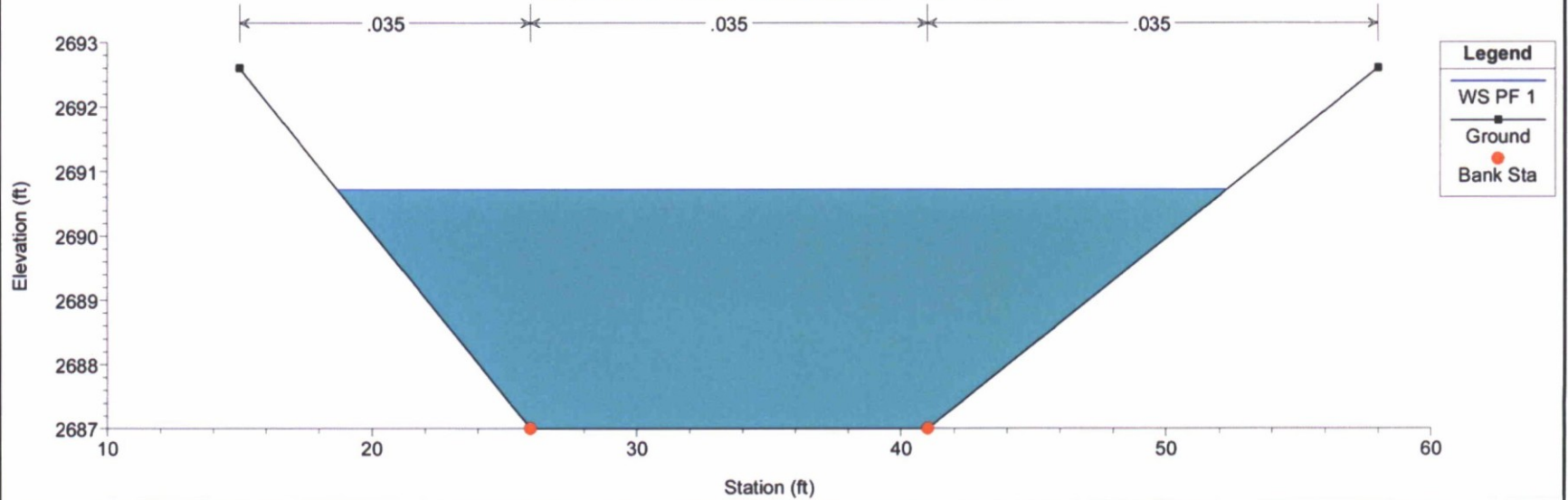
DM19_PD Post Development Mixed Plan: Plan 01 5/23/2017

River = DM19 Reach = Profile baseline RS = 4802



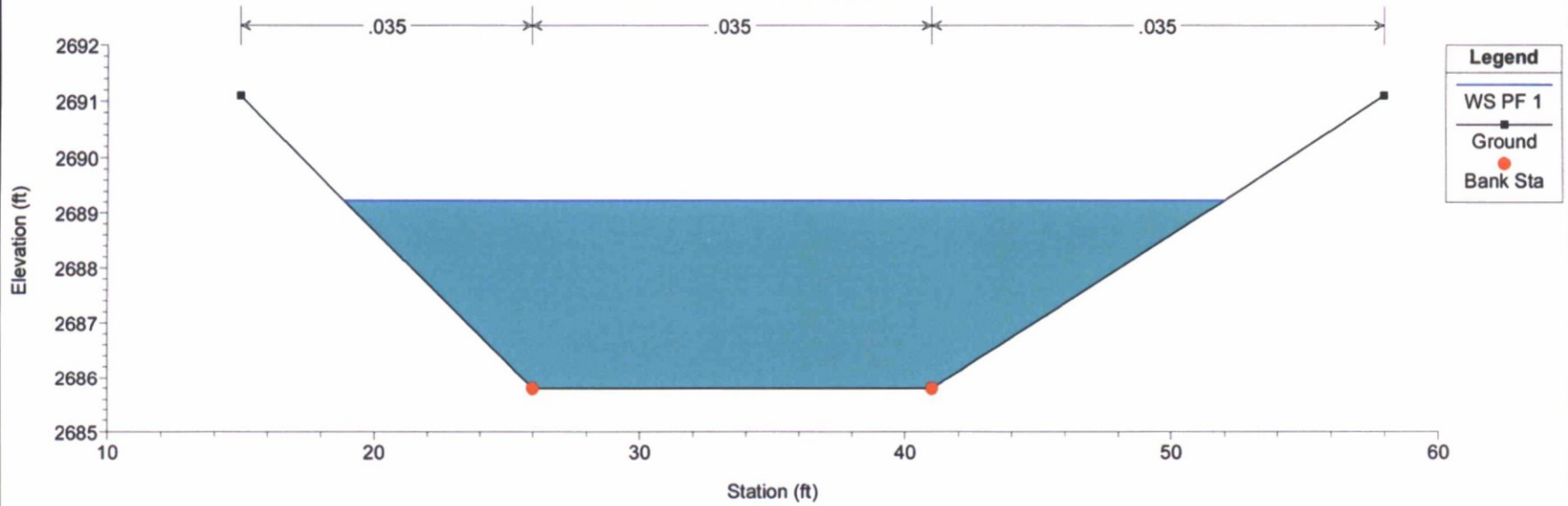
DM19_PD Post Development Mixed Plan: Plan 01 5/23/2017

River = DM19 Reach = Profile baseline RS = 4771



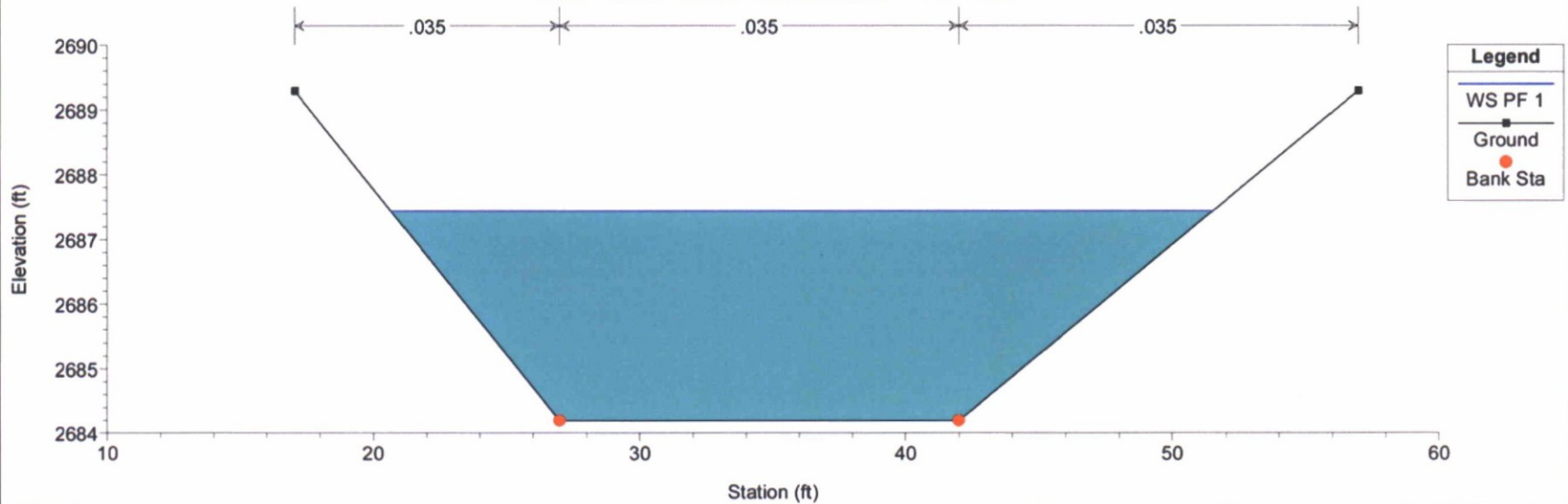
DM19_PD Post Development Mixed Plan: Plan 01 5/23/2017

River = DM19 Reach = Profile baseline RS = 4711



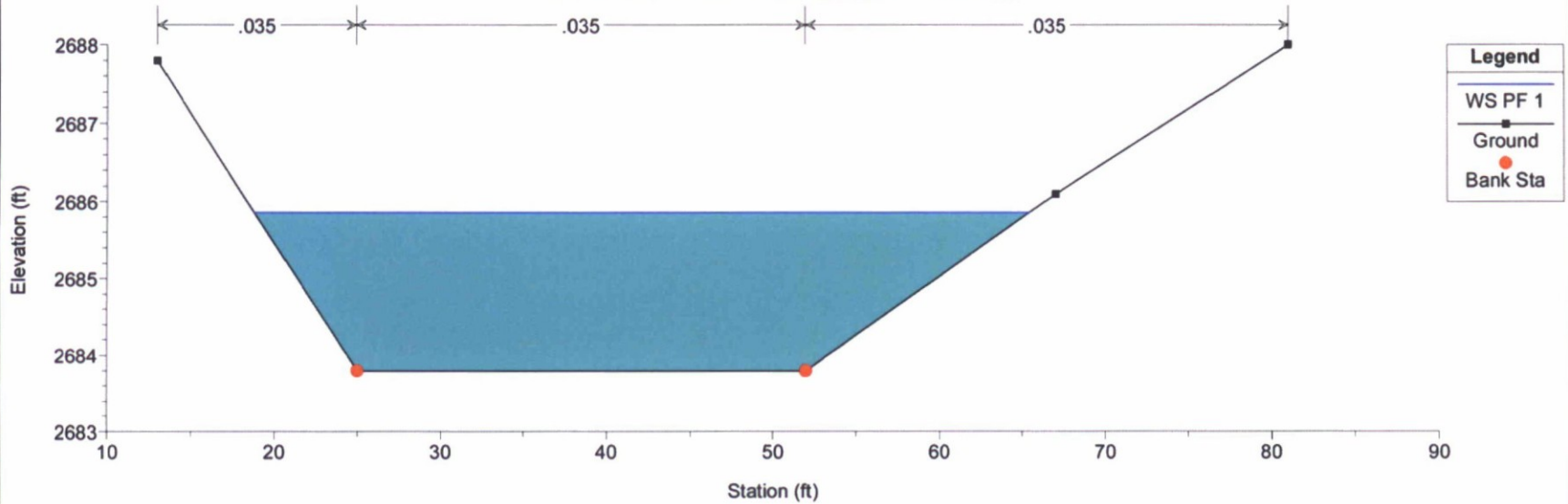
DM19_PD Post Development Mixed Plan: Plan 01 5/23/2017

River = DM19 Reach = Profile baseline RS = 4670



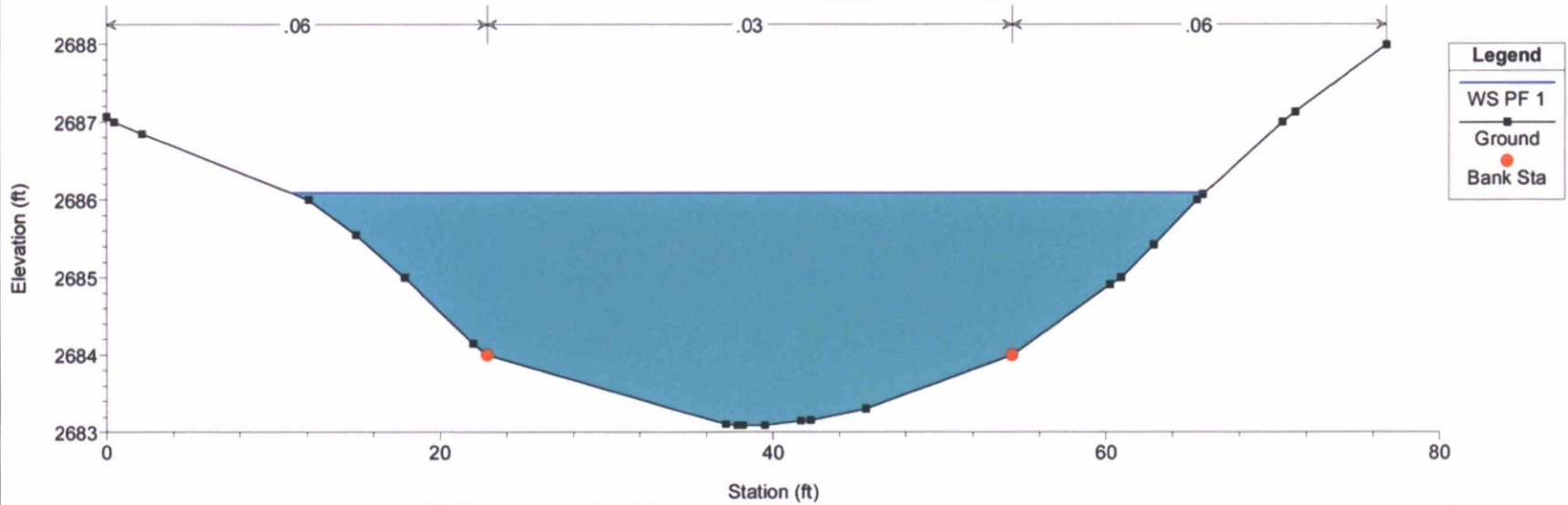
DM19_PD Post Development Mixed Plan: Plan 01 5/23/2017

River = DM19 Reach = Profile baseline RS = 4628



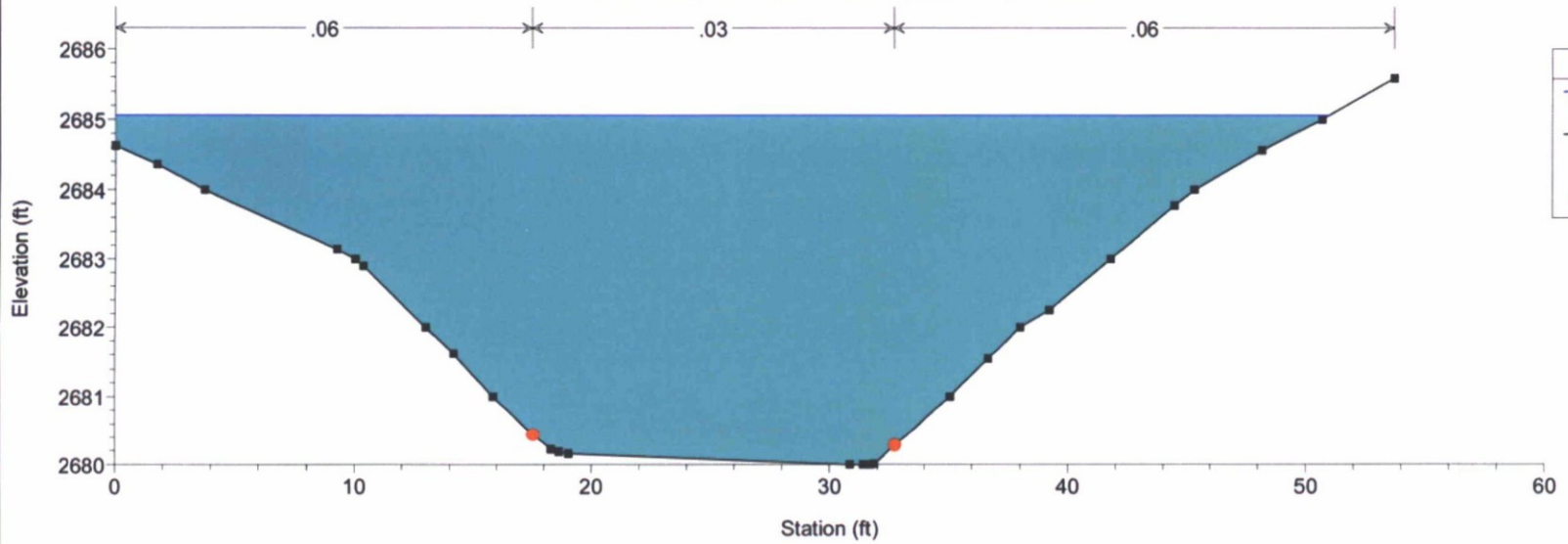
DM19_PD Post Development Mixed Plan: Plan 01 5/23/2017

River = DM19 Reach = Profile baseline RS = 4603



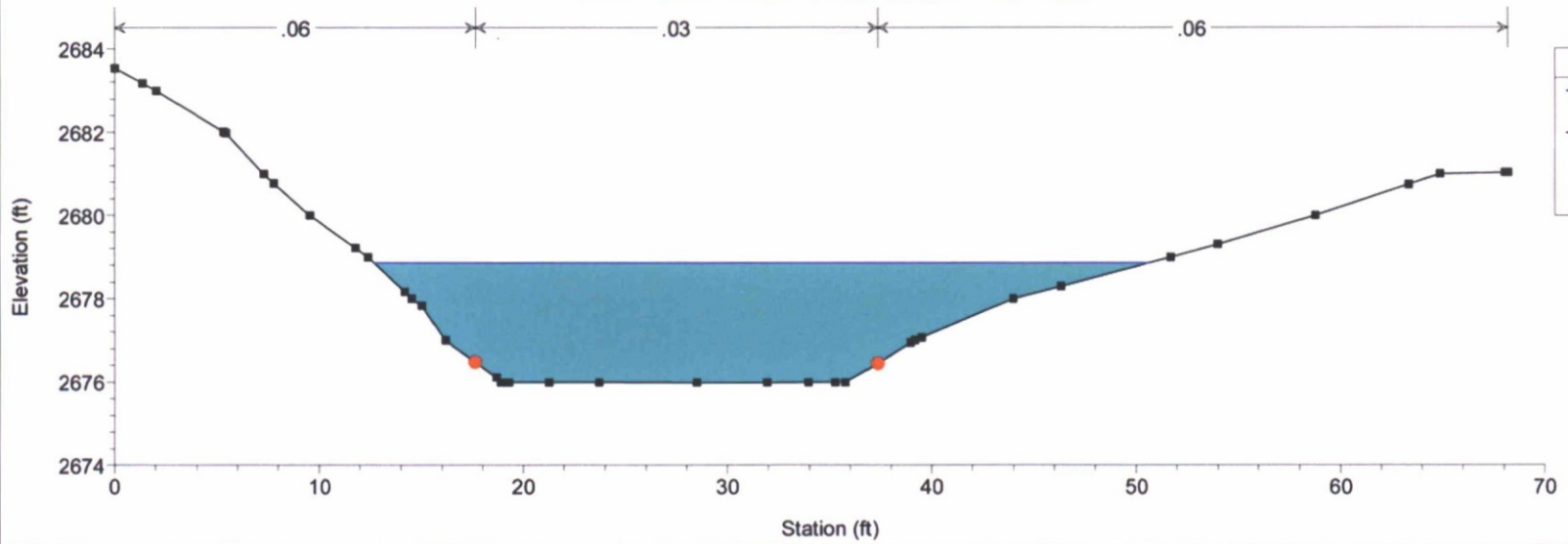
DM19_PD Post Development Mixed Plan: Plan 01 5/23/2017

River = DM19 Reach = Profile baseline RS = 4441



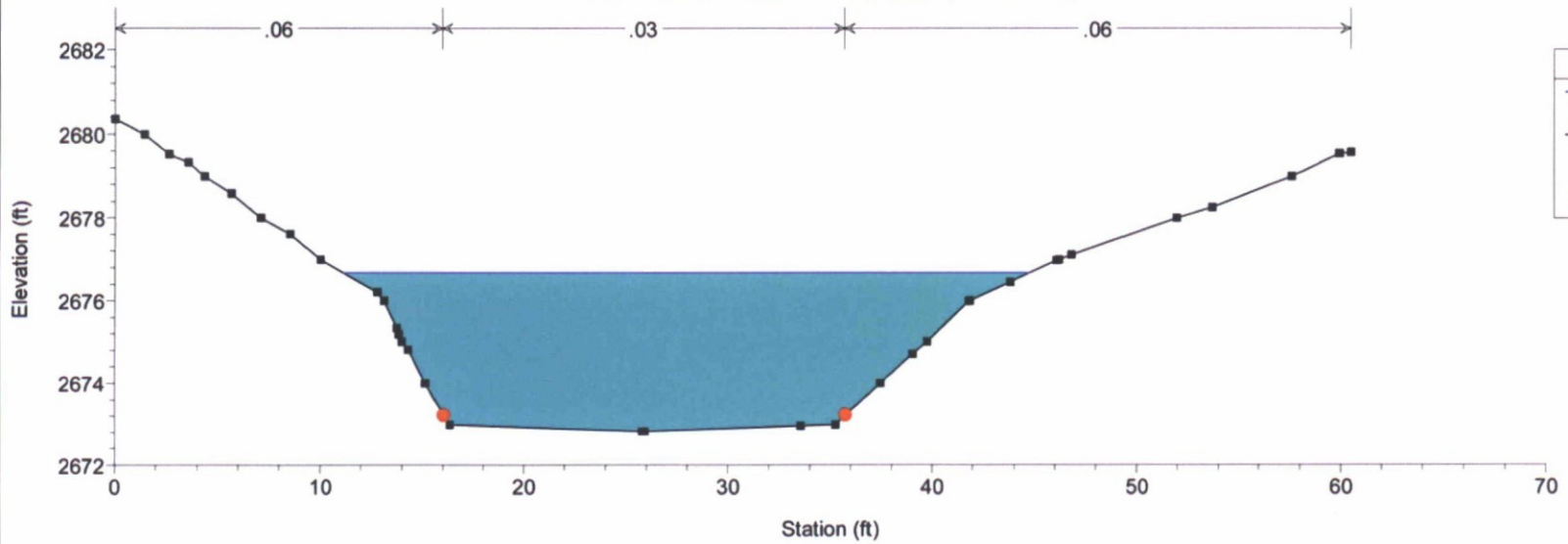
DM19_PD Post Development Mixed Plan: Plan 01 5/23/2017

River = DM19 Reach = Profile baseline RS = 4229



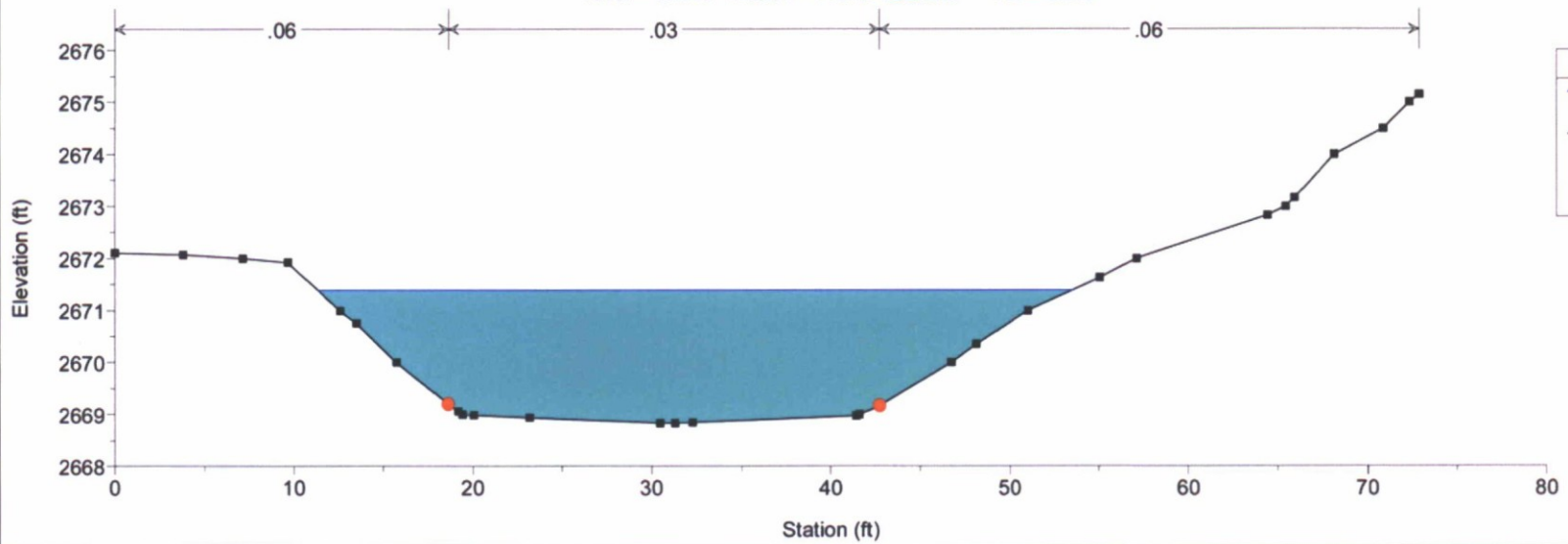
DM19_PD Post Development Mixed Plan: Plan 01 5/23/2017

River = DM19 Reach = Profile baseline RS = 4061



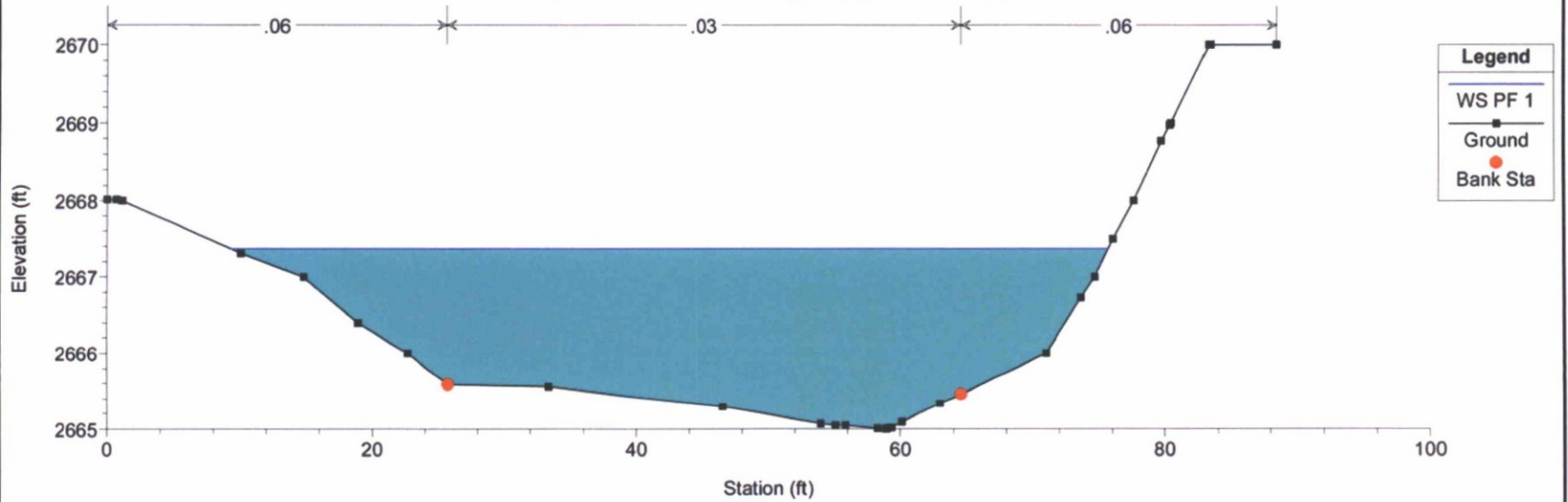
DM19_PD Post Development Mixed Plan: Plan 01 5/23/2017

River = DM19 Reach = Profile baseline RS = 3880



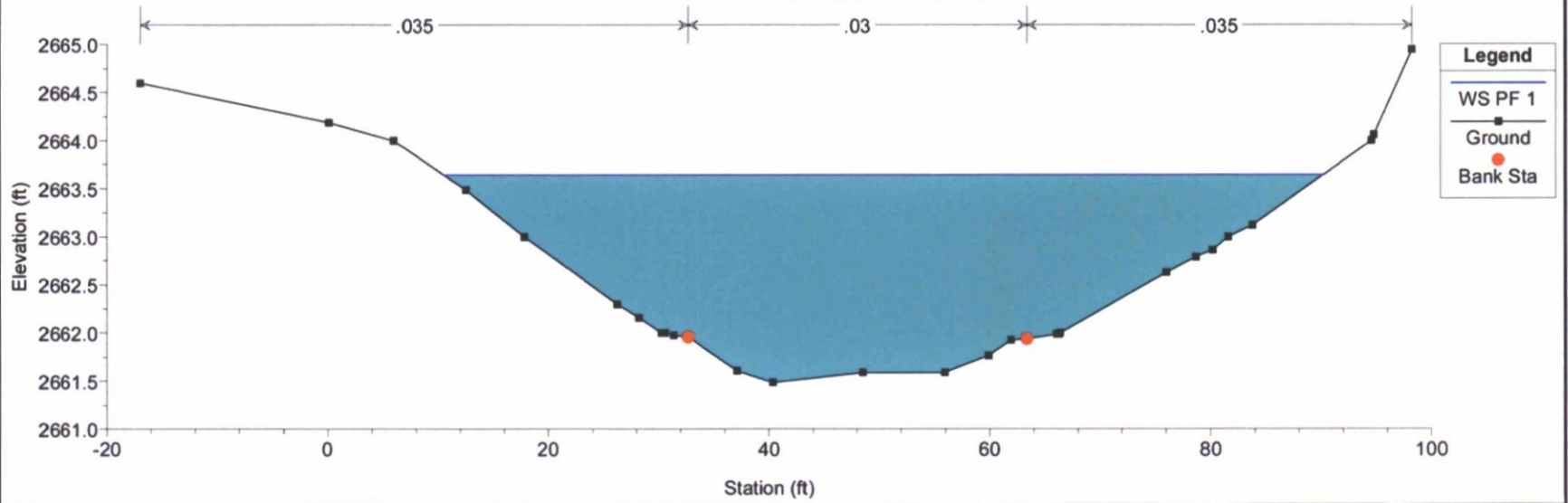
DM19_PD Post Development Mixed Plan: Plan 01 5/23/2017

River = DM19 Reach = Profile baseline RS = 3702



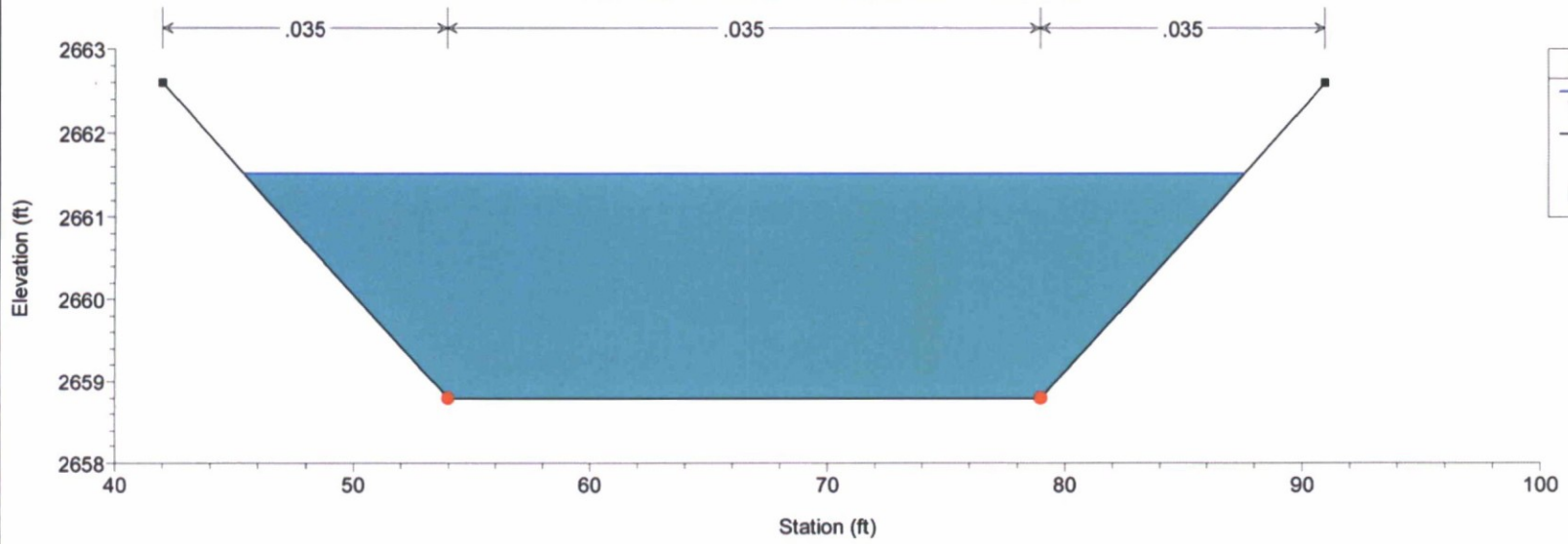
DM19_PD Post Development Mixed Plan: Plan 01 5/23/2017

River = DM19 Reach = Profile baseline RS = 3557



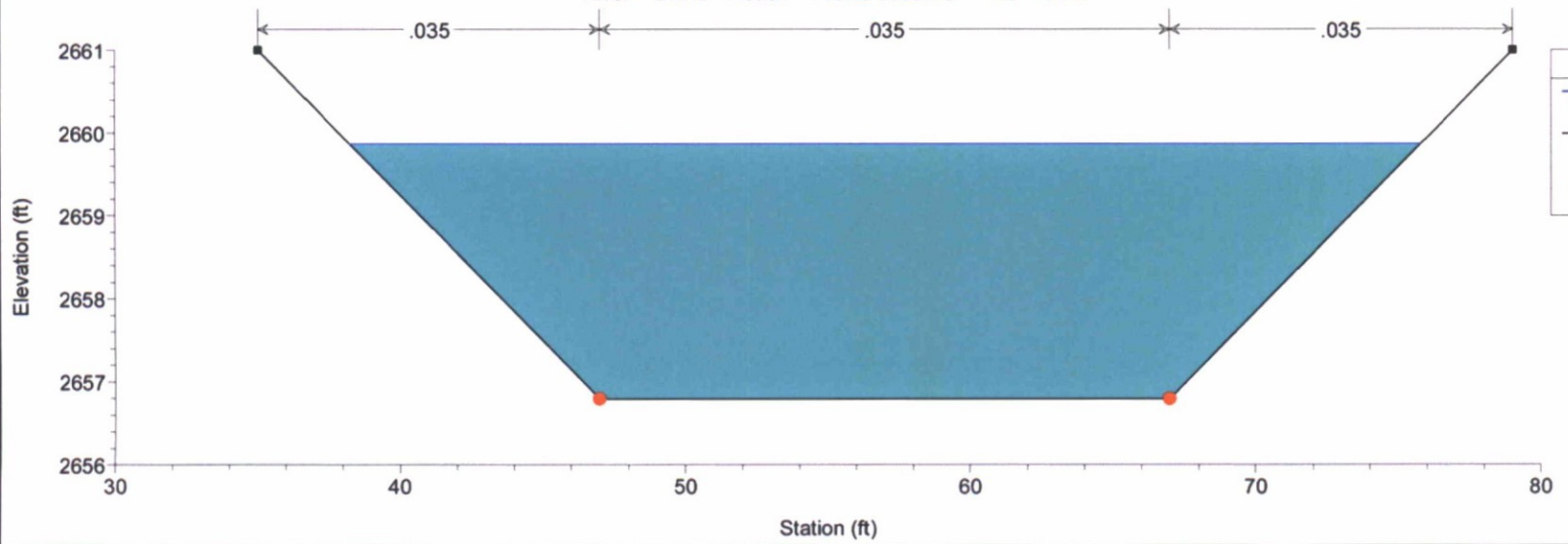
DM19_PD Post Development Mixed Plan: Plan 01 5/23/2017

River = DM19 Reach = Profile baseline RS = 3497



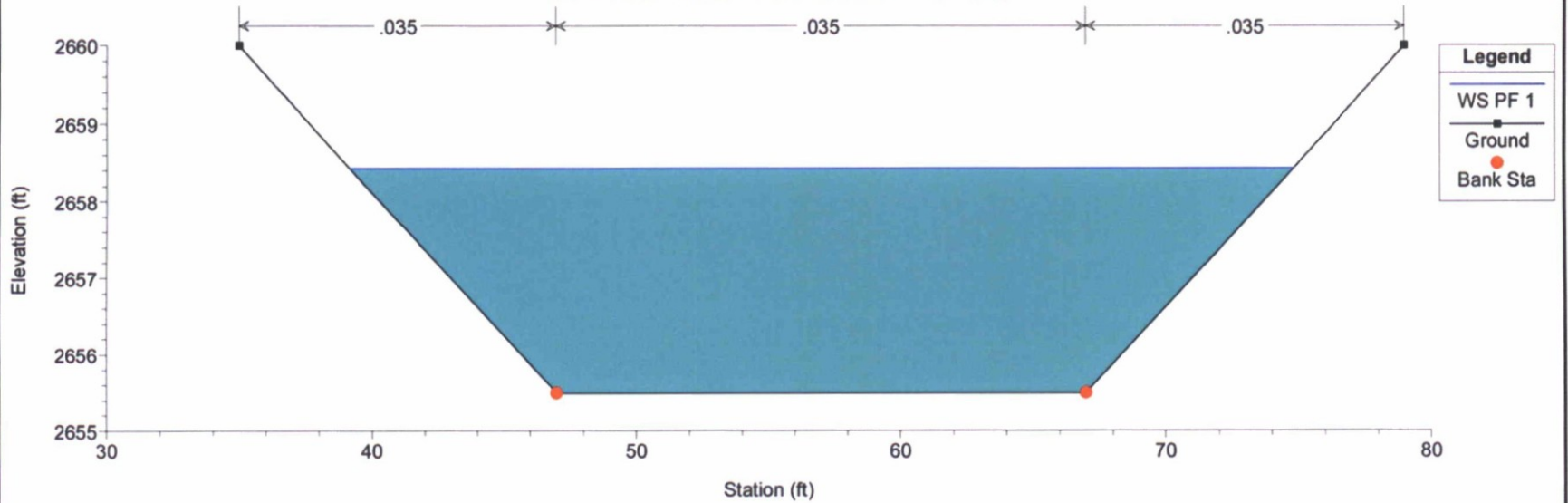
DM19_PD Post Development Mixed Plan: Plan 01 5/23/2017

River = DM19 Reach = Profile baseline RS = 3445



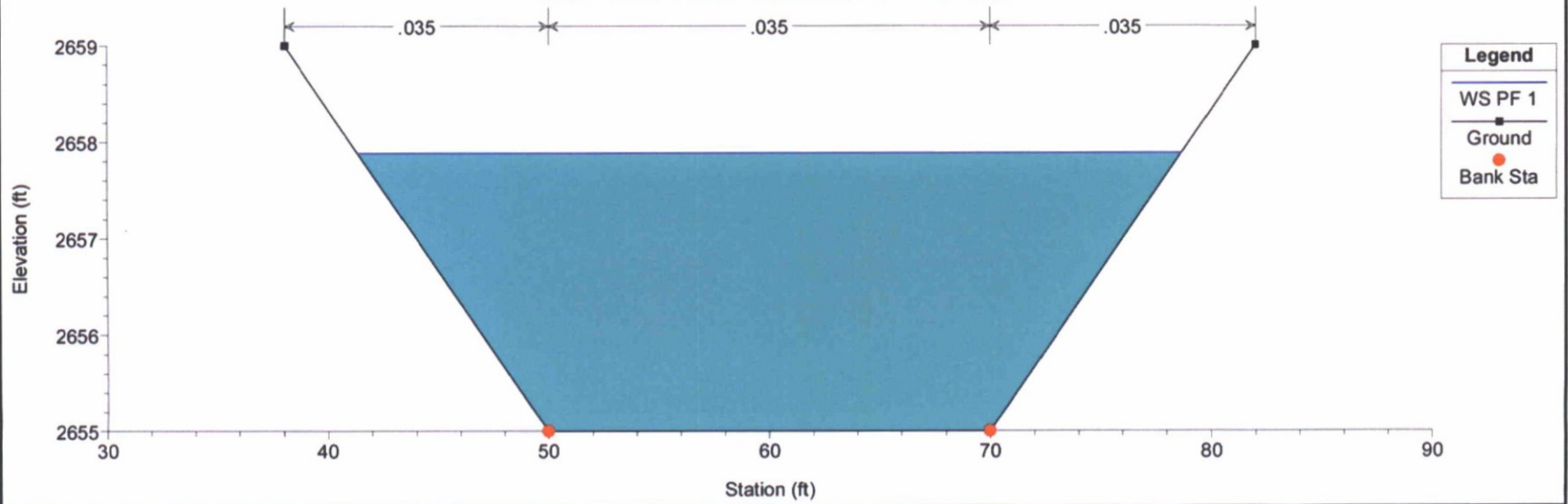
DM19_PD Post Development Mixed Plan: Plan 01 5/23/2017

River = DM19 Reach = Profile baseline RS = 3385



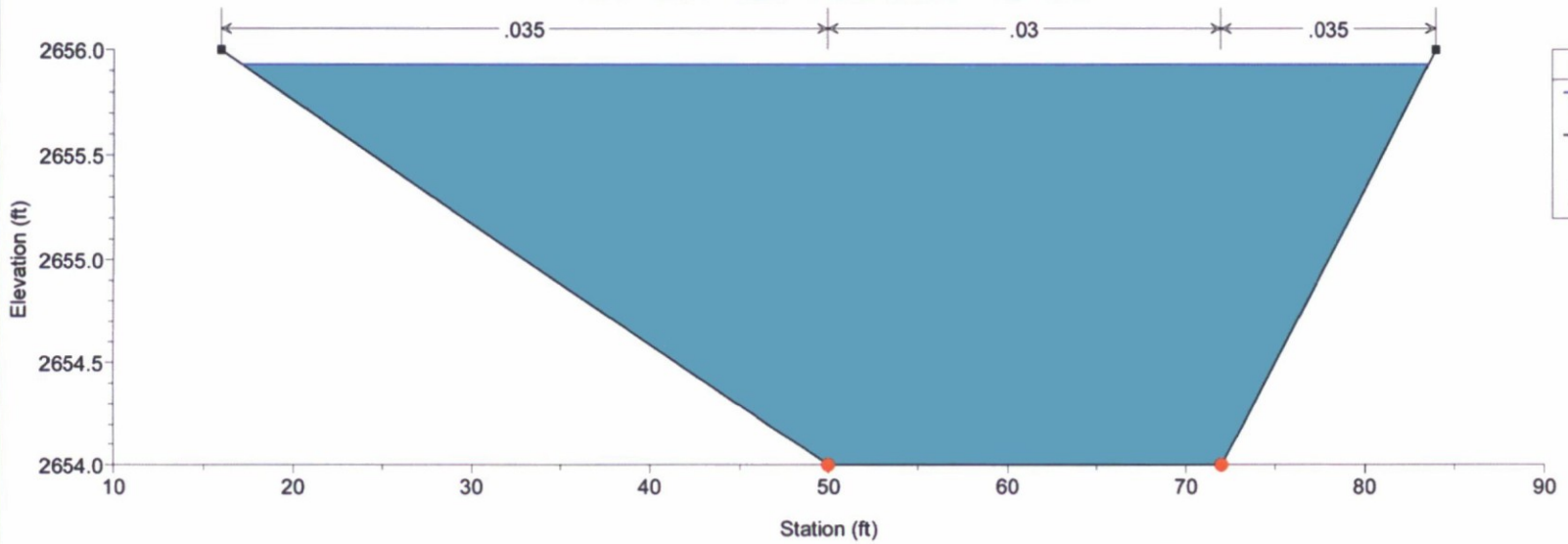
DM19_PD Post Development Mixed Plan: Plan 01 5/23/2017

River = DM19 Reach = Profile baseline RS = 3362



DM19_PD Post Development Mixed Plan: Plan 01 5/23/2017

River = DM19 Reach = Profile baseline RS = 3306



Legend

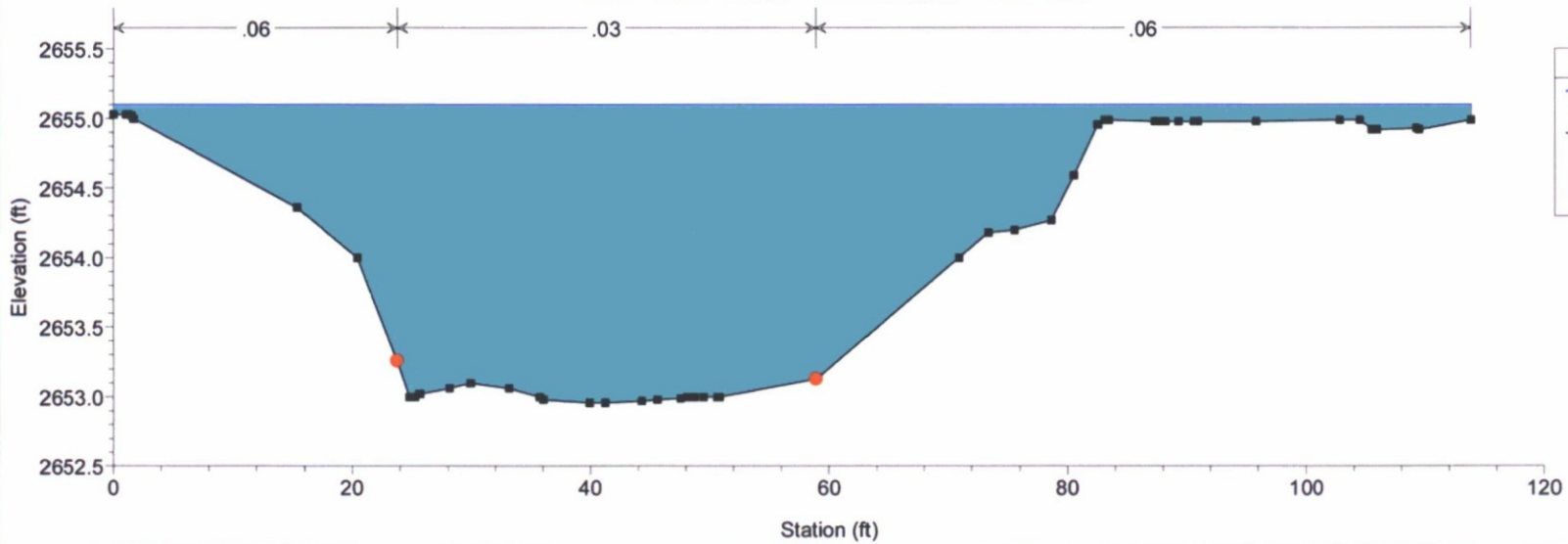
WS PF 1

Ground

Bank Sta

DM19_PD Post Development Mixed Plan: Plan 01 5/23/2017

River = DM19 Reach = Profile baseline RS = 3265



Legend

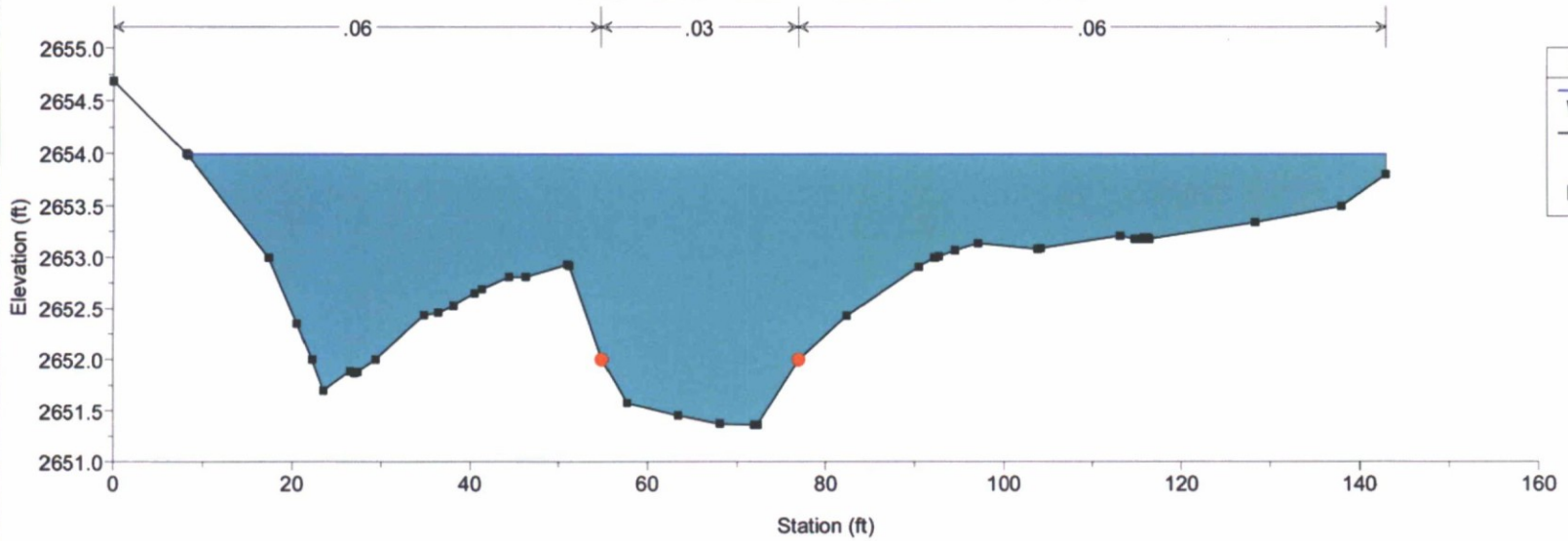
WS PF 1

Ground

Bank Sta

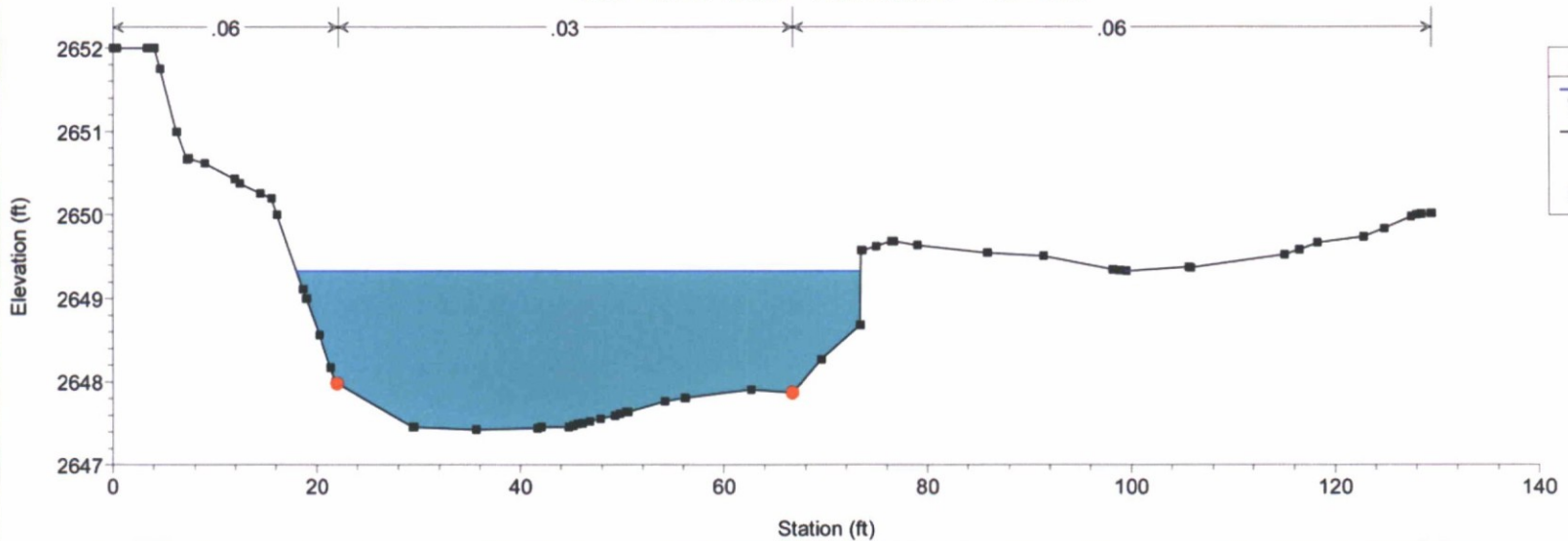
DM19_PD Post Development Mixed Plan: Plan 01 5/23/2017

River = DM19 Reach = Profile baseline RS = 3179



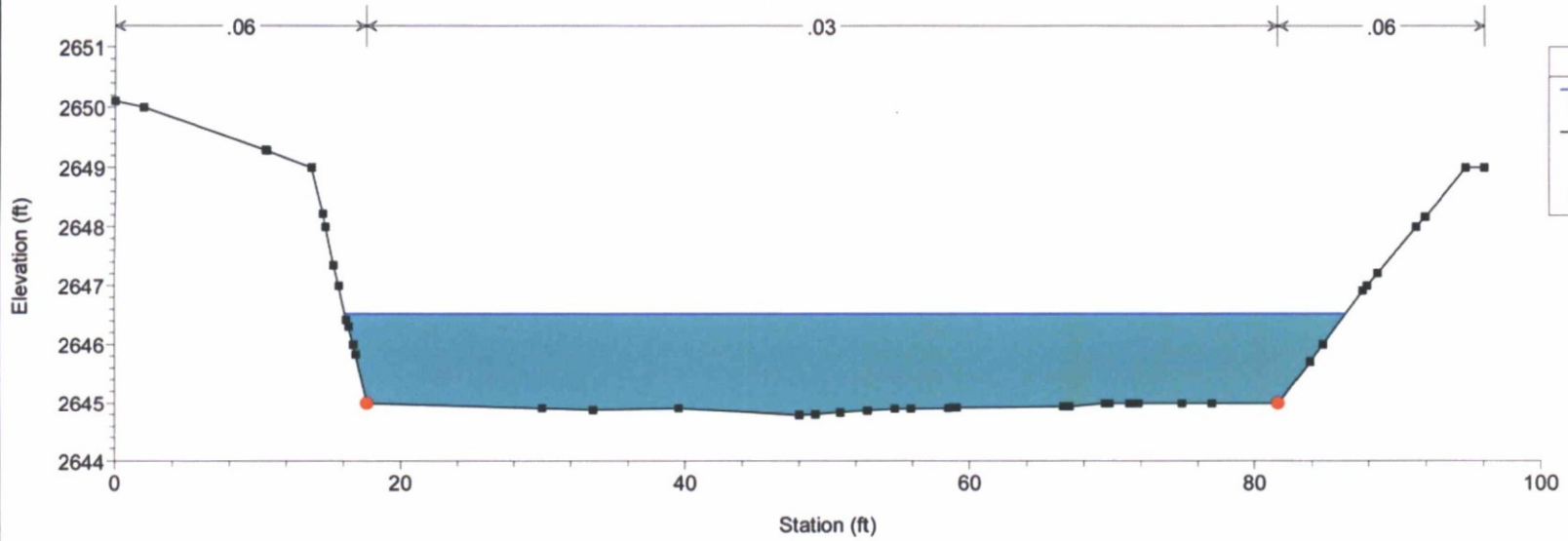
DM19_PD Post Development Mixed Plan: Plan 01 5/23/2017

River = DM19 Reach = Profile baseline RS = 3043



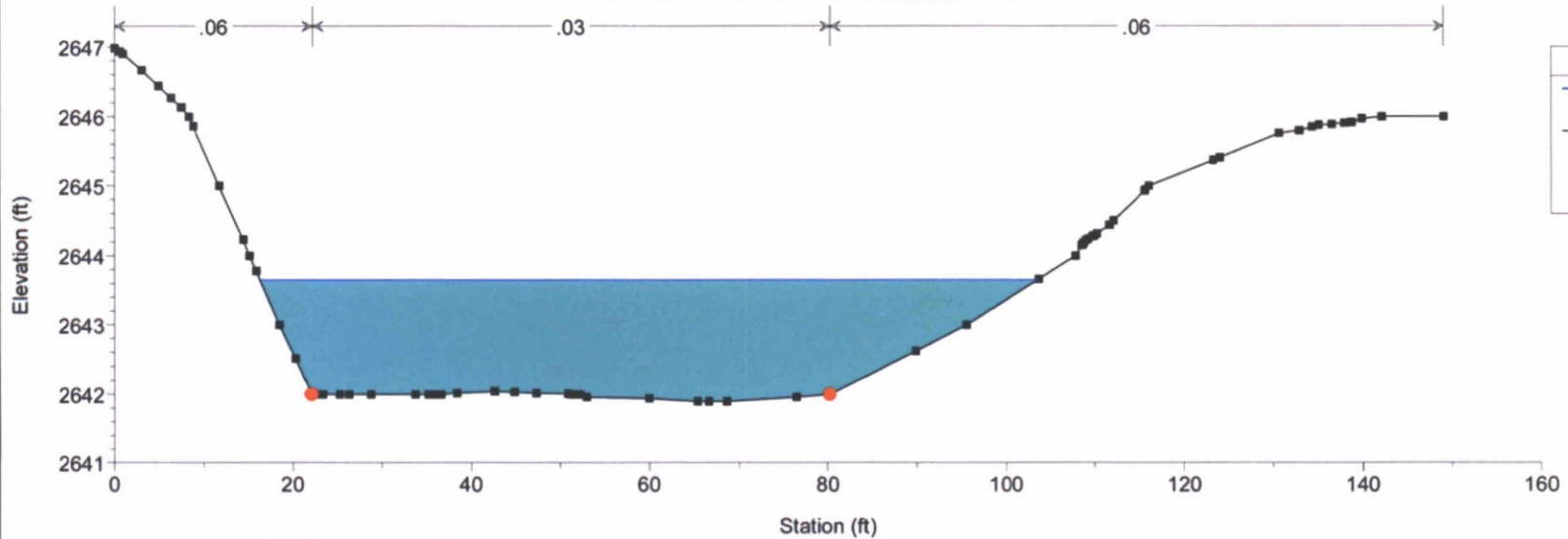
DM19_PD Post Development Mixed Plan: Plan 01 5/23/2017

River = DM19 Reach = Profile baseline RS = 2914



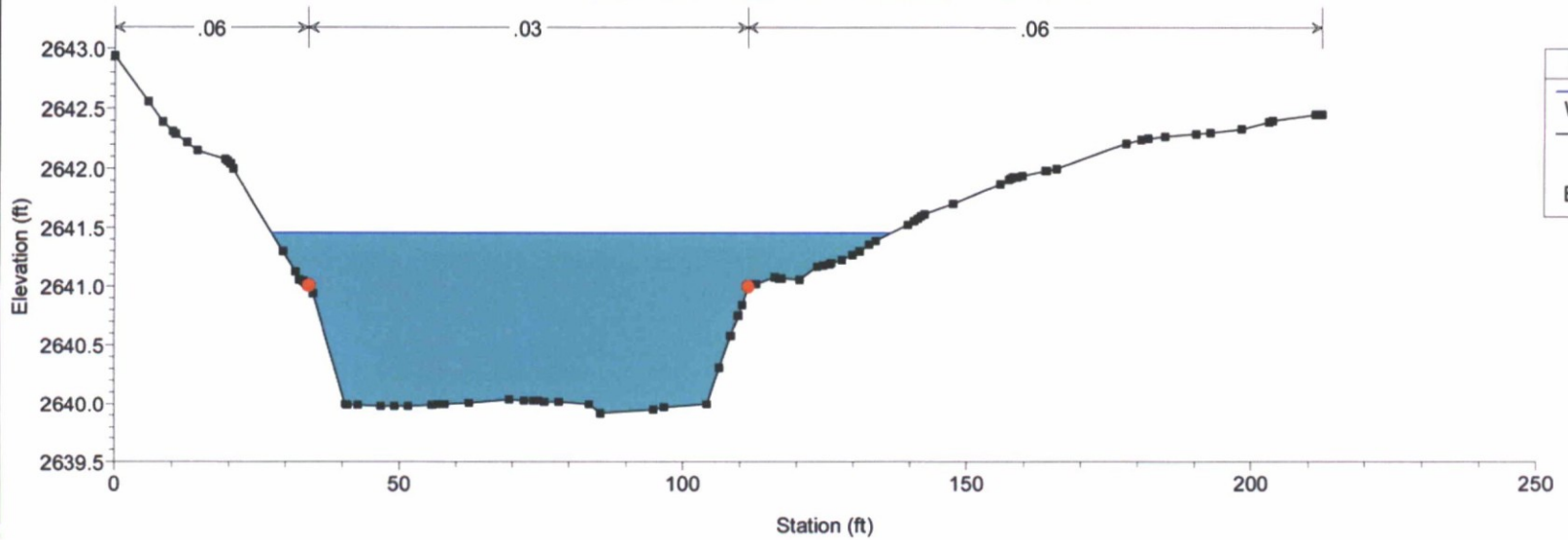
DM19_PD Post Development Mixed Plan: Plan 01 5/23/2017

River = DM19 Reach = Profile baseline RS = 2774



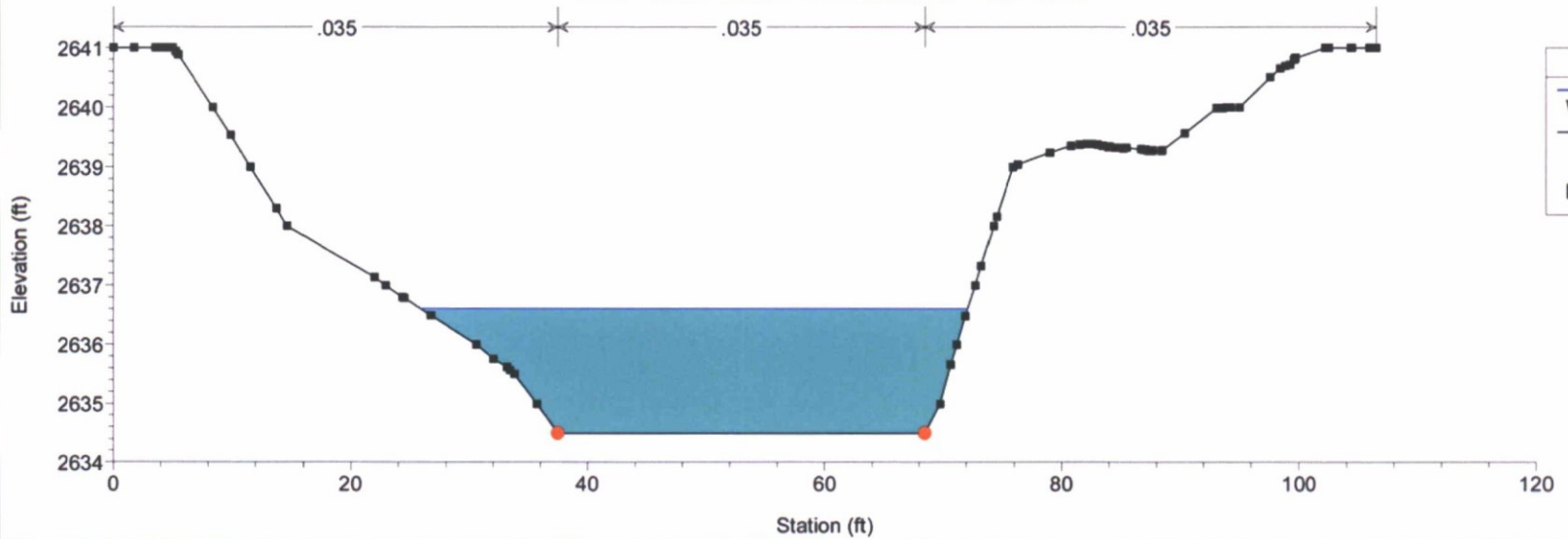
DM19_PD Post Development Mixed Plan: Plan 01 5/23/2017

River = DM19 Reach = Profile baseline RS = 2678



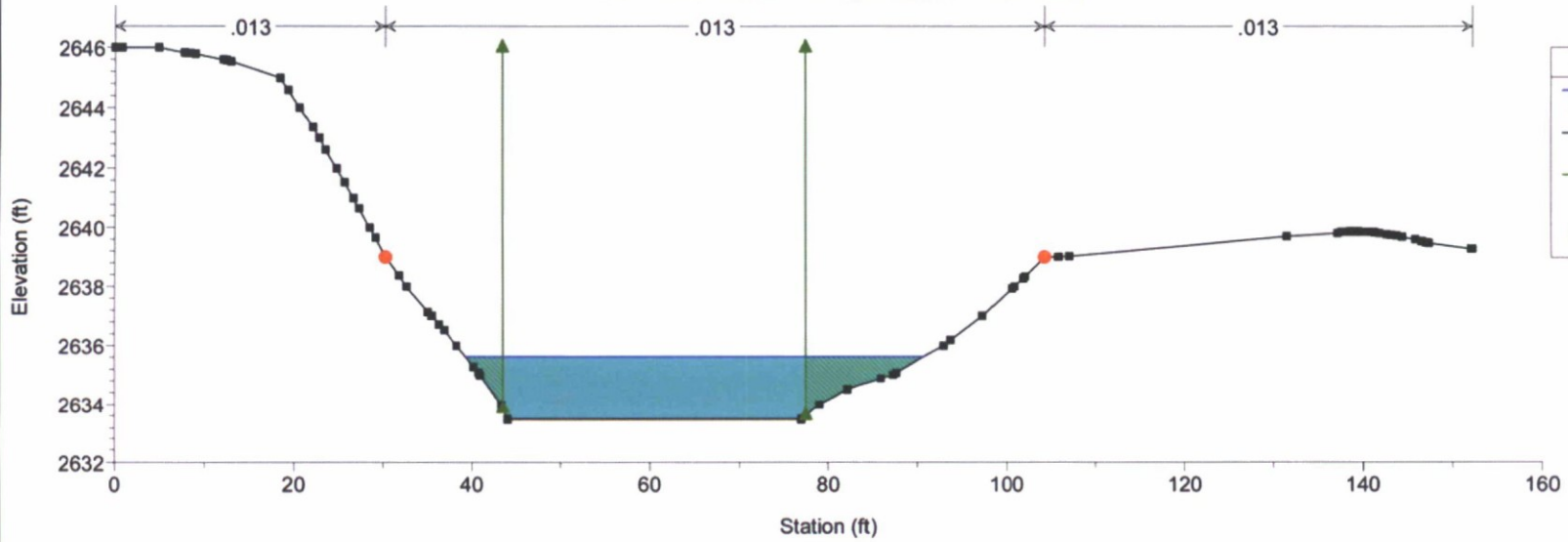
DM19_PD Post Development Mixed Plan: Plan 01 5/23/2017

River = DM19 Reach = Profile baseline RS = 2578



DM19_PD Post Development Mixed Plan: Plan 01 5/23/2017

River = DM19 Reach = Profile baseline RS = 2540

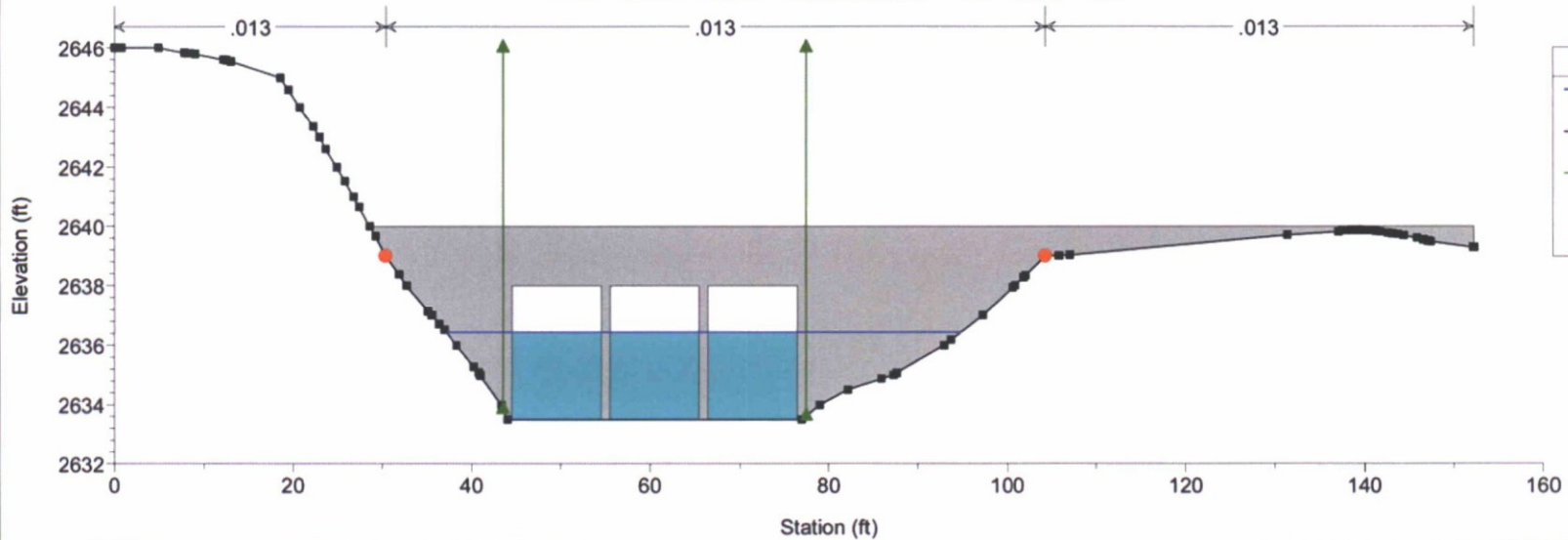


Legend

- WS PF 1
- Ground
- Ineff
- Bank Sta

DM19_PD Post Development Mixed Plan: Plan 01 5/23/2017

River = DM19 Reach = Profile baseline RS = 2520 BR

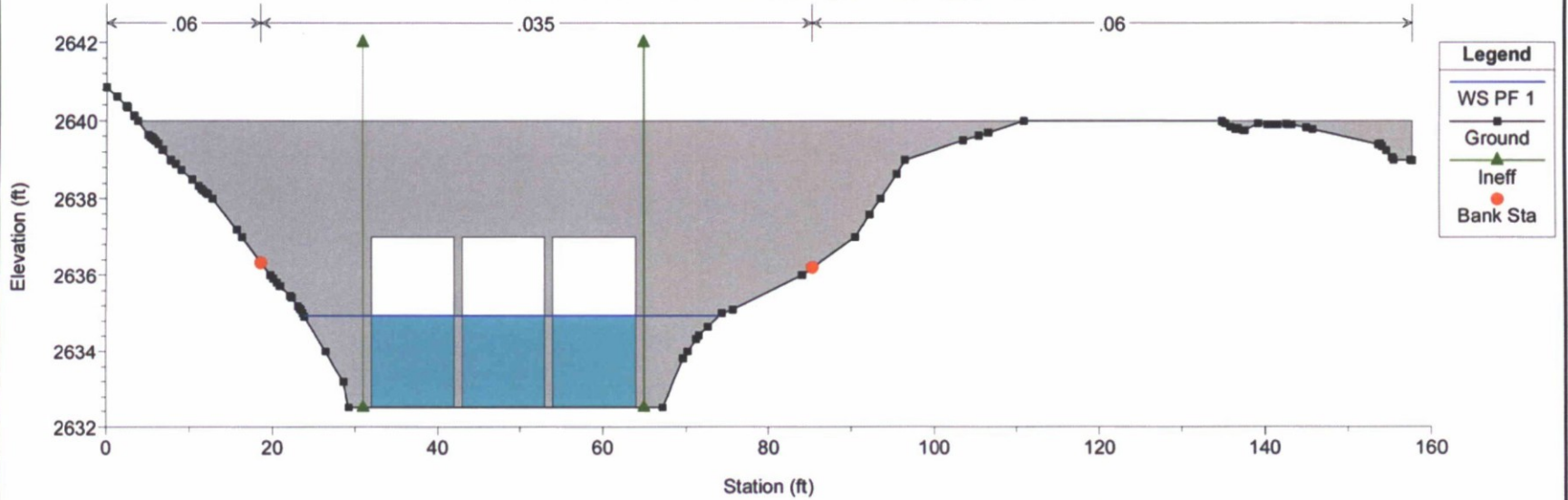


Legend

- WS PF 1
- Ground
- Ineff
- Bank Sta

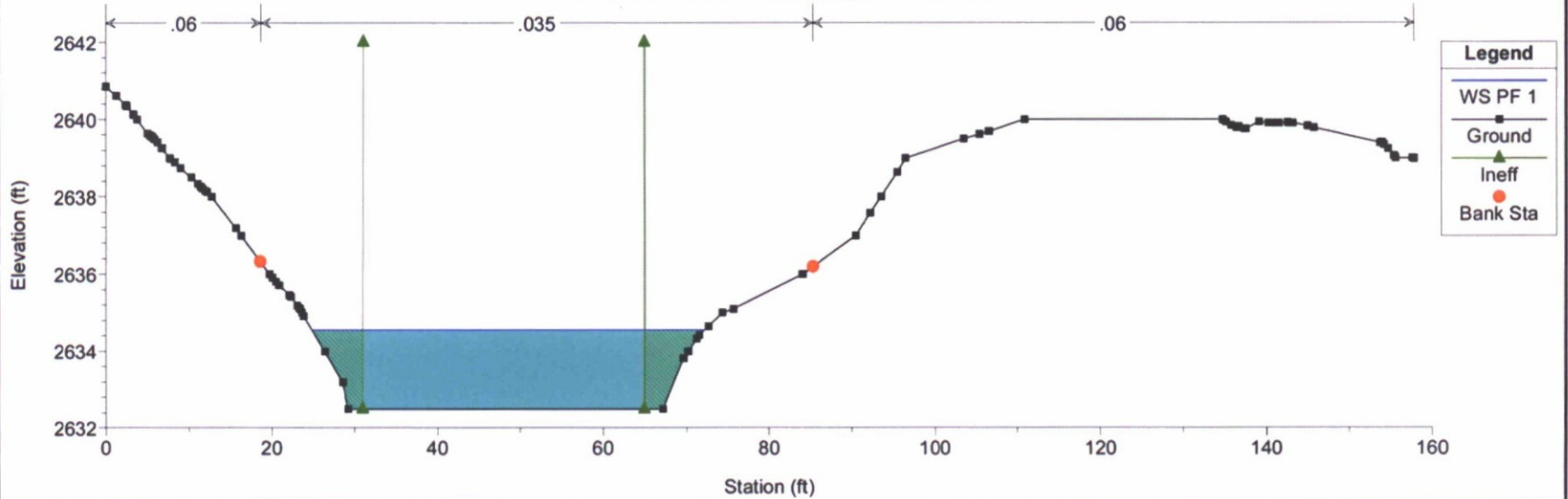
DM19_PD Post Development Mixed Plan: Plan 01 5/23/2017

River = DM19 Reach = Profile baseline RS = 2520 BR



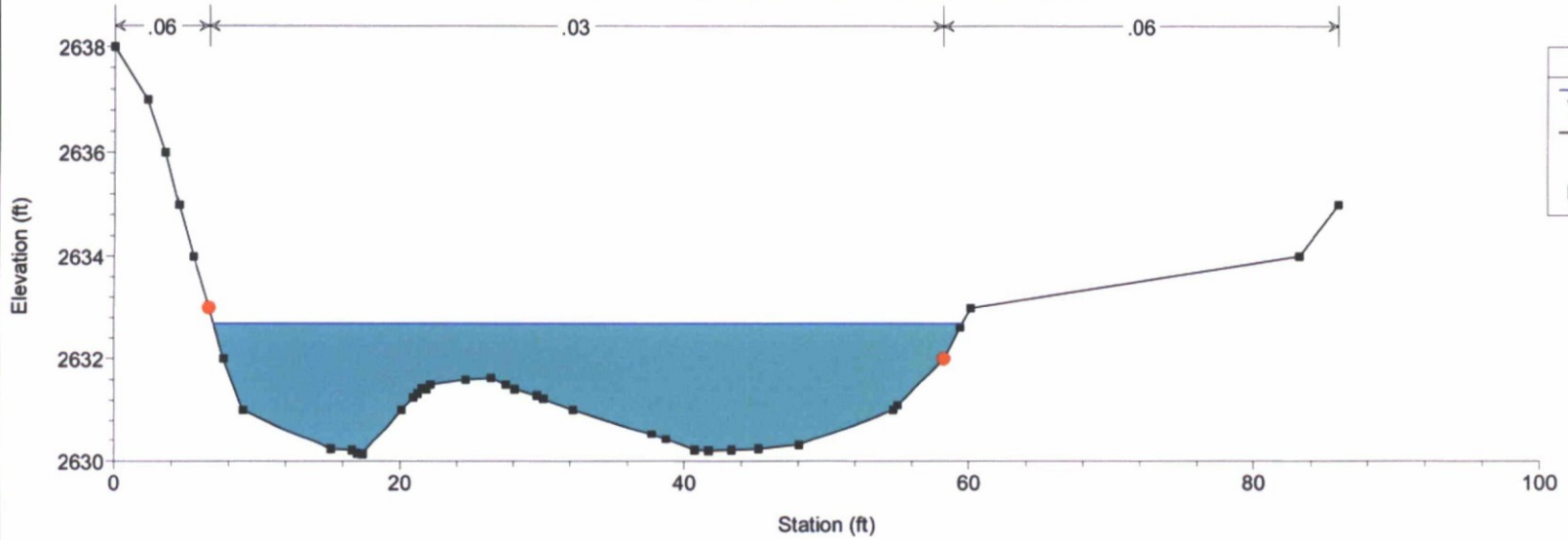
DM19_PD Post Development Mixed Plan: Plan 01 5/23/2017

River = DM19 Reach = Profile baseline RS = 2500



DM19_PD Post Development Mixed Plan: Plan 01 5/23/2017

River = DM19 Reach = Profile baseline RS = 2405



Legend

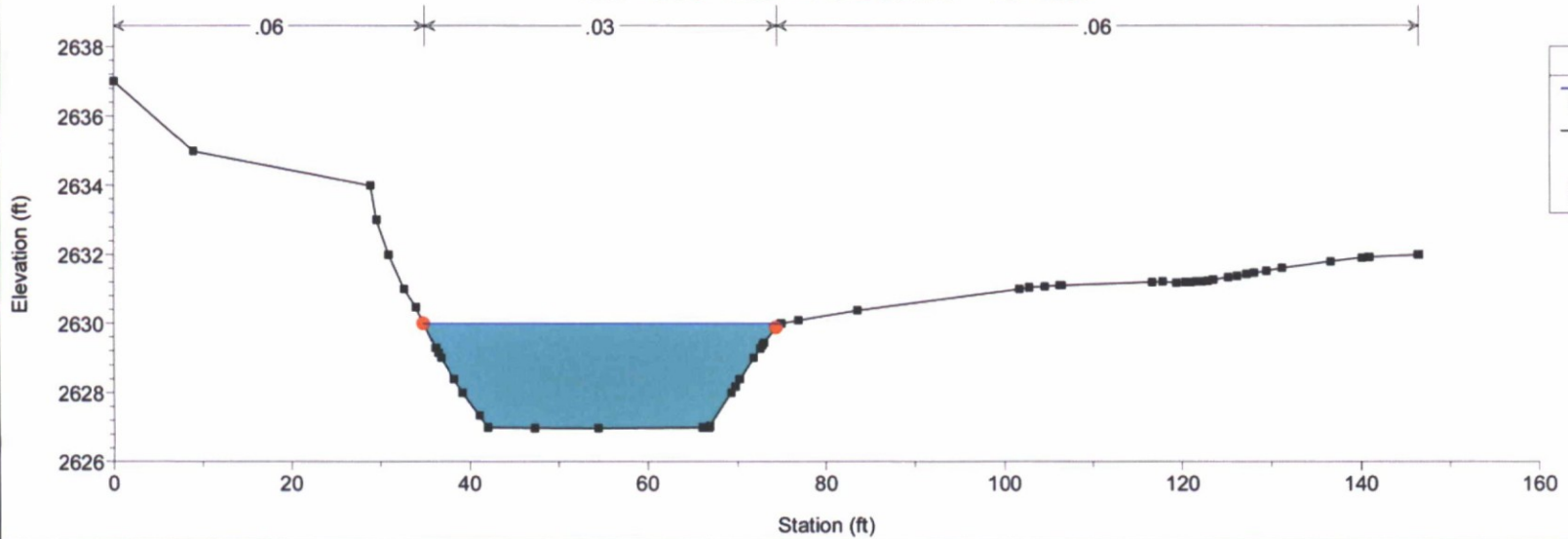
WS PF 1

Ground

Bank Sta

DM19_PD Post Development Mixed Plan: Plan 01 5/23/2017

River = DM19 Reach = Profile baseline RS = 2250



Legend

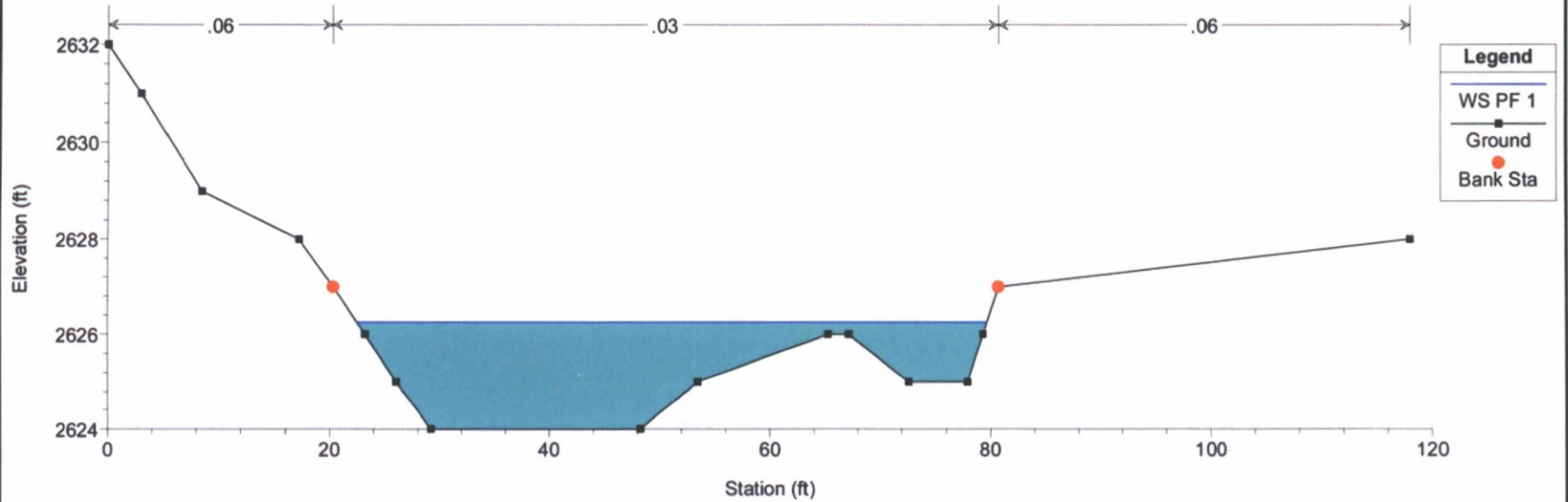
WS PF 1

Ground

Bank Sta

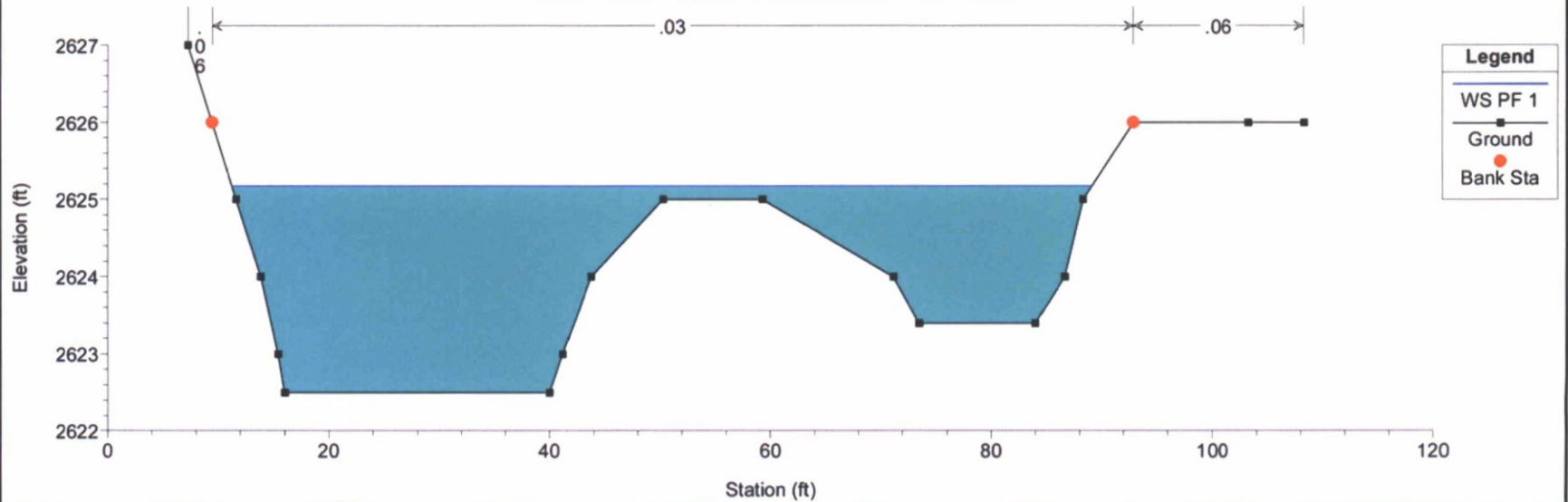
DM19_PD Post Development Mixed Plan: Plan 01 5/23/2017

River = DM19 Reach = Profile baseline RS = 2130



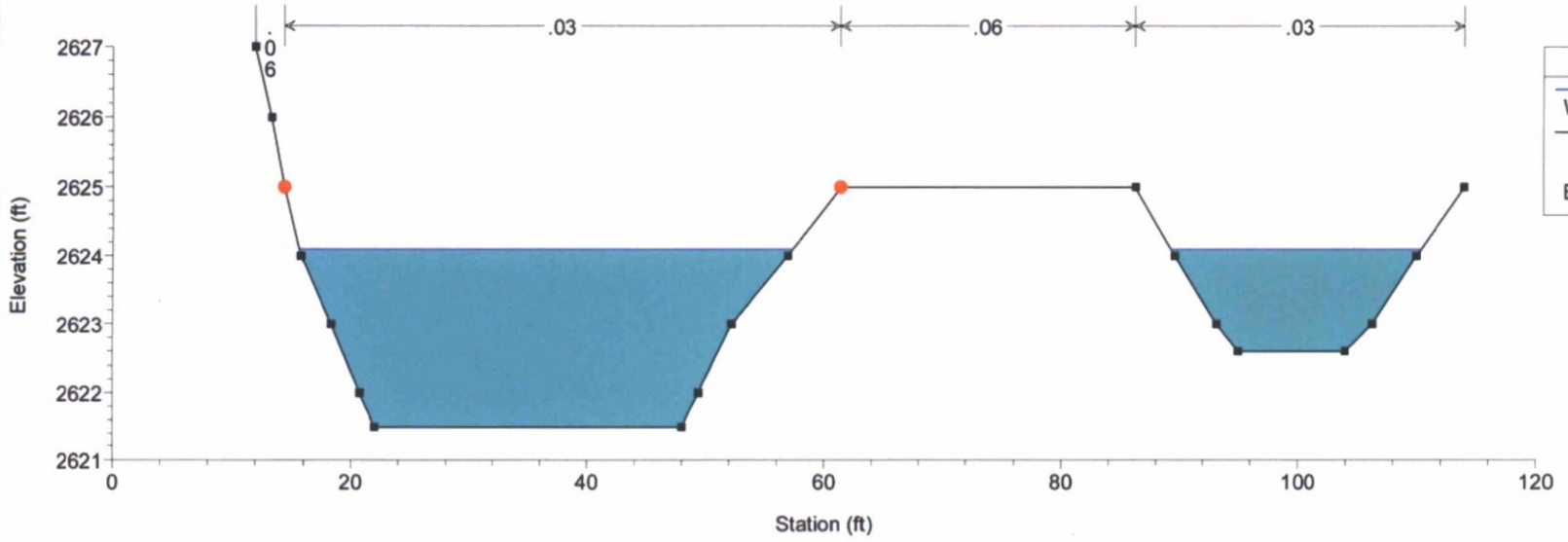
DM19_PD Post Development Mixed Plan: Plan 01 5/23/2017

River = DM19 Reach = Profile baseline RS = 2056



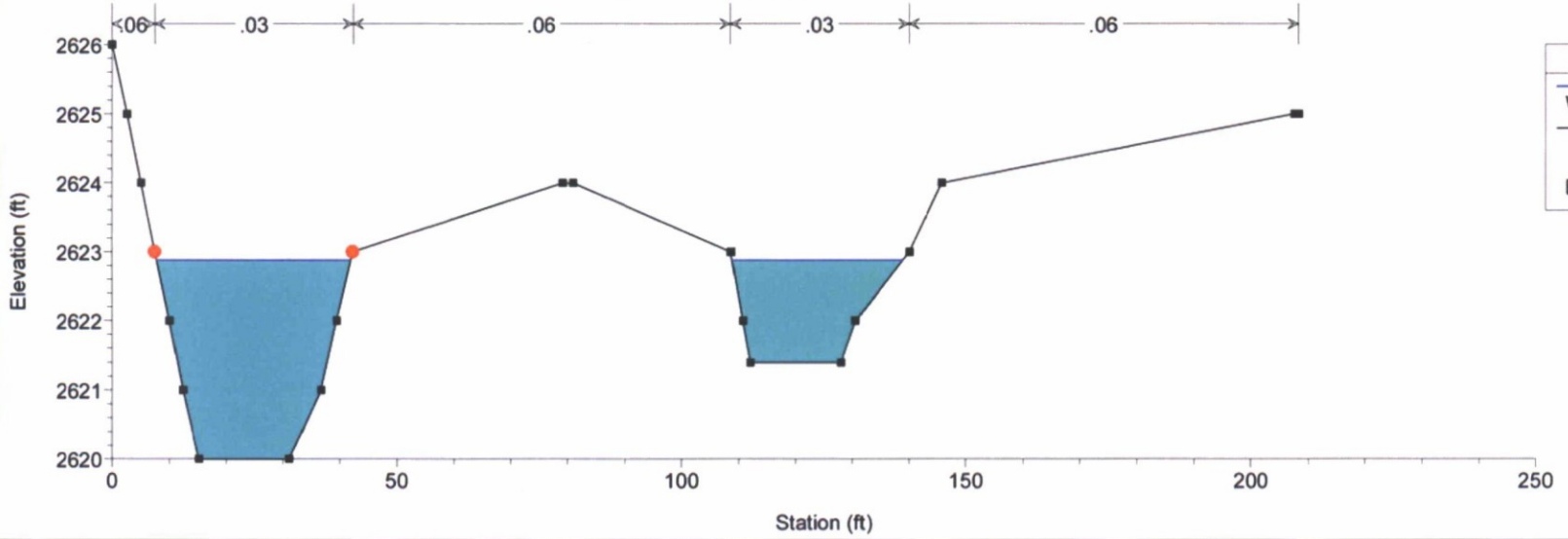
DM19_PD Post Development Mixed Plan: Plan 01 5/23/2017

River = DM19 Reach = Profile baseline RS = 2014 cs 60



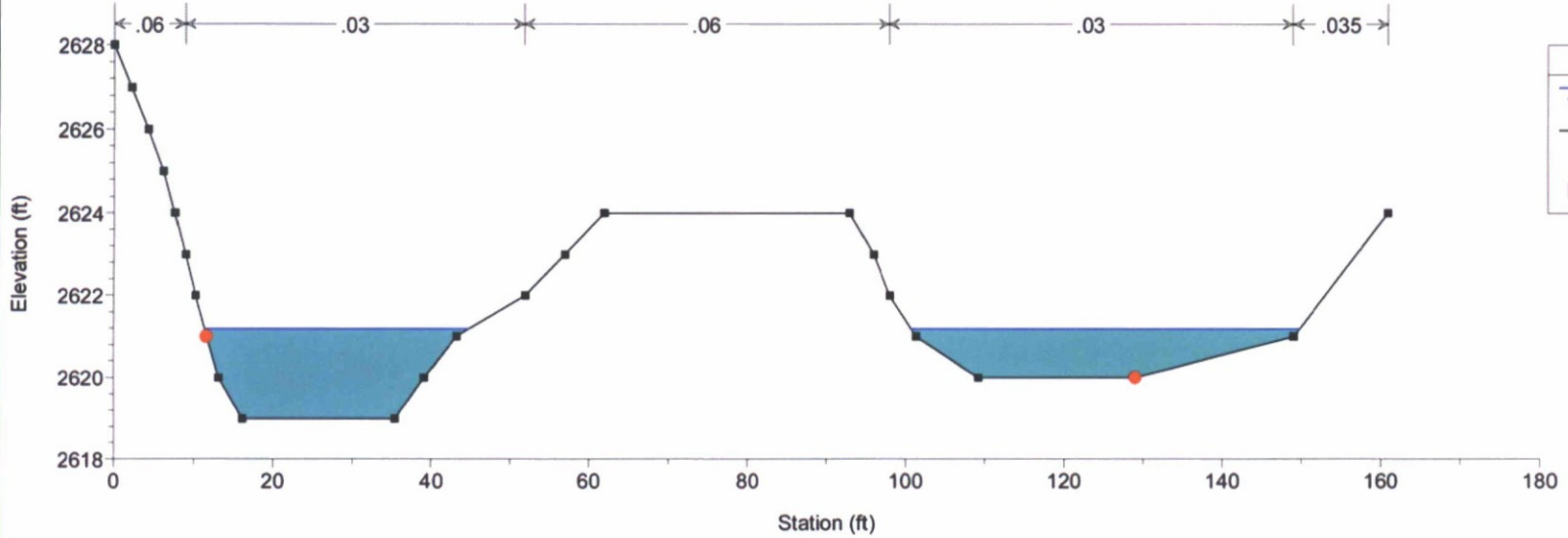
DM19_PD Post Development Mixed Plan: Plan 01 5/23/2017

River = DM19 Reach = Profile baseline RS = 1952



DM19_PD Post Development Mixed Plan: Plan 01 5/23/2017

River = DM19 Reach = Profile baseline RS = 1891

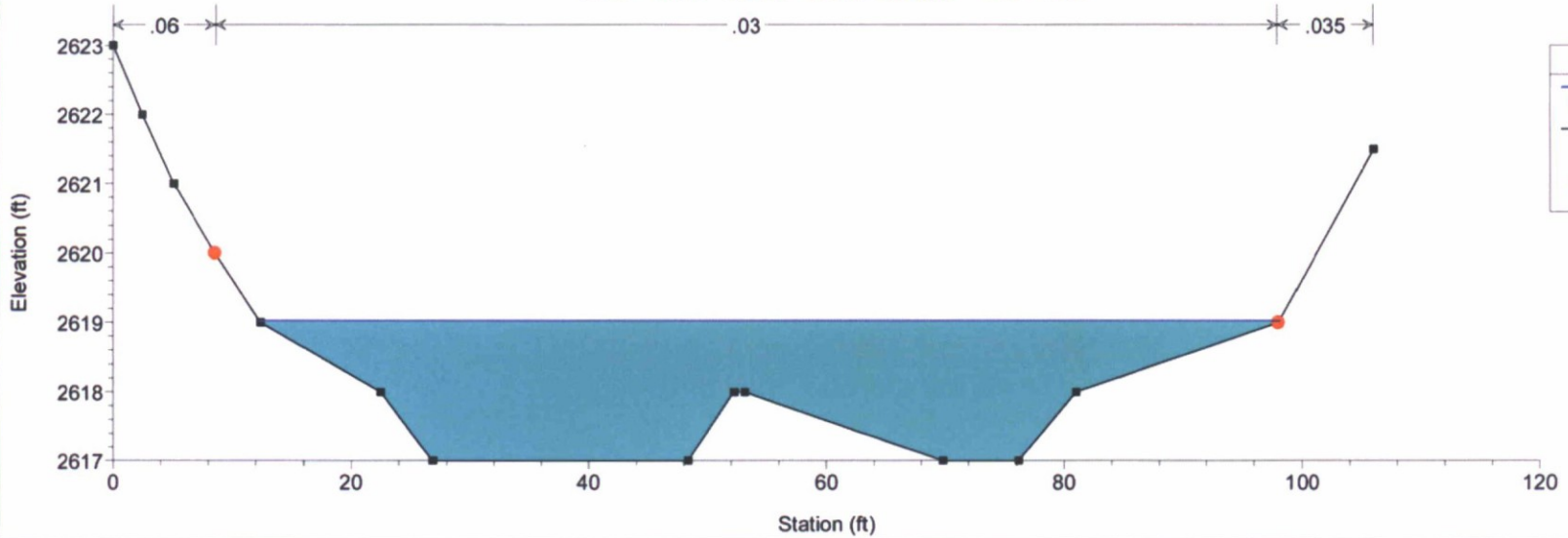


Legend

- WS PF 1
- Ground
- Bank Sta

DM19_PD Post Development Mixed Plan: Plan 01 5/23/2017

River = DM19 Reach = Profile baseline RS = 1791

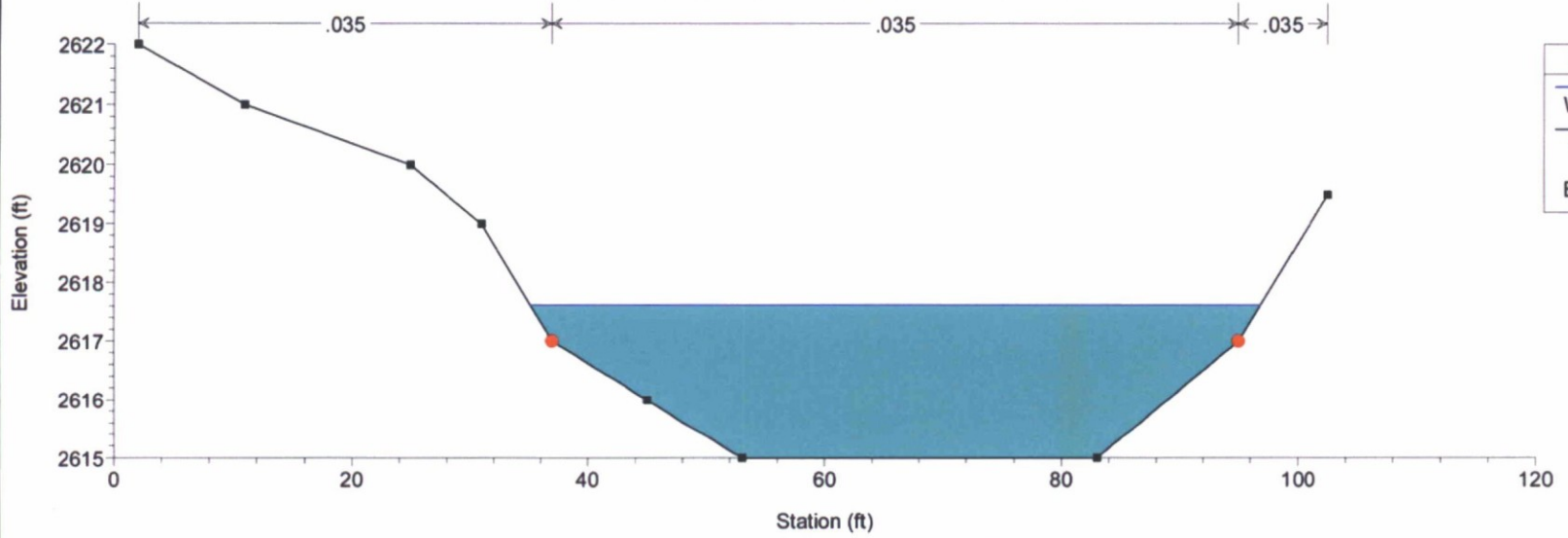


Legend

- WS PF 1
- Ground
- Bank Sta

DM19_PD Post Development Mixed Plan: Plan 01 5/23/2017

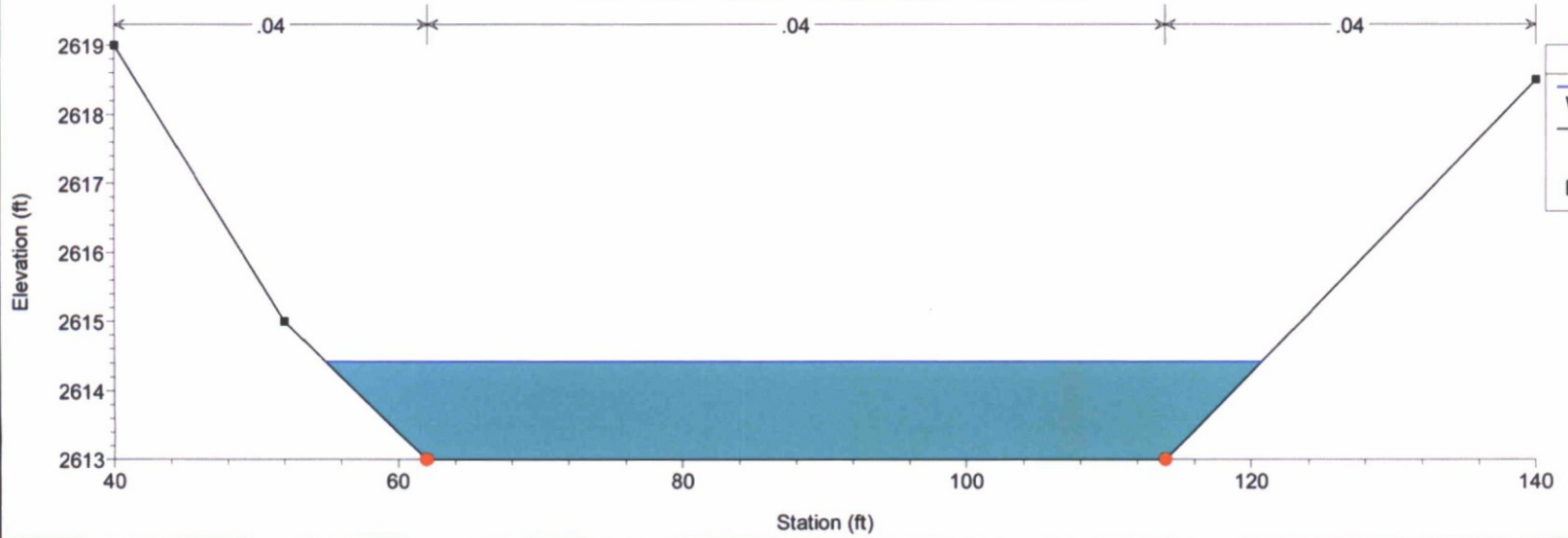
River = DM19 Reach = Profile baseline RS = 1705



- Legend**
- WS PF 1
 - Ground
 - Bank Sta

DM19_PD Post Development Mixed Plan: Plan 01 5/23/2017

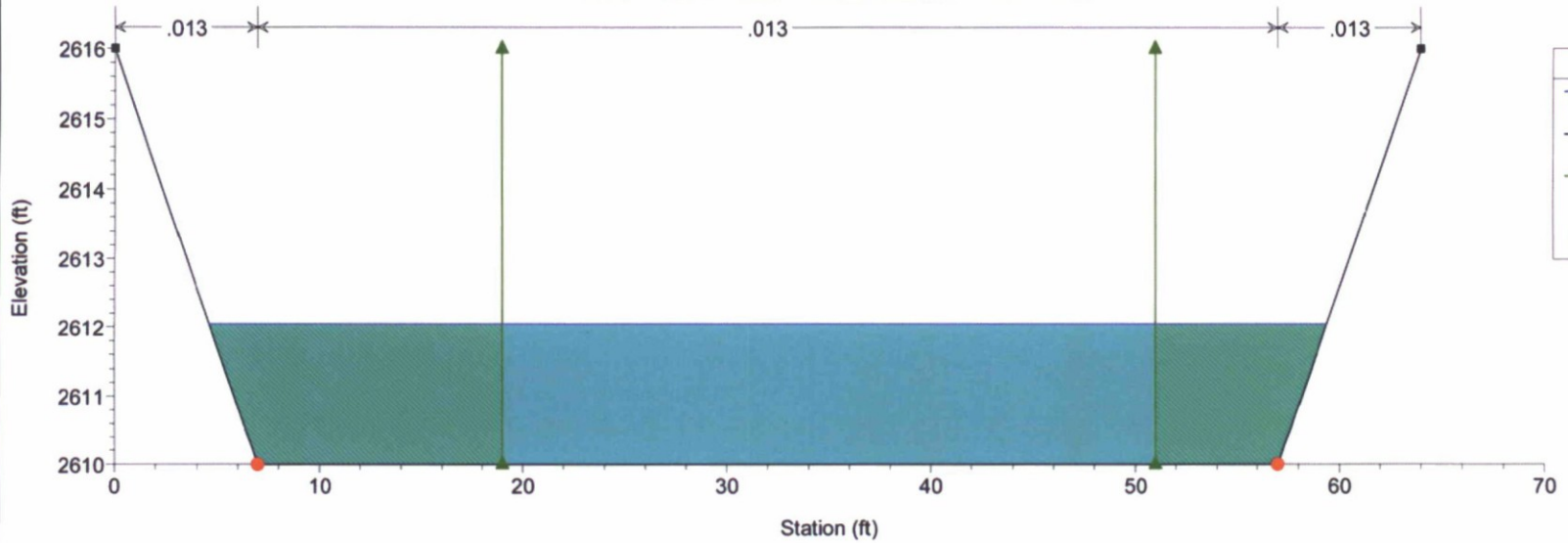
River = DM19 Reach = Profile baseline RS = 1650



- Legend**
- WS PF 1
 - Ground
 - Bank Sta

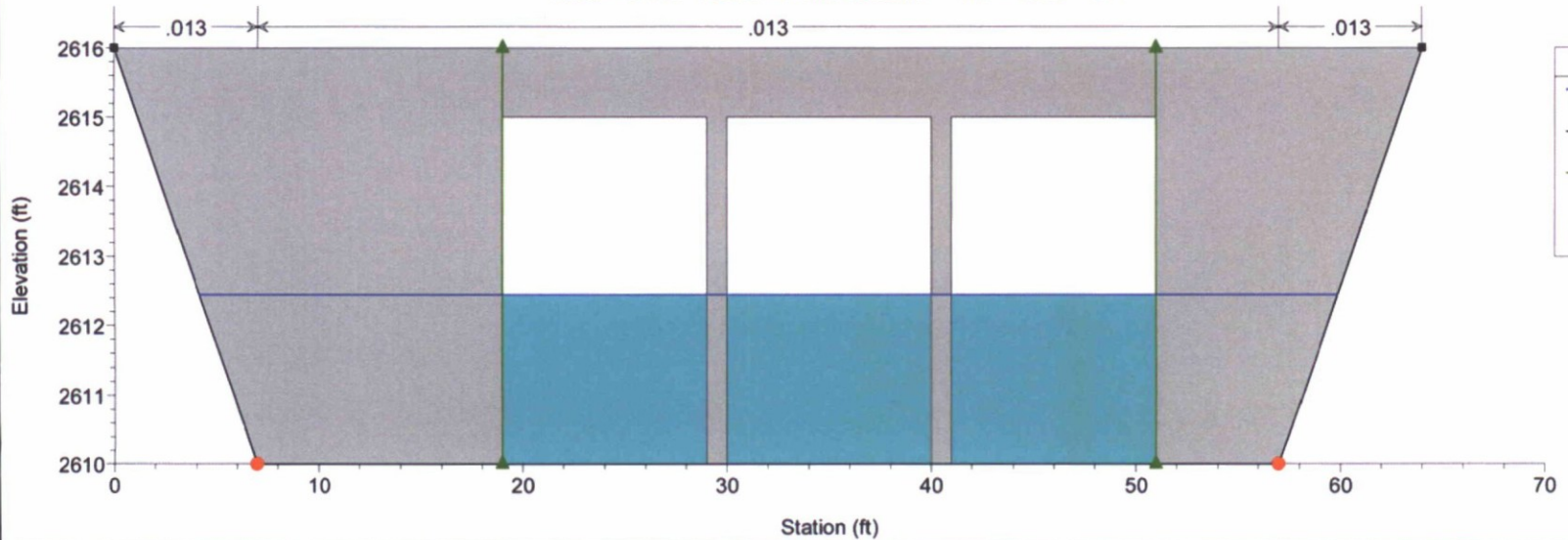
DM19_PD Post Development Mixed Plan: Plan 01 5/23/2017

River = DM19 Reach = Profile baseline RS = 1610



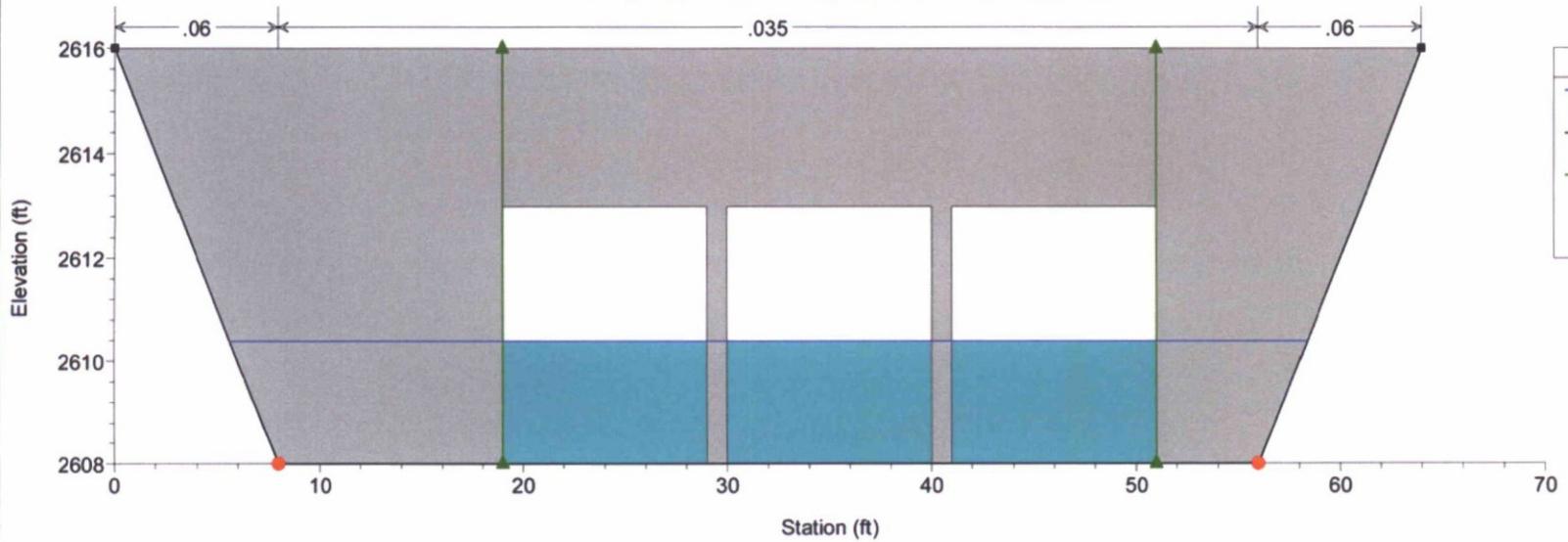
DM19_PD Post Development Mixed Plan: Plan 01 5/23/2017

River = DM19 Reach = Profile baseline RS = 1500 BR



DM19_PD Post Development Mixed Plan: Plan 01 5/23/2017

River = DM19 Reach = Profile baseline RS = 1500 BR

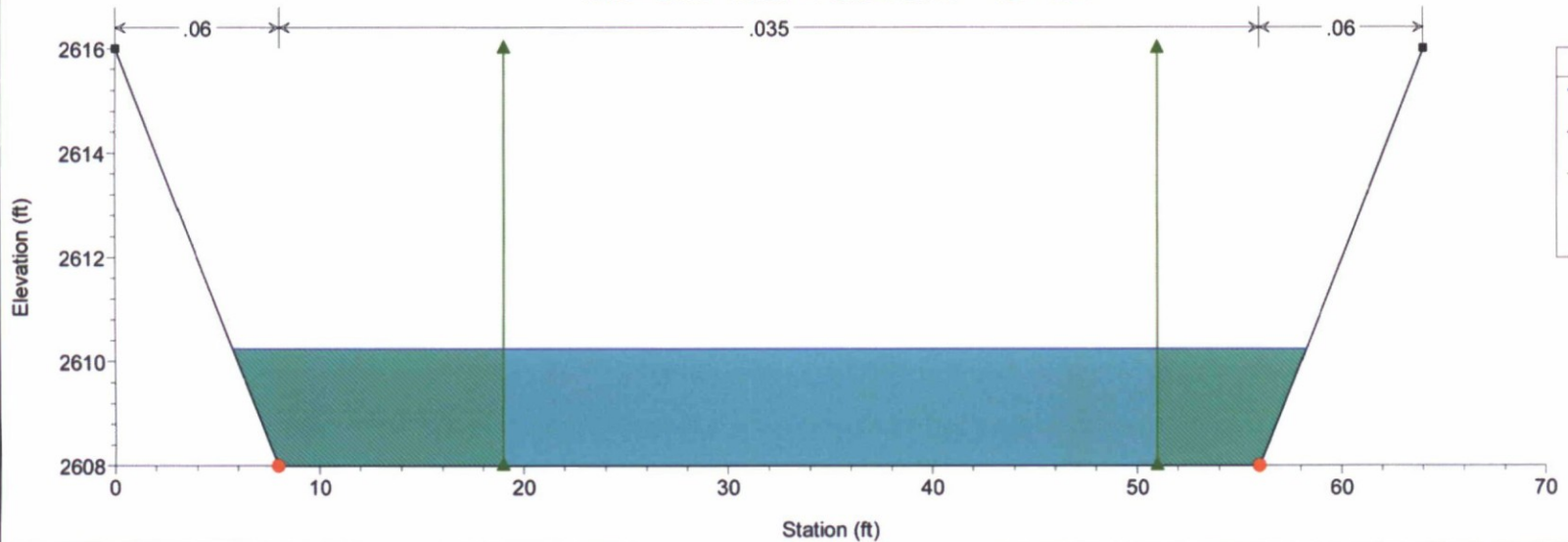


Legend

- WS PF 1
- Ground
- Ineff
- Bank Sta

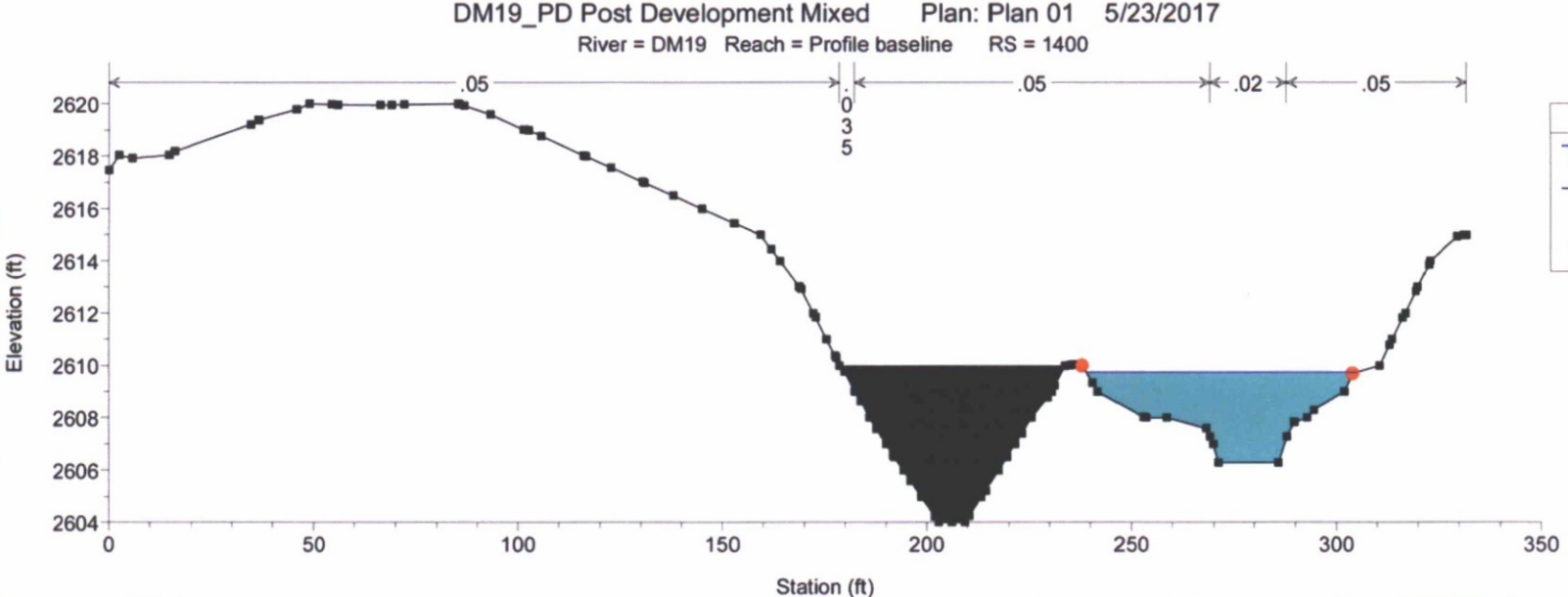
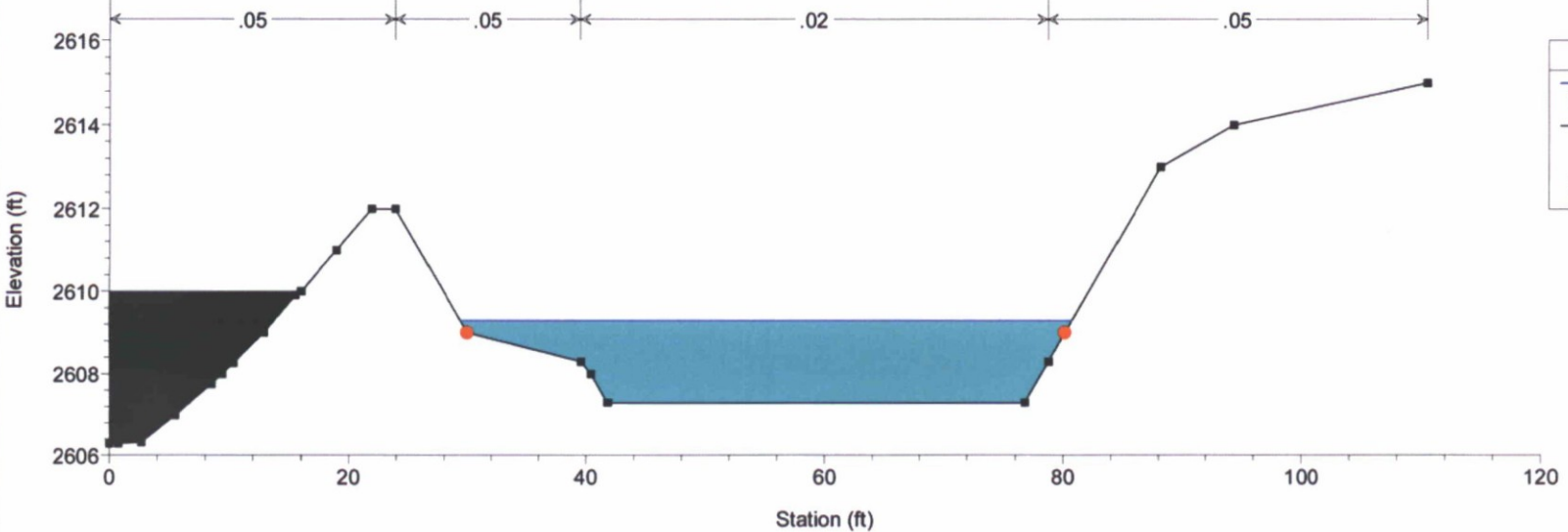
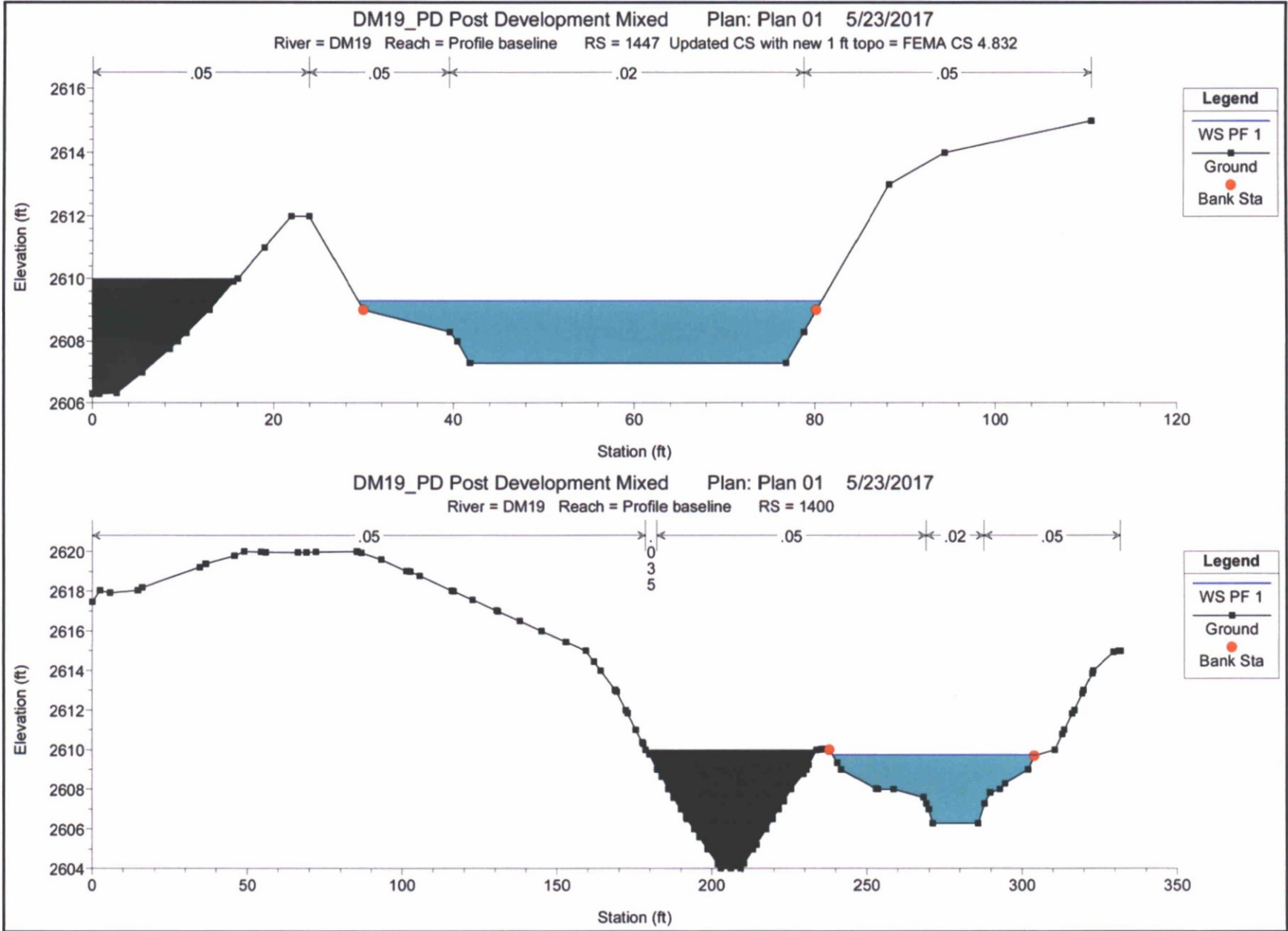
DM19_PD Post Development Mixed Plan: Plan 01 5/23/2017

River = DM19 Reach = Profile baseline RS = 1474



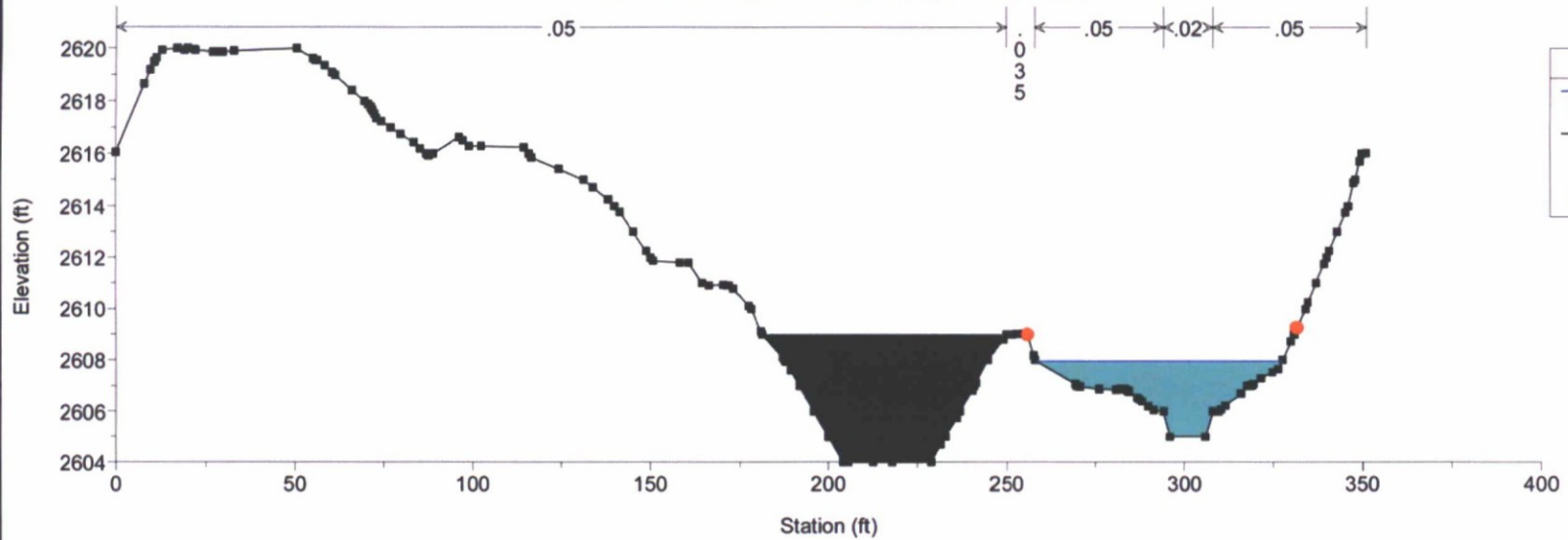
Legend

- WS PF 1
- Ground
- Ineff
- Bank Sta



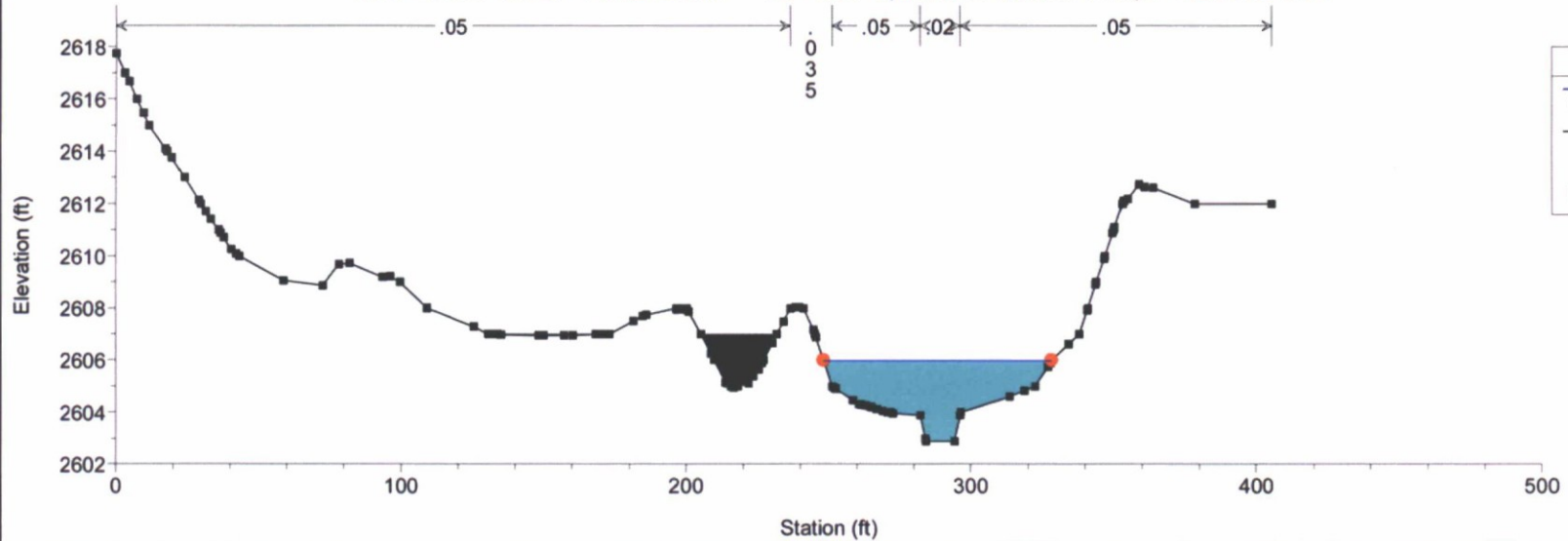
DM19_PD Post Development Mixed Plan: Plan 01 5/23/2017

River = DM19 Reach = Profile baseline RS = 1342



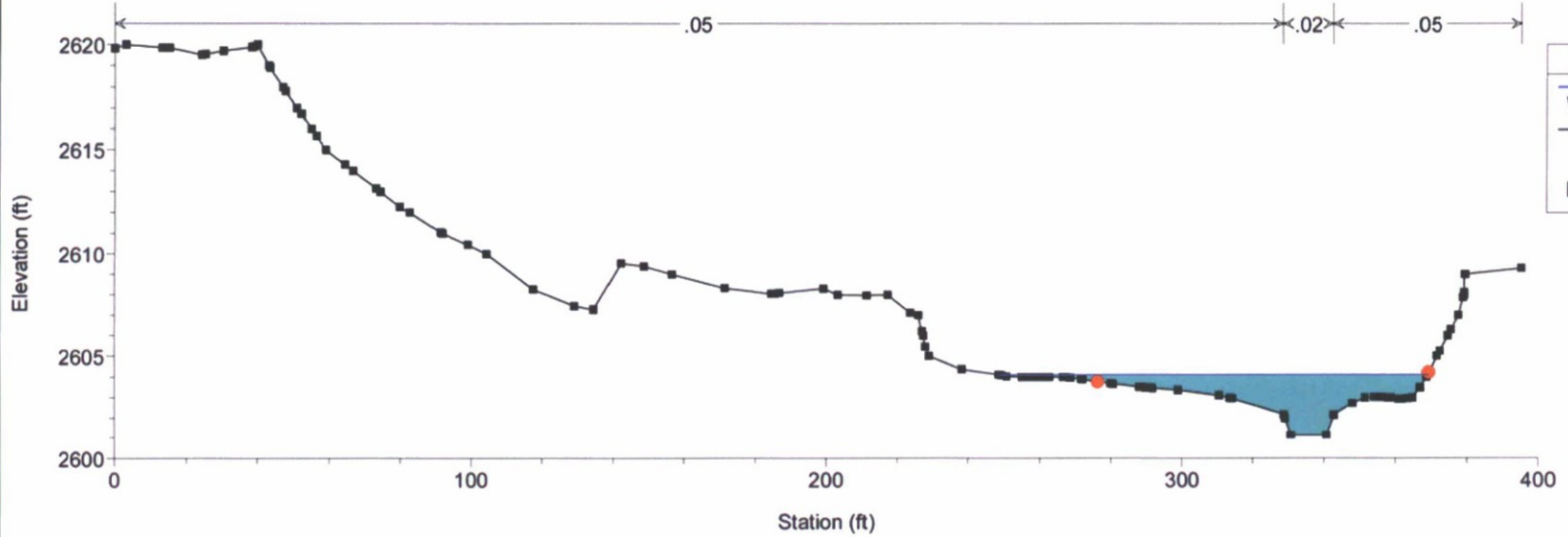
DM19_PD Post Development Mixed Plan: Plan 01 5/23/2017

River = DM19 Reach = Profile baseline RS = 1257 Updated CS with new 1 ft topo = FEMA CS 4.796



DM19_PD Post Development Mixed Plan: Plan 01 5/23/2017

River = DM19 Reach = Profile baseline RS = 1180



Legend

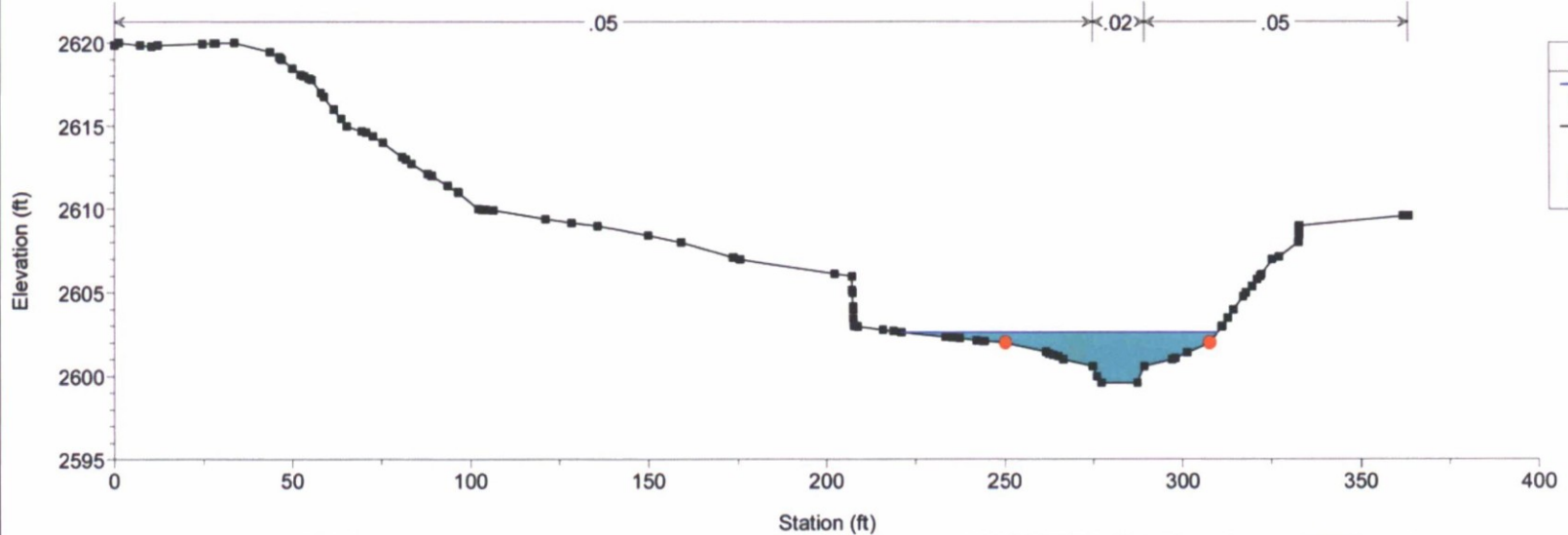
WS PF 1

Ground

Bank Sta

DM19_PD Post Development Mixed Plan: Plan 01 5/23/2017

River = DM19 Reach = Profile baseline RS = 1119 Updated CS with new 1 ft topo = FEMA CS 4.770



Legend

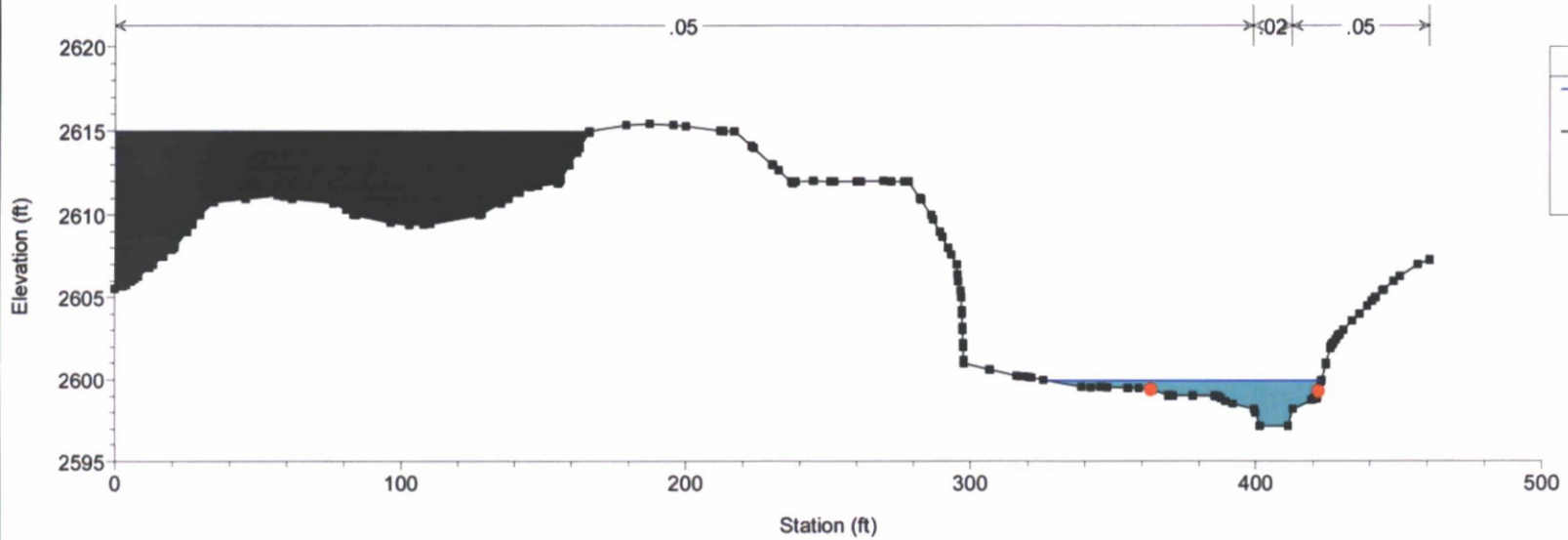
WS PF 1

Ground

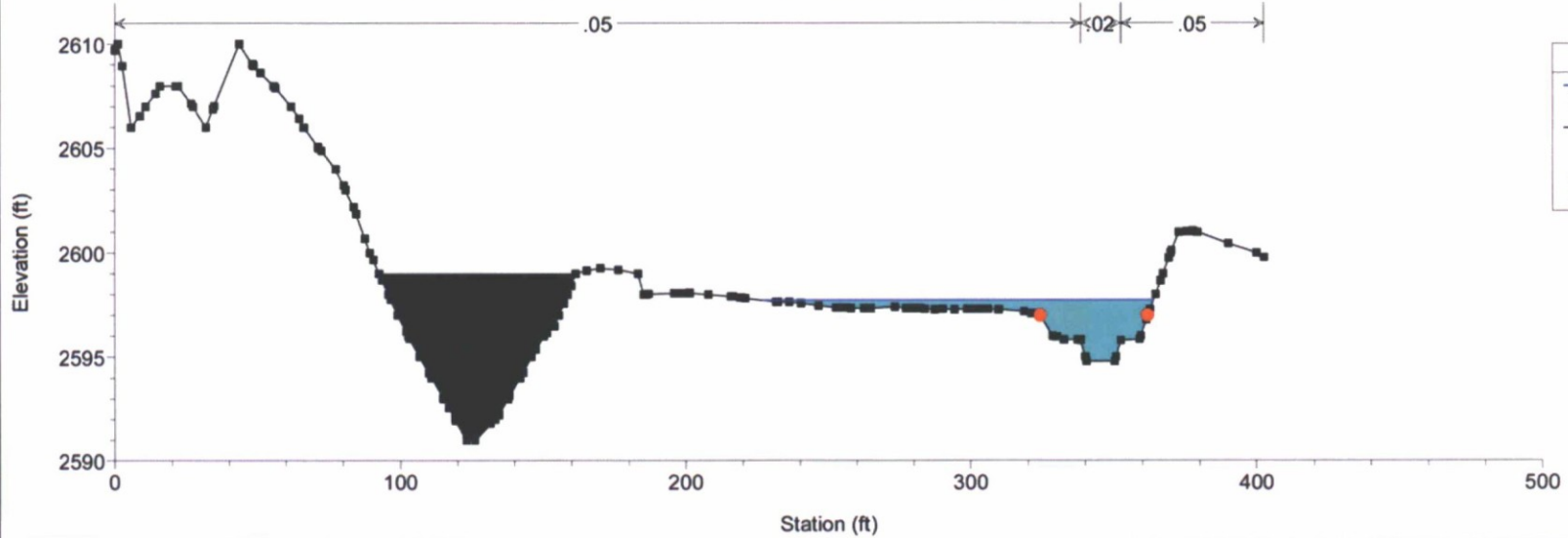
Bank Sta

DM19_PD Post Development Mixed Plan: Plan 01 5/23/2017

River = DM19 Reach = Profile baseline RS = 1015

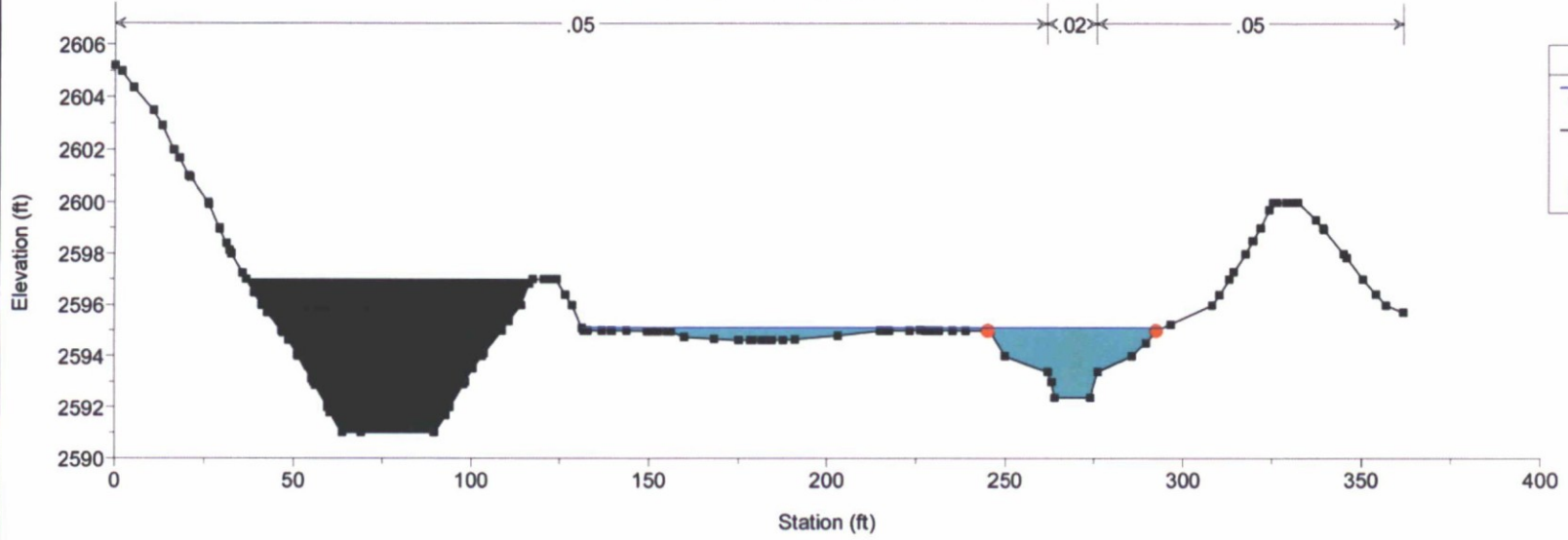


DM19_PD Post Development Mixed Plan: Plan 01 5/23/2017
River = DM19 Reach = Profile baseline RS = 918 Updated CS with new 1 ft topo = FEMA CS 4.732

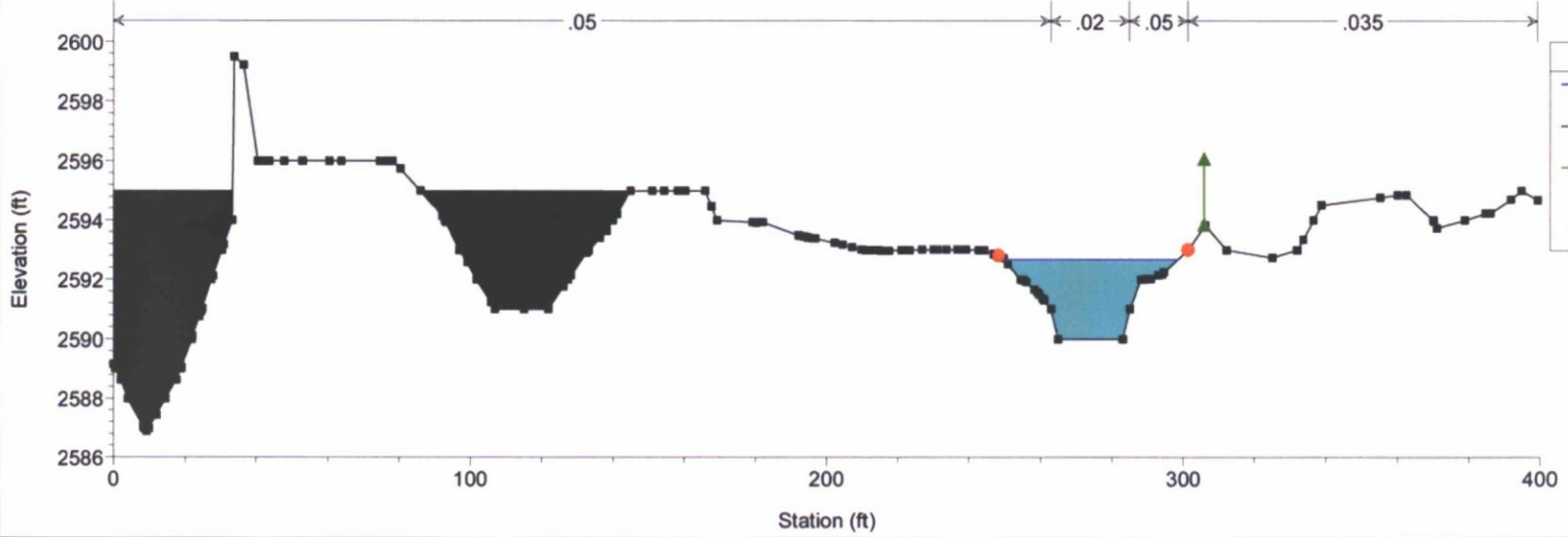


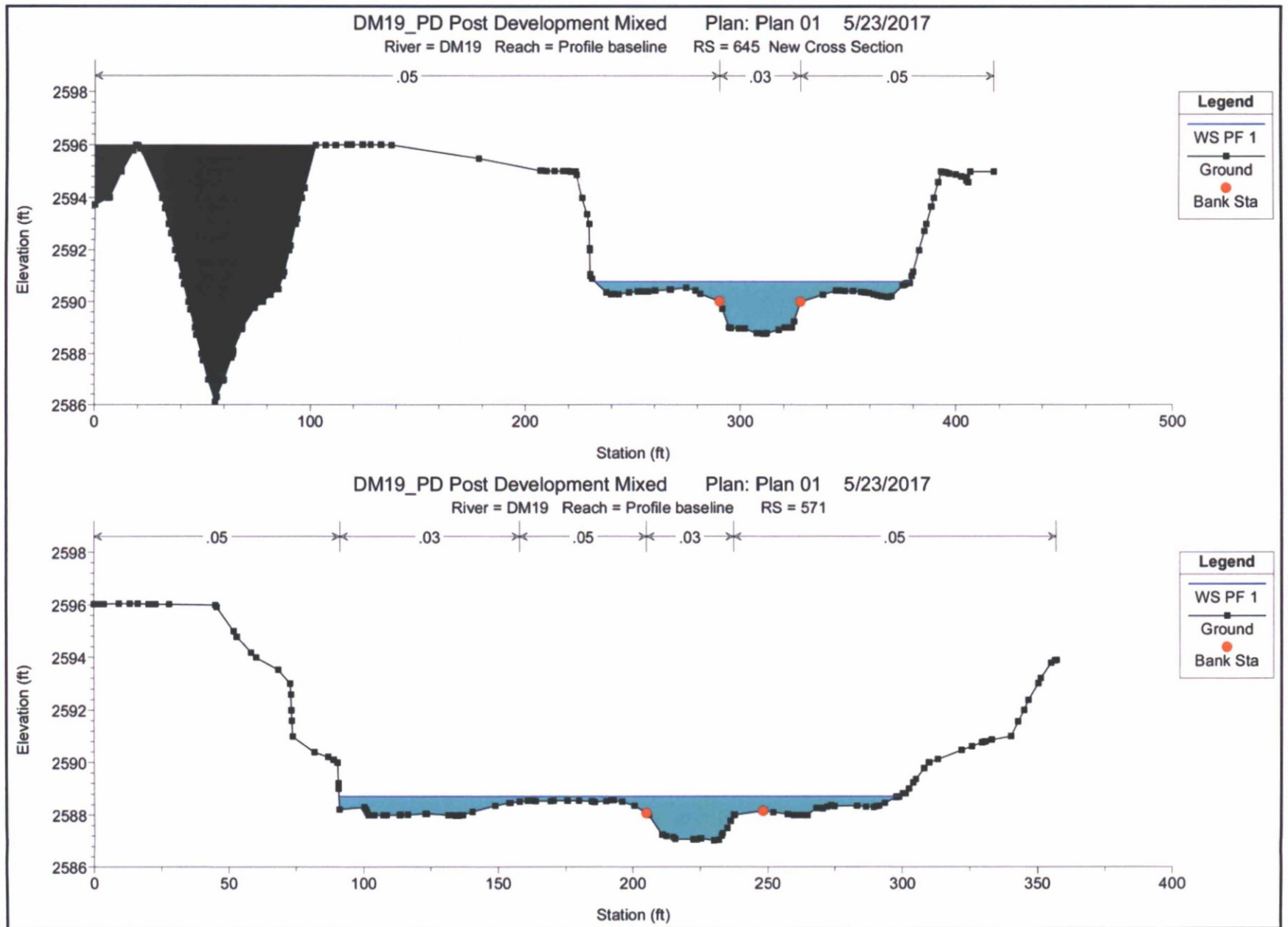
DM19_PD Post Development Mixed Plan: Plan 01 5/23/2017

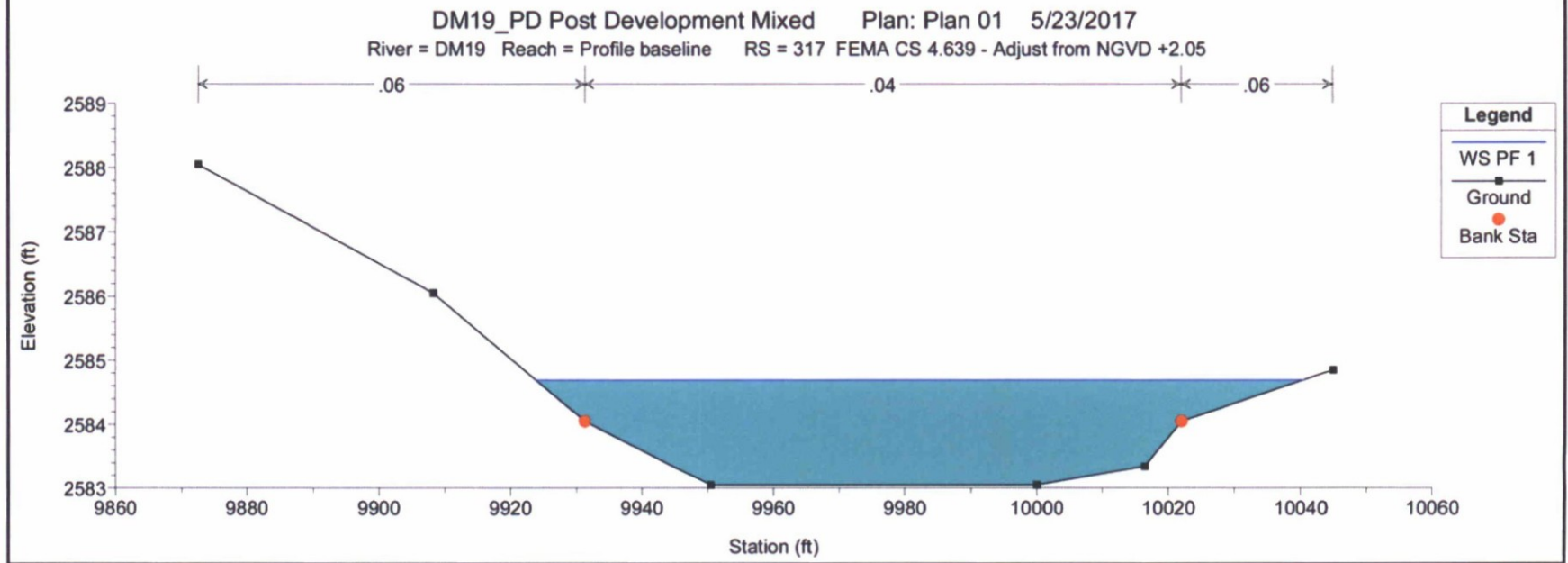
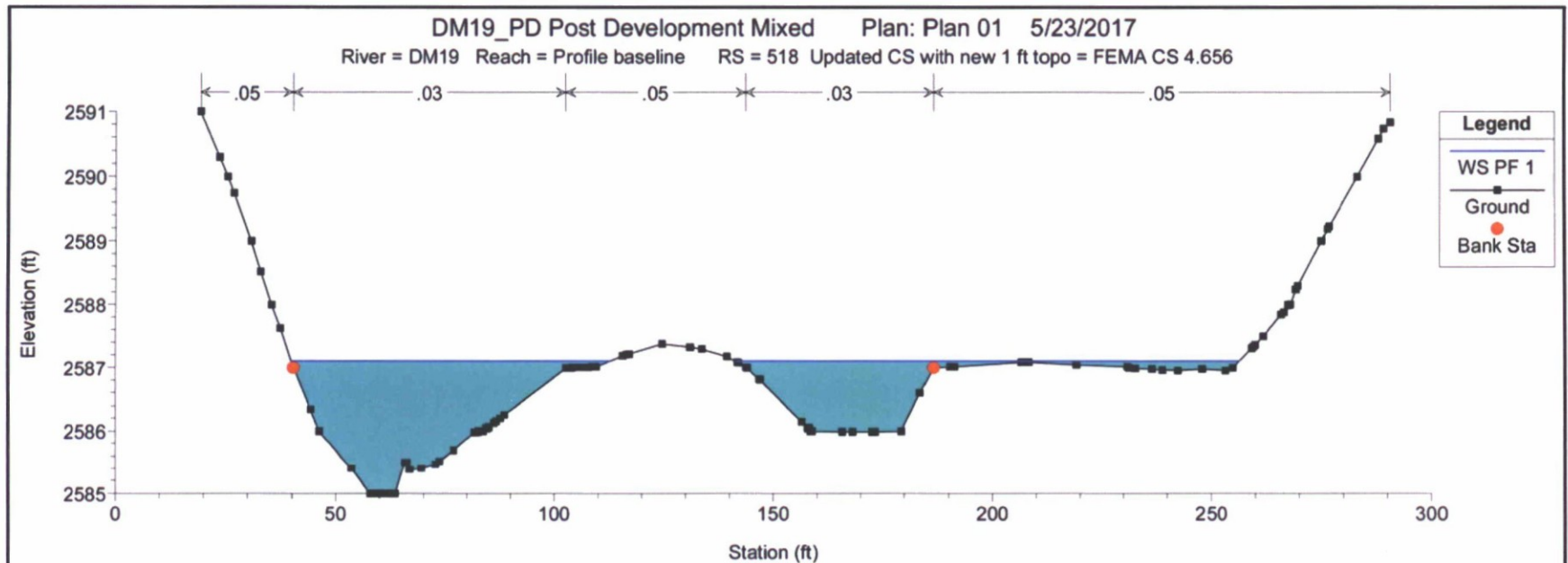
River = DM19 Reach = Profile baseline RS = 780 New CS

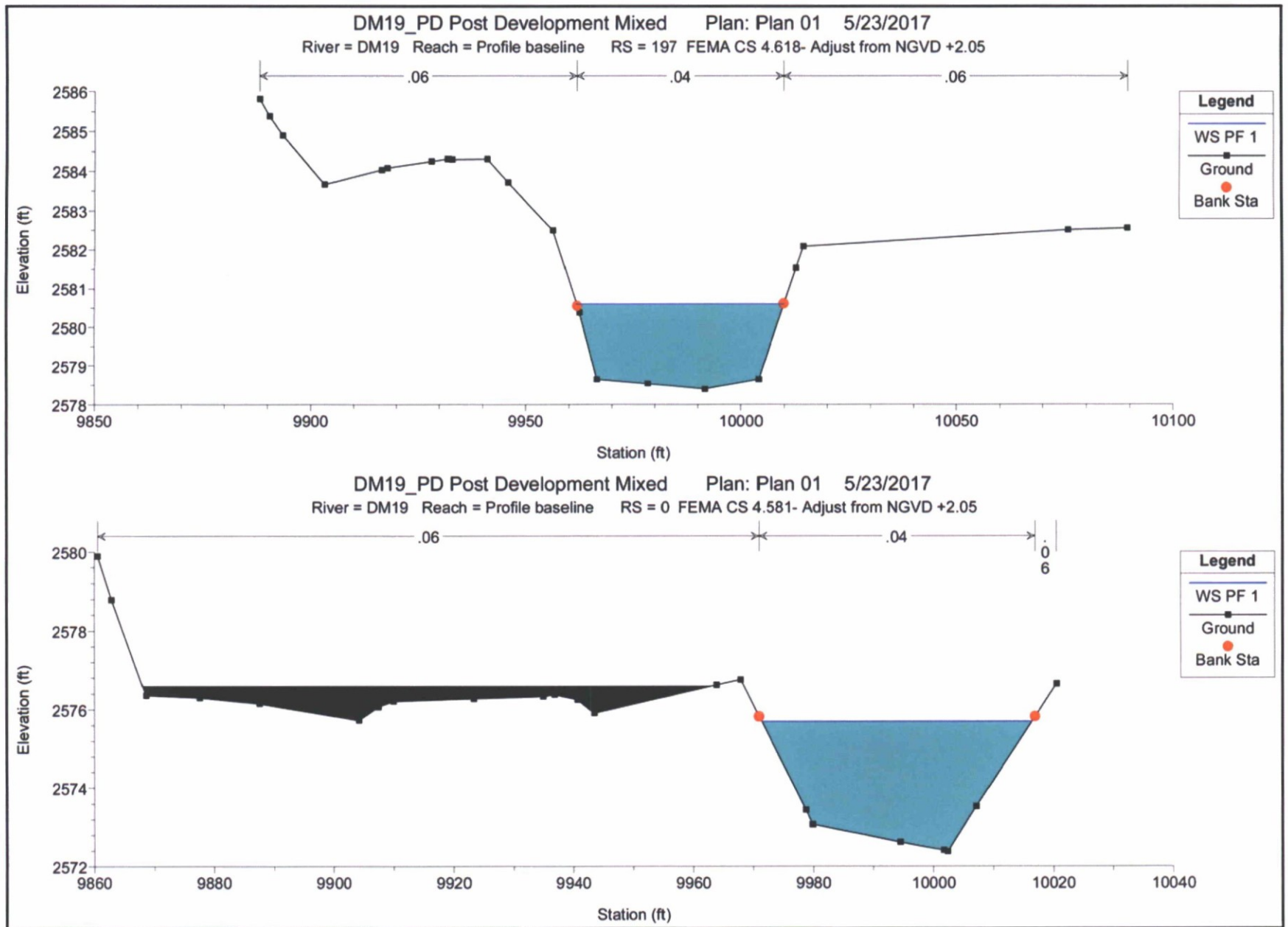


DM19_PD Post Development Mixed Plan: Plan 01 5/23/2017
River = DM19 Reach = Profile baseline RS = 716 Updated CS with new 1 ft topo = FEMA CS 4.694









FlowMaster Existing Wash Output Files

Cross Section for Q100 66 cfs

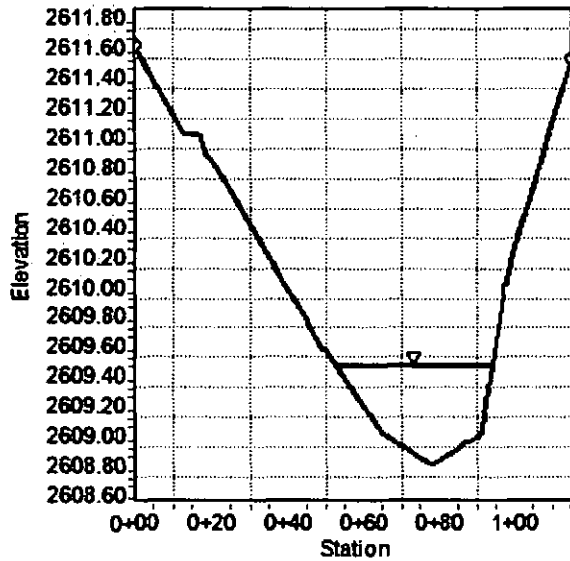
Project Description

Friction Method Manning Formula
Solve For Normal Depth

Input Data

Channel Slope 0.03000 ft/ft
Normal Depth 0.66 ft
Discharge 66.00 ft³/s

Cross Section Image



Worksheet for Q100 66 cfs

Project Description

Friction Method Manning Formula
Solve For Normal Depth

Input Data

Channel Slope 0.03000 ft/ft
Discharge 66.00 ft³/s
Section Definitions

Station (ft)	Elevation (ft)
0+00	2611.60
0+04	2611.42
0+12	2611.01
0+13	2611.01
0+17	2611.00
0+18	2610.87
0+18	2610.87
0+19	2610.84
0+21	2610.79
0+36	2610.12
0+38	2610.06
0+39	2610.00
0+39	2610.00
0+44	2609.76
0+45	2609.73
0+48	2609.60
0+49	2609.58
0+49	2609.57
0+50	2609.55
0+51	2609.52
0+64	2609.00
0+73	2608.85
0+78	2608.79
0+85	2608.90
0+86	2608.93
0+87	2608.93
0+90	2608.98

Worksheet for Q100 66 cfs

Input Data

Station (ft)	Elevation (ft)
0+90	2608.98
0+91	2608.99
0+91	2609.00
0+91	2609.00
0+98	2609.82
0+97	2609.97
0+98	2609.99
0+98	2610.00
1+00	2610.24
1+02	2610.42
1+07	2610.85
1+09	2611.00
1+15	2611.51

Options

Current roughness weighted Method	Pavlovskii's Method
Open Channel Weighting Method	Pavlovskii's Method
Closed Channel Weighting Method	Pavlovskii's Method

Results

Normal Depth	0.66 ft
Elevation Range	2608.79 to 2611.60 ft
Flow Area	17.90 ft ²
Wetted Perimeter	41.29 ft
Hydraulic Radius	0.43 ft
Top Width	41.24 ft
Normal Depth	0.66 ft
Critical Depth	0.65 ft
Critical Slope	0.03091 ft/R
Velocity	3.69 ft/s
Velocity Head	0.21 ft
Specific Energy	0.87 ft

Worksheet for Q100 66 cfs

Results

Froude Number 0.99
Flow Type Subcritical

GVF Input Data

Downstream Depth 0.00 ft
Length 0.00 ft
Number Of Steps 0

GVF Output Data

Upstream Depth 0.00 ft
Profile Description
Profile Headloss 0.00 ft
Downstream Velocity Infinity ft/s
Upstream Velocity Infinity ft/s
Normal Depth 0.66 ft
Critical Depth 0.65 ft
Channel Slope 0.03000 ft/ft
Critical Slope 0.03091 ft/ft

Cross Section for Q100 72 cfs US

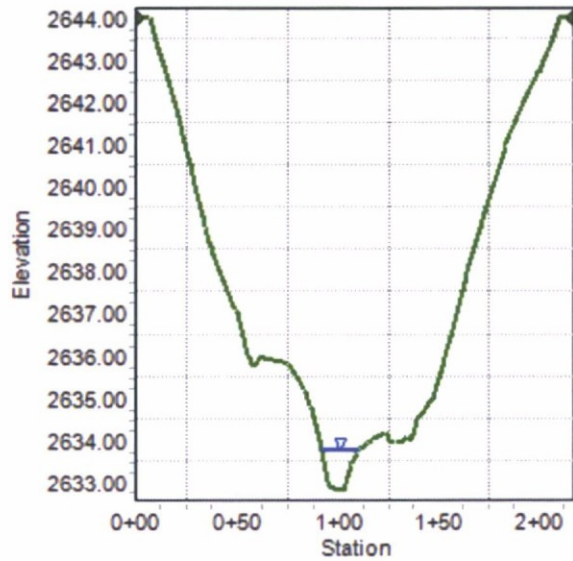
Project Description

Friction Method Manning Formula
Solve For Normal Depth

Input Data

Channel Slope 0.06000 ft/ft
Normal Depth 0.96 ft
Discharge 72.00 ft³/s

Cross Section Image



Worksheet for Q100 72 cfs US

Input Data

Station (ft)	Elevation (ft)
0+58	2635.72
0+62	2635.97
0+62	2635.97
0+62	2635.97
0+62	2635.96
0+62	2635.95
0+73	2635.84
0+74	2635.81
0+74	2635.81
0+75	2635.78
0+76	2635.75
0+77	2635.62
0+80	2635.47
0+80	2635.46
0+83	2635.21
0+83	2635.19
0+83	2635.18
0+84	2635.06
0+85	2635.00
0+85	2634.94
0+85	2634.94
0+85	2634.92
0+86	2634.85
0+86	2634.80
0+86	2634.76
0+91	2634.00
0+95	2633.00
0+95	2632.90
0+95	2632.88
0+99	2632.81
1+03	2632.79
1+03	2633.00
1+06	2633.40
1+06	2633.42
1+07	2633.45
1+09	2633.70
1+10	2633.73

Worksheet for Q100 72 cfs US

Input Data

Station (ft)	Elevation (ft)
1+10	2633.78
1+12	2633.83
1+12	2633.84
1+13	2633.86
1+13	2633.88
1+14	2633.92
1+16	2633.98
1+16	2633.98
1+17	2634.00
1+17	2634.00
1+18	2634.03
1+19	2634.09
1+21	2634.14
1+22	2634.15
1+23	2634.16
1+24	2634.13
1+25	2634.00
1+27	2633.94
1+28	2633.93
1+28	2633.92
1+32	2634.00
1+34	2634.09
1+34	2634.10
1+35	2634.01
1+35	2634.00
1+35	2634.00
1+36	2634.00
1+36	2634.00
1+37	2634.00
1+37	2634.11
1+37	2634.12
1+39	2634.49
1+41	2634.60
1+41	2634.60
1+41	2634.62
1+41	2634.64
1+42	2634.65

Worksheet for Q100 72 cfs US

Input Data

Station (ft)	Elevation (ft)
1+45	2634.91
1+47	2634.98
1+47	2634.99
1+47	2635.00
1+48	2635.18
1+50	2635.58
1+51	2635.74
1+53	2636.00
1+56	2636.46
1+59	2637.00
1+63	2637.73
1+64	2638.00
1+65	2638.14
1+70	2639.00
1+72	2639.23
1+77	2640.00
1+83	2640.96
1+84	2641.00
1+84	2641.05
1+92	2642.00
2+00	2642.70
2+00	2642.73
2+03	2643.00
2+08	2643.43
2+08	2643.70
2+10	2644.00
2+11	2644.00
2+17	2644.00

Roughness Segment Definitions

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Worksheet for Q100 72 cfs US

Input Data

Start Station	Ending Station	Roughness Coefficient
(0+00, 2644.00)	(2+17, 2644.00)	0.040

Options

Current Roughness weighted Method	Pavlovskii's Method
Open Channel Weighting Method	Pavlovskii's Method
Closed Channel Weighting Method	Pavlovskii's Method

Results

Normal Depth	0.96	ft
Elevation Range	2632.79 to 2644.00 ft	
Flow Area	11.07	ft ²
Wetted Perimeter	18.31	ft
Hydraulic Radius	0.60	ft
Top Width	18.13	ft
Normal Depth	0.96	ft
Critical Depth	1.25	ft
Critical Slope	0.02989	ft/R
Velocity	6.50	ft/s
Velocity Head	0.66	ft
Specific Energy	1.62	ft
Froude Number	1.47	
Flow Type	Supercritical	

GVF Input Data

Downstream Depth	0.00	ft
Length	0.00	ft
Number Of Steps	0	

GVF Output Data

Upstream Depth	0.00	ft
Profile Description		
Profile Headloss	0.00	ft
Downstream Velocity	Infinity	ft/s
Upstream Velocity	Infinity	ft/s
Normal Depth	0.96	ft
Critical Depth	1.25	ft
Channel Slope	0.06000	ft/R

Worksheet for Q100 72 cfs US

GVF Output Data

Critical Slope

0.02989 ft/ft

Cross Section for Q100 72 cfs mid

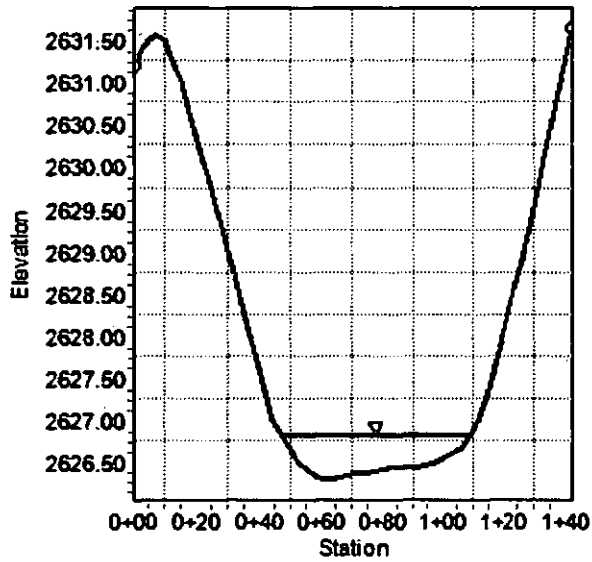
Project Description

Friction Method Manning Formula
Solve For Normal Depth

Input Data

Channel Slope 0.03000 ft/ft
Normal Depth 0.53 ft
Discharge 72.00 ft³/s

Cross Section Image



Worksheet for Q100 72 cfs mid

Input Data

Station (ft)	Elevation (ft)
0+30	2629.00
0+31	2628.89
0+32	2628.77
0+32	2628.75
0+32	2628.73
0+34	2628.37
0+37	2628.00
0+38	2627.88
0+44	2627.00
0+52	2626.50
0+58	2626.34
0+62	2626.30
0+62	2626.30
0+65	2626.32
0+69	2626.36
0+76	2626.40
0+82	2626.44
0+82	2626.44
0+83	2626.45
0+83	2626.45
0+84	2626.45
0+85	2626.46
0+90	2626.45
0+92	2626.46
0+97	2626.50
1+05	2626.68
1+12	2627.00
1+12	2627.00
1+14	2627.29
1+19	2628.00
1+22	2628.37
1+26	2629.00
1+28	2629.31
1+32	2630.00
1+33	2630.23
1+38	2631.00

Worksheet for Q100 72 cfs mid

Input Data

Station (ft)	Elevation (ft)
1+42	2631.64

Options

Current roughness weighted Method	Pavlovskii's Method
Open Channel Weighting Method	Pavlovskii's Method
Closed Channel Weighting Method	Pavlovskii's Method

Results

Normal Depth	0.53	ft
Elevation Range	2626.30 to 2631.64	ft
Flow Area	22.10	ft ²
Wetted Perimeter	61.24	ft
Hydraulic Radius	0.36	ft
Top Width	61.22	ft
Normal Depth	0.53	ft
Critical Depth	0.52	ft
Critical Slope	0.03303	ft/ft
Velocity	3.26	ft/s
Velocity Head	0.16	ft
Specific Energy	0.70	ft
Froude Number	0.96	
Flow Type	Subcritical	

GVF Input Data

Downstream Depth	0.00	ft
Length	0.00	ft
Number Of Steps	0	

GVF Output Data

Upstream Depth	0.00	ft
Profile Description		
Profile Headloss	0.00	ft
Downstream Velocity	Infinity	ft/s

Worksheet for Q100 72 cfs mid

GVF Output Data

Upstream Velocity	Infinity	ft/s
Normal Depth	0.53	ft
Critical Depth	0.52	ft
Channel Slope	0.03000	ft/ft
Critical Slope	0.03303	ft/ft

Cross Section for Q100 72 cfs DS

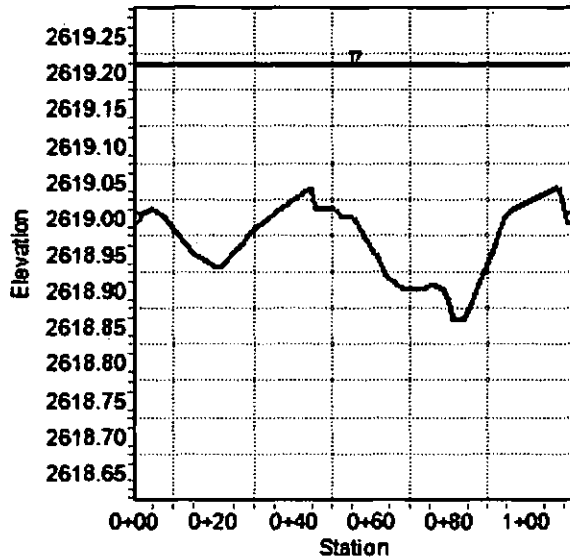
Project Description

Friction Method Manning Formula
Solve For Normal Depth

Input Data

Channel Slope	0.02000	ft/ft
Normal Depth	0.35	ft
Discharge	72.00	ft ³ /s

Cross Section Image



Worksheet for Q100 72 cfs DS

Input Data

Station (ft)	Elevation (ft)
0+75	2618.91
0+79	2618.90
0+80	2618.89
0+81	2618.86
0+84	2618.86
0+86	2618.88
0+93	2618.99
0+94	2619.00
0+96	2619.01
1+08	2619.04
1+08	2619.04
1+08	2619.04
1+10	2619.00
1+10	2618.99
1+11	2619.00
1+11	2619.00
1+11	2619.00
1+12	2619.00

Options

Current roughness weighted Method Pavlovskii's Method
Open Channel Weighting Method Pavlovskii's Method
Closed Channel Weighting Method Pavlovskii's Method

Results

Normal Depth 0.35 ft
Elevation Range 2618.86 to 2619.04 ft
Flow Area 26.71 ft²
Wetted Perimeter 111.94 ft
Hydraulic Radius 0.24 ft
Top Width 111.52 ft
Normal Depth 0.35 ft

Worksheet for Q100 72 cfs DS

Results

Critical Depth	0.34	ft
Critical Slope	0.02136	ft/ft
Velocity	2.70	ft/s
Velocity Head	0.11	ft
Specific Energy	0.46	ft
Froude Number	0.97	
Flow Type	Subcritical	

GVF Input Data

Downstream Depth	0.00	ft
Length	0.00	ft
Number Of Steps	0	

GVF Output Data

Upstream Depth	0.00	ft
Profile Description		
Profile Headloss	0.00	ft
Downstream Velocity	Infinity	ft/s
Upstream Velocity	Infinity	ft/s
Normal Depth	0.35	ft
Critical Depth	0.34	ft
Channel Slope	0.02000	ft/ft
Critical Slope	0.02136	ft/ft

Sill Scour Calculations

Sill Scour Computation Sheet

Project Name: DM Parcel 19

Location: Galloway Wash

Methodology from "Computing Degradation and Local Scour" by E. Pemberton and J. Lara, 1984,
 Technical Guideline for Bureau of Reclamation, pages 40-45, equation type "D"

100-year discharge =	1,070	cfs	Long-term degradation =	1.00	ft
Total flow area (u/s) =	150	ft ²	Total flow area (d/s) =	164.00	ft ²
Total top width (u/s) =	204	ft	Total top width (d/s) =	123.00	ft
Mean flow depth (u/s) =	0.74	ft	Mean flow depth (d/s) =	1.33	ft
Discharge per foot =	5.25	cfs/ft	WSEL (u/s) =	2587.27	ft
			WSEL (d/s) =	2584.88	ft

Veronese (1937)

$$d_s = KH_T^{0.225} q^{0.54} - d_m$$

ds = 3.0 ft

d_s = depth of scour (ft)

K =	1.32	1.32 inch-pound units
H_T =	3.52	head from U/S to D/S
q =	5.25	discharge per unit width (cfs per ft)
d_m =	1.33	D/S mean water depth

Sill Scour Computation Sheet

Project Name: DM Parcel 19

Location: Wash A

Methodology from "Computing Degradation and Local Scour" by E. Pemberton and J. Lara, 1984, Technical Guideline for Bureau of Reclamation, pages 40-45, equation type "D"

100-year discharge =	708	cfs	Long-term degradation =	1.00	ft
Total flow area (u/s) =	106	ft ²	Total flow area (d/s) =	190.00	ft ²
Total top width (u/s) =	246	ft	Total top width (d/s) =	189.00	ft
Mean flow depth (u/s) =	0.43	ft	Mean flow depth (d/s) =	1.01	ft
Discharge per foot =	2.88	cfs/ft	WSEL (u/s) =	2589.80	ft
			WSEL (d/s) =	2587.70	ft

Veronese (1937)

$$d_s = KH_T^{0.225} q^{0.54} - d_m$$

ds = 2.1 ft

d_s = depth of scour (ft)

K = 1.32 1.32 inch-pound units

H_T = 3.58 head from U/S to D/S

q = 2.88 discharge per unit width (cfs per ft)

d_m = 1.01 D/S mean water depth

Cross Section for Pima Wash A East

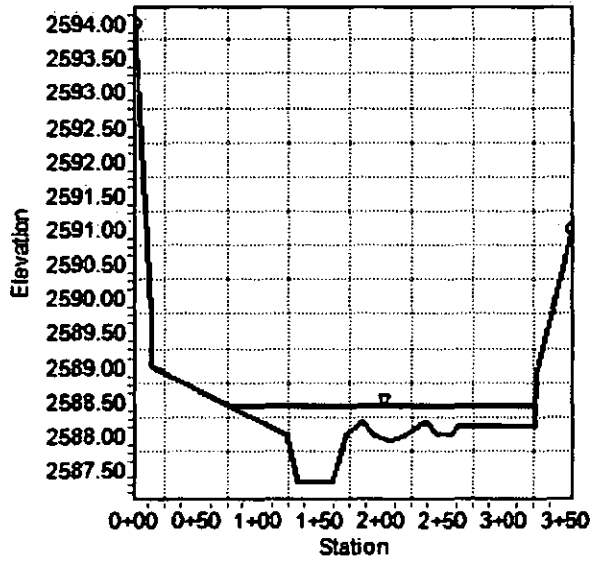
Project Description

Friction Method Manning Formula
Solve For Normal Depth

Input Data

Channel Slope 0.02500 ft/ft
Normal Depth 1.10 ft
Discharge 708.00 ft³/s

Cross Section Image



Worksheet for Pima Wash A East

Options

Current roughness weighted Method	Pavlovskii's Method
Open Channel Weighting Method	Pavlovskii's Method
Closed Channel Weighting Method	Pavlovskii's Method

Results

Normal Depth	1.10	ft
Elevation Range	2587.30 to 2594.00	ft
Flow Area	106.71	ft ²
Wetted Perimeter	246.73	ft
Hydraulic Radius	0.43	ft
Top Width	246.64	ft
Normal Depth	1.10	ft
Critical Depth	1.32	ft
Critical Slope	0.00891	ft/ft
Velocity	6.72	ft/s
Velocity Head	0.70	ft
Specific Energy	1.80	ft
Froude Number	1.80	
Flow Type	Supercritical	

GVF Input Data

Downstream Depth	0.00	ft
Length	0.00	ft
Number Of Steps	0	

GVF Output Data

Upstream Depth	0.00	ft
Profile Description		
Profile Headloss	0.00	ft
Downstream Velocity	Infinity	ft/s
Upstream Velocity	Infinity	ft/s
Normal Depth	1.10	ft
Critical Depth	1.32	ft
Channel Slope	0.02500	ft/ft
Critical Slope	0.00891	ft/ft

Cross Section for Pima Wash A West

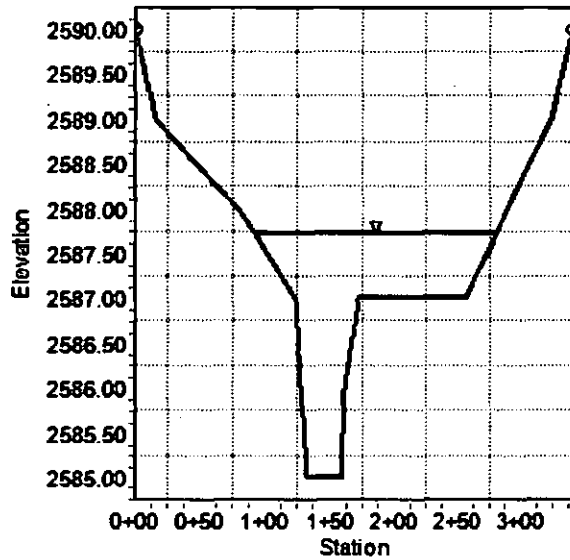
Project Description

Friction Method Manning Formula
Solve For Normal Depth

Input Data

Channel Slope 0.01000 ft/ft
Normal Depth 2.72 ft
Discharge 708.00 ft³/s

Cross Section Image



Worksheet for Pima Wash A West

Results

Normal Depth		2.73	ft
Elevation Range	2585.00 to 2590.00		ft
Flow Area		191.77	ft ²
Wetted Perimeter		189.93	ft
Hydraulic Radius		1.01	ft
Top Width		189.48	ft
Normal Depth		2.73	ft
Critical Depth		2.43	ft
Critical Slope		0.02487	ft/ft
Velocity		3.74	ft/s
Velocity Head		0.22	ft
Specific Energy		2.95	ft
Froude Number		0.66	
Flow Type	Subcritical		

GVF Input Data

Downstream Depth	0.00	ft
Length	0.00	ft
Number Of Steps	0	

GVF Output Data

Upstream Depth	0.00	ft
Profile Description		
Profile Headloss	0.00	ft
Downstream Velocity	Infinity	ft/s
Upstream Velocity	Infinity	ft/s
Normal Depth	2.73	ft
Critical Depth	2.43	ft
Channel Slope	0.01000	ft/ft
Critical Slope	0.02487	ft/ft

Scour Calculations

GALLOWAY WASH

Level 1 Analysis of Stream Degradation

Reference: ADWR, Flood Warning and Dam Safety Section, 1996.
State Standard 5-96: "Watercourse System Sediment Balance - Guideline 2:
Channel Degradation Estimation for Alluvial Channels in Arizona"

Assumptions: Channel reaches without major disturbances, such as dams and bridges.

Equations:

$$D_s = D_{gs} + D_{lts}$$

where:

D_s = total scour depth, in feet;

D_{gs} = general degradation, in feet;

D_{lts} = long term degradation, in feet;

For straight channel reaches:

$$D_{gs} = 0.157 * Q_{100}^{0.4}$$

For channel reaches with curvature:

$$D_{gs} = 0.219 * Q_{100}^{0.4}$$

Long term degradation:

$$D_{lts} = 0.02 * Q_{100}^{0.6}$$

Project Name: DM 19

Location: Galloway Wash

Input Data:

$$Q_{100} = 1072 \text{ cfs}$$

$D_s = 3.87 \text{ ft}$ for straight channel

$D_s = 4.88 \text{ ft}$ otherwise

Recommended Scour Depth = 5.0 ft

Note: the minimum total scour depth, D_s , shall be 3 feet.

WASH A

Level 1 Analysis of Stream Degradation

Reference: ADWR, Flood Warning and Dam Safety Section, 1996.
State Standard 5-96: "Watercourse System Sediment Balance - Guideline 2:
Channel Degradation Estimation for Alluvial Channels in Arizona"

Assumptions: Channel reaches without major disturbances, such as dams and bridges.

Equations:

$$D_s = D_{gs} + D_{lts}$$

where:

D_s = total scour depth, in feet;

D_{gs} = general degradation, in feet;

D_{lts} = long term degradation, in feet;

For straight channel reaches:

$$D_{gs} = 0.157 * Q_{100}^{0.4}$$

For channel reaches with curvature:

$$D_{gs} = 0.219 * Q_{100}^{0.4}$$

Long term degradation:

$$D_{lts} = 0.02 * Q_{100}^{0.6}$$

Project Name: DM 19

Location: Wash A

Input Data:

$$Q_{100} = 460 \text{ cfs}$$

$D_s = 2.62 \text{ ft}$ for straight channel

$D_s = 3.34 \text{ ft}$ otherwise

Recommended Scour Depth = 4.0 ft

Note: the minimum total scour depth, D_s , shall be 3 feet.

Erosion Hazard Setback Calculations

Erosion Hazard Limit**WOOD/PATEL**

CIVIL ENGINEERS * HYDROLOGISTS * LAND SURVEYORS * CONSTRUCTION MANAGERS

Description: *Desert Mountain Parcel 19*
Date: *13-Mar-17*
Location: *City of Scottsdale, Arizona*
Reference: *Drainage Design Manual for Maricopa County*

ADWR Erosion Hazard Setback Equations**State Standard for Watercourse System Sediment Balance****SSA 5-96, LMSA-5, September 1996**

For straight channel reaches or
 reaches with minor curvature $setback = 1.0(Q100)^{0.5}$

For channels with obvious
 curvature or channel bend $setback = 2.5(Q100)^{0.5}$

The setback allowance is to be measured outward from the 100-year floodway
 Or the top of the channel bank, whichever is greater

**EROSION HAZARD SETBACK CALCULATIONS
 FOR WORST CASE SCENARIO**

Wash Name	Q100 Discharge (in)	ADWR Erosion Hazard Setback (EHS) (ft)
Wash A	460	53.6
(bend)		
Wash A	460	21.4
Galloway Wash	1072	81.9
(bend)		
Galloway Wash	1072	32.7

Note:

The minimum EHS is 20' for Straight Channels

Worst Case Scenario is the wash with the highest peak 100-year discharge.

APPENDIX E

Supporting Documentation

**Master Drainage Report for Desert Mountain Parcel “C” –
Desert Mountain Parcel C Masterplan Exhibit**