FINAL DRAINAGE REPORT

BENT GRASS RESIDENTIAL SUBDIVISION

FILING NO. 2
(SF-19-014)

El Paso County, Colorado

PREPARED FOR:
Challenger Homes
8605 Explorer Dr., Suite 250
Colorado Springs, CO 80920

PREPARED BY:
Galloway & Company, Inc.
1155 Kelly Johnson Blvd., Suite 305
Colorado Springs, CO 80920

DATE:
July 2019
Revised October 2019
Revised January 2020
Revised March 2020

ENGINEER'S STATEMENT

The attached drainage plan and report were prepared under my direction and supervision and are correct to the best of my knowledge and belief. Said drainage report has been prepared according to the criteria established by the County for drainage reports and said report is in conformity with the applicable master plan of the drainage basin. I accept responsibility for any liability caused by any negligent acts, errors or omissions on my part in preparing this report.

COLORADO LICENSED
CHARLENE M DURHAM
36727
PROFESSIONAL ENGINEER

Charlene Durham
2/4/20

Charlene Durham, PE 36727
For and on behalf of Galloway & Company, Inc.

DEVELOPER'S CERTIFICATION

I, The developer, have read and will comply with all of the requirements specified in this drainage report and plan.

By: Sign

Date

Address: Challenger Homes
8605 Explorer Dr., Suite 250
Colorado Springs, CO 80920

DEVELOPER'S CERTIFICATION

Filed in accordance with the requirements of the Drainage Criteria Manual, Volumes 1 and 2, El Paso County Engineering Criteria Manual and Land Development Code as amended.

Jennifer Irvine, P.E.
County Engineer/ECM Administrator

Date

Conditions:

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I. Purpose

The intent of the developer is to develop the residential portion of the Bent Grass Subdivision. The purpose of this Preliminary Drainage Report is to identify on and offsite drainage patterns, locate and identify tributary or downstream drainage features and facilities that impact the site, and to identify which types of drainage facilities will be needed and where they will be located. This report will remain in general compliance with the MDDP, which is being submitted concurrently with this report, for the site prepared by Galloway & Company.

II. General Description

The project is a single-family residential development located in the Falcon area of El Paso County, Colorado. The site is located in the Northwest ¼ and Southwest ¼ of Section 1, Township 13S, Range 65W, of the Sixth Principal Meridian, County of El Paso, State of Colorado. The subject property is located to the south of The Meadows Filing No. 3; west of Bent Grass Residential Filing No. 1; north of Latigo Business Center Filing No 1, undeveloped property, and the Mountain View Electric Association; and east of The Meadows Filing No. 2. A Vicinity Map is included in Appendix A.

A Planned Unit Development Plan Amendment was approved for the site, PUD-14-002, approved in July 2014. This Development Plan is the basis for the drainage facility design contained within this MDDP. The site consists of approximately 103.4 acres and includes 309 dwelling units.

The existing soil types within the proposed site as determined by the NRCS Web Soil Survey for El Paso County Area consist of Columbine gravelly sandy loam, Blakeland-Fluvaquentic Haplaquolls, and Blakeland loamy sand. All soils are defined as having a hydrologic soil group of A. See the soils map included in Appendix A.

III. Previous Reports

The proposed site has been included in multiple drainage studies in the past. The following is a composite list of the existing reports pertaining to this site analysis.

1. *Falcon Drainage Basin Planning Study*, by Matrix Design Group, September 2015.
2. *Master Development Drainage Plan – Bent Grass Residential Subdivision*, by Galloway & Company, May 2019.
3. *Master Development Drainage Plan and Preliminary Drainage Plan – Bent Grass Subdivision*, by Kiowa Engineering Corporation, December 2006.
4. *Final Drainage Report for Bent Grass Residential (Filing No. 1)*, by Classic Consulting Engineers & Surveyors, LLC, August 2014.
5. *Final Drainage Report Addendum for Bent Grass Residential (Filing No. 1)*, by Classic Consulting Engineers & Surveyors, LLC, August 2015.
6. *Master Development Drainage Plan for The Ranch*, by Classic Consulting Engineers & Surveyors, LLC, November 2018.
7. *Falcon Highlands Master Development Drainage Plan & Preliminary Drainage Report & Final Drainage Report for Filing 1*, by URS, January 2005.
8. *Final Drainage Report and Erosion Control Plan – Latigo Business Center Filing No. 1 A Re-subdivision of a Portion of Latigo Business and Research Center Filing No. 1*, by Kiowa Engineering Corporation, November 2004.

9. *Final Drainage Letter Report for Lot 1, Latigo Business Center Filing No. 1*, by Colorado Design Concepts, April 2005.
10. *Final Drainage and Erosion Control for The Meadows Filing Three Subdivision* , by LADD Engineering, July 2000.

IV. Drainage Criteria

Hydrology calculations were performed using the City of Colorado Springs/El Paso County Drainage Criteria Manual, as revised in November 1991 and October 1994 with County adopted Chapter 6 and Section 3.2.1 of Chapter 13 of the City of Colorado Springs/El Paso County Drainage Criteria Manual as revised in May 2014 and the El Paso County Engineering Criteria Manual (ECM) as revised in July 2019.

The drainage calculations were based on the criteria manual Figure 6-5 and IDF equations to determine the intensity, and are listed in Table 1 below.

Table 1 - Precipitation Data

Return Period	One Hour Depth (in).	Intensity (in/hr)
5-year	1.50	5.17
100-year	2.52	8.68

The rational method was used to calculate peak flows as the tributary areas are less than 100 acres. The rational method has been proven to be accurate for basins of this size and is based on the following formula:

Q = CIA

Where:

Q = Peak Discharge (cfs)
C = Runoff Coefficient
I = Runoff intensity (inches/hour)
A = Drainage area (acres)

The runoff coefficients are calculated based on land use, percent imperviousness, and design storm for each basin, as shown in the drainage criteria manual (Table 6-6). Composite percent impervious and C values were calculated using the residential, streets, roofs, and lawns coefficients found in Table 6-6 of the manual.

The 100-year event was used as the major storm event for pipes and inlets. The 5-year event was used as the minor event.

For the preliminary design of the channels HEC-RAS version 5.0.3 was utilized. The model was prepared to evaluate velocity, Froude number, and channel depth. Additionally, the model was utilized to size the culverts under Bent Grass Meadows Parkway. A Manning's n value of 0.045 was utilized for the channel which is appropriate for a bunch type native grass that is anticipated within the full channel section. The channels were designed to have a maximum depth of 5' per the criteria manual and have a maximum velocity of 5 ft/s with a maximum Froude number of 0.6. Drainage swales which are not able to meet the 5 ft/s velocity will be lined with riprap.

The UD-Detention spreadsheet was utilized for sizing the water quality orifices on the proposed water quality portion of the regional detention pond. This spreadsheet was also utilized for the design of the proposed on-site water quality ponds, Pond (North) and Pond (South).

HEC-HMS was utilized to analyze the hydrology of the overall basin and verify that no changes in release rates have occurred to the regional detention pond with it's addition of water quality.

UD-Inlet was utilized to calculate both the street capacities and the inlet capacities.

StormCAD was utilized to size the storm sewer systems.

V. Existing Drainage Conditions

The site is contained fully within one major drainage basin; the West Falcon Tributary. The site does border the Middle Falcon Tributary along the eastern edge of the property. The site generally drains from north to south with an average slope of 2% outside of the channel. The rational method was used to analyze the individual basins within the site because their size permits it. Excerpts from the DBPS are included in Appendix A.

In addition to the DBPS, The Ranch MDDP to the north and west of the site has revisited their existing conditions as well as existing conditions from the site directly to the north of them. Several detention ponds have been created within the Paint Brush Hills Subdivision which revise the offsite flow entering the site within the major drainageway. This is taken into account with The Ranch MDDP. While The Ranch is still in design stage they are proposing detention ponds within their site to release at historic rates. This will revise the flow rates in their designed section of the channel to below the rates that are identified within the DBPS. A HEC-HMS model will be prepared with subsequent submittals updating the existing flow rates within the channel (as well as the proposed flow rates).

Per the DBPS the site lies within the basins, WT200, WT210, and WT220. These basins connect to channel reaches RWT202, RWT204, and RWT210. Both the RWT204 and RWT210 sections of channel currently exist and appear as a drainageway when visiting the site. Reach RWT202 appears to be a shallow overland flow through the project site. It is nearly unrecognizable through the site from a visual standpoint.

The existing channels have been visually inspected via a site walk and all appear in really good condition. There are no signs of scour within the bottoms of the channel. There are small areas that are incised or sloughing at the top of bank of the channel. These areas are less than 12" in height.

There is a small depression at the north end of the site, it appears to be the remnants of an old stock pond. It provides no detention or water quality for the upstream area. It will be removed with the development of this site.

There is an existing sediment pond located to the east of the site, on what is known as the "**School Site**." This sediment pond was designed with the FDR Addendum for Bent Grass Residential Filing 1 and works for existing conditions. A permanent pond will need to be provided upon development of this site. Drainage basins OS-5 and OS-6 in the provided Proposed Drainage Maps (Appendix G) represent these areas.

A historic basin map has been prepared for this site to analyze the existing basins as well as the offsite basins contributing to the site. The historic map is included in Appendix G and basins are described below.

Basin A-1 (5.42 AC, Q_5 = 2.2 cfs, Q_{100} = 12.4cfs): is associated with the northeastern portion of the proposed site. The basin is currently undeveloped. Runoff from the basin generally flows to the southeast, into the property to the east.

Basin A-2 (18.00 AC, Q_5 = 5.3 cfs, Q_{100} = 35.4 cfs): is associated with the northeastern portion of the proposed site. The basin is currently undeveloped. Runoff from the basin generally flows to the southwest into the existing channel RWT204.

Basin A-3 (19.59 AC, Q_5 = 6.0 cfs, Q_{100} = 40.7 cfs): is associated with the northwestern portion of the proposed site. The basin is currently undeveloped. Runoff from the basin generally flows to the southeast into the existing channel RWT204.

Basin A-4 (23.81 AC, Q_5 = 8.3 cfs, Q_{100} = 46.5 cfs): is associated with the western portion of the proposed site. The basin is currently undeveloped. Runoff from the basin generally flows to the south toward the Latigo Business Center Filing No. 1.

Basin B-1 (35.53 AC, Q_5 = 9.6 cfs, Q_{100} = 64.2 cfs): is associated with the southeastern portion of the proposed site. The basin is currently undeveloped. Runoff from the basin generally flows to the south offsite.

Basin B-2 (4.51 AC, Q_5 = 1.5 cfs, Q_{100} = 10.0 cfs): is associated with a portion of the middle of the site. The basin is currently undeveloped. Runoff from the basin generally flows to the southeast into the existing channel.

Basin B-3 (16.18 AC, Q_5 = 7.8 cfs, Q_{100} = 36.9 cfs): is associated with the southwestern portion of the proposed site. The basin is currently undeveloped. Runoff from the basin generally flows to the southeast into the existing channel.

Basin OS-1 (13.05 AC, Q5 = 6.9 cfs, Q100 = 28.6 cfs) is associated with The Meadows Filing No. 3 lots 14, 15, 16, and 17. Runoff from this basin sheet flows to the northern property line of the site and then into Basin A-1 to Design Point (DP1).

Basin OS-2 (17.81 AC, Q5 = 11.4 cfs, Q100 = 41.7 cfs) is associated with The Meadows Filing No. 3 lots 7, 10, 11, 12 and 13. Runoff from this basin sheet flows to the northern property line and into Basin A-2 to DP 2 where it enters RWT204.

Basin OS-3 (9.99 AC, Q5 = 5.4 cfs, Q100 = 23.4 cfs) is associated with The Meadows Filing No. 3 lots 4 and 5. Runoff from this basin sheet flows to the northern property line and into Basin A-3 to DP 3 where it enters RWT204.

Basin OS-4 (30.69 AC, Q5 = 12.0 cfs, Q100 = 55.4 cfs) is associated with The Meadows Filing No. 1 lots 4, 5, 6, 7, 8, 9, 10 and 11. Runoff from this basin sheet flows east to the western property line of the site and into Basin A-4 where it then flows south to DP 4.

Design Point 20 (225.0 AC, Q5 = 91.8 cfs, Q100 = 226.0 cfs) **–** This area is located north of Basin OS-5, and is comprised of Basins B3 thru B6, A1, and A3 in Bent Grass Filing No. 3. Flows will cross under Woodmen Hills Drive via an existing culvert, then sheet flow to the southeast, passing through Basin OS-5 to DP 11.

Basin OS-5 (14.13 AC, Q5 = 4.9 cfs, Q100 = 27.5 cfs): a basin that is associated with Bent Grass Filing No. 1. Runoff from this basin sheet flows from the North to the South into basin OS-6 and an existing sediment pond.

Basin OS-6 (5.81 AC, Q5 = 1.9 cfs, Q100 = 12.8 cfs): a basin that is associated with Bent Grass Filing No. 1. Runoff from this basin sheet flows from the North to South to an existing sediment pond and then into Bent Grass Meadows Drive. Flows will continue to the east, alongside Bent Grass Meadows Drive, to the Meridian Road intersection. At this location, flows will enter the existing roadside ditch along Meridian Road.

VI. Four Step Process

The Four Step Process is used to minimize the adverse impacts of urbanization and is a vital component of developing a balanced, sustainable project. Below identifies the approach to the four-step process:

1. Employ Runoff Reduction Practices

The proposed development uses Low Impact Development (LID) practices to reduce runoff at the source. Rather than creating point discharges that are directly connected to impervious areas, runoff is routed through pervious areas to promote infiltration. Grass buffers and swales are used where practical.

2. Implement BMPs That Provide a Water Quality Capture Volume with Slow Release

This step utilizes formalized water quality capture volume to slow the release of runoff from the site. Pond WU will be modified to provide EURV and WQCV for its entire tributary area. The EURV volume will release in 72 hours, while the WQCV will release in no less than 40 hours. On-site water quality control volume detention ponds will provide water quality treatment prior to the runoff being released into the channel.

3. Stabilize Drainageways

This step implements stabilization to channels to accommodate developed flows while protecting infrastructure and controlling sediment loading from erosion in the drainageways. Erosion protection in the form of riprap pads at all outfall points to the channel to prevent scouring of the channel from point discharges. A HEC-RAS model has been created and used to evaluate the stability of the existing and proposed channels. It has been determined that given that the channel is stable in its current state and the proposed velocities and Froude numbers are similar to those in the existing channel, no improvements will be made to the channel at this time. This will be further discussed later in this report.

4. Implement Site Specific and Other Source Control BMPs

Source control BMPs for homeowners include the use of garages as the primary area where pollutants can be stored. The single-family detached homes provide garages which can act as storage areas. The proposed development does not include outdoor storage or the potential for introduction of contaminants to the Counties' MS4, thus no targeted source control BMPs are necessary. The biggest source control BMP is public education which can be found on the City of

Colorado Springs website and discuss topics such as: pet waste, car washing, lawn care, fall leaves, and snow melt and deicer.

VII. Proposed Drainage Conditions

There has been very minor change to the overall Falcon Area Basin delineation with the proposed condition. A small portion of the site that previously went to the Middle Tributary has been revised to come into the site and a small portion of the site that was previously within the West Tributary has been designed to drain into the Middle Tributary. This will be discussed with the individual basins. All necessary calculations can be found within the appendices of the report.

According to the DBPS, there are two channels that run through the site. As was discussed within the Existing Conditions portion of the report both the RWT202 and RWT204 run through the site. The RWT202 channel will be rerouted on the north end, prior to entering the site, to flow in the existing RWT204 channel. The proposed development will drain to the RWT204 channel, which becomes RWT210 further south in the site. Because Bent Grass Meadows Parkway is being constructed, (2) 16' x 6' concrete box culverts for RWT204 will be installed with this project. This will be installed in its ultimate location.

The DBPS alternative that was approved shows a small sub regional pond (SR3) to provide EURV for a portion of the tributary area. The basin analysis provided in the DBPS shows no decrease in either the 2-year or the 100-year events through this point. It has been discussed with El Paso County to provide detention ponds that only treat the Water Quality Capture Volume (WQCV). This modification will be discussed later in the report.

The site will provide WQCV Detention Ponds to provide water quality treatment prior to discharging the runoff directly into the West Tributary channel RWT204. There are 5 basins which release offsite and do not reach any of the on-site water quality facilities. They are Basin I-1 (0.31 acres), Basin F-1 (0.44 acres), F-2 (0.55 acres), C-8 (0.42 acres) and H-1 (0.52 acres). These areas will be addressed further under "Proposed Water Quality Ponds".

As mentioned previously, the site is proposed to be single family residential. The site is designed to provide a large lot buffer between the existing large lots to the north and west of the site and the proposed site. Beyond this buffer the majority of the site is smaller approximately 1/8 acre lots.

Basin OS-1 (32.28 AC, Q5 = 15.1 cfs, Q100 = 65.1 cfs): a basin that is associated with The Meadows Filing No. 3 lots 7, 10, 11, 12, 13, 14, 15, 16, and 17. Runoff from this basin sheet flows south to the northern property line of the site. Proposed Swale - A intercept these flows and convey them directly to the existing channel, Reach RWT204.

Basin A-1 (2.70 AC, Q5 = 3.3 cfs, Q100 = 8.6 cfs): a basin that is in the northeast corner of the site. It encompasses single-family residential lots (Type A and B) along Ansley Court. Runoff will flow from each lot onto Ansley Court where proposed mountable curb and gutter will convey flows to **DP-1**. Flows will then be conveyed West by mountable curb and gutter to DP-2.

Basin A-2 (1.19 AC, Q5 = 1.5 cfs, Q100 = 4.2 cfs): a basin that is in the northeast area of the site. It encompasses single-family residential lots (Type A) along Berwyn Court. Runoff will flow from each lot

onto Berwyn Court where proposed mountable curb and gutter will convey flows to **DP- 2**. Flows will then be conveyed South by mountable curb and gutter to DP-3.

Basin A-3 (1.57 AC, Q5 = 2.1 cfs, Q100 = 5.0 cfs): a basin that is in the northeast area of the site. It encompasses single-family residential lots (Type A and B) along Niebrara Drive and Berwyn Court. Runoff will flow from each lot onto Niebrara Drive and Berwyn Court where proposed mountable curb and gutter will convey flows to **DP-3**. Flows will then be conveyed West by a proposed cross pan to DP-4.

Basin A-4 (2.24 AC, Q5 = 2.9 cfs, Q100 = 7.5 cfs): a basin that is in the northeast area of the site. It encompasses single-family residential lots (Type A and B) along Berwyn Court and a small portion of Willmore Drive. Runoff will flow from each lot onto Berwyn Court where proposed mountable curb and gutter will convey flows to **DP-4**. Flows will then be conveyed West along Bent Grass Meadows Drive by curb and gutter to DP-8.

Basin E-1 (1.71 AC, Q5 = 3.6 cfs, Q100 = 7.7 cfs): a basin that is in the center of the site and encompasses a portion of Bent Grass Meadows Drive. A high point on the far East of the basin forces water to flow to a low point at **DP-8**, which represents a 20' CDOT Type R sump inlet, which conveys stormwater via proposed 36" RCP storm sewer to the north water quality detention pond. Emergency overflow will spill over the crown of the road and enter into a proposed 10' CDOT Type R sump inlet represented by DP-7.

Basin D-2 (5.15 AC, Q5 = 5.8 cfs, Q100 = 15.4 cfs): a basin that is in the northwest area of the site. It is undeveloped and covered in native grasses, weeds, rock, and shrubs. Runoff from this basin sheet flows from North to South along grades between 2.5 and 6.5 percent. Small portions of the basin will flow directly into RWT202. Most of this basin sheet flows from north to south and collects at **DP-5**. Flows will then be conveyed East by a proposed cross pan to DP-6.

Basin D-1 (12.49 AC, Q5 = 13.3 cfs, Q100 = 35.5 cfs): a basin that is in the northwest area of the site. It is undeveloped and covered in native grasses, weeds, rock, and shrubs. Runoff from this basin sheet flows from North to South along grades between 2.5 and 6.5 percent. Small portions of the basin will flow directly into RWT204. Most of this basin sheet flows from north to south and collects at **DP-6**. Flows will then be conveyed East along Bent Grass Meadows Drive by curb and gutter to DP-8.

Basin E-2 (0.68 AC, Q5 = 2.4 cfs, Q100 = 4.6 cfs): a basin that is in the center of the site and encompasses a portion of Bent Grass Meadows Drive. A high point on the far West of the basin forces water to flow to a low point at **DP-8**, which represents a 20' CDOT Type R sump inlet, which conveys stormwater via a proposed 36" RCP storm sewer to the north water quality detention pond. Emergency overflow will spill over the crown of the road and enter into a proposed 10' CDOT Type R sump inlet represented by DP-7.

Basin E-3 (0.78 AC, Q5 = 2.9 cfs, Q100 = 5.3 cfs): a basin that is in the center of the site and encompasses a portion of Bent Grass Meadows Drive. A high point on the far West of the basin forces water to flow to a low point at **DP-7**, which represents a 10' CDOT Type R sump inlet, which conveys stormwater via a proposed 24" storm sewer to **DP-8**. This inlet receives emergency overflow from DP-8.

Basin B-3 (0.46 AC, Q5 = 1.1 cfs, Q100 = 2.3 cfs): a basin that is in the North-central area of the site. It encompasses the fronts of two single family Type A lots, and a large portion of Silky Thread Road. Runoff will flow form each lot onto Silky Thread Road where proposed mountable curb and gutter will convey flows west to **DP-9**. At DP-9, flows will continue across the temporary gravel turnaround to the west into

temporary, riprap lined, Proposed Swale - B. Flows will continue West and then South to **DP-14** where it will enter the north water quality detention pond.

Basin B-4 (1.19 AC, Q5 = 0.4 cfs, Q100 = 2.5 cfs): a basin that is in the North-central area of the site. Runoff from this basin sheet flows until it is intercepted by temporary Proposed Swale - B just West of Silky Thread Road. Once intercepted, flows will be routed West and then South to **DP-14** into the north water quality detention pond.

Basin B-1 (4.46 AC, Q5 = 5.6 cfs, Q100 = 14.0 cfs): a basin that is in the northeast area of the site. It encompasses single-family residential Type A lots along Thedford Court and Willmore Drive. Runoff will flow from each lot onto the street where proposed mountable curb and gutter will convey flows South and then West to **DP-11**. Flow from DP-11 combines with DP-12. **DP-13** is the combined flow from DP-11 and 12 and will sheet flow across the temporary gravel turnaround area and release into temporary swale B, which releases into WQCV North Detention Pond at **DP-14**.

Basin B-2 (1.17 AC, Q5 = 2.0 cfs, Q100 = 4.3 cfs): a basin that is in the northeast area of the site. It encompasses the fronts of single-family residential Type B lots along Willmore Drive. Runoff will flow from each lot onto the street where proposed mountable curb and gutter will convey flows West to **DP-12**. Flow from DP-11 combines with DP-12. **DP-13** is the combined flow from DP-11 and 12 and will sheet flow across the temporary gravel turnaround area and release into temporary swale B, which releases into WQCV North Detention Pond at **DP-14**.

Basin B-5 (1.56 AC, Q5 = 0.5 cfs, Q100 = 3.7 cfs): a basin that is in the northeast area of the site. It is undeveloped and covered in native grasses, weeds, rock, and shrubs. Runoff from this basin sheet flows from North to South along grades around 2 percent. Runoff will be intercepted by temporary Proposed Swale B that will convey flows to **DP-14** into the north water quality detention pond.

Basin B-6 (0.62 AC, Q5 = 0.2 cfs, Q100 = 1.5 cfs): a basin that is in the northeast area of the site adjacent to RWT204. It encompasses the proposed north water quality detention pond. Runoff will sheet flow directly into the pond. The pond will outfall to RWT204.

Basin C-5 (7.86 AC, Q5 = 10.9 cfs, Q100 = 24.9 cfs): a basin that is in the southeast area of the site. It encompasses single-family residential lots, Type A lots along Feather Reed Drive and Avena Road. Runoff will flow from each lot onto the street where proposed mountable curb and gutter will convey flows West and then South to a proposed on-grade 15’ CDOT Type R inlet, **DP-16**. Captured flow will convey stormwater via a proposed 24” RCP storm sewer to DP-17. By-pass flow will continue down Feather Reed Drive to DP-18 where 5 yr. and 100 yr. flows will be completely captured by a 20’ CDOT Type R sump inlet.

Basin C-6 (5.54 AC, Q5 = 7.0 cfs, Q100 = 16.9 cfs): a basin that is in the southeast area of the site. It encompasses single-family residential lots, Type A lots along the North portion of Feather Reed Drive and Type A lots along the South portion of Feather Reed Drive. Runoff will flow from each lot onto Feather Reed Drive where proposed mountable curb and gutter will convey flows West and then South to a proposed on-grade 10’ CDOT Type R inlet, **DP-17**. Captured flow will convey stormwater via a proposed 30” RCP storm sewer to DP-19A. By-pass flow will continue down Feather Reed Drive to DP-19 where 5 yr. and 100 yr. flows will be completely captured by a 20’ CDOT Type R sump inlet.

Basin C-3 (2.38 AC, Q5 = 3.3 cfs, Q100 = 7.8 cfs): a basin that is in the southeast area of the site. It encompasses single-family residential lots, Type A lots along Berwyn Drive. Runoff will flow from each lot

onto the street where proposed mountable curb and gutter will convey flows West to a proposed 20' CDOT Type R sump inlet, **DP-18**. 5 yr. and 100 yr. flows will be completely captured and then conveyed via a proposed 30" RCP storm sewer to DP-19.

Basin C-4 (3.61 AC, Q5 = 5.3 cfs, Q100 = 12.0 cfs): a basin that is in the southeast area of the site. It encompasses single-family residential lots, Type A lots along Bossett Drive. Runoff will flow from each lot onto the street where proposed mountable curb and gutter will convey flows West to a proposed 20' CDOT Type R sump inlet, **DP-18**. 5 yr. and 100 yr. flows will be completely captured and then conveyed via a proposed 30" RCP storm sewer to DP-19.

Basin C-1 (1.35 AC, Q5 = 2.6 cfs, Q100 = 5.8 cfs): a basin that is associated with Bent Grass Residential Filing No. 1 lots 58, 59, 60, 61, 62, 63, 64, 65, and 66. It encompasses the rears of single-family residential lots. Runoff will flow West from each lot into Proposed Swale G, which will convey flows South to Avena Road. Then, proposed mountable curb and gutter will convey flows West and will be routed through basin C-2 along Berwyn Drive to **DP-19**.

Basin C-2 (6.80 AC, Q5 = 7.1 cfs, Q100 = 18.5 cfs): a basin that is in the Southeast corner of the site. It encompasses fronts of single-family residential Type B lots. Runoff will flow from each lot onto Berwyn Drive where proposed mountable curb and gutter will convey flows South and then West to a proposed 20' CDOT Type R sump inlet, **DP-19**, where 5 yr. and 100 yr. flows will be completely captured and then conveyed via a proposed 30" RCP storm sewer pipe to outfall the south water quality detention pond.

Basin C-7 (0.89 AC, Q5 = 0.3 cfs, Q100 = 2.1 cfs): a basin that is in the South-central area of the site adjacent to RWT204 and RWT 210. It encompasses the proposed south water quality detention pond. Runoff will sheet flow directly into the pond. The pond will outfall to RWT210.

Basin C-8 (0.42 AC, Q5 = 0.2 cfs, Q100 = 1.0 cfs): a basin that is in the South-central area of the site adjacent to RWT204 and RWT 210. It encompasses the rears of single-family residential Type B lots. Runoff will sheet flow West directly into RWT204 and RWT210.

Basin OS-2 (20.08 AC, Q5 = 9.0 cfs, Q100 = 43.4 cfs): a basin that is associated with The Meadows Filing No. 2 lots 1, 2, 3, 4, 5, and 6. Runoff from this basin sheet flows from the Northwest to the Southeast, crossing the West property line of the site. The runoff will continue to sheet flow in the same manner through basins D-4 and D-3 until intercepted by Proposed Swale - D on the southern property line of the site. Collected flows will then be routed East to **DP-23** where 5 yr. and 100 yr. flows will be captured by a CDOT Type D area inlet. Flows will then be conveyed by a 36" RCP storm drain piped underneath Bent Grass Meadows Drive out falling into Proposed Swale - E that will route flows South to DP-26 and then East by Proposed Swale – F ultimately outfalling into RWT210. At the confluence of Swales E and F (DP-26), there will be a temporary sediment basin to provide water quality, prior to flows entering RWT210. This facility will be designed as a permanent feature, upon future development.

Basin OS-3 (10.62 AC, Q5 = 4.7 cfs, Q100 = 22.7 cfs): a basin that is associated with The Meadows Filing No. 1 lot 11 and The Meadows Filing No. 2 lots 1 and 2. Runoff from this basin sheet flows from the Northwest to the Southeast until crossing the West property line of the site. The runoff will continue to sheet flow in the same manner through basin D-4 until intercepted by Proposed Swale - D on the southern property line of the site. Collected flows will then be routed East to **DP-23** where 5 yr. and 100 yr. flows will be captured by a CDOT Type D area inlet. Flows will then be conveyed by a 36" RCP storm drain piped underneath Bent Grass Meadows Drive out-falling into Proposed Swale – E that will route

flows South to DP-26 and then ultimately East by Proposed Swale – F into RWT210. A temporary sediment basin is located at DP-26, which will provide water quality, prior to flows entering RWT210.

Basin OS-4 (2.64 AC, Q5 = 0.9 cfs, Q100 = 6.0 cfs): a basin located just south of Basin D-4, and west of Bent Grass Meadows Drive. Flows will be captured as gutter flow within Bent Grass Meadows, where it will continue to the south to **DP-24**, proposed 25' CDOT Type R on-grade inlet. By-pass flows will continue south along Bent Grass Meadows Drive, to be intercepted by an existing sump inlet, installed as part of the Latigo Business Park development.

Basin D-4 (9.53 AC, Q5 = 7.1 cfs, Q100 = 23.3 cfs): a basin that is in the West area of the site. Runoff from this basin sheet flows from the Northwest to the Southeast. The runoff be intercepted by Proposed Swale – D on the southern property line of the site. Collected flows will then be routed East to **DP-23** where 5 yr. and 100 yr. flows will be captured by a CDOT Type D area inlet. Flows will then be conveyed by a 36" RCP storm drain piped underneath Bent Grass Meadows Drive out-falling into Proposed Swale – E that will route flows South to DP-26 and then ultimately East by Proposed Swale – F into RWT210. The temporary sediment basin at DP-26 will provide water quality for this basin.

Basin D-3 (9.16 AC, Q5 = 9.4 cfs, Q100 = 26.2 cfs): a basin that is in the West area of the site. Runoff from this basin sheet flows from the Northwest to the Southeast. Flow from the basin will sheet flow onto Bent Grass Meadows Drive where proposed curb and gutter will convey flows South where the 5 yr. and 100 yr. flows will be captured by a proposed 25' CDOT Type R on-grade inlet, **DP-24**. Captured flow will be routed by a 24" RCP storm drain piped to DP-25.

Basin E-4 (0.91 AC, Q5 = 3.0 cfs, Q100 = 5.7 cfs): a basin that is in the Southwest area of the site and encompasses a portion of Bent Grass Meadows Drive. Runoff from this basin is captured by proposed curb and gutter and then routed South where the 5 yr. and 100 yr. flows will be captured by a proposed 25' CDOT Type R on-grade inlet, **DP-24**. Captured flow will be routed by a 24" RCP storm drain piped to DP-25. A temporary water quality facility will treat this flow.

Basin E-5 (0.89 AC, Q5 = 3.3 cfs, Q100 = 6.1 cfs): a basin that is in the Southwest area of the site and encompasses a portion of Bent Grass Meadows Drive. Runoff from this basin is captured by proposed curb and gutter and then routed South where the 5 yr. and 100 yr. flows will be captured by a proposed 25' CDOT Type R on-grade inlet, **DP-25**. Captured flow will be routed by a 24" RCP storm drain piped to an outfall at DP-26, where a temporary sediment basin will provide water quality for the basin. Flows will then be routed East by Proposed Swale – F until out-falling into RWT210.

Basin F-1 (0.44 AC, Q5 = 0.6 cfs, Q100 = 1.6 cfs): a basin that is in the Northeast corner of the site. It encompasses the rears of single-family residential Type B lots. Runoff from the basin will follow historical patterns East onto a vacant lot currently known as the "School Site", which has an existing sediment pond for water quality treatment.

Basin F-2 (0.55 AC, Q5 = 1.5 cfs, Q100 = 3.1 cfs): a basin that is in the east side of the site. It encompasses a portion of Bent Grass Meadows Parkway and a portion of back lots. There is a high point in the road causing a portion of the road to drain east into the existing roadway. Bent Grass Residential Filing No. 1 had two basins accounting for this condition (Basins A and B with a total area of 0.38 acres). The anticipated flow rate from these two basins was 1.3 cfs in the 5-year event and 2.6 cfs in the 100-year event. The proposed runoff from the proposed slightly exceeds the anticipated runoff in the Filing No. 1 Report. This basin will continue east as gutter flow in Bent Grass Meadow Drive, until it reaches an existing roadside ditch along Meridian Road.

Basin G-1 (1.47 AC, Q5 = 1.3 cfs, Q100 = 4.5 cfs): a basin that is along the East boundary of the site, south of Bent Grass Meadow Drive. It encompasses the rears of single-family residential Type B lots and open space. Flows from this basin will be routed to the south through Proposed Swale H. A flared end section is installed at the southeast corner, **DP-20**, of the project site to intercept this flow. An 18" rcp will convey flows to the west, releasing into the South water quality pond.

Basin H-1 (0.52 AC, Q5 = 0.2 cfs, Q100 = 1.4 cfs): is a basin along the south property line, east of the existing channel, consisting of a proposed utility easement. Flows will release directly offsite to the south

Basin I-1 (0.31 AC, Q5 = 1.0 cfs, Q100 = 2.1 cfs): a basin that is associated with Latigo Business Center Filing No. 1 lot 1. It encompasses a portion of Bent Grass Meadows Parkway South of the proposed (2) 25' CDOT Type R Inlets on site. There are a set of on-grade inlets (20' on the east side, 15' on the west side), which will intercept this flow. Inlets will then release flows to the east into an existing drainage swale. Based on the Latigo Business Park drainage report by Kiowa Engineering, inlets were designed for flows of 9.9 and 21.2 cfs from this basin. The development of the Bent Grass site has reduced the flows entering the Latigo Business Park site, ensuring the existing storm system will continue to function adequately.

Design Point 30 (225.0 AC, Q5 = 91.8 cfs, Q100 = 226.0 cfs) **–** This area is located north of Basin OS-5, and is comprised of Basins B3 thru B6, A1, and A3 in Bent Grass Filing No. 3. Flows will cross under Woodmen Hills Drive via an existing culvert, then sheet flow to the southeast, passing through Basin OS-5 to DP 31.

Basin OS-5 (14.13 AC, Q5 = 4.9 cfs, Q100 = 27.5 cfs): a basin that is associated with Bent Grass Filing No. 1. Runoff from this basin sheet flows from the North to the South into basin OS-6 and an existing sediment pond at DP-32.

Basin OS-6 (5.38 AC, Q5 = 8.8 cfs, Q100 = 19.3 cfs): a basin that is associated with Bent Grass Filing No. 1. Runoff from this basin sheet flows from the North to South to an existing sediment pond. This sediment pond works in existing conditions. A permanent pond will need to be provided upon development of this site. There are several options which will be analyzed, to determine the best scenario to deal with these flows. These options will be considered in the drainage report associated with Meridian Road improvements, which could include a DBPS Amendment to the Falcon Basin, depending on the scenario decided to be best suited for dealing with these off-site flows.

VIII. Proposed Water Quality Detention Ponds

Three Water Quality Capture Volume Detention Ponds will be provided for the proposed site. One will be provided for the area north of Bent Grass Meadows Drive, one will be provided for the area to the south and one will be provided along the east side of Bent Grass Meadows Drive at the south property line. All ponds are private. These detention ponds will only provide water quality. The EURV and 100-year volumes will be conveyed via the emergency overflow weir, which will be lined. The water quality volume release will be controlled with an orifice plate that will release in 40 hours. The north water quality pond will release into RWT204 and the south and west will release into RWT210. The west pond will act as a temporary sediment basin, at the confluence of Swales E and F (DP-26). Once the area south of Bent Grass Meadows Drive develops, final design of this pond and it's components will be provided.

There are four basins which are not provided with on-site water quality, as stated previously. Basin I-1, which releases to the South into the Latigo Business Park, has been reduced in size. From the FDR for Latigo Business Park, the offsite basin being accounted for was 7.2 acres. With the proposed development, the basin is only 0.31 acres. Also from this report, flows will continue through a natural swale, releasing eventually into the West Tributary, reaching Pond WU. Basin H-1, located at the south boundary lines, will release towards the south. Flows will continue until they reach the West Tributary, and then Pond WU.

Basins F-1 and F-2 release to the east, onto the “School Site” property. From the FDR for Bent Grass Filing No. 1, the existing sedimentation pond on the School Site was accommodating 5.42 acres from the proposed development. This area has been reduced to 0.99 acres (0.44 + 0.55). These 2 basins will receive water quality from the existing pond, but do not reach Pond WU, which is being revised to handle water quality from the developed basins, which cannot be treated on-site. Flows from this basin, as they continue east, will enter the Middle Tributary of the Falcon Basin. Total area which will not be treated via on-site facilities, or Pond WU is less than 1.0 acre required.

IX. Proposed Channel Improvements

As can be seen in the drainage maps the proposed Filing No. 2 does not encroach into the existing channel for the RWT204 reach. It is desired to leave the channel in its existing condition, as the channel was proven to be stable, refer to shear stress calculations in the appendix. Reach RWT204 does not lie within the FEMA 100-year floodplain. This development will define the 100-year floodplain into Tract H. Future development will reroute RWT204 into this tract.

The future channel and the existing channel do not align at this location. Therefore, a small amount of grading is proposed to direct runoff from the existing channel to the proposed culvert location. After outfalling to the south of Bent Grass Meadows Parkway there is another small section of grading to direct flows back to the existing channel. The radii of these bends were designed such that super elevation/increased velocities are not expected.

The future channel design, which will realign the facility with future development, has been analyzed with HEC-RAS and shown to be stable with increased flows.

Reviewing the HEC-RAS model prepared for the conditions proposed by this report shows that the existing and proposed conditions have similar velocities and Froude numbers. Given that the channel is stable in its current state, it is proposed to not provide improvements to the channel as part of this Filing. Refer to Appendix D for HEC-RAS modeling and output.

Riprap protection will be provided at the individual outfalls from the site into the channel to prevent scouring from the point discharges. Riprap lining will be provided for Swales B, C and F as they do not meet the 5 ft/s velocity constraint. Each of these swales will be lined with type M riprap. Other swales will be natural, grass lined swales.

Improvements to the existing channel will be outlined in the Master Development Drainage Plan for Bent Grass Residential Subdivision (MDDP). As development of Bent Grass proceeds from east to west, crossing the channel, improvements outlined in the MDDP for the existing channel will be implemented.

At this time the RWT202 reach will be rerouted along the north property line of the site and directed into the existing RWT204 reach. This has been modeled in the HEC-RAS model to ensure that the channel

remained stable with this additional flow. At the confluence of these two existing channels reaches, RWT210 becomes the next section of channel.

The MDDP identifies the use of check structures for the RWT210 channel downstream of the site. Again, due to the existing stability of the channel and the minor increase in flows, velocities and Froude numbers have only slightly changed, but channel remains stable. For the purposes of this Filing, it is proposed to leave the channel as is. A table comparing the velocities, Froude # and water surface elevations has been included with the HEC-RAS report, as well as plan and profile sheets. The P&P sheets include the location of the RAS Sections in plan and profile views as well as water surface elevations for the corrected (existing) and revised (proposed) condition models. Based on the model information, it is assumed where the Froude # is higher than 0.9 and velocities are higher than 5 fps, if any improvements or changes are being proposed within the channel, some channel protection would be necessary. In the sections where no improvements are being proposed, even though the velocity and Froude # are larger than design requirements, no additional protection will be constructed at this time. The channel is being left as near to existing conditions as possible, as field observations (by County staff, Galloway and client) and aerial photograph indicate that the channel is stable, and no signs of undercutting are evident. Any additional work to the channel, then what is necessary, could create an instability in the channel which is not evident today.

The channel design flow rates have previously been established using HEC-HMS in the DBPS. The site has been analyzed using the Rational method. The HEC-HMS model for the basin has been obtained from El Paso County and has been revised accordingly for the developed site. It was necessary to break apart the basin into a couple of smaller basins in order to accurately design the crossings of Bent Grass Meadows Drive. The DBPS identified a pond named SR3 at the junction of RWT202 and RWT204 near the south end of the Bent Grass Residential Subdivision. The purpose of this pond was to provide EURV for a portion of the tributary area, it was identified to have a volume of 1 acre-foot. It has been discussed with El Paso County to not construct this pond. In its place will be three on-site WQCV detention ponds (2 permanent facilities with this development, referred to as the North and South Ponds, one will be temporary sedimentation, referred to as the West Pond, until the adjacent area develops). Pond WU will be modified to provide water quality for the entire tributary area. It is not understood how the 1 ac-ft volume for pond SR3 was generated. The onsite water quality ponds proposed have a total of 1.34 ac-ft volume. If pond SR3 was truly online and provided EURV for the entire tributary area the volume would far exceed the 1 ac-ft volume that was required. In general, as the undeveloped areas develop and are now required to provide onsite water quality, this will aide in detaining the lower event storms which will aide in the stability of the existing channel in small storm events.

In addition to the changes made with this project, several changes have been made upstream of the Bent Grass Subdivision. The Ranch MDDP has added detention ponds for their project and has corrected several of the other offline ponds near the northern end of their site. In addition to the ponds the DBPS identified a flow diversion from the Falcon Watershed into the Sand Creek Watershed. This diversion was removed with The Ranch MDDP. The updated HEC-HMS model is necessary because the DBPS hydrology has now been superseded by The Ranch design.

The Ranch MDDP also investigated the connection from The Ranch site through the Meadows Filing No. 3 to the Bent Grass site. It was identified that the existing homes within the Meadows do not have the adequate drainage improvements to convey storm water through the subdivision. The drainage path through the Meadows is incorrectly identified and allowed homes to be built closer to the flow path than should have been allowed. In addition, several culverts were erroneously constructed restricting the flow path through the subdivision.

The conclusion of The Ranch MDDP is that major channel improvements are necessary through the Meadows subdivision. They state that multiple meetings have taken place with El Paso County regarding this issue and funding for the improvements is being discussed.

X. Proposed Regional Pond Improvements

Utilizing the areas and percent impervious values from the future models in the DBPS it was determined that pond WU has a tributary area of 3.58 square miles and a 7.33% impervious. Utilizing the WQCV equations contained with the Criteria it has been determined that a volume of 9.764 ac-ft is required for the entire tributary area. This volume exceeds the volume for the 5-year event per the DBPS.

The stage storage data for the pond was taken from the DBPS and it was found that the required volume exceeds the front edge of the existing outlet structure on the pond. It is proposed to raise the front edge of the existing outlet to provide the required water quality capture volume. The existing orifices on the face of the outlet structure will be covered to prevent release through them and a new rectangular hole will be cut through the existing wall. An orifice plate with square orifices will be installed to release the WQCV. A well screen will be installed on the face of the outlet structure. A small micro pool will be proposed directly in front of the orifice plate in an effort to reduce clogging of the well screen. A portion of the top of the outlet opening will be covered, to ensure flows exiting the pond meet the DBPS flows. The HEC-HMS model prepared for the Falcon DBPS has been modified to account for the changes to Pond WU, removal of Pond SR-3, addition of developed basin along Old Meridian Road and modifications made upstream in the Ranch MDDP. This model and results are provided in the appendix.

In reviewing the pond and in discussions with El Paso County, the inlet to Pond WU has washed out and is in need of repair. As part of the proposed improvements to the pond, the washed-out embankment will be repaired. In discussions with the County it is understood that there are multiple areas of wetlands in the area. While the majority of the West Tributary should be directed through Pond WU there are two 18” pipes to the east of the embankment that allow flows to pass from the West Tributary into the existing wetlands to maintain them. The embankment is designed such that flows will back up prior to entering Pond WU and will pass through the existing pipes to the east.

Site investigations have identified that a large reason the embankment failed was improper erosion protection. It is apparent that, as the embankment was overtopped it began scourging under the riprap placed on the downhill side of the embankment. Given enough time or a large enough storm it was able to dislodge a section of the protection and the embankment washed out.

It is proposed to fill the washed-out area of the embankment back to match the existing weir elevation of 6832.5. An 18” pipe will be installed through the embankment. The purpose of this pipe is to drain the area just upstream of the embankment since the dual pipes to the east are higher than that point. The new pipe will release “bottom” flows with the “pre-bay” area, so it does not retain water. The existing dual pipes will continue to provide flows from smaller storm events, above trickle flows, to the existing wetlands. Riprap will be re-established on the downstream side of the embankment. In addition, it is proposed to riprap the top of the embankment to protect it from scour. A cutoff wall will also be installed through the full length of the embankment from the top of the embankment to just below the toe of slope on the downstream side. The cutoff wall should be installed on the downstream side of the top of the embankment.

XI. Maintenance

The proposed channels are to be private facilities, along with the water quality ponds, which will be maintained by the Bent Grass Metropolitan District. After completion of construction and upon the Board of County Commissioners acceptance, all public drainage facilities within easements and public Right-of-Way will be owned and maintained by El Paso County. Other than the construction of the proposed twin culverts at Bent Grass Meadows Drive, the only other channel improvements with this Filing, is along the north property line, west of the Falcon Basin channel. Due to the size of the channel, an access road will be provided along the length of the channel. It will be a 15' wide dirt road along the top of the proposed channel. Access will be only on one side of the channel, as the second road would not be able to be located within the development property. Access has been provided at the upstream and downstream ends of the twin box culverts crossing under Bent Grass Meadow Drive.

XII. Wetlands Mitigation

No wetlands are located on site.

XIII. Floodplain Statement

A portion of the project site lies within Zone AE Special Flood Hazard Area as defined by the FIRM Map number 08041C0553G effective December 7, 2018. A copy of the FIRM Panel is included in Appendix A.

The portion of channel that has a floodplain designation is only the RWT210 and RWT204 portions of the channel. It is unknown why the western channel, RWT202 is unmapped since it is the larger contributor regarding flow rates. Discussions have occurred with PPRBD and a no rise certificate will be required for the existing channel. Models have been obtained from FEMA which show that the FEMA discharges are higher than the DBPS. Therefore, the culvert crossing at Bent Grass Meadows Parkway has been sized per the FEMA flows and not the DBPS. The no rise certification will be provided under a separate report.

XIV. Drainage/Bridge Fees and Credits/Reimbursements

The site lies within the Falcon Drainage Basin. The DBPS was approved in 2013 and has drainage and bridge fees associated with the basin.

The subdivision has a total area of 68.55 acres. The tracts (13.326 acres) and preservation area (4.36 acres) account for a total of 17.686 acres. Tract areas will pay fees when they are platted with future filings. This leaves a total area of 50.864 acres to assess fees for Bent Grass Residential Filing No. 2.

The percent impervious for the subdivision has been calculated with this report to be approximately 46.1 percent.

50.864 acres x 46.1% = 23.45 Impervious Acres

The following calculations are based on an interpolated rate between 2019 Falcon Basin drainage/bridge fees:

Drainage Fees

$29,622 x 23.45 Imp. Acres = <u>$694,635.90</u>

Bridge Fees

$4,069 x 23.45 Imp. Acres = $95,418.05

Per discussions with El Paso County the fees will be offset by the cost of regional improvements. Costs of the improvements to the regional pond facility will be deducted from the overall drainage fees for the project, leaving a net balance, to be paid The regional improvements would include channel, detention pond modification, and pond inlet repair costs. Below is a table of the reimbursable costs limited to those shown in the Falcon DBPS.

Item	Quantity	Unit	Unit Cost	Cost
Channel Improvements				
30" Grouted Boulders	33	SY	$ 190.00	$ 6,270.00
Soil Rip Rap - Type M	20.8	CY	$ 70.00	$ 1,456.00
6' Cutoff Wall - Concrete	35	CY	$ 600.00	$ 21,000.00
Subtotal				$ 28,726.00
Regional Pond Improvements (Public)				
18" RCP Storm Drain (Public)	126	LF	$ 54.00	$ 6,804.00
18" FES	2	EA	$ 920.00	$ 1,840.00
3' Concrete Headwall	2	CY	$ 600.00	$ 1,200.00
13' Cutoff Wall - Concrete	115	CY	$ 600.00	$ 69,000.00
13' Cutoff Wall - Steel Reinforcement	12230	LBS	$ 0.90	$ 11,005.50
Rip Rap - Type VH	2260	CY	$ 85.00	$ 192,100.00
Pond Modification to Full Spectrum	1	LS	$ 60,000.00	$ 60,000.00
Subtotal				$ 341,949.50
Total (Public)				$ 370,675.50
Contingency			10%	$ 37,067.55
Grand Total (Public)				$ 407,743.05

Below is a cost estimate for the improvements proposed with this filing.

Item	Quantity	Unit	Unit Cost	Cost
Storm Drain Improvements (Public)				
10' CDOT Type R Inlet (Public)	10	EA	$ 8,000.00	$ 80,000.00
15' CDOT Type R Inlet (Public)	3	EA	$ 9,800.00	$ 29,400.00
CDOT Type D Area Inlet (Public)	1	EA	$ 7,900.00	$ 7,900.00
5' Manhole - Type II (Public)	1	EA	$ 4,700.00	$ 4,700.00
24" RCP Storm Drain (Public)	137	LF	$ 70.00	$ 9,590.00
30" RCP Storm Drain (Public)	122	LF	$ 95.00	$ 11,590.00
36" RCP Storm Drain (Public)	245	LF	$ 110.00	$ 26,950.00
42" RCP Storm Drain (Public)	50	LF	$ 140.00	$ 7,000.00

24" FES	1	EA	$	970.00	$	970.00
36" FES	1	EA	$	1,610.00	$	1,610.00
18" FES	2	EA	$	1,700.00	$	3,400.00
Subtotal					$	183,110.00
Culvert (Concrete Box Culvert) (Public)						
6' x 12' Concrete Box Culvert	266	LF	$	1,600.00	$	425,600.00
30" Grouted Boulders	164	SY	$	190.00	$	31,160.00
Soil Rip Rap - Type M	52.44	CY	$	70.00	$	3,670.80
Headwalls - Concrete	35	CY	$	600.00	$	21,000.00
Wingwalls - Concrete	60	CY	$	600.00	$	36,000.00
Headwalls - Steel Reinforcement	1300	LBS	$	0.90	$	1,170.00
Wingwalls - Steel Reinforcement	4430	LBS	$	0.90	$	3,987.00
Subtotal					$	522,587.80
WQCV Detention Ponds (Private)						
Pond (North)	1	EA	$	80,000.00	$	80,000.00
Pond (South)	1	EA	$	80,000.00	$	80,000.00
Subtotal					$	160,000.00
Total					$	865,697.80
Contingency				10%	$	86,569.78
Grand Total					$	952,267.58

XV. Conclusion

The Bent Grass Residential Subdivision lies within the West Tributary of the Falcon Area Watershed. Recommendations are made within this report to establish and stabilize multiple drainageways through the project site. Detention for the site is provided in two on-site WQCV ponds and a regional pond that will be modified to provide water quality for the entire tributary area. Recommendations are also given for re-establishing the inlet to the regional pond. The proposed development will not have any adverse impacts on downstream developments or existing drainageways. Permission letters are being obtained from downstream property owners for maintenance of the channel, as it leaves the Bent Grass site.

All drainage facilities within this report were sized according to the Drainage Criteria Manuals. Bent Grass Metropolitan District will own and maintain the channels until such a time that all final improvements have been constructed. At that time, channel corridors will become publicly owned and maintained and shall be the responsibility of El Paso County. Upon development of future filings within the Bent Grass Residential Subdivision, separate Final Drainage Reports will be required to be submitted and approved by El Paso County.

XVI. References

1. *City of Colorado Springs/County of El Paso Drainage Criteria Manual*, October 1991.
2. *Drainage Criteria Manual, Volume 2*, City of Colorado Springs, November 2002.

3. *Urban Storm Drainage Criteria Manual*, Urban Drainage and Flood Control District, January 2016 (with current revisions).
4. *Falcon Drainage Basin Planning Study*, by Matrix Design Group, September 2015.
5. *Master Development Drainage Plan and Preliminary Drainage Plan – Bent Grass Subdivision*, by Kiowa Engineering Corporation, December 2006.
6. *Final Drainage Report for Bent Grass Residential (Filing No. 1)*, by Classic Consulting Engineers & Surveyors, LLC, August 2014.
7. *Final Drainage Report Addendum for Bent Grass Residential (Filing No. 1)*, by Classic Consulting Engineers & Surveyors, LLC, August 2015.
8. *Master Development Drainage Plan for The Ranch*, by Classic Consulting Engineers & Surveyors, LLC, November 2018.
9. *Falcon Highlands Master Development Drainage Plan & Preliminary Drainage Report & Final Drainage Report for Filing 1*, by URS, January 2005.
10. *Final Drainage Report and Erosion Control Plan – Latigo Business Center Filing No. 1 A Re-subdivision of a Portion of Latigo Business and Research Center Filing No. 1*, by Kiowa Engineering Corporation, November 2004.

APPENDIX A

Exhibits and Figures

BENT GRASS

-

BENT GRASS MEADOWS DRIVE
SCALE: 1" = 2,000'

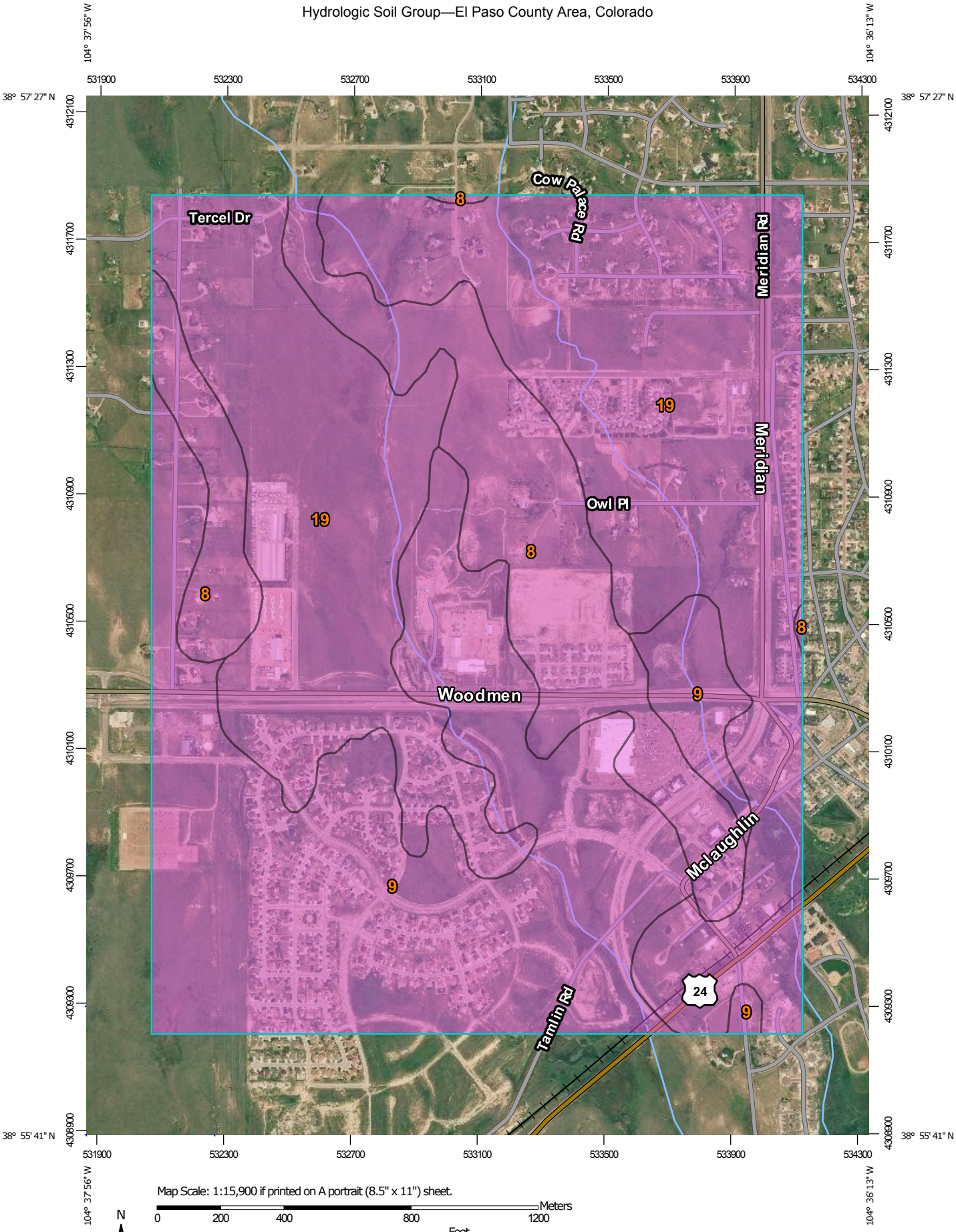
VICINITY MAP

Project No:	CLH000014.20
Drawn By:	CMWJ
Checked By:	RGD
Date:	04/02/2019

Galloway

1755 Telstar Drive, Suite 107
Colorado Springs, CO 80920
719.900.7220 • GallowayUS.com

Hydrologic Soil Group—El Paso County Area, Colorado



Map Scale: 1:15,900 if printed on A portrait (8.5" x 11") sheet.

N

Meters: 0 200 400 800 1200

Feet: 0 500 1000 2000 3000

Map projection: Web Mercator Corner coordinates: WGS84 Edge tics: UTM Zone 13N WGS84

MAP LEGEND

Area of Interest (AOI)

Area of Interest (AOI)

Soils

Soil Rating Polygons

- A
- A/D
- B
- B/D
- C
- C/D
- D
- Not rated or not available

Soil Rating Lines

- A
- A/D
- B
- B/D
- C
- C/D
- D
- Not rated or not available

Soil Rating Points

- A
- A/D
- B
- B/D
- C
- C/D
- D
- Not rated or not available

Water Features

Streams and Canals

Transportation

- Rails
- Interstate Highways
- US Routes
- Major Roads
- Local Roads

Background

Aerial Photography

MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:24,000.

Please rely on the bar scale on each map sheet for map measurements.

Source of Map: Natural Resources Conservation Service
Web Soil Survey URL:
Coordinate System: Web Mercator (EPSG:3857)

Maps from the Web Soil Survey are based on the Web Mercator projection, which preserves direction and shape but distorts distance and area. A projection that preserves area, such as the Albers equal-area conic projection, should be used if more accurate calculations of distance or area are required.

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: El Paso County Area, Colorado
Survey Area Data: Version 16, Sep 10, 2018

Soil map units are labeled (as space allows) for map scales 1:50,000 or larger.

Date(s) aerial images were photographed: Jun 7, 2016—Aug 17, 2017

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

Hydrologic Soil Group

Map unit symbol	Map unit name	Rating	Acres in AOI	Percent of AOI
8	Blakeland loamy sand, 1 to 9 percent slopes	A	214.3	16.0%
9	Blakeland-Fluvaquentic Haplaquolls	A	465.8	34.7%
19	Columbine gravelly sandy loam, 0 to 3 percent slopes	A	662.6	49.3%
Totals for Area of Interest			**1,342.6**	**100.0%**

Description

Hydrologic soil groups are based on estimates of runoff potential. Soils are assigned to one of four groups according to the rate of water infiltration when the soils are not protected by vegetation, are thoroughly wet, and receive precipitation from long-duration storms.

The soils in the United States are assigned to four groups (A, B, C, and D) and three dual classes (A/D, B/D, and C/D). The groups are defined as follows:

Group A. Soils having a high infiltration rate (low runoff potential) when thoroughly wet. These consist mainly of deep, well drained to excessively drained sands or gravelly sands. These soils have a high rate of water transmission.

Group B. Soils having a moderate infiltration rate when thoroughly wet. These consist chiefly of moderately deep or deep, moderately well drained or well drained soils that have moderately fine texture to moderately coarse texture. These soils have a moderate rate of water transmission.

Group C. Soils having a slow infiltration rate when thoroughly wet. These consist chiefly of soils having a layer that impedes the downward movement of water or soils of moderately fine texture or fine texture. These soils have a slow rate of water transmission.

Group D. Soils having a very slow infiltration rate (high runoff potential) when thoroughly wet. These consist chiefly of clays that have a high shrink-swell potential, soils that have a high water table, soils that have a claypan or clay layer at or near the surface, and soils that are shallow over nearly impervious material. These soils have a very slow rate of water transmission.

If a soil is assigned to a dual hydrologic group (A/D, B/D, or C/D), the first letter is for drained areas and the second is for undrained areas. Only the soils that in their natural condition are in group D are assigned to dual classes.

Rating Options

Aggregation Method: Dominant Condition

Component Percent Cutoff: None Specified

Tie-break Rule: Higher

NOTES TO USERS

This map is for use in administering the National Flood Insurance Program. It does not necessarily identify all areas subject to flooding, particularly from local drainage sources of small size. The **community map repository** should be consulted for possible updated or additional flood hazard information.

To obtain more detailed information in areas where **Base Flood Elevations** (BFEs) and/or **floodways** have been determined, users are encouraged to consult the Flood Profiles and Floodway Data and/or Summary of Stillwater Elevations tables contained within the Flood Insurance Study (FIS) report that accompanies this FIRM. Users should be aware that BFEs shown on the FIRM represent rounded whole-foot elevations. These BFEs are intended for flood insurance rating purposes only and should not be used as the sole source of flood elevation information. Accordingly, flood elevation data presented in the FIS report should be utilized in conjunction with the FIRM for purposes of construction and/or floodplain management.

Coastal Base Flood Elevations shown on this map apply only landward of 0.0' North American Vertical Datum of 1988 (NAVD88). Users of this FIRM should be aware that coastal flood elevations are also provided in the Summary of Stillwater Elevations table in the Flood Insurance Study report for this jurisdiction. Elevations shown in the Summary of Stillwater Elevations table should be used for construction and/or floodplain management purposes when they are higher than the elevations shown on this FIRM.

Boundaries of the **floodways** were computed at cross sections and interpolated between cross sections. The floodways were based on hydraulic considerations with regard to requirements of the National Flood Insurance Program. Floodway widths and other pertinent floodway data are provided in the Flood Insurance Study report for this jurisdiction.

Certain areas not in Special Flood Hazard Areas may be protected by **flood control structures**. Refer to section 2.4 "Flood Protection Measures" of the Flood Insurance Study report for information on flood control structures for this jurisdiction.

The **projection** used in the preparation of this map was Universal Transverse Mercator (UTM) zone 13. The **horizontal datum** was NAD83, GRS80 spheroid. Differences in datum, spheroid, projection or UTM zones zones used in the production of FIRMs for adjacent jurisdictions may result in slight positional differences in map features across jurisdiction boundaries. These differences do not affect the accuracy of this FIRM.

Flood elevations on this map are referenced to the **North American Vertical Datum of 1988 (NAVD88)**. These flood elevations must be compared to structure and ground elevations referenced to the same **vertical datum**. For information regarding conversion between the National Geodetic Vertical Datum of 1929 and the North American Vertical Datum of 1988, visit the National Geodetic Survey website at http://www.ngs.noaa.gov/ or contact the National Geodetic Survey at the following address:

NGS Information Services
NOAA, N/NGS12
National Geodetic Survey
SSMC-3, #9202
1315 East-West Highway
Silver Spring, MD 20910-3282

To obtain current elevation, description, and/or location information for **bench marks** shown on this map, please contact the Information Services Branch of the National Geodetic Survey at (301) 713-3242 or visit its website at http://www.ngs.noaa.gov/.

Base Map information shown on this FIRM was provided in digital format by El Paso County, Colorado Springs Utilities, City of Fountain, Bureau of Land Management, National Oceanic and Atmospheric Administration, United States Geological Survey, and Anderson Consulting Engineers, Inc. These data are current as of 2006.

This map reflects more detailed and up-to-date **stream channel configurations and floodplain delineations** than those shown on the previous FIRM for this jurisdiction. The floodplains and floodways that were transferred from the previous FIRM may have been adjusted to conform to these new stream channel configurations. As a result, the Flood Profiles and Floodway Data tables in the Flood Insurance Study Report (which contains authoritative hydraulic data) may reflect stream channel distances that differ from what is shown on this map. The profile baselines depicted on this map represent the hydraulic modeling baselines that match the flood profiles and Floodway Data Tables if applicable, in the FIS report. As a result, the profile baselines may deviate significantly from the new base map channel representation and may appear outside of the floodplain.

Corporate limits shown on this map are based on the best data available at the time of publication. Because changes due to annexations or de-annexations may have occurred after this map was published, map users should contact appropriate community officials to verify current corporate limit locations.

Please refer to the separately printed **Map Index** for an overview map of the county showing the layout of map panels; community map repository addresses; and a Listing of Communities table containing National Flood Insurance Program dates for each community as well as a listing of the panels on which each community is located.

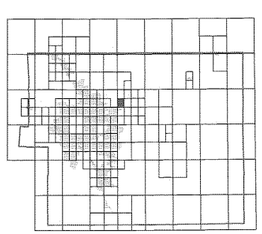
Contact **FEMA Map Service Center** (MSC) via the FEMA Map Information eXchange (FMIX) 1-877-336-2627 for information on available products associated with this FIRM. Available products may include previously issued Letters of Map Change, a Flood Insurance Study Report, and/or digital versions of this map. The MSC may also be reached by Fax at 1-800-358-9620 and its website at http://www.msc.fema.gov/.

If you have **questions about this map** or questions concerning the National Flood Insurance Program in general, please call **1-877-FEMA MAP** (1-877-336-2627) or visit the FEMA website at http://www.fema.gov/business/nfip.

El Paso County Vertical Datum Offset Table

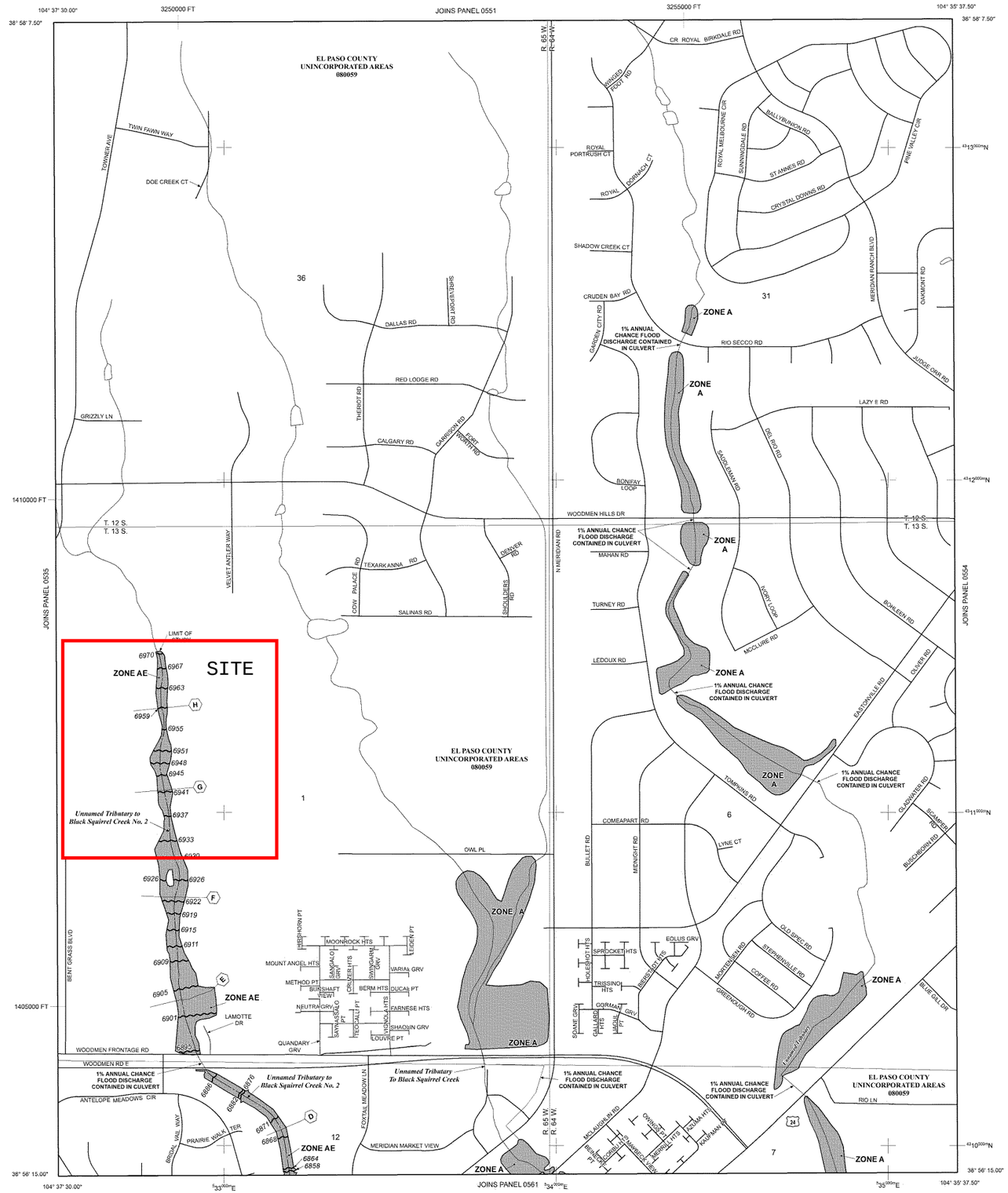
Flooding Source	Vertical Datum Offset (ft)
REFER TO SECTION 3.3 OF THE EL PASO COUNTY FLOOD INSURANCE STUDY FOR STREAM BY STREAM VERTICAL DATUM CONVERSION INFORMATION	

Panel Location Map



This Digital Flood Insurance Rate Map (DFIRM) was produced through a Cooperating Technical Partner (CTP) agreement between the State of Colorado Water Conservation Board (CWCB) and the Federal Emergency Management Agency (FEMA).

Additional Flood Hazard information and resources are available from local communities and the Colorado Water Conservation Board.



LEGEND

SPECIAL FLOOD HAZARD AREAS (SFHAS) SUBJECT TO INUNDATION BY THE 1% ANNUAL CHANCE FLOOD

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 Area 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 A	No Base Flood Elevations determined.
ZONE AE	Base Flood Elevations determined.
ZONE AH	Flood depths of 1 to 3 feet (usually areas of ponding); Base Flood Elevations determined.
ZONE AO	Flood depths of 1 to 3 feet (usually sheet flow on sloping terrain); average depths determined. For areas of alluvial fan flooding, velocities also determined.
ZONE AR	Special Flood Hazard Area Formerly protected from the 1% annual chance flood by a flood control system that was subsequently decertified. Zone AR indicates that the former flood control system is being restored to provide protection from the 1% annual chance or greater flood.
ZONE A99	Area to be protected from 1% annual chance flood by a Federal flood protection system under construction; no Base Flood Elevations determined.
ZONE V	Coastal flood zone with velocity hazard (wave action); no Base Flood Elevations determined.
ZONE VE	Coastal flood zone with velocity hazard (wave action); Base Flood Elevations determined.

FLOODWAY AREAS IN ZONE AE

The floodway is the channel of a stream plus any adjacent floodplain areas that must be kept free of encroachment so that the 1% annual chance flood can be carried without substantial increases in flood heights.

OTHER FLOOD AREAS

ZONE X	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 flood.

OTHER AREAS

ZONE X	Areas determined to be outside the 0.2% annual chance floodplain.
ZONE D	Areas in which flood hazards are undetermined, but possible.

COASTAL BARRIER RESOURCES SYSTEM (CBRS) AREAS

OTHERWISE PROTECTED AREAS (OPAs)

CBRS areas and OPAs are normally located within or adjacent to Special Flood Hazard Areas.

	Floodplain boundary
	Floodway boundary
	Zone D Boundary
	CBRS and OPA boundary
	Boundary dividing Special Flood Hazard Areas of different Base Flood Elevations, flood depths or flood velocities.
513	Base Flood Elevation line and value; elevation in feet*
(EL 987)	Base Flood Elevation value where uniform within zone; elevation in feet*

* Referenced to the North American Vertical Datum of 1988 (NAVD 88)

A — A	Cross section line
23 - - - - 23	Transect line
97° 07' 30.00" 32° 22' 30.00"	Geographic coordinates referenced to the North American Datum of 1983 (NAD 83)
$^{42}75^{000m}$N	1000-meter Universal Transverse Mercator grid ticks, zone 13
6000000 FT	5000-foot grid ticks: Colorado State Plane coordinate system, central zone (FIPSZONE 0502), Lambert Conformal Conic Projection
DX5510 ×	Bench mark (see explanation in Notes to Users section of this FIRM panel)
• M1.5	River Mile

MAP REPOSITORIES
Refer to Map Repositories list on Map Index

EFFECTIVE DATE OF COUNTYWIDE
FLOOD INSURANCE RATE MAP
MARCH 17, 1997

EFFECTIVE DATE(S) OF REVISION(S) TO THIS PANEL
DECEMBER 7, 2018 - to update corporate limits, to change Base Flood Elevations and Special Flood Hazard Areas, to update map format, to add roads and road names, and to incorporate previously issued Letters of Map Revision.

For community map revision history prior to countywide mapping, refer to the Community Map History Table located in the Flood Insurance Study report for this jurisdiction.

To determine if flood insurance is available in this community, contact your insurance agent or call the National Flood Insurance Program at 1-800-638-6620.

MAP SCALE 1" = 500'

250 0 500 1000 FEET

150 0 150 300 METERS

NFIP

NATIONAL FLOOD INSURANCE PROGRAM

PANEL 0553G

FIRM

FLOOD INSURANCE RATE MAP

EL PASO COUNTY, COLORADO
AND INCORPORATED AREAS

PANEL 553 OF 1300

(SEE MAP INDEX FOR FIRM PANEL LAYOUT)

CONTAINS:

COMMUNITY	NUMBER	PANEL	SUFFIX
EL PASO COUNTY	080059	0553	G

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

MAP NUMBER
08041C0553G

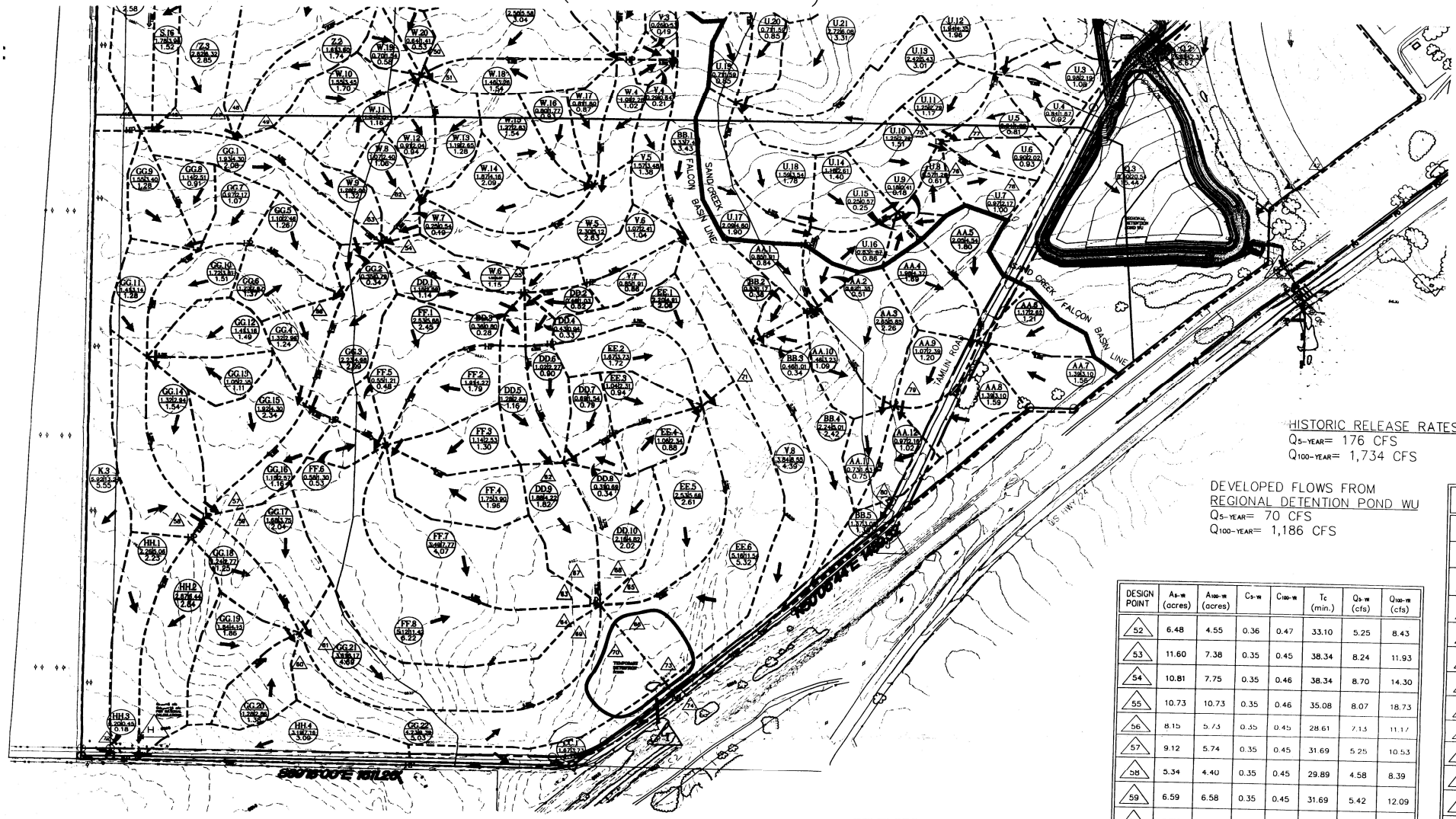
MAP REVISED
DECEMBER 7, 2018

Federal Emergency Management Agency

FINAL DRAINAGE
FALCON HIGHL

SHEET 4 OF 4

(SEE SHEET 3)



HISTORIC RELEASE RATES
$Q_{5\text{-YEAR}}$= 176 CFS
$Q_{100\text{-YEAR}}$= 1,734 CFS

DEVELOPED FLOWS FROM
REGIONAL DETENTION POND WU
$Q_{5\text{-YEAR}}$= 70 CFS
$Q_{100\text{-YEAR}}$= 1,186 CFS

DEVELOPED FLOWS FROM
TEMP. DETENTION POND
$Q_{5\text{-YEAR}}$= 49.70 CFS
$Q_{100\text{-YEAR}}$= 126.74 CFS

HISTORIC RELEASE RATES
$Q_{5\text{-YEAR}}$= 64.50 CFS
$Q_{100\text{-YEAR}}$= 159.70 CFS

DESIGN POINT	$A_{5\text{-YR}}$ (acres)	$A_{100\text{-YR}}$ (acres)	$C_{5\text{-YR}}$	$C_{100\text{-YR}}$	Tc (min.)	$Q_{5\text{-YR}}$ (cfs)	$Q_{100\text{-YR}}$ (cfs)
52	6.48	4.55	0.36	0.47	33.10	5.25	8.43
53	11.60	7.38	0.35	0.45	38.34	8.24	11.93
54	10.81	7.75	0.35	0.46	38.34	8.70	14.30
55	10.73	10.73	0.35	0.46	35.08	8.07	18.73
56	8.15	5.73	0.35	0.45	28.61	7.13	11.17
57	9.12	5.74	0.35	0.45	31.69	5.25	10.53
58	5.34	4.40	0.35	0.45	29.89	4.58	8.39
59	6.59	6.58	0.35	0.45	31.69	5.42	12.09
60	6.67	6.57	0.35	0.45	33.52	5.25	11.64
61	6.46	6.37	0.35	0.45	33.52	5.09	11.64
62	6.14	3.97	0.35	0.46	28.11	6.08	9.01
63	6.58	6.58	0.35	0.45	32.94	5.30	11.87
64	6.58	6.58	0.35	0.45	32.94	5.30	11.87
65	4.91	3.11	0.35	0.45	24.03	4.66	6.59
66	4.80	3.07	0.35	0.45	24.03	4.53	6.51

DESIGN POINT	$A_{5\text{-YR}}$ (acres)	$A_{100\text{-YR}}$ (acres)
67	5.30	5.24
68	5.24	5.24
69	16.51	16.51
70	16.51	16.51
71	7.99	5.79
72	8.34	8.34
73	21.57	21.57
74	21.57	21.57
75	17.68	17.63
76	6.11	6.19
77	6.11	6.19
78	7.39	7.39
79	7.30	7.30
80	8.23	8.23

URS
9960 FE
COLORAD
(719) 53

FIGURE

FALCON DRAINAGE BASIN PLANNING STUDY

SELECTED PLAN REPORT

FINAL - SEPTEMBER 2015

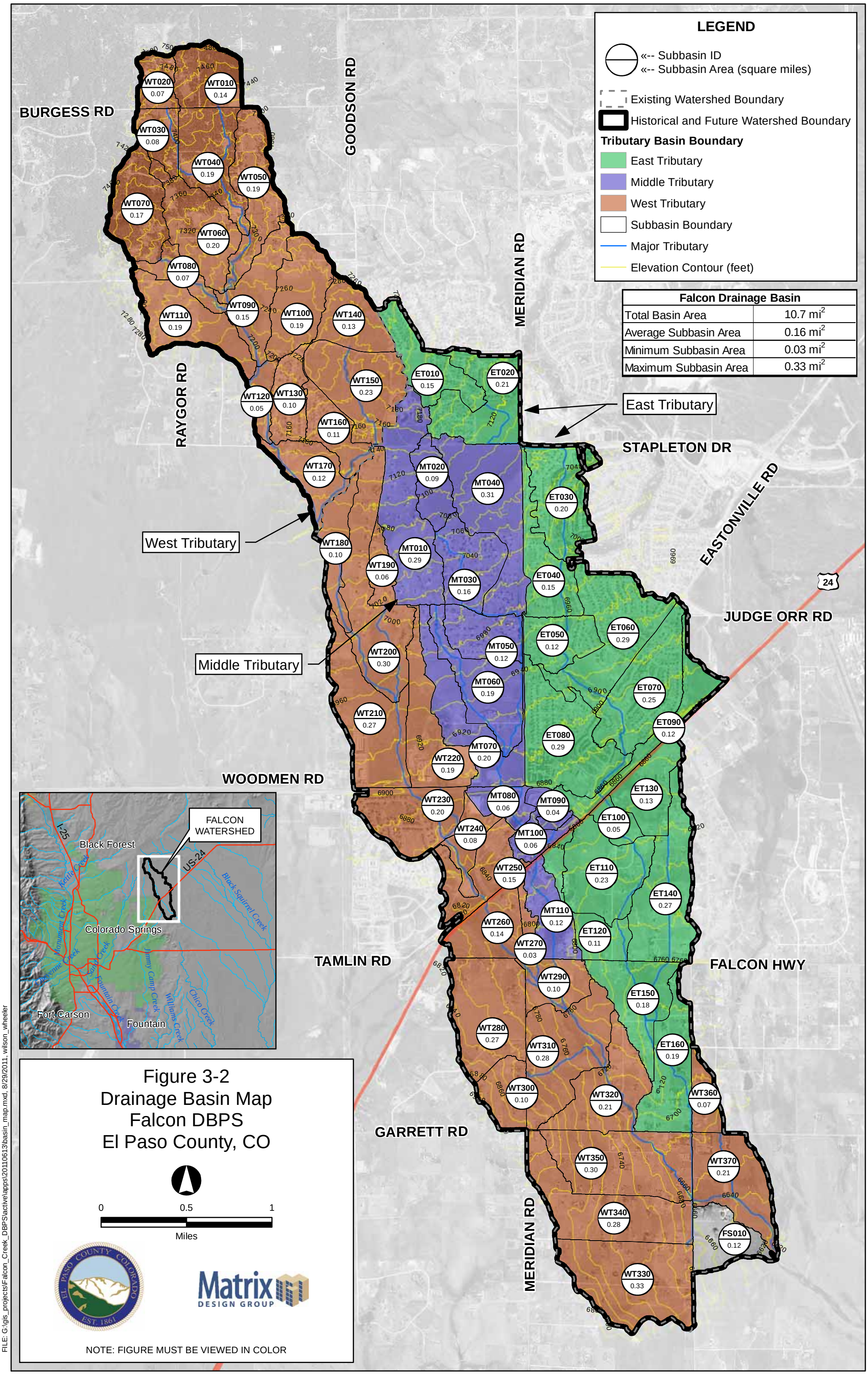
Prepared for:

El Paso County Public Services Department
3275 Akers Drive
Colorado Springs, CO 80922

Prepared By:

Matrix Design Group
2435 Research Parkway, Suite 300
Colorado Springs, CO 80920

Matrix Project No. 10.122.003


LEGEND
«-- Subbasin ID
«-- Subbasin Area (square miles)
Existing Watershed Boundary
Historical and Future Watershed Boundary
Tributary Basin Boundary
East Tributary
Middle Tributary
West Tributary
Subbasin Boundary
Major Tributary
Elevation Contour (feet)
Falcon Drainage Basin
Total Basin Area 10.7 mi²
Average Subbasin Area 0.16 mi²
Minimum Subbasin Area 0.03 mi²
Maximum Subbasin Area 0.33 mi²
BURGESS RD
GOODSON RD
MERIDIAN RD
RAYGOR RD
STAPLETON DR
EASTONVILLE RD
JUDGE ORR RD
WOODMEN RD
TAMLIN RD
FALCON HWY
GARRETT RD
East Tributary
West Tributary
Middle Tributary
FALCON WATERSHED
Black Forest
Colorado Springs
Fort Carson
Fountain
I-25
US-24
Kettle Creek
Monument Creek
Black Squirrel Creek
Jimmy Camp Creek
Williams Creek
Chico Creek
Sand Creek
Fountain Creek
Figure 3-2
Drainage Basin Map
Falcon DBPS
El Paso County, CO
0
0.5
1
Miles
Matrix DESIGN GROUP
NOTE: FIGURE MUST BE VIEWED IN COLOR
FILE: G:\gis_projects\Falcon_Creek_DBPS\active\apps\20110613\basin_map.mxd, 8/29/2011, wilson_wheeler

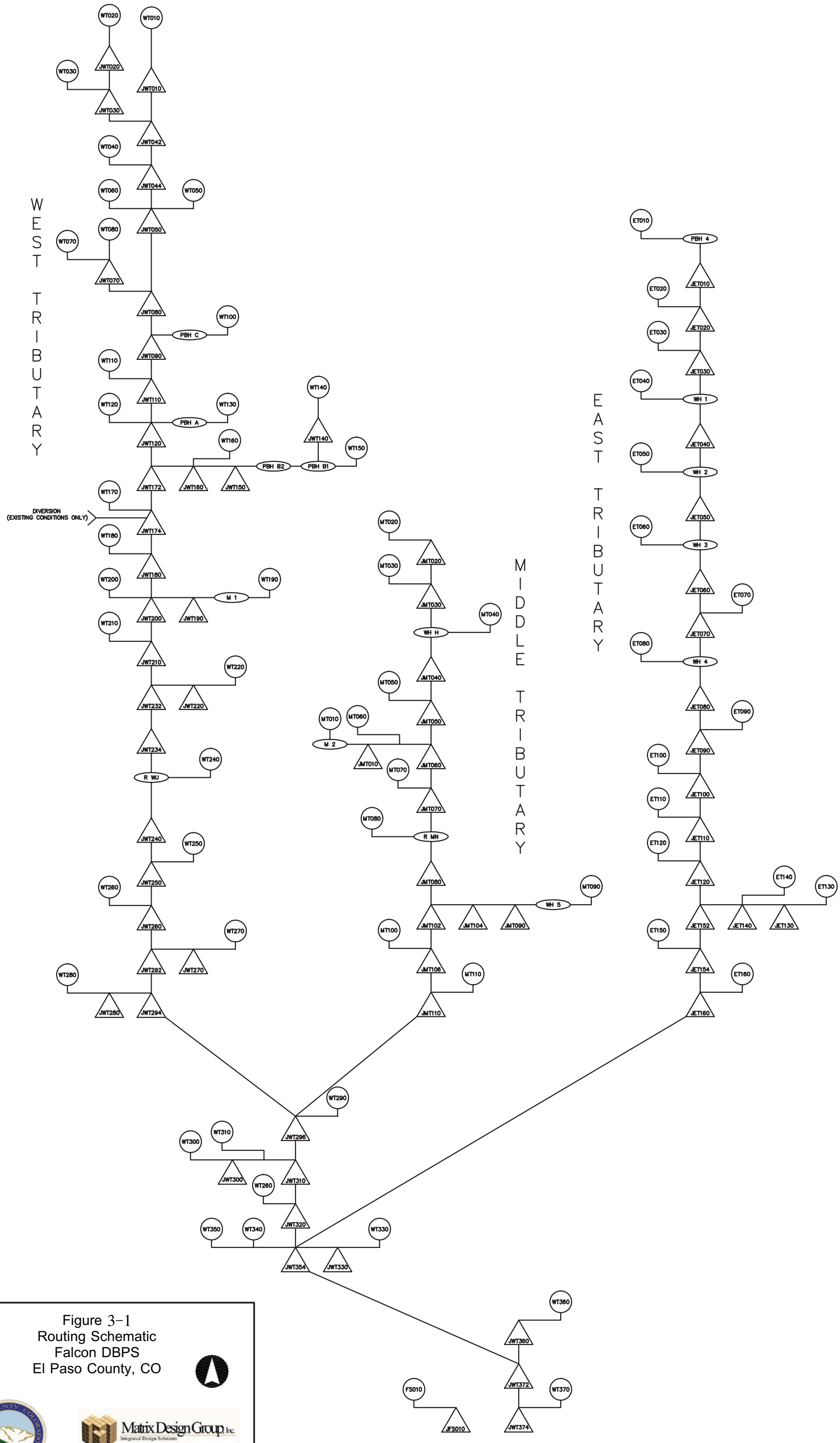


Figure 3-1
Routing Schematic
Falcon DBPS
El Paso County, CO

Matrix Design Group Inc.
Integrated Design Solutions

DRAWING NOT TO SCALE

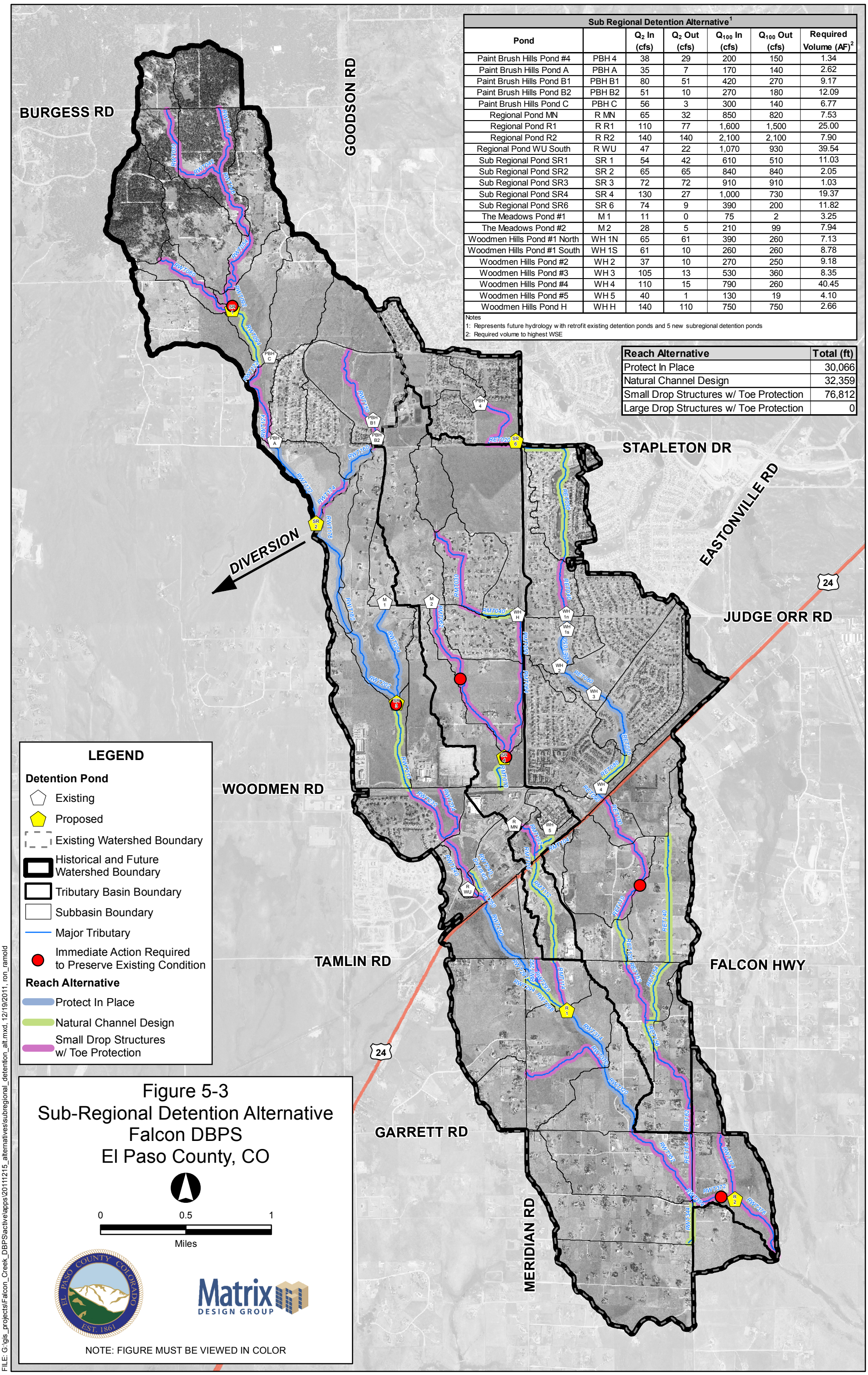
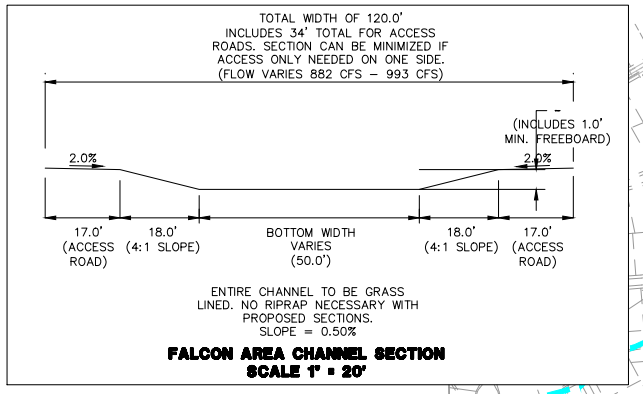


Figure 5-3
Sub-Regional Detention Alternative
Falcon DBPS
El Paso County, CO

Sub Regional Detention Alternative[1]						
Pond		Q_2 In (cfs)	Q_2 Out (cfs)	Q_{100} In (cfs)	Q_{100} Out (cfs)	Required Volume (AF)[2]
Paint Brush Hills Pond #4	PBH 4	38	29	200	150	1.34
Paint Brush Hills Pond A	PBH A	35	7	170	140	2.62
Paint Brush Hills Pond B1	PBH B1	80	51	420	270	9.17
Paint Brush Hills Pond B2	PBH B2	51	10	270	180	12.09
Paint Brush Hills Pond C	PBH C	56	3	300	140	6.77
Regional Pond MN	R MN	65	32	850	820	7.53
Regional Pond R1	R R1	110	77	1,600	1,500	25.00
Regional Pond R2	R R2	140	140	2,100	2,100	7.90
Regional Pond WU South	R WU	47	22	1,070	930	39.54
Sub Regional Pond SR1	SR 1	54	42	610	510	11.03
Sub Regional Pond SR2	SR 2	65	65	840	840	2.05
Sub Regional Pond SR3	SR 3	72	72	910	910	1.03
Sub Regional Pond SR4	SR 4	130	27	1,000	730	19.37
Sub Regional Pond SR6	SR 6	74	9	390	200	11.82
The Meadows Pond #1	M 1	11	0	75	2	3.25
The Meadows Pond #2	M 2	28	5	210	99	7.94
Woodmen Hills Pond #1 North	WH 1N	65	61	390	260	7.13
Woodmen Hills Pond #1 South	WH 1S	61	10	260	260	8.78
Woodmen Hills Pond #2	WH 2	37	10	270	250	9.18
Woodmen Hills Pond #3	WH 3	105	13	530	360	8.35
Woodmen Hills Pond #4	WH 4	110	15	790	260	40.45
Woodmen Hills Pond #5	WH 5	40	1	130	19	4.10
Woodmen Hills Pond H	WH H	140	110	750	750	2.66

Notes
1: Represents future hydrology with retrofit existing detention ponds and 5 new subregional detention ponds
2: Required volume to highest WSE

Reach Alternative	Total (ft)
Protect In Place	30,066
Natural Channel Design	32,359
Small Drop Structures w/ Toe Protection	76,812
Large Drop Structures w/ Toe Protection	0



FALCON AREA CHANNEL SECTION
SCALE 1" = 20'

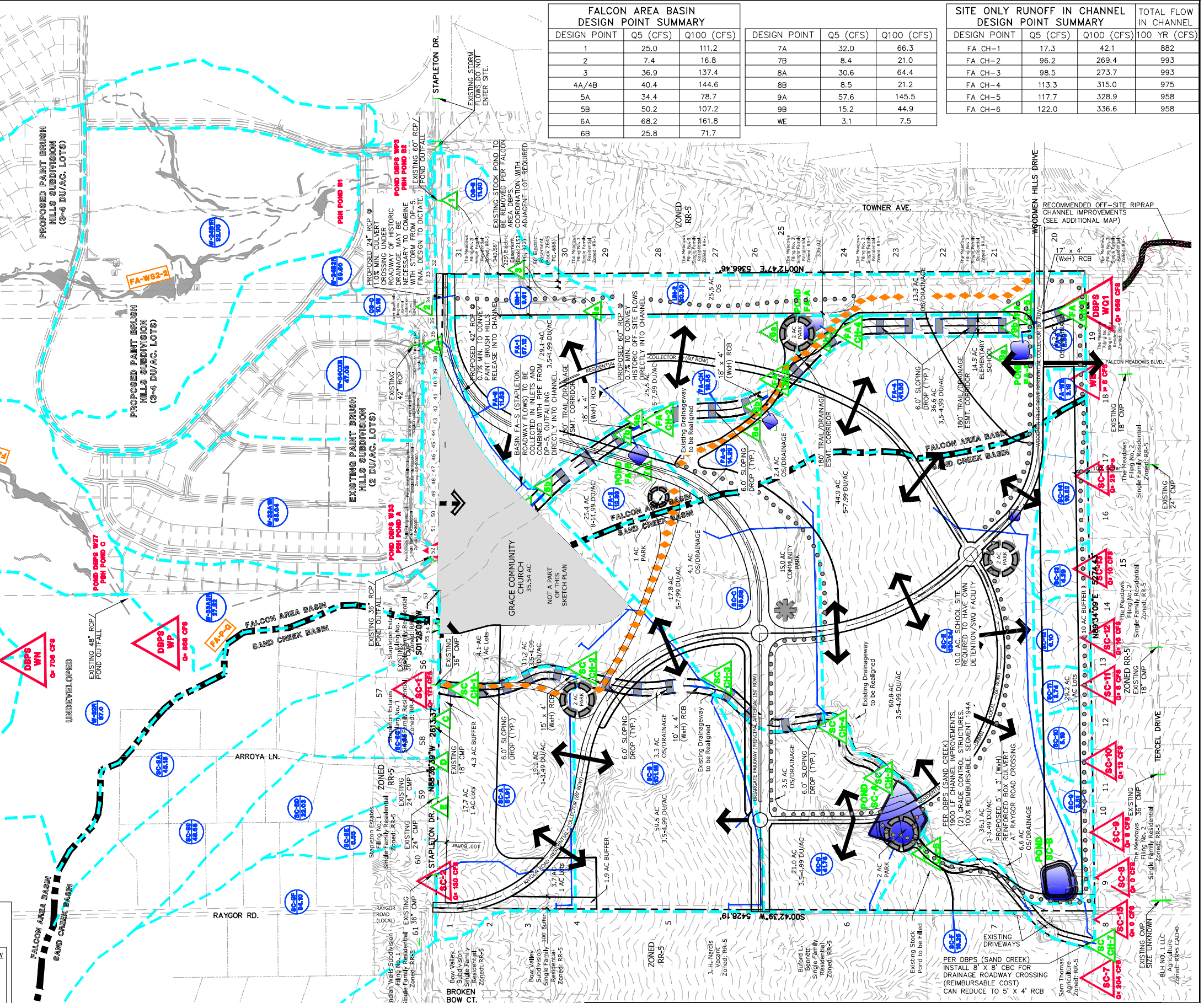
400 200 0 400 800

SCALE: 1" = 400'

FALCON AREA BASIN DESIGN POINT SUMMARY		
DESIGN POINT	Q5 (CFS)	Q100 (CFS)
1	25.0	111.2
2	7.4	16.8
3	36.9	137.4
4A/4B	40.4	144.6
5A	34.4	78.7
5B	50.2	107.2
6A	68.2	161.8
6B	25.8	71.7

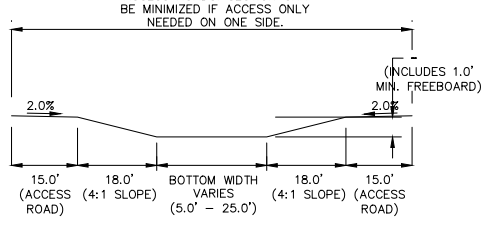
DESIGN POINT	Q5 (CFS)	Q100 (CFS)
7A	32.0	66.3
7B	8.4	21.0
8A	30.6	64.4
8B	8.5	21.2
9A	57.6	145.5
9B	15.2	44.9
WE	3.1	7.5

SITE ONLY RUNOFF IN CHANNEL DESIGN POINT SUMMARY			TOTAL FLOW IN CHANNEL
DESIGN POINT	Q5 (CFS)	Q100 (CFS)	100 YR (CFS)
FA CH–1	17.3	42.1	882
FA CH–2	96.2	269.4	993
FA CH–3	98.5	273.7	993
FA CH–4	113.3	315.0	975
FA CH–5	117.7	328.9	958
FA CH–6	122.0	336.6	958



SAND CREEK BASIN DESIGN POINT SUMMARY		
DESIGN POINT	Q5 (CFS)	Q100 (CFS)
SC–1/SC CH–1	27.2	171.4
SC–2	23.3	129.8
SC CH–2	62.2	370.8
SC CH–3	88.8	480.8
SC CH–4	105.4	576.6
SC CH–5	109.5	616.5
SC CH–6	8.2	125.9
SC–7/SC CH–7	16.6	203.8
SC–8	0.0	0.0
SC–9	3.4	8.1
SC–10	5.0	12.0
SC–11	3.3	8.0
SC–12	6.5	15.7
SC–13	4.1	9.9
SC–14	9.6	23.2
SC–15	0.0	0.0

TOTAL WIDTH VARIES (71.0' – 91.0')
INCLUDES 30' TOTAL FOR ACCESS ROADS. SECTION CAN BE MINIMIZED IF ACCESS ONLY NEEDED ON ONE SIDE.



SECTION	BOTTOM W	TOTAL W
CH–1 TO CH–2	5.0'	71.0'
CH–2 TO CH–3	15.0	81.0'
CH–3 TO CH–4	20.0'	86.0'
CH–4 TO CH–5	25.0'	91.0'
CH–5 TO CH–6	15.0'	81.0'

ENTIRE CHANNEL TO BE GRASS LINED. NO RIPRAP NECESSARY WITH PROPOSED SECTIONS.
SLOPE = 0.50%

SAND CREEK CHANNEL SECTIONS
SCALE 1" = 20'

REVIEW:

PREPARED UNDER MY DIRECT SUPERVISION FOR AND ON BEHALF OF CLASSIC CONSULTING ENGINEERS AND SURVEYORS, LLC

KYLE R. CAMPBELL, COLORADO P.E. #29794 DATE

CLASSIC CONSULTING
619 N. Cascade Avenue, Suite 200
Colorado Springs, Colorado 80903
(719)785-0790
(719)785-0799(Fax)

THE RANCH

MDDP DRAINAGE MAP
DEVELOPED CONDITIONS

DESIGNED BY	MAL	SCALE	DATE	11/11/18
DRAWN BY	BB	(H) 1"= 400'	SHEET 2	OF 2
CHECKED BY		(V) 1"= N/A	JOB NO.	1182.10

N:\118210\DRAWINGS\DEVELOPMENT\118210-MDDP-DEVELOPED.dwg, 11/12/2018 10:35:18 AM, 1:1

APPENDIX B

Hydrologic Computations

Existing Computations

COMPOSITE % IMPERVIOUS CALCULATIONS: EXISTING

Subdivision: Bent Grass Metro District
Location: CO, Colorado Springs

Project Name: Bent Grass
Project No.: CLH000014.20
Calculated By: CMWJ
Checked By:
Date: 10/25/19

Basin ID	Total Area (ac)	Paved/Dirt Roads			Lawns			Roofs			Basins Total Weighted % Imp.
		% Imp.	Area (ac)	Weighted % Imp.	% Imp.	Area (ac)	Weighted % Imp.	% Imp.	Area (ac)	Weighted % Imp.	
A-1	5.42	100	0.16	3.00	2	5.26	1.90	90	0.00	0.00	4.9
A-2	18.00	100	0.00	0.00	2	18.00	2.00	90	0.00	0.00	2.0
A-3	19.59	100	0.00	0.00	2	19.59	2.00	90	0.00	0.00	2.0
A-4	23.81	100	0.57	2.40	2	23.12	1.90	90	0.12	0.50	4.8
B-1	32.53	100	0.00	0.00	2	32.53	2.00	90	0.00	0.00	2.0
B-2	4.51	100	0.00	0.00	2	4.51	2.00	90	0.00	0.00	2.0
B-3	16.18	100	1.00	6.20	2	15.18	1.90	90	0.00	0.00	8.1
OS-1	13.06	100	0.84	6.40	2	11.65	1.80	90	0.57	3.90	12.1
OS-2	17.81	100	2.00	11.20	2	15.18	1.70	90	0.63	3.20	16.1
OS-3	9.99	100	0.69	6.90	2	9.08	1.80	90	0.22	2.00	10.7
OS-4	30.69	100	1.42	4.60	2	28.41	1.90	90	0.86	2.50	9.0
OS-5	14.13	100	0.17	1.20	2	13.74	1.90	90	0.22	1.40	4.5
OS-6	5.81	100	0.00	0.00	2	5.81	2.00	90	0.00	0.00	2.0

COMPOSITE RUNOFF COEFFICIENT CALCULATIONS: EXISTING

Subdivision: Bent Grass Metro District
Location: CO, Colorado Springs

Project Name: Bent Grass
Project No.: CLH000014.20
Calculated By: CMWJ
Checked By:
Date: 10/25/19

Basin ID	Total Area (ac)	Paved Roads			Lawns/Undeveloped			Roofs			Composite	Composite
		C_5	C_{100}	Area (ac)	C_5	C_{100}	Area (ac)	C_5	C_{100}	Area (ac)	C_5	C_{100}
A-1	5.42	0.90	0.96	0.16	0.09	0.36	5.26	0.73	0.81	0.00	0.11	0.38
A-2	18.00	0.90	0.96	0.00	0.09	0.36	18.00	0.73	0.81	0.00	0.09	0.36
A-3	19.59	0.90	0.96	0.00	0.09	0.36	19.59	0.73	0.81	0.00	0.09	0.36
A-4	23.81	0.90	0.96	0.57	0.09	0.36	23.12	0.73	0.81	0.12	0.11	0.38
B-1	32.53	0.90	0.96	0.00	0.09	0.36	32.53	0.73	0.81	0.00	0.09	0.36
B-2	4.51	0.90	0.96	0.00	0.09	0.36	4.51	0.73	0.81	0.00	0.09	0.36
B-3	16.18	0.90	0.96	1.00	0.09	0.36	15.18	0.73	0.81	0.00	0.14	0.40
OS-1	13.06	0.90	0.96	0.84	0.09	0.36	11.65	0.73	0.81	0.57	0.17	0.42
OS-2	17.81	0.90	0.96	2.00	0.09	0.36	15.18	0.73	0.81	0.63	0.20	0.44
OS-3	9.99	0.90	0.96	0.69	0.09	0.36	9.08	0.73	0.81	0.22	0.16	0.41
OS-4	30.69	0.90	0.96	1.42	0.09	0.36	28.41	0.73	0.81	0.86	0.15	0.40
OS-5	14.13	0.90	0.96	0.17	0.09	0.36	13.74	0.73	0.81	0.22	0.11	0.37
OS-6	5.81	0.90	0.96	0.00	0.09	0.36	5.81	0.73	0.81	0.00	0.09	0.36

C values are taken directly from Table 6-6 in the Colorado Springs DCM Vol. 1. (Referencing UDFCD 2001)

STANDARD FORM SF-2: EXISTING
TIME OF CONCENTRATION

Subdivision: Bent Grass Metro District
Location: CO, Colorado Springs

Project Name: Bent Grass
Project No.: CLH000014.20
Calculated By: CMWJ
Checked By:
Date: 10/25/19

SUB-BASIN DATA						INITIAL/OVERLAND (T_i)			TRAVEL TIME (T_t)					Tc CHECK (URBANIZED BASINS)			FINAL
BASIN ID	D.A. (AC)	Hydrologic Soils Group	Impervious (%)	C_{100}	C_5	L (FT)	S (%)	T_i (MIN)	L (FT)	S (%)	Cv	VEL. (FPS)	T_t (MIN)	COMP. T_c (MIN)	TOTAL LENGTH(FT)	Urbanized T_c (MIN)	T_c (MIN)
A-1	5.42	A	4.90	0.38	0.11	300	2.5	22.9	466	2.5	15.0	2.4	3.3	26.2	766.0	14.3	14.3
A-2	18.00	A	2.00	0.36	0.09	300	2.4	23.9	1130	2.0	15.0	2.1	8.9	32.8	1430.0	17.9	17.9
A-3	19.59	A	2.00	0.36	0.09	300	2.7	23.0	760	2.7	15.0	2.5	5.1	28.1	1060.0	15.9	15.9
A-4	23.81	A	4.80	0.38	0.11	300	2.0	24.9	1500	2.0	15.0	2.1	11.8	36.6	1800.0	20.0	20.0
B-1	32.53	A	2.00	0.36	0.09	300	2.6	23.3	1100	2.6	15.0	2.4	7.6	30.9	1400.0	17.8	17.8
B-2	4.51	A	2.00	0.36	0.09	300	3.0	22.2	323	5.0	15.0	3.4	1.6	23.8	623.0	13.5	13.5
B-3	16.18	A	8.10	0.40	0.14	300	2.9	21.4	780	2.9	15.0	2.6	5.1	26.4	1080.0	16.0	16.0
OS-1	13.06	A	12.10	0.42	0.17	300	2.5	21.7	1420	2.5	15.0	2.4	10.0	31.7	1720.0	19.6	19.6
OS-2	17.81	A	16.10	0.44	0.20	300	2.3	21.5	1370	2.3	15.0	2.3	10.0	31.6	1670.0	19.3	19.3
OS-3	9.99	A	10.70	0.41	0.16	300	2.0	23.7	850	2.0	15.0	2.1	6.7	30.3	1150.0	16.4	16.4
OS-4	30.69	A	9.00	0.40	0.15	300	2.3	22.9	2600	2.3	15.0	2.3	19.0	42.0	2900.0	26.1	26.1
OS-5	14.13	A	4.50	0.37	0.11	300	2.5	23.1	1400	3.0	15.0	2.6	9.0	32.1	1700.0	19.4	19.4
OS-6	5.81	A	2.00	0.36	0.09	300	2.0	25.4	400	2.0	15.0	2.1	3.1	28.6	700.0	13.9	13.9

NOTES:

T_i = (0.395*(1.1 - C_5)*(L)^0.5)/((S)^0.33), S in ft/ft

T_t=L/60V (Velocity From Fig. 501)

Velocity V=Cv*S^0.5, S in ft/ft

Tc Check = 10+L/180

For Urbanized basins a minimum T_c of 5.0 minutes is required.

For non-urbanized basins a minimum T_c of 10.0 minutes is required

STANDARD FORM SF-3: EXISTING

STORM DRAINAGE SYSTEM DESIGN

(RATIONAL METHOD PROCEDURE)

Subdivision: Bent Grass Metro District
Location: CO, Colorado Springs
Design Storm: 100-Year

Project Name: Bent Grass
Project No.: CLH000014.20
Calculated By: CMWJ
Checked By:
Date: 10/25/19

STREET	Design Point	DIRECT RUNOFF							TOTAL RUNOFF				STREET		PIPE			TRAVEL TIME			REMARKS
		Basin ID	Area (Ac)	Runoff Coeff.	Tc (min)	C*A (Ac)	I (in/hr)	Q (cfs)	Tc (min)	C*A (Ac)	I (in/hr)	Q (cfs)	Slope (%)	Street Flow (cfs)	Design Flow (cfs)	Slope (%)	Pipe Size (inches)	Length (ft)	Velocity (fps)	Tt (min)	
		OS-1	13.06	0.42	19.6	5.46	5.24	28.6													
		A-1	5.42	0.38	14.3	2.05	6.04	12.4													
	1								19.6	7.51	5.24	39.4									Total flow going offsite to Bent Grass F1 Residential
		OS-2	17.81	0.44	19.3	7.90	5.28	41.7													
		A-2	18.00	0.36	17.9	6.48	5.46	35.4													
	2								19.3	14.38	5.28	75.9									Total Flow entering Junction of RWT202&204
		OS-3	9.99	0.41	16.4	4.11	5.69	23.4													
		A-3	19.59	0.36	15.9	7.05	5.77	40.7													
	3								16.4	11.16	5.69	63.5									Total Flow entering Junction of RWT202&204
		OS-4	30.69	0.40	26.1	12.29	4.51	55.4													
		A-4	23.81	0.38	20.0	8.97	5.19	46.6													
	4								26.1	21.26	4.51	95.9									
	5	B-1	32.53	0.36	17.8	11.71	5.48	64.2													
	6	B-2	4.51	0.36	13.5	1.62	6.18	10.0													
	7	B-3	16.18	0.40	16.0	6.42	5.75	36.9													
	8							43.0													RWT204 - Per Matrix DBPS Existing Hydrology
	9							770													RWT202 - Per Matrix DBPS Existing Hydrology
	10							880													RWT210 - Per Matrix DBPS Existing Hydrology
	20							226													Flows into Basin OS-5 from Bent Grass Filing No. 3
		OS-5	14.13	0.37	19.4	5.29	5.26	27.8													
	11											253.8									Flows into Basin OS-6
		OS-6	5.81	0.36	13.9	2.09	6.10	12.7													
	12											266.6									Existing Sediment Pond in Basin and then flows to Bent Grass Meadows Drive

STANDARD FORM SF-3: EXISTING

STORM DRAINAGE SYSTEM DESIGN

(RATIONAL METHOD PROCEDURE)

Subdivision: Bent Grass Metro District
Location: CO, Colorado Springs
Design Storm: 5-Year

Project Name: Bent Grass
Project No.: CLH000014.20
Calculated By: CMWJ
Checked By:
Date: 10/25/19

STREET	Design Point	DIRECT RUNOFF							TOTAL RUNOFF				STREET		PIPE			TRAVEL TIME			REMARKS
		Basin ID	Area (Ac)	Runoff Coeff.	Tc (min)	C*A (Ac)	I (in/hr)	Q (cfs)	Tc (min)	C*A (Ac)	I (in/hr)	Q (cfs)	Slope (%)	Street Flow (cfs)	Design Flow (cfs)	Slope (%)	Pipe Size (inches)	Length (ft)	Velocity (fps)	Tt (min)	
		OS-1	13.06	0.17	19.6	2.22	3.12	6.9													
		A-1	5.42	0.11	14.3	0.62	3.60	2.2													
	1								19.6	2.84	3.12	8.9									Total flow going offsite to Bent Grass F1 Residential
		OS-2	17.81	0.20	19.3	3.63	3.14	11.4													
		A-2	18.00	0.09	17.9	1.62	3.25	5.3													
	2								19.3	5.25	3.14	16.5									Total Flow entering Junction of RWT202&204
		OS-3	9.99	0.16	16.4	1.60	3.39	5.4													
		A-3	19.59	0.09	15.9	1.76	3.43	6.0													
	3								16.4	3.36	3.39	11.4									Total Flow entering Junction of RWT202&204
		OS-4	30.69	0.15	26.1	4.46	2.69	12.0													
		A-4	23.81	0.11	20.0	2.68	3.09	8.3													
	4								26.1	7.14	2.69	19.2									
	5	B-1	32.53	0.09	17.8	2.93	3.27	9.6													
	6	B-2	4.51	0.09	13.5	0.41	3.68	1.5													
	7	B-3	16.18	0.14	16.0	2.27	3.42	7.8													
	8							4.0													RWT204 - Per Matrix DBPS Existing Hydrology
	9							0.0													RWT202 - Per Matrix DBPS Existing Hydrology
	10							14.0													RWT210 - Per Matrix DBPS Existing Hydrology
	20							98.1													Flows into Basin OS-5 from Bent Grass Filing No. 3
		OS-5	14.13	0.11	19.4	1.55	3.13	4.9													
	11											103.0									Flows into Basin OS-6
		OS-6	5.81	0.09	13.9	0.52	3.64	1.9													
	12											104.8									Existing Sediment Pond in Basin and then flows to Bent Grass Meadows Drive

Proposed Computations

COMPOSITE % IMPERVIOUS CALCULATIONS: PROPOSED

Subdivision: Bent Grass Residential Filing No. 2
Location: CO, Colorado Springs

Project Name: Bent Grass
Project No.: CLH000014
Calculated By: CMWJ
Checked By: SMB
Date: 1/13/20

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27
Basin ID	**Total Area (ac)**	**Paved/Gravel Roads**			**Lawns/Undeveloped**			**Roofs**			**Residential - 1/8 Acre**			**Residential - 1/4 Acre**			**Residential - 1/3 Acre**			**Residential - 1/2 Acre**			**Residential - 1 Acre**			**Basins Total Weighted % Imp.**
		% Imp.	**Area (ac)**	**Weighted % Imp.**	**% Imp.**	**Area (ac)**	**Weighted % Imp.**	**% Imp.**	**Area (ac)**	**Weighted % Imp.**	**% Imp.**	**Area (ac)**	**Weighted % Imp.**	**% Imp.**	**Area (ac)**	**Weighted % Imp.**	**% Imp.**	**Area (ac)**	**Weighted % Imp.**	**% Imp.**	**Area (ac)**	**Weighted % Imp.**	**% Imp.**	**Area (ac)**	**Weighted % Imp.**	
A-1	2.70	100	0.00	0.0	2	0.00	0.0	90	0.00	0.0	65.0	1.18	28.4	40	0.68	10.1	30	0.00	0.0	25	0.00	0.0	20	0.84	6.2	44.7
A-2	1.19	100	0.00	0.0	2	0.00	0.0	90	0.00	0.0	65.0	0.37	20.2	40	0.56	18.8	30	0.00	0.0	25	0.00	0.0	20	0.26	4.4	43.4
A-3	1.57	100	0.00	0.0	2	0.00	0.0	90	0.00	0.0	65.0	0.59	24.4	40	0.98	25.0	30	0.00	0.0	25	0.00	0.0	20	0.00	0.0	49.4
A-4	2.24	100	0.00	0.0	2	0.00	0.0	90	0.00	0.0	65.0	0.93	27.0	40	0.88	15.7	30	0.00	0.0	25	0.00	0.0	20	0.43	3.8	46.5
B-1	4.46	100	0.00	0.0	2	0.00	0.0	90	0.00	0.0	65.0	2.28	33.2	40	1.46	13.1	30	0.00	0.0	25	0.00	0.0	20	0.72	3.2	49.5
B-2	1.17	100	0.00	0.0	2	0.00	0.0	90	0.00	0.0	65.0	1.17	65.0	40	0.00	0.0	30	0.00	0.0	25	0.00	0.0	20	0.00	0.0	65.0
B-3	0.46	100	0.00	0.0	2	0.00	0.0	90	0.00	0.0	65.0	0.46	65.0	40	0.00	0.0	30	0.00	0.0	25	0.00	0.0	20	0.00	0.0	65.0
B-4	1.19	100	0.00	0.0	2	1.19	2.0	90	0.00	0.0	65.0	0.00	0.0	40	0.00	0.0	30	0.00	0.0	25	0.00	0.0	20	0.00	0.0	2.0
B-5	1.56	100	0.00	0.0	2	1.56	2.0	90	0.00	0.0	65.0	0.00	0.0	40	0.00	0.0	30	0.00	0.0	25	0.00	0.0	20	0.00	0.0	2.0
B-6	0.62	100	0.00	0.0	2	0.62	2.0	90	0.00	0.0	65.0	0.00	0.0	40	0.00	0.0	30	0.00	0.0	25	0.00	0.0	20	0.00	0.0	2.0
C-1	1.35	100	0.03	2.1	2	0.16	0.2	90	0.00	0.0	65.0	1.16	55.9	40	0.00	0.0	30	0.00	0.0	25	0.00	0.0	20	0.00	0.0	58.2
C-2	6.80	100	0.00	0.0	2	0.00	0.0	90	0.00	0.0	65.0	2.61	24.9	40	2.75	16.2	30	0.50	2.2	25	0.94	3.5	20	0.00	0.0	46.8
C-3	2.38	100	0.00	0.0	2	0.00	0.0	90	0.00	0.0	65.0	1.61	44.0	40	0.77	12.9	30	0.00	0.0	25	0.00	0.0	20	0.00	0.0	56.9
C-4	3.61	100	0.00	0.0	2	0.00	0.0	90	0.00	0.0	65.0	2.86	51.4	40	0.75	8.4	30	0.00	0.0	25	0.00	0.0	20	0.00	0.0	59.8
C-5	7.86	100	0.00	0.0	2	0.00	0.0	90	0.00	0.0	65.0	6.53	54.0	40	1.33	6.8	30	0.00	0.0	25	0.00	0.0	20	0.00	0.0	60.8
C-6	5.54	100	0.00	0.0	2	0.00	0.0	90	0.00	0.0	65.0	3.14	36.8	40	1.60	11.6	30	0.80	4.3	25	0.00	0.0	20	0.00	0.0	52.7
C-7	0.89	100	0.00	0.0	2	0.89	2.0	90	0.00	0.0	65.0	0.00	0.0	40	0.00	0.0	30	0.00	0.0	25	0.00	0.0	20	0.00	0.0	2.0
C-8	0.42	100	0.00	0.0	2	0.42	2.0	90	0.00	0.0	65.0	0.00	0.0	40	0.00	0.0	30	0.00	0.0	25	0.00	0.0	20	0.00	0.0	2.0
D-1	12.49	100	0.00	0.0	2	0.00	0.0	90	0.00	0.0	65.0	3.65	19.0	40	5.53	17.7	30	0.75	1.8	25	0.00	0.0	20	2.56	4.1	42.6
D-2	5.15	100	0.00	0.0	2	0.00	0.0	90	0.00	0.0	65.0	1.63	20.6	40	2.87	22.3	30	0.00	0.0	25	0.00	0.0	20	0.65	2.5	45.4
D-3	9.16	100	0.00	0.0	2	0.00	0.0	90	0.00	0.0	65.0	0.82	5.8	40	5.88	25.7	30	1.86	6.1	25	0.60	1.6	20	0.00	0.0	39.2
D-4	9.53	100	0.00	0.0	2	0.00	0.0	90	0.00	0.0	65.0	0.00	0.0	40	0.88	3.7	30	5.94	18.7	25	1.63	4.3	20	1.08	2.3	29.0
E-1	1.71	100	0.78	45.6	2	0.23	0.3	90	0.00	0.0	65.0	0.00	0.0	40	0.70	16.4	30	0.00	0.0	25	0.00	0.0	20	0.00	0.0	62.3
E-2	0.68	100	0.56	82.4	2	0.12	0.4	90	0.00	0.0	65.0	0.00	0.0	40	0.00	0.0	30	0.00	0.0	25	0.00	0.0	20	0.00	0.0	82.8
E-3	0.78	100	0.69	88.5	2	0.09	0.2	90	0.00	0.0	65.0	0.00	0.0	40	0.00	0.0	30	0.00	0.0	25	0.00	0.0	20	0.00	0.0	88.7
E-4	0.91	100	0.73	80.2	2	0.18	0.4	90	0.00	0.0	65.0	0.00	0.0	40	0.00	0.0	30	0.00	0.0	25	0.00	0.0	20	0.00	0.0	80.6
E-5	0.89	100	0.79	88.8	2	0.10	0.2	90	0.00	0.0	65.0	0.00	0.0	40	0.00	0.0	30	0.00	0.0	25	0.00	0.0	20	0.00	0.0	89.0
F-1	0.44	100	0.00	0.0	2	0.00	0.0	90	0.00	0.0	65.0	0.00	0.0	40	0.41	37.3	30	0.00	0.0	25	0.00	0.0	20	0.03	1.4	38.7
F-2	0.55	100	0.21	38.2	2	0.11	0.4	90	0.00	0.0	65.0	0.23	27.2	40	0.00	0.0	30	0.00	0.0	25	0.00	0.0	20	0.00	0.0	65.8
G-1	1.47	100	0.00	0.0	2	0.64	0.9	90	0.00	0.0	65.0	0.25	11.1	40	0.08	2.2	30	0.20	4.1	25	0.30	5.1	20	0.00	0.0	23.4
H-1	0.52	100	0.00	0.0	2	0.52	2.0	90	0.00	0.0	65.0	0.00	0.0	40	0.00	0.0	30	0.00	0.0	25	0.00	0.0	20	0.00	0.0	2.0
I-1	0.31	100	0.22	71.0	2	0.09	0.6	90	0.00	0.0	65.0	0.00	0.0	40	0.00	0.0	30	0.00	0.0	25	0.00	0.0	20	0.00	0.0	71.6
OS-1	32.28	100	2.15	6.7	2	29.25	1.8	90	0.88	2.5	65.0	0.00	0.0	40	0.00	0.0	30	0.00	0.0	25	0.00	0.0	20	0.00	0.0	11.0
OS-2	20.08	80	0.90	3.6	2	18.62	1.9	90	0.56	2.5	65.0	0.00	0.0	40	0.00	0.0	30	0.00	0.0	25	0.00	0.0	20	0.00	0.0	8.0
OS-3	10.62	80	0.48	3.6	2	9.84	1.9	90	0.30	2.5	65.0	0.00	0.0	40	0.00	0.0	30	0.00	0.0	25	0.00	0.0	20	0.00	0.0	8.0
OS-4	2.64	100	0.00	0.0	2	2.64	2.0	90	0.00	0.0	65.0	0.00	0.0	40	0.00	0.0	30	0.00	0.0	25	0.00	0.0	20	0.00	0.0	2.0
OS-5	14.13	100	0.17	1.2	2	13.74	1.9	90	0.22	1.4	65.0	0.00	0.0	40	0.00	0.0	30	0.00	0.0	25	0.00	0.0	20	0.00	0.0	4.5
OS-6	5.38	100	0.00	0.0	2	0.00	0.0	90	0.00	0.0	65.0	5.38	65.0	40	0.00	0.0	30	0.00	0.0	25	0.00	0.0	20	0.00	0.0	65.0

Lot Type Identification:	
Lot Size (SF)	*Lot Size (Acre)*
0 - 8,167	1/8 Acre
8,168 - 12,704	1/4 Acre
12,705 - 18,149	1/3 Acre
18,150 - 32,670	1/2 Acre
32,671 - 43,560	1 Acre

NOTES:
% Impervious values are taken directly from Table 6-6 in the Colorado Springs DCM Vol. 1. CH. 6 (Referencing UDFCD 2001)

COMPOSITE RUNOFF COEFFICIENT CALCULATIONS: PROPOSED

Subdivision: Bent Grass Residential Filing No. 2
Location: CO, Colorado Springs

Project Name: Bent Grass
Project No.: CLH000014
Calculated By: CMWJ
Checked By: SMB
Date: 1/13/20

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28
Basin ID	Total Area (ac)	Paved/Gravel Roads			Lawns/Undeveloped			Roofs			Residential - 1/8 Acre			Residential - 1/4 Acre			Residential - 1/3 Acre			Residential - 1/2 Acre			Residential - 1 Acre			Composite C_5	Composite C_{100}
		C_5	C_{100}	Area (ac)	C_5	C_{100}	Area (ac)	C_5	C_{100}	Area (ac)	C_5	C_{100}	Area (ac)	C_5	C_{100}	Area (ac)	C_5	C_{100}	Area (ac)	C_5	C_{100}	Area (ac)	C_5	C_{100}	Area (ac)		
A-1	2.70	0.90	0.96	0.00	0.09	0.36	0.00	0.73	0.81	0.00	0.45	0.59	1.18	0.30	0.50	0.68	0.25	0.47	0.00	0.22	0.46	0.00	0.20	0.44	0.84	0.33	0.52
A-2	1.19	0.90	0.96	0.00	0.09	0.36	0.00	0.73	0.81	0.00	0.45	0.59	0.37	0.30	0.50	0.56	0.25	0.47	0.00	0.22	0.46	0.00	0.20	0.44	0.26	0.32	0.51
A-3	1.57	0.90	0.96	0.00	0.09	0.36	0.00	0.73	0.81	0.00	0.45	0.59	0.59	0.30	0.50	0.98	0.25	0.47	0.00	0.22	0.46	0.00	0.20	0.44	0.00	0.36	0.53
A-4	2.24	0.90	0.96	0.00	0.09	0.36	0.00	0.73	0.81	0.00	0.45	0.59	0.93	0.30	0.50	0.88	0.25	0.47	0.00	0.22	0.46	0.00	0.20	0.44	0.43	0.34	0.53
B-1	4.46	0.90	0.96	0.00	0.09	0.36	0.00	0.73	0.81	0.00	0.45	0.59	2.28	0.30	0.50	1.46	0.25	0.47	0.00	0.22	0.46	0.00	0.20	0.44	0.72	0.36	0.54
B-2	1.17	0.90	0.96	0.00	0.09	0.36	0.00	0.73	0.81	0.00	0.45	0.59	1.17	0.30	0.50	0.00	0.25	0.47	0.00	0.22	0.46	0.00	0.20	0.44	0.00	0.45	0.59
B-3	0.46	0.90	0.96	0.00	0.09	0.36	0.00	0.73	0.81	0.00	0.45	0.59	0.46	0.30	0.50	0.00	0.25	0.47	0.00	0.22	0.46	0.00	0.20	0.44	0.00	0.45	0.59
B-4	1.19	0.90	0.96	0.00	0.09	0.36	1.19	0.73	0.81	0.00	0.45	0.59	0.00	0.30	0.50	0.00	0.25	0.47	0.00	0.22	0.46	0.00	0.20	0.44	0.00	0.09	0.36
B-5	1.56	0.90	0.96	0.00	0.09	0.36	1.56	0.73	0.81	0.00	0.45	0.59	0.00	0.30	0.50	0.00	0.25	0.47	0.00	0.22	0.46	0.00	0.20	0.44	0.00	0.09	0.36
B-6	0.62	0.90	0.96	0.00	0.09	0.36	0.62	0.73	0.81	0.00	0.45	0.59	0.00	0.30	0.50	0.00	0.25	0.47	0.00	0.22	0.46	0.00	0.20	0.44	0.00	0.09	0.36
C-1	1.35	0.90	0.96	0.03	0.09	0.36	0.16	0.73	0.81	0.00	0.45	0.59	1.16	0.30	0.50	0.00	0.25	0.47	0.00	0.22	0.46	0.00	0.20	0.44	0.00	0.42	0.57
C-2	6.80	0.90	0.96	0.00	0.09	0.36	0.00	0.73	0.81	0.00	0.45	0.59	2.61	0.30	0.50	2.75	0.25	0.47	0.50	0.22	0.46	0.94	0.20	0.44	0.00	0.34	0.53
C-3	2.38	0.90	0.96	0.00	0.09	0.36	0.00	0.73	0.81	0.00	0.45	0.59	1.61	0.30	0.50	0.77	0.25	0.47	0.00	0.22	0.46	0.00	0.20	0.44	0.00	0.40	0.56
C-4	3.61	0.90	0.96	0.00	0.09	0.36	0.00	0.73	0.81	0.00	0.45	0.59	2.86	0.30	0.50	0.75	0.25	0.47	0.00	0.22	0.46	0.00	0.20	0.44	0.00	0.42	0.57
C-5	7.86	0.90	0.96	0.00	0.09	0.36	0.00	0.73	0.81	0.00	0.45	0.59	6.53	0.30	0.50	1.33	0.25	0.47	0.00	0.22	0.46	0.00	0.20	0.44	0.00	0.42	0.57
C-6	5.54	0.90	0.96	0.00	0.09	0.36	0.00	0.73	0.81	0.00	0.45	0.59	3.14	0.30	0.50	1.60	0.25	0.47	0.80	0.22	0.46	0.00	0.20	0.44	0.00	0.38	0.55
C-7	0.89	0.90	0.96	0.00	0.09	0.36	0.89	0.73	0.81	0.00	0.45	0.59	0.00	0.30	0.50	0.00	0.25	0.47	0.00	0.22	0.46	0.00	0.20	0.44	0.00	0.09	0.36
C-8	0.42	0.90	0.96	0.00	0.09	0.36	0.42	0.73	0.81	0.00	0.45	0.59	0.00	0.30	0.50	0.00	0.25	0.47	0.00	0.22	0.46	0.00	0.20	0.44	0.00	0.09	0.36
D-1	12.49	0.90	0.96	0.00	0.09	0.36	0.00	0.73	0.81	0.00	0.45	0.59	3.65	0.30	0.50	5.53	0.25	0.47	0.75	0.22	0.46	0.00	0.20	0.44	2.56	0.32	0.51
D-2	5.15	0.90	0.96	0.00	0.09	0.36	0.00	0.73	0.81	0.00	0.45	0.59	1.63	0.30	0.50	2.87	0.25	0.47	0.00	0.22	0.46	0.00	0.20	0.44	0.65	0.33	0.52
D-3	9.16	0.90	0.96	0.00	0.09	0.36	0.00	0.73	0.81	0.00	0.45	0.59	0.82	0.30	0.50	5.88	0.25	0.47	1.86	0.22	0.46	0.60	0.20	0.44	0.00	0.30	0.50
D-4	9.53	0.90	0.96	0.00	0.09	0.36	0.00	0.73	0.81	0.00	0.45	0.59	0.00	0.30	0.50	0.88	0.25	0.47	5.94	0.22	0.46	1.63	0.20	0.44	1.08	0.24	0.47
E-1	1.71	0.90	0.96	0.78	0.09	0.36	0.23	0.73	0.81	0.00	0.45	0.59	0.00	0.30	0.50	0.70	0.25	0.47	0.00	0.22	0.46	0.00	0.20	0.44	0.00	0.55	0.69
E-2	0.68	0.90	0.96	0.56	0.09	0.36	0.12	0.73	0.81	0.00	0.45	0.59	0.00	0.30	0.50	0.00	0.25	0.47	0.00	0.22	0.46	0.00	0.20	0.44	0.00	0.76	0.85
E-3	0.78	0.90	0.96	0.69	0.09	0.36	0.09	0.73	0.81	0.00	0.45	0.59	0.00	0.30	0.50	0.00	0.25	0.47	0.00	0.22	0.46	0.00	0.20	0.44	0.00	0.81	0.89
E-4	0.91	0.90	0.96	0.73	0.09	0.36	0.18	0.73	0.81	0.00	0.45	0.59	0.00	0.30	0.50	0.00	0.25	0.47	0.00	0.22	0.46	0.00	0.20	0.44	0.00	0.74	0.84
E-5	0.89	0.90	0.96	0.79	0.09	0.36	0.10	0.73	0.81	0.00	0.45	0.59	0.00	0.30	0.50	0.00	0.25	0.47	0.00	0.22	0.46	0.00	0.20	0.44	0.00	0.81	0.89
F-1	0.44	0.90	0.96	0.00	0.09	0.36	0.00	0.73	0.81	0.00	0.45	0.59	0.00	0.30	0.50	0.41	0.25	0.47	0.00	0.22	0.46	0.00	0.20	0.44	0.03	0.29	0.50
F-2	0.55	0.90	0.96	0.21	0.09	0.36	0.11	0.73	0.81	0.00	0.45	0.59	0.23	0.30	0.50	0.00	0.25	0.47	0.00	0.22	0.46	0.00	0.20	0.44	0.00	0.55	0.69
G-1	1.47	0.90	0.96	0.00	0.09	0.36	0.64	0.73	0.81	0.00	0.45	0.59	0.25	0.30	0.50	0.08	0.25	0.47	0.20	0.22	0.46	0.30	0.20	0.44	0.00	0.21	0.44
H-1	0.52	0.90	0.96	0.00	0.09	0.36	0.52	0.73	0.81	0.00	0.45	0.59	0.00	0.30	0.50	0.00	0.25	0.47	0.00	0.22	0.46	0.00	0.20	0.44	0.00	0.09	0.36
I-1	0.31	0.90	0.96	0.22	0.09	0.36	0.09	0.73	0.81	0.00	0.45	0.59	0.00	0.30	0.50	0.00	0.25	0.47	0.00	0.22	0.46	0.00	0.20	0.44	0.00	0.66	0.79
OS-1	32.28	0.90	0.96	2.15	0.09	0.36	29.25	0.73	0.81	0.88	0.45	0.59	0.00	0.30	0.50	0.00	0.25	0.47	0.00	0.22	0.46	0.00	0.20	0.44	0.00	0.16	0.41
OS-2	20.08	0.90	0.96	0.90	0.09	0.36	18.62	0.73	0.81	0.56	0.45	0.59	0.00	0.30	0.50	0.00	0.25	0.47	0.00	0.22	0.46	0.00	0.20	0.44	0.00	0.14	0.40
OS-3	10.62	0.90	0.96	0.48	0.09	0.36	9.84	0.73	0.81	0.30	0.45	0.59	0.00	0.30	0.50	0.00	0.25	0.47	0.00	0.22	0.46	0.00	0.20	0.44	0.00	0.14	0.40
OS-4	2.64	0.90	0.96	0.00	0.09	0.36	2.64	0.73	0.81	0.00	0.45	0.59	0.00	0.30	0.50	0.00	0.25	0.47	0.00	0.22	0.46	0.00	0.20	0.44	0.00	0.09	0.36
OS-5	14.13	0.90	0.96	0.17	0.09	0.36	13.74	0.73	0.81	0.22	0.45	0.59	0.00	0.30	0.50	0.00	0.25	0.47	0.00	0.22	0.46	0.00	0.20	0.44	0.00	0.11	0.37
OS-6	5.38	0.90	0.96	0.00	0.09	0.36	0.00	0.73	0.81	0.00	0.45	0.59	5.38	0.30	0.50	0.00	0.25	0.47	0.00	0.22	0.46	0.00	0.20	0.44	0.00	0.45	0.59

Lot Type Identification:	
Lot Size (SF)	*Lot Size (Acre)*
0 - 8,167	<= 1/8 Acre
8,168 - 12,704	1/4 Acre
12,705 - 18,149	1/3 Acre
18,150 - 32,670	1/2 Acre
32,671 - 43,560	1 Acre

NOTES:
C values are taken directly from Table 6-6 in the Colorado Springs DCM Vol. 1. CH. 6 (Referencing UDFCD 2001)
Coeffficients use HSG A&B soils - Refer to "Appendix A: Exhibits and Figures" for soil map

STANDARD FORM SF-2: PROPOSED TIME OF CONCENTRATION

Subdivision: Bent Grass Residential Filing No. 2
Location: CO, Colorado Springs

Project Name: Bent Grass
Project No.: CLH000014
Calculated By: CMWJ
Checked By: SMB
Date: 1/13/20

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
SUB-BASIN DATA						INITIAL/OVERLAND (T_i)			TRAVEL TIME (T_t)					Tc CHECK (URBANIZED BASINS)			FINAL
BASIN ID	D.A. (AC)	Hydrologic Soils Group	Impervious (%)	C_5	C_{100}	L (FT)	S (%)	T_i (MIN)	L (FT)	S (%)	Cv	VEL. (FPS)	T_t (MIN)	COMP. T_c (MIN)	TOTAL LENGTH(FT)	Urbanized T_c (MIN)	T_c (MIN)
A-1	2.70	A	44.7	0.33	0.52	100	1.3	12.8	550	1.3	20	2.3	4.0	16.8	650.0	13.6	13.6
A-2	1.19	A	43.4	0.32	0.51	100	4.3	8.8	310	2.3	20	3.0	1.7	10.5	410.0	12.3	10.5
A-3	1.57	A	49.4	0.36	0.53	70	1.0	11.3	680	1.2	20	2.2	5.2	16.5	750.0	14.2	14.2
A-4	2.24	A	46.5	0.34	0.53	100	4.2	8.6	650	1.7	20	2.6	4.2	12.8	750.0	14.2	12.8
B-1	4.46	A	49.5	0.36	0.54	100	2.0	10.8	910	1.2	20	2.2	6.9	17.7	1010.0	15.6	15.6
B-2	1.17	A	65.0	0.45	0.59	85	0.2	18.7	430	0.9	20	1.9	3.9	22.6	515.0	12.9	12.9
B-3	0.46	A	65.0	0.45	0.59	15	2.0	3.7	190	1.0	20	2.0	1.6	5.2	205.0	11.1	5.2
B-4	1.19	A	2.0	0.09	0.36	300	2.7	22.9	690	2.7	15	2.5	4.6	27.6	990.0	15.5	15.5
B-5	1.56	A	2.0	0.09	0.36	200	2.7	18.8	100	2.7	15	2.5	0.7	19.5	300.0	11.7	11.7
B-6	0.62	A	2.0	0.09	0.36	100	5.0	10.8	30	2.7	15	2.5	0.2	11.0	130.0	10.7	10.7
C-1	1.35	A	58.2	0.42	0.57	35	2.4	5.5	400	2.4	20	3.1	2.2	7.7	435.0	12.4	7.7
C-2	6.80	A	46.8	0.34	0.53	100	2.0	11.0	1770	1.5	20	2.4	12.0	23.1	1870.0	20.4	20.4
C-3	2.38	A	56.9	0.40	0.56	100	1.6	11.0	810	1.0	20	2.0	6.8	17.7	910.0	15.1	15.1
C-4	3.61	A	59.8	0.42	0.57	100	2.0	9.9	973	2.0	20	2.8	5.7	15.6	1073.0	16.0	15.6
C-5	7.86	A	60.8	0.42	0.57	100	2.0	9.9	1200	1.3	20	2.2	8.9	18.8	1300.0	17.2	17.2
C-6	5.54	A	52.7	0.38	0.55	100	3.0	9.1	1230	1.5	20	2.4	8.4	17.5	1330.0	17.4	17.4
C-7	0.89	A	2.0	0.09	0.36	80	2.5	12.2	150	2.0	15	2.1	1.2	13.4	230.0	11.3	11.3
C-8	0.42	A	2.0	0.09	0.36	100	2.5	13.6	170	2.5	15	2.4	1.2	14.8	270.0	11.5	11.5
D-1	12.49	A	42.6	0.32	0.51	100	1.0	14.3	1180	2.0	20	2.8	7.0	21.2	1280.0	17.1	17.1
D-2	5.15	A	45.4	0.33	0.52	100	1.0	14.1	1000	2.0	20	2.8	5.9	20.0	1100.0	16.1	16.1
D-3	9.16	A	39.2	0.30	0.50	90	1.5	12.1	1020	1.5	20	2.4	6.9	19.1	1110.0	16.2	16.2
D-4	9.53	A	29.0	0.24	0.47	100	1.5	13.8	1700	1.5	20	2.4	11.6	25.3	1800.0	20.0	20.0
E-1	1.71	A	62.3	0.55	0.69	25	2.0	4.0	940	1.0	20	2.0	7.8	11.8	965.0	15.4	11.8
E-2	0.68	A	82.8	0.76	0.85	25	2.0	2.5	665	1.6	20	2.5	4.4	6.9	690.0	13.8	6.9
E-3	0.78	A	88.7	0.81	0.89	25	2.0	2.1	632	1.0	20	2.0	5.3	7.4	657.0	13.7	7.4
E-4	0.91	A	80.6	0.74	0.84	25	2.0	2.6	913	2.0	20	2.8	5.4	8.0	938.0	15.2	8.0
E-5	0.89	A	89.0	0.81	0.89	25	2.0	2.1	903	2.1	20	2.9	5.2	7.3	928.0	15.2	7.3
F-1	0.44	A	38.7	0.29	0.50	66	2.5	8.9	1	1.0	15	10.4	0.1	9.0	66.0	10.4	9.0
F-2	0.55	A	65.8	0.55	0.69	25	2.0	4.0	464	4.0	20	4.0	1.9	5.9	489.0	12.7	5.9
G-1	1.47	A	23.4	0.21	0.44	20	2.0	5.8	700	3.5	15	2.8	4.2	9.9	720.0	14.0	9.9
H-1	0.52	A	2.0	0.09	0.36	25	2.0	7.3	135	2.0	20	2.8	0.8	8.1	160.0	10.9	8.1
I-1	0.31	A	71.6	0.66	0.79	25	2.0	3.2	135	2.0	20	2.8	0.8	4.0	160.0	10.9	5.0
OS-1	32.28	A	11.0	0.16	0.41	100	2.4	12.9	2100	2.2	15	2.2	15.7	28.6	2200.0	22.2	22.2
OS-2	20.08	A	8.0	0.14	0.40	100	2.3	13.3	1400	2.3	15	2.3	10.3	23.6	1500.0	18.3	18.3
OS-3	10.62	A	8.0	0.14	0.40	100	2.0	14.0	1500	2.0	15	2.1	11.8	25.7	1600.0	18.9	18.9
OS-4	2.64	A	2.0	0.09	0.36	100	2.0	14.7	400	2.0	15	2.1	3.1	17.8	500.0	12.8	12.8
OS-5	14.13	A	4.5	0.11	0.37	100	2.5	13.4	1600	3.0	15	2.6	10.3	23.6	1700.0	19.4	19.4
OS-6	5.38	A	65.0	0.45	0.59	100	2.0	9.4	600	2.0	15	2.1	4.7	14.2	700.0	13.9	13.9

NOTES:

T_i = (0.395*(1.1 - C_5)*(L)^0.5)/((S)^0.33), S in ft/ft

T_t=L/60V (Velocity From Fig. 501)

Velocity V=Cv*S^0.5, S in ft/ft

Tc Check = 10+L/180

For Urbanized basins a minimum T_c of 5.0 minutes is required.

For non-urbanized basins a minimum T_c of 10.0 minutes is required

STANDARD FORM SF-3: PROPOSED

STORM DRAINAGE SYSTEM DESIGN

(RATIONAL METHOD PROCEDURE)

Subdivision: Bent Grass Residential Filing No. 2
Location: CO, Colorado Springs
Design Storm: 100-Year

Project Name: Bent Grass
Project No.: CLH000014
Calculated By: CMWJ
Checked By: SMB
Date: 1/13/20

		DIRECT RUNOFF							TOTAL RUNOFF				STREET		PIPE			TRAVEL TIME			
STREET	Design Point	Basin ID	Area (Ac)	Runoff Coeff.	Tc (min)	C*A (Ac)	I (in/hr)	Q (cfs)	Tc (min)	C*A (Ac)	I (in/hr)	Q (cfs)	Slope (%)	Street Flow (cfs)	Design Flow (cfs)	Slope (%)	Pipe Size (inches)	Length (ft)	Velocity (fps)	Tt (min)	REMARKS
	40	OS-1	32.28	0.41	22.2	13.23	4.92	65.1													Flows collect into Swale - A and is conveyed to existing channel (Tract H)
	1	A-1	2.70	0.52	13.6	1.40	6.16	8.6					1.0	8.6				160	2.0	1.3	Total flow on North side of Niebrara Drive
	2	A-2	1.19	0.51	10.5	0.61	6.82	4.2													
	2								14.9	2.01	5.92	11.9	1.5	11.9				290	2.4	2.0	Total flow at DP-2
	3	A-3	1.57	0.53	14.2	0.83	6.05	5.0													
	3								16.9	2.84	5.61	15.9	1.4	15.9				60	2.4	0.4	Total flow at NE corner of Bent Grass M.D. & Berwyn Ct.
	4	A-4	2.24	0.53	12.8	1.19	6.31	7.5													Total flow at NW corner of Bent Grass M.D. & Berwyn Ct.
	4								17.3	4.03	5.55	22.4	1.0	22.4				840	2.0	7.0	Total flow entering Bent Grass M.D. from Berwyn Ct.
	5	D-2	5.15	0.52	16.1	2.68	5.73	15.4													Total flow at DP-5
	6	D-1	12.49	0.51	17.1	6.37	5.58	35.5													Total flow at DP-6
	5&6								17.1	9.05	5.58	50.5 25.2									Q at each inlet = 25.2 cfs
	5								17.1	4.53	5.58	25.2	1.1	9.6	15.6			60	2.1	0.5	Future total flow by-passing inlet = 9.6 cfs Future total flow captured by inlet = 15.6 cfs
	6								17.1	4.53	5.58	25.2	1.0	5.7	19.5						Future total flow by-passing inlet = 5.7 cfs Future total flow captured by inlet = 19.5 cfs
	6								17.1	6.29	5.58	35.1									Total flow piped to future storm infrastructure
	6								17.6	2.75	5.51	15.2	1	15.2				430	2.0	3.6	Future total flow entering Bent Grass M.D. = 15.2 cfs // Routed to inlet at DP-8
	7	E-3	0.78	0.89	7.4	0.69	7.70	5.3													Total flow at DP-7 along South side of Bent Grass M.D.
	8	E-2	0.68	0.85	6.9	0.58	7.89	4.6													
	8-W								21.2	3.33	5.04	16.8									Total flow approaching DP-8 from the West
	8	E-1	1.71	0.69	11.8	1.18	6.51	7.7													
	8-E								24.3	5.21	4.69	24.4									Total flow approaching DP-8 from the East
	8								24.3	8.54	4.69	40.1									Total flow at DP-8 along North side of Bent Grass M.D
	7&8								24.3	9.23	4.69	43.3 21.6									Total flow at DP-7&8 Q at each inlet = 21.6 cfs
	7														21.6						Total flow captured by inlet = 21.6 cfs
	7														21.6						Total flow at DP-7 = 21.6 cfs // Piped to inlet at DP-8
	8														21.6						Total flow captured by inlet = 21.6 cfs
	8								24.3	15.52	4.69	72.8			72.8						Total flow at DP-8 = 72.8 cfs // Piped to North Water Quality Pond
	9	B-3	0.46	0.59	5.2	0.27	8.56	2.3					2.5	2.3				350	3.2	1.8	Total flow at the west point of Silky Thread Rd.
	10	B-4	1.19	0.36	15.5	0.43	5.83	2.5													Total flow at south west corner of Basin B-4. Flows into Swale B.
	10								15.5	0.70	5.83	4.1									Total flow to Swale B - directs flow to North Water Quality Pond
	11	B-1	4.46	0.54	15.6	2.41	5.81	14.0													Total flow on North side of Willmore Dr.

STANDARD FORM SF-3: PROPOSED

STORM DRAINAGE SYSTEM DESIGN

(RATIONAL METHOD PROCEDURE)

Subdivision: Bent Grass Residential Filing No. 2
Location: CO, Colorado Springs
Design Storm: 100-Year

Project Name: Bent Grass
Project No.: CLH000014
Calculated By: CMWJ
Checked By: SMB
Date: 1/13/20

		DIRECT RUNOFF							TOTAL RUNOFF				STREET		PIPE			TRAVEL TIME			
STREET	Design Point	Basin ID	Area (Ac)	Runoff Coeff.	Tc (min)	C*A (Ac)	I (in/hr)	Q (cfs)	Tc (min)	C*A (Ac)	I (in/hr)	Q (cfs)	Slope (%)	Street Flow (cfs)	Design Flow (cfs)	Slope (%)	Pipe Size (inches)	Length (ft)	Velocity (fps)	Tt (min)	REMARKS
	12	B-2	1.17	0.59	12.9	0.69	6.30	4.3													Total flow on South side of Willmore Dr.
	13								15.6	3.10	5.81	18.0	2.5	18.0				200	3.2	1.1	Total flow going West off of Willmore Dr. into Swale B
	14	B-5	1.56	0.36	11.7	0.56	6.54	3.7													Total flow sheet flowing from Basin B-4 to Swale B
	14								16.7	4.36	5.65	24.6									Total flow entering proposed North Water Quality Pond from Swale B
	15	B-6	0.62	0.36	10.7	0.22	6.76	1.5													Sheet flows directly into proposed North Water Quality Pond
	15								24.3	20.10	4.69	94.3									Total flow entering proposed North Water Quality Pond
Flow values from UD-Detention Spreadsheet	15A											37.0									Peak Outflow from North WQCV Detention Pond = 37 cfs
	AA								24.3	73.76	2.79	205.8									Total flow at US end of box culverts crossing Bent Grass Meadows Dr
	BB								24.3	74.45	2.79	207.7									Total flow at DS end of box culverts crossing Bent Grass Meadows Dr
	16	C-5	7.86	0.57	17.2	4.48	5.56	24.9					1.0	9.4	15.5			150	2.0	1.3	Total flow by-passing inlet = 9.4 cfs Total flow at DP-16 = 15.5 cfs // Piped to inlet at DP-17
	17	C-6	5.54	0.55	17.4	3.05	5.54	16.9					1	7.7	9.2			150	2.0	1.3	Total flow by-passing inlet = 7.7 cfs Total flow captured by inlet = 9.2 cfs
	17								17.4	4.45	5.54	24.6			24.6						Total flow at DP-17 = 24.6 cfs // Piped to manhole at DP-19A
	18	C-4	3.61	0.57	15.6	2.06	5.81	12.0													
	18								18.5	3.75	5.39	20.2									Total flow approaching DP-18 from the NW
	18	C-3	2.38	0.56	15.1	1.33	5.90	7.8													Total flow approaching DP-18 from the SE
	18								18.5	5.08	5.39	27.4			27.4						Total flow at DP-18 = 27.4 cfs // Piped to inlet at DP-19
	19	C-1	1.35	0.57	7.7	0.77	7.59	5.8					1.5	5.8				1400	2.4	9.5	
	19	C-2	6.80	0.53	20.4	3.60	5.14	18.5													
	19								20.4	4.37	5.14	22.5									Total flow approaching DP-19 from the SE
	19								20.4	5.76	5.14	29.6			29.6						Total flow captured by inlet = 29.6 cfs
	19								20.4	10.84	5.14	55.7			55.7						Total flow at DP-19 = 55.7 cfs // Piped to manhole at DP-19A
	19A								20.4	15.29	5.14	78.6			78.6						Total flow at DP-19 = 78.6 cfs // Piped to South Water Quality Pond
	20	G-1	1.47	0.44	9.9	0.65	6.95	4.5													Total flow at FES (DP-20) = 4.5 cfs // Piped to South Water Quality Pond
	20A	C-7	0.89	0.36	11.3	0.32	6.63	2.1													Flows directly into South Water Quality Pond
	20A								20.4	16.26	5.14	83.6			83.6						Total flow to South Water Quality Pond
Flow values from UD-Detention Spreadsheet	20B											64.9									Peak Outflow from South WQCV Detention Pond into Swale C = 64.9 cfs
	21	D-3	9.16	0.50	16.2	4.58	5.72	26.2							26.2						Total Flow at DP-21
	22	OS-2	20.08	0.40	18.3	8.03	5.41	43.4					1.5	43.4				1800	2.4	12.2	
	22	D-4	9.53	0.47	20.0	4.48	5.19	23.3													
	22								30.6	12.51	4.12	51.5									Total flow at DP-22

STANDARD FORM SF-3: PROPOSED

STORM DRAINAGE SYSTEM DESIGN

(RATIONAL METHOD PROCEDURE)

Subdivision: Bent Grass Residential Filing No. 2
Location: CO, Colorado Springs
Design Storm: 100-Year

Project Name: Bent Grass
Project No.: CLH000014
Calculated By: CMWJ
Checked By: SMB
Date: 1/13/20

		DIRECT RUNOFF							TOTAL RUNOFF				STREET		PIPE			TRAVEL TIME			
STREET	Design Point	Basin ID	Area (Ac)	Runoff Coeff.	Tc (min)	C*A (Ac)	I (in/hr)	Q (cfs)	Tc (min)	C*A (Ac)	I (in/hr)	Q (cfs)	Slope (%)	Street Flow (cfs)	Design Flow (cfs)	Slope (%)	Pipe Size (inches)	Length (ft)	Velocity (fps)	Tt (min)	REMARKS
	21&22								30.6	17.09	4.12	70.4 35.2									Total flow at DP-21&22 Q at each inlet = 35.2 cfs
	21								30.6	8.55	4.12	35.2	1.25	12.1	23.1			60	2.2	0.4	Total flow by-passing inlet = 12.1 cfs Total flow at DP-21 = 23.1 cfs // Piped to inlet at DP-22
	22								30.6	8.55	4.12	35.2		12.1	23.1						Total flow by-passing inlet = 12.1 cfs Total flow captured by inlet = 23.1 cfs
	22								31.0	5.88	4.08	24.0	2.5	24.0				550	3.2	2.9	Total flow entering Bent Grass M.D. from DP-21&22
	22								30.6	11.21	4.12	46.2			46.2						Total flow at DP-22 = 46.2 cfs // Piped to inlet at DP-23
	23	OS-3	10.62	0.40	18.9	4.25	5.33	22.7					2	22.7				470	2.8	2.8	Flows into Swale D and routed to area inlet
	23								21.7	4.25	4.99	21.2			21.2						Total flow captured by area inlet = 21.2 cfs
	23								30.6	15.46	4.12	63.7			63.7	2.0		600	2.8	3.5	Total flow at DP-23 = 63.7 cfs // Piped under Bent Grass M.D. into Swale E
	24	E-4	0.91	0.84	8.0	0.76	7.50	5.7													
	24	OS-4	2.64	0.36	12.8	0.95	6.31	6.0													
	24								31.0	7.59	4.08	31.0									Total flow at DP-24
	25	E-5	0.89	0.89	7.3	0.79	7.73	6.1													Total flow at DP-25
	24&25								31.0	8.38	4.08	34.2 17.1		0.1	17.0						Total flow at DP-24&25 Q at each inlet = 17.1 cfs
	24								31.0	4.19	4.08	17.1		0.1	17.0						Total flow by-passing inlet = 0.1 cfs Total flow at DP-24 = 17 cfs // Piped to inlet at DP-25
	25								31.0	4.19	4.08	17.1		0.1	17.0						Total flow by-passing inlet = 0.1 cfs Total flow captured by inlet = 17 cfs
	25								31.0	8.33	4.08	34.0			34.0						Total flow at DP-25 = 34 cfs // Piped to Sediment Basin at DP-26
	26								34.1	23.80	3.84	91.4			91.4						Total flow at DP-26 = 91.4 cfs // Overflows into Swale F ultimately into RWT210
		C-8	0.42	0.36	11.5	0.15	6.58	1.0													Pervious/Landscape - Flows directly into RWT204 & RWT210
	CC								24.3	90.86	2.79	253.5									Total Flow Exiting Site at Property Line
		F-1	0.44	0.50	9.0	0.22	7.20	1.6													Flows offsite
		F-2	0.55	0.69	5.9	0.38	8.25	3.1													Flows offsite
		G-1	1.47	0.44	9.9	0.65	6.95	4.5													Flows offsite
		H-1	0.52	0.36	8.1	0.19	7.45	1.4													Flows offsite
		I-1	0.31	0.79	5.0	0.24	8.68	2.1													
Value from The Meadows Fil. 3 FDR (DP-12)	30							226.0													Total flow from existing culvert into Basin OS-5 = 226 cfs
		OS-5	14.13	0.37	19.4	5.23	5.26	27.5													
	31											253.5									Total flow into Basin OS-6 = 253.5 cfs
		OS-6	5.38	0.59	13.9	3.17	6.10	19.3													Basin to be developed in the future
	32											272.8									Flows from Sediment pond routed East towards Meridian Road

STANDARD FORM SF-3: PROPOSED

STORM DRAINAGE SYSTEM DESIGN

(RATIONAL METHOD PROCEDURE)

Subdivision: Bent Grass Residential Filing No. 2
Location: CO, Colorado Springs
Design Storm: 5-Year

Project Name: Bent Grass
Project No.: CLH000014
Calculated By: CMWJ
Checked By: SMB
Date: 1/13/20

		DIRECT RUNOFF							TOTAL RUNOFF				STREET		PIPE			TRAVEL TIME			
STREET	Design Point	Basin ID	Area (Ac)	Runoff Coeff.	Tc (min)	C*A (Ac)	I (in/hr)	Q (cfs)	Tc (min)	C*A (Ac)	I (in/hr)	Q (cfs)	Slope (%)	Street Flow (cfs)	Design Flow (cfs)	Slope (%)	Pipe Size (inches)	Length (ft)	Velocity (fps)	Tt (min)	REMARKS
	40	OS-1	32.28	0.16	22.2	5.16	2.93	15.1													Flows collect into Swale - A and is conveyed to existing channel (Tract H)
	1	A-1	2.70	0.33	13.6	0.89	3.67	3.3					1	3.3				160	2.0	1.3	Total flow on North side of Niebrara Drive
	2	A-2	1.19	0.32	10.5	0.38	4.06	1.5													
	2								14.9	1.27	3.53	4.5	1.5	4.5				290	2.4	2.0	Total flow at DP-2
	3	A-3	1.57	0.36	14.2	0.57	3.61	2.1													
	3								16.9	1.84	3.34	6.1	1.4	6.1				60	2.4	0.4	Total flow at NE corner of Bent Grass M.D. & Berwyn Ct.
	4	A-4	2.24	0.34	12.8	0.76	3.76	2.9													Total flow at NW corner of Bent Grass M.D. & Berwyn Ct.
	4								17.3	2.60	3.30	8.6	1.0	8.6				840	2.0	7.0	Total flow entering Bent Grass M.D. from Berwyn Ct.
	5	D-2	5.15	0.33	16.1	1.70	3.41	5.8						0.0	5.8						Future total flow captured by inlet = 5.8 cfs
	6	D-1	12.49	0.32	17.1	4.00	3.32	13.3					1.1	0.4	12.9						Future total flow by-passing inlet = 0.4 cfs Future total flow captured by inlet = 12.9 cfs
	6								17.1	5.59	3.32	18.5									Total flow piped to future storm infrastructure.
	6								17.1	0.11	3.32	0.4		0.4				430	2.0	3.6	Future total flow entering Bent Grass M.D. = 0.4 cfs // Routed to inlet at DP-8
	7	E-3	0.78	0.81	7.4	0.63	4.59	2.9						0	2.9						Total flow captured by inlet = 2.9 cfs
	8	E-2	0.68	0.76	6.9	0.52	4.70	2.4													
	8-W								17.1	0.63	3.32	2.1									Total flow approaching DP-8 from the West
	8	E-1	1.71	0.55	11.8	0.94	3.88	3.6													
	8-E								24.3	3.54	2.79	9.9									Total flow approaching DP-8 from the East
	8								24.3	4.17	2.79	11.6			11.6						Total flow captured by inlet = 11.6 cfs
	8								24.34	10.39	2.79	29.0			29.0						Total flow at DP-8 = 29 cfs // Piped to North Water Quality Pond
	9	B-3	0.46	0.45	5.2	0.21	5.10	1.1					2.5	1.1				350	3.2	1.8	Total flow at the west point of Silky Thread Rd.
	10	B-4	1.19	0.09	15.5	0.11	3.47	0.4													Total flow at south west corner of Basin B-4. Flows into Swale B.
	10								15.5	0.32	3.47	1.1									Total flows into Swale B - Directs flows to North Water Quality Pond
	11	B-1	4.46	0.36	15.6	1.61	3.46	5.6													Total flow on North side of Willmore Dr.
	12	B-2	1.17	0.45	12.9	0.53	3.75	2.0													Total flow on South side of Willmore Dr.
	13								15.6	2.14	3.46	7.4	2.5	7.4				200	3.2	1.1	Total flow going West off of Willmore Dr. into Swale B
	14	B-5	1.56	0.09	11.7	0.14	3.90	0.5													Total flow sheet flowing from Basin B-4 into Swale B
	14								16.7	2.60	3.36	8.7									Total flow entering proposed North Water Quality Pond from Swale B
	15	B-6	0.62	0.09	10.7	0.06	4.02	0.2													Sheet Flows directly into proposed North Water Quality Pond
	15								24.3	13.05	2.79	36.4									Total flow entering proposed North Water Quality Pond
Flow values from UD-Detention Spreadsheet	15A											12.2									Peak Outflow from WQCV North Detention Pond = 12.2 cfs

STANDARD FORM SF-3: PROPOSED

STORM DRAINAGE SYSTEM DESIGN

(RATIONAL METHOD PROCEDURE)

Subdivision: Bent Grass Residential Filing No. 2
Location: CO, Colorado Springs
Design Storm: 5-Year

Project Name: Bent Grass
Project No.: CLH000014
Calculated By: CMWJ
Checked By: SMB
Date: 1/13/20

		DIRECT RUNOFF							TOTAL RUNOFF				STREET		PIPE			TRAVEL TIME			
STREET	Design Point	Basin ID	Area (Ac)	Runoff Coeff.	Tc (min)	C*A (Ac)	I (in/hr)	Q (cfs)	Tc (min)	C*A (Ac)	I (in/hr)	Q (cfs)	Slope (%)	Street Flow (cfs)	Design Flow (cfs)	Slope (%)	Pipe Size (inches)	Length (ft)	Velocity (fps)	Tt (min)	REMARKS
	AA								24.3	25.56	2.79	71.3									Total flow at US end of box culverts crossing Bent Grass Meadows Dr
	BB								24.3	26.19	2.79	73.1									Total flow at DS end of box culverts crossing Bent Grass Meadows Dr
	16	C-5	7.86	0.42	17.2	3.30	3.31	10.9					1.0	1.1	9.8			150	2.0	1.3	Total flow by-passing inlet = 1.1 cfs Total flow at DP-16 = 9.8 cfs // Piped to inlet at DP-17
	17	C-6	5.54	0.38	17.4	2.11	3.30	7.0					1	1.2	5.8			150	2.0	1.3	Total flow by-passing inlet = 1.2 cfs Total flow captured by inlet = 5.8 cfs
	17								17.4	4.72	3.30	15.6			15.6						Total flow at DP-17 = 15.6 cfs // Piped to manhole at DP-19A
	18	C-4	3.61	0.42	15.6	1.52	3.46	5.3													
	18								18.5	1.86	3.21	6.0									Total flow approaching DP-18 from the NW
	18	C-3	2.38	0.40	15.1	0.95	3.52	3.3													Total flow approaching DP-18 from the SE
	18								18.5	2.81	3.21	9.0			9.0						Total flow captured by inlet = 9 cfs Total flow at DP-18 = 9 cfs // Piped to inlet at DP-19
	19	C-1	1.35	0.42	7.7	0.57	4.52	2.6					1.5	2.6				1400	2.4	9.5	
	19	C-2	6.80	0.34	20.4	2.31	3.06	7.1													
	19								20.4	2.88	3.06	8.8									Total flow approaching DP-19 from the SE
	19								20.4	3.23	3.06	9.9			9.9						Total flow captured by inlet = 9.9 cfs
	19								20.4	6.04	3.06	18.5			18.5						Total flow at DP-19 = 18.5 cfs // Piped to manhole at DP-19A
	19A								20.4	10.76	3.06	32.9			32.9						Total flow at DP-19A = 32.9 cfs // Piped to South Water Quality Pond
	20	G-1	1.47	0.21	9.9	0.31	4.14	1.3													Total flows in Swale C into FES (DP-20) = 1.3 cfs // Piped to South WQ Pond
	20A	C-7	0.89	0.09	11.3	0.08	3.95	0.3													Flows directly into South Water Quality Pond
	20A								20.4	11.15	3.06	34.1			34.1						Total flow to South Water Quality Pond
Flow values from UD-Detention Spreadsheet	20B											21.2									Peak Outflow from South WQCV Detention Pond into Swale C = 21.2 cfs
	21	D-3	9.16	0.30	16.2	2.75	3.41	9.4							9.4						Total flow at DP-21 = 9.4 cfs // Piped to future inlet at DP-22
	22	OS-2	20.08	0.14	18.3	2.81	3.22	9.0					1.5	9.0				1800	2.4	12.2	
	22	D-4	9.53	0.24	20.0	2.29	3.09	7.1													
	22								30.6	5.10	2.45	12.5		0.2	12.3						Total flow by-passing inlet = 0.2 cfs Total flow captured by inlet = 12.3 cfs
	22								30.6	7.77	2.45	19.0			19.0						Total flow at DP-22 = 19 cfs // Piped to inlet at DP-23
	22								30.6	0.08	2.45	0.2	2.5	0.2				550	3.2	2.9	Total flow entering Bent Grass M.D. from DP-21&22
	23	OS-3	10.62	0.14	18.9	1.49	3.18	4.7					2	4.7				470	2.8	2.8	Flows into Swale D and routed to area inlet
	23								21.7	1.49	2.97	4.4			4.4						Total flow captured by area inlet = 4.4 cfs
	23								30.6	9.26	2.45	22.7			22.7	2.0		600	2.8	3.5	Total flow at DP-23A = 22.7 cfs // // Piped under Bent Grass M.D. into Swale E
	24	E-4	0.91	0.74	8.0	0.67	4.46	3.0													
	24	OS-4	2.64	0.09	12.8	0.24	3.76	0.9					2.8	0.9				150	3.3	0.7	

STANDARD FORM SF-3: PROPOSED

STORM DRAINAGE SYSTEM DESIGN

(RATIONAL METHOD PROCEDURE)

Subdivision: Bent Grass Residential Filing No. 2
Location: CO, Colorado Springs
Design Storm: 5-Year

Project Name: Bent Grass
Project No.: CLH000014
Calculated By: CMWJ
Checked By: SMB
Date: 1/13/20

		DIRECT RUNOFF							TOTAL RUNOFF				STREET		PIPE			TRAVEL TIME			
STREET	Design Point	Basin ID	Area (Ac)	Runoff Coeff.	Tc (min)	C*A (Ac)	I (in/hr)	Q (cfs)	Tc (min)	C*A (Ac)	I (in/hr)	Q (cfs)	Slope (%)	Street Flow (cfs)	Design Flow (cfs)	Slope (%)	Pipe Size (inches)	Length (ft)	Velocity (fps)	Tt (min)	REMARKS
	24								33.5	0.99	2.32	2.3			2.3						Total flow at DP-24 = 2.3 cfs // Piped to inlet at DP-25
	25	E-5	0.89	0.81	7.3	0.72	4.60	3.3							3.3						Total flow captured by inlet = 3.3 cfs
	25								33.5	1.71	2.32	4.0			4.0						Total flow at DP-25 = 4 cfs // Piped to Sediment Basin at DP-26
	26								33.5	10.97	2.32	25.5			25.5						Total flow at DP-26 = 25.5 cfs // Overflows into Swale F ultimately into RWT210
		C-8	0.42	0.09	11.5	0.04	3.92	0.2													Pervious/Landscape - Flows directly into RWT204 & RWT210
	CC								24.3	37.38	2.79	104.3									Total Flow Exiting Site at Property Line
		F-1	0.44	0.29	9.0	0.13	4.29	0.6													Flows offsite
		F-2	0.55	0.55	5.9	0.30	4.91	1.5													Flows offsite
		H-1	0.52	0.09	8.1	0.05	4.44	0.2													Flows offsite
		I-1	0.31	0.66	5.0	0.20	5.17	1.0													Flows offsite
Value from The Meadows Fil. 3 FDR (DP-12)	30							98.1													Total flow from existing culvert into Basin OS-5 = 98.1 cfs
		OS-5	14.13	0.11	19.4	1.55	3.13	4.9													
	31											103.0									Total flow into Basin OS-6 = 103 cfs
		OS-6	5.38	0.45	13.9	2.42	3.64	8.8													Basin to be developed in the future
	32											111.8									Flows from Sediment pond routed East towards Meridian Road

APPENDIX C

Hydraulic Computations

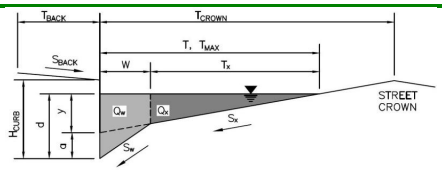
Version 4.05 Released March 2017

ALLOWABLE CAPACITY FOR ONE-HALF OF STREET (Minor & Major Storm)

(Based on Regulated Criteria for Maximum Allowable Flow Depth and Spread)

Project: **Bent Grass Residential Filing No. 2**

Inlet ID: **DP-1**



Gutter Geometry (Enter data in the blue cells)

Maximum Allowable Width for Spread Behind Curb	T_{BACK} =	8.0	ft
Side Slope Behind Curb (leave blank for no conveyance credit behind curb)	S_{BACK} =	0.020	ft/ft
Manning's Roughness Behind Curb (typically between 0.012 and 0.020)	n_{BACK} =	0.013	
Height of Curb at Gutter Flow Line	H_{CURB} =	6.00	inches
Distance from Curb Face to Street Crown	T_{CROWN} =	17.0	ft
Gutter Width	W =	2.00	ft
Street Transverse Slope	S_X =	0.020	ft/ft
Gutter Cross Slope (typically 2 inches over 24 inches or 0.083 ft/ft)	S_W =	0.083	ft/ft
Street Longitudinal Slope - Enter 0 for sump condition	S_O =	0.010	ft/ft
Manning's Roughness for Street Section (typically between 0.012 and 0.020)	n_{STREET} =	0.016	

		Minor Storm	Major Storm	
Max. Allowable Spread for Minor & Major Storm	T_{MAX} =	17.0	17.0	ft
Max. Allowable Depth at Gutter Flowline for Minor & Major Storm	d_{MAX} =	6.0	12.0	inches
Allow Flow Depth at Street Crown (leave blank for no)		☐	☑	check = yes

		Minor Storm	Major Storm	
MINOR STORM Allowable Capacity is based on Spread Criterion				
MAJOR STORM Allowable Capacity is based on Depth Criterion	**Q_{allow} =**	**10.9**	**113.0**	**cfs**

Minor storm max. allowable capacity GOOD - greater than the design flow given on sheet 'Inlet Management'

Major storm max. allowable capacity GOOD - greater than the design flow given on sheet 'Inlet Management'

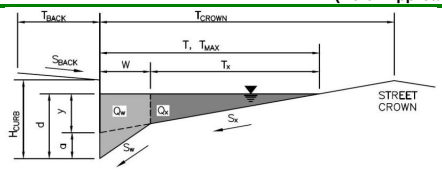
Version 4.05 Released March 2017

ALLOWABLE CAPACITY FOR ONE-HALF OF STREET (Minor & Major Storm)

(Based on Regulated Criteria for Maximum Allowable Flow Depth and Spread)

Project: **Bent Grass Residential Filing No. 2**

Inlet ID: **DP-2 (North Approach)**



Gutter Geometry (Enter data in the blue cells)

Maximum Allowable Width for Spread Behind Curb	T_{BACK} =	8.0	ft
Side Slope Behind Curb (leave blank for no conveyance credit behind curb)	S_{BACK} =	0.020	ft/ft
Manning's Roughness Behind Curb (typically between 0.012 and 0.020)	n_{BACK} =	0.013	
Height of Curb at Gutter Flow Line	H_{CURB} =	6.00	inches
Distance from Curb Face to Street Crown	T_{CROWN} =	17.0	ft
Gutter Width	W =	2.00	ft
Street Transverse Slope	S_X =	0.020	ft/ft
Gutter Cross Slope (typically 2 inches over 24 inches or 0.083 ft/ft)	S_W =	0.083	ft/ft
Street Longitudinal Slope - Enter 0 for sump condition	S_O =	0.023	ft/ft
Manning's Roughness for Street Section (typically between 0.012 and 0.020)	n_{STREET} =	0.016	

		Minor Storm	Major Storm	
Max. Allowable Spread for Minor & Major Storm	T_{MAX} =	17.0	17.0	ft
Max. Allowable Depth at Gutter Flowline for Minor & Major Storm	d_{MAX} =	6.0	12.0	inches
Allow Flow Depth at Street Crown (leave blank for no)		☐	☑	check = yes

		Minor Storm	Major Storm	
MINOR STORM Allowable Capacity is based on Spread Criterion				
MAJOR STORM Allowable Capacity is based on Depth Criterion	**Q_{allow} =**	**16.5**	**127.8**	**cfs**

Minor storm max. allowable capacity GOOD - greater than the design flow given on sheet 'Inlet Management'

Major storm max. allowable capacity GOOD - greater than the design flow given on sheet 'Inlet Management'

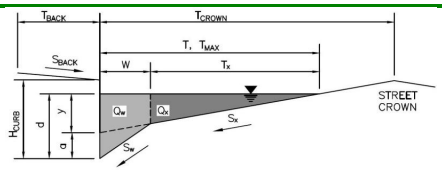
Version 4.05 Released March 2017

ALLOWABLE CAPACITY FOR ONE-HALF OF STREET (Minor & Major Storm)

(Based on Regulated Criteria for Maximum Allowable Flow Depth and Spread)

Project: **Bent Grass Residential Filing No. 2**

Inlet ID: **DP-2**



Gutter Geometry (Enter data in the blue cells)

Maximum Allowable Width for Spread Behind Curb	T_{BACK} =	8.0	ft
Side Slope Behind Curb (leave blank for no conveyance credit behind curb)	S_{BACK} =	0.020	ft/ft
Manning's Roughness Behind Curb (typically between 0.012 and 0.020)	n_{BACK} =	0.013	
Height of Curb at Gutter Flow Line	H_{CURB} =	6.00	inches
Distance from Curb Face to Street Crown	T_{CROWN} =	17.0	ft
Gutter Width	W =	2.00	ft
Street Transverse Slope	S_X =	0.020	ft/ft
Gutter Cross Slope (typically 2 inches over 24 inches or 0.083 ft/ft)	S_W =	0.083	ft/ft
Street Longitudinal Slope - Enter 0 for sump condition	S_O =	0.015	ft/ft
Manning's Roughness for Street Section (typically between 0.012 and 0.020)	n_{STREET} =	0.016	

		Minor Storm	Major Storm	
Max. Allowable Spread for Minor & Major Storm	T_{MAX} =	17.0	17.0	ft
Max. Allowable Depth at Gutter Flowline for Minor & Major Storm	d_{MAX} =	6.0	12.0	inches
Allow Flow Depth at Street Crown (leave blank for no)		☐	☑	check = yes

		Minor Storm	Major Storm	
MINOR STORM Allowable Capacity is based on Spread Criterion				
MAJOR STORM Allowable Capacity is based on Depth Criterion	**Q_{allow} =**	**13.3**	**138.4**	**cfs**

Minor storm max. allowable capacity GOOD - greater than the design flow given on sheet 'Inlet Management'

Major storm max. allowable capacity GOOD - greater than the design flow given on sheet 'Inlet Management'

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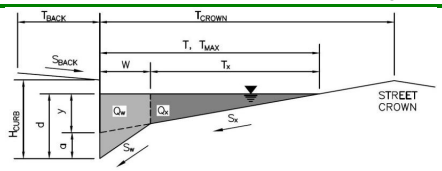
ALLOWABLE CAPACITY FOR ONE-HALF OF STREET (Minor & Major Storm)

(Based on Regulated Criteria for Maximum Allowable Flow Depth and Spread)

Project: **Bent Grass Residential Filing No. 2**

Inlet ID: **DP-3**



Gutter Geometry (Enter data in the blue cells)

Maximum Allowable Width for Spread Behind Curb	T_{BACK} =	8.0	ft
Side Slope Behind Curb (leave blank for no conveyance credit behind curb)	S_{BACK} =	0.020	ft/ft
Manning's Roughness Behind Curb (typically between 0.012 and 0.020)	n_{BACK} =	0.013	
Height of Curb at Gutter Flow Line	H_{CURB} =	6.00	inches
Distance from Curb Face to Street Crown	T_{CROWN} =	17.0	ft
Gutter Width	W =	2.00	ft
Street Transverse Slope	S_X =	0.020	ft/ft
Gutter Cross Slope (typically 2 inches over 24 inches or 0.083 ft/ft)	S_W =	0.083	ft/ft
Street Longitudinal Slope - Enter 0 for sump condition	S_O =	0.013	ft/ft
Manning's Roughness for Street Section (typically between 0.012 and 0.020)	n_{STREET} =	0.016	

		Minor Storm	Major Storm	
Max. Allowable Spread for Minor & Major Storm	T_{MAX} =	17.0	17.0	ft
Max. Allowable Depth at Gutter Flowline for Minor & Major Storm	d_{MAX} =	6.0	12.0	inches
Allow Flow Depth at Street Crown (leave blank for no)		☐	☑	check = yes

		Minor Storm	Major Storm	
MINOR STORM Allowable Capacity is based on Spread Criterion				
MAJOR STORM Allowable Capacity is based on Depth Criterion	**Q_{allow} =**	**12.4**	**128.8**	**cfs**

Minor storm max. allowable capacity GOOD - greater than the design flow given on sheet 'Inlet Management'

Major storm max. allowable capacity GOOD - greater than the design flow given on sheet 'Inlet Management'

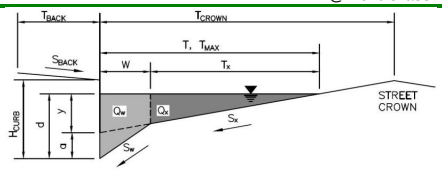
Version 4.05 Released March 2017

ALLOWABLE CAPACITY FOR ONE-HALF OF STREET (Minor & Major Storm)

(Based on Regulated Criteria for Maximum Allowable Flow Depth and Spread)

Project: **Bent Grass Residential Filing No. 2**

Inlet ID: **DP-4 @ Bent Grass M.D.**



Gutter Geometry (Enter data in the blue cells)

Maximum Allowable Width for Spread Behind Curb	T_{BACK} =	14.0	ft
Side Slope Behind Curb (leave blank for no conveyance credit behind curb)	S_{BACK} =	0.020	ft/ft
Manning's Roughness Behind Curb (typically between 0.012 and 0.020)	n_{BACK} =	0.013	
Height of Curb at Gutter Flow Line	H_{CURB} =	6.00	inches
Distance from Curb Face to Street Crown	T_{CROWN} =	26.0	ft
Gutter Width	W =	2.00	ft
Street Transverse Slope	S_X =	0.020	ft/ft
Gutter Cross Slope (typically 2 inches over 24 inches or 0.083 ft/ft)	S_W =	0.083	ft/ft
Street Longitudinal Slope - Enter 0 for sump condition	S_O =	0.010	ft/ft
Manning's Roughness for Street Section (typically between 0.012 and 0.020)	n_{STREET} =	0.016	

		Minor Storm	Major Storm	
Max. Allowable Spread for Minor & Major Storm	T_{MAX} =	26.0	26.0	ft
Max. Allowable Depth at Gutter Flowline for Minor & Major Storm	d_{MAX} =	6.0	12.0	inches
Allow Flow Depth at Street Crown (leave blank for no)		☐	☑	check = yes

		Minor Storm	Major Storm	
MINOR STORM Allowable Capacity is based on Depth Criterion				
MAJOR STORM Allowable Capacity is based on Depth Criterion	**Q_{allow} =**	**13.8**	**143.2**	**cfs**

Minor storm max. allowable capacity GOOD - greater than the design flow given on sheet 'Inlet Management'

Major storm max. allowable capacity GOOD - greater than the design flow given on sheet 'Inlet Management'

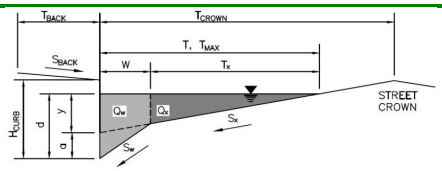
Version 4.05 Released March 2017

ALLOWABLE CAPACITY FOR ONE-HALF OF STREET (Minor & Major Storm)

(Based on Regulated Criteria for Maximum Allowable Flow Depth and Spread)

Project: **Bent Grass Residential Filing No. 2**

Inlet ID: **DP-4**



Gutter Geometry (Enter data in the blue cells)

Maximum Allowable Width for Spread Behind Curb	T_{BACK} =	8.0	ft
Side Slope Behind Curb (leave blank for no conveyance credit behind curb)	S_{BACK} =	0.020	ft/ft
Manning's Roughness Behind Curb (typically between 0.012 and 0.020)	n_{BACK} =	0.013	
Height of Curb at Gutter Flow Line	H_{CURB} =	6.00	inches
Distance from Curb Face to Street Crown	T_{CROWN} =	17.0	ft
Gutter Width	W =	2.00	ft
Street Transverse Slope	S_X =	0.020	ft/ft
Gutter Cross Slope (typically 2 inches over 24 inches or 0.083 ft/ft)	S_W =	0.083	ft/ft
Street Longitudinal Slope - Enter 0 for sump condition	S_O =	0.015	ft/ft
Manning's Roughness for Street Section (typically between 0.012 and 0.020)	n_{STREET} =	0.016	

		Minor Storm	Major Storm	
Max. Allowable Spread for Minor & Major Storm	T_{MAX} =	17.0	17.0	ft
Max. Allowable Depth at Gutter Flowline for Minor & Major Storm	d_{MAX} =	6.0	12.0	inches
Allow Flow Depth at Street Crown (leave blank for no)		☐	☑	check = yes

		Minor Storm	Major Storm	
MINOR STORM Allowable Capacity is based on Spread Criterion				
MAJOR STORM Allowable Capacity is based on Depth Criterion	**Q_{allow} =**	**13.3**	**138.4**	**cfs**

Minor storm max. allowable capacity GOOD - greater than the design flow given on sheet 'Inlet Management'

Major storm max. allowable capacity GOOD - greater than the design flow given on sheet 'Inlet Management'

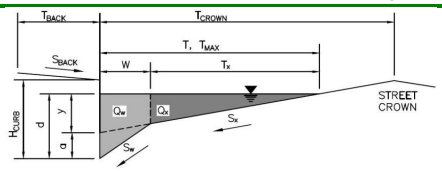
Version 4.05 Released March 2017

ALLOWABLE CAPACITY FOR ONE-HALF OF STREET (Minor & Major Storm)

(Based on Regulated Criteria for Maximum Allowable Flow Depth and Spread)

Project: **Bent Grass Residential Filing No. 2**

Inlet ID: **DP-5**



Gutter Geometry (Enter data in the blue cells)

Maximum Allowable Width for Spread Behind Curb	T_{BACK} =	8.0	ft
Side Slope Behind Curb (leave blank for no conveyance credit behind curb)	S_{BACK} =	0.020	ft/ft
Manning's Roughness Behind Curb (typically between 0.012 and 0.020)	n_{BACK} =	0.013	
Height of Curb at Gutter Flow Line	H_{CURB} =	6.00	inches
Distance from Curb Face to Street Crown	T_{CROWN} =	17.0	ft
Gutter Width	W =	2.00	ft
Street Transverse Slope	S_X =	0.020	ft/ft
Gutter Cross Slope (typically 2 inches over 24 inches or 0.083 ft/ft)	S_W =	0.083	ft/ft
Street Longitudinal Slope - Enter 0 for sump condition	S_O =	0.020	ft/ft
Manning's Roughness for Street Section (typically between 0.012 and 0.020)	n_{STREET} =	0.016	

		Minor Storm	Major Storm	
Max. Allowable Spread for Minor & Major Storm	T_{MAX} =	17.0	17.0	ft
Max. Allowable Depth at Gutter Flowline for Minor & Major Storm	d_{MAX} =	6.0	12.0	inches
Allow Flow Depth at Street Crown (leave blank for no)		☐	☑	check = yes

		Minor Storm	Major Storm	
MINOR STORM Allowable Capacity is based on Spread Criterion				
MAJOR STORM Allowable Capacity is based on Depth Criterion	**Q_{allow} =**	**15.4**	**133.3**	**cfs**

Minor storm max. allowable capacity GOOD - greater than the design flow given on sheet 'Inlet Management'

Major storm max. allowable capacity GOOD - greater than the design flow given on sheet 'Inlet Management'

INLET ON A CONTINUOUS GRADE

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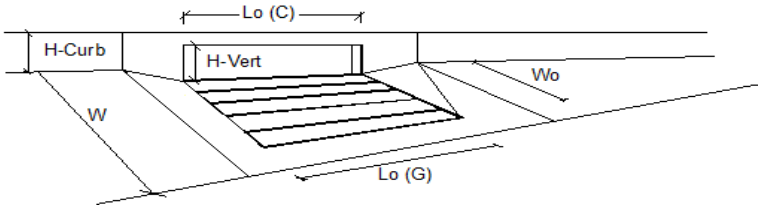


Design Information (Input)		MINOR	MAJOR	
Type of Inlet (CDOT Type R Curb Opening)	Type =	CDOT Type R Curb Opening		
Local Depression (additional to continuous gutter depression 'a')	a_{LOCAL} =	3.0	3.0	inches
Total Number of Units in the Inlet (Grate or Curb Opening)	No =	1	1	
Length of a Single Unit Inlet (Grate or Curb Opening)	L_o =	15.00	15.00	ft
Width of a Unit Grate (cannot be greater than W, Gutter Width)	W_o =	N/A	N/A	ft
Clogging Factor for a Single Unit Grate (typical min. value = 0.5)	C_f-G =	N/A	N/A	
Clogging Factor for a Single Unit Curb Opening (typical min. value = 0.1)	C_f-C =	0.10	0.10	

Street Hydraulics: OK - Q < Allowable Street Capacity'		MINOR	MAJOR	
Total Inlet Interception Capacity	**Q =**	**5.8**	**15.6**	**cfs**
Total Inlet Carry-Over Flow (flow bypassing inlet)	**Q_b =**	**0.0**	**9.6**	**cfs**
Capture Percentage = Q_a/Q_o =	**C% =**	**100**	**62**	**%**

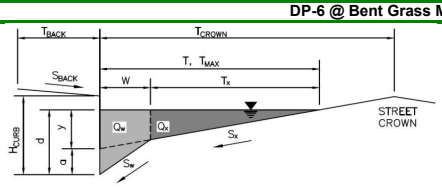
Version 4.05 Released March 2017

ALLOWABLE CAPACITY FOR ONE-HALF OF STREET (Minor & Major Storm)

(Based on Regulated Criteria for Maximum Allowable Flow Depth and Spread)

Project: Bent Grass Residential Filing No. 2

Inlet ID: DP-6 @ Bent Grass M.D.



Gutter Geometry (Enter data in the blue cells)

Maximum Allowable Width for Spread Behind Curb	T_{BACK} =	8.0	ft
Side Slope Behind Curb (leave blank for no conveyance credit behind curb)	S_{BACK} =	0.020	ft/ft
Manning's Roughness Behind Curb (typically between 0.012 and 0.020)	n_{BACK} =	0.013	
Height of Curb at Gutter Flow Line	H_{CURB} =	6.00	inches
Distance from Curb Face to Street Crown	T_{CROWN} =	17.0	ft
Gutter Width	W =	2.00	ft
Street Transverse Slope	S_X =	0.020	ft/ft
Gutter Cross Slope (typically 2 inches over 24 inches or 0.083 ft/ft)	S_W =	0.083	ft/ft
Street Longitudinal Slope - Enter 0 for sump condition	S_O =	0.020	ft/ft
Manning's Roughness for Street Section (typically between 0.012 and 0.020)	n_{STREET} =	0.016	

		Minor Storm	Major Storm	
Max. Allowable Spread for Minor & Major Storm	T_{MAX} =	17.0	17.0	ft
Max. Allowable Depth at Gutter Flowline for Minor & Major Storm	d_{MAX} =	6.0	12.0	inches
Allow Flow Depth at Street Crown (leave blank for no)		☐	☑	check = yes

		Minor Storm	Major Storm	
MINOR STORM Allowable Capacity is based on Spread Criterion				
MAJOR STORM Allowable Capacity is based on Depth Criterion	**Q_{allow} =**	**15.4**	**133.3**	**cfs**

Minor storm max. allowable capacity GOOD - greater than the design flow given on sheet 'Inlet Management'

Major storm max. allowable capacity GOOD - greater than the design flow given on sheet 'Inlet Management'

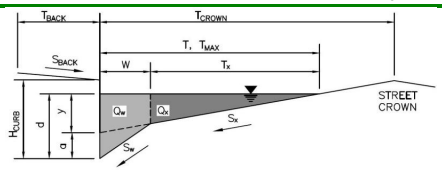
Version 4.05 Released March 2017

ALLOWABLE CAPACITY FOR ONE-HALF OF STREET (Minor & Major Storm)

(Based on Regulated Criteria for Maximum Allowable Flow Depth and Spread)

Project: **Bent Grass Residential Filing No. 2**

Inlet ID: **DP-6**



Gutter Geometry (Enter data in the blue cells)

Maximum Allowable Width for Spread Behind Curb	T_{BACK} =	8.0	ft
Side Slope Behind Curb (leave blank for no conveyance credit behind curb)	S_{BACK} =	0.020	ft/ft
Manning's Roughness Behind Curb (typically between 0.012 and 0.020)	n_{BACK} =	0.013	
Height of Curb at Gutter Flow Line	H_{CURB} =	6.00	inches
Distance from Curb Face to Street Crown	T_{CROWN} =	17.0	ft
Gutter Width	W =	2.00	ft
Street Transverse Slope	S_X =	0.020	ft/ft
Gutter Cross Slope (typically 2 inches over 24 inches or 0.083 ft/ft)	S_W =	0.083	ft/ft
Street Longitudinal Slope - Enter 0 for sump condition	S_O =	0.020	ft/ft
Manning's Roughness for Street Section (typically between 0.012 and 0.020)	n_{STREET} =	0.016	

		Minor Storm	Major Storm	
Max. Allowable Spread for Minor & Major Storm	T_{MAX} =	17.0	17.0	ft
Max. Allowable Depth at Gutter Flowline for Minor & Major Storm	d_{MAX} =	6.0	12.0	inches
Allow Flow Depth at Street Crown (leave blank for no)		☐	☑	check = yes

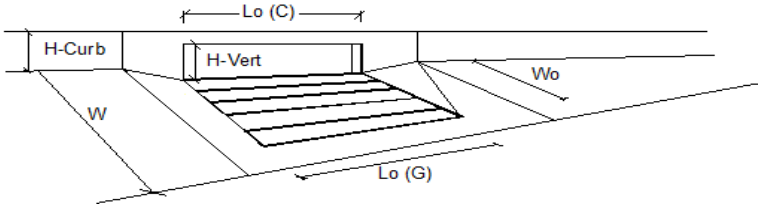
		Minor Storm	Major Storm	
MINOR STORM Allowable Capacity is based on Spread Criterion				
MAJOR STORM Allowable Capacity is based on Depth Criterion	**Q_{allow} =**	**15.4**	**133.3**	**cfs**

Minor storm max. allowable capacity GOOD - greater than the design flow given on sheet 'Inlet Management'

Major storm max. allowable capacity GOOD - greater than the design flow given on sheet 'Inlet Management'

INLET ON A CONTINUOUS GRADE

Version 4.05 Released March 2017



Design Information (Input)		MINOR	MAJOR	
Type of Inlet (CDOT Type R Curb Opening)	Type =	CDOT Type R Curb Opening		
Local Depression (additional to continuous gutter depression 'a')	a_{LOCAL} =	3.0	3.0	inches
Total Number of Units in the Inlet (Grate or Curb Opening)	No =	2	2	
Length of a Single Unit Inlet (Grate or Curb Opening)	L_o =	10.00	10.00	ft
Width of a Unit Grate (cannot be greater than W, Gutter Width)	W_o =	N/A	N/A	ft
Clogging Factor for a Single Unit Grate (typical min. value = 0.5)	C_f-G =	N/A	N/A	
Clogging Factor for a Single Unit Curb Opening (typical min. value = 0.1)	C_f-C =	0.10	0.10	

Street Hydraulics: OK - Q < Allowable Street Capacity'		MINOR	MAJOR	
Total Inlet Interception Capacity	**Q =**	**12.9**	**19.5**	**cfs**
Total Inlet Carry-Over Flow (flow bypassing inlet)	**Q_b =**	**0.4**	**5.7**	**cfs**
Capture Percentage = Q_a/Q_o =	**C% =**	**97**	**78**	**%**

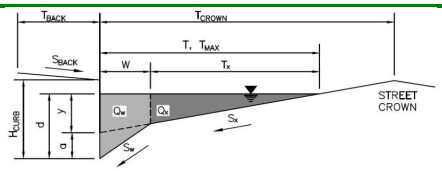
Version 4.05 Released March 2017

ALLOWABLE CAPACITY FOR ONE-HALF OF STREET (Minor & Major Storm)

(Based on Regulated Criteria for Maximum Allowable Flow Depth and Spread)

Project: **Bent Grass Residential Filing No. 2**

Inlet ID: **DP-7**



Gutter Geometry (Enter data in the blue cells)

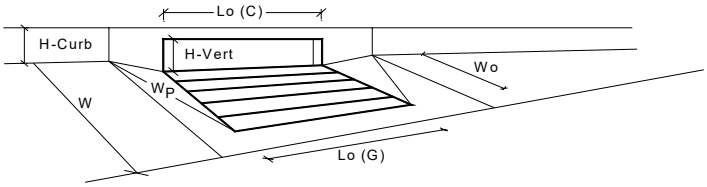
Maximum Allowable Width for Spread Behind Curb	T_{BACK} =	14.0	ft
Side Slope Behind Curb (leave blank for no conveyance credit behind curb)	S_{BACK} =	0.020	ft/ft
Manning's Roughness Behind Curb (typically between 0.012 and 0.020)	n_{BACK} =	0.013	
Height of Curb at Gutter Flow Line	H_{CURB} =	6.00	inches
Distance from Curb Face to Street Crown	T_{CROWN} =	26.0	ft
Gutter Width	W =	2.00	ft
Street Transverse Slope	S_X =	0.020	ft/ft
Gutter Cross Slope (typically 2 inches over 24 inches or 0.083 ft/ft)	S_W =	0.083	ft/ft
Street Longitudinal Slope - Enter 0 for sump condition	S_O =	0.000	ft/ft
Manning's Roughness for Street Section (typically between 0.012 and 0.020)	n_{STREET} =	0.016	

		Minor Storm	Major Storm	
Max. Allowable Spread for Minor & Major Storm	T_{MAX} =	26.0	26.0	ft
Max. Allowable Depth at Gutter Flowline for Minor & Major Storm	d_{MAX} =	6.0	12.0	inches
Check boxes are not applicable in SUMP conditions		☐	☐	

		Minor Storm	Major Storm	
MINOR STORM Allowable Capacity is based on Depth Criterion				
MAJOR STORM Allowable Capacity is based on Depth Criterion	**Q_{allow} =**	**SUMP**	**SUMP**	**cfs**

INLET IN A SUMP OR SAG LOCATION

Version 4.05 Released March 2017



Design Information (Input)		MINOR	MAJOR	
Type of Inlet (CDOT Type R Curb Opening)	Type =	CDOT Type R Curb Opening		
Local Depression (additional to continuous gutter depression 'a' from above)	a_{local} =	3.00	3.00	inches
Number of Unit Inlets (Grate or Curb Opening)	No =	1	1	
Water Depth at Flowline (outside of local depression)	Ponding Depth =	6.0	12.0	inches
Grate Information		MINOR	MAJOR	☑ Override Depths
Length of a Unit Grate	L_o (G) =	N/A	N/A	feet
Width of a Unit Grate	W_o =	N/A	N/A	feet
Area Opening Ratio for a Grate (typical values 0.15-0.90)	A_{ratio} =	N/A	N/A	
Clogging Factor for a Single Grate (typical value 0.50 - 0.70)	C_f (G) =	N/A	N/A	
Grate Weir Coefficient (typical value 2.15 - 3.60)	C_w (G) =	N/A	N/A	
Grate Orifice Coefficient (typical value 0.60 - 0.80)	C_o (G) =	N/A	N/A	
Curb Opening Information		MINOR	MAJOR	
Length of a Unit Curb Opening	L_o (C) =	10.00	10.00	feet
Height of Vertical Curb Opening in Inches	H_{vert} =	6.00	6.00	inches
Height of Curb Orifice Throat in Inches	H_{throat} =	6.00	6.00	inches
Angle of Throat (see USDCM Figure ST-5)	Theta =	63.40	63.40	degrees
Side Width for Depression Pan (typically the gutter width of 2 feet)	W_p =	2.00	2.00	feet
Clogging Factor for a Single Curb Opening (typical value 0.10)	C_f (C) =	0.10	0.10	
Curb Opening Weir Coefficient (typical value 2.3-3.7)	C_w (C) =	3.60	3.60	
Curb Opening Orifice Coefficient (typical value 0.60 - 0.70)	C_o (C) =	0.67	0.67	

Low Head Performance Reduction (Calculated)		MINOR	MAJOR	
Depth for Grate Midwidth	d_{Grate} =	N/A	N/A	ft
Depth for Curb Opening Weir Equation	d_{Curb} =	0.33	0.83	ft
Combination Inlet Performance Reduction Factor for Long Inlets	$RF_{Combination}$ =	0.57	1.00	
Curb Opening Performance Reduction Factor for Long Inlets	RF_{Curb} =	0.93	1.00	
Grated Inlet Performance Reduction Factor for Long Inlets	RF_{Grate} =	N/A	N/A	

		MINOR	MAJOR	
Total Inlet Interception Capacity (assumes clogged condition)	**Q_a =**	**8.3**	**25.5**	**cfs**
Inlet Capacity IS GOOD for Minor and Major Storms(>Q PEAK)	$Q_{PEAK\ REQUIRED}$ =	2.9	21.0	cfs

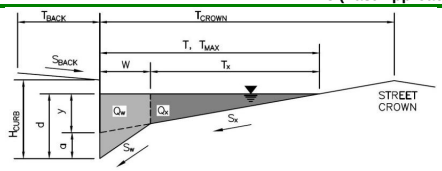
Version 4.05 Released March 2017

ALLOWABLE CAPACITY FOR ONE-HALF OF STREET (Minor & Major Storm)

(Based on Regulated Criteria for Maximum Allowable Flow Depth and Spread)

Project: **Bent Grass Residential Filing No. 2**

Inlet ID: **DP-8 (East Approach)**



Gutter Geometry (Enter data in the blue cells)

Maximum Allowable Width for Spread Behind Curb	T_{BACK} =	14.0	ft
Side Slope Behind Curb (leave blank for no conveyance credit behind curb)	S_{BACK} =	0.020	ft/ft
Manning's Roughness Behind Curb (typically between 0.012 and 0.020)	n_{BACK} =	0.013	
Height of Curb at Gutter Flow Line	H_{CURB} =	6.00	inches
Distance from Curb Face to Street Crown	T_{CROWN} =	26.0	ft
Gutter Width	W =	2.00	ft
Street Transverse Slope	S_X =	0.020	ft/ft
Gutter Cross Slope (typically 2 inches over 24 inches or 0.083 ft/ft)	S_W =	0.083	ft/ft
Street Longitudinal Slope - Enter 0 for sump condition	S_O =	0.019	ft/ft
Manning's Roughness for Street Section (typically between 0.012 and 0.020)	n_{STREET} =	0.016	

		Minor Storm	Major Storm	
Max. Allowable Spread for Minor & Major Storm	T_{MAX} =	26.0	26.0	ft
Max. Allowable Depth at Gutter Flowline for Minor & Major Storm	d_{MAX} =	6.0	12.0	inches
Allow Flow Depth at Street Crown (leave blank for no)		☐	☑	check = yes

		Minor Storm	Major Storm	
MINOR STORM Allowable Capacity is based on Depth Criterion				
MAJOR STORM Allowable Capacity is based on Depth Criterion	**Q_{allow} =**	**19.0**	**171.5**	**cfs**

Minor storm max. allowable capacity GOOD - greater than the design flow given on sheet 'Inlet Management'

Major storm max. allowable capacity GOOD - greater than the design flow given on sheet 'Inlet Management'

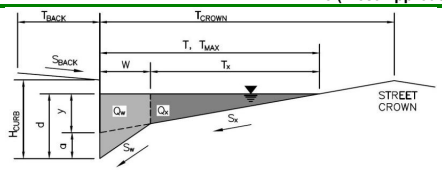
Version 4.05 Released March 2017

ALLOWABLE CAPACITY FOR ONE-HALF OF STREET (Minor & Major Storm)

(Based on Regulated Criteria for Maximum Allowable Flow Depth and Spread)

Project: Bent Grass Residential Filing No. 2

Inlet ID: DP-8 (West Approach)



Gutter Geometry (Enter data in the blue cells)

Maximum Allowable Width for Spread Behind Curb	T_{BACK} =	14.0	ft
Side Slope Behind Curb (leave blank for no conveyance credit behind curb)	S_{BACK} =	0.020	ft/ft
Manning's Roughness Behind Curb (typically between 0.012 and 0.020)	n_{BACK} =	0.013	
Height of Curb at Gutter Flow Line	H_{CURB} =	6.00	inches
Distance from Curb Face to Street Crown	T_{CROWN} =	26.0	ft
Gutter Width	W =	2.00	ft
Street Transverse Slope	S_X =	0.020	ft/ft
Gutter Cross Slope (typically 2 inches over 24 inches or 0.083 ft/ft)	S_W =	0.083	ft/ft
Street Longitudinal Slope - Enter 0 for sump condition	S_O =	0.011	ft/ft
Manning's Roughness for Street Section (typically between 0.012 and 0.020)	n_{STREET} =	0.016	

		Minor Storm	Major Storm	
Max. Allowable Spread for Minor & Major Storm	T_{MAX} =	26.0	26.0	ft
Max. Allowable Depth at Gutter Flowline for Minor & Major Storm	d_{MAX} =	6.0	12.0	inches
Allow Flow Depth at Street Crown (leave blank for no)		☐	☑	check = yes

		Minor Storm	Major Storm	
MINOR STORM Allowable Capacity is based on Depth Criterion				
MAJOR STORM Allowable Capacity is based on Depth Criterion	**Q_{allow} =**	**14.5**	**150.2**	**cfs**

Minor storm max. allowable capacity GOOD - greater than the design flow given on sheet 'Inlet Management'

Major storm max. allowable capacity GOOD - greater than the design flow given on sheet 'Inlet Management'

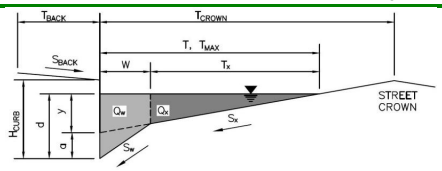
Version 4.05 Released March 2017

ALLOWABLE CAPACITY FOR ONE-HALF OF STREET (Minor & Major Storm)

(Based on Regulated Criteria for Maximum Allowable Flow Depth and Spread)

Project: **Bent Grass Residential Filing No. 2**

Inlet ID: **DP-8**



Gutter Geometry (Enter data in the blue cells)

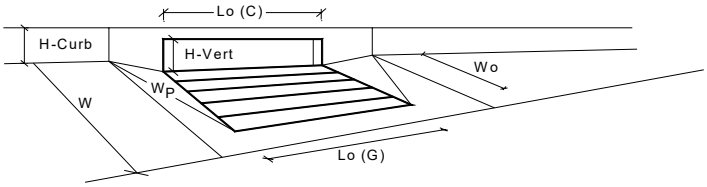
Maximum Allowable Width for Spread Behind Curb	T_{BACK} =	14.0	ft
Side Slope Behind Curb (leave blank for no conveyance credit behind curb)	S_{BACK} =	0.020	ft/ft
Manning's Roughness Behind Curb (typically between 0.012 and 0.020)	n_{BACK} =	0.013	
Height of Curb at Gutter Flow Line	H_{CURB} =	6.00	inches
Distance from Curb Face to Street Crown	T_{CROWN} =	26.0	ft
Gutter Width	W =	2.00	ft
Street Transverse Slope	S_X =	0.020	ft/ft
Gutter Cross Slope (typically 2 inches over 24 inches or 0.083 ft/ft)	S_W =	0.083	ft/ft
Street Longitudinal Slope - Enter 0 for sump condition	S_O =	0.000	ft/ft
Manning's Roughness for Street Section (typically between 0.012 and 0.020)	n_{STREET} =	0.016	

		Minor Storm	Major Storm	
Max. Allowable Spread for Minor & Major Storm	T_{MAX} =	26.0	26.0	ft
Max. Allowable Depth at Gutter Flowline for Minor & Major Storm	d_{MAX} =	6.0	12.0	inches
Check boxes are not applicable in SUMP conditions		☐	☐	

		Minor Storm	Major Storm	
MINOR STORM Allowable Capacity is based on Depth Criterion				
MAJOR STORM Allowable Capacity is based on Depth Criterion	**Q_{allow} =**	**SUMP**	**SUMP**	**cfs**

INLET IN A SUMP OR SAG LOCATION

Version 4.05 Released March 2017



Design Information (Input)		MINOR	MAJOR	
Type of Inlet (CDOT Type R Curb Opening)	Type =	CDOT Type R Curb Opening		
Local Depression (additional to continuous gutter depression 'a' from above)	a_{local} =	3.00	3.00	inches
Number of Unit Inlets (Grate or Curb Opening)	No =	2	2	
Water Depth at Flowline (outside of local depression)	Ponding Depth =	6.0	12.0	inches
Grate Information		MINOR	MAJOR	☑ Override Depths
Length of a Unit Grate	L_o (G) =	N/A	N/A	feet
Width of a Unit Grate	W_o =	N/A	N/A	feet
Area Opening Ratio for a Grate (typical values 0.15-0.90)	A_{ratio} =	N/A	N/A	
Clogging Factor for a Single Grate (typical value 0.50 - 0.70)	C_f (G) =	N/A	N/A	
Grate Weir Coefficient (typical value 2.15 - 3.60)	C_w (G) =	N/A	N/A	
Grate Orifice Coefficient (typical value 0.60 - 0.80)	C_o (G) =	N/A	N/A	
Curb Opening Information		MINOR	MAJOR	
Length of a Unit Curb Opening	L_o (C) =	10.00	10.00	feet
Height of Vertical Curb Opening in Inches	H_{vert} =	6.00	6.00	inches
Height of Curb Orifice Throat in Inches	H_{throat} =	6.00	6.00	inches
Angle of Throat (see USDCM Figure ST-5)	Theta =	63.40	63.40	degrees
Side Width for Depression Pan (typically the gutter width of 2 feet)	W_p =	2.00	2.00	feet
Clogging Factor for a Single Curb Opening (typical value 0.10)	C_f (C) =	0.10	0.10	
Curb Opening Weir Coefficient (typical value 2.3-3.7)	C_w (C) =	3.60	3.60	
Curb Opening Orifice Coefficient (typical value 0.60 - 0.70)	C_o (C) =	0.67	0.67	

Low Head Performance Reduction (Calculated)		MINOR	MAJOR	
Depth for Grate Midwidth	d_{Grate} =	N/A	N/A	ft
Depth for Curb Opening Weir Equation	d_{Curb} =	0.33	0.83	ft
Combination Inlet Performance Reduction Factor for Long Inlets	$RF_{Combination}$ =	0.57	1.00	
Curb Opening Performance Reduction Factor for Long Inlets	RF_{Curb} =	0.79	1.00	
Grated Inlet Performance Reduction Factor for Long Inlets	RF_{Grate} =	N/A	N/A	

		MINOR	MAJOR	
Total Inlet Interception Capacity (assumes clogged condition)	**Q_a =**	**14.4**	**52.7**	**cfs**
Inlet Capacity IS GOOD for Minor and Major Storms(>Q PEAK)	$Q_{PEAK\ REQUIRED}$ =	11.6	21.6	cfs

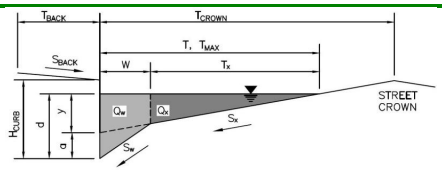
Version 4.05 Released March 2017

ALLOWABLE CAPACITY FOR ONE-HALF OF STREET (Minor & Major Storm)

(Based on Regulated Criteria for Maximum Allowable Flow Depth and Spread)

Project: **Bent Grass Residential Filing No. 2**

Inlet ID: **DP-11**



Gutter Geometry (Enter data in the blue cells)

Maximum Allowable Width for Spread Behind Curb	T_{BACK} =	8.0	ft
Side Slope Behind Curb (leave blank for no conveyance credit behind curb)	S_{BACK} =	0.020	ft/ft
Manning's Roughness Behind Curb (typically between 0.012 and 0.020)	n_{BACK} =	0.013	
Height of Curb at Gutter Flow Line	H_{CURB} =	6.00	inches
Distance from Curb Face to Street Crown	T_{CROWN} =	17.0	ft
Gutter Width	W =	2.00	ft
Street Transverse Slope	S_X =	0.020	ft/ft
Gutter Cross Slope (typically 2 inches over 24 inches or 0.083 ft/ft)	S_W =	0.083	ft/ft
Street Longitudinal Slope - Enter 0 for sump condition	S_O =	0.015	ft/ft
Manning's Roughness for Street Section (typically between 0.012 and 0.020)	n_{STREET} =	0.016	

		Minor Storm	Major Storm	
Max. Allowable Spread for Minor & Major Storm	T_{MAX} =	17.0	17.0	ft
Max. Allowable Depth at Gutter Flowline for Minor & Major Storm	d_{MAX} =	6.0	12.0	inches
Allow Flow Depth at Street Crown (leave blank for no)		☐	☑	check = yes

		Minor Storm	Major Storm	
MINOR STORM Allowable Capacity is based on Spread Criterion				
MAJOR STORM Allowable Capacity is based on Depth Criterion	**Q_{allow} =**	**13.3**	**138.4**	**cfs**

Minor storm max. allowable capacity GOOD - greater than the design flow given on sheet 'Inlet Management'

Major storm max. allowable capacity GOOD - greater than the design flow given on sheet 'Inlet Management'

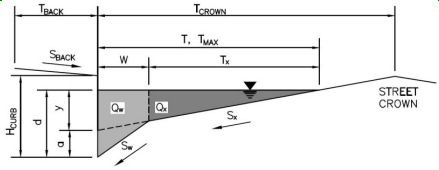
Version 4.05 Released March 2017

ALLOWABLE CAPACITY FOR ONE-HALF OF STREET (Minor & Major Storm)

(Based on Regulated Criteria for Maximum Allowable Flow Depth and Spread)

Project: **Bent Grass Residential Filing No. 2**

Inlet ID: **DP-12**



Gutter Geometry (Enter data in the blue cells)

Maximum Allowable Width for Spread Behind Curb	T_{BACK} =	8.0	ft
Side Slope Behind Curb (leave blank for no conveyance credit behind curb)	S_{BACK} =	0.020	ft/ft
Manning's Roughness Behind Curb (typically between 0.012 and 0.020)	n_{BACK} =	0.013	
Height of Curb at Gutter Flow Line	H_{CURB} =	6.00	inches
Distance from Curb Face to Street Crown	T_{CROWN} =	17.0	ft
Gutter Width	W =	2.00	ft
Street Transverse Slope	S_X =	0.020	ft/ft
Gutter Cross Slope (typically 2 inches over 24 inches or 0.083 ft/ft)	S_W =	0.083	ft/ft
Street Longitudinal Slope - Enter 0 for sump condition	S_O =	0.015	ft/ft
Manning's Roughness for Street Section (typically between 0.012 and 0.020)	n_{STREET} =	0.016	

		Minor Storm	Major Storm	
Max. Allowable Spread for Minor & Major Storm	T_{MAX} =	17.0	17.0	ft
Max. Allowable Depth at Gutter Flowline for Minor & Major Storm	d_{MAX} =	6.0	12.0	inches
Allow Flow Depth at Street Crown (leave blank for no)		☐	☑	check = yes

		Minor Storm	Major Storm	
MINOR STORM Allowable Capacity is based on Spread Criterion				
MAJOR STORM Allowable Capacity is based on Depth Criterion	**Q_{allow} =**	**13.3**	**138.4**	**cfs**

Minor storm max. allowable capacity GOOD - greater than the design flow given on sheet 'Inlet Management'

Major storm max. allowable capacity GOOD - greater than the design flow given on sheet 'Inlet Management'

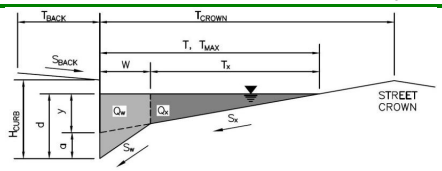
Version 4.05 Released March 2017

ALLOWABLE CAPACITY FOR ONE-HALF OF STREET (Minor & Major Storm)

(Based on Regulated Criteria for Maximum Allowable Flow Depth and Spread)

Project: **Bent Grass Residential Filing No. 2**

Inlet ID: **DP-16**



Gutter Geometry (Enter data in the blue cells)

Maximum Allowable Width for Spread Behind Curb	T_{BACK} =	8.0	ft
Side Slope Behind Curb (leave blank for no conveyance credit behind curb)	S_{BACK} =	0.020	ft/ft
Manning's Roughness Behind Curb (typically between 0.012 and 0.020)	n_{BACK} =	0.013	
Height of Curb at Gutter Flow Line	H_{CURB} =	6.00	inches
Distance from Curb Face to Street Crown	T_{CROWN} =	17.0	ft
Gutter Width	W =	2.00	ft
Street Transverse Slope	S_X =	0.020	ft/ft
Gutter Cross Slope (typically 2 inches over 24 inches or 0.083 ft/ft)	S_W =	0.083	ft/ft
Street Longitudinal Slope - Enter 0 for sump condition	S_O =	0.015	ft/ft
Manning's Roughness for Street Section (typically between 0.012 and 0.020)	n_{STREET} =	0.016	

		Minor Storm	Major Storm	
Max. Allowable Spread for Minor & Major Storm	T_{MAX} =	17.0	17.0	ft
Max. Allowable Depth at Gutter Flowline for Minor & Major Storm	d_{MAX} =	6.0	12.0	inches
Allow Flow Depth at Street Crown (leave blank for no)		☐	☑	check = yes

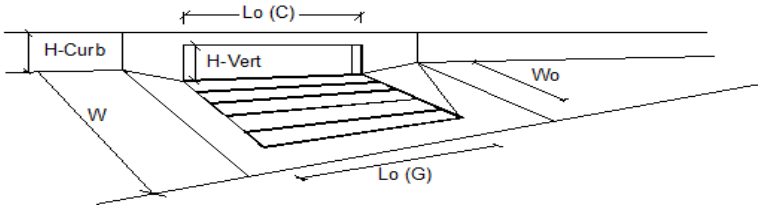
		Minor Storm	Major Storm	
MINOR STORM Allowable Capacity is based on Spread Criterion				
MAJOR STORM Allowable Capacity is based on Depth Criterion	**Q_{allow} =**	**13.1**	**136.0**	**cfs**

Minor storm max. allowable capacity GOOD - greater than the design flow given on sheet 'Inlet Management'

Major storm max. allowable capacity GOOD - greater than the design flow given on sheet 'Inlet Management'

INLET ON A CONTINUOUS GRADE

Version 4.05 Released March 2017



Design Information (Input)	CDOT Type R Curb Opening		MINOR	MAJOR	
Type of Inlet		Type =	CDOT Type R Curb Opening		
Local Depression (additional to continuous gutter depression 'a')		a_{LOCAL} =	3.0	3.0	inches
Total Number of Units in the Inlet (Grate or Curb Opening)		No =	1	1	
Length of a Single Unit Inlet (Grate or Curb Opening)		L_o =	15.00	15.00	ft
Width of a Unit Grate (cannot be greater than W, Gutter Width)		W_o =	N/A	N/A	ft
Clogging Factor for a Single Unit Grate (typical min. value = 0.5)		C_f-G =	N/A	N/A	
Clogging Factor for a Single Unit Curb Opening (typical min. value = 0.1)		C_f-C =	0.10	0.10	

Street Hydraulics: OK - Q < Allowable Street Capacity'		MINOR	MAJOR	
Total Inlet Interception Capacity	**Q =**	**9.8**	**15.5**	**cfs**
Total Inlet Carry-Over Flow (flow bypassing inlet)	**Q_b =**	**1.1**	**9.4**	**cfs**
Capture Percentage = Q_a/Q_o =	**C% =**	**90**	**62**	**%**

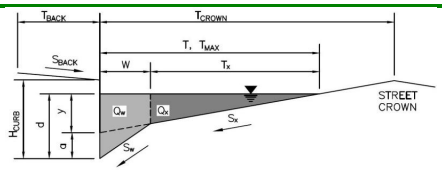
Version 4.05 Released March 2017

ALLOWABLE CAPACITY FOR ONE-HALF OF STREET (Minor & Major Storm)

(Based on Regulated Criteria for Maximum Allowable Flow Depth and Spread)

Project: **Bent Grass Residential Filing No. 2**

Inlet ID: **DP-17**



Gutter Geometry (Enter data in the blue cells)

Maximum Allowable Width for Spread Behind Curb	T_{BACK} =	8.0	ft
Side Slope Behind Curb (leave blank for no conveyance credit behind curb)	S_{BACK} =	0.020	ft/ft
Manning's Roughness Behind Curb (typically between 0.012 and 0.020)	n_{BACK} =	0.013	
Height of Curb at Gutter Flow Line	H_{CURB} =	6.00	inches
Distance from Curb Face to Street Crown	T_{CROWN} =	17.0	ft
Gutter Width	W =	2.00	ft
Street Transverse Slope	S_X =	0.020	ft/ft
Gutter Cross Slope (typically 2 inches over 24 inches or 0.083 ft/ft)	S_W =	0.083	ft/ft
Street Longitudinal Slope - Enter 0 for sump condition	S_O =	0.015	ft/ft
Manning's Roughness for Street Section (typically between 0.012 and 0.020)	n_{STREET} =	0.016	

		Minor Storm	Major Storm	
Max. Allowable Spread for Minor & Major Storm	T_{MAX} =	17.0	17.0	ft
Max. Allowable Depth at Gutter Flowline for Minor & Major Storm	d_{MAX} =	6.0	12.0	inches
Allow Flow Depth at Street Crown (leave blank for no)		☐	☑	check = yes

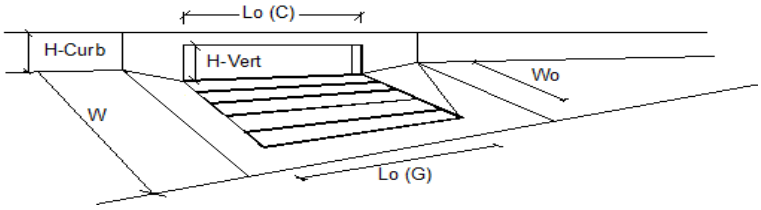
		Minor Storm	Major Storm	
MINOR STORM Allowable Capacity is based on Spread Criterion				
MAJOR STORM Allowable Capacity is based on Depth Criterion	**Q_{allow} =**	**13.1**	**136.0**	**cfs**

Minor storm max. allowable capacity GOOD - greater than the design flow given on sheet 'Inlet Management'

Major storm max. allowable capacity GOOD - greater than the design flow given on sheet 'Inlet Management'

INLET ON A CONTINUOUS GRADE

Version 4.05 Released March 2017



Design Information (Input)		MINOR	MAJOR	
Type of Inlet (CDOT Type R Curb Opening)	Type =	CDOT Type R Curb Opening		
Local Depression (additional to continuous gutter depression 'a')	a_{LOCAL} =	3.0	3.0	inches
Total Number of Units in the Inlet (Grate or Curb Opening)	No =	1	1	
Length of a Single Unit Inlet (Grate or Curb Opening)	L_o =	10.00	10.00	ft
Width of a Unit Grate (cannot be greater than W, Gutter Width)	W_o =	N/A	N/A	ft
Clogging Factor for a Single Unit Grate (typical min. value = 0.5)	C_f-G =	N/A	N/A	
Clogging Factor for a Single Unit Curb Opening (typical min. value = 0.1)	C_f-C =	0.10	0.10	

Street Hydraulics: OK - Q < Allowable Street Capacity'		MINOR	MAJOR	
Total Inlet Interception Capacity	**Q =**	**5.8**	**9.2**	**cfs**
Total Inlet Carry-Over Flow (flow bypassing inlet)	**Q_b =**	**1.2**	**7.7**	**cfs**
Capture Percentage = Q_a/Q_o =	**C% =**	**83**	**54**	**%**

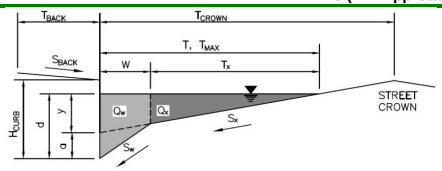
Version 4.05 Released March 2017

ALLOWABLE CAPACITY FOR ONE-HALF OF STREET (Minor & Major Storm)

(Based on Regulated Criteria for Maximum Allowable Flow Depth and Spread)

Project: **Bent Grass Residential Filing No. 2**

Inlet ID: **DP-18 (NW Approach)**



Gutter Geometry (Enter data in the blue cells)

Maximum Allowable Width for Spread Behind Curb	T_{BACK} =	8.0	ft
Side Slope Behind Curb (leave blank for no conveyance credit behind curb)	S_{BACK} =	0.020	ft/ft
Manning's Roughness Behind Curb (typically between 0.012 and 0.020)	n_{BACK} =	0.013	
Height of Curb at Gutter Flow Line	H_{CURB} =	6.00	inches
Distance from Curb Face to Street Crown	T_{CROWN} =	17.0	ft
Gutter Width	W =	2.00	ft
Street Transverse Slope	S_X =	0.020	ft/ft
Gutter Cross Slope (typically 2 inches over 24 inches or 0.083 ft/ft)	S_W =	0.083	ft/ft
Street Longitudinal Slope - Enter 0 for sump condition	S_O =	0.015	ft/ft
Manning's Roughness for Street Section (typically between 0.012 and 0.020)	n_{STREET} =	0.016	

		Minor Storm	Major Storm	
Max. Allowable Spread for Minor & Major Storm	T_{MAX} =	17.0	17.0	ft
Max. Allowable Depth at Gutter Flowline for Minor & Major Storm	d_{MAX} =	6.0	12.0	inches
Allow Flow Depth at Street Crown (leave blank for no)		☐	☑	check = yes

		Minor Storm	Major Storm	
MINOR STORM Allowable Capacity is based on Spread Criterion				
MAJOR STORM Allowable Capacity is based on Depth Criterion	**Q_{allow} =**	**13.3**	**138.4**	**cfs**

Minor storm max. allowable capacity GOOD - greater than the design flow given on sheet 'Inlet Management'

Major storm max. allowable capacity GOOD - greater than the design flow given on sheet 'Inlet Management'

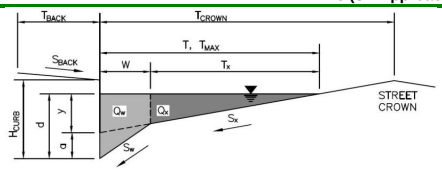
Version 4.05 Released March 2017

ALLOWABLE CAPACITY FOR ONE-HALF OF STREET (Minor & Major Storm)

(Based on Regulated Criteria for Maximum Allowable Flow Depth and Spread)

Project: **Bent Grass Residential Filing No. 2**

Inlet ID: **DP-18 (SE Approach)**



Gutter Geometry (Enter data in the blue cells)

Maximum Allowable Width for Spread Behind Curb	T_{BACK} =	8.0	ft
Side Slope Behind Curb (leave blank for no conveyance credit behind curb)	S_{BACK} =	0.020	ft/ft
Manning's Roughness Behind Curb (typically between 0.012 and 0.020)	n_{BACK} =	0.013	
Height of Curb at Gutter Flow Line	H_{CURB} =	6.00	inches
Distance from Curb Face to Street Crown	T_{CROWN} =	17.0	ft
Gutter Width	W =	2.00	ft
Street Transverse Slope	S_X =	0.020	ft/ft
Gutter Cross Slope (typically 2 inches over 24 inches or 0.083 ft/ft)	S_W =	0.083	ft/ft
Street Longitudinal Slope - Enter 0 for sump condition	S_O =	0.015	ft/ft
Manning's Roughness for Street Section (typically between 0.012 and 0.020)	n_{STREET} =	0.016	

		Minor Storm	Major Storm	
Max. Allowable Spread for Minor & Major Storm	T_{MAX} =	17.0	17.0	ft
Max. Allowable Depth at Gutter Flowline for Minor & Major Storm	d_{MAX} =	6.0	12.0	inches
Allow Flow Depth at Street Crown (leave blank for no)		☐	☑	check = yes

		Minor Storm	Major Storm	
MINOR STORM Allowable Capacity is based on Spread Criterion				
MAJOR STORM Allowable Capacity is based on Depth Criterion	**Q_{allow} =**	**13.3**	**138.4**	**cfs**

Minor storm max. allowable capacity GOOD - greater than the design flow given on sheet 'Inlet Management'

Major storm max. allowable capacity GOOD - greater than the design flow given on sheet 'Inlet Management'

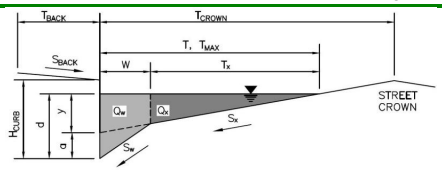
Version 4.05 Released March 2017

ALLOWABLE CAPACITY FOR ONE-HALF OF STREET (Minor & Major Storm)

(Based on Regulated Criteria for Maximum Allowable Flow Depth and Spread)

Project: **Bent Grass Residential Filing No. 2**

Inlet ID: **DP-18**



Gutter Geometry (Enter data in the blue cells)

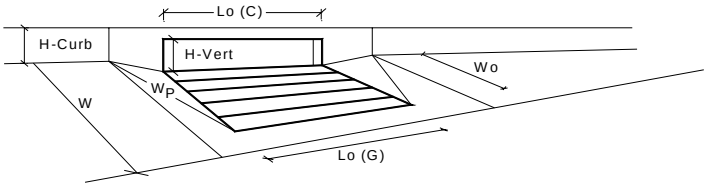
Maximum Allowable Width for Spread Behind Curb	T_{BACK} =	8.0	ft
Side Slope Behind Curb (leave blank for no conveyance credit behind curb)	S_{BACK} =	0.020	ft/ft
Manning's Roughness Behind Curb (typically between 0.012 and 0.020)	n_{BACK} =	0.013	
Height of Curb at Gutter Flow Line	H_{CURB} =	6.00	inches
Distance from Curb Face to Street Crown	T_{CROWN} =	17.0	ft
Gutter Width	W =	2.00	ft
Street Transverse Slope	S_X =	0.020	ft/ft
Gutter Cross Slope (typically 2 inches over 24 inches or 0.083 ft/ft)	S_W =	0.083	ft/ft
Street Longitudinal Slope - Enter 0 for sump condition	S_O =	0.000	ft/ft
Manning's Roughness for Street Section (typically between 0.012 and 0.020)	n_{STREET} =	0.016	

		Minor Storm	Major Storm	
Max. Allowable Spread for Minor & Major Storm	T_{MAX} =	17.0	17.0	ft
Max. Allowable Depth at Gutter Flowline for Minor & Major Storm	d_{MAX} =	6.0	12.0	inches
Check boxes are not applicable in SUMP conditions		☐	☐	

		Minor Storm	Major Storm	
MINOR STORM Allowable Capacity is based on Depth Criterion				
MAJOR STORM Allowable Capacity is based on Depth Criterion	Q_{allow} =	**SUMP**	**SUMP**	**cfs**

INLET IN A SUMP OR SAG LOCATION

Version 4.05 Released March 2017



Design Information (Input)		MINOR	MAJOR	
Type of Inlet (CDOT Type R Curb Opening)	Type =	CDOT Type R Curb Opening		
Local Depression (additional to continuous gutter depression 'a' from above)	a_{local} =	3.00	3.00	inches
Number of Unit Inlets (Grate or Curb Opening)	No =	2	2	
Water Depth at Flowline (outside of local depression)	Ponding Depth =	5.6	12.0	inches
Grate Information		MINOR	MAJOR	☑ Override Depths
Length of a Unit Grate	L_o (G) =	N/A	N/A	feet
Width of a Unit Grate	W_o =	N/A	N/A	feet
Area Opening Ratio for a Grate (typical values 0.15-0.90)	A_{ratio} =	N/A	N/A	
Clogging Factor for a Single Grate (typical value 0.50 - 0.70)	C_f (G) =	N/A	N/A	
Grate Weir Coefficient (typical value 2.15 - 3.60)	C_w (G) =	N/A	N/A	
Grate Orifice Coefficient (typical value 0.60 - 0.80)	C_o (G) =	N/A	N/A	
Curb Opening Information		MINOR	MAJOR	
Length of a Unit Curb Opening	L_o (C) =	10.00	10.00	feet
Height of Vertical Curb Opening in Inches	H_{vert} =	6.00	6.00	inches
Height of Curb Orifice Throat in Inches	H_{throat} =	6.00	6.00	inches
Angle of Throat (see USDCM Figure ST-5)	Theta =	63.40	63.40	degrees
Side Width for Depression Pan (typically the gutter width of 2 feet)	W_p =	2.00	2.00	feet
Clogging Factor for a Single Curb Opening (typical value 0.10)	C_f (C) =	0.10	0.10	
Curb Opening Weir Coefficient (typical value 2.3-3.7)	C_w (C) =	3.60	3.60	
Curb Opening Orifice Coefficient (typical value 0.60 - 0.70)	C_o (C) =	0.67	0.67	
Low Head Performance Reduction (Calculated)		MINOR	MAJOR	
Depth for Grate Midwidth	d_{Grate} =	N/A	N/A	ft
Depth for Curb Opening Weir Equation	d_{Curb} =	0.30	0.83	ft
Combination Inlet Performance Reduction Factor for Long Inlets	$RF_{Combination}$ =	0.53	1.00	
Curb Opening Performance Reduction Factor for Long Inlets	RF_{Curb} =	0.76	1.00	
Grated Inlet Performance Reduction Factor for Long Inlets	RF_{Grate} =	N/A	N/A	
		MINOR	MAJOR	
Total Inlet Interception Capacity (assumes clogged condition)	**Q_a =**	**11.8**	**52.7**	**cfs**
Inlet Capacity IS GOOD for Minor and Major Storms(>Q PEAK)	$Q_{PEAK\ REQUIRED}$ =	9.0	27.4	cfs

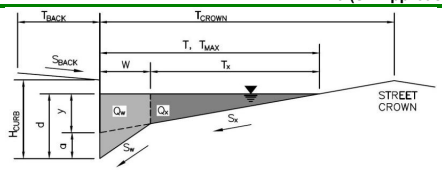
Version 4.05 Released March 2017

ALLOWABLE CAPACITY FOR ONE-HALF OF STREET (Minor & Major Storm)

(Based on Regulated Criteria for Maximum Allowable Flow Depth and Spread)

Project: Bent Grass Residential Filing No. 2

Inlet ID: DP-19 (SE Approach)



Gutter Geometry (Enter data in the blue cells)

Maximum Allowable Width for Spread Behind Curb	T_{BACK} =	8.0	ft
Side Slope Behind Curb (leave blank for no conveyance credit behind curb)	S_{BACK} =	0.020	ft/ft
Manning's Roughness Behind Curb (typically between 0.012 and 0.020)	n_{BACK} =	0.013	
Height of Curb at Gutter Flow Line	H_{CURB} =	6.00	inches
Distance from Curb Face to Street Crown	T_{CROWN} =	17.0	ft
Gutter Width	W =	2.00	ft
Street Transverse Slope	S_X =	0.020	ft/ft
Gutter Cross Slope (typically 2 inches over 24 inches or 0.083 ft/ft)	S_W =	0.083	ft/ft
Street Longitudinal Slope - Enter 0 for sump condition	S_O =	0.010	ft/ft
Manning's Roughness for Street Section (typically between 0.012 and 0.020)	n_{STREET} =	0.016	

		Minor Storm	Major Storm	
Max. Allowable Spread for Minor & Major Storm	T_{MAX} =	17.0	17.0	ft
Max. Allowable Depth at Gutter Flowline for Minor & Major Storm	d_{MAX} =	6.0	12.0	inches
Allow Flow Depth at Street Crown (leave blank for no)		☐	☑	check = yes

		Minor Storm	Major Storm	
MINOR STORM Allowable Capacity is based on Spread Criterion				
MAJOR STORM Allowable Capacity is based on Depth Criterion	**Q_{allow} =**	**10.9**	**113.0**	**cfs**

Minor storm max. allowable capacity GOOD - greater than the design flow given on sheet 'Inlet Management'

Major storm max. allowable capacity GOOD - greater than the design flow given on sheet 'Inlet Management'

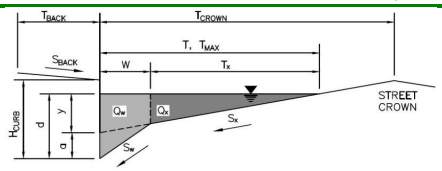
Version 4.05 Released March 2017

ALLOWABLE CAPACITY FOR ONE-HALF OF STREET (Minor & Major Storm)

(Based on Regulated Criteria for Maximum Allowable Flow Depth and Spread)

Project: **Bent Grass Residential Filing No. 2**

Inlet ID: **DP-19**



Gutter Geometry (Enter data in the blue cells)

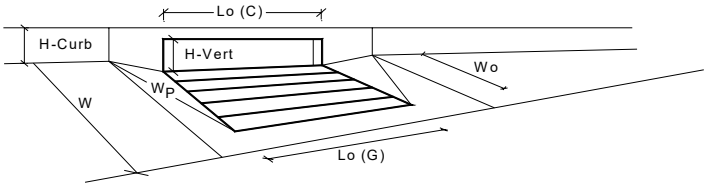
Maximum Allowable Width for Spread Behind Curb	T_{BACK} =	8.0	ft
Side Slope Behind Curb (leave blank for no conveyance credit behind curb)	S_{BACK} =	0.020	ft/ft
Manning's Roughness Behind Curb (typically between 0.012 and 0.020)	n_{BACK} =	0.013	
Height of Curb at Gutter Flow Line	H_{CURB} =	6.00	inches
Distance from Curb Face to Street Crown	T_{CROWN} =	17.0	ft
Gutter Width	W =	2.00	ft
Street Transverse Slope	S_X =	0.020	ft/ft
Gutter Cross Slope (typically 2 inches over 24 inches or 0.083 ft/ft)	S_W =	0.083	ft/ft
Street Longitudinal Slope - Enter 0 for sump condition	S_O =	0.000	ft/ft
Manning's Roughness for Street Section (typically between 0.012 and 0.020)	n_{STREET} =	0.016	

		Minor Storm	Major Storm	
Max. Allowable Spread for Minor & Major Storm	T_{MAX} =	17.0	17.0	ft
Max. Allowable Depth at Gutter Flowline for Minor & Major Storm	d_{MAX} =	6.0	12.0	inches
Check boxes are not applicable in SUMP conditions		☐	☐	

		Minor Storm	Major Storm	
MINOR STORM Allowable Capacity is based on Depth Criterion				
MAJOR STORM Allowable Capacity is based on Depth Criterion	**Q_{allow} =**	**SUMP**	**SUMP**	**cfs**

INLET IN A SUMP OR SAG LOCATION

Version 4.05 Released March 2017



		MINOR	MAJOR	
Design Information (Input)		MINOR	MAJOR	
Type of Inlet (CDOT Type R Curb Opening)	Type =	CDOT Type R Curb Opening		
Local Depression (additional to continuous gutter depression 'a' from above)	a_{local} =	3.00	3.00	inches
Number of Unit Inlets (Grate or Curb Opening)	No =	2	2	
Water Depth at Flowline (outside of local depression)	Ponding Depth =	5.6	12.0	inches
Grate Information		MINOR	MAJOR	☑ Override Depths
Length of a Unit Grate	L_o (G) =	N/A	N/A	feet
Width of a Unit Grate	W_o =	N/A	N/A	feet
Area Opening Ratio for a Grate (typical values 0.15-0.90)	A_{ratio} =	N/A	N/A	
Clogging Factor for a Single Grate (typical value 0.50 - 0.70)	C_f (G) =	N/A	N/A	
Grate Weir Coefficient (typical value 2.15 - 3.60)	C_w (G) =	N/A	N/A	
Grate Orifice Coefficient (typical value 0.60 - 0.80)	C_o (G) =	N/A	N/A	
Curb Opening Information		MINOR	MAJOR	
Length of a Unit Curb Opening	L_o (C) =	10.00	10.00	feet
Height of Vertical Curb Opening in Inches	H_{vert} =	6.00	6.00	inches
Height of Curb Orifice Throat in Inches	H_{throat} =	6.00	6.00	inches
Angle of Throat (see USDCM Figure ST-5)	Theta =	63.40	63.40	degrees
Side Width for Depression Pan (typically the gutter width of 2 feet)	W_p =	2.00	2.00	feet
Clogging Factor for a Single Curb Opening (typical value 0.10)	C_f (C) =	0.10	0.10	
Curb Opening Weir Coefficient (typical value 2.3-3.7)	C_w (C) =	3.60	3.60	
Curb Opening Orifice Coefficient (typical value 0.60 - 0.70)	C_o (C) =	0.67	0.67	
Low Head Performance Reduction (Calculated)		MINOR	MAJOR	
Depth for Grate Midwidth	d_{Grate} =	N/A	N/A	ft
Depth for Curb Opening Weir Equation	d_{Curb} =	0.30	0.83	ft
Combination Inlet Performance Reduction Factor for Long Inlets	$RF_{Combination}$ =	0.53	1.00	
Curb Opening Performance Reduction Factor for Long Inlets	RF_{Curb} =	0.76	1.00	
Grated Inlet Performance Reduction Factor for Long Inlets	RF_{Grate} =	N/A	N/A	
		MINOR	MAJOR	
Total Inlet Interception Capacity (assumes clogged condition)	**Q_a =**	**11.8**	**52.7**	**cfs**
Inlet Capacity IS GOOD for Minor and Major Storms(>Q PEAK)	$Q_{PEAK\ REQUIRED}$ =	9.9	29.6	cfs

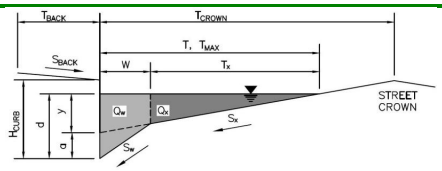
Version 4.05 Released March 2017

ALLOWABLE CAPACITY FOR ONE-HALF OF STREET (Minor & Major Storm)

(Based on Regulated Criteria for Maximum Allowable Flow Depth and Spread)

Project: **Bent Grass Residential Filing No. 2**

Inlet ID: **DP-21**



Gutter Geometry (Enter data in the blue cells)

Maximum Allowable Width for Spread Behind Curb	T_{BACK} =	8.0	ft
Side Slope Behind Curb (leave blank for no conveyance credit behind curb)	S_{BACK} =	0.020	ft/ft
Manning's Roughness Behind Curb (typically between 0.012 and 0.020)	n_{BACK} =	0.013	
Height of Curb at Gutter Flow Line	H_{CURB} =	6.00	inches
Distance from Curb Face to Street Crown	T_{CROWN} =	17.0	ft
Gutter Width	W =	2.00	ft
Street Transverse Slope	S_X =	0.020	ft/ft
Gutter Cross Slope (typically 2 inches over 24 inches or 0.083 ft/ft)	S_W =	0.083	ft/ft
Street Longitudinal Slope - Enter 0 for sump condition	S_O =	0.015	ft/ft
Manning's Roughness for Street Section (typically between 0.012 and 0.020)	n_{STREET} =	0.016	

		Minor Storm	Major Storm	
Max. Allowable Spread for Minor & Major Storm	T_{MAX} =	17.0	17.0	ft
Max. Allowable Depth at Gutter Flowline for Minor & Major Storm	d_{MAX} =	6.0	12.0	inches
Allow Flow Depth at Street Crown (leave blank for no)		☐	☑	check = yes

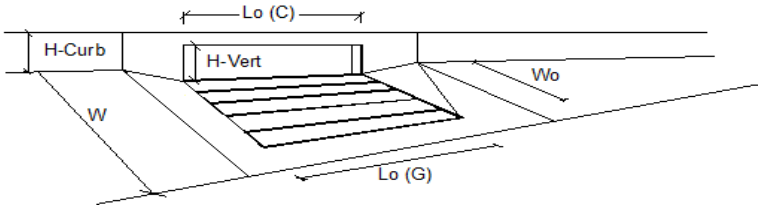
		Minor Storm	Major Storm	
MINOR STORM Allowable Capacity is based on Spread Criterion				
MAJOR STORM Allowable Capacity is based on Depth Criterion	**Q_{allow} =**	**13.3**	**138.4**	**cfs**

Minor storm max. allowable capacity GOOD - greater than the design flow given on sheet 'Inlet Management'

Major storm max. allowable capacity GOOD - greater than the design flow given on sheet 'Inlet Management'

INLET ON A CONTINUOUS GRADE

Version 4.05 Released March 2017



Design Information (Input)		MINOR	MAJOR	
Type of Inlet (CDOT Type R Curb Opening)	Type =	CDOT Type R Curb Opening		
Local Depression (additional to continuous gutter depression 'a')	a_{LOCAL} =	3.0	3.0	inches
Total Number of Units in the Inlet (Grate or Curb Opening)	No =	2	2	
Length of a Single Unit Inlet (Grate or Curb Opening)	L_o =	10.00	10.00	ft
Width of a Unit Grate (cannot be greater than W, Gutter Width)	W_o =	N/A	N/A	ft
Clogging Factor for a Single Unit Grate (typical min. value = 0.5)	C_f-G =	N/A	N/A	
Clogging Factor for a Single Unit Curb Opening (typical min. value = 0.1)	C_f-C =	0.10	0.10	

Street Hydraulics: OK - Q < Allowable Street Capacity'		MINOR	MAJOR	
Total Inlet Interception Capacity	**Q =**	**9.4**	**23.1**	**cfs**
Total Inlet Carry-Over Flow (flow bypassing inlet)	**Q_b =**	**0.0**	**12.1**	**cfs**
Capture Percentage = Q_a/Q_o =	**C% =**	**100**	**66**	**%**

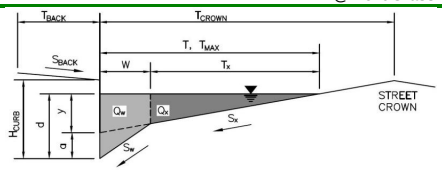
Version 4.05 Released March 2017

ALLOWABLE CAPACITY FOR ONE-HALF OF STREET (Minor & Major Storm)

(Based on Regulated Criteria for Maximum Allowable Flow Depth and Spread)

Project: **Bent Grass Residential Filing No. 2**

Inlet ID: **DP-22 @ Bent Grass M.D.**



Gutter Geometry (Enter data in the blue cells)

Maximum Allowable Width for Spread Behind Curb	T_{BACK} =	14.0	ft
Side Slope Behind Curb (leave blank for no conveyance credit behind curb)	S_{BACK} =	0.020	ft/ft
Manning's Roughness Behind Curb (typically between 0.012 and 0.020)	n_{BACK} =	0.013	
Height of Curb at Gutter Flow Line	H_{CURB} =	6.00	inches
Distance from Curb Face to Street Crown	T_{CROWN} =	26.0	ft
Gutter Width	W =	2.00	ft
Street Transverse Slope	S_X =	0.020	ft/ft
Gutter Cross Slope (typically 2 inches over 24 inches or 0.083 ft/ft)	S_W =	0.083	ft/ft
Street Longitudinal Slope - Enter 0 for sump condition	S_O =	0.015	ft/ft
Manning's Roughness for Street Section (typically between 0.012 and 0.020)	n_{STREET} =	0.016	

		Minor Storm	Major Storm	
Max. Allowable Spread for Minor & Major Storm	T_{MAX} =	26.0	26.0	ft
Max. Allowable Depth at Gutter Flowline for Minor & Major Storm	d_{MAX} =	6.0	12.0	inches
Allow Flow Depth at Street Crown (leave blank for no)		☐	☑	check = yes

		Minor Storm	Major Storm	
MINOR STORM Allowable Capacity is based on Depth Criterion				
MAJOR STORM Allowable Capacity is based on Depth Criterion	**Q_{allow} =**	**16.9**	**175.4**	**cfs**

Minor storm max. allowable capacity GOOD - greater than the design flow given on sheet 'Inlet Management'

Major storm max. allowable capacity GOOD - greater than the design flow given on sheet 'Inlet Management'

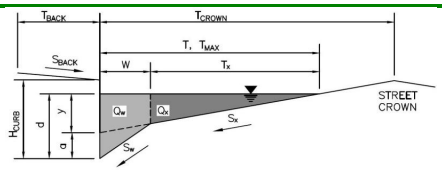
Version 4.05 Released March 2017

ALLOWABLE CAPACITY FOR ONE-HALF OF STREET (Minor & Major Storm)

(Based on Regulated Criteria for Maximum Allowable Flow Depth and Spread)

Project: **Bent Grass Residential Filing No. 2**

Inlet ID: **DP-22**



Gutter Geometry (Enter data in the blue cells)

Maximum Allowable Width for Spread Behind Curb	T_{BACK} =	8.0	ft
Side Slope Behind Curb (leave blank for no conveyance credit behind curb)	S_{BACK} =	0.020	ft/ft
Manning's Roughness Behind Curb (typically between 0.012 and 0.020)	n_{BACK} =	0.013	
Height of Curb at Gutter Flow Line	H_{CURB} =	6.00	inches
Distance from Curb Face to Street Crown	T_{CROWN} =	17.0	ft
Gutter Width	W =	2.00	ft
Street Transverse Slope	S_X =	0.020	ft/ft
Gutter Cross Slope (typically 2 inches over 24 inches or 0.083 ft/ft)	S_W =	0.083	ft/ft
Street Longitudinal Slope - Enter 0 for sump condition	S_O =	0.015	ft/ft
Manning's Roughness for Street Section (typically between 0.012 and 0.020)	n_{STREET} =	0.016	

		Minor Storm	Major Storm	
Max. Allowable Spread for Minor & Major Storm	T_{MAX} =	17.0	17.0	ft
Max. Allowable Depth at Gutter Flowline for Minor & Major Storm	d_{MAX} =	6.0	12.0	inches
Allow Flow Depth at Street Crown (leave blank for no)		☐	☑	check = yes

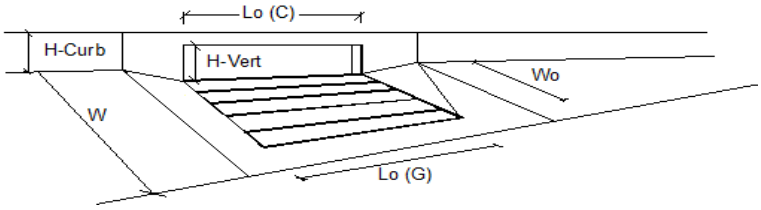
		Minor Storm	Major Storm	
MINOR STORM Allowable Capacity is based on Spread Criterion				
MAJOR STORM Allowable Capacity is based on Depth Criterion	**Q_{allow} =**	**13.3**	**138.4**	**cfs**

Minor storm max. allowable capacity GOOD - greater than the design flow given on sheet 'Inlet Management'

Major storm max. allowable capacity GOOD - greater than the design flow given on sheet 'Inlet Management'

INLET ON A CONTINUOUS GRADE

Version 4.05 Released March 2017



Design Information (Input)	CDOT Type R Curb Opening		MINOR	MAJOR	
Type of Inlet		Type =	CDOT Type R Curb Opening		
Local Depression (additional to continuous gutter depression 'a')		a_{LOCAL} =	3.0	3.0	inches
Total Number of Units in the Inlet (Grate or Curb Opening)		No =	2	2	
Length of a Single Unit Inlet (Grate or Curb Opening)		L_o =	10.00	10.00	ft
Width of a Unit Grate (cannot be greater than W, Gutter Width)		W_o =	N/A	N/A	ft
Clogging Factor for a Single Unit Grate (typical min. value = 0.5)		C_f-G =	N/A	N/A	
Clogging Factor for a Single Unit Curb Opening (typical min. value = 0.1)		C_f-C =	0.10	0.10	

Street Hydraulics: OK - Q < Allowable Street Capacity'		MINOR	MAJOR	
Total Inlet Interception Capacity	**Q =**	**12.3**	**23.1**	**cfs**
Total Inlet Carry-Over Flow (flow bypassing inlet)	**Q_b =**	**0.2**	**12.1**	**cfs**
Capture Percentage = Q_a/Q_o =	**C% =**	**98**	**66**	**%**

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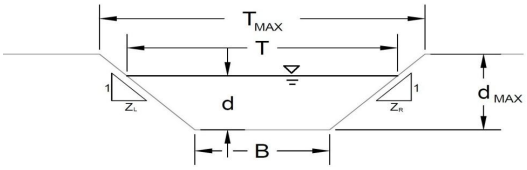
AREA INLET IN A SWALE

Bent Grass Residential Filing No. 2

DP-23



This worksheet uses the NRCS vegetal retardance method to determine Manning's n.

For more information see Section 7.2.3 of the USDCM.

Analysis of Trapezoidal Grass-Lined Channel Using SCS Method

NRCS Vegetal Retardance (A, B, C, D, or E)	A, B, C, D or E		
Manning's n (Leave cell D16 blank to manually enter an n value)	n =	0.030	
Channel Invert Slope	S_O =	0.0030	ft/ft
Bottom Width	B =	3.00	ft
Left Side Slope	Z1 =	4.00	ft/ft
Right Side Slope	Z2 =	4.00	ft/ft

Check one of the following soil types:

Soil Type:	Max. Velocity (V_{MAX})	Max Froude No. (F_{MAX})
Non-Cohesive	5.0 fps	0.60
Cohesive	7.0 fps	0.80
Paved	N/A	N/A

Choose One:
- (●) **Non-Cohesive**
- ( ) **Cohesive**
- ( ) **Paved**

		Minor Storm	Major Storm	
Max. Allowable Top Width of Channel for Minor & Major Storm	**T_{MAX} =**	**19.00**	**19.00**	**feet**
Max. Allowable Water Depth in Channel for Minor & Major Storm	**d_{MAX} =**	**1.50**	**1.50**	**feet**

Maximum Channel Capacity Based On Allowable Top Width

		Minor Storm	Major Storm	
Max. Allowable Top Width	**T_{MAX} =**	**19.00**	**19.00**	**ft**
Water Depth	d =	2.00	2.00	ft
Flow Area	A =	22.00	22.00	sq ft
Wetted Perimeter	P =	19.49	19.49	ft
Hydraulic Radius	R =	1.13	1.13	ft
Manning's n	n =	0.030	0.030	
Flow Velocity	V =	2.95	2.95	fps
Velocity-Depth Product	VR =	3.33	3.33	ft^2/s
Hydraulic Depth	D =	1.16	1.16	ft
Froude Number	Fr =	0.48	0.48	
Max. Flow Based On Allowable Top Width	**Q_T =**	**64.9**	**64.9**	**cfs**

Maximum Channel Capacity Based On Allowable Water Depth

		Minor Storm	Major Storm	
Max. Allowable Water Depth	**d_{MAX} =**	**1.50**	**1.50**	**feet**
Top Width	T =	15.00	15.00	feet
Flow Area	A =	13.50	13.50	square feet
Wetted Perimeter	P =	15.37	15.37	feet
Hydraulic Radius	R =	0.88	0.88	feet
Manning's n	n =	0.030	0.030	
Flow Velocity	V =	2.50	2.50	fps
Velocity-Depth Product	VR =	2.19	2.19	ft^2/s
Hydraulic Depth	D =	0.90	0.90	feet
Froude Number	Fr =	0.46	0.46	
Max. Flow Based On Allowable Water Depth	**Q_d =**	**33.7**	**33.7**	**cfs**

Allowable Channel Capacity Based On Channel Geometry

		Minor Storm	Major Storm	
MINOR STORM Allowable Capacity is based on Depth Criterion	**Q_{allow} =**	**33.7**	**33.7**	**cfs**
MAJOR STORM Allowable Capacity is based on Depth Criterion	**d_{allow} =**	**1.50**	**1.50**	**ft**

Water Depth in Channel Based On Design Peak Flow

Design Peak Flow	**Q_o =**	**4.4**	**21.2**	**cfs**
Water Depth	**d =**	**0.57**	**1.22**	**feet**
Top Width	T =	7.57	12.73	feet
Flow Area	A =	3.02	9.57	square feet
Wetted Perimeter	P =	7.71	13.03	feet
Hydraulic Radius	R =	0.39	0.73	feet
Manning's n	n =	0.030	0.030	
Flow Velocity	V =	1.46	2.21	fps
Velocity-Depth Product	VR =	0.57	1.63	ft^2/s
Hydraulic Depth	D =	0.40	0.75	feet
Froude Number	Fr =	0.41	0.45	

Minor storm max. allowable capacity GOOD - greater than the design flow given on sheet 'Inlet Management'
Major storm max. allowable capacity GOOD - greater than the design flow given on sheet 'Inlet Management'

Version 4.05 Released March 2017

AREA INLET IN A SWALE

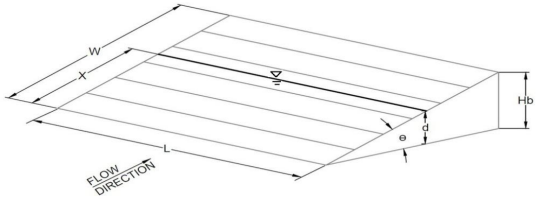
Bent Grass Residential Filing No. 2

DP-23

Inlet Design Information (Input)

Type of Inlet: CDOT TYPE D (Parallel & Depressed)

Inlet Type = CDOT TYPE D (Parallel & Depressed)



Angle of Inclined Grate (must be <= 30 degrees)	θ =	0.17	degrees
Width of Grate	W =	6.00	feet
Length of Grate	L =	3.00	feet
Open Area Ratio	A_{RATIO} =	0.70	
Height of Inclined Grate	H_B =	0.01	feet
Clogging Factor	C_f =	0.38	
Grate Discharge Coefficient	C_d =	0.67	
Orifice Coefficient	C_o =	0.45	
Weir Coefficient	C_w =	1.44	

		MINOR	MAJOR	
Water Depth at Inlet (for depressed inlets, 1 foot is added for depression)	d =	1.57	2.22	
Grate Capacity as a Weir				
Submerged Side Weir Length	X =	3.00	3.00	feet
Inclined Side Weir Flow	Q_{ws} =	14.9	25.0	cfs
Base Weir Flow	Q_{wb} =	42.7	71.5	cfs
Interception without Clogging	Q_{wi} =	72.4	121.4	cfs
Interception with Clogging	Q_{wa} =	45.3	75.9	cfs
Grate Capacity as an Orifice				
Interception without Clogging	Q_{oi} =	81.5	96.8	cfs
Interception with Clogging	Q_{oa} =	50.9	60.5	cfs
Total Inlet Interception Capacity (assumes clogged condition)	**Q_a =**	**45.3**	**60.5**	**cfs**
Bypassed Flow, Q_b =		**0.0**	**0.0**	**cfs**
Capture Percentage = Q_a/Q_o = C%		**100**	**100**	**%**

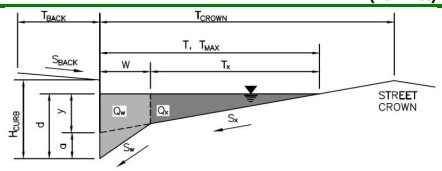
Version 4.05 Released March 2017

ALLOWABLE CAPACITY FOR ONE-HALF OF STREET (Minor & Major Storm)

(Based on Regulated Criteria for Maximum Allowable Flow Depth and Spread)

Project: **Bent Grass Residential Filing No. 2**

Inlet ID: **DP-24 (10' Inlet)**



Gutter Geometry (Enter data in the blue cells)

Maximum Allowable Width for Spread Behind Curb	T_{BACK} =	14.0	ft
Side Slope Behind Curb (leave blank for no conveyance credit behind curb)	S_{BACK} =	0.020	ft/ft
Manning's Roughness Behind Curb (typically between 0.012 and 0.020)	n_{BACK} =	0.013	
Height of Curb at Gutter Flow Line	H_{CURB} =	6.00	inches
Distance from Curb Face to Street Crown	T_{CROWN} =	26.0	ft
Gutter Width	W =	2.00	ft
Street Transverse Slope	S_X =	0.020	ft/ft
Gutter Cross Slope (typically 2 inches over 24 inches or 0.083 ft/ft)	S_W =	0.083	ft/ft
Street Longitudinal Slope - Enter 0 for sump condition	S_O =	0.028	ft/ft
Manning's Roughness for Street Section (typically between 0.012 and 0.020)	n_{STREET} =	0.016	

		Minor Storm	Major Storm	
Max. Allowable Spread for Minor & Major Storm	T_{MAX} =	26.0	26.0	ft
Max. Allowable Depth at Gutter Flowline for Minor & Major Storm	d_{MAX} =	6.0	12.0	inches
Allow Flow Depth at Street Crown (leave blank for no)		☐	☑	check = yes

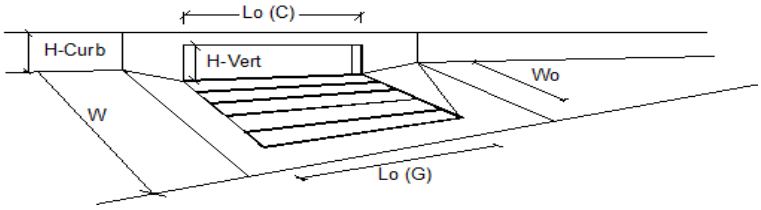
		Minor Storm	Major Storm	
MINOR STORM Allowable Capacity is based on Depth Criterion				
MAJOR STORM Allowable Capacity is based on Depth Criterion	**Q_{allow} =**	**18.1**	**152.7**	**cfs**

Minor storm max. allowable capacity GOOD - greater than the design flow given on sheet 'Inlet Management'

Major storm max. allowable capacity GOOD - greater than the design flow given on sheet 'Inlet Management'

INLET ON A CONTINUOUS GRADE

Version 4.05 Released March 2017



Design Information (Input)		MINOR	MAJOR	
Type of Inlet (CDOT Type R Curb Opening)	Type =	CDOT Type R Curb Opening		
Local Depression (additional to continuous gutter depression 'a')	a_{LOCAL} =	3.0	3.0	inches
Total Number of Units in the Inlet (Grate or Curb Opening)	No =	1	1	
Length of a Single Unit Inlet (Grate or Curb Opening)	L_o =	10.00	10.00	ft
Width of a Unit Grate (cannot be greater than W, Gutter Width)	W_o =	N/A	N/A	ft
Clogging Factor for a Single Unit Grate (typical min. value = 0.5)	C_f-G =	N/A	N/A	
Clogging Factor for a Single Unit Curb Opening (typical min. value = 0.1)	C_f-C =	0.10	0.10	

Street Hydraulics: OK - Q < Allowable Street Capacity'		MINOR	MAJOR	
Total Inlet Interception Capacity	**Q =**	**0.0**	**4.2**	**cfs**
Total Inlet Carry-Over Flow (flow bypassing inlet)	**Q_b =**	**0.0**	**0.1**	**cfs**
Capture Percentage = Q_a/Q_o =	**C% =**	**0**	**98**	**%**

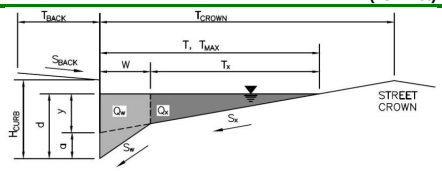
Version 4.05 Released March 2017

ALLOWABLE CAPACITY FOR ONE-HALF OF STREET (Minor & Major Storm)

(Based on Regulated Criteria for Maximum Allowable Flow Depth and Spread)

Project: **Bent Grass Residential Filing No. 2**

Inlet ID: **DP-24 (15' Inlet)**



Gutter Geometry (Enter data in the blue cells)

Maximum Allowable Width for Spread Behind Curb	T_{BACK} =	14.0	ft
Side Slope Behind Curb (leave blank for no conveyance credit behind curb)	S_{BACK} =	0.020	ft/ft
Manning's Roughness Behind Curb (typically between 0.012 and 0.020)	n_{BACK} =	0.013	
Height of Curb at Gutter Flow Line	H_{CURB} =	6.00	inches
Distance from Curb Face to Street Crown	T_{CROWN} =	26.0	ft
Gutter Width	W =	2.00	ft
Street Transverse Slope	S_X =	0.020	ft/ft
Gutter Cross Slope (typically 2 inches over 24 inches or 0.083 ft/ft)	S_W =	0.083	ft/ft
Street Longitudinal Slope - Enter 0 for sump condition	S_O =	0.028	ft/ft
Manning's Roughness for Street Section (typically between 0.012 and 0.020)	n_{STREET} =	0.016	

		Minor Storm	Major Storm	
Max. Allowable Spread for Minor & Major Storm	T_{MAX} =	26.0	26.0	ft
Max. Allowable Depth at Gutter Flowline for Minor & Major Storm	d_{MAX} =	6.0	12.0	inches
Allow Flow Depth at Street Crown (leave blank for no)		☐	☑	check = yes

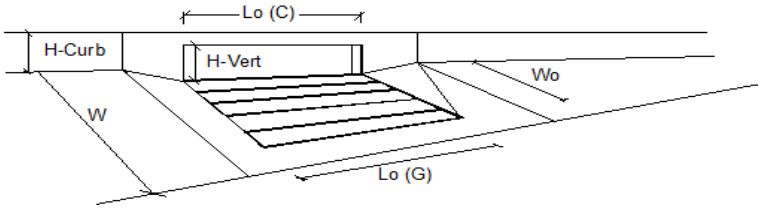
		Minor Storm	Major Storm	
MINOR STORM Allowable Capacity is based on Depth Criterion				
MAJOR STORM Allowable Capacity is based on Depth Criterion	**Q_{allow} =**	**18.1**	**152.7**	**cfs**

Minor storm max. allowable capacity GOOD - greater than the design flow given on sheet 'Inlet Management'

Major storm max. allowable capacity GOOD - greater than the design flow given on sheet 'Inlet Management'

INLET ON A CONTINUOUS GRADE

Version 4.05 Released March 2017



Design Information (Input)	CDOT Type R Curb Opening		MINOR	MAJOR	
Type of Inlet		Type =	CDOT Type R Curb Opening		
Local Depression (additional to continuous gutter depression 'a')		a_{LOCAL} =	3.0	3.0	inches
Total Number of Units in the Inlet (Grate or Curb Opening)		No =	1	1	
Length of a Single Unit Inlet (Grate or Curb Opening)		L_o =	15.00	15.00	ft
Width of a Unit Grate (cannot be greater than W, Gutter Width)		W_o =	N/A	N/A	ft
Clogging Factor for a Single Unit Grate (typical min. value = 0.5)		C_f-G =	N/A	N/A	
Clogging Factor for a Single Unit Curb Opening (typical min. value = 0.1)		C_f-C =	0.10	0.10	

Street Hydraulics: OK - Q < Allowable Street Capacity'		MINOR	MAJOR	
Total Inlet Interception Capacity	**Q =**	**2.3**	**12.8**	**cfs**
Total Inlet Carry-Over Flow (flow bypassing inlet)	**Q_b =**	**0.0**	**4.3**	**cfs**
Capture Percentage = Q_a/Q_o =	**C% =**	**100**	**75**	**%**

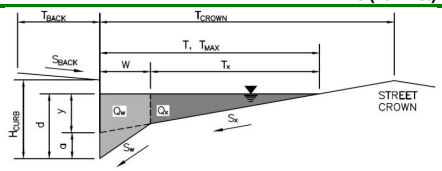
Version 4.05 Released March 2017

ALLOWABLE CAPACITY FOR ONE-HALF OF STREET (Minor & Major Storm)

(Based on Regulated Criteria for Maximum Allowable Flow Depth and Spread)

Project: **Bent Grass Residential Filing No. 2**

Inlet ID: **DP-25 (10' Inlet)**



Gutter Geometry (Enter data in the blue cells)

Maximum Allowable Width for Spread Behind Curb	T_{BACK} =	14.0	ft
Side Slope Behind Curb (leave blank for no conveyance credit behind curb)	S_{BACK} =	0.020	ft/ft
Manning's Roughness Behind Curb (typically between 0.012 and 0.020)	n_{BACK} =	0.013	
Height of Curb at Gutter Flow Line	H_{CURB} =	6.00	inches
Distance from Curb Face to Street Crown	T_{CROWN} =	26.0	ft
Gutter Width	W =	2.00	ft
Street Transverse Slope	S_X =	0.020	ft/ft
Gutter Cross Slope (typically 2 inches over 24 inches or 0.083 ft/ft)	S_W =	0.083	ft/ft
Street Longitudinal Slope - Enter 0 for sump condition	S_O =	0.028	ft/ft
Manning's Roughness for Street Section (typically between 0.012 and 0.020)	n_{STREET} =	0.016	

		Minor Storm	Major Storm	
Max. Allowable Spread for Minor & Major Storm	T_{MAX} =	26.0	26.0	ft
Max. Allowable Depth at Gutter Flowline for Minor & Major Storm	d_{MAX} =	6.0	12.0	inches
Allow Flow Depth at Street Crown (leave blank for no)		☐	☑	check = yes

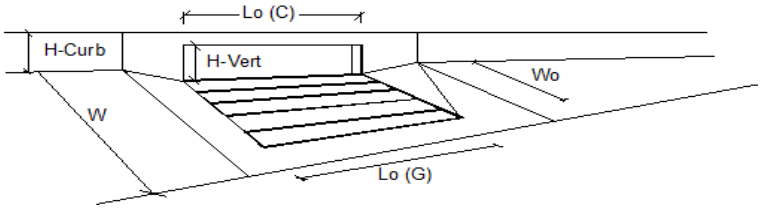
		Minor Storm	Major Storm	
MINOR STORM Allowable Capacity is based on Depth Criterion				
MAJOR STORM Allowable Capacity is based on Depth Criterion	**Q_{allow} =**	**18.1**	**152.7**	**cfs**

Minor storm max. allowable capacity GOOD - greater than the design flow given on sheet 'Inlet Management'

Major storm max. allowable capacity GOOD - greater than the design flow given on sheet 'Inlet Management'

INLET ON A CONTINUOUS GRADE

Version 4.05 Released March 2017



Design Information (Input)		MINOR	MAJOR	
Type of Inlet (CDOT Type R Curb Opening)	Type =	CDOT Type R Curb Opening		
Local Depression (additional to continuous gutter depression 'a')	a_{LOCAL} =	3.0	3.0	inches
Total Number of Units in the Inlet (Grate or Curb Opening)	No =	1	1	
Length of a Single Unit Inlet (Grate or Curb Opening)	L_o =	10.00	10.00	ft
Width of a Unit Grate (cannot be greater than W, Gutter Width)	W_o =	N/A	N/A	ft
Clogging Factor for a Single Unit Grate (typical min. value = 0.5)	C_f-G =	N/A	N/A	
Clogging Factor for a Single Unit Curb Opening (typical min. value = 0.1)	C_f-C =	0.10	0.10	

Street Hydraulics: OK - Q < Allowable Street Capacity'		MINOR	MAJOR	
Total Inlet Interception Capacity	**Q =**	**0.0**	**4.2**	**cfs**
Total Inlet Carry-Over Flow (flow bypassing inlet)	**Q_b =**	**0.0**	**0.1**	**cfs**
Capture Percentage = Q_a/Q_o =	**C% =**	**0**	**98**	**%**

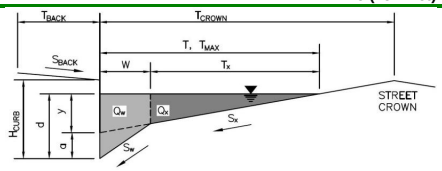
Version 4.05 Released March 2017

ALLOWABLE CAPACITY FOR ONE-HALF OF STREET (Minor & Major Storm)

(Based on Regulated Criteria for Maximum Allowable Flow Depth and Spread)

Project: **Bent Grass Residential Filing No. 2**

Inlet ID: **DP-25 (15' Inlet)**



Gutter Geometry (Enter data in the blue cells)

Maximum Allowable Width for Spread Behind Curb	T_{BACK} =	14.0	ft
Side Slope Behind Curb (leave blank for no conveyance credit behind curb)	S_{BACK} =	0.020	ft/ft
Manning's Roughness Behind Curb (typically between 0.012 and 0.020)	n_{BACK} =	0.013	
Height of Curb at Gutter Flow Line	H_{CURB} =	6.00	inches
Distance from Curb Face to Street Crown	T_{CROWN} =	26.0	ft
Gutter Width	W =	2.00	ft
Street Transverse Slope	S_X =	0.020	ft/ft
Gutter Cross Slope (typically 2 inches over 24 inches or 0.083 ft/ft)	S_W =	0.083	ft/ft
Street Longitudinal Slope - Enter 0 for sump condition	S_O =	0.028	ft/ft
Manning's Roughness for Street Section (typically between 0.012 and 0.020)	n_{STREET} =	0.016	

		Minor Storm	Major Storm	
Max. Allowable Spread for Minor & Major Storm	T_{MAX} =	26.0	26.0	ft
Max. Allowable Depth at Gutter Flowline for Minor & Major Storm	d_{MAX} =	6.0	12.0	inches
Allow Flow Depth at Street Crown (leave blank for no)		☐	☑	check = yes

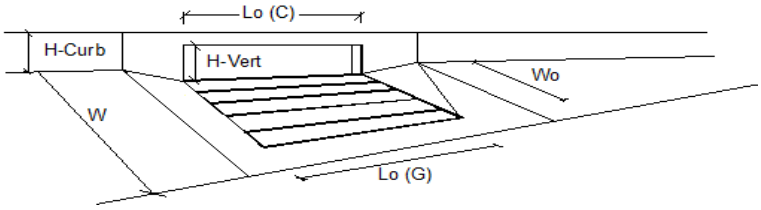
		Minor Storm	Major Storm	
MINOR STORM Allowable Capacity is based on Depth Criterion				
MAJOR STORM Allowable Capacity is based on Depth Criterion	**Q_{allow} =**	**18.1**	**152.7**	**cfs**

Minor storm max. allowable capacity GOOD - greater than the design flow given on sheet 'Inlet Management'

Major storm max. allowable capacity GOOD - greater than the design flow given on sheet 'Inlet Management'

INLET ON A CONTINUOUS GRADE

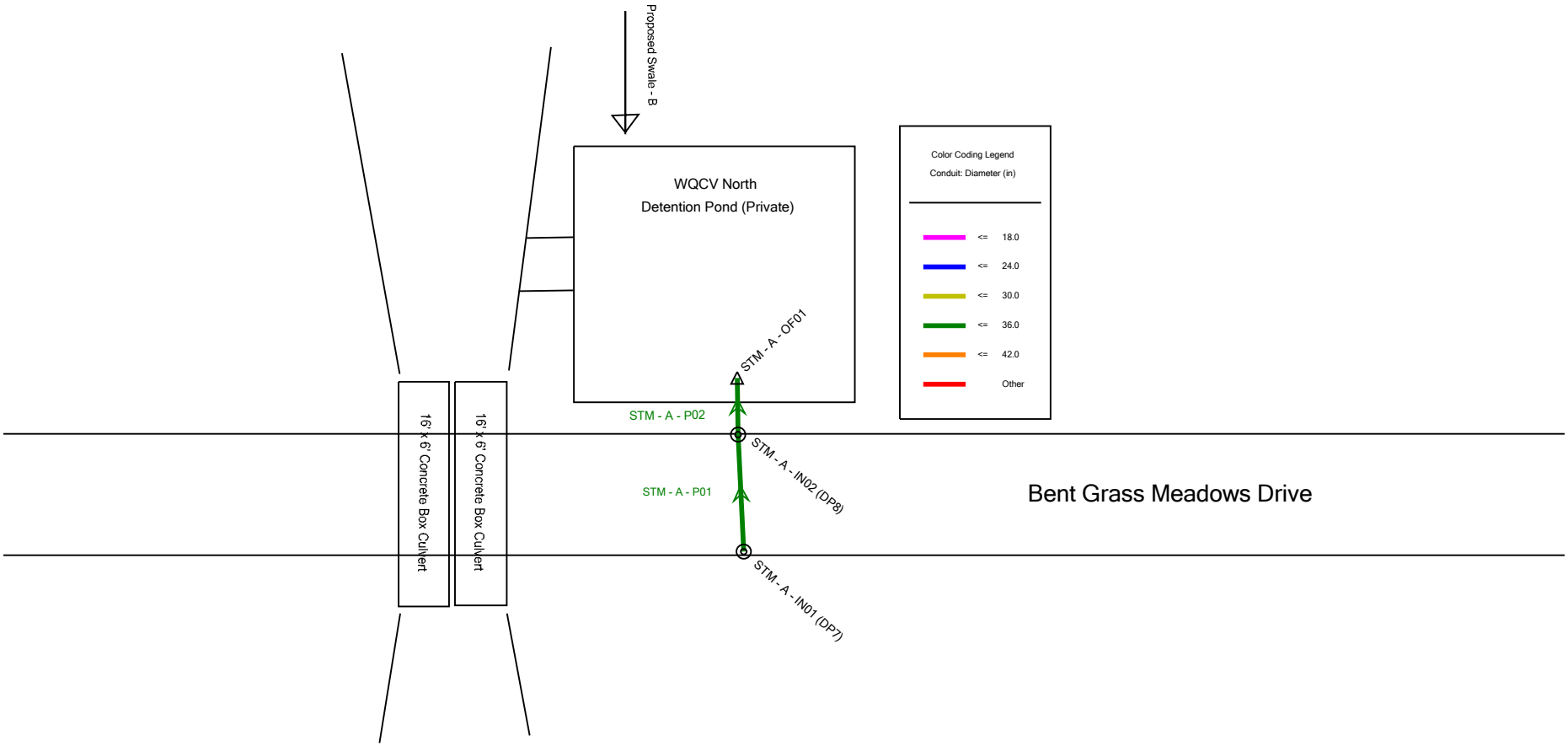
Version 4.05 Released March 2017



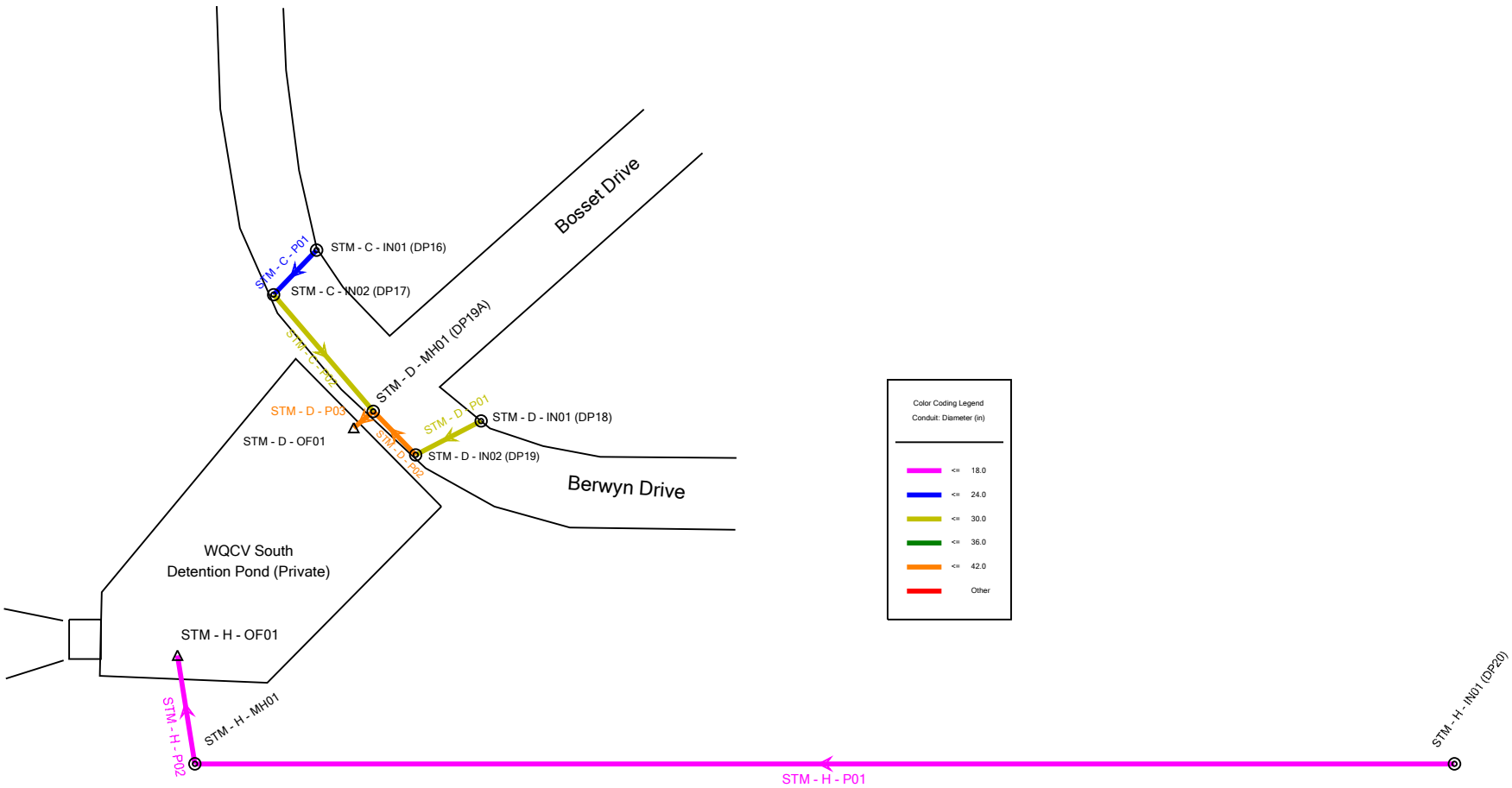
Design Information (Input)		MINOR	MAJOR	
Type of Inlet (CDOT Type R Curb Opening)	Type =	CDOT Type R Curb Opening		
Local Depression (additional to continuous gutter depression 'a')	a_{LOCAL} =	3.0	3.0	inches
Total Number of Units in the Inlet (Grate or Curb Opening)	No =	1	1	
Length of a Single Unit Inlet (Grate or Curb Opening)	L_o =	15.00	15.00	ft
Width of a Unit Grate (cannot be greater than W, Gutter Width)	W_o =	N/A	N/A	ft
Clogging Factor for a Single Unit Grate (typical min. value = 0.5)	C_f-G =	N/A	N/A	
Clogging Factor for a Single Unit Curb Opening (typical min. value = 0.1)	C_f-C =	0.10	0.10	

Street Hydraulics: OK - Q < Allowable Street Capacity'		MINOR	MAJOR	
Total Inlet Interception Capacity	**Q =**	**3.3**	**12.8**	**cfs**
Total Inlet Carry-Over Flow (flow bypassing inlet)	**Q_b =**	**0.0**	**4.3**	**cfs**
Capture Percentage = Q_a/Q_o =	**C% =**	**100**	**75**	**%**

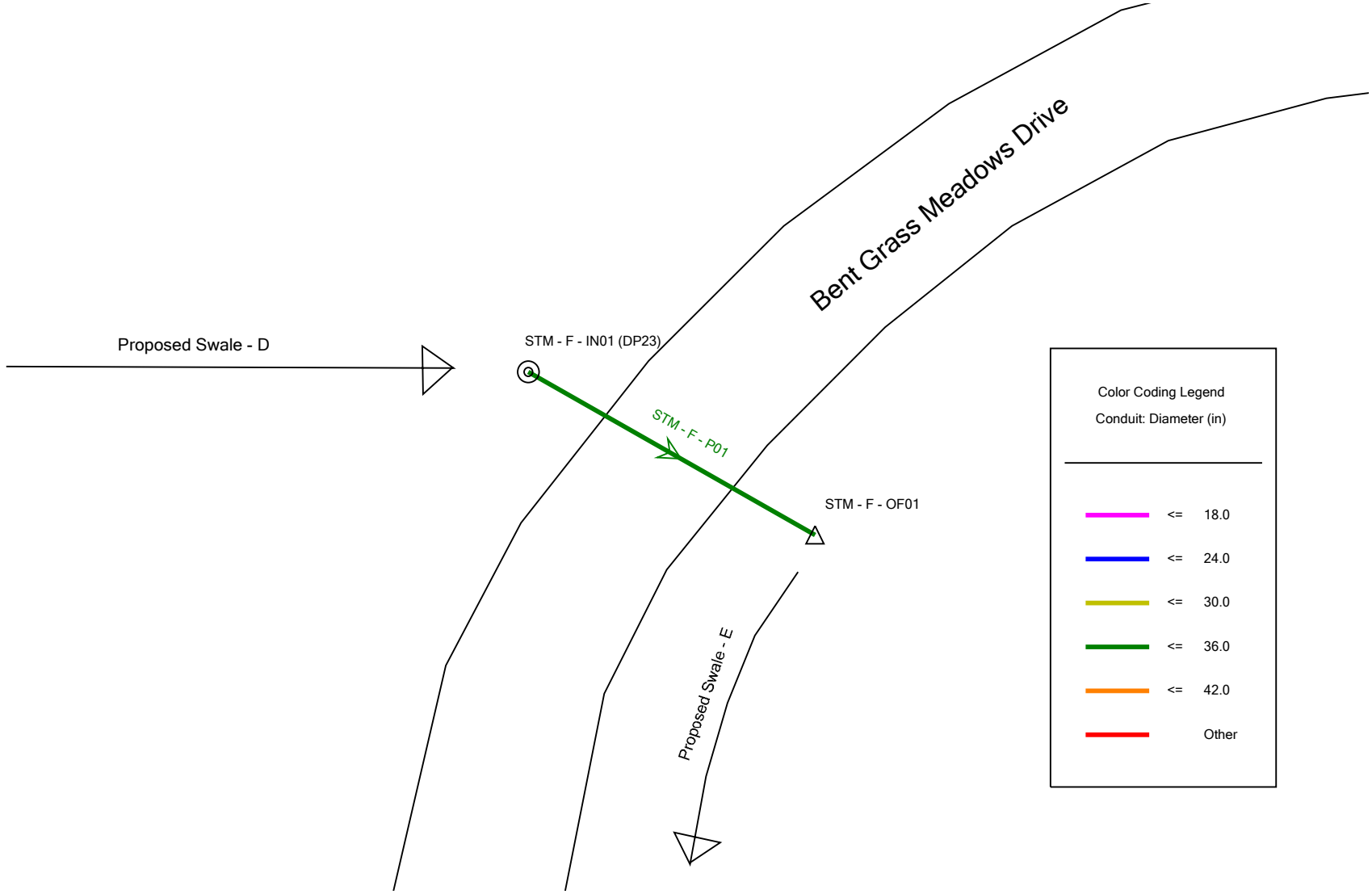
Storm A


Proposed Swale - B
WQCV North
Detention Pond (Private)
STM - A - OF01
STM - A - P02
STM - A - IN02 (DP8)
STM - A - P01
STM - A - IN01 (DP7)
16' x 6' Concrete Box Culvert
16' x 6' Concrete Box Culvert
Bent Grass Meadows Drive
Color Coding Legend
Conduit: Diameter (in)
<= 18.0
<= 24.0
<= 30.0
<= 36.0
<= 42.0
Other

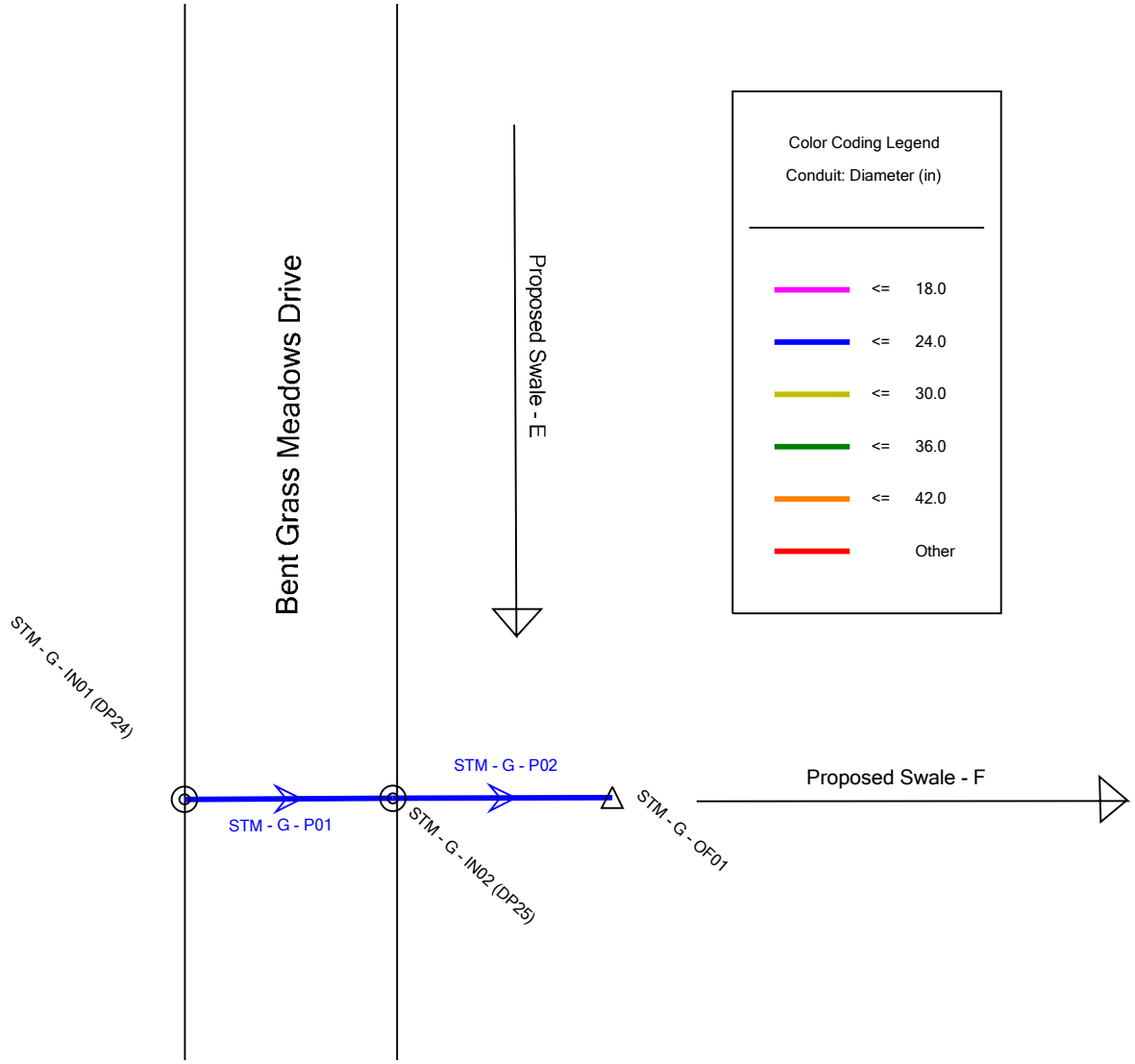
Storm C, D, and H



Storm F


Bent Grass Meadows Drive
Proposed Swale - D
STM - F - IN01 (DP23)
STM - F - P01
STM - F - OF01
Proposed Swale - E
Color Coding Legend
Conduit: Diameter (in)
<= 18.0
<= 24.0
<= 30.0
<= 36.0
<= 42.0
Other

Storm G


Bent Grass Meadows Drive
Proposed Swale - E
Color Coding Legend
Conduit: Diameter (in)
<= 18.0
<= 24.0
<= 30.0
<= 36.0
<= 42.0
Other
STM - G - IN01 (DP24)
STM - G - P01
STM - G - P02
STM - G - IN02 (DP25)
STM - G - OF01
Proposed Swale - F

FlexTable: Conduit Table

Active Scenario: 5 YR

Label	Start Node	Stop Node	Invert (Start) (ft)	Invert (Stop) (ft)	Length (User Defined) (ft)	Slope (Calculated) (ft/ft)	Diameter (in)	Manning's n	Flow (cfs)	Velocity (ft/s)	Capacity (Full Flow) (cfs)	Hydraulic Grade Line (In) (ft)	Hydraulic Grade Line (Out) (ft)	Energy Grade Line (In) (ft)	Energy Grade Line (Out) (ft)
STM - A - P01	STM - A - IN01 (DP7)	STM - A - IN02 (DP8)	6,940.04	6,939.80	49.0	0.005	36.0	0.013	2.90	3.67	46.66	6,940.80	6,940.80	6,940.86	6,940.83
STM - G - P01	STM - G - IN01 (DP24)	STM - G - IN02 (DP25)	6,931.91	6,931.67	49.0	0.005	24.0	0.013	2.40	3.64	15.83	6,932.45	6,932.38	6,932.64	6,932.47
STM - G - P02	STM - G - IN02 (DP25)	STM - G - OF01	6,931.67	6,931.41	51.4	0.005	24.0	0.013	4.00	4.25	16.09	6,932.37	6,932.09	6,932.63	6,932.37
STM - C - P01	STM - C - IN01 (DP16)	STM - C - IN02 (DP17)	6,926.43	6,926.25	36.2	0.005	24.0	0.013	9.80	5.33	15.94	6,927.82	6,927.79	6,928.10	6,928.01
STM - D - P01	STM - D - IN01 (DP18)	STM - D - IN02 (DP19)	6,925.97	6,925.79	36.5	0.005	30.0	0.013	9.00	5.18	28.79	6,927.18	6,927.19	6,927.41	6,927.35
STM - D - P03	STM - D - MH01 (DP19A)	STM - D - OF01	6,924.32	6,924.25	13.2	0.005	42.0	0.013	32.90	7.41	73.29	6,926.10	6,925.94	6,926.80	6,926.74
STM - A - P02	STM - A - IN02 (DP8)	STM - A - OF01	6,938.70	6,938.50	40.5	0.005	36.0	0.013	29.00	6.98	46.87	6,940.44	6,940.21	6,941.16	6,940.96
STM - F - P01	STM - F - IN01 (DP23)	STM - F - OF01	6,934.42	6,933.64	155.0	0.005	36.0	0.013	22.70	6.62	47.31	6,935.95	6,935.10	6,936.56	6,935.79
STM - C - P02	STM - C - IN02 (DP17)	STM - D - MH01 (DP19A)	6,925.75	6,925.32	85.4	0.005	30.0	0.013	15.60	6.03	29.11	6,927.08	6,927.02	6,927.62	6,927.32
STM - D - P02	STM - D - IN02 (DP19)	STM - D - MH01 (DP19A)	6,924.79	6,924.62	34.1	0.005	42.0	0.013	18.50	6.21	71.06	6,927.02	6,927.02	6,927.15	6,927.13
STM - H - P01	STM - H - IN01 (DP20)	STM - H - MH01	6,928.96	6,924.27	938.9	0.005	18.0	0.013	1.30	3.16	7.42	6,929.39	6,924.69	6,929.54	6,924.85
STM - H - P02	STM - H - MH01	STM - H - OF01	6,923.97	6,923.76	41.9	0.005	18.0	0.013	1.30	3.16	7.44	6,924.40	6,924.18	6,924.55	6,924.34

FlexTable: Manhole Table

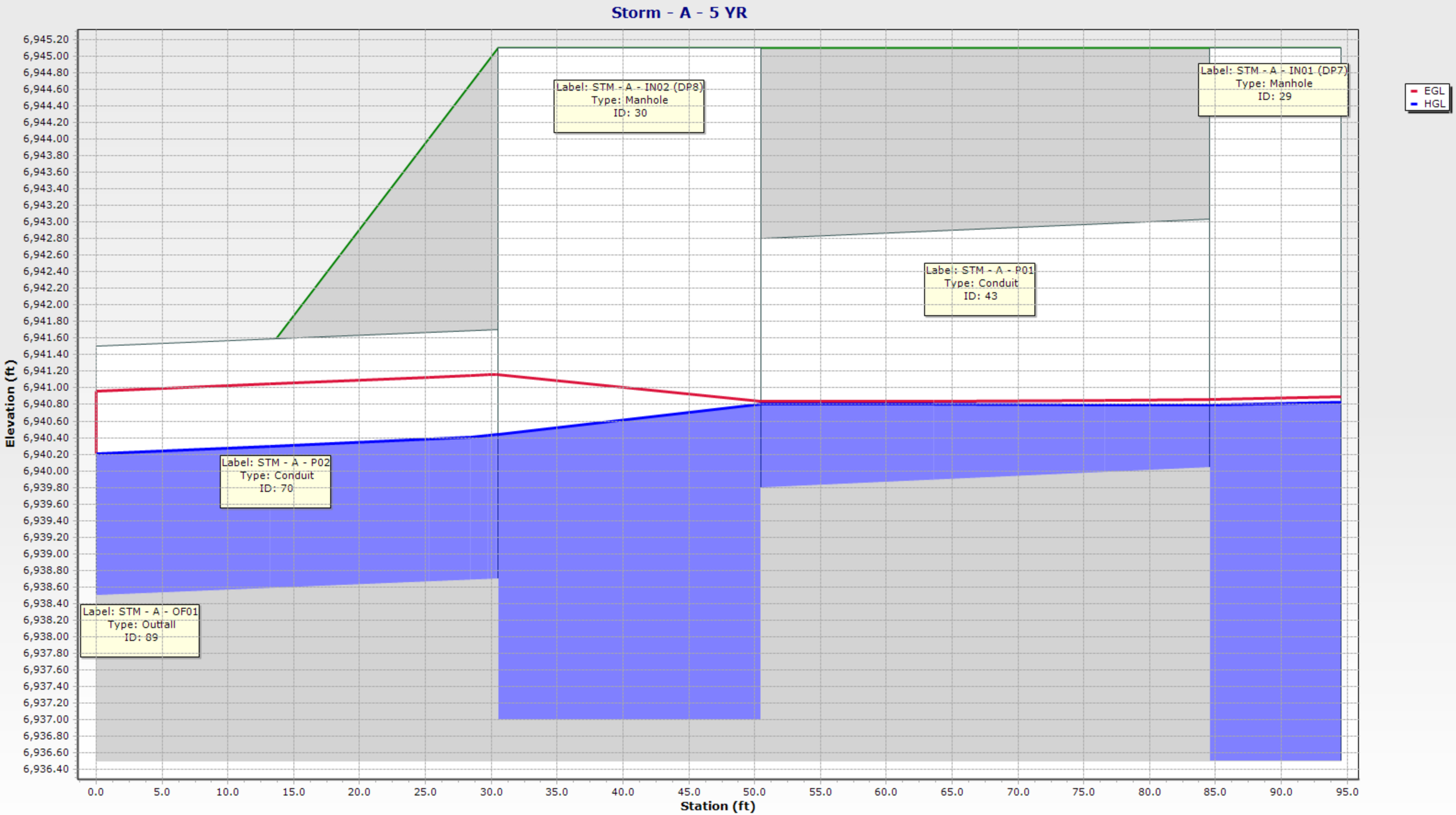
Active Scenario: 5 YR

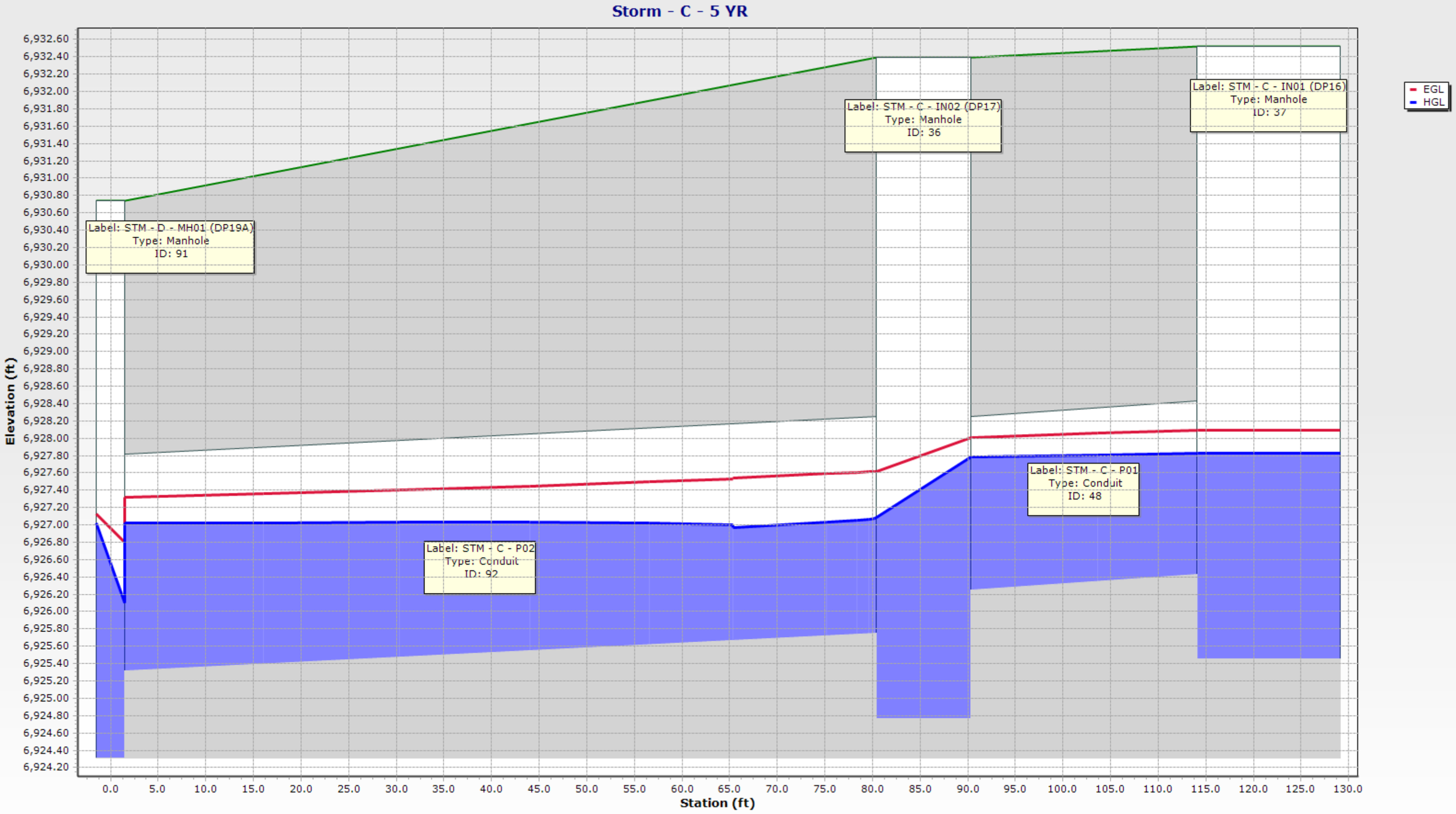
Label	Elevation (Rim) (ft)	Headloss Coefficient (Standard)	Headloss Method	Headloss (ft)	Hydraulic Grade Line (In) (ft)	Hydraulic Grade Line (Out) (ft)	Energy Grade Line (In) (ft)	Energy Grade Line (Out) (ft)
STM - A - IN01 (DP7)	6,945.10	0.500	Standard	0.03	6,940.83	6,940.80	6,940.90	6,940.86
STM - A - IN02 (DP8)	6,945.10	0.500	Standard	0.36	6,940.80	6,940.44	6,940.83	6,941.16
STM - G - IN02 (DP25)	6,937.01	0.050	Standard	0.01	6,932.38	6,932.37	6,932.47	6,932.63
STM - G - IN01 (DP24)	6,937.01	1.320	Standard	0.25	6,932.70	6,932.45	6,932.90	6,932.64
STM - C - IN02 (DP17)	6,932.39	1.320	Standard	0.70	6,927.79	6,927.08	6,928.01	6,927.62
STM - C - IN01 (DP16)	6,932.52	0.000	Standard	0.00	6,927.82	6,927.82	6,928.10	6,928.10
STM - D - IN01 (DP18)	6,931.23	0.000	Standard	0.00	6,927.18	6,927.18	6,927.41	6,927.41
STM - D - IN02 (DP19)	6,931.21	1.320	Standard	0.17	6,927.19	6,927.02	6,927.35	6,927.15
STM - F - IN01 (DP23)	6,945.20	0.000	Standard	0.00	6,935.95	6,935.95	6,936.56	6,936.56
STM - D - MH01 (DP19A)	6,930.74	1.320	Standard	0.92	6,927.02	6,926.10	6,927.13	6,926.80
STM - H - IN01 (DP20)	6,932.00	0.000	Standard	0.00	6,929.39	6,929.39	6,929.54	6,929.54
STM - H - MH01	6,928.75	1.320	Standard	0.20	6,924.60	6,924.40	6,924.75	6,924.55

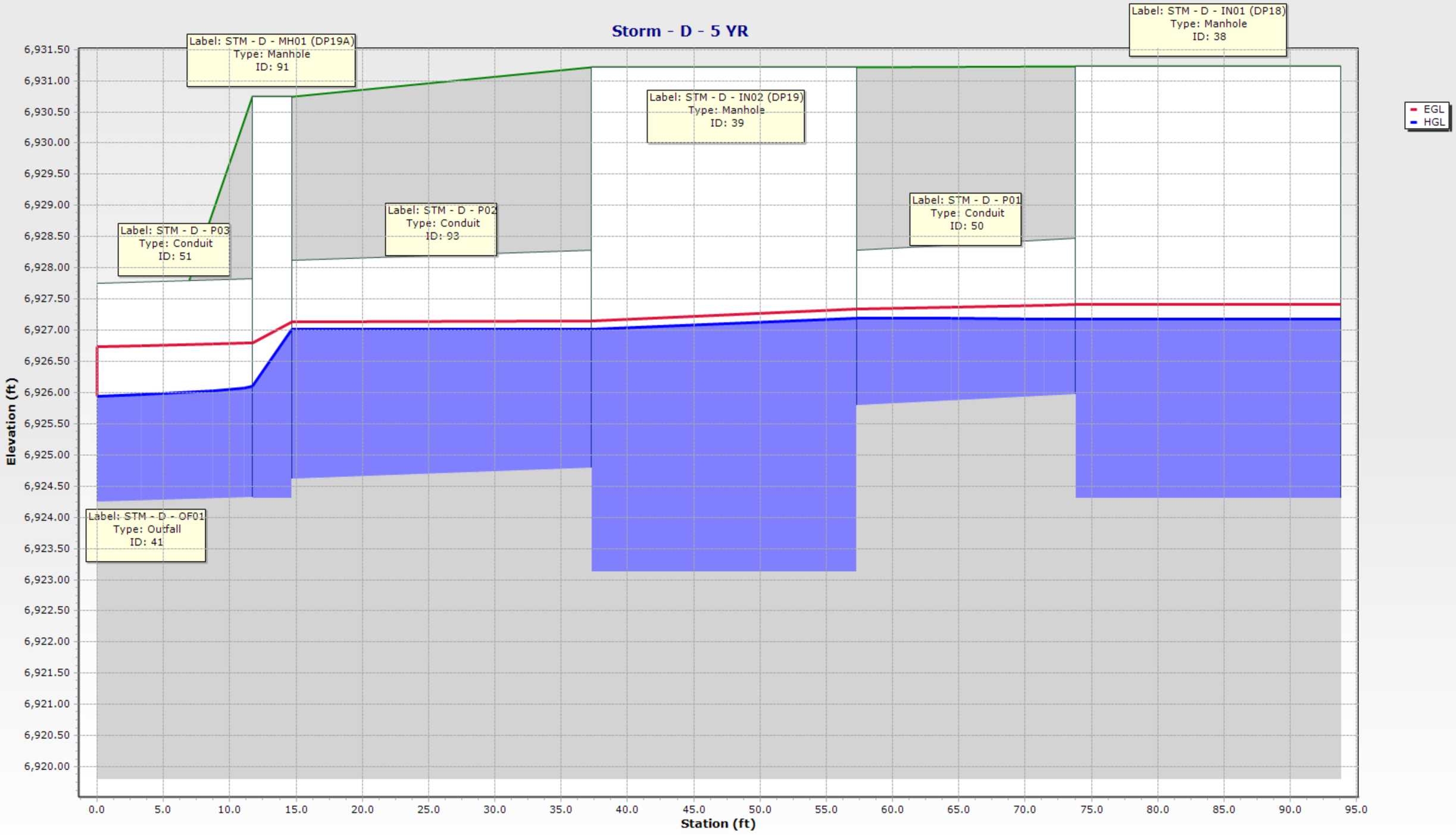
FlexTable: Outfall Table

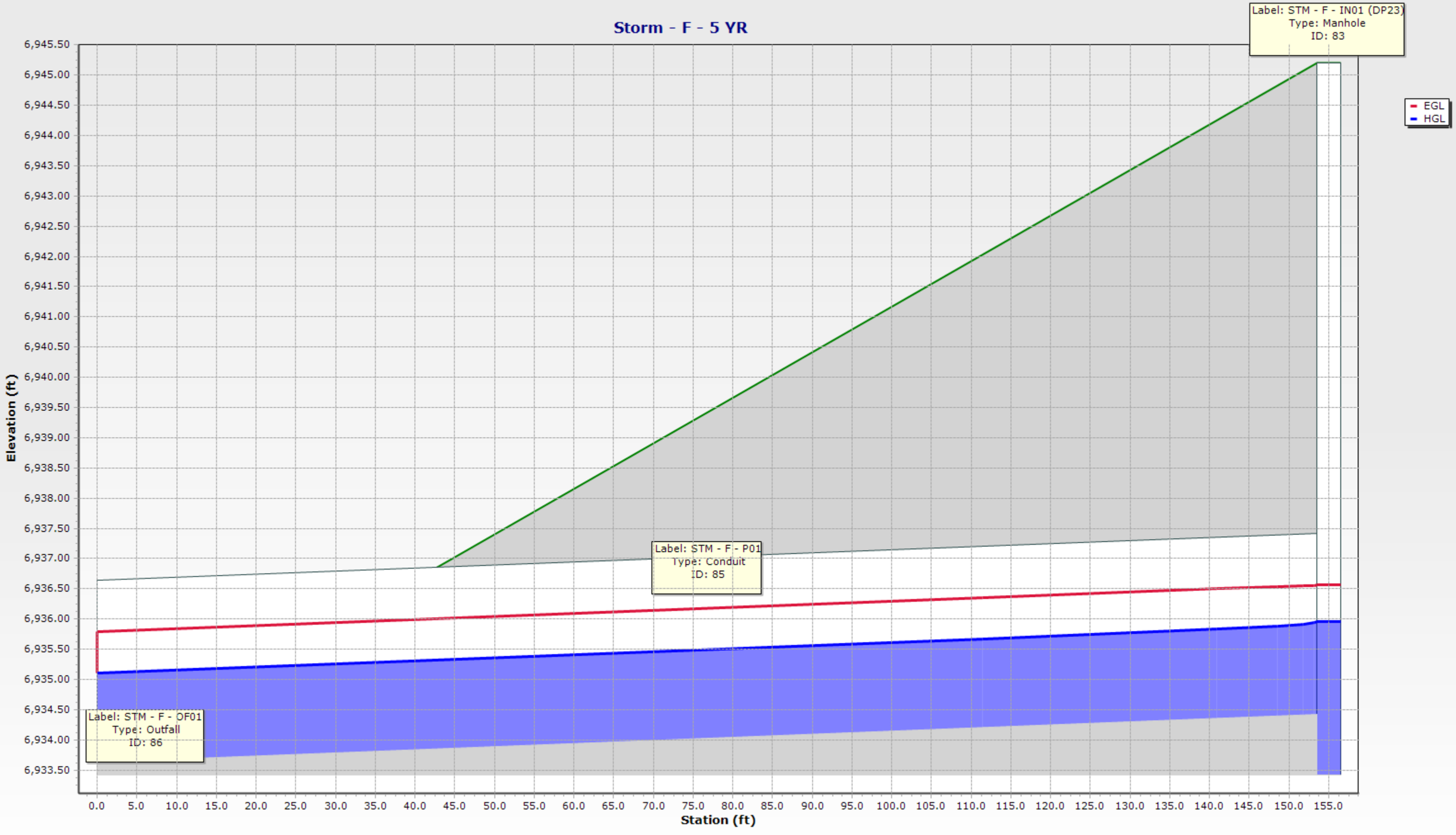
Active Scenario: 5 YR

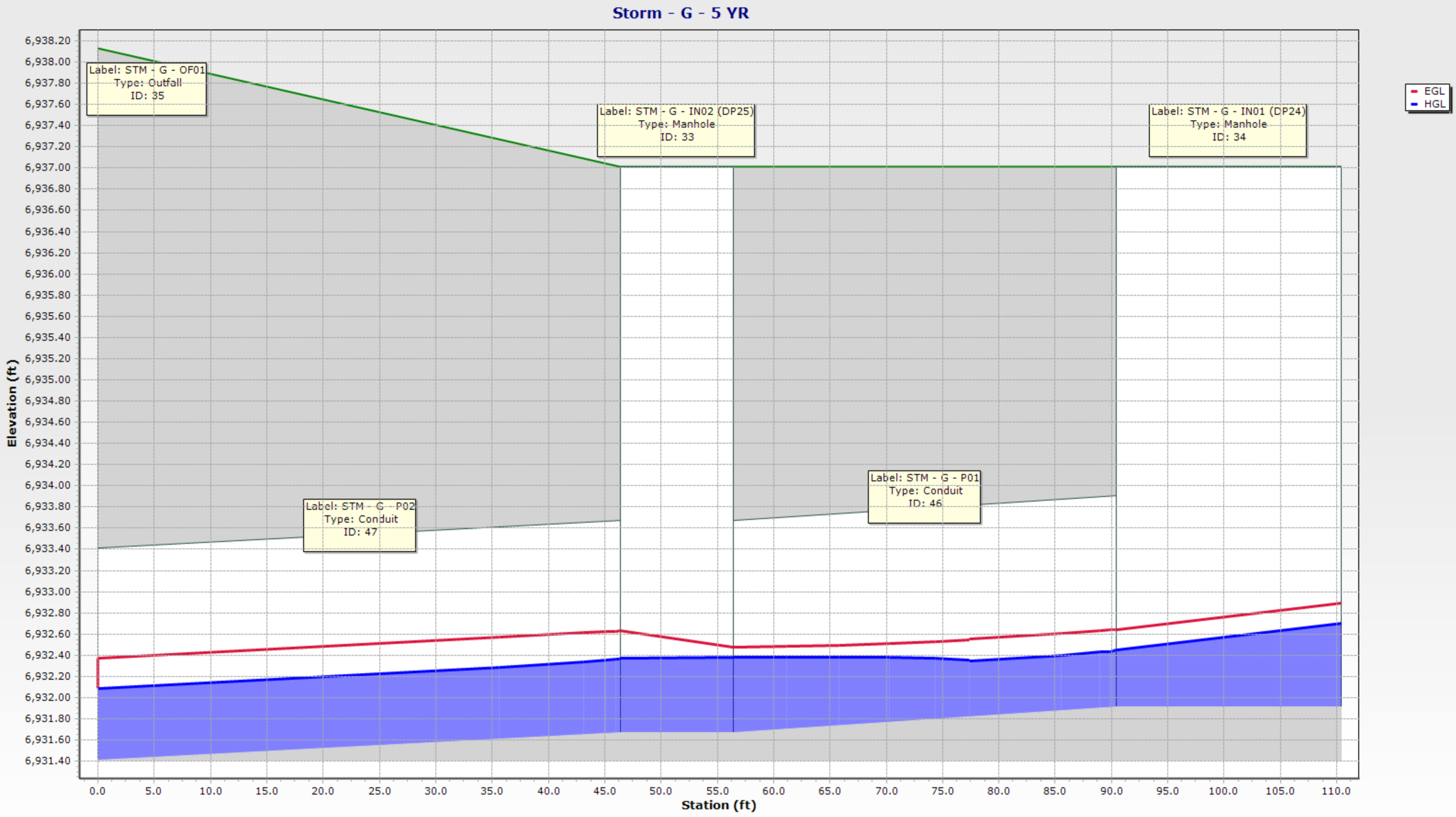
Label	Elevation (Ground) (ft)	Elevation (Invert) (ft)	Boundary Condition Type	Elevation (User Defined Tailwater) (ft)	Hydraulic Grade (ft)	Energy Grade Line (ft)	Flow (Total Out) (cfs)
STM - G - OF01	6,938.13	6,931.41	Free Outfall		6,932.09	6,932.09	4.00
STM - D - OF01	6,923.50	6,919.81	Free Outfall		6,925.94	6,925.94	32.90
STM - F - OF01	6,933.64	6,933.64	Free Outfall		6,935.10	6,935.10	22.70
STM - A - OF01	6,938.75	6,937.29	Free Outfall		6,940.21	6,940.21	29.00
STM - H - OF01	6,923.77	6,923.77	Free Outfall		6,924.18	6,924.18	1.30

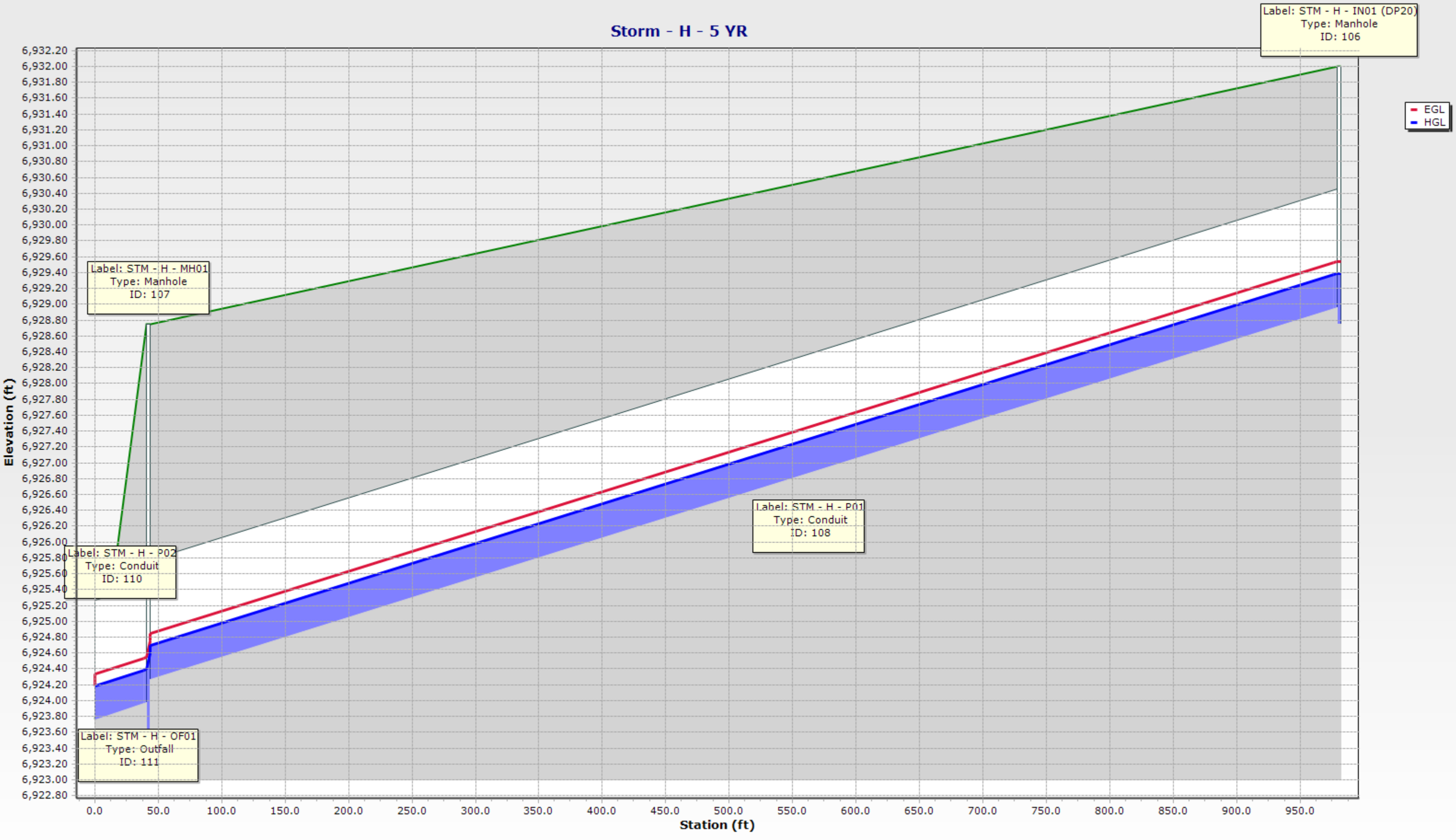

Storm - A - 5 YR
Elevation (ft)
Station (ft)
EGL
HGL
Label: STM - A - IN02 (DP8)
Type: Manhole
ID: 30
Label: STM - A - IN01 (DP7)
Type: Manhole
ID: 29
Label: STM - A - P01
Type: Conduit
ID: 43
Label: STM - A - P02
Type: Conduit
ID: 70
Label: STM - A - OF01
Type: Outfall
ID: 89


Storm - C - 5 YR
Elevation (ft)
Station (ft)
EGL
HGL
Label: STM - D - MH01 (DP19A)
Type: Manhole
ID: 91
Label: STM - C - IN02 (DP17)
Type: Manhole
ID: 36
Label: STM - C - IN01 (DP16)
Type: Manhole
ID: 37
Label: STM - C - P02
Type: Conduit
ID: 92
Label: STM - C - P01
Type: Conduit
ID: 48


Storm - D - 5 YR
Label: STM - D - MH01 (DP19A)
Type: Manhole
ID: 91
Label: STM - D - IN01 (DP18)
Type: Manhole
ID: 38
Label: STM - D - IN02 (DP19)
Type: Manhole
ID: 39
Label: STM - D - P03
Type: Conduit
ID: 51
Label: STM - D - P02
Type: Conduit
ID: 93
Label: STM - D - P01
Type: Conduit
ID: 50
Label: STM - D - OF01
Type: Outfall
ID: 41
EGL
HGL
Elevation (ft)
6,931.50
6,931.00
6,930.50
6,930.00
6,929.50
6,929.00
6,928.50
6,928.00
6,927.50
6,927.00
6,926.50
6,926.00
6,925.50
6,925.00
6,924.50
6,924.00
6,923.50
6,923.00
6,922.50
6,922.00
6,921.50
6,921.00
6,920.50
6,920.00
0.0
5.0
10.0
15.0
20.0
25.0
30.0
35.0
40.0
45.0
50.0
55.0
60.0
65.0
70.0
75.0
80.0
85.0
90.0
95.0
Station (ft)


Storm - F - 5 YR
Label: STM - F - IN01 (DP23)
Type: Manhole
ID: 83
EGL
HGL
Label: STM - F - P01
Type: Conduit
ID: 85
Label: STM - F - OF01
Type: Outfall
ID: 86
Elevation (ft)
6,945.50
6,945.00
6,944.50
6,944.00
6,943.50
6,943.00
6,942.50
6,942.00
6,941.50
6,941.00
6,940.50
6,940.00
6,939.50
6,939.00
6,938.50
6,938.00
6,937.50
6,937.00
6,936.50
6,936.00
6,935.50
6,935.00
6,934.50
6,934.00
6,933.50
0.0 5.0 10.0 15.0 20.0 25.0 30.0 35.0 40.0 45.0 50.0 55.0 60.0 65.0 70.0 75.0 80.0 85.0 90.0 95.0 100.0 105.0 110.0 115.0 120.0 125.0 130.0 135.0 140.0 145.0 150.0 155.0
Station (ft)


Storm - G - 5 YR
Label: STM - G - OF01
Type: Outfall
ID: 35
Label: STM - G - IN02 (DP25)
Type: Manhole
ID: 33
Label: STM - G - IN01 (DP24)
Type: Manhole
ID: 34
Label: STM - G - P02
Type: Conduit
ID: 47
Label: STM - G - P01
Type: Conduit
ID: 46
EGL
HGL
Elevation (ft)
Station (ft)


Storm - H - 5 YR
Label: STM - H - IN01 (DP20)
Type: Manhole
ID: 106
EGL
HGL
Label: STM - H - MH01
Type: Manhole
ID: 107
Label: STM - H - P01
Type: Conduit
ID: 108
Label: STM - H - P02
Type: Conduit
ID: 110
Label: STM - H - OF01
Type: Outfall
ID: 111
Elevation (ft)
6,932.20
6,932.00
6,931.80
6,931.60
6,931.40
6,931.20
6,931.00
6,930.80
6,930.60
6,930.40
6,930.20
6,930.00
6,929.80
6,929.60
6,929.40
6,929.20
6,929.00
6,928.80
6,928.60
6,928.40
6,928.20
6,928.00
6,927.80
6,927.60
6,927.40
6,927.20
6,927.00
6,926.80
6,926.60
6,926.40
6,926.20
6,926.00
6,925.80
6,925.60
6,925.40
6,925.20
6,925.00
6,924.80
6,924.60
6,924.40
6,924.20
6,924.00
6,923.80
6,923.60
6,923.40
6,923.20
6,923.00
6,922.80
0.0
50.0
100.0
150.0
200.0
250.0
300.0
350.0
400.0
450.0
500.0
550.0
600.0
650.0
700.0
750.0
800.0
850.0
900.0
950.0
Station (ft)

FlexTable: Conduit Table

Active Scenario: 100 YR

Label	Start Node	Stop Node	Invert (Start) (ft)	Invert (Stop) (ft)	Length (User Defined) (ft)	Slope (Calculated) (ft/ft)	Diameter (in)	Manning's n	Flow (cfs)	Velocity (ft/s)	Capacity (Full Flow) (cfs)	Hydraulic Grade Line (In) (ft)	Hydraulic Grade Line (Out) (ft)	Energy Grade Line (In) (ft)	Energy Grade Line (Out) (ft)
STM - A - P01	STM - A - IN01 (DP7)	STM - A - IN02 (DP8)	6,940.04	6,939.80	49.0	0.005	36.0	0.013	21.00	2.97	46.66	6,943.16	6,943.11	6,943.30	6,943.25
STM - G - P01	STM - G - IN01 (DP24)	STM - G - IN02 (DP25)	6,931.91	6,931.67	49.0	0.005	24.0	0.013	17.00	5.41	15.83	6,934.94	6,934.66	6,935.39	6,935.12
STM - G - P02	STM - G - IN02 (DP25)	STM - G - OF01	6,931.67	6,931.41	51.4	0.005	24.0	0.013	34.00	10.82	16.09	6,934.57	6,933.41	6,936.39	6,935.23
STM - C - P01	STM - C - IN01 (DP16)	STM - C - IN02 (DP17)	6,926.43	6,926.25	36.2	0.005	24.0	0.013	15.50	4.93	15.94	6,929.96	6,929.79	6,930.34	6,930.17
STM - D - P01	STM - D - IN01 (DP18)	STM - D - IN02 (DP19)	6,925.97	6,925.79	36.5	0.005	30.0	0.013	27.40	5.58	28.79	6,929.92	6,929.76	6,930.40	6,930.24
STM - D - P03	STM - D - MH01 (DP19A)	STM - D - OF01	6,924.32	6,924.25	13.2	0.005	42.0	0.013	78.60	8.51	73.29	6,927.22	6,927.02	6,928.54	6,928.46
STM - A - P02	STM - A - IN02 (DP8)	STM - A - OF01	6,938.70	6,938.50	40.5	0.005	36.0	0.013	71.50	10.12	46.87	6,942.32	6,941.85	6,943.91	6,943.44
STM - F - P01	STM - F - IN01 (DP23)	STM - F - OF01	6,934.42	6,933.64	155.0	0.005	36.0	0.013	63.70	9.01	47.31	6,938.05	6,936.64	6,939.32	6,937.90
STM - C - P02	STM - C - IN02 (DP17)	STM - D - MH01 (DP19A)	6,925.75	6,925.32	85.4	0.005	30.0	0.013	24.60	5.01	29.11	6,929.27	6,928.96	6,929.66	6,929.35
STM - D - P02	STM - D - IN02 (DP19)	STM - D - MH01 (DP19A)	6,924.79	6,924.62	34.1	0.005	42.0	0.013	55.70	5.79	71.06	6,929.07	6,928.96	6,929.59	6,929.49
STM - H - P01	STM - H - IN01 (DP20)	STM - H - MH01	6,928.96	6,924.27	938.9	0.005	18.0	0.013	4.50	4.40	7.42	6,929.80	6,926.89	6,930.10	6,926.99
STM - H - P02	STM - H - MH01	STM - H - OF01	6,923.97	6,923.76	41.9	0.005	18.0	0.013	4.50	2.55	7.44	6,926.76	6,926.68	6,926.86	6,926.78

FlexTable: Manhole Table

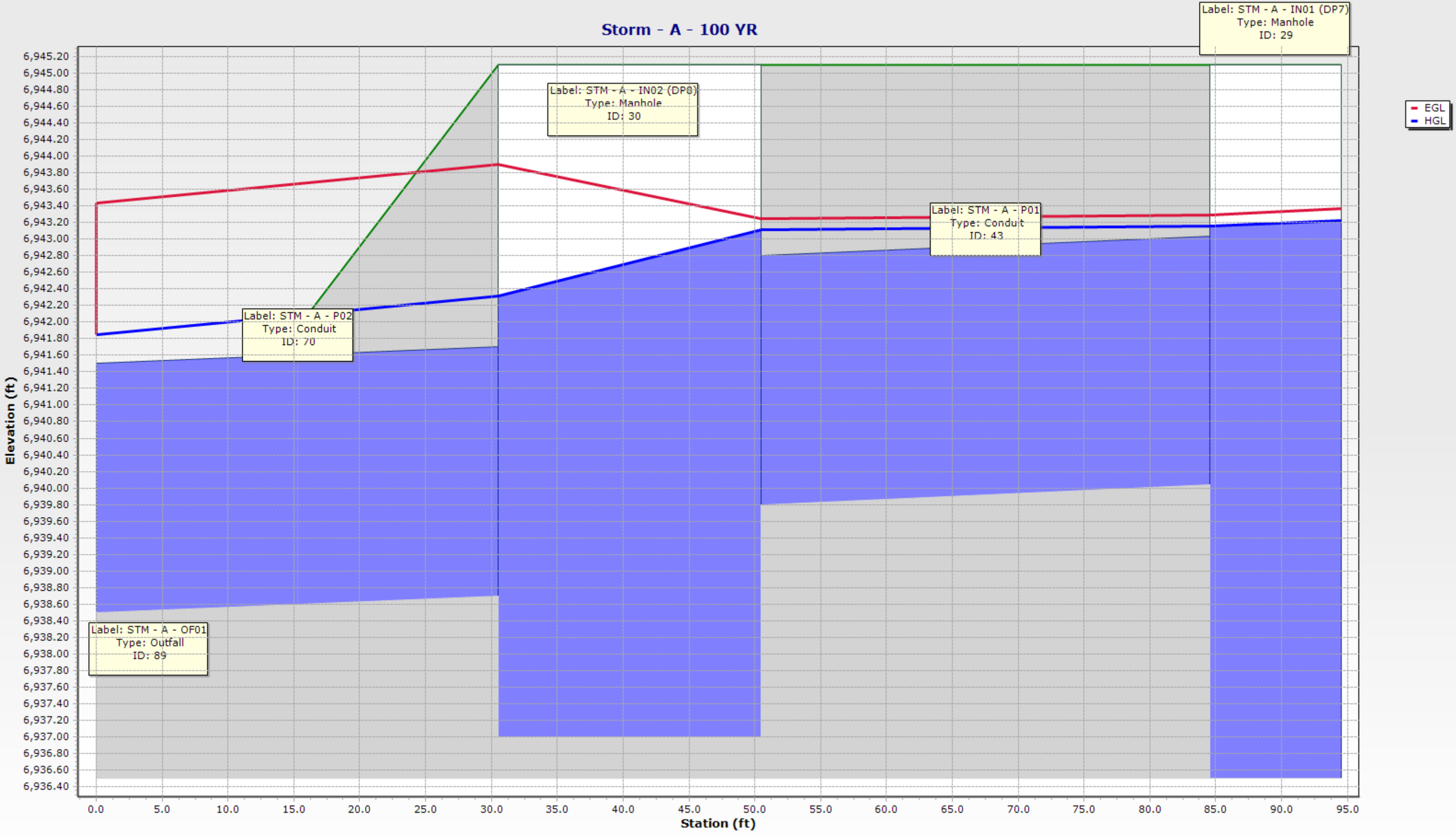
Active Scenario: 100 YR

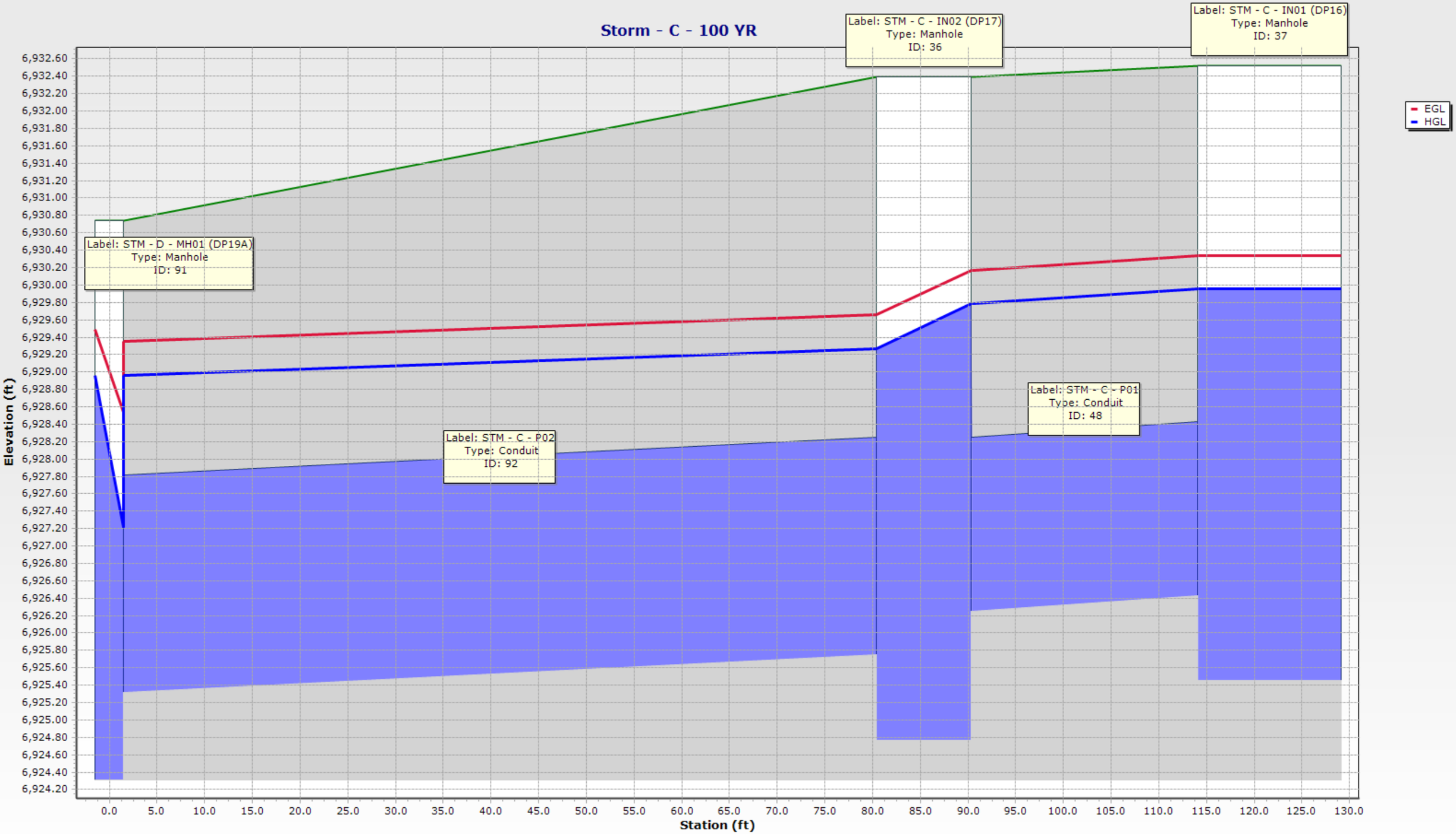
Label	Elevation (Rim) (ft)	Headloss Coefficient (Standard)	Headloss Method	Headloss (ft)	Hydraulic Grade Line (In) (ft)	Hydraulic Grade Line (Out) (ft)	Energy Grade Line (In) (ft)	Energy Grade Line (Out) (ft)
STM - A - IN01 (DP7)	6,945.10	0.500	Standard	0.07	6,943.23	6,943.16	6,943.36	6,943.30
STM - A - IN02 (DP8)	6,945.10	0.500	Standard	0.80	6,943.11	6,942.32	6,943.25	6,943.91
STM - G - IN02 (DP25)	6,937.01	0.050	Standard	0.09	6,934.66	6,934.57	6,935.12	6,936.39
STM - G - IN01 (DP24)	6,937.01	1.320	Standard	0.60	6,935.54	6,934.94	6,935.99	6,935.39
STM - C - IN02 (DP17)	6,932.39	1.320	Standard	0.52	6,929.79	6,929.27	6,930.17	6,929.66
STM - C - IN01 (DP16)	6,932.52	0.000	Standard	0.00	6,929.96	6,929.96	6,930.34	6,930.34
STM - D - IN01 (DP18)	6,931.23	0.000	Standard	0.00	6,929.92	6,929.92	6,930.40	6,930.40
STM - D - IN02 (DP19)	6,931.21	1.320	Standard	0.69	6,929.76	6,929.07	6,930.24	6,929.59
STM - F - IN01 (DP23)	6,945.20	0.000	Standard	0.00	6,938.05	6,938.05	6,939.32	6,939.32
STM - D - MH01 (DP19A)	6,930.74	1.320	Standard	1.75	6,928.96	6,927.22	6,929.49	6,928.54
STM - H - IN01 (DP20)	6,932.00	0.000	Standard	0.00	6,929.80	6,929.80	6,930.10	6,930.10
STM - H - MH01	6,928.75	1.320	Standard	0.13	6,926.89	6,926.76	6,926.99	6,926.86

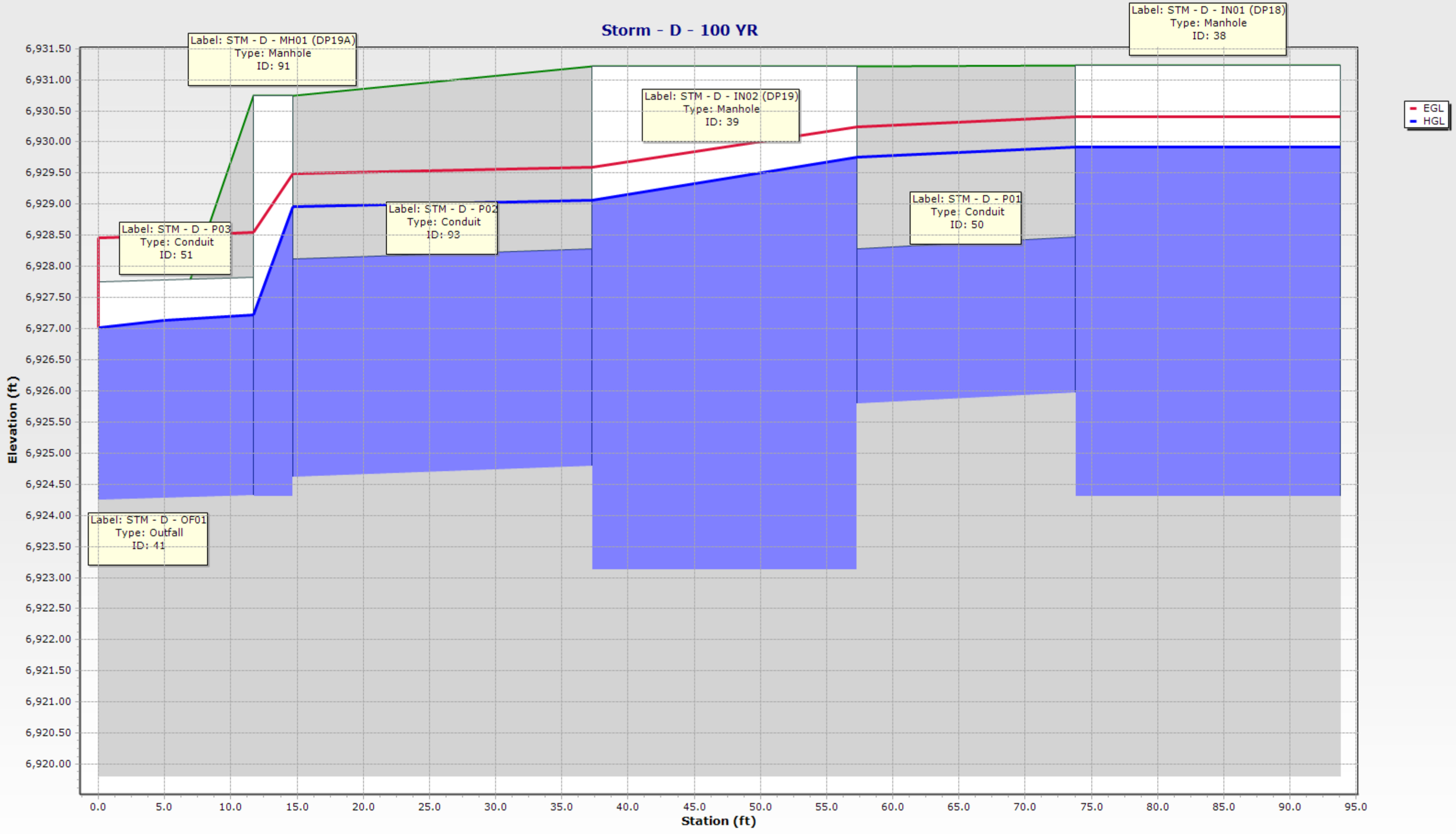
FlexTable: Outfall Table

Active Scenario: 100 YR

Label	Elevation (Ground) (ft)	Elevation (Invert) (ft)	Boundary Condition Type	Elevation (User Defined Tailwater) (ft)	Hydraulic Grade (ft)	Energy Grade Line (ft)	Flow (Total Out) (cfs)
STM - G - OF01	6,938.13	6,931.41	Crown		6,933.41	6,933.41	34.00
STM - D - OF01	6,923.50	6,919.81	User Defined Tailwater	6,926.68	6,927.02	6,927.02	78.60
STM - F - OF01	6,933.64	6,933.64	Crown		6,936.64	6,936.64	63.70
STM - A - OF01	6,938.75	6,937.29	User Defined Tailwater	6,941.85	6,941.85	6,941.85	71.50
STM - H - OF01	6,923.77	6,923.77	User Defined Tailwater	6,926.68	6,926.68	6,926.68	4.50


Storm - A - 100 YR
Label: STM - A - IN01 (DP7)
Type: Manhole
ID: 29
Label: STM - A - IN02 (DP8)
Type: Manhole
ID: 30
Label: STM - A - P01
Type: Conduit
ID: 43
Label: STM - A - P02
Type: Conduit
ID: 70
Label: STM - A - OF01
Type: Outfall
ID: 89
EGL
HGL
Elevation (ft)
Station (ft)
6,945.20
6,945.00
6,944.80
6,944.60
6,944.40
6,944.20
6,944.00
6,943.80
6,943.60
6,943.40
6,943.20
6,943.00
6,942.80
6,942.60
6,942.40
6,942.20
6,942.00
6,941.80
6,941.60
6,941.40
6,941.20
6,941.00
6,940.80
6,940.60
6,940.40
6,940.20
6,940.00
6,939.80
6,939.60
6,939.40
6,939.20
6,939.00
6,938.80
6,938.60
6,938.40
6,938.20
6,938.00
6,937.80
6,937.60
6,937.40
6,937.20
6,937.00
6,936.80
6,936.60
6,936.40
0.0
5.0
10.0
15.0
20.0
25.0
30.0
35.0
40.0
45.0
50.0
55.0
60.0
65.0
70.0
75.0
80.0
85.0
90.0
95.0


Storm - C - 100 YR
Label: STM - C - IN02 (DP17)
Type: Manhole
ID: 36
Label: STM - C - IN01 (DP16)
Type: Manhole
ID: 37
Label: STM - D - MH01 (DP19A)
Type: Manhole
ID: 91
Label: STM - C - P01
Type: Conduit
ID: 48
Label: STM - C - P02
Type: Conduit
ID: 92
EGL
HGL
Elevation (ft)
Station (ft)


Storm - D - 100 YR
Label: STM - D - MH01 (DP19A)
Type: Manhole
ID: 91
Label: STM - D - IN01 (DP18)
Type: Manhole
ID: 38
Label: STM - D - IN02 (DP19)
Type: Manhole
ID: 39
Label: STM - D - P03
Type: Conduit
ID: 51
Label: STM - D - P02
Type: Conduit
ID: 93
Label: STM - D - P01
Type: Conduit
ID: 50
Label: STM - D - OF01
Type: Outfall
ID: 41
EGL
HGL
Elevation (ft)
Station (ft)
6,931.50
6,931.00
6,930.50
6,930.00
6,929.50
6,929.00
6,928.50
6,928.00
6,927.50
6,927.00
6,926.50
6,926.00
6,925.50
6,925.00
6,924.50
6,924.00
6,923.50
6,923.00
6,922.50
6,922.00
6,921.50
6,921.00
6,920.50
6,920.00
0.0
5.0
10.0
15.0
20.0
25.0
30.0
35.0
40.0
45.0
50.0
55.0
60.0
65.0
70.0
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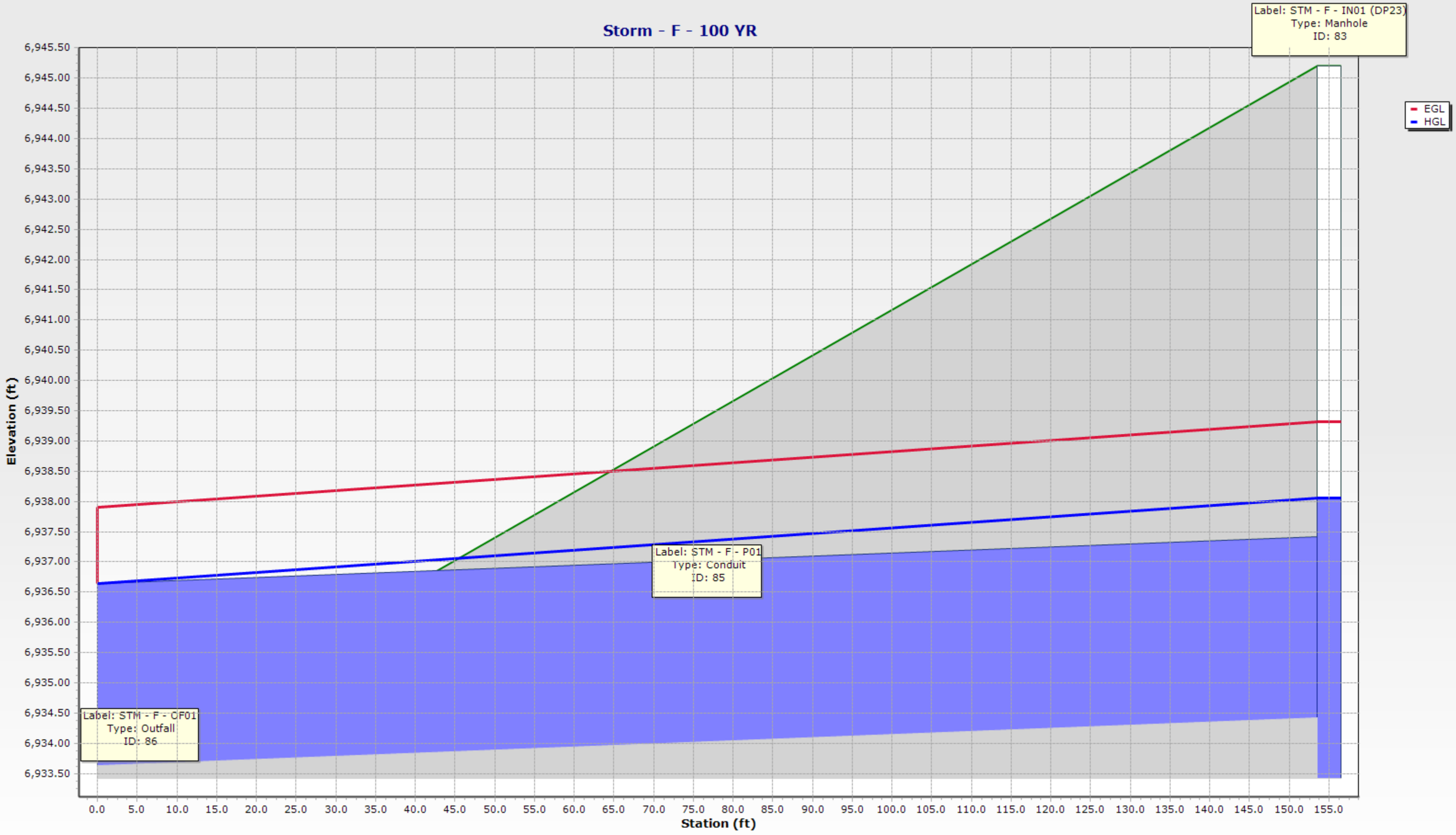
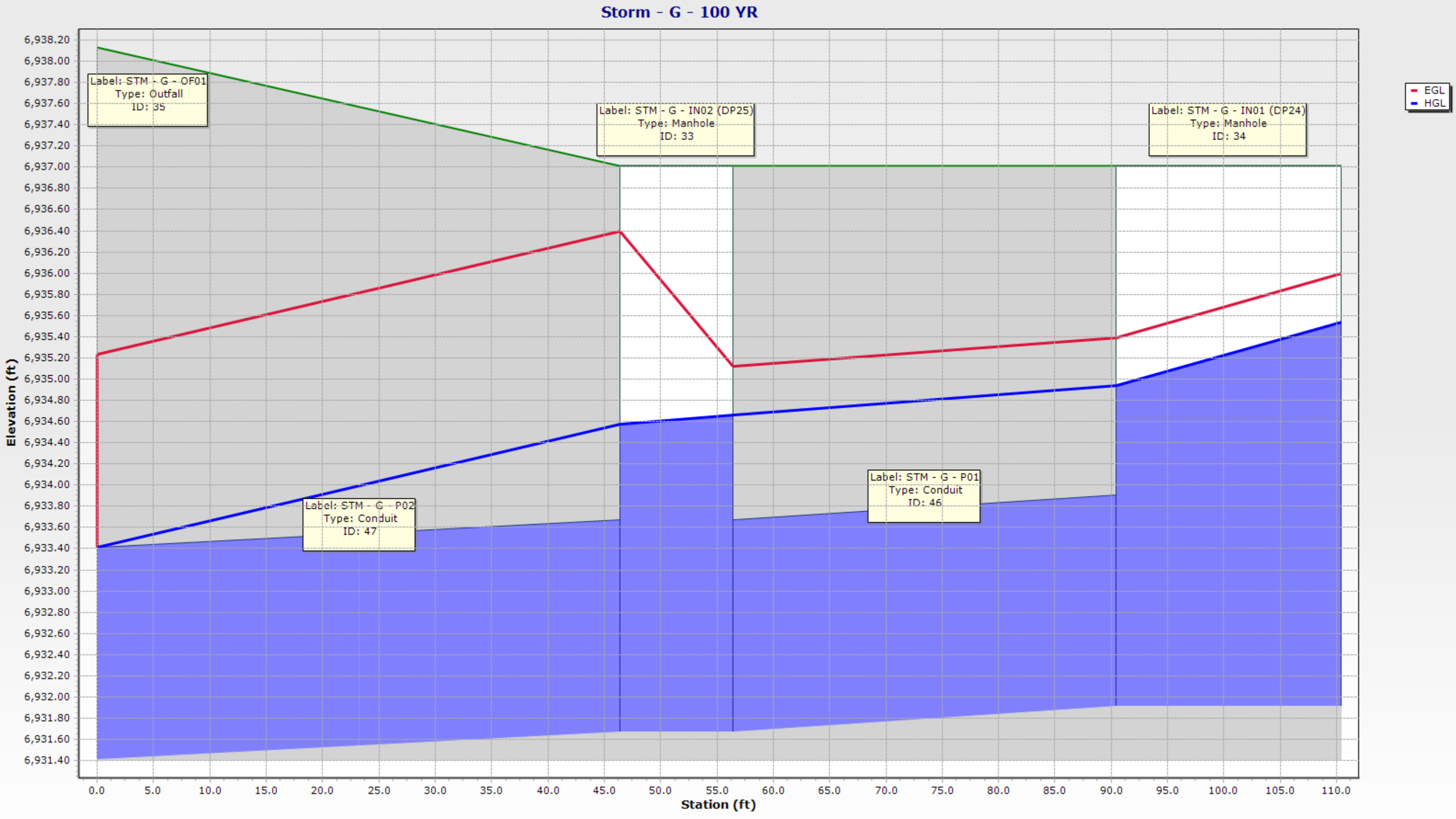
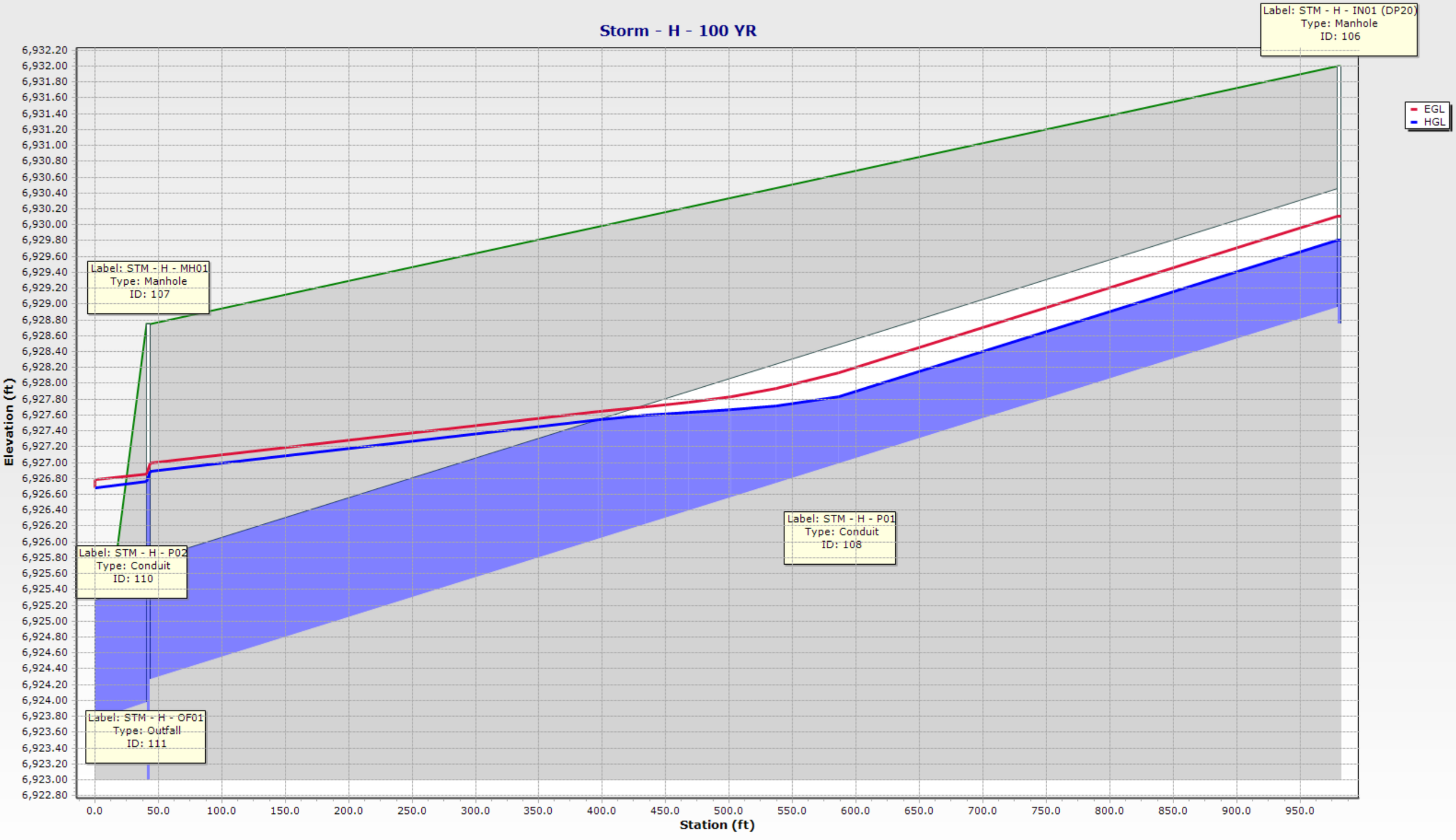
85.0
90.0
95.0


Storm - F - 100 YR
Label: STM - F - IN01 (DP23)
Type: Manhole
ID: 83
EGL
HGL
Label: STM - F - P01
Type: Conduit
ID: 85
Label: STM - F - OF01
Type: Outfall
ID: 86
Elevation (ft)
6,945.50
6,945.00
6,944.50
6,944.00
6,943.50
6,943.00
6,942.50
6,942.00
6,941.50
6,941.00
6,940.50
6,940.00
6,939.50
6,939.00
6,938.50
6,938.00
6,937.50
6,937.00
6,936.50
6,936.00
6,935.50
6,935.00
6,934.50
6,934.00
6,933.50
0.0 5.0 10.0 15.0 20.0 25.0 30.0 35.0 40.0 45.0 50.0 55.0 60.0 65.0 70.0 75.0 80.0 85.0 90.0 95.0 100.0 105.0 110.0 115.0 120.0 125.0 130.0 135.0 140.0 145.0 150.0 155.0
Station (ft)


Storm - G - 100 YR
Elevation (ft)
Station (ft)
EGL
HGL
Label: STM - G - OF01
Type: Outfall
ID: 35
Label: STM - G - IN02 (DP25)
Type: Manhole
ID: 33
Label: STM - G - IN01 (DP24)
Type: Manhole
ID: 34
Label: STM - G - P02
Type: Conduit
ID: 47
Label: STM - G - P01
Type: Conduit
ID: 46


Storm - H - 100 YR
Label: STM - H - IN01 (DP20)
Type: Manhole
ID: 106
EGL
HGL
Label: STM - H - MH01
Type: Manhole
ID: 107
Label: STM - H - P01
Type: Conduit
ID: 108
Label: STM - H - P02
Type: Conduit
ID: 110
Label: STM - H - OF01
Type: Outfall
ID: 111
Elevation (ft)
Station (ft)

Swale - A

Project Description

Friction Method	Manning Formula
Solve For	Normal Depth

Input Data

Roughness Coefficient	0.030	
Channel Slope	0.00540	ft/ft
Left Side Slope	4.00	ft/ft (H:V)
Right Side Slope	4.00	ft/ft (H:V)
Bottom Width	1.00	ft
Discharge	65.10	ft^3/s

Results

Normal Depth	1.98	ft
Flow Area	17.66	ft^2
Wetted Perimeter	17.33	ft
Hydraulic Radius	1.02	ft
Top Width	16.84	ft
Critical Depth	1.63	ft
Critical Slope	0.01424	ft/ft
Velocity	3.69	ft/s
Velocity Head	0.21	ft
Specific Energy	2.19	ft
Froude Number	0.63	
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	1.98	ft
Critical Depth	1.63	ft
Channel Slope	0.00540	ft/ft

Swale - A

GVF Output Data

Critical Slope	0.01424	ft/ft

Swale - B

Project Description

Friction Method	Manning Formula
Solve For	Normal Depth

Input Data

Roughness Coefficient	0.030	
Channel Slope	0.05000	ft/ft
Left Side Slope	4.00	ft/ft (H:V)
Right Side Slope	4.00	ft/ft (H:V)
Bottom Width	5.00	ft
Discharge	24.60	ft^3/s

Results

Normal Depth	0.55	ft
Flow Area	3.98	ft^2
Wetted Perimeter	9.55	ft
Hydraulic Radius	0.42	ft
Top Width	9.42	ft
Critical Depth	0.74	ft
Critical Slope	0.01646	ft/ft
Velocity	6.18	ft/s
Velocity Head	0.59	ft
Specific Energy	1.15	ft
Froude Number	1.68	
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	0.55	ft
Critical Depth	0.74	ft
Channel Slope	0.05000	ft/ft

Swale - B

GVF Output Data

Critical Slope	0.01646	ft/ft

Swale - C

Project Description

Friction Method	Manning Formula
Solve For	Normal Depth

Input Data

Roughness Coefficient	0.030	
Channel Slope	0.01000	ft/ft
Left Side Slope	4.00	ft/ft (H:V)
Right Side Slope	4.00	ft/ft (H:V)
Bottom Width	5.00	ft
Discharge	66.00	ft^3/s

Results

Normal Depth	1.38	ft
Flow Area	14.46	ft^2
Wetted Perimeter	16.35	ft
Hydraulic Radius	0.88	ft
Top Width	16.01	ft
Critical Depth	1.26	ft
Critical Slope	0.01428	ft/ft
Velocity	4.56	ft/s
Velocity Head	0.32	ft
Specific Energy	1.70	ft
Froude Number	0.85	
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	1.38	ft
Critical Depth	1.26	ft
Channel Slope	0.01000	ft/ft

Swale - C

GVF Output Data

Critical Slope	0.01428	ft/ft

Swale - D

Project Description

Friction Method	Manning Formula
Solve For	Normal Depth

Input Data

Roughness Coefficient	0.030	
Channel Slope	0.00500	ft/ft
Left Side Slope	4.00	ft/ft (H:V)
Right Side Slope	4.00	ft/ft (H:V)
Bottom Width	3.00	ft
Discharge	21.20	ft^3/s

Results

Normal Depth	1.08	ft
Flow Area	7.94	ft^2
Wetted Perimeter	11.93	ft
Hydraulic Radius	0.67	ft
Top Width	11.66	ft
Critical Depth	0.82	ft
Critical Slope	0.01660	ft/ft
Velocity	2.67	ft/s
Velocity Head	0.11	ft
Specific Energy	1.19	ft
Froude Number	0.57	
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	1.08	ft
Critical Depth	0.82	ft
Channel Slope	0.00500	ft/ft

Swale - D

GVF Output Data

Critical Slope	0.01660	ft/ft

Swale - E

Project Description

Friction Method	Manning Formula
Solve For	Normal Depth

Input Data

Roughness Coefficient	0.030	
Channel Slope	0.00500	ft/ft
Left Side Slope	4.00	ft/ft (H:V)
Right Side Slope	4.00	ft/ft (H:V)
Bottom Width	3.00	ft
Discharge	63.70	ft^3/s

Results

Normal Depth	1.78	ft
Flow Area	17.97	ft^2
Wetted Perimeter	17.66	ft
Hydraulic Radius	1.02	ft
Top Width	17.22	ft
Critical Depth	1.41	ft
Critical Slope	0.01428	ft/ft
Velocity	3.54	ft/s
Velocity Head	0.20	ft
Specific Energy	1.97	ft
Froude Number	0.61	
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	1.78	ft
Critical Depth	1.41	ft
Channel Slope	0.00500	ft/ft

Swale - E

GVF Output Data

Critical Slope	0.01428	ft/ft

Swale - F

Project Description

Friction Method	Manning Formula
Solve For	Normal Depth

Input Data

Roughness Coefficient	0.030	
Channel Slope	0.01300	ft/ft
Left Side Slope	4.00	ft/ft (H:V)
Right Side Slope	4.00	ft/ft (H:V)
Bottom Width	6.67	ft
Discharge	91.40	ft^3/s

Results

Normal Depth	1.39	ft
Flow Area	16.93	ft^2
Wetted Perimeter	18.10	ft
Hydraulic Radius	0.94	ft
Top Width	17.76	ft
Critical Depth	1.37	ft
Critical Slope	0.01372	ft/ft
Velocity	5.40	ft/s
Velocity Head	0.45	ft
Specific Energy	1.84	ft
Froude Number	0.98	
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	1.39	ft
Critical Depth	1.37	ft
Channel Slope	0.01300	ft/ft

Swale - F

GVF Output Data

Critical Slope	0.01372	ft/ft

Swale - G

Project Description

Friction Method	Manning Formula
Solve For	Normal Depth

Input Data

Roughness Coefficient	0.030	
Channel Slope	0.02500	ft/ft
Left Side Slope	40.00	ft/ft (H:V)
Right Side Slope	40.00	ft/ft (H:V)
Discharge	5.80	ft^3/s

Results

Normal Depth	0.27	ft
Flow Area	2.84	ft^2
Wetted Perimeter	21.32	ft
Hydraulic Radius	0.13	ft
Top Width	21.32	ft
Critical Depth	0.26	ft
Critical Slope	0.02574	ft/ft
Velocity	2.04	ft/s
Velocity Head	0.06	ft
Specific Energy	0.33	ft
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	0.27	ft
Critical Depth	0.26	ft
Channel Slope	0.02500	ft/ft
Critical Slope	0.02574	ft/ft

Swale - H

Project Description

Friction Method	Manning Formula
Solve For	Normal Depth

Input Data

Roughness Coefficient	0.030	
Channel Slope	0.01000	ft/ft
Left Side Slope	10.00	ft/ft (H:V)
Right Side Slope	10.00	ft/ft (H:V)
Discharge	4.50	ft^3/s

Results

Normal Depth	0.48	ft
Flow Area	2.35	ft^2
Wetted Perimeter	9.74	ft
Hydraulic Radius	0.24	ft
Top Width	9.69	ft
Critical Depth	0.42	ft
Critical Slope	0.02227	ft/ft
Velocity	1.92	ft/s
Velocity Head	0.06	ft
Specific Energy	0.54	ft
Froude Number	0.69	
Flow Type	Subcritical	

GVF Input Data

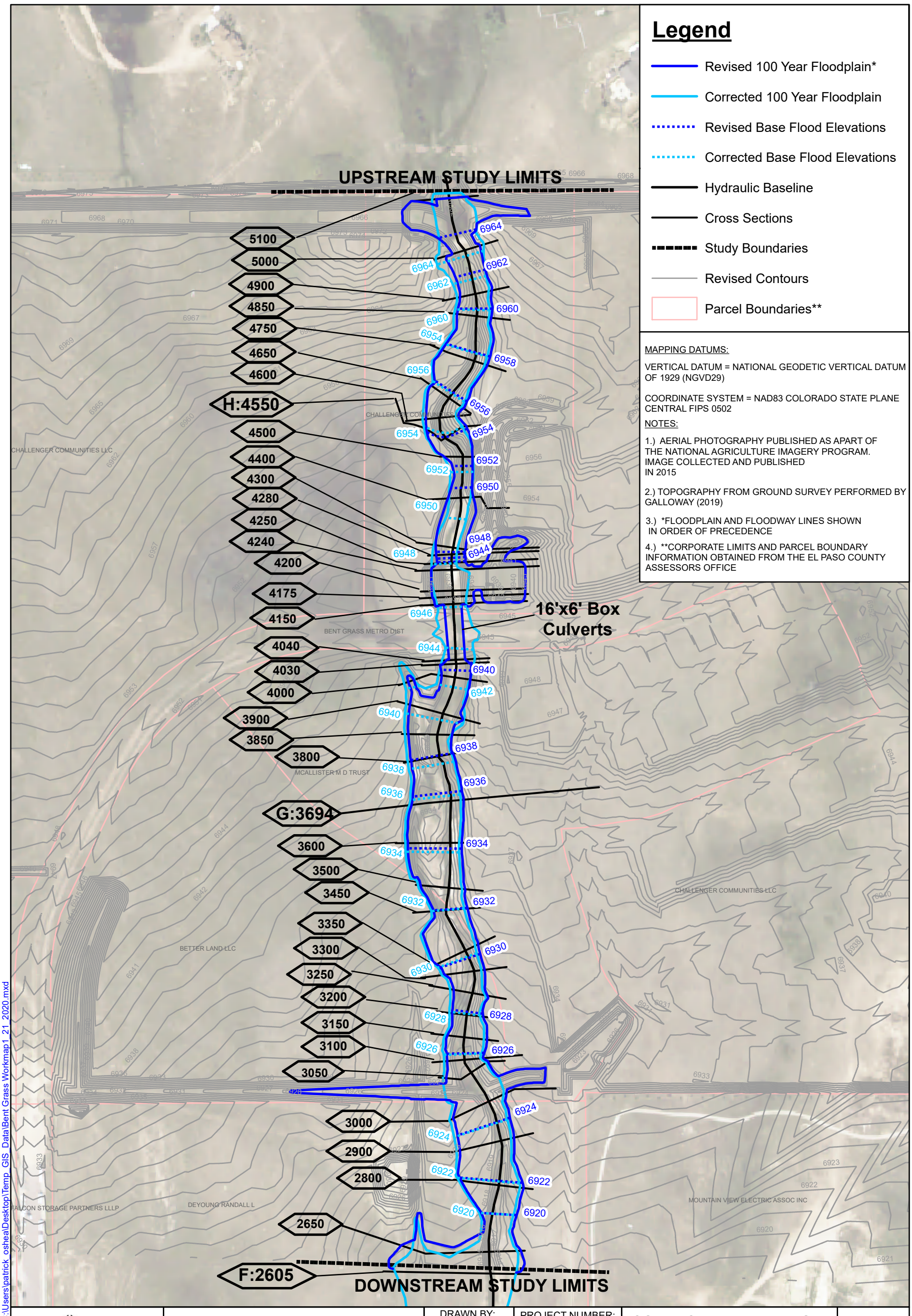
Downstream Depth	0.00	ft
Length	0.00	ft
Number Of Steps	0	

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	0.48	ft
Critical Depth	0.42	ft
Channel Slope	0.01000	ft/ft
Critical Slope	0.02227	ft/ft

APPENDIX D

Preliminary Channel HEC-RAS Models



Legend

- Revised 100 Year Floodplain*
- Corrected 100 Year Floodplain
- Revised Base Flood Elevations
- Corrected Base Flood Elevations
- Hydraulic Baseline
- Cross Sections
- Study Boundaries
- Revised Contours
- Parcel Boundaries**

MAPPING DATUMS:

VERTICAL DATUM = NATIONAL GEODETIC VERTICAL DATUM OF 1929 (NGVD29)

COORDINATE SYSTEM = NAD83 COLORADO STATE PLANE CENTRAL FIPS 0502

NOTES:

1.) AERIAL PHOTOGRAPHY PUBLISHED AS APART OF THE NATIONAL AGRICULTURE IMAGERY PROGRAM. IMAGE COLLECTED AND PUBLISHED IN 2015

2.) TOPOGRAPHY FROM GROUND SURVEY PERFORMED BY GALLOWAY (2019)

3.) *FLOODPLAIN AND FLOODWAY LINES SHOWN IN ORDER OF PRECEDENCE

4.) **CORPORATE LIMITS AND PARCEL BOUNDARY INFORMATION OBTAINED FROM THE EL PASO COUNTY ASSESSORS OFFICE

Galloway
Planning. Architecture. Engineering.
5265 Ronald Reagan Blvd., Suite 210
Johnstown, CO 80534
970.800.3300 GallowayUS.com

N

Original Scale: 1 " = 200 '

0 50 100 200 300 400 Feet

DRAWN BY: PMO	PROJECT NUMBER: CLH0000014.20
DESIGNED BY: PMO	PROJECT FILE: Effective Workmap
CHECKED BY: AL/CJP	DATE: 1/21/2020

CORRECTED AND REVISED FLOODPLAINS,UNNAMED TRIBUTARY TO BLACK SQUIRREL CREEK #2

FIGURE 1

Comparison of Hydraulic Information from HEC-RAS 100- Year Models (Existing vs. Proposed)

Reach	River Sta	Profile	Q Total	Min Ch El		W.S. Elev		Vel Chnl		Froude # Chl	
				Existing	Proposed	Existing	Proposed	Existing	Proposed	Existing	Proposed
			(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/s)	(ft/s)		
NCONFL-BGM	5100	100-YR	1450	6961.61	6961.68	6965.81	6965.31	7.26	8.78	0.77	1
NCONFL-BGM	5000	100-YR	1450	6959.87	6959.57	6964.45	6963.33	8.67	8.98	0.89	0.99
NCONFL-BGM	4900	100-YR	1450	6956.13	6956.08	6960.76	6960.79	9	8.63	0.99	1
NCONFL-BGM	4850	100-YR	1450	6954.51	6954.44	6959.69	6959.58	9.51	9.09	0.92	0.96
NCONFL-BGM	4750	100-YR	1450	6952.35	6952.25	6957.64	6957.61	8.54	8.52	0.89	0.87
NCONFL-BGM	4650	100-YR	1450	6950.66	6950.54	6955.77	6955.7	9.42	9.4	0.9	0.89
NCONFL-BGM	4600	100-YR	1450	6949.29	6949.23	6954.25	6954.15	9.39	9.36	0.94	0.94
NCONFL-BGM	4550	100-YR	1450	6947.92	6947.92	6953.98	6954.09	5.86	6.5	0.55	0.58
NCONFL-BGM	4500	100-YR	1450	6947.76	6947.9	6952.64	6952.81	9.25	9.54	1	0.99
NCONFL-BGM	4400	100-YR	1450	6945.04	6945	6950.89	6949.06	9.93	9.35	1	0.95
NCONFL-BGM	4300	100-YR	1450	6943.59	6944.71	6948.68	6948.34	9.64	7.63	1.01	0.78
NCONFL-BGM	4280	100-YR	1450		6944.64		6947.8		9.01		1
NCONFL-BGM	4250	100-YR	1450	6942.87	6940.08	6948.01	6943.2	9.46	9.25	1	0.98
NCONFL-BGM	4240	100-YR	1450		6937.01		6943.72		3.03		0.23
NCONFL-BGM	4200	100-YR	1450		6936.87		6943.62		3.55		0.26
NCONFL-BGM	4175	100-YR	1450		6936.83		6943.42		4.85		0.34
NCONFL-BGM	4150	100-YR	1450	6941.91	6936.78	6946.13	6943.35	9	5.17	1.01	0.36
NCONFL-BGM	4073		Culvert								
NCONFL-BGM	4040	100-YR	1450		6936.4		6940.05		9.57		0.89
NCONFL-BGM	4030	100-YR	1450		6936.38		6940.36		6.94		0.66
NCONFL-BGM	4000	100-YR	1450	6938.32	6936.28	6942.69	6939.58	8.59	8.58	1	0.93
NCONFL-BGM	3900	100-YR	1450	6937.27	6936.02	6940.25	6939.36	5.38	5.72	0.67	0.65
NCONFL-BGM	3850	100-YR	1450	6935.39	6935.31	6939.44	6938.84	7.21	6.58	0.92	0.77
NCONFL-BGM	3800	100-YR	1450	6934.46	6934.35	6938.47	6937.95	8.67	7.95	1.09	1.01
NCONFL-BGM	3694	100-YR	1482	6931.87	6931.81	6935.66	6935.53	6.36	6.76	0.8	0.87
NCONFL-BGM	3600	100-YR	1482	6930.63	6930.58	6934.23	6934.13	8.24	7.59	1.07	1.01
NCONFL-BGM	3500	100-YR	1482	6928.81	6928.8	6933.1	6933.06	5.43	5.39	0.58	0.57

Reach	River Sta	Profile	Q Total	Min Ch El		W.S. Elev		Vel Chnl		Froude # Chl	
				Existing	Proposed	Existing	Proposed	Existing	Proposed	Existing	Proposed
			(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/s)	(ft/s)		
NCONFL-BGM	3450	100-YR	1482	6928.02	6927.99	6931.98	6931.95	8.58	8.59	1	1
NCONFL-BGM	3350	100-YR	1482	6926.41	6926.42	6930.19	6930.26	8.33	7.76	0.97	1.01
NCONFL-BGM	3300	100-YR	1482	6924.89	6924.78	6929.53	6929.52	7.44	7.34	0.83	0.81
NCONFL-BGM	3250	100-YR	1482	6923.87	6923.75	6928.77	6928.66	8.39	8.63	0.93	0.96
NCONFL-BGM	3200	100-YR	1482	6923.23	6923.28	6927.95	6927.88	9.07	9.12	0.99	0.99
NCONFL-BGM	3150	100-YR	1482	6923.17	6923.15	6926.87	6926.8	8.93	8.89	0.95	0.95
NCONFL-BGM	3100	100-YR	1482	6922.12	6921.99	6925.7	6925.66	8.78	8.68	0.99	0.96
NCONFL-BGM	3050	100-YR	1482	6921.42	6921.38	6926	6925.94	5.64	5.7	0.53	0.54
NCONFL-BGM	3000	100-YR	1482	6920.33	6920.36	6925.06	6925.04	8.18	8.14	0.85	0.83
NCONFL-BGM	2900	100-YR	1482	6919.33	6919.32	6923.12	6923.09	8.53	8.61	0.89	0.9
NCONFL-BGM	2800	100-YR	1482	6917.24	6917.18	6921.9	6921.88	8.55	8.58	0.8	0.8
NCONFL-BGM	2650	100-YR	1482	6913.71	6913.71	6919.2	6919.22	7.28	7.34	0.7	0.67
NCONFL-BGM	2605	100-YR	1482	6914	6914	6918.85	6918.85	4.82	4.82	0.72	0.72

Existing Conditions Model

HEC-RAS HEC-RAS 5.0.7 March 2019
U.S. Army Corps of Engineers
Hydrologic Engineering Center
609 Second Street
Davis, California

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

PROJECT DATA
Project Title: HEC-RAS Model
Project File : CLH14_Final.prj
Run Date and Time:

Project in English units

Project Description:
CRS Info=<SpatialReference> <CoordinateSystem Code="3502" Unit="US_survey_Foot" AcadCode="" /> <Registration OffsetX="0" OffsetY="0" OffsetZ="0" ScaleX="1" ScaleY="1" ScaleZ="1" /></SpatialReference>

PLAN DATA

Plan Title:
Plan File :

Geometry Title: CE_Reduced2
Geometry File : h:\Challenger Homes Inc\CO, El Paso County-CLH0000014.20-Bent Grass\2. P&Z\2.05 Floodplain Analysis\Hydra\Hec Ras 1_24_2020 Final\CLH14_Final.g08

Flow Title   : Phase 1
Flow File   : h:\Challenger Homes Inc\CO, El Paso County-CLH0000014.20-Bent Grass\2. P&Z\2.05 Floodplain Analysis\Hydra\Hec Ras 1_24_2020 Final\CLH14_Final.f03

Plan Description:
revised condition model for the Bent Grass Subdivision Project. Effective Hydrologic information was incorporated into a Revised condition with both resurveyed topography as of 2019 and design topography for the Bent Grass Subdivision.
Calculated using Hec-Ras v. 5.0.3

Plan Summary Information:

Number of:	Cross Sections	= 33	Multiple Openings	=	0
	Culverts	= 0	Inline Structures	=	0
	Bridges	= 0	Lateral Structures	=	0

Computational Information

Water surface calculation tolerance	=	0.01
Critical depth calculation tolerance	=	0.01
Maximum number of iterations	=	20
Maximum difference tolerance	=	0.33
Flow tolerance factor	=	0.001

Computation Options

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

FLOW DATA

Flow Title: Phase 1
Flow File : h:\Challenger Homes Inc\CO, El Paso County-CLH0000014.20-Bent Grass\2. P&Z\2.05 Floodplain Analysis\Hydra\Hec Ras 1_24_2020 Final\CLH14_Final.f03

Flow Data (cfs)

River	Reach	RS	DBPS 100-YR	DBPS 2-YR
100-YR				
UT_BSC2	NCONFL-BGM	5100	1200	110
1450				
UT_BSC2	NCONFL-BGM	3694	1200	110
1482				

Boundary Conditions

River	Reach	Profile	Upstream	Downstream
UT_BSC2	NCONFL-BGM	DBPS 100-YR	Normal S = 0.003463	Normal S = 0.025094
UT_BSC2	NCONFL-BGM	DBPS 2-YR	Normal S = 0.003463	Normal S = 0.025094
UT_BSC2	NCONFL-BGM	100-YR	Normal S = 0.003463	Known WS = 6918.85

GEOMETRY DATA

Geometry Title: CE_Reduced2
Geometry File : h:\Challenger Homes Inc\CO, El Paso County-CLH0000014.20-Bent Grass\2. P&Z\2.05 Floodplain Analysis\Hydra\Hec Ras 1_24_2020 Final\CLH14_Final.g08

CROSS SECTION

RIVER: UT_BSC2
REACH: NCONFL-BGM RS: 5100

INPUT
Description: Source: Corrected Effective Topo
Datum: NGVD29
Coordinate
System: NAVD88 Colorado State Planes Central, US Feet.
Station Elevation Data num= 448

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	6968.99	.52	6968.99	.67	6968.98	1.32	6968.94	1.52	6968.93
1.76	6968.92	2.25	6968.9	2.53	6968.88	2.85	6968.86	3.17	6968.85
3.53	6968.83	3.95	6968.81	4.1	6968.8	4.53	6968.78	5.03	6968.75
5.04	6968.75	5.54	6968.72	5.95	6968.7	6.14	6968.69	6.54	6968.67
6.88	6968.65	7.23	6968.64	7.54	6968.62	7.81	6968.6	8.32	6968.58
8.55	6968.57	8.73	6968.56	9.42	6968.52	9.55	6968.51	9.66	6968.51
10.51	6968.46	10.59	6968.46	11	6968.44	11.51	6968.41	11.61	6968.41
12.44	6968.36	12.56	6968.36	12.7	6968.35	13.37	6968.31	13.56	6968.3
13.79	6968.29	14.29	6968.26	14.57	6968.25	14.89	6968.23	15.22	6968.22
15.57	6968.2	15.98	6968.18	16.15	6968.17	16.57	6968.14	17.07	6968.12
17.08	6968.09	17.58	6968.06	18	6967.96	18.17	6967.92	18.58	6967.82

18.93	6967.74	19.26	6967.68	19.58	6967.6	19.85	6967.55	20.36	6967.45
20.59	6967.4	20.78	6967.36	21.45	6967.22	21.59	6967.19	21.71	6967.17
22.55	6967	22.59	6966.99	22.63	6966.98	23.12	6966.88	23.56	6966.79
23.6	6966.78	23.64	6966.77	24.49	6966.6	24.6	6966.57	24.73	6966.55
25.41	6966.41	25.6	6966.37	25.83	6966.32	26.16	6966.26	26.34	6966.22
26.61	6966.16	26.92	6966.1	27.27	6966.02	27.61	6965.95	28.02	6965.87
28.19	6965.83	28.61	6965.75	29.11	6965.65	29.12	6965.64	29.62	6965.54
30.05	6965.45	30.2	6965.42	30.62	6965.34	30.97	6965.26	31.3	6965.2
31.62	6965.13	31.9	6965.07	32.39	6964.97	32.63	6964.92	32.83	6964.88
33.49	6964.75	33.63	6964.72	33.75	6964.69	34.58	6964.52	34.63	6964.51
34.68	6964.5	35.25	6964.39	35.61	6964.33	35.64	6964.32	35.67	6964.32
36.53	6964.19	36.64	6964.17	36.77	6964.15	37.46	6964.04	37.64	6964.01
37.86	6963.98	38.39	6963.9	38.65	6963.86	38.96	6963.81	39.31	6963.76
39.65	6963.71	40.05	6963.65	40.24	6963.62	40.65	6963.55	41.14	6963.48
41.17	6963.47	41.66	6963.4	42.09	6963.33	42.24	6963.31	42.66	6963.25
43.02	6963.19	43.33	6963.14	43.67	6963.09	43.95	6963.05	44.42	6962.97
44.67	6962.94	44.88	6962.91	45.52	6962.81	45.67	6962.78	45.8	6962.76
46.61	6962.64	46.68	6962.63	46.73	6962.62	47.37	6962.52	47.66	6962.48
47.68	6962.48	47.71	6962.47	48.58	6962.34	48.68	6962.32	48.8	6962.3
49.51	6962.19	49.69	6962.17	49.89	6962.14	50.44	6962.05	50.69	6962.01
50.99	6961.97	51.36	6961.91	51.69	6961.86	52.08	6961.8	52.29	6961.77
52.7	6961.71	53.18	6961.66	53.22	6961.66	53.7	6961.61	54.14	6961.62
54.27	6961.62	54.7	6961.63	55.07	6961.64	55.36	6961.65	55.71	6961.66
56	6961.66	56.46	6961.68	56.71	6961.68	56.92	6961.69	57.55	6961.7
57.71	6961.71	57.85	6961.71	58.65	6961.73	58.78	6961.73	59.5	6961.75
59.74	6961.75	60.63	6961.78	60.83	6961.78	61.56	6961.8	61.73	6961.8
61.93	6961.81	62.48	6961.82	62.73	6961.83	63.02	6961.83	63.41	6961.84
63.73	6961.85	64.1	6961.86	64.12	6961.86	64.34	6961.87	64.74	6961.88
65.21	6961.89	65.26	6961.89	65.74	6961.9	66.19	6961.91	66.3	6961.91
66.74	6961.92	67.12	6961.93	67.4	6961.94	67.75	6961.95	68.04	6961.96
68.49	6961.97	68.75	6961.97	68.97	6961.98	69.59	6961.99	69.75	6962
69.9	6962	70.68	6962.02	70.82	6962.02	71.62	6962.04	71.75	6962.05
71.77	6962.05	72.68	6962.07	72.87	6962.07	73.6	6962.09	73.77	6962.09
73.96	6962.1	74.53	6962.11	74.77	6962.12	75.06	6962.12	75.46	6962.14
75.77	6962.14	76.15	6962.15	76.38	6962.15	76.78	6962.16	77.24	6962.17
77.31	6962.17	77.78	6962.18	78.24	6962.18	78.34	6962.19	78.78	6962.19
79.16	6962.2	79.43	6962.2	79.79	6962.21	80.09	6962.24	80.53	6962.29
80.79	6962.31	81.02	6962.35	81.62	6962.44	81.8	6962.47	81.94	6962.49
82.71	6962.62	82.8	6962.63	82.87	6962.64	83.74	6962.78	83.8	6962.79
83.81	6962.79	84.72	6962.93	84.81	6962.94	84.9	6962.96	85.65	6963.08
85.81	6963.1	85.99	6963.13	86.58	6963.22	86.81	6963.26	87.09	6963.3
87.5	6963.37	87.82	6963.42	88.18	6963.47	88.43	6963.51	88.82	6963.57
89.28	6963.65	89.36	6963.66	89.82	6963.73	90.28	6963.81	90.37	6963.82
90.83	6963.9	91.21	6963.97	91.46	6964	91.83	6964.06	92.14	6964.12
92.56	6964.18	92.83	6964.23	93.06	6964.27	93.65	6964.38	93.84	6964.41
93.99	6964.44	94.64	6964.56	94.75	6964.58	94.84	6964.59	94.92	6964.61
95.84	6964.78	95.87	6964.78	96.77	6964.94	96.85	6964.96	96.93	6964.97
97.7	6965.11	97.85	6965.14	98.03	6965.17	98.63	6965.28	98.85	6965.32

```
   99.12 6965.37   99.55 6965.45   99.86  6965.5  100.22 6965.57  100.48 6965.62
  100.86 6965.69  101.31 6965.77  101.41 6965.79  101.86 6965.87  102.33 6965.95
   102.4 6965.97  102.87 6966.05  103.26 6966.12   103.5 6966.17  103.87 6966.23
  104.19 6966.29  104.59 6966.36  104.87 6966.41  105.11 6966.46  105.69 6966.56
  105.88  6966.6  106.04 6966.63  106.78 6966.76  106.88 6966.78  106.97 6966.79
  107.87 6966.96  107.89 6966.96  107.99 6966.98  108.82 6967.13  108.89 6967.14
  108.97 6967.16  109.75  6967.3  109.89 6967.33  110.06 6967.36  110.67 6967.47
  110.89 6967.51  111.16 6967.56   111.6 6967.64   111.9 6967.69  112.25 6967.75
  112.53  6967.8   112.9 6967.87  113.34 6967.95  113.45 6967.97   113.9 6968.05
  114.38 6968.12  114.44 6968.13  114.91  6968.2  115.31 6968.22  115.53 6968.24
  115.91 6968.26  116.23 6968.28  116.63  6968.3  116.91 6968.32  117.16 6968.33
  117.72 6968.36  117.92 6968.38  118.09 6968.39  118.81 6968.43  118.92 6968.43
  119.01 6968.44  119.91 6968.49  119.94 6968.49  120.12  6968.5  120.87 6968.54
  120.93 6968.55     121 6968.55  121.79 6968.59  121.93  6968.6   122.1 6968.61
  122.72 6968.65  122.94 6968.66  123.19 6968.67  123.65  6968.7  123.94 6968.72
  124.28 6968.74  124.57 6968.75  124.94 6968.77  125.38  6968.8   125.5  6968.8
  125.95 6968.83  126.43 6968.86  126.47 6968.86  126.95 6968.89  127.35 6968.91
  127.57 6968.92  127.95 6968.94  128.28 6968.96  128.66 6968.98  128.96    6969
  129.21 6969.01  129.75 6969.04  129.96 6969.06  130.13 6969.06  130.85 6969.11
  130.96 6969.11  131.06 6969.12  131.94 6969.17  131.99 6969.17  132.24 6969.18
  132.91 6969.22  132.97 6969.22  133.03 6969.23  133.84 6969.27  133.97 6969.28
  134.13 6969.29  134.77 6969.33  134.98 6969.34  135.22 6969.36  135.69 6969.38
  135.98  6969.4  136.32 6969.42  136.62 6969.44  136.98 6969.46  137.41  6969.5
  137.55  6969.5  137.99 6969.53  138.47 6969.57   138.5 6969.57  138.99 6969.61
   139.4 6969.64   139.6 6969.65  139.99 6969.68  140.33 6969.71  140.69 6969.74
     141 6969.76  141.25 6969.78  141.79 6969.82     142 6969.84  142.18 6969.85
  142.88  6969.9     143 6969.91  143.11 6969.92  143.97 6969.99  144.03 6969.99
  144.37 6970.02  144.96 6970.06  145.01 6970.07  145.07 6970.07  145.89 6970.13
  146.01 6970.14  146.16 6970.16  146.81 6970.21  147.02 6970.22  147.26 6970.24
  147.74 6970.28  148.02  6970.3  148.35 6970.32  148.67 6970.35  149.02 6970.37
  149.44 6970.41  149.59 6970.42  149.76 6970.42

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
       0     .05   17.58    .035  114.44     .05

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
         17.58  114.44           105.09  123.89  136.02             .1       .3

CROSS SECTION


RIVER: UT_BSC2
REACH: NCONFL-BGM         RS: 5000

INPUT
Description: Source: Corrected Effective Topo
Datum: NGVD29
```

Coordinate
System: NAVD88 Colorado State Planes Central, US Feet.

Station Elevation Data num= 459

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	6966.49	.34	6966.49	.65	6966.47	1.26	6966.43	1.39	6966.42
1.46	6966.41	1.69	6966.4	2.26	6966.36	2.43	6966.35	2.76	6966.33
3.06	6966.31	3.48	6966.28	3.86	6966.26	4.26	6966.23	4.52	6966.21
4.66	6966.2	5.12	6966.18	5.46	6966.15	5.57	6966.15	5.77	6966.13
6.26	6966.1	6.61	6966.08	7.06	6966.05	7.27	6966.03	7.66	6966.01
7.87	6966	8.55	6965.95	8.67	6965.94	8.77	6965.94	9.47	6965.89
9.75	6965.87	10.27	6965.84	10.28	6965.84	10.8	6965.81	11.07	6965.79
11.78	6965.74	11.87	6965.74	11.98	6965.73	12.67	6965.68	12.89	6965.67
13.28	6965.64	13.47	6965.63	13.93	6965.6	14.28	6965.58	14.79	6965.55
14.98	6965.53	15.08	6965.53	15.41	6965.51	15.88	6965.47	16.02	6965.47
16.29	6965.45	16.68	6965.42	17.07	6965.4	17.48	6965.37	17.8	6965.35
18.11	6965.33	18.28	6965.32	18.84	6965.28	19.08	6965.27	19.16	6965.26
19.3	6965.25	19.88	6965.21	20.2	6965.19	20.69	6965.16	20.8	6965.15
21.25	6965.12	21.49	6965.11	22.27	6965.06	22.31	6965.06	23.09	6965
23.34	6964.99	23.81	6964.96	23.89	6964.95	24.39	6964.92	24.69	6964.9
25.31	6964.86	25.43	6964.85	25.49	6964.85	25.7	6964.84	26.29	6964.8
26.48	6964.78	26.82	6964.76	27.1	6964.74	27.52	6964.72	27.9	6964.69
28.32	6964.66	28.57	6964.65	28.7	6964.64	29.13	6964.61	29.5	6964.59
29.61	6964.58	29.83	6964.57	30.3	6964.54	30.66	6964.51	31.1	6964.48
31.33	6964.47	31.7	6964.44	31.9	6964.43	32.56	6964.39	32.7	6964.38
32.75	6964.38	32.83	6964.37	33.51	6964.33	33.79	6964.31	34.31	6964.27
34.34	6964.27	34.84	6964.24	35.11	6964.22	35.84	6964.17	35.99	6964.17
36.71	6964.12	36.93	6964.1	37.34	6964.08	37.51	6964.07	37.98	6964.04
38.31	6964.01	38.49	6964	38.85	6963.98	39.02	6963.97	39.11	6963.96
39.42	6963.94	39.91	6963.91	40.07	6963.9	40.35	6963.88	40.72	6963.86
41.11	6963.83	41.52	6963.8	41.85	6963.78	42.16	6963.76	42.32	6963.75
42.85	6963.72	43.12	6963.7	43.2	6963.7	43.36	6963.69	43.92	6963.65
44.25	6963.63	44.72	6963.59	44.86	6963.56	45.29	6963.52	45.52	6963.49
46.28	6963.38	46.32	6963.37	46.37	6963.37	47.13	6963.26	47.38	6963.22
47.87	6963.15	47.93	6963.14	48.43	6963.07	48.73	6963.04	49.37	6962.96
49.48	6962.95	49.53	6962.94	49.71	6962.93	50.33	6962.86	50.52	6962.84
50.88	6962.81	51.13	6962.78	51.57	6962.74	51.93	6962.7	52.38	6962.66
52.61	6962.63	52.73	6962.62	53.14	6962.58	53.54	6962.54	53.66	6962.53
53.88	6962.5	54.34	6962.46	54.7	6962.42	55.14	6962.38	55.39	6962.35
55.75	6962.32	55.94	6962.3	56.57	6962.23	56.74	6962.21	56.79	6962.21
56.89	6962.2	57.54	6962.13	57.84	6962.1	58.34	6962.05	58.39	6962.05
58.88	6962	59.14	6961.97	59.9	6961.9	59.93	6961.89	60	6961.89
60.75	6961.81	60.97	6961.79	61.4	6961.74	61.55	6961.73	62.02	6961.68
62.35	6961.65	62.91	6961.59	63.07	6961.58	63.15	6961.57	63.43	6961.54
63.95	6961.49	64.11	6961.47	64.41	6961.44	64.75	6961.41	65.16	6961.37
65.55	6961.32	65.91	6961.29	66.2	6961.26	66.36	6961.24	66.86	6961.19
67.16	6961.16	67.25	6961.15	67.42	6961.14	67.96	6961.08	68.29	6961.05
68.76	6961	68.92	6960.98	69.34	6960.94	69.56	6960.92	70.29	6960.85
70.36	6960.84	70.38	6960.84	70.42	6960.83	71.16	6960.76	71.43	6960.73

71.93	6960.68	71.96	6960.68	72.47	6960.63	72.77	6960.61	73.43	6960.53
73.52	6960.52	73.57	6960.52	73.72	6960.5	74.37	6960.43	74.56	6960.41
74.94	6960.38	75.17	6960.38	75.61	6960.33	75.97	6960.32	76.13	6960.29
76.44	6960.23	76.66	6960.22	76.77	6960.22	77.15	6960.16	77.57	6960.13
77.7	6960.12	77.94	6960.09	78.37	6960.1	78.75	6960.05	79.17	6960.03
79.45	6959.97	79.79	6959.94	79.98	6959.93	80.58	6959.88	80.78	6959.88
80.84	6959.87	80.95	6959.88	81.58	6959.92	81.88	6959.94	82.38	6959.99
82.45	6960.04	82.93	6960.1	83.18	6960.13	83.96	6960.3	83.98	6960.3
84.01	6960.31	84.78	6960.47	85.02	6960.52	85.46	6960.61	85.58	6960.63
86.06	6960.73	86.39	6960.8	86.96	6960.92	87.11	6960.95	87.19	6960.97
87.44	6961.02	87.99	6961.13	88.16	6961.17	88.47	6961.23	88.79	6961.3
89.2	6961.38	89.59	6961.47	89.97	6961.54	90.25	6961.6	90.39	6961.63
90.87	6961.73	91.19	6961.8	91.29	6961.82	91.48	6961.86	91.99	6961.96
92.34	6962.04	92.8	6962.13	92.98	6962.17	93.38	6962.25	93.6	6962.3
94.3	6962.44	94.4	6962.46	94.43	6962.47	94.48	6962.48	95.2	6962.63
95.47	6962.69	95.99	6962.75	96	6962.79	96.52	6962.85	96.8	6962.86
97.49	6962.88	97.56	6962.88	97.6	6962.89	97.73	6962.89	98.4	6962.91
98.61	6962.92	98.99	6962.93	99.21	6962.94	99.65	6962.96	100.01	6962.97
100.5	6962.99	100.7	6962.99	100.81	6963	101.16	6963.01	101.61	6963.02
101.75	6963.03	102	6963.04	102.41	6963.05	102.79	6963.06	103.21	6963.08
103.51	6963.09	103.84	6963.1	104.01	6963.11	104.34	6963.12	104.59	6963.13
104.81	6963.14	105.01	6963.14	105.62	6963.16	105.93	6963.17	106.42	6963.19
106.51	6963.19	106.97	6963.21	107.22	6963.22	108.02	6963.25	108.82	6963.27
109.06	6963.28	109.52	6963.3	109.62	6963.3	110.11	6963.32	110.42	6963.33
111.02	6963.35	111.15	6963.35	111.22	6963.36	111.45	6963.36	112.02	6963.38
112.2	6963.39	112.53	6963.4	112.83	6963.41	113.25	6963.43	113.63	6963.44
114.03	6963.45	114.29	6963.46	114.43	6963.46	114.88	6963.48	115.23	6963.5
115.34	6963.5	115.53	6963.51	116.03	6963.47	116.38	6963.49	116.83	6963.48
117.04	6963.48	117.43	6963.47	117.63	6963.46	118.31	6963.44	118.54	6963.44
119.24	6963.42	119.52	6963.41	120.04	6963.4	120.05	6963.4	120.56	6963.39
120.84	6963.38	121.55	6963.36	121.74	6963.36	122.44	6963.34	122.65	6963.34
123.05	6963.33	123.24	6963.32	123.7	6963.31	124.04	6963.3	124.56	6963.29
124.74	6963.28	124.84	6963.28	125.17	6963.29	125.65	6963.31	125.79	6963.32
126.06	6963.35	126.45	6963.39	126.84	6963.43	127.25	6963.47	127.56	6963.49
127.88	6963.53	128.05	6963.54	128.6	6963.56	128.85	6963.57	128.93	6963.57
129.07	6963.58	129.65	6963.59	129.97	6963.61	130.45	6963.62	130.57	6963.62
131.02	6963.64	131.25	6963.65	132.03	6963.67	132.08	6963.67	132.86	6963.71
133.11	6963.72	133.58	6963.75	133.66	6963.75	134.15	6963.78	134.46	6963.8
135.08	6963.84	135.2	6963.85	135.26	6963.85	135.46	6963.86	136.06	6963.9
136.24	6963.92	136.59	6963.94	136.86	6963.96	137.29	6963.98	137.66	6964.01
138.09	6964.04	138.33	6964.05	138.47	6964.06	138.89	6964.09	139.27	6964.11
139.38	6964.12	139.59	6964.14	140.07	6964.17	140.43	6964.19	140.87	6964.22
141.1	6964.23	141.47	6964.26	141.67	6964.27	142.32	6964.31	142.47	6964.32
142.52	6964.33	142.6	6964.33	143.27	6964.38	143.56	6964.4	144.07	6964.43
144.1	6964.43	144.61	6964.46	144.88	6964.48	145.61	6964.53	145.68	6964.53
145.75	6964.54	146.48	6964.59	146.7	6964.6	147.11	6964.63	147.28	6964.64
147.74	6964.67	148.08	6964.69	148.62	6964.73	148.79	6964.74	148.88	6964.75
149.18	6964.77	149.68	6964.8	149.83	6964.81	150	6964.81		

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.05	45.52	.035	96	.05

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
45.52	96	101.57	100.09	91.93	.1	.3

CROSS SECTION

RIVER: UT_BSC2
REACH: NCONFL-BGM RS: 4900

INPUT
Description: Source: Corrected Effective Topo
Datum: NGVD29
Coordinate
System: NAVD88 Colorado State Planes Central, US Feet.
Station Elevation Data num= 464

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	6964.23	.38	6964.23	.59	6964.22	1.02	6964.21	1.43	6964.19
1.67	6964.19	2.04	6964.17	2.28	6964.16	2.97	6964.14	3.06	6964.14
3.12	6964.13	3.41	6964.12	3.96	6964.1	4.08	6964.1	4.26	6964.09
4.81	6964.07	5.1	6964.06	5.56	6964.04	5.65	6964.04	6.13	6964.02
6.5	6964.01	6.85	6964	7.15	6963.99	7.34	6963.98	8.15	6963.95
8.25	6963.95	9.03	6963.92	9.19	6963.91	9.44	6963.9	9.87	6963.89
10.21	6963.88	10.72	6963.86	10.74	6963.86	11.24	6963.84	11.56	6963.83
12.03	6963.81	12.26	6963.8	12.4	6963.8	13.1	6963.77	13.25	6963.77
13.28	6963.76	13.33	6963.76	14.09	6963.74	14.3	6963.73	14.62	6963.72
14.94	6963.71	15.32	6963.69	15.78	6963.67	15.92	6963.67	16.35	6963.65
16.62	6963.64	17.21	6963.62	17.37	6963.62	17.47	6963.61	17.95	6963.59
18.31	6963.58	18.39	6963.58	18.51	6963.57	19.16	6963.55	19.41	6963.54
19.8	6963.52	20	6963.51	20.43	6963.49	20.84	6963.48	20.95	6963.48
21.1	6963.47	21.46	6963.45	21.69	6963.45	22.39	6963.42	22.48	6963.41
22.53	6963.41	22.79	6963.4	23.38	6963.38	23.5	6963.37	23.69	6963.37
24.22	6963.35	24.52	6963.33	24.98	6963.31	25.06	6963.31	25.54	6963.29
25.91	6963.28	26.28	6963.26	26.57	6963.25	26.75	6963.23	27.57	6963.15
27.6	6963.15	27.64	6963.14	28.44	6963.03	28.61	6963	28.87	6962.97
29.28	6962.91	29.63	6962.86	30.13	6962.79	30.16	6962.78	30.65	6962.71
30.97	6962.67	31.46	6962.6	31.68	6962.56	31.82	6962.54	32.48	6962.45
32.66	6962.42	32.7	6962.42	32.75	6962.41	33.5	6962.3	33.72	6962.27
34.05	6962.23	34.35	6962.18	34.74	6962.13	35.19	6962.07	35.34	6962.05
35.76	6962	36.04	6961.96	36.64	6961.88	36.79	6961.86	36.88	6961.85
37.33	6961.79	37.72	6961.74	37.81	6961.73	37.93	6961.71	38.57	6961.63
38.83	6961.59	39.23	6961.54	39.41	6961.52	39.85	6961.46	40.26	6961.41
40.52	6961.37	40.87	6961.33	41.1	6961.3	41.82	6961.2	41.9	6961.19
41.94	6961.19	42.18	6961.15	42.79	6961.07	42.92	6961.06	43.12	6961.03

43.63	6960.96	43.94	6960.92	44.41	6960.86	44.48	6960.85	44.96	6960.78
45.32	6960.73	45.71	6960.68	45.98	6960.64	46.16	6960.62	47	6960.51
47.01	6960.51	47.02	6960.5	47.85	6960.39	48.03	6960.37	48.3	6960.33
48.7	6960.28	49.05	6960.23	49.54	6960.16	49.59	6960.16	50.07	6960.09
50.38	6960.05	50.89	6959.98	51.09	6959.96	51.23	6959.94	51.87	6959.85
52.07	6959.82	52.12	6959.82	52.18	6959.81	52.92	6959.71	53.14	6959.68
53.48	6959.63	53.76	6959.6	54.16	6959.54	54.6	6959.48	54.77	6959.46
55.18	6959.4	55.45	6959.37	56.07	6959.28	56.2	6959.27	56.29	6959.25
56.72	6959.2	57.14	6959.14	57.23	6959.13	57.36	6959.11	57.98	6959.03
58.25	6958.99	58.66	6958.94	58.83	6958.91	59.27	6958.85	59.67	6958.8
59.95	6958.76	60.29	6958.72	60.51	6958.69	61.25	6958.59	61.31	6958.58
61.36	6958.57	61.56	6958.54	62.2	6958.46	62.34	6958.44	62.54	6958.42
63.05	6958.36	63.36	6958.32	63.84	6958.25	63.89	6958.25	64.38	6958.18
64.73	6958.14	65.13	6958.09	65.4	6958.06	65.58	6958.03	66.41	6957.93
66.43	6957.93	67.27	6957.82	67.45	6957.8	67.72	6957.77	68.11	6957.72
68.47	6957.67	68.95	6957.61	69.02	6957.6	69.49	6957.54	69.8	6957.51
70.31	6957.44	70.51	6957.42	70.64	6957.4	71.26	6957.32	71.49	6957.29
71.53	6957.29	71.61	6957.28	72.33	6957.19	72.56	6957.16	72.9	6957.12
73.17	6957.08	73.58	6957.03	74.02	6956.98	74.2	6956.96	74.6	6956.91
74.86	6956.87	75.49	6956.79	75.62	6956.78	75.71	6956.77	75.72	6956.76
76.1	6956.72	76.55	6956.66	76.64	6956.65	76.79	6956.63	77.39	6956.56
77.67	6956.52	78.08	6956.49	78.24	6956.47	78.69	6956.44	79.08	6956.41
79.38	6956.39	79.71	6956.36	79.93	6956.35	80.67	6956.29	80.73	6956.29
80.77	6956.28	80.95	6956.27	81.61	6956.22	81.75	6956.21	81.97	6956.2
82.46	6956.17	82.78	6956.15	83.26	6956.15	83.3	6956.13	83.8	6956.13
84.15	6956.19	84.56	6956.27	84.82	6956.31	84.99	6956.34	85.8	6956.48
85.83	6956.49	85.85	6956.49	86.68	6956.64	86.86	6956.67	87.15	6956.72
87.52	6956.79	87.89	6956.85	88.37	6956.94	88.44	6956.94	88.91	6957.03
89.21	6957.08	89.74	6957.16	89.93	6957.19	90.05	6957.21	90.64	6957.31
90.9	6957.35	90.95	6957.36	91.03	6957.37	91.74	6957.48	91.97	6957.52
92.33	6957.57	92.59	6957.62	92.99	6957.68	93.43	6957.75	93.62	6957.78
94.02	6957.84	94.27	6957.88	94.92	6957.99	95.04	6958.01	95.12	6958.02
95.49	6958.08	95.96	6958.15	96.06	6958.17	96.21	6958.19	96.81	6958.29
97.08	6958.33	97.51	6958.4	97.65	6958.42	98.1	6958.49	98.49	6958.56
98.8	6958.6	99.13	6958.66	99.34	6958.69	100.1	6958.81	100.15	6958.82
100.18	6958.82	100.34	6958.85	101.03	6958.96	101.17	6958.98	101.39	6959.02
101.87	6959.09	102.19	6959.14	102.69	6959.22	102.71	6959.23	103.21	6959.31
103.56	6959.36	103.98	6959.43	104.24	6959.47	104.4	6959.5	105.18	6959.62
105.25	6959.63	105.28	6959.63	106.09	6959.76	106.28	6959.79	106.57	6959.83
106.93	6959.89	107.3	6959.93	107.78	6959.97	107.87	6959.98	108.32	6960.02
108.62	6960.04	109.16	6960.09	109.35	6960.11	109.47	6960.12	110.03	6960.16
110.31	6960.19	110.37	6960.19	110.46	6960.2	111.15	6960.26	111.39	6960.28
111.75	6960.31	112	6960.33	112.41	6960.36	112.84	6960.4	113.05	6960.42
113.43	6960.45	113.69	6960.47	114.34	6960.53	114.46	6960.54	114.53	6960.54
114.88	6960.57	115.37	6960.62	115.48	6960.62	115.64	6960.64	116.22	6960.69
116.5	6960.71	116.93	6960.75	117.06	6960.76	117.52	6960.8	117.91	6960.83
118.23	6960.86	118.54	6960.88	118.75	6960.9	119.52	6960.97	119.59	6960.97
119.72	6960.98	120.44	6961.04	120.59	6961.06	120.82	6961.08	121.28	6961.11

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  121.61 6961.14  122.11 6961.18  122.13 6961.19  122.63 6961.23  122.97 6961.26
  123.41 6961.29  123.65 6961.32  123.81 6961.33  124.57 6961.39  124.66  6961.4
   124.7  6961.4   125.5 6961.47   125.7 6961.49     126 6961.51  126.33 6961.54
  126.35 6961.54  126.72 6961.57  127.19 6961.61  127.29 6961.62  127.74 6961.66
  128.03 6961.69  128.59 6961.73  128.76 6961.75  128.88 6961.76  129.42  6961.8
  129.72 6961.83  129.79 6961.83  129.89 6961.84  130.57  6961.9  130.81 6961.92
  131.18 6961.95  131.41 6961.97  131.83 6962.01  132.25 6962.04  132.48 6962.06
  132.85 6962.09   133.1 6962.11  133.77 6962.17  133.87 6962.18  133.94 6962.18
  134.26 6962.21  134.79 6962.25   134.9 6962.26  135.07 6962.27  135.63 6962.32
  135.92 6962.34  136.36 6962.37  136.47 6962.38  136.94 6962.42  137.32 6962.44
  137.66 6962.47  137.96 6962.49  138.16 6962.51  138.95 6962.56  138.98 6962.57
  139.01 6962.57  139.11 6962.58  139.85 6962.63  140.01 6962.64  140.25 6962.66
  140.69 6962.69  141.03 6962.71  141.54 6962.75  142.05 6962.79  142.38 6962.81
  142.84 6962.85  143.07 6962.86  143.23 6962.87  143.96 6962.93  144.07 6962.94
  144.13 6962.94  144.91    6963  145.12 6963.01  145.43 6963.03  145.76 6963.06
  146.14 6963.09   146.6 6963.12  146.72 6963.13  147.16 6963.16  147.45 6963.18
  148.02 6963.22  148.18 6963.24  148.29 6963.24   148.8 6963.28  149.13  6963.3
   149.2 6963.31  149.31 6963.32  149.98 6963.37     150 6963.37

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
       0     .05   26.75    .035  106.93     .05

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
         26.75  106.93            70.83   50.05   32.48             .1       .3

CROSS SECTION


RIVER: UT_BSC2
REACH: NCONFL-BGM         RS: 4850

INPUT
Description: Source: Corrected Effective Topo
Datum: NGVD29
Coordinate
             System: NAVD88 Colorado State Planes Central, US Feet.
Station Elevation Data    num=     454
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
       0  6962.3     .62  6962.3     .78 6962.29     .98 6962.28    1.53 6962.25
    1.79 6962.24    2.11 6962.22    2.43  6962.2    2.79 6962.18    3.24 6962.15
    3.34 6962.15     3.8 6962.12    4.24  6962.1    4.38 6962.09     4.8 6962.06
    5.15 6962.04    5.51 6962.02    5.81 6962.01    6.05 6961.99    6.64 6961.96
    6.82 6961.95    6.96 6961.94    7.78 6961.89    7.86 6961.89    8.18 6961.87
    8.76 6961.84    8.83 6961.83    8.91 6961.83    9.67 6961.78    9.84 6961.78
   10.05 6961.76   10.57 6961.73   10.84 6961.72   11.18  6961.7   11.48 6961.68
   11.85 6961.66   12.31 6961.63   12.38 6961.63   12.86  6961.6   13.29 6961.58
   13.45 6961.57   13.86 6961.54   14.19 6961.53   14.58  6961.5   14.87 6961.49
```

15.1	6961.47	15.72	6961.44	15.87	6961.43	16	6961.42	16.85	6961.37
16.9	6961.37	17.12	6961.36	17.81	6961.32	17.89	6961.31	17.98	6961.31
18.71	6961.27	18.89	6961.26	19.12	6961.24	19.62	6961.22	19.9	6961.2
20.25	6961.18	20.52	6961.16	20.91	6961.14	21.39	6961.11	21.43	6961.11
21.91	6961.08	22.33	6961.06	22.52	6961.05	22.92	6961.03	23.24	6961.01
23.65	6960.98	23.92	6960.97	24.14	6960.96	24.79	6960.92	24.93	6960.91
25.05	6960.9	25.92	6960.85	26.06	6960.85	26.85	6960.8	26.94	6960.8
27.06	6960.79	27.76	6960.75	27.95	6960.74	28.19	6960.72	28.66	6960.7
28.96	6960.68	29.32	6960.66	29.57	6960.65	29.96	6960.62	30.46	6960.59
30.47	6960.59	30.97	6960.57	31.38	6960.54	31.59	6960.53	31.98	6960.51
32.28	6960.49	32.72	6960.46	32.98	6960.45	33.19	6960.44	33.86	6960.4
33.99	6960.39	34.09	6960.39	34.99	6960.34	35.01	6960.33	35.9	6960.28
36	6960.28	36.13	6960.27	36.8	6960.23	37.01	6960.22	37.26	6960.21
37.71	6960.18	38.01	6960.16	38.39	6960.14	38.61	6960.13	39.02	6960.1
39.52	6960.08	39.53	6960.08	40.03	6960.05	40.42	6960.02	40.66	6960.01
41.03	6959.99	41.33	6959.97	41.8	6959.95	42.04	6959.93	42.23	6959.92
42.93	6959.88	43.04	6959.87	43.14	6959.87	43.95	6959.83	44.04	6959.82
44.06	6959.82	44.95	6959.77	45.06	6959.77	45.2	6959.76	45.85	6959.72
46.06	6959.71	46.33	6959.7	46.75	6959.67	47.07	6959.66	47.47	6959.64
47.66	6959.63	48.08	6959.6	48.56	6959.58	48.6	6959.58	49.08	6959.55
49.47	6959.53	49.73	6959.52	50.09	6959.5	50.37	6959.48	50.87	6959.45
51.1	6959.44	51.28	6959.43	52	6959.39	52.1	6959.39	52.18	6959.38
52.89	6959.35	53.09	6959.34	53.11	6959.33	53.14	6959.33	53.99	6959.29
54.11	6959.28	54.27	6959.27	54.42	6959.26	54.89	6959.24	55.12	6959.23
55.4	6959.21	55.8	6959.19	56.13	6959.17	56.54	6959.15	56.7	6959.14
57.13	6959.12	57.61	6959.09	57.67	6959.09	58.14	6959.07	58.51	6959.05
58.8	6959.03	59.15	6959.01	59.42	6959	59.94	6958.96	60.15	6958.94
60.32	6958.91	61.07	6958.73	61.16	6958.71	61.23	6958.69	61.83	6958.55
62.13	6958.48	62.16	6958.47	62.21	6958.46	63.04	6958.26	63.17	6958.23
63.34	6958.19	63.94	6958.05	64.18	6957.99	64.47	6957.92	64.84	6957.83
65.18	6957.75	65.61	6957.65	65.75	6957.62	66.19	6957.51	66.65	6957.4
66.74	6957.38	67.2	6957.28	67.56	6957.19	67.88	6957.11	68.2	6957.04
68.46	6956.98	69.01	6956.85	69.21	6956.8	69.37	6956.76	70.14	6956.58
70.21	6956.56	70.27	6956.55	70.78	6956.43	71.18	6956.33	71.22	6956.32
71.28	6956.31	72.08	6956.12	72.23	6956.08	72.41	6956.04	72.99	6955.9
73.23	6955.84	73.55	6955.77	73.89	6955.69	74.24	6955.6	74.46	6955.55
74.68	6955.5	74.79	6955.47	75.25	6955.36	75.7	6955.26	75.81	6955.23
76.25	6955.13	76.6	6955.04	76.95	6954.96	77.26	6954.89	77.51	6954.83
78.08	6954.69	78.27	6954.65	78.41	6954.63	79.21	6954.56	79.32	6954.56
79.72	6954.55	80.22	6954.53	80.35	6954.53	81.13	6954.51	81.28	6954.52
81.48	6954.54	82.03	6954.59	82.29	6954.61	82.62	6954.65	82.94	6954.68
83.3	6954.73	83.75	6954.8	83.84	6954.81	84.3	6954.89	84.74	6954.96
84.88	6954.98	85.31	6955.05	85.65	6955.1	86.02	6955.16	86.32	6955.21
86.55	6955.24	87.15	6955.34	87.32	6955.36	87.46	6955.39	88.29	6955.52
88.33	6955.52	88.36	6955.53	88.66	6955.58	89.27	6955.67	89.33	6955.68
89.42	6955.7	90.17	6955.82	90.34	6955.84	90.55	6955.88	91.08	6955.96
91.35	6956	91.69	6956.06	91.98	6956.1	92.35	6956.16	92.82	6956.24
92.88	6956.25	93.36	6956.32	93.79	6956.39	93.96	6956.42	94.37	6956.48

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   94.69 6956.53   95.09  6956.6   95.37 6956.64    95.6 6956.68   96.22 6956.78
   96.38  6956.8    96.5 6956.82   97.36 6956.96   97.41 6956.96   97.61    6957
   98.31 6957.11   98.39 6957.12   98.49 6957.14   99.22 6957.26    99.4 6957.28
   99.63 6957.32  100.12 6957.42   100.4 6957.46  100.76 6957.52  101.03 6957.57
  101.41 6957.64  101.89 6957.73  101.93 6957.74  102.42 6957.82  102.83  6957.9
  103.03 6957.93  103.42    6958  103.74 6958.03  104.16 6958.07  104.43  6958.1
  104.64 6958.11  105.29 6958.16  105.44 6958.17  105.55 6958.18  106.43 6958.24
  106.44 6958.24  106.45 6958.25  106.55 6958.25  107.36 6958.31  107.45 6958.32
  107.56 6958.33  108.26 6958.38  108.45 6958.39   108.7 6958.41  109.17 6958.45
  109.46 6958.47  109.83  6958.5  110.07 6958.51  110.47 6958.55  110.96 6958.59
  110.98 6958.59  111.09  6958.6  111.47 6958.63  111.88 6958.66   112.1 6958.68
  112.48 6958.71  112.78 6958.73  113.23 6958.77  113.49 6958.79  113.69 6958.81
  114.37 6958.86  114.49 6958.87  114.59 6958.88  115.49 6958.96   115.5 6958.96
   116.4 6959.03  116.51 6959.04  116.63 6959.05  117.31 6959.11  117.51 6959.12
  117.77 6959.14  118.21 6959.18  118.52  6959.2   118.9 6959.24  119.12 6959.25
  119.52 6959.29  120.02 6959.33  120.04 6959.33  120.53 6959.37  120.93  6959.4
  121.17 6959.42  121.54 6959.45  121.83 6959.48   122.3 6959.51  122.54 6959.53
  122.73 6959.55  123.44 6959.61  123.55 6959.62  123.64 6959.62  124.43 6959.69
  124.54  6959.7  124.57  6959.7  125.45 6959.77  125.56 6959.78  125.71 6959.79
  126.35 6959.85  126.57 6959.86  126.84 6959.89  127.26 6959.92  127.57 6959.95
  127.97 6959.98  128.16 6959.99  128.58 6960.03  129.07 6960.07  129.11 6960.07
  129.59 6960.11  129.97 6960.14  130.24 6960.16  130.59 6960.19  130.87 6960.22
  131.37 6960.26   131.6 6960.28  131.78 6960.29  132.51 6960.35  132.61 6960.36
  132.68 6960.36  133.38 6960.42  133.59 6960.44  133.64 6960.44  134.49 6960.52
  134.62 6960.53  134.78 6960.54   135.4  6960.6  135.63 6960.62  135.91 6960.65
   136.3 6960.68  136.63 6960.71  137.04 6960.75  137.21 6960.76  137.64  6960.8
  138.11 6960.85  138.18 6960.85  138.64  6960.9  139.02 6960.93  139.31 6960.96
  139.65 6960.99  139.92 6961.01  140.45 6961.06  140.66 6961.08  140.82 6961.09
  141.58 6961.16  141.66 6961.17  141.73 6961.18  142.32 6961.23  142.63 6961.26
  142.67 6961.26  142.71 6961.27  143.54 6961.34  143.68 6961.35  143.85 6961.37
  144.44 6961.42  144.68 6961.45  144.98 6961.47  145.35 6961.51  145.69 6961.54
  146.12 6961.58  146.25 6961.59  146.69 6961.63  147.16 6961.67  147.25 6961.68
   147.7 6961.72  148.06 6961.75  148.38 6961.78  148.71 6961.81  148.97 6961.84
  149.52 6961.89  149.71 6961.91  149.87 6961.92     150 6961.92

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
       0     .05   60.15    .035  104.16     .05

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
         60.15  104.16           109.19  100.34   86.55             .1       .3

CROSS SECTION


RIVER: UT_BSC2
REACH: NCONFL-BGM         RS: 4750
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INPUT
Description: Source: Corrected Effective Topo
Datum: NGVD29
Coordinate
System: NAVD88 Colorado State Planes Central, US Feet.
Station Elevation Data num= 448

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	6959.53	.14	6959.53	.37	6959.52	.6	6959.52	1.17	6959.5
1.5	6959.49	1.96	6959.48	2.16	6959.47	2.55	6959.46	2.76	6959.46
3.38	6959.44	3.55	6959.44	3.61	6959.43	3.71	6959.43	4.34	6959.41
4.66	6959.41	5.14	6959.39	5.27	6959.39	5.71	6959.38	5.93	6959.37
6.62	6959.35	6.83	6959.35	7.52	6959.33	7.81	6959.32	8.31	6959.31
8.38	6959.3	8.86	6959.29	9.11	6959.29	9.86	6959.26	9.94	6959.26
10.69	6959.24	10.96	6959.23	11.49	6959.22	11.5	6959.22	12.02	6959.21
12.28	6959.2	13.05	6959.18	13.1	6959.18	13.87	6959.16	14.12	6959.15
14.61	6959.14	14.66	6959.13	15.17	6959.12	15.46	6959.11	16.16	6959.09
16.34	6959.09	17.04	6959.07	17.27	6959.06	17.72	6959.05	17.84	6959.05
18.32	6959.03	18.63	6959.03	19.28	6959.01	19.37	6959.01	19.43	6959
19.58	6959	20.22	6958.98	20.43	6958.98	20.83	6958.97	21.01	6958.96
21.48	6958.95	21.81	6958.94	22.39	6958.92	22.6	6958.92	22.82	6958.91
23.39	6958.9	23.58	6958.89	23.94	6958.88	24.19	6958.88	24.63	6958.86
24.98	6958.85	25.5	6958.84	25.68	6958.83	25.78	6958.83	26.06	6958.82
26.57	6958.81	26.73	6958.81	27.06	6958.8	27.36	6958.79	27.79	6958.78
28.16	6958.77	28.61	6958.76	28.84	6958.75	28.95	6958.75	29.3	6958.74
29.74	6958.73	30.94	6958.73	31.33	6958.72	33.04	6958.72	33.28	6958.71
35.3	6958.71	35.78	6958.7	37.25	6958.7	37.68	6958.69	39.03	6958.69
39.27	6958.68	39.35	6958.68	39.51	6958.67	40.06	6958.64	40.25	6958.62
40.4	6958.61	40.86	6958.57	41.06	6958.55	41.45	6958.52	41.65	6958.5
42.27	6958.45	42.45	6958.44	42.5	6958.43	42.62	6958.42	43.24	6958.37
43.55	6958.34	44.03	6958.3	44.17	6958.29	44.61	6958.26	44.83	6958.24
45.51	6958.18	45.62	6958.17	45.66	6958.17	45.73	6958.15	46.41	6958.03
46.71	6957.98	47.21	6957.89	47.29	6957.88	47.76	6957.8	48	6957.76
48.75	6957.63	48.8	6957.62	48.81	6957.61	48.84	6957.61	49.59	6957.48
49.86	6957.43	50.38	6957.34	50.4	6957.34	50.91	6957.25	51.18	6957.2
51.95	6957.06	51.99	6957.06	52.76	6956.92	53.02	6956.88	53.51	6956.79
53.56	6956.78	54.07	6956.69	54.35	6956.64	55.07	6956.52	55.12	6956.51
55.15	6956.5	55.23	6956.49	55.94	6956.37	56.17	6956.32	56.62	6956.25
56.73	6956.23	57.22	6956.14	57.53	6956.09	58.18	6955.97	58.27	6955.95
58.32	6955.95	58.47	6955.92	59.11	6955.81	59.32	6955.77	59.74	6955.7
59.91	6955.67	60.38	6955.58	60.7	6955.52	61.29	6955.42	61.43	6955.4
61.5	6955.38	61.71	6955.35	62.29	6955.24	62.48	6955.21	62.85	6955.15
63.08	6955.1	63.53	6955.02	63.88	6954.96	64.4	6954.87	64.58	6954.84
64.67	6954.82	64.95	6954.77	65.47	6954.68	65.63	6954.65	65.96	6954.59
66.26	6954.54	66.68	6954.47	67.05	6954.4	67.52	6954.32	67.73	6954.28
67.85	6954.26	68.19	6954.2	68.64	6954.12	68.79	6954.09	69.07	6954.04
69.43	6953.98	69.84	6953.91	70.23	6953.84	70.63	6953.77	70.89	6953.72
71.02	6953.7	71.43	6953.62	71.82	6953.56	71.94	6953.54	72.18	6953.49
72.61	6953.42	72.99	6953.35	73.4	6953.28	73.69	6953.23	73.74	6953.22

74.04	6953.16	74.2	6953.14	74.67	6953.05	74.99	6953	75.09	6952.98
75.3	6952.94	75.78	6952.85	76.15	6952.79	76.58	6952.71	76.85	6952.67
77.2	6952.6	77.37	6952.57	77.91	6952.48	78.17	6952.43	78.25	6952.42
78.41	6952.42	78.96	6952.39	79.3	6952.38	79.75	6952.37	79.96	6952.36
80.35	6952.35	80.55	6952.35	81.15	6952.36	81.34	6952.37	81.4	6952.37
81.52	6952.38	82.13	6952.42	82.45	6952.48	82.93	6952.59	83.08	6952.62
83.5	6952.72	83.72	6952.77	84.39	6952.92	84.52	6952.95	84.56	6952.96
84.63	6952.98	85.31	6953.13	85.61	6953.2	86.1	6953.32	86.19	6953.34
86.66	6953.44	86.9	6953.5	87.64	6953.67	87.69	6953.68	87.71	6953.69
87.75	6953.69	88.49	6953.87	88.76	6953.93	89.28	6954.05	89.3	6954.05
89.81	6954.17	90.07	6954.23	90.86	6954.39	90.87	6954.39	91.66	6954.54
91.91	6954.59	92.41	6954.69	92.45	6954.7	92.97	6954.8	93.25	6954.85
93.97	6954.99	94.02	6955	94.04	6955.01	94.12	6955.02	94.84	6955.16
95.07	6955.21	95.53	6955.29	95.63	6955.31	96.12	6955.41	96.38	6955.46
96.42	6955.47	97.08	6955.6	97.17	6955.61	97.22	6955.62	97.36	6955.65
98.01	6955.78	98.22	6955.82	98.64	6955.9	98.8	6955.93	99.27	6956.02
99.6	6956.09	100.19	6956.2	100.33	6956.23	100.39	6956.24	100.6	6956.28
101.19	6956.39	101.38	6956.43	101.75	6956.48	101.98	6956.52	102.43	6956.57
102.77	6956.59	103.31	6956.62	103.48	6956.63	103.57	6956.63	103.84	6956.65
104.36	6956.67	104.53	6956.68	104.86	6956.7	105.15	6956.71	105.58	6956.73
105.95	6956.75	106.42	6956.78	106.63	6956.79	106.74	6956.79	107.08	6956.81
107.54	6956.83	107.68	6956.84	107.97	6956.85	108.33	6956.87	108.74	6956.89
109.12	6956.9	109.53	6956.89	109.79	6956.9	111.09	6956.9	111.51	6956.89
114.68	6956.89	115.04	6956.88	118.2	6956.88	118.65	6956.87	121.98	6956.87
122.4	6956.86	128.17	6956.86	128.2	6956.85	134.53	6956.85	135.02	6956.84
139.3	6956.84	139.54	6956.86	139.96	6956.86	140.39	6956.89	140.72	6956.91
141.46	6956.95	141.48	6956.95	141.5	6956.96	142.24	6957	142.58	6957.02
142.99	6957.05	143.46	6957.07	143.67	6957.09	143.75	6957.09	143.93	6957.1
144.51	6957.14	144.76	6957.15	145.27	6957.18	145.43	6957.19	145.86	6957.22
146.03	6957.23	146.4	6957.25	146.78	6957.27	146.95	6957.28	147.39	6957.31
147.54	6957.32	148.05	6957.35	148.3	6957.37	148.87	6957.4	149.06	6957.41
149.14	6957.42	149.35	6957.43	149.82	6957.46	150.23	6957.48	150.57	6957.5
151.32	6957.55	151.34	6957.55	152.09	6957.6	152.42	6957.62	152.85	6957.64
153.28	6957.67	153.51	6957.68	153.61	6957.69	153.81	6957.7	154.36	6957.73
154.61	6957.75	155.12	6957.78	155.24	6957.79	155.7	6957.81	155.88	6957.82
156.28	6957.85	156.64	6957.87	156.79	6957.88	157.2	6957.9	157.4	6957.92
157.89	6957.95	158.15	6957.96	158.75	6958	158.91	6958.01	158.98	6958.01
159.17	6958.02	159.67	6958.05	160.08	6958.08	160.43	6958.1	161.13	6958.14
161.19	6958.14	161.22	6958.15	161.94	6958.18	162.26	6958.2	162.7	6958.21
163.09	6958.23	163.36	6958.24	163.46	6958.25	163.69	6958.25	164.22	6958.28
164.45	6958.28	164.98	6958.31	165.06	6958.31	165.54	6958.33	165.73	6958.34
166.16	6958.35	166.49	6958.37	166.64	6958.37	167.02	6958.39	167.25	6958.4
167.73	6958.41	168.01	6958.43	168.63	6958.45	168.77	6958.46	168.98	6958.46
169.52	6958.49	169.92	6958.5	170.28	6958.52	170.94	6958.54	171.01	6958.55
171.1	6958.55	171.8	6958.58	172.11	6958.59	172.56	6958.61	172.91	6958.62
173.2	6958.63	173.31	6958.64	173.57	6958.65	174.07	6958.67	174.29	6958.68
174.83	6958.7	174.87	6958.7	175.39	6958.72	175.59	6958.73	176.04	6958.75
176.35	6958.76	176.48	6958.76	176.83	6958.78	177.1	6958.79	177.57	6958.81

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  177.86 6958.82  178.51 6958.84  178.53 6958.84

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
       0     .05   44.61    .035  104.53     .05

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
         44.61  104.53           111.78  100.72   82.51             .1       .3

CROSS SECTION


RIVER: UT_BSC2
REACH: NCONFL-BGM         RS: 4650

INPUT
Description: Source: Corrected Effective Topo
Datum: NGVD29
Coordinate
             System: NAVD88 Colorado State Planes Central, US Feet.
Station Elevation Data    num=     403
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
       0    6957     .01    6957     .38 6956.99     .64 6956.98     1.1 6956.96
    1.75 6956.93    1.86 6956.93    2.14 6956.91    2.53  6956.9    3.09 6956.88
    3.25 6956.87    3.48 6956.86    3.97 6956.84    4.31 6956.83    4.68 6956.81
    5.21 6956.79     5.4 6956.78    5.53 6956.78    6.12 6956.76    6.31 6956.75
    6.76 6956.73    6.84 6956.73    6.95 6956.72    7.55  6956.7    7.98 6956.68
    8.27 6956.67    8.68 6956.65    8.99 6956.64    9.21 6956.63    9.71 6956.61
   10.41 6956.58   10.47 6956.58   11.14 6956.55   11.66 6956.53   11.86 6956.53
   12.15 6956.51   12.58  6956.5   12.88 6956.48   13.29 6956.47   13.88 6956.44
   14.01 6956.44    14.1 6956.43   14.64  6956.4   14.73 6956.39   15.33 6956.36
   15.45 6956.35   15.62 6956.35   16.16 6956.31   16.55 6956.28   16.88 6956.26
   17.35 6956.23    17.6 6956.21   17.78  6956.2   18.32 6956.17    18.8 6956.14
      19 6956.12   19.08 6956.12   19.75 6956.07   20.22 6956.04   20.47 6956.03
   20.82    6956   21.19 6955.98   21.45 6955.96    21.9 6955.93   22.55 6955.89
   22.62 6955.88   22.67 6955.88   22.97 6955.86   23.34 6955.83    23.9  6955.8
   24.06 6955.78   24.28 6955.76   24.77 6955.72   25.12  6955.7   25.49 6955.67
   26.02 6955.62   26.21 6955.61   26.35  6955.6   26.93 6955.55   27.13 6955.53
   27.57  6955.5   27.64 6955.49   27.75 6955.48   28.36 6955.43   28.79  6955.4
   29.08 6955.38   29.48 6955.34    29.8 6955.32   30.02  6955.3   30.51 6955.26
   31.22  6955.2    31.3  6955.2   31.95 6955.14   32.47  6955.1   32.67 6955.09
   32.95 6955.06   33.38 6955.03   33.69    6955    34.1 6954.97   34.69 6954.92
   34.82 6954.91   34.91  6954.9   35.46 6954.86   35.54 6954.85   36.14  6954.8
   36.25  6954.8   36.42 6954.78   36.97 6954.74   37.36 6954.71   37.69 6954.68
   38.15 6954.64   38.41 6954.62   38.59 6954.61   39.12 6954.56   39.63 6954.52
    39.7 6954.52   39.81 6954.51   39.84 6954.51   39.89  6954.5   40.56 6954.45
   41.04 6954.41   41.28 6954.39   41.62 6954.36      42 6954.33   42.26 6954.31
   42.71 6954.27   43.35 6954.16   43.43 6954.15   43.48 6954.14    43.8 6954.09
```

44.15	6954.02	44.71	6953.92	44.87	6953.89	45.09	6953.85	45.58	6953.76
45.93	6953.7	46.3	6953.64	46.82	6953.54	47.02	6953.51	47.16	6953.48
47.74	6953.38	47.96	6953.34	48.38	6953.26	48.45	6953.25	48.56	6953.23
49.17	6953.12	49.6	6953.04	49.89	6952.99	50.29	6952.92	50.61	6952.86
50.83	6952.82	51.32	6952.73	52.02	6952.61	52.04	6952.6	52.05	6952.6
52.13	6952.59	52.76	6952.48	53.28	6952.38	53.48	6952.35	53.76	6952.3
54.19	6952.22	54.5	6952.16	54.91	6952.09	55.49	6951.99	55.63	6951.96
55.73	6951.95	56.29	6951.85	56.35	6951.84	56.95	6951.73	57.06	6951.71
57.22	6951.68	57.78	6951.58	58.17	6951.51	58.5	6951.46	58.96	6951.37
59.18	6951.34	59.22	6951.33	59.4	6951.3	59.93	6951.2	60.46	6951.11
60.62	6951.08	60.65	6951.08	60.69	6951.07	61.37	6950.95	61.85	6950.86
62.09	6950.82	62.42	6950.76	62.8	6950.7	63.07	6950.68	63.52	6950.66
64.16	6950.7	64.24	6950.71	64.29	6950.71	64.62	6950.73	64.96	6950.75
65.52	6950.78	65.67	6950.79	65.89	6950.8	66.39	6950.83	66.74	6950.85
67.11	6950.87	67.63	6950.93	67.83	6950.95	67.97	6950.98	68.54	6951.1
68.79	6951.14	69.19	6951.22	69.26	6951.24	69.36	6951.26	69.98	6951.38
70.42	6951.46	70.7	6951.51	71.09	6951.59	71.41	6951.65	71.64	6951.7
72.13	6951.79	72.83	6951.92	72.85	6951.93	72.86	6951.93	72.95	6951.95
73.57	6952.07	74.09	6952.17	74.28	6952.2	74.56	6952.26	75	6952.34
75.31	6952.4	75.72	6952.48	76.29	6952.59	76.44	6952.62	76.54	6952.64
77.12	6952.75	77.15	6952.76	77.76	6952.87	77.87	6952.89	78.03	6952.92
78.59	6953.03	78.98	6953.11	79.31	6953.17	79.76	6953.26	80.02	6953.31
80.21	6953.34	80.74	6953.45	81.28	6953.55	81.43	6953.58	81.46	6953.58
81.49	6953.59	81.56	6953.6	82.18	6953.72	82.66	6953.82	82.89	6953.86
83.23	6953.92	83.61	6954	83.88	6954.05	84.33	6954.14	84.96	6954.26
85.05	6954.28	85.11	6954.28	85.45	6954.31	85.76	6954.35	86.33	6954.38
86.48	6954.39	86.7	6954.4	87.2	6954.42	87.55	6954.44	87.92	6954.46
88.43	6954.48	88.63	6954.49	88.78	6954.5	89.35	6954.52	89.62	6954.54
90	6954.55	90.07	6954.56	90.16	6954.56	90.79	6954.59	91.23	6954.61
91.5	6954.63	91.9	6954.65	92.22	6954.66	92.45	6954.67	92.94	6954.69
93.63	6954.73	93.67	6954.73	93.78	6954.74	94.37	6954.78	94.9	6954.81
95.09	6954.82	95.36	6954.84	95.81	6954.87	96.12	6954.89	96.53	6954.92
97.1	6954.95	97.24	6954.96	97.35	6954.97	97.95	6955.01	97.96	6955.01
98.57	6955.05	98.68	6955.06	98.83	6955.07	99.4	6955.11	99.8	6955.14
100.11	6955.16	100.57	6955.19	100.83	6955.2	101.02	6955.22	101.55	6955.25
102.11	6955.29	102.24	6955.3	102.3	6955.3	102.98	6955.35	103.47	6955.38
103.7	6955.4	104.03	6955.42	104.42	6955.45	104.69	6955.46	105.14	6955.49
105.77	6955.54	105.85	6955.54	105.92	6955.55	106.28	6955.57	106.57	6955.59
107.14	6955.63	107.29	6955.64	107.5	6955.65	108.01	6955.69	108.36	6955.71
108.72	6955.74	109.23	6955.77	109.44	6955.78	109.59	6955.79	110.16	6955.83
110.44	6955.85	110.81	6955.88	110.97	6955.88	111.59	6955.9	112.04	6955.91
112.31	6955.91	112.7	6955.92	113.03	6955.92	113.26	6955.93	113.75	6955.93
114.43	6955.94	114.46	6955.95	114.61	6955.95	115.18	6955.96	115.71	6955.96
115.9	6955.97	116.17	6955.97	116.62	6955.98	116.93	6955.98	117.33	6955.99
117.9	6955.99	118.05	6956	118.16	6956	118.77	6956.01	119.38	6956.01
119.49	6956.02	119.64	6956.02	120.2	6956.03	120.61	6956.03	120.92	6956.04
121.37	6956.04	121.64	6956.05	121.83	6956.05	122.36	6956.06	122.94	6956.08
123.1	6956.08	123.79	6956.1	124.28	6956.11	124.51	6956.12	124.84	6956.13

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  125.23 6956.14   125.5 6956.15  125.94 6956.16  126.57 6956.18  126.73 6956.18
   127.1 6956.19  127.38  6956.2  127.95 6956.22   128.1 6956.22   128.3 6956.23
  128.81 6956.24  129.18 6956.25  129.53 6956.26  130.04 6956.28  130.25 6956.28
   130.4 6956.29  130.97  6956.3  131.27 6956.31  131.62 6956.32  131.77 6956.32
   132.4 6956.34  132.85 6956.35  133.12 6956.36   133.5 6956.37  133.84 6956.38
  134.07 6956.39  134.56  6956.4  135.24 6956.42   135.3 6956.42  135.44 6956.43
  135.99 6956.44  136.52 6956.46  136.54 6956.46

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
       0     .05   42.71    .035   85.05     .05

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
         42.71   85.05            17.98   49.31   85.86             .1       .3

CROSS SECTION


RIVER: UT_BSC2
REACH: NCONFL-BGM         RS: 4600

INPUT
Description: Source: Corrected Effective Topo
Datum: NGVD29
Coordinate
             System: NAVD88 Colorado State Planes Central, US Feet.
Station Elevation Data    num=     348
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
       0 6956.76     .77 6956.76     .96 6956.75    1.69 6956.69    1.76 6956.68
    1.85 6956.67    2.61 6956.61    2.77  6956.6    2.96 6956.58    3.52 6956.54
    3.77 6956.52    4.07 6956.49    4.44 6956.46    4.78 6956.43    5.19  6956.4
    5.35 6956.39    5.78 6956.35    6.27 6956.31     6.3 6956.31    6.78 6956.27
    7.18 6956.24    7.41 6956.22    7.79 6956.19     8.1 6956.16    8.53 6956.13
    8.79 6956.11    9.02 6956.09    9.64 6956.04     9.8 6956.03    9.93 6956.01
   10.75 6955.94    10.8 6955.94   10.85 6955.93   11.28 6955.89   11.76 6955.84
   11.81 6955.83   11.86 6955.83   12.68 6955.74   12.81 6955.73   12.98 6955.71
   13.59 6955.65   13.82 6955.63   14.09  6955.6   14.51 6955.55   14.82 6955.52
    15.2 6955.48   15.42 6955.46   15.83 6955.42   16.32 6955.37   16.34 6955.37
   16.83 6955.32   17.26 6955.28   17.43 6955.26   17.84 6955.22   18.17 6955.21
   18.54 6955.18   18.84 6955.17   19.09 6955.16   19.66 6955.12   19.85 6955.11
      20  6955.1   20.77 6955.06   20.85 6955.06   20.92 6955.05   21.61 6955.02
   21.83    6955   21.88    6955   22.75 6954.95   22.86 6954.95      23 6954.94
   23.66  6954.9   23.87 6954.89   24.11 6954.88   24.58 6954.85   24.87 6954.84
   25.22 6954.82    25.5  6954.8   25.87 6954.78   26.33 6954.75   26.41 6954.75
   26.88 6954.72   27.33 6954.69   27.45 6954.69   27.88 6954.66   28.24 6954.63
   28.56 6954.61   28.89 6954.59   29.16 6954.57   29.67 6954.53   29.89 6954.51
   30.07  6954.5   30.79 6954.45    30.9 6954.44   30.99 6954.43    31.9 6954.36
   31.93 6954.36   32.82  6954.3   32.91 6954.29   33.01 6954.28   33.74 6954.23
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33.91	6954.22	34.13	6954.2	34.65	6954.16	34.92	6954.14	35.24	6954.12
35.57	6954.09	35.92	6954.07	36.35	6954.04	36.48	6954.03	36.93	6953.99
37.4	6953.96	37.46	6953.95	37.93	6953.92	38.31	6953.89	38.58	6953.87
38.94	6953.84	39.05	6953.83	39.23	6953.82	39.69	6953.79	39.94	6953.77
40.15	6953.76	40.8	6953.71	40.95	6953.7	41.06	6953.69	41.92	6953.62
41.98	6953.62	42.26	6953.6	42.89	6953.55	42.95	6953.55	43.03	6953.54
43.81	6953.48	43.96	6953.47	44.14	6953.46	44.72	6953.42	44.96	6953.4
45.26	6953.37	45.64	6953.35	45.97	6953.32	46.37	6953.26	46.56	6953.24
46.97	6953.18	47.47	6953.11	47.48	6953.11	47.98	6953.04	48.39	6952.98
48.59	6952.95	48.98	6952.89	49.3	6952.85	49.71	6952.79	49.99	6952.75
50.22	6952.71	50.82	6952.62	50.99	6952.6	51.13	6952.58	51.93	6952.46
52	6952.45	52.05	6952.45	52.58	6952.37	52.96	6952.31	53	6952.31
53.05	6952.3	53.88	6952.18	54.01	6952.16	54.16	6952.14	54.8	6952.05
55.01	6952.02	55.27	6951.98	55.71	6951.91	56.02	6951.87	56.39	6951.82
56.63	6951.78	57.02	6951.72	57.5	6951.65	57.54	6951.65	58.03	6951.58
58.46	6951.52	58.61	6951.49	59.03	6951.43	59.37	6951.38	59.73	6951.33
60.04	6951.29	60.29	6951.25	60.84	6951.17	61.04	6951.14	61.21	6951.12
61.95	6951.01	62.04	6950.99	62.12	6950.98	62.91	6950.87	63.04	6950.85
63.06	6950.85	63.95	6950.72	64.05	6950.7	64.18	6950.69	64.87	6950.58
65.06	6950.56	65.29	6950.52	65.78	6950.45	66.06	6950.41	66.4	6950.36
66.7	6950.32	67.07	6950.27	67.52	6950.2	67.61	6950.19	68.07	6950.12
68.53	6950.05	68.63	6950.04	69.08	6949.97	69.45	6949.92	69.52	6949.91
69.74	6949.88	70.08	6949.83	70.36	6949.79	70.86	6949.73	71.09	6949.69
71.28	6949.67	71.97	6949.58	72.09	6949.56	72.19	6949.55	73.08	6949.43
73.1	6949.43	73.11	6949.42	73.23	6949.41	74.02	6949.35	74.1	6949.34
74.19	6949.34	74.94	6949.33	75.11	6949.33	75.31	6949.32	75.86	6949.31
76.11	6949.31	76.42	6949.3	76.77	6949.29	77.12	6949.29	77.53	6949.33
77.69	6949.34	78.12	6949.39	78.6	6949.5	78.65	6949.51	79.12	6949.61
79.52	6949.7	79.76	6949.75	80.13	6949.83	80.43	6949.9	80.87	6949.99
81.13	6950.05	81.35	6950.1	81.99	6950.24	82.14	6950.27	82.26	6950.3
83.1	6950.5	83.14	6950.51	83.18	6950.52	83.56	6950.61	84.1	6950.74
84.15	6950.75	84.21	6950.77	85.01	6950.96	85.15	6950.99	85.32	6951.04
85.93	6951.18	86.16	6951.24	86.44	6951.3	86.84	6951.4	87.16	6951.48
87.55	6951.57	87.76	6951.62	88.17	6951.72	88.66	6951.84	88.67	6951.84
88.89	6951.89	89.17	6951.96	89.59	6952.06	89.78	6952.11	90.18	6952.21
90.51	6952.29	90.89	6952.38	91.18	6952.45	91.42	6952.51	92	6952.65
92.19	6952.69	92.34	6952.73	93.12	6952.92	93.19	6952.93	93.25	6952.95
93.88	6953.1	94.17	6953.17	94.2	6953.18	94.23	6953.18	95.08	6953.31
95.2	6953.33	95.34	6953.34	96	6953.39	96.21	6953.41	96.46	6953.43
96.91	6953.46	97.21	6953.48	97.57	6953.51	97.83	6953.53	98.21	6953.56
98.68	6953.6	98.75	6953.6	99.22	6953.64	99.66	6953.68	99.79	6953.69
100.22	6953.72	100.58	6953.75	100.91	6953.77	101.23	6953.8	101.49	6953.82
102.02	6953.86	102.23	6953.88	102.41	6953.89	103.13	6953.95	103.24	6953.95
103.32	6953.96	104.21	6954.03	104.25	6954.03	105.16	6954.1	105.25	6954.11
105.36	6954.12	106.07	6954.17	106.25	6954.19	106.47	6954.21	106.99	6954.25
107.26	6954.27	107.59	6954.3	107.9	6954.32	108.26	6954.35	108.7	6954.4
108.82	6954.4	109.27	6954.45	109.73	6954.49	109.81	6954.5	110.27	6954.55
110.65	6954.56	110.92	6954.55	111.56	6954.55	112.04	6954.54	113.4	6954.54

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  114.26 6954.53  122.33 6954.53  122.55 6954.52  130.79 6954.52  130.96 6954.51
  139.41 6954.51  139.86  6954.5  144.24  6954.5

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
       0     .05   45.64    .035    95.2     .05

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
         45.64    95.2            48.42   48.42   48.42             .1       .3

CROSS SECTION


RIVER: UT_BSC2
REACH: NCONFL-BGM         RS: 4550

INPUT
Description: Source: Corrected Effective Topo
Datum: NGVD29
Coordinate
             System: NAVD88 Colorado State Planes Central, US Feet.
Station Elevation Data    num=     491
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
  -48.02 6958.32  -47.84 6958.32   -47.4  6958.3  -47.13 6958.28   -46.9 6958.27
  -46.32 6958.23  -45.96 6958.21  -45.24 6958.16  -45.03 6958.15  -44.17 6958.09
  -44.09 6958.09  -43.57 6958.06  -43.15 6958.03  -43.09 6958.03  -42.21 6957.97
  -42.01 6957.96  -41.12  6957.9  -40.34 6957.86  -40.11 6957.84  -39.86 6957.83
  -39.11 6957.78  -38.47 6957.74  -38.11 6957.72   -37.7 6957.69  -37.11 6957.65
  -36.59 6957.62  -35.65 6957.56  -35.55 6957.56   -35.1 6957.53  -34.72  6957.5
  -34.47 6957.49  -33.78 6957.45   -33.1  6957.4  -32.84 6957.39  -32.31 6957.35
  -31.91 6957.33  -31.24 6957.29  -30.97 6957.27  -30.16 6957.22  -30.03 6957.21
  -29.18 6957.16  -29.08 6957.15  -28.16 6957.09     -28 6957.09  -26.93 6957.02
  -26.28 6956.98  -26.08 6956.97  -25.85 6956.95  -25.35 6956.92  -24.77 6956.88
  -24.08 6956.84  -23.69 6956.82  -23.47  6956.8  -23.07 6956.77  -22.62 6956.74
  -22.53 6956.73  -22.07  6956.7   -21.6 6956.66  -21.54 6956.65  -21.07 6956.62
  -20.66 6956.58  -20.46 6956.57  -20.07 6956.54  -19.38 6956.48  -19.06 6956.46
  -18.79 6956.43  -18.06 6956.37  -17.85 6956.36  -17.23 6956.31  -16.91 6956.28
  -16.15 6956.22  -15.97 6956.21  -15.07 6956.13  -14.79 6956.11     -14 6956.03
  -13.16 6955.94  -12.92 6955.92  -11.84 6955.81  -11.29 6955.75  -11.04 6955.73
  -10.76  6955.7  -10.04 6955.63   -9.69 6955.59   -9.04 6955.52   -8.48 6955.47
   -8.04 6955.42   -7.04 6955.32    -6.6 6955.28   -6.45 6955.26   -6.03 6955.22
   -5.38 6955.15   -5.03 6955.12   -4.73 6955.09    -4.3 6955.04   -4.03 6955.02
   -3.79 6954.99   -3.03 6954.91   -2.85  6954.9   -2.14 6954.82   -1.92  6954.8
   -1.07 6954.71    -.98 6954.71     -.4 6954.65    -.04 6954.61     .01  6954.6
     .89 6954.51    1.09  6954.5    1.83 6954.42    1.99  6954.4    2.17 6954.39
    2.77 6954.32    3.24 6954.28    3.99  6954.2    4.32 6954.17    4.64 6954.13
    4.99  6954.1     5.4 6954.08    5.58 6954.06       6 6954.04    6.48 6954.01
    6.74    6954    7.05 6953.98    7.29 6953.96    7.66 6953.94    8.01 6953.91
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8.24	6953.9	8.73	6953.86	9.36	6953.82	10.07	6953.77	10.18	6953.76
10.63	6953.73	11.31	6953.68	11.83	6953.65	12.35	6953.61	12.82	6953.56
13.13	6953.53	13.79	6953.43	15.24	6953.23	15.42	6953.21	15.96	6953.13
16.28	6953.08	16.61	6953.04	16.78	6953.01	17.4	6952.93	17.81	6952.87
18.12	6952.83	18.61	6952.76	18.85	6952.73	19	6952.7	19.57	6952.62
19.75	6952.6	20.2	6952.54	20.29	6952.52	21.01	6952.42	21.39	6952.37
21.74	6952.32	22.26	6952.25	22.59	6952.2	23.18	6952.12	23.21	6952.12
23.78	6952.04	24.09	6951.99	24.63	6951.92	25.35	6951.82	25.91	6951.74
26.17	6951.7	26.67	6951.63	26.79	6951.61	28.24	6951.41	28.57	6951.37
28.96	6951.31	29.56	6951.23	29.68	6951.21	30.14	6951.15	30.4	6951.11
30.96	6951.03	31.13	6951.01	31.39	6950.97	32.15	6950.87	33.21	6950.72
33.6	6950.66	34.02	6950.6	34.54	6950.53	35.74	6950.36	36.86	6950.21
37.06	6950.18	38.13	6950.03	38.69	6949.95	39.07	6949.9	39.32	6949.86
39.79	6949.8	40.51	6949.7	40.53	6949.69	41.24	6949.59	41.71	6949.53
41.96	6949.49	42.34	6949.44	43.99	6949.21	44.16	6949.19	44.85	6949.09
45.3	6949.03	45.99	6948.93	46.3	6948.89	47.02	6948.78	47.45	6948.72
47.69	6948.69	48.46	6948.57	48.89	6948.54	49.18	6948.51	49.64	6948.47
50.63	6948.36	50.92	6948.34	51.28	6948.31	52.47	6948.19	52.8	6948.15
53.29	6948.1	53.52	6948.08	53.67	6948.06	54.24	6948	54.38	6947.99
54.96	6947.93	55.12	6947.92	55.69	6947.94	56.06	6948	56.94	6948.15
57.25	6948.2	57.84	6948.36	57.85	6948.36	58.77	6948.62	59.3	6948.76
59.3	6948.77	59.65	6948.86	60.01	6948.96	60.52	6949.11	60.73	6949.16
60.88	6949.21	61.45	6949.36	61.74	6949.45	62.1	6949.55	62.88	6949.76
63.33	6949.89	63.6	6949.96	63.98	6950.07	64.32	6950.16	64.56	6950.23
65.04	6950.36	65.78	6950.57	65.95	6950.62	66.17	6950.65	66.52	6950.69
66.84	6950.69	67.86	6950.72	68.72	6950.74	68.97	6950.75	69.19	6950.75
69.68	6950.77	70.23	6950.78	70.38	6950.78	70.52	6950.79	71.09	6950.8
71.74	6950.82	71.85	6950.82	72.51	6950.84	72.68	6950.84	73.25	6950.86
73.93	6950.88	74.52	6950.89	74.77	6950.9	75.34	6950.91	75.85	6950.93
76.05	6950.93	76.28	6950.94	77.18	6950.96	77.79	6950.98	78.18	6950.99
78.52	6950.99	79.31	6951.01	79.85	6951.03	80.82	6951.05	81.01	6951.06
81.18	6951.06	81.72	6951.08	82.33	6951.09	82.52	6951.1	83.14	6951.12
84.55	6951.16	85.18	6951.19	85.36	6951.19	85.97	6951.21	86.51	6951.23
86.87	6951.25	87.39	6951.26	87.85	6951.28	88.38	6951.3	88.81	6951.32
89.83	6951.35	89.9	6951.35	90.5	6951.37	90.93	6951.39	91.43	6951.4
91.82	6951.42	92.35	6951.43	92.97	6951.46	93.06	6951.46	93.77	6951.55
94.7	6951.69	95.19	6951.77	95.82	6951.88	96.6	6952.02	97.16	6952.11
97.31	6952.14	98.73	6952.38	99	6952.43	99.82	6952.56	100.15	6952.62
100.52	6952.68	100.83	6952.74	100.86	6952.74	101.12	6952.79	101.58	6952.89
102.34	6953.04	103.03	6953.08	103.5	6953.15	104.13	6953.17	104.47	6953.19
104.69	6953.19	104.75	6953.2	105.19	6953.21	105.81	6953.23	105.97	6953.24
107.25	6953.28	107.42	6953.28	108.03	6953.3	108.52	6953.32	109.28	6953.38
109.62	6953.41	109.93	6953.43	110.27	6953.47	110.73	6953.51	111.02	6953.53
111.68	6953.6	112.55	6953.68	113.33	6953.75	113.96	6953.81	114.11	6953.82
114.52	6953.86	114.89	6953.9	115.02	6953.91	115.6	6953.97	115.67	6953.97
116.42	6954.04	117.15	6954.11	117.23	6954.12	118.29	6954.21	119.2	6954.3
119.46	6954.31	119.72	6954.33	120.27	6954.35	121.09	6954.35	121.45	6954.34
122.07	6954.34	122.49	6954.33	123.23	6954.33	123.46	6954.32	123.72	6954.32

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   124.4 6954.31  124.78 6954.31  125.23  6954.3  125.57  6954.3  126.07 6954.29
   126.9 6954.29  128.48 6954.27  129.12 6954.27  129.28 6954.26  130.07 6954.26
  130.59 6954.25   130.9 6954.25  131.36 6954.24  132.84 6954.24  133.34 6954.25
   134.2 6954.25  134.67 6954.26  135.72 6954.26  135.89 6954.27  136.95 6954.27
  137.29 6954.28  138.42 6954.28  138.56 6954.29  141.98 6954.29  142.25  6954.3
  144.05  6954.3   144.3 6954.31  145.19 6954.31  145.76 6954.32  146.61 6954.32
  147.05 6954.33  148.32 6954.33  148.92 6954.34  150.13 6954.34  150.98 6954.35
  152.11 6954.35  152.43 6954.36  154.13 6954.36  154.62 6954.37  158.59 6954.37
  159.13 6954.39  159.31 6954.39  159.57  6954.4  160.03 6954.41  160.35 6954.42
  160.75 6954.42  161.31 6954.44  161.57 6954.44  162.18 6954.46  162.79 6954.47
   162.9 6954.48  163.05 6954.48  163.62 6954.49  164.33 6954.51  164.79 6954.52
  165.05 6954.53  165.24 6954.53  165.77 6954.55  166.29 6954.56  166.53 6954.56
  167.21 6954.58  167.68 6954.59  168.27 6954.61  168.64 6954.61   168.9 6954.62
  169.36 6954.63  169.66 6954.64  170.12 6954.65  171.59 6954.69  172.22 6954.71
   172.4 6954.71  173.42 6954.74  173.83 6954.75  174.68 6954.78  175.65 6954.81
  176.57 6954.83  176.76 6954.84  176.96 6954.84  177.87 6954.87  178.32 6954.88
  178.75  6954.9  178.99  6954.9  179.07 6954.91  179.26 6954.91  180.08 6954.94
  180.58 6954.95  180.75 6954.95  181.18 6954.97  181.34 6954.97   182.1 6954.99
  182.27    6955  182.74 6955.01  182.85 6955.02  183.37 6955.03  183.61 6955.04
  184.14 6955.05  184.36 6955.06  185.12 6955.08  185.56  6955.1  185.88  6955.1
  187.39 6955.15  188.15 6955.17  188.71 6955.19   188.9 6955.19  189.02  6955.2
  189.94 6955.23  190.43 6955.24  190.58 6955.25  191.02 6955.27   191.2 6955.27
  191.66 6955.29  191.97  6955.3   192.1 6955.31  192.74 6955.33  193.17 6955.35
   194.2 6955.38  194.32 6955.39  195.04 6955.41  195.33 6955.43  195.81 6955.44
  196.41 6955.47  196.58 6955.47  196.99 6955.49  197.34  6955.5  197.49 6955.51
  198.12 6955.53

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
  -48.02     .05   10.07    .035   66.52     .05

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
         10.07   66.52            60.05   60.05   60.05             .1       .3

CROSS SECTION


RIVER: UT_BSC2
REACH: NCONFL-BGM         RS: 4500

INPUT
Description: Source: Corrected Effective Topo
Datum: NGVD29
Coordinate
             System: NAVD88 Colorado State Planes Central, US Feet.
Station Elevation Data    num=     268
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
   33.56 6954.42   34.02 6954.42   34.16 6954.41    34.3  6954.4   35.03 6954.35
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35.16	6954.34	35.29	6954.33	36.05	6954.27	36.16	6954.26	36.27	6954.25
37.06	6954.2	37.16	6954.19	37.26	6954.18	38.07	6954.12	38.16	6954.11
38.25	6954.11	39.08	6954.04	39.16	6954.04	39.24	6954.03	40.09	6953.97
40.16	6953.96	40.23	6953.96	41.1	6953.89	41.16	6953.89	41.22	6953.88
42.11	6953.81	42.21	6953.81	43.12	6953.74	43.16	6953.73	43.2	6953.73
44.13	6953.66	44.19	6953.66	45.15	6953.58	45.18	6953.58	46.11	6953.51
46.17	6953.51	46.59	6953.47	47.16	6953.43	47.17	6953.43	48.14	6953.35
48.18	6953.35	49.13	6953.27	49.19	6953.27	50.12	6953.19	50.2	6953.19
51.11	6953.11	51.21	6953.11	52.1	6953.04	52.16	6953.03	52.22	6953.02
53.09	6952.89	53.16	6952.88	53.24	6952.87	54.08	6952.7	54.16	6952.68
54.25	6952.67	55.07	6952.5	55.16	6952.49	55.26	6952.47	56.06	6952.31
56.16	6952.29	56.27	6952.27	57.05	6952.11	57.16	6952.09	57.28	6952.07
58.04	6951.92	58.16	6951.89	58.29	6951.87	59.03	6951.72	59.16	6951.7
59.3	6951.67	60.02	6951.53	60.16	6951.5	60.31	6951.47	61	6951.33
61.16	6951.3	61.32	6951.27	61.99	6951.14	62.16	6951.1	62.34	6951.07
62.98	6950.94	63.16	6950.91	63.35	6950.87	63.97	6950.75	64.16	6950.71
64.36	6950.67	64.96	6950.55	65.16	6950.51	65.37	6950.46	65.95	6950.33
66.16	6950.28	66.38	6950.23	66.94	6950.09	67.16	6950.04	67.39	6949.99
67.93	6949.86	68.16	6949.8	68.4	6949.75	68.92	6949.63	69.16	6949.57
69.41	6949.51	69.91	6949.39	70.16	6949.33	70.42	6949.27	70.9	6949.16
71.16	6949.1	71.44	6949.03	71.89	6948.93	72.16	6948.86	72.45	6948.79
72.87	6948.69	73.16	6948.62	73.46	6948.55	73.86	6948.46	74.16	6948.39
74.47	6948.32	74.85	6948.23	75.16	6948.15	75.48	6948.08	75.84	6947.99
76.16	6947.92	76.34	6947.89	76.49	6947.87	76.83	6947.82	77.16	6947.77
77.5	6947.78	78.51	6947.78	78.81	6947.79	79.52	6947.79	79.8	6947.8
80.79	6947.8	81.16	6947.81	82.16	6947.81	82.56	6947.8	82.77	6947.79
83.16	6947.78	83.57	6947.78	83.76	6947.76	84.16	6947.76	84.58	6947.85
84.75	6947.89	85.16	6947.98	85.59	6948.07	85.73	6948.11	86.16	6948.2
86.6	6948.3	86.72	6948.33	87.16	6948.42	87.61	6948.52	87.71	6948.54
88.16	6948.64	88.63	6948.74	88.7	6948.76	89.16	6948.86	89.64	6948.93
89.69	6948.97	90.16	6949.04	90.65	6949.11	90.68	6949.12	91.16	6949.19
91.66	6949.26	91.67	6949.27	92.16	6949.34	92.66	6949.41	92.67	6949.41
93.16	6949.49	93.65	6949.56	93.68	6949.56	94.16	6949.64	94.64	6949.71
94.69	6949.71	95.16	6949.78	95.63	6949.85	95.7	6949.86	96.16	6949.93
96.62	6950	96.71	6950.02	97.16	6950.08	97.61	6950.15	97.73	6950.17
98.16	6950.23	98.59	6950.29	98.74	6950.32	99.16	6950.38	99.58	6950.44
99.75	6950.47	100.16	6950.53	100.57	6950.59	100.76	6950.62	101.16	6950.68
101.56	6950.74	101.77	6950.77	102.17	6950.83	102.55	6950.88	102.78	6950.92
103.17	6950.97	103.54	6951.03	103.79	6951.07	104.17	6951.12	104.53	6951.18
104.8	6951.22	105.17	6951.27	105.52	6951.32	105.81	6951.37	106.17	6951.42
106.51	6951.47	106.83	6951.52	107.17	6951.57	107.5	6951.62	107.55	6951.63
107.84	6951.67	108.17	6951.72	108.49	6951.76	108.85	6951.82	109.17	6951.87
109.48	6951.91	109.86	6951.97	110.17	6952.01	110.46	6952.06	110.87	6952.12
111.17	6952.16	111.45	6952.21	111.88	6952.27	112.17	6952.31	112.44	6952.34
112.89	6952.42	113.17	6952.45	113.43	6952.46	113.9	6952.48	114.17	6952.49
114.42	6952.5	114.92	6952.51	115.17	6952.52	115.41	6952.53	115.93	6952.55
116.17	6952.55	116.4	6952.56	116.94	6952.58	117.17	6952.59	117.39	6952.59
117.95	6952.61	118.17	6952.62	118.38	6952.63	118.96	6952.65	119.17	6952.65

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  119.37 6952.66  119.97 6952.68  120.17 6952.69  120.36 6952.69  120.98 6952.71
  121.17 6952.72  121.35 6952.72  121.99 6952.74  122.17 6952.75  122.34 6952.75
     123 6952.77  123.17 6952.77  123.32 6952.78  124.02  6952.8  124.31  6952.8
  125.03 6952.82  125.17 6952.82   125.3 6952.83  126.04 6952.85  126.29 6952.85
  126.61 6952.86  126.93 6952.87  127.51 6952.87

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
   33.56     .05   52.22    .035  112.89     .05

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
         52.22  112.89            90.12   91.85   93.21             .1       .3

CROSS SECTION


RIVER: UT_BSC2
REACH: NCONFL-BGM         RS: 4400

INPUT
Description: Source: Corrected Effective Topo
Datum: NGVD29
Coordinate
             System: NAVD88 Colorado State Planes Central, US Feet.
Station Elevation Data    num=     433
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
  -47.22 6953.61  -46.79 6953.61   -46.3  6953.6   -44.3  6953.6  -43.84 6953.59
  -41.75 6953.59   -41.3 6953.58   -39.3 6953.58  -38.88 6953.57  -34.69 6953.57
   -34.3 6953.58   -32.3 6953.58  -31.94 6953.59  -29.95 6953.59  -29.65  6953.6
  -27.64  6953.6   -27.3 6953.61   -25.3 6953.61  -24.99 6953.62  -23.01 6953.62
   -22.6 6953.63  -20.58 6953.63   -20.3 6953.64   -18.3 6953.64  -18.04 6953.65
  -16.06 6953.65  -15.54 6953.66  -14.08 6953.66  -13.53 6953.67  -11.51 6953.67
   -11.3 6953.68   -9.11 6953.68   -8.49 6953.69   -7.13 6953.69   -6.47  6953.7
   -6.14  6953.7   -5.46 6953.69    -5.3 6953.68   -5.15 6953.68   -4.46 6953.67
    -4.3 6953.66   -4.15 6953.66   -3.45 6953.64   -3.16 6953.64   -2.44 6953.62
   -2.17 6953.62   -1.43  6953.6    -1.3  6953.6   -1.18 6953.59    -.42 6953.58
     -.3 6953.58    -.18 6953.57     .58 6953.56      .7 6953.55     .81 6953.55
    1.59 6953.53    1.76 6953.53    2.37 6953.55    2.78 6953.56    3.11 6953.57
    3.68 6953.59    3.93 6953.59    4.25  6953.6    4.58 6953.61    5.08 6953.63
    5.31 6953.63    5.73 6953.65    6.05 6953.65    6.22 6953.66    6.78 6953.68
    6.85 6953.68    7.37 6953.69    7.51  6953.7    7.78  6953.7    8.25 6953.72
    8.51 6953.73    9.45 6953.75    9.66 6953.76    9.83 6953.76   10.45 6953.78
   10.81 6953.79   11.19  6953.8   11.87 6953.82   11.92 6953.82   11.95 6953.83
   12.05 6953.83   12.66 6953.85    13.1 6953.86   13.39 6953.87   13.92 6953.88
   14.13 6953.89   14.24 6953.89   14.65  6953.9   14.86 6953.91   15.39 6953.92
    15.6 6953.93   15.97 6953.94   16.33 6953.95   16.53 6953.96   17.07 6953.97
   17.25 6953.98   17.68 6953.99    17.8 6953.99   18.02    6954   18.54 6954.02
   18.83 6954.02   19.27 6954.04   19.85 6954.05   19.97 6954.06   20.07 6954.06
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20.74	6954.08	21.12	6954.09	21.48	6954.1	22.12	6954.12	22.26	6954.12
22.45	6954.13	22.95	6954.14	23.41	6954.16	23.68	6954.16	24.16	6954.18
24.41	6954.19	24.56	6954.19	25.05	6954.2	25.15	6954.21	25.7	6954.22
25.88	6954.23	26.21	6954.24	26.62	6954.25	26.85	6954.26	27.35	6954.27
27.65	6954.28	27.99	6954.29	28.09	6954.29	28.26	6954.3	28.82	6954.31
29.56	6954.31	30.25	6954.25	30.31	6954.25	30.69	6954.22	30.85	6954.2
31.51	6954.12	31.8	6954.09	32.23	6954.04	32.51	6954.01	32.75	6953.98
33.29	6953.92	33.51	6953.89	33.7	6953.87	34.35	6953.8	34.51	6953.78
34.66	6953.76	35.41	6953.68	35.61	6953.66	36.46	6953.56	36.51	6953.55
36.56	6953.55	37.41	6953.45	37.51	6953.44	37.52	6953.44	38.46	6953.35
38.52	6953.34	38.58	6953.34	39.33	6953.27	39.41	6953.26	39.52	6953.25
39.63	6953.23	40.36	6953.16	40.52	6953.15	40.69	6953.13	41.31	6953.07
41.52	6953.05	41.75	6953.03	42.26	6952.98	42.52	6952.95	42.81	6952.92
43.21	6952.88	43.52	6952.85	43.86	6952.82	44.17	6952.79	44.52	6952.76
44.92	6952.7	45.12	6952.67	45.53	6952.61	45.98	6952.51	46.07	6952.49
46.53	6952.39	47.02	6952.28	47.04	6952.27	47.53	6952.16	47.97	6952.06
48.09	6952.03	48.53	6951.94	48.92	6951.85	49.15	6951.8	49.53	6951.71
49.87	6951.64	50.21	6951.56	50.53	6951.49	50.82	6951.42	51.27	6951.32
51.53	6951.27	51.77	6951.21	52.32	6951.09	52.53	6951.04	52.73	6951
53.38	6950.85	53.54	6950.82	53.68	6950.79	54.44	6950.62	54.54	6950.6
54.63	6950.58	55.5	6950.38	55.54	6950.37	55.58	6950.37	56.32	6950.2
56.53	6950.15	56.55	6950.15	57.48	6949.94	57.54	6949.93	57.61	6949.91
58.43	6949.73	58.54	6949.71	58.67	6949.68	59.38	6949.52	59.54	6949.48
59.72	6949.44	60.33	6949.31	60.55	6949.26	60.78	6949.21	61.28	6949.1
61.55	6949.04	61.84	6948.97	62.24	6948.88	62.55	6948.82	62.9	6948.74
63.19	6948.67	63.55	6948.59	63.95	6948.5	64.14	6948.46	64.55	6948.37
65.01	6948.27	65.09	6948.25	65.55	6948.15	66.04	6948.04	66.07	6948.03
66.55	6947.92	66.99	6947.83	67.13	6947.8	67.56	6947.7	67.94	6947.62
68.18	6947.56	68.56	6947.48	68.89	6947.4	69.24	6947.33	69.56	6947.26
69.84	6947.19	70.3	6947.09	70.56	6947.03	70.8	6946.98	71.36	6946.86
71.56	6946.81	71.75	6946.77	72.41	6946.62	72.56	6946.59	72.7	6946.56
73.47	6946.39	73.56	6946.37	73.65	6946.35	74.53	6946.15	74.57	6946.14
74.6	6946.14	75.11	6946.02	75.24	6945.99	75.55	6945.92	75.59	6945.92
76.5	6945.71	76.57	6945.7	76.64	6945.68	77.45	6945.57	77.57	6945.55
77.7	6945.52	78.4	6945.41	78.57	6945.38	78.76	6945.35	79.35	6945.25
79.57	6945.21	79.82	6945.17	80.31	6945.09	80.57	6945.04	80.87	6945.06
81.26	6945.06	81.58	6945.08	81.93	6945.19	82.21	6945.27	82.58	6945.38
82.99	6945.5	83.16	6945.55	83.58	6945.67	84.04	6945.8	84.11	6945.82
84.58	6945.96	85.06	6946.1	85.1	6946.11	85.58	6946.25	86.01	6946.38
86.16	6946.42	86.58	6946.55	86.96	6946.66	87.22	6946.73	87.58	6946.84
87.91	6946.93	88.27	6947.04	88.59	6947.13	88.87	6947.21	89.33	6947.35
89.59	6947.42	89.82	6947.49	90.39	6947.66	90.59	6947.72	90.77	6947.77
91.45	6947.97	91.59	6948.01	91.72	6948.05	92.5	6948.28	92.59	6948.3
92.67	6948.32	93.56	6948.58	93.62	6948.6	94.15	6948.76	94.57	6948.88
94.59	6948.89	94.62	6948.89	95.52	6949.16	95.6	6949.18	95.68	6949.2
96.47	6949.44	96.6	6949.47	96.73	6949.51	97.42	6949.71	97.6	6949.76
97.79	6949.82	98.38	6949.99	98.6	6950.06	98.65	6950.07	98.85	6950.13
99.33	6950.27	99.6	6950.35	99.91	6950.44	100.28	6950.55	100.6	6950.65

```
  100.96 6950.76  101.23 6950.86   101.6 6950.97  102.02 6951.12  102.18 6951.17
   102.6 6951.31  103.08 6951.47  103.13 6951.49  103.61 6951.65  104.08 6951.77
  104.13 6951.81  104.61 6951.93  105.98 6951.93  106.25 6951.94  107.61 6951.94
  107.89 6951.95  109.42 6951.95  109.61 6951.96  110.74 6951.96  111.54 6951.97
  112.64 6951.97  113.06 6951.98  114.54 6951.98  114.62 6951.99  115.77 6951.99
  116.45    6952  117.88    6952  118.35 6952.01  119.63 6952.01     120 6952.02
   121.2 6952.02  121.63 6952.03   123.1 6952.03  123.17 6952.04  124.64 6952.04
     125 6952.05  125.96 6952.05  126.34 6952.06  126.91 6952.06   127.4 6952.07
  127.86 6952.07  128.45 6952.08  128.81 6952.08  129.51 6952.09  129.76 6952.09
  130.57  6952.1  130.71  6952.1  131.63 6952.11  131.98 6952.11  132.61 6952.12
  132.68 6952.12  133.56 6952.13  133.74 6952.13  134.52 6952.14  135.47 6952.14
  135.65 6952.15  136.42 6952.15  136.65 6952.16  137.37 6952.16  137.65 6952.17
  138.66 6952.17  139.03 6952.18  139.66 6952.18  140.09 6952.19  140.66 6952.19
  141.14  6952.2  141.66  6952.2  142.12 6952.21  142.66 6952.21  143.07 6952.22
  143.66 6952.22  144.03 6952.23  144.66 6952.23  144.98 6952.24  145.93 6952.24
  146.43 6952.25  146.88 6952.25  147.49 6952.26  147.83 6952.26  148.54 6952.27
  148.78 6952.27   149.6 6952.28  149.99 6952.28

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
  -47.22     .05   44.52    .035  104.61     .05

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
         44.52  104.61           126.25  112.69  105.25             .1       .3
Ineffective Flow     num=       1
   Sta L   Sta R    Elev  Permanent
  -47.22    4.43 6945.81       T

CROSS SECTION


RIVER: UT_BSC2
REACH: NCONFL-BGM         RS: 4300

INPUT
Description: Source: Corrected Effective Topo
Datum: NGVD29
Coordinate
             System: NAVD88 Colorado State Planes Central, US Feet.
Station Elevation Data    num=     492
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
 -124.14 6951.97 -123.19 6951.95 -123.09 6951.95 -122.22 6951.93 -122.06 6951.93
 -121.25 6951.91 -121.03 6951.91 -119.99 6951.88 -119.64 6951.88 -118.64 6951.85
 -118.35 6951.85 -117.64 6951.83 -117.38 6951.83  -116.9 6951.82 -116.64 6951.81
 -116.41 6951.81 -115.86 6951.79 -115.44 6951.79 -114.83 6951.77 -114.64 6951.77
 -114.47 6951.76 -113.64 6951.75  -113.5 6951.74 -112.76 6951.73 -112.53 6951.72
 -111.73 6951.71 -111.56  6951.7  -110.7 6951.68 -110.59 6951.68 -109.66 6951.66
 -108.91 6951.65 -108.63 6951.64 -106.71  6951.6 -106.56 6951.59 -105.74 6951.58
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-105.64 6951.57 -104.77 6951.56 -104.64 6951.55  -103.8 6951.54 -102.83 6951.51
-102.43 6951.51 -101.86 6951.49 -101.64 6951.49  -101.4 6951.48 -100.89 6951.47
-100.63 6951.47  -99.92 6951.45  -99.63 6951.45  -98.63 6951.42   -98.3 6951.42
 -97.27 6951.39  -97.01 6951.39  -96.23 6951.37  -96.04 6951.37   -95.2 6951.35
 -95.07 6951.35  -92.63  6951.3  -92.16 6951.28  -91.19 6951.26  -91.07 6951.26
 -90.22 6951.24  -90.03 6951.24  -89.25 6951.22     -89 6951.22  -87.97 6951.19
 -87.63 6951.19  -86.93 6951.17  -86.63 6951.17   -85.9 6951.15  -85.63 6951.14
 -85.37 6951.14  -84.87 6951.13  -84.63 6951.12   -84.4 6951.12  -83.83 6951.11
 -83.63  6951.1  -83.43  6951.1   -82.8 6951.08  -82.46 6951.08  -81.77 6951.06
 -81.49 6951.06  -80.73 6951.04  -80.52 6951.03  -79.62 6951.02  -79.55 6951.01
 -77.62 6950.99  -77.61 6950.98  -77.27 6950.98   -76.6 6950.97  -74.62 6950.95
 -74.54 6950.94  -73.73 6950.93   -73.5 6950.93  -72.76 6950.92  -72.47 6950.92
 -71.62 6950.91  -71.44  6950.9  -70.82 6950.89   -70.4 6950.89  -69.85 6950.88
 -69.37 6950.88  -68.88 6950.87  -68.62 6950.87  -68.34 6950.86  -67.91 6950.86
 -67.62 6950.85   -67.3 6950.85  -66.94 6950.84  -66.62 6950.84  -66.27 6950.83
 -65.62 6950.83  -65.24 6950.82     -65 6950.82  -64.62 6950.81   -64.2 6950.81
 -64.03  6950.8  -63.62  6950.8  -63.17 6950.79  -62.62 6950.79  -61.62 6950.77
  -61.1 6950.77  -60.16 6950.75  -59.61 6950.75  -58.61 6950.73  -58.22 6950.73
    -58 6950.72  -57.61 6950.72  -57.25 6950.71  -56.61 6950.71  -56.28  6950.7
 -55.94  6950.7  -55.61 6950.69  -55.31 6950.69  -54.91 6950.68  -54.34 6950.68
 -53.87 6950.67  -53.61 6950.67  -53.37 6950.66  -52.84 6950.66  -52.61 6950.65
  -52.4 6950.65  -51.81 6950.64  -51.43 6950.64  -50.77 6950.63  -49.49 6950.63
 -48.71 6950.62  -47.55 6950.62  -46.64 6950.61  -45.61 6950.61  -44.64  6950.6
 -43.54  6950.6   -42.7 6950.59  -41.47 6950.59  -40.76 6950.58  -38.82 6950.58
  -38.6 6950.57   -36.6 6950.57  -36.31 6950.56   -34.6 6950.56  -34.24 6950.55
  -32.6 6950.55  -32.18 6950.54   -30.6 6950.54  -30.11 6950.53  -28.15 6950.53
 -28.04 6950.52   -26.6 6950.52  -26.21 6950.51  -24.94 6950.51   -24.6  6950.5
 -23.91  6950.5   -23.6 6950.49  -22.33 6950.49  -21.84 6950.48  -21.36 6950.48
 -20.81 6950.47  -19.78 6950.47  -19.59 6950.46  -18.45 6950.46  -17.71 6950.45
 -17.48 6950.45  -16.68 6950.44  -15.65 6950.43  -14.57 6950.43  -13.98 6950.42
 -13.58 6950.42  -11.66  6950.4  -10.59  6950.4  -10.48 6950.39   -9.45 6950.39
  -8.75 6950.38   -8.41 6950.38   -7.78 6950.37   -6.81 6950.37   -6.59 6950.36
  -5.59 6950.36   -5.31 6950.35   -4.88 6950.35   -4.59 6950.34   -4.28 6950.34
  -3.91 6950.33   -3.25 6950.33   -2.94 6950.32   -2.59 6950.32   -2.21 6950.31
  -1.97 6950.31   -1.59  6950.3   -1.18  6950.3      -1 6950.29    -.59 6950.29
    .42 6950.27     .94 6950.27    2.42 6950.24    2.95 6950.24    3.85 6950.22
   4.42 6950.22    4.82 6950.21    5.02 6950.21    5.42  6950.2    5.79  6950.2
   6.05 6950.19    6.42 6950.19    6.76 6950.18    7.08 6950.18    7.42 6950.17
   7.73 6950.17    8.12 6950.16    8.42 6950.16     8.7 6950.15    9.15 6950.15
   9.42 6950.14    9.67 6950.14   10.18 6950.13   10.64 6950.13   11.22 6950.12
  11.42 6950.11   11.61 6950.11   12.25  6950.1   12.58  6950.1   13.42 6950.09
  13.55 6950.08   14.32 6950.07   14.52 6950.07   15.49 6950.06   16.38 6950.04
  17.42 6950.03   17.66 6950.03    18.4 6950.01   20.43 6949.99   20.52 6949.98
  21.31 6949.97   21.55 6949.97   22.28 6949.96   22.58 6949.95   23.25 6949.94
  23.62 6949.94   24.22 6949.93   24.43 6949.93   24.65 6949.92   25.19 6949.92
  25.43 6949.91   25.68 6949.91   26.16  6949.9   26.71  6949.9   27.43 6949.88
   28.1 6949.88   28.43 6949.87   28.78 6949.87   29.07 6949.86   29.43 6949.86
  29.81 6949.85   30.04 6949.85   30.43 6949.84   30.85 6949.84   31.01 6949.83
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31.43	6949.83	32.43	6949.81	32.95	6949.81	34.43	6949.78	34.94	6949.78
35.44	6949.77	35.83	6949.77	36.1	6949.76	36.71	6949.76	37.11	6949.75
37.28	6949.74	37.59	6949.74	38.46	6949.72	39.36	6949.71	39.63	6949.7
40.25	6949.69	40.49	6949.69	41.13	6949.67	41.5	6949.67	42.51	6949.65
42.9	6949.64	43.16	6949.64	43.52	6949.63	43.79	6949.63	44.34	6949.62
44.67	6949.61	45.52	6949.59	46.55	6949.58	46.69	6949.57	47.33	6949.56
47.56	6949.56	48.21	6949.54	48.57	6949.54	49.58	6949.52	49.98	6949.51
50.22	6949.51	50.59	6949.5	50.87	6949.5	51.4	6949.49	52.58	6949.46
52.82	6949.45	53.62	6949.37	54.63	6949.15	55.64	6948.92	56.1	6948.82
56.17	6948.8	56.65	6948.7	57.28	6948.56	57.66	6948.47	58.83	6948.22
59.95	6947.97	60.69	6947.8	60.81	6947.78	61.7	6947.58	61.99	6947.52
62.37	6947.43	62.71	6947.36	63.16	6947.25	63.25	6947.24	63.72	6947.13
64.14	6947.04	64.34	6946.99	64.73	6946.91	65.02	6946.84	65.74	6946.68
65.91	6946.65	66.69	6946.47	67.08	6946.39	67.76	6946.24	67.87	6946.21
68.56	6946.06	69.44	6945.86	69.78	6945.79	70.22	6945.69	70.33	6945.68
70.79	6945.57	71.21	6945.49	72.1	6945.31	72.58	6945.21	72.81	6945.17
72.98	6945.13	73.75	6944.98	73.82	6944.97	74.75	6944.78	74.83	6944.77
75.84	6944.57	76.11	6944.51	76.85	6944.37	77.41	6944.25	77.86	6944.16
78.29	6944.08	78.46	6944.04	79.64	6943.81	79.88	6943.76	80.81	6943.61
80.95	6943.59	81.35	6943.61	81.99	6943.65	83.17	6943.7	83.6	6943.73
83.92	6943.74	84.48	6943.77	85.37	6943.81	85.94	6943.84	86.25	6943.86
87.14	6943.9	87.96	6943.92	88.48	6944.02	88.91	6944.11	89.79	6944.3
90.23	6944.39	91.4	6944.65	91.56	6944.68	92.45	6944.88	92.58	6944.9
93.01	6945	94.22	6945.26	94.93	6945.42	95.1	6945.45	95.61	6945.57
96.04	6945.66	96.11	6945.67	97.28	6945.93	97.75	6946.03	98.46	6946.19
98.64	6946.22	99.07	6946.32	99.52	6946.42	99.64	6946.44	100.08	6946.54
100.81	6946.7	101.29	6946.8	101.99	6946.95	102.18	6947	102.48	6947.06
103.17	6947.21	103.95	6947.38	104.34	6947.47	104.83	6947.57	105.13	6947.64
105.52	6947.72	105.72	6947.77	107.15	6948.08	107.49	6948.15	107.87	6948.24
108.37	6948.34	109.05	6948.49	109.26	6948.54	109.88	6948.67	110.23	6948.75
111.03	6948.92	111.19	6948.96	111.4	6949	111.91	6949.12	112.58	6949.26
112.79	6949.31	113.68	6949.5	114.22	6949.62	114.93	6949.77	115.45	6949.89
116.11	6950.03	116.33	6950.08	117.01	6950.19	117.29	6950.23	118.26	6950.3
118.46	6950.3	118.99	6950.31	119.64	6950.31	119.87	6950.32	121.64	6950.32
121.99	6950.33	123.41	6950.33	124.14	6950.34	125.52	6950.34	126.07	6950.35
127.35	6950.35	127.83	6950.36	129.37	6950.36	129.6	6950.37	131.41	6950.37
132.26	6950.38	132.58	6950.38	133.14	6950.39	133.76	6950.39	134.03	6950.4
134.42	6950.4	134.91	6950.41	134.93	6950.4	135.43	6950.41	136.11	6950.41
136.44	6950.42	136.68	6950.42	137.29	6950.43	137.57	6950.43	139.34	6950.45
139.64	6950.45	140.22	6950.46	140.82	6950.46	141.11	6950.47	141.49	6950.47
141.99	6950.48	142.5	6950.48	142.87	6950.49	143.51	6950.49	143.76	6950.5
144.52	6950.5	144.64	6950.51	145.52	6950.52	146.41	6950.52	146.54	6950.53
147.3	6950.53	147.55	6950.54	148.18	6950.54	148.56	6950.55	149.07	6950.55
149.57	6950.56	150.01	6950.56						

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
-124.14	.05	52.82	.035	118.46	.05

```
Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
         52.82  118.46            30.91   33.98   43.47             .1       .3
Ineffective Flow     num=       1
   Sta L   Sta R    Elev  Permanent
 -124.14     5.3 6945.81       T

CROSS SECTION


RIVER: UT_BSC2
REACH: NCONFL-BGM         RS: 4250

INPUT
Description: Source: Corrected Effective Topo
Datum: NGVD29
Coordinate
             System: NAVD88 Colorado State Planes Central, US Feet.
Station Elevation Data    num=     491
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
 -147.06  6951.4 -146.68  6951.4 -146.54 6951.39 -145.86 6951.38 -145.49 6951.37
  -144.9 6951.36 -144.68 6951.35 -144.44 6951.35 -143.94 6951.34  -143.4 6951.32
 -142.98 6951.31 -142.68 6951.31 -142.02 6951.29 -141.68 6951.29 -140.68 6951.26
 -140.26 6951.26 -140.11 6951.25 -137.68  6951.2 -137.12 6951.19 -136.27 6951.17
 -136.07 6951.16 -135.67 6951.16 -134.67 6951.13 -134.35 6951.13 -133.67 6951.11
 -133.39 6951.11 -132.93  6951.1 -132.67 6951.09 -132.43 6951.09 -131.88 6951.07
 -131.67 6951.07 -131.47 6951.06 -130.67 6951.05 -130.52 6951.04 -129.79 6951.03
 -129.56 6951.02 -128.74 6951.01  -128.6    6951  -127.7 6950.98    -127 6950.97
 -126.65 6950.96 -125.72 6950.94  -125.6 6950.94 -124.76 6950.92 -124.56 6950.91
  -123.8  6950.9 -123.51 6950.89 -122.84 6950.88 -121.88 6950.86 -121.66 6950.85
 -121.42 6950.85 -120.92 6950.84 -120.37 6950.82 -119.97 6950.81 -119.66 6950.81
 -119.01 6950.79 -118.66 6950.79 -118.05 6950.77 -117.23 6950.75 -117.09 6950.75
 -114.65  6950.7 -114.09 6950.69 -113.25 6950.67 -113.04 6950.66 -112.65 6950.66
 -111.65 6950.63 -111.33 6950.63 -110.65 6950.61 -110.37 6950.61  -109.9  6950.6
 -109.42 6950.58 -108.86 6950.57 -108.65 6950.57 -108.46 6950.56 -107.65 6950.55
  -107.5 6950.54 -106.76 6950.53 -106.54 6950.52 -105.72  6950.5 -105.58  6950.5
 -104.67 6950.48 -104.09 6950.47  -102.7 6950.44 -102.58 6950.44 -101.74 6950.42
 -101.53 6950.41 -100.78  6950.4 -100.48 6950.39  -99.64 6950.38  -99.44 6950.37
  -98.87 6950.37  -98.64 6950.36  -98.39 6950.36  -97.91 6950.35  -97.34 6950.35
  -96.95 6950.34  -96.64 6950.34   -96.3 6950.33  -95.99 6950.33  -95.64 6950.32
  -95.25 6950.32  -95.03 6950.31  -94.63 6950.31   -94.2  6950.3  -93.63  6950.3
  -92.63 6950.28  -92.11 6950.28  -91.19 6950.26  -90.63 6950.26  -90.23 6950.25
  -90.02 6950.25  -89.63 6950.24  -89.28 6950.24  -88.97 6950.23  -88.63 6950.23
  -88.32 6950.22  -87.92 6950.22  -87.63 6950.21  -87.36 6950.21  -86.88  6950.2
   -86.4  6950.2  -85.83 6950.19  -85.44 6950.19  -84.78 6950.18  -84.48 6950.17
  -83.74 6950.16  -83.52 6950.16  -82.56 6950.15  -81.64 6950.13  -81.18 6950.13
   -80.6 6950.12  -79.55 6950.11  -78.73 6950.09   -78.5 6950.09  -77.77 6950.08
  -77.46 6950.08  -76.81 6950.07  -76.41 6950.06  -75.85 6950.06  -75.62 6950.05
```

-75.36	6950.05	-74.89	6950.04	-74.62	6950.04	-74.32	6950.03	-73.61	6950.03
-73.27	6950.02	-72.97	6950.02	-72.61	6950.01	-72.22	6950.01	-72.01	6950
-71.61	6950	-70.61	6949.98	-70.09	6949.98	-69.14	6949.96	-68.61	6949.96
-67.61	6949.94	-66.99	6949.94	-66.61	6949.93	-66.26	6949.93	-65.94	6949.92
-65.61	6949.92	-65.3	6949.91	-64.9	6949.91	-64.61	6949.9	-64.34	6949.9
-63.85	6949.89	-63.38	6949.89	-62.8	6949.88	-62.42	6949.87	-61.76	6949.86
-61.46	6949.86	-60.71	6949.85	-60.5	6949.85	-59.66	6949.84	-58.59	6949.83
-58.26	6949.82	-57.57	6949.81	-55.71	6949.79	-55.48	6949.79	-54.75	6949.78
-54.43	6949.78	-53.79	6949.77	-53.38	6949.77	-52.83	6949.76	-52.59	6949.76
-52.34	6949.75	-51.87	6949.75	-51.59	6949.74	-50.91	6949.74	-50.59	6949.73
-50.24	6949.73	-49.95	6949.72	-49.59	6949.72	-49	6949.71	-48.15	6949.69
-48.04	6949.69	-47.1	6949.67	-47.08	6949.66	-46.59	6949.65	-45.59	6949.61
-45.16	6949.6	-45.01	6949.59	-44.59	6949.58	-43.96	6949.55	-42.92	6949.52
-42.58	6949.5	-41.87	6949.48	-41.32	6949.46	-40.82	6949.45	-40.58	6949.44
-40.36	6949.44	-39.78	6949.41	-39.4	6949.41	-38.45	6949.38	-37.68	6949.37
-36.53	6949.36	-35.59	6949.34	-35.35	6949.34	-34.61	6949.33	-33.65	6949.32
-33.5	6949.31	-32.69	6949.3	-32.45	6949.3	-31.57	6949.29	-31.4	6949.28
-30.77	6949.27	-30.36	6949.27	-29.81	6949.26	-29.57	6949.26	-29.31	6949.25
-28.86	6949.25	-28.57	6949.24	-28.26	6949.24	-27.9	6949.23	-27.57	6949.23
-27.22	6949.22	-26.94	6949.22	-26.57	6949.21	-26.17	6949.21	-25.98	6949.2
-25.57	6949.2	-24.57	6949.18	-24.08	6949.18	-24.06	6949.17	-23.57	6949.17
-22.57	6949.15	-22.14	6949.15	-21.98	6949.14	-21.56	6949.14	-21.18	6949.13
-20.94	6949.13	-20.56	6949.12	-20.22	6949.12	-19.89	6949.11	-19.56	6949.11
-18.84	6949.09	-18.31	6949.09	-17.79	6949.08	-17.56	6949.07	-17.35	6949.07
-16.56	6949.06	-16.39	6949.05	-15.7	6949.04	-15.43	6949.04	-14.65	6949.03
-14.47	6949.02	-13.51	6949.01	-12.56	6948.99	-11.51	6948.98	-10.63	6948.96
-9.67	6948.95	-9.42	6948.95	-8.72	6948.93	-8.37	6948.93	-7.76	6948.92
-7.55	6948.92	-7.33	6948.91	-6.8	6948.9	-6.28	6948.9	-5.55	6948.88
-5.23	6948.88	-4.88	6948.87	-4.55	6948.87	-4.19	6948.86	-3.92	6948.86
-3.55	6948.85	-3.14	6948.85	-2.96	6948.84	-2.55	6948.84	-1.05	6948.81
-.54	6948.81	.88	6948.78	1.46	6948.77	1.83	6948.77	2.09	6948.76
2.46	6948.76	2.79	6948.75	3.14	6948.75	3.46	6948.74	3.75	6948.74
4.19	6948.73	4.46	6948.73	4.71	6948.72	5.23	6948.71	5.67	6948.71
6.28	6948.7	6.46	6948.69	7.33	6948.68	7.59	6948.68	8.37	6948.66
9.51	6948.65	10.47	6948.63	11.42	6948.62	11.51	6948.61	12.56	6948.6
13.34	6948.59	13.47	6948.58	14.3	6948.57	14.65	6948.57	15.26	6948.56
15.47	6948.55	15.7	6948.55	16.22	6948.54	16.47	6948.54	16.75	6948.53
17.18	6948.53	17.47	6948.52	17.79	6948.52	18.47	6948.5	19.1	6948.5
19.89	6948.48	20.48	6948.47	20.94	6948.47	21.01	6948.46	21.48	6948.46
22.92	6948.43	23.48	6948.43	23.88	6948.42	24.09	6948.42	24.83	6948.4
25.14	6948.4	25.48	6948.39	25.79	6948.39	26.2	6948.38	26.48	6948.38
26.74	6948.37	27.25	6948.37	27.48	6948.36	27.7	6948.36	28.48	6948.35
28.65	6948.34	29.35	6948.33	29.61	6948.33	30.4	6948.32	30.56	6948.31
31.49	6948.3	31.52	6948.29	32.2	6948.23	32.48	6948.21	32.5	6948.2
33.43	6948.04	34.39	6947.88	34.49	6947.86	35.34	6947.72	35.49	6947.69
36.71	6947.48	37.25	6947.39	37.49	6947.34	37.76	6947.3	38.5	6947.17
38.81	6947.12	39.86	6946.94	40.12	6946.89	40.91	6946.76	41.5	6946.65
42.5	6946.48	42.99	6946.4	43.02	6946.39	43.5	6946.31	43.94	6946.23

```
    44.5 6946.14    45.5 6945.96   46.17 6945.85    46.5 6945.79   46.81 6945.74
   47.76 6945.58   48.72 6945.41   49.33 6945.31   49.51 6945.27   49.67 6945.25
   50.38 6945.13   50.51  6945.1   51.43 6944.94   52.48 6944.74    53.5 6944.54
   53.53 6944.53   54.45 6944.35   54.58 6944.32   55.52 6944.14   55.63 6944.11
   56.52 6943.94   56.69  6943.9   57.74  6943.7   58.52 6943.54   58.79 6943.49
   59.52 6943.34   59.84 6943.28   60.52 6943.14   61.14 6943.02   61.52 6942.94
   61.94 6942.91    62.1 6942.91   62.52 6942.87   62.99  6942.9   63.52 6942.92
   64.53 6942.98   64.96    6943    65.1    6943   65.53 6943.03   65.92 6943.04
   66.53 6943.07   66.87 6943.09    67.2  6943.1   67.53 6943.12   68.53 6943.16
    69.3 6943.28   69.53 6943.31   70.35 6943.51   70.69  6943.6   71.41 6943.77
   71.53 6943.81   71.65 6943.83   72.46 6944.03   72.61 6944.07   73.43 6944.27
   73.51 6944.29   73.56 6944.31   74.09 6944.44   74.52 6944.54   75.47 6944.78
   75.61 6944.81   76.43 6945.02   76.54 6945.04   77.54 6945.29   77.71 6945.33
   78.54 6945.54   78.76  6945.6   79.29 6945.72   79.54 6945.79   79.82 6945.85
   80.25 6945.95    81.2 6946.18   81.92 6946.35   82.16 6946.41   82.97  6946.6
   83.12 6946.63   83.55 6946.74   84.55 6946.97   85.07  6947.1   85.98 6947.31
   86.12 6947.35   86.94 6947.54   87.55 6947.69   88.23 6947.85   88.55 6947.92
   89.28 6948.09    89.8 6948.22   90.33 6948.34   90.76 6948.45   91.56 6948.63
   91.71 6948.67   92.56 6948.87   93.48 6949.05   94.54 6949.11   95.03 6949.14
   95.54 6949.16   95.59 6949.17   96.49 6949.21   96.64 6949.22   97.45 6949.26
   97.69 6949.28    98.4 6949.31   98.74 6949.33   99.79 6949.38  100.31 6949.37
  100.57 6949.38   101.9 6949.38  102.22 6949.37  104.14 6949.37  104.57 6949.36
  105.22 6949.36

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
 -147.06     .05   31.52    .035   93.48     .05

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
         31.52   93.48            91.84   91.84   91.84             .1       .3
Ineffective Flow     num=       1
   Sta L   Sta R    Elev  Permanent
 -147.06     -.5 6945.81       T

CROSS SECTION


RIVER: UT_BSC2
REACH: NCONFL-BGM         RS: 4150

INPUT
Description: Source: Corrected Effective Topo
Datum: NGVD29
Coordinate
             System: NAVD88 Colorado State Planes Central, US Feet.
Station Elevation Data    num=     492
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
  -88.61 6949.58  -88.32 6949.57  -87.48 6949.56  -87.35 6949.55  -86.58 6949.54
```

-86.38	6949.54	-85.55	6949.52	-85.41	6949.52	-84.51	6949.5	-84.44	6949.5
-82.51	6949.46	-81.54	6949.45	-81.48	6949.44	-80.47	6949.43	-80.38	6949.42
-79.6	6949.41	-79.34	6949.4	-78.63	6949.38	-78.31	6949.38	-77.66	6949.36
-77.47	6949.36	-77.27	6949.35	-76.69	6949.34	-76.47	6949.33	-76.24	6949.33
-75.72	6949.32	-75.21	6949.3	-74.75	6949.29	-74.47	6949.29	-73.47	6949.26
-73.14	6949.26	-72.1	6949.23	-71.85	6949.23	-71.07	6949.21	-70.88	6949.2
-70.47	6949.2	-70.04	6949.19	-69.91	6949.18	-69	6949.16	-67	6949.12
-66.93	6949.11	-66.03	6949.09	-65.9	6949.09	-65.06	6949.07	-64.87	6949.07
-64.09	6949.05	-63.47	6949.03	-63.12	6949.03	-62.15	6949	-61.76	6949
-61.18	6948.98	-60.73	6948.97	-60.46	6948.96	-60.21	6948.96	-59.7	6948.95
-59.46	6948.94	-59.25	6948.94	-58.66	6948.92	-58.46	6948.92	-58.28	6948.91
-57.63	6948.9	-57.46	6948.9	-57.31	6948.89	-56.59	6948.88	-56.34	6948.87
-55.56	6948.85	-55.37	6948.85	-54.53	6948.83	-54.4	6948.83	-53.49	6948.8
-51.49	6948.76	-51.42	6948.76	-50.52	6948.74	-50.39	6948.73	-49.55	6948.71
-49.36	6948.71	-48.58	6948.69	-48.32	6948.69	-47.62	6948.67	-47.46	6948.67
-47.29	6948.66	-46.65	6948.65	-46.46	6948.64	-46.25	6948.64	-45.68	6948.62
-45.46	6948.62	-45.22	6948.61	-44.71	6948.6	-44.46	6948.6	-44.19	6948.59
-43.74	6948.58	-43.46	6948.57	-43.15	6948.57	-42.77	6948.56	-41.8	6948.53
-41.45	6948.53	-40.83	6948.51	-40.05	6948.49	-39.86	6948.49	-39.02	6948.47
-38.89	6948.47	-37.98	6948.45	-37.45	6948.45	-36.95	6948.44	-36.45	6948.44
-35.45	6948.42	-34.88	6948.42	-34.45	6948.41	-33.85	6948.41	-33.45	6948.4
-33.08	6948.4	-32.45	6948.38	-32.11	6948.38	-31.45	6948.36	-31.14	6948.36
-30.75	6948.35	-30.45	6948.35	-30.17	6948.34	-29.71	6948.33	-29.45	6948.33
-29.2	6948.32	-28.68	6948.31	-28.45	6948.31	-28.23	6948.3	-27.64	6948.29
-27.45	6948.29	-27.26	6948.28	-26.61	6948.27	-26.29	6948.27	-25.58	6948.25
-25.32	6948.25	-24.54	6948.23	-24.36	6948.23	-23.51	6948.21	-23.39	6948.21
-21.57	6948.17	-21.44	6948.17	-19.51	6948.13	-19.37	6948.13	-18.54	6948.11
-18.34	6948.11	-17.57	6948.1	-17.44	6948.09	-17.3	6948.09	-16.6	6948.08
-16.44	6948.07	-16.27	6948.07	-15.63	6948.06	-15.44	6948.05	-15.24	6948.05
-14.66	6948.04	-14.44	6948.04	-14.2	6948.03	-13.69	6948.02	-13.44	6948.02
-13.17	6948.01	-12.73	6948	-12.44	6948	-11.76	6947.98	-11.44	6947.98
-11.1	6947.97	-10.79	6947.97	-10.07	6947.95	-9.82	6947.95	-9.03	6947.93
-8.85	6947.93	-8	6947.91	-7.88	6947.91	-4	6947.83	-3.86	6947.83
-3.03	6947.81	-2.83	6947.81	-2.43	6947.8	-2.06	6947.8	-1.43	6947.78
-1.1	6947.78	-.43	6947.76	-.13	6947.76	.27	6947.75	.57	6947.75
.84	6947.74	1.31	6947.73	1.57	6947.73	1.81	6947.72	2.34	6947.71
2.57	6947.71	2.78	6947.7	3.38	6947.69	3.57	6947.69	3.75	6947.68
4.41	6947.67	4.65	6947.67	4.72	6947.66	5.46	6947.65	5.67	6947.65
6.51	6947.63	6.63	6947.63	7.56	6947.61	7.8	6947.6	8.61	6947.59
9.49	6947.57	9.67	6947.57	10.45	6947.55	10.72	6947.55	11.4	6947.53
11.77	6947.53	12.36	6947.51	12.82	6947.51	13.31	6947.49	13.58	6947.49
13.87	6947.48	14.27	6947.46	15.22	6947.43	15.58	6947.41	15.98	6947.4
16.18	6947.39	16.58	6947.38	17.03	6947.36	17.13	6947.36	17.58	6947.34
18.59	6947.3	19.04	6947.28	19.14	6947.28	19.59	6947.26	20	6947.25
20.59	6947.22	21.24	6947.2	21.59	6947.18	21.91	6947.17	22.29	6947.15
22.86	6947.13	23.82	6947.09	24.4	6947.07	24.59	6947.06	24.77	6947.06
25.45	6947.03	26.5	6946.99	26.68	6946.98	27.55	6946.94	27.64	6946.94
28.46	6946.91	28.6	6946.9	29.55	6946.87	29.66	6946.86	30.5	6946.83

31.46	6946.79	31.6	6946.78	31.76	6946.78	32.6	6946.74	32.81	6946.74
33.37	6946.71	33.87	6946.69	34.32	6946.68	34.6	6946.66	35.28	6946.64
35.61	6946.62	36.23	6946.6	36.61	6946.58	37.02	6946.57	37.61	6946.54
38.07	6946.53	38.14	6946.52	38.61	6946.5	39.09	6946.49	39.13	6946.48
39.61	6946.46	40.05	6946.45	40.18	6946.44	40.61	6946.42	41	6946.41
41.23	6946.4	41.61	6946.39	41.96	6946.37	42.61	6946.35	42.91	6946.33
43.34	6946.32	43.87	6946.3	44.39	6946.27	44.62	6946.27	45.44	6946.23
45.62	6946.23	46.62	6946.16	46.73	6946.14	47.54	6946.01	47.69	6945.99
48.6	6945.85	48.64	6945.84	49.11	6945.76	49.6	6945.68	49.65	6945.68
50.55	6945.53	51.51	6945.41	51.62	6945.39	51.75	6945.38	52.46	6945.29
52.8	6945.25	53.42	6945.17	53.86	6945.11	54.63	6945.02	54.88	6944.98
54.91	6944.98	55.33	6944.93	55.63	6944.89	56.28	6944.81	56.63	6944.76
57.01	6944.72	57.63	6944.64	58.07	6944.58	58.19	6944.57	58.63	6944.51
59.12	6944.45	59.15	6944.45	59.63	6944.39	60.64	6944.26	61.22	6944.19
61.64	6944.13	62.01	6944.09	62.27	6944.05	62.64	6944.01	62.97	6943.97
63.64	6943.88	63.92	6943.85	64.38	6943.79	64.64	6943.76	65.43	6943.66
65.64	6943.63	65.83	6943.61	66.64	6943.5	66.79	6943.49	67.54	6943.39
67.74	6943.36	68.59	6943.26	68.7	6943.24	69.64	6943.13	69.77	6943.11
70.61	6943	71.56	6942.88	71.74	6942.86	72.52	6942.76	72.65	6942.75
73.47	6942.64	73.85	6942.6	74.65	6942.49	75.38	6942.4	75.95	6942.34
76.34	6942.28	76.65	6942.25	77	6942.24	77.29	6942.22	78.06	6942.2
78.25	6942.2	79.11	6942.18	79.2	6942.18	80.66	6942.15	81.21	6942.14
82.06	6942.12	82.27	6942.11	82.66	6942.11	83.32	6942.09	83.66	6942.09
84.37	6942.07	84.66	6942.07	84.93	6942.06	85.42	6942.05	85.66	6942.05
85.88	6942.04	86.47	6942.03	86.67	6942.02	86.84	6942.02	87.53	6942.01
87.79	6942	88.58	6941.99	88.75	6941.98	89.63	6941.94	90.42	6941.92
90.68	6941.91	91.61	6942.1	91.74	6942.12	92.67	6942.31	92.79	6942.33
93.67	6942.51	93.84	6942.54	94.48	6942.67	94.89	6942.75	95.68	6942.91
95.94	6942.96	96.68	6943.11	97	6943.17	97.68	6943.31	97.76	6943.33
98.05	6943.38	98.68	6943.51	99.25	6943.62	99.68	6943.7	100.15	6943.8
100.68	6943.9	101.16	6944	101.2	6944	101.68	6944.1	102.12	6944.18
102.68	6944.3	103.07	6944.37	103.31	6944.42	103.69	6944.49	104.03	6944.56
104.36	6944.62	104.98	6944.75	105.41	6944.83	105.69	6944.89	105.94	6944.93
106.47	6945.04	107.52	6945.24	107.69	6945.28	108.57	6945.45	108.8	6945.49
109.62	6945.65	109.76	6945.68	110.67	6945.86	110.71	6945.86	111.08	6945.94
111.73	6946.06	112.62	6946.24	112.78	6946.26	113.58	6946.41	113.83	6946.43
114.53	6946.45	114.7	6946.46	114.88	6946.46	115.49	6946.49	115.7	6946.49
116.44	6946.52	116.7	6946.54	117.4	6946.56	117.7	6946.58	118.35	6946.6
118.7	6946.62	119.09	6946.63	119.7	6946.66	120.14	6946.67	120.26	6946.68
120.71	6946.7	121.71	6946.74	122.17	6946.76	122.25	6946.76	122.71	6946.78
123.13	6946.79	123.71	6946.82	124.35	6946.84	124.71	6946.86	125.03	6946.87
125.4	6946.89	125.99	6946.91	126.94	6946.95	127.51	6946.97	127.9	6946.99
128.56	6947.01	128.85	6947.03	129.61	6947.06	129.81	6947.07	130.67	6947.1
130.76	6947.1	132.67	6947.18	132.77	6947.18	133.82	6947.23	134.87	6947.27
135.54	6947.3	135.72	6947.3	136.49	6947.34	136.72	6947.34	137.45	6947.37
137.73	6947.39	138.4	6947.41	138.73	6947.43	139.36	6947.45	139.73	6947.47
140.14	6947.48	140.73	6947.51	141.27	6947.52	141.73	6947.54	142.73	6947.54
143.18	6947.55	144.13	6947.55	144.34	6947.56	145.09	6947.56	145.4	6947.57

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  146.45 6947.57  146.74 6947.58  147.74 6947.58  147.95 6947.59  148.91 6947.59
   149.6  6947.6     150  6947.6

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
  -88.61     .05   46.62    .035  113.58     .05

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
         46.62  113.58           164.63  164.63  164.63             .3       .5

CROSS SECTION


RIVER: UT_BSC2
REACH: NCONFL-BGM         RS: 4000

INPUT
Description: Source: Corrected Effective Topo
Datum: NGVD29
Coordinate
             System: NAVD88 Colorado State Planes Central, US Feet.
Station Elevation Data    num=     491
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
       0 6944.95     .14 6944.95     .56 6944.92    1.02  6944.9    1.18  6944.9
     2.1 6944.85    2.36 6944.84    2.79 6944.82    3.11  6944.8    3.54 6944.78
    3.67 6944.78    4.12 6944.76    4.55 6944.74    4.72 6944.73    5.13 6944.71
    5.44 6944.69    6.14 6944.66    6.32 6944.65    7.09 6944.61     7.2 6944.61
    7.54 6944.59    8.08 6944.57    8.16 6944.56    8.27 6944.56    8.97 6944.53
    9.17 6944.52    9.45  6944.5    9.85 6944.48   10.18 6944.47   10.63 6944.45
   10.73 6944.44   11.19 6944.42   11.61  6944.4    12.2 6944.37    12.5 6944.36
      13 6944.33   13.22 6944.32   13.38 6944.32   14.18 6944.28   14.26 6944.27
   14.51 6944.26   15.14 6944.23   15.24 6944.23   15.36 6944.22   16.25 6944.18
   16.54 6944.16   16.91 6944.15   17.26 6944.13   17.72 6944.11   17.79 6944.11
   18.27 6944.08   18.67 6944.06    18.9 6944.05   19.28 6944.03   20.09    6944
   20.29 6943.99   20.44 6943.98   21.27 6943.94   21.32 6943.94   21.48 6943.93
    22.2  6943.9   22.45 6943.88   23.09 6943.84   23.32 6943.82   23.63 6943.79
   23.97 6943.76   24.33 6943.73   24.81 6943.68   24.85 6943.69   25.34 6943.64
   25.99 6943.59   26.35 6943.56   26.62 6943.53   27.18 6943.49   27.36 6943.47
    27.5 6943.46   28.36 6943.39   28.45 6943.38   29.26 6943.32   29.38 6943.31
   29.54 6943.29   30.39 6943.22   30.72  6943.2   31.03 6943.17    31.9  6943.1
   31.91  6943.1   32.79 6943.03   33.08    6943   33.42 6942.97   33.68 6942.95
   34.27 6942.91   34.43 6942.89   35.37 6942.81   35.45 6942.81   36.46 6942.73
   36.63 6942.71   37.21 6942.66   37.47 6942.64   37.81 6942.61   38.09 6942.59
   38.48 6942.56   38.97 6942.52   38.99 6942.52   39.86 6942.45   40.17 6942.42
    40.5 6942.39   40.74 6942.37   41.36 6942.32   41.51 6942.31   41.62  6942.3
    42.4 6942.24    42.5 6942.23   42.54 6942.23   43.39 6942.16   43.53 6942.14
   43.72 6942.13   44.27 6942.08   44.54 6942.06   45.15 6942.01   45.55 6941.98
   46.03 6941.94   46.08 6941.93   46.56 6941.89   46.92 6941.87   47.26 6941.84
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47.57	6941.81	47.8	6941.79	48.58	6941.73	48.68	6941.72	49.37	6941.66
49.56	6941.65	49.63	6941.64	50.45	6941.58	50.6	6941.56	50.81	6941.55
51.33	6941.5	51.61	6941.48	51.99	6941.45	52.21	6941.43	52.62	6941.4
53.09	6941.36	53.17	6941.35	53.63	6941.31	53.98	6941.29	54.35	6941.25
54.64	6941.23	54.86	6941.21	55.54	6941.16	55.74	6941.14	56.34	6941.09
56.62	6941.07	56.72	6941.06	57.51	6941	57.67	6940.98	57.9	6940.96
58.39	6940.92	58.69	6940.9	59.08	6940.87	59.27	6940.85	59.7	6940.82
60.71	6940.73	61.04	6940.71	61.45	6940.67	61.72	6940.65	61.92	6940.63
62.63	6940.58	62.8	6940.56	63.32	6940.52	63.68	6940.49	63.74	6940.48
63.81	6940.48	64.57	6940.42	64.75	6940.4	64.99	6940.38	65.45	6940.34
65.76	6940.32	66.17	6940.28	66.33	6940.27	66.77	6940.23	67.35	6940.19
67.78	6940.15	68.1	6940.13	68.54	6940.09	68.79	6940.07	68.98	6940.05
69.72	6939.99	69.8	6939.99	69.86	6939.98	70.29	6939.95	70.74	6939.91
70.81	6939.9	70.9	6939.9	71.63	6939.84	71.82	6939.82	72.08	6939.8
72.62	6939.75	72.83	6939.74	73.26	6939.7	73.39	6939.69	73.84	6939.65
74.27	6939.62	74.44	6939.6	74.85	6939.57	75.16	6939.55	75.86	6939.49
76.04	6939.47	76.81	6939.41	76.87	6939.4	76.92	6939.4	77.26	6939.37
77.8	6939.33	77.99	6939.31	78.69	6939.26	78.89	6939.24	79.17	6939.22
79.57	6939.18	79.9	6939.16	80.35	6939.12	80.45	6939.11	80.91	6939.07
81.34	6939.04	81.53	6939.02	81.93	6938.99	82.22	6938.97	82.72	6938.92
82.94	6938.91	83.1	6938.89	83.9	6938.83	83.98	6938.82	84.24	6938.8
84.87	6938.75	85.08	6938.73	85.75	6938.68	85.97	6938.66	86.26	6938.63
86.63	6938.6	86.98	6938.57	87.44	6938.54	87.51	6938.53	87.99	6938.49
88.4	6938.46	88.62	6938.44	89	6938.41	89.28	6938.4	89.81	6938.39
90.01	6938.38	90.16	6938.38	90.99	6938.36	91.21	6938.36	91.93	6938.35
92.03	6938.34	92.17	6938.34	92.81	6938.33	93.35	6938.33	93.69	6938.32
94.05	6938.32	94.53	6938.45	94.57	6938.43	95.06	6938.56	95.46	6938.67
96.07	6938.84	96.34	6938.92	96.9	6939.07	97.22	6939.16	98.08	6939.4
98.1	6939.4	98.18	6939.42	98.99	6939.65	99.1	6939.68	99.26	6939.72
99.87	6939.89	100.11	6939.96	100.44	6940.05	100.75	6940.14	101.12	6940.24
101.62	6940.38	101.63	6940.38	102.13	6940.52	102.52	6940.62	102.8	6940.7
103.14	6940.8	103.99	6941.03	104.15	6941.08	104.28	6941.11	105.15	6941.34
105.16	6941.34	106.05	6941.57	106.18	6941.6	106.35	6941.65	106.93	6941.8
107.53	6941.96	107.81	6942.03	108.2	6942.13	108.69	6942.26	108.71	6942.26
109.21	6942.39	109.58	6942.49	109.89	6942.57	110.22	6942.65	110.46	6942.72
110.82	6942.81	111.08	6942.87	111.23	6942.91	111.34	6942.92	112.13	6942.91
113.99	6942.91	114.26	6942.9	116.28	6942.9	116.64	6942.89	118.4	6942.89
119.1	6942.88	121.33	6942.88	121.71	6942.87	123.35	6942.87	123.7	6942.86
125.46	6942.86	125.91	6942.85	127.05	6942.85	127.47	6942.84	127.83	6942.84
128.34	6942.83	129.4	6942.83	129.58	6942.82	130.19	6942.82	130.64	6942.81
130.97	6942.81	131.59	6942.8	132.76	6942.8	133.21	6942.79	133.82	6942.79
134.11	6942.78	134.96	6942.78	135.68	6942.77	135.94	6942.77	136.46	6942.76
137.26	6942.76	138	6942.75	138.09	6942.75	138.83	6942.74	139.61	6942.74
139.71	6942.73	140.4	6942.73	141.03	6942.72	141.34	6942.72	141.97	6942.71
142.97	6942.71	143.35	6942.7	144.07	6942.7	144.32	6942.69	145.11	6942.69
145.47	6942.68	146.53	6942.68	146.68	6942.67	147.59	6942.67	147.84	6942.66
148.65	6942.66	149.03	6942.65	149.82	6942.65	150.15	6942.64	151.09	6942.64
151.39	6942.63	152.18	6942.63	152.72	6942.62	153.19	6942.62	153.75	6942.61

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  154.53 6942.61     155  6942.6  155.32  6942.6  155.97 6942.59  156.89 6942.59
  157.12 6942.58  157.67 6942.58  158.18 6942.57  159.24 6942.57  159.27 6942.56
  160.03 6942.48  160.29 6942.42  160.81 6942.29  160.84 6942.29  161.35 6942.16
  162.31 6941.93  162.39 6941.91  162.41 6941.91  162.47 6941.89  163.17 6941.73
  163.47 6941.65  163.96 6941.54   164.1  6941.5  164.53  6941.4  164.74 6941.35
  165.35  6941.2  165.53 6941.16  165.59 6941.14  165.72 6941.11  166.65 6940.89
   167.1 6940.78  167.35 6940.72  167.71 6940.63  167.88 6940.59  168.67  6940.4
  168.97 6940.34  169.45 6940.24  169.83 6940.15  170.24 6940.06   170.6 6939.98
  171.02 6939.89  171.42  6939.8  171.94 6939.68  172.59 6939.54     173 6939.45
  173.85 6939.27  174.06 6939.22  174.16  6939.2  174.46 6939.13  174.95 6939.02
  175.12 6938.99  175.47 6938.91  175.74 6938.85  176.18 6938.76  176.52 6938.73
   177.1 6938.72  177.24 6938.71  177.31 6938.71   177.5  6938.7  178.09 6938.69
   178.3 6938.69  178.72 6938.68  178.88 6938.67  179.36 6938.66  179.66 6938.66
  180.35 6938.64  180.54 6938.64  181.23 6938.62  181.47 6938.62  181.97  6938.6
  182.02  6938.6  182.53 6938.59   182.8 6938.59  183.58 6938.66   183.6 6938.66
  184.37 6938.83  184.65 6938.89  185.16 6939.02  185.23 6939.03  185.71 6939.15
  185.94 6939.21  186.62 6939.38  186.85 6939.44  187.52  6939.6  187.83 6939.68
   188.3  6939.8  188.48 6939.85  188.89 6939.95  189.09    6940  189.66 6940.14
  189.87  6940.2  189.95 6940.21   190.1 6940.25  190.66 6940.39  191.44 6940.59
  191.73 6940.66  192.06 6940.75   192.7  6940.9  193.01 6940.98  193.35 6941.07
   193.8 6941.18  194.18 6941.28  194.98 6941.48  195.37 6941.57  195.73 6941.67
  196.15 6941.77   196.3 6941.81   196.6 6941.88  196.94 6941.97  197.36 6942.07
  197.72 6942.17  198.23 6942.29  198.42 6942.34  198.51 6942.36  198.77 6942.43
  199.29 6942.56  199.48 6942.59  199.85  6942.6  200.08 6942.62  200.54 6942.63
  200.87 6942.64  201.48 6942.65  201.65 6942.65  201.81 6942.66  202.44 6942.67
  202.62 6942.67

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
       0     .05   35.37    .035  110.82     .05

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
         35.37  110.82            93.31   85.66   98.56             .1       .3
Ineffective Flow     num=       1
   Sta L   Sta R    Elev  Permanent
  111.09  202.62 6942.98       F

CROSS SECTION


RIVER: UT_BSC2
REACH: NCONFL-BGM         RS: 3900

INPUT
Description: Source: Corrected Effective Topo
Datum: NGVD29
Coordinate
             System: NAVD88 Colorado State Planes Central, US Feet.
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Station Elevation Data num= 459

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	6943.24	1.31	6943.24	1.92	6943.25	2.94	6943.25	3.08	6943.26
4.12	6943.26	4.57	6943.27	5.39	6943.27	6.17	6943.28	7.02	6943.28
7.23	6943.29	7.58	6943.27	7.84	6943.28	8.26	6943.26	8.65	6943.21
8.99	6943.18	9.3	6943.14	9.47	6943.12	10.12	6943.05	10.29	6943.04
10.33	6943.03	10.41	6943.02	11.1	6942.95	11.37	6942.92	11.82	6942.87
11.92	6942.86	12.4	6942.81	12.74	6942.77	13.24	6942.72	13.44	6942.69
13.55	6942.68	13.98	6942.63	14.37	6942.59	14.47	6942.58	14.65	6942.56
15.19	6942.5	15.51	6942.47	16	6942.42	16.07	6942.41	16.54	6942.36
16.82	6942.33	17.48	6942.26	17.58	6942.25	17.64	6942.24	17.85	6942.22
18.45	6942.15	18.61	6942.13	18.89	6942.1	19.65	6942.02	20.08	6941.97
20.31	6941.95	20.68	6941.91	20.9	6941.88	21.71	6941.8	21.72	6941.8
22.53	6941.71	22.75	6941.68	23.14	6941.64	23.35	6941.62	23.79	6941.57
24.17	6941.53	24.55	6941.49	24.83	6941.46	24.98	6941.44	25.57	6941.38
25.8	6941.35	25.86	6941.35	25.97	6941.34	26.62	6941.27	26.9	6941.23
27.38	6941.18	27.43	6941.18	27.93	6941.12	28.25	6941.09	28.79	6941.03
28.97	6941.01	29.07	6941	29.44	6940.96	29.88	6940.91	30	6940.9
30.21	6940.88	30.7	6940.83	31.04	6940.8	31.52	6940.75	31.62	6940.74
32.07	6940.7	32.33	6940.67	33.04	6940.6	33.11	6940.6	33.15	6940.59
33.3	6940.58	33.96	6940.52	34.14	6940.5	34.45	6940.47	34.78	6940.44
35.18	6940.4	35.6	6940.36	35.87	6940.33	36.21	6940.3	36.41	6940.28
37.16	6940.18	37.23	6940.18	37.25	6940.17	37.28	6940.17	38.05	6940.07
38.28	6940.04	38.69	6939.99	38.86	6939.97	39.32	6939.91	39.68	6939.87
40.11	6939.84	40.35	6939.81	40.5	6939.8	41.03	6939.76	41.31	6939.75
41.39	6939.74	41.52	6939.73	42.13	6939.7	42.43	6939.68	42.94	6939.65
42.95	6939.65	43.46	6939.62	43.76	6939.6	44.35	6939.56	44.5	6939.55
44.58	6939.55	44.89	6939.53	45.4	6939.5	45.53	6939.49	45.77	6939.47
46.21	6939.45	46.57	6939.42	47.03	6939.4	47.18	6939.39	47.6	6939.36
47.85	6939.35	48.59	6939.3	48.64	6939.3	48.66	6939.29	48.75	6939.29
49.48	6939.24	49.67	6939.23	50.01	6939.21	50.29	6939.2	50.71	6939.17
51.11	6939.16	51.42	6939.14	51.74	6939.13	51.93	6939.12	52.62	6939.1
52.74	6939.09	52.98	6939.09	53.56	6939.07	53.81	6939.06	54.25	6939.05
54.38	6939.04	54.85	6939.03	55.19	6939.02	55.67	6939	55.88	6938.99
56.01	6938.99	56.48	6938.98	56.83	6938.96	57.08	6938.96	57.64	6938.94
57.95	6938.93	58.46	6938.91	58.49	6938.91	58.99	6938.9	59.28	6938.89
59.91	6938.87	60.03	6938.86	60.09	6938.86	60.34	6938.85	60.91	6938.83
61.06	6938.83	61.32	6938.82	61.73	6938.81	62.1	6938.8	62.54	6938.78
62.74	6938.78	63.13	6938.76	63.36	6938.76	64.15	6938.73	64.21	6938.73
64.99	6938.7	65.2	6938.7	65.57	6938.69	65.81	6938.68	66.24	6938.67
66.62	6938.65	66.98	6938.64	67.27	6938.63	67.44	6938.63	68.07	6938.61
68.26	6938.6	68.39	6938.6	69.07	6938.58	69.34	6938.57	69.81	6938.55
69.89	6938.55	70.38	6938.54	70.71	6938.53	71.22	6938.51	71.41	6938.5
71.52	6938.5	71.93	6938.49	72.34	6938.48	72.45	6938.47	72.64	6938.47
73.16	6938.46	73.48	6938.45	73.97	6938.43	74.05	6938.43	74.52	6938.41
74.79	6938.41	75.47	6938.39	75.61	6938.39	75.8	6938.38	76.42	6938.36
76.59	6938.36	76.88	6938.35	77.24	6938.34	77.62	6938.33	78.06	6938.32
78.29	6938.31	78.66	6938.3	78.87	6938.3	79.66	6938.28	79.69	6938.27

79.71	6938.27	80.5	6938.25	80.73	6938.25	81.12	6938.24	81.32	6938.23
81.77	6938.22	82.14	6938.21	82.54	6938.2	82.8	6938.19	82.95	6938.19
83.52	6938.17	83.77	6938.16	83.95	6938.16	84.59	6938.14	84.87	6938.13
85.22	6938.12	85.4	6938.12	85.91	6938.11	86.22	6938.1	86.78	6938.08
86.94	6938.08	87.04	6938.07	87.39	6938.07	87.85	6938.05	87.98	6938.05
88.19	6938.04	88.67	6938.03	89.01	6938.02	89.49	6938.01	89.61	6938.01
90.05	6937.99	90.3	6937.99	91.02	6937.97	91.08	6937.96	91.25	6937.96
91.94	6937.94	92.12	6937.93	92.44	6937.92	92.75	6937.9	93.15	6937.88
93.57	6937.86	93.85	6937.85	94.19	6937.83	94.38	6937.82	95.11	6937.78
95.22	6937.78	95.27	6937.77	96.02	6937.73	96.26	6937.72	96.68	6937.7
96.83	6937.69	97.3	6937.67	97.65	6937.65	98.09	6937.63	98.33	6937.61
98.47	6937.61	98.98	6937.6	100.92	6937.6	101.44	6937.61	105.58	6937.61
105.82	6937.62	107.45	6937.62	107.65	6937.63	108.26	6937.63	108.68	6937.64
109.08	6937.65	109.41	6937.65	109.72	6937.66	109.9	6937.66	110.57	6937.67
110.71	6937.68	110.82	6937.68	111.53	6937.69	111.79	6937.7	112.24	6937.7
112.35	6937.71	112.82	6937.71	113.16	6937.72	113.65	6937.73	113.98	6937.73
114.43	6937.74	114.8	6937.75	115.06	6937.75	115.61	6937.76	115.93	6937.77
116.43	6937.78	116.48	6937.77	116.97	6937.78	118.88	6937.78	119.04	6937.77
121.33	6937.77	122.14	6937.76	123.78	6937.76	124.21	6937.75	126.38	6937.75
127.04	6937.74	129.39	6937.74	129.49	6937.73	131.94	6937.73	132.04	6937.72
134.57	6937.72	134.86	6937.71	136.84	6937.71	137.61	6937.7	139.74	6937.7
140.11	6937.69	141.94	6937.69	142.56	6937.68	144.92	6937.68	145.01	6937.67
146.99	6937.67	147.46	6937.66	148.27	6937.66	149.01	6937.65	150.42	6937.65
150.72	6937.64	152.35	6937.64	153.06	6937.63	154.24	6937.63	154.66	6937.62
155.27	6937.62	155.62	6937.59	156.08	6937.57	156.31	6937.56	156.44	6937.54
156.56	6937.53	156.93	6937.5	157.25	6937.47	157.34	6937.46	157.49	6937.45
158.07	6937.39	158.38	6937.36	158.89	6937.32	158.91	6937.31	159.41	6937.27
159.7	6937.33	160.32	6937.47	160.45	6937.49	160.52	6937.51	160.79	6937.59
161.34	6937.74	161.48	6937.78	161.74	6937.85	162.15	6937.96	162.52	6938.06
162.97	6938.18	163.15	6938.23	163.55	6938.35	163.79	6938.41	164.56	6938.62
164.59	6938.63	164.6	6938.63	164.65	6938.65	165.42	6938.86	165.62	6938.91
165.98	6939.01	166.24	6939.08	166.66	6939.2	167.05	6939.31	167.39	6939.4
167.69	6939.48	167.87	6939.53	168.52	6939.71	168.68	6939.76	168.73	6939.77
168.81	6939.79	169.5	6939.98	169.76	6940.05	170.22	6940.18	170.32	6940.2
170.8	6940.34	171.13	6940.43	171.64	6940.57	171.84	6940.62	171.95	6940.65
172.38	6940.77	172.77	6940.88	172.87	6940.91	173.05	6940.96	173.58	6941.1
173.91	6941.19	174.4	6941.33	174.46	6941.35	174.94	6941.48	175.22	6941.55
175.88	6941.73	175.98	6941.76	176.03	6941.78	176.24	6941.83	176.85	6942
177.01	6942.03	177.29	6942.05	177.67	6942.07	178.05	6942.09	178.48	6942.11
178.71	6942.11	179.08	6942.12	179.3	6942.13	180.11	6942.15	180.12	6942.15
180.93	6942.18	181.15	6942.18	181.54	6942.19	181.75	6942.2	182.19	6942.21
182.56	6942.22	182.95	6942.23	183.22	6942.24	183.38	6942.24	183.97	6942.26
184.2	6942.27	184.36	6942.27	185.01	6942.29	185.29	6942.3	185.78	6942.31
185.83	6942.31	186.33	6942.33	186.65	6942.34	187.19	6942.35	187.36	6942.36
187.46	6942.36	187.83	6942.37	188.28	6942.38	188.4	6942.39	188.61	6942.39
189.1	6942.41	189.44	6942.42	189.91	6942.43	190.37	6942.43		

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.05	8.26	.035	177.67	.05

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
8.26	177.67	26.02	48.36	73.69	.1	.3

CROSS SECTION

RIVER: UT_BSC2
REACH: NCONFL-BGM RS: 3850

INPUT
Description: Source: Corrected Effective Topo
Datum: NGVD29
Coordinate
System: NAVD88 Colorado State Planes Central, US Feet.
Station Elevation Data num= 461

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	6942.72	.83	6942.72	.98	6942.7	1.68	6942.64	1.83	6942.62
2	6942.61	2.66	6942.53	2.83	6942.51	3.02	6942.49	3.64	6942.42
3.83	6942.4	4.04	6942.38	4.62	6942.31	4.83	6942.29	5.05	6942.26
5.6	6942.2	5.83	6942.18	6.07	6942.15	6.59	6942.09	6.83	6942.06
7.09	6942.04	7.57	6941.98	7.83	6941.95	8.11	6941.92	8.55	6941.87
8.83	6941.84	9.13	6941.81	9.53	6941.76	9.84	6941.73	10.15	6941.69
10.51	6941.66	10.84	6941.62	11.17	6941.6	11.5	6941.59	11.84	6941.57
12.19	6941.55	12.48	6941.54	12.84	6941.52	13.21	6941.51	13.46	6941.49
13.84	6941.48	14.23	6941.46	14.44	6941.45	14.84	6941.43	15.25	6941.41
15.42	6941.41	15.84	6941.39	16.27	6941.37	16.4	6941.36	16.84	6941.34
17.28	6941.32	17.39	6941.32	17.84	6941.29	18.3	6941.27	18.37	6941.27
18.84	6941.25	19.32	6941.23	19.35	6941.23	19.84	6941.2	20.33	6941.18
20.34	6941.18	20.84	6941.16	21.31	6941.14	21.36	6941.13	21.84	6941.11
22.3	6941.09	22.38	6941.09	22.84	6941.07	23.28	6941.05	23.4	6941.04
23.84	6941.02	24.26	6941	24.42	6940.99	24.84	6940.97	25.24	6940.96
25.44	6940.95	25.84	6940.93	26.22	6940.9	26.46	6940.9	26.84	6940.88
27.21	6940.86	27.48	6940.85	27.84	6940.82	28.19	6940.8	28.5	6940.78
28.84	6940.76	29.17	6940.74	29.51	6940.72	29.84	6940.7	30.15	6940.69
30.53	6940.66	30.84	6940.64	31.13	6940.63	31.55	6940.6	31.84	6940.58
32.11	6940.57	32.57	6940.54	32.84	6940.53	33.1	6940.51	33.59	6940.48
33.84	6940.47	34.08	6940.45	34.61	6940.42	34.84	6940.41	35.06	6940.39
35.63	6940.36	35.84	6940.35	36.04	6940.33	36.65	6940.3	36.84	6940.29
37.02	6940.28	37.67	6940.24	37.84	6940.23	38.01	6940.22	38.69	6940.18
38.84	6940.17	38.99	6940.16	39.71	6940.11	39.84	6940.11	39.97	6940.1
40.73	6940.05	40.84	6940.05	40.95	6940.04	41.74	6939.99	41.84	6939.99
41.93	6939.98	42.76	6939.93	42.84	6939.93	42.92	6939.92	43.78	6939.87
43.84	6939.87	43.9	6939.86	44.8	6939.81	44.84	6939.81	44.88	6939.8
45.82	6939.75	45.86	6939.75	46.84	6939.69	46.9	6939.68	47.82	6939.63
47.86	6939.63	48.21	6939.61	48.81	6939.57	48.88	6939.57	49.79	6939.51

49.9	6939.51	50.77	6939.46	50.84	6939.45	50.92	6939.45	51.75	6939.4
51.84	6939.4	51.94	6939.39	52.73	6939.35	52.84	6939.34	52.96	6939.33
53.72	6939.29	53.84	6939.28	53.97	6939.28	54.7	6939.23	54.84	6939.23
54.99	6939.22	55.68	6939.18	55.84	6939.17	56.01	6939.16	56.66	6939.12
56.84	6939.11	57.03	6939.1	57.64	6939.07	57.84	6939.06	58.05	6939.05
58.63	6939.01	58.84	6939	59.07	6938.99	59.61	6938.96	59.84	6938.95
60.09	6938.93	60.59	6938.9	60.84	6938.89	61.11	6938.88	61.57	6938.85
61.84	6938.83	62.13	6938.82	62.55	6938.79	62.84	6938.78	63.15	6938.76
63.53	6938.74	63.84	6938.72	64.17	6938.7	64.52	6938.68	64.84	6938.67
65.19	6938.65	65.5	6938.63	65.84	6938.61	66.2	6938.59	66.48	6938.57
66.84	6938.55	67.22	6938.53	67.46	6938.52	67.85	6938.5	68.24	6938.48
68.44	6938.46	68.85	6938.44	69.26	6938.42	69.43	6938.41	69.85	6938.39
70.28	6938.36	70.41	6938.35	70.85	6938.33	71.3	6938.3	71.39	6938.3
71.85	6938.27	72.32	6938.25	72.37	6938.24	72.85	6938.22	73.34	6938.19
73.35	6938.19	73.85	6938.16	74.34	6938.13	74.36	6938.13	74.85	6938.1
75.32	6938.08	75.38	6938.08	75.85	6938.05	76.3	6938.02	76.4	6938.02
76.85	6937.99	77.28	6937.97	77.42	6937.96	77.85	6937.94	78.26	6937.91
78.43	6937.9	78.85	6937.88	79.24	6937.86	79.45	6937.85	79.85	6937.82
80.23	6937.8	80.47	6937.79	80.85	6937.77	81.21	6937.75	81.49	6937.73
81.85	6937.71	82.19	6937.69	82.33	6937.69	82.51	6937.67	82.85	6937.66
83.17	6937.63	83.53	6937.62	83.85	6937.6	84.15	6937.58	84.55	6937.56
84.85	6937.54	85.14	6937.52	85.57	6937.49	85.85	6937.47	86.12	6937.45
86.59	6937.42	86.85	6937.4	87.1	6937.39	87.61	6937.35	87.85	6937.34
88.08	6937.32	88.63	6937.28	88.85	6937.27	89.06	6937.25	89.65	6937.21
89.85	6937.2	90.05	6937.18	90.66	6937.14	90.85	6937.13	91.03	6937.12
91.68	6937.07	91.85	6937.06	92.01	6937.05	92.7	6937	92.85	6936.99
92.99	6936.98	93.72	6936.93	93.85	6936.92	93.97	6936.91	94.74	6936.86
94.85	6936.85	94.95	6936.85	95.76	6936.88	95.94	6936.88	96.78	6936.92
96.85	6936.93	96.92	6936.93	97.8	6936.97	97.9	6936.97	98.82	6937.01
98.85	6937.02	98.88	6937.02	99.84	6937.06	99.86	6937.06	100.57	6937.09
100.85	6937.11	100.86	6937.11	101.83	6937.15	101.88	6937.15	102.81	6937.19
102.89	6937.19	103.79	6937.24	103.85	6937.24	103.91	6937.23	104.77	6937.26
104.93	6937.26	105.76	6937.25	105.85	6937.24	105.95	6937.24	106.74	6937.23
106.97	6937.23	107.72	6937.22	107.99	6937.22	108.7	6937.21	109.01	6937.21
109.68	6937.2	109.85	6937.2	110.03	6937.19	110.66	6937.19	110.85	6937.18
111.05	6937.18	111.65	6937.17	112.07	6937.17	112.63	6937.16	113.09	6937.16
113.61	6937.15	113.85	6937.15	114.11	6937.14	114.59	6937.14	114.85	6937.13
115.12	6937.13	115.57	6937.12	116.14	6937.12	116.56	6937.11	116.85	6937.11
117.16	6937.1	117.85	6937.1	118.18	6937.09	118.52	6937.09	118.85	6937.08
119.5	6937.08	119.85	6937.07	120.22	6937.07	120.48	6937.06	120.85	6937.06
121.24	6937.05	121.85	6937.05	122.26	6937.04	122.45	6937.04	122.85	6937.03
123.43	6937.03	123.85	6937.02	124.41	6937.02	124.85	6937.01	125.32	6937
125.86	6937	126.34	6936.99	126.86	6936.99	127.35	6936.98	127.86	6936.97
128.37	6936.97	128.86	6936.96	129.32	6936.96	129.39	6936.95	129.86	6936.95
130.3	6936.94	130.86	6936.94	131.28	6936.89	131.43	6936.93	131.86	6936.88
132.27	6936.81	132.45	6936.79	132.86	6936.72	133.25	6936.64	133.47	6936.6
133.86	6936.53	134.23	6936.46	134.49	6936.41	134.86	6936.34	135.21	6936.27
135.51	6936.21	135.86	6936.15	136.19	6936.08	136.53	6936.02	136.86	6935.96

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  137.18  6935.9  137.55 6935.83  137.86 6935.77  138.16 6935.71  138.57 6935.63
  138.86 6935.58  139.14 6935.52  139.58 6935.44  139.86 6935.39  140.12 6935.44
   140.6  6935.5  140.86 6935.55   141.1 6935.61  141.62 6935.75  141.86 6935.81
  142.08 6935.87  142.64 6936.01  142.86 6936.07  143.07 6936.12  143.66 6936.28
  143.86 6936.33  144.05 6936.38  144.68 6936.54  144.86 6936.59  145.03 6936.63
   145.7 6936.81  145.86 6936.85  146.01 6936.89  146.72 6937.07  146.86 6937.11
  146.99 6937.14  147.74 6937.34  147.86 6937.37  147.98  6937.4  148.76  6937.6
  148.86 6937.63  148.96 6937.65  149.05 6937.67  149.78 6937.87  149.86 6937.89
  149.94 6937.91   150.8 6938.13  150.86 6938.15  150.92 6938.16  151.81  6938.4
  151.86 6938.41   151.9 6938.42  152.83 6938.66  152.86 6938.67  152.89 6938.67
  153.85 6938.92  153.87 6938.92  154.24 6939.02  154.85 6939.17  154.86 6939.17
  154.87 6939.18  155.83 6939.42  155.86 6939.43  155.89 6939.43  156.81 6939.67
  156.86 6939.68  156.91 6939.69  157.79 6939.92  157.86 6939.93  157.93 6939.95
  158.78 6940.16  158.86 6940.19  158.95 6940.21  159.76 6940.41  159.86 6940.44
  159.97 6940.47  160.74 6940.66  160.86 6940.69  160.99 6940.72  161.72 6940.91
  161.79 6940.91

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
       0     .05   48.21    .035  160.74     .05

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
         48.21  160.74            46.06   51.61   64.96             .1       .3

CROSS SECTION


RIVER: UT_BSC2
REACH: NCONFL-BGM         RS: 3800

INPUT
Description: Source: Corrected Effective Topo
Datum: NGVD29
Coordinate
             System: NAVD88 Colorado State Planes Central, US Feet.
Station Elevation Data    num=     436
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
       0 6940.48      .2 6940.48     .53 6940.46     .96 6940.44    1.22 6940.43
    1.39 6940.42    2.21 6940.38    2.25 6940.38    2.34 6940.37    3.11 6940.32
    3.25 6940.31    3.45  6940.3    3.97 6940.27    4.27 6940.25     4.7 6940.22
    4.83 6940.21    5.28 6940.19    5.69 6940.16    5.94 6940.14     6.3 6940.12
    6.55 6940.11    7.19 6940.07    7.32 6940.06     7.4 6940.05    7.89 6940.02
    8.26    6940    8.33 6939.99    8.43 6939.99    9.12 6939.95    9.35 6939.93
    9.68 6939.91    9.98 6939.89   10.37 6939.87   10.84 6939.84   10.92 6939.83
   11.38  6939.8    11.7 6939.78   12.17 6939.75    12.4 6939.74   12.56 6939.73
   13.41 6939.68   13.42 6939.68   13.44 6939.67   14.28 6939.62   14.43 6939.61
   14.65  6939.6   15.14 6939.57   15.45 6939.55    15.9 6939.52      16 6939.51
   16.47 6939.48   16.86 6939.46   17.14 6939.44   17.48 6939.42   17.71 6939.41
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18.39	6939.36	18.5	6939.36	18.57	6939.35	18.99	6939.33	19.43	6939.3
19.52	6939.29	19.63	6939.29	20.29	6939.24	20.53	6939.23	20.88	6939.21
21.15	6939.19	21.55	6939.17	22.01	6939.14	22.12	6939.13	22.57	6939.1
22.87	6939.08	23.37	6939.05	23.58	6939.04	23.73	6939.03	23.83	6939.02
24.53	6938.98	24.59	6938.97	24.61	6938.97	25.45	6938.92	25.61	6938.91
25.86	6938.89	26.31	6938.87	26.63	6938.85	27.1	6938.82	27.17	6938.81
27.65	6938.78	28.03	6938.76	28.35	6938.74	28.66	6938.72	28.88	6938.7
29.59	6938.66	29.68	6938.65	29.74	6938.65	30.08	6938.61	30.6	6938.56
30.7	6938.54	30.84	6938.52	31.46	6938.45	31.71	6938.4	32.08	6938.36
32.32	6938.35	32.73	6938.29	33.18	6938.25	33.33	6938.23	33.75	6938.19
34.04	6938.16	34.57	6938.11	34.76	6938.09	34.9	6938.08	35.63	6938.01
35.76	6937.99	35.82	6937.99	36.62	6937.91	36.8	6937.89	37.06	6937.86
37.48	6937.82	37.81	6937.79	38.3	6937.74	38.34	6937.74	38.83	6937.69
39.2	6937.65	39.55	6937.62	39.85	6937.59	40.05	6937.57	40.79	6937.49
40.86	6937.49	40.91	6937.48	41.18	6937.46	41.77	6937.4	41.88	6937.39
42.04	6937.37	42.63	6937.31	42.9	6937.29	43.28	6937.25	43.49	6937.23
43.91	6937.19	44.35	6937.14	44.53	6937.13	44.93	6937.09	45.21	6937.06
45.77	6937	45.95	6936.98	46.07	6936.97	46.73	6936.91	46.93	6936.89
46.96	6936.88	47.02	6936.88	47.79	6936.8	47.98	6936.78	48.26	6936.76
48.65	6936.72	49	6936.68	49.51	6936.63	50.01	6936.58	50.36	6936.55
50.75	6936.51	51.03	6936.48	51.22	6936.46	52	6936.39	52.05	6936.38
52.08	6936.38	52.28	6936.36	52.94	6936.29	53.06	6936.28	53.24	6936.26
53.8	6936.21	54.08	6936.18	54.49	6936.14	54.66	6936.12	55.1	6936.08
55.52	6936.04	55.73	6936.02	56.11	6935.98	56.38	6935.95	56.98	6935.89
57.13	6935.88	57.24	6935.87	57.82	6935.81	58.1	6935.78	58.15	6935.78
58.22	6935.77	58.96	6935.7	59.16	6935.68	59.46	6935.65	59.82	6935.61
60.18	6935.58	60.68	6935.53	60.71	6935.52	61.2	6935.48	61.53	6935.44
61.95	6935.4	62.21	6935.38	62.39	6935.36	63.01	6935.3	63.2	6935.28
63.23	6935.27	63.25	6935.27	63.37	6935.26	64.11	6935.19	64.25	6935.17
64.44	6935.15	64.97	6935.1	65.26	6935.07	65.69	6935.03	65.83	6935.02
66.28	6934.97	66.69	6934.93	66.93	6934.91	67.3	6934.87	67.55	6934.85
68.18	6934.78	68.31	6934.77	68.41	6934.76	68.92	6934.71	69.27	6934.68
69.33	6934.67	69.42	6934.66	70.13	6934.59	70.35	6934.57	70.67	6934.55
70.99	6934.51	71.36	6934.48	71.85	6934.46	71.91	6934.57	72.38	6934.57
72.7	6934.64	73.16	6934.73	73.4	6934.78	73.56	6934.82	74.4	6934.99
74.41	6934.99	74.42	6935	74.47	6935	75.28	6935.17	75.43	6935.2
75.65	6935.25	76.14	6935.36	76.45	6935.42	76.89	6935.52	77	6935.57
77.46	6935.67	77.86	6935.77	78.14	6935.84	78.48	6935.93	78.72	6935.99
79.38	6936.16	79.5	6936.19	79.58	6936.21	80.02	6936.33	80.44	6936.43
80.51	6936.45	80.62	6936.48	81.3	6936.66	81.53	6936.72	81.87	6936.81
82.16	6936.88	82.55	6936.98	83.01	6937.1	83.11	6937.13	83.56	6937.24
83.87	6937.32	84.36	6937.45	84.58	6937.51	84.73	6937.54	85.57	6937.66
85.59	6937.67	85.6	6937.67	86.45	6937.79	86.61	6937.81	86.85	6937.84
87.31	6937.9	87.63	6937.95	88.09	6938.01	88.17	6938.02	88.65	6938.09
89.03	6938.14	89.34	6938.18	89.66	6938.23	89.89	6938.26	90.58	6938.36
90.68	6938.37	90.75	6938.38	91.12	6938.43	91.61	6938.5	91.7	6938.51
91.83	6938.53	92.47	6938.62	92.71	6938.65	93.07	6938.68	93.33	6938.7
93.73	6938.73	94.18	6938.7	94.32	6938.65	94.75	6938.61	95.04	6938.54

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   95.56 6938.41   95.76 6938.36    95.9 6938.32   96.66 6938.14   96.76 6938.11
   96.78 6938.11   96.81  6938.1   97.62 6937.92    97.8 6937.89   98.05 6937.84
   98.48 6937.75   98.81 6937.68    99.3 6937.59   99.34 6937.58   99.83 6937.48
   100.2  6937.4  100.54 6937.34  100.85 6937.27  101.06 6937.23  101.79 6937.08
  101.86 6937.07  101.92 6937.06  102.21    6937  102.78 6936.88  102.88 6936.86
  103.03 6936.83  103.64 6936.71   103.9 6936.66  104.27 6936.58   104.5 6936.54
  104.91 6936.45  105.35 6936.36  105.52 6936.33  105.93 6936.25  106.21 6936.19
  106.76 6936.08  106.95 6936.04  107.07 6936.02  107.76 6935.88  107.93 6935.84
  107.96 6935.84  108.01 6935.83  108.79 6935.67  108.98 6935.63  109.25 6935.58
  109.65  6935.5     110 6935.43   110.5 6935.33  110.51 6935.33  111.01 6935.22
  111.37 6935.15  111.74 6935.08  112.03 6935.02  112.23 6934.98  112.99 6934.83
  113.05 6934.81  113.09 6934.81  113.31 6934.78  113.95 6934.71  114.06 6934.71
  114.23 6934.74  114.81 6934.86  115.08 6934.92  115.48    6935  115.66 6935.04
   116.1 6935.13  116.52 6935.22  116.72 6935.26  117.11 6935.34  117.38  6935.4
  117.97 6935.52  118.13 6935.55  118.24 6935.58  118.86  6935.7   119.1 6935.75
  119.15 6935.76  119.21 6935.78  119.96 6935.93  120.16 6935.98  120.46 6936.04
  120.82 6936.11  121.18 6936.19  121.68 6936.29   121.7  6936.3   122.2  6936.4
  122.54 6936.47  122.95 6936.55  123.21 6936.61   123.4 6936.65  124.19 6936.81
  124.23 6936.82  124.26 6936.83  124.41 6936.86  125.12 6937.01  125.25 6937.03
  125.43 6937.07  125.98 6937.19  126.26 6937.24  126.68 6937.33  126.83 6937.36
  127.28 6937.46  127.69 6937.54  127.92 6937.59   128.3 6937.67  128.55 6937.72
  129.17 6937.85  129.31 6937.88  129.41  6937.9  129.95 6938.01  130.27 6938.08
  130.33 6938.09  130.41 6938.11  131.13 6938.26  131.35  6938.3  131.66 6938.37
  131.99 6938.44  132.36 6938.51   132.8 6938.61  132.85 6938.62   132.9 6938.63
  133.38 6938.73  133.71 6938.79  134.15 6938.89   134.4 6938.94  134.57 6938.97
  135.39 6939.15  135.43 6939.15   135.5 6939.17  136.29 6939.33  136.43 6939.36
  136.64  6939.4  137.15  6939.5  137.45 6939.56  137.88 6939.64     138 6939.67
  138.46 6939.76  138.86 6939.81  139.13 6939.83  139.48 6939.87  139.72 6939.88
     140 6939.88

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
       0     .05   29.74    .035   93.73     .05

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
         29.74   93.73           106.47  105.93  111.29             .1       .3

CROSS SECTION


RIVER: UT_BSC2
REACH: NCONFL-BGM         RS: 3694

INPUT
Description: Source: Corrected Effective Topo
Datum: NGVD29
Coordinate
             System: NAVD88 Colorado State Planes Central, US Feet.
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Station Elevation Data num= 490

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	6941.33	.76	6941.33	1.68	6941.31	2.22	6941.31	3.22	6941.29
4.44	6941.28	6.19	6941.26	6.24	6941.25	9.25	6941.22	10.87	6941.19
12.26	6941.18	13.27	6941.16	16.28	6941.13	16.39	6941.12	17.57	6941.11
20.06	6941.08	20.3	6941.07	22.3	6941.05	23.31	6941.03	23.89	6941.03
25	6941.01	25.58	6941.01	26.5	6940.99	27.21	6940.99	27.32	6940.98
30.53	6940.95	32.01	6940.93	32.75	6940.93	33.85	6940.91	36.61	6940.88
37.37	6940.88	37.53	6940.87	38.28	6940.87	38.37	6940.86	39.29	6940.86
39.38	6940.85	43.05	6940.81	43.81	6940.81	43.97	6940.8	46.72	6940.77
47.41	6940.77	47.64	6940.76	48.41	6940.76	48.56	6940.75	49.34	6940.75
49.42	6940.74	50.15	6940.74	50.4	6940.73	52.66	6940.71	54.08	6940.69
54.88	6940.69	55.92	6940.67	57.45	6940.66	57.75	6940.65	58.46	6940.65
58.67	6940.64	59.46	6940.64	59.59	6940.63	60.41	6940.63	60.47	6940.62
62.62	6940.6	65.11	6940.57	65.94	6940.57	66.95	6940.55	68.79	6940.53
69.5	6940.53	69.71	6940.52	70.51	6940.52	70.62	6940.51	71.88	6940.5
75.22	6940.46	75.9	6940.46	77.01	6940.44	78.54	6940.43	79.82	6940.41
80.55	6940.41	80.74	6940.4	81.56	6940.4	81.66	6940.39	85.33	6940.35
85.86	6940.35	86.97	6940.33	88.59	6940.32	89.59	6940.3	90.29	6940.3
91.39	6940.28	92.5	6940.27	93.6	6940.27	94.53	6940.26	97.28	6940.26
97.62	6940.25	100.25	6940.25	100.64	6940.24	103.72	6940.24	104.47	6940.23
107.4	6940.23	107.67	6940.22	110.68	6940.22	111.07	6940.21	113.83	6940.21
114.63	6940.2	117.51	6940.2	117.71	6940.19	120.72	6940.19	121.18	6940.18
123.94	6940.18	124.59	6940.17	127.75	6940.17	127.91	6940.16	131.23	6940.16
131.3	6940.15	134.55	6940.15	134.78	6940.14	137.87	6940.14	138.65	6940.13
141.19	6940.13	141.41	6940.12	142.82	6940.12	143.25	6940.11	144.17	6940.11
145.62	6940.09	146.83	6940.09	146.92	6940.08	147.91	6940.08	150.6	6940.05
151.85	6940.05	152.25	6940.04	153.36	6940.03	154.28	6940.03	154.47	6940.02
155.57	6940.02	155.87	6940.01	156.68	6940.01	156.87	6940	157.96	6940
160.71	6939.97	161.63	6939.97	161.9	6939.96	162.9	6939.96	164.39	6939.94
165.53	6939.94	165.91	6939.93	166.64	6939.93	166.92	6939.92	167.92	6939.92
168.07	6939.91	168.99	6939.91	171.94	6939.88	172.17	6939.87	172.94	6939.87
176.96	6939.83	177.26	6939.82	177.96	6939.82	178.18	6939.81	179.1	6939.81
180.5	6939.79	181.86	6939.78	182.13	6939.77	182.99	6939.77	183.24	6939.76
183.99	6939.76	186	6939.74	187.37	6939.72	188.29	6939.72	189.88	6939.7
191.97	6939.68	193.03	6939.68	193.2	6939.67	194.3	6939.67	194.73	6939.66
195.65	6939.65	196.56	6939.65	197.05	6939.64	198.05	6939.64	199.05	6939.63
199.32	6939.62	200.24	6939.62	203	6939.59	204.08	6939.59	204.26	6939.58
205.08	6939.58	205.37	6939.57	206.48	6939.57	206.68	6939.56	207.6	6939.56
209.1	6939.54	210.1	6939.54	210.35	6939.53	211.27	6939.53	214.03	6939.5
214.95	6939.5	215.12	6939.49	216.13	6939.49	216.44	6939.48	217.13	6939.48
217.54	6939.47	218.63	6939.47	218.65	6939.46	219.76	6939.46	220.14	6939.45
220.86	6939.45	221.15	6939.44	221.97	6939.44	222.15	6939.43	223.22	6939.43
225.06	6939.41	227.5	6939.41	227.82	6939.4	231.19	6939.4	231.5	6939.39
231.93	6939.4	232.42	6939.39	233.34	6939.39	234.81	6939.37	237.93	6939.3
238.85	6939.29	241.61	6939.23	242.24	6939.22	243.45	6939.19	244.37	6939.18
246.31	6939.14	247.42	6939.11	248.26	6939.1	249.88	6939.06	250.27	6939.06
253.28	6939	255.4	6938.95	256.27	6938.94	257.3	6938.92	257.38	6938.91

259.31	6938.88	260.91	6938.84	261.32	6938.84	263.33	6938.8	264.02	6938.78
265.34	6938.76	266.43	6938.73	267.35	6938.72	267.4	6938.71	268.27	6938.7
269.35	6938.67	270.66	6938.65	271.36	6938.63	273.37	6938.59	273.78	6938.59
276.38	6938.53	277.3	6938.52	278.4	6938.49	279.3	6938.48	281.72	6938.43
282.41	6938.41	284.42	6938.37	284.81	6938.37	286.42	6938.33	287.26	6938.32
288.36	6938.29	289.47	6938.27	290.44	6938.19	292.45	6937.91	293.09	6937.83
293.45	6937.77	294.46	6937.64	295.85	6937.44	296.77	6937.32	299.52	6936.93
300.44	6936.81	303.85	6936.33	306.07	6936.03	306.51	6935.96	307.51	6935.82
307.8	6935.79	309.39	6935.56	310.85	6935.36	311.47	6935.28	313.54	6934.99
314.23	6934.89	315.15	6934.77	319.35	6934.18	322.5	6933.75	325.26	6933.36
326.18	6933.24	328.94	6932.85	329.86	6932.73	332.57	6932.35	332.63	6932.35
333.73	6932.19	335.37	6931.97	335.63	6931.93	336.64	6931.87	337.21	6931.93
338.65	6932.1	339.65	6932.21	342.73	6932.58	343.69	6932.69	344.8	6932.83
347.68	6933.17	348.69	6933.3	350.08	6933.46	351.44	6933.63	352.54	6933.75
352.84	6933.77	354.3	6933.9	354.76	6933.93	355.6	6934.01	356.72	6934.1
357.73	6934.09	358.36	6934.07	360.74	6934.02	361.11	6934.02	362.03	6934
363.87	6933.98	364.72	6933.96	365.16	6933.96	366.63	6933.94	367.55	6933.92
368.04	6933.92	370.31	6933.88	370.78	6933.88	372.46	6933.85	373.06	6933.85
373.98	6933.83	375.82	6933.81	376.02	6933.8	378	6933.78	379.5	6933.75
380.21	6933.75	381.83	6933.72	382.42	6933.72	383.84	6933.7	384.08	6933.69
386.11	6933.67	386.96	6933.65	388.1	6933.64	389.25	6933.62	389.88	6933.62
392.18	6933.58	392.9	6933.58	393.08	6933.57	394.6	6933.55	395.78	6933.54
395.92	6933.53	397.25	6933.52	398.94	6933.49	399.38	6933.49	401.82	6933.43
402.08	6933.43	403.88	6933.39	404.99	6933.37	405.99	6933.34	408.67	6933.29
410.19	6933.25	411.09	6933.24	412.04	6933.21	412.89	6933.36	413.24	6933.41
414.38	6933.62	415.53	6933.82	415.59	6933.84	417.07	6934.1	417.81	6934.24
418.08	6934.28	420.1	6934.65	421.24	6934.85	422.38	6935.06	423.69	6935.29
424.67	6935.47	425.49	6935.61	426.39	6935.78	427.29	6935.92	430.38	6936.41
430.89	6936.5	431.52	6936.59	431.79	6936.64	433.59	6936.92	434.49	6937.07
436.29	6937.35	440.23	6937.98	441.24	6938.13	441.69	6938.21	442.25	6938.29
442.95	6938.41	443.25	6938.45	444.09	6938.59	445.27	6938.73	445.53	6938.73
448.29	6938.8	448.66	6938.8	449.3	6938.82	450.3	6938.84	450.95	6938.86
451.31	6938.86	453.23	6938.91	454.01	6938.92	456.1	6938.97	458.8	6939.03
459.37	6939.05	460.6	6939.07	461.5	6939.1	463.3	6939.14	463.51	6939.14
466	6939.2	468.08	6939.24	470.37	6939.3	471.51	6939.32	473.46	6939.37
476.8	6939.44	478.37	6939.48	478.6	6939.48	480.4	6939.52	481.3	6939.55
482.53	6939.57	483.1	6939.59	485.22	6939.63	485.8	6939.65	486.55	6939.66
487.51	6939.69	488.65	6939.71	490.58	6939.76	490.93	6939.76	491.59	6939.78
493.6	6939.82	495.51	6939.87	496.65	6939.89	497.79	6939.92	498.41	6939.93
498.93	6939.95	499.31	6939.95	500.21	6939.98	502.01	6940.02	502.36	6940.02
502.91	6940.04	503.67	6940.05	504.65	6940.08	504.94	6940.08	507.7	6940.15
508.07	6940.15	508.71	6940.17	509.72	6940.19	510.72	6940.22	511.01	6940.22
512.81	6940.26	513.71	6940.29	514.93	6940.31	516.77	6940.36	518.36	6940.39
521.78	6940.47	523.81	6940.52	524.51	6940.53	525.41	6940.53	525.83	6940.54
528.11	6940.54	528.64	6940.55	530.92	6940.55	531.72	6940.56	533.88	6940.56
534.35	6940.57	537.12	6940.57	537.78	6940.58	540.06	6940.58	540.72	6940.59
542.95	6940.59	543.42	6940.6	546.12	6940.6	546.92	6940.61	549.21	6940.61
549.72	6940.62	552.63	6940.62	553.02	6940.63	555.87	6940.63	556.02	6940.64

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  559.06 6940.64  559.49 6940.65  562.32 6940.65  562.92 6940.66   565.2 6940.66
  565.92 6940.67  568.63 6940.67  569.13 6940.68  571.32 6940.68  572.06 6940.69
   573.2 6940.69  574.03  6940.7  574.93  6940.7  576.18 6940.72  577.77 6940.73
  578.19 6940.74  578.91 6940.74   579.2 6940.75  580.05 6940.75  580.54 6940.76

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
       0     .05  289.47    .035  445.27     .05

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
        289.47  445.27            95.37   93.53    91.5             .1       .3

CROSS SECTION


RIVER: UT_BSC2
REACH: NCONFL-BGM         RS: 3600

INPUT
Description: Source: Corrected Effective Topo
Datum: NGVD29
Coordinate
             System: NAVD88 Colorado State Planes Central, US Feet.
Station Elevation Data    num=     492
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
       0 6937.68    7.19 6937.68    8.11 6937.66     8.2 6937.66    9.11 6937.63
     9.2 6937.63    10.1 6937.61   10.21 6937.61    11.1 6937.58   11.21 6937.58
   12.09 6937.56   12.16 6937.56   12.22 6937.55   12.79 6937.54   13.09 6937.53
   13.23 6937.53   14.08 6937.51   14.16  6937.5   14.23  6937.5   15.08 6937.48
   15.24 6937.48   16.07 6937.45   16.24 6937.45   17.07 6937.43   17.16 6937.43
   17.25 6937.42   18.06  6937.4   18.25  6937.4   19.06 6937.38   19.16 6937.37
   19.26 6937.37   20.05 6937.35   20.16 6937.35   20.26 6937.34   21.04  6937.3
   21.16  6937.3   21.27 6937.29   22.04 6937.25   22.16 6937.25   22.27 6937.24
   23.03  6937.2   23.16  6937.2   23.28 6937.19   24.03 6937.15   24.16 6937.14
   24.28 6937.14   25.02  6937.1   25.16 6937.09   25.29 6937.09   26.02 6937.05
    26.3 6937.03   27.01    6937    27.3 6936.98   28.01 6936.95   28.31 6936.93
      29  6936.9   29.31 6936.88      30 6936.85   30.32 6936.83   30.99  6936.8
   31.32 6936.78   31.99 6936.74   32.16 6936.74   32.33 6936.73   32.98 6936.69
   33.16 6936.68   33.33 6936.68   33.98 6936.64   34.34 6936.62   34.97 6936.59
   35.34 6936.57   35.97 6936.54   36.35 6936.52   36.96 6936.46   37.16 6936.45
   37.35 6936.42   37.95 6936.34   38.16 6936.31   38.36 6936.28   38.95  6936.2
   39.16 6936.17   39.37 6936.15   39.94 6936.07   40.16 6936.04   40.37 6936.01
   40.94 6935.93   41.38 6935.87   41.93  6935.8   42.16 6935.77   42.38 6935.74
   42.93 6935.66   43.39  6935.6   43.92 6935.53   44.16  6935.5   44.39 6935.46
   44.92 6935.39    45.4 6935.33   45.91 6935.26   46.16 6935.23    46.4 6935.19
   46.91 6935.12   47.41 6935.06    47.9 6934.99   48.16 6934.95   48.41 6934.92
    48.9 6934.85   49.16 6934.82   49.42 6934.78   49.89 6934.72   50.16 6934.68
   50.42 6934.64   50.89 6934.58   51.16 6934.54   51.43 6934.51   51.88 6934.44
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52.44	6934.36	53.16	6934.26	53.44	6934.22	53.87	6934.16	54.16	6934.12
54.45	6934.07	54.86	6934.01	55.16	6933.97	55.45	6933.93	55.86	6933.87
56.46	6933.79	56.85	6933.73	57.16	6933.69	57.46	6933.64	57.85	6933.59
58.16	6933.54	58.47	6933.5	58.84	6933.44	59.16	6933.4	59.47	6933.35
59.84	6933.3	60.16	6933.26	60.48	6933.21	60.83	6933.16	61.16	6933.11
61.48	6933.07	61.83	6933.02	62.82	6932.87	63.16	6932.83	63.82	6932.73
64.5	6932.63	64.81	6932.59	65.51	6932.49	65.81	6932.45	66.51	6932.35
66.8	6932.3	67.52	6932.2	67.8	6932.16	68.52	6932.06	68.79	6932.02
69.16	6931.97	69.53	6931.91	69.78	6931.88	70.16	6931.82	70.53	6931.77
70.78	6931.73	71.54	6931.63	71.77	6931.59	72.16	6931.54	72.54	6931.48
72.77	6931.45	73.15	6931.39	73.55	6931.34	73.76	6931.31	74.16	6931.25
74.55	6931.19	74.76	6931.16	75.16	6931.11	75.56	6931.05	75.75	6931.02
76.16	6930.96	76.57	6930.91	76.75	6930.88	77.57	6930.76	77.74	6930.74
78.16	6930.68	78.58	6930.66	78.74	6930.65	79.16	6930.63	79.58	6930.66
80.16	6930.7	80.59	6930.74	80.73	6930.75	81.59	6930.81	81.72	6930.82
82.16	6930.86	82.6	6930.89	82.72	6930.9	83.16	6930.93	83.6	6930.97
83.71	6930.97	84.16	6931.01	84.61	6931.04	84.7	6931.05	85.16	6931.08
85.61	6931.12	85.7	6931.13	86.16	6931.16	86.62	6931.2	86.69	6931.2
87.16	6931.24	87.62	6931.27	87.69	6931.28	88.16	6931.31	88.63	6931.35
88.68	6931.35	89.64	6931.43	89.68	6931.43	90.16	6931.47	90.64	6931.5
90.67	6931.5	91.65	6931.58	91.67	6931.58	92.65	6931.66	92.66	6931.66
93.16	6931.69	94.16	6931.77	94.65	6931.8	94.66	6931.8	95.16	6931.84
95.65	6931.87	95.67	6931.87	96.16	6931.9	96.64	6931.93	96.67	6931.93
97.16	6931.96	97.64	6931.99	97.68	6931.99	98.16	6932.02	98.63	6932.04
98.68	6932.05	99.16	6932.08	99.62	6932.1	99.69	6932.11	100.16	6932.14
100.62	6932.16	100.69	6932.17	101.16	6932.2	101.61	6932.22	101.7	6932.23
102.16	6932.26	102.61	6932.28	102.71	6932.29	103.16	6932.32	103.6	6932.34
103.71	6932.35	104.16	6932.38	104.6	6932.42	104.72	6932.42	105.16	6932.46
105.59	6932.51	105.72	6932.52	106.16	6932.56	106.59	6932.6	106.73	6932.62
107.16	6932.66	107.58	6932.7	107.73	6932.71	108.16	6932.75	108.58	6932.8
108.74	6932.81	109.16	6932.85	109.57	6932.89	109.74	6932.91	110.16	6932.95
110.57	6932.98	110.75	6933	111.16	6933.04	111.56	6933.07	111.75	6933.1
112.16	6933.13	112.56	6933.16	112.76	6933.17	113.16	6933.2	113.55	6933.23
113.76	6933.25	114.16	6933.28	114.55	6933.31	114.77	6933.32	115.16	6933.35
115.54	6933.38	115.78	6933.4	116.16	6933.43	116.53	6933.46	116.78	6933.47
117.16	6933.5	117.53	6933.53	117.79	6933.55	118.16	6933.58	118.52	6933.61
118.79	6933.63	119.16	6933.65	119.52	6933.68	119.8	6933.7	120.16	6933.73
120.51	6933.76	120.8	6933.78	121.16	6933.81	121.51	6933.83	121.81	6933.85
122.16	6933.88	122.5	6933.91	122.81	6933.93	123.16	6933.96	123.5	6933.98
123.82	6934.01	124.16	6934.03	124.49	6934.06	124.82	6934.08	125.16	6934.11
125.49	6934.13	125.83	6934.16	126.16	6934.18	126.48	6934.21	126.84	6934.23
127.16	6934.26	127.48	6934.28	127.84	6934.31	128.16	6934.33	128.47	6934.36
128.85	6934.39	129.47	6934.43	129.85	6934.46	130.16	6934.49	130.46	6934.51
130.86	6934.54	131.16	6934.56	131.45	6934.52	131.86	6934.47	132.16	6934.44
132.45	6934.4	132.87	6934.34	133.16	6934.3	133.44	6934.27	133.87	6934.21
134.16	6934.17	134.44	6934.13	134.88	6934.08	135.16	6934.04	135.43	6934
135.88	6933.94	136.16	6933.91	136.43	6933.87	136.89	6933.81	137.16	6933.77
137.42	6933.74	137.89	6933.68	138.16	6933.64	138.42	6933.61	138.9	6933.54

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  139.16 6933.51  139.41 6933.47  140.16 6933.38  140.41 6933.34  140.91 6933.27
  141.16 6933.24   141.4 6933.21  141.92 6933.14   142.4 6933.08  142.92 6933.01
  143.16 6932.98  143.39 6932.95  143.93 6932.87  145.16 6932.71  145.38 6932.68
  145.94 6932.61  146.16 6932.58  146.37 6932.55  146.94 6932.47  147.16 6932.45
  147.37 6932.42  147.95 6932.34  148.16 6932.31  148.36 6932.29  148.95 6932.21
  149.16 6932.19  149.36 6932.16  149.96 6932.09  150.16 6932.07  150.35 6932.04
  150.96 6931.97  151.35 6931.93  151.97 6931.85  152.34 6931.81  152.98 6931.73
  153.34 6931.69  153.98 6931.61  154.16 6931.59  154.33 6931.57  154.99 6931.49
  155.33 6931.45  155.99 6931.37  156.16 6931.35  156.32 6931.33     157 6931.25
  157.32 6931.21     158 6931.13  158.31 6931.09  159.01 6931.01  159.16 6930.99
  159.31 6930.98  160.01 6930.94  160.16 6930.93   160.3 6930.96  161.02 6931.13
  161.16 6931.16   161.3  6931.2  162.02 6931.37  162.16  6931.4  163.16 6931.63
  163.28 6931.66  164.03 6931.84  164.16 6931.87  164.28 6931.89  165.04 6932.07
  165.16  6932.1  165.27 6932.13  166.05 6932.31  166.16 6932.33  166.27 6932.36
  167.05 6932.54  167.16 6932.57  167.26 6932.59  168.06 6932.78  168.26 6932.82
  169.06 6933.01  169.16 6933.03  169.25 6933.06  170.07 6933.25  170.25 6933.29
  171.07 6933.48  171.16  6933.5  171.24 6933.52  172.08 6933.72  172.16 6933.74
  172.24 6933.75  173.08 6933.95  173.16 6933.97  173.23 6933.99  174.09 6934.19
  174.16  6934.2  174.23 6934.22  175.09 6934.42  175.16 6934.44  175.22 6934.45
   176.1 6934.66  176.22 6934.68  177.11 6934.89  177.21 6934.91   178.2 6935.13
  179.12 6935.33   179.2 6935.35  180.12 6935.56  180.16 6935.56  180.19 6935.57
  181.06 6935.76  181.13 6935.78  181.16 6935.78  181.19 6935.79  182.13    6936
  182.16 6936.01  182.18 6936.01  183.14 6936.22  183.16 6936.23  183.18 6936.23
  184.14 6936.44  184.17 6936.45  185.15 6936.66  185.17 6936.67  186.15 6936.89
  186.16 6936.89  186.96 6937.06  187.16 6937.11  188.15 6937.18  188.16 6937.18
  189.15 6937.22  189.17 6937.22  190.14 6937.26  190.18 6937.26  191.14  6937.3
  191.18  6937.3  192.13 6937.34  192.19 6937.34  193.13 6937.37  193.19 6937.37
  194.12 6937.39  194.98 6937.39

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
       0     .05   36.35    .035  130.86     .05

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
         36.35  130.86           108.43  100.15   91.04             .1       .3

CROSS SECTION


RIVER: UT_BSC2
REACH: NCONFL-BGM         RS: 3500

INPUT
Description: Source: Corrected Effective Topo
Datum: NGVD29
Coordinate
             System: NAVD88 Colorado State Planes Central, US Feet.
Station Elevation Data    num=     430
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Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	6935.12	.58	6935.12	1.24	6935.13	1.56	6935.13	2.43	6935.14
2.66	6935.14	3.35	6935.15	3.76	6935.15	4.27	6935.16	4.54	6935.16
4.86	6935.17	5.54	6935.17	5.96	6935.18	6.55	6935.18	7.04	6935.19
7.55	6935.19	7.96	6935.2	8.56	6935.2	8.88	6935.21	9.56	6935.21
9.81	6935.22	10.56	6935.22	10.73	6935.23	11.65	6935.23	12.57	6935.24
12.61	6935.24	13.5	6935.25	13.58	6935.25	13.67	6935.26	14.58	6935.26
14.77	6935.27	15.01	6935.27	15.58	6935.27	15.87	6935.28	16.59	6935.28
16.97	6935.29	17.19	6935.29	17.59	6935.3	18.11	6935.3	18.6	6935.31
19.18	6935.31	19.6	6935.32	20.6	6935.32	20.88	6935.3	21.38	6935.26
21.61	6935.25	21.8	6935.23	22.48	6935.18	22.61	6935.16	22.72	6935.16
23.58	6935.09	23.61	6935.08	23.64	6935.08	23.97	6935.06	24.57	6935.01
24.62	6935	24.68	6935	25.49	6934.93	25.62	6934.92	25.78	6934.91
26.41	6934.86	26.63	6934.84	26.88	6934.82	27.33	6934.78	27.63	6934.76
27.98	6934.73	28.26	6934.71	28.63	6934.68	29.09	6934.64	29.18	6934.64
29.64	6934.6	30.1	6934.56	30.19	6934.55	30.64	6934.52	31.02	6934.49
31.29	6934.47	31.65	6934.44	31.94	6934.41	32.39	6934.38	32.65	6934.36
32.87	6934.35	33.49	6934.3	33.65	6934.29	33.79	6934.28	34.59	6934.23
34.66	6934.23	34.71	6934.22	35.33	6934.18	35.63	6934.16	35.69	6934.16
36.56	6934.1	36.67	6934.09	36.79	6934.08	37.48	6934.04	37.67	6934.02
37.9	6934.01	38.4	6933.97	38.67	6933.96	39	6933.93	39.32	6933.91
39.68	6933.89	40.1	6933.86	40.25	6933.85	40.68	6933.82	41.17	6933.79
41.2	6933.79	41.68	6933.75	42.09	6933.7	42.3	6933.67	42.69	6933.62
43.01	6933.57	43.4	6933.52	43.69	6933.48	43.94	6933.44	44.5	6933.36
44.7	6933.34	44.86	6933.32	45.6	6933.21	45.7	6933.2	45.78	6933.19
46.7	6933.06	47.63	6932.93	47.71	6932.92	47.81	6932.9	48.55	6932.8
48.71	6932.78	48.91	6932.75	49.47	6932.67	49.72	6932.64	50.01	6932.6
50.39	6932.54	50.72	6932.5	51.11	6932.44	51.32	6932.41	51.72	6932.36
52.21	6932.29	52.24	6932.29	52.73	6932.22	53.16	6932.16	53.31	6932.14
53.73	6932.08	54.08	6932.03	54.41	6931.98	54.74	6931.94	55	6931.9
55.51	6931.83	55.74	6931.8	55.93	6931.77	56.62	6931.67	56.74	6931.66
56.85	6931.64	57.72	6931.52	57.75	6931.52	57.77	6931.51	58.06	6931.47
58.69	6931.38	58.75	6931.38	58.82	6931.37	59.62	6931.26	59.75	6931.24
59.92	6931.21	60.54	6931.13	60.76	6931.1	61.02	6931.06	61.46	6931.02
61.76	6930.98	62.12	6930.93	62.38	6930.91	62.77	6930.85	63.22	6930.8
63.31	6930.79	63.77	6930.74	64.23	6930.69	64.32	6930.67	64.77	6930.62
65.15	6930.58	65.42	6930.55	65.78	6930.51	66.07	6930.47	66.53	6930.42
66.78	6930.39	67	6930.37	67.63	6930.29	67.79	6930.27	67.92	6930.26
68.73	6930.17	68.79	6930.16	68.84	6930.15	69.42	6930.09	69.76	6930.05
69.79	6930.04	69.83	6930.04	70.69	6929.94	70.8	6929.93	70.93	6929.91
71.61	6929.83	71.8	6929.81	72.03	6929.78	72.53	6929.73	72.81	6929.69
73.13	6929.66	73.45	6929.62	73.81	6929.58	74.23	6929.53	74.38	6929.51
74.81	6929.46	75.3	6929.41	75.34	6929.4	75.82	6929.35	76.14	6929.31
76.22	6929.3	76.44	6929.27	76.82	6929.23	77.14	6929.19	77.54	6929.15
77.82	6929.11	78.06	6929.09	78.64	6929.02	78.83	6929	78.99	6928.98
79.74	6928.89	79.83	6928.88	79.91	6928.88	80.78	6928.82	80.83	6928.81
80.84	6928.81	81.75	6928.9	81.84	6928.91	81.94	6928.92	82.68	6928.99
82.84	6929.01	83.04	6929.03	83.6	6929.08	83.85	6929.1	84.15	6929.13

84.52	6929.17	84.85	6929.2	85.25	6929.24	85.44	6929.26	85.86	6929.3
86.35	6929.34	86.37	6929.34	86.86	6929.39	87.29	6929.43	87.45	6929.45
87.86	6929.49	88.21	6929.52	88.55	6929.55	88.87	6929.58	89.13	6929.61
89.65	6929.66	89.87	6929.68	90.06	6929.7	90.75	6929.77	90.88	6929.78
90.98	6929.79	91.85	6929.87	91.88	6929.87	91.9	6929.88	92.15	6929.9
92.82	6929.96	92.88	6929.97	92.95	6929.98	93.75	6930.05	93.89	6930.07
94.06	6930.08	94.67	6930.14	94.89	6930.16	95.16	6930.19	95.59	6930.23
95.89	6930.26	96.26	6930.29	96.51	6930.32	96.9	6930.36	97.36	6930.39
97.44	6930.37	97.9	6930.41	98.36	6930.39	98.46	6930.39	98.91	6930.37
99.28	6930.35	99.56	6930.36	99.91	6930.34	100.2	6930.33	100.66	6930.32
100.91	6930.31	101.12	6930.31	101.76	6930.29	102.05	6930.29	102.87	6930.27
102.97	6930.27	103.51	6930.25	103.93	6930.25	103.97	6930.24	104.81	6930.23
104.93	6930.22	105.07	6930.22	105.74	6930.2	106.17	6930.2	106.66	6930.18
106.94	6930.18	107.27	6930.17	107.58	6930.16	107.94	6930.16	108.37	6930.15
108.5	6930.14	108.95	6930.13	109.43	6930.12	109.47	6930.12	109.95	6930.11
110.35	6930.1	110.57	6930.1	110.95	6930.09	111.27	6930.08	111.67	6930.07
111.96	6930.07	112.19	6930.06	112.78	6930.05	112.96	6930.04	113.12	6930.04
113.88	6930.02	114.04	6930.02	114.87	6930	114.98	6930	115.88	6929.98
115.97	6929.98	116.08	6929.97	116.81	6929.96	116.98	6929.95	117.18	6929.94
117.73	6929.9	117.98	6929.87	118.28	6929.85	118.65	6929.81	118.98	6929.78
119.38	6929.75	119.57	6929.73	119.99	6929.69	120.48	6929.65	120.5	6929.65
120.99	6929.6	121.42	6929.56	121.59	6929.55	122	6929.51	122.34	6929.48
122.69	6929.45	123	6929.42	123.26	6929.4	123.79	6929.35	124	6929.33
124.18	6929.31	124.89	6929.25	125.01	6929.24	125.11	6929.23	125.99	6929.15
126.03	6929.15	126.24	6929.13	126.95	6929.06	127.02	6929.06	127.09	6929.05
127.87	6928.99	128.02	6928.98	128.19	6928.99	128.8	6929.15	129.02	6929.16
129.29	6929.21	129.72	6929.3	130.03	6929.37	130.39	6929.44	130.64	6929.49
131.03	6929.57	131.5	6929.67	131.56	6929.68	132.03	6929.78	132.49	6929.88
132.6	6929.9	133.04	6929.99	133.41	6930.07	133.7	6930.13	134.04	6930.2
134.33	6930.26	134.8	6930.35	135.05	6930.41	135.25	6930.45	135.9	6930.58
136.05	6930.61	136.18	6930.64	137	6930.81	137.05	6930.82	137.1	6930.83
137.6	6930.93	138.02	6931.02	138.06	6931.03	138.1	6931.04	138.94	6931.21
139.06	6931.24	139.2	6931.27	139.87	6931.4	140.07	6931.45	140.31	6931.5
140.79	6931.6	141.07	6931.67	141.41	6931.76	141.71	6931.84	142.07	6931.94
142.51	6932.06	142.63	6932.1	143.08	6932.22	143.56	6932.36	143.61	6932.37
144.08	6932.51	144.48	6932.62	144.71	6932.68	145.09	6932.79	145.4	6932.88
145.81	6932.99	146.09	6933.07	146.26	6933.11	146.32	6933.13	146.91	6933.3
147.09	6933.35	147.24	6933.39	148.01	6933.61	148.1	6933.63	148.17	6933.65
148.96	6933.87	149.09	6933.91	149.1	6933.91	149.11	6933.92	150	6933.92

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.05	42.09	.035	149.09	.05

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
42.09	149.09	40.72	50.26	59.45	.1	.3

CROSS SECTION

RIVER: UT_BSC2
REACH: NCONFL-BGM RS: 3450

INPUT
Description: Source: Corrected Effective Topo
Datum: NGVD29
Coordinate
System: NAVD88 Colorado State Planes Central, US Feet.
Station Elevation Data num= 419

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	6934.24	.15	6934.24	.26	6934.25	.71	6934.24	1.19	6934.24
1.23	6934.23	2.12	6934.23	2.32	6934.22	2.71	6934.22	3.05	6934.21
3.41	6934.21	3.72	6934.2	3.98	6934.2	4.49	6934.19	4.72	6934.18
4.91	6934.18	5.58	6934.16	5.84	6934.16	6.67	6934.14	6.77	6934.14
7.41	6934.13	7.7	6934.12	7.75	6934.12	8.64	6934.1	8.84	6934.1
9.57	6934.08	9.93	6934.08	10.5	6934.07	10.74	6934.06	11.01	6934.06
11.43	6934.05	11.74	6934.04	12.09	6934.03	12.36	6934.03	12.74	6934.02
13.19	6934.01	13.29	6934.01	13.75	6934	14.22	6933.99	14.27	6933.99
14.75	6933.98	15.15	6933.97	15.36	6933.97	15.75	6933.96	16.08	6933.95
16.45	6933.95	16.75	6933.94	17.02	6933.93	17.54	6933.92	17.95	6933.92
18.62	6933.9	18.76	6933.9	18.88	6933.88	19.71	6933.76	19.76	6933.75
19.81	6933.74	20.41	6933.63	20.74	6933.57	20.77	6933.56	20.8	6933.56
21.67	6933.39	21.77	6933.38	21.88	6933.35	22.6	6933.22	22.77	6933.19
22.97	6933.16	23.53	6933.05	23.77	6933.02	24.06	6932.99	24.46	6932.95
24.78	6932.92	25.14	6932.89	25.4	6932.86	25.78	6932.83	26.23	6932.78
26.33	6932.78	26.78	6932.73	27.26	6932.69	27.32	6932.68	27.79	6932.64
28.19	6932.6	28.4	6932.58	28.79	6932.54	29.12	6932.51	29.49	6932.48
29.79	6932.45	30.05	6932.42	30.58	6932.37	30.8	6932.35	30.98	6932.34
31.66	6932.27	31.8	6932.26	31.91	6932.25	32.75	6932.17	32.8	6932.16
32.84	6932.16	33.41	6932.11	33.78	6932.07	33.84	6932.07	34.71	6931.98
34.81	6931.97	34.92	6931.96	35.64	6931.89	35.81	6931.88	36.01	6931.86
36.57	6931.81	36.81	6931.78	37.1	6931.76	37.5	6931.72	37.82	6931.69
38.19	6931.65	38.43	6931.64	38.82	6931.6	39.27	6931.56	39.36	6931.55
39.82	6931.51	40.29	6931.47	40.36	6931.47	40.83	6931.43	41.22	6931.39
41.45	6931.38	41.83	6931.34	42.16	6931.32	42.53	6931.28	42.83	6931.26
43.09	6931.24	43.62	6931.19	43.83	6931.17	44.02	6931.16	44.71	6931.1
44.84	6931.09	44.95	6931.08	45.79	6931.01	45.84	6931	45.88	6931
46.4	6930.96	46.81	6930.92	46.88	6930.92	47.74	6930.84	47.85	6930.84
47.97	6930.83	48.67	6930.77	48.85	6930.75	49.05	6930.73	49.6	6930.69
49.85	6930.67	50.14	6930.64	50.54	6930.61	50.85	6930.58	51.23	6930.55
51.47	6930.53	51.86	6930.5	52.31	6930.46	52.4	6930.45	52.86	6930.41
53.33	6930.37	53.4	6930.37	53.86	6930.33	54.26	6930.29	54.49	6930.27
54.87	6930.24	55.19	6930.22	55.57	6930.18	55.87	6930.16	56.12	6930.14
56.66	6930.09	56.87	6930.07	57.05	6930.06	57.75	6930	57.88	6929.99
57.98	6929.98	58.84	6929.91	58.88	6929.9	58.92	6929.9	59.4	6929.86
59.85	6929.82	59.92	6929.82	60.78	6929.74	60.88	6929.73	61.01	6929.72

61.71	6929.67	61.89	6929.65	62.1	6929.63	62.64	6929.59	62.89	6929.57
63.18	6929.54	63.57	6929.51	63.89	6929.48	64.27	6929.45	64.5	6929.43
64.9	6929.4	65.36	6929.36	65.43	6929.35	65.9	6929.31	66.37	6929.27
66.44	6929.27	66.9	6929.23	67.3	6929.19	67.53	6929.17	67.91	6929.14
68.23	6929.11	68.62	6929.08	68.91	6929.06	69.16	6929.04	69.7	6928.99
69.91	6928.97	70.09	6928.96	70.79	6928.9	70.91	6928.89	71.02	6928.88
71.88	6928.81	71.95	6928.81	72.4	6928.79	72.88	6928.78	72.96	6928.78
73.81	6928.76	73.92	6928.75	74.05	6928.75	74.75	6928.73	74.93	6928.73
75.14	6928.72	75.68	6928.71	75.93	6928.7	76.11	6928.69	76.22	6928.69
76.61	6928.68	76.93	6928.67	77.31	6928.66	77.54	6928.66	77.94	6928.64
78.4	6928.63	78.47	6928.63	78.94	6928.62	79.4	6928.6	79.49	6928.6
79.94	6928.59	80.33	6928.58	80.57	6928.57	80.94	6928.56	81.26	6928.55
81.66	6928.54	81.95	6928.53	82.19	6928.52	82.75	6928.51	82.95	6928.5
83.13	6928.5	83.83	6928.47	83.95	6928.47	84.06	6928.46	84.92	6928.43
84.96	6928.43	84.99	6928.42	85.4	6928.41	85.92	6928.39	85.96	6928.39
86.01	6928.38	86.85	6928.35	86.96	6928.35	87.09	6928.34	87.78	6928.31
87.96	6928.31	88.18	6928.3	88.71	6928.28	88.97	6928.27	89.27	6928.26
89.64	6928.24	89.97	6928.23	90.35	6928.21	90.57	6928.2	90.97	6928.19
91.44	6928.17	91.51	6928.17	91.98	6928.15	92.44	6928.13	92.53	6928.13
92.98	6928.11	93.37	6928.1	93.61	6928.09	93.98	6928.07	94.3	6928.06
94.7	6928.04	94.99	6928.03	95.23	6928.02	95.79	6928.09	95.99	6928.08
96.16	6928.12	96.87	6928.32	96.99	6928.35	97.09	6928.38	97.96	6928.62
97.99	6928.63	98.02	6928.64	98.39	6928.74	98.95	6928.9	99	6928.91
99.05	6928.93	99.89	6929.16	100	6929.19	100.13	6929.23	100.82	6929.42
101	6929.47	101.22	6929.53	101.75	6929.68	102.01	6929.75	102.31	6929.83
102.68	6929.94	103.01	6930.03	103.4	6930.14	103.61	6930.2	104.01	6930.31
104.48	6930.44	104.54	6930.46	105.02	6930.59	105.47	6930.71	105.57	6930.74
106.02	6930.87	106.4	6930.97	106.66	6931.04	107.02	6931.15	107.33	6931.23
107.74	6931.35	108.02	6931.43	108.27	6931.49	108.83	6931.63	109.03	6931.69
109.2	6931.73	109.55	6931.81	109.92	6931.9	110.03	6931.93	110.13	6931.96
111	6932.17	111.03	6932.18	111.06	6932.18	111.39	6932.26	111.99	6932.4
112.04	6932.42	112.09	6932.43	112.92	6932.63	113.04	6932.66	113.18	6932.68
113.85	6932.85	114.04	6932.88	114.26	6932.89	114.78	6932.93	115.05	6932.94
115.35	6932.95	115.71	6932.97	116.05	6932.99	116.44	6933	116.65	6933.01
117.05	6933.03	117.52	6933.06	117.58	6933.06	118.05	6933.08	118.51	6933.09
118.61	6933.11	119.06	6933.11	119.44	6933.12	119.7	6933.12	120.06	6933.13
120.78	6933.13	121.06	6933.14	121.3	6933.14	121.87	6933.15	122.23	6933.15
122.96	6933.16	123.16	6933.16	124.05	6933.17	124.39	6933.17	125.03	6933.18
125.13	6933.18	125.96	6933.19	126.22	6933.19	126.89	6933.2	127.31	6933.2
127.82	6933.21	128.39	6933.21	128.75	6933.22	129.68	6933.22	130.09	6933.23
130.61	6933.23	131.09	6933.24	131.65	6933.24	132.1	6933.25	132.47	6933.25
132.74	6933.26	133.41	6933.26	133.83	6933.27	134.34	6933.27	134.91	6933.28
135.27	6933.28	136	6933.29	136.2	6933.29	137.09	6933.3	137.39	6933.3
138.06	6933.31	138.17	6933.31	138.99	6933.32	139.26	6933.32	139.92	6933.33
140.35	6933.33	140.85	6933.34	141.43	6933.34	141.79	6933.35	142.13	6933.35
142.52	6933.36	143.13	6933.36	143.61	6933.37	144.13	6933.37	144.58	6933.38
145.13	6933.38	145.51	6933.39	146.14	6933.39	146.44	6933.4	147.37	6933.4
147.96	6933.41	148.3	6933.41	149.04	6933.42	150	6933.42		

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.05	18.88	.035	114.78	.05

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
18.88	114.78	75.69	100.23	119	.1	.3

CROSS SECTION

RIVER: UT_BSC2
REACH: NCONFL-BGM RS: 3350

INPUT
Description: Source: Corrected Effective Topo
Datum: NGVD29
Coordinate
System: NAVD88 Colorado State Planes Central, US Feet.
Station Elevation Data num= 492

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	6932.84	.31	6932.84	.72	6932.83	1.27	6932.83	1.42	6932.82
1.58	6932.82	2.22	6932.81	2.53	6932.81	2.97	6932.8	3.4	6932.8
3.64	6932.79	3.89	6932.79	4.47	6932.78	4.75	6932.78	5.22	6932.77
5.85	6932.77	5.97	6932.76	6.72	6932.76	6.96	6932.75	7.47	6932.75
7.67	6932.74	8.22	6932.74	8.51	6932.73	8.96	6932.73	9.18	6932.72
9.8	6932.72	10.29	6932.71	10.46	6932.71	10.83	6932.7	11.21	6932.7
11.4	6932.69	11.93	6932.69	11.96	6932.68	12.51	6932.68	12.71	6932.67
13.14	6932.64	13.46	6932.63	13.62	6932.62	14.06	6932.59	14.21	6932.59
14.73	6932.56	14.96	6932.55	15.45	6932.52	15.71	6932.51	15.84	6932.5
16.19	6932.49	16.46	6932.48	16.94	6932.45	17.21	6932.44	17.76	6932.41
17.96	6932.4	18.05	6932.4	18.32	6932.39	18.71	6932.37	19.16	6932.35
19.46	6932.33	20.08	6932.3	20.27	6932.3	20.45	6932.29	20.96	6932.26
21.38	6932.24	21.71	6932.23	22.39	6932.2	22.46	6932.19	22.58	6932.19
23.21	6932.16	23.6	6932.14	23.96	6932.12	24.7	6932.09	24.72	6932.09
25.46	6932.06	25.82	6932.04	26.2	6932.02	26.85	6931.99	26.95	6931.99
27.01	6931.98	27.7	6931.95	28.04	6931.94	28.45	6931.92	28.98	6931.89
29.14	6931.88	29.33	6931.88	29.95	6931.85	30.25	6931.83	30.7	6931.81
31.11	6931.79	31.36	6931.78	31.45	6931.78	31.64	6931.77	32.2	6931.74
32.47	6931.73	32.95	6931.71	33.24	6931.69	33.58	6931.68	33.7	6931.67
33.95	6931.66	34.45	6931.64	34.69	6931.63	35.04	6931.61	35.2	6931.6
35.37	6931.59	35.8	6931.57	35.95	6931.57	36.26	6931.55	36.7	6931.53
36.91	6931.52	37.45	6931.5	37.5	6931.5	38.02	6931.47	38.2	6931.46
38.58	6931.45	38.95	6931.43	39.13	6931.42	39.63	6931.4	39.7	6931.39
40.24	6931.37	40.45	6931.36	40.89	6931.34	41.2	6931.32	41.34	6931.32
41.76	6931.26	41.95	6931.24	42.45	6931.18	43.2	6931.06	43.44	6931.02
43.56	6931	43.9	6930.95	44.19	6930.9	44.67	6930.82	44.94	6930.78
45.51	6930.69	45.69	6930.66	45.78	6930.65	46.03	6930.61	46.44	6930.54

46.89	6930.47	47.19	6930.42	47.83	6930.32	47.94	6930.31	48	6930.3
48.16	6930.27	48.69	6930.19	49.11	6930.12	49.44	6930.07	50.14	6929.96
50.19	6929.95	50.22	6929.95	50.29	6929.93	50.94	6929.83	51.33	6929.77
51.69	6929.71	52.42	6929.6	52.43	6929.59	52.45	6929.59	53.19	6929.48
53.54	6929.42	53.94	6929.36	54.55	6929.26	54.65	6929.24	54.69	6929.24
54.76	6929.23	55.44	6929.12	55.76	6929.07	56.19	6929	56.68	6928.92
56.87	6928.89	57.08	6928.86	57.69	6928.76	57.98	6928.72	58.44	6928.64
58.81	6928.58	59.09	6928.54	59.19	6928.53	59.39	6928.49	59.94	6928.41
60.2	6928.37	60.69	6928.29	60.94	6928.25	61.31	6928.19	61.43	6928.17
61.7	6928.13	62.18	6928.05	62.42	6928.01	62.93	6927.93	63.08	6927.91
63.53	6927.84	63.68	6927.82	64.01	6927.76	64.43	6927.69	64.63	6927.66
65.18	6927.59	65.21	6927.57	65.74	6927.49	65.93	6927.47	66.33	6927.41
66.68	6927.36	66.85	6927.33	67.34	6927.26	67.43	6927.26	67.96	6927.18
68.18	6927.15	68.64	6927.09	68.93	6927.06	69.07	6927.04	69.47	6926.99
69.68	6926.96	70.18	6926.89	70.43	6926.86	70.95	6926.79	71.18	6926.76
71.29	6926.75	71.6	6926.71	71.93	6926.67	72.4	6926.6	72.68	6926.57
73.16	6926.51	73.26	6926.49	73.43	6926.47	73.51	6926.46	73.73	6926.45
74.18	6926.41	75.72	6926.41	75.86	6926.42	76.43	6926.43	76.83	6926.44
77.18	6926.45	77.89	6926.47	77.99	6926.47	78.67	6926.5	79.05	6926.51
79.42	6926.52	80.12	6926.54	80.2	6926.54	80.92	6926.56	81.27	6926.57
81.67	6926.59	82.26	6926.6	82.38	6926.61	82.51	6926.61	83.17	6926.63
83.49	6926.64	83.92	6926.65	84.39	6926.67	84.6	6926.68	84.83	6926.68
85.42	6926.7	85.71	6926.71	86.17	6926.72	86.52	6926.73	86.82	6926.74
86.92	6926.75	87.14	6926.75	87.67	6926.77	87.92	6926.78	88.42	6926.81
88.65	6926.83	89.03	6926.86	89.17	6926.87	89.45	6926.89	89.92	6926.92
90.14	6926.94	90.67	6926.98	90.78	6926.98	91.25	6927.02	91.42	6927.03
91.76	6927.06	92.17	6927.09	92.36	6927.1	92.91	6927.14	93.47	6927.18
93.67	6927.2	94.08	6927.23	94.42	6927.25	94.58	6927.26	95.04	6927.3
95.17	6927.31	95.69	6927.35	95.91	6927.36	96.39	6927.4	96.66	6927.42
96.8	6927.43	97.17	6927.45	97.41	6927.47	97.91	6927.51	98.16	6927.53
98.7	6927.57	98.91	6927.58	99.01	6927.59	99.3	6927.61	99.66	6927.64
100.12	6927.67	100.41	6927.69	101.01	6927.74	101.16	6927.75	101.23	6927.75
101.43	6927.77	101.91	6927.8	102.34	6927.83	102.66	6927.86	103.33	6927.91
103.41	6927.91	103.45	6927.92	103.57	6927.92	104.16	6927.97	104.56	6928
104.91	6928.02	105.64	6928.08	105.7	6928.08	106.41	6928.13	106.78	6928.16
107.16	6928.19	107.83	6928.24	107.91	6928.24	107.95	6928.25	108.66	6928.3
109	6928.32	109.41	6928.35	109.96	6928.39	110.11	6928.4	110.16	6928.41
110.26	6928.42	110.91	6928.46	111.21	6928.49	111.66	6928.52	112.09	6928.55
112.32	6928.57	112.41	6928.57	112.58	6928.59	113.16	6928.63	113.43	6928.65
113.9	6928.68	114.22	6928.71	114.54	6928.73	114.65	6928.74	114.89	6928.76
115.4	6928.79	115.65	6928.81	116.15	6928.85	116.35	6928.86	116.76	6928.89
116.9	6928.9	117.2	6928.93	117.65	6928.96	117.87	6928.97	118.4	6929.01
118.48	6929.02	118.98	6929.06	119.15	6929.07	119.51	6929.09	119.9	6929.12
120.09	6929.14	120.61	6929.18	120.65	6929.18	121.2	6929.22	121.4	6929.23
121.83	6929.26	122.15	6929.29	122.3	6929.3	122.75	6929.33	122.9	6929.34
123.41	6929.38	123.65	6929.4	124.14	6929.43	124.4	6929.45	124.52	6929.46
124.88	6929.49	125.15	6929.51	125.63	6929.54	125.9	6929.55	126.45	6929.57
126.65	6929.58	126.74	6929.58	127.01	6929.59	127.4	6929.6	127.85	6929.61

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  128.15 6929.62  128.76 6929.64  128.96 6929.64  129.14 6929.65  129.65 6929.66
  130.07 6929.67   130.4 6929.68  131.08  6929.7  131.14  6929.7  131.18 6929.71
  131.27 6929.71  131.89 6929.73  132.29 6929.74  132.64 6929.75  133.39 6929.77
   133.4 6929.77  134.14 6929.79   134.5  6929.8  134.89 6929.81  135.53 6929.83
   135.7 6929.83  136.39 6929.85  136.72 6929.86  137.14 6929.87  137.66 6929.89
  137.89 6929.89  138.01  6929.9  138.64 6929.92  138.94 6929.92  139.39 6929.94
  139.79 6929.95  140.05 6929.95  140.14 6929.96  140.33 6929.96  140.89 6929.98
  141.16 6929.99  141.64    6930  141.93 6930.01  142.27 6930.02  142.39 6930.02
  142.64 6930.03  143.14 6930.04  143.38 6930.05  143.89 6930.06  144.06 6930.07
  144.49 6930.08  144.64 6930.08  144.95 6930.09  145.39  6930.1   145.6 6930.11
  146.14 6930.13  146.19 6930.13   146.7 6930.14  146.89 6930.15  147.26 6930.16
  147.64 6930.17  147.81 6930.17  148.32 6930.19  148.38 6930.19  148.92  6930.2
  149.13 6930.21  149.58 6930.22  149.88 6930.23  150.03 6930.24  150.45 6930.25
  150.63 6930.25  151.14 6930.26  151.38 6930.27  151.89 6930.28  152.13 6930.29
  152.25 6930.29  152.58  6930.3  152.88 6930.31  153.36 6930.32  153.63 6930.33
   154.2 6930.34  154.38 6930.34  154.47 6930.35  154.71 6930.35  155.13 6930.36
  155.58 6930.37  155.88 6930.38  156.51 6930.39  156.63  6930.4  156.84  6930.4
  157.38 6930.41  157.79 6930.42  158.13 6930.43  158.83 6930.45  158.97 6930.45
  159.63 6930.46  160.01 6930.47  160.38 6930.48  161.11  6930.5  161.14  6930.5
  161.88 6930.52  162.23 6930.53  162.24 6930.53  162.63 6930.53  163.24 6930.55
  163.45 6930.55  164.13 6930.57  164.45 6930.58  164.88 6930.59  165.37  6930.6
  165.62  6930.6  165.76 6930.61  166.37 6930.62  166.67 6930.63  167.12 6930.64
   167.5 6930.65  167.78 6930.65  167.87 6930.66  168.08 6930.66  168.62 6930.67
  168.89 6930.68  169.23 6930.68

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
       0     .05   41.34    .035  125.63     .05

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
         41.34  125.63             63.32    50.1   22.83              .1       .3

CROSS SECTION


RIVER: UT_BSC2
REACH: NCONFL-BGM         RS: 3300

INPUT
Description: Source: Corrected Effective Topo
Datum: NGVD29
Coordinate
             System: NAVD88 Colorado State Planes Central, US Feet.
Station Elevation Data    num=     491
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
       0 6931.23     1.4 6931.23    1.67 6931.22    4.09 6931.22    4.39 6931.21
    6.77 6931.21    7.09  6931.2    8.56  6931.2    9.39 6931.19   10.44 6931.19
   10.55 6931.18   11.25 6931.17   11.45 6931.16    11.7 6931.16   12.15 6931.15
```

12.45	6931.14	12.85	6931.13	13.04	6931.13	13.46	6931.12	13.94	6931.11
14	6931.11	14.47	6931.1	14.83	6931.09	15.48	6931.07	15.73	6931.07
16.31	6931.05	16.62	6931.05	17.46	6931.03	17.52	6931.03	17.71	6931.02
18.41	6931.01	18.5	6931	18.61	6931	19.31	6930.99	19.51	6930.98
19.77	6930.98	20.2	6930.97	20.52	6930.96	20.92	6930.95	21.1	6930.95
21.52	6930.94	21.99	6930.93	22.07	6930.92	22.53	6930.91	22.89	6930.91
23.54	6930.89	23.78	6930.89	24.38	6930.87	24.68	6930.87	25.53	6930.85
25.58	6930.84	25.73	6930.84	26.47	6930.82	26.68	6930.82	27.37	6930.8
27.57	6930.8	27.84	6930.79	28.26	6930.78	28.58	6930.78	28.99	6930.77
29.16	6930.76	30.05	6930.74	30.14	6930.74	30.6	6930.73	30.95	6930.72
31.29	6930.72	31.6	6930.71	31.84	6930.7	32.45	6930.69	32.61	6930.69
32.74	6930.68	33.6	6930.66	33.75	6930.66	34.53	6930.64	34.75	6930.64
35.42	6930.62	35.63	6930.62	35.91	6930.61	36.32	6930.6	36.64	6930.59
37.06	6930.59	37.21	6930.58	38.11	6930.56	38.21	6930.56	38.66	6930.55
39.36	6930.53	39.67	6930.53	39.9	6930.52	40.52	6930.51	40.67	6930.5
40.8	6930.5	41.67	6930.48	41.77	6930.48	42.59	6930.46	42.69	6930.46
42.82	6930.45	43.48	6930.44	43.7	6930.43	43.98	6930.43	44.38	6930.42
44.71	6930.41	44.98	6930.4	45.27	6930.4	46.17	6930.38	46.28	6930.38
46.72	6930.37	47.43	6930.35	47.73	6930.34	47.96	6930.34	48.59	6930.32
48.85	6930.32	49.74	6930.3	49.79	6930.3	50.64	6930.27	50.75	6930.27
50.89	6930.26	51.54	6930.19	51.76	6930.17	52.04	6930.14	52.44	6930.1
53.2	6930.03	53.33	6930.01	53.78	6929.97	54.23	6929.92	54.35	6929.91
54.78	6929.87	55.12	6929.8	55.5	6929.71	55.79	6929.65	56.02	6929.59
56.66	6929.42	56.91	6929.35	57.8	6929.11	58.7	6928.88	58.82	6928.85
58.96	6928.81	59.6	6928.64	60.11	6928.5	60.83	6928.31	61.39	6928.17
61.84	6928.05	62.28	6927.93	62.42	6927.89	62.85	6927.78	63.18	6927.69
63.57	6927.59	63.85	6927.51	64.07	6927.46	64.72	6927.28	64.86	6927.25
65.82	6926.99	65.88	6926.98	66.76	6926.75	67.03	6926.68	67.66	6926.51
67.89	6926.45	68.18	6926.37	68.55	6926.28	68.89	6926.19	69.34	6926.09
69.45	6926.09	69.9	6925.99	70.34	6925.9	70.49	6925.88	70.91	6925.8
71.24	6925.73	71.64	6925.66	71.92	6925.61	72.13	6925.57	72.79	6925.44
72.93	6925.42	73.14	6925.38	73.84	6925.24	73.92	6925.23	73.95	6925.22
74.82	6925.06	74.94	6925.04	75.1	6925.02	75.71	6924.9	75.95	6924.89
76.25	6924.9	76.96	6924.94	77.4	6924.96	77.5	6924.97	77.96	6924.99
78.4	6925.02	78.56	6925.03	78.97	6925.05	79.3	6925.07	79.71	6925.09
79.98	6925.1	80.19	6925.11	80.86	6925.15	80.99	6925.16	81.09	6925.16
82.02	6925.22	83	6925.3	83.17	6925.31	84.01	6925.38	84.32	6925.4
85.02	6925.46	85.47	6925.49	85.56	6925.5	86.03	6925.53	86.46	6925.57
86.63	6925.58	87.04	6925.61	87.35	6925.64	87.78	6925.67	88.04	6925.69
88.25	6925.71	88.93	6925.76	89.14	6925.78	89.88	6925.84	90.08	6925.85
90.93	6925.92	91.24	6925.94	92.07	6926.01	92.73	6926.05	93.08	6926.08
93.54	6926.11	93.62	6926.11	94.09	6926.15	94.52	6926.18	94.7	6926.19
95.1	6926.22	95.41	6926.24	95.85	6926.27	96.11	6926.29	96.31	6926.31
97	6926.35	97.2	6926.37	97.9	6926.42	98.1	6926.43	98.15	6926.44
99.13	6926.51	99.31	6926.52	99.89	6926.56	100.14	6926.58	100.78	6926.62
101.15	6926.65	101.61	6926.68	101.68	6926.69	102.15	6926.72	102.57	6926.75
102.76	6926.76	103.16	6926.79	103.92	6926.84	104.17	6926.86	104.36	6926.88
105.07	6926.93	105.18	6926.93	105.26	6926.94	105.92	6926.99	106.16	6927

106.22	6927.01	107.19	6927.08	107.38	6927.09	107.95	6927.13	108.2	6927.15
108.84	6927.19	109.21	6927.22	109.68	6927.25	109.74	6927.26	110.22	6927.29
110.63	6927.32	110.83	6927.33	111.22	6927.36	111.53	6927.38	111.99	6927.42
112.23	6927.43	112.42	6927.45	113.14	6927.5	113.24	6927.51	113.32	6927.51
113.94	6927.56	114.21	6927.58	114.25	6927.58	114.29	6927.59	115.11	6927.65
115.26	6927.67	115.45	6927.68	116	6927.73	116.26	6927.75	116.6	6927.78
116.9	6927.8	117.27	6927.83	117.75	6927.87	117.79	6927.88	118.28	6927.92
118.69	6927.95	118.9	6927.97	119.29	6928	119.59	6928.03	120.3	6928.09
120.48	6928.1	121.21	6928.16	121.38	6928.18	121.96	6928.23	122.27	6928.25
122.31	6928.26	122.36	6928.26	123.17	6928.33	123.32	6928.34	123.51	6928.36
124.33	6928.42	124.67	6928.45	124.96	6928.48	125.82	6928.55	125.85	6928.55
126.34	6928.59	126.75	6928.63	126.97	6928.65	127.35	6928.68	127.64	6928.7
128.13	6928.74	128.36	6928.76	128.54	6928.78	128.8	6928.8	129.28	6928.84
129.37	6928.85	129.43	6928.85	129.98	6928.9	130.33	6928.93	130.43	6928.93
131.22	6929	131.38	6929.01	131.58	6929.03	132.12	6929.08	132.39	6929.1
132.74	6929.13	133.02	6929.15	133.4	6929.18	133.89	6929.22	133.91	6929.23
134.41	6929.27	134.81	6929.29	135.04	6929.3	135.41	6929.33	135.7	6929.34
136.19	6929.34	136.42	6929.35	136.6	6929.35	137.35	6929.37	137.49	6929.37
138	6929.38	138.39	6929.39	138.5	6929.39	139.28	6929.4	139.44	6929.41
139.65	6929.41	140.18	6929.42	140.45	6929.42	140.81	6929.43	141.07	6929.44
141.46	6929.44	142.47	6929.46	142.86	6929.47	143.11	6929.47	143.48	6929.48
143.76	6929.49	144.26	6929.5	144.65	6929.5	145.42	6929.52	145.55	6929.52
146.02	6929.53	146.45	6929.54	146.57	6929.54	147.34	6929.57	147.51	6929.57
147.72	6929.58	148.24	6929.6	148.52	6929.61	148.87	6929.62	149.13	6929.63
149.52	6929.64	150.53	6929.68	150.92	6929.69	151.18	6929.7	151.54	6929.71
151.82	6929.72	152.33	6929.74	152.55	6929.75	152.71	6929.75	153.49	6929.78
153.61	6929.78	154.04	6929.8	154.5	6929.82	154.64	6929.82	155.4	6929.85
155.57	6929.85	155.79	6929.86	156.29	6929.88	156.58	6929.89	156.94	6929.9
157.19	6929.91	157.59	6929.92	158.1	6929.94	158.59	6929.96	158.98	6929.97
159.25	6929.98	159.6	6930	159.88	6930	160.4	6930.02	160.61	6930.03
160.77	6930.04	161.55	6930.06	161.62	6930.07	161.67	6930.07	162.05	6930.08
162.56	6930.1	162.71	6930.1	163.46	6930.13	163.63	6930.14	163.86	6930.14
164.35	6930.16	164.64	6930.17	165.01	6930.18	165.25	6930.19	165.65	6930.21
166.17	6930.22	166.66	6930.24	167.04	6930.26	167.32	6930.27	167.66	6930.28
168.47	6930.31	168.67	6930.31	168.83	6930.32	169.62	6930.35	169.72	6930.35
170.07	6930.36	170.62	6930.38	170.69	6930.38	170.78	6930.39	171.52	6930.41
171.7	6930.42	171.93	6930.43	172.41	6930.44	172.7	6930.45	173.08	6930.47
173.31	6930.48	173.71	6930.49	174.2	6930.51	174.24	6930.51	174.72	6930.52
175.1	6930.54	175.39	6930.55	175.73	6930.56	176.54	6930.59	176.74	6930.6
176.89	6930.6	177.69	6930.63	177.78	6930.63	178.68	6930.66	178.75	6930.67
178.85	6930.67	179.57	6930.69	179.76	6930.7	180.47	6930.73	180.77	6930.74
181.15	6930.75	181.36	6930.76	181.77	6930.77	182.26	6930.79	182.3	6930.79
182.78	6930.81	183.15	6930.82	183.79	6930.84	184.05	6930.85	184.61	6930.87
184.8	6930.88	184.95	6930.88	185.76	6930.91	185.84	6930.91	186.11	6930.92
186.74	6930.95	186.92	6930.95	187.63	6930.98	187.82	6930.98	188.07	6930.99
188.53	6931	188.83	6931.01	189.22	6931.03	189.42	6931.03	189.84	6931.05
190.32	6931.06	190.37	6931.06	190.85	6931.08	191.21	6931.09	191.85	6931.11
192	6931.11								

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.05	53.78	.035	135.41	.05

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
53.78	135.41	64.11	49.63	23.06	.1	.3

CROSS SECTION

RIVER: UT_BSC2
REACH: NCONFL-BGM RS: 3250

INPUT
Description: Source: Corrected Effective Topo
Datum: NGVD29
Coordinate
System: NAVD88 Colorado State Planes Central, US Feet.
Station Elevation Data num= 492

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	6929.69	.07	6929.69	.5	6929.68	.68	6929.68	1.36	6929.67
1.59	6929.66	1.92	6929.66	2.22	6929.65	2.6	6929.65	3.09	6929.64
3.15	6929.64	3.62	6929.63	3.95	6929.63	4.38	6929.62	4.81	6929.62
5.62	6929.61	7.4	6929.61	7.68	6929.6	8.09	6929.59	8.26	6929.59
9.13	6929.57	9.32	6929.56	9.71	6929.55	9.99	6929.54	10.56	6929.53
10.73	6929.52	10.85	6929.52	11.54	6929.5	11.71	6929.49	11.79	6929.49
12.58	6929.47	12.76	6929.46	13.02	6929.46	13.44	6929.45	13.78	6929.44
14.26	6929.42	14.3	6929.42	14.79	6929.41	15.16	6929.4	15.81	6929.38
16.03	6929.38	16.73	6929.36	16.89	6929.36	17.27	6929.35	17.75	6929.34
17.84	6929.34	17.96	6929.33	18.61	6929.32	18.85	6929.31	19.2	6929.31
19.48	6929.3	19.87	6929.29	20.34	6929.28	20.43	6929.28	20.89	6929.27
21.2	6929.27	21.66	6929.26	21.9	6929.25	22.07	6929.25	22.9	6929.23
23	6929.23	23.79	6929.21	24.13	6929.21	24.65	6929.19	24.95	6929.19
25.37	6929.18	25.52	6929.18	26.38	6929.16	26.6	6929.15	26.98	6929.15
27.24	6929.14	27.84	6929.13	27.99	6929.13	28.1	6929.12	28.73	6929.11
28.97	6929.11	29.01	6929.1	29.07	6929.1	29.83	6929.09	30.03	6929.08
30.3	6929.08	30.69	6929.07	31.04	6929.06	32.06	6929.04	32.42	6929.03
32.77	6929.03	33.07	6929.02	33.28	6929.02	34.01	6929	34.14	6929
34.46	6928.99	35.01	6928.98	35.24	6928.98	35.87	6928.96	36.12	6928.96
36.48	6928.95	36.73	6928.95	37.13	6928.94	37.59	6928.93	37.71	6928.93
38.15	6928.92	38.46	6928.91	38.95	6928.9	39.17	6928.9	39.32	6928.89
40.18	6928.87	41.04	6928.86	41.2	6928.85	41.41	6928.85	41.91	6928.84
42.21	6928.83	42.65	6928.82	42.77	6928.82	43.23	6928.81	43.63	6928.8
43.88	6928.8	44.24	6928.79	44.5	6928.79	45.12	6928.77	45.36	6928.77
45.92	6928.76	46.22	6928.75	46.35	6928.75	47.08	6928.73	47.29	6928.73
47.59	6928.72	47.95	6928.71	48.31	6928.71	49.32	6928.69	49.67	6928.68
50.05	6928.67	50.34	6928.67	50.53	6928.66	50.59	6928.66	51.29	6928.65

51.35	6928.64	51.65	6928.64	52.26	6928.63	52.37	6928.62	52.52	6928.62
53.12	6928.61	53.38	6928.6	53.76	6928.59	53.99	6928.59	54.4	6928.58
54.85	6928.57	54.99	6928.57	55.41	6928.56	55.71	6928.54	56.23	6928.48
56.43	6928.46	56.57	6928.43	57.38	6928.21	57.44	6928.19	57.46	6928.19
58.3	6927.96	58.46	6927.92	58.69	6927.86	59.16	6927.73	59.48	6927.65
59.93	6927.52	60.02	6927.5	60.49	6927.37	60.89	6927.27	61.16	6927.19
61.51	6927.1	61.75	6927.04	62.4	6926.86	62.52	6926.83	62.61	6926.81
63.11	6926.68	63.48	6926.59	63.54	6926.57	63.63	6926.55	64.34	6926.39
64.87	6926.27	65.2	6926.2	65.57	6926.11	66.06	6926	66.1	6925.99
66.59	6925.88	66.93	6925.81	67.33	6925.71	67.6	6925.65	67.79	6925.61
68.57	6925.43	68.65	6925.41	68.84	6925.37	69.51	6925.22	69.63	6925.19
69.8	6925.15	70.38	6925.02	70.65	6924.96	71.04	6924.87	71.24	6924.83
71.66	6924.73	72.1	6924.63	72.27	6924.59	72.68	6924.5	72.96	6924.44
73.51	6924.31	73.7	6924.27	74.57	6924.07	74.69	6924.04	74.74	6924.04
75.39	6923.91	75.55	6923.88	75.73	6923.87	75.97	6923.89	76.42	6923.92
76.74	6923.95	77.21	6923.99	77.28	6924	77.76	6924.04	78.14	6924.07
78.44	6924.09	78.77	6924.12	79	6924.14	79.68	6924.19	79.79	6924.2
79.87	6924.21	80.3	6924.25	80.73	6924.28	80.8	6924.29	80.91	6924.3
81.59	6924.35	81.82	6924.37	82.15	6924.4	82.45	6924.42	82.84	6924.45
83.32	6924.49	83.38	6924.5	83.85	6924.54	84.18	6924.57	84.62	6924.6
84.87	6924.62	85.04	6924.64	85.85	6924.71	85.91	6924.71	86.03	6924.72
86.77	6924.8	86.9	6924.81	87.08	6924.83	87.63	6924.9	87.91	6924.93
88.32	6924.98	88.49	6925	88.93	6925.05	89.36	6925.11	89.55	6925.12
89.94	6925.17	90.22	6925.2	90.79	6925.26	90.96	6925.28	91.08	6925.29
91.76	6925.36	91.94	6925.38	92.02	6925.38	92.81	6925.46	93.26	6925.51
93.67	6925.55	94.01	6925.59	94.49	6925.64	94.53	6925.64	95.02	6925.69
95.39	6925.73	95.72	6925.76	96.04	6925.79	96.26	6925.82	96.96	6925.89
97.05	6925.9	97.12	6925.9	97.98	6925.99	98.07	6926	98.19	6926.01
98.85	6926.08	99.08	6926.11	99.43	6926.14	99.71	6926.17	100.1	6926.21
100.66	6926.27	101.12	6926.31	101.43	6926.35	101.9	6926.39	102.13	6926.42
102.3	6926.43	103.13	6926.52	103.16	6926.52	103.23	6926.53	104.02	6926.61
104.16	6926.62	104.36	6926.65	104.88	6926.7	105.18	6926.73	105.6	6926.77
105.75	6926.79	106.19	6926.83	106.61	6926.88	106.83	6926.9	107.21	6926.94
107.47	6926.97	108.07	6927.03	108.22	6927.04	108.34	6927.05	108.96	6927.12
109.2	6927.14	109.24	6927.15	109.3	6927.15	110.06	6927.23	110.26	6927.25
110.92	6927.32	111.27	6927.36	111.77	6927.41	111.79	6927.41	112.29	6927.46
112.65	6927.5	113	6927.54	113.3	6927.57	114.24	6927.66	114.32	6927.67
114.37	6927.68	114.69	6927.71	115.33	6927.78	115.47	6927.79	116.1	6927.86
116.35	6927.88	116.71	6927.92	116.96	6927.94	117.37	6927.99	117.82	6928.03
117.94	6928.04	118.38	6928.09	118.69	6928.12	119.18	6928.17	119.4	6928.19
119.55	6928.21	120.41	6928.3	120.42	6928.3	121.28	6928.39	121.43	6928.4
121.65	6928.43	122.14	6928.48	122.44	6928.51	122.82	6928.54	122.88	6928.55
123	6928.57	123.46	6928.61	123.86	6928.66	124.11	6928.68	124.47	6928.71
124.73	6928.74	125.35	6928.79	125.49	6928.8	125.59	6928.81	126.15	6928.86
126.45	6928.88	126.51	6928.88	126.58	6928.89	127.31	6928.95	127.52	6928.97
127.82	6928.99	128.54	6929.05	129.04	6929.08	129.05	6929.09	129.55	6929.12
129.9	6929.13	130.29	6929.14	130.57	6929.14	130.77	6929.15	131.52	6929.16
131.58	6929.16	131.63	6929.17	131.88	6929.17	132.49	6929.18	132.6	6929.18

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  132.75 6929.19  133.35  6929.2  133.61  6929.2  133.99 6929.21  134.22 6929.22
  134.63 6929.22  135.08 6929.23  135.22 6929.24  135.65 6929.24  135.94 6929.25
  136.46 6929.26  136.66 6929.26   136.8 6929.27  137.61 6929.28  137.69 6929.28
  138.53  6929.3  138.69  6929.3  138.93 6929.31  139.39 6929.32  139.71 6929.32
  140.16 6929.33  140.25 6929.34  140.72 6929.34  141.12 6929.35  141.39 6929.36
  141.74 6929.36  141.98 6929.37  142.63 6929.38  142.75 6929.38  142.84 6929.39
  143.34  6929.4  143.77  6929.4  143.86 6929.41  144.57 6929.42  144.79 6929.42
  145.43 6929.44   145.8 6929.44  146.29 6929.45  146.33 6929.45  146.82 6929.46
  147.16 6929.47  147.57 6929.48  147.83 6929.48  148.02 6929.49   148.8  6929.5
  148.88  6929.5  149.07 6929.51  149.74 6929.52  149.86 6929.52  150.03 6929.53
  150.61 6929.54  150.88 6929.54  151.27 6929.55  151.47 6929.56  151.89 6929.56
  152.33 6929.57   152.5 6929.58  152.91 6929.58   153.2 6929.59  153.74  6929.6
  153.93  6929.6  154.06 6929.61   154.8 6929.62  154.97 6929.62  155.78 6929.64
  155.96 6929.64  156.21 6929.65  156.65 6929.66  156.97 6929.66  157.44 6929.67
  157.51 6929.67  157.99 6929.68  158.37 6929.69  158.67  6929.7     159  6929.7
  159.23 6929.71  159.91 6929.73  160.02 6929.73   160.1 6929.74  160.53 6929.75
  160.96 6929.77  161.04 6929.77  161.14 6929.78  161.82  6929.8  162.05 6929.81
  162.38 6929.83  162.68 6929.84  163.07 6929.85  163.55 6929.87  163.61 6929.87
  164.08 6929.89  164.41  6929.9  164.85 6929.92   165.1 6929.93  165.27 6929.94
  166.08 6929.97  166.14 6929.97  166.26 6929.98     167    6930  167.13 6930.01
  167.32 6930.02  168.14 6930.05  168.55 6930.06  168.72 6930.07  169.16 6930.09
  169.59  6930.1  170.18 6930.13  170.45 6930.14  171.02 6930.16  171.19 6930.17
  171.31 6930.17  171.99  6930.2  172.17  6930.2  172.21 6930.21  172.25 6930.21
  173.04 6930.24  173.05 6930.24

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
       0     .05   55.71    .035  128.54     .05

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
         55.71  128.54            50.23   50.23   50.23             .1       .3

CROSS SECTION


RIVER: UT_BSC2
REACH: NCONFL-BGM         RS: 3200

INPUT
Description: Source: Corrected Effective Topo
Datum: NGVD29
Coordinate
             System: NAVD88 Colorado State Planes Central, US Feet.
Station Elevation Data    num=     405
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
       0 6928.77    1.46 6928.77     1.7 6928.76    3.48 6928.76    3.97 6928.75
    5.49 6928.75     5.8 6928.74    7.61 6928.74     8.5 6928.73    9.51 6928.73
    9.64 6928.72   11.53 6928.72   11.91 6928.71   13.54 6928.71   13.94  6928.7
```

15.55	6928.7	15.75	6928.69	17.58	6928.69	18.46	6928.68	19.58	6928.68
19.85	6928.67	21.59	6928.67	22.08	6928.66	23.6	6928.66	23.88	6928.65
24.61	6928.65	24.79	6928.64	25.61	6928.64	25.69	6928.63	26.39	6928.61
26.6	6928.6	26.65	6928.6	27.5	6928.58	27.63	6928.57	27.78	6928.57
28.41	6928.55	28.63	6928.54	28.92	6928.53	29.31	6928.52	29.64	6928.51
30.05	6928.5	30.22	6928.49	30.65	6928.48	31.12	6928.47	31.19	6928.46
31.65	6928.45	32.02	6928.44	32.32	6928.43	32.66	6928.42	32.93	6928.41
33.46	6928.39	33.67	6928.39	33.83	6928.38	34.59	6928.36	34.67	6928.36
34.74	6928.35	35.32	6928.34	35.64	6928.33	35.68	6928.33	35.72	6928.32
36.55	6928.3	36.68	6928.29	36.86	6928.29	37.45	6928.27	37.69	6928.26
37.99	6928.25	38.36	6928.24	38.7	6928.23	39.13	6928.22	39.26	6928.22
39.7	6928.2	40.16	6928.19	40.26	6928.18	40.71	6928.17	41.07	6928.16
41.39	6928.14	41.72	6928.13	41.97	6928.12	42.53	6928.09	42.72	6928.08
42.88	6928.07	43.66	6928.04	43.73	6928.03	43.78	6928.03	44.25	6928.01
44.69	6927.99	44.74	6927.98	44.8	6927.98	45.59	6927.94	45.74	6927.93
45.93	6927.92	46.5	6927.9	46.75	6927.88	47.06	6927.87	47.4	6927.85
47.75	6927.83	47.88	6927.82	48.2	6927.81	48.3	6927.81	48.76	6927.78
49.21	6927.76	49.33	6927.76	49.77	6927.74	50.11	6927.72	50.47	6927.7
50.77	6927.69	51.02	6927.67	51.6	6927.65	51.78	6927.64	51.92	6927.63
52.74	6927.59	52.79	6927.59	52.83	6927.58	53.18	6927.55	53.73	6927.5
53.79	6927.5	53.87	6927.49	54.63	6927.36	54.8	6927.33	55	6927.3
55.54	6927.21	55.8	6927.17	56.14	6927.11	56.44	6927.06	56.81	6927
57.27	6926.92	57.35	6926.91	57.82	6926.83	58.25	6926.76	58.41	6926.74
58.82	6926.67	59.16	6926.61	59.54	6926.55	59.83	6926.5	60.06	6926.46
60.67	6926.36	60.84	6926.34	60.97	6926.31	61.81	6926.18	61.84	6926.17
61.87	6926.17	62.11	6926.13	62.77	6926.02	62.85	6926	62.94	6925.99
63.68	6925.87	63.86	6925.83	64.08	6925.79	64.58	6925.71	64.86	6925.65
65.21	6925.58	65.49	6925.53	65.87	6925.46	66.34	6925.36	66.39	6925.35
66.87	6925.26	67.3	6925.18	67.48	6925.14	67.88	6925.07	68.2	6925
68.61	6924.92	68.89	6924.87	69.11	6924.83	69.75	6924.7	69.89	6924.68
70.01	6924.65	70.88	6924.48	70.91	6924.48	71.04	6924.45	71.82	6924.3
71.91	6924.29	72.02	6924.26	72.72	6924.13	72.91	6924.09	73.15	6924.04
73.63	6923.95	73.92	6923.9	74.28	6923.82	74.53	6923.78	74.92	6923.7
75.42	6923.6	75.44	6923.6	75.93	6923.51	76.22	6923.48	76.34	6923.46
76.55	6923.46	76.94	6923.42	77.25	6923.41	77.69	6923.39	77.94	6923.39
78.15	6923.38	78.82	6923.35	79.05	6923.35	79.95	6923.32	79.97	6923.31
80.86	6923.28	81.09	6923.28	81.77	6923.25	81.97	6923.25	82.22	6923.24
82.67	6923.24	82.98	6923.23	83.36	6923.25	83.58	6923.23	83.98	6923.26
84.48	6923.32	84.49	6923.34	84.99	6923.4	85.38	6923.46	85.62	6923.5
85.99	6923.55	86.29	6923.6	86.76	6923.67	87	6923.71	87.19	6923.74
87.89	6923.84	88.01	6923.86	88.1	6923.88	88.91	6924	89	6924.01
89.01	6924.02	89.03	6924.02	89.91	6924.15	90.02	6924.17	90.16	6924.19
90.81	6924.29	91.03	6924.32	91.3	6924.36	91.72	6924.43	92.03	6924.47
92.43	6924.54	92.62	6924.56	93.04	6924.63	93.52	6924.7	93.56	6924.71
94.05	6924.78	94.43	6924.84	94.7	6924.88	95.05	6924.93	95.33	6924.98
95.83	6925.05	96.06	6925.09	96.24	6925.12	96.97	6925.23	97.06	6925.24
97.14	6925.25	97.84	6925.36	98.05	6925.39	98.07	6925.39	98.1	6925.4
98.95	6925.53	99.08	6925.55	99.23	6925.57	99.86	6925.66	100.08	6925.7

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  100.37 6925.74  100.76  6925.8  101.09 6925.85   101.5 6925.91  101.66 6925.93
   102.1    6926  102.57 6926.07  102.64 6926.08   103.1 6926.15  103.47  6926.2
  103.77 6926.25  104.11  6926.3  104.38 6926.34  104.91 6926.42  105.11 6926.45
  105.28 6926.47  106.04 6926.59  106.12  6926.6  106.19 6926.61  106.77  6926.7
  107.09 6926.74  107.13 6926.75  107.17 6926.76     108 6926.88  108.13  6926.9
  108.31 6926.93   108.9 6927.02  109.14 6927.05  109.33 6927.08  109.44  6927.1
   109.8 6927.15  110.15  6927.2  110.58 6927.27  110.71 6927.29  111.15 6927.35
  111.61 6927.42  111.71 6927.44  112.16  6927.5  112.52 6927.56  112.84 6927.61
  113.17 6927.65  113.42 6927.69  113.98 6927.78  114.17  6927.8  114.33 6927.83
  115.11 6927.95  115.18 6927.96  115.23 6927.96   115.7 6927.98  116.13    6928
  116.18 6928.01  116.25 6928.01  117.04 6928.04  117.19 6928.04  117.38 6928.05
  117.94 6928.07   118.2 6928.08  118.51 6928.09  118.85  6928.1   119.2 6928.12
  119.65 6928.13  119.75 6928.14  120.21 6928.15  120.66 6928.17  120.78 6928.18
  121.22 6928.19  121.56  6928.2  121.92 6928.22  122.22 6928.23  122.47 6928.24
  123.05 6928.26  123.23 6928.26  123.37 6928.27  124.19  6928.3  124.27  6928.3
  124.63 6928.32  125.18 6928.34  125.32 6928.34  126.08 6928.37  126.25 6928.37
  126.45 6928.38  126.99  6928.4  127.25 6928.41  127.59 6928.42  127.89 6928.43
  128.26 6928.45  128.72 6928.46   128.8 6928.47  129.27 6928.49   129.7  6928.5
  129.86 6928.51  130.27 6928.52  130.61 6928.53  130.99 6928.55  131.28 6928.56
  131.51 6928.57  132.12 6928.59  132.29  6928.6  132.41  6928.6  133.26 6928.63
  133.32 6928.63  133.56 6928.64  134.22 6928.67  134.39 6928.67  135.13  6928.7
   135.3 6928.71  135.53 6928.71  136.03 6928.73  136.31 6928.74  136.66 6928.75
  136.94 6928.76  137.32 6928.78  137.79  6928.8  137.84  6928.8  138.32 6928.82
  138.75 6928.83  138.93 6928.84  139.33 6928.85  139.65 6928.86  140.06 6928.88
  140.34 6928.89  140.55  6928.9   141.2 6928.92  141.34 6928.93  141.46 6928.93
  142.33 6928.96  142.36 6928.96  142.49 6928.97  143.27 6928.99  143.36    6929
  143.47    6929  144.17 6929.02  144.36 6929.02   144.6 6929.03  145.08 6929.04
  145.37 6929.05  145.73 6929.06  145.98 6929.07  146.37 6929.08  146.87 6929.09
  146.88 6929.09  147.38 6929.11  147.79 6929.12     148 6929.12  148.39 6929.13
  148.69 6929.14  149.14 6929.15  149.39 6929.16   149.6 6929.17     150 6929.17

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
       0     .05   51.92    .035  115.18     .05

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
         51.92  115.18            50.08   50.08   50.08             .1       .3

CROSS SECTION


RIVER: UT_BSC2
REACH: NCONFL-BGM         RS: 3150

INPUT
Description: Source: Corrected Effective Topo
Datum: NGVD29
Coordinate
```

System: NAVD88 Colorado State Planes Central, US Feet.

Station Elevation Data num= 431

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	6927.71	.14	6927.71	.51	6927.7	.85	6927.69	1.28	6927.68
1.42	6927.68	1.86	6927.66	2.32	6927.65	2.41	6927.65	2.86	6927.64
3.23	6927.63	3.54	6927.62	3.87	6927.61	4.13	6927.6	4.68	6927.59
4.88	6927.58	5.03	6927.58	5.81	6927.56	5.88	6927.55	5.94	6927.55
6.44	6927.54	6.84	6927.53	6.95	6927.53	7.75	6927.5	7.9	6927.5
8.08	6927.49	8.65	6927.48	8.9	6927.47	9.21	6927.46	9.56	6927.45
9.91	6927.44	10.35	6927.43	10.46	6927.43	10.91	6927.42	11.37	6927.4
11.48	6927.4	11.92	6927.39	12.27	6927.38	12.62	6927.37	12.93	6927.36
13.17	6927.36	13.75	6927.34	13.93	6927.33	14.08	6927.33	14.89	6927.31
14.98	6927.31	15.37	6927.3	15.89	6927.28	16.02	6927.28	16.79	6927.26
16.95	6927.25	17.15	6927.25	17.7	6927.23	17.96	6927.22	18.29	6927.22
18.6	6927.21	18.97	6927.2	19.42	6927.18	19.51	6927.18	19.97	6927.17
20.41	6927.16	20.56	6927.15	20.98	6927.14	21.31	6927.13	21.69	6927.12
21.98	6927.11	22.22	6927.11	22.82	6927.09	22.99	6927.09	23.12	6927.08
23.96	6927.06	24.03	6927.06	24.3	6927.05	24.93	6927.03	25.09	6927.03
25.84	6927.01	26.01	6927	26.23	6927	26.74	6926.98	27.02	6926.98
27.36	6926.97	27.65	6926.96	28.02	6926.95	28.49	6926.94	28.55	6926.94
29.03	6926.92	29.45	6926.91	29.63	6926.91	30.03	6926.89	30.36	6926.89
30.76	6926.87	31.04	6926.87	31.26	6926.86	31.9	6926.84	32.17	6926.84
33.03	6926.81	33.23	6926.81	33.98	6926.79	34.06	6926.79	34.17	6926.78
34.88	6926.76	35.07	6926.76	35.3	6926.75	35.78	6926.74	36.07	6926.73
36.43	6926.72	36.69	6926.71	37.08	6926.7	37.57	6926.69	37.59	6926.68
38.09	6926.67	38.5	6926.66	38.7	6926.65	39.09	6926.64	39.4	6926.63
39.84	6926.62	40.1	6926.61	40.31	6926.61	40.97	6926.59	41.1	6926.58
41.21	6926.58	42.1	6926.55	42.16	6926.55	43.02	6926.53	43.12	6926.52
43.24	6926.52	43.92	6926.5	44.12	6926.49	44.37	6926.49	44.83	6926.47
45.13	6926.46	45.51	6926.45	45.77	6926.45	46.14	6926.43	46.64	6926.42
47.14	6926.4	47.54	6926.39	47.78	6926.39	48.15	6926.38	48.45	6926.37
48.91	6926.35	49.16	6926.35	49.35	6926.34	50.04	6926.32	50.16	6926.32
50.26	6926.31	51.09	6926.29	51.18	6926.29	52.06	6926.2	52.17	6926.19
52.31	6926.17	52.97	6926.05	53.18	6926.02	53.45	6925.97	53.87	6925.89
54.19	6925.84	54.58	6925.77	54.78	6925.73	55.19	6925.66	55.68	6925.57
55.71	6925.57	56.2	6925.48	56.59	6925.41	56.85	6925.36	57.21	6925.3
57.49	6925.25	57.98	6925.16	58.21	6925.12	58.4	6925.08	59.12	6924.95
59.22	6924.93	59.3	6924.92	60.02	6924.78	60.2	6924.75	60.22	6924.75
60.25	6924.74	61.11	6924.59	61.23	6924.56	61.38	6924.53	62.01	6924.42
62.24	6924.38	62.52	6924.33	62.92	6924.25	63.24	6924.19	63.65	6924.12
63.82	6924.09	64.25	6924.01	64.73	6923.92	64.79	6923.91	65.26	6923.83
65.63	6923.76	65.92	6923.7	66.26	6923.64	66.53	6923.59	67.06	6923.5
67.27	6923.46	67.44	6923.43	68.19	6923.29	68.28	6923.27	68.34	6923.27
68.95	6923.2	69.25	6923.17	69.32	6923.17	70.15	6923.18	70.29	6923.19
70.46	6923.19	71.06	6923.2	71.29	6923.2	71.59	6923.21	71.96	6923.22
72.3	6923.22	72.73	6923.23	72.87	6923.23	73.31	6923.24	73.77	6923.25
73.86	6923.25	74.31	6923.26	74.67	6923.27	74.99	6923.27	75.32	6923.28
75.58	6923.29	76.13	6923.3	76.48	6923.3	77.26	6923.32	77.39	6923.32

77.88	6923.33	78.29	6923.34	78.4	6923.34	79.2	6923.35	79.34	6923.36
79.53	6923.36	80.1	6923.37	80.35	6923.38	80.66	6923.38	81.01	6923.39
81.36	6923.39	81.8	6923.4	81.91	6923.4	82.36	6923.41	82.81	6923.42
82.93	6923.42	83.37	6923.43	83.72	6923.44	84.07	6923.45	84.38	6923.45
84.62	6923.46	85.2	6923.47	85.53	6923.47	86.34	6923.49	86.43	6923.49
86.81	6923.5	87.34	6923.51	87.47	6923.51	88.24	6923.52	88.4	6923.53
88.6	6923.53	89.15	6923.54	89.41	6923.55	89.74	6923.55	90.05	6923.56
90.41	6923.56	90.87	6923.57	90.95	6923.57	91.42	6923.58	91.86	6923.59
92.01	6923.59	92.43	6923.6	92.76	6923.61	93.14	6923.62	93.67	6923.62
94.27	6923.64	94.57	6923.64	95.41	6923.65	95.74	6923.65	96.38	6923.66
97.28	6923.66	97.46	6923.67	98.47	6923.67	98.81	6923.7	99.09	6923.69
99.47	6923.72	99.94	6923.82	100	6923.83	100.48	6923.93	100.9	6924.02
101.08	6924.05	101.48	6924.13	101.81	6924.2	102.21	6924.28	102.49	6924.34
102.71	6924.39	103.35	6924.52	103.5	6924.55	103.62	6924.57	104.48	6924.76
104.52	6924.76	104.67	6924.8	105.42	6924.95	105.51	6924.97	105.62	6924.99
106.33	6925.14	106.52	6925.18	106.55	6925.19	106.75	6925.23	107.23	6925.33
107.52	6925.39	107.88	6925.47	108.14	6925.52	108.53	6925.6	109.02	6925.71
109.04	6925.71	109.53	6925.81	109.95	6925.9	110.15	6925.94	110.54	6926.02
110.85	6926.09	111.29	6926.18	111.55	6926.24	111.76	6926.27	112.42	6926.38
112.55	6926.4	112.66	6926.41	113.55	6926.47	113.56	6926.47	113.6	6926.48
114.47	6926.54	114.57	6926.54	114.69	6926.55	115.37	6926.6	115.57	6926.61
115.82	6926.63	116.28	6926.66	116.58	6926.68	116.96	6926.71	117.18	6926.73
117.59	6926.76	118.09	6926.79	118.59	6926.83	118.99	6926.85	119.23	6926.87
119.6	6926.9	119.9	6926.92	120.36	6926.95	120.6	6926.97	120.8	6926.98
121.49	6927.03	121.61	6927.04	121.7	6927.05	122.53	6927.1	122.61	6927.11
122.63	6927.11	123.51	6927.17	123.62	6927.18	123.76	6927.19	124.42	6927.24
124.63	6927.25	124.9	6927.27	125.32	6927.3	125.64	6927.32	126.03	6927.35
126.23	6927.36	126.64	6927.39	127.13	6927.43	127.16	6927.43	127.65	6927.46
128.04	6927.49	128.3	6927.51	128.65	6927.53	128.94	6927.55	129.43	6927.59
129.66	6927.61	129.84	6927.62	130.57	6927.67	130.67	6927.68	130.75	6927.68
131.46	6927.73	131.65	6927.75	131.7	6927.75	132.56	6927.81	132.68	6927.82
132.83	6927.83	133.46	6927.87	133.69	6927.89	133.97	6927.91	134.37	6927.94
134.69	6927.96	135.1	6927.98	135.27	6928	135.7	6928.02	136.17	6928.05
136.24	6928.04	136.71	6928.07	137.08	6928.09	137.37	6928.1	137.71	6928.11
137.98	6928.12	138.51	6928.14	138.72	6928.15	138.89	6928.15	139.64	6928.18
139.72	6928.18	139.79	6928.19	140.4	6928.21	140.7	6928.22	140.77	6928.22
141.6	6928.25	141.74	6928.26	141.91	6928.27	142.51	6928.29	142.74	6928.3
143.04	6928.31	143.41	6928.32	143.75	6928.33	144.18	6928.35	144.31	6928.36
144.76	6928.37	145.22	6928.39	145.31	6928.39	145.76	6928.41	146.12	6928.42
146.44	6928.44	146.77	6928.45	147.03	6928.46	147.58	6928.48	147.78	6928.48
147.93	6928.49	148.71	6928.52	148.84	6928.52	149.33	6928.54	149.74	6928.56
150	6928.56								

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.05	51.18	.035	111.76	.05

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

51.18 111.76 39.96 50.14 58.01 .1 .3

CROSS SECTION

RIVER: UT_BSC2
REACH: NCONFL-BGM RS: 3100

INPUT
Description: Source: Corrected Effective Topo
Datum: NGVD29
Coordinate
System: NAVD88 Colorado State Planes Central, US Feet.
Station Elevation Data num= 492

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	6928.19	.15	6928.19	.58	6928.18	.85	6928.18	1.08	6928.17
1.67	6928.16	2.01	6928.16	2.76	6928.15	2.86	6928.14	2.93	6928.14
3.9	6928.13	4.79	6928.11	4.95	6928.11	5.72	6928.1	5.87	6928.1
6.04	6928.09	6.65	6928.08	6.87	6928.08	7.13	6928.07	7.57	6928.07
7.87	6928.06	8.22	6928.06	8.5	6928.05	8.88	6928.05	9.32	6928.04
9.43	6928.04	10.36	6928.02	10.88	6928.01	11.28	6928.01	11.5	6928
11.89	6928	12.21	6927.99	12.59	6927.98	13.14	6927.98	13.68	6927.97
13.89	6927.96	14.07	6927.96	14.78	6927.95	14.89	6927.95	15	6927.94
15.92	6927.93	16.24	6927.92	16.85	6927.91	16.96	6927.91	17.78	6927.9
17.9	6927.9	18.05	6927.89	18.71	6927.88	19.14	6927.88	19.64	6927.87
19.91	6927.86	20.24	6927.86	20.56	6927.85	20.91	6927.85	21.33	6927.84
21.49	6927.84	21.92	6927.83	22.92	6927.81	23.35	6927.81	23.51	6927.8
23.92	6927.8	24.27	6927.79	24.6	6927.79	24.93	6927.78	25.2	6927.78
25.7	6927.77	25.93	6927.76	26.13	6927.76	26.79	6927.75	27.06	6927.75
27.88	6927.73	27.99	6927.73	28.58	6927.72	28.91	6927.72	28.97	6927.71
29.84	6927.7	30.07	6927.7	30.77	6927.68	31.16	6927.68	31.7	6927.67
31.95	6927.66	32.25	6927.66	32.63	6927.65	32.95	6927.65	33.34	6927.64
33.55	6927.64	33.96	6927.63	34.43	6927.62	34.96	6927.62	35.41	6927.61
35.53	6927.61	36.34	6927.59	36.62	6927.59	36.97	6927.58	37.26	6927.58
37.71	6927.57	37.97	6927.57	38.19	6927.56	38.8	6927.55	39.12	6927.55
39.89	6927.53	40.05	6927.53	40.92	6927.52	40.99	6927.52	41.9	6927.5
42.08	6927.5	42.83	6927.49	42.99	6927.48	43.17	6927.48	43.76	6927.47
44.26	6927.45	44.69	6927.43	44.99	6927.41	45.35	6927.4	45.62	6927.38
46	6927.36	46.45	6927.34	46.54	6927.34	47	6927.31	47.47	6927.29
47.54	6927.29	48	6927.26	48.4	6927.25	48.63	6927.23	49.01	6927.21
49.33	6927.2	49.72	6927.18	50.25	6927.16	50.82	6927.14	51.01	6927.14
51.18	6927.13	51.91	6927.11	52.02	6927.1	52.11	6927.1	53	6927.07
53.26	6927.06	53.97	6927.04	54.09	6927.03	54.89	6927.01	55.03	6927
55.18	6927	55.82	6926.97	56.03	6926.97	56.75	6926.94	57.03	6926.93
57.68	6926.91	58.04	6926.9	58.46	6926.89	58.61	6926.88	59.04	6926.87
60.04	6926.83	60.46	6926.82	60.64	6926.81	61.05	6926.8	61.74	6926.78
62.05	6926.76	62.32	6926.76	62.83	6926.74	63.24	6926.72	63.92	6926.7
64.06	6926.7	64.17	6926.69	65.01	6926.66	65.1	6926.66	65.6	6926.64

66.03	6926.63	66.1	6926.63	66.96	6926.6	67.07	6926.59	67.2	6926.59
67.88	6926.57	68.29	6926.55	68.81	6926.54	69.38	6926.52	69.74	6926.5
70.47	6926.48	70.67	6926.47	71.08	6926.46	71.56	6926.44	72.08	6926.43
72.52	6926.41	72.66	6926.41	73.09	6926.39	73.45	6926.38	74.38	6926.35
75.09	6926.32	75.31	6926.32	75.93	6926.3	76.23	6926.28	77.03	6926.26
77.1	6926.26	77.16	6926.25	77.94	6926.23	78.12	6926.22	79.02	6926.19
79.11	6926.19	79.21	6926.18	79.95	6926.16	80.11	6926.15	80.3	6926.15
80.87	6926.13	81.39	6926.11	81.8	6926.1	82.12	6926.09	82.49	6926.07
82.73	6926.07	83.12	6926.05	83.58	6926.04	83.66	6926.03	84.12	6926.02
84.59	6926	84.67	6926	85.13	6925.98	85.51	6925.97	85.76	6925.96
86.13	6925.95	86.44	6925.94	86.85	6925.93	87.37	6925.91	87.95	6925.89
88.14	6925.88	88.3	6925.88	89.04	6925.85	89.22	6925.85	90.13	6925.82
90.15	6925.81	90.28	6925.81	91.08	6925.78	91.22	6925.78	92.01	6925.75
92.15	6925.75	92.31	6925.74	92.94	6925.72	93.41	6925.7	93.86	6925.69
94.5	6925.67	94.79	6925.66	95.16	6925.65	95.21	6925.65	95.59	6925.63
95.72	6925.63	96.16	6925.61	96.65	6925.59	97.17	6925.58	97.58	6925.56
97.77	6925.56	98.17	6925.54	98.87	6925.52	99.17	6925.51	99.96	6925.48
100.18	6925.48	100.36	6925.47	101.05	6925.45	101.29	6925.43	102.14	6925.33
102.62	6925.26	103.14	6925.18	103.24	6925.16	104.07	6925.03	104.33	6924.99
105	6924.89	105.19	6924.85	105.42	6924.81	105.93	6924.73	106.2	6924.68
106.51	6924.62	106.85	6924.55	107.6	6924.4	107.78	6924.37	108.2	6924.29
108.7	6924.19	108.71	6924.19	109.2	6924.09	109.64	6924.01	109.79	6923.98
110.21	6923.9	110.88	6923.77	111.21	6923.7	111.49	6923.65	111.97	6923.56
112.21	6923.51	113.22	6923.32	113.35	6923.29	114.16	6923.13	114.28	6923.11
114.96	6922.98	115.25	6922.92	116.34	6922.71	117.06	6922.57	117.23	6922.54
117.99	6922.39	118.23	6922.35	118.52	6922.29	118.92	6922.21	119.24	6922.15
119.62	6922.15	119.84	6922.12	120.24	6922.13	120.71	6922.15	120.77	6922.15
121.7	6922.19	121.8	6922.19	122.25	6922.21	122.63	6922.23	122.89	6922.24
123.25	6922.25	123.56	6922.27	123.98	6922.28	124.25	6922.3	124.48	6922.31
125.08	6922.33	125.26	6922.34	125.41	6922.34	126.17	6922.38	126.34	6922.38
127.26	6922.42	127.3	6922.43	128.19	6922.46	128.27	6922.47	128.35	6922.47
128.58	6922.48	129.12	6922.5	129.45	6922.52	130.05	6922.52	130.54	6922.54
130.98	6922.54	131.28	6922.55	131.91	6922.55	132.28	6922.56	132.83	6922.56
133.76	6922.58	134.29	6922.58	134.69	6922.59	135.29	6922.59	135.62	6922.6
136.29	6922.6	136.55	6922.61	137.09	6922.61	137.3	6922.62	137.47	6922.62
138.18	6922.63	138.4	6922.63	139.27	6922.64	139.64	6922.64	140.26	6922.65
140.37	6922.65	141.18	6922.66	141.31	6922.66	141.46	6922.67	142.11	6922.67
142.31	6922.68	143.04	6922.68	143.32	6922.69	143.64	6922.69	143.97	6922.7
144.73	6922.7	144.9	6922.71	145.32	6922.71	145.82	6922.72	146.33	6922.72
146.75	6922.73	146.92	6922.73	147.33	6922.74	148.01	6922.74	148.33	6922.75
148.61	6922.75	149.1	6922.76	149.54	6922.76	150.19	6922.77	150.46	6922.77
151.29	6922.78	151.39	6922.78	151.98	6922.79	152.38	6922.79	153.25	6922.8
153.35	6922.81	153.47	6922.81	154.17	6922.82	154.56	6922.82	155.1	6922.83
155.36	6922.83	155.66	6922.88	156.03	6922.91	156.75	6923.04	156.96	6923.07
157.36	6923.15	157.84	6923.23	158.37	6923.33	158.81	6923.41	158.93	6923.43
159.37	6923.51	159.74	6923.58	160.02	6923.63	160.67	6923.74	161.12	6923.82
161.38	6923.87	162.21	6924.02	162.38	6924.05	162.53	6924.08	162.73	6924.12
163.3	6924.22	163.38	6924.24	163.45	6924.25	164.32	6924.42	164.39	6924.43

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  165.31 6924.62  165.48 6924.66  166.39 6924.84   167.4 6925.05  167.67  6925.1
  168.09 6925.19   168.4 6925.25  168.76  6925.3  169.02 6925.34   169.4 6925.38
  169.95 6925.43  170.41 6925.46  170.88  6925.5  170.94  6925.5  171.41 6925.54
   171.8 6925.57  172.41 6925.62  172.73 6925.64  173.13 6925.67  173.42 6925.69
  173.66 6925.71  174.22 6925.75  174.42 6925.77  174.59 6925.78  175.31 6925.84
  175.42 6925.85  175.52 6925.85  176.41 6925.92  176.44 6925.93  176.66 6925.94
  177.37    6926  177.43    6926   177.5 6926.01  178.43 6926.08  178.59 6926.09
  179.23 6926.14  179.44 6926.16  179.68 6926.18  180.15 6926.21  180.44 6926.23
  180.77 6926.26  181.08 6926.28  181.44 6926.31  182.01 6926.35  182.45 6926.39
  182.94 6926.43  182.96 6926.43  183.45 6926.47  183.87  6926.5  184.05 6926.51
  184.45 6926.54  185.14  6926.6  185.46 6926.62  186.23 6926.68  186.46  6926.7
  186.65 6926.71  187.46 6926.77  188.42 6926.85  188.51 6926.85     189 6926.89
  189.43 6926.93  189.51 6926.93   190.6 6927.02  191.29 6927.07  191.48 6927.09
  191.69  6927.1  192.48 6927.16  192.79 6927.19  193.15 6927.22  193.48 6927.24
  193.88 6927.27  194.07 6927.29  194.49 6927.32  194.97 6927.36     195 6927.36
  195.49  6927.4  196.06 6927.44  196.49 6927.48  196.86 6927.51  197.15 6927.53
   197.5 6927.56  197.78 6927.57  198.25 6927.59   198.5 6927.61  199.64 6927.61
  200.43 6927.62  200.66 6927.62

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
       0     .05  100.36    .035  169.02     .05

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
        100.36  169.02            33.13   33.13   33.13             .1       .3

CROSS SECTION


RIVER: UT_BSC2
REACH: NCONFL-BGM         RS: 3050

INPUT
Description: Source: Corrected Effective Topo
Datum: NGVD29
Coordinate
             System: NAVD88 Colorado State Planes Central, US Feet.
Station Elevation Data    num=      25
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
   -6.37 6927.39    2.14 6927.27    4.14  6927.2     7.2 6927.05    25.3 6926.46
   33.84 6926.18   42.43 6925.86   50.36 6925.43   56.26 6925.12   57.24 6925.03
   65.26  6923.3   74.15 6921.58   75.28 6921.42   84.24 6921.52   97.94 6921.65
  105.87 6921.74  108.65 6921.76  111.62 6921.86  112.63 6921.98  116.86 6922.77
  128.84 6924.75   130.4 6924.89  142.64  6925.7  147.29 6926.02  156.89 6926.65

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
   -6.37    .035   56.26    .035  128.84    .035
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Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
         56.26  128.84            75.27   75.27   75.27             .1       .3

CROSS SECTION


RIVER: UT_BSC2
REACH: NCONFL-BGM         RS: 3000

INPUT
Description: Source: Corrected Effective Topo
Datum: NGVD29
Coordinate
             System: NAVD88 Colorado State Planes Central, US Feet.
Station Elevation Data    num=     491
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
  -79.24 6927.64  -78.83 6927.63  -77.35 6927.63  -77.05 6927.62  -76.04 6927.62
  -75.64 6927.61  -74.52 6927.61  -74.04  6927.6  -72.62  6927.6  -72.44 6927.59
  -71.04 6927.59  -70.73 6927.58  -69.79 6927.58  -69.24 6927.57   -67.9 6927.57
  -66.05 6927.55  -64.98 6927.55  -64.12 6927.54  -63.02 6927.54  -62.85 6927.53
  -61.78 6927.53  -61.28 6927.52  -60.02 6927.52  -59.65 6927.51  -58.45 6927.51
  -58.01  6927.5  -57.01  6927.5  -56.56 6927.49  -55.39 6927.49  -55.01 6927.48
  -53.72 6927.48  -53.26 6927.47  -52.19 6927.47     -52 6927.46  -50.89 6927.46
  -48.05 6927.43  -46.99 6927.43  -46.87 6927.42   -45.8 6927.42  -45.21 6927.41
  -44.74 6927.41  -44.27  6927.4  -43.32  6927.4  -42.99 6927.39  -41.98 6927.39
  -41.54 6927.38  -40.98 6927.38  -40.49 6927.37  -39.54 6927.37  -39.41 6927.36
  -38.34 6927.36  -37.98 6927.35  -36.97 6927.35  -36.71 6927.34  -35.76 6927.34
  -34.08 6927.32  -33.01 6927.31  -31.95 6927.31  -30.88  6927.3  -29.15 6927.28
  -28.75 6927.28  -27.96 6927.27  -27.69 6927.26  -26.96 6927.26  -26.62 6927.25
  -25.96 6927.25  -24.95 6927.23  -24.42 6927.23  -23.95 6927.22  -23.42 6927.22
  -22.95 6927.21  -22.36 6927.21  -21.95  6927.2  -21.29  6927.2  -20.95 6927.19
  -20.23 6927.18  -19.69 6927.18  -19.16 6927.17  -18.75 6927.17   -18.1 6927.16
  -15.91 6927.14  -15.51 6927.13   -14.9 6927.13  -13.08 6927.11  -12.77  6927.1
  -11.93  6927.1   -11.7 6927.09  -11.19 6927.09  -10.93 6927.08  -10.24 6927.08
   -9.93 6927.07    -9.3 6927.07   -8.92 6927.06   -8.35 6927.06   -7.92 6927.05
   -7.41 6927.05   -6.92 6927.04   -6.37 6927.04   -5.92 6927.03   -5.52 6927.03
   -5.31 6927.02   -4.57 6927.02   -4.24 6927.01   -3.63 6927.01   -3.18    6927
   -2.68    6927     1.1 6926.96    1.22 6926.95     2.1 6926.95    2.15 6926.94
    2.99 6926.94     3.1 6926.93    3.94 6926.93     4.1 6926.92    4.88 6926.92
     5.1 6926.91    5.83 6926.91     6.1  6926.9    6.77  6926.9     7.1 6926.89
    7.72 6926.89    8.11 6926.88    8.66 6926.88    9.61 6926.86   10.11 6926.86
   10.55 6926.85   11.12 6926.85   11.39 6926.84   12.99 6926.82   13.22 6926.82
   14.26  6926.8   15.39 6926.79   16.19 6926.77   16.68 6926.77    17.4 6926.75
   17.79 6926.75   18.36  6926.7   18.54  6926.7   19.29 6926.62   20.71 6926.49
   20.95 6926.46   22.29 6926.35   23.79 6926.21   24.54 6926.15   25.14 6926.09
   25.59 6926.06   27.54 6925.88   28.29 6925.82   28.97 6925.76   29.57  6925.7
   29.79 6925.69   30.68 6925.61   31.29 6925.55   32.04 6925.49   33.22 6925.38
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33.54	6925.36	34.01	6925.31	34.29	6925.29	35.79	6925.16	37.19	6925.03
38.04	6924.96	38.44	6924.92	39.51	6924.83	39.58	6924.82	41.04	6924.7
42.87	6924.53	43.29	6924.5	44.01	6924.43	44.15	6924.42	44.79	6924.37
46.29	6924.23	47.04	6924.17	47.31	6924.14	48.54	6924.04	48.79	6924.01
49.52	6923.95	50.2	6923.88	51.11	6923.8	51.54	6923.75	53.43	6923.55
53.79	6923.52	55.06	6923.38	56.03	6923.28	56.56	6923.22	58.07	6923.07
58.28	6923.04	59.03	6922.97	59.78	6922.89	60.81	6922.77	61.71	6922.64
62.03	6922.6	62.78	6922.49	63.53	6922.39	63.93	6922.33	64.28	6922.29
65.05	6922.18	66.15	6922.03	66.53	6921.97	68.03	6921.76	68.36	6921.72
70.28	6921.45	71.03	6921.35	71.42	6921.29	71.69	6921.26	72.8	6921.1
73.28	6921.04	74.2	6920.91	74.3	6920.89	75.01	6920.8	75.53	6920.72
76.12	6920.65	77.03	6920.61	77.23	6920.61	78.94	6920.55	79.28	6920.53
80.03	6920.51	81.53	6920.45	82.03	6920.44	83.88	6920.37	84.15	6920.37
84.99	6920.35	85.28	6920.35	85.9	6920.33	86.1	6920.33	86.27	6920.36
86.78	6920.34	87.2	6920.44	88.4	6920.7	89.03	6920.85	89.42	6920.93
89.78	6921.02	91.64	6921.43	92.03	6921.52	95.78	6922.37	96.07	6922.43
96.53	6922.54	96.89	6922.61	98.29	6922.93	99.01	6923.09	99.82	6923.28
100.28	6923.38	101.61	6923.68	102.53	6923.86	103.83	6923.88	104.03	6923.89
104.46	6923.89	106.05	6923.92	106.78	6923.94	107.78	6923.95	108.53	6923.97
109.1	6923.98	109.62	6923.98	110.48	6924	110.78	6924	111.42	6924.02
111.74	6924.02	112.69	6924.04	113.03	6924.04	113.74	6924.06	115.28	6924.08
116.78	6924.11	117.13	6924.12	117.53	6924.12	119.03	6924.15	119.34	6924.15
121.28	6924.19	121.56	6924.19	123.53	6924.23	124.48	6924.24	125.78	6924.27
125.99	6924.27	127.65	6924.3	128.03	6924.3	128.21	6924.31	129.97	6924.34
130.43	6924.35	130.84	6924.35	131.03	6924.36	132.29	6924.38	133.28	6924.4
133.75	6924.4	134.03	6924.41	134.86	6924.42	135.53	6924.44	135.97	6924.44
136.28	6924.45	137.78	6924.47	138.53	6924.49	140.03	6924.51	140.78	6924.53
142.28	6924.55	143.03	6924.57	144.53	6924.59	144.83	6924.6	145.28	6924.6
146.78	6924.63	147.05	6924.64	147.53	6924.64	149.03	6924.67	149.27	6924.67
151.28	6924.71	151.48	6924.71	152.59	6924.73	152.78	6924.74	153.16	6924.74
154.82	6924.77	155.02	6924.77	155.93	6924.79	157.7	6924.82	158.16	6924.83
158.61	6924.83	158.76	6924.84	159.97	6924.86	160.39	6924.86	161.5	6924.88
161.75	6924.88	162.49	6924.9	162.98	6924.9	163.73	6924.92	164.85	6924.93
166.78	6924.96	166.98	6924.97	167.36	6924.97	168.19	6924.99	168.47	6924.99
169.55	6925.01	169.96	6925.01	170.71	6925.03	171.32	6925.03	172.64	6925.06
173.76	6925.07	173.92	6925.08	174.45	6925.08	174.66	6925.09	175.37	6925.1
175.85	6925.12	177.34	6925.15	177.85	6925.17	179.85	6925.21	180.41	6925.23
181.85	6925.26	182.27	6925.26	182.44	6925.25	183.25	6925.25	183.45	6925.24
184.24	6925.24	184.47	6925.23	185.48	6925.23	185.85	6925.22	186.5	6925.22
186.85	6925.21	187.51	6925.21	187.85	6925.2	188.53	6925.2	188.85	6925.19
189.54	6925.19	189.85	6925.18	190.56	6925.18	190.85	6925.17	191.57	6925.17
191.85	6925.16	192.59	6925.16	192.85	6925.15	193.6	6925.15	193.85	6925.14
194.62	6925.14	194.85	6925.13	195.63	6925.13	195.85	6925.12	196.65	6925.12
196.85	6925.11	197.66	6925.11	197.85	6925.1	198.68	6925.1	198.85	6925.09
199.69	6925.09	199.85	6925.08	200.7	6925.08	200.85	6925.07	201.85	6925.07
201.98	6925.06	202.85	6925.06	202.97	6925.05	203.85	6925.05	203.95	6925.04
204.85	6925.04	204.94	6925.03	205.85	6925.03	205.93	6925.02	206.91	6925.02
210.91	6924.98	223.67	6924.85	224.05	6924.85	224.66	6924.84	225.06	6924.84

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  225.64 6924.83  226.07 6924.83  226.63 6924.82  227.09 6924.82  227.61 6924.81
   228.1 6924.81   228.6  6924.8  229.12  6924.8  229.59 6924.79  230.13 6924.79
  230.86 6924.78  231.86 6924.72  232.54 6924.57  233.53 6924.38  234.19 6924.24
  235.21 6924.04  235.86 6923.92  236.22 6923.84  237.47  6923.6  238.25 6923.44
  239.27 6923.24  239.86 6923.12  241.42 6922.82   242.4 6922.62  243.39 6922.43
  243.86 6922.33  244.86 6922.14  246.86 6921.74  247.39 6921.75  247.86 6921.77
  248.32 6921.89  248.86 6922.02   249.3 6922.14  250.29 6922.39  251.27 6922.65
  252.86 6923.05  253.24 6923.15  253.86 6923.29  254.49 6923.44  254.86 6923.52
  255.86 6923.76  256.52 6923.91  257.53 6924.15  257.86 6924.22  258.17  6924.3
  258.55 6924.38  258.86 6924.46  259.16 6924.46  259.56 6924.48  261.59 6924.54
  262.12 6924.56   263.1 6924.58  263.86 6924.61  264.09 6924.61  264.86 6924.64
  265.07 6924.64  265.86 6924.67  266.06 6924.67  271.98 6924.85  272.76 6924.87
  272.96 6924.87  273.77  6924.9  273.95  6924.9  274.79 6924.93  274.93 6924.93
  279.86 6925.08  279.94 6925.08  281.83 6925.14  283.92  6925.2  284.79 6925.23
  284.93 6925.24  285.78 6925.26  285.95 6925.27  286.76 6925.29  286.96  6925.3
  287.75 6925.32  293.66  6925.5  294.07 6925.51  294.86 6925.54  295.08 6925.54
  295.64 6925.56  297.11 6925.62  297.61 6925.63  299.58 6925.71  300.56 6925.74
  300.86 6925.76  302.19  6925.8  302.54 6925.82  303.52 6925.85  303.86 6925.87
  304.86  6925.9  305.49 6925.93  306.24 6925.95  306.86 6925.98  307.26 6925.99
  308.37 6926.03

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
  -79.24     .05   44.01    .035  102.53     .05

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
         44.01  102.53            92.31   92.31   92.31             .1       .3
Ineffective Flow     num=       1
   Sta L   Sta R    Elev  Permanent
  181.81  308.37 6925.28       F

CROSS SECTION


RIVER: UT_BSC2
REACH: NCONFL-BGM         RS: 2900

INPUT
Description: Source: Corrected Effective Topo
Datum: NGVD29
Coordinate
             System: NAVD88 Colorado State Planes Central, US Feet.
Station Elevation Data    num=     492
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
       0 6925.35     .76 6925.35     1.6 6925.34    1.86 6925.33    2.27 6925.33
    2.63 6925.32    3.66  6925.3    3.94  6925.3    4.77 6925.29     5.6 6925.27
    5.89 6925.27    6.74 6925.25    7.26 6925.25     8.1 6925.23    8.57 6925.23
    9.51 6925.21    9.82 6925.21    9.92  6925.2   10.59 6925.19   10.85 6925.19
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11.87	6925.17	12.25	6925.17	12.6	6925.16	12.9	6925.16	13.09	6925.15
14.75	6925.13	14.96	6925.12	15.29	6925.12	15.58	6925.11	15.98	6925.11
17.24	6925.09	17.97	6925.07	18.25	6925.07	19.06	6925.06	19.32	6925.05
19.74	6925.05	20.09	6925.04	21.12	6925.02	21.4	6925.02	22	6925.01
22.24	6925.01	23.07	6924.99	23.34	6924.99	23.9	6924.98	24.2	6924.97
24.73	6924.97	25.56	6924.95	26.03	6924.95	26.25	6924.94	27.23	6924.93
27.37	6924.92	28.06	6924.91	28.31	6924.91	28.72	6924.88	28.89	6924.88
29.72	6924.82	30.55	6924.77	31.36	6924.71	31.4	6924.71	33.05	6924.61
33.45	6924.58	33.88	6924.56	34.09	6924.54	34.71	6924.51	35.73	6924.44
36.38	6924.4	36.53	6924.4	37.21	6924.35	38.04	6924.3	38.12	6924.3
38.87	6924.25	39.46	6924.22	39.7	6924.2	40.1	6924.18	40.8	6924.13
41.37	6924.1	41.82	6924.07	42.14	6924.05	42.2	6924.05	43.49	6923.97
43.72	6923.95	43.86	6923.95	44.47	6923.91	44.69	6923.89	44.83	6923.89
45.52	6923.84	45.77	6923.83	46.17	6923.8	46.8	6923.77	47.19	6923.74
47.83	6923.7	48.02	6923.67	48.84	6923.51	48.86	6923.51	49.68	6923.32
50.2	6923.21	51.35	6922.95	51.55	6922.91	53.21	6922.54	53.84	6922.39
54.23	6922.31	55.51	6922.02	56.05	6921.9	56.34	6921.84	56.92	6921.71
57.07	6921.67	58	6921.47	58.83	6921.28	59.13	6921.22	60.5	6920.91
61.18	6920.76	61.33	6920.72	61.95	6920.59	62.99	6920.35	63.24	6920.3
64.26	6920.07	64.65	6919.99	65.49	6919.81	67.34	6919.41	67.66	6919.39
67.98	6919.36	68.37	6919.35	75.72	6919.35	76.3	6919.34	82.75	6919.34
82.95	6919.33	88.92	6919.33	89.61	6919.42	90.44	6919.54	90.97	6919.62
91.83	6919.74	92.1	6919.77	93.03	6919.9	94.05	6920.05	94.6	6920.12
95.86	6920.3	96.26	6920.35	96.91	6920.45	97.92	6920.59	98.55	6920.67
99	6920.73	99.89	6920.86	100.42	6920.94	101.23	6921.05	101.28	6921.05
102.08	6921.14	102.57	6921.19	103.92	6921.34	104.58	6921.41	105.26	6921.47
105.65	6921.49	106.38	6921.5	106.6	6921.51	107.41	6921.53	108.43	6921.55
108.74	6921.56	109.29	6921.57	109.57	6921.58	110.4	6921.6	110.63	6921.61
111.23	6921.62	111.52	6921.63	112.54	6921.65	113.32	6921.67	113.57	6921.67
113.73	6921.68	114.4	6921.69	115.39	6921.72	115.63	6921.72	116.22	6921.74
117.05	6921.76	117.35	6921.76	117.89	6921.78	119.55	6921.82	119.73	6921.82
120.38	6921.84	120.76	6921.84	121.21	6921.85	121.79	6921.87	122.05	6921.87
122.72	6921.89	123.71	6921.91	124.87	6921.94	125.4	6921.95	125.9	6921.97
126.2	6921.97	126.75	6921.99	127.04	6921.99	127.87	6922.01	128.09	6922.02
128.7	6922.03	128.98	6922.04	130.01	6922.06	131.19	6922.09	131.88	6922.11
132.12	6922.11	132.86	6922.13	133.09	6922.14	133.46	6922.14	133.69	6922.15
134.52	6922.17	134.8	6922.18	135.14	6922.18	135.35	6922.19	137.02	6922.23
137.2	6922.23	138.23	6922.26	139.25	6922.28	139.51	6922.29	140.28	6922.3
140.34	6922.31	140.62	6922.31	141.18	6922.33	141.52	6922.33	142.01	6922.35
142.33	6922.35	142.84	6922.37	144.2	6922.4	144.5	6922.4	144.99	6922.42
145.33	6922.42	145.42	6922.43	146.17	6922.44	146.44	6922.45	147.47	6922.47
148.66	6922.5	149.36	6922.52	149.58	6922.52	150.33	6922.54	150.92	6922.56
151.16	6922.56	151.99	6922.58	152.61	6922.6	152.82	6922.6	153.6	6922.62
153.73	6922.62	154.48	6922.64	154.66	6922.64	155.69	6922.67	156.72	6922.69
156.98	6922.7	157.63	6922.71	157.74	6922.72	158.64	6922.74	159.8	6922.77
160.82	6922.79	162.8	6922.84	163	6922.84	163.63	6922.86	163.91	6922.86
164.35	6922.87	164.46	6922.88	165.3	6922.9	165.69	6922.9	166.13	6922.92
166.84	6922.93	167.03	6922.94	167.79	6922.95	168.38	6922.97	168.62	6922.97

169.46	6922.99	170.07	6923.01	170.29	6923.01	171.06	6923.03	171.21	6923.03
171.95	6923.05	172.12	6923.06	172.41	6923.06	173.61	6923.09	173.75	6923.1
174.18	6923.11	174.45	6923.11	175.09	6923.13	176.23	6923.15	176.43	6923.16
177.26	6923.18	178.29	6923.2	180.46	6923.25	181.1	6923.27	181.37	6923.27
181.81	6923.29	182.4	6923.3	183.15	6923.32	183.42	6923.32	184.2	6923.35
184.42	6923.35	185.19	6923.38	185.42	6923.38	186.18	6923.41	186.42	6923.41
186.67	6923.42	187.18	6923.43	187.67	6923.45	188.17	6923.46	188.68	6923.48
189.16	6923.49	189.69	6923.51	190.15	6923.52	190.7	6923.54	191.15	6923.55
191.7	6923.57	192.14	6923.58	192.71	6923.6	193.13	6923.61	195.73	6923.69
197.75	6923.75	198.09	6923.75	198.42	6923.76	198.76	6923.75	199.42	6923.75
199.76	6923.74	200.77	6923.74	201.07	6923.73	201.78	6923.73	202.06	6923.72
202.79	6923.72	203.06	6923.71	204.05	6923.71	204.42	6923.7	205.42	6923.7
205.81	6923.69	206.82	6923.69	207.03	6923.68	208.02	6923.68	208.42	6923.67
209.84	6923.67	210	6923.66	211.42	6923.66	211.86	6923.65	212.86	6923.65
212.98	6923.64	214.42	6923.64	214.88	6923.63	215.96	6923.63	216.42	6923.62
217.42	6923.62	217.9	6923.61	218.94	6923.61	219.42	6923.6	220.42	6923.6
220.92	6923.59	221.93	6923.59	222.42	6923.58	223.42	6923.58	223.9	6923.57
224.96	6923.57	225.42	6923.56	226.42	6923.56	226.88	6923.55	227.98	6923.55
228.42	6923.54	229.86	6923.54	229.99	6923.53	231.42	6923.53	231.84	6923.52
233.02	6923.52	233.42	6923.51	234.42	6923.51	234.82	6923.5	236.04	6923.5
236.42	6923.49	237.42	6923.49	237.8	6923.48	239.06	6923.48	239.42	6923.47
240.42	6923.47	240.77	6923.46	242.08	6923.46	242.42	6923.45	243.75	6923.45
244.1	6923.44	245.11	6923.44	245.42	6923.43	246.73	6923.43	247.12	6923.42
247.42	6923.42	248.42	6923.29	250.15	6922.98	250.42	6922.92	251.15	6922.79
252.16	6922.6	252.42	6922.56	253.17	6922.42	253.68	6922.32	254.42	6922.19
254.67	6922.14	255.18	6922.05	255.42	6922	255.66	6921.96	256.19	6921.86
257.2	6921.68	257.42	6921.63	258.21	6921.49	258.64	6921.41	259.21	6921.31
260.22	6921.14	261.23	6920.96	261.62	6920.9	262.24	6920.79	262.61	6920.72
263.42	6920.58	263.6	6920.59	264.25	6920.61	264.42	6920.62	265.26	6920.86
265.42	6920.91	266.58	6921.25	267.28	6921.45	267.57	6921.54	268.28	6921.75
269.43	6922.08	270.3	6922.34	270.55	6922.41	271.31	6922.64	271.54	6922.7
272.31	6922.93	272.53	6923	273.32	6923.23	274.33	6923.52	274.52	6923.58
275.51	6923.87	276.34	6924.11	277.35	6924.41	277.5	6924.45	278.36	6924.7
279.37	6925	279.48	6925.03	280.37	6925.3	281.38	6925.59	281.47	6925.61
282.39	6925.87	283.4	6926.16	284.41	6926.35	284.45	6926.36	285.41	6926.19
285.44	6926.19	286.42	6926.08	287.11	6926.04	287.42	6926.03	288.44	6925.97
290.4	6925.85	290.45	6925.85	291.39	6925.8	291.46	6925.79	292.39	6925.74
292.47	6925.73	293.38	6925.68	293.47	6925.68	294.37	6925.62	294.48	6925.62
295.36	6925.57	296.5	6925.49	298.34	6925.38	298.51	6925.36	300.33	6925.25
300.53	6925.23	301.32	6925.18	301.53	6925.17	302.31	6925.12	302.54	6925.1
303.43	6925.04	303.55	6925.04	304.3	6924.99	305.29	6924.92	305.43	6924.92
307.27	6924.79	307.43	6924.79	308.27	6924.73	309.43	6924.66	309.6	6924.64
311.43	6924.53	311.61	6924.51	312.43	6924.46	312.62	6924.46	313.23	6924.41
313.63	6924.41	314.22	6924.35	314.63	6924.36	315.21	6924.31	315.64	6924.32
316.21	6924.31	317.2	6924.33	317.66	6924.35	318.19	6924.36	319.18	6924.4
319.43	6924.4	320.18	6924.44	320.43	6924.44	320.68	6924.46	322.69	6924.54
323.15	6924.56	323.32	6924.56						

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.05	48.02	.035	105.26	.05

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
48.02	105.26	118.9	99.71	72.05	.1	.3

Ineffective Flow num= 1

Sta L	Sta R	Elev	Permanent
197.58	323.32	6923.76	F

CROSS SECTION

RIVER: UT_BSC2
REACH: NCONFL-BGM RS: 2800

INPUT
Description: Source: Corrected Effective Topo
Datum: NGVD29
Coordinate
System: NAVD88 Colorado State Planes Central, US Feet.
Station Elevation Data num= 491

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	6922.8	.77	6922.78	1	6922.78	1.62	6922.76	1.9	6922.76
2.75	6922.74	3	6922.73	3.71	6922.71	3.89	6922.71	4.61	6922.69
5.51	6922.67	5.8	6922.66	6.17	6922.66	6.81	6922.64	7.82	6922.62
8.82	6922.59	9.12	6922.59	9.58	6922.57	9.83	6922.57	10.03	6922.56
10.72	6922.55	10.93	6922.54	12.74	6922.5	12.99	6922.49	13.64	6922.48
13.85	6922.47	14.13	6922.47	15.27	6922.44	15.87	6922.43	16.35	6922.41
16.4	6922.4	16.87	6922.38	17.25	6922.37	17.54	6922.35	17.88	6922.34
18.15	6922.32	18.68	6922.3	19.05	6922.28	19.82	6922.25	19.96	6922.24
20.5	6922.22	21.76	6922.16	22.09	6922.14	22.91	6922.11	23.23	6922.09
23.57	6922.08	24.36	6922.04	24.47	6922.03	25.37	6921.99	25.5	6921.99
25.93	6921.97	26.64	6921.93	27.18	6921.91	27.95	6921.87	28.08	6921.87
28.91	6921.83	29.26	6921.81	29.89	6921.78	30.05	6921.78	30.97	6921.73
31.97	6921.69	32.33	6921.67	32.98	6921.64	33.99	6921.6	34.99	6921.55
35.74	6921.52	36	6921.5	36.88	6921.46	40.72	6921.29	41.03	6921.28
41.62	6921.25	42.04	6921.24	42.53	6921.21	43.05	6921.19	43.43	6921.17
44.33	6921.14	45.06	6921.1	45.23	6921.1	45.98	6921.06	46.14	6921.06
46.76	6921.03	47.07	6921.02	47.11	6921.01	47.94	6920.98	48.25	6920.96
49.09	6920.93	49.39	6920.91	49.75	6920.9	50.53	6920.86	50.65	6920.86
51.55	6920.82	51.66	6920.81	52.11	6920.8	52.8	6920.76	53.36	6920.74
53.94	6920.71	54.97	6920.67	55.07	6920.67	55.17	6920.66	55.51	6920.65
56.07	6920.62	56.21	6920.62	57.14	6920.57	57.35	6920.57	57.87	6920.54
58.49	6920.52	58.78	6920.5	59.15	6920.49	59.62	6920.47	59.68	6920.46
60.16	6920.44	60.58	6920.37	60.76	6920.32	61.16	6920.25	61.48	6920.16
62.17	6919.98	63.04	6919.75	64.17	6919.44	64.26	6919.41	65.1	6919.19
65.31	6919.13	66	6918.95	66.45	6918.82	67.2	6918.62	67.59	6918.52

67.8	6918.46	68.21	6918.36	68.71	6918.23	68.72	6918.22	69.22	6918.1
69.61	6918	69.86	6917.93	70.22	6917.84	70.51	6917.76	71	6917.64
71.41	6917.53	72.14	6917.34	72.32	6917.31	73.02	6917.25	73.27	6917.24
74.25	6917.25	74.41	6917.26	75.03	6917.27	75.26	6917.27	75.55	6917.28
75.93	6917.28	76.23	6917.29	76.69	6917.29	76.83	6917.3	77.27	6917.3
78.28	6917.32	78.64	6917.32	79.28	6917.34	79.54	6917.34	80.1	6917.35
80.44	6917.35	81.24	6917.37	81.77	6917.38	82.3	6917.38	82.37	6917.39
83.15	6917.4	83.51	6917.4	84.05	6917.41	84.32	6917.42	84.65	6917.42
84.96	6917.43	85.32	6917.43	86.33	6917.41	86.76	6917.43	86.92	6917.45
87.34	6917.46	87.66	6917.51	88.06	6917.58	89.2	6917.76	89.35	6917.78
90.52	6917.97	91.28	6918.1	91.47	6918.14	92.18	6918.26	93.08	6918.43
93.75	6918.54	93.98	6918.59	94.88	6918.75	96.02	6918.95	96.4	6919.02
97.16	6919.15	97.4	6919.2	97.59	6919.23	98.3	6919.36	98.5	6919.39
99.27	6919.53	100.57	6919.77	101.21	6919.88	102.11	6920.04	102.43	6920.1
102.85	6920.17	103.44	6920.28	103.91	6920.34	103.98	6920.34	104.45	6920.4
105.45	6920.43	105.72	6920.43	106.26	6920.44	107.4	6920.47	107.53	6920.47
108.02	6920.49	108.53	6920.5	109.67	6920.53	110.23	6920.54	110.49	6920.55
110.81	6920.55	111.49	6920.57	112.94	6920.6	113.08	6920.61	114.22	6920.64
114.51	6920.64	114.75	6920.65	115.36	6920.66	115.65	6920.67	116.49	6920.69
116.78	6920.7	117.46	6920.71	117.53	6920.72	118.36	6920.73	118.54	6920.74
118.77	6920.74	119.26	6920.76	119.55	6920.76	120.55	6920.79	121.97	6920.82
122.57	6920.84	122.87	6920.84	123.57	6920.86	123.77	6920.86	124.46	6920.88
124.68	6920.89	126.48	6920.93	126.73	6920.94	127.39	6920.95	127.6	6920.96
127.87	6920.96	129.01	6920.99	129.61	6921	130.09	6921.02	131	6921.04
131.28	6921.04	131.9	6921.06	132.42	6921.07	133.56	6921.1	133.71	6921.1
134.28	6921.12	134.61	6921.12	134.69	6921.13	135.51	6921.15	135.83	6921.15
136.41	6921.17	136.66	6921.17	137.67	6921.2	139.12	6921.23	139.24	6921.24
139.68	6921.25	140.02	6921.25	140.93	6921.28	141.69	6921.29	141.83	6921.3
143.03	6921.33	143.71	6921.34	143.79	6921.35	144.54	6921.36	144.71	6921.37
144.94	6921.37	145.42	6921.38	146.13	6921.4	146.3	6921.41	147.18	6921.43
147.32	6921.43	148.51	6921.46	148.76	6921.46	148.94	6921.47	149.7	6921.49
150.7	6921.51	150.89	6921.52	151.57	6921.53	151.79	6921.54	152.08	6921.54
152.8	6921.56	153.33	6921.57	153.81	6921.59	154.21	6921.59	155.09	6921.62
155.84	6921.63	155.97	6921.64	157.73	6921.68	158.04	6921.69	158.6	6921.7
158.87	6921.71	159.23	6921.71	159.88	6921.73	160.89	6921.75	161.9	6921.78
162.12	6921.78	162.8	6921.8	163	6921.8	163.54	6921.82	165.19	6921.86
165.63	6921.86	166.38	6921.88	166.51	6921.88	166.96	6921.9	167.39	6921.9
167.57	6921.91	167.97	6921.92	168.27	6921.92	168.76	6921.93	169.95	6921.96
170.24	6921.97	171.01	6921.98	171.14	6921.99	171.6	6922	172.01	6922
172.22	6922.01	173.81	6922.04	174.01	6922.04	174.22	6922.05	174.8	6922.06
175.01	6922.06	175.22	6922.07	175.8	6922.08	176.22	6922.08	176.8	6922.1
177.23	6922.1	177.8	6922.12	178.23	6922.12	178.8	6922.13	179.01	6922.14
179.23	6922.14	179.8	6922.15	180.01	6922.16	180.23	6922.16	180.79	6922.17
181.01	6922.18	181.23	6922.18	181.79	6922.19	182.01	6922.2	182.23	6922.2
182.79	6922.21	183.01	6922.22	183.24	6922.22	183.79	6922.23	184.01	6922.24
184.24	6922.24	184.79	6922.25	185.01	6922.26	185.24	6922.26	185.79	6922.27
186.01	6922.27	186.24	6922.28	186.78	6922.29	187.01	6922.29	187.24	6922.3
187.78	6922.31	188.01	6922.31	188.24	6922.32	189.78	6922.32	190.01	6922.31

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  191.25 6922.31  191.78  6922.3  192.77  6922.3  193.01 6922.29  194.25 6922.29
  194.77 6922.28  196.01 6922.28  196.26 6922.27  197.26 6922.27  197.76 6922.26
  199.01 6922.26  199.26 6922.25  200.26 6922.25  200.76 6922.24  206.27 6922.24
  206.75 6922.23  221.72 6922.23  222.01 6922.22  237.01 6922.22  237.33 6922.21
  245.01 6922.21  245.34 6922.19  245.68 6922.18  246.01 6922.16  246.34 6922.11
  246.68 6922.05  247.34 6921.95  247.68 6921.89  248.01 6921.84  248.35 6921.78
  248.68 6921.73  249.01 6921.67  249.68 6921.57  250.01 6921.51  250.35 6921.46
  250.68  6921.4  251.01 6921.35  251.35 6921.29  251.67 6921.24  252.01 6921.18
  252.35 6921.13  252.67 6921.07  253.01 6921.02  253.35 6920.96  253.67 6920.91
  254.01 6920.85  254.67 6920.75  255.36 6920.63  256.01 6920.53  256.67 6920.42
  257.01 6920.36  257.36 6920.31  259.01 6920.03  259.36 6920.12  259.66 6920.21
  260.01 6920.29  260.37 6920.45  260.66 6920.57  261.01 6920.73  261.37 6920.88
  261.66 6921.01  262.37 6921.31  264.01 6922.03  264.65  6922.3  265.01 6922.46
  265.65 6922.73  266.65 6923.17  267.01 6923.32  267.38 6923.48  268.01 6923.76
  268.38 6923.92  268.65 6924.03  269.01 6924.19  271.01 6925.05  271.38 6925.22
  272.39 6925.65  273.01 6925.92  273.39 6926.08  273.64 6926.17  274.01 6926.33
  274.39 6926.48  274.64 6926.56  275.01 6926.72  278.01 6927.83   278.4 6927.98
  278.63 6928.06  279.01 6928.21   279.4 6928.35  279.63 6928.44   280.4 6928.72
  280.63 6928.81  281.01 6928.95  282.01 6929.33  282.62 6929.55  283.01  6929.7
   283.4 6929.84  283.62 6929.93  284.01 6930.07  284.62  6930.3  285.01 6930.44
  286.01 6930.82  286.41 6930.96  287.01 6931.19  287.41  6931.3  287.61 6931.37
  288.01 6931.48  288.41 6931.48  288.61 6931.47  289.01 6931.47  290.01 6931.45
  290.61 6931.45  291.42 6931.43  292.01 6931.43  292.61 6931.42  293.01 6931.41
   293.6 6931.41  294.42 6931.39  295.01 6931.39  296.01 6931.37  296.43 6931.37
   296.6 6931.36  297.01 6931.36  297.43 6931.35  298.01 6931.35  298.43 6931.34
  298.72 6931.34

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
       0     .05   59.62    .035  103.91     .05

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
         59.62  103.91           140.72  150.39  162.43             .1       .3
Ineffective Flow     num=       1
   Sta L   Sta R    Elev  Permanent
  187.97  298.72 6922.44       F

CROSS SECTION


RIVER: UT_BSC2
REACH: NCONFL-BGM         RS: 2650

INPUT
Description: Source: Corrected Effective Topo
Datum: NGVD29
Coordinate
             System: NAVD88 Colorado State Planes Central, US Feet.
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Station Elevation Data num= 491

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
-7.75	6919.63	-7.29	6919.63	-6.84	6919.61	-5.84	6919.59	-5.35	6919.57
-4.84	6919.56	-4.37	6919.54	-3.84	6919.53	-3.4	6919.51	-2.84	6919.5
-2.43	6919.48	-1.84	6919.47	-1.45	6919.45	-.84	6919.44	-.48	6919.42
-.19	6919.42	1.16	6919.38	1.87	6919.35	2.16	6919.35	2.9	6919.32
3.16	6919.32	3.93	6919.29	4.16	6919.29	5.35	6919.25	8.27	6919.16
9.08	6919.14	9.24	6919.13	10.11	6919.11	10.21	6919.1	12.15	6919.05
13.12	6919.02	13.21	6919.01	15.07	6918.95	15.27	6918.95	16.3	6918.91
17.33	6918.88	17.98	6918.85	18.95	6918.82	19.93	6918.77	20.9	6918.73
23.81	6918.64	25.17	6918.6	25.58	6918.58	26.17	6918.57	26.61	6918.55
27.17	6918.54	27.64	6918.52	28.17	6918.51	29.17	6918.47	29.71	6918.46
30.17	6918.44	30.74	6918.43	31.17	6918.41	31.77	6918.4	32.17	6918.38
36.93	6918.24	37.41	6918.22	37.96	6918.21	38.38	6918.19	38.99	6918.18
39.35	6918.16	41.05	6918.11	41.3	6918.11	42.08	6918.08	42.27	6918.08
47.13	6917.93	47.24	6917.92	48.18	6917.9	48.27	6917.89	49.07	6917.87
51.98	6917.78	53.18	6917.74	53.42	6917.74	54.18	6917.71	55.18	6917.54
55.87	6917.38	56.18	6917.32	57.18	6917.09	57.55	6917.01	58.78	6916.72
59.61	6916.54	60.19	6916.4	61.19	6916.18	62.7	6915.83	63.64	6915.62
64.19	6915.49	65.59	6915.18	66.56	6914.95	67.86	6914.66	69.19	6914.35
70.19	6914.18	71.19	6914.1	71.41	6914.09	72.39	6914.02	73.36	6913.94
74.19	6913.89	74.33	6913.89	76.11	6913.82	76.27	6913.82	77.14	6913.79
77.24	6913.78	78.21	6913.75	79.2	6913.71	80.16	6913.91	81.13	6914.15
81.27	6914.19	82.3	6914.45	83.33	6914.7	85.01	6915.12	85.39	6915.22
85.99	6915.36	86.96	6915.61	87.93	6915.85	88.2	6915.91	88.48	6915.99
89.2	6916.16	90.07	6916.38	91.58	6916.76	92.2	6916.91	92.61	6917.03
92.79	6917.06	93.2	6917.18	93.76	6917.33	94.2	6917.46	95.2	6917.74
95.7	6917.89	96.2	6918.03	96.67	6918.07	96.73	6918.06	97.2	6918.1
97.76	6918.1	98.2	6918.11	99.2	6918.11	99.59	6918.12	100.86	6918.12
101.2	6918.13	102.2	6918.13	102.5	6918.14	103.47	6918.14	103.95	6918.15
104.44	6918.15	104.98	6918.16	106.21	6918.17	106.39	6918.18	108.08	6918.2
109.21	6918.21	109.3	6918.22	111.24	6918.24	113.19	6918.27	115.13	6918.29
115.29	6918.3	117.07	6918.32	118.21	6918.33	118.39	6918.34	119.02	6918.34
119.21	6918.35	120.45	6918.36	121.93	6918.38	122.9	6918.4	123.54	6918.4
125.21	6918.43	125.82	6918.43	126.64	6918.45	127.22	6918.45	128.22	6918.47
128.73	6918.47	129.7	6918.49	130.22	6918.49	131.22	6918.51	131.79	6918.51
132.82	6918.53	133.22	6918.53	134.22	6918.55	134.89	6918.55	135.22	6918.56
136.95	6918.58	137.98	6918.6	138.45	6918.6	139.42	6918.61	140.39	6918.63
143.14	6918.66	143.3	6918.67	146.23	6918.7	147.19	6918.72	149.13	6918.74
149.32	6918.75	151.08	6918.77	152.23	6918.78	152.42	6918.79	153.02	6918.79
153.23	6918.8	153.99	6918.81	154.48	6918.81	155.93	6918.83	156.9	6918.85
157.57	6918.85	157.88	6918.86	158.6	6918.86	158.85	6918.85	159.64	6918.85
159.82	6918.84	160.79	6918.84	161.23	6918.83	161.76	6918.83	162.23	6918.82
162.73	6918.82	163.23	6918.81	164.23	6918.81	164.68	6918.8	165.23	6918.8
165.65	6918.79	166.62	6918.79	166.85	6918.78	167.59	6918.78	167.88	6918.77
168.92	6918.77	169.23	6918.76	169.95	6918.76	170.23	6918.75	170.98	6918.75
171.24	6918.74	172.24	6918.74	172.45	6918.73	173.42	6918.73	178.2	6918.68
179.25	6918.68	179.59	6918.67	180.26	6918.67	185.08	6918.62	186.05	6918.62

186.24	6918.61	187.24	6918.61	187.48	6918.6	188.24	6918.6	188.51	6918.59
189.54	6918.59	189.94	6918.58	190.57	6918.58	190.91	6918.57	191.88	6918.57
192.24	6918.56	192.85	6918.56	193.24	6918.55	193.82	6918.55	194.25	6918.54
195.25	6918.54	195.73	6918.53	196.25	6918.53	196.74	6918.52	197.25	6918.52
197.71	6918.51	198.82	6918.51	199.25	6918.5	199.85	6918.5	200.25	6918.49
200.88	6918.49	201.25	6918.48	202.25	6918.48	202.56	6918.47	203.25	6918.47
203.54	6918.46	204.51	6918.46	205.01	6918.45	205.48	6918.45	208.1	6918.42
209.13	6918.42	209.25	6918.41	210.25	6918.41	210.34	6918.4	211.31	6918.4
212.96	6918.38	216.09	6918.38	216.35	6918.39	219.6	6918.39	220.3	6918.3
222.94	6918	223.46	6917.95	225.04	6917.77	226.11	6917.66	226.98	6917.56
227.7	6917.49	228.2	6917.43	229.09	6917.34	229.28	6917.31	230.14	6917.22
231.2	6917.22	232.45	6917.35	232.94	6917.41	233.3	6917.44	233.73	6917.49
234.36	6917.55	235.31	6917.65	235.41	6917.67	236.47	6917.78	237.21	6917.87
237.52	6917.9	238.79	6918.06	239.26	6918.11	239.63	6918.16	240.84	6918.31
241.74	6918.41	242.42	6918.5	242.8	6918.54	244	6918.62	244.46	6918.64
245.58	6918.67	245.96	6918.69	246.71	6918.7	247.95	6918.73	248.3	6918.73
249.12	6918.75	249.53	6918.75	250.32	6918.77	250.76	6918.77	251.47	6918.79
251.9	6918.79	252.69	6918.81	253.05	6918.81	253.91	6918.83	254.39	6918.83
255.06	6918.85	255.45	6918.85	257.06	6918.89	257.43	6918.89	259.39	6918.94
259.8	6918.94	261.78	6918.99	262.17	6918.99	262.83	6919.01	263.75	6919.03
264.15	6919.03	266.13	6919.08	267.05	6919.09	268.1	6919.12	268.5	6919.12
270.48	6919.17	270.87	6919.17	272.07	6919.2	272.32	6919.2	272.82	6919.22
273.24	6919.22	275.24	6919.27	275.61	6919.27	276.82	6919.3	277.19	6919.3
277.98	6919.32	278.65	6919.33	279.12	6919.33	279.7	6919.34	280.35	6919.36
280.76	6919.36	281.58	6919.38	282.72	6919.39	283.51	6919.41	283.92	6919.41
284.75	6919.43	285.09	6919.43	285.88	6919.45	286.33	6919.45	287.08	6919.47
288.14	6919.48	289.5	6919.51	289.83	6919.51	290.62	6919.53	291.08	6919.53
291.73	6919.55	292.2	6919.55	292.36	6919.56	293.41	6919.57	294.25	6919.59
294.57	6919.59	295.36	6919.61	295.84	6919.61	296.57	6919.63	296.94	6919.63
297.73	6919.65	298.04	6919.65	300.1	6919.68	300.79	6919.7	301.19	6919.7
302.18	6919.72	302.47	6919.72	304.34	6919.76	304.84	6919.76	305.01	6919.77
306.06	6919.78	306.93	6919.8	308.17	6919.82	309.58	6919.86	310.28	6919.87
311.16	6919.89	311.69	6919.91	311.95	6919.91	312.74	6919.93	313.27	6919.95
314.85	6919.98	315.9	6920.01	316.44	6920.02	316.95	6920.04	317.66	6920.05
319.06	6920.09	320.1	6920.11	320.64	6920.13	321.43	6920.14	321.88	6920.16
322.22	6920.16	323.01	6920.18	323.8	6920.21	325.95	6920.26	326.4	6920.28
326.97	6920.29	328.21	6920.33	328.55	6920.33	329.34	6920.36	329.55	6920.36
331.37	6920.41	332.29	6920.44	334.08	6920.48	334.54	6920.5	334.87	6920.5
335.66	6920.53	337.04	6920.56	338.62	6920.61	340.4	6920.65	341.19	6920.68
341.79	6920.69	343.38	6920.74	344.03	6920.75	345.31	6920.79	345.93	6920.8
346.72	6920.83	348.13	6920.86	349.3	6920.9	350.35	6920.92	351.62	6920.96
352.25	6920.97	353.04	6921	353.83	6921.02	354.47	6921.03	355.62	6921.07
356.68	6921.09	358.57	6921.15	359.22	6921.16	360.81	6921.21	361.07	6921.21
361.95	6921.24	362.52	6921.25	363.01	6921.27	364.89	6921.33	365.68	6921.37
366.47	6921.4	370.53	6921.58	371.21	6921.6	371.9	6921.63	373.49	6921.68
375.16	6921.74	375.66	6921.75	376.66	6921.79	376.83	6921.79	377.53	6921.82
377.77	6921.82	379.11	6921.87	379.83	6921.89	382.27	6921.98	384.64	6922.06
385.15	6922.07	387.02	6922.14	387.26	6922.14	388.6	6922.19	389.33	6922.21

```
  389.44 6922.22  390.18 6922.24  391.76  6922.3  392.59 6922.32  393.59 6922.36
  394.13 6922.37  395.67 6922.43   396.5 6922.45  398.08 6922.51  398.84 6922.53
  398.89 6922.54  399.66 6922.56  400.97 6922.61  401.24 6922.61  403.08 6922.68
  403.61 6922.69  405.18 6922.75  405.98 6922.77  407.56 6922.83  408.35 6922.85
  408.97 6922.85

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
   -7.75     .05   48.18    .035    97.2     .05

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
         48.18    97.2             48.2   45.53   42.16             .1       .3
Ineffective Flow     num=       1
   Sta L   Sta R    Elev  Permanent
  157.31  408.97 6918.88       F

CROSS SECTION


RIVER: UT_BSC2
REACH: NCONFL-BGM         RS: 2605

INPUT
Description: Source: 2003 LOMR HEC-2 model
Datum: NGVD29
Coordinate System:
             NAVD88 Colorado State Planes Central, US Feet.
Station Elevation Data    num=      17
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
       0    6920   90.01    6918  100.01  6916.2  108.01    6918  115.01  6918.2
  127.01    6918  138.01  6917.5  150.01    6918  182.01    6918  190.01  6917.6
  200.01    6918  222.01  6918.4  242.01    6918  258.01    6914  270.01    6916
  305.01    6918     325  6919.8

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
       0     .05   90.01    .035  305.01     .05

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
         90.01  305.01                0       0       0             .1       .3



SUMMARY OF MANNING'S N VALUES

River:UT_BSC2

      Reach          River Sta.       n1        n2        n3
```

NCONFL-BGM	5100	.05	.035	.05
NCONFL-BGM	5000	.05	.035	.05
NCONFL-BGM	4900	.05	.035	.05
NCONFL-BGM	4850	.05	.035	.05
NCONFL-BGM	4750	.05	.035	.05
NCONFL-BGM	4650	.05	.035	.05
NCONFL-BGM	4600	.05	.035	.05
NCONFL-BGM	4550	.05	.035	.05
NCONFL-BGM	4500	.05	.035	.05
NCONFL-BGM	4400	.05	.035	.05
NCONFL-BGM	4300	.05	.035	.05
NCONFL-BGM	4250	.05	.035	.05
NCONFL-BGM	4150	.05	.035	.05
NCONFL-BGM	4000	.05	.035	.05
NCONFL-BGM	3900	.05	.035	.05
NCONFL-BGM	3850	.05	.035	.05
NCONFL-BGM	3800	.05	.035	.05
NCONFL-BGM	3694	.05	.035	.05
NCONFL-BGM	3600	.05	.035	.05
NCONFL-BGM	3500	.05	.035	.05
NCONFL-BGM	3450	.05	.035	.05
NCONFL-BGM	3350	.05	.035	.05
NCONFL-BGM	3300	.05	.035	.05
NCONFL-BGM	3250	.05	.035	.05
NCONFL-BGM	3200	.05	.035	.05
NCONFL-BGM	3150	.05	.035	.05
NCONFL-BGM	3100	.05	.035	.05
NCONFL-BGM	3050	.035	.035	.035
NCONFL-BGM	3000	.05	.035	.05
NCONFL-BGM	2900	.05	.035	.05
NCONFL-BGM	2800	.05	.035	.05
NCONFL-BGM	2650	.05	.035	.05
NCONFL-BGM	2605	.05	.035	.05

SUMMARY OF REACH LENGTHS

River: UT_BSC2

Reach	River Sta.	Left	Channel	Right
NCONFL-BGM	5100	105.09	123.89	136.02
NCONFL-BGM	5000	101.57	100.09	91.93
NCONFL-BGM	4900	70.83	50.05	32.48
NCONFL-BGM	4850	109.19	100.34	86.55

NCONFL-BGM	4750	111.78	100.72	82.51
NCONFL-BGM	4650	17.98	49.31	85.86
NCONFL-BGM	4600	48.42	48.42	48.42
NCONFL-BGM	4550	60.05	60.05	60.05
NCONFL-BGM	4500	90.12	91.85	93.21
NCONFL-BGM	4400	126.25	112.69	105.25
NCONFL-BGM	4300	30.91	33.98	43.47
NCONFL-BGM	4250	91.84	91.84	91.84
NCONFL-BGM	4150	164.63	164.63	164.63
NCONFL-BGM	4000	93.31	85.66	98.56
NCONFL-BGM	3900	26.02	48.36	73.69
NCONFL-BGM	3850	46.06	51.61	64.96
NCONFL-BGM	3800	106.47	105.93	111.29
NCONFL-BGM	3694	95.37	93.53	91.5
NCONFL-BGM	3600	108.43	100.15	91.04
NCONFL-BGM	3500	40.72	50.26	59.45
NCONFL-BGM	3450	75.69	100.23	119
NCONFL-BGM	3350	63.32	50.1	22.83
NCONFL-BGM	3300	64.11	49.63	23.06
NCONFL-BGM	3250	50.23	50.23	50.23
NCONFL-BGM	3200	50.08	50.08	50.08
NCONFL-BGM	3150	39.96	50.14	58.01
NCONFL-BGM	3100	33.13	33.13	33.13
NCONFL-BGM	3050	75.27	75.27	75.27
NCONFL-BGM	3000	92.31	92.31	92.31
NCONFL-BGM	2900	118.9	99.71	72.05
NCONFL-BGM	2800	140.72	150.39	162.43
NCONFL-BGM	2650	48.2	45.53	42.16
NCONFL-BGM	2605	0	0	0

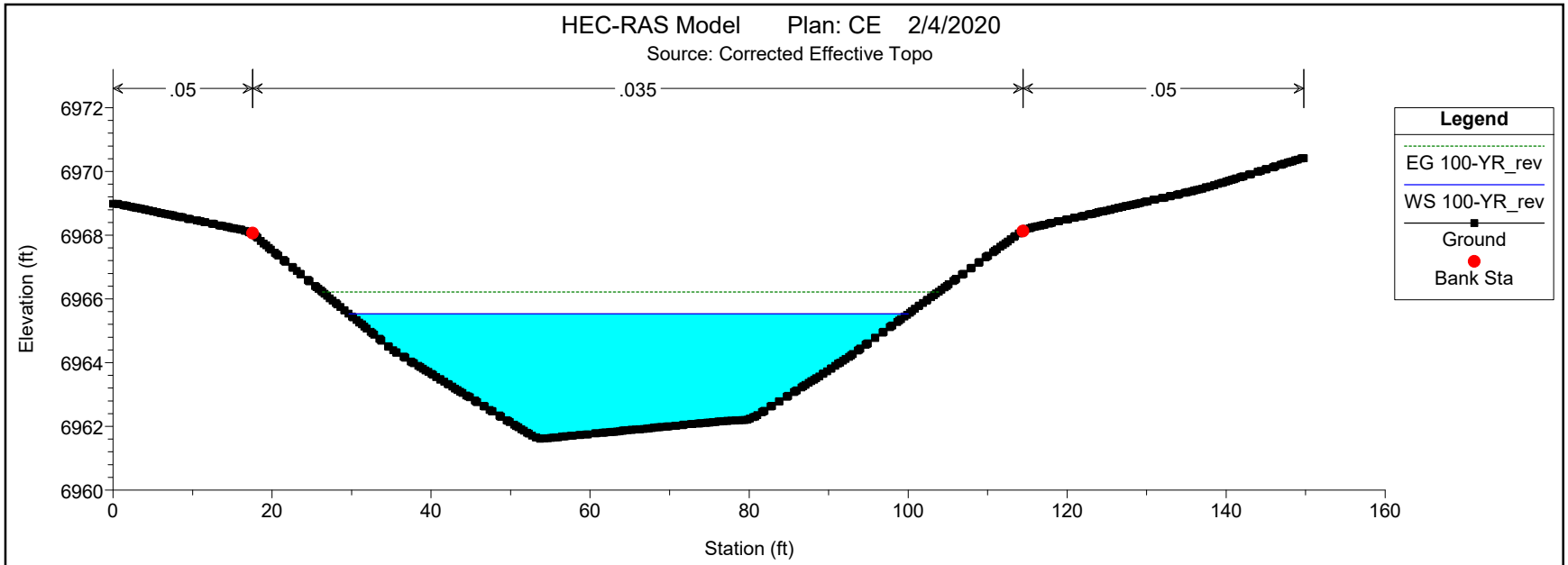
SUMMARY OF CONTRACTION AND EXPANSION COEFFICIENTS
River: UT_BSC2

Reach	River Sta.	Contr.	Expan.
NCONFL-BGM	5100	.1	.3
NCONFL-BGM	5000	.1	.3
NCONFL-BGM	4900	.1	.3
NCONFL-BGM	4850	.1	.3
NCONFL-BGM	4750	.1	.3
NCONFL-BGM	4650	.1	.3
NCONFL-BGM	4600	.1	.3
NCONFL-BGM	4550	.1	.3
NCONFL-BGM	4500	.1	.3

NCONFL-BGM	4400	.1	.3
NCONFL-BGM	4300	.1	.3
NCONFL-BGM	4250	.1	.3
NCONFL-BGM	4150	.3	.5
NCONFL-BGM	4000	.1	.3
NCONFL-BGM	3900	.1	.3
NCONFL-BGM	3850	.1	.3
NCONFL-BGM	3800	.1	.3
NCONFL-BGM	3694	.1	.3
NCONFL-BGM	3600	.1	.3
NCONFL-BGM	3500	.1	.3
NCONFL-BGM	3450	.1	.3
NCONFL-BGM	3350	.1	.3
NCONFL-BGM	3300	.1	.3
NCONFL-BGM	3250	.1	.3
NCONFL-BGM	3200	.1	.3
NCONFL-BGM	3150	.1	.3
NCONFL-BGM	3100	.1	.3
NCONFL-BGM	3050	.1	.3
NCONFL-BGM	3000	.1	.3
NCONFL-BGM	2900	.1	.3
NCONFL-BGM	2800	.1	.3
NCONFL-BGM	2650	.1	.3
NCONFL-BGM	2605	.1	.3

Corrected Effective

Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Shear Chan	Shear Total	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
			(cfs)	(ft)	(ft)	(lb/sq ft)	(lb/sq ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
NCONFL-BGM	5100	100-YR-REV	1450	6961.61	6965.81	1.31	1.31		6966.63	0.007753	7.26	199.82	73.21	0.77
NCONFL-BGM	5000	100-YR-REV	1450	6959.87	6964.45	1.82	1.1	6964.45	6965.52	0.009873	8.67	203.55	112.98	0.89
NCONFL-BGM	4900	100-YR-REV	1450	6956.13	6960.76	2.05	1.81	6960.76	6962.01	0.012791	9	164.53	71.91	0.99
NCONFL-BGM	4850	100-YR-REV	1450	6954.51	6959.69	2.11	1.38	6959.69	6961.05	0.0103	9.51	168.73	77.99	0.92
NCONFL-BGM	4750	100-YR-REV	1450	6952.35	6957.64	1.78	1.16	6957.64	6958.72	0.010065	8.54	193.64	104.05	0.89
NCONFL-BGM	4650	100-YR-REV	1450	6950.66	6955.77	2.05	1.26	6955.77	6957.08	0.009681	9.42	178.26	85.08	0.9
NCONFL-BGM	4600	100-YR-REV	1450	6949.29	6954.25	2.11	1.53	6954.25	6955.6	0.011157	9.39	163.18	73.41	0.94
NCONFL-BGM	4550	100-YR-REV	1450	6947.92	6953.98	0.79	0.62		6954.43	0.003662	5.86	299.03	108.8	0.55
NCONFL-BGM	4500	100-YR-REV	1450	6947.76	6952.64	2.15	1.96	6952.64	6953.97	0.013043	9.25	157.24	64.3	1
NCONFL-BGM	4400	100-YR-REV	1450	6945.04	6950.89	2.38	2.38	6950.89	6952.42	0.01294	9.93	146.07	48.1	1
NCONFL-BGM	4300	100-YR-REV	1450	6943.59	6948.68	2.29	2.29	6948.68	6950.12	0.013214	9.64	150.44	53.15	1.01
NCONFL-BGM	4250	100-YR-REV	1450	6942.87	6948.01	2.22	2.22	6948.01	6949.4	0.013073	9.46	153.33	55.34	1
NCONFL-BGM	4150	100-YR-REV	1450	6941.91	6946.13	2.08	2.08	6946.13	6947.39	0.013663	9	161.07	65.24	1.01
NCONFL-BGM	4000	100-YR-REV	1450	6938.32	6942.61	1.1	1.07	6942.61	6943.15	0.007928	6.46	256.76	117.49	0.76
NCONFL-BGM	3900	100-YR-REV	1450	6937.27	6940.25	0.8	0.8		6940.7	0.006366	5.38	269.27	133.82	0.67
NCONFL-BGM	3850	100-YR-REV	1450	6935.39	6939.44	1.45	1.45	6939.3	6940.25	0.012222	7.21	201.06	104.8	0.92
NCONFL-BGM	3800	100-YR-REV	1450	6934.46	6938.47	2.08	2.06	6938.47	6939.46	0.017113	8.67	189.62	96.99	1.09
NCONFL-BGM	3694	100-YR-REV	1482	6931.87	6935.66	1.12	1.12		6936.29	0.009046	6.36	232.84	117.04	0.8
NCONFL-BGM	3600	100-YR-REV	1482	6930.63	6934.23	1.93	1.87	6934.23	6935.13	0.016954	8.24	203.11	113.96	1.07
NCONFL-BGM	3500	100-YR-REV	1482	6928.81	6933.1	0.73	0.73		6933.55	0.004315	5.43	273.15	99.76	0.58
NCONFL-BGM	3450	100-YR-REV	1482	6928.02	6931.98	1.94	1.94	6931.98	6933.13	0.013747	8.58	172.65	75.55	1
NCONFL-BGM	3350	100-YR-REV	1482	6926.41	6930.19	1.82	1.47	6930.19	6931.26	0.012797	8.33	183.79	99.51	0.97
NCONFL-BGM	3300	100-YR-REV	1482	6924.89	6929.53	1.42	1.26	6929.18	6930.39	0.009098	7.44	200.07	89.6	0.83
NCONFL-BGM	3250	100-YR-REV	1482	6923.87	6928.77	1.79	1.57	6928.6	6929.86	0.011382	8.39	177.72	79.38	0.93
NCONFL-BGM	3200	100-YR-REV	1482	6923.23	6927.95	2.08	1.9	6927.95	6929.23	0.013067	9.07	164.36	69.72	0.99
NCONFL-BGM	3150	100-YR-REV	1482	6923.17	6926.87	1.99	1.43	6926.87	6928.1	0.011803	8.93	172.45	88.08	0.95
NCONFL-BGM	3100	100-YR-REV	1482	6922.12	6925.7	1.99	1.72	6925.69	6926.9	0.013055	8.78	170.13	80	0.99
NCONFL-BGM	3050	100-YR-REV	1482	6921.42	6926	0.72	0.52		6926.48	0.003291	5.64	276.02	108.1	0.53
NCONFL-BGM	3000	100-YR-REV	1482	6920.33	6925.06	1.63	0.89	6925.06	6926.04	0.009052	8.18	214.31	212.08	0.85
NCONFL-BGM	2900	100-YR-REV	1482	6919.33	6923.12	1.78	1.08	6923.12	6924.15	0.01008	8.53	213.3	147.71	0.89
NCONFL-BGM	2800	100-YR-REV	1482	6917.24	6921.9	1.67	0.78	6921.9	6922.92	0.007745	8.55	226.31	155.5	0.8
NCONFL-BGM	2650	100-YR-REV	1482	6913.71	6919.2	1.23	0.44	6919.2	6919.88	0.00589	7.28	316.68	264.82	0.7
NCONFL-BGM	2605	100-YR-REV	1482	6914	6918.85	0.72	0.63	6918.57	6919.21	0.008288	4.82	321.29	262.7	0.72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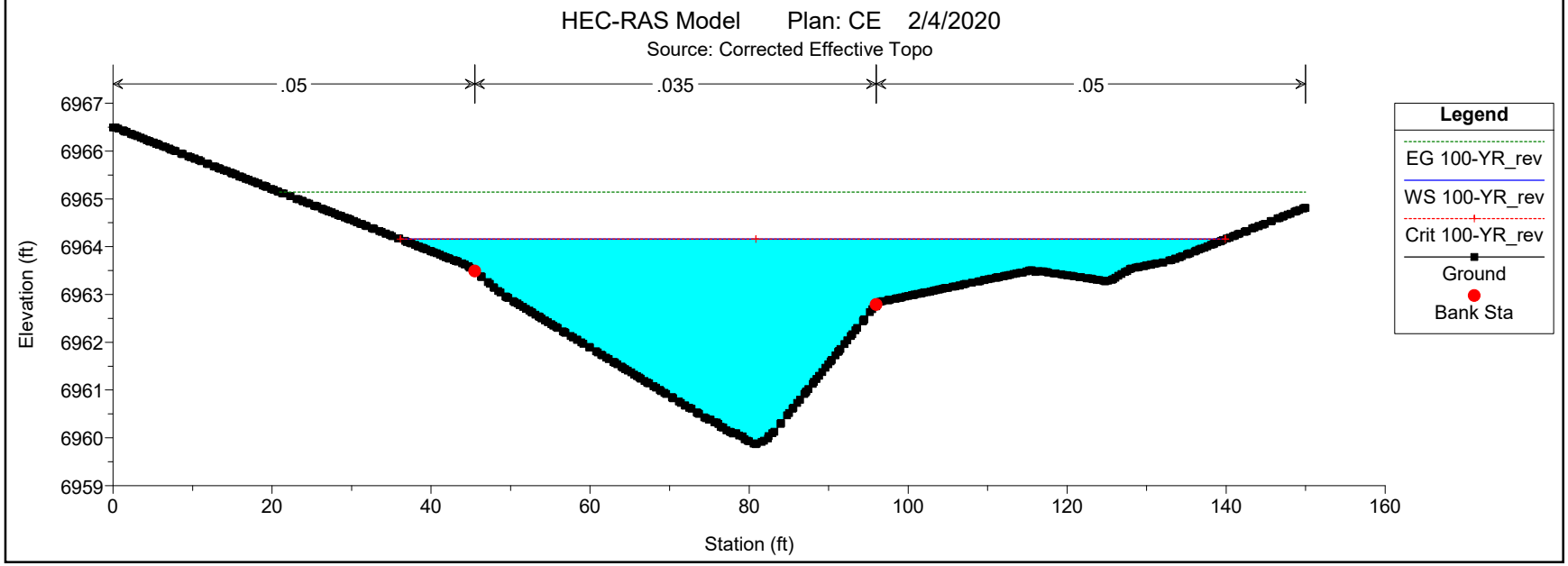
Source: Corrected Effective Topo
.05
.035
.05
Elevation (ft)
6972
6970
6968
6966
6964
6962
6960
0
20
40
60
80
100
120
140
160
Station (ft)
Legend
EG 100-YR_rev
WS 100-YR_rev
Ground
Bank Sta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Elevation (ft)
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6966
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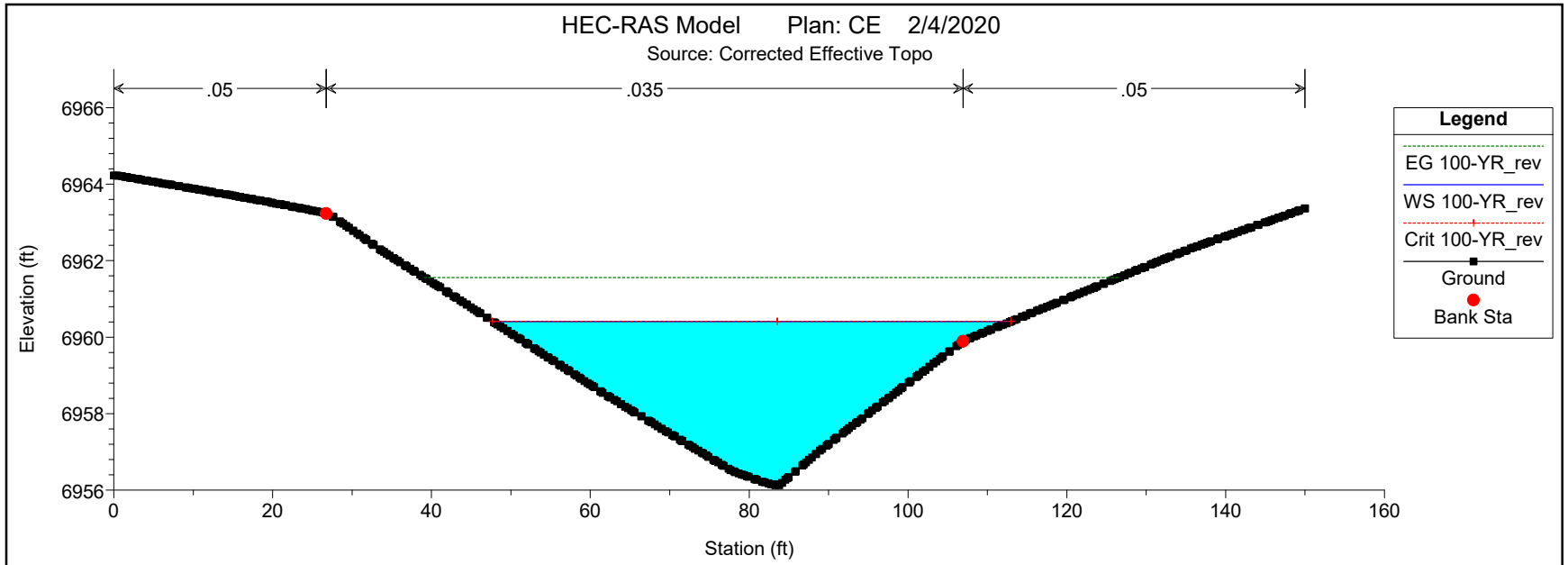
6963
6962
6961
6960
6959
0
20
40
60
80
100
120
140
160
Station (ft)
Legend
EG 100-YR_rev
WS 100-YR_rev
Crit 100-YR_rev
Ground
Bank Sta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Source: Corrected Effective Topo
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.035
.05
Elevation (ft)
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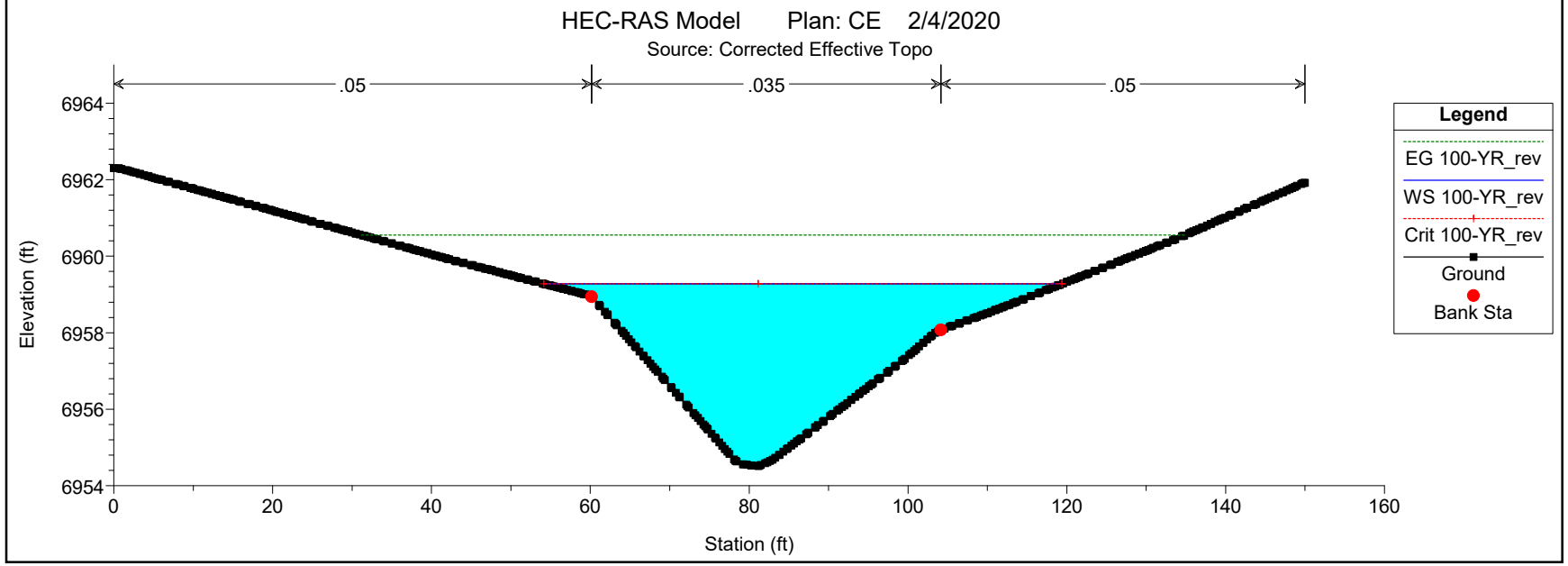
6962
6960
6958
6956
0
20
40
60
80
100
120
140
160
Station (ft)
Legend
EG 100-YR_rev
WS 100-YR_rev
Crit 100-YR_rev
Ground
Bank Sta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Source: Corrected Effective Topo
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.05
Elevation (ft)
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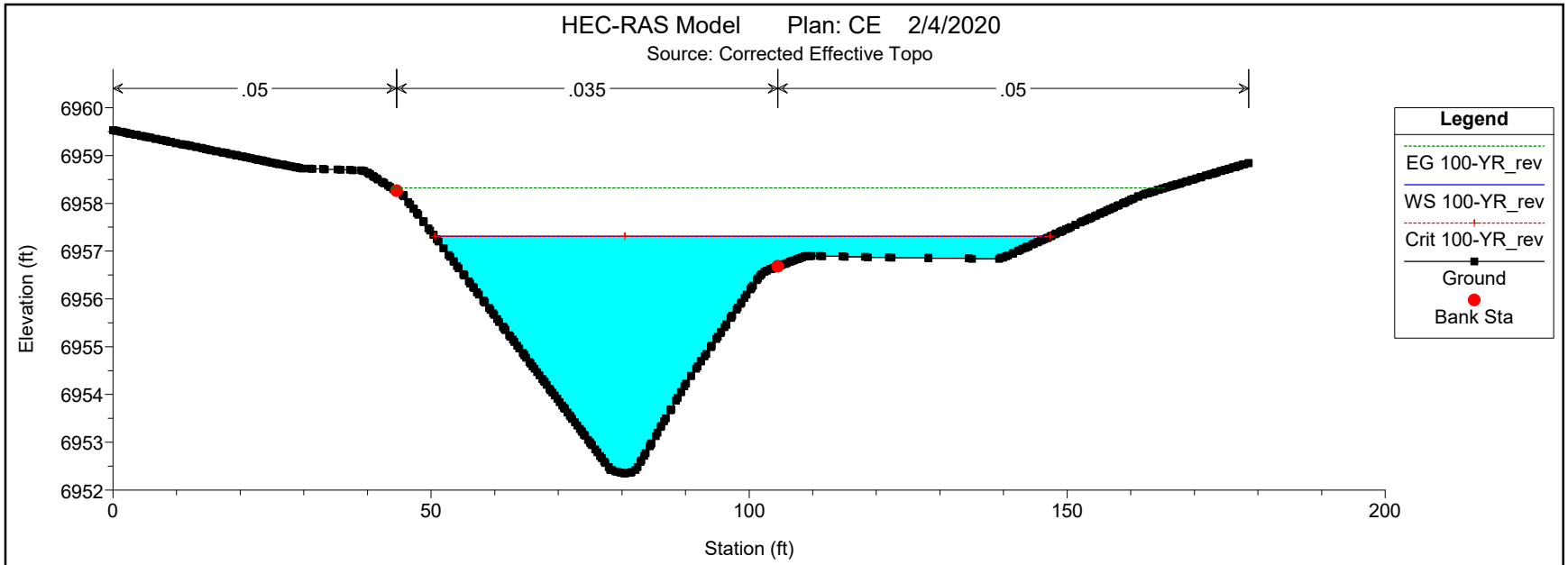
6962
6960
6958
6956
6954
0
20
40
60
80
100
120
140
160
Station (ft)
Legend
EG 100-YR_rev
WS 100-YR_rev
Crit 100-YR_rev
Ground
Bank Sta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Source: Corrected Effective Topo
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.035
.05
Elevation (ft)
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6958
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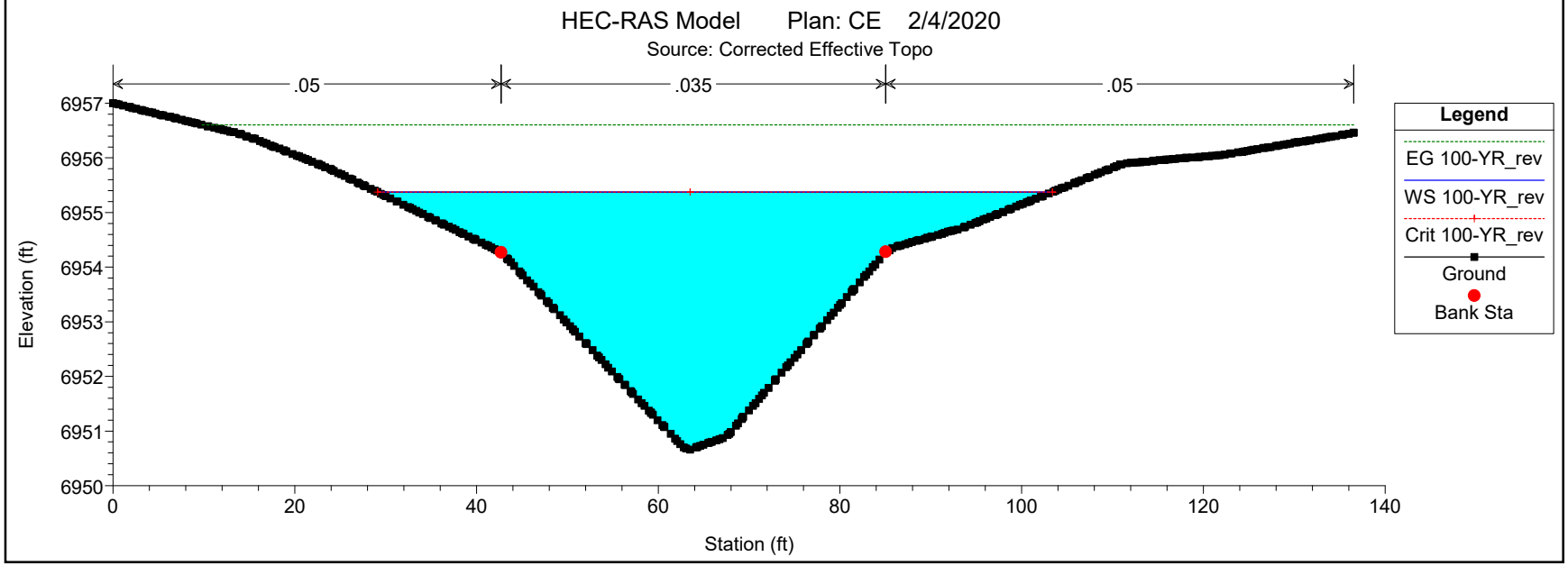
6956
6955
6954
6953
6952
0
50
100
150
200
Station (ft)
Legend
EG 100-YR_rev
WS 100-YR_rev
Crit 100-YR_rev
Ground
Bank Sta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Source: Corrected Effective Topo
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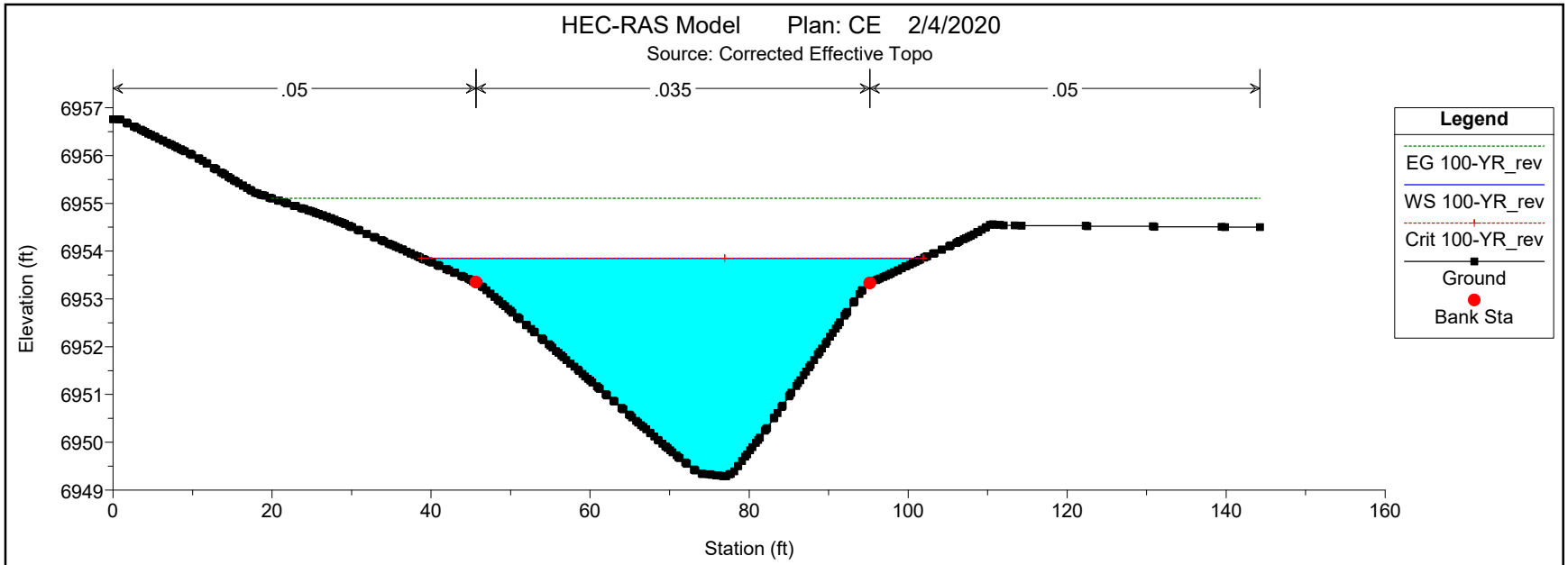
.035
.05
Elevation (ft)
6957
6956
6955
6954
6953
6952
6951
6950
0
20
40
60
80
100
120
140
Station (ft)
Legend
EG 100-YR_rev
WS 100-YR_rev
Crit 100-YR_rev
Ground
Bank Sta


HEC-RAS Model Plan: CE 2/4/2020
Source: Corrected Effective Topo
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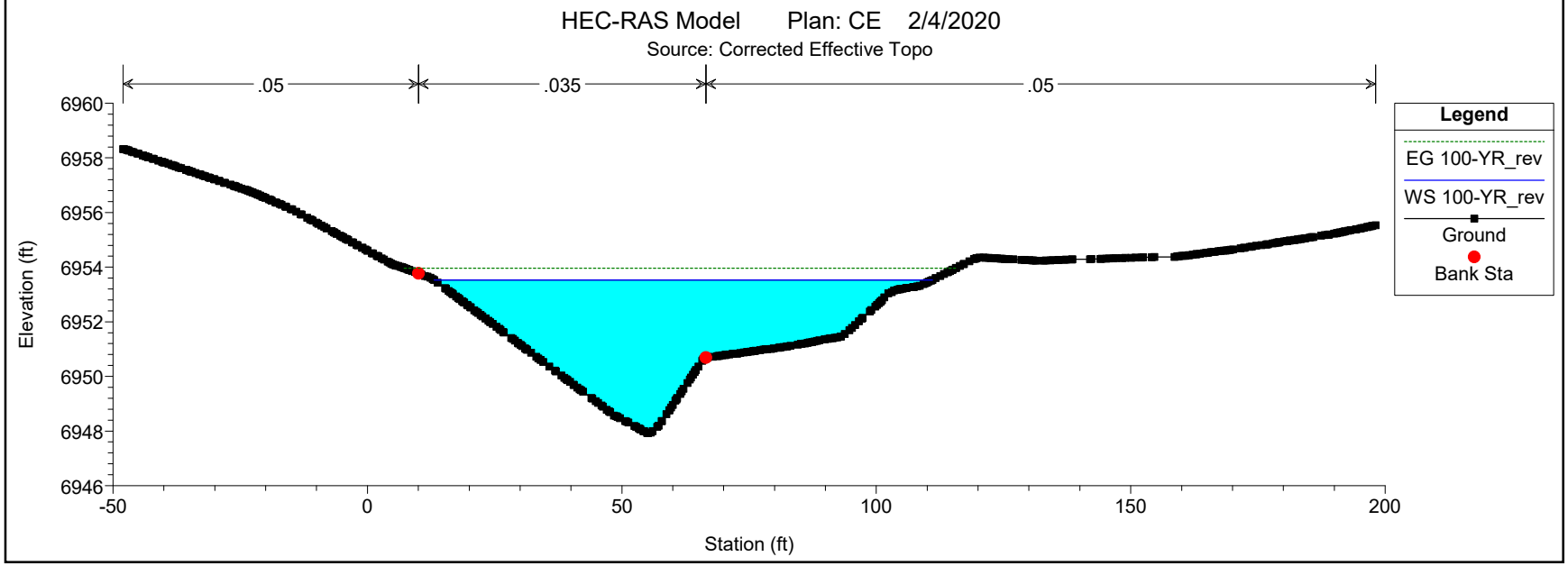
.035
.05
Elevation (ft)
6957
6956
6955
6954
6953
6952
6951
6950
6949
0
20
40
60
80
100
120
140
160
Station (ft)
Legend
EG 100-YR_rev
WS 100-YR_rev
Crit 100-YR_rev
Ground
Bank Sta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Source: Corrected Effective Topo
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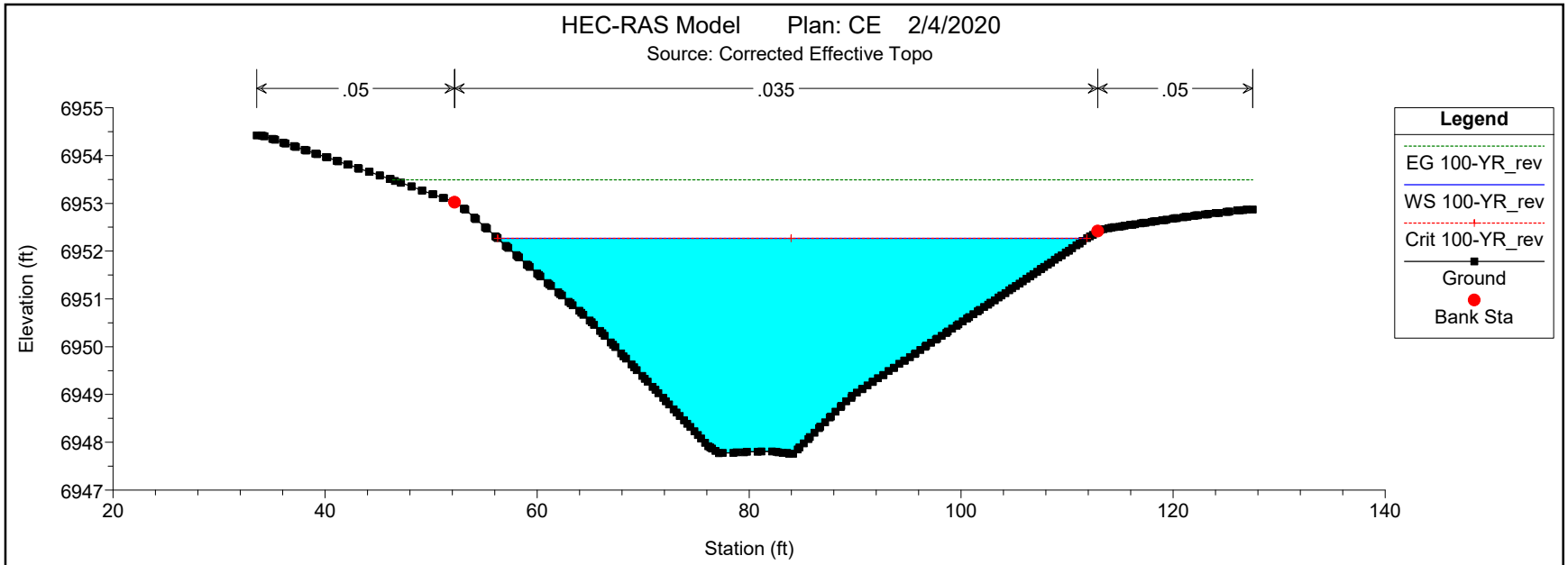
.035
.05
Elevation (ft)
6960
6958
6956
6954
6952
6950
6948
6946
-50
0
50
100
150
200
Station (ft)
Legend
EG 100-YR_rev
WS 100-YR_rev
Ground
Bank Sta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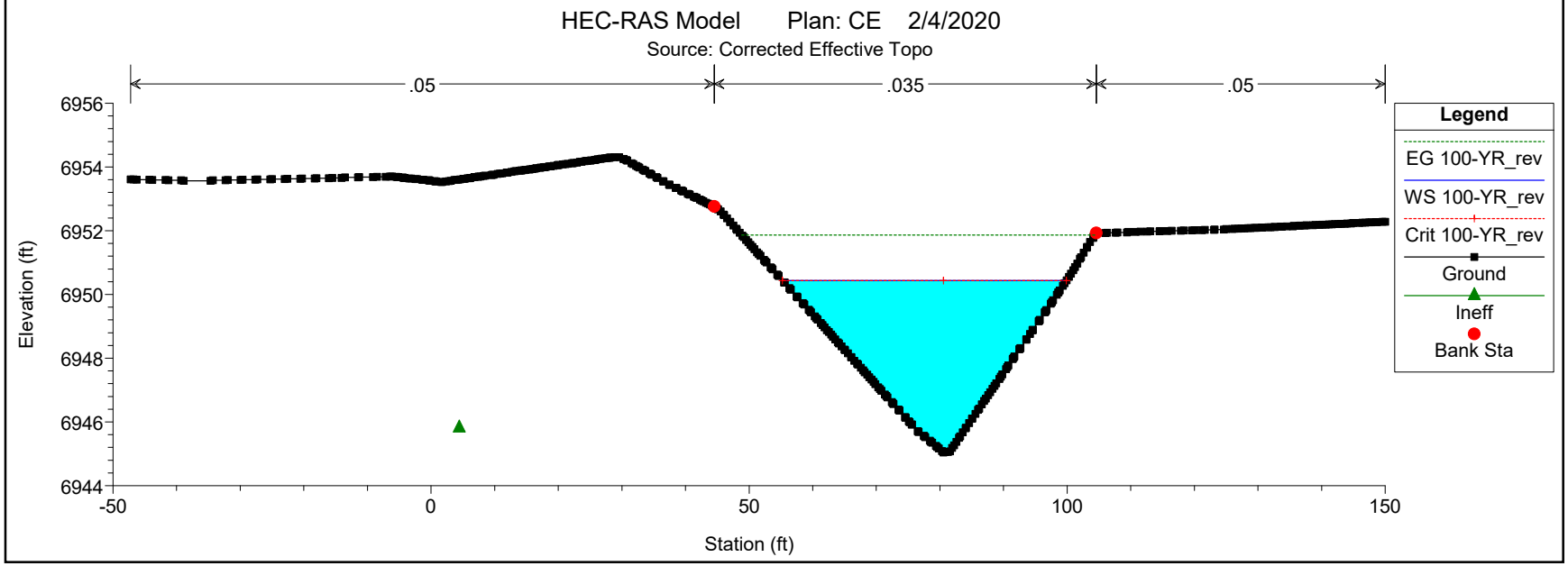
Source: Corrected Effective Topo
.05
.035
.05
Elevation (ft)
6955
6954
6953
6952
6951
6950
6949
6948
6947
20
40
60
80
100
120
140
Station (ft)
Legend
EG 100-YR_rev
WS 100-YR_rev
Crit 100-YR_rev
Ground
Bank Sta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.05
Elevation (ft)
6956
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6952
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6946
6944
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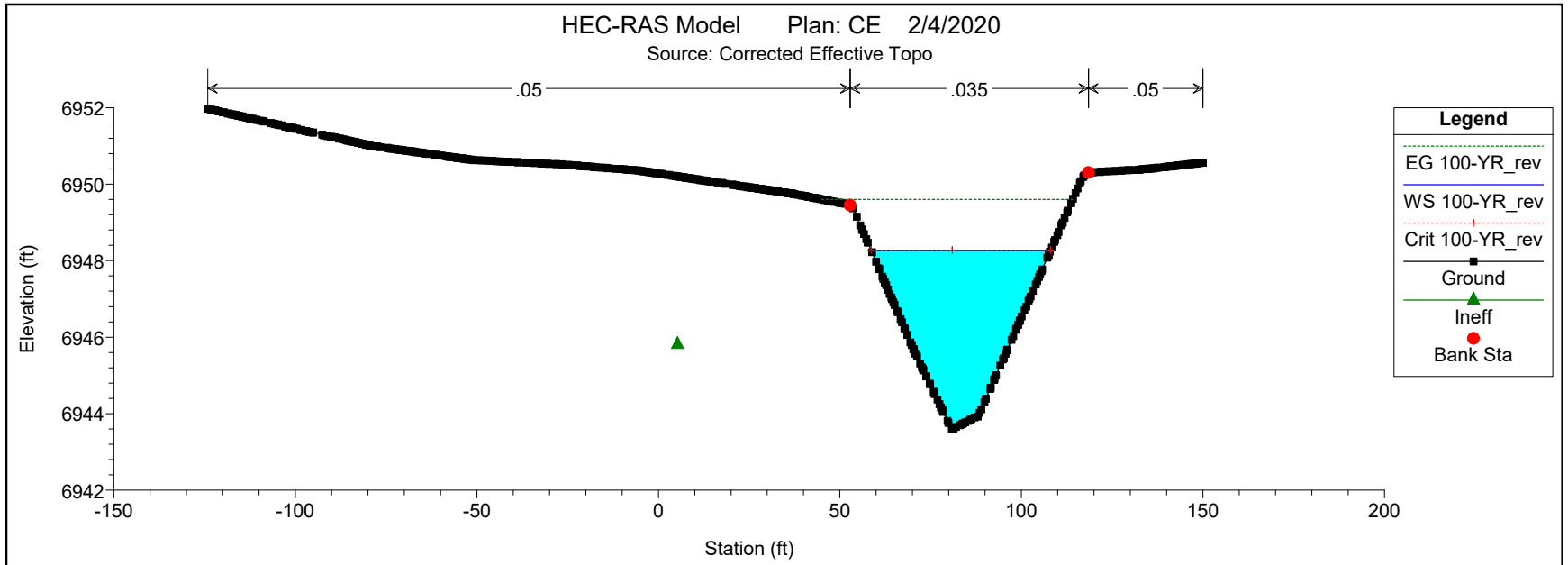
Station (ft)
Legend
EG 100-YR_rev
WS 100-YR_rev
Crit 100-YR_rev
Ground
Ineff
Bank Sta


HEC-RAS Model Plan: CE 2/4/2020
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Elevation (ft)
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6942
-150
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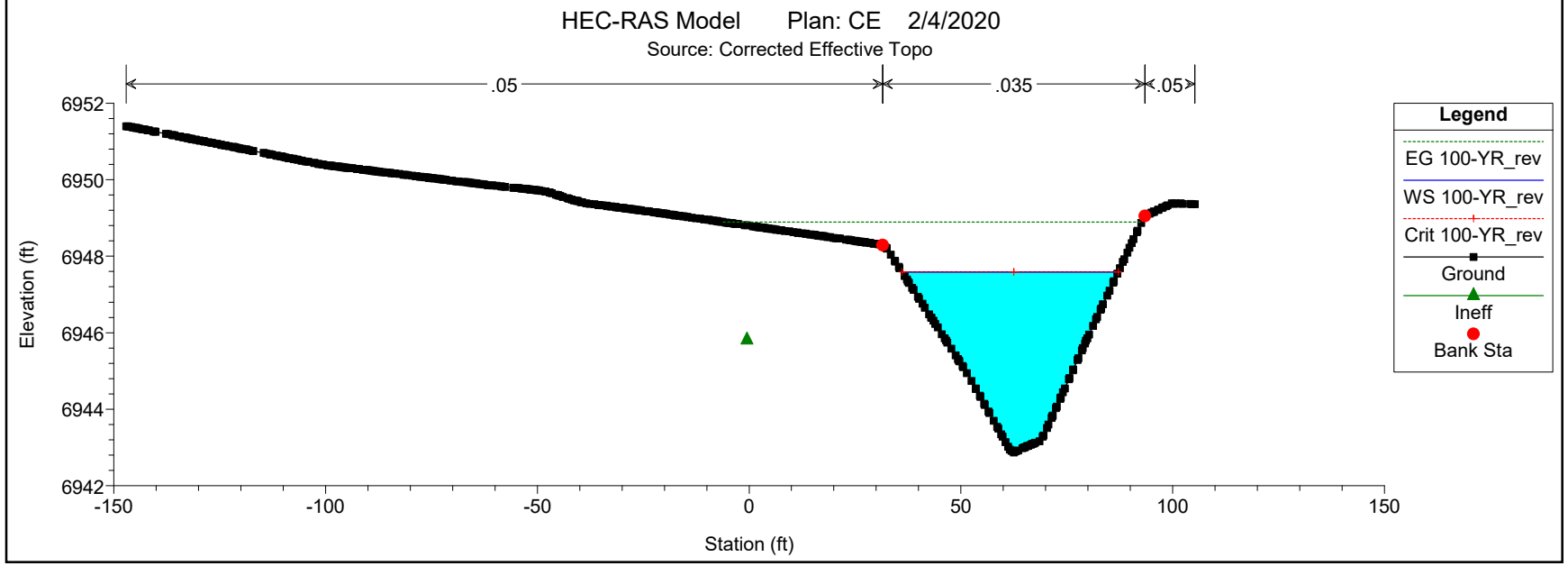
Station (ft)
Legend
EG 100-YR_rev
WS 100-YR_rev
Crit 100-YR_rev
Ground
Ineff
Bank Sta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.05
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Station (ft)
Legend
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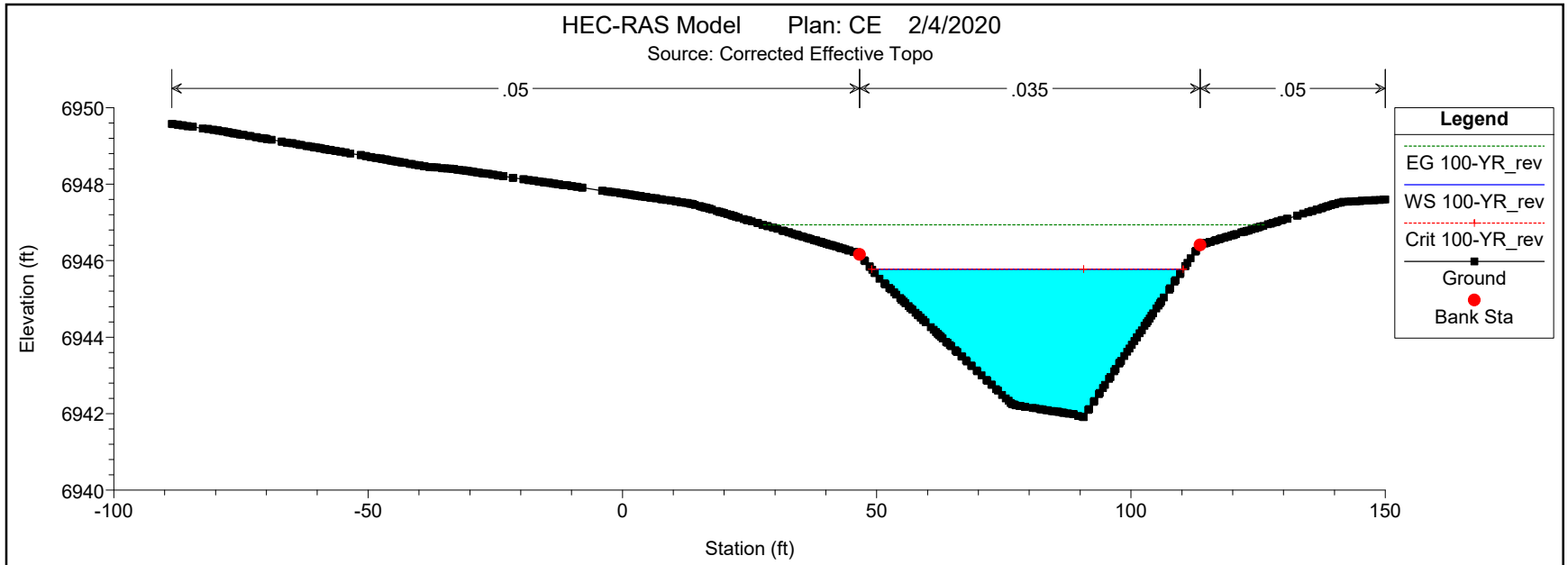
WS 100-YR_rev
Crit 100-YR_rev
Ground
Ineff
Bank Sta


HEC-RAS Model Plan: CE 2/4/2020
Source: Corrected Effective Topo
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.05
Elevation (ft)
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6942
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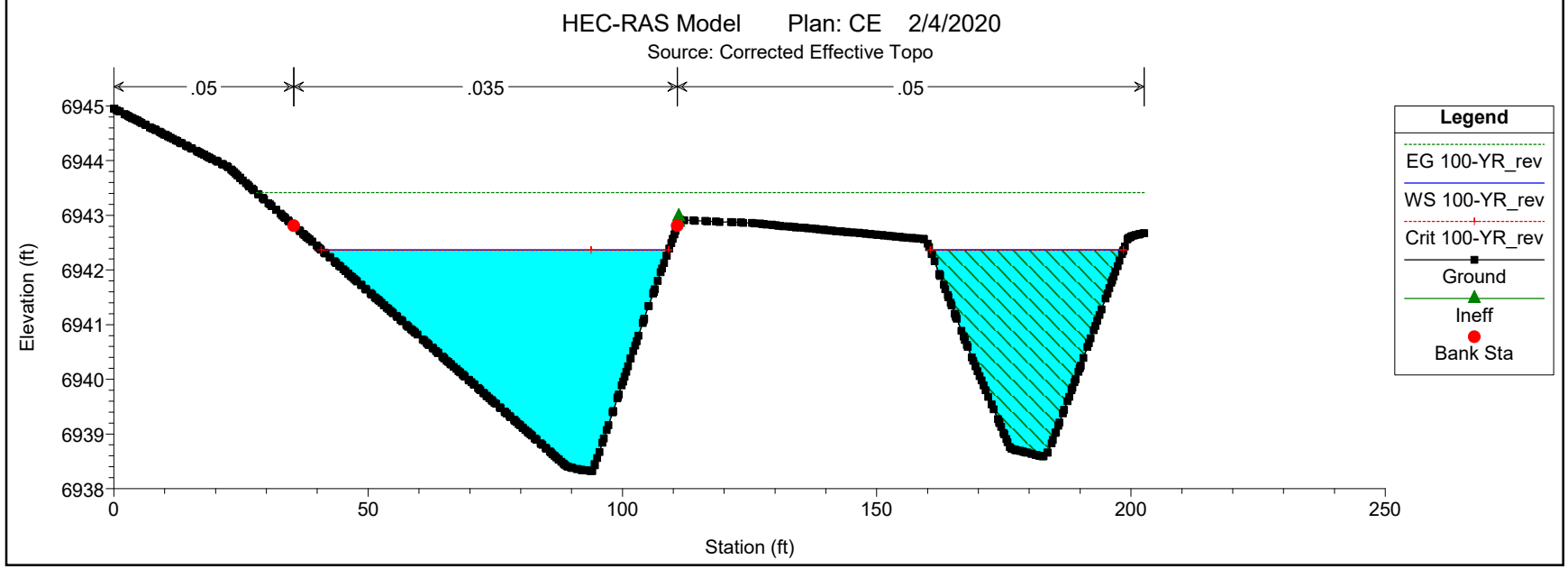
150
Station (ft)
Legend
EG 100-YR_rev
WS 100-YR_rev
Crit 100-YR_rev
Ground
Bank Sta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Elevation (ft)
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Station (ft)
Legend
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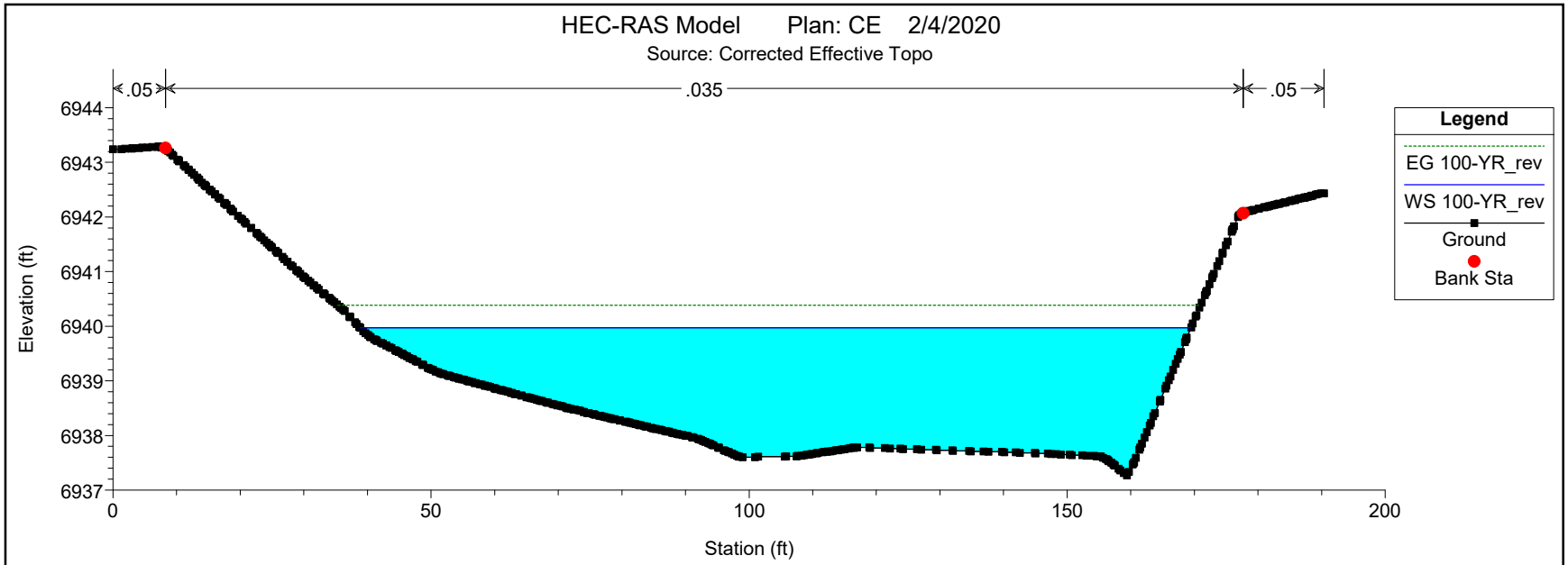
WS 100-YR_rev
Crit 100-YR_rev
Ground
Ineff
Bank Sta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.05
Elevation (ft)
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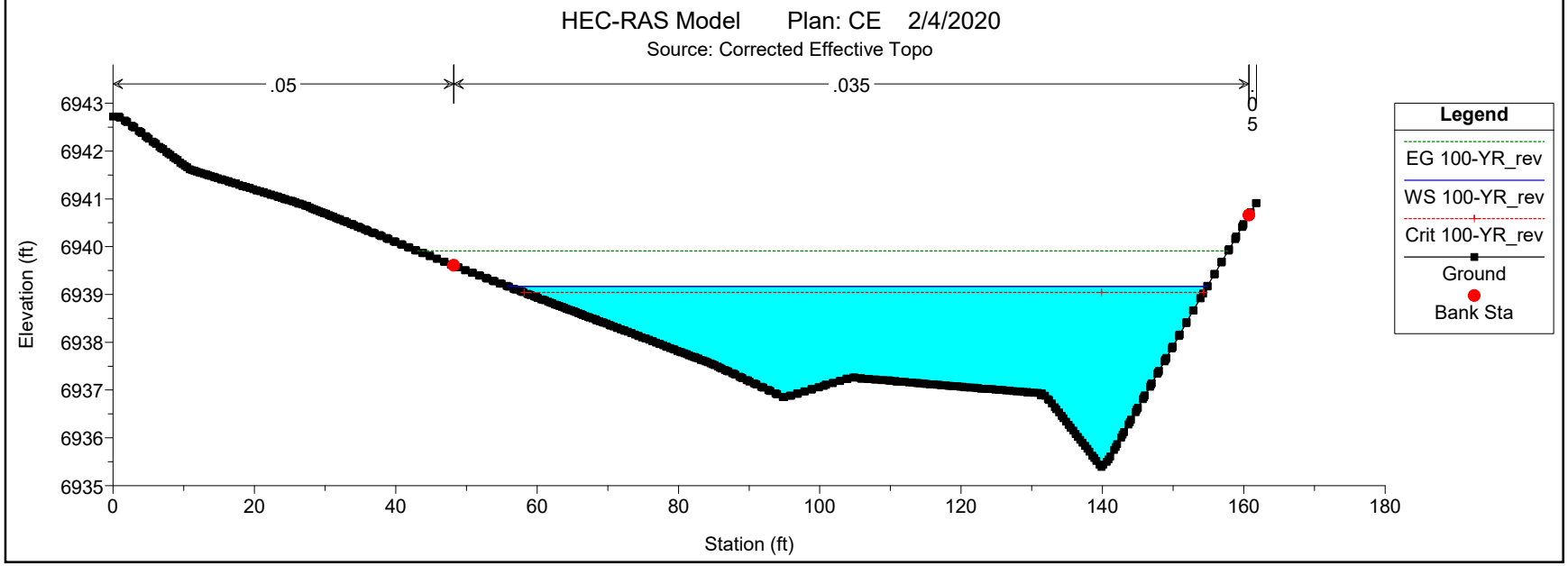
200
Station (ft)
Legend
EG 100-YR_rev
WS 100-YR_rev
Ground
Bank Sta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Source: Corrected Effective Topo
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Elevation (ft)
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6941
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6935
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40
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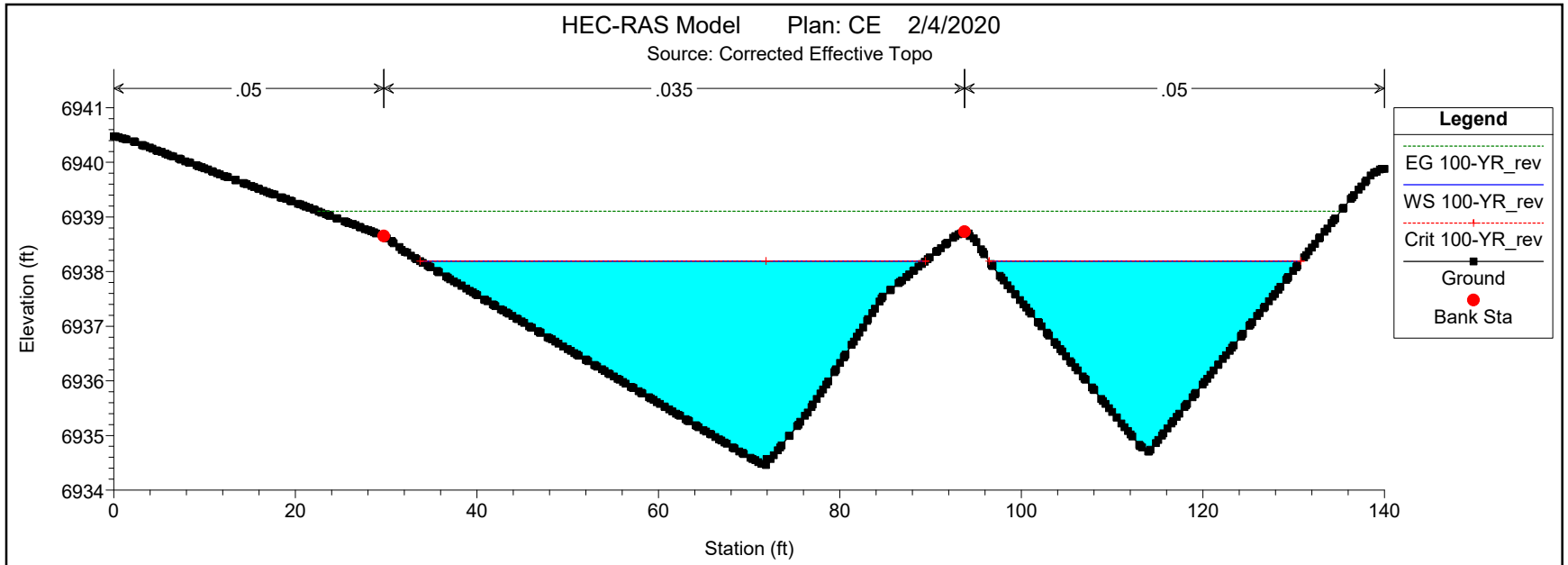
180
Station (ft)
Legend
EG 100-YR_rev
WS 100-YR_rev
Crit 100-YR_rev
Ground
Bank Sta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Source: Corrected Effective Topo
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Elevation (ft)
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6935
6934
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Station (ft)
Legend
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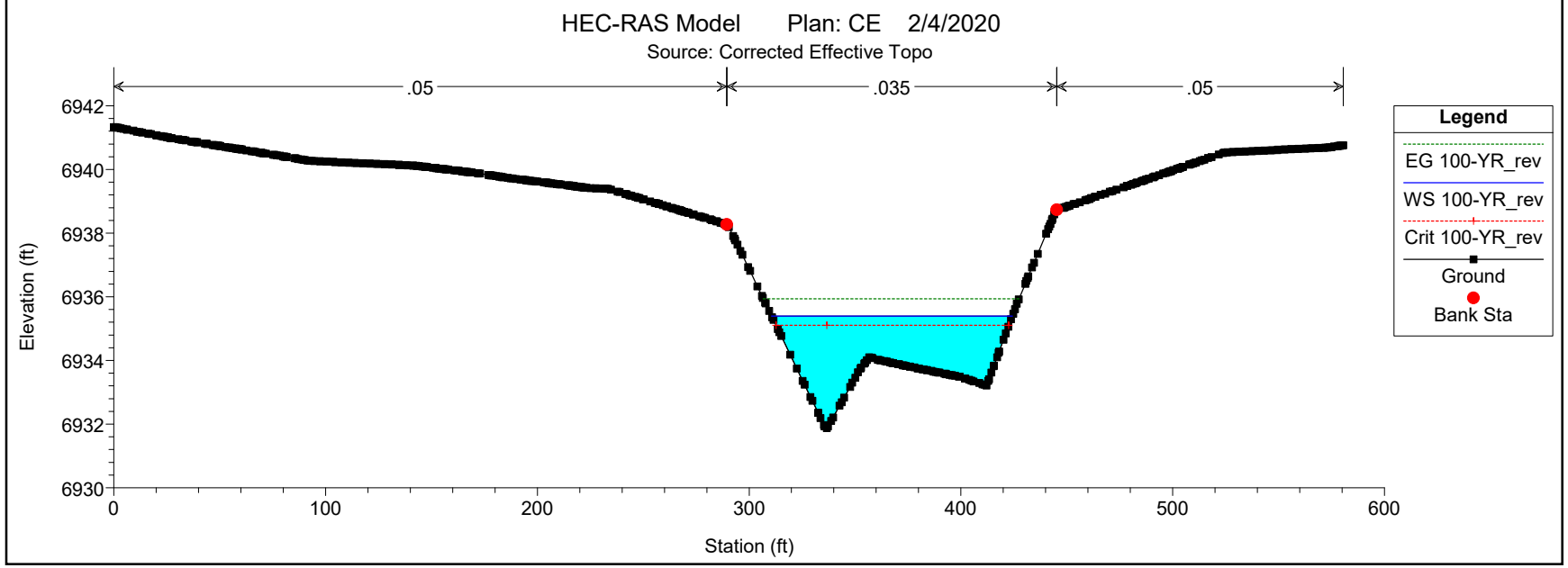
Ground
Bank Sta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Source: Corrected Effective Topo
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.05
Elevation (ft)
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6932
6930
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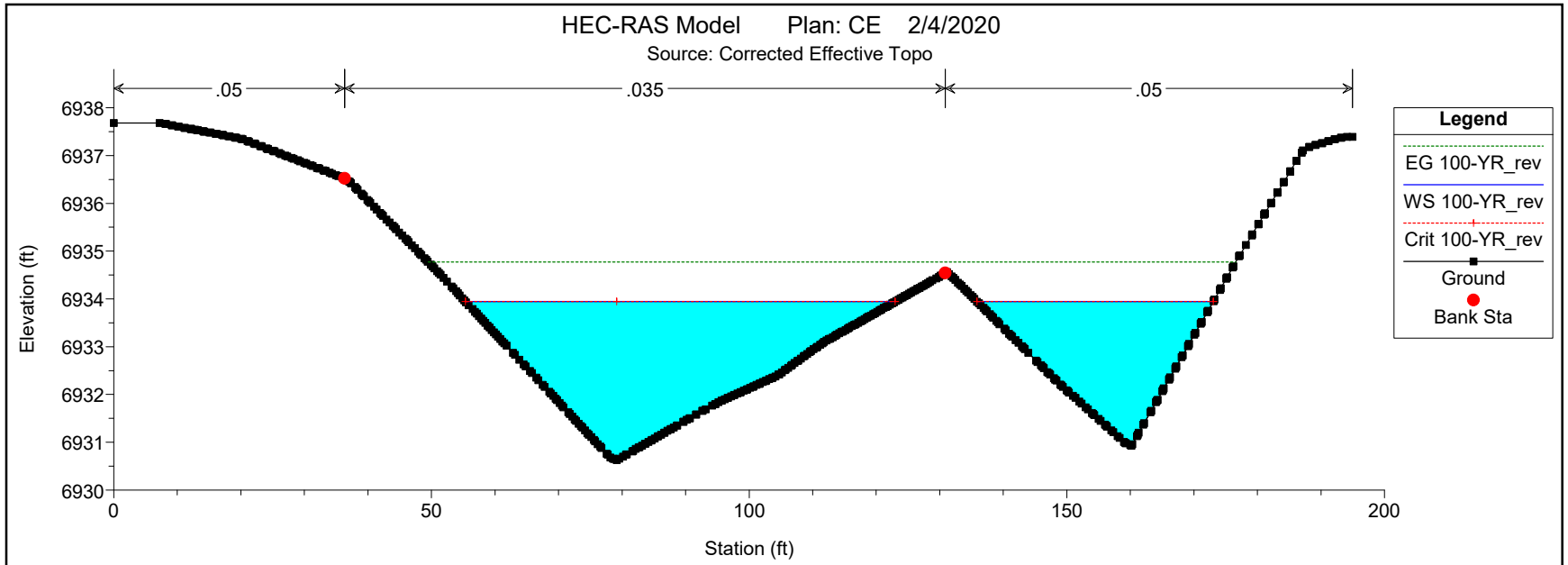
500
600
Station (ft)
Legend
EG 100-YR_rev
WS 100-YR_rev
Crit 100-YR_rev
Ground
Bank Sta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Source: Corrected Effective Topo
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.05
Elevation (ft)
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6932
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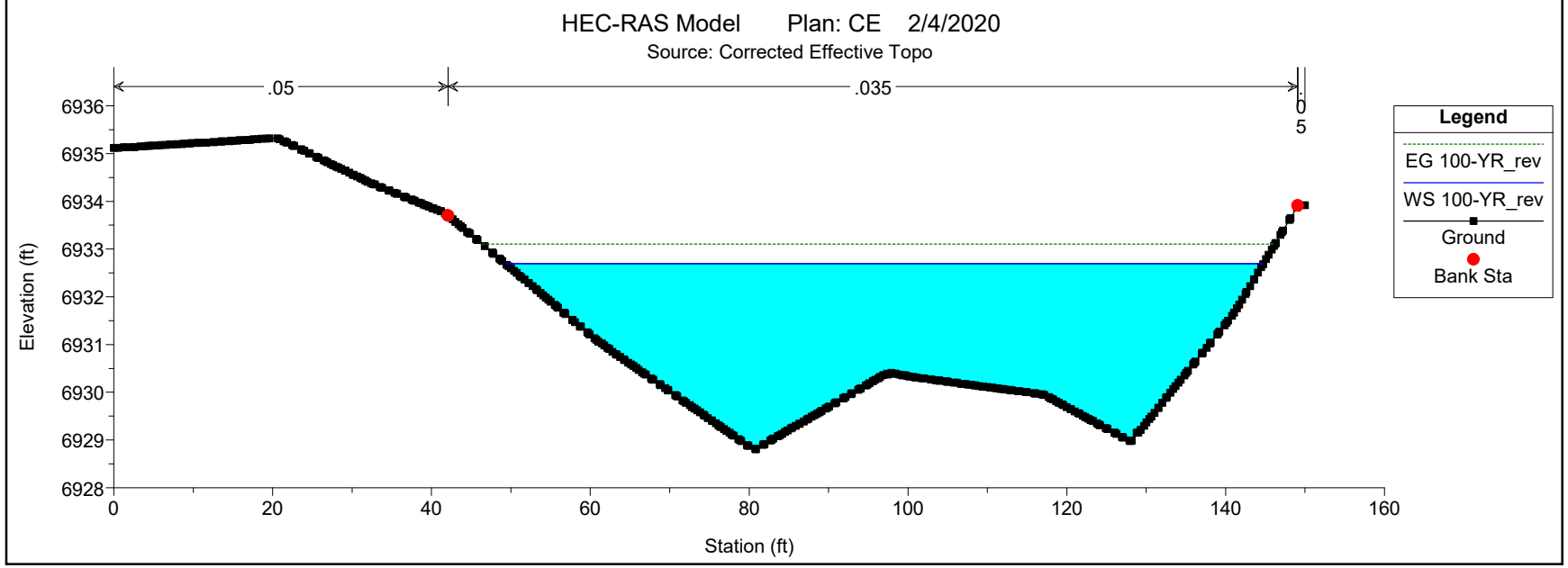
200
Station (ft)
Legend
EG 100-YR_rev
WS 100-YR_rev
Crit 100-YR_rev
Ground
Bank Sta


HEC-RAS Model Plan: CE 2/4/2020
Source: Corrected Effective Topo
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Elevation (ft)
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6935
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6928
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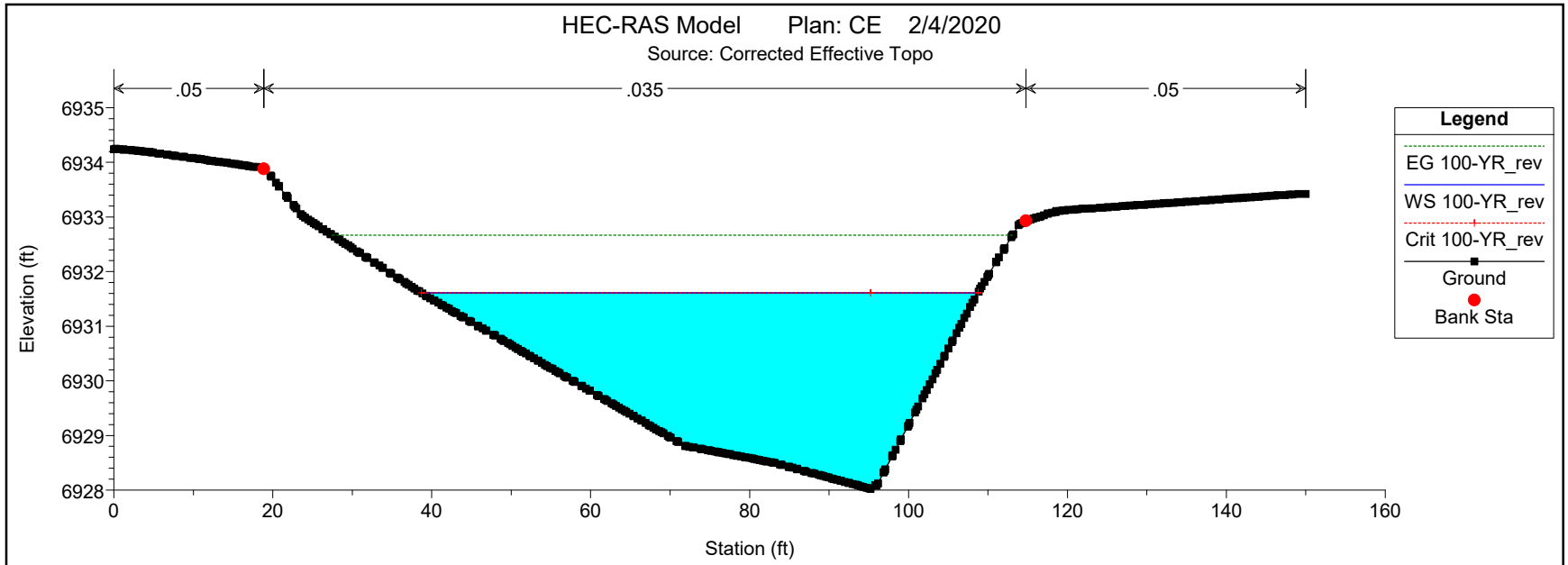
120
140
160
Station (ft)
Legend
EG 100-YR_rev
WS 100-YR_rev
Ground
Bank Sta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Source: Corrected Effective Topo
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Elevation (ft)
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6929
6928
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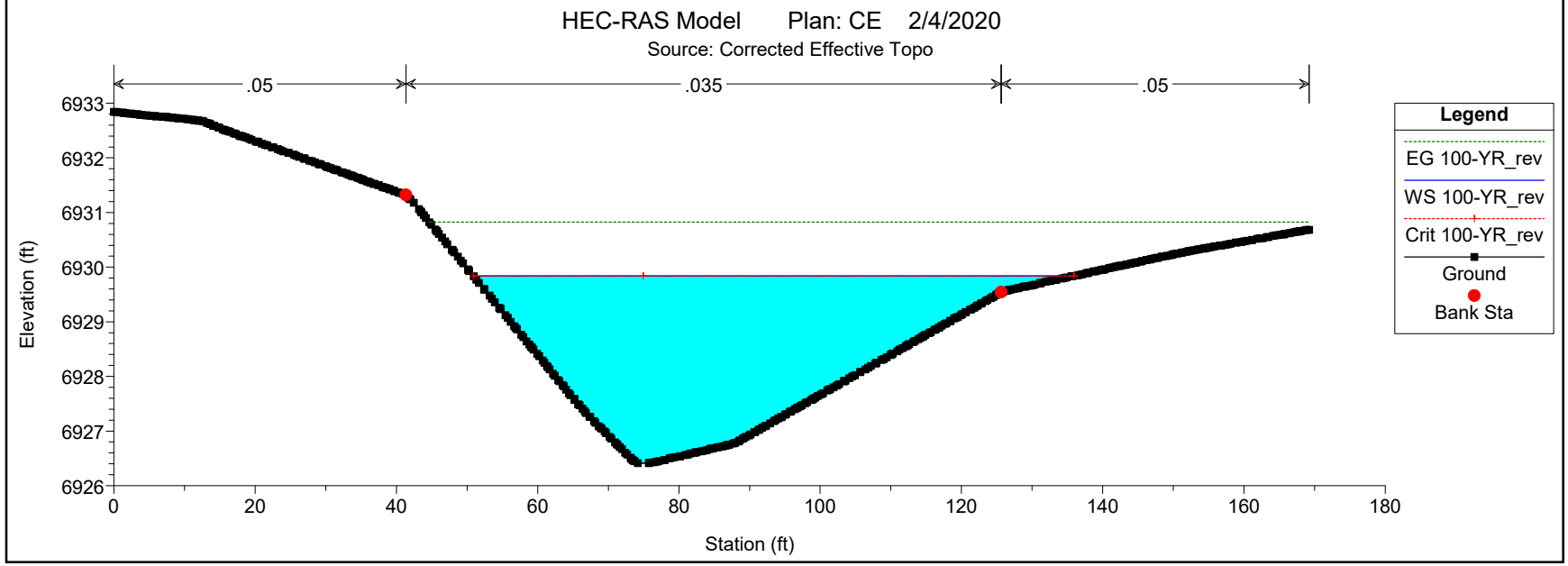
Station (ft)
Legend
EG 100-YR_rev
WS 100-YR_rev
Crit 100-YR_rev
Ground
Bank Sta


HEC-RAS Model Plan: CE 2/4/2020
Source: Corrected Effective Topo
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Elevation (ft)
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6926
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Station (ft)
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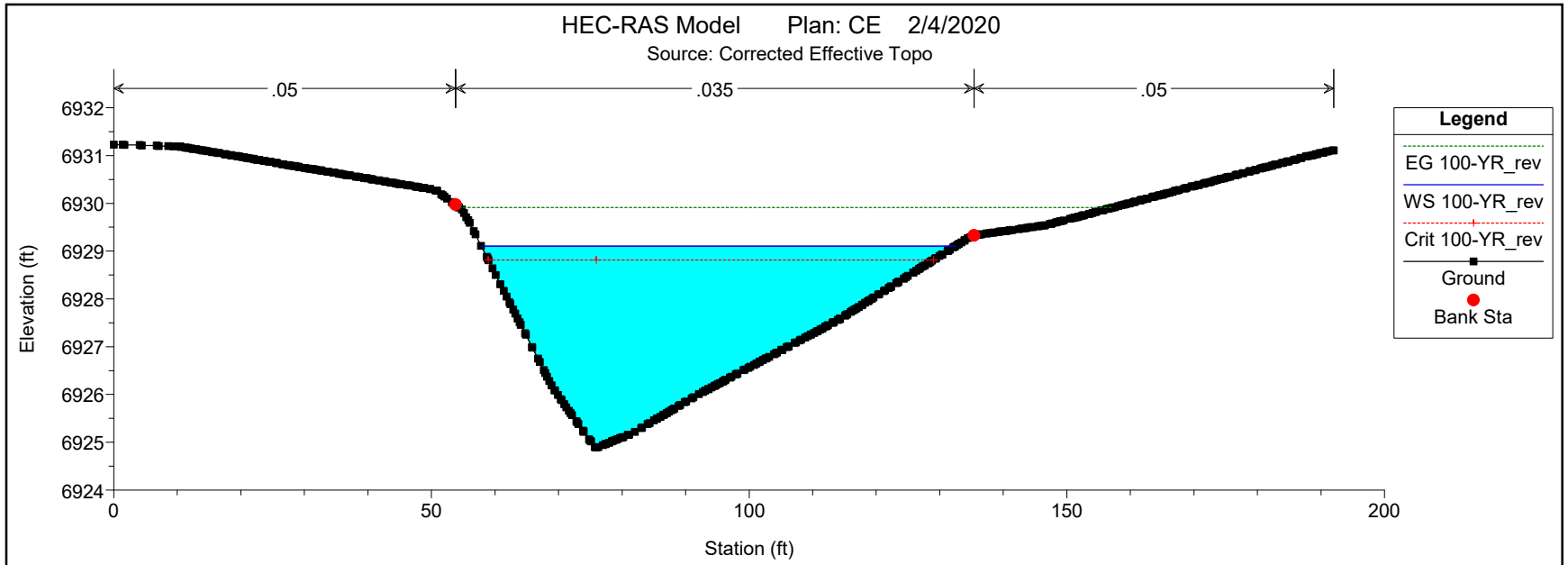
WS 100-YR_rev
Crit 100-YR_rev
Ground
Bank Sta


HEC-RAS Model Plan: CE 2/4/2020
Source: Corrected Effective Topo
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Elevation (ft)
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200
Station (ft)
Legend
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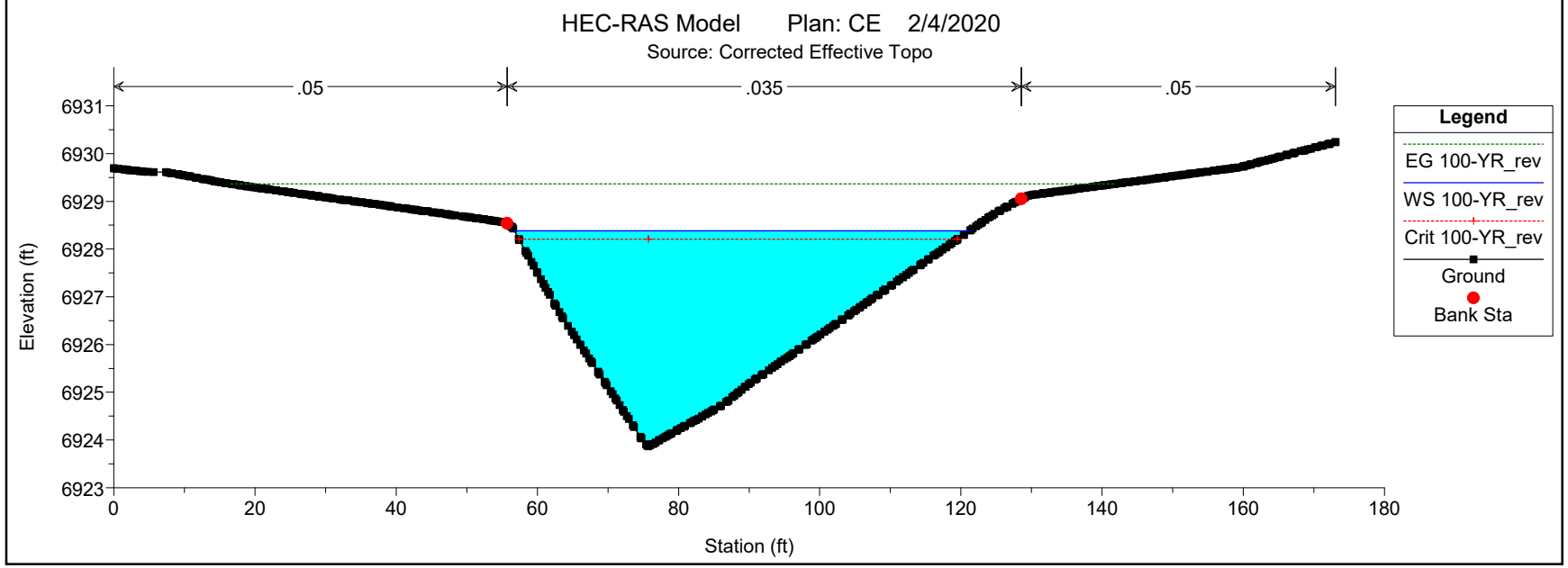
Crit 100-YR_rev
Ground
Bank Sta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Source: Corrected Effective Topo
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Elevation (ft)
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40
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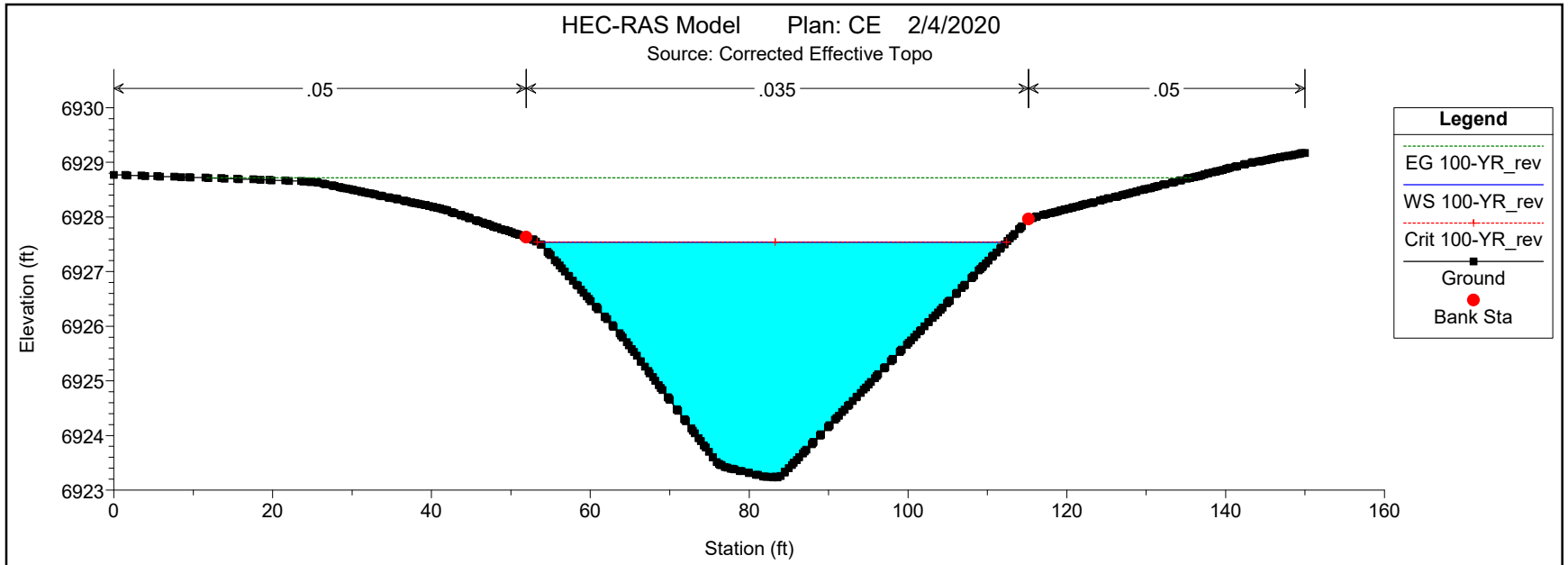
Station (ft)
Legend
EG 100-YR_rev
WS 100-YR_rev
Crit 100-YR_rev
Ground
Bank Sta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Source: Corrected Effective Topo
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.05
Elevation (ft)
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6923
0
20
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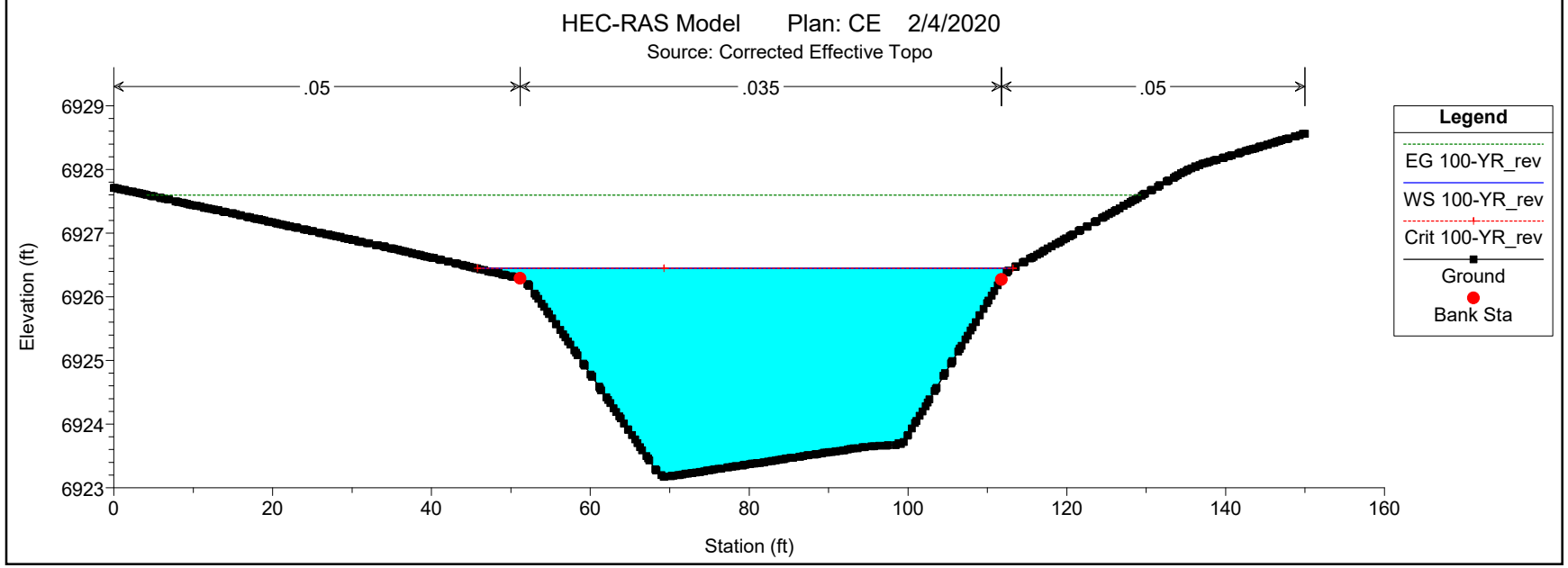
Station (ft)
Legend
EG 100-YR_rev
WS 100-YR_rev
Crit 100-YR_rev
Ground
Bank Sta


HEC-RAS Model Plan: CE 2/4/2020
Source: Corrected Effective Topo
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.035
.05
Elevation (ft)
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6927
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6925
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6923
0
20
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140
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Station (ft)
Legend
EG 100-YR_rev
WS 100-YR_rev
Crit 100-YR_rev
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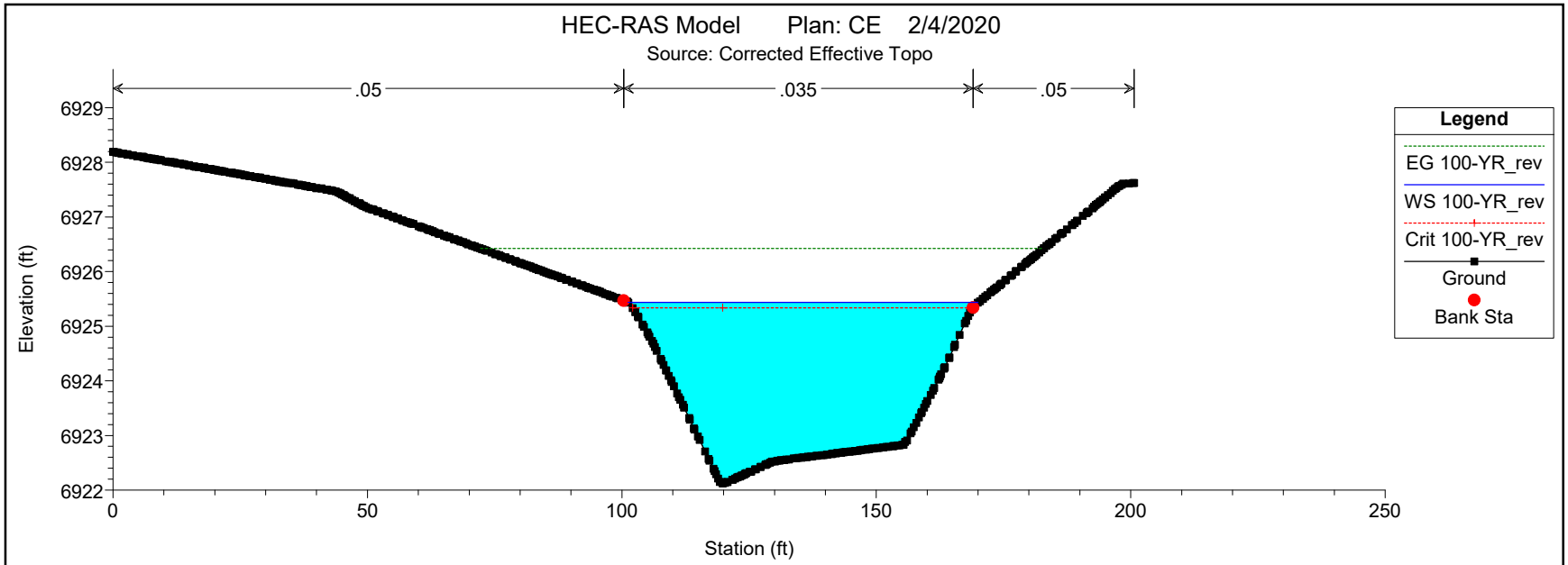
Bank Sta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Source: Corrected Effective Topo
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.05
Elevation (ft)
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6928
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6923
6922
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250
Station (ft)
Legend
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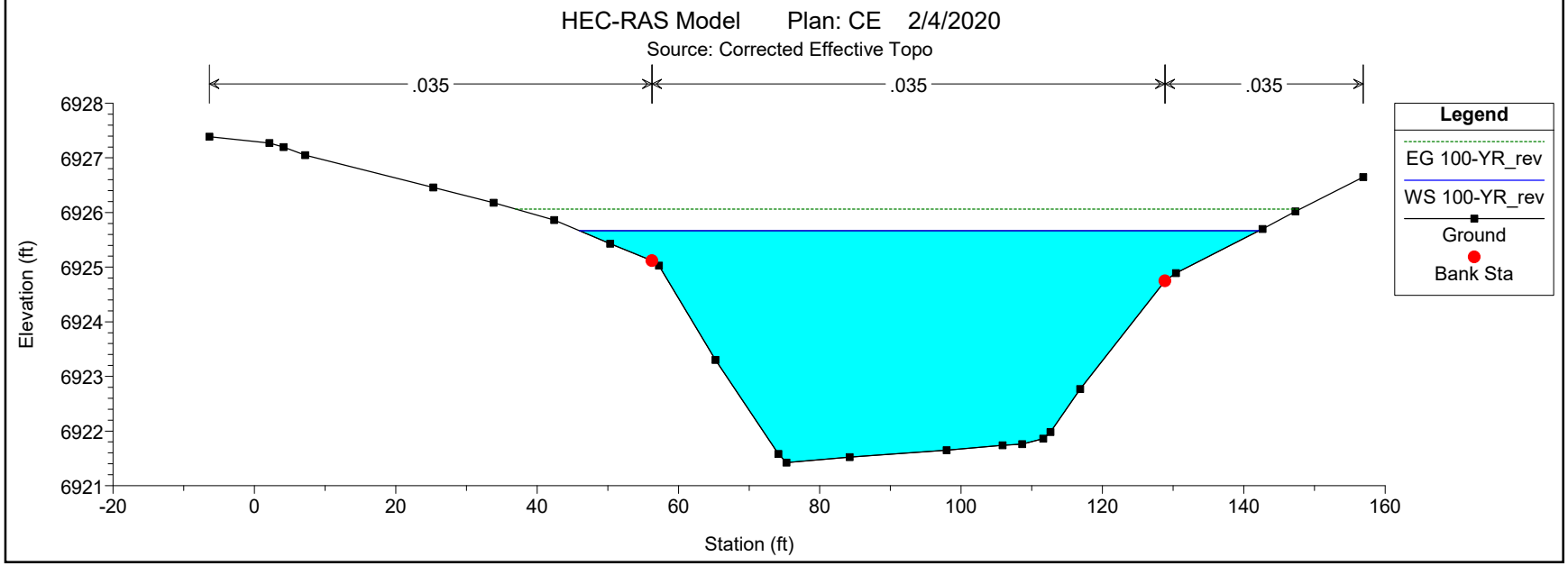
WS 100-YR_rev
Crit 100-YR_rev
Ground
Bank Sta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Elevation (ft)
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6923
6922
6921
-20
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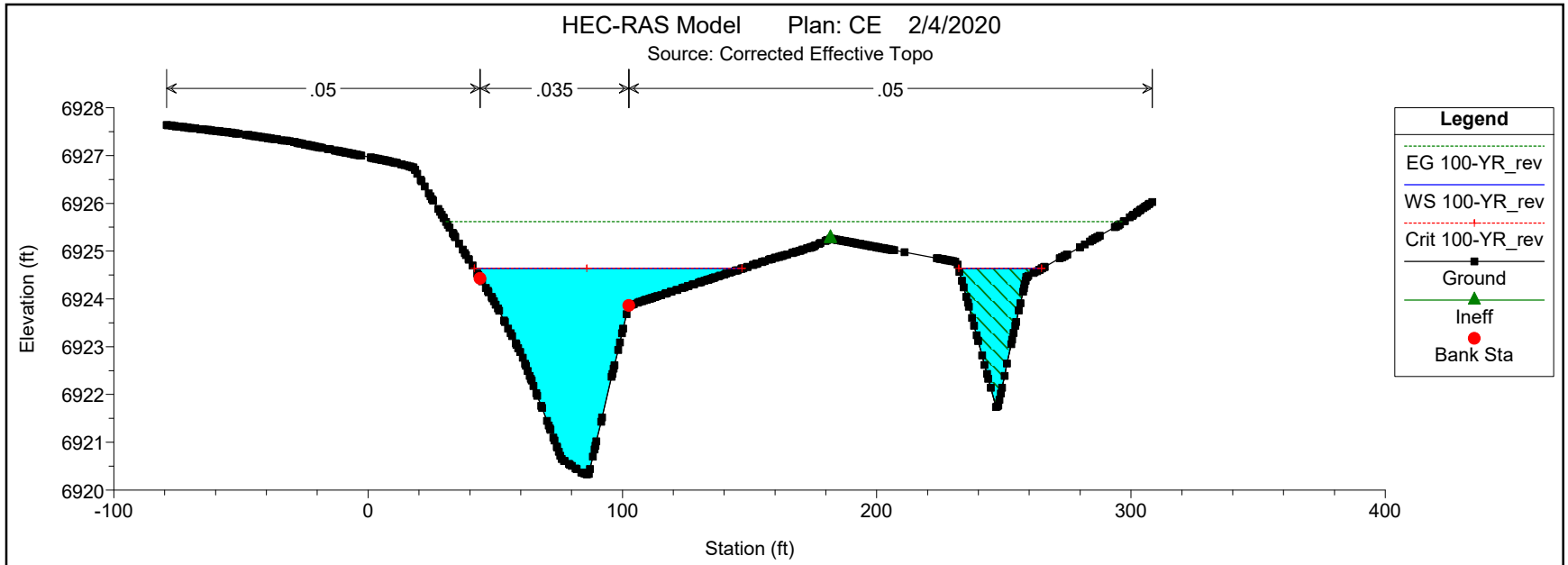
Station (ft)
Legend
EG 100-YR_rev
WS 100-YR_rev
Ground
Bank Sta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Source: Corrected Effective Topo
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.05
Elevation (ft)
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6921
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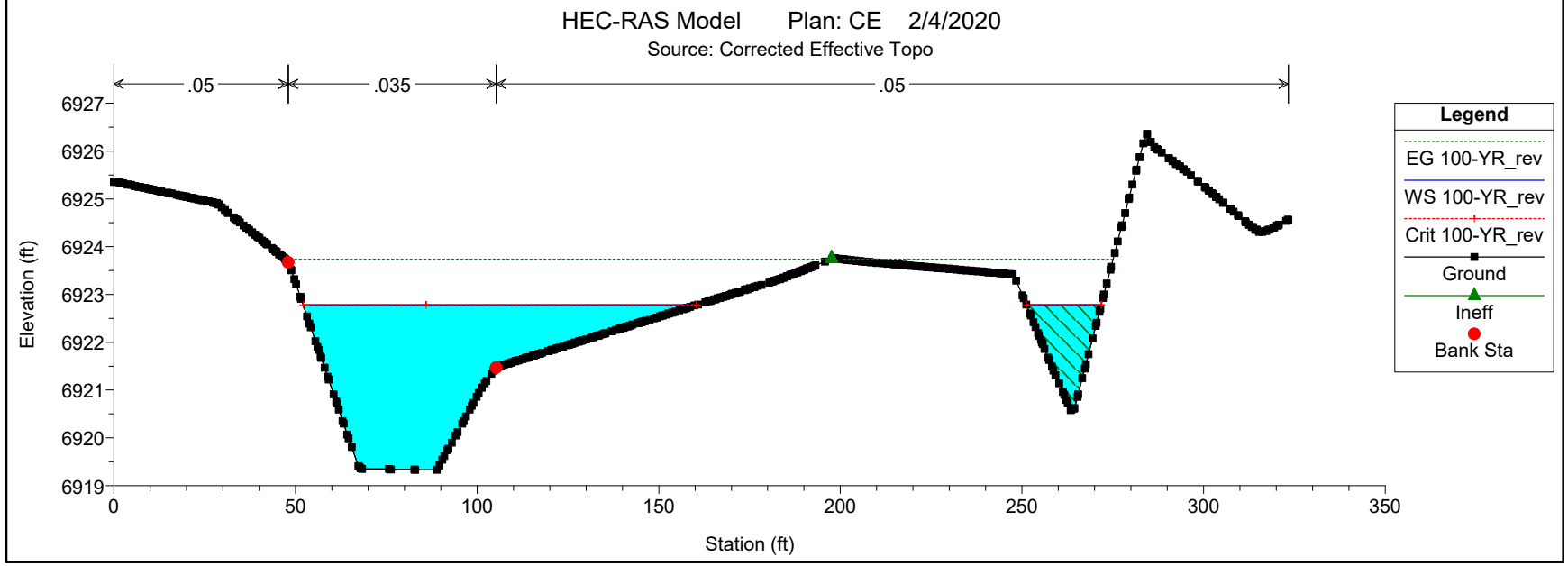
Station (ft)
Legend
EG 100-YR_rev
WS 100-YR_rev
Crit 100-YR_rev
Ground
Ineff
Bank Sta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Source: Corrected Effective Topo
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.05
Elevation (ft)
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6922
6921
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6919
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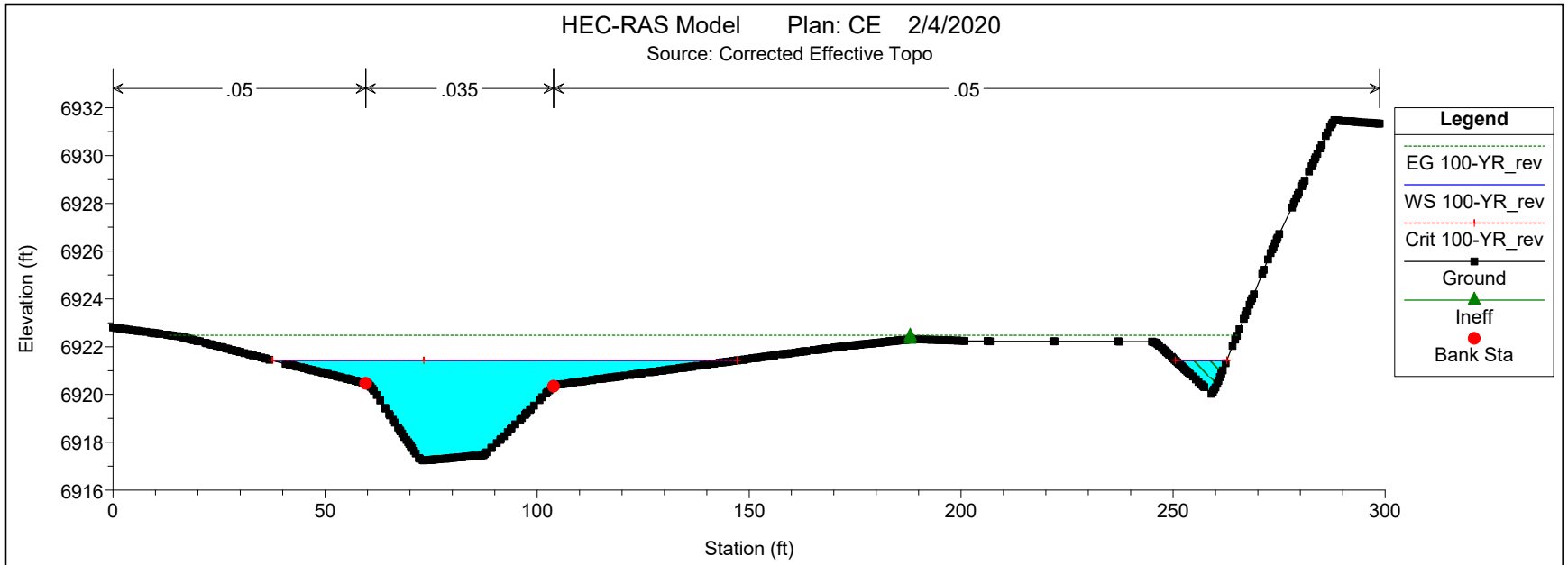
Station (ft)
Legend
EG 100-YR_rev
WS 100-YR_rev
Crit 100-YR_rev
Ground
Ineff
Bank Sta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Source: Corrected Effective Topo
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.05
Elevation (ft)
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6916
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Station (ft)
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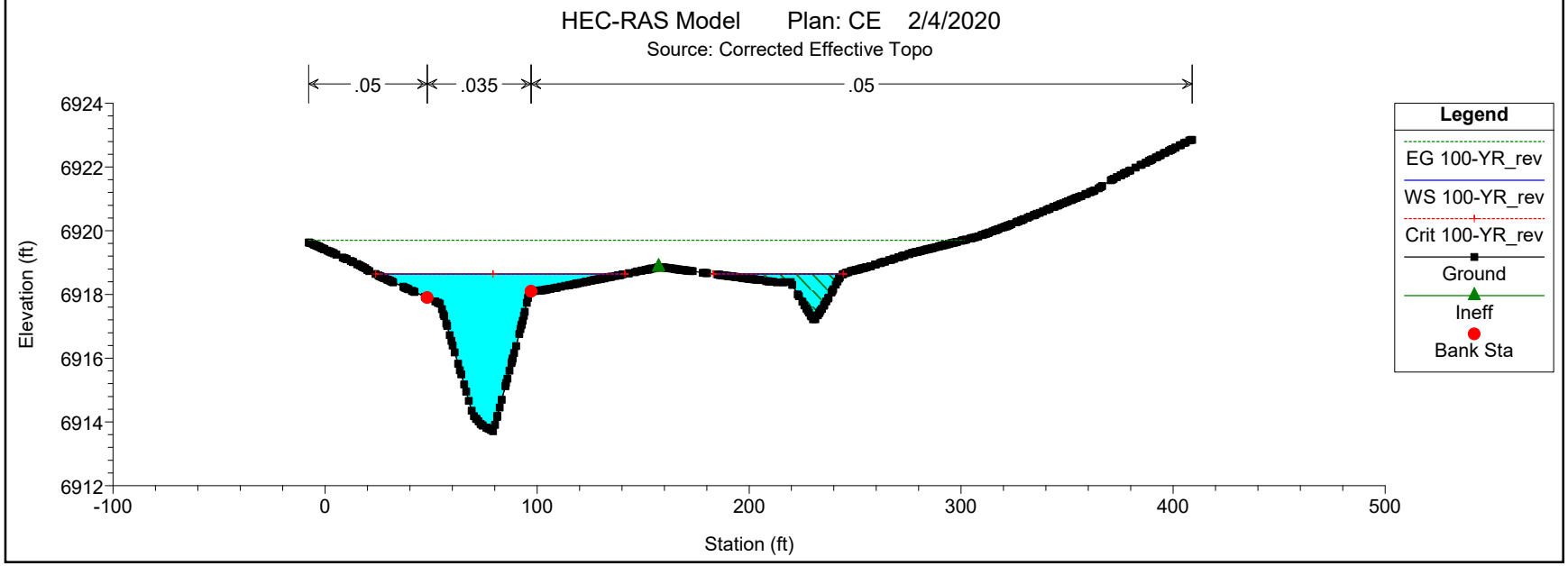
WS 100-YR_rev
Crit 100-YR_rev
Ground
Ineff
Bank Sta


HEC-RAS Model Plan: CE 2/4/2020
Source: Corrected Effective Topo
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.035
.05
Elevation (ft)
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Station (ft)
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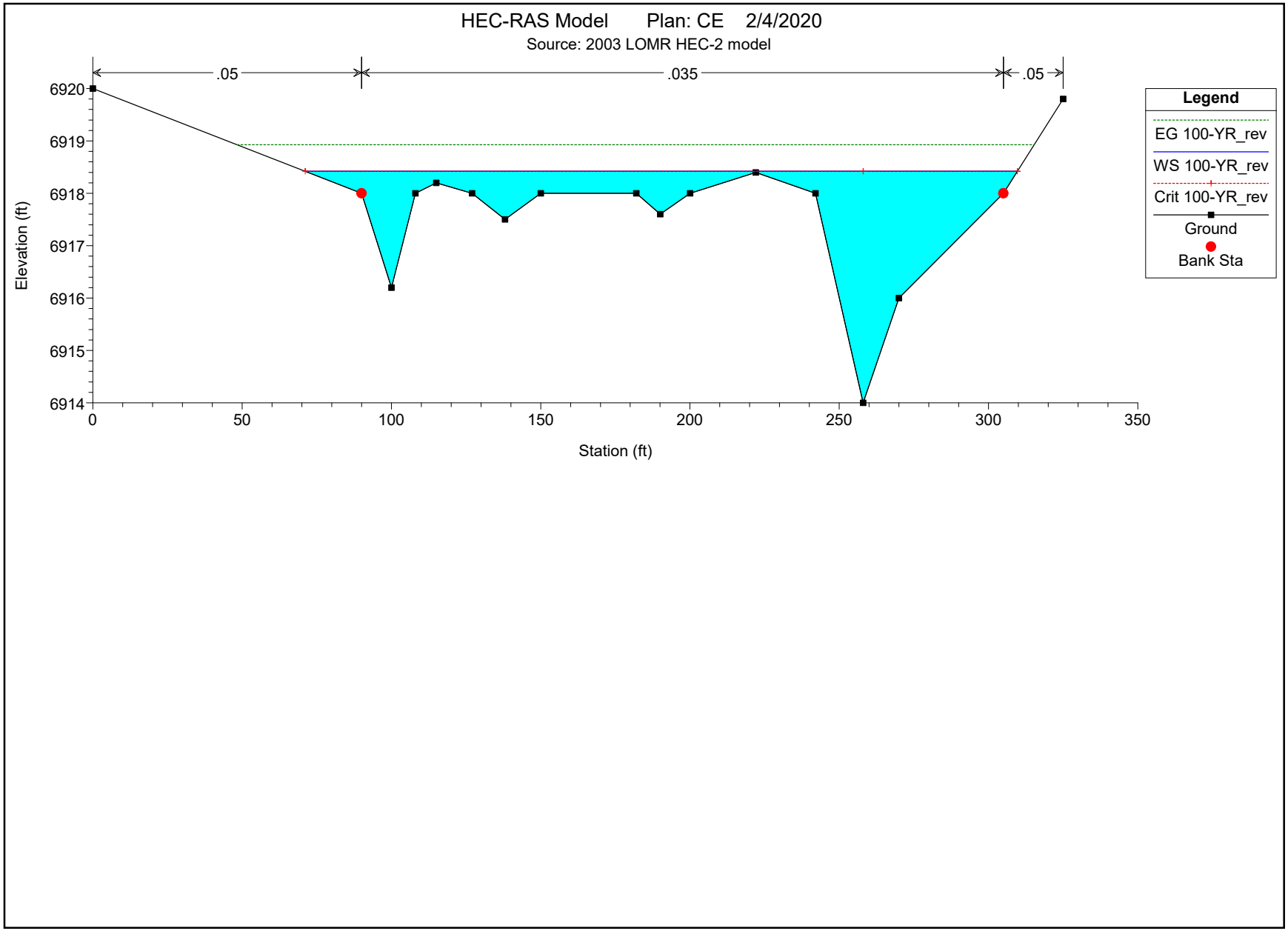
Crit 100-YR_rev
Ground
Ineff
Bank Sta


HEC-RAS Model Plan: CE 2/4/2020
Source: 2003 LOMR HEC-2 model
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.035
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6914
0
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150
200
250
300
350
Station (ft)
Legend
EG 100-YR_rev
WS 100-YR_rev
Crit 100-YR_rev
Ground
Bank Sta

Proposed Conditions Model

HEC-RAS HEC-RAS 5.0.7 March 2019
U.S. Army Corps of Engineers
Hydrologic Engineering Center
609 Second Street
Davis, California

```
X     X  XXXXXX    XXXX        XXXX       XX      XXXX
X     X  X        X    X       X   X     X  X    X
X     X  X        X            X   X    X    X   X
XXXXXXX  XXXX     X       XXX  XXXX     XXXXXX    XXXX
X     X  X        X            X  X     X    X        X
X     X  X        X    X       X   X    X    X        X
X     X  XXXXXX    XXXX        X    X   X    X   XXXXX
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PROJECT DATA
Project Title: HEC-RAS Model
Project File : CLH14_Final.prj
Run Date and Time:

Project in English units

Project Description:
CRS Info=<SpatialReference> <CoordinateSystem Code="3502" Unit="US_survey_Foot" AcadCode="" /> <Registration OffsetX="0" OffsetY="0" OffsetZ="0" ScaleX="1" ScaleY="1" ScaleZ="1" /></SpatialReference>

PLAN DATA

Plan Title:
Plan File :

Geometry Title: RC_Reduced
Geometry File : h:\Challenger Homes Inc\CO, El Paso County-CLH0000014.20-Bent Grass\2. P&Z\2.05 Floodplain Analysis\Hydra\Hec Ras 1_24_2020 Final\CLH14_Final.g06

Flow Title   : Existing
Flow File   : h:\Challenger Homes Inc\CO, El Paso County-CLH0000014.20-Bent Grass\2. P&Z\2.05 Floodplain Analysis\Hydra\Hec Ras 1_24_2020 Final\CLH14_Final.f01

Plan Description:
Corrected effective condition model for the Bent Grass Subdivision Project.
Effective Hydrologic information was incorporated into a corrected effective condition with resurveyed topography as of 2019
Calculated using Hec-Ras v.
5.0.3

Plan Summary Information:

Number of:	Cross Sections	= 39	Multiple Openings	=	0
	Culverts	= 1	Inline Structures	=	0
	Bridges	= 0	Lateral Structures	=	0

Computational Information

Water surface calculation tolerance	=	0.01
Critical depth calculation tolerance	=	0.01
Maximum number of iterations	=	20
Maximum difference tolerance	=	0.33
Flow tolerance factor	=	0.001

Computation Options

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

FLOW DATA

Flow Title: Existing
Flow File : h:\Challenger Homes Inc\CO, El Paso County-CLH0000014.20-Bent Grass\2. P&Z\2.05 Floodplain Analysis\Hydra\Hec Ras 1_24_2020 Final\CLH14_Final.f01

Flow Data (cfs)

River	Reach	RS	100-YR_rev	5-YR	100-YR
Existing Channel	East	5100	43	4	1450
Existing Channel	East	5000	43	4	1450
Existing Channel	East	3900	880	14	1482
UT_BSC2	NCONFL-BGM	5100	1200	110	

1450
UT_BSC2 NCONFL-BGM 3694 1200 110
1482

Boundary Conditions

River Reach Profile Upstream
Downstream

UT_BSC2 NCONFL-BGM 100-YR_rev Normal S = 0.024735
Normal S = 0.019178
UT_BSC2 NCONFL-BGM 5-YR Normal S = 0.024735
Normal S = 0.019178
UT_BSC2 NCONFL-BGM 100-YR Normal S = 0.024735
Known WS = 6918.85

GEOMETRY DATA

Geometry Title: RC_Reduced
Geometry File : h:\Challenger Homes Inc\CO, El Paso County-CLH0000014.20-Bent Grass\2. P&Z\2.05 Floodplain Analysis\Hydra\Hec Ras 1_24_2020 Final\CLH14_Final.g06

CROSS SECTION

RIVER: UT_BSC2
REACH: NCONFL-BGM RS: 5100

INPUT
Description: Source: Revised Condition Topo
Datum: NGVD29
Coordinate System:
NAVD88 Colorado State Planes Central, US Feet.
Station Elevation Data num= 403

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	6967.89	.23	6967.89	.61	6967.86	.87	6967.85	1.23	6967.83
1.53	6967.81	1.97	6967.78	2.23	6967.77	2.46	6967.75	3.06	6967.72
3.24	6967.71	3.39	6967.7	4.15	6967.65	4.24	6967.65	4.31	6967.64
5.2	6967.59	5.25	6967.59	6.17	6967.54	6.25	6967.53	6.34	6967.53
7.09	6967.48	7.25	6967.47	7.44	6967.46	8.02	6967.43	8.25	6967.41

8.53	6967.4	8.95	6967.37	9.26	6967.35	9.62	6967.33	9.87	6967.32
10.26	6967.29	10.72	6967.27	10.8	6967.26	11.26	6967.23	11.73	6967.21
11.81	6967.2	12.27	6967.18	12.65	6967.14	12.9	6967.11	13.27	6967.08
13.58	6967.04	14	6966.99	14.27	6966.95	14.51	6966.94	15.09	6966.88
15.28	6966.87	15.43	6966.85	16.19	6966.81	16.28	6966.8	16.36	6966.79
17.28	6966.59	17.32	6966.58	18.21	6966.39	18.29	6966.38	18.37	6966.36
19.14	6966.2	19.29	6966.17	19.47	6966.13	20.07	6966	20.29	6965.96
20.56	6965.9	20.99	6965.8	21.3	6965.74	21.66	6965.66	21.92	6965.6
22.3	6965.52	22.75	6965.41	22.85	6965.39	23.3	6965.29	23.77	6965.18
23.84	6965.16	24.31	6965.06	24.7	6964.97	24.94	6964.91	25.31	6964.83
25.63	6964.76	26.03	6964.66	26.16	6964.63	26.31	6964.6	26.55	6964.54
27.13	6964.41	27.32	6964.37	27.48	6964.33	28.22	6964.16	28.32	6964.14
28.41	6964.12	29.31	6963.91	29.33	6963.91	29.45	6963.88	30.26	6963.69
30.33	6963.68	30.41	6963.66	31.19	6963.5	31.33	6963.47	31.5	6963.44
32.11	6963.32	32.33	6963.28	32.59	6963.22	33.04	6963.14	33.34	6963.08
33.69	6963.01	33.97	6962.96	34.34	6962.89	34.78	6962.8	34.89	6962.78
35.34	6962.69	35.82	6962.58	35.88	6962.58	36.35	6962.47	36.75	6962.38
36.97	6962.33	37.35	6962.24	37.67	6962.18	38.06	6962.1	38.35	6962.05
38.6	6962.01	39.16	6961.91	39.36	6961.88	39.53	6961.85	40.25	6961.73
40.36	6961.71	40.45	6961.69	41.35	6961.69	41.36	6961.68	41.38	6961.68
41.57	6961.69	42.31	6961.74	42.37	6961.74	42.44	6961.75	43.23	6961.79
43.37	6961.8	43.53	6961.82	44.16	6961.93	44.37	6961.94	44.63	6961.98
45.09	6962.06	45.38	6962.1	45.72	6962.16	46.01	6962.2	46.38	6962.26
46.81	6962.3	46.94	6962.31	47.38	6962.34	49	6962.34	49.39	6962.33
50.65	6962.33	51.19	6962.32	52.5	6962.32	53.38	6962.31	54.47	6962.31
55.28	6962.3	57.13	6962.3	57.42	6962.29	58.99	6962.29	59.42	6962.28
61.04	6962.28	61.43	6962.27	63.22	6962.27	63.44	6962.26	64.55	6962.26
65.41	6962.25	67.33	6962.25	67.45	6962.24	68.69	6962.24	69.18	6962.23
69.79	6962.23	70.11	6962.22	71.03	6962.22	71.46	6962.21	72.47	6962.21
72.89	6962.2	73.07	6962.21	73.47	6962.21	73.81	6962.26	74.16	6962.32
74.47	6962.36	74.74	6962.4	75.26	6962.48	75.48	6962.52	75.67	6962.55
76.35	6962.66	76.48	6962.68	76.59	6962.69	77.44	6962.83	77.48	6962.83
77.52	6962.84	77.94	6962.91	78.45	6962.99	78.49	6962.99	78.54	6963
79.37	6963.13	79.49	6963.15	79.63	6963.17	80.3	6963.28	80.49	6963.31
80.72	6963.34	81.23	6963.42	81.5	6963.47	81.82	6963.52	82.15	6963.57
82.5	6963.63	82.91	6963.69	83.08	6963.72	83.5	6963.79	84.01	6963.87
84.51	6963.95	84.93	6964.02	85.1	6964.05	85.51	6964.12	85.86	6964.17
86.19	6964.23	86.51	6964.28	86.79	6964.32	87.29	6964.4	87.52	6964.44
87.71	6964.47	88.38	6964.58	88.52	6964.61	88.64	6964.63	89.48	6964.76
89.52	6964.77	89.57	6964.78	90.07	6964.86	90.49	6964.93	90.53	6964.93
90.57	6964.94	91.42	6965.08	91.53	6965.1	91.66	6965.12	92.35	6965.25
92.53	6965.28	92.76	6965.31	93.27	6965.41	93.54	6965.46	93.85	6965.51
94.2	6965.58	94.54	6965.63	94.64	6965.65	94.95	6965.71	95.13	6965.74
95.54	6965.82	96.04	6965.91	96.05	6965.91	96.55	6966	96.98	6966.08
97.13	6966.1	97.55	6966.18	97.91	6966.24	98.23	6966.3	98.56	6966.36
98.83	6966.41	99.32	6966.5	99.56	6966.54	99.76	6966.58	100.41	6966.7
100.56	6966.73	100.69	6966.75	101.51	6966.9	101.57	6966.91	101.61	6966.92
102.19	6967.02	102.54	6967.09	102.57	6967.09	102.6	6967.1	103.47	6967.25

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  103.57 6967.27   103.7 6967.29  104.39 6967.39  104.58 6967.41  104.79 6967.44
  105.32  6967.5  105.58 6967.53  105.88 6967.55  106.25 6967.61  106.58 6967.63
  106.98  6967.6  107.17  6967.7  107.59 6967.66  108.07 6967.61   108.1  6967.6
  108.59 6967.56  109.03 6967.51  109.17  6967.5  109.59 6967.45  109.95 6967.42
  110.26 6967.38   110.6 6967.35  110.88 6967.32  111.35 6967.27   111.6 6967.25
  111.81 6967.23  112.45 6967.17   112.6 6967.16  112.73 6967.15  113.54 6967.08
  113.61 6967.07  113.66 6967.07  114.32 6967.01  114.59 6966.99  114.64 6966.99
  115.51 6966.91  115.61  6966.9  115.73 6966.89  116.44 6966.83  116.62 6966.82
  116.82  6966.8  117.37 6966.75  117.62 6966.73  117.92 6966.71  118.29 6966.68
  118.62 6966.65  119.01 6966.62  119.22  6966.6  119.63 6966.56   120.1 6966.52
  120.15 6966.52  120.63 6966.48  121.07 6966.44   121.2 6966.43  121.63  6966.4
     122 6966.37  122.29 6966.35  122.64 6966.33  122.93 6966.31  123.39 6966.28
  123.64 6966.26  123.85 6966.25  124.48 6966.21  124.64 6966.19  124.78 6966.19
  125.57 6966.13  125.65 6966.13  125.71 6966.12  126.44 6966.07  126.63 6966.06
  126.67 6966.06  127.56 6966.01  127.65    6966  127.76    6966  128.49 6965.96
  128.66 6965.95  128.86 6965.94  129.41 6965.92  129.66  6965.9  129.95 6965.89
  130.34 6965.87  130.66 6965.85  131.04 6965.84  131.27 6965.83  131.67 6965.82
  132.14  6965.8  132.19  6965.8  132.67 6965.78  133.12 6965.77  133.23 6965.76
  133.67 6965.75  134.05 6965.73  134.32 6965.72  134.68 6965.71  134.97  6965.7
  135.42 6965.68  135.68 6965.67   135.9 6965.66  136.51 6965.64  136.68 6965.64
  136.83 6965.63  137.61  6965.6  137.75  6965.6  138.56 6965.57  138.68 6965.56
   138.7 6965.56  139.61 6965.53  139.69 6965.53  139.79 6965.52  140.53 6965.51
   140.7  6965.5  140.89  6965.5  141.46 6965.48   141.7 6965.48  141.98 6965.47
  142.39 6965.46   142.7 6965.46  143.08 6965.45  143.31 6965.44  143.71 6965.43
  144.17 6965.42  144.24 6965.42  144.71 6965.41  145.17  6965.4  145.26 6965.39
  145.71 6965.38  146.09 6965.37  146.36 6965.37  146.72 6965.36  147.02 6965.35
  147.45 6965.34  147.72 6965.34  147.95 6965.33  148.55 6965.32  148.72 6965.32
  148.87 6965.33  149.64 6965.39  149.76 6965.39

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
       0     .05   16.19    .035   103.7     .05

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
         16.19   103.7           123.64  123.64  123.64             .1       .3

CROSS SECTION


RIVER: UT_BSC2
REACH: NCONFL-BGM         RS: 5000

INPUT
Description: Source: Revised Condition Topo
Datum: NGVD29
Coordinate System:
             NAVD88 Colorado State Planes Central, US Feet.
Station Elevation Data    num=      22
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     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
       0 6966.08   38.49 6963.58      54 6961.82   54.36  6961.8   54.81 6961.69
   63.38 6959.57    71.3 6959.57   74.14 6959.57   75.86 6959.57   80.43 6959.57
   89.06 6959.58   89.61 6959.58    89.7  6959.6   89.83 6959.63   90.38 6959.77
   99.95 6962.13  104.34 6963.22  111.19 6963.43  118.77 6963.24  121.11 6963.48
   125.8 6963.63     150 6965.22

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
       0     .05   38.49    .035  104.34     .05

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
         38.49  104.34           106.14  100.12    95.6             .1       .3

CROSS SECTION


RIVER: UT_BSC2
REACH: NCONFL-BGM         RS: 4900

INPUT
Description: Source: Revised Condition Topo
Datum: NGVD29
Coordinate System:
             NAVD88 Colorado State Planes Central, US Feet.
Station Elevation Data    num=      14
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
       0 6963.99   12.58 6963.53   20.95  6963.2   27.05 6962.33   36.46 6961.09
   59.75 6957.96   71.58 6956.48   75.25  6956.2   76.29 6956.13   77.28 6956.08
    80.6 6956.68   100.6 6959.86  126.33 6962.03     150 6963.76

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
       0     .05   20.95    .035  126.33     .05

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
         20.95  126.33            67.95   50.29   29.23             .1       .3

CROSS SECTION


RIVER: UT_BSC2
REACH: NCONFL-BGM         RS: 4850

INPUT
Description: Source: Revised Condition Topo
Datum: NGVD29
Coordinate System:
```

NAVD88 Colorado State Planes Central, US Feet.

Station Elevation Data num= 14

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	6961.95	34.39	6959.99	54.42	6958.91	58.9	6957.85	72.94	6954.52
73.41	6954.5	76.05	6954.44	77.22	6954.55	88.32	6956.31	97.52	6957.97
111.09	6958.96	131.03	6960.59	146.87	6962.04	150	6962.13		

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.05	54.42	.035	111.09	.05

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
54.42	111.09	100.34	100.34	100.34	.1	.3

CROSS SECTION

RIVER: UT_BSC2
REACH: NCONFL-BGM RS: 4750

INPUT
Description: Source: Revised Condition Topo
Datum: NGVD29
Coordinate System:
NAVD88 Colorado State Planes Central, US Feet.

Station Elevation Data num= 461

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	6959.29	.15	6959.29	.34	6959.28	.93	6959.27	1.13	6959.26
1.33	6959.26	1.93	6959.24	2.25	6959.23	2.72	6959.22	2.89	6959.21
3.3	6959.2	3.52	6959.2	4.17	6959.18	4.31	6959.18	4.36	6959.17
4.45	6959.17	5.1	6959.15	5.41	6959.15	5.9	6959.13	6	6959.13
6.46	6959.12	6.69	6959.11	7.41	6959.09	7.56	6959.09	8.28	6959.07
8.56	6959.06	9.07	6959.05	9.11	6959.05	9.61	6959.03	9.87	6959.02
10.65	6959	10.66	6959	11.45	6958.98	11.71	6958.97	12.23	6958.96
12.25	6958.96	12.77	6958.95	13.04	6958.94	13.78	6958.92	13.89	6958.92
14.63	6958.89	14.87	6958.89	15.34	6958.88	15.42	6958.87	15.92	6958.86
16.22	6958.85	16.89	6958.83	17.13	6958.83	17.8	6958.81	18.02	6958.8
18.45	6958.79	18.6	6958.79	19.07	6958.77	19.39	6958.77	20.01	6958.75
20.12	6958.75	20.18	6958.74	20.37	6958.74	20.98	6958.72	21.18	6958.72
21.56	6958.71	21.77	6958.7	22.23	6958.69	22.57	6958.68	23.12	6958.66
23.36	6958.66	23.61	6958.65	24.15	6958.64	24.33	6958.63	24.67	6958.62
24.95	6958.61	25.38	6958.6	25.74	6958.59	26.23	6958.58	26.43	6958.57
26.53	6958.57	26.85	6958.56	27.33	6958.55	27.48	6958.55	27.79	6958.54
28.12	6958.53	28.53	6958.52	28.92	6958.51	29.34	6958.5	29.59	6958.49
29.71	6958.49	30.09	6958.48	30.5	6958.46	30.64	6958.46	30.9	6958.45
31.3	6958.44	31.69	6958.43	32.09	6958.42	32.45	6958.41	32.74	6958.4
32.88	6958.4	33.33	6958.39	33.68	6958.38	34.01	6958.38	34.47	6958.37
35.27	6958.37	35.57	6958.36	36.85	6958.36	36.94	6958.35	37.12	6958.34

37.65	6958.34	38	6958.31	38.44	6958.27	38.68	6958.25	39.05	6958.22
39.23	6958.2	39.81	6958.13	40.03	6958.1	40.1	6958.09	40.23	6958.07
40.25	6958.07	40.82	6957.97	41.15	6957.91	41.62	6957.83	41.79	6957.8
42.2	6957.73	42.41	6957.69	43.05	6957.58	43.2	6957.55	43.25	6957.54
43.35	6957.52	44	6957.41	44.3	6957.36	44.79	6957.27	44.9	6957.25
45.35	6957.17	45.58	6957.13	46.29	6957	46.38	6956.99	46.4	6956.98
46.46	6956.97	47.17	6956.85	47.46	6956.8	47.96	6956.71	48.01	6956.7
48.51	6956.61	48.76	6956.57	49.53	6956.43	49.55	6956.43	49.57	6956.42
50.35	6956.29	50.61	6956.24	51.13	6956.15	51.14	6956.15	51.66	6956.05
51.93	6956.01	52.68	6955.87	52.73	6955.87	52.77	6955.86	53.52	6955.72
53.76	6955.68	54.24	6955.6	54.31	6955.58	54.81	6955.5	55.11	6955.44
55.79	6955.32	55.87	6955.31	55.9	6955.3	56.01	6955.28	56.7	6955.16
56.92	6955.12	57.35	6955.05	57.49	6955.02	57.97	6954.94	58.28	6954.88
58.91	6954.77	59.02	6954.75	59.08	6954.74	59.26	6954.71	59.87	6954.6
60.07	6954.56	60.46	6954.5	60.66	6954.46	61.12	6954.38	61.46	6954.32
62.02	6954.22	62.17	6954.19	62.25	6954.18	62.5	6954.14	63.05	6954.04
63.22	6954.01	63.57	6953.94	63.84	6953.9	64.28	6953.82	64.63	6953.76
65.13	6953.67	65.33	6953.63	65.43	6953.62	65.74	6953.56	66.22	6953.48
66.38	6953.45	66.69	6953.39	67.01	6953.34	67.43	6953.26	67.81	6953.19
68.24	6953.12	68.48	6953.08	68.6	6953.05	68.98	6952.99	69.4	6952.91
69.53	6952.89	69.8	6952.84	70.19	6952.77	70.58	6952.7	70.98	6952.63
71.35	6952.57	71.63	6952.52	71.78	6952.49	72.22	6952.41	72.57	6952.35
72.69	6952.33	72.91	6952.33	73.36	6952.29	73.69	6952.28	73.74	6952.28
74.16	6952.27	74.47	6952.26	74.79	6952.25	74.95	6952.26	75.46	6952.28
75.75	6952.29	75.84	6952.3	76.02	6952.32	76.54	6952.33	76.89	6952.38
77.33	6952.48	77.58	6952.54	77.94	6952.62	78.13	6952.66	78.7	6952.8
78.92	6952.85	78.99	6952.86	79.13	6952.9	79.71	6953.03	80.04	6953.11
80.51	6953.21	80.69	6953.25	81.1	6953.35	81.3	6953.4	81.94	6953.54
82.1	6953.58	82.15	6953.59	82.25	6953.61	82.89	6953.76	83.2	6953.83
83.68	6953.94	83.8	6953.97	84.25	6954.07	84.48	6954.13	85.18	6954.29
85.27	6954.31	85.3	6954.32	85.36	6954.33	86.06	6954.49	86.35	6954.56
86.86	6954.67	86.91	6954.69	87.4	6954.8	87.65	6954.86	88.42	6955.03
88.45	6955.04	88.47	6955.04	89.24	6955.19	89.51	6955.24	90.03	6955.34
90.56	6955.44	90.83	6955.5	91.58	6955.64	91.61	6955.65	91.62	6955.65
91.66	6955.66	92.41	6955.81	92.66	6955.85	93.14	6955.95	93.21	6955.96
93.71	6956.06	94	6956.11	94.69	6956.25	94.76	6956.26	94.8	6956.27
94.9	6956.29	95.59	6956.42	95.81	6956.46	96.25	6956.48	96.38	6956.49
96.86	6956.52	97.18	6956.53	97.81	6956.56	97.92	6956.57	97.97	6956.57
98.14	6956.58	98.76	6956.61	98.97	6956.62	99.36	6956.64	99.56	6956.65
100.02	6956.68	100.35	6956.69	100.92	6956.72	101.07	6956.73	101.15	6956.73
101.38	6956.75	101.94	6956.77	102.12	6956.78	102.47	6956.8	102.73	6956.81
103.17	6956.84	103.53	6956.85	104.03	6956.88	104.22	6956.89	104.62	6956.89
105.11	6956.9	105.27	6956.9	105.59	6956.89	109.08	6956.89	109.48	6956.88
112.63	6956.88	113.05	6956.87	116.48	6956.87	116.84	6956.86	120.2	6956.86
120.83	6956.85	125.25	6956.85	125.75	6956.84	132.1	6956.84	132.61	6956.83
136.07	6956.83	136.71	6956.84	136.81	6956.85	136.86	6956.85	137.03	6956.86
137.41	6956.88	137.65	6956.89	137.88	6956.91	138.4	6956.94	138.48	6956.94
138.97	6956.97	139.16	6956.98	139.59	6957.01	139.92	6957.03	140.07	6957.04

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  140.45 6957.06  140.68 6957.07  141.16  6957.1  141.44 6957.12  142.06 6957.16
  142.19 6957.17  142.25 6957.17  142.41 6957.18  142.95 6957.21  143.35 6957.24
  143.71 6957.26  144.37  6957.3  144.47  6957.3  144.53 6957.31  145.23 6957.35
  145.54 6957.37  145.98  6957.4  146.34 6957.42  146.63 6957.43  146.74 6957.44
     147 6957.46   147.5 6957.49  147.72  6957.5  148.26 6957.53   148.3 6957.53
  148.82 6957.57  149.02 6957.58  149.47 6957.61  149.77 6957.62  149.91 6957.63
  150.26 6957.65  150.53 6957.67     151  6957.7  151.29 6957.72  151.94 6957.75
  152.05 6957.76   152.1 6957.76  152.22 6957.77  152.81 6957.81  153.19 6957.83
  153.56 6957.85  154.19 6957.89  154.28  6957.9  154.41  6957.9  155.08 6957.94
  155.38 6957.96  155.84 6957.98  156.15 6957.99  156.47 6958.01   156.6 6958.01
  156.88 6958.02  157.35 6958.04  157.56 6958.05  158.11 6958.07  158.66 6958.09
  158.87  6958.1  159.35 6958.12  159.63 6958.13  159.75 6958.14  160.07 6958.15
  160.39 6958.16  160.85 6958.18  161.14 6958.19  161.82 6958.22   161.9 6958.22
  161.94 6958.23  162.04 6958.23  162.66 6958.25  163.03 6958.27  163.42 6958.28
     164 6958.31  164.17 6958.31  164.29 6958.32  164.93 6958.34  165.22 6958.36
  165.69 6958.37  165.96 6958.39  166.31  6958.4  166.45  6958.4  166.75 6958.42
  167.21 6958.43  167.41 6958.44  167.92 6958.46  167.96 6958.46   168.5 6958.49
  168.72  6958.5  169.22 6958.52  169.48 6958.53  169.59 6958.53  169.89 6958.54
  170.24 6958.56  170.69 6958.57     171 6958.59  171.69 6958.61  171.75 6958.62
  171.85 6958.62  172.51 6958.65  172.87 6958.66  173.27 6958.68  173.81  6958.7
  173.97  6958.7  174.03 6958.71  174.16 6958.71  174.79 6958.74  175.06 6958.75
  175.54 6958.76  175.78 6958.77  176.16 6958.79   176.3 6958.79  176.63 6958.81
  177.06 6958.82  177.25 6958.83  177.74 6958.85  177.82 6958.85  178.34 6958.87
  178.53 6958.87

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
       0     .05   40.25    .035   96.38     .05

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
         40.25   96.38           100.72  100.72  100.72             .1       .3

CROSS SECTION


RIVER: UT_BSC2
REACH: NCONFL-BGM         RS: 4650

INPUT
Description: Source: Revised Condition Topo
Datum: NGVD29
Coordinate System:
             NAVD88 Colorado State Planes Central, US Feet.
Station Elevation Data    num=      22
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
       0 6956.44    5.23 6956.23     9.7 6956.05    11.8 6955.97   13.75 6955.88
   15.98 6955.77   17.47 6955.75   19.19 6955.69   39.69 6954.03    39.7 6954.03
    40.7 6953.88   57.45 6950.92   59.62 6950.54   62.99 6950.73   63.73 6950.75
```

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   68.59 6951.79   81.56 6954.29  100.82 6955.21  110.86 6955.88  117.25 6955.97
  128.49 6956.29  136.54 6956.52

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
       0     .05    39.7    .035   81.56     .05

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
          39.7   81.56            17.95   48.25   87.43             .1       .3

CROSS SECTION


RIVER: UT_BSC2
REACH: NCONFL-BGM         RS: 4600

INPUT
Description: Source: Revised Condition Topo
Datum: NGVD29
Coordinate System:
             NAVD88 Colorado State Planes Central, US Feet.
Station Elevation Data    num=      18
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
       0 6956.26    1.83 6956.11    4.72 6955.85   11.44 6955.16   22.53 6954.54
   39.04 6953.33   39.05 6953.33   60.56  6950.2   67.66 6949.26    68.1 6949.28
   68.33 6949.29   71.51 6949.23   78.98 6950.86   88.89 6953.25   99.86 6954.11
  104.06 6954.54  107.26 6954.49  144.24 6954.44

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
       0     .05   39.05    .035   88.89     .05

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
         39.05   88.89            48.37   48.37   48.37             .1       .3

CROSS SECTION


RIVER: UT_BSC2
REACH: NCONFL-BGM         RS: 4550

INPUT
Description: Source: Revised Condition Topo
Datum: NGVD29
Coordinate System:
             NAVD88 Colorado State Planes Central, US Feet.
Station Elevation Data    num=     492
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
```

-48.02	6961.13	-47.51	6961.13	-47.35	6961.14	-46.43	6961.17	-46.28	6961.17
-45.47	6961.2	-45.35	6961.2	-44.54	6961.11	-44.41	6961.12	-43.6	6960.94
-43.41	6960.89	-43.2	6960.85	-42.66	6960.73	-42.41	6960.67	-42.12	6960.61
-41.41	6960.45	-41.04	6960.37	-40.79	6960.31	-40.41	6960.23	-39.85	6960.1
-39.4	6960	-38.91	6959.9	-38.89	6959.89	-38.4	6959.78	-37.98	6959.69
-36.73	6959.41	-36.4	6959.34	-35.66	6959.17	-35.39	6959.12	-34.23	6958.86
-33.5	6958.7	-33.29	6958.66	-32.42	6958.46	-32.35	6958.44	-31.89	6958.34
-31.42	6958.23	-31.35	6958.22	-30.48	6958.02	-29.19	6957.72	-28.61	6957.58
-28.38	6957.53	-28.11	6957.46	-27.37	6957.29	-26.73	6957.14	-25.96	6956.95
-25.37	6956.81	-24.88	6956.69	-24.86	6956.69	-23.8	6956.43	-23.37	6956.33
-22.98	6956.27	-22.73	6956.17	-22.36	6956.12	-22.05	6956.09	-21.65	6956.04
-21.36	6956.02	-21.11	6955.99	-20.57	6955.95	-20.17	6955.91	-19.36	6955.84
-19.24	6955.82	-18.42	6955.75	-18.3	6955.73	-17.5	6955.65	-17.34	6955.64
-16.42	6955.54	-16.35	6955.54	-15.49	6955.45	-15.35	6955.43	-15.18	6955.42
-14.55	6955.35	-14.11	6955.31	-13.03	6955.2	-12.68	6955.16	-12.34	6955.13
-11.34	6955.03	-10.33	6954.92	-9.86	6954.88	-9.33	6954.82	-8.33	6954.72
-7.99	6954.69	-7.64	6954.65	-7.33	6954.62	-6.57	6954.54	-6.12	6954.5
-5.49	6954.43	-5.32	6954.42	-5.18	6954.4	-4.32	6954.31	-4.24	6954.31
-3.33	6954.21	-3.3	6954.21	-2.37	6954.11	-1.18	6954.01	-.31	6953.96
.44	6953.92	.69	6953.91	.98	6953.89	1.38	6953.87	1.69	6953.86
2.05	6953.84	2.32	6953.82	3.13	6953.78	3.25	6953.77	3.7	6953.75
4.7	6953.69	6.07	6953.62	6.36	6953.6	6.71	6953.59	7.31	6953.53
8.39	6953.38	8.99	6953.29	9.83	6953.18	10.07	6953.14	10.28	6953.11
10.55	6953.08	10.96	6953.02	11.28	6952.98	12	6952.87	12.68	6952.78
12.72	6952.77	13.87	6952.61	14.62	6952.51	15.07	6952.44	15.92	6952.33
16.44	6952.25	17.05	6952.17	17.46	6952.11	17.78	6952.07	18.27	6952
18.5	6951.96	19.22	6951.86	19.85	6951.78	19.94	6951.76	21.04	6951.61
21.39	6951.56	21.92	6951.49	22.24	6951.44	23.43	6951.28	23.74	6951.23
24.28	6951.16	25.57	6950.98	25.82	6950.94	26.44	6950.85	27.89	6950.65
28.21	6950.61	28.61	6950.55	29.22	6950.47	29.41	6950.44	30.06	6950.35
30.6	6950.27	30.78	6950.25	31.04	6950.21	31.5	6950.15	31.8	6950.1
32.22	6950.05	32.87	6949.96	33.24	6949.9	34.19	6949.77	35.39	6949.6
35.83	6949.54	36.52	6949.44	36.58	6949.44	37.28	6949.33	38	6949.23
38.72	6949.12	38.97	6949.09	39.45	6949.02	40.16	6948.91	40.89	6948.81
41.36	6948.74	41.99	6948.64	42.33	6948.59	42.56	6948.57	43.06	6948.51
43.82	6948.44	44.95	6948.34	45.22	6948.32	46.14	6948.23	46.67	6948.19
47.34	6948.13	47.47	6948.11	48.11	6948.05	48.53	6948.02	48.83	6947.99
49.3	6947.95	49.56	6947.92	50.28	6948	50.55	6948.11	50.92	6948.18
51.12	6948.23	51.72	6948.4	52.45	6948.6	53.89	6949	54.01	6949.04
54.51	6949.18	54.61	6949.2	54.77	6949.25	55.34	6949.41	56.78	6949.81
56.9	6949.84	57.48	6950	57.5	6950.01	58.42	6950.27	58.95	6950.41
59.67	6950.62	60.39	6950.82	60.49	6950.84	61.11	6951.02	61.68	6951.18
61.84	6951.22	62.07	6951.29	62.47	6951.4	62.56	6951.42	63.28	6951.62
63.6	6951.67	64.16	6951.7	64.47	6951.72	65.5	6951.78	65.96	6951.8
66.43	6951.83	66.85	6951.85	67.45	6951.89	68.55	6951.95	68.95	6951.97
69.18	6951.99	69.57	6952	70.37	6952.04	70.98	6952.06	71.78	6952.1
72.4	6952.12	73.19	6952.16	73.5	6952.18	73.78	6952.19	74.69	6952.25
75.13	6952.27	76.19	6952.33	76.47	6952.35	77.04	6952.38	77.81	6952.43

78.46	6952.46	79.16	6952.5	79.17	6952.51	79.47	6952.52	80.47	6952.59
81.3	6952.65	81.78	6952.68	82.01	6952.69	82.72	6952.74	83.08	6952.77
83.43	6952.79	84.14	6952.84	84.71	6952.87	84.85	6952.87	86.28	6952.97
86.9	6953.05	86.99	6953.04	87.12	6953.05	87.71	6953.05	88.14	6953.13
89.13	6953.16	89.85	6953.19	90.47	6953.21	90.64	6953.21	91.13	6953.23
91.52	6953.25	92	6953.26	92.72	6953.29	93.05	6953.3	93.45	6953.32
94.09	6953.34	94.23	6953.35	94.46	6953.35	95.62	6953.4	96.35	6953.42
97.38	6953.46	98.02	6953.5	98.56	6953.55	98.86	6953.57	99.83	6953.66
100.13	6953.68	101.13	6953.77	101.52	6953.81	102.99	6953.94	103.4	6953.97
104.47	6954.07	104.73	6954.09	105.67	6954.17	105.95	6954.18	106.48	6954.21
106.8	6954.24	107.17	6954.23	108.6	6954.23	108.91	6954.22	110.39	6954.22
110.74	6954.21	111.89	6954.21	112.42	6954.2	113.5	6954.2	113.72	6954.19
114.94	6954.19	115.55	6954.18	115.82	6954.18	116.47	6954.17	117.36	6954.17
117.81	6954.16	118.03	6954.16	118.72	6954.15	119.62	6954.15	119.91	6954.14
120.49	6954.14	120.96	6954.13	122	6954.13	122.01	6954.12	123.07	6954.12
123.19	6954.11	124.12	6954.11	124.37	6954.1	125.06	6954.11	125.25	6954.11
125.94	6954.12	126.24	6954.12	126.72	6954.13	127.51	6954.13	128.12	6954.14
128.47	6954.14	129.11	6954.15	129.39	6954.15	129.9	6954.16	130.73	6954.16
131.33	6954.17	131.85	6954.17	132.36	6954.18	132.75	6954.18	133.18	6954.19
133.99	6954.19	134.18	6954.2	134.81	6954.2	135.47	6954.21	136.47	6954.21
136.63	6954.22	137.66	6954.22	138.15	6954.23	139	6954.23	139.49	6954.24
139.84	6954.24	141.52	6954.25	141.75	6954.25	142.05	6954.26	143.27	6954.26
143.77	6954.27	145.02	6954.27	145.64	6954.28	145.9	6954.28	147.65	6954.29
148.52	6954.29	148.83	6954.3	150.24	6954.3	150.51	6954.31	151.75	6954.31
151.88	6954.32	153.96	6954.32	154.77	6954.33	157.16	6954.33	157.6	6954.34
158.1	6954.34	158.81	6954.36	159.26	6954.37	159.86	6954.39	160.05	6954.39
160.6	6954.41	160.92	6954.41	161.08	6954.42	161.63	6954.43	161.97	6954.44
162.42	6954.46	162.66	6954.46	163.03	6954.47	163.21	6954.48	163.74	6954.49
164.25	6954.51	164.79	6954.52	165.58	6954.54	166.19	6954.56	166.37	6954.56
167.16	6954.59	167.43	6954.59	167.94	6954.61	168.73	6954.63	169.36	6954.65
169.52	6954.65	170.41	6954.67	170.61	6954.68	171.47	6954.7	171.89	6954.72
172.2	6954.72	172.68	6954.74	173.47	6954.76	173.58	6954.77	173.78	6954.77
174.26	6954.79	175.05	6954.81	175.69	6954.83	175.84	6954.83	176.3	6954.85
176.74	6954.86	177.42	6954.89	178.21	6954.91	178.55	6954.93	179	6954.94
179.44	6954.96	179.79	6954.97	179.9	6954.98	180.14	6954.98	180.58	6955
180.96	6955.01	181.37	6955.03	182.01	6955.05	182.16	6955.06	182.58	6955.07
182.95	6955.09	183.07	6955.09	183.74	6955.12	184.12	6955.13	184.53	6955.15
185.18	6955.17	185.32	6955.18	186.11	6955.2	186.49	6955.22	186.9	6955.23
187.29	6955.25	187.68	6955.26	188.34	6955.29	188.47	6955.29	188.86	6955.31
189.26	6955.32	189.4	6955.33	190.05	6955.35	190.45	6955.37	191.26	6955.39
191.63	6955.41	192	6955.42	192.42	6955.44	192.85	6955.45	193.21	6955.47
193.62	6955.48	194	6955.5	194.44	6955.51	194.79	6955.53	195.58	6955.55
195.73	6955.56	196.37	6955.58	196.78	6955.6	197.16	6955.61	197.84	6955.64
198.28	6955.65	198.89	6955.68	199.53	6955.7	199.95	6955.72	200.32	6955.73
200.79	6955.75	201	6955.75	201.11	6955.76	201.9	6955.79	202.06	6955.79
202.38	6955.81	203.11	6955.83	203.48	6955.85	203.97	6955.86	204.27	6955.88
204.56	6955.89	205.06	6955.9	205.22	6955.91	205.85	6955.93	206.28	6955.95
206.64	6955.96	208.21	6956.02	208.39	6956.03	209	6956.05	209.44	6956.07

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  209.79 6956.08  211.37 6956.14  211.55 6956.14  212.16 6956.17  212.61 6956.18
  212.95  6956.2   213.5 6956.22  213.74 6956.22  214.53 6956.25  214.72 6956.26
  215.09 6956.27  215.27 6956.27

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
  -48.02     .05   10.07    .035   62.47     .05

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
         10.07   62.47             60.1    60.1    60.1             .1       .3

CROSS SECTION


RIVER: UT_BSC2
REACH: NCONFL-BGM         RS: 4500

INPUT
Description: Source: Revised Condition Topo
Datum: NGVD29
Coordinate System:
             NAVD88 Colorado State Planes Central, US Feet.
Station Elevation Data    num=      12
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
   33.56 6958.43   46.11  6955.1   55.02 6952.74   69.08  6947.9   75.54 6947.96
   76.98 6947.94   77.38    6948   83.71 6948.98  107.55 6952.53  110.42 6952.62
  126.61 6953.03  127.51 6953.05

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
   33.56     .05   46.11    .035  107.55     .05

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
         46.11  107.55            88.02   91.85   94.75             .1       .3

CROSS SECTION


RIVER: UT_BSC2
REACH: NCONFL-BGM         RS: 4400

INPUT
Description: Source: Revised Condition Topo
Datum: NGVD29
Coordinate System:
             NAVD88 Colorado State Planes Central, US Feet.
Station Elevation Data    num=     489
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
```

-47.22	6953.53	-46.37	6953.53	-45.81	6953.52	-45.37	6953.52	-44.8	6953.51
-44.38	6953.51	-43.79	6953.5	-42.4	6953.5	-41.78	6953.46	-41.59	6953.45
-41.41	6953.44	-40.77	6953.41	-40.59	6953.4	-40.41	6953.4	-39.76	6953.36
-39.59	6953.35	-39.42	6953.35	-38.76	6953.31	-38.59	6953.3	-38.43	6953.3
-37.75	6953.26	-37.59	6953.25	-37.44	6953.23	-36.74	6953.13	-36.59	6953.1
-36.44	6953.07	-35.73	6952.89	-35.59	6952.85	-35.45	6952.82	-34.72	6952.64
-34.59	6952.6	-34.46	6952.57	-33.72	6952.38	-33.59	6952.35	-33.47	6952.32
-32.71	6952.13	-32.59	6952.1	-32.48	6952.07	-31.7	6951.88	-31.59	6951.85
-31.48	6951.83	-30.69	6951.63	-30.59	6951.6	-30.49	6951.58	-29.68	6951.38
-29.59	6951.35	-29.5	6951.33	-28.68	6951.13	-28.59	6951.1	-28.51	6951.08
-27.67	6950.87	-27.59	6950.85	-27.51	6950.83	-26.66	6950.62	-26.59	6950.6
-26.52	6950.59	-25.65	6950.37	-25.59	6950.35	-25.53	6950.34	-24.65	6950.12
-24.59	6950.1	-24.54	6950.09	-23.64	6949.87	-23.59	6949.85	-23.55	6949.84
-22.63	6949.61	-22.59	6949.6	-22.55	6949.59	-21.62	6949.36	-21.59	6949.35
-21.56	6949.35	-20.61	6949.11	-20.59	6949.1	-20.57	6949.1	-19.61	6948.86
-19.59	6948.85	-19.58	6948.85	-18.6	6948.61	-18.59	6948.6	-17.71	6948.38
-17.59	6948.35	-16.6	6948.23	-12.59	6948.23	-12.55	6948.24	-11.64	6948.35
-11.59	6948.36	-11.54	6948.37	-10.65	6948.59	-10.59	6948.61	-10.54	6948.62
-9.65	6948.84	-9.59	6948.86	-9.53	6948.87	-8.66	6949.09	-8.59	6949.11
-8.52	6949.12	-7.67	6949.34	-7.59	6949.36	-7.51	6949.38	-6.68	6949.59
-6.59	6949.61	-6.5	6949.63	-5.69	6949.83	-5.59	6949.86	-5.5	6949.88
-4.69	6950.08	-4.59	6950.11	-4.49	6950.13	-3.7	6950.33	-3.59	6950.36
-3.48	6950.38	-2.71	6950.58	-2.59	6950.61	-2.47	6950.64	-1.72	6950.83
-1.59	6950.86	-1.47	6950.89	-.72	6951.07	-.59	6951.11	-.46	6951.14
.27	6951.32	.41	6951.36	.55	6951.39	1.26	6951.57	1.41	6951.61
1.56	6951.64	1.76	6951.69	1.93	6951.72	2.35	6951.79	3.07	6951.9
3.08	6951.91	3.09	6951.91	3.82	6952.02	4.22	6952.09	4.55	6952.14
5.14	6952.23	5.29	6952.26	5.37	6952.27	5.67	6952.32	6.02	6952.37
6.52	6952.45	6.76	6952.49	7.18	6952.56	7.49	6952.61	7.66	6952.63
8.23	6952.72	8.27	6952.73	8.81	6952.82	8.96	6952.84	9.23	6952.88
9.69	6952.96	9.95	6953	10.43	6953.08	10.87	6953.14	11.1	6953.18
11.16	6953.19	11.28	6953.21	11.9	6953.31	12.24	6953.36	12.63	6953.43
13.33	6953.54	13.39	6953.54	13.47	6953.55	14.1	6953.63	14.54	6953.68
14.84	6953.72	15.38	6953.78	15.57	6953.8	15.68	6953.8	16.07	6953.83
16.31	6953.84	16.83	6953.87	17.04	6953.89	17.43	6953.91	17.78	6953.93
17.97	6953.95	18.51	6953.98	18.67	6953.99	19.12	6954.02	19.25	6954.03
19.47	6954.04	19.98	6954.07	20.27	6954.09	20.72	6954.12	21.27	6954.15
21.41	6954.16	21.45	6954.17	21.52	6954.17	22.19	6954.18	22.56	6954.24
22.92	6954.26	23.57	6954.21	23.65	6954.2	23.7	6954.19	23.87	6954.2
24.39	6954.18	24.85	6954.21	25.12	6954.15	25.62	6954.1	25.86	6954.03
25.99	6954.01	26.47	6953.95	26.59	6954.03	27.14	6953.91	27.33	6953.84
27.67	6953.81	28.06	6953.78	28.29	6953.75	28.8	6953.71	29.07	6953.64
29.43	6953.6	29.53	6953.58	29.71	6953.56	30.27	6953.51	30.58	6953.47
30.69	6953.45	31.14	6953.32	31.22	6953.29	31.28	6953.27	32.2	6953
32.22	6953	32.23	6952.99	32.58	6952.9	33.19	6952.75	33.25	6952.73
34.14	6952.5	34.22	6952.48	34.31	6952.46	35.09	6952.26	35.22	6952.23
35.37	6952.19	36.04	6952.02	36.22	6951.97	36.43	6951.92	36.99	6951.77
37.22	6951.71	37.48	6951.64	37.94	6951.53	38.22	6951.45	38.54	6951.37

38.89	6951.28	39.23	6951.2	39.33	6951.17	39.6	6951.1	39.84	6951.04
40.23	6950.94	40.65	6950.83	40.79	6950.79	41.23	6950.68	41.71	6950.56
41.74	6950.55	42.23	6950.43	42.7	6950.31	42.77	6950.29	43.23	6950.17
43.65	6950.06	43.83	6950.02	44.23	6949.91	44.6	6949.82	44.88	6949.74
45.23	6949.66	45.55	6949.57	45.94	6949.47	46.24	6949.4	46.5	6949.33
47	6949.2	47.24	6949.14	47.45	6949.09	48.06	6948.93	48.24	6948.88
48.4	6948.84	49.11	6948.66	49.24	6948.63	49.35	6948.6	50.17	6948.39
50.24	6948.37	50.3	6948.35	51.23	6948.12	51.24	6948.11	51.25	6948.11
51.49	6948.05	52.21	6947.87	52.24	6947.86	52.29	6947.84	53.16	6947.62
53.24	6947.6	53.34	6947.57	54.11	6947.38	54.25	6947.34	54.4	6947.3
55.06	6947.13	55.25	6947.08	55.46	6947.03	56.01	6946.89	56.25	6946.83
56.51	6946.76	56.96	6946.64	57.25	6946.57	57.57	6946.49	57.91	6946.4
58.25	6946.31	58.63	6946.22	58.86	6946.16	59.25	6946.06	59.69	6945.94
59.81	6945.91	60.25	6945.8	60.74	6945.67	60.76	6945.67	61.26	6945.54
61.72	6945.48	61.8	6945.48	62.26	6945.42	62.67	6945.38	62.86	6945.36
63.26	6945.32	63.62	6945.29	63.92	6945.26	64.26	6945.23	64.57	6945.2
64.97	6945.16	65.26	6945.13	65.52	6945.1	66.03	6945.05	66.26	6945.03
66.47	6945.02	67.09	6945.01	67.26	6945	84.29	6945	84.54	6945.03
85.06	6945.01	85.29	6945.04	85.49	6945.09	86.12	6945.23	86.29	6945.26
86.44	6945.3	87.18	6945.46	87.29	6945.49	87.39	6945.51	88.23	6945.7
88.29	6945.71	88.34	6945.72	89.29	6945.93	89.32	6945.94	90.24	6946.14
90.29	6946.15	90.35	6946.16	91.2	6946.35	91.29	6946.37	91.41	6946.4
92.15	6946.56	92.3	6946.6	92.46	6946.63	93.1	6946.77	93.3	6946.82
93.52	6946.87	94.05	6946.98	94.3	6947.04	94.58	6947.1	95	6947.19
95.3	6947.26	95.63	6947.34	95.95	6947.4	96.3	6947.48	96.69	6947.57
96.9	6947.62	97.3	6947.7	97.75	6947.8	97.85	6947.83	98.3	6947.93
98.65	6948.01	98.8	6948.04	99.31	6948.15	99.75	6948.25	99.86	6948.27
100.31	6948.37	100.71	6948.46	100.92	6948.51	101.31	6948.59	101.66	6948.67
101.98	6948.74	102.31	6948.81	102.61	6948.88	103.04	6948.97	103.31	6949.04
103.56	6949.09	104.09	6949.21	104.31	6949.26	104.51	6949.3	105.15	6949.44
105.31	6949.48	105.46	6949.51	106.21	6949.68	106.31	6949.7	106.41	6949.72
107.27	6949.91	107.32	6949.92	107.36	6949.93	108.23	6950.13	108.31	6950.14
108.32	6950.15	109.26	6950.35	109.32	6950.37	109.38	6950.38	110.22	6950.57
110.32	6950.59	110.44	6950.61	111.17	6950.78	111.32	6950.81	111.49	6950.85
112.12	6950.99	112.32	6951.03	112.55	6951.08	113.07	6951.2	113.32	6951.25
113.61	6951.32	114.02	6951.41	114.33	6951.48	114.67	6951.55	114.97	6951.62
115.33	6951.7	115.72	6951.78	115.92	6951.83	116.33	6951.92	116.78	6952.01
116.87	6951.98	117.33	6952.08	117.84	6952.08	118.33	6952.09	118.77	6952.08
118.9	6952.09	119.33	6952.08	119.72	6952.08	119.95	6952.09	120.33	6952.08
120.68	6952.09	121.33	6952.09	121.63	6952.1	122.58	6952.1	123.12	6952.11
123.53	6952.11	124.18	6952.12	124.48	6952.12	125.24	6952.13	125.43	6952.13
126.3	6952.14	126.38	6952.14	127.14	6952.15	127.35	6952.15	128.28	6952.16
128.41	6952.16	129.23	6952.17	130.19	6952.17	130.35	6952.18	131.35	6952.18
131.58	6952.19	132.35	6952.19	132.64	6952.2	133.35	6952.2	133.7	6952.21
134.35	6952.21	134.76	6952.22	135.35	6952.22	135.81	6952.23	136.87	6952.23
137.36	6952.24	137.93	6952.24	138.36	6952.25	138.98	6952.25	139.36	6952.26
140.04	6952.26	140.36	6952.27	141.1	6952.27	141.36	6952.28	142.36	6952.28
142.55	6952.29	143.36	6952.29	143.5	6952.3	144.45	6952.3	145.33	6952.31

```
   145.4 6952.31  146.06 6952.32  146.39 6952.32   147.3 6952.33  147.44 6952.33
  148.25 6952.34   148.5 6952.34  149.21 6952.35  149.99 6952.35

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
  -47.22    .035   39.33    .035   98.65    .035

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
         39.33   98.65           117.95  112.69  105.12             .1       .3
Ineffective Flow     num=       1
   Sta L   Sta R    Elev  Permanent
  -47.22   22.09 6954.31       T

CROSS SECTION


RIVER: UT_BSC2
REACH: NCONFL-BGM         RS: 4300

INPUT
Description: Source: Revised Condition Topo
Datum: NGVD29
Coordinate System:
             NAVD88 Colorado State Planes Central, US Feet.
Station Elevation Data    num=     492
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
 -124.14 6947.84 -123.93 6947.84 -123.72 6947.81 -123.12 6947.76 -122.75 6947.72
 -122.08 6947.66 -121.93 6947.64 -121.78 6947.63 -121.05 6947.56 -120.81 6947.54
 -120.02 6947.46 -119.84 6947.44 -118.87 6947.35 -117.95 6947.26  -117.9 6947.26
 -116.92 6947.17 -115.96 6947.07 -115.88 6947.07 -114.99 6946.98 -114.85 6946.97
 -113.82 6946.87 -113.05  6946.8 -112.78 6946.77 -112.08  6946.7 -111.92 6946.69
 -111.75 6946.67 -111.11 6946.61 -110.72 6946.57 -109.69 6946.48 -109.17 6946.43
 -108.92  6946.4 -108.65 6946.38  -108.2 6946.33 -107.92 6946.31 -106.92 6946.21
 -105.92 6946.12 -105.55 6946.08 -105.29 6946.06 -104.92 6946.02 -104.32 6945.96
 -103.92 6945.93 -103.49 6945.88 -103.35 6945.87 -102.92 6945.83 -102.45 6945.79
 -102.38 6945.78 -101.92 6945.74 -100.92 6945.64 -100.45 6945.59 -100.39 6945.59
  -99.92 6945.54  -99.35 6945.49  -98.51 6945.41  -97.92 6945.35  -97.54 6945.32
  -97.29 6945.29  -96.92 6945.26  -96.57 6945.22  -96.26  6945.2  -95.92 6945.16
   -95.6 6945.13  -95.22  6945.1  -94.63 6945.04  -94.19    6945  -93.91 6944.97
  -93.66 6944.95  -93.16  6944.9  -92.91 6944.88  -92.69 6944.85  -92.12  6944.8
  -91.09  6944.7  -90.91 6944.69  -90.75 6944.67  -90.06  6944.6  -89.78 6944.58
  -89.02 6944.51  -88.81 6944.48  -87.99 6944.41  -87.84 6944.39  -86.96 6944.31
  -86.87  6944.3   -85.5 6944.17  -84.93 6944.11  -84.89 6944.11  -83.86 6944.01
  -82.99 6943.93  -82.83 6943.91  -81.79 6943.82  -81.05 6943.74  -80.76 6943.72
  -80.08 6943.65  -79.91 6943.64  -79.73 6943.62  -78.91 6943.54  -78.14 6943.47
  -77.91 6943.44  -77.66 6943.42  -77.17 6943.37  -76.91 6943.35  -76.63 6943.32
   -76.2 6943.28  -75.91 6943.25  -74.56 6943.21  -74.26 6943.21  -73.53 6943.19
  -73.29 6943.19  -72.49 6943.15  -72.32 6943.15  -71.46 6943.11  -71.35 6943.08
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-70.9	6943.06	-70.43	6943.03	-70.38	6943.03	-69.9	6942.99	-69.41	6942.96
-69.39	6942.95	-68.9	6942.91	-68.44	6942.88	-68.36	6942.87	-67.9	6942.84
-67.33	6942.8	-66.9	6942.78	-66.5	6942.75	-66.3	6942.74	-65.9	6942.71
-65.53	6942.69	-65.26	6942.67	-64.56	6942.63	-64.23	6942.6	-63.59	6942.56
-63.2	6942.54	-62.9	6942.52	-62.62	6942.49	-62.16	6942.47	-61.65	6942.41
-61.13	6942.37	-60.68	6942.31	-60.1	6942.24	-59.71	6942.2	-59.06	6942.12
-58.9	6942.11	-58.03	6942	-57.78	6941.98	-56.9	6941.89	-56.81	6941.89
-55.96	6941.81	-54.93	6941.72	-54.87	6941.71	-53.9	6941.6	-53.86	6941.6
-52.93	6941.48	-52.87	6941.48	-51.96	6941.37	-51.83	6941.35	-50.99	6941.25
-50.8	6941.23	-50.02	6941.13	-49.77	6941.1	-49.05	6941.04	-48.73	6941
-48.08	6940.94	-47.11	6940.84	-46.89	6940.81	-46.67	6940.79	-45.89	6940.7
-45.63	6940.68	-44.89	6940.6	-44.6	6940.56	-43.89	6940.49	-43.57	6940.45
-43.23	6940.48	-42.89	6940.44	-42.53	6940.42	-42.26	6940.49	-41.89	6940.46
-41.29	6940.49	-40.89	6940.52	-40.47	6940.56	-40.32	6940.57	-39.89	6940.61
-39.44	6940.67	-38.89	6940.74	-38.4	6940.8	-38.38	6940.8	-37.41	6940.92
-37.37	6940.92	-36.89	6940.98	-36.44	6941.04	-36.34	6941.05	-35.89	6941.11
-34.89	6941.23	-33.89	6941.36	-33.53	6941.4	-33.24	6941.44	-32.56	6941.52
-31.89	6941.61	-31.17	6941.68	-30.89	6941.71	-30.14	6941.85	-29.89	6941.89
-29.65	6941.98	-28.89	6942.27	-28.68	6942.33	-28.07	6942.49	-27.89	6942.54
-27.71	6942.53	-23.83	6942.53	-22.91	6942.58	-22.86	6942.58	-22.22	6942.69
-21.89	6942.75	-21.87	6942.76	-20.92	6942.92	-19.95	6943.16	-19.81	6943.19
-18.98	6943.38	-18.77	6943.42	-18.01	6943.55	-17.74	6943.59	-16.88	6943.74
-16.08	6943.93	-15.88	6943.98	-15.67	6944.02	-15.11	6944.15	-14.88	6944.2
-14.14	6944.32	-13.88	6944.37	-13.61	6944.41	-13.17	6944.48	-12.88	6944.53
-12.57	6944.6	-12.2	6944.69	-11.88	6944.76	-11.54	6944.84	-10.88	6944.99
-9.88	6945.15	-9.48	6945.22	-8.88	6945.32	-8.32	6945.45	-7.88	6945.54
-7.41	6945.65	-7.35	6945.67	-6.88	6945.78	-6.38	6945.87	-5.88	6945.97
-5.41	6946.06	-5.34	6946.07	-4.88	6946.16	-3.88	6946.39	-3.47	6946.45
-2.88	6946.54	-2.5	6946.52	-2.24	6946.51	-1.53	6946.47	-.56	6946.41
-.18	6946.39	.13	6946.38	.41	6946.38	.86	6946.37	1.13	6946.37
1.89	6946.4	2.35	6946.42	3.32	6946.47	3.95	6946.5	4.29	6946.52
4.99	6946.55	5.13	6946.56	5.26	6946.56	6.02	6946.6	7.05	6946.65
7.2	6946.65	8.09	6946.7	8.17	6946.7	9.12	6946.78	9.42	6946.8
10.11	6946.87	10.15	6946.87	11.08	6946.95	12.05	6947.04	12.22	6947.05
13.02	6947.13	13.25	6947.15	13.99	6947.22	14.13	6947.23	14.29	6947.25
14.96	6947.31	15.32	6947.35	16.13	6947.43	16.35	6947.46	16.9	6947.51
17.38	6947.57	17.87	6947.62	18.13	6947.65	18.42	6947.69	18.84	6947.74
19.13	6947.77	19.45	6947.81	19.81	6947.85	20.13	6947.89	20.48	6947.93
20.78	6947.96	21.13	6948.01	21.52	6948.05	22.14	6948.13	23.14	6948.25
23.58	6948.3	23.68	6948.32	24.14	6948.37	24.62	6948.43	24.65	6948.43
25.62	6948.55	25.65	6948.56	26.14	6948.62	26.68	6948.68	27.14	6948.74
28.14	6948.86	29.14	6948.99	29.5	6949.04	29.78	6949.07	30.14	6949.12
30.82	6949.2	31.44	6949.28	31.85	6949.33	32.14	6949.37	32.41	6949.4
32.88	6949.46	33.14	6949.49	33.38	6949.51	33.91	6949.59	34.14	6949.61
34.35	6949.56	34.91	6949.42	35.14	6949.37	36.15	6949.11	36.63	6949
36.68	6948.98	37.11	6948.87	37.16	6948.86	37.57	6948.76	38.45	6948.54
39.34	6948.32	40.16	6948.12	40.22	6948.1	40.41	6948.06	41.11	6947.88
41.34	6947.83	41.99	6947.66	42.51	6947.54	42.87	6947.44	43.22	6947.36

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   43.69 6947.24   43.76 6947.23   44.23 6947.11   44.64 6947.01   44.87 6946.95
   45.53 6946.79   46.04 6946.66   47.22 6946.37   48.18 6946.13   48.39 6946.07
   49.07 6945.91   49.28 6945.85   49.95 6945.69   50.29  6945.6   50.84 6945.47
    51.3 6945.35   51.72 6945.25   52.31  6945.1   52.61 6945.03    53.1  6944.9
   53.32 6944.85   53.49 6944.82   54.28 6944.71   87.11 6944.71   87.22 6944.72
    91.7 6944.72   91.92 6944.75   92.71 6944.88    93.1 6944.97   93.72 6945.13
   94.18 6945.24   94.28 6945.27   94.73 6945.38   95.07 6945.46   95.45 6945.56
   95.95 6945.68   96.75 6945.88   96.84  6945.9   97.47 6946.06   97.76 6946.13
   97.81 6946.15   98.77 6946.39   98.98 6946.44   99.49 6946.57  100.16 6946.73
  100.38 6946.79  100.79 6946.89  101.34 6947.03   101.8 6947.14  102.48 6947.31
  102.51 6947.32  102.81  6947.4  103.03 6947.45  103.69 6947.62  103.92 6947.67
   104.8 6947.89  104.87 6947.91  106.85  6948.4  107.45 6948.56  107.86 6948.66
  108.34 6948.78   108.4 6948.79  109.57 6949.09  109.88 6949.16  110.11 6949.22
  110.75 6949.38  110.99 6949.44  111.73 6949.63  111.88 6949.66  112.76 6949.88
   113.1 6949.97  113.65  6950.1  113.92 6950.17  114.28 6950.19  114.53 6950.19
  114.93 6950.21  115.94 6950.21   116.3 6950.22  117.81 6950.22  117.96 6950.23
  118.98 6950.23  119.84 6950.24  120.16 6950.24  120.72 6950.25  121.34 6950.25
  121.61 6950.26  122.51 6950.26  123.01 6950.27  123.69 6950.27  124.02 6950.28
  124.26 6950.28  124.87 6950.29  125.15 6950.29  126.92 6950.31  127.22 6950.31
   127.8 6950.32   128.4 6950.32  128.69 6950.33  129.07 6950.33  129.57 6950.34
  130.08 6950.34  130.45 6950.35  131.09 6950.35  131.34 6950.36   132.1 6950.36
  132.22 6950.37  133.11 6950.37  133.13 6950.38  133.99 6950.38  134.12 6950.39
  134.88 6950.39  135.13  6950.4  135.76  6950.4  136.14 6950.41  136.65 6950.41
  137.15 6950.42  137.81 6950.42  138.15 6950.43  138.42 6950.43  138.98 6950.44
   139.3 6950.44  140.26 6950.45  141.07 6950.46  141.34 6950.46  141.96 6950.47
  142.51 6950.47  142.84 6950.48   143.2 6950.48  143.69 6950.49  144.21 6950.49
  144.61  6950.5  145.22  6950.5  145.49 6950.51  146.23 6950.51  146.38 6950.52
  147.22 6950.52  147.24 6950.53  148.15 6950.53  148.25 6950.54  149.03 6950.54
  149.26 6950.55  150.01 6950.55

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
 -124.14    .035   37.11    .035  102.48    .035

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
         37.11  102.48              6.2   14.98   23.62             .1       .3
Ineffective Flow     num=       1
   Sta L   Sta R    Elev  Permanent
 -124.14   33.44 6949.62       T

CROSS SECTION


RIVER: UT_BSC2
REACH: NCONFL-BGM         RS: 4280

INPUT
Description: Source: Revised Condition Topo
```

Datum: NGVD29
Coordinate System:
NAVD88 Colorado State Planes Central, US Feet.
Station Elevation Data num= 492

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
-154.13	6948.39	-154.06	6948.39	-153.33	6948.33	-153.02	6948.31	-152.36	6948.25
-151.99	6948.23	-151.68	6948.2	-151.4	6948.18	-150.95	6948.14	-149.92	6948.06
-149.46	6948.02	-148.88	6947.98	-148.68	6947.96	-148.49	6947.95	-147.84	6947.9
-147.68	6947.88	-147.53	6947.87	-146.56	6947.79	-145.77	6947.73	-145.59	6947.71
-144.62	6947.63	-143.7	6947.56	-143.65	6947.55	-142.67	6947.48	-141.72	6947.4
-141.63	6947.39	-140.75	6947.32	-140.6	6947.31	-139.56	6947.22	-138.81	6947.16
-138.53	6947.14	-137.85	6947.08	-137.67	6947.07	-137.49	6947.05	-136.88	6947.01
-136.45	6946.97	-135.91	6946.93	-134.94	6946.85	-134.67	6946.83	-134.38	6946.8
-133.98	6946.77	-133.67	6946.74	-133.35	6946.72	-132.67	6946.66	-131.28	6946.55
-131.07	6946.53	-130.67	6946.5	-130.1	6946.46	-129.67	6946.42	-129.21	6946.38
-129.14	6946.38	-128.67	6946.34	-127.67	6946.26	-127.2	6946.22	-127.14	6946.21
-126.67	6946.18	-126.23	6946.14	-125.67	6946.1	-125.26	6946.06	-125.07	6946.05
-124.67	6946.01	-124.03	6945.96	-123.67	6945.93	-123.33	6945.91	-122.67	6945.85
-122.36	6945.83	-121.96	6945.79	-121.39	6945.75	-120.43	6945.67	-119.89	6945.63
-119.46	6945.59	-118.85	6945.54	-118.67	6945.53	-118.49	6945.51	-117.82	6945.46
-117.66	6945.45	-117.52	6945.43	-116.66	6945.36	-116.55	6945.36	-115.75	6945.29
-115.59	6945.28	-114.71	6945.21	-114.62	6945.2	-113.68	6945.12	-113.65	6945.12
-112.68	6945.04	-112.64	6945.04	-111.6	6944.95	-110.75	6944.88	-110.57	6944.87
-109.78	6944.81	-108.81	6944.73	-108.66	6944.71	-108.5	6944.7	-107.84	6944.65
-107.66	6944.63	-107.46	6944.62	-106.66	6944.55	-105.91	6944.55	-105.66	6944.54
-104.94	6944.54	-104.66	6944.55	-104.36	6944.55	-103.97	6944.52	-103.32	6944.52
-103	6944.49	-102.29	6944.49	-102.04	6944.45	-101.66	6944.46	-101.25	6944.46
-101.07	6944.43	-100.66	6944.43	-100.22	6944.4	-100.1	6944.4	-99.66	6944.37
-99.13	6944.35	-98.66	6944.32	-98.14	6944.3	-97.65	6944.27	-97.2	6944.25
-97.11	6944.24	-96.23	6944.2	-96.07	6944.19	-95.04	6944.14	-94.29	6944.1
-94	6944.09	-93.65	6944.06	-93.33	6944.01	-92.97	6943.97	-92.65	6943.92
-92.36	6943.87	-91.93	6943.8	-91.65	6943.75	-91.39	6943.73	-90.9	6943.63
-90.65	6943.6	-90.42	6943.58	-89.86	6943.5	-89.45	6943.46	-88.65	6943.37
-88.49	6943.35	-87.79	6943.28	-87.65	6943.26	-87.52	6943.25	-86.75	6943.17
-86.65	6943.15	-85.72	6943.05	-85.58	6943.03	-84.68	6942.87	-84.61	6942.85
-83.65	6942.66	-83.63	6942.66	-82.68	6942.53	-81.71	6942.39	-81.58	6942.37
-80.74	6942.26	-80.65	6942.24	-80.54	6942.23	-79.65	6942.1	-79.51	6942.07
-78.81	6941.93	-78.47	6941.86	-77.84	6941.75	-77.64	6941.7	-76.87	6941.58
-76.4	6941.5	-75.64	6941.38	-74.94	6941.25	-74.64	6941.2	-73.97	6941.07
-73.64	6941.01	-73.29	6940.94	-73	6940.91	-72.64	6940.84	-72.26	6940.79
-72.03	6940.78	-71.64	6940.72	-71.22	6940.68	-71.06	6940.67	-70.64	6940.62
-70.19	6940.58	-69.64	6940.52	-69.15	6940.46	-69.13	6940.46	-68.64	6940.4
-68.16	6940.39	-68.12	6940.34	-67.64	6940.32	-67.19	6940.38	-67.08	6940.36
-66.64	6940.41	-66.23	6940.46	-66.05	6940.49	-65.64	6940.54	-65.26	6940.58
-65.01	6940.62	-64.29	6940.7	-63.98	6940.74	-63.64	6940.79	-63.32	6940.82
-62.64	6940.91	-62.35	6940.94	-61.64	6941.02	-61.39	6941.09	-60.87	6941.24
-60.64	6941.31	-60.42	6941.39	-59.83	6941.62	-59.64	6941.69	-59.45	6941.74
-58.8	6941.89	-58.64	6941.93	-56.55	6941.93	-55.69	6941.92	-54.61	6941.92

-53.96	6941.96	-53.62	6941.99	-52.68	6942.15	-52.59	6942.17	-51.71	6942.32
-51.55	6942.35	-50.74	6942.53	-50.63	6942.56	-50.52	6942.58	-49.77	6942.75
-49.63	6942.78	-49.48	6942.8	-48.63	6942.95	-48.44	6942.98	-47.84	6943.08
-47.41	6943.16	-46.87	6943.28	-46.63	6943.33	-46.37	6943.39	-45.9	6943.49
-45.63	6943.55	-45.34	6943.6	-44.93	6943.66	-44.63	6943.71	-44.3	6943.77
-43.96	6943.82	-43.63	6943.88	-43.27	6943.95	-43	6944.01	-42.63	6944.08
-42.23	6944.17	-42.03	6944.21	-41.63	6944.3	-41.2	6944.37	-41.06	6944.4
-40.09	6944.56	-39.63	6944.64	-39.13	6944.74	-38.63	6944.83	-38.16	6944.94
-38.09	6944.96	-37.19	6945.15	-37.05	6945.17	-36.62	6945.26	-36.22	6945.33
-35.62	6945.45	-35.25	6945.53	-34.98	6945.58	-34.62	6945.66	-34.29	6945.7
-33.95	6945.75	-33.62	6945.79	-33.32	6945.77	-32.91	6945.75	-32.62	6945.73
-32.35	6945.72	-31.88	6945.69	-31.62	6945.68	-31.38	6945.66	-30.84	6945.63
-30.41	6945.61	-29.62	6945.57	-29.45	6945.57	-28.77	6945.6	-28.62	6945.61
-28.48	6945.61	-27.74	6945.65	-27.62	6945.65	-27.51	6945.66	-26.7	6945.7
-26.54	6945.7	-25.67	6945.76	-25.58	6945.76	-24.63	6945.85	-23.64	6945.94
-23.59	6945.94	-22.56	6946.04	-21.7	6946.13	-20.74	6946.24	-20.62	6946.25
-20.49	6946.27	-19.77	6946.35	-18.8	6946.47	-18.62	6946.49	-18.42	6946.52
-17.83	6946.59	-17.61	6946.62	-17.38	6946.64	-16.87	6946.71	-16.35	6946.77
-15.9	6946.83	-15.61	6946.86	-14.93	6946.95	-13.96	6947.07	-13.24	6947.15
-12.99	6947.19	-12.61	6947.23	-12.2	6947.27	-12.03	6947.3	-11.61	6947.34
-11.17	6947.39	-11.06	6947.4	-10.61	6947.45	-10.13	6947.5	-10.09	6947.5
-9.12	6947.6	-9.1	6947.6	-8.61	6947.66	-8.15	6947.7	-7.61	6947.76
-7.19	6947.8	-7.03	6947.82	-6.61	6947.86	-6.22	6947.91	-5.99	6947.93
-5.25	6948.01	-4.96	6948.04	-4.61	6948.07	-4.28	6948.11	-3.92	6948.15
-3.32	6948.21	-2.89	6948.25	-2.35	6948.31	-1.85	6948.36	-1.61	6948.39
-1.38	6948.41	-.81	6948.47	-.41	6948.51	.22	6948.58	.56	6948.62
1.26	6948.69	1.39	6948.7	1.52	6948.72	2.29	6948.82	2.4	6948.83
2.49	6948.85	3.46	6949.08	4.4	6949.31	4.43	6949.3	5.37	6949.08
5.4	6949.07	6.4	6948.82	6.85	6948.7	6.86	6948.7	7.32	6948.59
8.55	6948.28	9.21	6948.11	9.4	6948.07	9.61	6948.01	10.16	6947.88
10.68	6947.75	11.11	6947.64	11.4	6947.57	12.05	6947.4	12.41	6947.32
13	6947.17	13.41	6947.07	14.41	6946.81	15.41	6946.56	15.84	6946.46
16.41	6946.31	16.79	6946.22	17.41	6946.06	17.73	6945.98	18.12	6945.89
18.42	6945.81	18.68	6945.75	19.18	6945.62	19.42	6945.56	20.25	6945.36
20.57	6945.27	21.52	6945.04	22.37	6944.82	22.47	6944.8	23.21	6944.7
23.41	6944.67	23.42	6944.66	28.43	6944.66	28.75	6944.67	29.09	6944.66
29.43	6944.66	29.82	6944.67	31.94	6944.67	32.44	6944.66	32.88	6944.66
33.01	6944.67	33.44	6944.67	33.82	6944.66	34.44	6944.66	34.77	6944.67
35.14	6944.66	36.66	6944.66	37.26	6944.67	37.45	6944.66	41.52	6944.66
42.34	6944.65	42.45	6944.65	42.58	6944.66	43.29	6944.65	46.46	6944.65
46.83	6944.66	47.08	6944.65	47.46	6944.65	47.9	6944.66	48.02	6944.65
48.46	6944.66	58.53	6944.66	59.38	6944.65	59.6	6944.65	60.33	6944.64
60.66	6944.66	61.27	6944.7	61.49	6944.72	61.72	6944.78	62.22	6944.9
62.49	6944.96	62.79	6945.04	63.17	6945.12	63.49	6945.2	64.11	6945.34
64.91	6945.53	65.06	6945.56	65.49	6945.66	65.98	6945.77	66.01	6945.77
66.49	6945.89	67.5	6946.11	67.9	6946.2	68.1	6946.25	68.85	6946.42
69.17	6946.49	69.79	6946.64	70.23	6946.73	70.5	6946.8	70.74	6946.85
71.29	6946.98	71.5	6947.02	71.69	6947.07	72.5	6947.25	73.42	6947.46

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   73.58  6947.5   74.53 6947.71   75.47 6947.93   75.55 6947.94   76.42 6948.14
   76.61 6948.18   77.67 6948.43   78.31 6948.57   78.51 6948.62   79.26 6948.78
   79.51 6948.83    79.8  6948.9   80.14 6948.97   80.52 6949.04   80.86 6949.12
   81.15 6949.18   81.52 6949.25   81.93 6949.34    82.1 6949.38   82.52 6949.46
   82.99 6949.48   83.05 6949.48   83.52  6949.5   84.52  6949.5   84.94 6949.51
   86.18 6949.51   86.53 6949.52   87.53 6949.52   87.78 6949.53   88.73 6949.53
   89.37 6949.54   89.67 6949.54   90.44 6949.55   90.62 6949.55    91.5 6949.56
   92.09 6949.57   92.49 6949.57

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
 -154.13    .035    6.85    .035   80.14    .035

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
          6.85   80.14               19      19      19             .1       .3
Ineffective Flow     num=       1
   Sta L   Sta R    Elev  Permanent
 -154.13    3.47 6949.25       T

CROSS SECTION


RIVER: UT_BSC2
REACH: NCONFL-BGM         RS: 4250

INPUT
Description: Source: Revised Condition Topo
Datum: NGVD29
Coordinate System:
             NAVD88 Colorado State Planes Central, US Feet.
Station Elevation Data    num=     491
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
 -147.06 6947.35 -146.97 6947.35 -146.38 6947.28 -145.96 6947.24 -145.42 6947.18
 -144.96 6947.12 -144.46 6947.07 -143.96 6947.01 -142.96  6946.9 -141.96 6946.78
 -140.96 6946.67 -140.63 6946.64 -140.28 6946.59 -139.96 6946.56 -139.67 6946.53
 -139.23 6946.49 -138.96 6946.46 -138.18  6946.4 -137.75 6946.36 -137.14  6946.3
 -136.96 6946.29 -136.79 6946.27 -136.09 6946.21 -135.83 6946.19 -135.04 6946.12
 -134.87  6946.1    -134 6946.03 -133.91 6946.02 -132.99 6945.94 -132.95 6945.93
    -132 6945.85 -131.04 6945.76 -130.95 6945.76 -130.86 6945.75 -130.08 6945.68
 -129.81 6945.66 -129.12 6945.59 -128.95 6945.58 -128.76 6945.56 -128.16 6945.51
 -127.72 6945.47  -127.2 6945.42 -126.67 6945.38 -126.24 6945.34 -125.95 6945.31
 -125.63 6945.29 -124.95 6945.23 -124.58 6945.19 -124.32 6945.18 -123.94 6945.14
 -123.53 6945.11 -123.36  6945.1 -122.94 6945.06 -122.49 6945.02 -122.41 6945.02
 -121.94 6944.98 -120.94  6944.9 -120.39 6944.85 -119.94 6944.82 -119.53 6944.78
 -119.35 6944.77 -118.94 6944.74  -118.3 6944.69 -117.94 6944.66 -117.61 6944.63
 -117.25  6944.6 -116.94 6944.58 -116.65 6944.55 -116.21 6944.52 -115.69 6944.48
 -115.16 6944.43 -114.94 6944.42 -114.73  6944.4 -114.11 6944.35 -113.94 6944.34
 -113.77 6944.32 -113.07 6944.28 -112.94 6944.27 -112.02 6944.27 -111.93 6944.26
```

-108.98	6944.26	-108.93	6944.25	-108.02	6944.25	-107.83	6944.23	-107.06	6944.24
-106.93	6944.22	-106.79	6944.21	-106.1	6944.18	-105.93	6944.16	-105.74	6944.15
-105.14	6944.1	-104.93	6944.09	-104.69	6944.09	-104.18	6944.08	-103.93	6944.08
-103.65	6944.07	-102.93	6944.07	-102.6	6944.06	-101.93	6944.06	-101.55	6944.05
-100.92	6944.05	-100.51	6944.04	-100.35	6944.04	-99.92	6944.03	-99.39	6944.03
-98.92	6944.02	-98.41	6944.02	-97.92	6944.01	-97.37	6944.01	-96.92	6944
-96.51	6944	-96.32	6943.99	-95.55	6943.99	-95.27	6943.98	-94.59	6943.98
-94.23	6943.97	-93.64	6943.97	-93.18	6943.96	-92.68	6943.96	-92.13	6943.95
-91.92	6943.95	-91.72	6943.94	-90.92	6943.94	-90.76	6943.93	-89.91	6943.93
-89.8	6943.92	-88.99	6943.91	-88.84	6943.91	-87.95	6943.9	-87.17	6943.9
-86.9	6943.89	-85.96	6943.88	-85.85	6943.88	-85.01	6943.87	-84.81	6943.87
-84.05	6943.86	-83.76	6943.86	-83.09	6943.85	-82.71	6943.85	-82.13	6943.84
-81.67	6943.84	-81.17	6943.83	-80.91	6943.83	-80.62	6943.82	-79.91	6943.82
-79.57	6943.81	-79.25	6943.81	-78.91	6943.8	-78.29	6943.8	-77.9	6943.79
-77.33	6943.79	-76.9	6943.78	-76.37	6943.78	-75.9	6943.77	-75.39	6943.77
-74.9	6943.76	-74.46	6943.71	-74.34	6943.76	-73.9	6943.71	-73.5	6943.59
-73.29	6943.69	-72.9	6943.58	-72.54	6943.49	-72.25	6943.4	-71.9	6943.31
-71.58	6943.25	-71.2	6943.17	-70.9	6943.11	-70.16	6942.9	-69.9	6942.83
-69.66	6942.77	-68.9	6942.55	-68.7	6942.51	-68.06	6942.33	-67.9	6942.29
-67.02	6942.12	-66.89	6942.1	-66.78	6942.07	-65.97	6941.89	-65.83	6941.85
-64.92	6941.62	-64.87	6941.61	-64.26	6941.45	-63.91	6941.37	-63.88	6941.36
-62.95	6941.16	-62.83	6941.13	-61.99	6940.94	-61.78	6940.9	-61.03	6940.72
-60.89	6940.69	-60.74	6940.65	-60.07	6940.51	-59.89	6940.47	-59.69	6940.45
-59.11	6940.4	-58.89	6940.37	-58.64	6940.35	-58.15	6940.3	-57.89	6940.27
-57.6	6940.25	-57.19	6940.21	-56.89	6940.19	-56.55	6940.16	-56.24	6940.13
-55.88	6940.1	-55.5	6940.18	-55.28	6940.27	-54.88	6940.35	-54.46	6940.42
-54.32	6940.45	-53.88	6940.52	-51.32	6940.52	-50.88	6940.51	-49.88	6940.51
-49.52	6940.54	-49.22	6940.57	-48.88	6940.6	-48.56	6940.66	-48.18	6940.72
-47.88	6940.78	-47.6	6940.82	-47.13	6940.9	-46.88	6940.95	-46.08	6941.09
-45.69	6941.17	-45.04	6941.3	-44.73	6941.36	-43.99	6941.48	-43.77	6941.52
-42.94	6941.66	-42.81	6941.68	-41.9	6941.83	-41.34	6941.94	-40.89	6942.03
-40.85	6942.04	-39.93	6942.19	-38.97	6942.34	-38.76	6942.38	-38.01	6942.5
-37.87	6942.53	-37.71	6942.55	-37.06	6942.68	-36.66	6942.74	-35.87	6942.88
-35.14	6943	-34.87	6943.04	-34.57	6943.09	-34.18	6943.16	-33.87	6943.21
-33.52	6943.26	-33.22	6943.33	-32.86	6943.38	-32.48	6943.42	-32.26	6943.47
-31.86	6943.52	-31.43	6943.58	-31.3	6943.59	-30.86	6943.65	-30.38	6943.71
-30.34	6943.71	-29.38	6943.83	-29.34	6943.84	-28.86	6943.9	-28.42	6943.97
-28.29	6943.97	-27.86	6944.05	-27.47	6944.1	-27.24	6944.17	-26.86	6944.22
-26.51	6944.23	-26.2	6944.31	-25.55	6944.33	-25.15	6944.34	-24.59	6944.36
-23.63	6944.4	-23.06	6944.42	-22.86	6944.42	-22.67	6944.43	-22.01	6944.45
-21.85	6944.46	-21.71	6944.46	-20.96	6944.49	-20.85	6944.49	-20.75	6944.5
-19.92	6944.53	-19.79	6944.53	-18.87	6944.56	-18.43	6944.58	-17.88	6944.6
-17.82	6944.6	-16.92	6944.63	-16.78	6944.64	-15.96	6944.66	-15.73	6944.68
-15	6944.71	-14.85	6944.72	-14.69	6944.72	-14.04	6944.76	-13.08	6944.81
-12.85	6944.82	-12.59	6944.81	-12.12	6944.72	-11.85	6944.71	-11.55	6944.67
-11.16	6944.61	-10.85	6944.56	-10.5	6944.51	-9.84	6944.42	-9.45	6944.36
-8.84	6944.27	-8.29	6944.18	-7.84	6944.12	-7.36	6944.03	-7.33	6944.09
-6.84	6944	-6.37	6944.05	-6.31	6943.99	-5.84	6944.04	-5.41	6944.08

```
   -5.27  6944.1   -4.84 6944.14   -4.45 6944.18   -4.22  6944.2   -3.84 6944.24
   -3.49 6944.28   -2.84 6944.34   -2.53 6944.37   -1.84 6944.44   -1.57 6944.47
   -1.08 6944.52    -.84 6944.54    -.61 6944.57     .16 6944.65     .35 6944.66
    1.01 6944.73    1.17 6944.75     1.3 6944.76    2.26 6944.86    3.11 6944.94
    3.22 6944.96    4.15 6945.05    4.18 6945.05    4.48 6945.08    5.14 6945.15
     5.2 6945.16     6.1 6945.25    6.25 6945.25    7.06 6945.16    7.17 6945.15
    7.29 6945.11    8.02  6944.9    8.17 6944.86    8.98 6944.62    9.17 6944.56
    9.39  6944.5   10.17 6944.27   10.43  6944.2   10.89 6944.07   11.17 6943.98
   11.48 6943.89   11.85 6943.79   12.18 6943.69   12.81 6943.51   13.18  6943.4
   13.57 6943.29   13.77 6943.23   14.62 6942.98   14.73 6942.95   15.67 6942.68
   15.69 6942.67   16.18 6942.53   16.65 6942.39   16.71 6942.38   17.18 6942.24
   17.61 6942.12   17.76 6942.07   18.18 6941.95   18.57 6941.87   18.81 6941.78
   19.18  6941.7   19.57 6941.62   20.18 6941.49   20.48 6941.43   20.91 6941.34
   21.18 6941.28   21.44 6941.23   21.96 6941.12   22.18 6941.07   22.39 6941.03
   23.01  6940.9   23.35 6940.82   24.06 6940.67   24.19 6940.65    24.3 6940.62
   25.11 6940.45   25.19 6940.44   25.26 6940.42   26.21 6940.22   26.72 6940.15
   27.17 6940.09   27.19 6940.08   29.32 6940.08   30.03 6940.09   64.23 6940.09
   65.06 6940.17   65.23 6940.19   65.38 6940.22   66.11 6940.41   66.23 6940.44
   66.34 6940.46   67.16 6940.67    67.3  6940.7   68.21 6940.93   69.21 6941.18
   69.23 6941.19   70.16 6941.42   71.24 6941.69   71.37 6941.72   72.07  6941.9
   72.42 6941.98   73.03 6942.14   73.24 6942.19   73.43 6942.24   73.98 6942.38
   74.24 6942.44   74.52 6942.51   74.94 6942.61   75.24 6942.69   75.89 6942.85
   76.63 6943.04   76.85 6943.09   77.24 6943.19   78.24 6943.44   78.73 6943.56
   78.76 6943.57   79.25 6943.69   79.72 6943.81   79.78 6943.83   80.25 6943.94
   80.67 6944.05   81.25 6944.19   81.63 6944.29   82.25 6944.44   82.58 6944.53
   82.93 6944.61   83.25 6944.69   83.54 6944.77   83.98 6944.88   84.25 6944.94
   85.04 6945.14   85.25 6945.19   86.09  6945.4   86.25 6945.45    86.4 6945.48
   87.14 6945.67   87.25  6945.7   87.36 6945.72   88.19 6945.93   89.24 6946.19
   89.27  6946.2   90.26 6946.45   90.29 6946.46   91.18 6946.68   92.26 6946.95
    92.4 6946.98   93.09 6947.16   93.45 6947.24   94.05 6947.39   94.26 6947.45
    94.5 6947.51      95 6947.63   95.26  6947.7   95.96 6947.87   96.26 6947.95
    96.6 6948.03   97.65  6948.3   97.87 6948.35   98.27 6948.45    98.7 6948.56
   99.27  6948.7   99.75 6948.82   99.78 6948.83  100.27 6948.95  100.81 6949.09
  101.27  6949.2  101.69 6949.21  101.86 6949.35  104.27 6949.35  104.56 6949.34
  105.22 6949.34

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
 -147.06    .035   17.61    .035   73.43    .035

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
         17.61   73.43            15.35   15.35   15.35             .1       .3
Ineffective Flow     num=       1
   Sta L   Sta R    Elev  Permanent
 -147.06  -12.62 6944.87       T

CROSS SECTION
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RIVER: UT_BSC2
REACH: NCONFL-BGM RS: 4240

INPUT
Description: Source: Revised Condition Topo
Datum: NGVD29
Coordinate System:
NAVD88 Colorado State Planes Central, US Feet.
Station Elevation Data num= 491

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
-125.51	6947.39	-125.37	6947.37	-124.53	6947.28	-124.32	6947.26	-123.57	6947.17
-123.43	6947.16	-123.28	6947.14	-122.62	6947.06	-121.66	6946.96	-121.18	6946.9
-120.14	6946.79	-119.74	6946.74	-119.43	6946.71	-119.09	6946.67	-118.78	6946.63
-118.43	6946.59	-118.04	6946.55	-117.82	6946.53	-117.43	6946.48	-117	6946.43
-116.86	6946.42	-116.43	6946.37	-115.95	6946.32	-115.9	6946.31	-115.42	6946.26
-114.94	6946.2	-114.9	6946.2	-114.42	6946.15	-113.99	6946.1	-113.86	6946.08
-113.42	6946.03	-113.03	6945.99	-112.81	6945.96	-112.42	6945.92	-112.07	6945.88
-111.76	6945.85	-111.42	6945.81	-111.11	6945.77	-110.42	6945.7	-110.15	6945.67
-109.42	6945.58	-109.19	6945.56	-108.62	6945.49	-108.23	6945.45	-107.58	6945.38
-107.27	6945.34	-106.53	6945.26	-106.31	6945.24	-105.48	6945.14	-105.35	6945.13
-104.44	6945.03	-104.4	6945.02	-103.95	6944.97	-103.44	6944.91	-103.39	6944.91
-102.48	6944.81	-102.34	6944.79	-101.52	6944.7	-101.41	6944.69	-101.3	6944.67
-100.56	6944.59	-100.41	6944.57	-100.25	6944.56	-99.6	6944.48	-99.2	6944.44
-98.16	6944.31	-97.41	6944.2	-97.11	6944.12	-96.72	6944.03	-96.06	6943.86
-95.76	6943.79	-95.02	6943.6	-94.81	6943.58	-94.41	6943.48	-93.97	6943.38
-93.85	6943.36	-93.41	6943.26	-92.92	6943.13	-92.4	6942.98	-91.93	6942.83
-91.88	6942.84	-91.4	6942.69	-90.97	6942.58	-90.83	6942.55	-90.01	6942.34
-89.78	6942.28	-89.4	6942.19	-88.74	6942.02	-88.4	6941.93	-88.09	6941.86
-87.69	6941.76	-87.4	6941.68	-87.13	6941.62	-86.64	6941.49	-86.4	6941.43
-86.17	6941.38	-85.4	6941.19	-85.22	6941.14	-84.55	6940.97	-84.4	6940.94
-84.26	6940.9	-83.5	6940.71	-83.4	6940.69	-83.3	6940.66	-82.46	6940.45
-82.34	6940.43	-81.41	6940.24	-81.38	6940.24	-81.05	6940.19	-80.42	6940.1
-80.36	6940.09	-79.46	6940.05	-79.39	6940.04	-78.5	6940.03	-78.27	6940.03
-77.54	6940.02	-77.22	6940.02	-76.58	6940.01	-76.18	6940.01	-75.63	6940
-75.13	6940	-74.67	6939.99	-74.39	6939.99	-74.08	6939.98	-73.39	6939.98
-73.04	6939.97	-72.75	6939.97	-72.39	6939.96	-71.79	6939.96	-71.39	6939.95
-70.83	6939.95	-70.38	6939.94	-69.87	6939.94	-69.38	6939.93	-68.91	6939.93
-68.85	6939.92	-68.38	6939.92	-67.95	6939.91	-67.38	6939.91	-67	6939.9
-66.38	6939.9	-66.04	6939.89	-65.38	6939.89	-65.08	6939.88	-64.66	6939.88
-64.38	6939.87	-63.62	6939.87	-63.38	6939.86	-63.16	6939.86	-62.57	6939.85
-62.2	6939.85	-61.52	6939.84	-61.24	6939.84	-60.48	6939.83	-60.28	6939.83
-59.43	6939.82	-59.32	6939.82	-58.36	6939.81	-58.14	6939.8	-57.41	6939.79
-56.45	6939.78	-56.29	6939.78	-55.49	6939.77	-55.24	6939.77	-54.53	6939.76
-54.2	6939.76	-53.57	6939.75	-53.15	6939.75	-52.61	6939.74	-52.37	6939.74
-52.1	6939.73	-51.37	6939.73	-51.06	6939.72	-50.69	6939.72	-50.37	6939.71
-49.73	6939.71	-49.37	6939.7	-48.77	6939.7	-48.37	6939.69	-47.82	6939.69
-46.87	6939.67	-46.36	6939.67	-45.9	6939.66	-45.36	6939.66	-44.94	6939.65

-44.36	6939.65	-43.98	6939.64	-43.73	6939.64	-43.36	6939.63	-42.69	6939.63
-42.36	6939.62	-42.06	6939.62	-41.64	6939.61	-41.1	6939.61	-40.59	6939.6
-39.55	6939.6	-39.36	6939.59	-38.36	6939.59	-38.23	6939.58	-37.27	6939.58
-36.41	6939.57	-36.31	6939.57	-35.36	6939.56	-35.24	6939.56	-34.39	6939.55
-33.43	6939.54	-33.27	6939.54	-32.47	6939.53	-31.51	6939.53	-31.35	6939.52
-31.17	6939.52	-30.55	6939.38	-30.35	6939.38	-30.13	6939.37	-29.6	6939.34
-29.35	6939.33	-28.64	6939.33	-28.35	6939.32	-25.34	6939.32	-24.89	6939.34
-24.8	6939.38	-24.34	6939.4	-23.85	6939.4	-23.84	6939.46	-23.34	6939.45
-22.34	6939.45	-21.92	6939.44	-21.34	6939.44	-20.96	6939.43	-20.01	6939.43
-19.66	6939.42	-19.05	6939.42	-18.61	6939.41	-18.09	6939.41	-17.57	6939.4
-16.52	6939.4	-16.34	6939.39	-15.34	6939.39	-15.21	6939.38	-14.43	6939.41
-14.34	6939.41	-14.25	6939.42	-13.38	6939.64	-13.29	6939.65	-12.34	6939.89
-11.33	6940.14	-11.29	6940.16	-10.42	6940.37	-10.33	6940.39	-10.24	6940.42
-9.46	6940.61	-9.33	6940.64	-9.19	6940.68	-8.5	6940.85	-8.33	6940.89
-8.15	6940.94	-7.54	6941.09	-7.33	6941.14	-7.1	6941.2	-6.58	6941.33
-6.05	6941.46	-5.62	6941.57	-5.01	6941.72	-4.66	6941.81	-4.33	6941.89
-3.96	6941.99	-3.7	6942.05	-3.33	6942.14	-2.91	6942.22	-2.74	6942.29
-2.32	6942.36	-1.87	6942.36	-1.78	6942.46	-1.32	6942.46	-.83	6942.45
-.32	6942.45	.13	6942.44	1.09	6942.44	1.27	6942.43	2.32	6942.43
2.68	6942.42	3.37	6942.42	3.68	6942.41	4.68	6942.41	4.93	6942.4
5.68	6942.4	5.89	6942.39	6.85	6942.39	7.55	6942.38	7.8	6942.38
8.6	6942.37	8.76	6942.37	10.57	6942.35	10.69	6942.35	11.64	6942.34
12.69	6942.34	12.79	6942.33	13.83	6942.33	14.52	6942.32	14.88	6942.32
15.48	6942.31	15.93	6942.31	16.44	6942.3	16.97	6942.3	17.39	6942.29
18.35	6942.29	18.69	6942.28	19.31	6942.28	19.69	6942.27	20.7	6942.27
21.16	6942.26	21.7	6942.26	22.19	6942.25	22.7	6942.25	23.15	6942.24
24.11	6942.24	24.3	6942.23	25.34	6942.23	25.7	6942.22	26.39	6942.22
26.7	6942.21	27.7	6942.21	27.94	6942.2	28.7	6942.2	28.9	6942.17
29.53	6942.19	29.7	6942.17	29.86	6942.16	30.53	6942.14	30.58	6942.13
30.82	6942.13	31.61	6942.06	31.7	6942.06	31.79	6942.03	32.65	6941.78
32.76	6941.75	33.69	6941.48	34.21	6941.31	34.72	6941.16	35.66	6940.91
35.76	6940.88	36.62	6940.66	36.8	6940.61	37.59	6940.4	37.83	6940.34
38.87	6940.07	39.71	6939.85	39.91	6939.8	40.49	6939.65	40.94	6939.53
41.46	6939.4	41.71	6939.33	41.98	6939.26	42.42	6939.14	42.71	6939.07
43.02	6938.99	43.39	6938.89	43.71	6938.81	44.05	6938.72	44.71	6938.55
45.32	6938.39	46.29	6938.14	47.17	6937.91	47.26	6937.89	48.2	6937.64
48.23	6937.63	48.71	6937.51	49.19	6937.38	49.24	6937.37	49.71	6937.24
50.16	6937.14	50.28	6937.11	50.72	6937.01	87.86	6937.01	88.63	6937.03
88.74	6937.04	88.83	6937.06	89.67	6937.28	89.8	6937.32	90.71	6937.56
90.76	6937.57	91.74	6937.83	92.78	6938.1	93.66	6938.34	93.82	6938.38
94.63	6938.59	94.85	6938.65	95.6	6938.85	95.74	6938.88	96.56	6939.1
96.74	6939.15	97.53	6939.36	97.74	6939.41	97.96	6939.47	98.5	6939.61
98.74	6939.68	99	6939.74	99.47	6939.87	100.04	6940.02	100.74	6940.2
101.4	6940.38	101.74	6940.47	102.11	6940.56	103.15	6940.84	103.33	6940.89
103.74	6940.99	104.18	6941.11	104.3	6941.14	104.74	6941.26	105.22	6941.38
105.27	6941.4	105.74	6941.52	106.23	6941.65	106.26	6941.66	107.2	6941.91
107.29	6941.93	108.17	6942.16	108.75	6942.31	109.13	6942.42	109.37	6942.48
110.1	6942.67	110.4	6942.75	110.75	6942.84	111.07	6942.93	111.44	6943.02

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  111.75 6943.11  112.03 6943.18  112.48  6943.3  112.75 6943.37     113 6943.44
  113.52 6943.57  113.97 6943.69  114.55 6943.84  114.93 6943.95   115.9  6944.2
  116.63 6944.39  116.87 6944.45  117.66 6944.66  117.83 6944.71   118.7 6944.94
   118.8 6944.97  119.74 6945.21  119.77 6945.22  120.22 6945.34  120.77 6945.48
  121.81 6945.76  122.67 6945.98  122.75 6946.01  122.85 6946.03  123.64 6946.24
  123.88  6946.3  124.75 6946.53  124.92 6946.58  125.68 6946.78  125.76  6946.8
  125.96 6946.85  126.54    6947  126.76 6947.06  126.99 6947.11   127.5 6947.24
  127.76 6947.31  128.03 6947.37  128.47 6947.48  128.76 6947.56  129.07 6947.63
  129.44 6947.73  129.76 6947.81   130.1 6947.89   130.4 6947.97  130.76 6948.06
  131.14 6948.15  131.76 6948.31  132.34 6948.45  132.76 6948.56  133.21 6948.67
   133.3 6948.69  133.76 6948.81  134.25 6948.93  134.27 6948.94  134.76 6949.06
  135.29 6949.18  135.76 6949.29  136.32 6949.29  136.76  6949.3  141.04  6949.3
  141.51 6949.29   144.9 6949.29  145.65 6949.28  147.81 6949.28  148.76 6949.27
     150 6949.27

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
 -125.51    .035   31.61    .035  108.17    .035

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
         31.61  108.17            46.77   46.77   46.77             .1       .3
Ineffective Flow     num=       1
   Sta L   Sta R    Elev  Permanent
 -125.51   -2.53 6942.48       T

CROSS SECTION


RIVER: UT_BSC2
REACH: NCONFL-BGM         RS: 4200

INPUT
Description: Source: Revised Condition Topo
Datum: NGVD29
Coordinate System:
             NAVD88 Colorado State Planes Central, US Feet.
Station Elevation Data    num=     377
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
  -82.45 6943.36  -82.13 6943.36  -81.93 6943.31  -81.72 6943.26  -81.16 6943.12
  -80.93 6943.06  -80.69    6943  -80.18 6942.88  -79.93 6942.81  -79.66 6942.75
  -79.21 6942.63  -78.93 6942.56  -78.63 6942.49  -78.24 6942.39  -77.93 6942.31
   -77.6 6942.23  -77.27 6942.15  -76.93 6942.06  -76.57 6941.97  -76.29  6941.9
  -75.93 6941.81  -75.54 6941.72  -75.32 6941.66  -74.93 6941.56  -74.51 6941.46
  -74.35 6941.42  -73.93 6941.31  -73.48  6941.2  -73.37 6941.18  -72.93 6941.06
  -72.45 6940.95   -72.4 6940.93  -71.93 6940.81  -71.43 6940.69  -70.93 6940.56
  -70.46 6940.45   -70.4 6940.43  -69.93 6940.31  -69.48  6940.2  -69.37 6940.17
  -68.93 6940.06  -68.51 6939.96  -68.34 6939.92  -67.93 6939.81  -67.54 6939.72
  -67.31 6939.66  -66.93 6939.56  -66.56 6939.47  -66.28  6939.4  -65.93 6939.31
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-65.59	6939.29	-65.25	6939.27	-64.92	6939.25	-50.92	6939.25	-50.84	6939.26
-50.03	6939.28	-49.81	6939.28	-49.05	6939.29	-41.57	6939.29	-41.27	6939.3
-39.92	6939.3	-39.51	6939.27	-39.33	6939.28	-38.92	6939.26	-38.48	6939.25
-38.35	6939.26	-37.92	6939.25	-37.38	6939.25	-36.92	6939.24	-32.31	6939.24
-31.91	6939.23	-26.91	6939.23	-26.68	6939.22	-21.81	6939.22	-17.92	6939.21
-15.98	6939.21	-15.91	6939.2	-12.91	6939.2	-12.75	6939.12	-12.09	6938.79
-11.91	6938.7	-10.91	6938.7	-10.69	6938.77	-10.14	6938.94	-9.91	6939.02
-9.66	6939.06	-9.17	6939.15	-8.91	6939.2	-8.63	6939.2	-8.2	6939.21
-7.91	6939.21	-7.6	6939.22	-7.22	6939.22	-6.91	6939.23	-6.57	6939.23
-6.25	6939.24	-5.54	6939.24	-5.28	6939.25	-2.9	6939.25	-2.45	6939.36
-2.36	6939.39	-1.9	6939.5	-1.42	6939.62	-1.39	6939.63	-.9	6939.75
-.41	6939.87	-.39	6939.88	.1	6940	.56	6940.12	.64	6940.13
1.1	6940.25	1.53	6940.36	1.66	6940.39	2.1	6940.5	2.51	6940.6
2.69	6940.65	3.1	6940.75	3.48	6940.85	3.72	6940.91	4.1	6941
4.45	6941.09	4.75	6941.16	5.1	6941.25	5.42	6941.33	5.78	6941.42
6.1	6941.5	6.4	6941.57	6.81	6941.68	7.1	6941.75	7.37	6941.82
7.84	6941.94	8.1	6942	8.34	6942.06	8.87	6942.19	9.1	6942.25
9.32	6942.3	9.9	6942.45	10.1	6942.5	10.29	6942.55	10.93	6942.71
11.1	6942.75	11.26	6942.79	17.1	6943.41	19.04	6943.41	19.1	6943.42
21.22	6943.42	21.96	6943.43	23.28	6943.43	23.91	6943.44	26.11	6943.44
26.37	6943.45	28.11	6943.45	28.44	6943.46	30.11	6943.46	30.5	6943.47
31.68	6943.47	32.11	6943.48	32.57	6943.43	32.65	6943.48	33.11	6943.43
33.6	6943.33	33.62	6943.41	34.11	6943.3	34.59	6943.2	34.63	6943.19
35.11	6943.08	35.56	6942.98	35.66	6942.96	36.11	6942.86	36.53	6942.77
36.7	6942.73	36.8	6942.71	37.11	6942.64	37.5	6942.55	37.73	6942.5
38.11	6942.42	38.47	6942.34	38.76	6942.27	39.11	6942.19	39.44	6942.12
39.79	6942.04	40.11	6941.97	40.41	6941.91	40.83	6941.81	41.11	6941.75
41.38	6941.69	41.86	6941.58	42.11	6941.53	42.35	6941.47	42.89	6941.33
43.11	6941.28	43.32	6941.22	43.92	6941.07	44.11	6941.03	44.29	6940.98
44.96	6940.81	45.11	6940.78	45.26	6940.74	50.11	6939.53	50.12	6939.52
51.08	6939.28	51.12	6939.28	51.15	6939.27	52.05	6939.04	52.12	6939.03
52.19	6939.01	53.02	6938.8	53.12	6938.78	53.22	6938.75	53.99	6938.56
54.12	6938.53	54.25	6938.49	54.96	6938.31	55.12	6938.28	55.28	6938.23
55.93	6938.07	56.12	6938.03	56.32	6937.98	56.9	6937.83	57.12	6937.78
57.35	6937.72	57.87	6937.59	58.12	6937.53	58.38	6937.46	58.84	6937.35
59.12	6937.28	59.41	6937.2	59.81	6937.1	60.12	6937.03	60.45	6936.98
60.78	6936.92	61.12	6936.87	98.13	6936.87	98.62	6936.91	98.65	6936.92
99.14	6936.96	99.59	6937.07	99.68	6937.1	100.14	6937.21	100.56	6937.32
100.72	6937.36	101.14	6937.46	101.53	6937.56	101.75	6937.61	102.14	6937.71
102.5	6937.8	102.78	6937.87	103.14	6937.96	103.47	6938.04	103.81	6938.13
104.14	6938.21	104.44	6938.29	104.85	6938.39	105.14	6938.46	105.41	6938.53
105.88	6938.65	106.14	6938.71	106.38	6938.77	106.91	6938.91	107.14	6938.96
107.35	6939.02	107.95	6939.16	108.14	6939.21	108.32	6939.26	108.98	6939.42
109.14	6939.46	109.29	6939.5	110.01	6939.68	110.14	6939.71	110.26	6939.74
111.04	6939.94	111.14	6939.96	111.23	6939.99	112.08	6940.2	112.14	6940.21
112.2	6940.23	114.14	6940.71	115.11	6940.96	115.14	6940.96	115.17	6940.97
116.08	6941.2	116.14	6941.21	116.21	6941.23	117.05	6941.44	117.14	6941.46
117.24	6941.49	118.02	6941.68	118.14	6941.71	118.27	6941.75	118.99	6941.93

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  119.14 6941.96   119.3    6942  119.96 6942.17  120.14 6942.21  120.34 6942.26
  120.93 6942.41  121.14 6942.46  121.37 6942.52   121.9 6942.65  122.14 6942.71
   122.4 6942.78  122.87  6942.9  123.15 6942.96  123.43 6943.04  123.84 6943.14
  124.15 6943.21  124.47 6943.29  124.81 6943.38  125.15 6943.46   125.5 6943.55
  125.78 6943.62  126.15 6943.71  126.53 6943.81  126.75 6943.87  127.15 6943.96
  127.56 6944.07  127.72 6944.11  128.15 6944.21   128.6 6944.33  128.69 6944.35
  129.15 6944.46  129.63 6944.59  129.66 6944.59  130.15 6944.71  130.64 6944.84
  130.66 6944.84  131.15 6944.97  131.61 6945.08  131.69  6945.1  132.15 6945.21
  132.58 6945.32  132.73 6945.36  133.15 6945.47  133.55 6945.56  133.76 6945.62
  134.15 6945.72  134.52 6945.81  134.79 6945.88  135.15 6945.97  135.49 6946.05
  135.83 6946.13  136.15 6946.22  136.46 6946.29  136.86 6946.39  137.15 6946.47
  137.43 6946.53  137.89 6946.65  138.15 6946.72   138.4 6946.78  138.92 6946.91
  139.15 6946.97  139.37 6947.02  139.96 6947.17  140.15 6947.22  140.34 6947.26
  140.99 6947.43  141.15 6947.47  141.31  6947.5  142.02 6947.68  142.15 6947.72
  142.28 6947.75  142.76 6947.87  143.05 6947.95  143.15 6947.97  143.25    6948
  144.09 6948.32  144.15 6948.34  144.22 6948.36  145.12 6948.41  145.15 6948.41
  145.19 6948.42  147.13 6948.43  147.18 6948.43   148.1 6948.44  148.22 6948.44
  149.07 6948.45  150.14 6948.45

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
  -82.45    .035    36.8    .035  142.76    .035

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
          36.8  142.76            13.79   13.79   13.79             .1       .3
Ineffective Flow     num=       2
   Sta L   Sta R    Elev  Permanent
  -82.45      44 6945.81       T
     114  150.14 6945.81       T

CROSS SECTION


RIVER: UT_BSC2
REACH: NCONFL-BGM         RS: 4175

INPUT
Description: Source: Revised Condition Topo
Datum: NGVD29
Coordinate System:
             NAVD88 Colorado State Planes Central, US Feet.
Station Elevation Data    num=     487
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
 -114.99 6944.58 -114.85 6944.58 -114.38 6944.53 -114.32 6944.53 -113.85 6944.48
 -113.41 6944.43 -113.28 6944.42 -112.85 6944.37 -112.44 6944.33 -112.25 6944.31
 -111.85 6944.27 -111.47 6944.18 -111.21 6944.12 -110.85 6944.04 -110.51 6943.95
 -110.18 6943.87 -109.85 6943.79 -109.54 6943.71 -109.14 6943.61 -108.85 6943.54
 -108.57 6943.47 -108.11 6943.35 -107.85 6943.29  -107.6 6943.23 -107.07 6943.09
```

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-106.85 6943.04 -106.63 6942.98 -106.04 6942.83 -105.84 6942.79 -105.66 6942.74
   -105 6942.58 -104.84 6942.54  -104.7  6942.5 -103.97 6942.32 -103.84 6942.29
-103.73 6942.26 -102.93 6942.06 -102.84 6942.04 -102.76 6942.02  -101.9  6941.8
-101.84 6941.79 -101.79 6941.77 -100.86 6941.54 -100.84 6941.54 -100.82 6941.53
-100.27 6941.39  -99.86 6941.29  -99.84 6941.29  -99.83 6941.28  -98.89 6941.05
 -98.84 6941.04  -98.79 6941.02  -97.92 6940.81  -97.84 6940.79  -97.76 6940.76
 -96.95 6940.56  -96.84 6940.54  -96.72 6940.51  -95.98 6940.32  -95.84 6940.29
 -95.69 6940.25  -95.01 6940.08  -94.84 6940.04  -94.65 6939.99  -94.05 6939.84
 -93.84 6939.79  -93.62 6939.73  -93.08  6939.6  -92.84 6939.54  -92.58 6939.47
 -92.11 6939.35  -91.84 6939.29  -91.55 6939.28  -91.14 6939.26  -90.84 6939.25
 -83.83 6939.25   -83.4 6939.28  -83.27 6939.37  -82.83  6939.4  -82.43 6939.51
 -82.23 6939.56  -81.83 6939.66  -81.46 6939.75   -81.2 6939.82  -80.83 6939.91
 -80.49    6940  -80.16 6940.08  -79.83 6940.17  -79.52 6940.24  -79.13 6940.34
 -78.83 6940.42  -78.56 6940.49  -78.09 6940.61  -77.83 6940.67  -77.59 6940.73
 -77.06 6940.87  -76.83 6940.93  -76.62 6940.96  -76.02 6941.07  -75.83  6941.1
 -73.95  6941.1  -73.83 6941.11  -71.78 6941.11  -70.85 6941.12  -68.78 6941.12
 -67.91 6941.13  -65.83 6941.13  -65.67 6941.12     -65 6941.07  -64.82 6941.06
 -64.64 6941.01  -64.03 6940.86  -63.82 6940.81   -63.6 6940.75  -63.07 6940.62
 -62.82 6940.56  -62.57  6940.5   -62.1 6940.38  -61.82 6940.32  -61.53 6940.24
 -61.13 6940.14  -60.82 6940.07   -60.5 6939.99  -60.16 6939.91  -59.82 6939.82
 -59.46 6939.73  -59.19 6939.67  -58.82 6939.58  -58.43 6939.48  -58.22 6939.43
 -57.82 6939.33  -57.39 6939.26  -57.26 6939.32  -56.82 6939.25   -43.7 6939.25
  -42.9 6938.84  -42.81 6938.84  -42.73 6938.81  -41.86 6938.78  -41.81 6938.75
 -31.81 6938.75  -31.51 6939.12  -31.12  6939.1  -30.81 6939.49  -30.48 6939.29
 -30.15 6939.51  -29.81  6939.3  -29.44  6939.3  -29.18 6939.32  -28.81 6939.32
 -28.41 6939.38  -28.21 6939.47  -27.81 6939.53  -27.37 6939.64  -27.24 6939.67
 -26.81 6939.78  -26.34  6939.9  -26.27 6939.91  -25.81 6940.03  -25.31 6940.15
  -25.3 6940.15  -24.81 6940.28  -24.34  6940.4  -24.27 6940.41   -23.8 6940.53
 -23.37 6940.64  -23.23 6940.67   -22.8 6940.78   -22.2 6940.93   -21.8 6941.03
 -21.43 6941.12  -21.16 6941.19   -20.8 6941.28  -20.47 6941.36  -20.13 6941.45
  -19.8 6941.53   -19.5 6941.61  -19.09 6941.71   -18.8 6941.78  -18.53 6941.85
 -18.06 6941.96   -17.8 6942.03  -17.56 6942.09  -17.02 6942.22   -16.8 6942.28
 -16.59 6942.33  -15.99 6942.48   -15.8 6942.53  -15.63 6942.57  -14.95 6942.74
  -14.8 6942.78  -14.66 6942.82  -13.92    6943   -13.8 6943.03  -13.69 6943.06
 -12.88 6943.26   -12.8 6943.28  -12.72  6943.3  -11.85 6943.52   -11.8 6943.53
 -11.75 6943.54  -10.81 6943.78  -10.78 6943.78  -10.36 6943.89   -9.82 6944.02
   -9.8 6944.03   -9.78 6944.03   -8.85 6944.24    -8.8 6944.26   -8.74 6944.26
  -7.88  6944.3    -7.8 6944.31   -7.71 6944.31   -6.91 6944.35    -6.8 6944.36
  -6.67 6944.36   -5.94  6944.4    -5.8 6944.41   -5.64 6944.41   -4.98 6944.45
   -4.8 6944.46    -4.6 6944.47   -4.01  6944.5   -3.79 6944.51   -3.57 6944.52
  -3.04 6944.54   -2.79 6944.56   -2.53 6944.57   -2.07 6944.59   -1.79 6944.61
   -1.5 6944.62    -1.1 6944.64    -.79 6944.66    -.46 6944.67    -.13 6944.69
    .21 6944.71     .57 6944.71     .83 6944.72    1.21 6944.72    1.61 6944.63
    1.8 6944.58    2.21 6944.49    2.64 6944.38    2.77 6944.35    3.21 6944.25
   3.68 6944.14    3.74 6944.13    4.21 6944.02    4.71  6943.9    5.21 6943.78
   5.67 6943.67    5.75 6943.65    6.21 6943.55    6.64 6943.44    6.78 6943.41
   7.21 6943.31    7.61 6943.22    7.82 6943.17    8.21 6943.07    8.58 6942.99
   8.85 6942.92    9.21 6942.84    9.89 6942.68   10.21  6942.6   10.52 6942.53
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10.92	6942.44	11.21	6942.37	11.48	6942.31	11.96	6942.19	12.21	6942.14
12.45	6942.08	12.99	6941.95	13.21	6941.9	13.42	6941.86	14	6941.73
14.03	6941.72	14.21	6941.68	14.38	6941.65	15.08	6941.49	15.22	6941.46
15.34	6941.43	16.13	6941.26	16.22	6941.24	16.29	6941.22	17.18	6941.02
17.22	6941.02	17.25	6941.01	17.86	6940.87	18.2	6940.8	18.22	6940.8
18.24	6940.79	19.16	6940.59	19.22	6940.57	19.29	6940.55	20.11	6940.35
20.22	6940.32	20.34	6940.29	21.07	6940.11	21.22	6940.07	21.39	6940.03
22.02	6939.87	22.22	6939.82	22.44	6939.77	22.98	6939.63	23.22	6939.57
23.5	6939.5	23.93	6939.39	24.22	6939.32	24.55	6939.24	24.89	6939.16
25.23	6939.07	25.6	6938.98	25.84	6938.92	26.23	6938.82	26.65	6938.72
26.8	6938.68	27.23	6938.57	27.71	6938.45	27.75	6938.44	28.23	6938.32
28.7	6938.2	28.76	6938.19	29.23	6938.07	29.66	6937.96	29.81	6937.93
30.23	6937.82	30.61	6937.73	30.86	6937.66	31.23	6937.57	31.57	6937.49
31.91	6937.4	32.23	6937.32	32.52	6937.25	32.97	6937.14	33.23	6937.07
33.48	6937.01	34.02	6936.88	34.24	6936.83	71.67	6936.83	71.89	6936.84
72.28	6936.84	72.63	6936.93	72.95	6937.01	73.28	6937.09	73.58	6937.17
74	6937.27	74.28	6937.34	74.54	6937.4	75.05	6937.53	75.28	6937.59
75.49	6937.64	76.1	6937.79	76.28	6937.84	76.45	6937.88	77.15	6938.06
77.28	6938.09	77.4	6938.12	78.21	6938.32	78.28	6938.34	78.36	6938.36
79.26	6938.58	79.29	6938.59	79.31	6938.6	79.83	6938.72	80.27	6938.83
80.29	6938.84	80.31	6938.84	81.22	6939.07	81.29	6939.09	81.36	6939.11
82.18	6939.31	82.29	6939.34	82.41	6939.37	83.13	6939.55	83.29	6939.59
83.47	6939.63	84.08	6939.79	84.29	6939.84	84.52	6939.9	85.04	6940.03
85.29	6940.09	85.57	6940.16	85.99	6940.26	86.29	6940.34	86.95	6940.5
87.29	6940.59	87.67	6940.68	87.9	6940.74	88.3	6940.84	88.73	6940.95
88.86	6940.98	89.3	6941.09	89.78	6941.21	89.81	6941.22	90.3	6941.34
90.77	6941.46	90.83	6941.47	91.3	6941.59	91.72	6941.7	91.88	6941.74
92.3	6941.84	92.5	6941.89	92.68	6941.94	92.94	6941.99	93.3	6942.08
93.63	6942.16	93.99	6942.19	94.3	6942.27	94.59	6942.33	95.04	6942.52
95.3	6942.57	95.54	6942.62	96.09	6942.9	96.3	6942.94	96.5	6943.02
97.14	6943.3	97.31	6943.37	97.45	6943.43	98.2	6943.75	98.31	6943.79
98.41	6943.84	99.25	6944.19	99.31	6944.22	99.36	6944.24	100.3	6944.64
100.31	6944.64	100.32	6944.65	100.48	6944.72	101.27	6945.05	101.31	6945.07
101.35	6945.09	102.23	6945.46	102.31	6945.49	102.4	6945.53	103.18	6945.86
103.31	6945.92	103.46	6945.98	104.14	6946.27	104.31	6946.34	104.51	6946.43
105.09	6946.67	105.31	6946.77	105.56	6946.87	106.05	6947.08	106.32	6947.19
106.61	6947.32	107	6947.49	107.32	6947.61	107.66	6947.63	107.96	6947.81
108.32	6947.83	108.72	6947.84	108.91	6947.85	109.32	6947.86	109.77	6947.88
109.86	6947.88	110.32	6947.89	110.82	6947.91	111.32	6947.92	111.77	6947.93
111.87	6947.93	112.32	6947.95	112.93	6947.95	113.32	6947.96	113.68	6947.96
113.98	6947.97	114.64	6947.97	115.03	6947.98	116.08	6947.98	116.33	6947.99
117.33	6947.99	117.5	6948	118.46	6948	119.24	6948.01	119.41	6948.01
120.29	6948.02	121.14	6948.02	121.32	6948.03	122.39	6948.03	123.23	6948.04
123.45	6948.04	124.19	6948.05	124.5	6948.05	125.14	6948.06	126.1	6948.06
126.34	6948.07	126.86	6948.07						

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val

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 -114.99    .035      14    .035    92.5    .035

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
            14    92.5            15.93   15.93   15.93             .3       .5
Ineffective Flow     num=       2
   Sta L   Sta R    Elev  Permanent
 -114.99      30 6945.81       T
      76  126.86 6945.81       T

CROSS SECTION


RIVER: UT_BSC2
REACH: NCONFL-BGM         RS: 4150

INPUT
Description: Source: Revised Condition Topo
Datum: NGVD29
Coordinate System:
             NAVD88 Colorado State Planes Central, US Feet.
Station Elevation Data    num=     475
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
  -88.61 6944.46  -87.88 6944.46  -87.76 6944.45  -87.63 6944.45  -86.91 6944.41
  -86.76  6944.4   -86.6 6944.39  -85.94 6944.36  -85.76 6944.35  -85.56 6944.34
  -84.98  6944.3  -84.76 6944.29  -84.53 6944.28  -84.01 6944.21  -83.76  6944.2
   -83.5 6944.17  -83.04 6944.04  -82.76 6944.02  -82.46 6943.98  -82.07  6943.9
  -81.76 6943.86  -81.43 6943.81   -81.1 6943.76  -80.76 6943.71  -80.39 6943.66
  -80.13 6943.62  -79.76 6943.57  -79.36 6943.51  -79.16  6943.5  -78.76 6943.44
  -78.33  6943.4  -78.19  6943.4  -77.76 6943.35  -77.29 6943.32  -77.22 6943.29
  -76.76 6943.26  -76.26 6943.22  -76.25  6943.2  -75.76 6943.16  -75.28  6943.1
  -75.22 6943.11  -74.76 6943.05  -74.32    6943  -74.19 6942.99  -73.75 6942.94
  -73.35 6942.89  -73.16 6942.86  -72.75 6942.82  -72.38 6942.79  -72.12 6942.74
  -71.75 6942.72  -71.41 6942.71  -71.09  6942.7  -70.75 6942.69  -70.44 6942.69
  -70.06  6942.7  -68.75  6942.7   -68.5 6942.71  -66.95 6942.71  -66.75 6942.72
  -65.59 6942.72  -64.89 6942.73  -63.66 6942.73  -62.82 6942.74  -61.78 6942.74
  -61.75 6942.75  -60.72 6942.75  -59.78 6942.76  -58.68 6942.76  -57.84 6942.77
  -56.75 6942.77  -56.61 6942.78  -54.93 6942.78  -54.75 6942.79  -54.55 6942.81
  -53.96 6942.97  -53.75    6943  -53.51 6943.06     -53 6943.19  -52.75 6943.25
  -52.48 6943.29  -52.03 6943.35  -51.74 6943.39  -51.06 6943.39  -50.74  6943.4
  -48.15  6943.4  -47.74 6943.41  -45.24 6943.41  -44.74 6943.42  -42.33 6943.42
  -42.14 6943.43  -41.74 6943.43  -41.37 6943.39  -41.11 6943.35  -40.74 6943.31
   -40.4 6943.23  -39.74 6943.07  -39.43 6942.99  -39.04 6942.96  -38.74 6942.88
  -38.46 6942.88     -38 6942.89  -36.52 6942.89  -35.94  6942.9  -34.58  6942.9
  -33.87 6942.91  -32.84 6942.91  -32.74 6942.92  -31.67 6942.92  -30.77 6942.93
  -29.74 6942.93  -28.77 6942.94  -27.73 6942.94  -27.67 6942.95  -26.63 6942.95
  -25.86 6942.96  -24.56 6942.96  -23.92 6942.97  -22.73 6942.97   -22.5 6942.98
  -21.01 6942.98  -20.73 6942.99  -19.39 6942.99  -19.08    6943  -17.73    6943
  -17.33 6943.01  -17.14 6941.17  -16.73 6941.21  -16.29  6940.7  -16.17 6940.69
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-15.73	6940.17	-15.26	6940.82	-15.2	6940.22	-14.73	6940.89	-14.23	6940.96
-14.23	6940.5	-13.73	6940.56	-13.26	6940.61	-13.19	6940.98	-12.73	6941.04
-12.29	6941.1	-12.16	6941.25	-11.73	6941.31	-11.32	6941.37	-11.12	6941.17
-10.73	6941.22	-10.35	6941.35	-10.09	6941.54	-9.73	6941.67	-9.39	6943.05
-9.06	6941.76	-8.73	6943.06	-7.45	6943.06	-6.99	6943.07	-5.72	6943.07
-5.51	6943.08	-4.54	6943.08	-3.89	6943.09	-2.72	6943.09	-2.6	6943.1
-1.82	6943.12	-1.72	6943.12	-1.63	6943.13	-.78	6943.23	-.72	6943.23
-.66	6943.24	.25	6943.32	.31	6943.32	1.16	6943.4	1.28	6943.41
2.24	6943.49	2.28	6943.5	2.32	6943.5	3.21	6943.58	3.28	6943.58
3.35	6943.59	4.18	6943.66	4.28	6943.67	4.38	6943.69	4.65	6943.72
5.14	6943.79	5.28	6943.81	5.43	6943.83	6.1	6943.94	6.28	6943.97
6.48	6943.99	7.05	6944.1	7.28	6944.12	7.54	6944.12	8.01	6944.23
8.28	6944.24	8.59	6944.25	8.96	6944.27	9.29	6944.28	9.64	6944.29
9.92	6944.3	10.29	6944.31	10.69	6944.32	10.87	6944.32	11.29	6944.33
11.74	6944.35	11.83	6944.36	12.29	6944.37	12.78	6944.39	12.8	6944.39
13.29	6944.41	13.74	6944.43	13.85	6944.43	14.29	6944.45	14.69	6944.47
14.9	6944.48	15.29	6944.49	15.65	6944.51	15.95	6944.52	16.29	6944.53
16.6	6944.54	17.01	6944.56	17.29	6944.57	17.56	6944.58	18.06	6944.6
18.3	6944.61	18.51	6944.62	19.11	6944.65	19.3	6944.65	19.47	6944.66
20.16	6944.69	20.3	6944.7	20.42	6944.71	21.21	6944.74	21.3	6944.75
21.38	6944.74	22.27	6944.53	22.3	6944.53	22.33	6944.52	22.97	6944.4
23.29	6944.34	23.3	6944.34	23.32	6944.33	24.24	6944.2	24.3	6944.19
24.37	6944.18	25.2	6944.07	25.3	6944.05	25.42	6944.03	26.15	6943.93
26.3	6943.91	26.47	6943.88	27.11	6943.79	27.31	6943.77	27.53	6943.73
28.06	6943.66	28.31	6943.62	28.58	6943.58	29.01	6943.52	29.31	6943.48
29.63	6943.43	29.97	6943.38	30.31	6943.34	30.68	6943.28	30.92	6943.25
31.31	6943.19	31.73	6943.13	31.88	6943.11	32.31	6943.05	32.79	6942.98
32.83	6942.98	33.31	6942.91	33.79	6942.84	33.84	6942.83	34.31	6942.76
34.74	6942.7	34.89	6942.68	35.31	6942.62	35.7	6942.57	35.94	6942.53
36.32	6942.48	36.65	6942.43	37	6942.38	37.32	6942.34	37.61	6942.29
38.05	6942.23	38.32	6942.19	38.56	6942.16	39.1	6942.08	39.32	6942.05
39.52	6942.02	40.15	6941.93	40.32	6941.91	40.47	6941.89	41.2	6941.85
41.32	6941.83	41.43	6941.84	42.26	6941.85	42.38	6941.85	43.31	6941.9
43.34	6941.9	43.63	6941.94	44.29	6942.02	44.32	6942.03	44.36	6942.03
45.25	6942.14	45.33	6942.15	45.41	6942.16	46.2	6942.26	46.33	6942.28
46.46	6942.29	47.16	6942.38	47.33	6942.4	47.52	6942.43	48.11	6942.5
48.33	6942.53	48.57	6942.56	49.07	6942.62	49.33	6942.65	49.62	6942.69
50.02	6942.74	50.33	6942.78	50.67	6942.82	50.98	6942.86	51.33	6942.9
51.72	6942.95	51.93	6942.98	52.33	6943.03	52.78	6943.08	52.89	6942.76
53.33	6942.83	53.83	6942.55	53.84	6940.39	54.34	6940.21	54.8	6940.2
54.88	6937.45	55.34	6937.33	55.75	6937.23	55.93	6937.18	56.12	6937.13
56.34	6937.08	56.7	6936.99	56.98	6936.92	57.34	6936.83	57.66	6936.81
58.04	6936.8	58.34	6936.78	95.38	6936.78	95.85	6936.87	95.91	6936.89
96.38	6936.99	96.81	6937.09	96.96	6937.13	97.38	6937.24	97.76	6937.33
97.9	6939.55	98.02	6941.45	98.38	6941.66	98.72	6943.21	99.07	6941.62
99.38	6943.02	99.67	6943.48	100.12	6942.82	100.39	6943.22	100.63	6943.1
101.17	6943.16	101.39	6943.06	101.58	6943.05	102.23	6943.01	102.39	6943.01
102.54	6943	103.28	6942.95	103.39	6942.95	103.49	6942.94	104.33	6942.9

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  104.39 6942.89  104.45 6942.89  105.38 6942.84   105.4 6942.84  105.59 6942.83
  106.36 6942.78  106.43 6942.78  107.31 6942.73  107.39 6942.72  107.49 6942.72
  108.27 6942.68  108.39 6942.67  108.54 6942.66  109.22 6942.62   109.4 6942.61
  109.59  6942.6  110.17 6942.57   110.4 6942.56  110.64 6942.54  111.13 6942.52
   111.4  6942.5  111.69 6942.48  112.08 6942.46   112.4 6942.44  112.75 6942.42
  113.04 6942.41   113.4 6942.39   113.8 6942.37  113.99 6942.35   114.4 6942.33
  114.85  6942.4  114.95 6942.53   115.4  6942.6   116.4 6943.02  116.86 6943.21
  116.95 6943.25   117.4 6943.44  117.81 6943.61  118.01 6943.69  118.41 6943.86
  118.77 6944.01  119.06 6944.13  119.41 6944.28  119.72 6944.41  120.11 6944.58
  120.41  6944.7  120.68 6944.81  121.16 6945.02  121.41 6945.12  121.63 6945.22
  122.21 6945.46  122.41 6945.54  122.59 6945.62  123.27  6945.9  123.41 6945.96
  123.54 6946.02  124.32 6946.34   124.5 6946.42  125.37 6946.78  125.41  6946.8
  125.45 6946.82  126.25 6947.13  126.41 6947.19  126.41  6947.2  127.36 6947.24
  127.48 6947.24  128.32 6947.26  128.42 6947.26  128.53 6947.27  129.27 6947.29
  129.42 6947.29  129.58  6947.3  130.23 6947.31  130.42 6947.32  130.63 6947.32
  131.18 6947.33  131.68 6947.33  132.14 6947.34  132.74 6947.34  133.09 6947.35
  134.05 6947.35  134.42 6947.36     135 6947.36  135.42 6947.37  136.43 6947.37
  136.91 6947.38  137.43 6947.38  137.86 6947.39  138.82 6947.39  139.05  6947.4
   140.1  6947.4  140.43 6947.41  141.43 6947.41  141.68 6947.42  142.64 6947.42
  143.26 6947.43  143.59 6947.43  144.31 6947.44   145.5 6947.44  146.41 6947.45
   146.9 6947.45  147.41 6947.46  147.47 6947.46  148.37 6947.47     150 6947.47

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
  -88.61    .035   54.88    .013   97.76    .035

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
         54.88   97.76           125.43  125.43  125.43             .3       .5
Ineffective Flow     num=       2
   Sta L   Sta R    Elev  Permanent
  -88.61   52.34 6945.81       T
   98.18     150 6945.81       T

CULVERT


RIVER: UT_BSC2
REACH: NCONFL-BGM         RS: 4073

INPUT
Description: Source: Revised Condition Topo
Datum: NGVD29
Coordinate System:
             NAVD88 Colorado State Planes Central, US Feet.
Distance from Upstream XS =   39.21
Deck/Roadway Width        =   47.87
Weir Coefficient          =     2.6
Upstream  Deck/Roadway Coordinates
```

num= 116

Sta	Hi Cord	Lo Cord	Sta	Hi Cord	Lo Cord	Sta	Hi Cord	Lo Cord
-133.85	6948.14	0	-130.68	6948.06	0	-130.54	6948.05	0
-130.4	6948.05	0	-123.71	6947.88	0	-123.55	6947.87	0
-123.54	6947.87	0	-123.14	6947.86	0	-123.07	6947.86	0
-120.28	6947.79	0	-116.65	6947.7	0	-116.55	6947.7	0
-116.54	6947.7	0	-115.88	6947.68	0	-109.7	6947.53	0
-109.56	6947.53	0	-105.51	6947.44	0	-105.42	6947.43	0
-102.62	6947.37	0	-102.56	6947.37	0	-102.47	6947.37	0
-98.56	6947.28	0	-95.61	6947.22	0	-95.56	6947.22	0
-88.68	6947.07	0	-88.56	6947.07	0	-81.67	6946.93	0
-81.55	6946.93	0	-74.65	6946.8	0	-74.55	6946.8	0
-73.57	6946.78	0	-73.55	6946.78	0	-67.63	6946.68	0
-67.55	6946.68	0	-60.63	6946.57	0	-60.55	6946.56	0
-53.61	6946.46	0	-53.55	6946.46	0	-53.51	6946.46	0
-48.55	6946.39	0	-46.57	6946.36	0	-46.55	6946.36	0
-39.59	6946.27	0	-39.55	6946.27	0	-32.57	6946.18	0
-32.55	6946.18	0	-25.56	6946.11	0	-25.55	6946.11	0
-23.55	6946.08	0	-21.69	6946.07	0	-18.56	6946.04	0
-18.55	6946.04	0	-11.55	6945.97	0	-11.53	6945.97	0
-4.55	6945.92	0	-4.53	6945.92	0	1.45	6945.88	0
2.45	6945.87	0	2.49	6945.87	0	9.45	6945.83	0
9.5	6945.83	0	16.45	6945.8	0	16.52	6945.8	0
23.45	6945.77	0	23.48	6945.77	0	26.45	6945.76	0
30.39	6945.76	0	30.45	6945.76	0	30.54	6945.76	0
37.45	6945.75	0	41.66	6945.74	0	41.73	6945.74	0
41.78	6945.74	0	44.45	6945.74	0	44.57	6945.74	0
51.45	6945.75	0	51.58	6945.75	0	58.45	6945.76	0
58.6	6945.76	0	65.45	6945.79	0	65.61	6945.79	0
72.45	6945.81	0	72.55	6945.82	0	76.45	6945.83	0
79.37	6945.85	0	79.45	6945.85	0	79.64	6945.85	0
81.02	6945.86	0	86.45	6945.9	0	86.64	6945.9	0
93.45	6945.95	0	93.64	6945.95	0	100.45	6946.01	0
100.47	6946.01	0	101.45	6946.02	0	101.55	6946.02	0
105.26	6946.06	0	105.82	6946.06	0	126.45	6946.27	0
127.09	6946.27	0	151.45	6946.51	0	152.06	6946.52	0
176.45	6946.76	0	177.04	6946.77	0	201.45	6947.01	0
202.02	6947.02	0	213.4	6947.13	0	226.45	6947.26	0
226.99	6947.27	0	251.45	6947.51	0	251.95	6947.51	0
276.45	6947.76	0	276.9	6947.76	0	301.45	6948.01	0
301.86	6948.01	0	309.04	6948.08	0			

Upstream Bridge Cross Section Data

Station Elevation Data num= 475

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
-88.61	6944.46	-87.88	6944.46	-87.76	6944.45	-87.63	6944.45	-86.91	6944.41
-86.76	6944.4	-86.6	6944.39	-85.94	6944.36	-85.76	6944.35	-85.56	6944.34
-84.98	6944.3	-84.76	6944.29	-84.53	6944.28	-84.01	6944.21	-83.76	6944.2

-83.5	6944.17	-83.04	6944.04	-82.76	6944.02	-82.46	6943.98	-82.07	6943.9
-81.76	6943.86	-81.43	6943.81	-81.1	6943.76	-80.76	6943.71	-80.39	6943.66
-80.13	6943.62	-79.76	6943.57	-79.36	6943.51	-79.16	6943.5	-78.76	6943.44
-78.33	6943.4	-78.19	6943.4	-77.76	6943.35	-77.29	6943.32	-77.22	6943.29
-76.76	6943.26	-76.26	6943.22	-76.25	6943.2	-75.76	6943.16	-75.28	6943.1
-75.22	6943.11	-74.76	6943.05	-74.32	6943	-74.19	6942.99	-73.75	6942.94
-73.35	6942.89	-73.16	6942.86	-72.75	6942.82	-72.38	6942.79	-72.12	6942.74
-71.75	6942.72	-71.41	6942.71	-71.09	6942.7	-70.75	6942.69	-70.44	6942.69
-70.06	6942.7	-68.75	6942.7	-68.5	6942.71	-66.95	6942.71	-66.75	6942.72
-65.59	6942.72	-64.89	6942.73	-63.66	6942.73	-62.82	6942.74	-61.78	6942.74
-61.75	6942.75	-60.72	6942.75	-59.78	6942.76	-58.68	6942.76	-57.84	6942.77
-56.75	6942.77	-56.61	6942.78	-54.93	6942.78	-54.75	6942.79	-54.55	6942.81
-53.96	6942.97	-53.75	6943	-53.51	6943.06	-53	6943.19	-52.75	6943.25
-52.48	6943.29	-52.03	6943.35	-51.74	6943.39	-51.06	6943.39	-50.74	6943.4
-48.15	6943.4	-47.74	6943.41	-45.24	6943.41	-44.74	6943.42	-42.33	6943.42
-42.14	6943.43	-41.74	6943.43	-41.37	6943.39	-41.11	6943.35	-40.74	6943.31
-40.4	6943.23	-39.74	6943.07	-39.43	6942.99	-39.04	6942.96	-38.74	6942.88
-38.46	6942.88	-38	6942.89	-36.52	6942.89	-35.94	6942.9	-34.58	6942.9
-33.87	6942.91	-32.84	6942.91	-32.74	6942.92	-31.67	6942.92	-30.77	6942.93
-29.74	6942.93	-28.77	6942.94	-27.73	6942.94	-27.67	6942.95	-26.63	6942.95
-25.86	6942.96	-24.56	6942.96	-23.92	6942.97	-22.73	6942.97	-22.5	6942.98
-21.01	6942.98	-20.73	6942.99	-19.39	6942.99	-19.08	6943	-17.73	6943
-17.33	6943.01	-17.14	6941.17	-16.73	6941.21	-16.29	6940.7	-16.17	6940.69
-15.73	6940.17	-15.26	6940.82	-15.2	6940.22	-14.73	6940.89	-14.23	6940.96
-14.23	6940.5	-13.73	6940.56	-13.26	6940.61	-13.19	6940.98	-12.73	6941.04
-12.29	6941.1	-12.16	6941.25	-11.73	6941.31	-11.32	6941.37	-11.12	6941.17
-10.73	6941.22	-10.35	6941.35	-10.09	6941.54	-9.73	6941.67	-9.39	6943.05
-9.06	6941.76	-8.73	6943.06	-7.45	6943.06	-6.99	6943.07	-5.72	6943.07
-5.51	6943.08	-4.54	6943.08	-3.89	6943.09	-2.72	6943.09	-2.6	6943.1
-1.82	6943.12	-1.72	6943.12	-1.63	6943.13	-.78	6943.23	-.72	6943.23
-.66	6943.24	.25	6943.32	.31	6943.32	1.16	6943.4	1.28	6943.41
2.24	6943.49	2.28	6943.5	2.32	6943.5	3.21	6943.58	3.28	6943.58
3.35	6943.59	4.18	6943.66	4.28	6943.67	4.38	6943.69	4.65	6943.72
5.14	6943.79	5.28	6943.81	5.43	6943.83	6.1	6943.94	6.28	6943.97
6.48	6943.99	7.05	6944.1	7.28	6944.12	7.54	6944.12	8.01	6944.23
8.28	6944.24	8.59	6944.25	8.96	6944.27	9.29	6944.28	9.64	6944.29
9.92	6944.3	10.29	6944.31	10.69	6944.32	10.87	6944.32	11.29	6944.33
11.74	6944.35	11.83	6944.36	12.29	6944.37	12.78	6944.39	12.8	6944.39
13.29	6944.41	13.74	6944.43	13.85	6944.43	14.29	6944.45	14.69	6944.47
14.9	6944.48	15.29	6944.49	15.65	6944.51	15.95	6944.52	16.29	6944.53
16.6	6944.54	17.01	6944.56	17.29	6944.57	17.56	6944.58	18.06	6944.6
18.3	6944.61	18.51	6944.62	19.11	6944.65	19.3	6944.65	19.47	6944.66
20.16	6944.69	20.3	6944.7	20.42	6944.71	21.21	6944.74	21.3	6944.75
21.38	6944.74	22.27	6944.53	22.3	6944.53	22.33	6944.52	22.97	6944.4
23.29	6944.34	23.3	6944.34	23.32	6944.33	24.24	6944.2	24.3	6944.19
24.37	6944.18	25.2	6944.07	25.3	6944.05	25.42	6944.03	26.15	6943.93
26.3	6943.91	26.47	6943.88	27.11	6943.79	27.31	6943.77	27.53	6943.73
28.06	6943.66	28.31	6943.62	28.58	6943.58	29.01	6943.52	29.31	6943.48

29.63	6943.43	29.97	6943.38	30.31	6943.34	30.68	6943.28	30.92	6943.25
31.31	6943.19	31.73	6943.13	31.88	6943.11	32.31	6943.05	32.79	6942.98
32.83	6942.98	33.31	6942.91	33.79	6942.84	33.84	6942.83	34.31	6942.76
34.74	6942.7	34.89	6942.68	35.31	6942.62	35.7	6942.57	35.94	6942.53
36.32	6942.48	36.65	6942.43	37	6942.38	37.32	6942.34	37.61	6942.29
38.05	6942.23	38.32	6942.19	38.56	6942.16	39.1	6942.08	39.32	6942.05
39.52	6942.02	40.15	6941.93	40.32	6941.91	40.47	6941.89	41.2	6941.85
41.32	6941.83	41.43	6941.84	42.26	6941.85	42.38	6941.85	43.31	6941.9
43.34	6941.9	43.63	6941.94	44.29	6942.02	44.32	6942.03	44.36	6942.03
45.25	6942.14	45.33	6942.15	45.41	6942.16	46.2	6942.26	46.33	6942.28
46.46	6942.29	47.16	6942.38	47.33	6942.4	47.52	6942.43	48.11	6942.5
48.33	6942.53	48.57	6942.56	49.07	6942.62	49.33	6942.65	49.62	6942.69
50.02	6942.74	50.33	6942.78	50.67	6942.82	50.98	6942.86	51.33	6942.9
51.72	6942.95	51.93	6942.98	52.33	6943.03	52.78	6943.08	52.89	6942.76
53.33	6942.83	53.83	6942.55	53.84	6940.39	54.34	6940.21	54.8	6940.2
54.88	6937.45	55.34	6937.33	55.75	6937.23	55.93	6937.18	56.12	6937.13
56.34	6937.08	56.7	6936.99	56.98	6936.92	57.34	6936.83	57.66	6936.81
58.04	6936.8	58.34	6936.78	95.38	6936.78	95.85	6936.87	95.91	6936.89
96.38	6936.99	96.81	6937.09	96.96	6937.13	97.38	6937.24	97.76	6937.33
97.9	6939.55	98.02	6941.45	98.38	6941.66	98.72	6943.21	99.07	6941.62
99.38	6943.02	99.67	6943.48	100.12	6942.82	100.39	6943.22	100.63	6943.1
101.17	6943.16	101.39	6943.06	101.58	6943.05	102.23	6943.01	102.39	6943.01
102.54	6943	103.28	6942.95	103.39	6942.95	103.49	6942.94	104.33	6942.9
104.39	6942.89	104.45	6942.89	105.38	6942.84	105.4	6942.84	105.59	6942.83
106.36	6942.78	106.43	6942.78	107.31	6942.73	107.39	6942.72	107.49	6942.72
108.27	6942.68	108.39	6942.67	108.54	6942.66	109.22	6942.62	109.4	6942.61
109.59	6942.6	110.17	6942.57	110.4	6942.56	110.64	6942.54	111.13	6942.52
111.4	6942.5	111.69	6942.48	112.08	6942.46	112.4	6942.44	112.75	6942.42
113.04	6942.41	113.4	6942.39	113.8	6942.37	113.99	6942.35	114.4	6942.33
114.85	6942.4	114.95	6942.53	115.4	6942.6	116.4	6943.02	116.86	6943.21
116.95	6943.25	117.4	6943.44	117.81	6943.61	118.01	6943.69	118.41	6943.86
118.77	6944.01	119.06	6944.13	119.41	6944.28	119.72	6944.41	120.11	6944.58
120.41	6944.7	120.68	6944.81	121.16	6945.02	121.41	6945.12	121.63	6945.22
122.21	6945.46	122.41	6945.54	122.59	6945.62	123.27	6945.9	123.41	6945.96
123.54	6946.02	124.32	6946.34	124.5	6946.42	125.37	6946.78	125.41	6946.8
125.45	6946.82	126.25	6947.13	126.41	6947.19	126.41	6947.2	127.36	6947.24
127.48	6947.24	128.32	6947.26	128.42	6947.26	128.53	6947.27	129.27	6947.29
129.42	6947.29	129.58	6947.3	130.23	6947.31	130.42	6947.32	130.63	6947.32
131.18	6947.33	131.68	6947.33	132.14	6947.34	132.74	6947.34	133.09	6947.35
134.05	6947.35	134.42	6947.36	135	6947.36	135.42	6947.37	136.43	6947.37
136.91	6947.38	137.43	6947.38	137.86	6947.39	138.82	6947.39	139.05	6947.4
140.1	6947.4	140.43	6947.41	141.43	6947.41	141.68	6947.42	142.64	6947.42
143.26	6947.43	143.59	6947.43	144.31	6947.44	145.5	6947.44	146.41	6947.45
146.9	6947.45	147.41	6947.46	147.47	6947.46	148.37	6947.47	150	6947.47

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
-88.61	.035	54.88	.013	97.76	.035

```
Bank Sta: Left   Right    Coeff Contr.   Expan.
         54.88   97.76             .3       .5
Ineffective Flow     num=       2
   Sta L   Sta R    Elev  Permanent
  -88.61   52.34 6945.81       T
   98.18     150 6945.81       T

Downstream  Deck/Roadway Coordinates
    num=     116
     Sta Hi Cord Lo Cord     Sta Hi Cord Lo Cord     Sta Hi Cord Lo Cord
  -134.4 6948.14       0 -131.23 6948.06       0 -131.09 6948.05       0
 -130.95 6948.05       0 -124.26 6947.88       0  -124.1 6947.87       0
 -124.09 6947.87       0 -123.69 6947.86       0 -123.62 6947.86       0
 -120.83 6947.79       0  -117.2  6947.7       0  -117.1  6947.7       0
 -117.09  6947.7       0 -116.43 6947.68       0 -110.25 6947.53       0
 -110.11 6947.53       0 -106.06 6947.44       0 -105.97 6947.43       0
 -103.17 6947.37       0 -103.11 6947.37       0 -103.02 6947.37       0
  -99.11 6947.28       0  -96.16 6947.22       0  -96.11 6947.22       0
  -89.23 6947.07       0  -89.11 6947.07       0  -82.22 6946.93       0
   -82.1 6946.93       0   -75.2  6946.8       0   -75.1  6946.8       0
  -74.12 6946.78       0   -74.1 6946.78       0  -68.18 6946.68       0
   -68.1 6946.68       0  -61.18 6946.57       0   -61.1 6946.56       0
  -54.16 6946.46       0   -54.1 6946.46       0  -54.06 6946.46       0
   -49.1 6946.39       0  -47.12 6946.36       0   -47.1 6946.36       0
  -40.14 6946.27       0   -40.1 6946.27       0  -33.12 6946.18       0
   -33.1 6946.18       0  -26.11 6946.11       0   -26.1 6946.11       0
   -24.1 6946.08       0  -22.24 6946.07       0  -19.11 6946.04       0
   -19.1 6946.04       0   -12.1 6945.97       0  -12.08 6945.97       0
    -5.1 6945.92       0   -5.08 6945.92       0      .9 6945.88       0
     1.9 6945.87       0    1.94 6945.87       0     8.9 6945.83       0
    8.95 6945.83       0    15.9  6945.8       0   15.97  6945.8       0
    22.9 6945.77       0   22.93 6945.77       0    25.9 6945.76       0
   29.84 6945.76       0    29.9 6945.76       0   29.99 6945.76       0
    36.9 6945.75       0   41.11 6945.74       0   41.18 6945.74       0
   41.23 6945.74       0    43.9 6945.74       0   44.02 6945.74       0
    50.9 6945.75       0   51.03 6945.75       0    57.9 6945.76       0
   58.05 6945.76       0    64.9 6945.79       0   65.06 6945.79       0
    71.9 6945.81       0      72 6945.82       0    75.9 6945.83       0
   78.82 6945.85       0    78.9 6945.85       0   79.09 6945.85       0
   80.47 6945.86       0    85.9  6945.9       0   86.09  6945.9       0
    92.9 6945.95       0   93.09 6945.95       0    99.9 6946.01       0
   99.92 6946.01       0   100.9 6946.02       0     101 6946.02       0
  104.71 6946.06       0  105.27 6946.06       0   125.9 6946.27       0
  126.54 6946.27       0   150.9 6946.51       0  151.51 6946.52       0
   175.9 6946.76       0  176.49 6946.77       0   200.9 6947.01       0
  201.47 6947.02       0  212.85 6947.13       0   225.9 6947.26       0
  226.44 6947.27       0   250.9 6947.51       0   251.4 6947.51       0
```

```
   275.9 6947.76       0  276.35 6947.76       0   300.9 6948.01       0
  301.31 6948.01       0  308.49 6948.08       0

Downstream Bridge Cross Section Data
Station Elevation Data    num=      46
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
       0 6945.08    1.53 6945.06    2.48 6944.97    7.41 6944.75    7.51 6944.75
   12.38 6944.53   12.48 6944.52   12.61 6944.51   17.31 6944.29   21.85 6944.13
   26.23 6943.62    29.4 6943.25   31.77 6942.61   33.63 6942.27   53.17 6942.94
   53.28 6943.41   53.31 6943.51   53.54 6943.55   54.44 6943.69   54.56 6937.03
   54.58 6936.94   54.94 6936.85   56.79  6936.4   58.88  6936.4   74.51  6936.4
   75.79  6936.4   78.86  6936.4   94.79  6936.4   96.62 6936.85   96.98 6936.94
      97 6937.03   97.12  6943.7   97.32 6943.66   98.25 6943.52   98.28 6943.41
    98.4 6942.94  122.18 6943.21  124.52 6943.84  125.96 6943.87  127.43 6943.87
  129.25 6943.86  135.98 6944.11  140.37 6944.08  143.66  6944.1  147.99 6944.08
     150 6944.06

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
       0    .035   54.94    .013   96.62    .035

Bank Sta: Left   Right    Coeff Contr.   Expan.
         54.94   96.62             .3       .5
Ineffective Flow     num=       2
   Sta L   Sta R    Elev  Permanent
       0   54.39 6945.81       F
    96.9     150 6945.81       F

Upstream Embankment side slope              =       3 horiz. to 1.0 vertical
Downstream Embankment side slope            =       3 horiz. to 1.0 vertical
Maximum allowable submergence for weir flow =     .98
Elevation at which weir flow begins         =
Energy head used in spillway design         =
Spillway height used in design              =
Weir crest shape                            = Broad Crested

Number of Culverts =  1

Culvert Name     Shape      Rise    Span
Culvert #1           Box       6      16
FHWA Chart # 8 - flared wingwalls
FHWA Scale # 1 - Wingwall flared 30 to 75 deg.
Solution Criteria = Highest U.S. EG
Culvert Upstrm Dist  Length    Top n  Bottom n  Depth Blocked  Entrance Loss Coef
Exit Loss Coef
                  1     120     .011     .011        0                   .5
      1
Number of Barrels =  2
```

```
Upstream   Elevation =  6936.77
Centerline Stations
    Sta.    Sta.
      67    85.5
Downstream Elevation =  6936.41
Centerline Stations
    Sta.    Sta.
      67    85.5

CROSS SECTION


RIVER: UT_BSC2
REACH: NCONFL-BGM         RS: 4040

INPUT
Description: Source: Revised Condition Topo
Datum: NGVD29
Coordinate System:
             NAVD88 Colorado State Planes Central, US Feet.
Station Elevation Data    num=      46
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
       0 6945.08    1.53 6945.06    2.48 6944.97    7.41 6944.75    7.51 6944.75
   12.38 6944.53   12.48 6944.52   12.61 6944.51   17.31 6944.29   21.85 6944.13
   26.23 6943.62    29.4 6943.25   31.77 6942.61   33.63 6942.27   53.17 6942.94
   53.28 6943.41   53.31 6943.51   53.54 6943.55   54.44 6943.69   54.56 6937.03
   54.58 6936.94   54.94 6936.85   56.79  6936.4   58.88  6936.4   74.51  6936.4
   75.79  6936.4   78.86  6936.4   94.79  6936.4   96.62 6936.85   96.98 6936.94
      97 6937.03   97.12  6943.7   97.32 6943.66   98.25 6943.52   98.28 6943.41
    98.4 6942.94  122.18 6943.21  124.52 6943.84  125.96 6943.87  127.43 6943.87
  129.25 6943.86  135.98 6944.11  140.37 6944.08  143.66  6944.1  147.99 6944.08
     150 6944.06

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
       0    .035   54.94    .013   96.62    .035

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
         54.94   96.62             8.99    8.99    8.99             .3       .5
Ineffective Flow     num=       2
   Sta L   Sta R    Elev  Permanent
       0   54.39 6945.81       F
    96.9     150 6945.81       F

CROSS SECTION


RIVER: UT_BSC2
```

```
REACH: NCONFL-BGM         RS: 4030

INPUT
Description: Source: Revised Condition Topo
Datum: NGVD29
Coordinate System:
             NAVD88 Colorado State Planes Central, US Feet.
Station Elevation Data    num=      46
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
       0 6945.21    3.74 6945.15   11.79 6944.39   13.92  6944.3   14.57 6944.27
   17.27 6944.15   17.81 6944.09   18.55 6944.01   20.88  6943.9   23.14 6943.83
   25.31 6943.57   26.89 6943.39   38.91 6940.17   39.21 6940.11   42.35 6940.22
   42.37  6940.3   42.49 6940.73   43.44 6940.88   43.63 6940.91   43.65 6939.56
   43.77 6939.11   44.02 6939.05   54.92 6936.38   65.53 6936.38   72.11 6936.38
   73.92 6936.38   89.52 6936.38   92.92 6936.38  103.83 6939.05  104.07 6939.11
  104.19 6939.55  104.21 6940.91  105.19 6940.76  105.35 6940.74  105.47  6940.3
  105.49 6940.22  109.33 6940.27  121.26 6943.46  124.17 6943.53  126.92 6943.52
  130.05  6943.5  133.09 6943.49  136.04 6943.48  138.91 6943.46   141.7 6943.45
     150 6943.42

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
       0    .035   44.02     .04  103.83    .035

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
         44.02  103.83             39.8    30.2   21.92             .3       .5
Ineffective Flow     num=       2
   Sta L   Sta R    Elev  Permanent
       0   43.92 6945.81       F
  104.02     150 6945.81       F

CROSS SECTION


RIVER: UT_BSC2
REACH: NCONFL-BGM         RS: 4000

INPUT
Description: Source: Revised Condition Topo
Datum: NGVD29
Coordinate System:
             NAVD88 Colorado State Planes Central, US Feet.
Station Elevation Data    num=     456
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
       0 6944.51     .13 6944.51     .51 6944.49      .8 6944.47    1.01 6944.46
     1.7 6944.43    1.81 6944.43    1.89 6944.42    2.47 6944.39    2.77 6944.38
    2.88 6944.38    3.66 6944.34    3.83 6944.33    4.06 6944.32    4.54  6944.3
    4.84 6944.28    5.24 6944.26    5.42 6944.25    5.85 6944.23     6.3 6944.21
```

6.42	6944.21	6.86	6944.19	7.19	6944.17	7.6	6944.15	7.87	6944.14
8.07	6944.13	8.79	6944.09	8.95	6944.09	9.44	6944.07	9.83	6944.05
9.89	6944.05	9.97	6944.04	10.72	6944.02	10.9	6944.01	11.15	6944
11.6	6943.99	11.91	6943.97	12.33	6943.96	12.48	6943.95	12.92	6943.93
13.36	6943.92	13.51	6943.91	13.93	6943.9	14.25	6943.89	14.69	6943.87
14.94	6943.86	15.13	6943.86	15.88	6943.83	15.95	6943.83	16.01	6943.82
16.41	6943.8	16.89	6943.78	16.96	6943.78	17.06	6943.77	17.78	6943.72
17.97	6943.7	18.24	6943.68	18.66	6943.65	18.98	6943.63	19.42	6943.59
19.54	6943.59	19.99	6943.55	20.42	6943.52	20.6	6943.51	21.01	6943.47
21.31	6943.45	21.78	6943.42	22.02	6943.4	22.19	6943.38	22.97	6943.25
23.03	6943.25	23.07	6943.24	23.38	6943.16	23.95	6943.02	24.04	6943
24.15	6942.97	24.84	6942.8	25.05	6942.74	25.33	6942.67	25.72	6942.58
26.06	6942.49	26.51	6942.38	26.6	6942.36	27.07	6942.24	27.48	6942.13
27.69	6942.08	28.08	6941.99	28.37	6941.91	28.87	6941.79	29.09	6941.73
29.25	6941.69	30.05	6941.49	30.1	6941.48	30.13	6941.47	30.36	6941.42
31.01	6941.25	31.11	6941.23	31.24	6941.2	31.9	6941.03	32.12	6940.98
32.42	6940.9	32.78	6940.81	33.13	6940.73	33.6	6940.61	33.66	6940.59
34.14	6940.47	34.54	6940.37	34.78	6940.31	35.15	6940.22	35.37	6940.16
35.43	6940.15	35.96	6940.02	36.16	6939.97	36.31	6939.93	37.14	6939.72
37.17	6939.72	37.19	6939.71	37.33	6939.68	38.07	6939.49	38.18	6939.46
38.33	6939.43	38.96	6939.27	39.19	6939.21	39.51	6939.13	39.84	6939.05
40.2	6938.96	40.69	6938.84	40.72	6938.83	41.21	6938.71	41.6	6938.61
41.87	6938.55	42.22	6938.46	42.49	6938.39	43.05	6938.25	43.23	6938.21
43.37	6938.17	44.23	6937.96	44.24	6937.95	44.25	6937.95	44.3	6937.94
45.13	6937.73	45.25	6937.7	45.42	6937.66	46.02	6937.51	46.26	6937.45
46.6	6937.37	46.9	6937.29	47.27	6937.2	47.78	6937.07	48.29	6936.95
48.66	6936.85	48.96	6936.78	49.3	6936.7	49.55	6936.63	50.14	6936.48
50.31	6936.44	50.43	6936.42	51.27	6936.29	51.31	6936.28	63.67	6936.28
64.32	6936.29	88.7	6936.29	89.13	6936.37	89.26	6936.38	89.71	6936.46
90.14	6936.56	90.32	6936.61	90.72	6936.71	91.02	6936.78	91.5	6936.9
91.73	6936.96	91.91	6937	92.68	6937.2	92.74	6937.21	92.79	6937.22
93.11	6937.3	93.67	6937.44	93.75	6937.46	93.86	6937.49	94.55	6937.66
94.76	6937.72	95.04	6937.79	95.44	6937.88	95.77	6937.97	96.22	6938.08
96.32	6938.1	96.78	6938.22	97.2	6938.32	97.41	6938.38	97.79	6938.47
98.08	6938.54	98.59	6938.67	98.8	6938.72	98.97	6938.76	99.77	6938.96
99.81	6938.98	99.85	6938.98	100.08	6939.04	100.73	6939.2	100.82	6939.23
100.95	6939.26	101.61	6939.43	101.84	6939.48	102.13	6939.55	102.5	6939.65
102.85	6939.73	103.31	6939.85	103.38	6939.87	103.86	6939.99	104.26	6940.09
104.5	6940.15	104.87	6940.24	105.14	6940.31	105.68	6940.44	105.88	6940.49
106.03	6940.53	106.86	6940.74	106.89	6940.74	106.91	6940.75	107.05	6940.78
107.79	6940.97	107.9	6940.99	108.04	6941.03	108.67	6941.19	108.91	6941.25
109.22	6941.33	109.56	6941.41	109.92	6941.5	110.4	6941.62	110.44	6941.63
110.82	6941.72	110.93	6941.75	111.32	6941.85	111.59	6941.92	111.94	6942
112.2	6942.07	112.77	6942.21	112.95	6942.26	113.09	6942.29	113.95	6942.51
113.96	6942.51	114.03	6942.52	114.85	6942.73	114.97	6942.76	115.13	6942.77
115.73	6942.82	115.98	6942.84	116.31	6942.83	118.67	6942.83	119.01	6942.82
121.03	6942.82	121.91	6942.81	123.68	6942.81	124.06	6942.8	124.56	6942.8
124.58	6942.81	125.07	6942.8	125.44	6942.8	125.76	6942.81	125.91	6942.8

```
  126.67  6942.8  127.15 6942.79  128.21 6942.79   128.3 6942.78  129.27 6942.78
  129.74 6942.77  130.52 6942.77  131.09 6942.76  131.55 6942.76   132.1 6942.75
  132.45 6942.75  132.88 6942.74  133.67 6942.74  134.13 6942.73   134.8 6942.73
  135.24 6942.72  136.02 6942.72  136.42 6942.71  137.17 6942.71  137.59  6942.7
  138.38  6942.7   138.8 6942.69  139.67 6942.69  139.86 6942.68  140.92 6942.68
   141.3 6942.67  141.98 6942.67   142.3 6942.66  143.24 6942.66  143.87 6942.65
  144.09 6942.65  144.55 6942.64  145.44 6942.64  146.17 6942.63  146.28 6942.63
  147.02 6942.62   147.8 6942.62  148.33 6942.61  148.59 6942.61  149.32  6942.6
  150.16  6942.6  150.45 6942.59  151.05 6942.59  151.51 6942.58  152.51 6942.58
  152.57 6942.57  152.67 6942.55   153.3 6942.51  153.62 6942.43  154.08 6942.32
   154.3 6942.27  154.68 6942.18  154.87 6942.13   155.4    6942  155.65 6941.94
  155.74 6941.92  155.92 6941.88  156.44 6941.75   156.8 6941.66  157.22 6941.56
  157.55 6941.48  157.86 6941.41  158.01 6941.37  158.44 6941.27  158.79 6941.18
  158.92 6941.15  159.18 6941.09  159.58 6940.99  159.98  6940.9  160.36  6940.8
   160.8  6940.7  161.04 6940.64  161.15 6940.61  161.48 6940.53  161.94 6940.43
   162.1 6940.39  162.43 6940.32  162.72 6940.25  163.15 6940.15  163.51 6940.07
  164.05 6939.93  164.21  6939.9  164.29 6939.88  164.52 6939.82  165.08  6939.7
  165.27 6939.66  165.68 6939.57  165.86 6939.53  166.33 6939.43  166.65 6939.36
   167.3 6939.21  167.39  6939.2  167.43 6939.19  167.55 6939.16  168.22 6939.01
  168.45 6938.96  168.93 6938.87     169 6938.84  169.51 6938.74  169.79 6938.72
  170.55 6938.71  170.59 6938.71  171.36 6938.69  171.63 6938.68  172.14 6938.67
  172.18 6938.67  172.68 6938.66  172.93 6938.65  173.63 6938.64   173.8 6938.64
   174.5 6938.62   174.8 6938.61  175.28  6938.6  175.43  6938.6  175.86 6938.59
  176.07 6938.59  176.67 6938.65  176.86 6938.66  176.92 6938.67  177.05  6938.7
  177.64 6938.84  177.98 6938.92  178.43 6939.03  178.68 6939.09  179.04 6939.18
  179.21 6939.23  179.71 6939.35     180 6939.42   180.1 6939.45   180.3  6939.5
  180.78 6939.62  181.16 6939.71  181.57 6939.82  181.93 6939.91  182.21 6939.98
  182.35 6940.01  182.75 6940.11  183.14 6940.21  183.27 6940.24  183.55 6940.31
  183.92 6940.41  184.33 6940.51  184.71  6940.6  185.18 6940.72  185.39 6940.78
  185.49  6940.8  185.79 6940.87  186.28    6941  186.45 6941.04   186.8 6941.13
  187.06 6941.19  187.51 6941.31  187.85 6941.39  188.43 6941.54  188.57 6941.57
  188.63 6941.59  188.83 6941.64  189.42 6941.79  189.63 6941.84  190.05 6941.95
   190.2 6941.98  190.69  6942.1  190.99 6942.18  191.68 6942.35  191.74 6942.37
  191.78 6942.38  191.86  6942.4  192.56 6942.57   192.8 6942.62  193.31 6942.63
  193.35 6942.63  193.86 6942.64  194.13 6942.65   194.9 6942.66  194.93 6942.66
   195.7 6942.68  195.98 6942.68  196.49 6942.69  196.56  6942.7  197.04 6942.71
  197.27 6942.71  197.94 6942.73  198.18 6942.73  198.84 6942.74  199.16 6942.75
  199.63 6942.76  199.81 6942.76  200.22 6942.77  200.41 6942.78  200.98 6942.79
   201.2 6942.79  201.27  6942.8  201.43  6942.8  201.98 6942.81  202.33 6942.82
  202.62 6942.82

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
       0    .035   35.37    .035  110.82    .035

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
         35.37  110.82             85.66   85.66   85.66             .1       .3
Ineffective Flow     num=       1
```

```
   Sta L   Sta R    Elev  Permanent
  152.39  202.62  6942.6       T

CROSS SECTION


RIVER: UT_BSC2
REACH: NCONFL-BGM         RS: 3900

INPUT
Description: Source: Revised Condition Topo
Datum: NGVD29
Coordinate System:
             NAVD88 Colorado State Planes Central, US Feet.
Station Elevation Data    num=      33
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
       0  6943.2    2.46 6943.22   33.41 6939.86   35.37 6939.67    36.6 6939.52
   39.71 6939.33   45.47 6939.13   52.98 6938.93   58.14 6937.65   64.68 6936.04
   71.55 6936.03   73.66 6936.03   79.41 6936.03   80.98 6936.03   83.75 6936.03
    87.1 6936.03   90.85 6936.03   92.74 6936.02  103.06 6936.02  105.91 6936.73
  107.03 6937.01  109.59 6937.64  112.81 6937.65  113.66 6937.66  114.33 6937.66
   129.2 6937.61  148.46  6937.5  151.59 6937.21  153.38 6937.13  156.56 6937.91
  171.58 6942.04  176.24 6942.19  190.37 6942.59

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
       0    .035   52.98    .035  156.56    .035

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
         52.98  156.56             35.1    50.3   65.88             .1       .3

CROSS SECTION


RIVER: UT_BSC2
REACH: NCONFL-BGM         RS: 3850

INPUT
Description: Source: Revised Condition Topo
Datum: NGVD29
Coordinate System:
             NAVD88 Colorado State Planes Central, US Feet.
Station Elevation Data    num=      28
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
       0 6942.16    3.34 6941.79   16.12  6941.2    44.4 6939.51   45.87 6939.43
   46.22 6939.41   47.38 6939.35   48.21  6939.3   56.35 6937.27   61.02 6936.11
   61.91 6935.89   75.41 6935.88   79.35 6935.88   79.69 6935.88   80.96 6935.88
    82.4 6935.88   82.99 6935.88   90.23 6935.88  100.05 6935.88   104.3 6936.94
```

```
  105.69 6937.29  105.87 6937.35  108.18 6937.39  123.96  6937.2  133.88 6935.31
  149.05 6939.25  156.89 6941.24  161.79 6941.36

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
       0    .035   48.21    .035  149.05    .035

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
         48.21  149.05             37.4   50.43   64.11             .1       .3

CROSS SECTION


RIVER: UT_BSC2
REACH: NCONFL-BGM         RS: 3800

INPUT
Description: Source: Revised Condition Topo
Datum: NGVD29
Coordinate System:
             NAVD88 Colorado State Planes Central, US Feet.
Station Elevation Data    num=      26
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
       0 6940.08   23.83 6938.59   26.75  6938.1   27.41 6938.02   31.79 6937.43
   34.91 6936.64   39.02  6935.9    41.7 6935.42   43.32 6935.41   58.12    6935
   58.22 6934.99   63.76 6934.44   64.69 6934.35   66.28 6934.68   67.06    6935
   71.73 6935.38   75.33 6935.53   83.44 6937.16   88.43 6937.54   90.78 6938.12
   90.82 6938.12    93.1 6937.56  107.51 6934.66     127 6938.71   132.8 6939.83
     140 6940.13

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
       0     .05   23.83    .035   132.8     .05

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
         23.83   132.8           105.51  105.75  101.97             .1       .3

CROSS SECTION


RIVER: UT_BSC2
REACH: NCONFL-BGM         RS: 3694

INPUT
Description: Source: Revised Condition Topo
Datum: NGVD29
Coordinate System:
             NAVD88 Colorado State Planes Central, US Feet.
```

```
Station Elevation Data    num=      72
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
       0 6940.88     .22 6940.88     .38 6940.88    1.74 6940.88    3.43 6940.88
    5.58 6940.88    8.48 6940.89   12.64 6940.89   19.24  6940.9   25.41 6940.92
   26.35 6940.89   28.07 6940.83   29.17  6940.8   33.34 6940.67   33.38 6940.67
   34.69 6940.19   34.79 6940.16   35.87 6940.23   36.02 6940.24   43.86 6940.31
   51.84 6940.38   53.01 6940.34   54.76 6940.29   67.57 6939.93   68.11 6939.88
    68.8 6939.82   69.34 6940.01   70.19 6940.31   74.39 6940.35   75.42 6940.36
   77.88 6940.39   78.04 6940.39   95.74  6941.4   97.19 6941.48   98.79 6941.54
  102.02 6941.54  117.91 6940.64  148.27  6940.6  170.62 6940.45  189.38 6940.33
  192.77 6940.15  194.41 6940.08  209.54 6939.46  212.94 6939.43  215.23 6939.41
  216.13  6939.4  216.61  6939.4  218.04 6939.38  224.16 6939.37   224.8 6939.39
  230.17 6939.34  283.17 6938.28  321.32 6932.99  329.85 6931.81  330.75 6931.92
   335.9 6932.51  345.72 6933.69  350.66  6934.1  352.53 6934.05  367.38 6933.83
  391.71 6933.51  405.62 6933.21  419.98 6935.82  438.03 6938.72  493.39 6940.01
  515.83 6940.54  519.02 6940.59  553.64 6940.73  565.72 6940.78   567.7 6940.79
  567.83 6940.79  580.54 6940.92

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
       0     .05  283.17    .035  438.03     .05

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
        283.17  438.03            94.09   94.09   94.09             .1       .3

CROSS SECTION


RIVER: UT_BSC2
REACH: NCONFL-BGM         RS: 3600

INPUT
Description: Source: Revised Condition Topo
Datum: NGVD29
Coordinate System:
             NAVD88 Colorado State Planes Central, US Feet.
Station Elevation Data    num=      17
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
       0 6937.62     3.4 6937.62   12.79 6937.38   31.35 6936.43    41.1 6935.11
    72.3 6930.64   72.71 6930.58   85.12 6931.53   99.12 6932.37  109.14 6933.33
  125.17 6934.55  145.22 6931.88  153.89 6930.85  173.12 6935.35  181.06  6937.1
  185.24 6937.26  194.98 6937.42

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
       0     .05   12.79    .035  181.06     .05

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

```
         12.79  181.06           106.69  100.23  101.74             .1       .3

CROSS SECTION


RIVER: UT_BSC2
REACH: NCONFL-BGM         RS: 3500

INPUT
Description: Source: Revised Condition Topo
Datum: NGVD29
Coordinate System:
             NAVD88 Colorado State Planes Central, US Feet.
Station Elevation Data    num=      15
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
       0 6935.09   15.01 6935.25   28.58 6934.15   35.27  6933.7   49.03 6931.78
   74.87  6928.8   75.13 6928.82   88.97 6930.15   92.89 6930.24   97.98 6929.93
  111.92 6929.62  120.37 6928.86  136.63 6932.23  146.26 6934.93     150 6934.42

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
       0     .05   15.01    .035  146.26     .05

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
         15.01  146.26            39.01    50.1   61.55             .1       .3

CROSS SECTION


RIVER: UT_BSC2
REACH: NCONFL-BGM         RS: 3450

INPUT
Description: Source: Revised Condition Topo
Datum: NGVD29
Coordinate System:
             NAVD88 Colorado State Planes Central, US Feet.
Station Elevation Data    num=      15
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
       0 6934.04   12.09 6933.79   12.83 6933.78   16.91 6933.02   34.95 6931.31
   65.27 6928.75   75.11 6928.49   78.87 6928.39   88.93 6927.99   98.97 6930.78
  107.19 6932.75  109.55 6932.86  114.68  6933.1  140.81 6933.36     150 6933.46

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
       0     .05   12.09    .035  109.55     .05

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

```
         12.09  109.55            73.26  100.11  126.77             .1       .3

CROSS SECTION


RIVER: UT_BSC2
REACH: NCONFL-BGM         RS: 3350

INPUT
Description: Source: Revised Condition Topo
Datum: NGVD29
Coordinate System:
             NAVD88 Colorado State Planes Central, US Feet.
Station Elevation Data    num=      15
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
       0 6932.77     3.8 6932.72    5.77 6932.69    7.36  6932.6   35.04 6931.32
   58.71 6927.57   67.53 6926.42   69.95 6926.44   73.15 6926.54   81.57 6926.79
   98.39 6928.03  119.22 6929.56  143.64 6930.24  162.24 6930.68  169.23 6930.91

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
       0     .05   35.04    .035  162.24     .05

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
         35.04  162.24            69.29   50.21   21.13             .1       .3

CROSS SECTION


RIVER: UT_BSC2
REACH: NCONFL-BGM         RS: 3300

INPUT
Description: Source: Revised Condition Topo
Datum: NGVD29
Coordinate System:
             NAVD88 Colorado State Planes Central, US Feet.
Station Elevation Data    num=      15
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
       0 6931.17    1.46 6931.16   44.98 6930.18   48.76  6929.8   64.02 6925.77
   69.23 6924.78   72.51 6924.96   73.78 6925.03   84.98 6925.91  105.49 6927.36
   128.8 6929.31  141.49 6929.55  185.07 6931.08  185.49 6931.08     192 6931.06

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
       0     .05   44.98    .035   128.8     .05

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

```
         44.98   128.8            65.29   49.89   27.72             .1       .3

CROSS SECTION


RIVER: UT_BSC2
REACH: NCONFL-BGM         RS: 3250

INPUT
Description: Source: Revised Condition Topo
Datum: NGVD29
Coordinate System:
             NAVD88 Colorado State Planes Central, US Feet.
Station Elevation Data    num=      15
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
       0 6929.55    4.97 6929.53   22.77 6929.02   50.59 6928.45   55.37 6927.16
    70.4 6923.75   74.08 6924.06   77.53 6924.34   81.44 6924.74   88.07 6925.55
  122.82  6929.1  123.27 6929.11  155.02 6929.73  171.66 6930.38  173.05  6930.4

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
       0     .05   50.59    .035  122.82     .05

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
         50.59  122.82            50.17   50.17   50.17             .1       .3

CROSS SECTION


RIVER: UT_BSC2
REACH: NCONFL-BGM         RS: 3200

INPUT
Description: Source: Revised Condition Topo
Datum: NGVD29
Coordinate System:
             NAVD88 Colorado State Planes Central, US Feet.
Station Elevation Data    num=      14
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
       0 6928.69   16.79 6928.61   37.89 6927.96   47.88 6927.46   61.58  6925.2
   70.66 6923.44   75.17 6923.29   75.47 6923.28   79.54 6923.32  108.39 6927.73
  109.33 6927.91  114.48  6928.1  140.39 6929.05     150 6929.31

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
       0     .05   47.88    .035  109.33     .05

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

```
         47.88  109.33            50.08   50.08   50.08             .1       .3

CROSS SECTION


RIVER: UT_BSC2
REACH: NCONFL-BGM         RS: 3150

INPUT
Description: Source: Revised Condition Topo
Datum: NGVD29
Coordinate System:
             NAVD88 Colorado State Planes Central, US Feet.
Station Elevation Data    num=      13
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
       0 6927.49   22.24 6926.88   45.77 6926.19   52.94 6924.92   62.61 6923.15
   75.17 6923.39   82.58 6923.53    93.8 6923.61  101.67 6925.21  106.55 6926.24
  133.38 6928.12  144.02 6928.52     150  6928.6

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
       0     .05   45.77    .035  106.55     .05

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
         45.77  106.55            40.98   49.96   61.22             .1       .3

CROSS SECTION


RIVER: UT_BSC2
REACH: NCONFL-BGM         RS: 3100

INPUT
Description: Source: Revised Condition Topo
Datum: NGVD29
Coordinate System:
             NAVD88 Colorado State Planes Central, US Feet.
Station Elevation Data    num=      18
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
       0 6928.05   38.05 6927.43    43.4 6927.16   93.94 6925.45   95.21 6925.41
   96.15 6925.26  113.08 6921.99  125.32 6922.51  127.87 6922.54  149.07 6922.79
  160.41 6924.83  162.73 6925.31  174.68 6926.23  189.47 6927.42  191.56 6927.56
  191.58 6927.56  193.94 6927.59  200.66 6927.61

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
       0     .05   95.21    .035  162.73     .05
```

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
95.21	162.73	33.13	33.13	33.13	.1	.3

CROSS SECTION

RIVER: UT_BSC2
REACH: NCONFL-BGM RS: 3050

INPUT
Description: Source: Revised Condition Topo
Datum: NGVD29
Coordinate System:
NAVD88 Colorado State Planes Central, US Feet.
Station Elevation Data num= 418

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
-3.6	6927.2	-3.5	6927.2	-3.11	6927.18	-2.56	6927.15	-2.48	6927.15
-1.62	6927.1	-1.52	6927.1	-1.41	6927.09	-.68	6927.06	-.52	6927.05
-.34	6927.04	.26	6927.02	.48	6927.01	.73	6927	1.2	6926.99
1.48	6926.98	1.8	6926.97	2.14	6926.96	2.49	6926.95	2.88	6926.93
3.08	6926.92	3.49	6926.91	3.95	6926.9	4.02	6926.89	4.49	6926.88
4.96	6926.86	5.02	6926.86	5.34	6926.85	5.49	6926.84	5.93	6926.83
6.05	6926.83	6.49	6926.81	6.91	6926.8	7.07	6926.79	7.49	6926.78
7.89	6926.77	8.09	6926.76	8.49	6926.75	8.87	6926.73	9.11	6926.73
9.49	6926.71	9.85	6926.7	10.13	6926.69	10.49	6926.68	10.84	6926.67
11.15	6926.66	11.49	6926.65	11.82	6926.64	12.17	6926.62	12.49	6926.61
12.8	6926.6	13.19	6926.59	13.49	6926.58	13.78	6926.57	14.21	6926.56
14.49	6926.55	14.76	6926.54	15.23	6926.52	15.49	6926.52	15.75	6926.51
16.24	6926.49	16.49	6926.48	16.75	6926.47	17.24	6926.46	17.49	6926.45
17.75	6926.44	18.24	6926.43	18.49	6926.42	18.75	6926.41	19.24	6926.39
19.49	6926.39	19.75	6926.38	20.24	6926.36	20.49	6926.35	20.75	6926.34
21.24	6926.33	21.49	6926.32	21.63	6926.32	21.74	6926.31	22.26	6926.3
22.49	6926.29	22.71	6926.28	23.29	6926.26	23.49	6926.25	23.68	6926.25
24.32	6926.23	24.49	6926.22	24.65	6926.22	25.36	6926.19	25.49	6926.19
25.62	6926.18	26.39	6926.16	26.49	6926.15	26.59	6926.15	29.49	6926.06
29.5	6926.06	30.46	6926.02	30.53	6926.02	31.43	6925.99	31.57	6925.99
32.4	6925.96	32.5	6925.96	32.6	6925.95	33.37	6925.93	33.47	6925.92
33.5	6925.92	33.96	6925.91	34.12	6925.9	34.68	6925.88	34.85	6925.87
35.12	6925.86	35.57	6925.85	35.85	6925.84	36.3	6925.82	37.02	6925.79
37.04	6925.79	37.75	6925.75	38.21	6925.72	38.47	6925.71	38.86	6925.69
39.19	6925.67	39.42	6925.66	39.92	6925.63	41.36	6925.55	41.82	6925.53
42.08	6925.52	42.46	6925.49	42.8	6925.48	43.02	6925.46	43.52	6925.44
44.96	6925.36	45.43	6925.34	45.68	6925.32	46.06	6925.3	46.4	6925.28
46.63	6925.27	47.13	6925.24	48.57	6925.17	48.62	6925.17	49.04	6925.14
49.29	6925.12	49.66	6925.06	50.01	6925.01	50.24	6924.96	50.73	6924.85
52.17	6924.54	52.64	6924.44	52.89	6924.39	53.26	6924.31	53.61	6924.23
53.85	6924.18	54.33	6924.07	55.78	6923.76	56.25	6923.66	56.5	6923.61
56.86	6923.53	57.22	6923.45	57.46	6923.4	57.94	6923.3	59.38	6922.98

59.86	6922.89	60.1	6922.84	60.46	6922.77	60.82	6922.7	61.06	6922.65
61.54	6922.56	62.26	6922.42	62.27	6922.42	62.99	6922.28	63.47	6922.19
63.71	6922.14	64.06	6922.07	64.43	6922	64.67	6921.96	65.15	6921.86
65.86	6921.73	65.87	6921.73	65.87	6921.72	65.89	6921.72	66.59	6921.59
67.08	6921.49	67.31	6921.45	67.66	6921.42	68.03	6921.38	68.75	6921.38
69.46	6921.39	69.51	6921.39	70.19	6921.4	70.68	6921.4	70.92	6921.41
71.64	6921.41	71.89	6921.42	72.36	6921.42	73.06	6921.43	73.14	6921.43
73.8	6921.44	74.52	6921.44	74.86	6921.45	75.49	6921.45	75.96	6921.46
76.66	6921.46	76.68	6921.47	77.4	6921.47	77.9	6921.48	78.46	6921.48
78.85	6921.49	79.57	6921.49	80.26	6921.5	80.38	6921.5	81.01	6921.51
81.51	6921.51	81.73	6921.52	82.45	6921.52	82.71	6921.53	83.17	6921.53
83.86	6921.54	84.01	6921.54	84.61	6921.55	85.33	6921.55	85.66	6921.56
86.32	6921.56	86.78	6921.57	87.46	6921.58	88.22	6921.58	88.72	6921.59
89.26	6921.59	89.66	6921.6	90.38	6921.6	91.06	6921.61	91.25	6921.61
91.82	6921.62	92.33	6921.62	92.54	6921.63	93.26	6921.63	93.53	6921.64
93.99	6921.64	94.66	6921.65	94.87	6921.65	95.43	6921.66	95.94	6921.66
96.15	6921.67	96.46	6921.67	96.87	6921.68	97.14	6921.68	97.59	6921.7
98.26	6921.71	98.5	6921.71	99.03	6921.73	99.54	6921.74	99.75	6921.74
100.06	6921.75	100.47	6921.76	100.75	6921.77	101.19	6921.78	101.86	6921.8
101.95	6921.8	102.12	6921.81	102.64	6921.82	103.15	6921.83	103.36	6921.84
103.66	6921.85	104.08	6921.86	104.35	6921.89	104.8	6921.98	105.46	6922.1
105.52	6922.11	105.56	6922.12	105.74	6922.15	106.24	6922.23	106.67	6922.3
107.04	6922.37	107.34	6922.42	107.68	6922.47	107.96	6922.52	108.45	6922.6
108.68	6922.64	108.88	6922.67	109.55	6922.78	109.69	6922.81	109.8	6922.83
110.66	6922.97	110.69	6922.97	110.72	6922.98	111.04	6923.03	111.64	6923.13
111.69	6923.14	111.76	6923.15	112.56	6923.28	112.7	6923.31	112.86	6923.34
113.48	6923.44	113.7	6923.47	113.97	6923.52	114.4	6923.59	114.71	6923.64
115.07	6923.7	115.32	6923.74	115.71	6923.81	116.18	6923.89	116.24	6923.9
116.71	6923.98	117.16	6924.05	117.28	6924.07	117.72	6924.14	118.08	6924.2
118.38	6924.25	118.72	6924.31	119.01	6924.36	119.49	6924.44	119.73	6924.48
119.93	6924.51	120.59	6924.62	120.73	6924.64	120.85	6924.66	121.7	6924.77
121.73	6924.77	121.77	6924.78	122.12	6924.8	122.13	6924.8	122.69	6924.84
122.8	6924.84	123.61	6924.9	123.74	6924.91	123.9	6924.92	124.53	6924.96
124.75	6924.97	125.01	6924.99	125.45	6925.02	125.75	6925.04	126.11	6925.07
126.37	6925.08	126.75	6925.11	127.22	6925.14	127.29	6925.15	127.76	6925.18
128.21	6925.21	128.32	6925.21	128.76	6925.24	129.13	6925.27	129.42	6925.29
129.77	6925.31	130.05	6925.33	130.53	6925.36	130.77	6925.38	130.97	6925.39
131.63	6925.44	131.78	6925.44	131.89	6925.45	132.74	6925.51	132.81	6925.51
133.21	6925.54	133.74	6925.58	133.84	6925.58	134.66	6925.64	134.79	6925.65
134.94	6925.66	135.58	6925.7	135.79	6925.71	136.05	6925.73	136.5	6925.76
136.8	6925.78	137.15	6925.8	137.42	6925.82	137.8	6925.85	138.26	6925.88
138.34	6925.88	138.8	6925.91	139.26	6925.94	139.36	6925.95	139.81	6925.98
140.18	6926.01	140.46	6926.03	140.81	6926.05	141.1	6926.07	141.57	6926.1
141.82	6926.12	142.02	6926.13	142.67	6926.17	142.82	6926.18	142.94	6926.19
143.78	6926.25	143.86	6926.25	144.29	6926.28	144.78	6926.31	144.83	6926.32
144.88	6926.32	145.7	6926.38	145.83	6926.38	145.99	6926.39	146.62	6926.44
146.84	6926.45	147.09	6926.47	147.54	6926.5	147.84	6926.52	148.19	6926.54
148.47	6926.56	148.84	6926.59	149.3	6926.62	149.39	6926.62	149.85	6926.65

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  150.31 6926.66   150.4 6926.67  150.85 6926.67  151.23 6926.68  151.51 6926.68
  151.86 6926.69  152.15  6926.7  152.61  6926.7  152.86 6926.71  153.07 6926.71
  153.71 6926.72  153.86 6926.72  153.99 6926.73  154.82 6926.74  154.91 6926.74
  155.37 6926.75  155.83 6926.76  156.25 6926.76

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
    -3.6    .035   48.62    .035  122.13    .035

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
         48.62  122.13            75.27   75.27   75.27             .1       .3

CROSS SECTION


RIVER: UT_BSC2
REACH: NCONFL-BGM         RS: 3000

INPUT
Description: Source: Revised Condition Topo
Datum: NGVD29
Coordinate System:
             NAVD88 Colorado State Planes Central, US Feet.
Station Elevation Data    num=     492
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
   -86.1 6927.39  -84.34 6927.39  -83.81  6927.4  -81.57  6927.4  -81.28 6927.41
  -79.24 6927.41  -78.91 6927.42  -76.57 6927.42  -76.18 6927.38  -75.97 6927.43
  -75.57 6927.38  -69.57 6927.38   -69.1 6927.39  -69.04 6927.38  -68.57 6927.39
  -68.12 6927.42  -68.02 6927.38  -67.57 6927.41  -67.14 6927.42     -67 6927.41
  -66.57 6927.42  -65.98 6927.42  -65.57 6927.41   -64.2 6927.41  -63.94  6927.4
  -62.57  6927.4  -62.23 6927.39  -60.88 6927.39  -60.57 6927.38  -59.29 6927.38
  -58.84 6927.37  -57.82 6927.37  -57.57 6927.36  -56.57 6927.36  -56.35 6927.35
  -55.37 6927.35  -54.76 6927.34  -53.74 6927.34  -53.57 6927.33  -52.43 6927.33
  -50.68 6927.31  -49.57 6927.31  -49.48  6927.3   -48.5  6927.3   -46.6 6927.28
  -45.56 6927.28  -45.06 6927.27  -44.56 6927.27  -42.62 6927.25  -41.64 6927.25
  -41.57 6927.24  -40.65 6927.24  -40.57 6927.23  -39.67 6927.23  -39.57 6927.22
  -38.69 6927.22  -38.57 6927.21  -37.71 6927.21  -37.57  6927.2  -36.73  6927.2
  -36.57 6927.19  -35.75 6927.19  -35.57 6927.18  -34.77 6927.18  -34.57 6927.17
  -33.79 6927.17  -33.57 6927.16  -32.81 6927.16  -32.57 6927.15  -31.83 6927.15
  -31.57 6927.14  -30.85 6927.14  -30.57 6927.13  -29.87 6927.13  -29.57 6927.12
  -28.88 6927.12  -28.57 6927.11   -27.9 6927.11  -27.57  6927.1  -26.92  6927.1
  -26.57 6927.09  -25.94 6927.09  -25.57 6927.08  -24.96 6927.08  -24.57 6927.07
  -23.98 6927.07  -23.57 6927.06     -23 6927.06  -22.57 6927.05  -22.02 6927.05
  -21.57 6927.04  -21.04 6927.04  -20.57 6927.03  -20.06 6927.03  -19.57 6927.02
  -19.06 6927.02  -18.57 6927.01  -18.04 6927.01  -17.57    6927  -17.01    6927
  -16.57 6926.99  -15.99 6926.99  -15.57 6926.98  -14.97 6926.98  -14.57 6926.97
  -13.95 6926.97  -13.56 6926.96  -12.93 6926.96  -12.56 6926.95  -11.91 6926.95
  -11.56 6926.94  -10.89 6926.94  -10.56 6926.93   -9.87 6926.93   -9.56 6926.92
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-8.85	6926.92	-8.56	6926.91	-7.83	6926.91	-7.56	6926.9	-6.81	6926.9
-6.56	6926.89	-5.79	6926.89	-5.56	6926.88	-4.77	6926.88	-4.56	6926.87
-3.75	6926.87	-3.56	6926.86	-2.73	6926.86	-2.4	6926.85	2.37	6926.8
2.5	6926.79	3.39	6926.79	3.44	6926.78	4.44	6926.77	4.47	6926.76
5.43	6926.67	5.89	6926.62	6.31	6926.59	6.49	6926.6	7.02	6926.59
7.06	6926.58	7.6	6926.58	8.24	6926.57	8.56	6926.53	9.14	6926.48
9.82	6926.41	10.56	6926.35	12.03	6926.2	12.31	6926.18	13.39	6926.07
13.81	6926.04	14.25	6925.99	14.56	6925.97	15.36	6925.88	16.06	6925.83
17.52	6925.69	18.31	6925.62	19.06	6925.56	20.9	6925.4	22.01	6925.3
22.15	6925.28	22.81	6925.23	24.22	6925.1	25.06	6925.03	25.33	6925
26.12	6924.93	26.56	6924.9	26.79	6924.87	28.24	6924.75	30.3	6924.56
31.05	6924.5	31.43	6924.46	31.98	6924.42	34.2	6924.22	34.8	6924.17
36.41	6924.02	36.73	6924	37.34	6923.94	37.8	6923.9	38.63	6923.83
40.05	6923.7	42.3	6923.46	43.03	6923.39	43.8	6923.3	44.17	6923.27
45.22	6923.16	45.35	6923.14	46.05	6923.07	47.34	6922.93	47.5	6922.92
48.3	6922.83	49.05	6922.76	49.46	6922.71	49.99	6922.66	50.82	6922.55
51.3	6922.5	51.93	6922.41	52.8	6922.3	53.04	6922.26	54.3	6922.09
55.25	6921.95	56.55	6921.77	58.05	6921.57	58.58	6921.49	60.07	6921.29
60.8	6921.18	61.59	6921.08	61.9	6921.03	63.3	6920.84	64.12	6920.72
64.32	6920.71	64.8	6920.66	65.55	6920.64	66.22	6920.61	66.44	6920.61
67.05	6920.58	67.8	6920.56	69.3	6920.5	70.68	6920.46	71.55	6920.43
71.88	6920.43	72.8	6920.41	72.99	6920.4	73.8	6920.39	74.93	6920.36
75.3	6920.36	76.05	6920.48	78.53	6921.04	79.17	6921.19	80.14	6921.4
80.55	6921.5	82.05	6921.83	82.46	6921.93	82.8	6922	84.07	6922.29
85.54	6922.62	86.28	6922.79	87.1	6922.97	87.39	6923.04	88.05	6923.18
89.78	6923.57	90.3	6923.67	91.05	6923.83	91.8	6923.91	92.55	6923.92
93.23	6923.94	93.3	6923.94	95.55	6923.97	97.37	6924.01	97.8	6924.01
98.7	6924.03	99.58	6924.04	100.39	6924.06	100.69	6924.06	101.55	6924.08
102.3	6924.09	102.51	6924.1	103.34	6924.11	105.12	6924.14	107.34	6924.18
108.3	6924.2	110.29	6924.23	110.54	6924.24	111	6924.24	111.77	6924.26
112.04	6924.26	113.99	6924.3	114.93	6924.31	115.79	6924.33	117.37	6924.35
118.04	6924.37	119.57	6924.39	120.29	6924.41	120.64	6924.41	121.61	6924.43
122.54	6924.44	123.29	6924.46	123.96	6924.47	124.79	6924.48	125.54	6924.5
126.53	6924.51	127.29	6924.53	128.4	6924.55	128.85	6924.55	129.5	6924.57
130.04	6924.57	130.1	6924.58	130.61	6924.58	132.83	6924.62	133.04	6924.63
133.49	6924.63	133.79	6924.64	134.54	6924.65	135.29	6924.67	135.81	6924.67
136.47	6924.69	136.79	6924.69	138.13	6924.72	138.59	6924.72	139.48	6924.74
139.79	6924.74	140.45	6924.76	140.71	6924.76	141.69	6924.78	142.04	6924.78
142.77	6924.8	144.96	6924.83	145.09	6924.84	146.13	6924.85	147.08	6924.87
147.41	6924.87	148.35	6924.89	148.79	6924.89	149.68	6924.91	150.57	6924.92
151.43	6924.94	151.95	6924.94	152.8	6924.96	153.27	6924.96	153.92	6924.98
155.81	6925	156.49	6925.02	157.01	6925.02	157.75	6925.04	158.37	6925.04
159.25	6925.06	160.18	6925.07	161.03	6925.09	161.49	6925.09	162.24	6925.11
162.83	6925.11	165.57	6925.16	165.97	6925.16	166.72	6925.18	167.28	6925.18
169.51	6925.22	170.72	6925.23	183.51	6925.1	184.12	6925.1	184.52	6925.09
186.49	6925.07	187.47	6925.07	187.52	6925.06	188.52	6925.06	188.59	6925.05
189.52	6925.05	189.6	6925.04	190.52	6925.04	190.62	6925.03	191.52	6925.03
191.63	6925.02	192.52	6925.02	192.65	6925.01	193.52	6925.01	193.66	6925

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  194.68    6925  195.69 6924.99  196.71 6924.97  197.72 6924.97  200.29 6924.94
  200.76 6924.94  201.28 6924.93  201.78 6924.93  202.26 6924.92  202.79 6924.92
  203.25 6924.91  203.81 6924.91  204.23  6924.9  204.82  6924.9  205.22 6924.89
  205.84 6924.89   206.2 6924.88  206.85 6924.88  207.19 6924.87  207.87 6924.87
  208.18 6924.86  208.88 6924.86  209.16 6924.85   209.9 6924.85  210.15 6924.84
  210.91 6924.84  211.13 6924.83  211.93 6924.83  212.12 6924.82  212.94 6924.82
   213.1 6924.81  213.96 6924.81  214.09  6924.8  215.08  6924.8  215.52 6924.79
  216.06 6924.79  216.52 6924.78  217.05 6924.78  218.02 6924.76  218.03 6924.77
  219.02 6924.75  219.52 6924.75  220.52 6924.64  221.06 6924.54  221.52 6924.44
  221.98 6924.36  222.96 6924.16  223.95 6923.97  224.52 6923.85  225.12 6923.74
  226.13 6923.54   226.9 6923.38  227.15 6923.34  228.16 6923.13  229.52 6922.86
  231.83 6922.41  233.52 6922.07  233.81 6922.02  234.52 6921.88  234.79 6921.82
  235.52 6921.68  236.28 6921.76  236.53 6921.78  237.75  6922.1  239.32  6922.5
  239.72 6922.61  240.71 6922.85  242.37 6923.24  243.38 6923.48  244.53 6923.74
  246.43 6924.19  247.44 6924.41  247.61 6924.43  248.46 6924.45  248.59 6924.46
  249.58 6924.48  253.15 6924.59  253.53  6924.6  257.46 6924.72  258.45 6924.74
   258.6 6924.75  259.43 6924.77  267.32 6925.01  267.53 6925.01  268.31 6925.04
  268.53 6925.04  269.29 6925.07  269.53 6925.07  270.28  6925.1  270.53  6925.1
  271.26 6925.13  271.53 6925.13  272.25 6925.16  272.53 6925.16  273.24 6925.19
  273.53 6925.19  274.22 6925.22  274.53 6925.22  275.21 6925.25  275.86 6925.26
  276.19 6925.28  276.87  6925.3  277.18  6925.3  277.53 6925.32  278.16 6925.33
  278.53 6925.35  279.15 6925.36  279.53 6925.38  280.14 6925.39  280.53 6925.41
  281.12 6925.42  281.53 6925.44  282.11 6925.45  282.53 6925.47  283.09 6925.48
  284.08 6925.52  284.53 6925.53  287.53 6925.65  288.03 6925.66  289.99 6925.74
  291.08 6925.78  292.09 6925.81  292.95 6925.85  294.53  6925.9  295.14 6925.93
  295.91 6925.96  296.15 6925.96  296.53 6925.98  297.16    6926  297.53 6926.02
  298.86 6926.06  299.19 6926.08  300.21 6926.11  300.53 6926.13  301.82 6926.17
  302.24 6926.19  303.34 6926.23

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
   -86.1    .035   37.34    .035   93.23    .035

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
         37.34   93.23            92.31   92.31   92.31             .1       .3
Ineffective Flow     num=       1
   Sta L   Sta R    Elev  Permanent
   176.3  303.34 6925.25       F

CROSS SECTION


RIVER: UT_BSC2
REACH: NCONFL-BGM         RS: 2900

INPUT
Description: Source: Revised Condition Topo
Datum: NGVD29
```

Coordinate System:
NAVD88 Colorado State Planes Central, US Feet.
Station Elevation Data num= 492

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	6925.25	.28	6925.24	.56	6925.24	.94	6925.23	1.31	6925.23
2.34	6925.21	2.61	6925.21	3.37	6925.2	3.44	6925.19	3.75	6925.19
4.27	6925.18	4.59	6925.18	5.93	6925.15	6.45	6925.15	7.28	6925.13
7.6	6925.13	8.43	6925.11	9.26	6925.1	9.53	6925.1	10.09	6925.09
10.92	6925.07	11.3	6925.07	11.76	6925.06	12.65	6925.05	13.42	6925.03
13.99	6925.03	14.66	6925.01	15.08	6925.01	15.33	6925	15.69	6925
15.91	6924.99	16.67	6924.98	17.75	6924.97	18.41	6924.95	18.77	6924.95
19.8	6924.93	20.07	6924.93	20.83	6924.92	20.9	6924.91	21.23	6924.91
21.74	6924.9	21.85	6924.89	22.88	6924.83	23.39	6924.79	24.23	6924.74
24.73	6924.7	25.6	6924.65	26.73	6924.58	26.99	6924.56	27.42	6924.54
28.02	6924.5	28.76	6924.46	30.1	6924.37	30.89	6924.33	31.1	6924.31
31.72	6924.27	32.13	6924.25	32.55	6924.22	33.15	6924.19	33.38	6924.17
34.13	6924.13	34.34	6924.11	35.21	6924.06	35.47	6924.04	36.24	6924
37.26	6923.93	37.54	6923.92	38.16	6923.88	39.2	6923.82	40.03	6923.76
40.34	6923.75	40.85	6923.71	41.37	6923.68	41.7	6923.61	41.82	6923.58
42.53	6923.42	43.08	6923.3	43.36	6923.23	43.53	6923.2	44.45	6922.99
44.87	6922.9	45.02	6922.86	45.86	6922.68	46.51	6922.53	47.45	6922.32
47.56	6922.3	48.56	6922.07	49.18	6921.94	49.59	6921.84	50.62	6921.62
50.85	6921.56	51.82	6921.35	52.51	6921.19	53.7	6920.93	54.17	6920.82
55	6920.64	56.19	6920.37	56.67	6920.27	56.78	6920.24	58.3	6919.9
58.33	6919.9	58.83	6919.79	59.64	6919.62	59.99	6919.54	60.57	6919.42
60.83	6919.36	60.99	6919.35	61.66	6919.34	63.97	6919.34	64.15	6919.35
66.65	6919.35	67.05	6919.34	73.68	6919.34	74.13	6919.33	80.4	6919.33
80.79	6919.32	81.43	6919.32	81.62	6919.33	82.47	6919.36	83.28	6919.48
83.49	6919.5	83.81	6919.55	85.16	6919.74	85.78	6919.82	86.5	6919.93
86.57	6919.93	86.79	6919.97	87.44	6920.06	87.84	6920.11	88.27	6920.17
89.65	6920.37	90.68	6920.51	91.87	6920.68	92.43	6920.75	92.73	6920.8
93.21	6920.86	94.09	6920.99	94.56	6921.03	94.78	6921.07	94.93	6921.08
95.53	6921.15	96.59	6921.26	97.87	6921.4	98.58	6921.45	98.89	6921.48
99	6921.48	99.08	6921.48	100.75	6921.52	101.27	6921.54	101.58	6921.54
102.41	6921.56	103	6921.58	103.24	6921.58	104.27	6921.61	105.06	6921.62
105.3	6921.63	106.08	6921.65	107.11	6921.67	107.4	6921.68	107.98	6921.69
108.23	6921.7	109.06	6921.72	109.33	6921.73	109.9	6921.74	110.19	6921.75
111.22	6921.77	112.39	6921.8	113.01	6921.81	114.05	6921.84	114.3	6921.84
114.89	6921.86	115.72	6921.88	116.04	6921.88	116.55	6921.9	118.21	6921.94
118.41	6921.94	119.05	6921.96	119.44	6921.96	119.88	6921.97	120.46	6921.99
120.71	6921.99	121.75	6922.02	122.37	6922.03	123.55	6922.06	124.1	6922.07
124.57	6922.09	124.87	6922.09	125.44	6922.11	125.7	6922.11	126.53	6922.13
126.78	6922.14	127.36	6922.15	127.65	6922.16	128.68	6922.18	129.86	6922.21
130.49	6922.23	130.81	6922.23	131.76	6922.26	132.15	6922.26	132.35	6922.27
133.5	6922.3	133.82	6922.3	134.02	6922.31	135.68	6922.35	135.87	6922.35
136.51	6922.37	137.34	6922.39	137.53	6922.39	138.17	6922.41	138.87	6922.42
138.95	6922.43	139.23	6922.43	139.84	6922.45	140.21	6922.45	140.67	6922.47
141.01	6922.47	141.5	6922.49	142.03	6922.5	142.33	6922.5	142.9	6922.52

143.16	6922.52	144	6922.54	144.24	6922.55	144.83	6922.56	145.12	6922.57
146.14	6922.59	147.32	6922.62	148.27	6922.65	148.99	6922.66	149.61	6922.68
149.82	6922.68	150.65	6922.7	151.28	6922.72	151.48	6922.72	153.14	6922.76
153.33	6922.76	153.98	6922.78	154.81	6922.8	154.98	6922.8	156.32	6922.84
156.71	6922.84	157.3	6922.86	158.47	6922.89	159.5	6922.91	159.8	6922.92
160.35	6922.93	160.63	6922.94	161.46	6922.96	161.7	6922.96	162.29	6922.98
162.58	6922.98	163.04	6922.99	163.13	6923	164.79	6923.04	165.62	6923.05
165.66	6923.06	166.45	6923.07	167.07	6923.09	167.28	6923.09	168.12	6923.11
168.74	6923.13	168.95	6923.13	170.61	6923.17	170.8	6923.18	171.1	6923.18
172.27	6923.21	172.85	6923.23	173.11	6923.23	174.19	6923.26	174.77	6923.27
175.93	6923.3	176.96	6923.32	177.81	6923.34	178.1	6923.35	178.93	6923.37
179.15	6923.37	179.76	6923.39	180.04	6923.39	180.5	6923.41	181.07	6923.42
181.84	6923.44	182.25	6923.45	182.93	6923.46	183.09	6923.47	183.37	6923.47
184.03	6923.49	184.22	6923.5	185.04	6923.52	185.21	6923.53	186.05	6923.55
186.21	6923.56	187.06	6923.58	187.2	6923.59	188.06	6923.61	188.19	6923.62
189.07	6923.64	189.18	6923.65	190.18	6923.67	191.09	6923.7	192.16	6923.71
194.11	6923.69	195.14	6923.69	196.12	6923.68	196.68	6923.68	197.12	6923.67
198.14	6923.67	199.11	6923.66	200.15	6923.66	202.09	6923.64	203.18	6923.64
205.06	6923.62	206.2	6923.62	208.04	6923.6	209.22	6923.6	210.03	6923.59
211.02	6923.59	211.13	6923.58	212.24	6923.58	213	6923.57	214	6923.57
214.13	6923.56	215.27	6923.56	215.98	6923.55	217.13	6923.55	217.28	6923.54
218.29	6923.54	218.96	6923.53	220.13	6923.53	220.31	6923.52	221.31	6923.52
221.94	6923.51	223.13	6923.51	223.33	6923.5	224.34	6923.5	224.91	6923.49
226.35	6923.49	226.9	6923.48	227.89	6923.48	228.13	6923.47	229.37	6923.47
229.88	6923.46	230.87	6923.46	231.13	6923.45	232.4	6923.45	232.85	6923.44
233.85	6923.44	234.13	6923.43	235.42	6923.43	235.83	6923.42	237.13	6923.42
237.43	6923.41	238.44	6923.41	238.81	6923.4	240.13	6923.4	240.46	6923.39
241.13	6923.39	241.79	6923.27	242.13	6923.2	242.78	6923.08	243.48	6922.96
243.77	6922.9	244.13	6922.84	245.49	6922.58	245.76	6922.54	246.75	6922.35
247.51	6922.21	248.52	6922.03	249.13	6921.91	249.52	6921.84	249.73	6921.81
250.13	6921.73	251.71	6921.46	252.13	6921.38	252.7	6921.28	253.55	6921.14
254.13	6921.04	255.57	6920.78	255.68	6920.77	257.13	6920.51	257.58	6920.59
257.67	6920.62	258.13	6920.7	259.6	6921.14	259.65	6921.15	261.13	6921.58
261.61	6921.73	261.64	6921.73	262.13	6921.88	262.63	6922.02	263.62	6922.32
264.13	6922.46	264.61	6922.61	264.64	6922.61	265.13	6922.76	266.13	6923.05
266.65	6923.21	267.13	6923.34	268.12	6923.64	268.67	6923.8	269.58	6924.06
270.57	6924.35	270.68	6924.39	271.56	6924.65	271.69	6924.68	272.55	6924.94
273.12	6925.1	273.55	6925.23	273.71	6925.27	274.12	6925.4	274.54	6925.52
275.53	6925.81	275.72	6925.87	276.12	6925.98	276.52	6926.12	276.73	6926.16
277.12	6926.29	277.52	6926.44	277.74	6926.46	278.12	6926.6	278.51	6926.61
278.74	6926.57	279.12	6926.57	279.75	6926.54	280.12	6926.51	280.76	6926.48
281.48	6926.44	281.77	6926.42	282.48	6926.38	282.77	6926.36	284.46	6926.26
284.79	6926.25	288.12	6926.05	288.43	6926.04	288.82	6926.01	289.12	6926
290.42	6925.91	290.83	6925.89	292.4	6925.78	292.85	6925.76	294.12	6925.67
294.39	6925.66	294.86	6925.62	295.12	6925.61	295.87	6925.56	296.12	6925.54
296.37	6925.53	296.88	6925.49	297.89	6925.43	298.12	6925.41	298.36	6925.4
298.89	6925.36	299.35	6925.33	299.9	6925.3	301.33	6925.2	301.92	6925.17
302.92	6925.1	303.32	6925.08	303.93	6925.04	304.12	6925.02	305.3	6924.95

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  305.95  6924.9  307.29 6924.82  307.96 6924.77  308.97 6924.71  310.12 6924.63
  310.27 6924.63  311.12 6924.57  311.26 6924.57  311.99 6924.54  312.25 6924.54
     313 6924.52  313.24 6924.51  314.01 6924.49  314.24 6924.48  315.02  6924.5
  315.23 6924.49  316.02 6924.53  316.22 6924.53  317.03 6924.56  317.21 6924.56
  318.04  6924.6  318.21  6924.6  319.05 6924.63   319.2 6924.64  320.05 6924.67
  320.19 6924.68  321.06 6924.71  321.18 6924.72  322.07 6924.75  322.18 6924.76
  323.08  6924.8  323.32  6924.8

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
       0     .05   41.82    .035      99     .05

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
         41.82      99           110.37   99.71   68.37             .1       .3
Ineffective Flow     num=       1
   Sta L   Sta R    Elev  Permanent
  190.81  323.32 6923.73       F

CROSS SECTION


RIVER: UT_BSC2
REACH: NCONFL-BGM         RS: 2800

INPUT
Description: Source: Revised Condition Topo
Datum: NGVD29
Coordinate System:
             NAVD88 Colorado State Planes Central, US Feet.
Station Elevation Data    num=     492
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
       0 6922.59     .13 6922.59     .93 6922.57    1.04 6922.57    1.94 6922.55
    2.07 6922.54    2.84 6922.52     3.2 6922.52    3.74  6922.5    4.34 6922.49
    4.65 6922.48    5.48 6922.46    5.82 6922.45    6.45 6922.44    6.62 6922.43
    7.35 6922.42    7.53 6922.41    7.75 6922.41    8.26  6922.4    9.16 6922.37
    9.54 6922.37   10.55 6922.33   11.56 6922.28   11.87 6922.27    12.3 6922.25
   12.56 6922.23   12.77 6922.23   13.44 6922.19   17.28 6922.02   17.99 6921.98
   18.19 6921.98    18.6 6921.96   19.09 6921.93   19.61 6921.91   19.99 6921.89
   20.26 6921.88   20.62 6921.86    21.4 6921.83    21.8 6921.81   22.54 6921.78
   23.32 6921.74    23.6 6921.73   23.68 6921.72   24.51 6921.69   24.81 6921.67
   25.41 6921.64   25.95 6921.62   26.31  6921.6   26.66 6921.59   27.09 6921.57
   27.21 6921.56   28.12 6921.52   28.23 6921.51   28.67 6921.49   29.02 6921.48
   29.36 6921.46   29.92 6921.44    30.5 6921.41   30.82 6921.39   31.64 6921.36
   31.73 6921.35   32.07 6921.34   32.78  6921.3   33.53 6921.27   33.91 6921.25
   34.71 6921.22   35.05  6921.2   35.34 6921.19   35.71 6921.17   36.72 6921.13
   37.73 6921.08   38.05 6921.07    39.6    6921   40.74 6920.95   40.82 6920.95
   41.87  6920.9   43.46 6920.83   43.77 6920.82   44.77 6920.77   45.78 6920.73
   46.42  6920.7   46.79 6920.69   47.07 6920.67   47.79 6920.64   47.98 6920.63
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48.7	6920.6	48.88	6920.59	49.84	6920.55	50.68	6920.51	51.59	6920.48
51.82	6920.47	52.11	6920.45	52.49	6920.44	52.82	6920.42	53.25	6920.4
53.39	6920.4	53.83	6920.38	54.29	6920.32	54.38	6920.29	54.84	6920.23
54.97	6920.19	55.2	6920.13	55.52	6920.05	55.84	6919.96	57	6919.65
57.91	6919.4	58.93	6919.13	59.71	6918.92	59.87	6918.87	60.07	6918.82
60.61	6918.67	61.21	6918.51	61.52	6918.43	61.88	6918.33	62.35	6918.21
62.89	6918.06	63.48	6917.91	63.9	6917.8	64.22	6917.71	64.9	6917.54
65.91	6917.28	66.03	6917.26	66.9	6917.18	67.08	6917.18	67.84	6917.19
68.03	6917.19	68.74	6917.21	69.17	6917.21	69.64	6917.22	69.94	6917.23
70.31	6917.23	70.54	6917.24	70.94	6917.24	71.95	6917.26	72.35	6917.26
72.58	6917.27	72.96	6917.27	73.25	6917.28	73.72	6917.29	74.15	6917.29
74.86	6917.31	75.06	6917.31	75.83	6917.32	75.99	6917.32	76.23	6917.33
76.86	6917.34	77.13	6917.34	77.76	6917.35	77.99	6917.36	78.27	6917.36
78.67	6917.37	78.99	6917.37	79.41	6917.38	79.57	6917.38	80.47	6917.4
81.01	6917.41	81.68	6917.52	82.01	6917.58	82.28	6917.62	82.82	6917.72
83.02	6917.76	83.18	6917.78	83.95	6917.92	84.08	6917.95	84.58	6918.03
85.09	6918.13	86.23	6918.33	86.79	6918.43	87.05	6918.48	87.37	6918.53
88.05	6918.66	88.5	6918.74	88.6	6918.75	89.06	6918.84	89.5	6918.91
89.64	6918.94	90.4	6919.08	90.78	6919.14	91.07	6919.2	91.31	6919.24
92.08	6919.38	92.21	6919.4	93.33	6919.6	94.19	6919.75	94.92	6919.88
95.1	6919.92	95.82	6920.05	96.47	6920.16	96.72	6920.21	97.11	6920.28
97.6	6920.33	97.62	6920.34	98.12	6920.4	98.3	6920.4	98.53	6920.41
98.74	6920.42	99.12	6920.42	99.88	6920.44	100.13	6920.45	100.33	6920.45
101.01	6920.47	101.24	6920.48	103.04	6920.52	103.29	6920.52	103.94	6920.54
104.16	6920.55	104.43	6920.55	105.56	6920.58	105.75	6920.58	106.17	6920.59
106.65	6920.61	107.18	6920.62	107.55	6920.63	107.84	6920.63	108.46	6920.65
108.98	6920.66	109.19	6920.67	109.36	6920.67	110.11	6920.69	110.26	6920.69
110.83	6920.71	111.2	6920.71	111.25	6920.72	112.07	6920.74	112.39	6920.74
112.97	6920.76	113.22	6920.76	114.22	6920.79	114.78	6920.8	115.68	6920.82
115.8	6920.83	116.24	6920.84	116.58	6920.84	117.24	6920.86	117.48	6920.87
118.07	6920.88	118.25	6920.88	118.39	6920.89	119.59	6920.92	120.19	6920.93
120.35	6920.93	121.09	6920.95	121.27	6920.96	121.49	6920.96	122	6920.97
122.9	6921	123.28	6921	123.76	6921.02	124.71	6921.04	124.9	6921.04
125.61	6921.06	126.04	6921.07	126.3	6921.08	126.51	6921.08	127.17	6921.1
127.41	6921.1	128.31	6921.13	129.22	6921.15	129.45	6921.15	130.12	6921.17
130.33	6921.17	130.59	6921.18	131.02	6921.19	131.72	6921.21	131.93	6921.21
132.86	6921.23	133.35	6921.25	133.73	6921.26	134	6921.26	134.63	6921.28
135.13	6921.29	135.36	6921.29	135.54	6921.3	136.27	6921.32	136.44	6921.32
137.09	6921.34	137.41	6921.34	138.25	6921.36	138.38	6921.37	138.55	6921.37
139.15	6921.39	139.39	6921.39	140.39	6921.42	140.95	6921.43	141.86	6921.45
142.4	6921.46	143.41	6921.49	143.66	6921.49	144.23	6921.51	144.56	6921.51
145.4	6921.54	145.6	6921.54	146.33	6921.56	146.59	6921.56	147.21	6921.57
147.78	6921.59	148.09	6921.59	148.46	6921.6	149.47	6921.62	150.48	6921.65
150.72	6921.65	151.35	6921.66	151.6	6921.67	152.3	6921.68	152.54	6921.69
153.36	6921.71	153.73	6921.71	154.24	6921.73	154.53	6921.73	154.93	6921.74
155.11	6921.74	155.99	6921.76	156.12	6921.77	156.55	6921.77	157.31	6921.79
157.56	6921.8	157.75	6921.8	158.5	6921.82	159.51	6921.84	159.69	6921.84
160.39	6921.86	160.6	6921.86	161.26	6921.88	161.61	6921.88	162.62	6921.9

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  163.02 6921.91  163.63 6921.93   163.9 6921.93  164.46 6921.94  164.78 6921.95
  166.54 6921.99  166.84 6921.99  167.41 6922.01  167.68 6922.01  168.03 6922.02
  168.29 6922.02  168.69 6922.03   169.7 6922.05  170.71 6922.08  170.93 6922.08
   171.6  6922.1  171.84  6922.1   172.6 6922.11  172.83 6922.12  173.61 6922.13
  173.72 6922.14  174.61 6922.15  174.83 6922.16  175.61 6922.17  175.72 6922.18
  176.72 6922.19  176.83  6922.2  177.72 6922.21  177.83 6922.22  178.72 6922.23
  178.82 6922.24  179.61 6922.25  179.82 6922.25  180.62 6922.27  180.82 6922.27
  181.62 6922.29  182.82 6922.29  183.62 6922.28  184.81 6922.28  185.62 6922.27
  185.81 6922.27  186.63 6922.26  187.81 6922.26  188.63 6922.25  188.81 6922.25
  189.63 6922.24   190.8 6922.24  191.63 6922.23   191.8 6922.23  192.64 6922.22
   193.8 6922.22  194.64 6922.21  195.64 6922.21  195.72  6922.2  196.79  6922.2
  197.64 6922.19  203.78 6922.19  204.66 6922.18  218.75 6922.18  219.68 6922.17
  234.73 6922.17  235.71 6922.16  238.72 6922.16  239.72 6922.11  240.71 6921.95
  241.71 6921.79  241.72 6921.79  242.71 6921.63  242.72 6921.63  243.71 6921.46
  243.72 6921.46  244.71  6921.3  244.72  6921.3  245.71 6921.14  245.72 6921.13
   246.7 6920.97  246.72 6920.97   247.7 6920.81  247.72  6920.8   248.7 6920.64
  248.73 6920.64   249.7 6920.48  249.73 6920.48   250.7 6920.32  250.73 6920.31
   251.7 6920.15  251.73 6920.15  252.69 6919.99  252.73 6919.99  253.69  6920.4
  253.73 6920.42  254.74 6920.85  255.69 6921.26  255.74 6921.28  256.69 6921.69
  256.74 6921.72  257.69 6922.13  257.74 6922.15  258.68 6922.56  258.74 6922.58
  259.68 6922.99  259.74 6923.02  260.68 6923.42  261.75 6923.88  262.68 6924.29
  263.67 6924.72  263.75 6924.75  264.67 6925.15  264.75 6925.18  265.67 6925.55
  266.67 6925.92  266.76 6925.96  267.67  6926.3  267.76 6926.33  268.67 6926.67
  268.76  6926.7  269.66 6927.04  269.76 6927.08  270.66 6927.41  270.76 6927.45
  271.66 6927.78  271.76 6927.82  272.66 6928.16  274.77 6928.94  275.65 6929.27
  275.77 6929.32  276.65 6929.65  276.77 6929.69  277.65 6930.02  277.77 6930.06
  278.65 6930.39  278.77 6930.44  279.65 6930.76  280.64 6931.13  280.78 6931.17
  281.64 6931.38  281.78 6931.39  282.64 6931.38  283.78 6931.37  284.64 6931.35
  285.64 6931.34  286.63 6931.33  286.79 6931.33  287.63 6931.31  287.79 6931.31
  288.63  6931.3  288.79  6931.3  289.63 6931.29  289.79 6931.28  290.63 6931.27
  290.79 6931.27  291.63 6931.26   291.8 6931.26  292.71 6931.25   292.8 6931.24
  293.62 6931.23   293.8 6931.23  294.62 6931.22   294.8 6931.22  295.62 6931.21
   295.8  6931.2  296.62 6931.19   296.8 6931.19  297.62 6931.18  297.81 6931.18
  298.61 6931.17  298.72 6931.16

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
       0     .05   54.97    .035    98.3     .05

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
         54.97    98.3           142.81  150.39  167.75             .1       .3
Ineffective Flow     num=       1
   Sta L   Sta R    Elev  Permanent
   181.3  298.72 6922.41       F

CROSS SECTION
```

RIVER: UT_BSC2
REACH: NCONFL-BGM RS: 2650

INPUT
Description: Source: Revised Condition Topo
Datum: NGVD29
Coordinate System:
NAVD88 Colorado State Planes Central, US Feet.
Station Elevation Data num= 492

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
-7.75	6919.41	-7.13	6919.41	-5.94	6919.37	-3.02	6919.28	-2.05	6919.26
-1.18	6919.23	-.1	6919.2	.76	6919.17	2.94	6919.11	3.97	6919.07
4.76	6919.05	6.03	6919.01	6.7	6918.98	7.67	6918.95	7.88	6918.95
9.13	6918.9	9.62	6918.89	10.88	6918.85	11.19	6918.83	12.22	6918.8
12.53	6918.78	12.88	6918.77	13.88	6918.72	14.28	6918.71	15.31	6918.66
15.44	6918.66	16.35	6918.62	17.38	6918.58	17.39	6918.59	18.36	6918.55
18.88	6918.54	19.33	6918.52	19.88	6918.51	20.3	6918.49	20.88	6918.48
21.27	6918.46	21.5	6918.46	21.88	6918.44	22.53	6918.43	22.88	6918.41
24.89	6918.35	25.16	6918.35	25.89	6918.32	26.13	6918.32	26.89	6918.29
27.1	6918.29	29.75	6918.21	30.78	6918.17	30.99	6918.17	31.81	6918.14
31.96	6918.14	36.82	6917.99	36.97	6917.99	38	6917.95	40.7	6917.87
40.89	6917.87	41.67	6917.84	41.89	6917.84	42.64	6917.81	42.89	6917.81
43.89	6917.77	44.19	6917.77	44.89	6917.74	46.89	6917.68	47.5	6917.65
47.89	6917.62	48.18	6917.56	48.31	6917.54	48.47	6917.5	48.89	6917.42
49.89	6917.22	50.37	6917.12	50.42	6917.1	51.4	6916.89	52.36	6916.68
53.33	6916.45	53.9	6916.33	54.3	6916.23	54.9	6916.1	55.53	6915.95
55.9	6915.87	57.22	6915.57	57.59	6915.48	58.19	6915.35	60.13	6914.91
61.1	6914.68	61.71	6914.55	62.07	6914.46	62.9	6914.28	64.02	6914.13
64.81	6914.08	64.99	6914.06	65.96	6913.99	66.87	6913.93	66.93	6913.92
67.9	6913.89	68.87	6913.85	69.84	6913.82	69.96	6913.81	70.73	6913.78
70.99	6913.78	72.76	6913.71	72.9	6913.71	73.73	6913.92	74.09	6914
74.7	6914.16	75.12	6914.26	75.9	6914.46	76.9	6914.7	78.21	6915.03
78.91	6915.2	79.24	6915.29	79.91	6915.45	80.53	6915.61	80.91	6915.7
82.34	6916.06	83.37	6916.31	84.4	6916.58	84.42	6916.58	85.39	6916.84
85.43	6916.86	85.91	6916.99	87.33	6917.4	87.91	6917.56	88.3	6917.68
88.91	6917.85	89.27	6917.94	89.55	6917.98	89.91	6918.06	90.07	6918.06
90.24	6918.07	91.22	6918.07	91.62	6918.08	92.65	6918.08	92.91	6918.09
94.13	6918.09	94.71	6918.1	95.74	6918.11	97.04	6918.11	98.83	6918.13
99.91	6918.13	99.96	6918.14	100.93	6918.14	101.93	6918.16	103.84	6918.18
103.99	6918.19	106.05	6918.21	106.76	6918.22	107.73	6918.24	108.7	6918.25
109.15	6918.25	110.18	6918.27	110.64	6918.27	111.61	6918.29	112.24	6918.29
114.53	6918.33	114.92	6918.33	115.33	6918.34	115.92	6918.34	116.92	6918.36
117.44	6918.36	118.41	6918.38	118.92	6918.38	119.92	6918.4	120.49	6918.4
121.33	6918.42	121.92	6918.42	122.92	6918.44	123.58	6918.44	124.92	6918.46
125.21	6918.47	125.64	6918.47	126.67	6918.49	127.16	6918.49	127.92	6918.5
128.13	6918.51	128.74	6918.51	128.92	6918.52	130.07	6918.53	131.83	6918.55
131.92	6918.56	133.96	6918.58	135.9	6918.61	137.84	6918.63	137.93	6918.64
140.08	6918.66	140.93	6918.67	141.11	6918.68	141.73	6918.69	142.14	6918.69

142.7	6918.7	143.17	6918.7	144.2	6918.72	144.64	6918.72	146.27	6918.75
146.93	6918.75	147.93	6918.77	148.33	6918.77	148.53	6918.78	148.93	6918.78
149.36	6918.79	149.93	6918.79	150.93	6918.81	152.45	6918.81	152.93	6918.8
153.93	6918.8	154.36	6918.79	154.93	6918.79	155.33	6918.78	156.3	6918.78
156.58	6918.77	157.27	6918.77	157.61	6918.76	158.24	6918.76	158.64	6918.75
159.67	6918.75	159.94	6918.74	160.7	6918.74	160.94	6918.73	161.94	6918.73
162.13	6918.72	163.1	6918.72	167.92	6918.67	168.95	6918.67	174.76	6918.61
175.73	6918.61	175.94	6918.6	176.94	6918.6	177.2	6918.59	177.94	6918.59
178.23	6918.58	179.26	6918.58	179.61	6918.57	180.29	6918.57	180.59	6918.56
181.56	6918.56	181.94	6918.55	182.53	6918.55	182.94	6918.54	183.5	6918.54
183.94	6918.53	184.94	6918.53	185.44	6918.52	185.95	6918.52	186.41	6918.51
186.95	6918.51	187.39	6918.5	188.36	6918.5	188.54	6918.49	189.57	6918.49
189.95	6918.48	190.6	6918.48	190.95	6918.47	191.63	6918.47	191.95	6918.46
192.95	6918.46	193.21	6918.45	194.19	6918.45	194.73	6918.44	195.16	6918.44
196.79	6918.42	198.85	6918.4	199.88	6918.4	199.95	6918.39	200.99	6918.39
202.15	6918.38	205.84	6918.34	206.81	6918.34	206.95	6918.33	207.95	6918.33
208.13	6918.32	209.16	6918.32	209.73	6918.31	210.19	6918.31	210.7	6918.3
212.26	6918.3	212.96	6918.28	213.97	6918.16	214.03	6918.16	215.06	6918.04
215.61	6917.99	216.37	6917.9	218.78	6917.64	221.95	6917.3	222.44	6917.24
222.69	6917.22	223.54	6917.13	224.55	6917.2	225.61	6917.31	225.85	6917.33
226.71	6917.42	227.43	6917.5	228.22	6917.58	229.01	6917.67	229.83	6917.75
229.87	6917.76	230.88	6917.86	231.93	6917.99	232.17	6918.01	233.75	6918.21
234.63	6918.31	235.33	6918.4	236.21	6918.5	236.91	6918.53	238.26	6918.58
238.49	6918.58	239.18	6918.61	239.38	6918.61	240.37	6918.65	241.42	6918.67
242.34	6918.68	242.55	6918.69	243.53	6918.7	244.59	6918.72	244.81	6918.72
245.49	6918.74	246.39	6918.75	246.7	6918.76	247.18	6918.76	247.3	6918.77
247.75	6918.77	247.97	6918.78	249.55	6918.8	249.86	6918.81	250.91	6918.83
251.79	6918.84	252.06	6918.85	253.02	6918.86	254.08	6918.89	254.94	6918.9
255.23	6918.91	257.24	6918.95	257.45	6918.96	258.09	6918.97	259.82	6919.01
260.61	6919.02	261.25	6919.04	262.19	6919.05	263.57	6919.08	263.77	6919.09
265.36	6919.12	266.15	6919.14	266.94	6919.15	267.55	6919.17	267.9	6919.17
268.52	6919.19	269.31	6919.2	269.89	6919.22	270.7	6919.23	272.47	6919.27
273.85	6919.29	274.84	6919.31	275.17	6919.31	277	6919.34	277.21	6919.35
278.33	6919.36	280.16	6919.39	281.49	6919.42	281.95	6919.42	282.16	6919.43
282.55	6919.43	283.31	6919.45	283.75	6919.45	285.11	6919.48	286.46	6919.5
287.48	6919.52	287.82	6919.52	289.61	6919.55	290.98	6919.58	291.43	6919.58
292.22	6919.6	292.76	6919.6	293.8	6919.62	294.59	6919.64	294.84	6919.64
296.42	6919.67	296.96	6919.67	297.75	6919.69	299.07	6919.71	299.42	6919.72
300.47	6919.73	301.53	6919.76	302.58	6919.78	302.76	6919.79	304.07	6919.82
304.69	6919.84	305.74	6919.86	305.93	6919.87	307.23	6919.9	307.52	6919.9
308.02	6919.92	308.81	6919.94	309.1	6919.94	309.6	6919.96	309.96	6919.96
311.67	6920.01	312.27	6920.02	315.23	6920.09	317.02	6920.14	317.34	6920.14
318.61	6920.18	319.87	6920.21	322.61	6920.28	323.03	6920.3	323.36	6920.3
323.82	6920.32	324.72	6920.34	324.95	6920.35	326.98	6920.4	328.11	6920.43
328.56	6920.45	333.3	6920.57	333.73	6920.59	334.09	6920.59	334.88	6920.62
339.62	6920.74	340.04	6920.76	340.79	6920.78	345.94	6920.91	346.34	6920.93
351.47	6921.06	351.88	6921.08	356.21	6921.19	357	6921.23	357.41	6921.24
358.46	6921.29	358.58	6921.29	359.52	6921.34	360.16	6921.36	360.95	6921.4

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  361.74 6921.43  362.97 6921.49  363.33  6921.5  364.12 6921.54  364.56 6921.55
  365.25 6921.59   365.7  6921.6  366.49 6921.64  367.28 6921.66  367.95 6921.69
   368.4  6921.7  368.86 6921.72  369.65 6921.74  370.06 6921.76   370.9 6921.79
  372.02 6921.82  372.17 6921.83  373.23 6921.86   373.6 6921.88  374.71 6921.91
  375.18 6921.93  375.65 6921.94  375.97 6921.96  376.76 6921.98  377.44 6922.01
  377.86 6922.02  379.13 6922.06  379.55 6922.08  380.71 6922.11  381.01 6922.13
   381.5 6922.14  382.29 6922.17  383.08 6922.19  383.77 6922.22  384.66 6922.25
  385.45 6922.27  385.88 6922.29  387.31 6922.34  387.82 6922.35  389.04  6922.4
  389.91 6922.42  391.77 6922.49  392.56 6922.51  394.14 6922.57  394.93 6922.59
  395.37 6922.61  396.77 6922.66   397.3 6922.67  398.09  6922.7  398.53 6922.71
  398.88 6922.73  399.42 6922.74  401.25 6922.81  402.04 6922.83  403.62 6922.89
  404.17  6922.9  404.86 6922.93  405.99 6922.97  406.22 6922.97  407.57 6923.02
  408.02 6923.03  408.97 6923.06

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
   -7.75     .05   48.18    .035   90.07     .05

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
         48.18   90.07            44.76   44.76   44.76             .1       .3
Ineffective Flow     num=       1
   Sta L   Sta R    Elev  Permanent
  150.92  408.97 6918.86       F

CROSS SECTION


RIVER: UT_BSC2
REACH: NCONFL-BGM         RS: 2605

INPUT
Description: Source: 2003 LOMR Hec-2 Output
Datum: NGVD29
Coordinate System:
             NAVD88 Colorado State Planes Central, US Feet.
Station Elevation Data    num=      17
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
       0    6920   90.01    6918  100.01  6916.2  108.01    6918  115.01  6918.2
  127.01    6918  138.01  6917.5  150.01    6918  182.01    6918  190.01  6917.6
  200.01    6918  222.01  6918.4  242.01    6918  258.01    6914  270.01    6916
  305.01    6918     325  6919.8

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
       0     .05   90.01    .035  305.01     .05

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
         90.01  305.01                0       0       0             .1       .3
```

SUMMARY OF MANNING'S N VALUES

River:UT_BSC2

Reach	River Sta.	n1	n2	n3
NCONFL-BGM	5100	.05	.035	.05
NCONFL-BGM	5000	.05	.035	.05
NCONFL-BGM	4900	.05	.035	.05
NCONFL-BGM	4850	.05	.035	.05
NCONFL-BGM	4750	.05	.035	.05
NCONFL-BGM	4650	.05	.035	.05
NCONFL-BGM	4600	.05	.035	.05
NCONFL-BGM	4550	.05	.035	.05
NCONFL-BGM	4500	.05	.035	.05
NCONFL-BGM	4400	.035	.035	.035
NCONFL-BGM	4300	.035	.035	.035
NCONFL-BGM	4280	.035	.035	.035
NCONFL-BGM	4250	.035	.035	.035
NCONFL-BGM	4240	.035	.035	.035
NCONFL-BGM	4200	.035	.035	.035
NCONFL-BGM	4175	.035	.035	.035
NCONFL-BGM	4150	.035	.013	.035
NCONFL-BGM	4073	Culvert		
NCONFL-BGM	4040	.035	.013	.035
NCONFL-BGM	4030	.035	.04	.035
NCONFL-BGM	4000	.035	.035	.035
NCONFL-BGM	3900	.035	.035	.035
NCONFL-BGM	3850	.035	.035	.035
NCONFL-BGM	3800	.05	.035	.05
NCONFL-BGM	3694	.05	.035	.05
NCONFL-BGM	3600	.05	.035	.05
NCONFL-BGM	3500	.05	.035	.05
NCONFL-BGM	3450	.05	.035	.05
NCONFL-BGM	3350	.05	.035	.05
NCONFL-BGM	3300	.05	.035	.05
NCONFL-BGM	3250	.05	.035	.05
NCONFL-BGM	3200	.05	.035	.05
NCONFL-BGM	3150	.05	.035	.05
NCONFL-BGM	3100	.05	.035	.05
NCONFL-BGM	3050	.035	.035	.035
NCONFL-BGM	3000	.035	.035	.035
NCONFL-BGM	2900	.05	.035	.05
NCONFL-BGM	2800	.05	.035	.05
NCONFL-BGM	2650	.05	.035	.05

NCONFL-BGM	2605	.05	.035	.05

SUMMARY OF REACH LENGTHS

River: UT_BSC2

Reach	River Sta.	Left	Channel	Right
NCONFL-BGM	5100	123.64	123.64	123.64
NCONFL-BGM	5000	106.14	100.12	95.6
NCONFL-BGM	4900	67.95	50.29	29.23
NCONFL-BGM	4850	100.34	100.34	100.34
NCONFL-BGM	4750	100.72	100.72	100.72
NCONFL-BGM	4650	17.95	48.25	87.43
NCONFL-BGM	4600	48.37	48.37	48.37
NCONFL-BGM	4550	60.1	60.1	60.1
NCONFL-BGM	4500	88.02	91.85	94.75
NCONFL-BGM	4400	117.95	112.69	105.12
NCONFL-BGM	4300	6.2	14.98	23.62
NCONFL-BGM	4280	19	19	19
NCONFL-BGM	4250	15.35	15.35	15.35
NCONFL-BGM	4240	46.77	46.77	46.77
NCONFL-BGM	4200	13.79	13.79	13.79
NCONFL-BGM	4175	15.93	15.93	15.93
NCONFL-BGM	4150	125.43	125.43	125.43
NCONFL-BGM	4073	Culvert		
NCONFL-BGM	4040	8.99	8.99	8.99
NCONFL-BGM	4030	39.8	30.2	21.92
NCONFL-BGM	4000	85.66	85.66	85.66
NCONFL-BGM	3900	35.1	50.3	65.88
NCONFL-BGM	3850	37.4	50.43	64.11
NCONFL-BGM	3800	105.51	105.75	101.97
NCONFL-BGM	3694	94.09	94.09	94.09
NCONFL-BGM	3600	106.69	100.23	101.74
NCONFL-BGM	3500	39.01	50.1	61.55
NCONFL-BGM	3450	73.26	100.11	126.77
NCONFL-BGM	3350	69.29	50.21	21.13
NCONFL-BGM	3300	65.29	49.89	27.72
NCONFL-BGM	3250	50.17	50.17	50.17
NCONFL-BGM	3200	50.08	50.08	50.08
NCONFL-BGM	3150	40.98	49.96	61.22
NCONFL-BGM	3100	33.13	33.13	33.13
NCONFL-BGM	3050	75.27	75.27	75.27
NCONFL-BGM	3000	92.31	92.31	92.31
NCONFL-BGM	2900	110.37	99.71	68.37

NCONFL-BGM	2800	142.81	150.39	167.75
NCONFL-BGM	2650	44.76	44.76	44.76
NCONFL-BGM	2605	0	0	0

SUMMARY OF CONTRACTION AND EXPANSION COEFFICIENTS
River: UT_BSC2

Reach	River Sta.	Contr.	Expan.
NCONFL-BGM	5100	.1	.3
NCONFL-BGM	5000	.1	.3
NCONFL-BGM	4900	.1	.3
NCONFL-BGM	4850	.1	.3
NCONFL-BGM	4750	.1	.3
NCONFL-BGM	4650	.1	.3
NCONFL-BGM	4600	.1	.3
NCONFL-BGM	4550	.1	.3
NCONFL-BGM	4500	.1	.3
NCONFL-BGM	4400	.1	.3
NCONFL-BGM	4300	.1	.3
NCONFL-BGM	4280	.1	.3
NCONFL-BGM	4250	.1	.3
NCONFL-BGM	4240	.1	.3
NCONFL-BGM	4200	.1	.3
NCONFL-BGM	4175	.3	.5
NCONFL-BGM	4150	.3	.5
NCONFL-BGM	4073	Culvert	
NCONFL-BGM	4040	.3	.5
NCONFL-BGM	4030	.3	.5
NCONFL-BGM	4000	.1	.3
NCONFL-BGM	3900	.1	.3
NCONFL-BGM	3850	.1	.3
NCONFL-BGM	3800	.1	.3
NCONFL-BGM	3694	.1	.3
NCONFL-BGM	3600	.1	.3
NCONFL-BGM	3500	.1	.3
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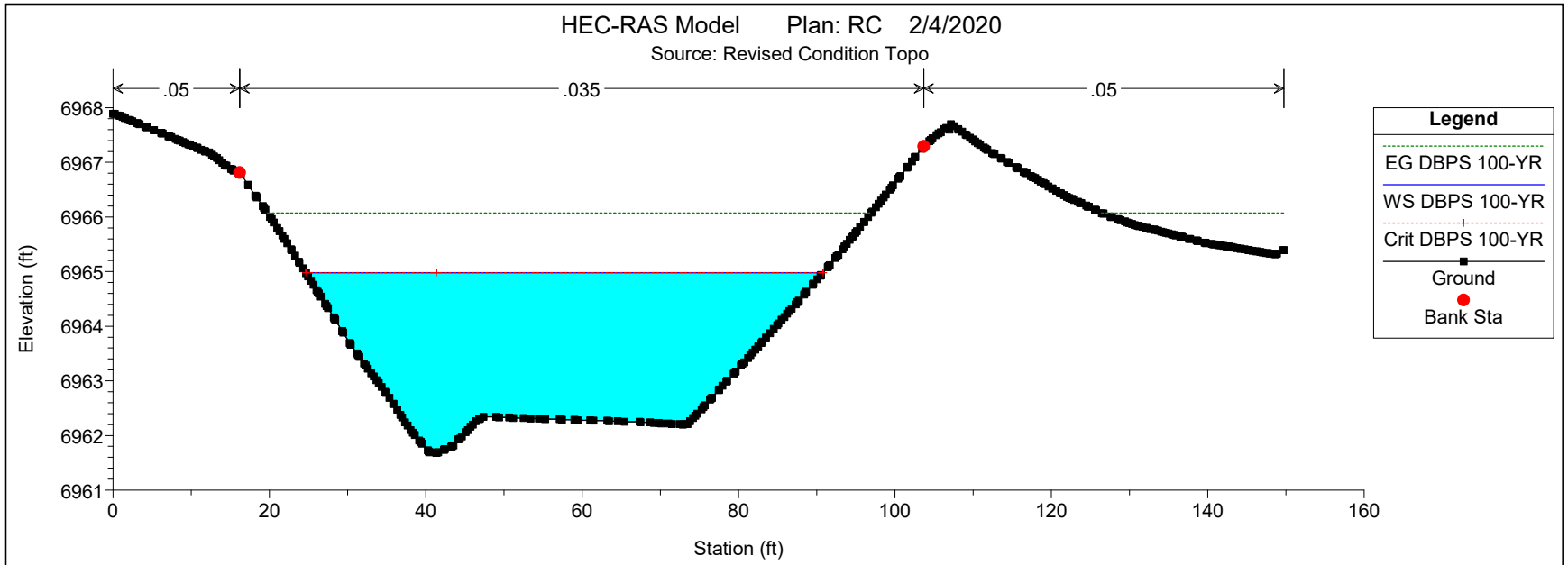
NCONFL-BGM	3350	.1	.3
NCONFL-BGM	3300	.1	.3
NCONFL-BGM	3250	.1	.3
NCONFL-BGM	3200	.1	.3
NCONFL-BGM	3150	.1	.3
NCONFL-BGM	3100	.1	.3
NCONFL-BGM	3050	.1	.3

NCONFL-BGM	3000	.1	.3
NCONFL-BGM	2900	.1	.3
NCONFL-BGM	2800	.1	.3
NCONFL-BGM	2650	.1	.3
NCONFL-BGM	2605	.1	.3

Revised Condition

Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Shear Chan	Shear Total	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
			(cfs)	(ft)	(ft)	(lb/sq ft)	(lb/sq ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
NCONFL-BGM	5100	FEMA 100-YR	1450	6961.68	6965.31	2.01	2.01	6965.31	6966.5	0.013647	8.78	165.23	69.52	1
NCONFL-BGM	5000	FEMA 100-YR	1450	6959.57	6963.33	2.06	1.83	6963.33	6964.58	0.013151	8.98	161.83	71.6	0.99
NCONFL-BGM	4900	FEMA 100-YR	1450	6956.08	6960.79	1.96	1.96	6960.79	6961.95	0.013751	8.63	167.98	72.94	1
NCONFL-BGM	4850	FEMA 100-YR	1450	6954.44	6959.58	2.04	1.58	6959.58	6960.85	0.011886	9.09	164.84	76.61	0.96
NCONFL-BGM	4750	FEMA 100-YR	1450	6952.25	6957.61	1.75	1.09	6957.61	6958.68	0.009513	8.52	197.2	106.64	0.87
NCONFL-BGM	4650	FEMA 100-YR	1450	6950.54	6955.7	2.04	1.21	6955.7	6956.99	0.009615	9.4	181.5	89.06	0.89
NCONFL-BGM	4600	FEMA 100-YR	1450	6949.23	6954.15	2.1	1.54	6954.15	6955.5	0.011109	9.36	162.85	72.45	0.94
NCONFL-BGM	4550	FEMA 100-YR	1450	6947.92	6954.09	0.94	0.6		6954.69	0.003918	6.5	263.6	106.84	0.58
NCONFL-BGM	4500	FEMA 100-YR	1450	6947.9	6952.81	2.23	1.89	6952.81	6954.22	0.012699	9.54	153.3	63.23	0.99
NCONFL-BGM	4400	FEMA 100-YR	1450	6945	6949.06	2.11	1.96	6948.98	6950.42	0.011344	9.35	156.84	67.53	0.95
NCONFL-BGM	4300	FEMA 100-YR	1450	6944.71	6948.34	1.4	1.33	6947.85	6949.24	0.007601	7.63	191.51	215.39	0.78
NCONFL-BGM	4280	FEMA 100-YR	1450	6944.64	6947.8	2.08	2.08	6947.8	6949.06	0.013478	9.01	161	203.94	1
NCONFL-BGM	4250	FEMA 100-YR	1450	6940.08	6943.2	2.11	1.9	6943.2	6944.52	0.012253	9.25	159.4	100.87	0.98
NCONFL-BGM	4240	FEMA 100-YR	1450	6937.01	6943.72	0.18	0.09		6943.85	0.000547	3.03	580.63	209.57	0.23
NCONFL-BGM	4200	FEMA 100-YR	1450	6936.87	6943.62	0.24	0.24		6943.81	0.00068	3.55	408.05	208.21	0.26
NCONFL-BGM	4175	FEMA 100-YR	1450	6936.83	6943.42	0.44	0.44		6943.78	0.001083	4.85	299.02	186.78	0.34
NCONFL-BGM	4150	FEMA 100-YR	1450	6936.78	6943.35	0.07	0.05	6940.09	6943.76	0.000168	5.17	285.54	154.16	0.36
NCONFL-BGM	4073		Culvert											
NCONFL-BGM	4040	FEMA 100-YR	1450	6936.4	6940.05	0.29	0.27	6939.74	6941.47	0.001263	9.57	153.28	42.55	0.89
NCONFL-BGM	4030	FEMA 100-YR	1450	6936.38	6940.36	1.44	1.44	6939.5	6941.1	0.006694	6.94	209.04	68.93	0.66
NCONFL-BGM	4000	FEMA 100-YR	1450	6936.28	6939.58	1.86	1.86	6939.45	6940.73	0.011507	8.58	168.98	79.52	0.93
NCONFL-BGM	3900	FEMA 100-YR	1450	6936.02	6939.36	0.85	0.73		6939.87	0.005632	5.72	258.04	122.62	0.65
NCONFL-BGM	3850	FEMA 100-YR	1450	6935.31	6938.84	1.15	1.15		6939.51	0.008202	6.58	220.49	97.4	0.77
NCONFL-BGM	3800	FEMA 100-YR	1450	6934.35	6937.95	1.76	1.76	6937.95	6938.94	0.014759	7.95	182.42	94.05	1.01
NCONFL-BGM	3694	FEMA 100-YR	1482	6931.81	6935.53	1.28	1.28	6935.35	6936.24	0.010872	6.76	219.11	115.41	0.87
NCONFL-BGM	3600	FEMA 100-YR	1482	6930.58	6934.13	1.66	1.66	6934.13	6935.02	0.015245	7.59	195.35	111.22	1.01
NCONFL-BGM	3500	FEMA 100-YR	1482	6928.8	6933.06	0.72	0.72		6933.51	0.004225	5.39	274.81	99.75	0.57
NCONFL-BGM	3450	FEMA 100-YR	1482	6927.99	6931.95	1.95	1.95	6931.95	6933.09	0.01378	8.59	172.56	75.61	1
NCONFL-BGM	3350	FEMA 100-YR	1482	6926.42	6930.26	1.7	1.7	6930.26	6931.2	0.014757	7.76	190.87	102.92	1.01
NCONFL-BGM	3300	FEMA 100-YR	1482	6924.78	6929.52	1.37	1.21	6929.14	6930.36	0.00868	7.34	202.85	89.96	0.81
NCONFL-BGM	3250	FEMA 100-YR	1482	6923.75	6928.66	1.9	1.67	6928.57	6929.81	0.012179	8.63	172.72	77.97	0.96
NCONFL-BGM	3200	FEMA 100-YR	1482	6923.28	6927.88	2.09	1.86	6927.88	6929.18	0.012816	9.12	164	69.79	0.99
NCONFL-BGM	3150	FEMA 100-YR	1482	6923.15	6926.8	1.97	1.41	6926.8	6928.02	0.011701	8.89	173.92	89.73	0.95
NCONFL-BGM	3100	FEMA 100-YR	1482	6921.99	6925.66	1.92	1.65	6925.61	6926.83	0.012306	8.68	172.24	79.63	0.96
NCONFL-BGM	3050	FEMA 100-YR	1482	6921.38	6925.94	0.75	0.55		6926.44	0.003459	5.7	271.11	106.11	0.54
NCONFL-BGM	3000	FEMA 100-YR	1482	6920.36	6925.04	1.59	0.84	6925.04	6926	0.008551	8.14	210.53	210.44	0.83
NCONFL-BGM	2900	FEMA 100-YR	1482	6919.32	6923.09	1.82	1.11	6923.09	6924.14	0.010417	8.61	210.14	146.5	0.9
NCONFL-BGM	2800	FEMA 100-YR	1482	6917.18	6921.88	1.68	0.77	6921.88	6922.91	0.007634	8.58	227.48	156.9	0.8
NCONFL-BGM	2650	FEMA 100-YR	1482	6913.71	6919.22	1.21	0.4	6919.22	6919.89	0.005223	7.34	334.61	270.62	0.67
NCONFL-BGM	2605	FEMA 100-YR	1482	6914	6918.85	0.72	0.63	6918.58	6919.21	0.008288	4.82	321.29	262.7	0.72


HEC-RAS Model Plan: RC 2/4/2020
Source: Revised Condition Topo
.05
.035
.05
Elevation (ft)
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6967
6966
6965
6964
6963
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6961
0
20
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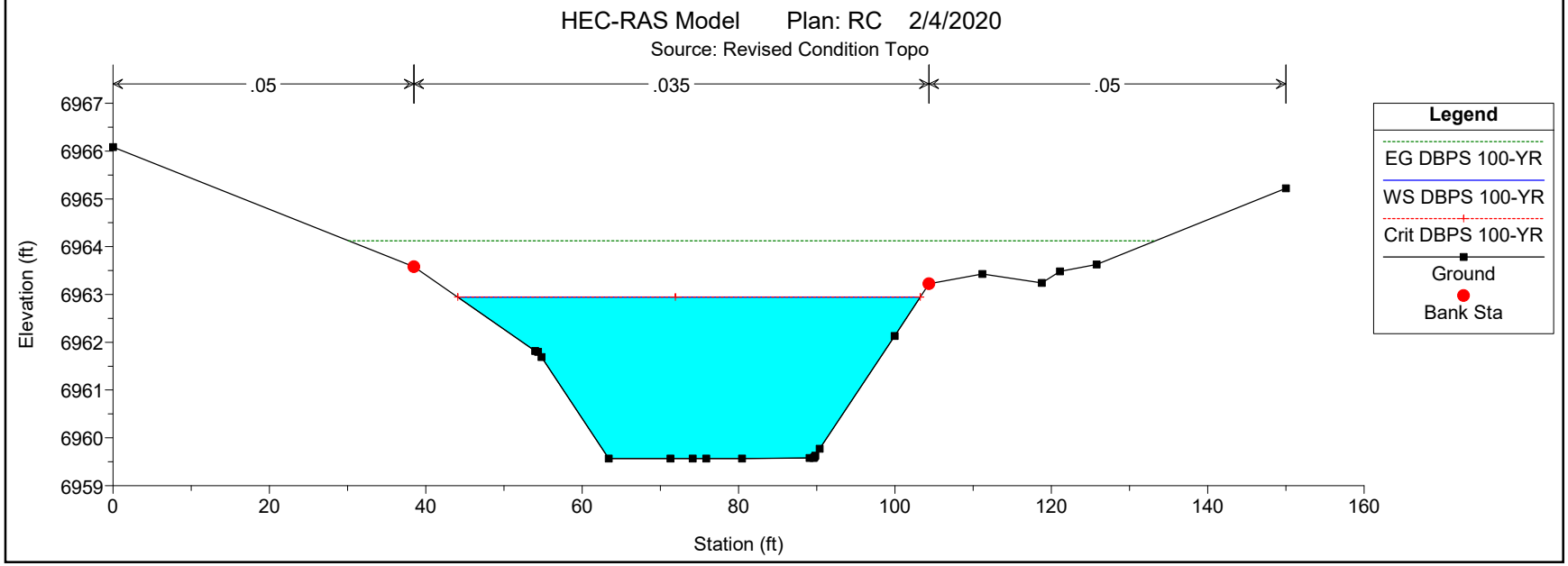
120
140
160
Station (ft)
Legend
EG DBPS 100-YR
WS DBPS 100-YR
Crit DBPS 100-YR
Ground
Bank Sta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Source: Revised Condition Topo
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Elevation (ft)
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6959
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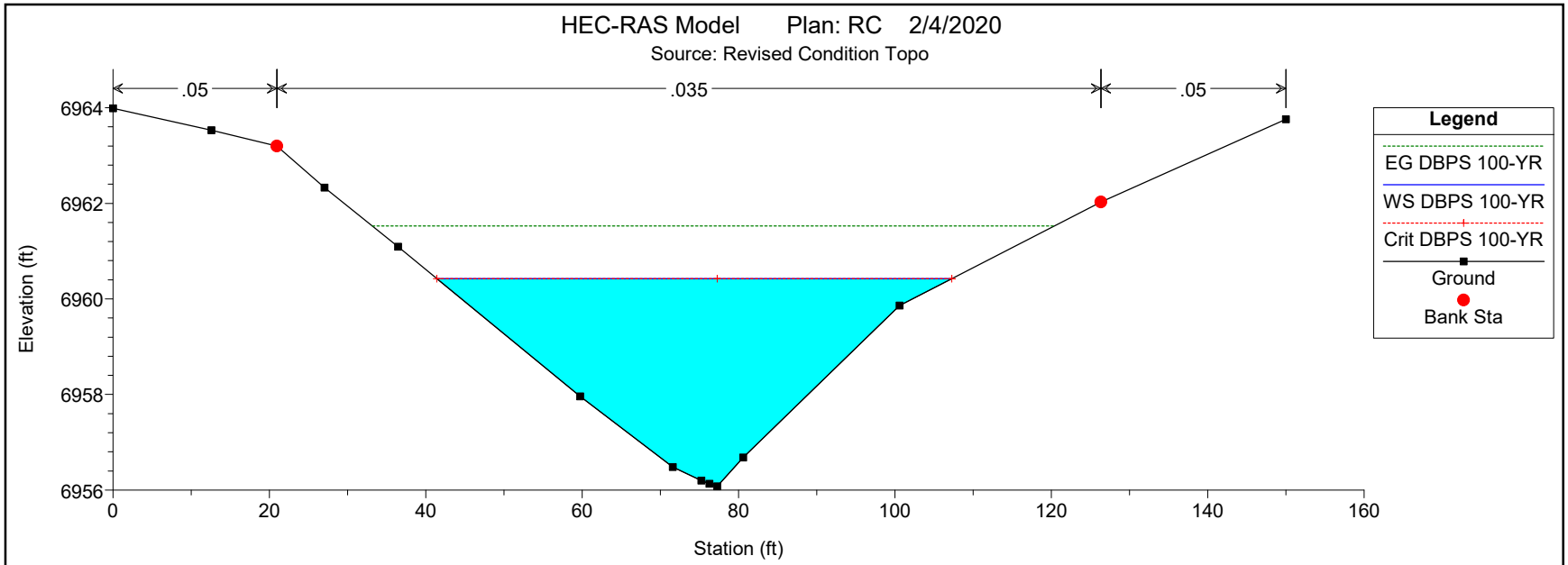
140
160
Station (ft)
Legend
EG DBPS 100-YR
WS DBPS 100-YR
Crit DBPS 100-YR
Ground
Bank Sta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Source: Revised Condition Topo
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Elevation (ft)
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Station (ft)
Legend
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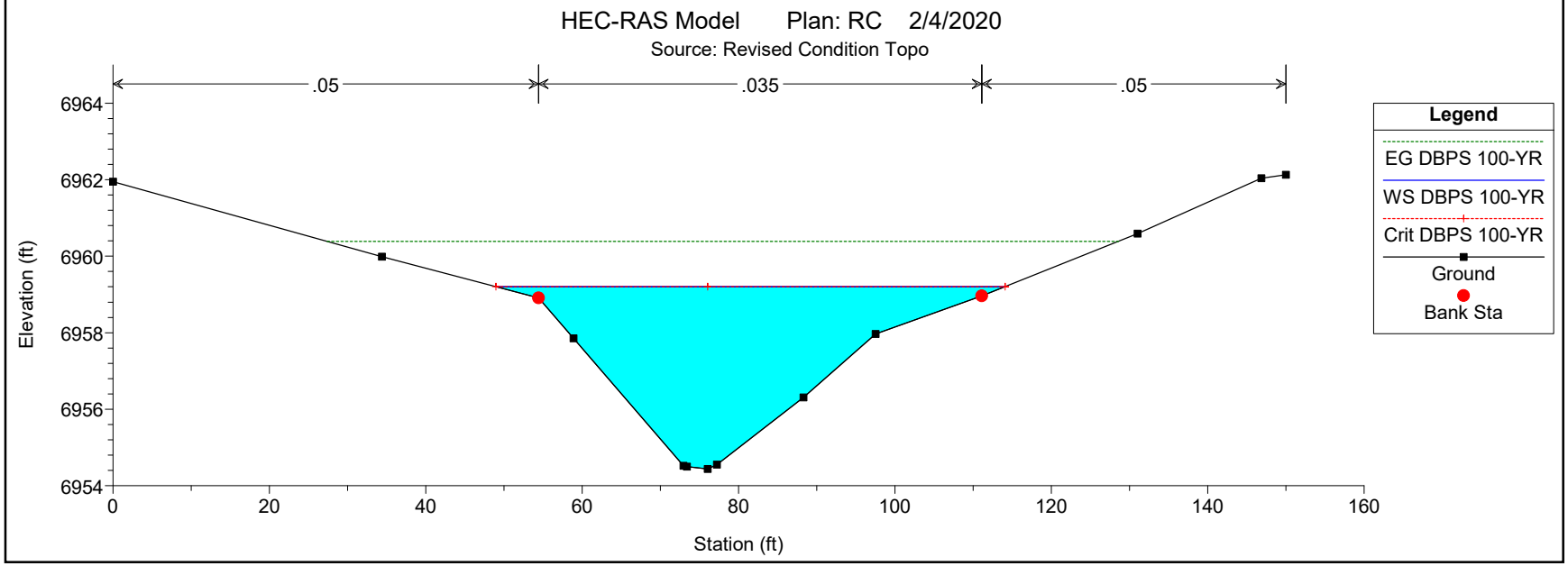
WS DBPS 100-YR
Crit DBPS 100-YR
Ground
Bank Sta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Source: Revised Condition Topo
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Elevation (ft)
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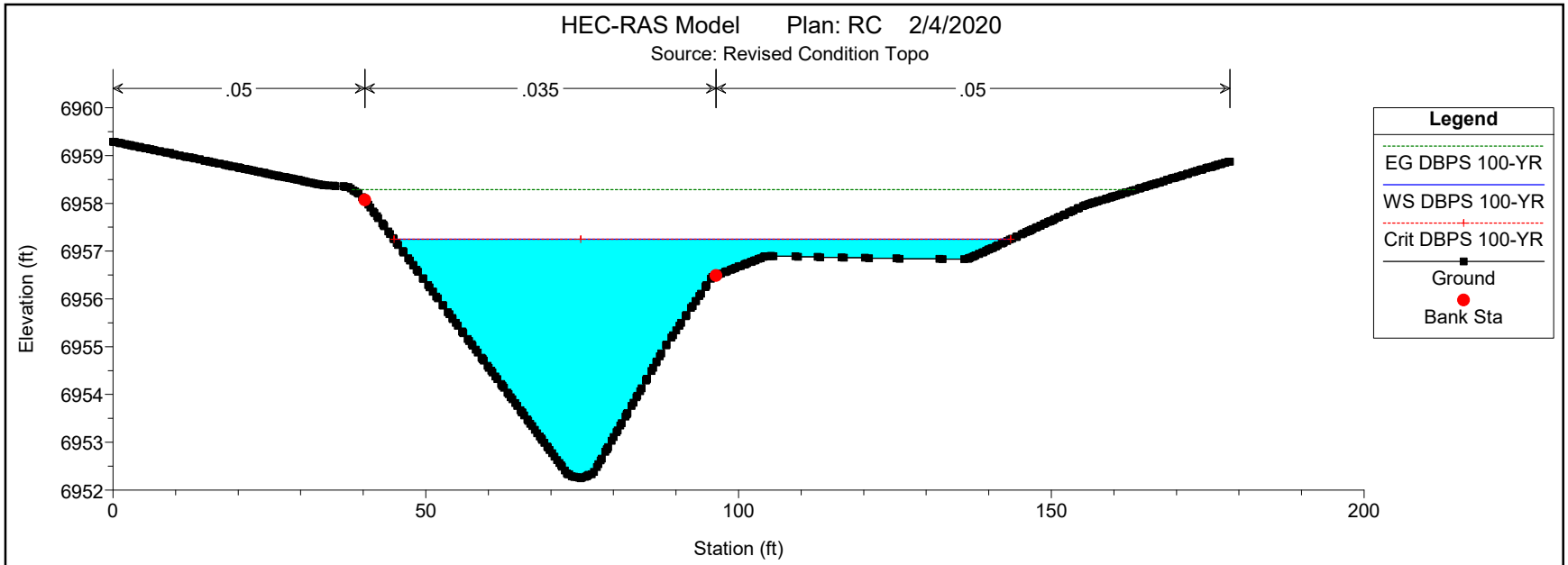
Station (ft)
Legend
EG DBPS 100-YR
WS DBPS 100-YR
Crit DBPS 100-YR
Ground
Bank Sta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Source: Revised Condition Topo
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Elevation (ft)
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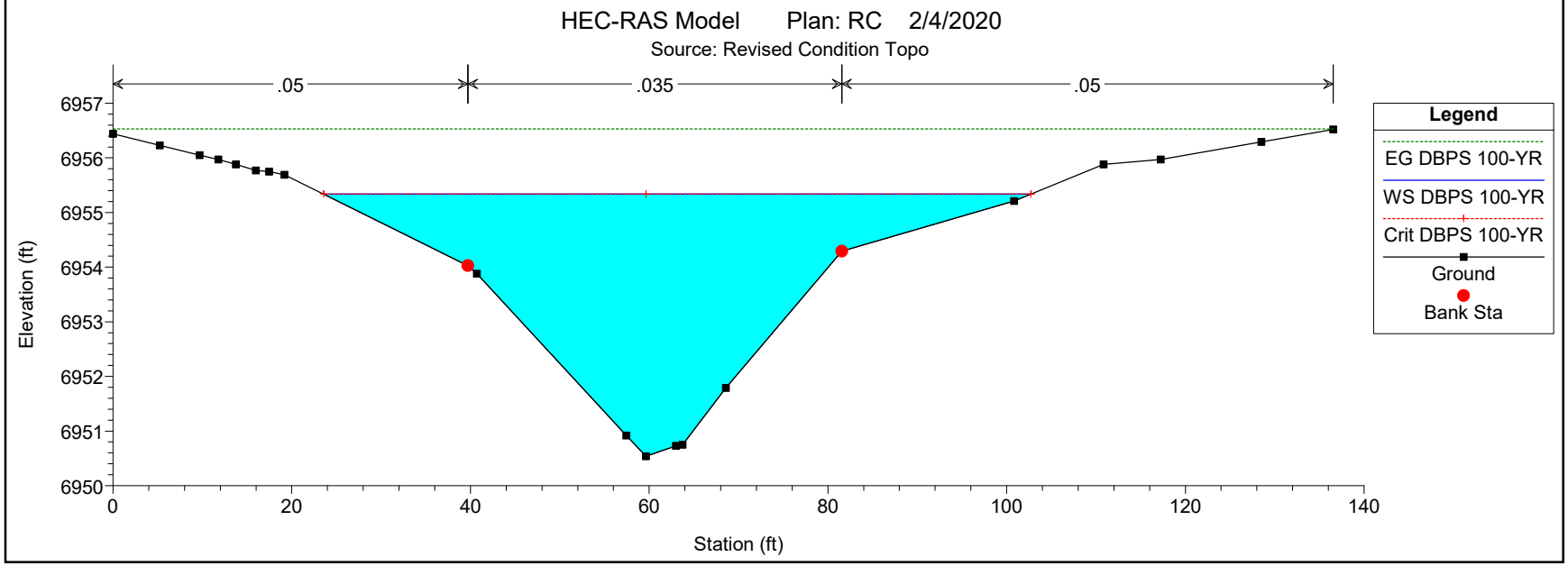
200
Station (ft)
Legend
EG DBPS 100-YR
WS DBPS 100-YR
Crit DBPS 100-YR
Ground
Bank Sta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Source: Revised Condition Topo
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Elevation (ft)
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Station (ft)
Legend
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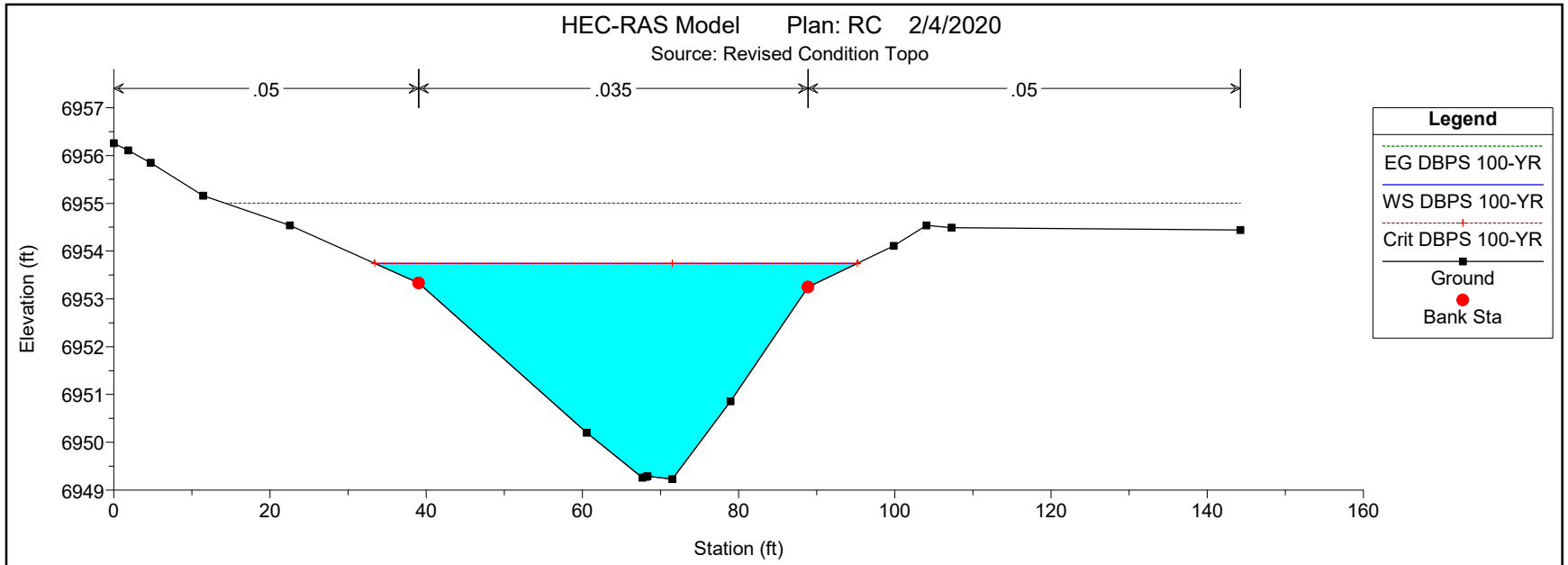
WS DBPS 100-YR
Crit DBPS 100-YR
Ground
Bank Sta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Source: Revised Condition Topo
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Elevation (ft)
Station (ft)
Legend
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WS DBPS 100-YR
Crit DBPS 100-YR
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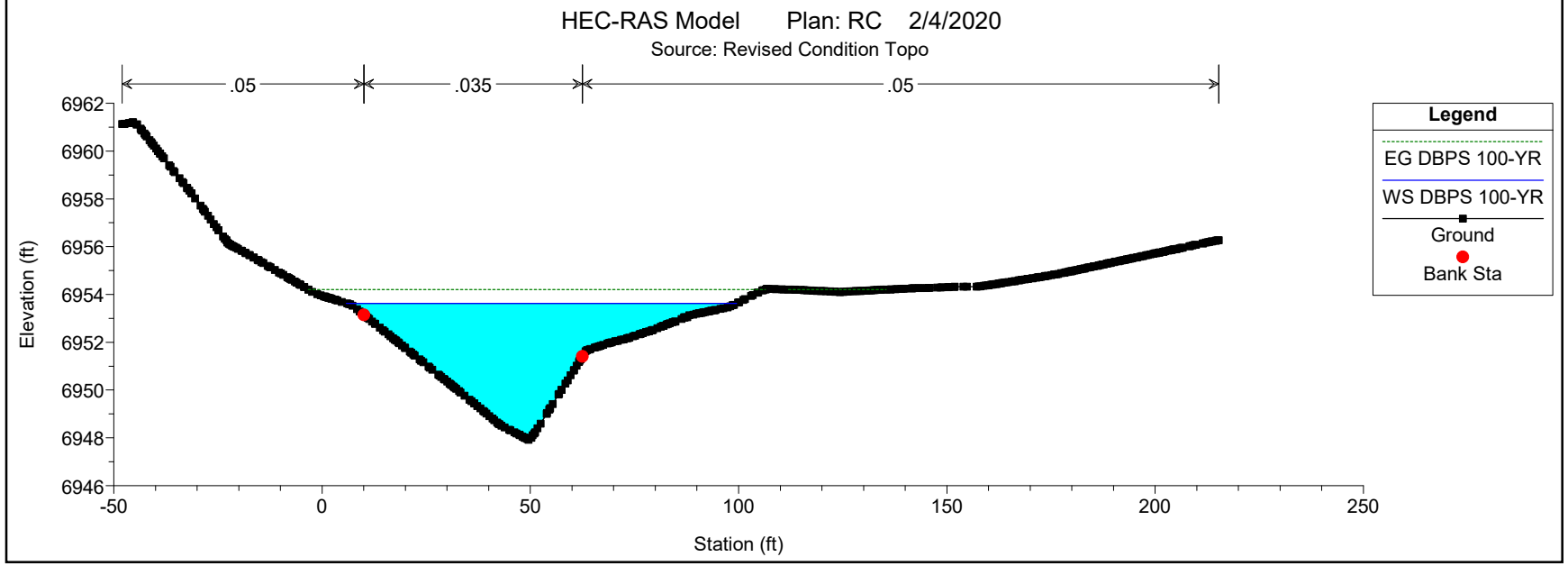
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Elevation (ft)
Station (ft)
Legend
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WS DBPS 100-YR
Ground
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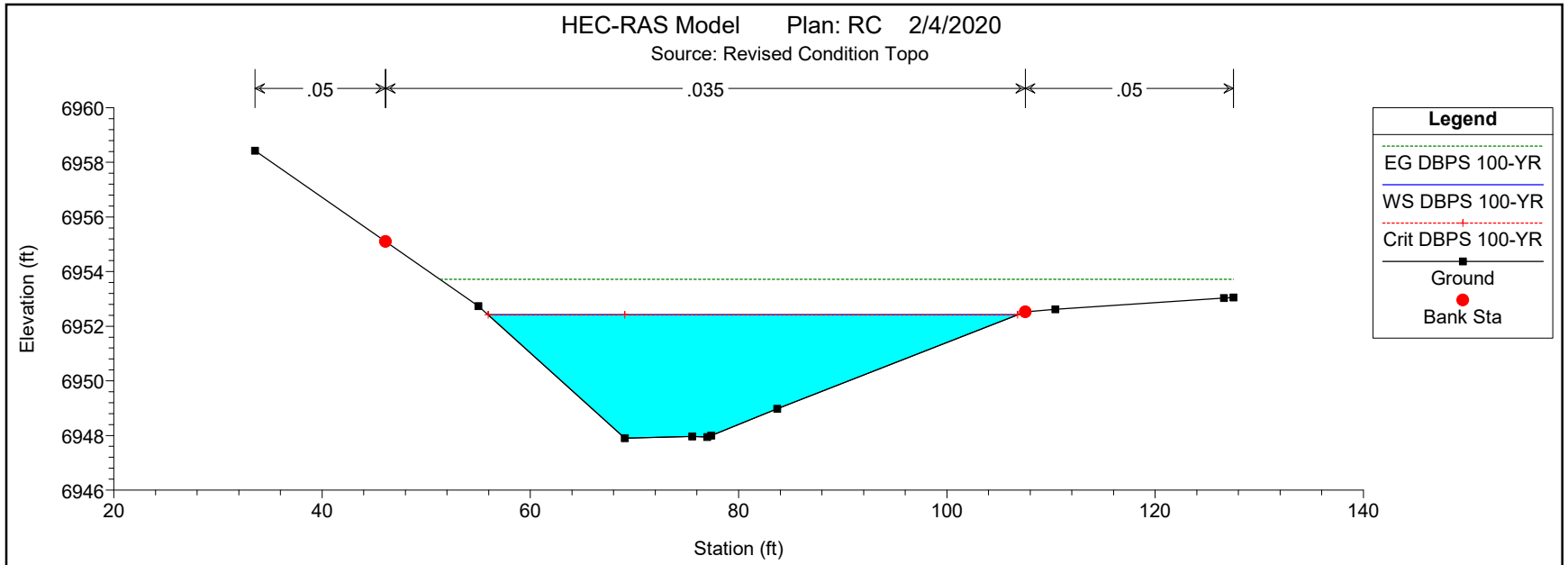
HEC-RAS Model Plan: RC 2/4/2020
Source: Revised Condition Topo
.05
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Elevation (ft)
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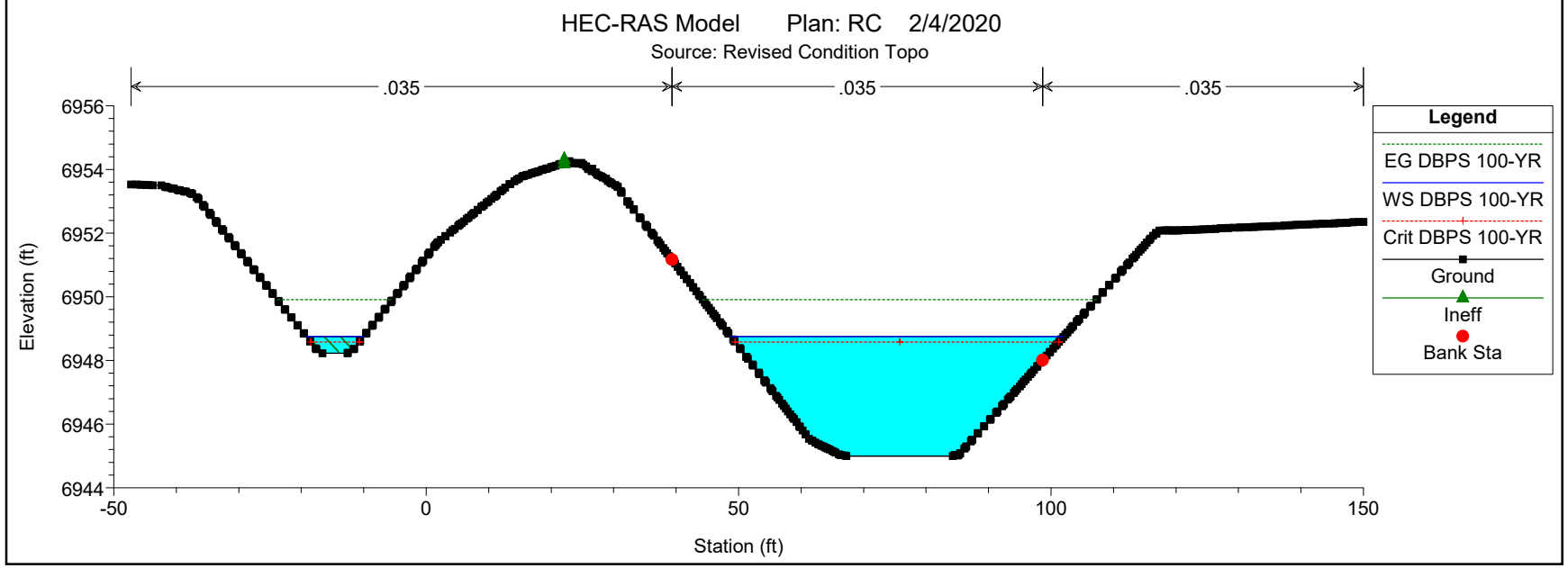
Station (ft)
Legend
EG DBPS 100-YR
WS DBPS 100-YR
Crit DBPS 100-YR
Ground
Bank Sta


HEC-RAS Model Plan: RC 2/4/2020
Source: Revised Condition Topo
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Elevation (ft)
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Station (ft)
Legend
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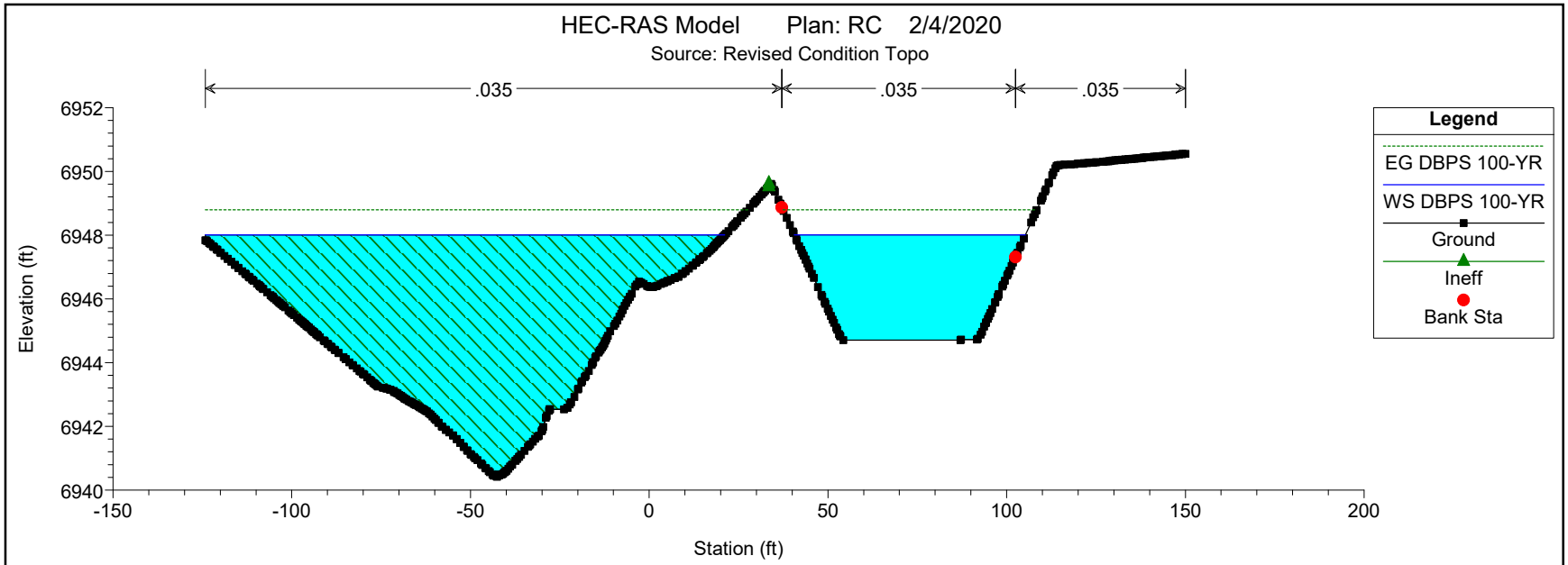
WS DBPS 100-YR
Crit DBPS 100-YR
Ground
Ineff
Bank Sta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Source: Revised Condition Topo
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Elevation (ft)
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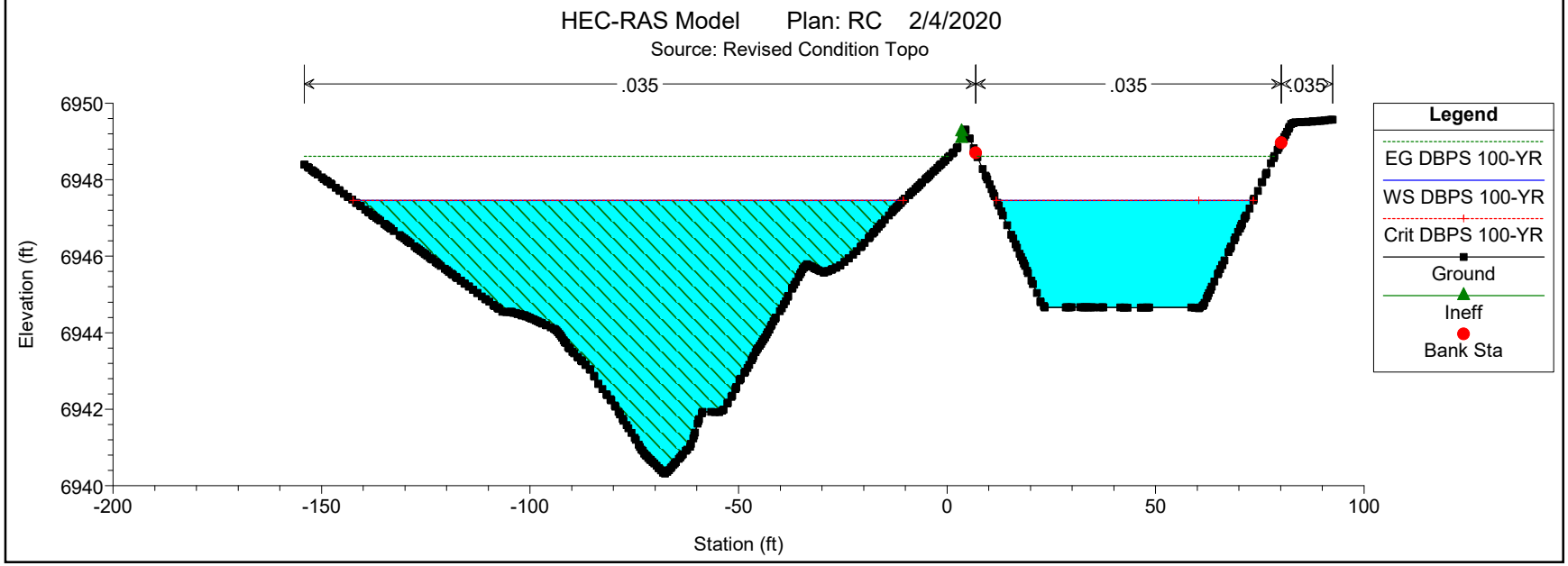
Station (ft)
Legend
EG DBPS 100-YR
WS DBPS 100-YR
Ground
Ineff
Bank Sta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Source: Revised Condition Topo
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Elevation (ft)
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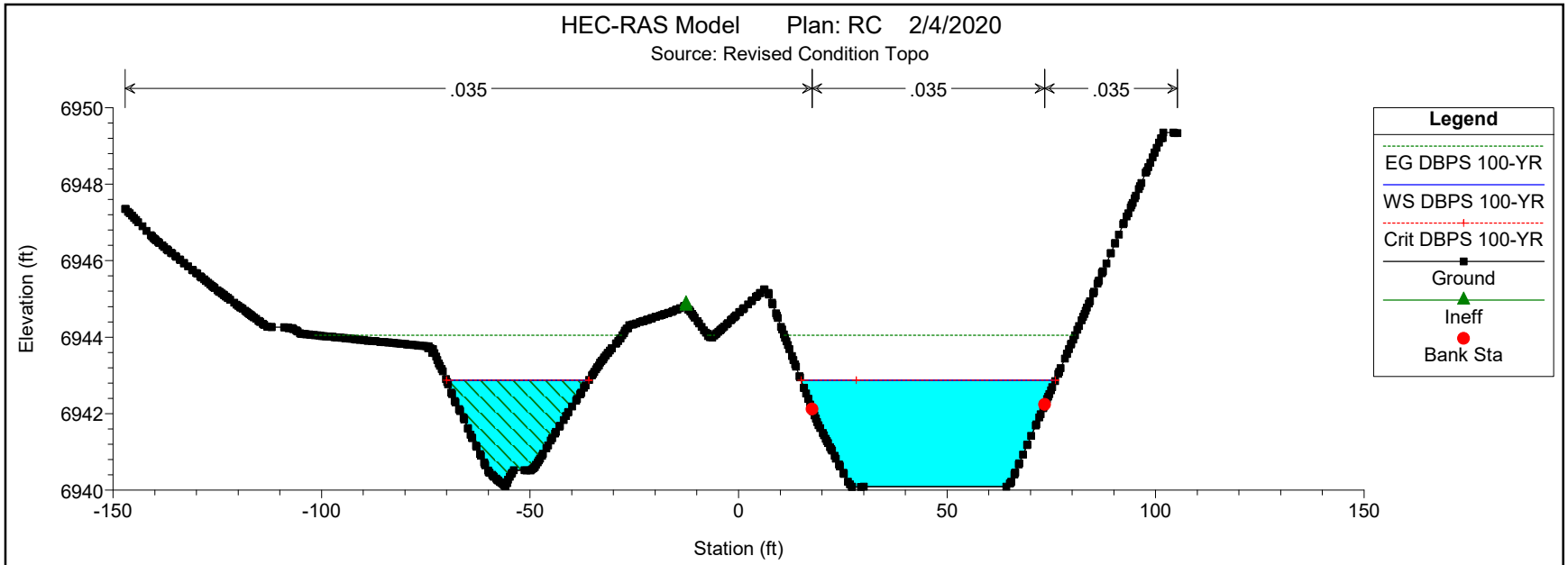
Station (ft)
Legend
EG DBPS 100-YR
WS DBPS 100-YR
Crit DBPS 100-YR
Ground
Ineff
Bank Sta


HEC-RAS Model Plan: RC 2/4/2020
Source: Revised Condition Topo
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Elevation (ft)
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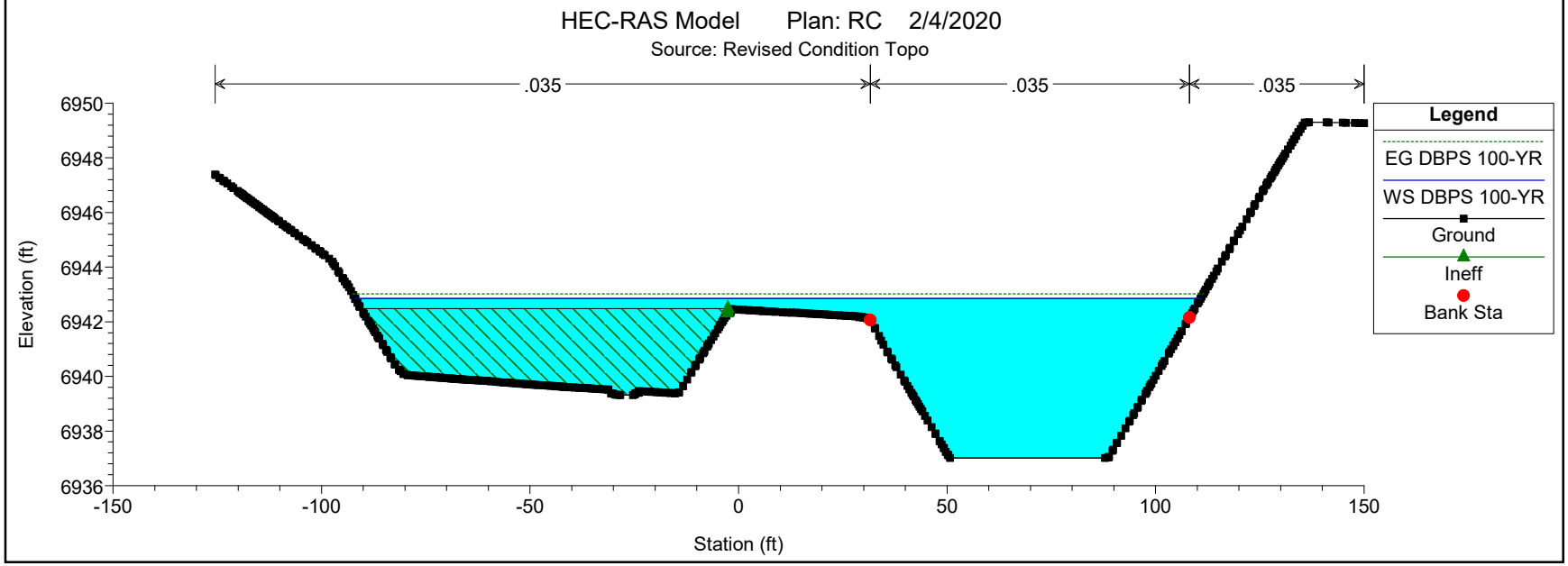
Station (ft)
Legend
EG DBPS 100-YR
WS DBPS 100-YR
Crit DBPS 100-YR
Ground
Ineff
Bank Sta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Source: Revised Condition Topo
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Elevation (ft)
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Station (ft)
Legend
EG DBPS 100-YR
WS DBPS 100-YR
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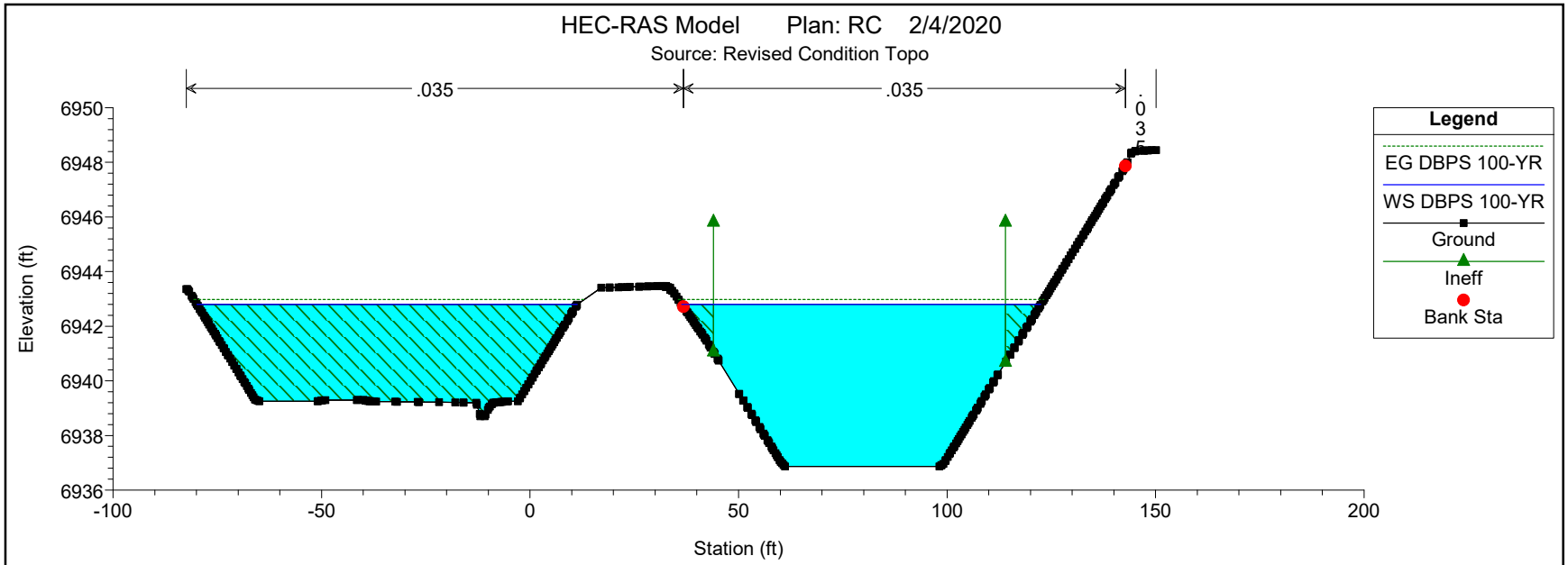
Bank Sta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Elevation (ft)
Station (ft)
Legend
EG DBPS 100-YR
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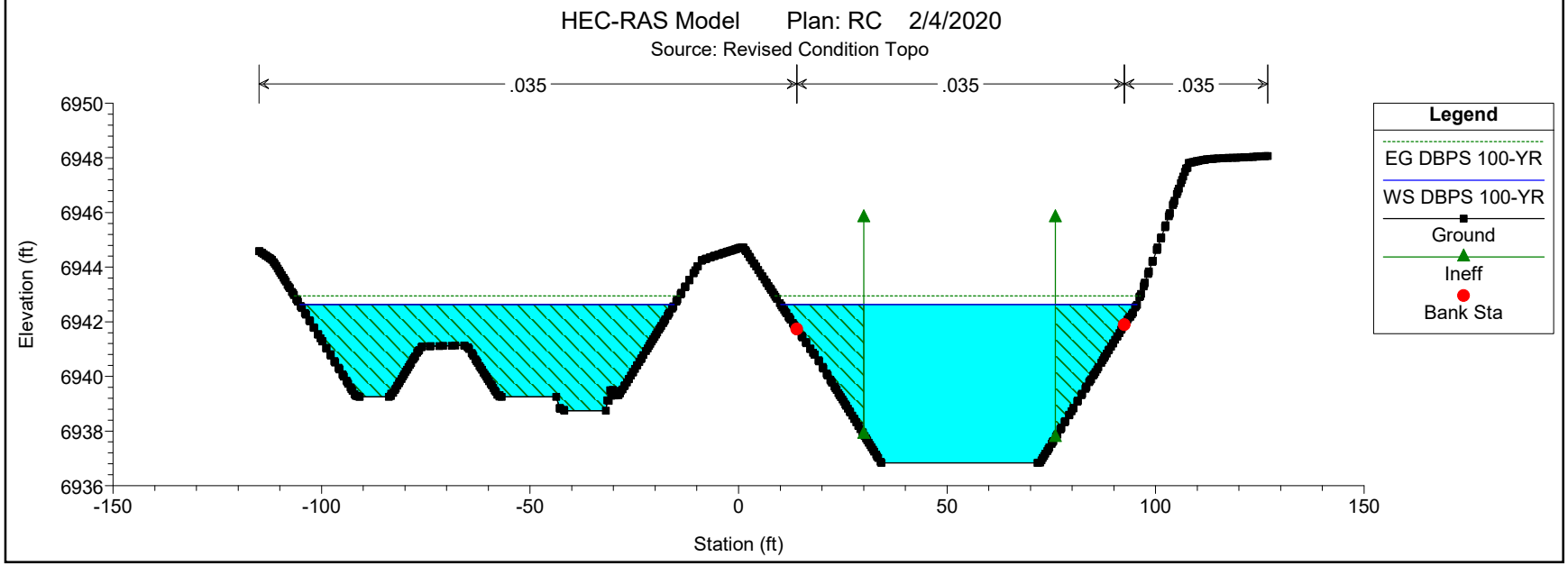
Bank Sta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Source: Revised Condition Topo
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Elevation (ft)
Station (ft)
Legend
EG DBPS 100-YR
WS DBPS 100-YR
Ground
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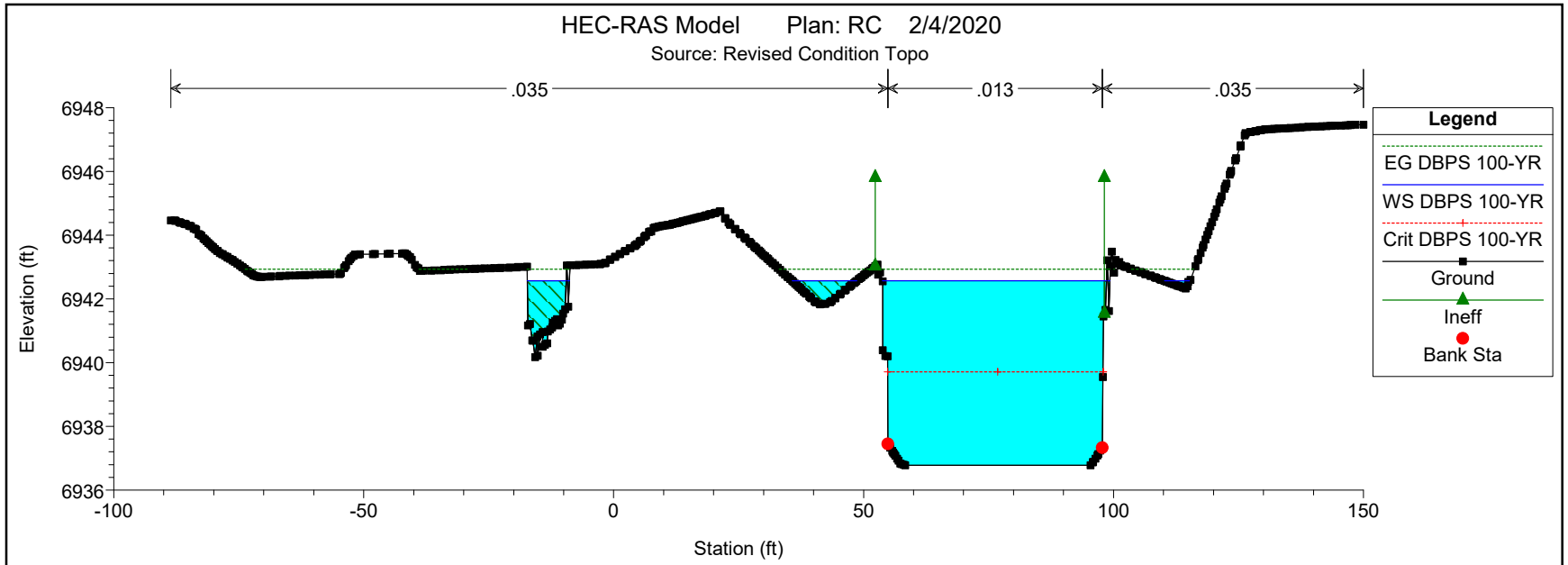
Bank Sta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Source: Revised Condition Topo
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Elevation (ft)
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6936
-100
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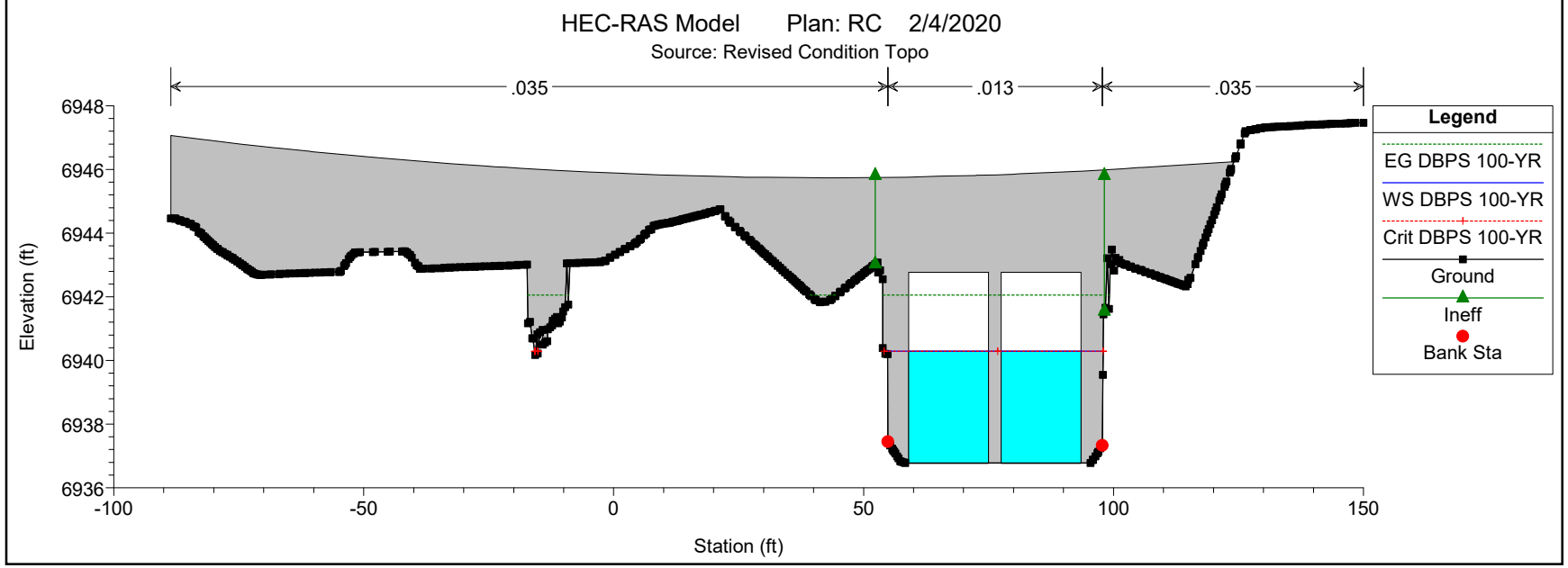
100
150
Station (ft)
Legend
EG DBPS 100-YR
WS DBPS 100-YR
Crit DBPS 100-YR
Ground
Ineff
Bank Sta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Source: Revised Condition Topo
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.035
Elevation (ft)
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6940
6938
6936
-100
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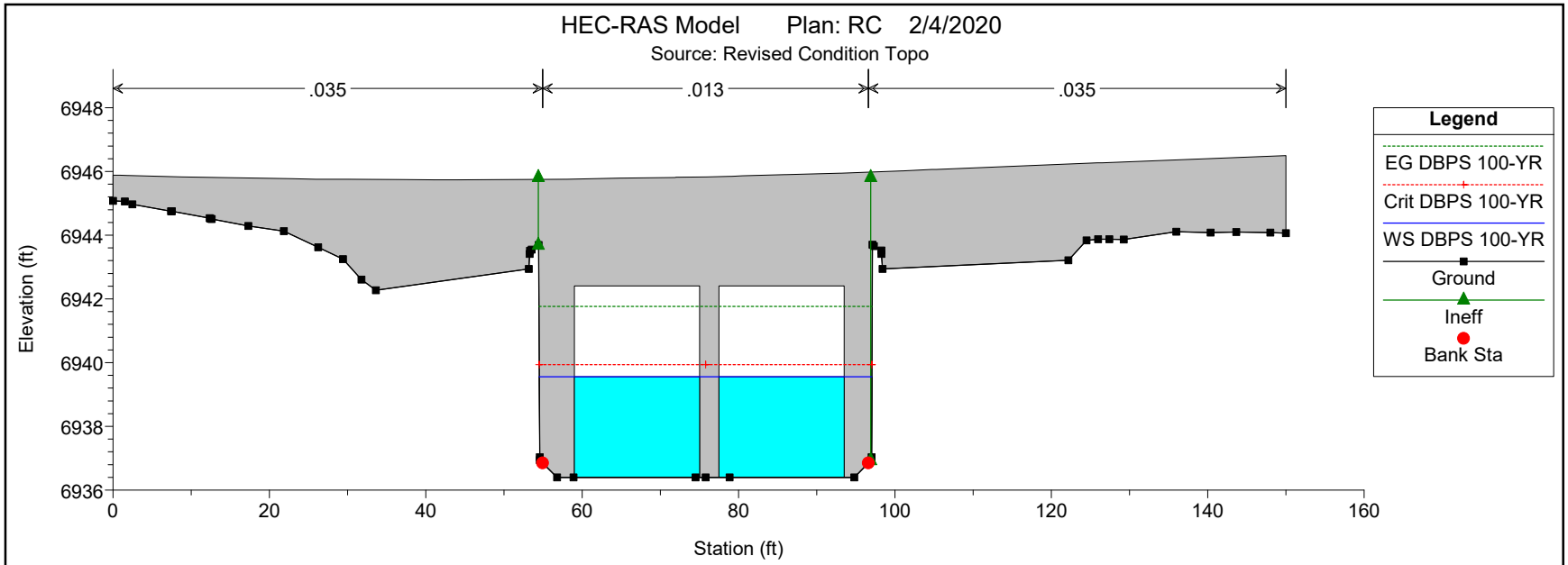
100
150
Station (ft)
Legend
EG DBPS 100-YR
WS DBPS 100-YR
Crit DBPS 100-YR
Ground
Ineff
Bank Sta


HEC-RAS Model Plan: RC 2/4/2020
Source: Revised Condition Topo
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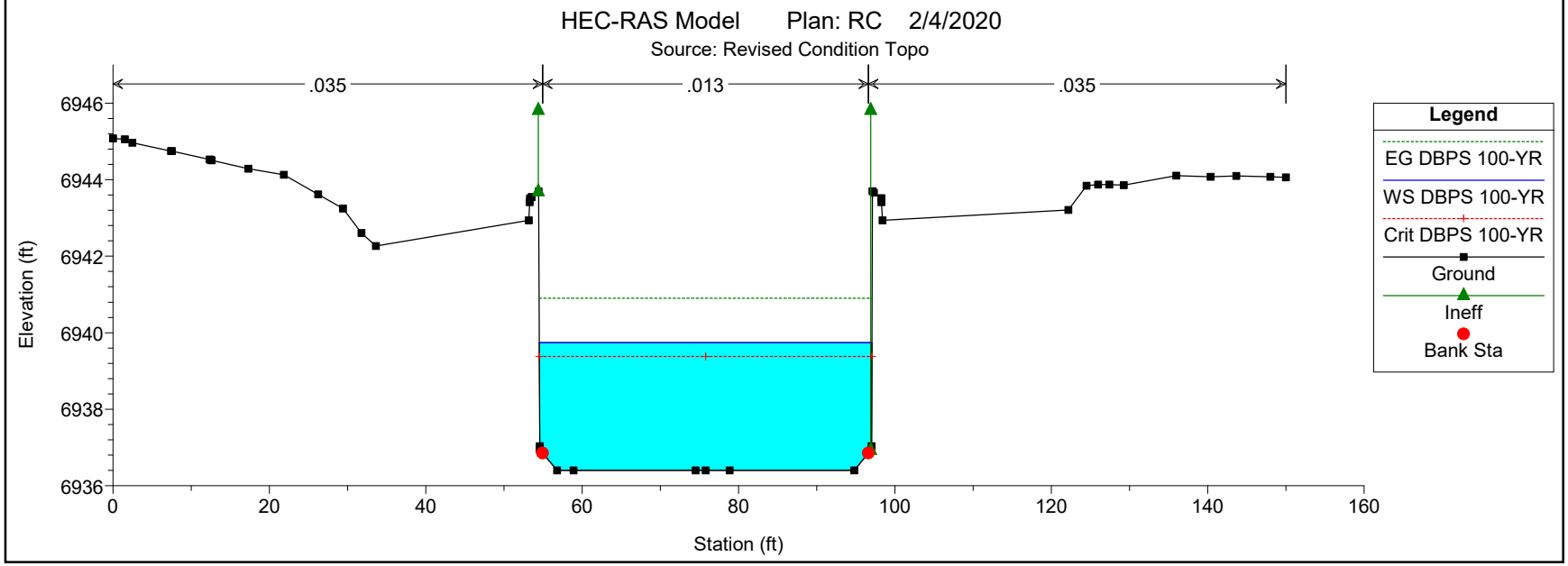
Elevation (ft)
Station (ft)
Legend
EG DBPS 100-YR
Crit DBPS 100-YR
WS DBPS 100-YR
Ground
Ineff
Bank Sta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Source: Revised Condition Topo
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.013
.035
Elevation (ft)
Station (ft)
Legend
EG DBPS 100-YR
WS DBPS 100-YR
Crit DBPS 100-YR
Ground
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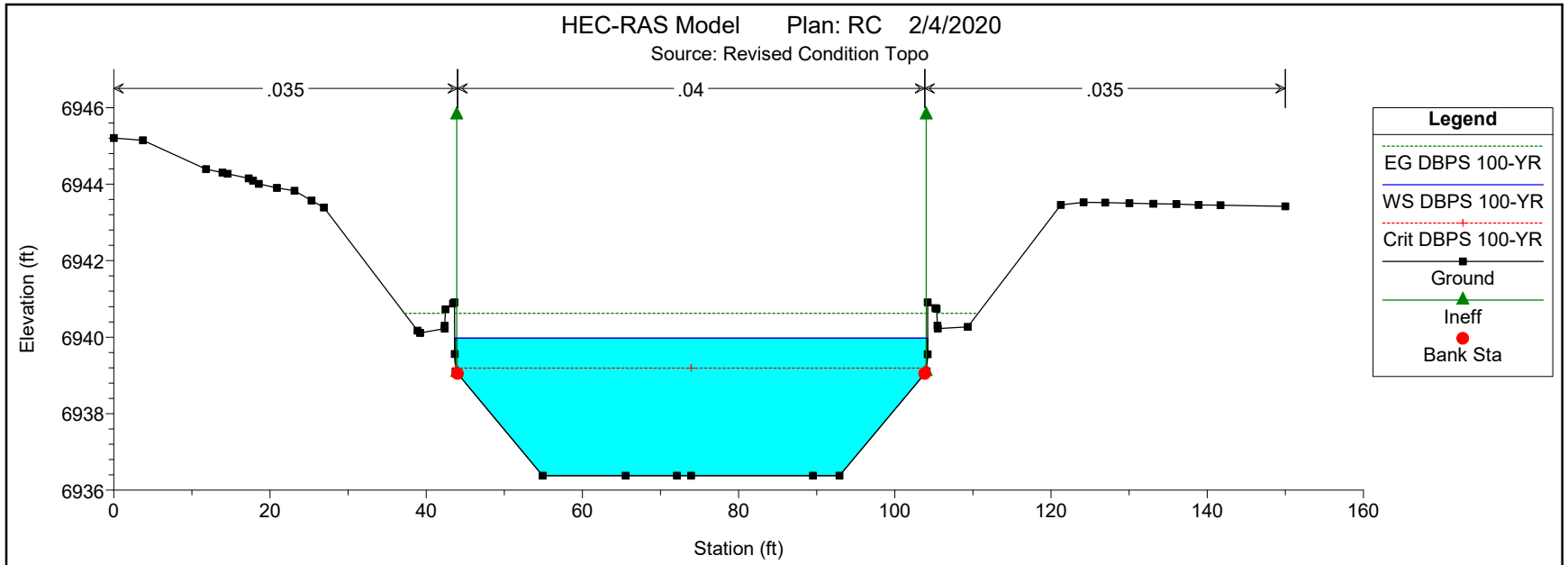
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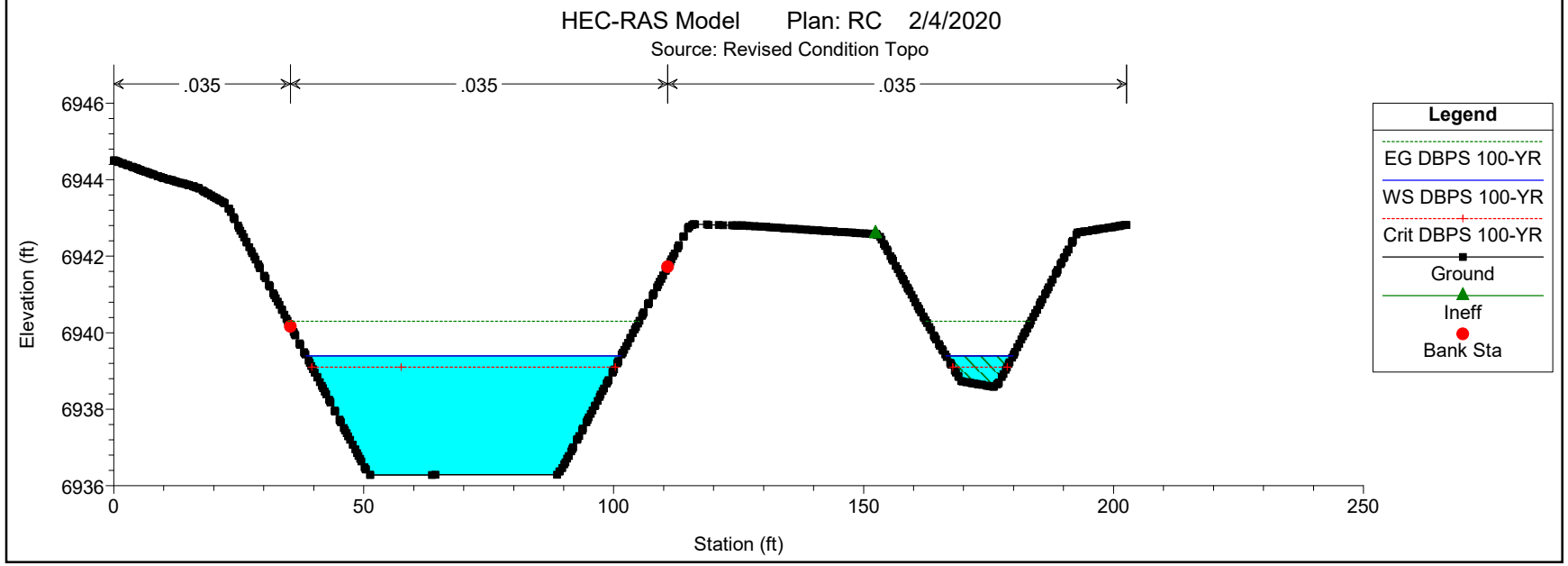
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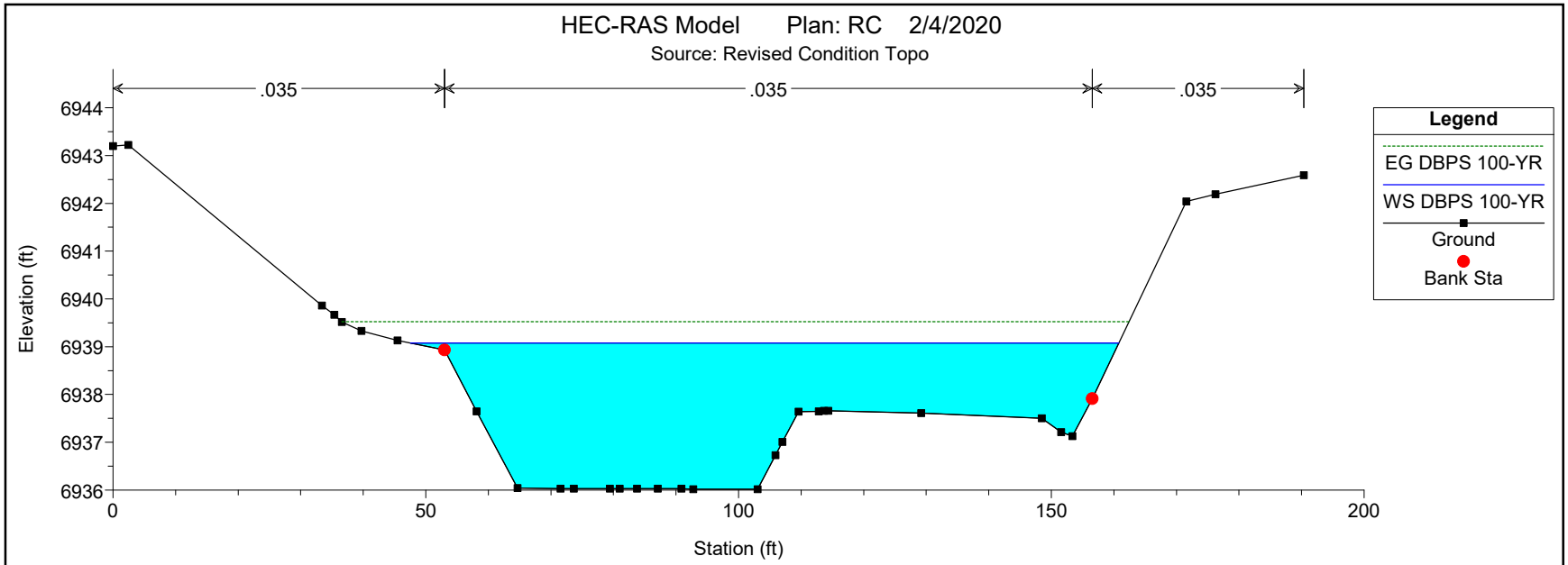
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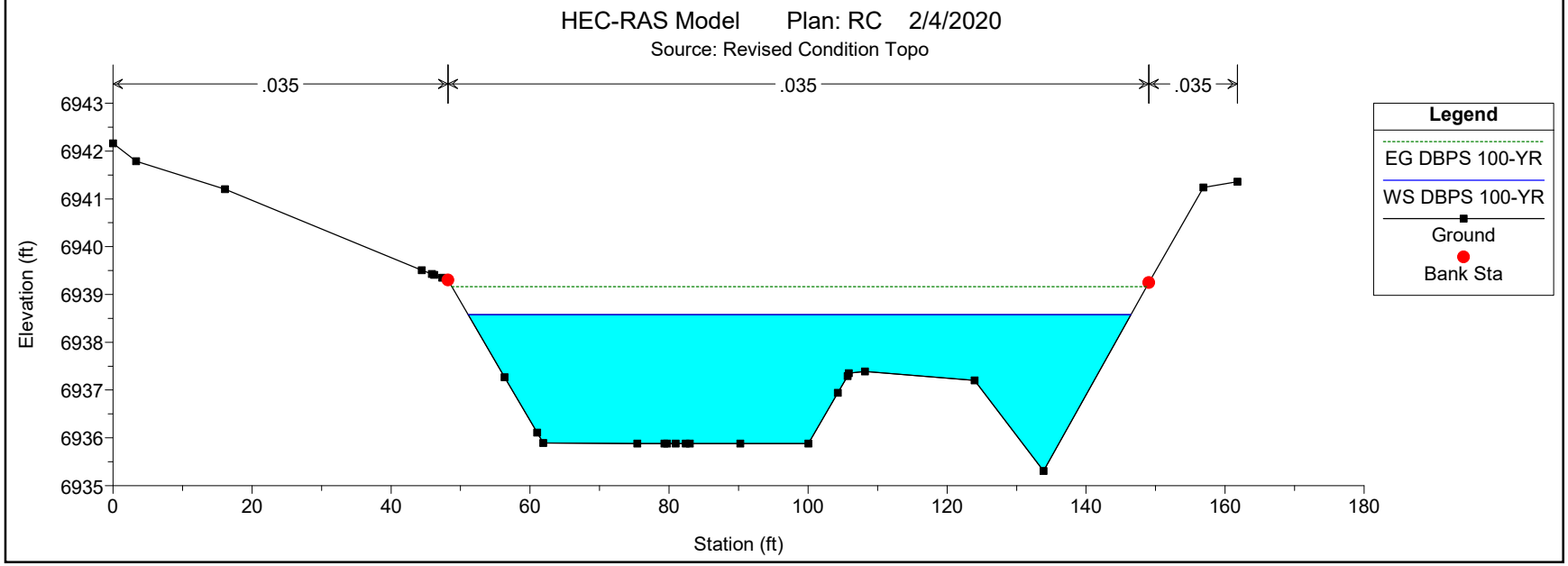
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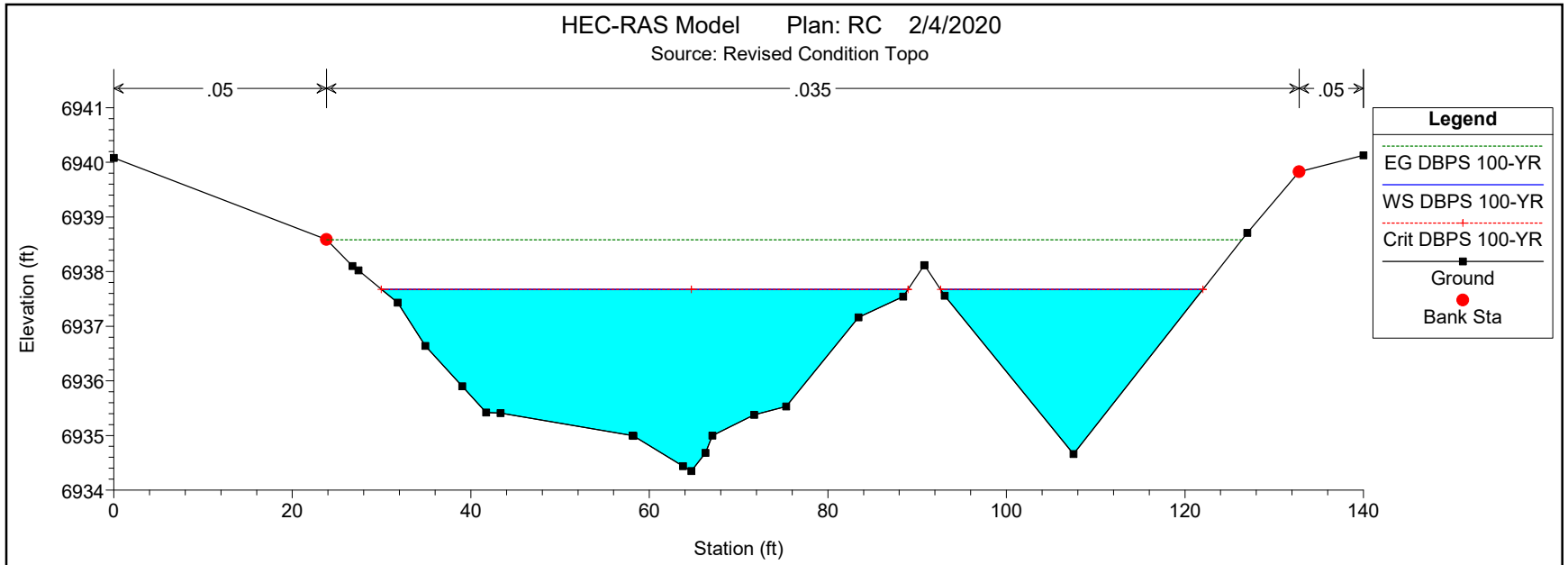
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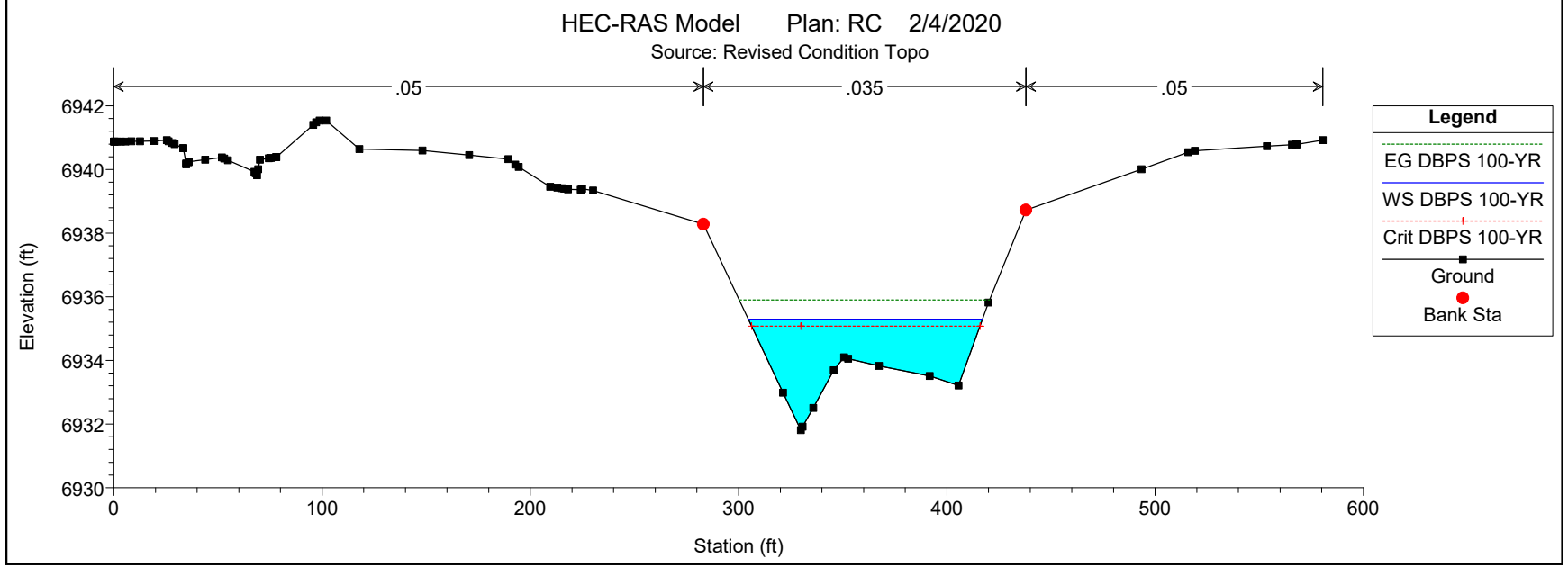
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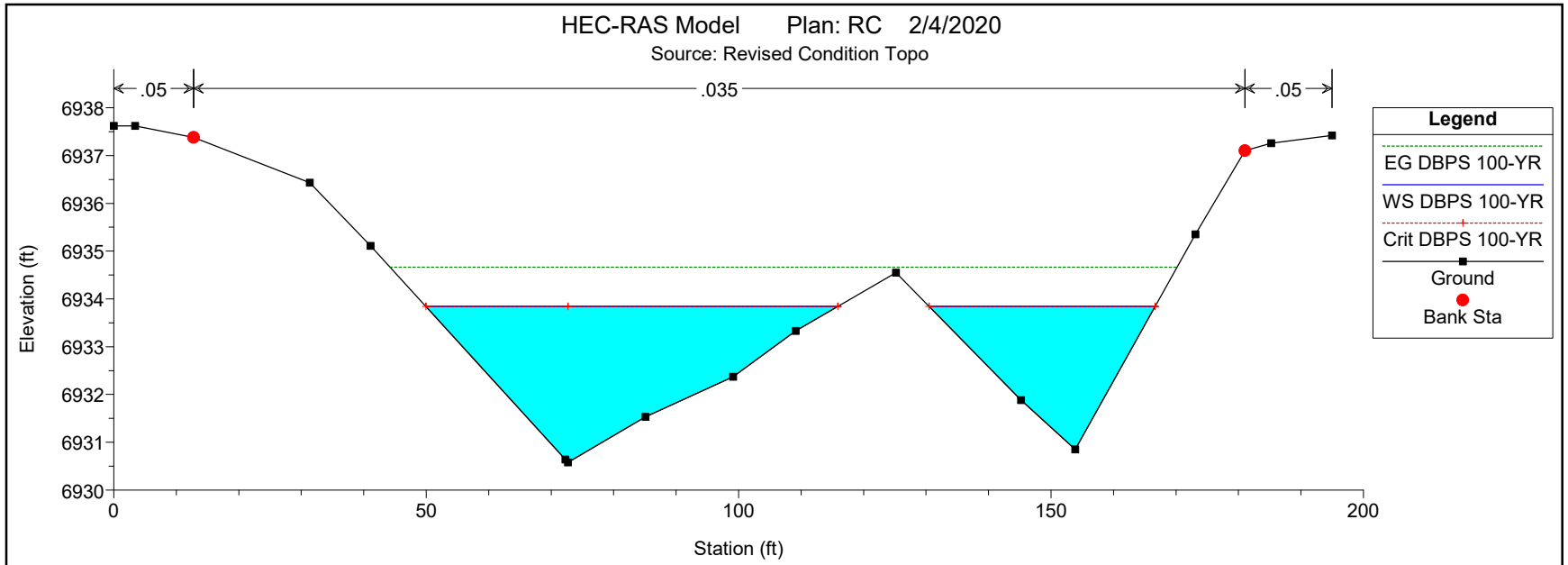
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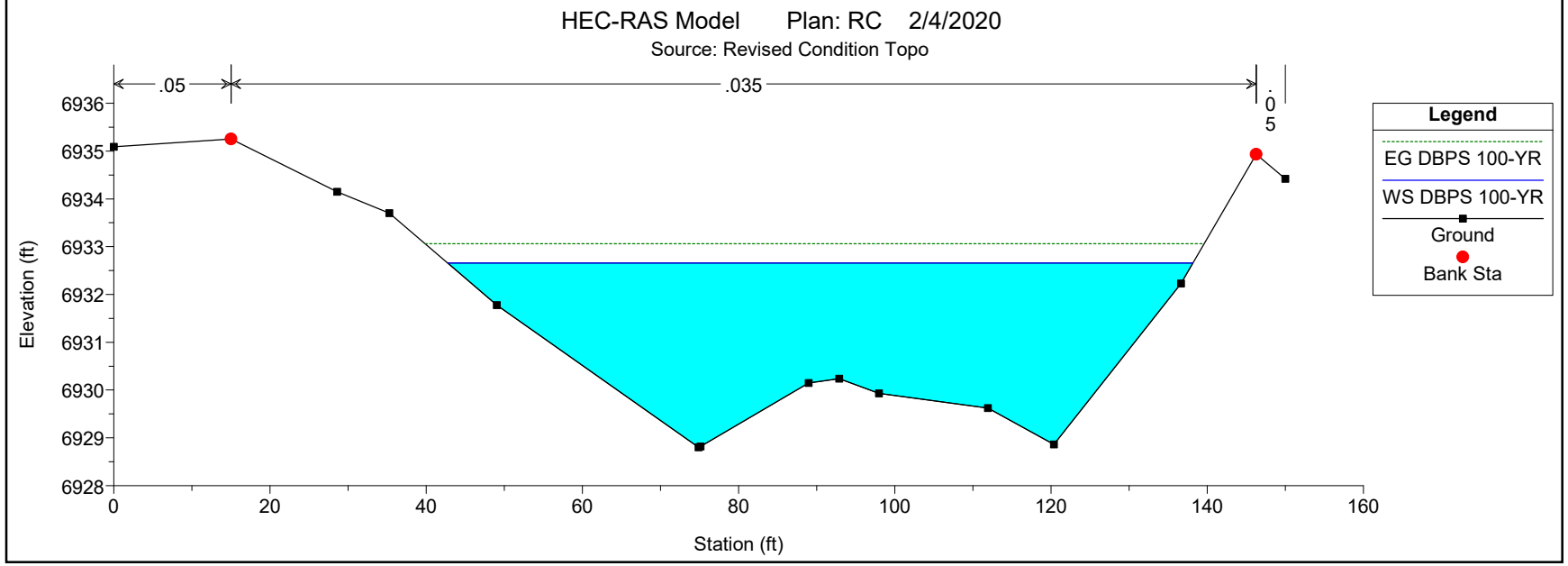
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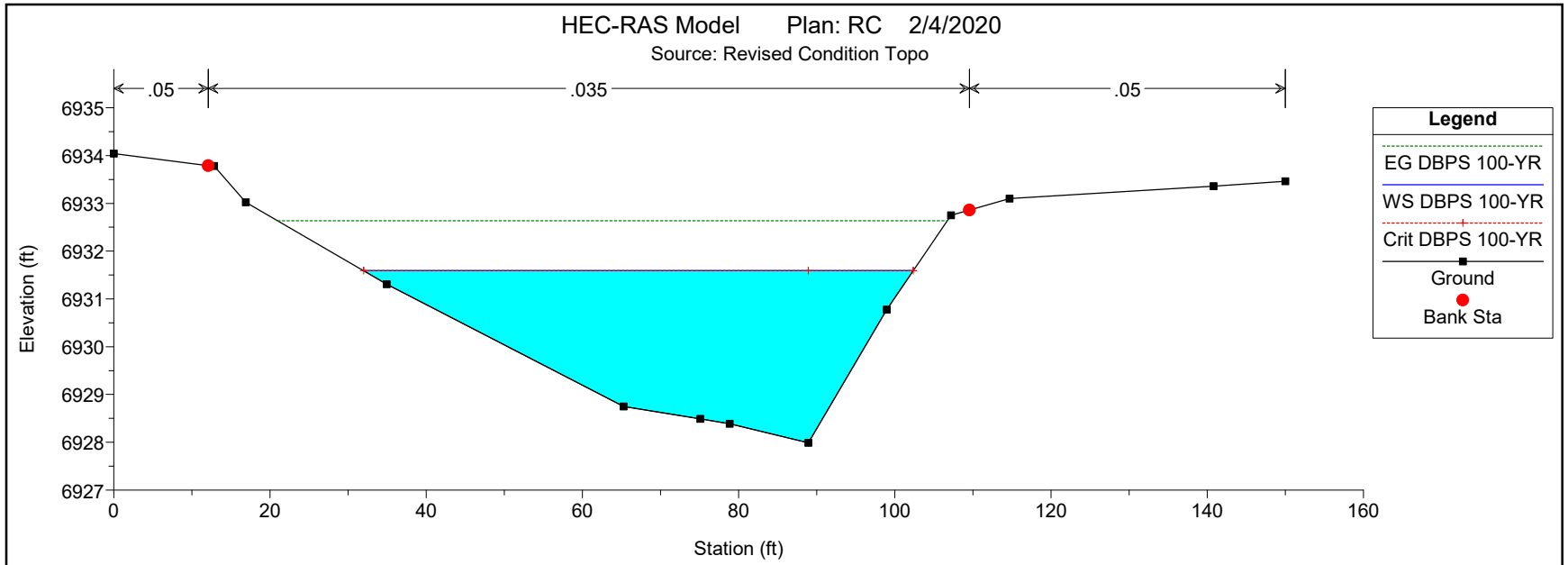
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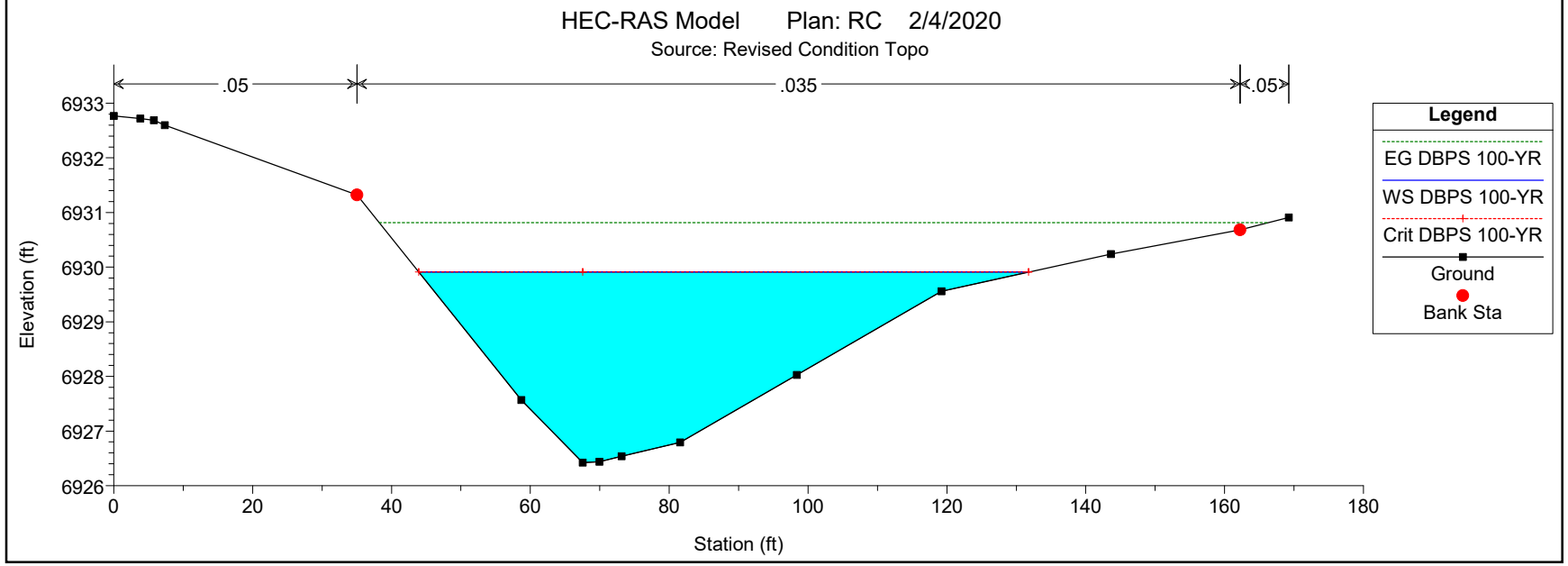
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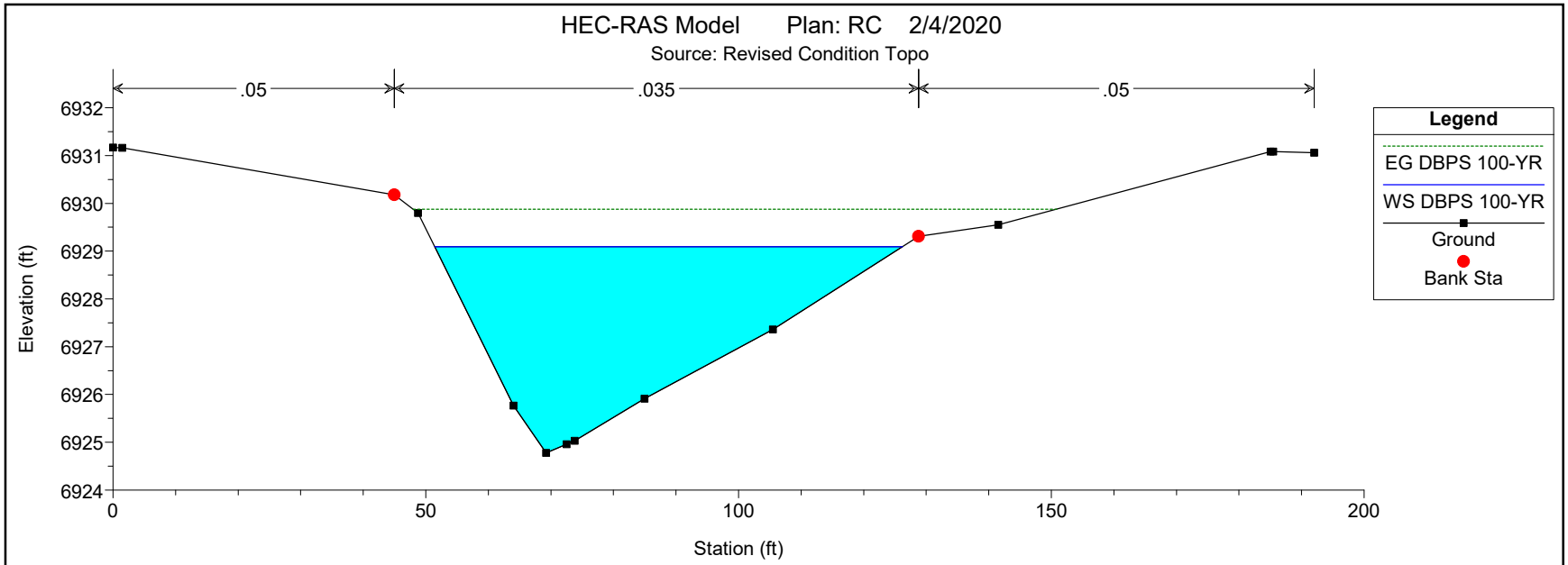
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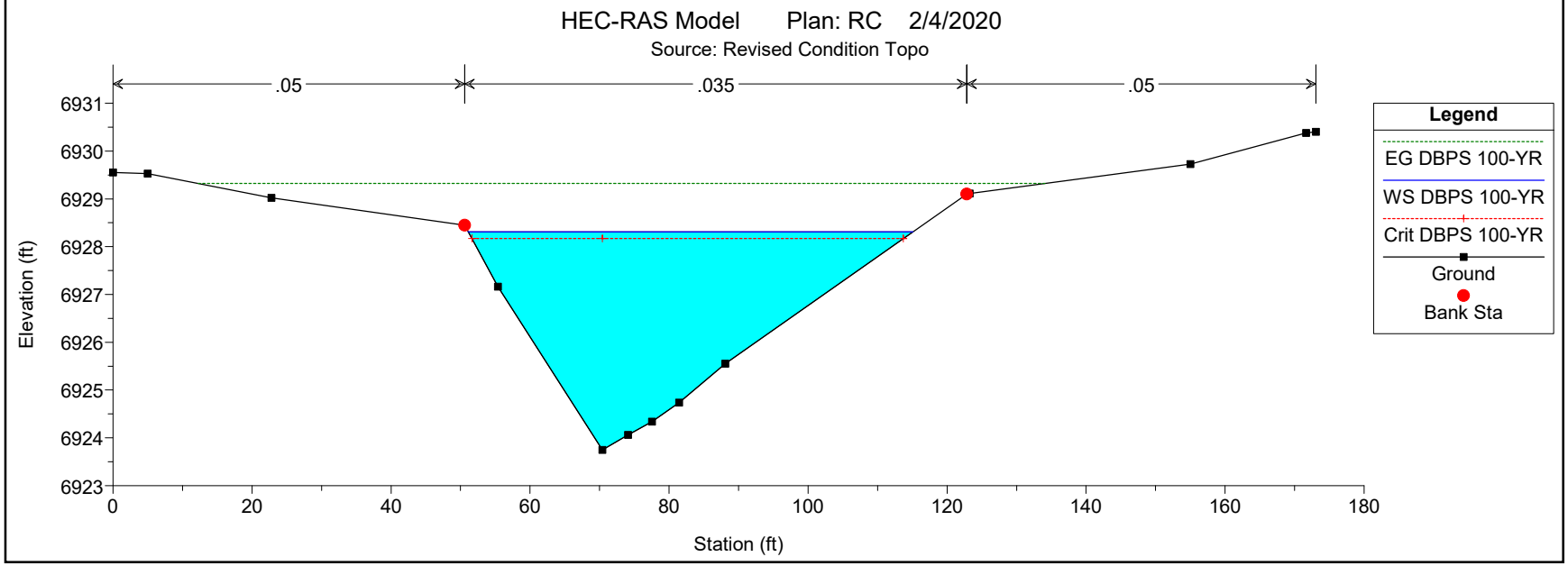
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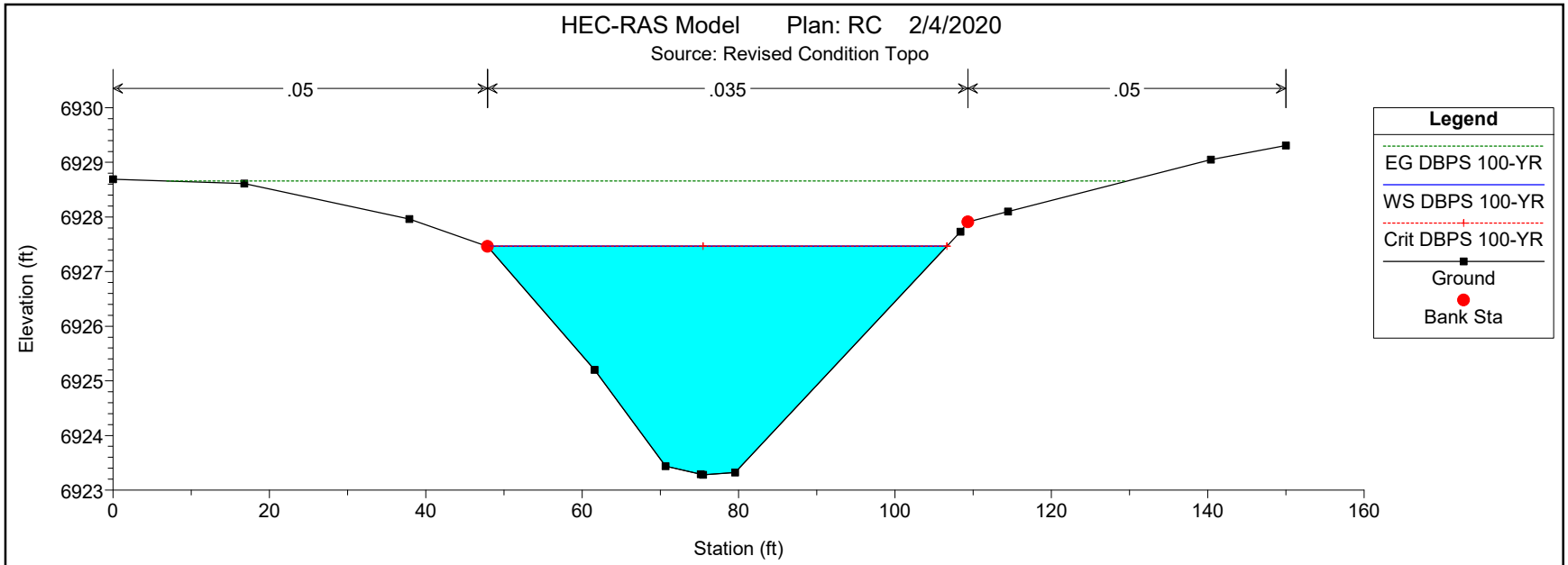
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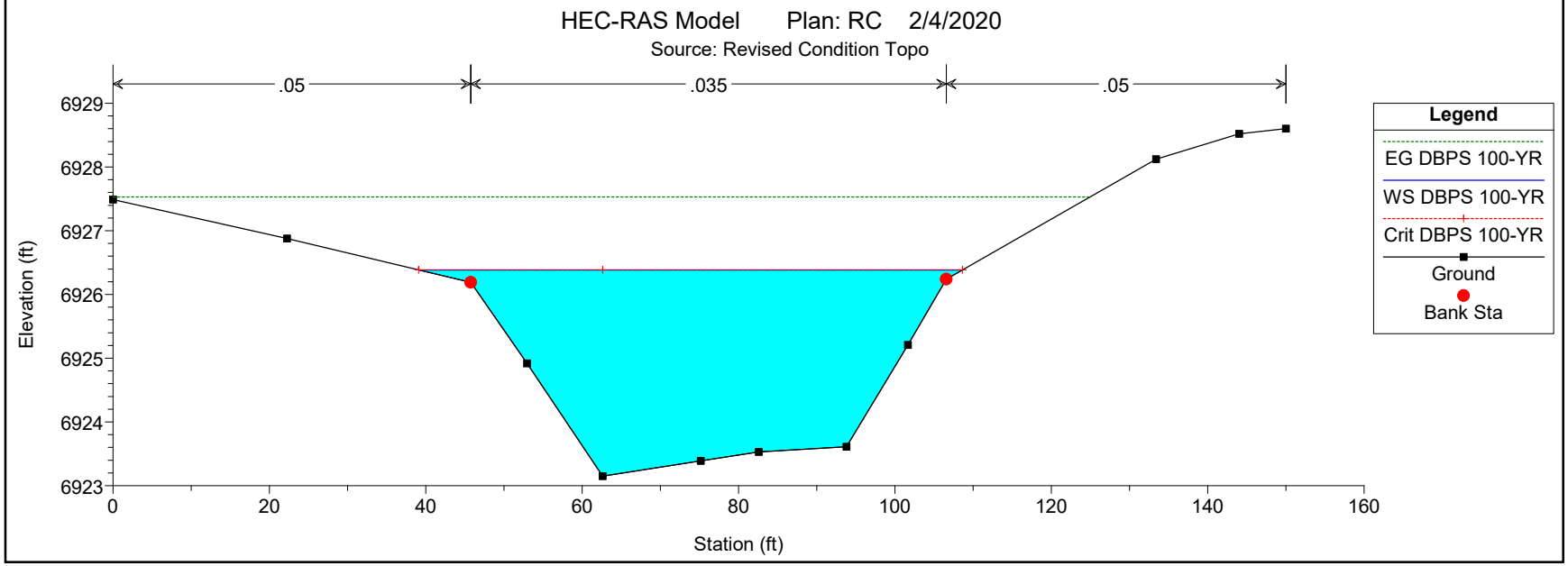
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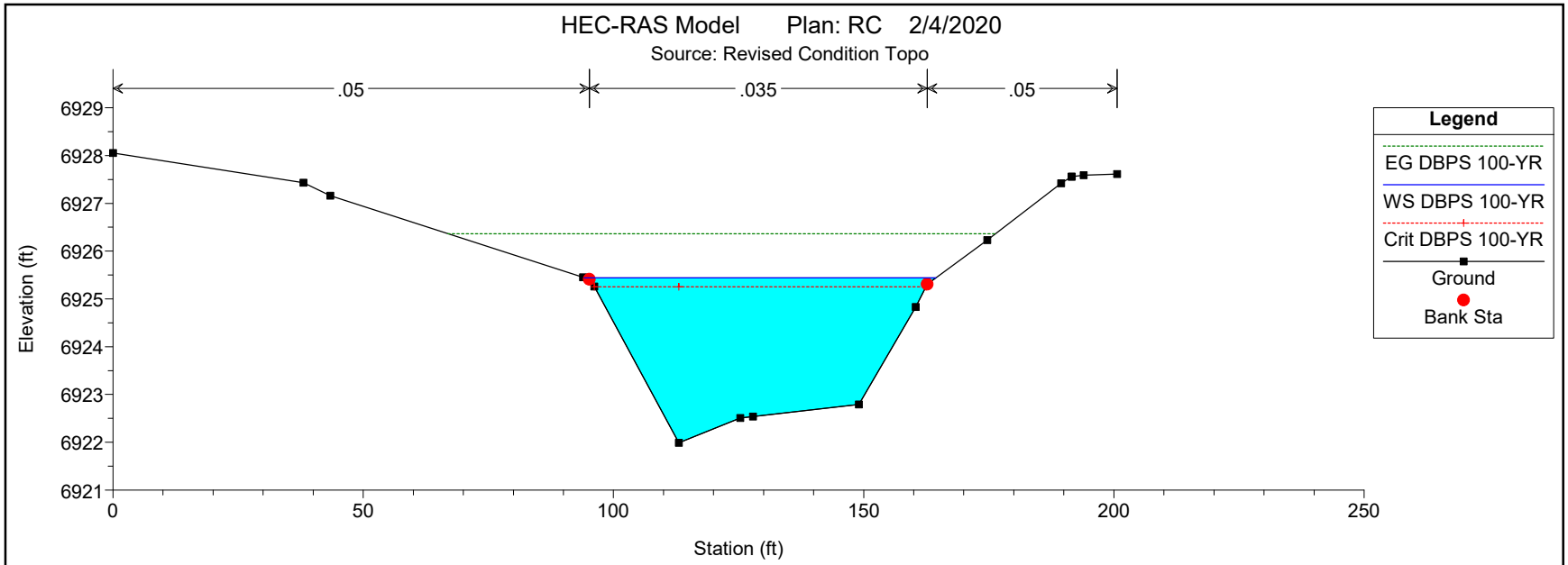
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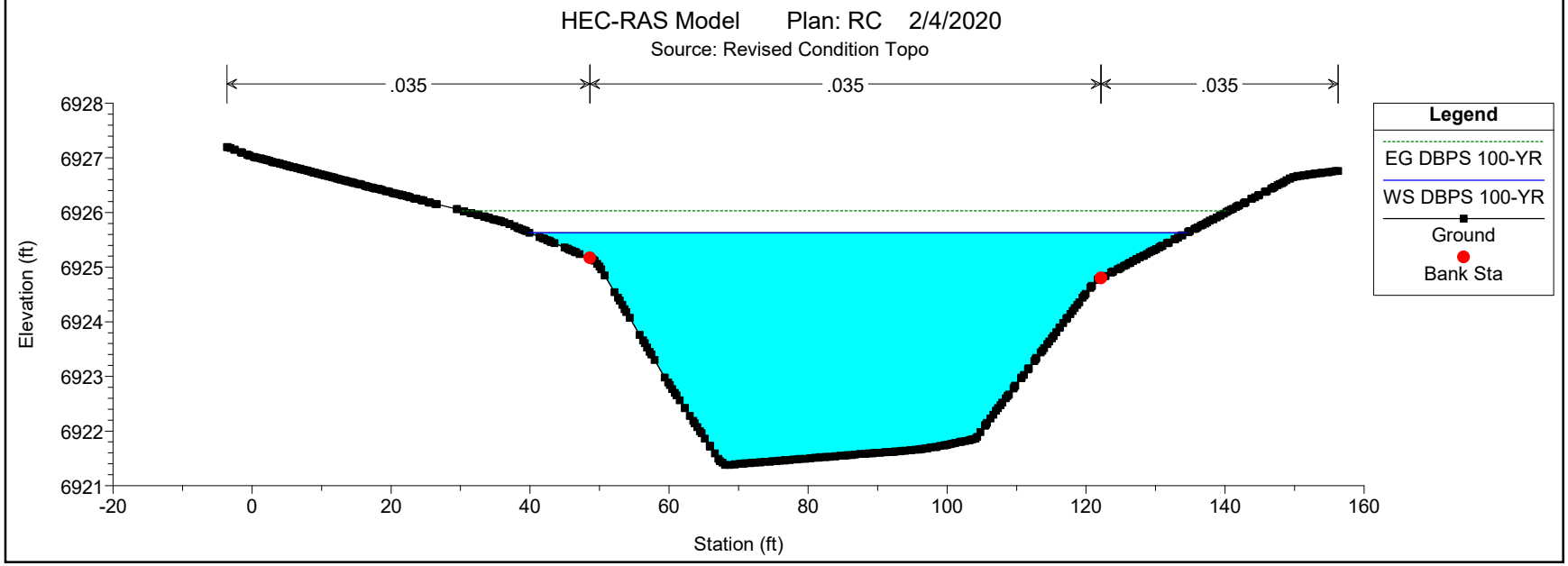
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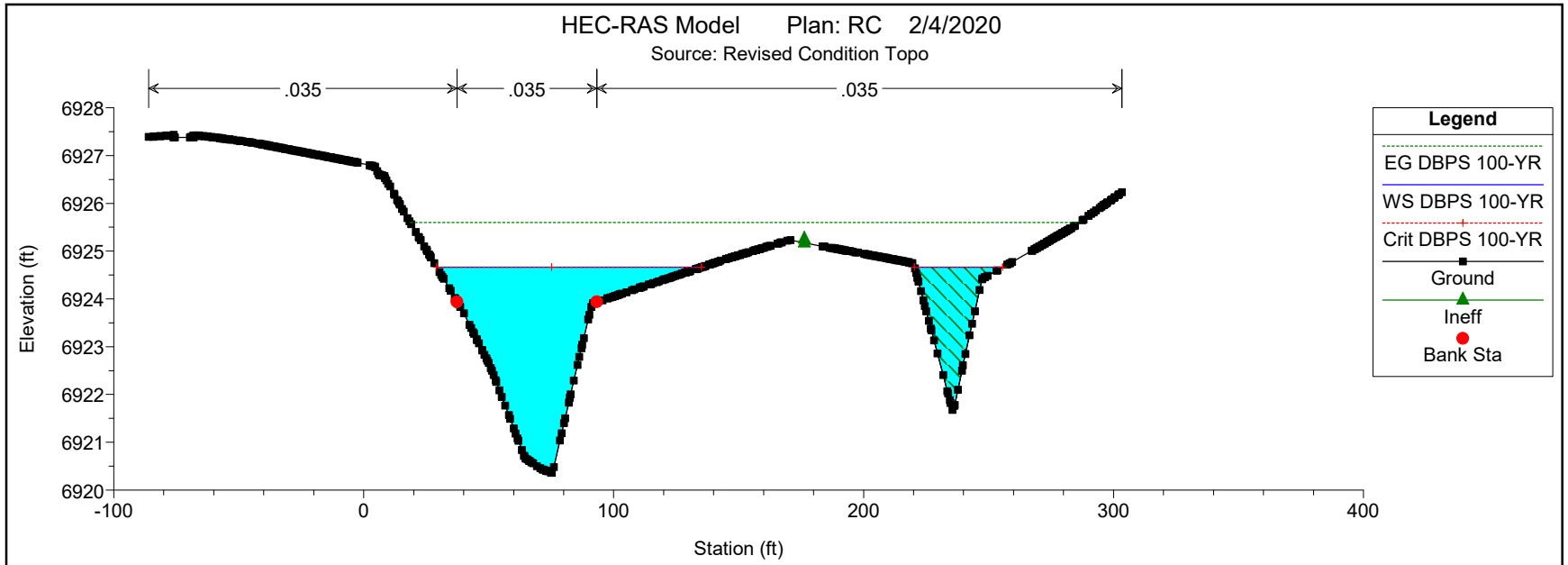
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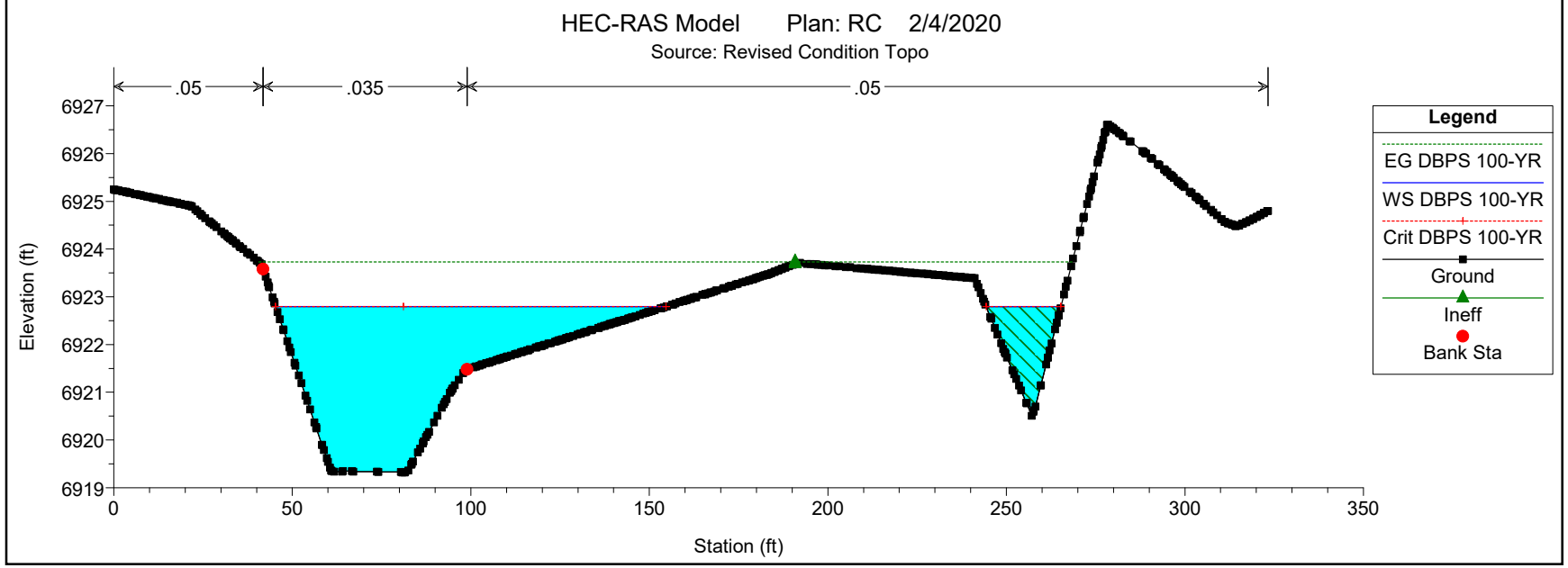
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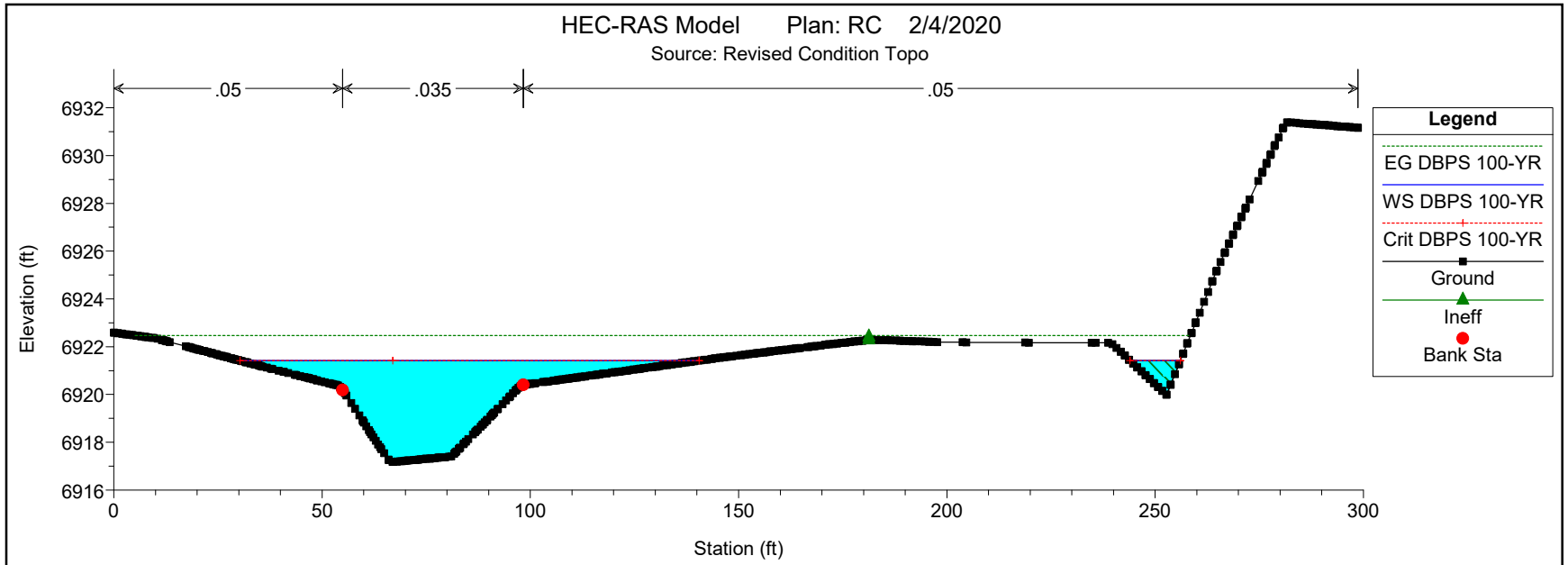
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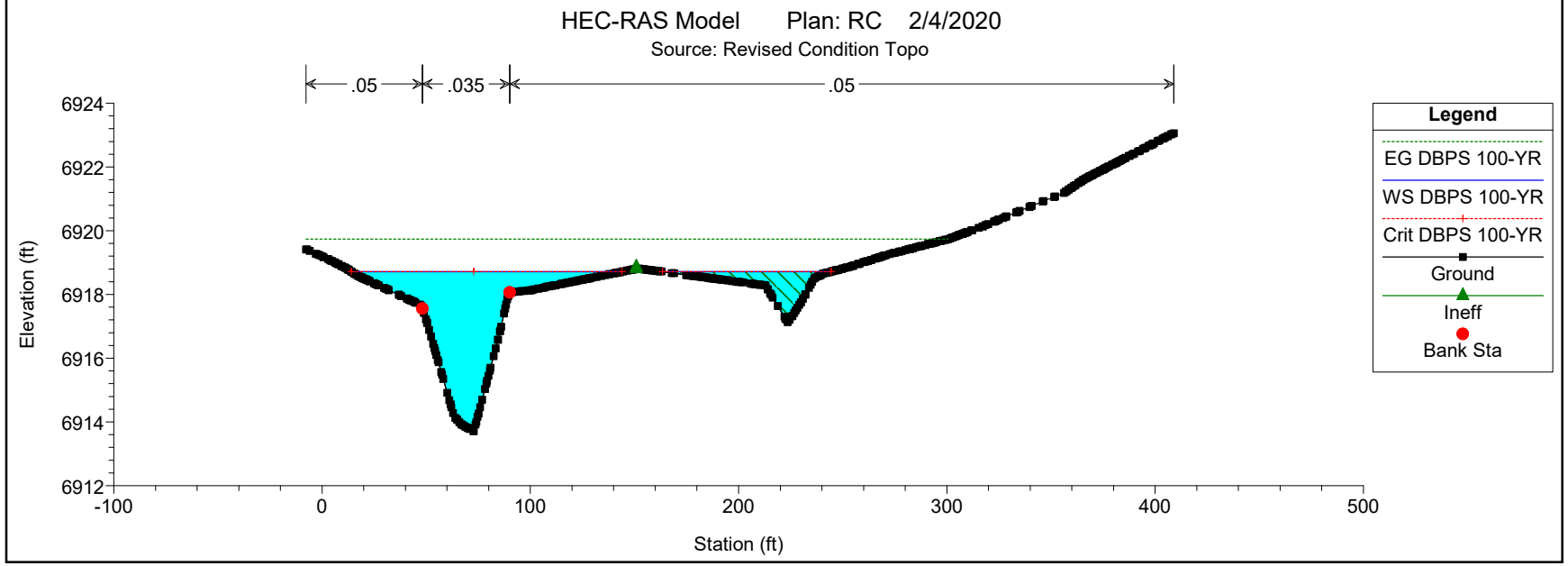
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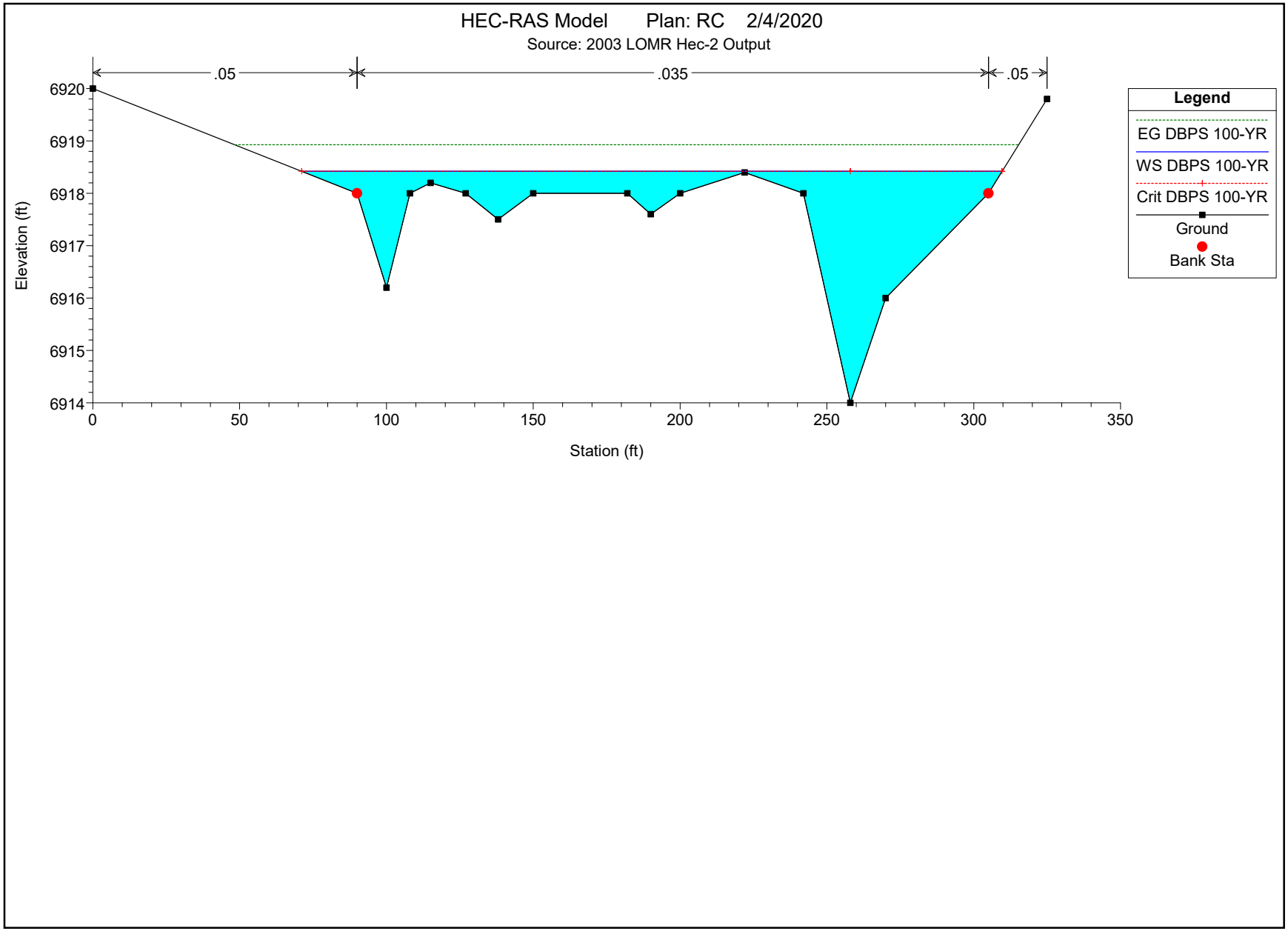
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Crit DBPS 100-YR
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USDA NRCS Part 650 Engineering Field Handbook, Chapter 7 Grassed Waterways. 2007.
By: AJL
Date: 1/21/2020

Variable		**Unit**	**Source**
Allowable Effective Stress, Ta	0.03	lb/ft2	Table 7-1: "Erodible"
Void Ratio, e	0.65		Table 7-2: "Dense angular-grained silty sand
Void Ratio Correction Factor, Ce	1.04		Table 7-7
Vegetation Height, h	0.21	ft	Estimated from photos
Stem Density, M	116.7	#/sf	Table 7-3: "Kentucky Bluegrass, Poor Condition"
Retardance Curve Index, C1	3.3		Eq 7-5
Allowable Vegetative Stress, Tva	**2.46**		**Eq 7-4**
Max Shear in Existing Condition	**2.38**	**lb/sf**	**OK, SHEAR STRESS ON CHANNEL < ALLOWABLE VEGETATIVE STRESS**
Max Shear in Revised Condition	**2.23**	**lb/sf**	**OK, SHEAR STRESS ON CHANNEL < ALLOWABLE VEGETATIVE STRESS**

Steps in waterway design are as follows:

Step 1 Determine allowable effective stress based on an evaluation of the soil material.

Step 2 Determine the flow retardance and the allowable stress on the vegetation based on the sparsest and shortest vegetation expected (typically winter vegetation) and the flow retardance offered by the densest and longest vegetation (typically summer vegetation).

Step 3 Determine the vegetal cover factor associated with sparsest vegetation expected.

Step 4 Determine the bed slope.

Step 5 Choose a cross section shape.

Step 6 Use design aids or equations to size channel for sparsest and shortest vegetation.

Step 7 Use design aids or equations to determine depth required to contain the flow for densest and longest vegetation.

Step 8 Add freeboard as appropriate.

$$\tau_e = \gamma DS\left(1 - C_F\right)\left(\frac{n_s}{n}\right)^2 \qquad \text{(eq. 7–1)}$$

where:

γ = unit weight of water, 62.4 lb/ft^3
D = maximum flow depth in the cross section
C_F = a vegetal cover factor
n_s = roughness associated with soil grain size
n = Manning's roughness coefficient
S = channel bed slope, ft/ft

Table 7–1 Allowable effective stress for categories of soil erodibility

Category	Allowable stress, τ_a, lb/ft^2
Easily eroded	0.02
Erodible	0.03
Erosion resistant	0.05
Very erosion resistant	0.07

$$\tau_{va} = 0.75C_I \qquad \text{(eq. 7–4)}$$

Retardance curve index (C_I) is in turn related to the stem length and density of the cover as:

$$C_I = 2.5\left(h\sqrt{M}\right)^{\frac{1}{3}} \qquad \text{(eq. 7–5)}$$

where:

h = the representative height of the vegetation in feet
M = the stem density in stems per square foot

Urban Drainage and Flood Control District. *USDCM Volume 2, Chapter 9, Hydraulic Structures* . 2017.

By: AJL

Date: 1/16/2020

Riprap Apron Length

Variable		**Unit**	**Source**
Width of Conduit, W	32	ft	Design Plans
Tailwater Depth, Yt	3.34	ft	HEC-RAS Model
Design Discharge, Q	1,200	cfs	Master Plan
Allowable Velocity, V	5.0	ft/s	El Paso County Drainage Criteria Manual
Required Area of Flow, At	240	ft2	
Conduit Height, H	6	ft	
Froude Parameter, Q/WH^1.5	2.55		
Yt/H	0.56		
Expansion Factor	6.7		Figure 9-36
Length of Protection, Lp	267	ft	
Max Lp Check	60	ft	
Adopted Lp	**60**	**ft**	

Rock Size

Q/WH^0.5	15.3		
Yt/H	0.56		
Required Riprap Size	Type L		Figure 9-39
Minimum Riprap D50	9	in	
Minimum Riprap Thickness	18	in	2*D50

$$L_p = \left(\frac{1}{2\tan\theta}\right)\left(\frac{A_t}{Y_t} - W\right)$$ Equation 9-11

Where:

L_p = length of protection (ft)

W = width of the conduit (ft, use diameter for circular conduits)

Y_t = tailwater depth (ft)

θ = the expansion angle of the culvert flow

and:

$$A_t = \frac{Q}{V}$$ Equation 9-12

Where:

Q = design discharge (cfs)

V = the allowable non-eroding velocity in the downstream channel (ft/sec)

A_t = required area of flow at allowable velocity (ft²)

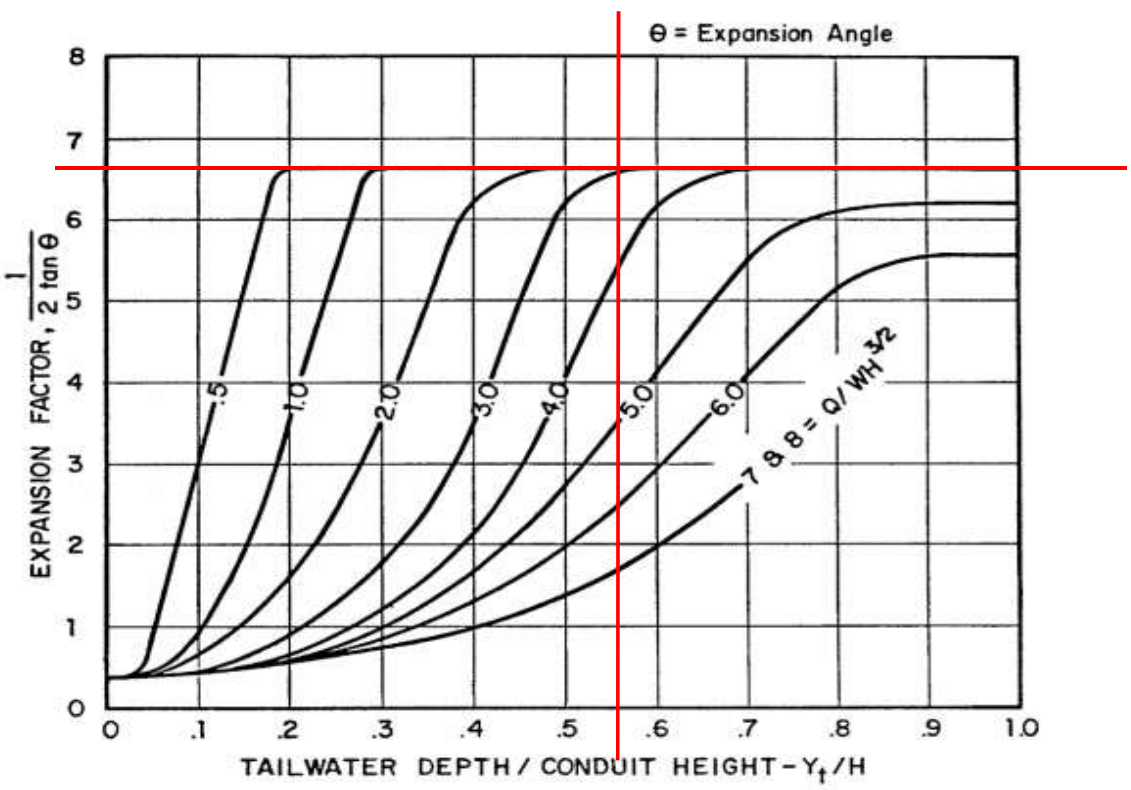
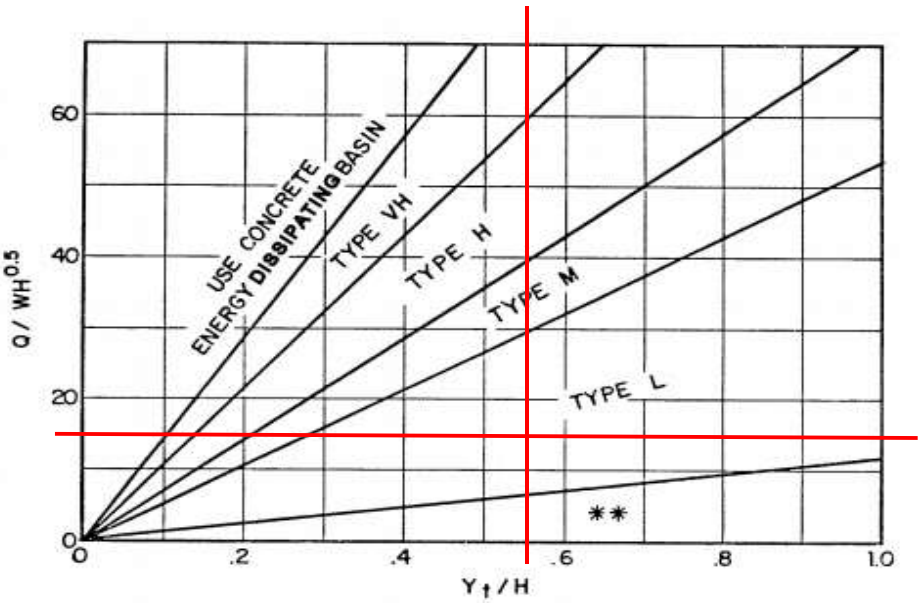


Figure 9-36. Expansion factor for rectangular conduits



Use H_a instead of H whenever culvert has supercritical flow in the barrel.
**Use Type L for a distance of 3H downstream.

Figure 9-39. Riprap erosion protection at rectangular conduit outlet (valid for Q/WH1.5 ≤ 8.0)

APPENDIX E

On-Site Pond Calculations

Detention Pond Tributary Areas

Subdivision: Bent Grass Residential Filing No. 2
Location: CO, Colorado Springs

Project Name: Bent Grass Residential Filing No. 2
Project No.: CLH000014
Calculated By: CMWJ
Checked By: SMB
Date: 1/13/20

Pond (North)

Basin	Area	% Imp
A-1	2.7	44.7
A-2	1.19	43.4
A-3	1.57	49.4
A-4	2.24	46.5
B-1	4.46	49.5
B-2	1.17	65
B-3	0.46	65
B-5	1.56	2
B-6	0.62	2
E-1	1.71	62.3
E-2	0.68	82.8
E-3	0.78	88.7
Total	**19.14**	**47.9**

Pond (South)

Basin	Area	% Imp
C-1	1.35	58.2
C-2	6.8	46.8
C-3	2.38	56.9
C-4	3.61	59.8
C-5	7.86	60.8
C-6	5.54	52.7
C-7	0.89	2
G-1	1.47	23.4
Total	**29.90**	**52.0**

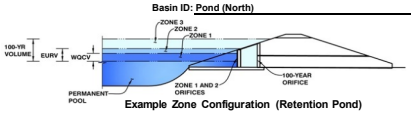
Pond (North) Calculations

DETENTION BASIN STAGE-STORAGE TABLE BUILDER

UD-Detention, Version 3.07 (February 2017)

Project: Bent Grass Residential Filing No. 2

Basin ID: Pond (North)



Example Zone Configuration (Retention Pond)

Required Volume Calculation

Selected BMP Type =	**EDB**	
Watershed Area =	19.12	acres
Watershed Length =	1,700	ft
Watershed Slope =	0.020	ft/ft
Watershed Imperviousness =	47.90%	percent
Percentage Hydrologic Soil Group A =	100.0%	percent
Percentage Hydrologic Soil Group B =	0.0%	percent
Percentage Hydrologic Soil Groups C/D =	0.0%	percent
Desired WQCV Drain Time =	40.0	hours
Location for 1-hr Rainfall Depths =	User Input	
Water Quality Capture Volume (WQCV) =	0.320	acre-feet
Excess Urban Runoff Volume (EURV) =	1.043	acre-feet
2-yr Runoff Volume (P1 = 1.19 in.) =	0.711	acre-feet
5-yr Runoff Volume (P1 = 1.5 in.) =	0.936	acre-feet
10-yr Runoff Volume (P1 = 1.75 in.) =	1.154	acre-feet
25-yr Runoff Volume (P1 = 2 in.) =	1.445	acre-feet
50-yr Runoff Volume (P1 = 2.25 in.) =	1.817	acre-feet
100-yr Runoff Volume (P1 = 2.52 in.) =	2.259	acre-feet
500-yr Runoff Volume (P1 = 3.68 in.) =	3.846	acre-feet
Approximate 2-yr Detention Volume =	0.670	acre-feet
Approximate 5-yr Detention Volume =	0.883	acre-feet
Approximate 10-yr Detention Volume =	1.079	acre-feet
Approximate 25-yr Detention Volume =	1.324	acre-feet
Approximate 50-yr Detention Volume =	1.481	acre-feet
Approximate 100-yr Detention Volume =	1.678	acre-feet

Optional User Override 1-hr Precipitation

1.19	inches
1.50	inches
1.75	inches
2.00	inches
2.25	inches
2.52	inches
3.68	inches

Stage-Storage Calculation

Zone 1 Volume (WQCV) =	0.320	acre-feet
Select Zone 2 Storage Volume (Optional) =		acre-feet
Select Zone 3 Storage Volume (Optional) =		acre-feet
Total Detention Basin Volume =	0.320	acre-feet
Initial Surcharge Volume (ISV) =	user	ft^3
Initial Surcharge Depth (ISD) =	user	ft
Total Available Detention Depth (H_{total}) =	user	ft
Depth of Trickle Channel (H_{TC}) =	user	ft
Slope of Trickle Channel (S_{TC}) =	user	ft/ft
Slopes of Main Basin Sides (S_{main}) =	user	H:V
Basin Length-to-Width Ratio ($R_{L/W}$) =	user	
Initial Surcharge Area (A_{ISV}) =	user	ft^2
Surcharge Volume Length (L_{ISV}) =	user	ft
Surcharge Volume Width (W_{ISV}) =	user	ft
Depth of Basin Floor (H_{FLOOR}) =	user	ft
Length of Basin Floor (L_{FLOOR}) =	user	ft
Width of Basin Floor (W_{FLOOR}) =	user	ft
Area of Basin Floor (A_{FLOOR}) =	user	ft^2
Volume of Basin Floor (V_{FLOOR}) =	user	ft^3
Depth of Main Basin (H_{MAIN}) =	user	ft
Length of Main Basin (L_{MAIN}) =	user	ft
Width of Main Basin (W_{MAIN}) =	user	ft
Area of Main Basin (A_{MAIN}) =	user	ft^2
Volume of Main Basin (V_{MAIN}) =	user	ft^3
Calculated Total Basin Volume (V_{total}) =	**user**	acre-feet

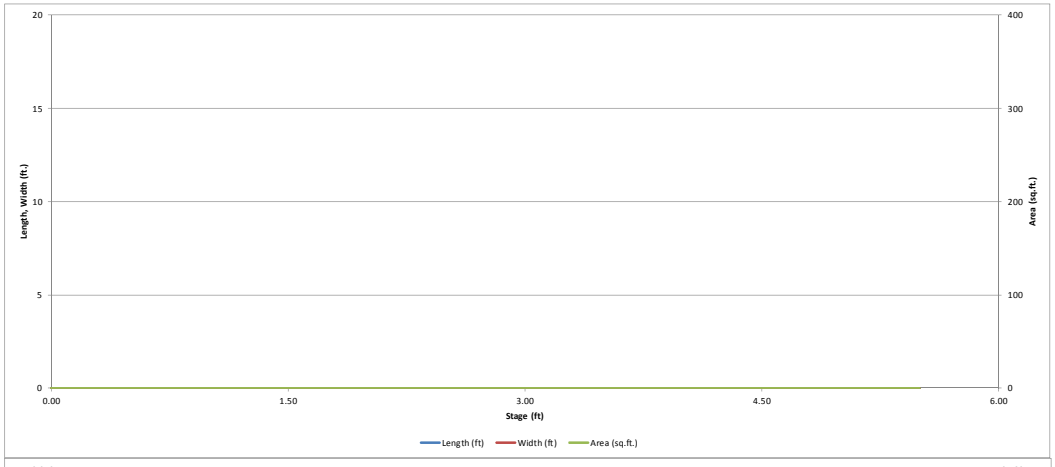
Total detention volume is less than 100-year volume.

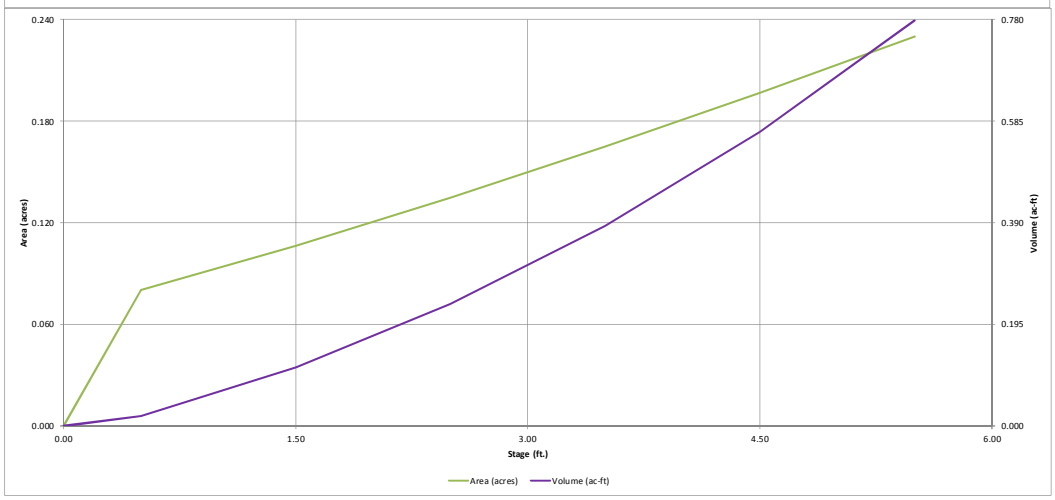
Depth Increment = User ft

Stage - Storage Description	Stage (ft)	Optional Override Stage (ft)	Length (ft)	Width (ft)	Area (ft^2)	Optional Override Area (ft^2)	Area (acre)	Volume (ft^3)	Volume (ac-ft)
Top of Micropool	--	0.00	--	--	--	0	0.000		
6939.25	--	0.50	--	--	--	3,500	0.080	840	0.019
6940.25	--	1.50	--	--	--	4,637	0.106	4,897	0.112
6941.25	--	2.50	--	--	--	5,865	0.135	10,194	0.234
6942.25	--	3.50	--	--	--	7,177	0.165	16,715	0.384
6943.25	--	4.50	--	--	--	8,559	0.196	24,583	0.564
6944.25	--	5.50	--	--	--	10,013	0.230	33,869	0.778

DETENTION BASIN STAGE-STORAGE TABLE BUILDER

UD-Detention, Version 3.07 (February 2017)



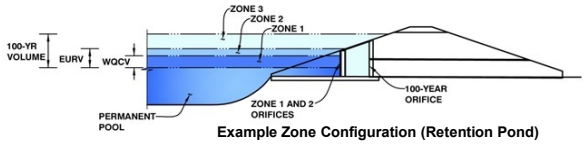


Detention Basin Outlet Structure Design

UD-Detention, Version 3.07 (February 2017)

Project: Bent Grass Residential Filing No. 2

Basin ID: Pond (North)



Example Zone Configuration (Retention Pond)

	Stage (ft)	Zone Volume (ac-ft)	Outlet Type
Zone 1 (WQCV)	3.10	0.320	Orifice Plate
Zone 2			
Zone 3			
		0.320	Total

User Input: Orifice at Underdrain Outlet (typically used to drain WQCV in a Filtration BMP)

Underdrain Orifice Invert Depth =	N/A	ft (distance below the filtration media surface)
Underdrain Orifice Diameter =	N/A	inches

Calculated Parameters for Underdrain

Underdrain Orifice Area =	N/A	ft^2
Underdrain Orifice Centroid =	N/A	feet

User Input: Orifice Plate with one or more orifices or Elliptical Slot Weir (typically used to drain WQCV and/or EURV in a sedimentation BMP)

Invert of Lowest Orifice =	0.00	ft (relative to basin bottom at Stage = 0 ft)
Depth at top of Zone using Orifice Plate =	3.10	ft (relative to basin bottom at Stage = 0 ft)
Orifice Plate: Orifice Vertical Spacing =	N/A	inches
Orifice Plate: Orifice Area per Row =	1.66	sq. inches (diameter = 1-7/16 inches)

Calculated Parameters for Plate

WQ Orifice Area per Row =	1.153E-02	ft^2
Elliptical Half-Width =	N/A	feet
Elliptical Slot Centroid =	N/A	feet
Elliptical Slot Area =	N/A	ft^2

User Input: Stage and Total Area of Each Orifice Row (numbered from lowest to highest)

	Row 1 (required)	Row 2 (optional)	Row 3 (optional)	Row 4 (optional)	Row 5 (optional)	Row 6 (optional)	Row 7 (optional)	Row 8 (optional)
Stage of Orifice Centroid (ft)	0.00	1.00	2.00					
Orifice Area (sq. inches)	1.66	1.66	1.66					

	Row 9 (optional)	Row 10 (optional)	Row 11 (optional)	Row 12 (optional)	Row 13 (optional)	Row 14 (optional)	Row 15 (optional)	Row 16 (optional)
Stage of Orifice Centroid (ft)								
Orifice Area (sq. inches)								

User Input: Vertical Orifice (Circular or Rectangular)

	Not Selected	Not Selected	
Invert of Vertical Orifice =			ft (relative to basin bottom at Stage = 0 ft)
Depth at top of Zone using Vertical Orifice =			ft (relative to basin bottom at Stage = 0 ft)
Vertical Orifice Diameter =			inches

Calculated Parameters for Vertical Orifice

	Not Selected	Not Selected	
Vertical Orifice Area =			ft^2
Vertical Orifice Centroid =			feet

User Input: Overflow Weir (Dropbox) and Grate (Flat or Sloped)

	Not Selected	Not Selected	
Overflow Weir Front Edge Height, Ho =			ft (relative to basin bottom at Stage = 0 ft)
Overflow Weir Front Edge Length =			feet
Overflow Weir Slope =			H:V (enter zero for flat grate)
Horiz. Length of Weir Sides =			feet
Overflow Grate Open Area % =			%, grate open area/total area
Debris Clogging % =			%

Calculated Parameters for Overflow Weir

	Not Selected	Not Selected	
Height of Grate Upper Edge, H_t =			feet
Over Flow Weir Slope Length =			feet
Grate Open Area / 100-yr Orifice Area =			should be $\geq$ 4
Overflow Grate Open Area w/o Debris =			ft^2
Overflow Grate Open Area w/ Debris =			ft^2

User Input: Outlet Pipe w/ Flow Restriction Plate (Circular Orifice, Restrictor Plate, or Rectangular Orifice)

	Not Selected	Not Selected	
Depth to Invert of Outlet Pipe =			ft (distance below basin bottom at Stage = 0 ft)
Circular Orifice Diameter =			inches

Calculated Parameters for Outlet Pipe w/ Flow Restriction Plate

	Not Selected	Not Selected	
Outlet Orifice Area =			ft^2
Outlet Orifice Centroid =			feet
Half-Central Angle of Restrictor Plate on Pipe =	N/A	N/A	radians

User Input: Emergency Spillway (Rectangular or Trapezoidal)

Spillway Invert Stage=	3.25	ft (relative to basin bottom at Stage = 0 ft)
Spillway Crest Length =	40.00	feet
Spillway End Slopes =	4.00	H:V
Freeboard above Max Water Surface =	1.00	feet

Calculated Parameters for Spillway

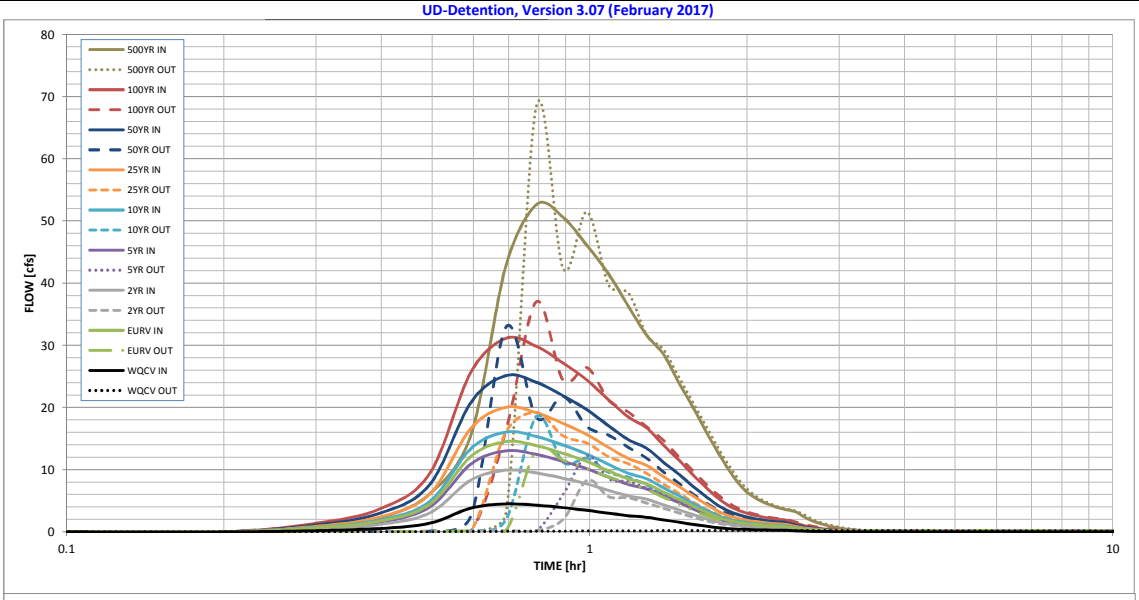
Spillway Design Flow Depth=	0.39	feet
Stage at Top of Freeboard =	4.64	feet
Basin Area at Top of Freeboard =	0.20	acres

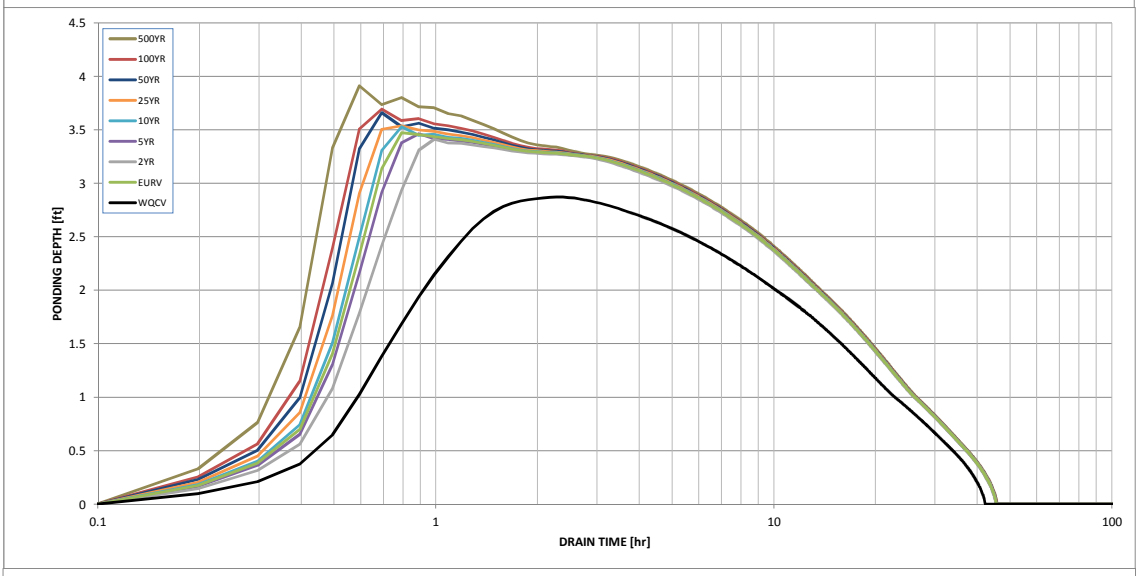
Routed Hydrograph Results

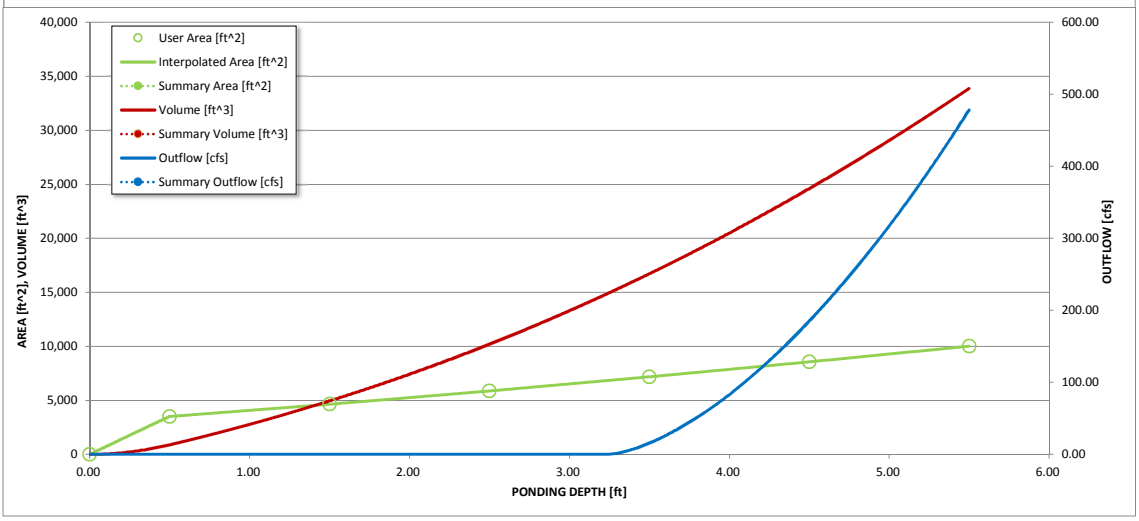
Design Storm Return Period =	WQCV	EURV	2 Year	5 Year	10 Year	25 Year	50 Year	100 Year	500 Year
One-Hour Rainfall Depth (in) =	0.53	1.07	1.19	1.50	1.75	2.00	2.25	2.52	3.68
Calculated Runoff Volume (acre-ft) =	0.320	1.043	0.711	0.936	1.154	1.445	1.817	2.259	3.846
OPTIONAL Override Runoff Volume (acre-ft) =									
Inflow Hydrograph Volume (acre-ft) =	0.320	1.043	0.710	0.936	1.154	1.445	1.817	2.259	3.847
Predevelopment Unit Peak Flow, q (cfs/acre) =	0.00	0.00	0.00	0.00	0.01	0.02	0.15	0.38	1.02
Predevelopment Peak Q (cfs) =	0.0	0.0	0.0	0.1	0.2	0.4	3.0	7.2	19.5
Peak Inflow Q (cfs) =	4.5	14.5	9.9	13.0	16.1	20.0	25.1	31.1	52.6
Peak Outflow Q (cfs) =	0.2	13.2	8.3	12.2	18.5	19.2	32.9	37.0	68.4
Ratio Peak Outflow to Predevelopment Q =	N/A	N/A	N/A	159.6	104.1	48.2	11.1	5.1	3.5
Structure Controlling Flow =	Plate	Spillway	Spillway	Spillway	Spillway	Spillway	Spillway	Spillway	Spillway
Max Velocity through Grate 1 (fps) =	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Max Velocity through Grate 2 (fps) =	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Time to Drain 97% of Inflow Volume (hours) =	38	34	37	35	33	31	28	26	19
Time to Drain 99% of Inflow Volume (hours) =	**40**	40	42	41	40	39	38	37	32
Maximum Ponding Depth (ft) =	2.87	3.47	3.41	3.46	3.53	3.54	3.66	3.69	3.91
Area at Maximum Ponding Depth (acres) =	0.15	0.16	0.16	0.16	0.17	0.17	0.17	0.17	0.18
Maximum Volume Stored (acre-ft) =	0.286	0.379	0.369	0.377	0.389	0.389	0.410	0.416	0.454

Detention Basin Outlet Structure Design

UD-Detention, Version 3.07 (February 2017)







S-A-V-D Chart Axis Override	X-axis	Left Y-Axis	Right Y-Axis
minimum bound			
maximum bound			

Pond (North) - FOREBAY CALCULATIONS

1) WQCV (inches) = $a(.91I^3 - 1.19I^2 + .78I)$

I = impervious percentage = 48%

a = Coefficient corresponding to WQCV drain time = 1 (40 hours)

WQCV (inches) = 0.20 inches

2) WQCV (ac-ft) = (WQCV (inches))/12 x A

Area = tributary area = 19.12 acres

WQCV (ac-ft) = 0.32

WQCV (cubic feet) = 13,923

3) Forebay Volume

Per Table EDB-4, Section T-5 of USDCM Volume 3 - Forebay Volume = 2% of WQCV and be 18" depth since watershed up to 5 impervious acres

Forebay Volume = 2% of WQCV = 278 cubic feet

with pond depth at 1.5', Forebay Area = 185.6 sq-ft (minimum)

4) Forebay Discharge

Per Table EDB-4, Section T-5 of USDCM Volume 3 - Forebay Discharge = 2% of 100-yr Flow into pond

Q100 = 50 cfs

Forebay discharge = 1.00 cfs

Pond (North) - Forebay Slot

Project Description

Solve For	Crest Length

Input Data

Discharge	1.00	ft³/s
Headwater Elevation	1.25	ft
Crest Elevation	0.00	ft
Tailwater Elevation	0.00	ft
Weir Coefficient	3.00	US
Number Of Contractions	0	

Results

Crest Length	0.24	ft
Headwater Height Above Crest	1.25	ft
Tailwater Height Above Crest	0.00	ft
Flow Area	0.30	ft²
Velocity	3.35	ft/s
Wetted Perimeter	2.74	ft
Top Width	0.24	ft

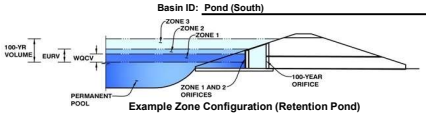
Pond (South) Calculations

DETENTION BASIN STAGE-STORAGE TABLE BUILDER

UD-Detention, Version 3.07 (February 2017)

Project: Bent Grass Residential Filing No. 2

Basin ID: Pond (South)



Example Zone Configuration (Retention Pond)

Required Volume Calculation

Selected BMP Type =	**EDB**			
Watershed Area =	29.90	acres		
Watershed Length =	1,800	ft		
Watershed Slope =	0.020	ft/ft		
Watershed Imperviousness =	53.20%	percent		
Percentage Hydrologic Soil Group A =	100.0%	percent		
Percentage Hydrologic Soil Group B =	0.0%	percent		
Percentage Hydrologic Soil Groups C/D =	0.0%	percent		
Desired WQCV Drain Time =	40.0	hours		
Location for 1-hr Rainfall Depths =	User Input			
Water Quality Capture Volume (WQCV) =	0.536	acre-feet	Optional User Override 1-hr Precipitation	
Excess Urban Runoff Volume (EURV) =	1.866	acre-feet		
2-yr Runoff Volume (P1 = 1.19 in.) =	1.276	acre-feet	1.19	inches
5-yr Runoff Volume (P1 = 1.5 in.) =	1.674	acre-feet	1.50	inches
10-yr Runoff Volume (P1 = 1.75 in.) =	2.056	acre-feet	1.75	inches
25-yr Runoff Volume (P1 = 2 in.) =	2.545	acre-feet	2.00	inches
50-yr Runoff Volume (P1 = 2.25 in.) =	3.141	acre-feet	2.25	inches
100-yr Runoff Volume (P1 = 2.52 in.) =	3.840	acre-feet	2.52	inches
500-yr Runoff Volume (P1 = 3.68 in.) =	6.387	acre-feet	3.68	inches
Approximate 2-yr Detention Volume =	1.203	acre-feet		
Approximate 5-yr Detention Volume =	1.582	acre-feet		
Approximate 10-yr Detention Volume =	1.924	acre-feet		
Approximate 25-yr Detention Volume =	2.345	acre-feet		
Approximate 50-yr Detention Volume =	2.609	acre-feet		
Approximate 100-yr Detention Volume =	2.919	acre-feet		

Stage-Storage Calculation

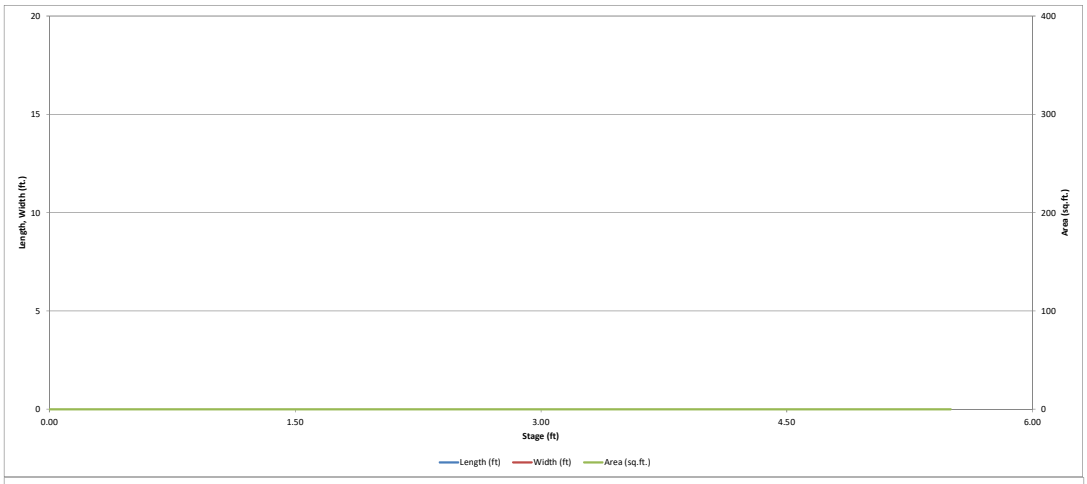
Zone 1 Volume (WQCV) =	0.536	acre-feet	
Select Zone 2 Storage Volume (Optional) =		acre-feet	**Total detention volume is less than 100-year volume.**
Select Zone 3 Storage Volume (Optional) =		acre-feet	
Total Detention Basin Volume =	0.536	acre-feet	
Initial Surcharge Volume (ISV) =	user	ft^3	
Initial Surcharge Depth (ISD) =	user	ft	
Total Available Detention Depth (H_{total}) =	user	ft	
Depth of Trickle Channel (H_{TC}) =	user	ft	
Slope of Trickle Channel (S_{TC}) =	user	ft/ft	
Slopes of Main Basin Sides (S_{main}) =	user	H:V	
Basin Length-to-Width Ratio ($R_{L/W}$) =	user		
Initial Surcharge Area (A_{ISV}) =	user	ft^2	
Surcharge Volume Length (L_{ISV}) =	user	ft	
Surcharge Volume Width (W_{ISV}) =	user	ft	
Depth of Basin Floor (H_{FLOOR}) =	user	ft	
Length of Basin Floor (L_{FLOOR}) =	user	ft	
Width of Basin Floor (W_{FLOOR}) =	user	ft	
Area of Basin Floor (A_{FLOOR}) =	user	ft^2	
Volume of Basin Floor (V_{FLOOR}) =	user	ft^3	
Depth of Main Basin (H_{MAIN}) =	user	ft	
Length of Main Basin (L_{MAIN}) =	user	ft	
Width of Main Basin (W_{MAIN}) =	user	ft	
Area of Main Basin (A_{MAIN}) =	user	ft^2	
Volume of Main Basin (V_{MAIN}) =	user	ft^3	
Calculated Total Basin Volume (V_{total}) =	**user**	acre-feet	

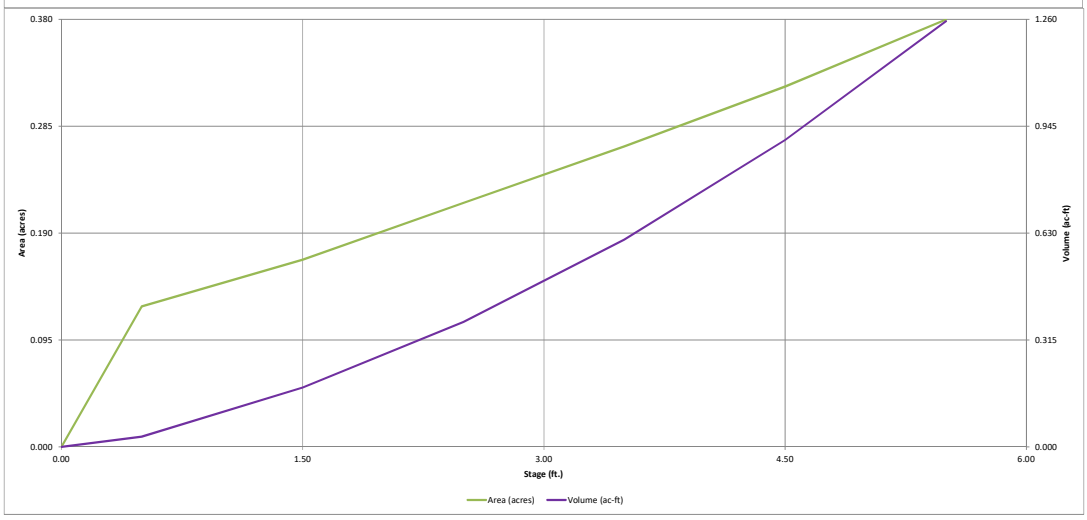
Depth Increment = User ft

Stage - Storage Description	Stage (ft)	Optional Override Stage (ft)	Length (ft)	Width (ft)	Area (ft^2)	Optional Override Area (ft^2)	Area (acre)	Volume (ft^3)	Volume (ac-ft)
Top of Micropool	--	0.00	--	--	--	0	0.000		
6924	--	0.50	--	--	--	5,438	0.125	1,305	0.030
6925	--	1.50	--	--	--	7,249	0.166	7,630	0.175
6926	--	2.50	--	--	--	9,448	0.217	16,051	0.368
6927	--	3.50	--	--	--	11,635	0.267	26,593	0.610
6928	--	4.50	--	--	--	13,951	0.320	39,386	0.904
6929	--	5.50	--	--	--	16,542	0.380	54,632	1.254

DETENTION BASIN STAGE-STORAGE TABLE BUILDER

UD-Detention, Version 3.07 (February 2017)



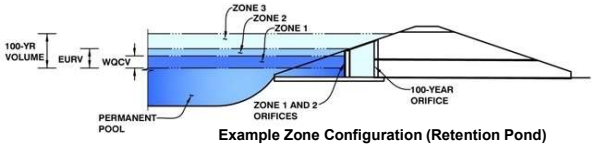


Detention Basin Outlet Structure Design

UD-Detention, Version 3.07 (February 2017)

Project: Bent Grass Residential Filing No. 2

Basin ID: Pond (South)



Example Zone Configuration (Retention Pond)

	Stage (ft)	Zone Volume (ac-ft)	Outlet Type
Zone 1 (WQCV)	3.22	0.536	Orifice Plate
Zone 2			Not Utilized
Zone 3			Not Utilized
		0.536	Total

User Input: Orifice at Underdrain Outlet (typically used to drain WQCV in a Filtration BMP)

Underdrain Orifice Invert Depth =	N/A	ft (distance below the filtration media surface)
Underdrain Orifice Diameter =	N/A	inches

Calculated Parameters for Underdrain

Underdrain Orifice Area =	N/A	ft^2
Underdrain Orifice Centroid =	N/A	feet

User Input: Orifice Plate with one or more orifices or Elliptical Slot Weir (typically used to drain WQCV and/or EURV in a sedimentation BMP)

Invert of Lowest Orifice =	0.00	ft (relative to basin bottom at Stage = 0 ft)
Depth at top of Zone using Orifice Plate =	3.30	ft (relative to basin bottom at Stage = 0 ft)
Orifice Plate: Orifice Vertical Spacing =	12.80	inches
Orifice Plate: Orifice Area per Row =	2.75	sq. inches (diameter = 1-7/8 inches)

Calculated Parameters for Plate

WQ Orifice Area per Row =	1.910E-02	ft^2
Elliptical Half-Width =	N/A	feet
Elliptical Slot Centroid =	N/A	feet
Elliptical Slot Area =	N/A	ft^2

User Input: Stage and Total Area of Each Orifice Row (numbered from lowest to highest)

	Row 1 (required)	Row 2 (optional)	Row 3 (optional)	Row 4 (optional)	Row 5 (optional)	Row 6 (optional)	Row 7 (optional)	Row 8 (optional)
Stage of Orifice Centroid (ft)	0.00	1.10	2.20					
Orifice Area (sq. inches)	2.75	2.75	2.75					

	Row 9 (optional)	Row 10 (optional)	Row 11 (optional)	Row 12 (optional)	Row 13 (optional)	Row 14 (optional)	Row 15 (optional)	Row 16 (optional)
Stage of Orifice Centroid (ft)								
Orifice Area (sq. inches)								

User Input: Vertical Orifice (Circular or Rectangular)

	Not Selected	Not Selected	
Invert of Vertical Orifice =	N/A	N/A	ft (relative to basin bottom at Stage = 0 ft)
Depth at top of Zone using Vertical Orifice =	N/A	N/A	ft (relative to basin bottom at Stage = 0 ft)
Vertical Orifice Diameter =	N/A	N/A	inches

Calculated Parameters for Vertical Orifice

	Not Selected	Not Selected	
Vertical Orifice Area =	N/A	N/A	ft^2
Vertical Orifice Centroid =	N/A	N/A	feet

User Input: Overflow Weir (Dropbox) and Grate (Flat or Sloped)

	Not Selected	Not Selected	
Overflow Weir Front Edge Height, Ho =	N/A	N/A	ft (relative to basin bottom at Stage = 0 ft)
Overflow Weir Front Edge Length =	N/A	N/A	feet
Overflow Weir Slope =	N/A	N/A	H:V (enter zero for flat grate)
Horiz. Length of Weir Sides =	N/A	N/A	feet
Overflow Grate Open Area % =	N/A	N/A	%, grate open area/total area
Debris Clogging % =	N/A	N/A	%

Calculated Parameters for Overflow Weir

	Not Selected	Not Selected	
Height of Grate Upper Edge, H_t =	N/A	N/A	feet
Over Flow Weir Slope Length =	N/A	N/A	feet
Grate Open Area / 100-yr Orifice Area =	N/A	N/A	should be ≥ 4
Overflow Grate Open Area w/o Debris =	N/A	N/A	ft^2
Overflow Grate Open Area w/ Debris =	N/A	N/A	ft^2

User Input: Outlet Pipe w/ Flow Restriction Plate (Circular Orifice, Restrictor Plate, or Rectangular Orifice)

	Not Selected	Not Selected	
Depth to Invert of Outlet Pipe =	N/A	N/A	ft (distance below basin bottom at Stage = 0 ft)
Circular Orifice Diameter =	N/A	N/A	inches

Calculated Parameters for Outlet Pipe w/ Flow Restriction Plate

	Not Selected	Not Selected	
Outlet Orifice Area =	N/A	N/A	ft^2
Outlet Orifice Centroid =	N/A	N/A	feet
Half-Central Angle of Restrictor Plate on Pipe =	N/A	N/A	radians

User Input: Emergency Spillway (Rectangular or Trapezoidal)

Spillway Invert Stage=	3.25	ft (relative to basin bottom at Stage = 0 ft)
Spillway Crest Length =	50.00	feet
Spillway End Slopes =	4.00	H:V
Freeboard above Max Water Surface =	1.00	feet

Calculated Parameters for Spillway

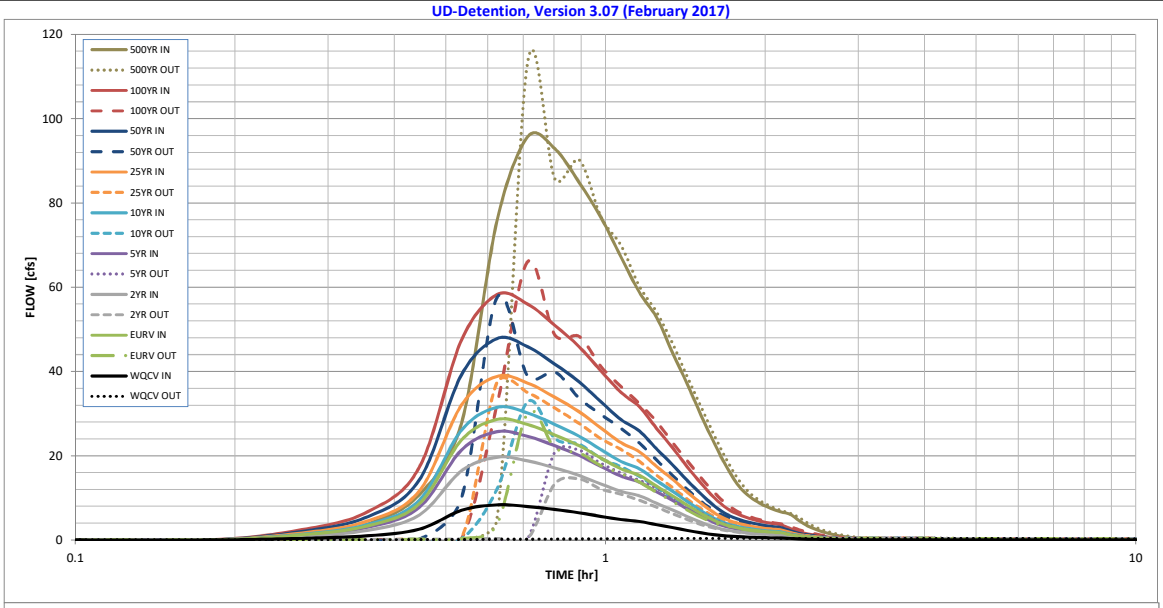
Spillway Design Flow Depth=	0.52	feet
Stage at Top of Freeboard =	4.77	feet
Basin Area at Top of Freeboard =	0.34	acres

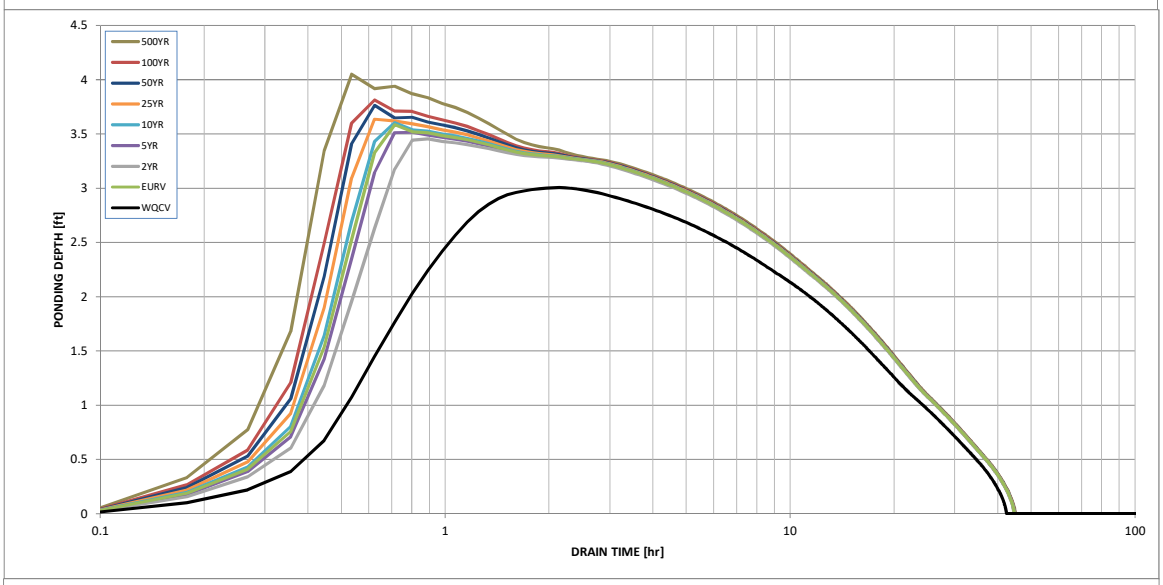
Routed Hydrograph Results

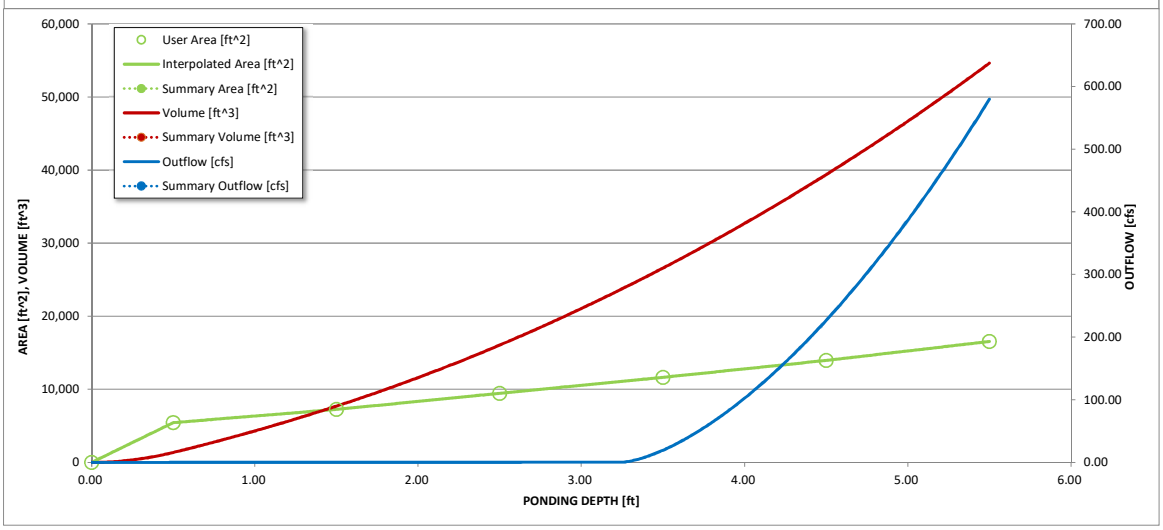
Design Storm Return Period =	WQCV	EURV	2 Year	5 Year	10 Year	25 Year	50 Year	100 Year	500 Year
One-Hour Rainfall Depth (in) =	0.53	1.07	1.19	1.50	1.75	2.00	2.25	2.52	3.68
Calculated Runoff Volume (acre-ft) =	0.536	1.866	1.276	1.674	2.056	2.545	3.141	3.840	6.387
OPTIONAL Override Runoff Volume (acre-ft) =									
Inflow Hydrograph Volume (acre-ft) =	0.536	1.866	1.275	1.674	2.055	2.544	3.141	3.840	6.382
Predevelopment Unit Peak Flow, q (cfs/acre) =	0.00	0.00	0.00	0.00	0.01	0.02	0.18	0.43	1.16
Predevelopment Peak Q (cfs) =	0.0	0.0	0.0	0.1	0.3	0.7	5.4	13.0	34.7
Peak Inflow Q (cfs) =	8.3	28.6	19.6	25.7	31.5	38.8	47.8	58.2	95.7
Peak Outflow Q (cfs) =	0.4	30.1	14.5	21.3	32.8	37.3	57.5	66.0	113.4
Ratio Peak Outflow to Predevelopment Q =	N/A	N/A	N/A	153.5	101.7	51.7	10.7	5.1	3.3
Structure Controlling Flow =	Plate	Spillway	Spillway	Spillway	Spillway	Spillway	Spillway	Spillway	Spillway
Max Velocity through Grate 1 (fps) =	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Max Velocity through Grate 2 (fps) =	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Time to Drain 97% of Inflow Volume (hours) =	38	33	36	34	32	30	27	25	19
Time to Drain 99% of Inflow Volume (hours) =	**40**	40	41	40	39	38	37	36	32
Maximum Ponding Depth (ft) =	3.01	3.58	3.45	3.52	3.60	3.64	3.76	3.81	4.05
Area at Maximum Ponding Depth (acres) =	0.24	0.27	0.26	0.27	0.27	0.27	0.28	0.28	0.30
Maximum Volume Stored (acre-ft) =	0.483	0.632	0.597	0.613	0.637	0.646	0.682	0.696	0.765

Detention Basin Outlet Structure Design

UD-Detention, Version 3.07 (February 2017)







S-A-V-D Chart Axis Override	X-axis	Left Y-Axis	Right Y-Axis
minimum bound			
maximum bound			

Detention Basin Outlet Structure Design

Outflow Hydrograph Workbook Filename:

Storm Inflow Hydrographs **UD-Detention, Version 3.07 (February 2017)**

The user can override the calculated inflow hydrographs from this workbook with inflow hydrographs developed in a separate program.

	SOURCE	WORKBOOK	WORKBOOK	WORKBOOK	WORKBOOK	WORKBOOK	WORKBOOK	WORKBOOK	WORKBOOK	WORKBOOK
Time Interval	TIME	WQCV [cfs]	EURV [cfs]	2 Year [cfs]	5 Year [cfs]	10 Year [cfs]	25 Year [cfs]	50 Year [cfs]	100 Year [cfs]	500 Year [cfs]
5.35 min	0:00:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	0:05:21	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Hydrograph	0:10:42	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Constant	0:16:03	0.37	1.23	0.86	1.11	1.35	1.65	2.02	2.43	3.79
0.935	0:21:24	1.00	3.36	2.32	3.03	3.69	4.54	5.56	6.74	10.77
	0:26:45	2.56	8.64	5.96	7.77	9.48	11.66	14.29	17.30	27.66
	0:32:06	7.04	23.71	16.37	21.33	26.03	31.99	39.19	47.44	75.74
	0:37:27	8.33	28.60	19.63	25.69	31.46	38.83	47.79	58.23	95.72
	0:42:48	7.95	27.38	18.77	24.58	30.13	37.22	45.85	55.97	92.86
	0:48:09	7.23	24.92	17.09	22.38	27.42	33.87	41.73	50.95	84.88
	0:53:30	6.45	22.37	15.31	20.08	24.63	30.45	37.55	45.89	76.53
	0:58:51	5.57	19.44	13.28	17.43	21.42	26.53	32.77	40.12	67.15
	1:04:12	4.85	16.88	11.54	15.14	18.61	23.09	28.57	35.01	58.73
	1:09:33	4.39	15.31	10.47	13.74	16.87	20.91	25.83	31.62	52.84
	1:14:54	3.62	12.76	8.69	11.44	14.07	17.46	21.60	26.49	44.52
	1:20:15	2.95	10.52	7.14	9.42	11.61	14.42	17.87	21.94	36.97
	1:25:36	2.27	8.24	5.56	7.37	9.10	11.35	14.10	17.36	29.49
	1:30:57	1.68	6.27	4.20	5.59	6.94	8.69	10.84	13.39	22.91
	1:36:18	1.22	4.61	3.06	4.10	5.11	6.43	8.05	9.99	17.24
	1:41:39	0.95	3.50	2.34	3.12	3.88	4.86	6.07	7.50	12.84
	1:47:00	0.78	2.85	1.92	2.54	3.15	3.94	4.90	6.04	10.25
	1:52:21	0.66	2.41	1.62	2.15	2.66	3.32	4.13	5.08	8.61
	1:57:42	0.58	2.10	1.42	1.88	2.32	2.90	3.60	4.43	7.47
	2:03:03	0.52	1.89	1.28	1.69	2.08	2.60	3.22	3.96	6.67
	2:08:24	0.48	1.73	1.17	1.55	1.91	2.38	2.95	3.63	6.10
	2:13:45	0.35	1.28	0.86	1.14	1.41	1.76	2.19	2.70	4.60
	2:19:06	0.26	0.93	0.63	0.83	1.03	1.28	1.59	1.95	3.32
	2:24:27	0.19	0.69	0.46	0.61	0.76	0.94	1.17	1.44	2.46
	2:29:48	0.14	0.51	0.34	0.45	0.56	0.70	0.87	1.07	1.83
	2:35:09	0.10	0.37	0.25	0.33	0.41	0.51	0.64	0.79	1.35
	2:40:30	0.07	0.26	0.18	0.23	0.29	0.36	0.46	0.56	0.97
	2:45:51	0.05	0.19	0.13	0.17	0.21	0.26	0.33	0.41	0.70
	2:51:12	0.03	0.13	0.09	0.12	0.14	0.18	0.23	0.29	0.50
	2:56:33	0.02	0.08	0.05	0.07	0.09	0.12	0.15	0.18	0.33
	3:01:54	0.01	0.04	0.03	0.04	0.05	0.06	0.08	0.10	0.19
	3:07:15	0.00	0.02	0.01	0.02	0.02	0.03	0.04	0.05	0.09
	3:12:36	0.00	0.00	0.00	0.00	0.00	0.01	0.01	0.01	0.03
	3:17:57	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	3:23:18	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	3:28:39	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	3:34:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	3:39:21	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	3:44:42	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	3:50:03	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	3:55:24	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	4:00:45	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	4:06:06	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	4:11:27	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	4:16:48	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	4:22:09	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	4:27:30	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	4:32:51	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	4:38:12	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	4:43:33	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	4:48:54	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	4:54:15	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	4:59:36	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	5:04:57	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	5:10:18	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	5:15:39	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	5:21:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	5:26:21	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	5:31:42	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	5:37:03	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	5:42:24	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	5:47:45	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	5:53:06	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	5:58:27	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	6:03:48	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	6:09:09	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	6:14:30	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	6:19:51	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	6:25:12	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Pond (South) - FOREBAY CALCULATIONS

1) WQCV (inches) = $a(.91I^3 - 1.19I^2 + .78I)$

I = impervious percentage = 53%

a = Coefficient corresponding to WQCV drain time = 1 (40 hours)

WQCV (inches) = 0.22 inches

2) WQCV (ac-ft) = (WQCV (inches))/12 x A

Area = tributary area = 29.31 acres

WQCV (ac-ft) = 0.53

WQCV (cubic feet) = 22,894

3) Forebay Volume

Per Table EDB-4, Section T-5 of USDCM Volume 3 - Forebay Volume = 2% of WQCV and be 18" depth since watershed up to 5 impervious acres

Forebay Volume = 2% of WQCV = 458 cubic feet

with pond depth at 1.5', Forebay Area = 305.3 sq-ft (minimum)

4) Forebay Discharge

Per Table EDB-4, Section T-5 of USDCM Volume 3 - Forebay Discharge = 2% of 100-yr Flow into pond

Q100 = 85 cfs

Forebay discharge = 1.70 cfs

Pond (South) - Forebay Slot

Project Description

Solve For	Crest Length

Input Data

Discharge	1.70	ft³/s
Headwater Elevation	1.25	ft
Crest Elevation	0.00	ft
Tailwater Elevation	0.00	ft
Weir Coefficient	3.00	US
Number Of Contractions	0	

Results

Crest Length	0.41	ft
Headwater Height Above Crest	1.25	ft
Tailwater Height Above Crest	0.00	ft
Flow Area	0.51	ft²
Velocity	3.35	ft/s
Wetted Perimeter	2.91	ft
Top Width	0.41	ft

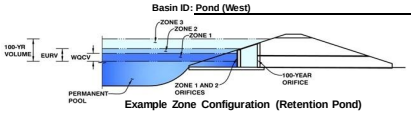
Pond (West) Calculations

DETENTION BASIN STAGE-STORAGE TABLE BUILDER

UD-Detention, Version 3.07 (February 2017)

Project: **Bent Grass Residential Filing No. 2**

Basin ID: **Pond (West)**



Example Zone Configuration (Retention Pond)

Required Volume Calculation

Selected BMP Type =	**EDB**	
Watershed Area =	25.96	acres
Watershed Length =	1,300	ft
Watershed Slope =	0.020	ft/ft
Watershed Imperviousness =	57.78%	percent
Percentage Hydrologic Soil Group A =	100.0%	percent
Percentage Hydrologic Soil Group B =	0.0%	percent
Percentage Hydrologic Soil Groups C/D =	0.0%	percent
Desired WQCV Drain Time =	40.0	hours
Location for 1-hr Rainfall Depths =	User Input	
Water Quality Capture Volume (WQCV) =	0.495	acre-feet
Excess Urban Runoff Volume (EURV) =	1.801	acre-feet
2-yr Runoff Volume (P1 = 1.19 in.) =	1.234	acre-feet
5-yr Runoff Volume (P1 = 1.5 in.) =	1.616	acre-feet
10-yr Runoff Volume (P1 = 1.75 in.) =	1.978	acre-feet
25-yr Runoff Volume (P1 = 2 in.) =	2.426	acre-feet
50-yr Runoff Volume (P1 = 2.25 in.) =	2.952	acre-feet
100-yr Runoff Volume (P1 = 2.52 in.) =	3.565	acre-feet
500-yr Runoff Volume (P1 = 3.68 in.) =	5.826	acre-feet
Approximate 2-yr Detention Volume =	1.166	acre-feet
Approximate 5-yr Detention Volume =	1.529	acre-feet
Approximate 10-yr Detention Volume =	1.853	acre-feet
Approximate 25-yr Detention Volume =	2.246	acre-feet
Approximate 50-yr Detention Volume =	2.488	acre-feet
Approximate 100-yr Detention Volume =	2.759	acre-feet

Optional User Override 1-hr Precipitation

1.19	inches
1.50	inches
1.75	inches
2.00	inches
2.25	inches
2.52	inches
3.68	inches

Stage-Storage Calculation

Zone 1 Volume (WQCV) =	0.495	acre-feet
Select Zone 2 Storage Volume (Optional) =		acre-feet
Select Zone 3 Storage Volume (Optional) =		acre-feet
Total Detention Basin Volume =	0.495	acre-feet
Initial Surcharge Volume (ISV) =	user	ft^3
Initial Surcharge Depth (ISD) =	user	ft
Total Available Detention Depth (H_{total}) =	user	ft
Depth of Trickle Channel (H_{TC}) =	user	ft
Slope of Trickle Channel (S_{TC}) =	user	ft/ft
Slopes of Main Basin Sides (S_{main}) =	user	H:V
Basin Length-to-Width Ratio ($R_{L/W}$) =	user	
Initial Surcharge Area (A_{ISV}) =	user	ft^2
Surcharge Volume Length (L_{ISV}) =	user	ft
Surcharge Volume Width (W_{ISV}) =	user	ft
Depth of Basin Floor (H_{FLOOR}) =	user	ft
Length of Basin Floor (L_{FLOOR}) =	user	ft
Width of Basin Floor (W_{FLOOR}) =	user	ft
Area of Basin Floor (A_{FLOOR}) =	user	ft^2
Volume of Basin Floor (V_{FLOOR}) =	user	ft^3
Depth of Main Basin (H_{MAIN}) =	user	ft
Length of Main Basin (L_{MAIN}) =	user	ft
Width of Main Basin (W_{MAIN}) =	user	ft
Area of Main Basin (A_{MAIN}) =	user	ft^2
Volume of Main Basin (V_{MAIN}) =	user	ft^3
Calculated Total Basin Volume (V_{total}) =	user	acre-feet

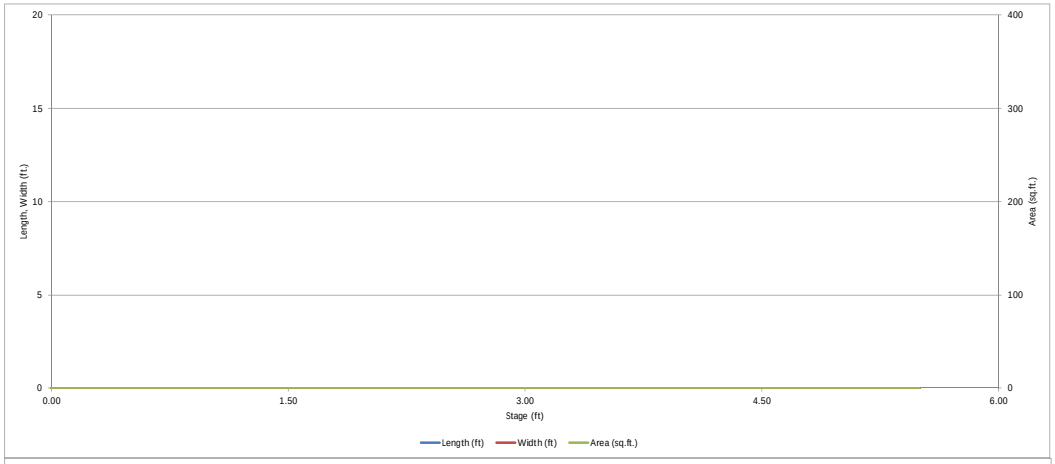
Total detention volume is less than 100-year volume.

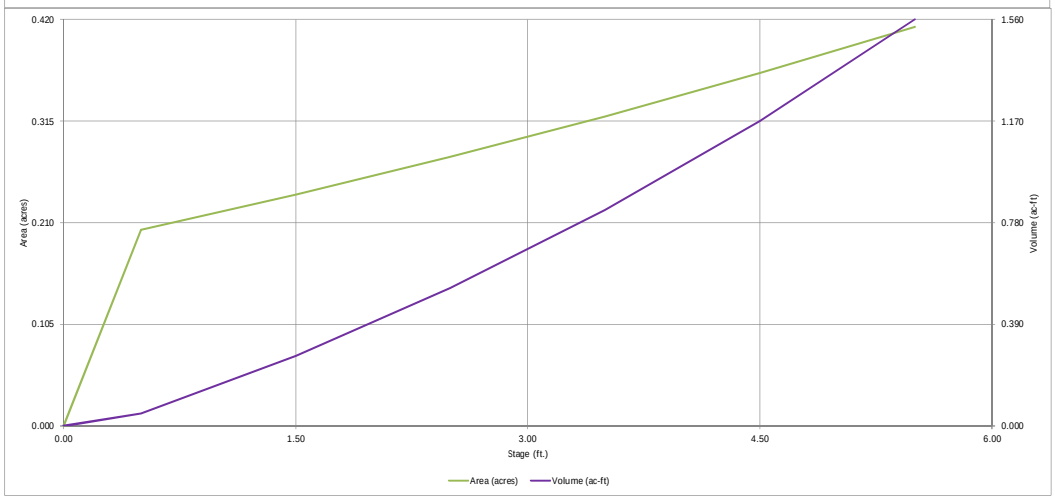
Depth Increment = User ft

Stage - Storage Description	Stage (ft)	Optional Override Stage (ft)	Length (ft)	Width (ft)	Area (ft^2)	Optional Override Area (ft^2)	Area (acre)	Volume (ft^3)	Volume (ac-ft)
Top of Micropool	--	0.00	--	--	--	0	0.000		
6931	--	0.50	--	--	--	8,836	0.203	2,121	0.049
6932	--	1.50	--	--	--	10,404	0.239	11,724	0.269
6933	--	2.50	--	--	--	12,100	0.278	23,080	0.530
6934	--	3.50	--	--	--	13,924	0.320	36,092	0.829
6935	--	4.50	--	--	--	15,876	0.364	50,992	1.171
6936	--	5.50	--	--	--	17,956	0.412	67,908	1.559

DETENTION BASIN STAGE-STORAGE TABLE BUILDER

UD-Detention, Version 3.07 (February 2017)





APPENDIX F

Regional Pond Calculations

Tributary to Detention Pond WU

See Figures 3-2 & 3-7 of the Falcon Drainage Basin Planning Study (September 2015)

Basin	Area (sq miles)	Percent Impervious
WT10	0.14	2%
WT20	0.07	2%
WT30	0.08	4%
WT40	0.19	3%
WT50	0.19	2%
WT60	0.20	2%
WT70	0.17	1%
WT80	0.07	2%
WT90	0.15	1%
WT100	0.19	1%
WT110	0.19	2%
WT120	0.05	3%
WT130	0.10	29%
WT140	0.13	2%
WT150	0.23	10%
WT160	0.11	20%
WT170	0.12	3%
WT180	0.10	0%
WT190	0.06	8%
WT200	0.30	4%
WT210	0.27	12%
WT220	0.19	13%
WT230	0.20	27%
WT240	0.08	27%
Total	3.58	7.33%

Water Quality Capture Volume, WQCV:

WQCV = a(0.91*I* ^3 - 1.19*I* ^2 + 0.78*I*) (Equation 3-1)

Where:

a = Coefficient corresponding to WQCV drain time

I = Imperviousness (%/100)

Drain Time =	40	hrs
WQCV =	0.051	Inches

BMP Storage Volume, V:

V = (WQCV/12)A (Equation 3-3)

Where:

A = Tributary area (acres)

V =	9.764	acre-ft

*Reference Section 3.0 of UDFCD Volume 3, August 2011

HEC-HMS - FALCON BASIN - 100-YEAR STORM

HEC-HMS 3.5 [H:\Challenger Homes Inc\CO, El Paso County-CLH0000014.20-Bent Grass\3. Pe...

Hydrologic Element	Drainage Area (MI2)	Peak Discharge (CFS)	Time of Peak	Volume (AC-FT)
WT020	0.0671383	41.9	01Jan2011, 06:21	4.8
JWT020	0.0671383	41.9	01Jan2011, 06:21	4.8
RWT030	0.0671383	41.9	01Jan2011, 06:29	4.8
WT030	0.0764732	75.3	01Jan2011, 06:07	5.5
JWT030	0.1436115	85.4	01Jan2011, 06:09	10.3
RWT042	0.1436115	85.3	01Jan2011, 06:15	10.3
WT010	0.1353300	88.9	01Jan2011, 06:17	9.3
JWT010	0.1353300	88.9	01Jan2011, 06:17	9.3
RWT044	0.1353300	88.8	01Jan2011, 06:24	9.3
JWT042	0.2789415	167.0	01Jan2011, 06:21	19.6
RWT046	0.2789415	166.7	01Jan2011, 06:28	19.6
WT040	0.1850600	92.7	01Jan2011, 06:28	12.8
JWT044	0.4640015	259.4	01Jan2011, 06:28	32.4
RWT054	0.4640015	258.8	01Jan2011, 06:35	32.3
WT060	0.1956300	116.8	01Jan2011, 06:26	15.1
WT050	0.1899300	139.4	01Jan2011, 06:19	15.3
JWT050	0.8495615	475.4	01Jan2011, 06:31	62.7
RWT092	0.8495615	475.2	01Jan2011, 06:32	62.7
WT070	0.1711000	133.9	01Jan2011, 06:12	11.8
JWT070	0.1711000	133.9	01Jan2011, 06:12	11.8
RWT080	0.1711000	133.4	01Jan2011, 06:22	11.8
WT080	0.0691596	67.3	01Jan2011, 06:10	5.6
Sub Regional Pond SR1	1.0898211	513.2	01Jan2011, 06:40	78.4
JWT080	1.0898211	513.2	01Jan2011, 06:40	78.4
RWT094	1.0898211	512.4	01Jan2011, 06:45	78.3
WT100-REV	0.1292700	203.0	01Jan2011, 06:04	12.9
W26-REV	0.0720000	103.6	01Jan2011, 06:03	6.4
WS3-1	0.0720000	102.8	01Jan2011, 06:10	6.4
Paint Brush Hills Pond C	0.2012700	64.4	01Jan2011, 06:26	19.2
WT090	0.1533300	162.4	01Jan2011, 06:09	12.8
JWT090	1.4444211	595.9	01Jan2011, 06:44	110.2
RWT122	1.4444211	595.5	01Jan2011, 06:45	110.2
WT110	0.1942800	169.9	01Jan2011, 06:14	16.2
JWT110	1.6387011	651.0	01Jan2011, 06:43	126.4
RWT124	1.6387011	650.8	01Jan2011, 06:47	126.3
WT130-REV	0.1016250	130.0	01Jan2011, 06:11	10.9
Paint Brush Hills Pond A	0.1016250	53.8	01Jan2011, 06:32	10.9

HEC-HMS - FALCON BASIN - 100-YEAR STORM

Hydrologic Element	Drainage Area (MI2)	Peak Discharge (CFS)	Time of Peak	Volume (AC-FT)
WT120-REV	0.0430300	51.1	01Jan2011, 06:08	3.8
JWT120	1.7833561	703.6	01Jan2011, 06:46	140.9
RWT172	1.7833561	702.5	01Jan2011, 06:58	140.5
WT140-REV	0.1445300	194.2	01Jan2011, 06:12	16.8
JWT140	0.1445300	194.2	01Jan2011, 06:12	16.8
RWT150	0.1445300	193.3	01Jan2011, 06:22	16.8
WT150-REV	0.1308100	202.5	01Jan2011, 06:08	15.0
Paint Brush Hills Pond...	0.2753400	235.6	01Jan2011, 06:29	31.8
W34B2-REV	0.0935900	141.8	01Jan2011, 06:07	10.2
Paint Brush Hills Pond...	0.3689300	234.3	01Jan2011, 06:43	38.9
JWT150	0.3689300	234.3	01Jan2011, 06:43	38.9
RWT160	0.3689300	234.2	01Jan2011, 06:49	38.8
WT160-REV	0.0734800	109.9	01Jan2011, 06:06	7.5
JWT160	0.4424100	244.8	01Jan2011, 06:48	46.3
RWT174	0.4424100	244.7	01Jan2011, 06:56	46.2
WT170-REV	0.1060150	85.2	01Jan2011, 06:19	9.2
W34-CY-REV	0.0465469	38.1	01Jan2011, 06:16	3.8
JWT172	2.3783280	981.9	01Jan2011, 06:56	199.7
RWT176	2.3783280	981.6	01Jan2011, 06:57	199.7
Sub Regional Pond SR2	2.3783280	972.9	01Jan2011, 07:01	194.8
JWT174	2.3783280	972.9	01Jan2011, 07:01	194.8
RWT180	2.3783280	972.1	01Jan2011, 07:10	194.2
WT180-REV	0.0409400	29.3	01Jan2011, 06:19	3.2
JWT180	2.4192680	978.0	01Jan2011, 07:10	197.4
RWT202	2.4192680	977.3	01Jan2011, 07:21	196.8
WT200	0.3017100	186.8	01Jan2011, 06:30	26.0
WT190	0.0574561	74.7	01Jan2011, 06:05	5.0
The Meadows Pond #1	0.0574561	2.1	01Jan2011, 08:29	2.8
JWT190	0.0574561	2.1	01Jan2011, 08:29	2.8
RWT204	0.0574561	2.1	01Jan2011, 08:55	2.7
JWT200	2.7784341	1041.0	01Jan2011, 07:19	225.5
RWT210	2.7784341	1040.5	01Jan2011, 07:24	225.1
WT210	0.2654600	187.9	01Jan2011, 06:35	28.0
JWT210	3.0438941	1113.0	01Jan2011, 07:23	253.1
RWT232	3.0438941	1112.6	01Jan2011, 07:27	252.7
WT220	0.1895300	250.4	01Jan2011, 06:12	21.3
JWT220	0.1895300	250.4	01Jan2011, 06:12	21.3
RWT234	0.1895300	249.6	01Jan2011, 06:20	21.3

HEC-HMS - FALCON BASIN - 100-YEAR STORM

Hydrologic Element	Drainage Area (MI2)	Peak Discharge (CFS)	Time of Peak	Volume (AC-FT)
JWT232	3.2334241	1138.4	01Jan2011, 07:26	274.0
RWT236	3.2334241	1138.3	01Jan2011, 07:26	274.0
WT230	0.1981800	346.7	01Jan2011, 06:05	23.1
JWT234	3.4316041	1155.6	01Jan2011, 07:26	297.0
RWT240	3.4316041	1155.0	01Jan2011, 07:29	296.8
WT240	0.0761461	160.3	01Jan2011, 06:01	9.1
Regional Pond WU No...	3.5077502	1160.9	01Jan2011, 07:30	304.7
Regional Pond WU Di...	3.5077502	1122.2	01Jan2011, 07:30	261.4
Old Meridian	0.0335900	85.0	01Jan2011, 06:07	6.1
RWT-OM	0.0335900	84.2	01Jan2011, 06:12	6.1
Regional Pond WU So...	3.5413402	1116.5	01Jan2011, 07:34	257.3
RWT240_Diversion R...	0.0000000	38.8	01Jan2011, 07:35	43.1
JWT240	3.5413402	1155.3	01Jan2011, 07:34	300.5
RWT250	3.5413402	1154.5	01Jan2011, 07:35	300.4
WT250	0.1469500	291.4	01Jan2011, 06:02	17.1
JWT250	3.6882902	1166.7	01Jan2011, 07:35	317.5
RWT260	3.6882902	1165.2	01Jan2011, 07:45	316.6
WT260	0.1388002	77.5	01Jan2011, 06:34	11.5
JWT260	3.8270904	1182.9	01Jan2011, 07:45	328.1
RWT291	3.8270904	1182.7	01Jan2011, 07:47	327.9
WT270	0.0324738	57.1	01Jan2011, 06:04	3.6
JWT270	0.0324738	57.1	01Jan2011, 06:04	3.6
RWT292	0.0324738	56.9	01Jan2011, 06:08	3.5
JWT292	3.8595642	1185.3	01Jan2011, 07:47	331.4
RWT295	3.8595642	1185.0	01Jan2011, 07:48	331.3
WT280	0.2669500	251.8	01Jan2011, 06:12	22.3
JWT280	0.2669500	251.8	01Jan2011, 06:12	22.3
RWT294	0.2669500	251.2	01Jan2011, 06:15	22.2
JWT294	4.1265142	1203.3	01Jan2011, 07:48	353.5
RWT296	4.1265142	1201.9	01Jan2011, 07:53	353.0
MT040	0.3084200	455.2	01Jan2011, 06:11	38.1
MT030	0.1566300	228.6	01Jan2011, 06:05	15.1
MT020	0.0902033	143.1	01Jan2011, 06:04	9.0
JMT020	0.0902033	143.1	01Jan2011, 06:04	9.0
RMT030	0.0902033	141.8	01Jan2011, 06:17	8.9
JMT030	0.2468333	294.4	01Jan2011, 06:07	24.0
RMT040	0.2468333	293.0	01Jan2011, 06:11	24.0
Woodmen Hills Pond H	0.5552533	751.7	01Jan2011, 06:11	61.7

HEC-HMS - FALCON BASIN - 100-YEAR STORM

Hydrologic Element	Drainage Area (MI2)	Peak Discharge (CFS)	Time of Peak	Volume (AC-FT)
JMT040	0.5552533	751.7	01Jan2011, 06:11	61.7
RMT050	0.5552533	745.8	01Jan2011, 06:14	61.7
MT050	0.1186100	109.7	01Jan2011, 06:18	11.4
JMT050	0.6738633	851.9	01Jan2011, 06:14	73.1
RMT064	0.6738633	847.0	01Jan2011, 06:21	73.0
MT010	0.2898900	206.3	01Jan2011, 06:24	25.0
The Meadows Pond #2	0.2898900	99.3	01Jan2011, 06:53	23.4
JMT010	0.2898900	99.3	01Jan2011, 06:53	23.4
RMT062	0.2898900	99.2	01Jan2011, 07:18	23.2
MT060	0.1941800	199.3	01Jan2011, 06:13	18.0
Sub Regional Pond SR4	1.1579333	727.4	01Jan2011, 06:35	108.8
JMT060	1.1579333	727.4	01Jan2011, 06:35	108.8
RMT070	1.1579333	725.8	01Jan2011, 06:40	108.6
MT070	0.1994800	165.4	01Jan2011, 06:22	19.1
JMT070	1.3574133	844.1	01Jan2011, 06:38	127.7
RMT080	1.3574133	843.3	01Jan2011, 06:40	127.7
MT080	0.0638371	191.9	01Jan2011, 06:00	11.0
Regional Pond MN	1.4212504	824.2	01Jan2011, 06:45	136.1
JMT080	1.4212504	824.2	01Jan2011, 06:45	136.1
RMT102	1.4212504	822.3	01Jan2011, 06:51	135.9
MT090	0.0435103	127.4	01Jan2011, 06:00	7.1
Woodmen Hills Pond #5	0.0435103	18.6	01Jan2011, 06:07	5.9
JMT090	0.0435103	18.6	01Jan2011, 06:07	5.9
RMT090	0.0435103	18.6	01Jan2011, 06:08	5.9
JMT104	0.0435103	18.6	01Jan2011, 06:08	5.9
RMT104	0.0435103	18.6	01Jan2011, 06:12	5.9
JMT102	1.4647607	837.8	01Jan2011, 06:51	141.8
RMT106	1.4647607	832.9	01Jan2011, 06:53	141.7
MT100	0.0557682	88.2	01Jan2011, 06:05	5.9
JMT106	1.5205289	840.1	01Jan2011, 06:53	147.6
RMT112	1.5205289	836.8	01Jan2011, 07:04	146.9
MT110	0.1163900	117.4	01Jan2011, 06:16	11.5
JMT110	1.6369189	859.1	01Jan2011, 07:04	158.4
RMT114	1.6369189	857.8	01Jan2011, 07:09	158.2
WT290	0.1037800	110.3	01Jan2011, 06:09	8.7
Regional Pond R1	5.8672131	1636.5	01Jan2011, 07:50	512.3
JWT296	5.8672131	1636.5	01Jan2011, 07:50	512.3
RWT314	5.8672131	1635.7	01Jan2011, 07:55	511.5

HEC-HMS - FALCON BASIN - 100-YEAR STORM

Hydrologic Element	Drainage Area (MI2)	Peak Discharge (CFS)	Time of Peak	Volume (AC-FT)
WT300	0.0970199	91.6	01Jan2011, 06:12	8.1
JWT300	0.0970199	91.6	01Jan2011, 06:12	8.1
RWT312	0.0970199	91.1	01Jan2011, 06:29	8.1
WT310	0.2774200	246.7	01Jan2011, 06:13	22.3
JWT310	6.2416530	1660.9	01Jan2011, 07:55	541.9
RWT320	6.2416530	1656.3	01Jan2011, 08:04	541.0
WT320	0.2061400	200.6	01Jan2011, 06:11	17.2
JWT320	6.4477930	1670.0	01Jan2011, 08:04	558.2
RWT352	6.4477930	1666.8	01Jan2011, 08:13	556.9
ET020	0.2131700	360.5	01Jan2011, 06:06	24.8
ET010	0.1451300	198.3	01Jan2011, 06:11	16.4
Paint Brush Hills Pond...	0.1451300	150.9	01Jan2011, 06:20	16.3
JET010	0.1451300	150.9	01Jan2011, 06:20	16.3
RET020	0.1451300	150.0	01Jan2011, 06:37	16.3
Sub Regional Pond SR6	0.3583000	195.4	01Jan2011, 06:41	37.9
JET020	0.3583000	195.4	01Jan2011, 06:41	37.9
RET030	0.3583000	194.9	01Jan2011, 07:02	37.5
ET030	0.2042800	242.0	01Jan2011, 06:15	23.0
JET030	0.5625800	266.0	01Jan2011, 06:43	60.5
RET040	0.5625800	265.2	01Jan2011, 06:50	60.3
Woodmen Hills Pond ...	0.7117200	263.5	01Jan2011, 07:09	75.5
ET040	0.1491400	165.7	01Jan2011, 06:14	15.3
Woodmen Hills Pond ...	0.7117200	261.1	01Jan2011, 07:18	69.5
JET040	0.7117200	261.1	01Jan2011, 07:18	69.5
RET050	0.7117200	261.1	01Jan2011, 07:23	69.4
ET050	0.1171900	197.1	01Jan2011, 06:03	11.6
Woodmen Hills Pond #2	0.8289100	250.3	01Jan2011, 07:46	79.3
JET050	0.8289100	250.3	01Jan2011, 07:46	79.3
RET060	0.8289100	250.3	01Jan2011, 07:53	79.1
ET060	0.2854300	529.3	01Jan2011, 06:01	29.3
Woodmen Hills Pond #3	1.1143400	360.9	01Jan2011, 06:06	105.9
JET060	1.1143400	360.9	01Jan2011, 06:06	105.9
RET070	1.1143400	356.7	01Jan2011, 06:16	105.6
ET070	0.2497500	461.0	01Jan2011, 06:02	27.3
JET070	1.3640900	636.4	01Jan2011, 06:04	132.9
RET080	1.3640900	517.5	01Jan2011, 06:23	131.3
ET080	0.2916400	517.9	01Jan2011, 06:07	37.1
Woodmen Hills Pond #4	1.6557300	288.0	01Jan2011, 07:00	139.2

HEC-HMS - FALCON BASIN - 100-YEAR STORM

Hydrologic Element	Drainage Area (MI2)	Peak Discharge (CFS)	Time of Peak	Volume (AC-FT)
JET080	1.6557300	288.0	01Jan2011, 07:00	139.2
RET090	1.6557300	287.3	01Jan2011, 07:03	139.0
ET090	0.1242400	133.0	01Jan2011, 06:22	14.9
JET090	1.7799700	330.8	01Jan2011, 06:59	153.9
RET100	1.7799700	330.7	01Jan2011, 07:01	153.8
ET100	0.0480615	72.0	01Jan2011, 06:02	4.0
JET100	1.8280315	335.4	01Jan2011, 07:01	157.8
RET110	1.8280315	335.2	01Jan2011, 07:05	157.6
ET110	0.2260300	198.8	01Jan2011, 06:12	17.5
JET110	2.0540615	362.1	01Jan2011, 07:03	175.1
RET120	2.0540615	361.3	01Jan2011, 07:09	174.7
ET120	0.1091300	89.4	01Jan2011, 06:14	8.5
JET120	2.1631915	403.2	01Jan2011, 06:17	183.2
RET152	2.1631915	402.2	01Jan2011, 06:24	182.9
ET130	0.1348100	85.4	01Jan2011, 06:27	11.2
JET130	0.1348100	85.4	01Jan2011, 06:27	11.2
RET140	0.1348100	84.7	01Jan2011, 06:54	11.1
ET140	0.2675900	122.8	01Jan2011, 06:46	22.2
JET140	0.4024000	204.8	01Jan2011, 06:51	33.3
RET154	0.4024000	204.4	01Jan2011, 07:05	33.2
JET152	2.5655915	572.3	01Jan2011, 07:10	216.1
RET156	2.5655915	572.0	01Jan2011, 07:14	215.8
ET150	0.1777300	136.2	01Jan2011, 06:18	14.3
JET154	2.7433215	595.8	01Jan2011, 07:12	230.1
RET162	2.7433215	595.1	01Jan2011, 07:25	228.9
ET160	0.1889200	137.2	01Jan2011, 06:23	16.3
JET160	2.9322415	633.6	01Jan2011, 06:38	245.2
RET164	2.9322415	629.0	01Jan2011, 06:47	244.7
WT350	0.3037700	276.7	01Jan2011, 06:14	26.3
JWT352	9.6838045	2166.4	01Jan2011, 07:37	827.9
RWT354	9.6838045	2166.3	01Jan2011, 07:37	827.9
WT330	0.3266800	249.3	01Jan2011, 06:19	27.2
JWT330	0.3266800	249.3	01Jan2011, 06:19	27.2
RWT344	0.3266800	248.4	01Jan2011, 06:25	27.2
WT340	0.2780000	147.3	01Jan2011, 06:37	23.1
JWT354	10.2884845	2247.6	01Jan2011, 07:36	878.1
RWT372	10.2884845	2244.8	01Jan2011, 07:41	877.0
WT360	0.0656830	54.8	01Jan2011, 06:15	5.3

HEC-HMS - FALCON BASIN - 100-YEAR STORM

Hydrologic Element	Drainage Area (MI2)	Peak Discharge (CFS)	Time of Peak	Volume (AC-FT)
JWT360	0.0656830	54.8	01Jan2011, 06:15	5.3
RWT374	0.0656830	54.6	01Jan2011, 06:24	5.3
Regional Pond R2	10.3541675	2248.6	01Jan2011, 07:43	878.9
JWT372	10.3541675	2248.6	01Jan2011, 07:43	878.9
RWT376	10.3541675	2242.9	01Jan2011, 07:53	876.5
WT370	0.2147600	123.3	01Jan2011, 06:12	11.5
JWT374_OUTLET	10.5689275	2253.1	01Jan2011, 07:53	888.0
FS010	0.1220000	74.9	01Jan2011, 06:16	7.7

Project: Aug15_Working_Falcon_DBPS_S

Simulation Run: FU 100-yr Reservoir: Regional Pond WU South

Start of Run:	01Jan2011, 00:00	Basin Model:	Falcon_DBPS_Future
End of Run:	02Jan2011, 00:00	Meteorologic Model:	100-yr
Compute Time:	25Mar2020, 11:48:34	Control Specifications:	24-hr Storm

Volume Units: AC-FT

Computed Results

Peak Inflow :	1126.7 (CFS)	Date/Time of Peak Inflow :	01Jan2011, 07:30
Peak Outflow :	1116.5 (CFS)	Date/Time of Peak Outflow :	01Jan2011, 07:34
Total Inflow :	267.5 (AC-FT)	Peak Storage :	19.5 (AC-FT)
Total Outflow :	257.3 (AC-FT)	Peak Elevation :	6824.1 (FT)

HEC - HMS - FALCON BASIN - 5-YEAR STORM

HEC-HMS 3.5 [H:\Challenger Homes Inc\CO, El Paso County-CLH0000014.20-Bent Grass\3. Pe...

Hydrologic Element	Drainage Area (MI2)	Peak Discharge (CFS)	Time of Peak	Volume (AC-FT)
WT020	0.0671383	10.3	01Jan2011, 06:23	1.4
JWT020	0.0671383	10.3	01Jan2011, 06:23	1.4
RWT030	0.0671383	10.3	01Jan2011, 06:34	1.4
WT030	0.0764732	19.5	01Jan2011, 06:08	1.6
JWT030	0.1436115	20.0	01Jan2011, 06:09	3.0
RWT042	0.1436115	19.9	01Jan2011, 06:18	3.0
WT010	0.1353300	21.2	01Jan2011, 06:19	2.6
JWT010	0.1353300	21.2	01Jan2011, 06:19	2.6
RWT044	0.1353300	21.2	01Jan2011, 06:29	2.6
JWT042	0.2789415	37.2	01Jan2011, 06:24	5.6
RWT046	0.2789415	37.2	01Jan2011, 06:35	5.6
WT040	0.1850600	21.9	01Jan2011, 06:31	3.6
JWT044	0.4640015	58.9	01Jan2011, 06:34	9.2
RWT054	0.4640015	58.7	01Jan2011, 06:43	9.2
WT060	0.1956300	30.1	01Jan2011, 06:29	4.5
WT050	0.1899300	37.3	01Jan2011, 06:21	4.7
JWT050	0.8495615	108.6	01Jan2011, 06:38	18.4
RWT092	0.8495615	108.5	01Jan2011, 06:39	18.4
WT070	0.1711000	32.6	01Jan2011, 06:13	3.4
JWT070	0.1711000	32.6	01Jan2011, 06:13	3.4
RWT080	0.1711000	32.5	01Jan2011, 06:28	3.3
WT080	0.0691596	18.5	01Jan2011, 06:12	1.7
Sub Regional Pond SR1	1.0898211	113.8	01Jan2011, 06:50	21.9
JWT080	1.0898211	113.8	01Jan2011, 06:50	21.9
RWT094	1.0898211	113.7	01Jan2011, 06:58	21.8
WT100-REV	0.1292700	67.7	01Jan2011, 06:05	4.5
W26-REV	0.0720000	33.7	01Jan2011, 06:04	2.1
WS3-1	0.0720000	33.4	01Jan2011, 06:13	2.1
Paint Brush Hills Pond C	0.2012700	14.0	01Jan2011, 06:38	6.5
WT090	0.1533300	46.0	01Jan2011, 06:10	4.0
JWT090	1.4444211	133.8	01Jan2011, 06:57	32.3
RWT122	1.4444211	133.7	01Jan2011, 07:01	32.3
WT110	0.1942800	47.0	01Jan2011, 06:16	5.1
JWT110	1.6387011	144.0	01Jan2011, 07:00	37.4
RWT124	1.6387011	144.0	01Jan2011, 07:08	37.3
WT130-REV	0.1016250	43.5	01Jan2011, 06:12	3.9
Paint Brush Hills Pond A	0.1016250	9.3	01Jan2011, 06:49	3.9

HEC - HMS - FALCON BASIN - 5-YEAR STORM

Hydrologic Element	Drainage Area (MI2)	Peak Discharge (CFS)	Time of Peak	Volume (AC-FT)
WT120-REV	0.0430300	14.8	01Jan2011, 06:09	1.2
JWT120	1.7833561	154.4	01Jan2011, 07:08	42.4
RWT172	1.7833561	154.2	01Jan2011, 07:18	42.2
WT140-REV	0.1445300	65.2	01Jan2011, 06:14	6.1
JWT140	0.1445300	65.2	01Jan2011, 06:14	6.1
RWT150	0.1445300	64.9	01Jan2011, 06:24	6.1
WT150-REV	0.1308100	71.3	01Jan2011, 06:08	5.5
Paint Brush Hills Pond...	0.2753400	110.4	01Jan2011, 06:15	11.6
W34B2-REV	0.0935900	49.1	01Jan2011, 06:08	3.7
Paint Brush Hills Pond...	0.3689300	20.1	01Jan2011, 07:15	13.8
JWT150	0.3689300	20.1	01Jan2011, 07:15	13.8
RWT160	0.3689300	20.0	01Jan2011, 07:24	13.8
WT160-REV	0.0734800	36.3	01Jan2011, 06:07	2.6
JWT160	0.4424100	37.3	01Jan2011, 06:07	16.4
RWT174	0.4424100	36.9	01Jan2011, 06:20	16.3
WT170-REV	0.1060150	24.0	01Jan2011, 06:21	2.9
W34-CY-REV	0.0465469	10.7	01Jan2011, 06:18	1.2
JWT172	2.3783280	181.3	01Jan2011, 07:17	62.6
RWT176	2.3783280	181.2	01Jan2011, 07:18	62.6
Sub Regional Pond SR2	2.3783280	171.7	01Jan2011, 07:30	59.3
JWT174	2.3783280	171.7	01Jan2011, 07:30	59.3
RWT180	2.3783280	171.6	01Jan2011, 07:45	59.0
WT180-REV	0.0409400	7.6	01Jan2011, 06:21	1.0
JWT180	2.4192680	172.6	01Jan2011, 07:45	59.9
RWT202	2.4192680	172.6	01Jan2011, 08:03	59.5
WT200	0.3017100	52.2	01Jan2011, 06:33	8.3
WT190	0.0574561	22.5	01Jan2011, 06:06	1.6
The Meadows Pond #1	0.0574561	0.6	01Jan2011, 10:18	0.9
JWT190	0.0574561	0.6	01Jan2011, 10:18	0.9
RWT204	0.0574561	0.6	01Jan2011, 10:56	0.8
JWT200	2.7784341	182.8	01Jan2011, 08:02	68.6
RWT210	2.7784341	182.7	01Jan2011, 08:10	68.3
WT210	0.2654600	59.7	01Jan2011, 06:38	9.8
JWT210	3.0438941	194.3	01Jan2011, 08:09	78.2
RWT232	3.0438941	194.3	01Jan2011, 08:16	77.9
WT220	0.1895300	84.8	01Jan2011, 06:13	7.8
JWT220	0.1895300	84.8	01Jan2011, 06:13	7.8
RWT234	0.1895300	84.4	01Jan2011, 06:25	7.7

HEC - HMS - FALCON BASIN - 5-YEAR STORM

Hydrologic Element	Drainage Area (MI2)	Peak Discharge (CFS)	Time of Peak	Volume (AC-FT)
JWT232	3.2334241	200.7	01Jan2011, 08:16	85.7
RWT236	3.2334241	200.7	01Jan2011, 08:16	85.7
WT230	0.1981800	124.0	01Jan2011, 06:06	8.5
JWT234	3.4316041	205.6	01Jan2011, 08:15	94.2
RWT240	3.4316041	205.4	01Jan2011, 08:21	94.0
WT240	0.0761461	61.0	01Jan2011, 06:02	3.4
Regional Pond WU No...	3.5077502	206.4	01Jan2011, 08:23	96.3
Regional Pond WU Di...	3.5077502	169.3	01Jan2011, 08:23	64.8
Old Meridian	0.0335900	38.2	01Jan2011, 06:09	2.8
RWT-OM	0.0335900	37.8	01Jan2011, 06:14	2.8
Regional Pond WU So...	3.5413402	164.4	01Jan2011, 08:34	58.4
RWT240_Diversion R...	0.0000000	37.1	01Jan2011, 08:29	31.4
JWT240	3.5413402	201.5	01Jan2011, 08:34	89.7
RWT250	3.5413402	201.4	01Jan2011, 08:35	89.7
WT250	0.1469500	107.5	01Jan2011, 06:03	6.3
JWT250	3.6882902	204.0	01Jan2011, 08:35	96.0
RWT260	3.6882902	203.8	01Jan2011, 08:50	95.4
WT260	0.1388002	21.0	01Jan2011, 06:36	3.6
JWT260	3.8270904	206.4	01Jan2011, 08:50	99.0
RWT291	3.8270904	206.4	01Jan2011, 08:54	98.8
WT270	0.0324738	20.0	01Jan2011, 06:04	1.3
JWT270	0.0324738	20.0	01Jan2011, 06:04	1.3
RWT292	0.0324738	19.9	01Jan2011, 06:10	1.3
JWT292	3.8595642	206.9	01Jan2011, 08:54	100.1
RWT295	3.8595642	206.9	01Jan2011, 08:55	100.0
WT280	0.2669500	70.1	01Jan2011, 06:14	6.9
JWT280	0.2669500	70.1	01Jan2011, 06:14	6.9
RWT294	0.2669500	70.0	01Jan2011, 06:17	6.9
JWT294	4.1265142	210.3	01Jan2011, 08:55	107.0
RWT296	4.1265142	210.1	01Jan2011, 09:03	106.5
MT040	0.3084200	163.5	01Jan2011, 06:12	14.5
MT030	0.1566300	73.4	01Jan2011, 06:06	5.1
MT020	0.0902033	47.3	01Jan2011, 06:05	3.1
JMT020	0.0902033	47.3	01Jan2011, 06:05	3.1
RMT030	0.0902033	46.8	01Jan2011, 06:21	3.1
JMT030	0.2468333	93.6	01Jan2011, 06:07	8.1
RMT040	0.2468333	92.8	01Jan2011, 06:12	8.1
Woodmen Hills Pond H	0.5552533	242.5	01Jan2011, 06:16	22.5

HEC - HMS - FALCON BASIN - 5-YEAR STORM

Hydrologic Element	Drainage Area (MI2)	Peak Discharge (CFS)	Time of Peak	Volume (AC-FT)
JMT040	0.5552533	242.5	01Jan2011, 06:16	22.5
RMT050	0.5552533	242.2	01Jan2011, 06:19	22.5
MT050	0.1186100	33.2	01Jan2011, 06:20	3.8
JMT050	0.6738633	275.4	01Jan2011, 06:19	26.3
RMT064	0.6738633	273.1	01Jan2011, 06:29	26.2
MT010	0.2898900	57.8	01Jan2011, 06:26	8.0
The Meadows Pond #2	0.2898900	20.8	01Jan2011, 07:07	6.5
JMT010	0.2898900	20.8	01Jan2011, 07:07	6.5
RMT062	0.2898900	20.8	01Jan2011, 07:45	6.4
MT060	0.1941800	59.3	01Jan2011, 06:14	5.9
Sub Regional Pond SR4	1.1579333	141.8	01Jan2011, 06:52	36.1
JMT060	1.1579333	141.8	01Jan2011, 06:52	36.1
RMT070	1.1579333	141.3	01Jan2011, 06:58	36.0
MT070	0.1994800	49.8	01Jan2011, 06:24	6.4
JMT070	1.3574133	162.4	01Jan2011, 06:56	42.4
RMT080	1.3574133	162.3	01Jan2011, 06:58	42.3
MT080	0.0638371	91.5	01Jan2011, 06:00	5.0
Regional Pond MN	1.4212504	160.0	01Jan2011, 07:04	44.9
JMT080	1.4212504	160.0	01Jan2011, 07:04	44.9
RMT102	1.4212504	159.5	01Jan2011, 07:12	44.7
MT090	0.0435103	59.3	01Jan2011, 06:00	3.2
Woodmen Hills Pond #5	0.0435103	2.2	01Jan2011, 08:01	2.3
JMT090	0.0435103	2.2	01Jan2011, 08:01	2.3
RMT090	0.0435103	2.2	01Jan2011, 08:01	2.3
JMT104	0.0435103	2.2	01Jan2011, 08:01	2.3
RMT104	0.0435103	2.2	01Jan2011, 08:07	2.3
JMT102	1.4647607	161.7	01Jan2011, 07:12	47.1
RMT106	1.4647607	159.8	01Jan2011, 07:15	47.0
MT100	0.0557682	29.8	01Jan2011, 06:06	2.1
JMT106	1.5205289	161.8	01Jan2011, 07:15	49.1
RMT112	1.5205289	161.1	01Jan2011, 07:36	48.5
MT110	0.1163900	36.3	01Jan2011, 06:18	3.9
JMT110	1.6369189	165.3	01Jan2011, 07:36	52.4
RMT114	1.6369189	165.0	01Jan2011, 07:43	52.3
WT290	0.1037800	31.2	01Jan2011, 06:10	2.7
Regional Pond R1	5.8672131	305.5	01Jan2011, 07:52	154.4
JWT296	5.8672131	305.5	01Jan2011, 07:52	154.4
RWT314	5.8672131	305.3	01Jan2011, 07:59	153.7

HEC - HMS - FALCON BASIN - 5-YEAR STORM

Hydrologic Element	Drainage Area (MI2)	Peak Discharge (CFS)	Time of Peak	Volume (AC-FT)
WT300	0.0970199	25.5	01Jan2011, 06:14	2.5
JWT300	0.0970199	25.5	01Jan2011, 06:14	2.5
RWT312	0.0970199	25.4	01Jan2011, 06:34	2.5
WT310	0.2774200	67.1	01Jan2011, 06:14	6.9
JWT310	6.2416530	314.2	01Jan2011, 07:59	163.1
RWT320	6.2416530	313.5	01Jan2011, 08:06	162.4
WT320	0.2061400	56.1	01Jan2011, 06:13	5.4
JWT320	6.4477930	318.3	01Jan2011, 08:06	167.8
RWT352	6.4477930	317.8	01Jan2011, 08:15	167.0
ET020	0.2131700	128.1	01Jan2011, 06:07	9.2
ET010	0.1451300	67.4	01Jan2011, 06:12	5.9
Paint Brush Hills Pond...	0.1451300	48.8	01Jan2011, 06:22	5.9
JET010	0.1451300	48.8	01Jan2011, 06:22	5.9
RET020	0.1451300	48.7	01Jan2011, 06:37	5.9
Sub Regional Pond SR6	0.3583000	19.9	01Jan2011, 07:26	13.5
JET020	0.3583000	19.9	01Jan2011, 07:26	13.5
RET030	0.3583000	19.7	01Jan2011, 08:14	13.1
ET030	0.2042800	81.2	01Jan2011, 06:17	8.4
JET030	0.5625800	81.2	01Jan2011, 06:17	21.5
RET040	0.5625800	80.9	01Jan2011, 06:28	21.4
Woodmen Hills Pond ...	0.7117200	103.5	01Jan2011, 06:35	26.6
ET040	0.1491400	52.6	01Jan2011, 06:15	5.3
Woodmen Hills Pond ...	0.7117200	32.8	01Jan2011, 07:14	21.7
JET040	0.7117200	32.8	01Jan2011, 07:14	21.7
RET050	0.7117200	32.8	01Jan2011, 07:22	21.6
ET050	0.1171900	66.6	01Jan2011, 06:03	4.0
Woodmen Hills Pond #2	0.8289100	29.6	01Jan2011, 08:07	23.9
JET050	0.8289100	29.6	01Jan2011, 08:07	23.9
RET060	0.8289100	29.6	01Jan2011, 08:19	23.7
ET060	0.2854300	185.5	01Jan2011, 06:02	10.2
Woodmen Hills Pond #3	1.1143400	82.1	01Jan2011, 06:08	31.5
JET060	1.1143400	82.1	01Jan2011, 06:08	31.5
RET070	1.1143400	81.0	01Jan2011, 06:18	31.2
ET070	0.2497500	164.1	01Jan2011, 06:03	9.8
JET070	1.3640900	164.5	01Jan2011, 06:03	41.0
RET080	1.3640900	123.5	01Jan2011, 06:29	40.2
ET080	0.2916400	192.2	01Jan2011, 06:08	14.3
Woodmen Hills Pond #4	1.6557300	26.7	01Jan2011, 14:58	26.8

HEC - HMS - FALCON BASIN - 5-YEAR STORM

Hydrologic Element	Drainage Area (MI2)	Peak Discharge (CFS)	Time of Peak	Volume (AC-FT)
JET080	1.6557300	26.7	01Jan2011, 14:58	26.8
RET090	1.6557300	26.7	01Jan2011, 15:03	26.6
ET090	0.1242400	46.0	01Jan2011, 06:23	5.6
JET090	1.7799700	50.6	01Jan2011, 06:24	32.2
RET100	1.7799700	50.6	01Jan2011, 06:28	32.1
ET100	0.0480615	22.3	01Jan2011, 06:02	1.3
JET100	1.8280315	53.2	01Jan2011, 06:28	33.3
RET110	1.8280315	53.1	01Jan2011, 06:35	33.1
ET110	0.2260300	52.7	01Jan2011, 06:13	5.3
JET110	2.0540615	86.0	01Jan2011, 06:13	38.4
RET120	2.0540615	85.1	01Jan2011, 06:19	38.1
ET120	0.1091300	23.5	01Jan2011, 06:16	2.5
JET120	2.1631915	107.9	01Jan2011, 06:19	40.7
RET152	2.1631915	107.7	01Jan2011, 06:25	40.4
ET130	0.1348100	23.2	01Jan2011, 06:30	3.5
JET130	0.1348100	23.2	01Jan2011, 06:30	3.5
RET140	0.1348100	23.1	01Jan2011, 07:00	3.5
ET140	0.2675900	33.4	01Jan2011, 06:49	6.9
JET140	0.4024000	55.3	01Jan2011, 06:56	10.4
RET154	0.4024000	55.2	01Jan2011, 07:19	10.3
JET152	2.5655915	108.6	01Jan2011, 06:26	50.8
RET156	2.5655915	108.3	01Jan2011, 06:30	50.6
ET150	0.1777300	36.6	01Jan2011, 06:20	4.4
JET154	2.7433215	138.8	01Jan2011, 06:29	55.0
RET162	2.7433215	135.5	01Jan2011, 06:54	54.2
ET160	0.1889200	38.5	01Jan2011, 06:25	5.2
JET160	2.9322415	154.7	01Jan2011, 06:53	59.4
RET164	2.9322415	154.3	01Jan2011, 06:58	59.2
WT350	0.3037700	78.7	01Jan2011, 06:16	8.4
JWT352	9.6838045	413.5	01Jan2011, 08:12	234.5
RWT354	9.6838045	413.4	01Jan2011, 08:12	234.5
WT330	0.3266800	68.2	01Jan2011, 06:21	8.5
JWT330	0.3266800	68.2	01Jan2011, 06:21	8.5
RWT344	0.3266800	67.9	01Jan2011, 06:30	8.5
WT340	0.2780000	40.0	01Jan2011, 06:39	7.2
JWT354	10.2884845	430.2	01Jan2011, 08:12	250.2
RWT372	10.2884845	429.8	01Jan2011, 08:16	249.6
WT360	0.0656830	14.8	01Jan2011, 06:17	1.6

Project: Aug15_Working_Falcon_DBPS_S

Simulation Run: FU 5-yr Reservoir: Regional Pond WU South

Start of Run:	01Jan2011, 00:00	Basin Model:	Falcon_DBPS_Future
End of Run:	02Jan2011, 00:00	Meteorologic Model:	5-yr
Compute Time:	25Mar2020, 16:39:40	Control Specifications:	24-hr Storm

Volume Units: IN

Computed Results

Peak Inflow :	171.1 (CFS)	Date/Time of Peak Inflow :	01Jan2011, 08:23
Peak Outflow :	164.4 (CFS)	Date/Time of Peak Outflow :	01Jan2011, 08:34
Total Inflow :	0.36 (IN)	Peak Storage :	11.8 (AC-FT)
Total Outflow :	0.31 (IN)	Peak Elevation :	6822.4 (FT)

HEC - HMS - FALCON BASIN - 2-YEAR STORM

HEC-HMS 3.5 [H:\Challenger Homes Inc\CO, El Paso County-CLH0000014.20-Bent Grass\3. Pe...

Hydrologic Element	Drainage Area (MI2)	Peak Discharge (CFS)	Time of Peak	Volume (AC-FT)
WT020	0.0671383	4.4	01Jan2011, 06:25	0.7
JWT020	0.0671383	4.4	01Jan2011, 06:25	0.7
RWT030	0.0671383	4.4	01Jan2011, 06:39	0.7
WT030	0.0764732	8.6	01Jan2011, 06:09	0.8
JWT030	0.1436115	8.7	01Jan2011, 06:09	1.5
RWT042	0.1436115	8.7	01Jan2011, 06:20	1.5
WT010	0.1353300	8.8	01Jan2011, 06:21	1.3
JWT010	0.1353300	8.8	01Jan2011, 06:21	1.3
RWT044	0.1353300	8.8	01Jan2011, 06:33	1.3
JWT042	0.2789415	15.1	01Jan2011, 06:26	2.8
RWT046	0.2789415	15.1	01Jan2011, 06:40	2.8
WT040	0.1850600	9.1	01Jan2011, 06:34	1.8
JWT044	0.4640015	23.9	01Jan2011, 06:39	4.5
RWT054	0.4640015	23.8	01Jan2011, 06:50	4.5
WT060	0.1956300	13.6	01Jan2011, 06:30	2.3
WT050	0.1899300	17.3	01Jan2011, 06:23	2.4
JWT050	0.8495615	42.8	01Jan2011, 06:47	9.3
RWT092	0.8495615	42.7	01Jan2011, 06:49	9.3
WT070	0.1711000	13.6	01Jan2011, 06:15	1.6
JWT070	0.1711000	13.6	01Jan2011, 06:15	1.6
RWT080	0.1711000	13.6	01Jan2011, 06:34	1.6
WT080	0.0691596	8.7	01Jan2011, 06:13	0.9
Sub Regional Pond SR1	1.0898211	41.9	01Jan2011, 07:03	10.4
JWT080	1.0898211	41.9	01Jan2011, 07:03	10.4
RWT094	1.0898211	41.9	01Jan2011, 07:14	10.3
WT100-REV	0.1292700	37.0	01Jan2011, 06:05	2.5
W26-REV	0.0720000	18.4	01Jan2011, 06:04	1.2
WS3-1	0.0720000	18.1	01Jan2011, 06:15	1.2
Paint Brush Hills Pond C	0.2012700	10.4	01Jan2011, 06:34	3.7
WT090	0.1533300	22.1	01Jan2011, 06:11	2.1
JWT090	1.4444211	54.5	01Jan2011, 07:12	16.1
RWT122	1.4444211	54.5	01Jan2011, 07:17	16.1
WT110	0.1942800	22.3	01Jan2011, 06:17	2.7
JWT110	1.6387011	58.6	01Jan2011, 07:16	18.7
RWT124	1.6387011	58.6	01Jan2011, 07:26	18.7
WT130-REV	0.1016250	24.0	01Jan2011, 06:13	2.3
Paint Brush Hills Pond A	0.1016250	4.8	01Jan2011, 06:53	2.3

HEC - HMS - FALCON BASIN - 2-YEAR STORM

Hydrologic Element	Drainage Area (MI2)	Peak Discharge (CFS)	Time of Peak	Volume (AC-FT)
WT120-REV	0.0430300	7.2	01Jan2011, 06:09	0.6
JWT120	1.7833561	63.9	01Jan2011, 07:26	21.6
RWT172	1.7833561	63.8	01Jan2011, 07:38	21.5
WT140-REV	0.1445300	35.7	01Jan2011, 06:14	3.6
JWT140	0.1445300	35.7	01Jan2011, 06:14	3.6
RWT150	0.1445300	35.5	01Jan2011, 06:25	3.6
WT150-REV	0.1308100	40.8	01Jan2011, 06:09	3.3
Paint Brush Hills Pond...	0.2753400	58.7	01Jan2011, 06:19	6.8
W34B2-REV	0.0935900	27.9	01Jan2011, 06:08	2.2
Paint Brush Hills Pond...	0.3689300	9.8	01Jan2011, 07:30	8.0
JWT150	0.3689300	9.8	01Jan2011, 07:30	8.0
RWT160	0.3689300	9.8	01Jan2011, 07:40	8.0
WT160-REV	0.0734800	19.7	01Jan2011, 06:07	1.5
JWT160	0.4424100	20.1	01Jan2011, 06:07	9.5
RWT174	0.4424100	19.8	01Jan2011, 06:23	9.4
WT170-REV	0.1060150	11.6	01Jan2011, 06:22	1.6
W34-CY-REV	0.0465469	5.2	01Jan2011, 06:19	0.6
JWT172	2.3783280	81.2	01Jan2011, 06:39	33.1
RWT176	2.3783280	81.1	01Jan2011, 06:40	33.1
Sub Regional Pond SR2	2.3783280	66.8	01Jan2011, 08:06	30.0
JWT174	2.3783280	66.8	01Jan2011, 08:06	30.0
RWT180	2.3783280	66.8	01Jan2011, 08:25	29.7
WT180-REV	0.0409400	3.4	01Jan2011, 06:22	0.5
JWT180	2.4192680	67.2	01Jan2011, 08:25	30.2
RWT202	2.4192680	67.1	01Jan2011, 08:51	29.9
WT200	0.3017100	25.3	01Jan2011, 06:34	4.4
WT190	0.0574561	11.3	01Jan2011, 06:07	0.9
The Meadows Pond #1	0.0574561	0.3	01Jan2011, 13:19	0.4
JWT190	0.0574561	0.3	01Jan2011, 13:19	0.4
RWT204	0.0574561	0.3	01Jan2011, 14:16	0.4
JWT200	2.7784341	70.6	01Jan2011, 08:50	34.8
RWT210	2.7784341	70.6	01Jan2011, 09:00	34.6
WT210	0.2654600	31.9	01Jan2011, 06:39	5.6
JWT210	3.0438941	74.5	01Jan2011, 08:59	40.2
RWT232	3.0438941	74.5	01Jan2011, 09:08	40.0
WT220	0.1895300	47.1	01Jan2011, 06:14	4.5
JWT220	0.1895300	47.1	01Jan2011, 06:14	4.5
RWT234	0.1895300	46.9	01Jan2011, 06:26	4.5

HEC - HMS - FALCON BASIN - 2-YEAR STORM

Hydrologic Element	Drainage Area (MI2)	Peak Discharge (CFS)	Time of Peak	Volume (AC-FT)
JWT232	3.2334241	76.6	01Jan2011, 09:08	44.5
RWT236	3.2334241	76.6	01Jan2011, 09:09	44.5
WT230	0.1981800	71.3	01Jan2011, 06:06	5.0
JWT234	3.4316041	84.5	01Jan2011, 06:43	49.5
RWT240	3.4316041	84.0	01Jan2011, 06:48	49.4
WT240	0.0761461	36.4	01Jan2011, 06:02	2.1
Regional Pond WU No...	3.5077502	89.8	01Jan2011, 06:10	50.3
Regional Pond WU Di...	3.5077502	62.4	01Jan2011, 06:10	27.5
Old Meridian	0.0335900	24.6	01Jan2011, 06:09	1.9
RWT-OM	0.0335900	24.3	01Jan2011, 06:16	1.8
Regional Pond WU So...	3.5413402	48.2	01Jan2011, 09:42	21.5
RWT240_Diversion R...	0.0000000	27.1	01Jan2011, 06:16	22.8
JWT240	3.5413402	72.4	01Jan2011, 09:40	44.3
RWT250	3.5413402	72.4	01Jan2011, 09:42	44.2
WT250	0.1469500	63.0	01Jan2011, 06:03	3.7
JWT250	3.6882902	74.1	01Jan2011, 09:42	48.0
RWT260	3.6882902	74.0	01Jan2011, 10:02	47.6
WT260	0.1388002	9.9	01Jan2011, 06:38	1.9
JWT260	3.8270904	75.0	01Jan2011, 10:02	49.5
RWT291	3.8270904	75.0	01Jan2011, 10:06	49.3
WT270	0.0324738	11.3	01Jan2011, 06:05	0.7
JWT270	0.0324738	11.3	01Jan2011, 06:05	0.7
RWT292	0.0324738	11.2	01Jan2011, 06:11	0.7
JWT292	3.8595642	75.3	01Jan2011, 10:06	50.1
RWT295	3.8595642	75.3	01Jan2011, 10:08	50.0
WT280	0.2669500	33.4	01Jan2011, 06:15	3.7
JWT280	0.2669500	33.4	01Jan2011, 06:15	3.7
RWT294	0.2669500	33.4	01Jan2011, 06:18	3.7
JWT294	4.1265142	94.0	01Jan2011, 06:30	53.7
RWT296	4.1265142	91.9	01Jan2011, 06:40	53.3
MT040	0.3084200	94.6	01Jan2011, 06:13	8.8
MT030	0.1566300	39.0	01Jan2011, 06:06	2.8
MT020	0.0902033	25.8	01Jan2011, 06:05	1.7
JMT020	0.0902033	25.8	01Jan2011, 06:05	1.7
RMT030	0.0902033	25.4	01Jan2011, 06:20	1.7
JMT030	0.2468333	50.1	01Jan2011, 06:10	4.5
RMT040	0.2468333	49.3	01Jan2011, 06:16	4.5
Woodmen Hills Pond H	0.5552533	107.8	01Jan2011, 06:25	13.2

HEC - HMS - FALCON BASIN - 2-YEAR STORM

Hydrologic Element	Drainage Area (MI2)	Peak Discharge (CFS)	Time of Peak	Volume (AC-FT)
JMT040	0.5552533	107.8	01Jan2011, 06:25	13.2
RMT050	0.5552533	107.4	01Jan2011, 06:28	13.2
MT050	0.1186100	17.0	01Jan2011, 06:21	2.1
JMT050	0.6738633	123.1	01Jan2011, 06:27	15.3
RMT064	0.6738633	121.2	01Jan2011, 06:40	15.2
MT010	0.2898900	27.9	01Jan2011, 06:27	4.3
The Meadows Pond #2	0.2898900	5.4	01Jan2011, 07:46	3.1
JMT010	0.2898900	5.4	01Jan2011, 07:46	3.1
RMT062	0.2898900	5.4	01Jan2011, 08:41	3.0
MT060	0.1941800	29.9	01Jan2011, 06:15	3.2
Sub Regional Pond SR4	1.1579333	27.0	01Jan2011, 08:03	19.7
JMT060	1.1579333	27.0	01Jan2011, 08:03	19.7
RMT070	1.1579333	26.9	01Jan2011, 08:11	19.6
MT070	0.1994800	25.4	01Jan2011, 06:25	3.6
JMT070	1.3574133	30.5	01Jan2011, 08:10	23.2
RMT080	1.3574133	30.5	01Jan2011, 08:14	23.2
MT080	0.0638371	62.4	01Jan2011, 06:00	3.4
Regional Pond MN	1.4212504	31.5	01Jan2011, 08:17	24.1
JMT080	1.4212504	31.5	01Jan2011, 08:17	24.1
RMT102	1.4212504	31.5	01Jan2011, 08:28	23.9
MT090	0.0435103	39.9	01Jan2011, 06:00	2.1
Woodmen Hills Pond #5	0.0435103	1.4	01Jan2011, 08:02	1.5
JMT090	0.0435103	1.4	01Jan2011, 08:02	1.5
RMT090	0.0435103	1.4	01Jan2011, 08:02	1.5
JMT104	0.0435103	1.4	01Jan2011, 08:02	1.5
RMT104	0.0435103	1.4	01Jan2011, 08:09	1.5
JMT102	1.4647607	32.9	01Jan2011, 08:28	25.5
RMT106	1.4647607	32.8	01Jan2011, 08:30	25.4
MT100	0.0557682	16.5	01Jan2011, 06:06	1.2
JMT106	1.5205289	33.4	01Jan2011, 08:30	26.6
RMT112	1.5205289	33.3	01Jan2011, 09:07	26.0
MT110	0.1163900	18.9	01Jan2011, 06:19	2.2
JMT110	1.6369189	34.4	01Jan2011, 09:07	28.2
RMT114	1.6369189	34.4	01Jan2011, 09:17	28.0
WT290	0.1037800	15.0	01Jan2011, 06:11	1.4
Regional Pond R1	5.8672131	104.8	01Jan2011, 10:31	75.9
JWT296	5.8672131	104.8	01Jan2011, 10:31	75.9
RWT314	5.8672131	104.8	01Jan2011, 10:42	75.3

HEC - HMS - FALCON BASIN - 2-YEAR STORM

Hydrologic Element	Drainage Area (MI2)	Peak Discharge (CFS)	Time of Peak	Volume (AC-FT)
WT300	0.0970199	12.2	01Jan2011, 06:15	1.3
JWT300	0.0970199	12.2	01Jan2011, 06:15	1.3
RWT312	0.0970199	12.1	01Jan2011, 06:39	1.3
WT310	0.2774200	31.3	01Jan2011, 06:16	3.6
JWT310	6.2416530	107.0	01Jan2011, 10:41	80.2
RWT320	6.2416530	106.9	01Jan2011, 10:51	79.6
WT320	0.2061400	26.8	01Jan2011, 06:14	2.8
JWT320	6.4477930	108.1	01Jan2011, 10:51	82.4
RWT352	6.4477930	108.0	01Jan2011, 11:02	81.7
ET020	0.2131700	73.4	01Jan2011, 06:07	5.4
ET010	0.1451300	37.5	01Jan2011, 06:12	3.5
Paint Brush Hills Pond...	0.1451300	29.4	01Jan2011, 06:21	3.5
JET010	0.1451300	29.4	01Jan2011, 06:21	3.5
RET020	0.1451300	29.3	01Jan2011, 06:37	3.5
Sub Regional Pond SR6	0.3583000	9.3	01Jan2011, 07:43	7.9
JET020	0.3583000	9.3	01Jan2011, 07:43	7.9
RET030	0.3583000	9.3	01Jan2011, 08:37	7.6
ET030	0.2042800	44.9	01Jan2011, 06:17	4.9
JET030	0.5625800	44.9	01Jan2011, 06:17	12.5
RET040	0.5625800	44.6	01Jan2011, 06:30	12.4
Woodmen Hills Pond ...	0.7117200	60.8	01Jan2011, 06:33	15.4
ET040	0.1491400	27.9	01Jan2011, 06:16	3.0
Woodmen Hills Pond ...	0.7117200	9.6	01Jan2011, 12:57	12.0
JET040	0.7117200	9.6	01Jan2011, 12:57	12.0
RET050	0.7117200	9.6	01Jan2011, 13:08	11.8
ET050	0.1171900	36.5	01Jan2011, 06:03	2.2
Woodmen Hills Pond #2	0.8289100	10.4	01Jan2011, 13:06	12.5
JET050	0.8289100	10.4	01Jan2011, 13:06	12.5
RET060	0.8289100	10.4	01Jan2011, 13:21	12.3
ET060	0.2854300	105.0	01Jan2011, 06:02	5.8
Woodmen Hills Pond #3	1.1143400	12.6	01Jan2011, 13:03	15.7
JET060	1.1143400	12.6	01Jan2011, 13:03	15.7
RET070	1.1143400	12.6	01Jan2011, 13:18	15.5
ET070	0.2497500	93.5	01Jan2011, 06:03	5.7
JET070	1.3640900	93.6	01Jan2011, 06:03	21.2
RET080	1.3640900	64.9	01Jan2011, 06:31	20.7
ET080	0.2916400	113.3	01Jan2011, 06:08	8.7
Woodmen Hills Pond #4	1.6557300	9.8	02Jan2011, 00:00	12.0

HEC - HMS - FALCON BASIN - 2-YEAR STORM

Hydrologic Element	Drainage Area (MI2)	Peak Discharge (CFS)	Time of Peak	Volume (AC-FT)
JET080	1.6557300	9.8	02Jan2011, 00:00	12.0
RET090	1.6557300	9.8	02Jan2011, 00:00	11.9
ET090	0.1242400	26.0	01Jan2011, 06:24	3.3
JET090	1.7799700	29.2	01Jan2011, 06:25	15.3
RET100	1.7799700	29.1	01Jan2011, 06:30	15.2
ET100	0.0480615	11.4	01Jan2011, 06:02	0.7
JET100	1.8280315	30.6	01Jan2011, 06:30	15.8
RET110	1.8280315	30.6	01Jan2011, 06:38	15.7
ET110	0.2260300	24.0	01Jan2011, 06:15	2.7
JET110	2.0540615	41.4	01Jan2011, 06:32	18.4
RET120	2.0540615	41.4	01Jan2011, 06:39	18.2
ET120	0.1091300	10.7	01Jan2011, 06:17	1.3
JET120	2.1631915	49.7	01Jan2011, 06:21	19.5
RET152	2.1631915	49.5	01Jan2011, 06:29	19.4
ET130	0.1348100	10.9	01Jan2011, 06:31	1.8
JET130	0.1348100	10.9	01Jan2011, 06:31	1.8
RET140	0.1348100	10.9	01Jan2011, 07:06	1.8
ET140	0.2675900	15.9	01Jan2011, 06:51	3.6
JET140	0.4024000	25.8	01Jan2011, 07:01	5.5
RET154	0.4024000	25.7	01Jan2011, 07:27	5.4
JET152	2.5655915	53.7	01Jan2011, 07:01	24.8
RET156	2.5655915	53.5	01Jan2011, 07:06	24.7
ET150	0.1777300	17.0	01Jan2011, 06:21	2.3
JET154	2.7433215	62.3	01Jan2011, 06:34	27.0
RET162	2.7433215	59.6	01Jan2011, 07:07	26.4
ET160	0.1889200	18.6	01Jan2011, 06:26	2.8
JET160	2.9322415	66.8	01Jan2011, 07:06	29.2
RET164	2.9322415	66.5	01Jan2011, 07:12	29.1
WT350	0.3037700	38.3	01Jan2011, 06:17	4.5
JWT352	9.6838045	132.6	01Jan2011, 08:22	115.3
RWT354	9.6838045	132.6	01Jan2011, 08:22	115.3
WT330	0.3266800	32.2	01Jan2011, 06:23	4.5
JWT330	0.3266800	32.2	01Jan2011, 06:23	4.5
RWT344	0.3266800	32.0	01Jan2011, 06:34	4.5
WT340	0.2780000	18.9	01Jan2011, 06:42	3.8
JWT354	10.2884845	141.3	01Jan2011, 08:22	123.6
RWT372	10.2884845	141.3	01Jan2011, 08:27	123.1
WT360	0.0656830	6.9	01Jan2011, 06:18	0.8

HEC - HMS - FALCON BASIN - 2-YEAR STORM

Hydrologic Element	Drainage Area (MI2)	Peak Discharge (CFS)	Time of Peak	Volume (AC-FT)
JWT360	0.0656830	6.9	01Jan2011, 06:18	0.8
RWT374	0.0656830	6.9	01Jan2011, 06:36	0.8
Regional Pond R2	10.3541675	141.9	01Jan2011, 08:29	120.7
JWT372	10.3541675	141.9	01Jan2011, 08:29	120.7
RWT376	10.3541675	141.7	01Jan2011, 08:38	119.9
WT370	0.2147600	7.2	01Jan2011, 06:17	1.2
JWT374_OUTLET	10.5689275	142.5	01Jan2011, 08:38	121.1
FS010	0.1220000	6.3	01Jan2011, 06:20	1.0
JFS010_OUTLET	0.1220000	6.3	01Jan2011, 06:20	1.0

Project: Aug15_Working_Falcon_DBPS_S

Simulation Run: FU 2-yr Reservoir: Regional Pond WU South

Start of Run:	01Jan2011, 00:00	Basin Model:	Falcon_DBPS_Future
End of Run:	02Jan2011, 00:00	Meteorologic Model:	2-yr
Compute Time:	25Mar2020, 16:48:23	Control Specifications:	24-hr Storm

Volume Units: IN

Computed Results

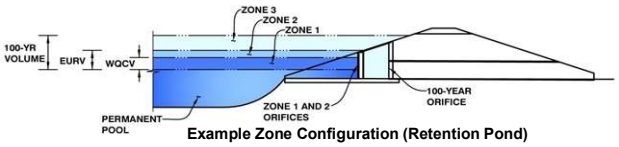
Peak Inflow :	83.8 (CFS)	Date/Time of Peak Inflow :	01Jan2011, 06:11
Peak Outflow :	48.2 (CFS)	Date/Time of Peak Outflow :	01Jan2011, 09:42
Total Inflow :	0.16 (IN)	Peak Storage :	10.5 (AC-FT)
Total Outflow :	0.11 (IN)	Peak Elevation :	6822.1 (FT)

DETENTION BASIN STAGE-STORAGE TABLE BUILDER

UD-Detention, Version 3.07 (February 2017)

Project: Challenger Homes

Basin ID: Detention and Water Quality Pond WU



Example Zone Configuration (Retention Pond)

Required Volume Calculation

Selected BMP Type =	**EDB**			
Watershed Area =	2312.70	acres		
Watershed Length =	27,984	ft		
Watershed Slope =	0.020	ft/ft		
Watershed Imperviousness =	7.33%	percent		
Percentage Hydrologic Soil Group A =	100.0%	percent		
Percentage Hydrologic Soil Group B =	0.0%	percent		
Percentage Hydrologic Soil Groups C/D =	0.0%	percent		
Desired WQCV Drain Time =	40.0	hours		
Location for 1-hr Rainfall Depths =	Castle Pines - City Office			
Water Quality Capture Volume (WQCV) =	9.856	acre-feet	Optional User Override 1-hr Precipitation	
Excess Urban Runoff Volume (EURV) =	11.418	acre-feet		
2-yr Runoff Volume (P1 = 0.84 in.) =	5.205	acre-feet		inches
5-yr Runoff Volume (P1 = 1.12 in.) =	7.573	acre-feet		inches
10-yr Runoff Volume (P1 = 1.36 in.) =	10.562	acre-feet		inches
25-yr Runoff Volume (P1 = 1.72 in.) =	17.920	acre-feet		inches
50-yr Runoff Volume (P1 = 2.01 in.) =	37.919	acre-feet		inches
100-yr Runoff Volume (P1 = 2.31 in.) =	83.576	acre-feet		inches
500-yr Runoff Volume (P1 = 3.07 in.) =	203.707	acre-feet		inches
Approximate 2-yr Detention Volume =	4.786	acre-feet		
Approximate 5-yr Detention Volume =	6.972	acre-feet		
Approximate 10-yr Detention Volume =	9.691	acre-feet		
Approximate 25-yr Detention Volume =	14.807	acre-feet		
Approximate 50-yr Detention Volume =	22.296	acre-feet		
Approximate 100-yr Detention Volume =	41.280	acre-feet		

Depth Increment = ft

Stage - Storage Description	Stage (ft)	Optional Override Stage (ft)	Length (ft)	Width (ft)	Area (ft^2)	Optional Override Area (ft^2)	Area (acre)	Volume (ft^3)	Volume (ac-ft)
Top of Micropool	--	0.00	--	--	--	15	0.000		
6818.2	--	1.90	--	--	--	21,261	0.488	20,000	0.459
6819	--	2.70	--	--	--	61,537	1.413	53,331	1.224
6820	--	3.70	--	--	--	111,883	2.568	140,041	3.215
6821	--	4.70	--	--	--	149,826	3.440	270,895	6.219
6822	--	5.70	--	--	--	184,669	4.239	438,143	10.058
6823	--	6.70	--	--	--	197,045	4.524	629,000	14.440
6824	--	7.70	--	--	--	203,805	4.679	829,425	19.041
6825	--	8.70	--	--	--	209,996	4.821	1,036,325	23.791
6826	--	9.70	--	--	--	216,045	4.960	1,249,346	28.681
6827	--	10.70	--	--	--	222,053	5.098	1,468,395	33.710
6828	--	11.70	--	--	--	228,051	5.235	1,693,447	38.876
6829	--	12.70	--	--	--	234,619	5.386	1,924,782	44.187
6830	--	13.70	--	--	--	241,328	5.540	2,162,755	49.650
6830.2	--	13.90	--	--	--	242,670	5.571	2,211,155	50.761
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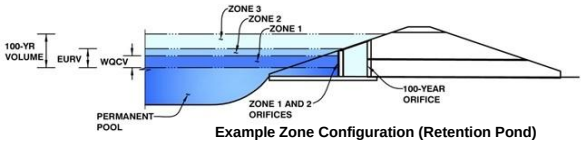
Detention Basin Outlet Structure Design

UD-Detention, Version 3.07 (February 2017)

Project: **Challenger Homes**

Basin ID: **Detention and Water Quality Pond WU - Revisions to Vertical Orifices**



Example Zone Configuration (Retention Pond)

	Stage (ft)	Zone Volume (ac-ft)	Outlet Type
Zone 1 (WQCV)	5.66	9.856	Orifice Plate
Zone 2 (EURV)	6.02	1.562	
Zone 3 (100-year)	12.16	29.862	
		41.280	Total

User Input: Orifice at Underdrain Outlet (typically used to drain WQCV in a Filtration BMP)

Underdrain Orifice Invert Depth =	N/A	ft (distance below the filtration media surface)
Underdrain Orifice Diameter =	N/A	inches

Calculated Parameters for Underdrain

Underdrain Orifice Area =	N/A	ft^2
Underdrain Orifice Centroid =	N/A	feet

User Input: Orifice Plate with one or more orifices or Elliptical Slot Weir (typically used to drain WQCV and/or EURV in a sedimentation BMP)

Invert of Lowest Orifice =	0.00	ft (relative to basin bottom at Stage = 0 ft)
Depth at top of Zone using Orifice Plate =	5.66	ft (relative to basin bottom at Stage = 0 ft)
Orifice Plate: Orifice Vertical Spacing =	N/A	inches
Orifice Plate: Orifice Area per Row =	15.87	sq. inches (use rectangular openings)

Calculated Parameters for Plate

WQ Orifice Area per Row =	1.102E-01	ft^2
Elliptical Half-Width =	N/A	feet
Elliptical Slot Centroid =	N/A	feet
Elliptical Slot Area =	N/A	ft^2

User Input: Stage and Total Area of Each Orifice Row (numbered from lowest to highest)

	Row 1 (required)	Row 2 (optional)	Row 3 (optional)	Row 4 (optional)	Row 5 (optional)	Row 6 (optional)	Row 7 (optional)	Row 8 (optional)
Stage of Orifice Centroid (ft)	0.00	1.00	2.00	3.00	4.00	5.00		
Orifice Area (sq. inches)	15.87	15.87	15.87	15.87	15.87	15.87		

	Row 9 (optional)	Row 10 (optional)	Row 11 (optional)	Row 12 (optional)	Row 13 (optional)	Row 14 (optional)	Row 15 (optional)	Row 16 (optional)
Stage of Orifice Centroid (ft)								
Orifice Area (sq. inches)								

User Input: Vertical Orifice (Circular or Rectangular)

	Not Selected	Not Selected	
Invert of Vertical Orifice =			ft (relative to basin bottom at Stage = 0 ft)
Depth at top of Zone using Vertical Orifice =			ft (relative to basin bottom at Stage = 0 ft)
Vertical Orifice Diameter =			inches

Calculated Parameters for Vertical Orifice

	Not Selected	Not Selected	
Vertical Orifice Area =			ft^2
Vertical Orifice Centroid =			feet

User Input: Overflow Weir (Dropbox) and Grate (Flat or Sloped)

	Not Selected	Not Selected	
Overflow Weir Front Edge Height, Ho =	5.62		ft (relative to basin bottom at Stage = 0 ft)
Overflow Weir Front Edge Length =	45.50		feet
Overflow Weir Slope =	0.00		H:V (enter zero for flat grate)
Horiz. Length of Weir Sides =	10.50		feet
Overflow Grate Open Area % =	100%		%, grate open area/total area
Debris Clogging % =	50%		%

Calculated Parameters for Overflow Weir

	Not Selected	Not Selected	
Height of Grate Upper Edge, H_t =	5.62		feet
Over Flow Weir Slope Length =	10.50		feet
Grate Open Area / 100-yr Orifice Area =			should be $\geq$ 4
Overflow Grate Open Area w/o Debris =	477.75		ft^2
Overflow Grate Open Area w/ Debris =	238.88		ft^2

User Input: Outlet Pipe w/ Flow Restriction Plate (Circular Orifice, Restrictor Plate, or Rectangular Orifice)

	Not Selected	Not Selected	
Depth to Invert of Outlet Pipe =			ft (distance below basin bottom at Stage = 0 ft)
Circular Orifice Diameter =			inches

Calculated Parameters for Outlet Pipe w/ Flow Restriction Plate

	Not Selected	Not Selected	
Outlet Orifice Area =			ft^2
Outlet Orifice Centroid =			feet
Half-Central Angle of Restrictor Plate on Pipe =	N/A	N/A	radians

User Input: Emergency Spillway (Rectangular or Trapezoidal)

Spillway Invert Stage=	12.70	ft (relative to basin bottom at Stage = 0 ft)
Spillway Crest Length =	200.00	feet
Spillway End Slopes =	4.00	H:V
Freeboard above Max Water Surface =	0.00	feet

Calculated Parameters for Spillway

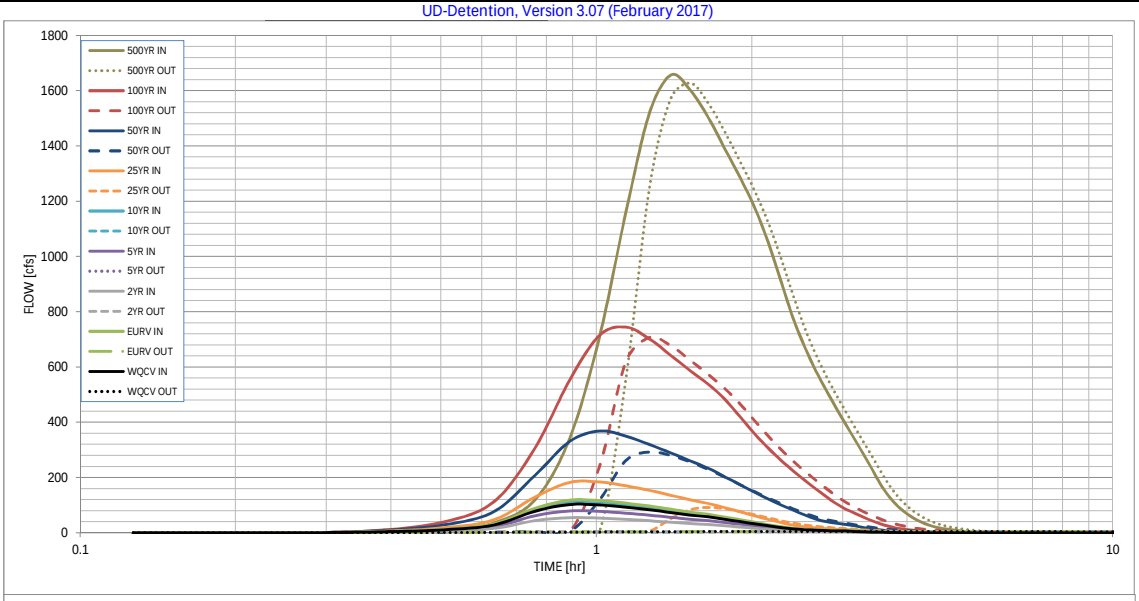
Spillway Design Flow Depth=	1.13	feet
Stage at Top of Freeboard =	13.83	feet
Basin Area at Top of Freeboard =	5.56	acres

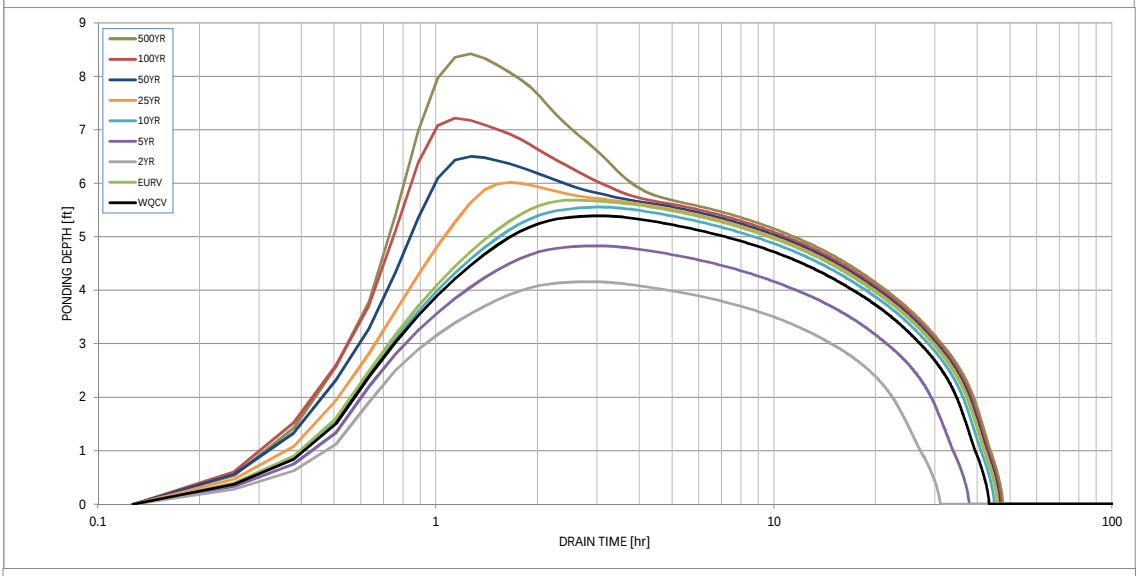
Routed Hydrograph Results

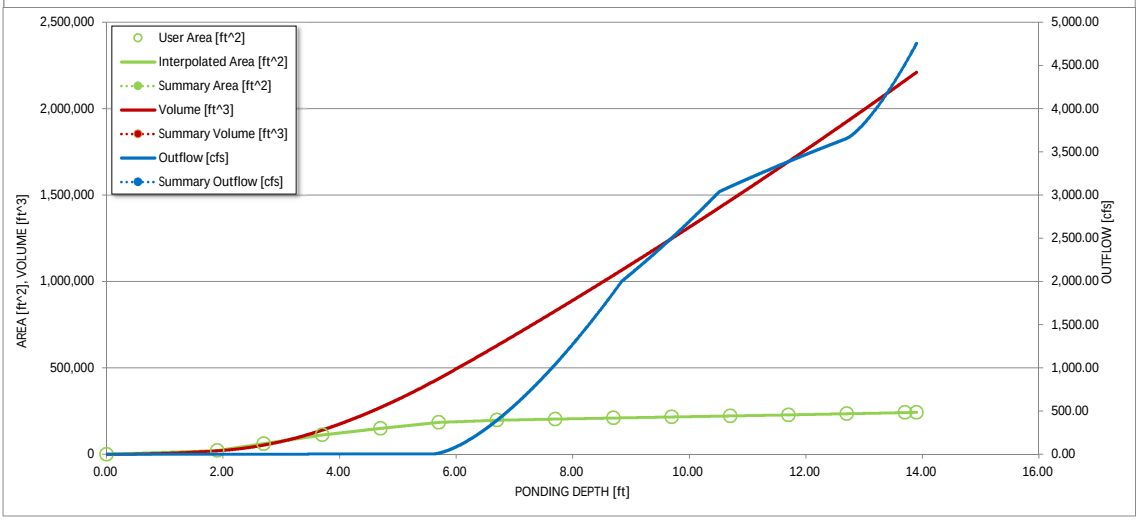
Design Storm Return Period =	WQCV	EURV	2 Year	5 Year	10 Year	25 Year	50 Year	100 Year	500 Year
One-Hour Rainfall Depth (in) =	0.53	1.07	0.84	1.12	1.36	1.72	2.01	2.31	3.07
Calculated Runoff Volume (acre-ft) =	9.856	11.418	5.205	7.573	10.562	17.920	37.919	83.576	203.707
OPTIONAL Override Runoff Volume (acre-ft) =									
Inflow Hydrograph Volume (acre-ft) =	9.847	11.406	5.199	7.568	10.553	17.912	37.899	83.471	203.592
Predevelopment Unit Peak Flow, q (cfs/acre) =	0.00	0.00	0.00	0.00	0.01	0.01	0.11	0.27	0.68
Predevelopment Peak Q (cfs) =	0.0	0.0	0.8	5.4	13.1	32.6	251.4	632.0	1583.9
Peak Inflow Q (cfs) =	102.7	118.4	55.2	79.5	109.8	183.9	368.6	744.9	1657.0
Peak Outflow Q (cfs) =	5.1	11.1	3.6	4.3	5.3	92.1	292.6	707.2	1627.9
Ratio Peak Outflow to Predevelopment Q =	N/A	N/A	N/A	0.8	0.4	2.8	1.2	1.1	1.0
Structure Controlling Flow =	Plate	Overflow Grate 1	Plate	Plate	Plate	Overflow Grate 1	Overflow Grate 1	Overflow Grate 1	Overflow Grate 1
Max Velocity through Grate 1 (fps) =	N/A	-0.01	N/A	N/A	N/A	0.0	0.0	0.0	0.0
Max Velocity through Grate 2 (fps) =	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Time to Drain 97% of Inflow Volume (hours) =	37	39	27	32	38	37	34	27	15
Time to Drain 99% of Inflow Volume (hours) =	40	42	29	35	42	41	39	36	30
Maximum Ponding Depth (ft) =	5.39	5.68	4.16	4.83	5.56	6.02	6.50	7.22	8.42
Area at Maximum Ponding Depth (acres) =	3.99	4.22	2.96	3.54	4.12	4.33	4.47	4.60	4.78
Maximum Volume Stored (acre-ft) =	8.783	9.974	4.459	6.673	9.431	11.386	13.541	16.813	22.446

Detention Basin Outlet Structure Design

UD-Detention, Version 3.07 (February 2017)







S-A-V-D Chart Axis Override	X-axis	Left Y-Axis	Right Y-Axis
minimum bound			
maximum bound			

Detention Basin Outlet Structure Design

Outflow Hydrograph Workbook Filename:

Storm Inflow Hydrographs UD-Detention, Version 3.07 (February 2017)

The user can override the calculated inflow hydrographs from this workbook with inflow hydrographs developed in a separate program.

	SOURCE	WORKBOOK	WORKBOOK	WORKBOOK	WORKBOOK	WORKBOOK	WORKBOOK	WORKBOOK	WORKBOOK	WORKBOOK
Time Interval	TIME	WQCV [cfs]	EURV [cfs]	2 Year [cfs]	5 Year [cfs]	10 Year [cfs]	25 Year [cfs]	50 Year [cfs]	100 Year [cfs]	500 Year [cfs]
7.60 min	0:00:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	0:07:36	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Hydrograph	0:15:12	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Constant	0:22:48	3.78	4.23	2.24	3.07	3.99	5.83	8.12	9.63	7.55
0.658	0:30:24	11.14	12.64	6.29	8.83	11.83	18.45	28.98	39.81	36.27
	0:38:00	28.61	32.50	16.15	22.69	30.39	47.52	77.16	113.31	119.37
	0:45:36	78.20	88.74	44.25	62.08	83.02	129.36	208.22	306.52	340.39
	0:53:12	102.69	118.37	55.16	79.54	109.80	182.46	330.35	551.89	708.66
	1:00:48	100.90	116.93	53.28	77.51	108.15	183.89	368.56	714.37	1158.65
	1:08:24	92.65	107.57	48.61	70.97	99.39	170.29	350.02	744.89	1519.54
	1:16:00	83.61	97.10	43.81	64.01	89.71	153.84	319.92	701.78	1656.96
	1:23:36	73.62	85.59	38.38	56.24	79.03	136.10	289.43	642.05	1601.97
	1:31:12	64.47	74.98	33.54	49.22	69.22	119.33	260.42	586.69	1503.07
	1:38:48	57.77	67.09	30.23	44.21	61.98	106.22	234.07	537.93	1389.73
	1:46:24	49.02	57.08	25.40	37.35	52.66	91.17	202.90	483.26	1283.80
	1:54:00	40.78	47.52	21.07	31.04	43.82	76.04	173.70	419.62	1175.34
	2:01:36	32.75	38.25	16.75	24.83	35.23	61.67	146.54	358.04	1049.42
	2:09:12	25.57	29.91	12.98	19.33	27.53	48.47	122.16	306.04	908.33
	2:16:48	19.37	22.70	9.74	14.58	20.87	37.11	100.68	261.88	774.31
	2:24:24	14.32	16.74	7.27	10.83	15.41	27.54	81.69	223.97	671.92
	2:32:00	11.36	13.24	5.83	8.62	12.21	21.51	64.60	190.29	587.13
	2:39:36	9.51	11.08	4.90	7.24	10.22	17.86	50.03	159.29	515.95
	2:47:12	8.23	9.58	4.26	6.27	8.84	15.36	40.52	130.85	451.91
	2:54:48	7.33	8.52	3.80	5.59	7.87	13.62	34.54	105.75	392.95
	3:02:24	6.69	7.77	3.48	5.11	7.18	12.38	30.52	85.92	337.21
	3:10:00	5.14	6.01	2.61	3.88	5.53	9.80	25.26	71.12	283.48
	3:17:36	3.70	4.33	1.89	2.80	3.98	7.07	19.18	56.90	230.22
	3:25:12	2.75	3.21	1.40	2.08	2.96	5.23	14.01	43.44	177.02
	3:32:48	2.04	2.38	1.04	1.54	2.20	3.88	10.33	32.60	135.67
	3:40:24	1.51	1.77	0.76	1.14	1.62	2.88	7.80	24.47	103.76
	3:48:00	1.09	1.28	0.55	0.82	1.18	2.09	5.88	18.34	79.77
	3:55:36	0.79	0.92	0.40	0.59	0.85	1.51	4.42	13.80	60.99
	4:03:12	0.56	0.66	0.28	0.42	0.61	1.09	3.31	10.56	46.56
	4:10:48	0.37	0.44	0.18	0.28	0.40	0.74	2.52	8.08	35.06
	4:18:24	0.22	0.26	0.10	0.16	0.24	0.45	1.83	6.30	26.32
	4:26:00	0.11	0.13	0.05	0.08	0.12	0.24	1.25	4.87	20.35
	4:33:36	0.04	0.04	0.01	0.02	0.04	0.09	0.78	3.61	15.90
	4:41:12	0.00	0.00	0.00	0.00	0.00	0.01	0.42	2.55	12.73
	4:48:48	0.00	0.00	0.00	0.00	0.00	0.00	0.17	1.67	9.92
	4:56:24	0.00	0.00	0.00	0.00	0.00	0.00	0.03	0.97	7.47
	5:04:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.46	5.36
	5:11:36	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.14	3.60
	5:19:12	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	2.19
	5:26:48	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.12
	5:34:24	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.40
	5:42:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.03
	5:49:36	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	5:57:12	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	6:04:48	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	6:12:24	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	6:20:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	6:27:36	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	6:35:12	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	6:42:48	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	6:50:24	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	6:58:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	7:05:36	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	7:13:12	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	7:20:48	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	7:28:24	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	7:36:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	7:43:36	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	7:51:12	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	7:58:48	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	8:06:24	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	8:14:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	8:21:36	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	8:29:12	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	8:36:48	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	8:44:24	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	8:52:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	8:59:36	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	9:07:12	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

STAGE - STORAGE - DISCHARGE TABLE (POND WU - OUTLET REVISIONS)

per UDFCD UD-Detention Spreadsheet

Stage	Area	Volume	2*Vol	Orifice Plate	Overflow #1 Weir	Overflow #1 Orifice	Overflow #1 Mixed	Overflow #1 Control	Spill Way	Total Outflow
[ft]	[ft^2]	[ft^3]	[ft^3]	[cfs]	[cfs]	[cfs]	[cfs]	[cfs]	[cfs]	[cfs]
0.00	15	0	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00
1.90	21261	20212	40424	1.23	0.00	0.00	0.00	0.00	0.00	1.23
2.70	61537	53331	106662	2.01	0.00	0.00	0.00	0.00	0.00	2.01
3.70	111883	140041	280081	3.03	0.00	0.00	0.00	0.00	0.00	3.03
4.70	149826	270895	541790	4.18	0.00	0.00	0.00	0.00	0.00	4.18
5.70	184669	438143	876285	5.45	7.81	387.49	334.25	7.81	0.00	13.25
6.70	197045	629000	1257999	6.38	387.20	1423.73	986.79	387.20	0.00	393.58
7.70	203805	829425	1658849	7.16	1034.90	1975.83	1423.47	1034.90	0.00	1042.06
8.70	209996	1036325	2072650	7.85	1864.79	2404.32	1918.75	1864.79	0.00	1872.64
9.70	216045	1249346	2498691	8.48	2843.11	2767.24	2496.89	2496.89	0.00	2505.37
10.70	222053	1468395	2936789	9.07	3950.02	3087.80	3161.25	3087.80	0.00	3096.87
11.70	228051	1693447	3386893	9.61	5172.01	3378.07	3910.41	3378.07	0.00	3387.69
12.70	234619	1924782	3849563	10.13	6499.10	3645.30	4741.64	3645.30	0.00	3655.44

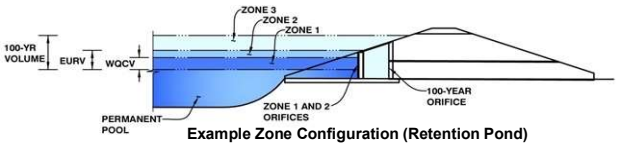
Needs pipes?

DETENTION BASIN STAGE-STORAGE TABLE BUILDER

UD-Detention, Version 3.07 (February 2017)

Project: Challenger Homes

Basin ID: Channel and Pre-Pond Area



Example Zone Configuration (Retention Pond)

Required Volume Calculation

Selected BMP Type =	**EDB**			
Watershed Area =	2291.20	acres		
Watershed Length =	27,984	ft		
Watershed Slope =	0.020	ft/ft		
Watershed Imperviousness =	7.33%	percent		
Percentage Hydrologic Soil Group A =	100.0%	percent		
Percentage Hydrologic Soil Group B =	0.0%	percent		
Percentage Hydrologic Soil Groups C/D =	0.0%	percent		
Desired WQCV Drain Time =	40.0	hours		
Location for 1-hr Rainfall Depths =	Castle Pines - City Office			
Water Quality Capture Volume (WQCV) =	9.764	acre-feet	Optional User Override 1-hr Precipitation	
Excess Urban Runoff Volume (EURV) =	11.312	acre-feet		
2-yr Runoff Volume (P1 = 0.84 in.) =	5.157	acre-feet		inches
5-yr Runoff Volume (P1 = 1.12 in.) =	7.503	acre-feet		inches
10-yr Runoff Volume (P1 = 1.36 in.) =	10.464	acre-feet		inches
25-yr Runoff Volume (P1 = 1.72 in.) =	17.753	acre-feet		inches
50-yr Runoff Volume (P1 = 2.01 in.) =	37.566	acre-feet		inches
100-yr Runoff Volume (P1 = 2.31 in.) =	82.799	acre-feet		inches
500-yr Runoff Volume (P1 = 3.07 in.) =	201.813	acre-feet		inches
Approximate 2-yr Detention Volume =	4.741	acre-feet		
Approximate 5-yr Detention Volume =	6.907	acre-feet		
Approximate 10-yr Detention Volume =	9.601	acre-feet		
Approximate 25-yr Detention Volume =	14.669	acre-feet		
Approximate 50-yr Detention Volume =	22.089	acre-feet		
Approximate 100-yr Detention Volume =	40.896	acre-feet		

Depth Increment = ft

Stage - Storage Description	Stage (ft)	Optional Override Stage (ft)	Length (ft)	Width (ft)	Area (ft^2)	Optional Override Area (ft^2)	Area (acre)	Volume (ft^3)	Volume (ac-ft)
Top of Micropool	--	0.00	--	--	--	0	0.000		
6831.5	--	0.04	--	--	--	44,524	1.022	866	0.020
6832	--	0.54	--	--	--	48,743	1.119	23,695	0.544
6832.5	--	1.04	--	--	--	50,470	1.159	48,481	1.113
6833	--	1.54	--	--	--	52,652	1.209	74,240	1.704
6834	--	2.54	--	--	--	57,106	1.311	129,645	2.976
6835	--	3.54	--	--	--	61,671	1.416	189,034	4.340
6836	--	4.54	--	--	--	66,376	1.524	253,057	5.809
6837	--	5.54	--	--	--	71,191	1.634	321,841	7.388
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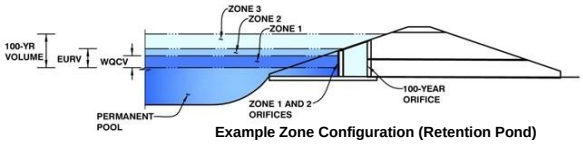
Detention Basin Outlet Structure Design

UD-Detention, Version 3.07 (February 2017)

Project: **Challenger Homes**

Basin ID: **Channel and Pre-Pond Area**



Example Zone Configuration (Retention Pond)

	Stage (ft)	Zone Volume (ac-ft)	Outlet Type
Zone 1 (WQCV)		9.764	Orifice Plate
Zone 2			
Zone 3			
		9.764	Total

User Input: Orifice at Underdrain Outlet (typically used to drain WQCV in a Filtration BMP)

Underdrain Orifice Invert Depth =	N/A	ft (distance below the filtration media surface)	Underdrain Orifice Area =	N/A	ft^2
Underdrain Orifice Diameter =	N/A	inches	Underdrain Orifice Centroid =	N/A	feet

User Input: Orifice Plate with one or more orifices or Elliptical Slot Weir (typically used to drain WQCV and/or EURV in a sedimentation BMP)

Invert of Lowest Orifice =	0.00	ft (relative to basin bottom at Stage = 0 ft)	WQ Orifice Area per Row =	1.102E-01	ft^2
Depth at top of Zone using Orifice Plate =		ft (relative to basin bottom at Stage = 0 ft)	Elliptical Half-Width =	N/A	feet
Orifice Plate: Orifice Vertical Spacing =	N/A	inches	Elliptical Slot Centroid =	N/A	feet
Orifice Plate: Orifice Area per Row =	15.87	sq. inches (use rectangular openings)	Elliptical Slot Area =	N/A	ft^2

User Input: Stage and Total Area of Each Orifice Row (numbered from lowest to highest)

	Row 1 (required)	Row 2 (optional)	Row 3 (optional)	Row 4 (optional)	Row 5 (optional)	Row 6 (optional)	Row 7 (optional)	Row 8 (optional)
Stage of Orifice Centroid (ft)	0.00	1.00	2.00	3.00	4.00	5.00		
Orifice Area (sq. inches)	15.87	15.87	15.87	15.87	15.87	15.87		

	Row 9 (optional)	Row 10 (optional)	Row 11 (optional)	Row 12 (optional)	Row 13 (optional)	Row 14 (optional)	Row 15 (optional)	Row 16 (optional)
Stage of Orifice Centroid (ft)								
Orifice Area (sq. inches)								

User Input: Vertical Orifice (Circular or Rectangular)

	Not Selected	Not Selected	
Invert of Vertical Orifice =	0.00	0.66	ft (relative to basin bottom at Stage = 0 ft)
Depth at top of Zone using Vertical Orifice =	4.00	6.00	ft (relative to basin bottom at Stage = 0 ft)
Vertical Orifice Diameter =	24.00	24.00	inches

Calculated Parameters for Vertical Orifice

	Not Selected	Not Selected	
Vertical Orifice Area =	3.14	3.14	ft^2
Vertical Orifice Centroid =	1.00	1.00	feet

User Input: Overflow Weir (Dropbox) and Grate (Flat or Sloped)

	Not Selected	Not Selected	
Overflow Weir Front Edge Height, Ho =			ft (relative to basin bottom at Stage = 0 ft)
Overflow Weir Front Edge Length =			feet
Overflow Weir Slope =			H:V (enter zero for flat grate)
Horiz. Length of Weir Sides =			feet
Overflow Grate Open Area % =			%, grate open area/total area
Debris Clogging % =			%

Calculated Parameters for Overflow Weir

	Not Selected	Not Selected	
Height of Grate Upper Edge, H_t =			feet
Over Flow Weir Slope Length =			feet
Grate Open Area / 100-yr Orifice Area =			should be $\geq$ 4
Overflow Grate Open Area w/o Debris =			ft^2
Overflow Grate Open Area w/ Debris =			ft^2

User Input: Outlet Pipe w/ Flow Restriction Plate (Circular Orifice, Restrictor Plate, or Rectangular Orifice)

	Not Selected	Not Selected	
Depth to Invert of Outlet Pipe =	0.00		ft (distance below basin bottom at Stage = 0 ft)
Circular Orifice Diameter =	18.00		inches

Calculated Parameters for Outlet Pipe w/ Flow Restriction Plate

	Not Selected	Not Selected	
Outlet Orifice Area =	1.77		ft^2
Outlet Orifice Centroid =	0.75		feet
Half-Central Angle of Restrictor Plate on Pipe =	N/A	N/A	radians

User Input: Emergency Spillway (Rectangular or Trapezoidal)

Spillway Invert Stage=	1.04	ft (relative to basin bottom at Stage = 0 ft)
Spillway Crest Length =	200.00	feet
Spillway End Slopes =	10.00	H:V
Freeboard above Max Water Surface =	0.00	feet

Calculated Parameters for Spillway

Spillway Design Flow Depth=	1.11	feet
Stage at Top of Freeboard =	2.15	feet
Basin Area at Top of Freeboard =	1.27	acres

Routed Hydrograph Results

Design Storm Return Period =	WQCV	EURV	2 Year	5 Year	10 Year	25 Year	50 Year	100 Year	500 Year
One-Hour Rainfall Depth (in) =	0.53	1.07	0.84	1.12	1.36	1.72	2.01	2.31	3.07
Calculated Runoff Volume (acre-ft) =	9.764	11.312	5.157	7.503	10.464	17.753	37.566	82.799	201.813
OPTIONAL Override Runoff Volume (acre-ft) =									
Inflow Hydrograph Volume (acre-ft) =	9.756	11.304	5.148	7.496	10.451	17.740	37.540	82.749	201.703
Predevelopment Unit Peak Flow, q (cfs/acre) =	0.00	0.00	0.00	0.00	0.01	0.01	0.11	0.27	0.68
Predevelopment Peak Q (cfs) =	0.0	0.0	0.7	5.4	13.0	32.3	249.1	626.2	1569.1
Peak Inflow Q (cfs) =	101.5	117.0	54.5	78.6	108.5	181.6	364.4	736.9	1639.4
Peak Outflow Q (cfs) =	111.1	121.5	52.7	92.0	116.0	201.0	355.9	736.7	1638.2
Ratio Peak Outflow to Predevelopment Q =	N/A	N/A	N/A	17.1	8.9	6.2	1.4	1.2	1.0
Structure Controlling Flow =	Spillway	Spillway	Spillway	Spillway	Spillway	Spillway	Spillway	Spillway	Spillway
Max Velocity through Grate 1 (fps) =	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Max Velocity through Grate 2 (fps) =	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Time to Drain 97% of Inflow Volume (hours) =	12	10	18	14	11	7	4	1	1
Time to Drain 99% of Inflow Volume (hours) =	25	23	37	30	24	17	10	6	3
Maximum Ponding Depth (ft) =	1.35	1.37	1.22	1.31	1.36	1.50	1.72	2.14	2.89
Area at Maximum Ponding Depth (acres) =	1.19	1.19	1.18	1.19	1.19	1.20	1.23	1.27	1.35
Maximum Volume Stored (acre-ft) =	1.489	1.500	1.335	1.441	1.489	1.668	1.936	2.460	3.441

Detention Basin Outlet Structure Design

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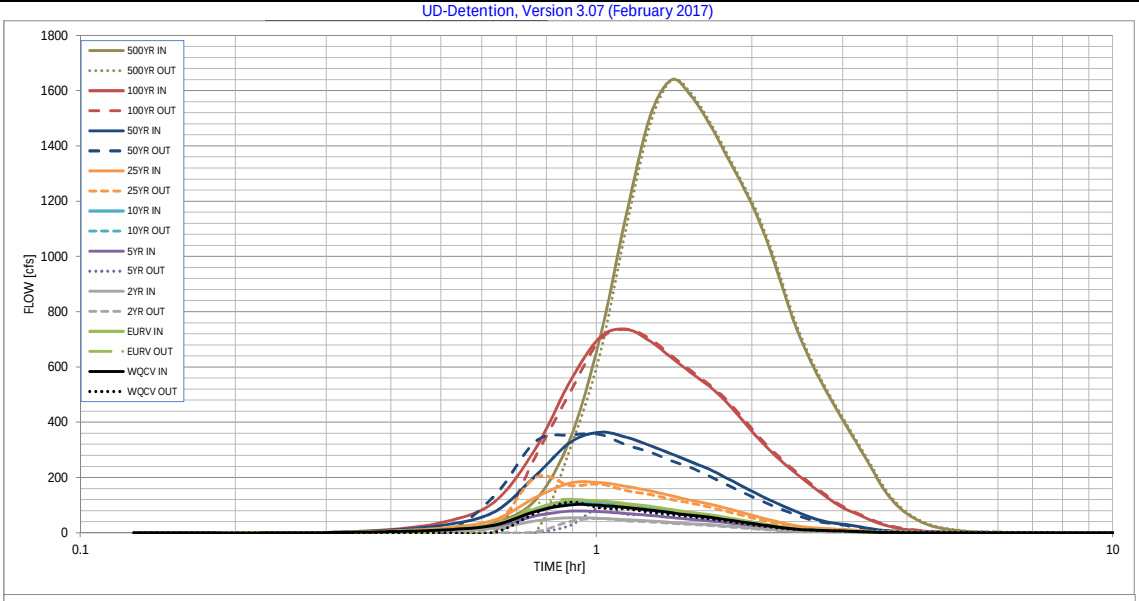
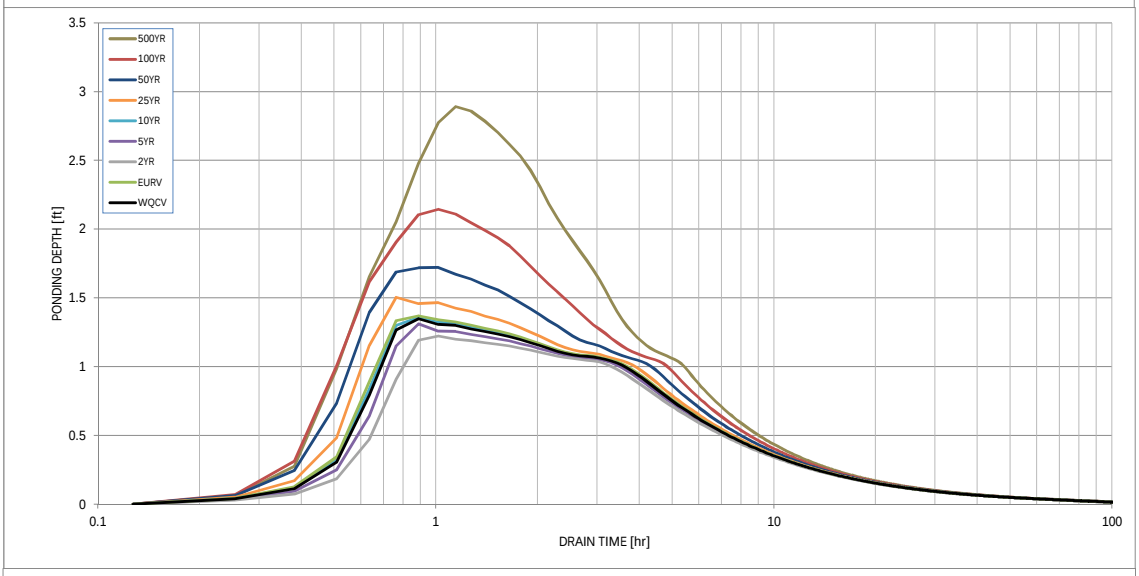
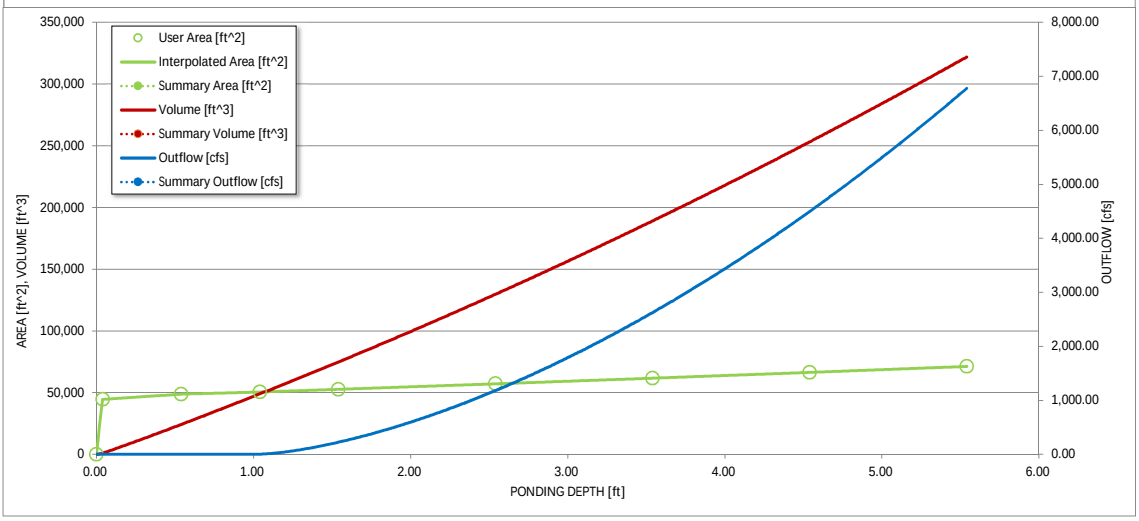






S-A-V-D Chart Axis Override	X-axis	Left Y-Axis	Right Y-Axis
minimum bound			
maximum bound			

Detention Basin Outlet Structure Design

Outflow Hydrograph Workbook Filename:

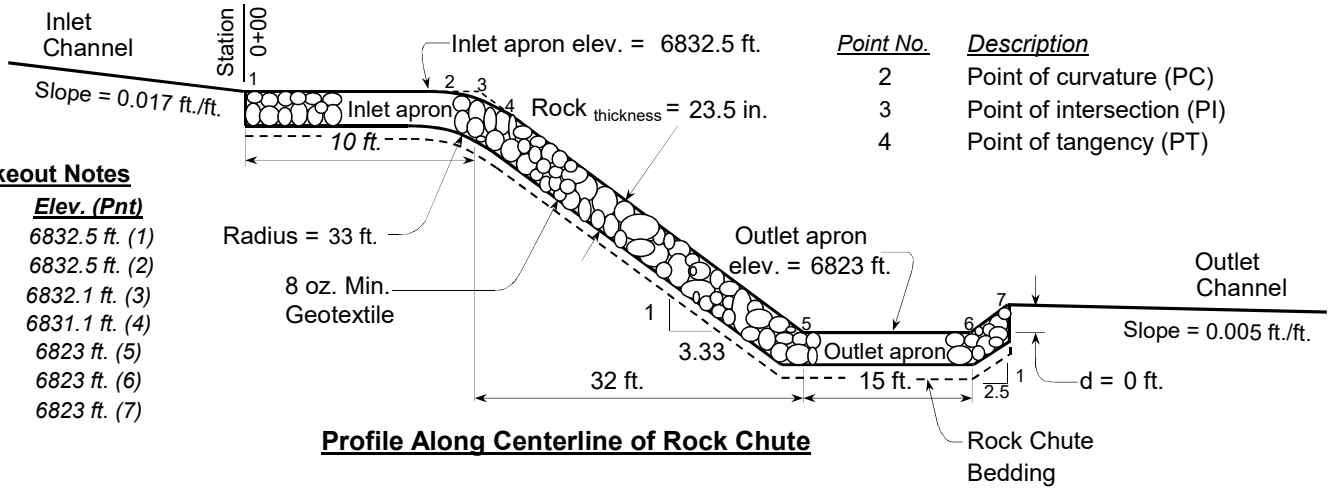
Storm Inflow Hydrographs UD-Detention, Version 3.07 (February 2017)

The user can override the calculated inflow hydrographs from this workbook with inflow hydrographs developed in a separate program.

	SOURCE	WORKBOOK	WORKBOOK	WORKBOOK	WORKBOOK	WORKBOOK	WORKBOOK	WORKBOOK	WORKBOOK	WORKBOOK
Time Interval	TIME	WQCV [cfs]	EURV [cfs]	2 Year [cfs]	5 Year [cfs]	10 Year [cfs]	25 Year [cfs]	50 Year [cfs]	100 Year [cfs]	500 Year [cfs]
7.62 min	0:00:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	0:07:37	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Hydrograph	0:15:14	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Constant	0:22:52	3.75	4.19	2.22	3.04	3.95	5.78	8.07	9.62	7.55
0.656	0:30:29	11.02	12.51	6.22	8.74	11.70	18.26	28.75	39.66	36.25
	0:38:06	28.31	32.16	15.96	22.44	30.05	47.01	76.51	112.76	119.21
	0:45:43	77.37	87.83	43.73	61.40	82.11	128.00	206.49	305.00	339.58
	0:53:20	101.50	117.04	54.48	78.60	108.49	180.31	327.12	548.13	706.31
	1:00:58	99.69	115.58	52.61	76.57	106.82	181.63	364.45	707.89	1152.67
	1:08:35	91.53	106.31	48.00	70.10	98.16	168.17	345.95	736.86	1507.19
	1:16:12	82.60	95.96	43.26	63.23	88.59	151.92	316.08	693.86	1639.38
	1:23:49	72.72	84.59	37.90	55.55	78.04	134.40	285.91	634.53	1582.08
	1:31:26	63.68	74.10	33.12	48.61	68.35	117.83	257.20	579.81	1484.12
	1:39:04	57.07	66.30	29.85	43.67	61.21	104.90	231.14	531.57	1371.90
	1:46:41	48.42	56.40	25.08	36.89	51.99	90.02	200.35	477.34	1267.45
	1:54:18	40.28	46.95	20.80	30.66	43.27	75.07	171.48	414.25	1160.11
	2:01:55	32.35	37.79	16.54	24.51	34.78	60.88	144.61	353.48	1035.17
	2:09:32	25.25	29.55	12.81	19.08	27.18	47.84	120.49	302.13	895.48
	2:17:10	19.12	22.42	9.61	14.40	20.60	36.62	99.24	258.47	763.51
	2:24:47	14.14	16.54	7.18	10.69	15.21	27.18	80.45	220.99	662.68
	2:32:24	11.22	13.09	5.75	8.52	12.05	21.23	63.54	187.66	578.97
	2:40:01	9.40	10.95	4.84	7.15	10.09	17.64	49.17	156.98	508.74
	2:47:38	8.13	9.46	4.20	6.19	8.73	15.17	39.88	128.85	445.41
	2:55:16	7.24	8.42	3.75	5.52	7.77	13.45	34.03	104.08	387.09
	3:02:53	6.60	7.68	3.44	5.05	7.09	12.22	30.08	84.67	331.93
	3:10:30	5.07	5.94	2.58	3.83	5.46	9.67	24.88	70.11	278.80
	3:18:07	3.65	4.27	1.86	2.76	3.93	6.98	18.88	56.07	226.05
	3:25:44	2.71	3.17	1.38	2.05	2.92	5.17	13.79	42.78	173.48
	3:33:22	2.01	2.36	1.03	1.52	2.17	3.83	10.17	32.10	133.07
	3:40:59	1.49	1.74	0.75	1.12	1.60	2.84	7.68	24.09	101.80
	3:48:36	1.08	1.26	0.54	0.81	1.16	2.07	5.79	18.05	78.28
	3:56:13	0.78	0.91	0.39	0.59	0.84	1.49	4.35	13.59	59.83
	4:03:50	0.55	0.65	0.28	0.42	0.60	1.08	3.26	10.39	45.67
	4:11:28	0.37	0.43	0.18	0.27	0.40	0.73	2.47	7.95	34.37
	4:19:05	0.22	0.26	0.10	0.16	0.24	0.45	1.79	6.21	25.80
	4:26:42	0.11	0.13	0.05	0.08	0.12	0.23	1.22	4.79	19.98
	4:34:19	0.03	0.04	0.01	0.02	0.04	0.09	0.76	3.55	15.62
	4:41:56	0.00	0.00	0.00	0.00	0.00	0.01	0.41	2.50	12.50
	4:49:34	0.00	0.00	0.00	0.00	0.00	0.00	0.16	1.63	9.73
	4:57:11	0.00	0.00	0.00	0.00	0.00	0.00	0.03	0.95	7.31
	5:04:48	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.45	5.24
	5:12:25	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.13	3.51
	5:20:02	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	2.12
	5:27:40	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.07
	5:35:17	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.37
	5:42:54	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01
	5:50:31	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	5:58:08	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	6:05:46	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	6:13:23	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	6:21:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	6:28:37	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	6:36:14	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	6:43:52	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	6:51:29	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	6:59:06	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	7:06:43	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	7:14:20	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	7:21:58	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	7:29:35	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	7:37:12	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	7:44:49	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	7:52:26	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	8:00:04	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	8:07:41	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	8:15:18	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	8:22:55	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	8:30:32	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	8:38:10	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	8:45:47	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	8:53:24	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	9:01:01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	9:08:38	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Design Values			**Rock Gradation Envelope**			**Quantities** [a]		
Angular D_{50} dia. =	11.7	in.	*% Passing*		*Diameter, in. (weight, lbs.)*	**Angular** Rock =	935	yd^3
$Rock_{chute}$ thickness =	23.5	in.	D_{100}	---------	18 - 23 (394 - 934)	Geotextile (8 oz.)[b] =	1486	yd^2
Inlet apron length =	10	ft.	D_{85}	---------	15 - 21 (256 - 681)	Bedding (6 in.) =	250	yd^3
Outlet apron length =	15	ft.	D_{50}	---------	12 - 18 (117 - 394)	Excavation =	0	yd^3
Radius =	33	ft.	D_{10}	---------	9 - 15 (60 - 256)	Earthfill =	0	yd^3
Will bedding be used?	Yes		*Coefficient of Uniformity, $(D_{60})/(D_{10}) \leq 2.0$*			Seeding =	0.0	acres

Notes: [a] *Rock, bedding, and geotextile quantities are determined from x-section below (neglect radius).*
[b] *Geotextile shall be overlapped (18-in. minimum) and anchored (18-in. minimum along sides and 24-in. minimum on the ends) --- quantity not included.*

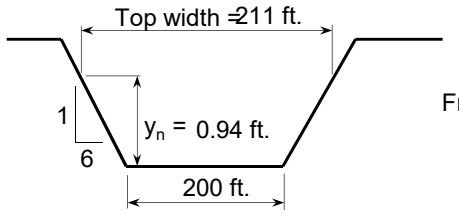


Point No.	*Description*
2	Point of curvature (PC)
3	Point of intersection (PI)
4	Point of tangency (PT)

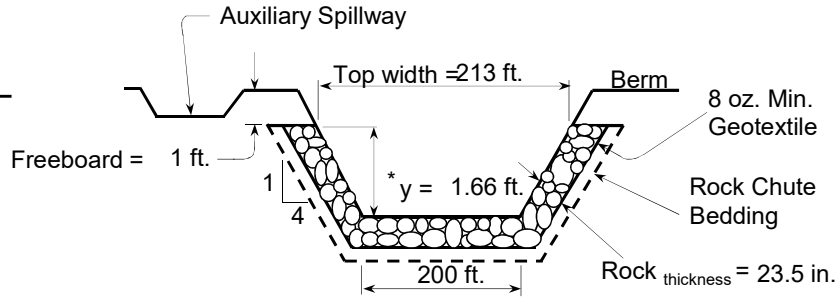
Stakeout Notes

Sta.	*Elev. (Pnt)*
0+00	6832.5 ft. (1)
0+5.2	6832.5 ft. (2)
0+10	6832.1 ft. (3)
0+14.6	6831.1 ft. (4)
0+42	6823 ft. (5)
0+57	6823 ft. (6)
0+57	6823 ft. (7)

Profile Along Centerline of Rock Chute

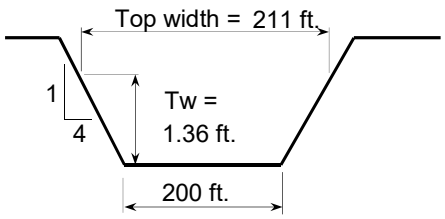


Inlet Channel Cross Section



Rock Chute Cross Section

* Use H_p throughout chute but not less than z_2.



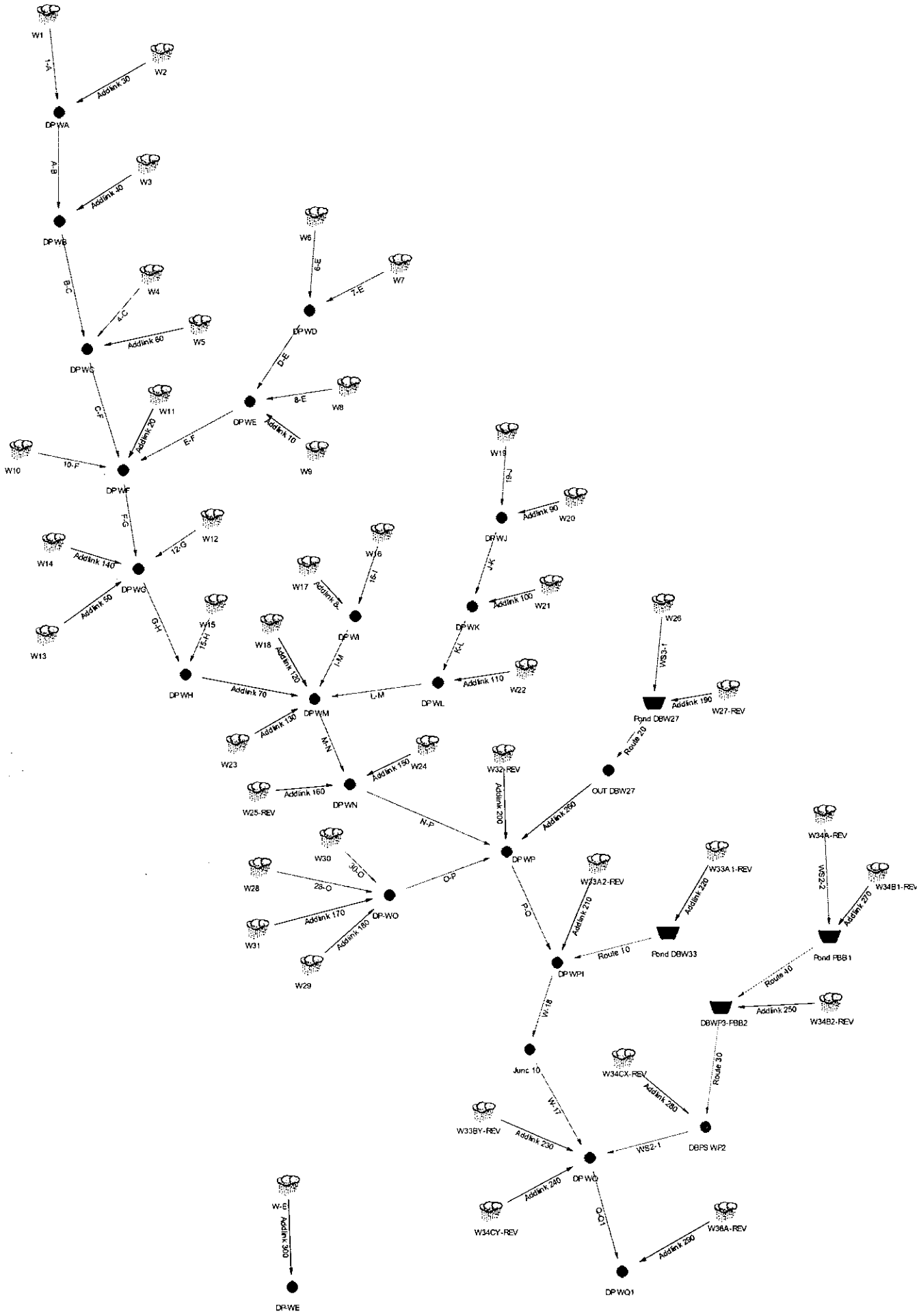
Outlet Channel Cross Section

Profile, Cross Sections, and Quantities

Project: Pond WU - Riprap Weir
Location: County

U.S. Department of Agriculture
Natural Resources Conservation Service

Designed: Aaron Johnston	Approved by:	
Drawn: NRCS Standard Dwg.	Title:	
Traced:	Sheet No.	Drawing No.
Checked:	of	


W1
1-A
W2
Addlink 30
DPWA
B-A
W3
Addlink 40
DPWB
C-B
W4
4-C
Addlink 60
W5
DPWC
C-F
W11
Addlink 20
E-F
W10
10-F
DPWF
F-G
W12
12-G
W14
Addlink 140
DPWG
Addlink 50
W13
G-H
W15
15-H
DPWH
W6
6-D
7-E
W7
DPWD
D-E
8-E
W8
DPWE
Addlink 10
W9
W19
19-J
Addlink 90
W20
DPWJ
J-K
Addlink 100
W21
DPWK
K-L
Addlink 110
W22
DPWL
W16
16-I
W17
Addlink 80
DPWI
I-M
W18
Addlink 120
Addlink 70
DPWM
L-M
Addlink 130
W23
M-N
W24
Addlink 150
W25-REV
Addlink 160
DPWN
N-P
W26
WS3-1
Pond DBW27
Addlink 190
W27-REV
Route 20
OUT DBW27
Addlink 260
W32-REV
Addlink 200
DPWP
W30
30-O
W28
28-O
Addlink 170
W31
Addlink 180
DPWO
O-P
W29
W33A2-REV
W33A1-REV
Addlink 220
Pond DBW33
P-O
Addlink 210
DPWP1
Route 10
W34A-REV
WS2-2
W34B1-REV
Addlink 270
Pond PBB1
Route 40
DBWP3-PBB2
Addlink 250
W34B2-REV
W-18
Junc 10
W34CX-REV
Addlink 280
Route 30
W-17
W33BY-REV
Addlink 230
WS2-1
DBPS WP2
DPWQ
Addlink 240
W34CY-REV
Q-Q1
W36A-REV
Addlink 290
DPWQ1
W-E
Addlink 300
DPWE

FALCON AREA DRAINAGE BASIN - EXISTING SCS ANALYSIS BASIN SUMMARY

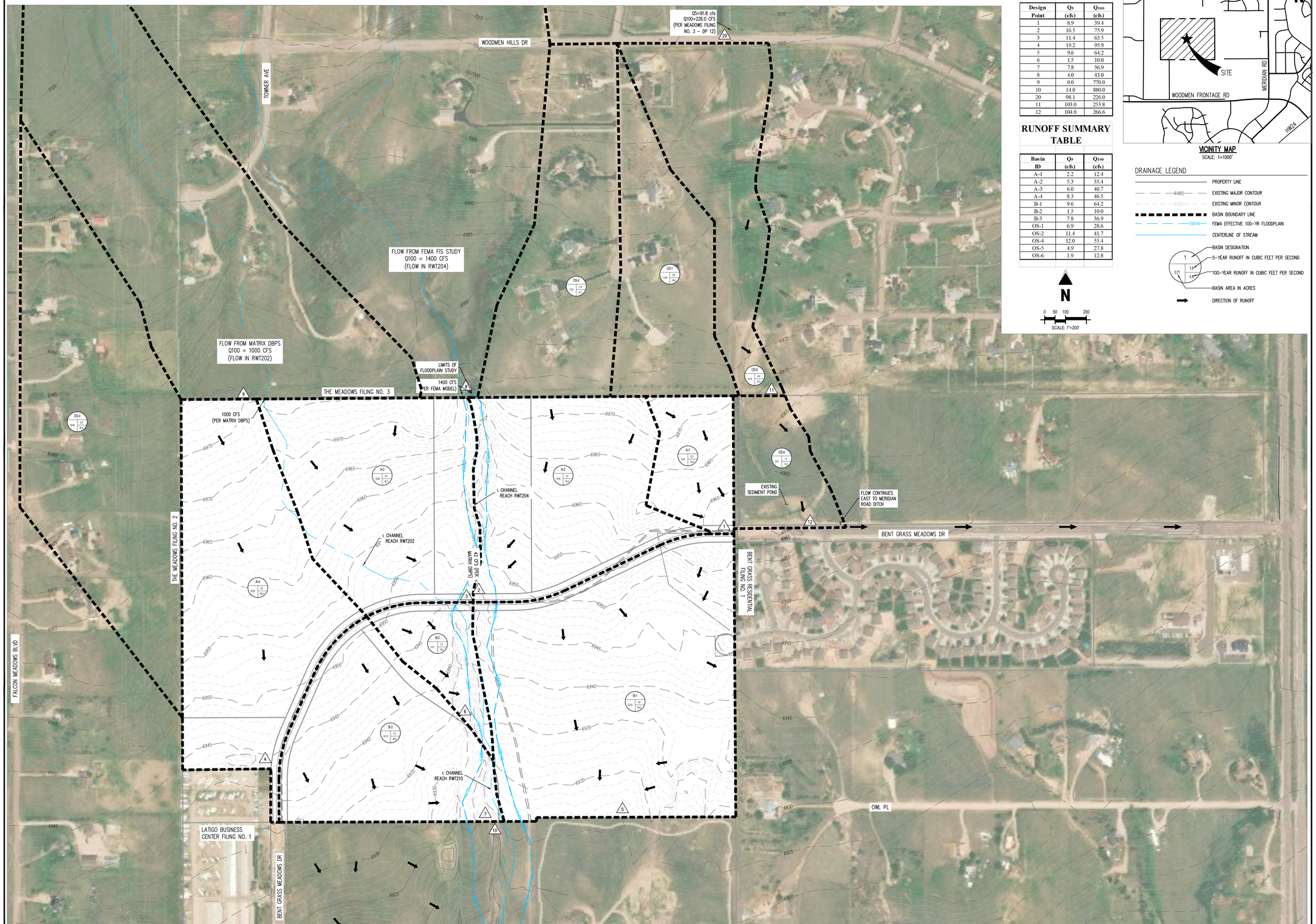
BASIN ID	BASIN AREA (ac.)	WEIGHTED C_N	Time of Concentration (hrs.)
W1	30.66	60.0	0.1552
W2	17.79	60.0	0.2560
W3	31.87	61.0	0.2224
W4	3.46	62.0	0.0833
W5	10.18	60.0	0.1200
W6	31.10	60.0	0.1360
W7	13.89	60.0	0.1184
W8	18.30	60.0	0.1104
W9	25.73	61.0	0.1552
W10	27.58	61.0	0.1536
W11	20.10	60.0	0.1232
W12	25.47	60.0	0.1520
W13	71.87	61.0	0.2912
W14	30.27	61.0	0.2160
W15	56.38	61.0	0.2256
W16	18.69	61.0	0.1472
W17	11.78	60.0	0.1360
W18	80.06	60.0	0.3024
W19	27.39	61.0	0.1328
W20	20.16	61.0	0.1136
W21	86.21	60.0	0.2496
W22	5.50	63.0	0.0880
W23	15.62	60.0	0.1792
W24	28.29	60.0	0.2240
W25-REV	53.59	63.7	0.2640
W26	46.08	63.0	0.1456
W27-REV	82.73	68.0	0.3152
W28	25.41	63.0	0.2048
W29	26.18	63.0	0.2320
W30	32.58	63.0	0.1968
W31	7.87	63.0	0.1168
W32-REV	67.00	62.0	0.2720
W33A1-REV	65.04	70.0	0.3216
W33A2-REV	27.52	65.0	0.3117
W33BY-REV	67.85	63.6	0.4467
W34A-REV	83.72	71.8	0.2544
W34B1-REV	92.05	73.7	0.3472
W34B2-REV	59.50	69.8	0.2350
W34CX-REV	47.03	69.2	0.2100
W34CY-REV	29.79	62.1	0.4000
W36A-REV	26.20	61.0	0.4367
W-E1	62.63	61.0	0.4600

FALCON AREA DRAINAGE BASIN - EXISTING SCS ANALYSIS REACH SUMMARY

Reach ID	Mannings n	Reach Slope (%)	Reach Length (ft.)	Base Width (ft.)	Side slopes
1-A	0.035	2.63%	1519	5	4:1
A-B	0.035	1.51%	464	5	4:1
B-C	0.035	2.79%	823	5	4:1
4-C	0.035	4.82%	1078	5	4:1
C-F	0.035	4.49%	557	10	4:1
6-E	0.035	3.72%	592	5	4:1
7-E	0.035	14.66%	464	5	4:1
D-E	0.035	4.79%	1044	5	4:1
8-E	0.035	5.04%	1449	5	4:1
E-F	0.035	0.38%	789	5	4:1
10-F	0.035	3.88%	824	5	4:1
F-G	0.035	2.11%	2319	10	4:1
12-G	0.035	3.07%	2478	5	4:1
G-H	0.035	2.17%	2632	15	4:1
15-H	0.035	2.89%	1763	5	4:1
16-I	0.035	3.50%	1345	5	4:1
I-M	0.035	3.70%	2650	15	4:1
19-J	0.035	3.29%	881	5	4:1
J-K	0.035	2.35%	3061	5	4:1
K-L	0.035	2.46%	487	5	4:1
L-M	0.035	2.97%	1786	5	4:1
M-N	0.035	1.49%	1345	20	4:1
N-P	0.035	1.70%	1589	20	4:1
28-O	0.035	2.08%	1345	5	4:1
30-O	0.035	0.74%	1078	5	4:1
O-P	0.035	2.26%	2169	5	4:1
WS3-1	0.040	1.93%	3400	2	2:1
P-Q	0.035	1.82%	1925	25	4:1
W-18	0.035	1.50%	750	25	4:1
W-17	0.035	2.00%	1750	25	4:1
WS2-2	0.035	2.18%	1560	20	4:1
WS2-1	0.040	2.00%	3150	10	2:1
Q-Q1	0.035	2.20%	2940	25	4:1

APPENDIX G

Drainage Map



DESIGN POINT SUMMARY TABLE

Design Point	Qs (cfs)	Q_{100} (cfs)
1	8.9	39.4
2	16.5	75.9
3	11.4	63.5
4	19.2	95.9
5	9.6	64.2
6	1.5	10.0
7	7.8	36.9
8	4.0	43.0
9	0.0	770.0
10	14.0	880.0
20	98.1	226.0
11	103.0	253.8
12	104.8	266.6

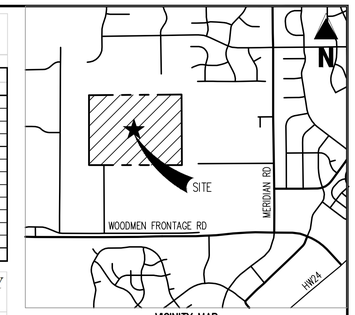
RUNOFF SUMMARY TABLE

Basin ID	Qs (cfs)	Q_{100} (cfs)
A-1	2.2	12.4
A-2	5.3	35.4
A-3	6.0	40.7
A-4	8.3	46.5
B-1	9.6	64.2
B-2	1.5	10.0
B-3	7.8	36.9
OS-1	6.9	28.6
OS-2	11.4	41.7
OS-4	12.0	55.4
OS-5	4.9	27.8
OS-6	1.9	12.8

N

0 50 100 200

SCALE: 1"=200'



VICINITY MAP

SCALE: 1=1000'

DRAINAGE LEGEND

- PROPERTY LINE
- 6485 EXISTING MAJOR CONTOUR
- 6483 EXISTING MINOR CONTOUR
- BASIN BOUNDARY LINE
- 100YR FEMA EFFECTIVE 100-YR FLOODPLAIN
- CENTERLINE OF STREAM
- 1 BASIN DESIGNATION
- 1.8 5-YEAR RUNOFF IN CUBIC FEET PER SECOND
- 4.8 100-YEAR RUNOFF IN CUBIC FEET PER SECOND
- 0.71 BASIN AREA IN ACRES
- DIRECTION OF RUNOFF

Galloway
1155 Kelly Johnson Blvd., Suite 305
Colorado Springs, CO 80920
719.900.7220
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CHALLENGER HOMES

DRAINAGE PLAN
BENT GRASS RESIDENTIAL FILING NO. 2
FOR
CHALLENGER COMMUNITIES, LLC

BENT GRASS MEADOWS DRIVE & MERIDIAN ROAD
FALCON, CO - EL PASO COUNTY

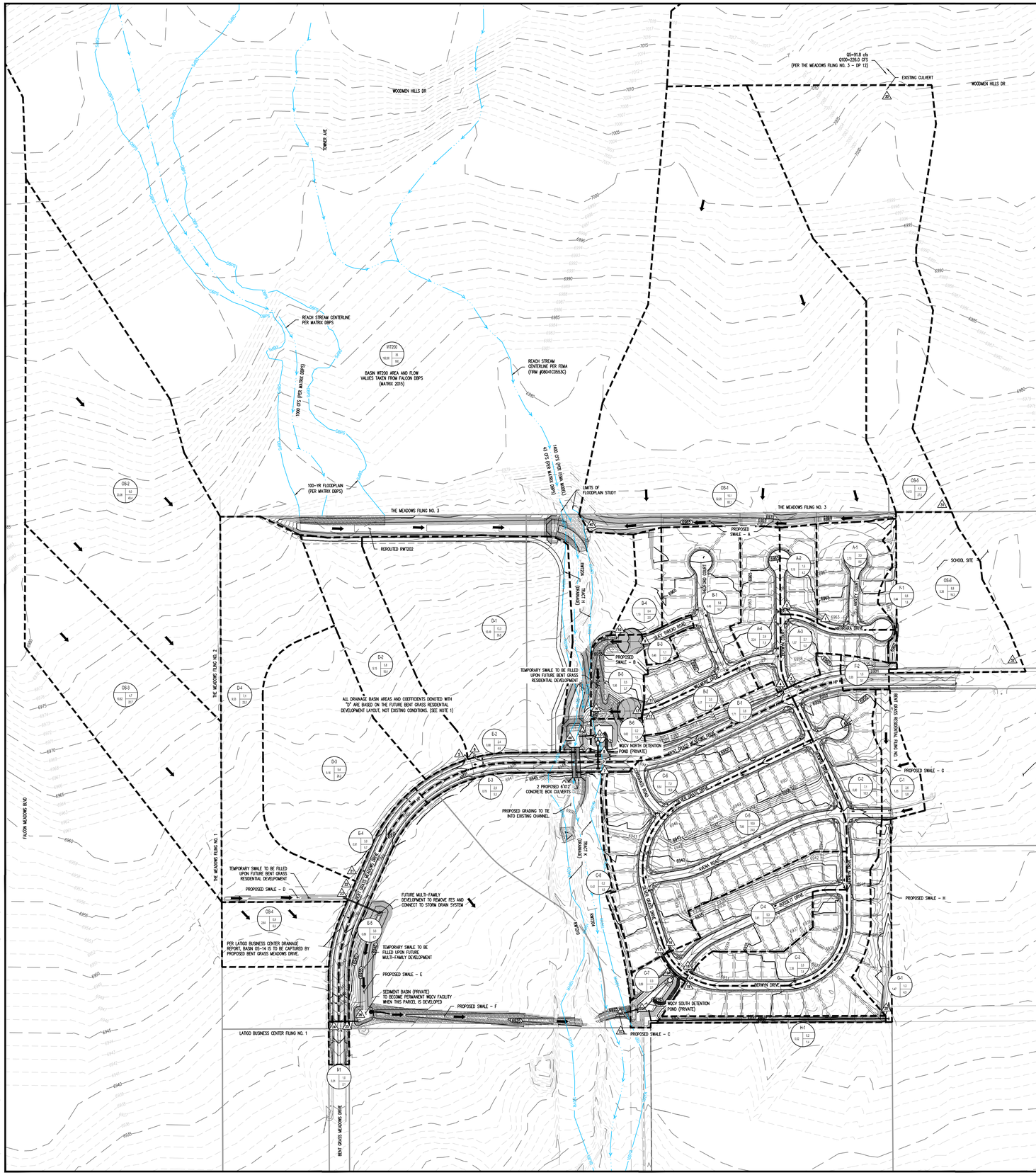
#	Date	Issue / Description	Init.

Project No:	CLH000014.20
Drawn By:	CMWJ
Checked By:	SMB
Date:	OCTOBER 2019

EXISTING DRAINAGE MAP

DR-1

Sheet 1 of 3



PIPE AND INLET SUMMARY TABLE

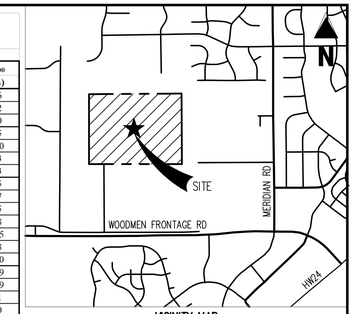
Design Point	Qs (cfs)	Q_{100} (cfs)
5 Inlet	5.8	15.6
6 Inlet	12.9	19.5
6 Pipe	18.5	35.1
7 Inlet	2.9	21.6
8 Inlet	11.6	21.6
8 Pipe	29.0	72.8
16 Inlet	9.8	15.5
16 Pipe	9.8	15.5
17 Inlet	5.8	9.2
17 Pipe	15.6	24.6
18 Inlet	9.0	27.4
18 Pipe	9.0	27.4
19 Inlet	9.9	29.6
19 Pipe	18.5	55.7
21 Inlet	9.4	23.1
21 Pipe	9.4	23.1
22 Inlet	12.3	23.1
22 Pipe	19.0	46.2
23 Inlet	4.4	21.2
23 Pipe	22.7	63.7
24 Inlet	2.3	17.0
24 Pipe	2.3	17.0
25 Inlet	3.3	17.0
25 Pipe	4.0	34.0

DESIGN POINT SUMMARY TABLE

Design Point	Qs (cfs)	Q_{100} (cfs)
1	3.3	8.6
2	4.5	11.9
3	6.1	15.9
4	8.6	22.4
5	5.8	25.2
6	13.3	25.2
7	2.9	21.6
8	11.6	21.6
9	1.1	2.3
10	1.1	4.1
11	5.6	14.0
12	2.0	4.3
13	15.6	18.0
14	8.7	24.6
15	36.4	94.3
15A	12.2	37.0
A-A	71.3	205.8
BB	73.1	207.7
16	10.9	24.9
17	7.0	16.9
18	9.0	27.4
19	9.9	29.6
19A	32.9	78.6
20	1.3	4.5
20A	34.1	83.6
20B	21.3	66.0
21	9.4	35.2
22	12.5	35.2
23	4.4	21.2
24	2.3	17.1
25	4.0	17.1
26	25.5	91.4
CC	104.3	253.5
30	98.1	226.0
31	103.0	253.5
32	111.8	272.8
40	15.1	65.1

RUNOFF SUMMARY TABLE

Basin ID	Area (acres)	Qs (cfs)	Q_{100} (cfs)
A-1	2.70	3.3	8.6
A-2	1.19	1.5	4.2
A-3	1.57	2.1	5.0
A-4	2.24	2.9	7.5
B-1	4.46	5.6	14.0
B-2	1.17	2.0	4.3
B-3	0.46	1.1	2.3
B-4	1.19	0.4	2.5
B-5	1.56	0.5	3.7
B-6	0.62	0.2	1.5
C-1	1.35	2.6	5.8
C-2	6.80	7.1	18.5
C-3	2.38	3.3	7.8
C-4	3.61	5.3	12.0
C-5	7.86	10.9	24.9
C-6	5.54	7.0	16.9
C-7	0.89	0.3	2.1
C-8	0.42	0.2	1.0
D-1	12.49	13.3	35.5
D-2	5.15	5.8	15.4
D-3	9.16	9.4	26.2
D-4	9.53	7.1	23.3
E-1	1.71	3.6	7.7
E-2	0.68	2.4	4.6
E-3	0.78	2.9	5.3
E-4	0.91	3.0	5.7
E-5	0.89	3.3	6.1
F-1	0.44	0.6	1.6
F-2	0.55	1.5	3.1
G-1	1.47	1.3	4.5
H-1	0.52	0.2	1.4
I-1	0.31	1.0	2.1
OS-1	32.28	15.1	65.1
OS-2	20.08	9.0	43.4
OS-3	10.62	4.7	22.7
OS-4	2.64	0.9	6.0
OS-5	14.13	4.9	27.5
OS-6	5.38	8.8	19.3



VICINITY MAP
SCALE: 1=1000'

DRAINAGE LEGEND

- PROPERTY LINE
- 6485 — PROPOSED MAJOR CONTOUR
- 6483 — PROPOSED MINOR CONTOUR
- 6485 — EXISTING MAJOR CONTOUR
- 6483 — EXISTING MINOR CONTOUR
- BASIN BOUNDARY LINE
- 100YR — FEMA EFFECTIVE 100-YR FLOODPLAIN
- DBPS — 100-YR FLOODPLAIN PER MATRIX DBPS
- CENTERLINE OF REACH
- BASIN DESIGNATION
- 5-YEAR RUNOFF IN CUBIC FEET PER SECOND
- 100-YEAR RUNOFF IN CUBIC FEET PER SECOND
- BASIN AREA IN ACRES
- DESIGN POINT
- DIRECTION OF RUNOFF

NOTES

1. SEE "BENT GRASS RESIDENTIAL SUBDIVISION" MDDP DRAINAGE MAPS FOR THE APPROXIMATE FUTURE SITE LAYOUT OF BENT GRASS RESIDENTIAL SUBDIVISION.

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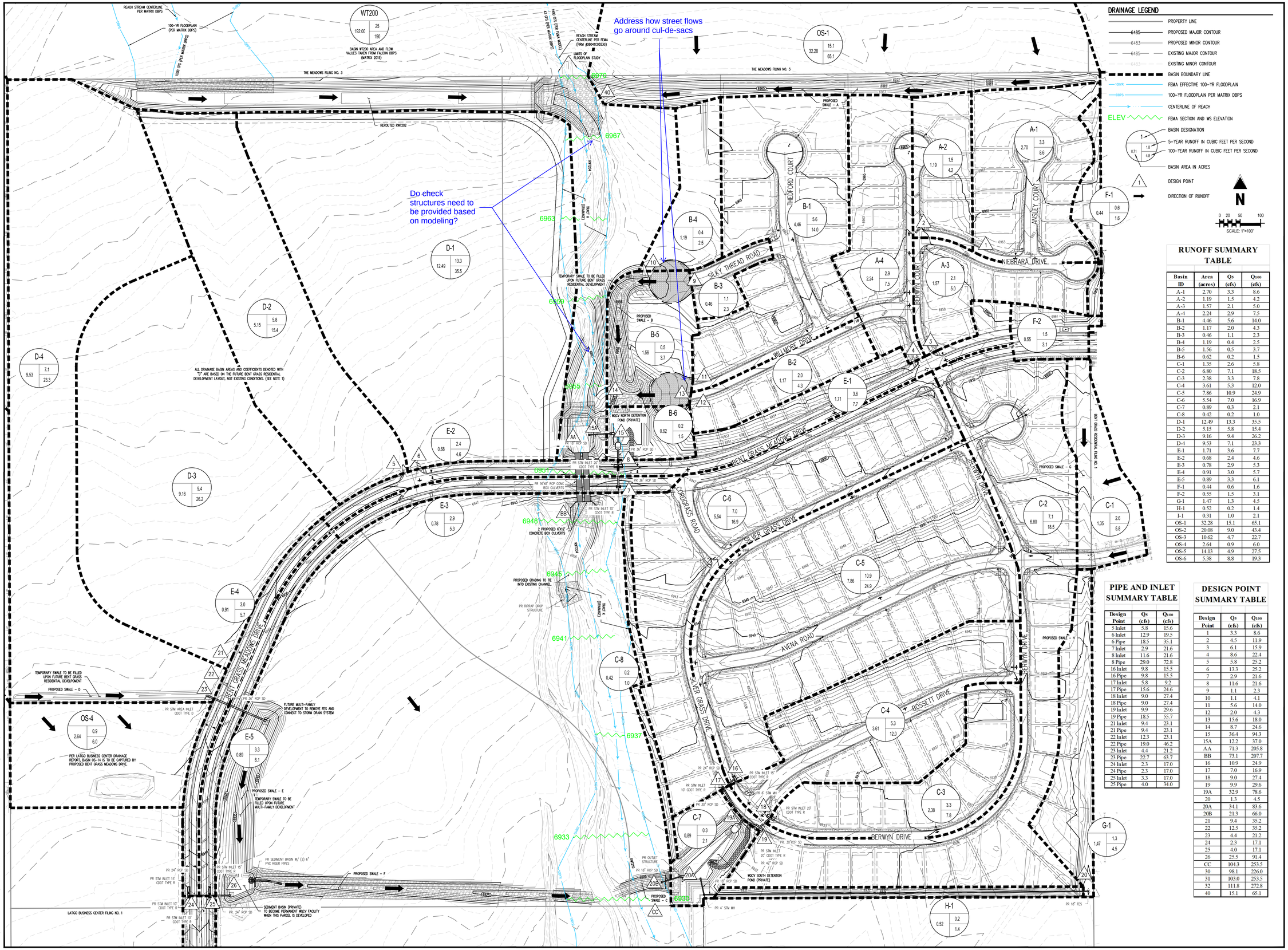
OVERALL BASIN PLAN - FDR

DR-2
Sheet 2 of 3



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C-7	0.89	0.3	2.1
C-8	0.42	0.2	1.0
D-1	12.49	13.3	35.5
D-2	5.15	5.8	15.4
D-3	9.16	9.4	26.2
D-4	9.53	7.1	23.3
E-1	1.71	3.6	7.7
E-2	0.68	2.4	4.6
E-3	0.78	2.9	5.3
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F-2	0.55	1.5	3.1
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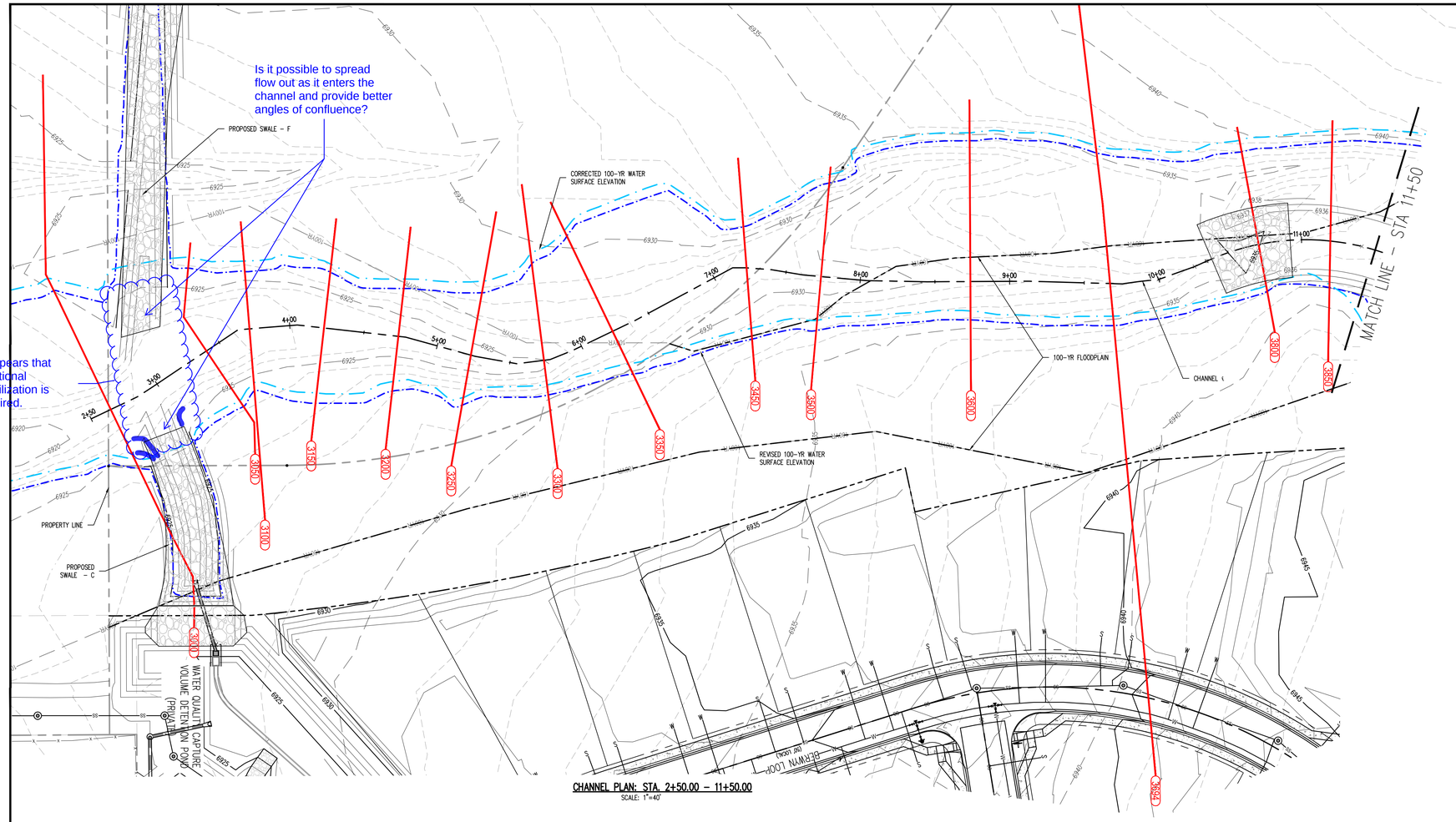
PROPOSED DRAINAGE MAP - FDR

DR-3
Sheet 3 of 3

Is it possible to spread flow out as it enters the channel and provide better angles of confluence?

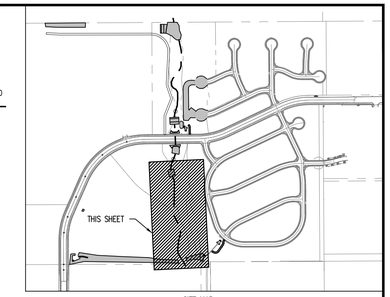
It appears that additional stabilization is required.



CHANNEL PLAN: STA. 2+50.00 – 11+50.00
SCALE: 1"=40'

N

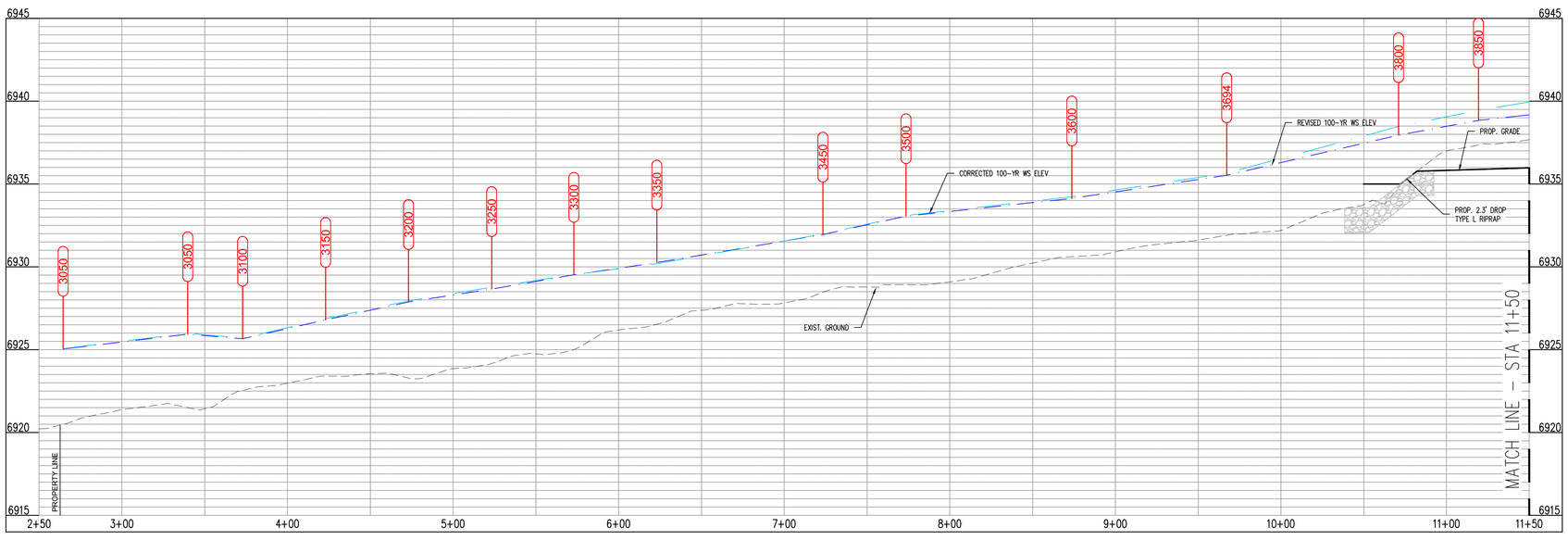
0 20 40
SCALE: 1"=40'



SITE MAP
SCALE: 1"=600'

LEGEND

6931	EXISTING MINOR CONTOUR
6930	EXISTING MAJOR CONTOUR
6941	PROPOSED MINOR CONTOUR
6940	PROPOSED MAJOR CONTOUR
	PROPERTY BOUNDARY
100YR	100 – YR FLOODPLAIN LINE
	CORRECTED 100-YR WATER SURFACE
	REVISED 100-YR WATER SURFACES
3900	HEC-RAS SECTIONS
	EXISTING STORM SEWER
	PROPOSED STORM SEWER
	PROPOSED RIPRAP
	PROPOSED GROUTED BOULDERS



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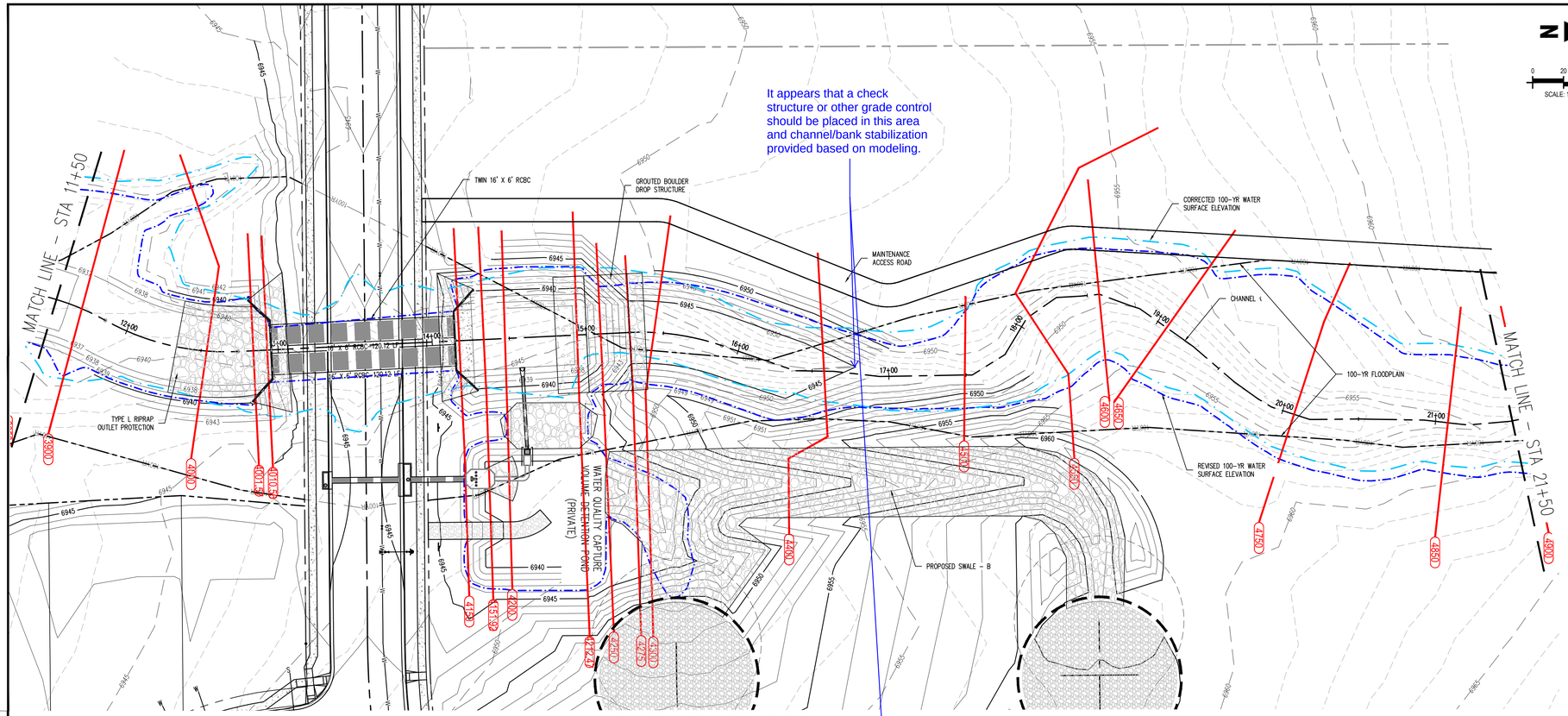
CHANNEL PLAN & PROFILE

DR2.1
Sheet 1 of 3



CHANNEL PLAN: STA. 11+50.00 - 21+50.00
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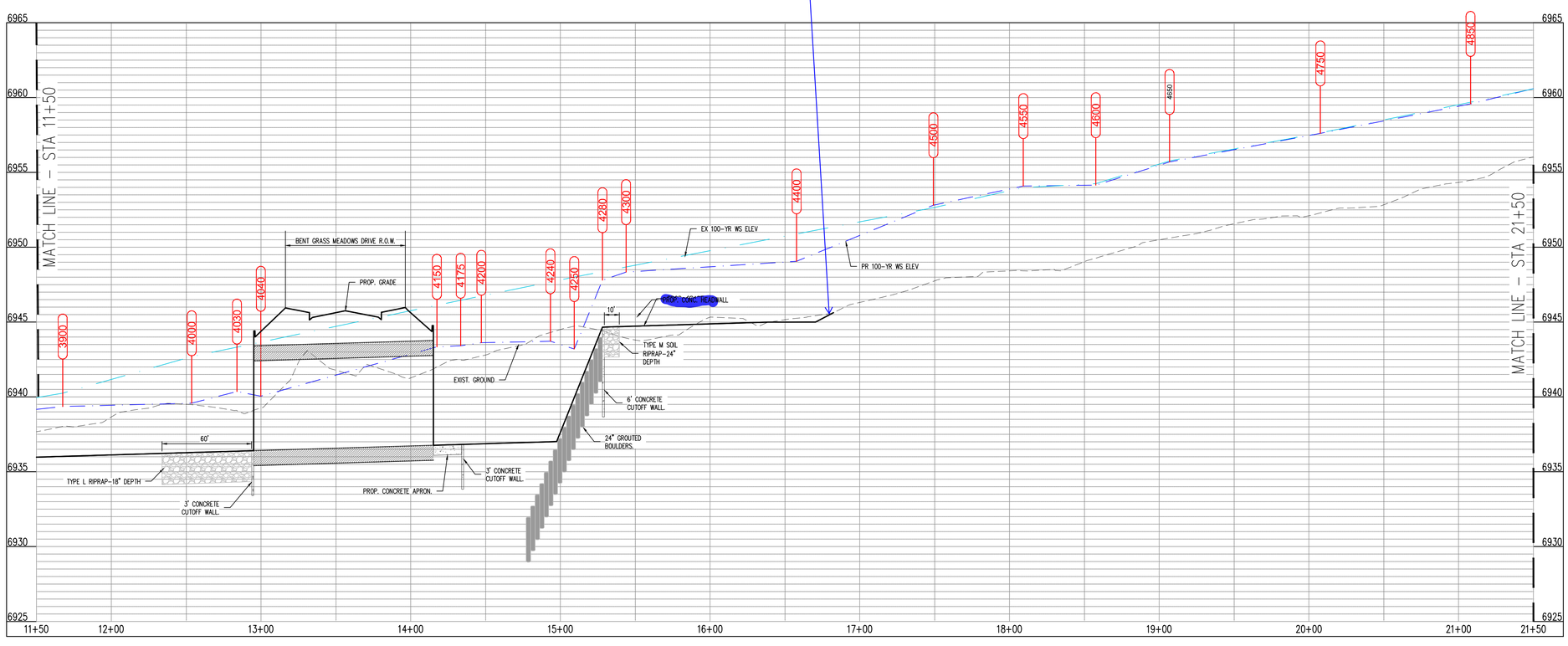

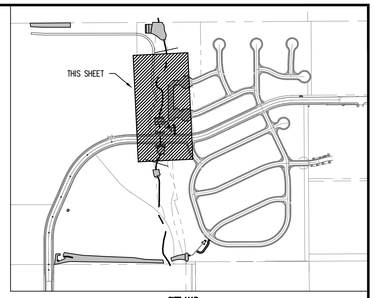

SITE MAP
SCALE: 1"=600'

LEGEND

6931	EXISTING MINOR CONTOUR
6930	EXISTING MAJOR CONTOUR
6941	PROPOSED MINOR CONTOUR
6940	PROPOSED MAJOR CONTOUR
	PROPERTY BOUNDARY
100YR	100 - YR FLOODPLAIN LINE
	CORRECTED 100-YR WATER SURFACE
	REVISED 100-YR WATER SURFACES
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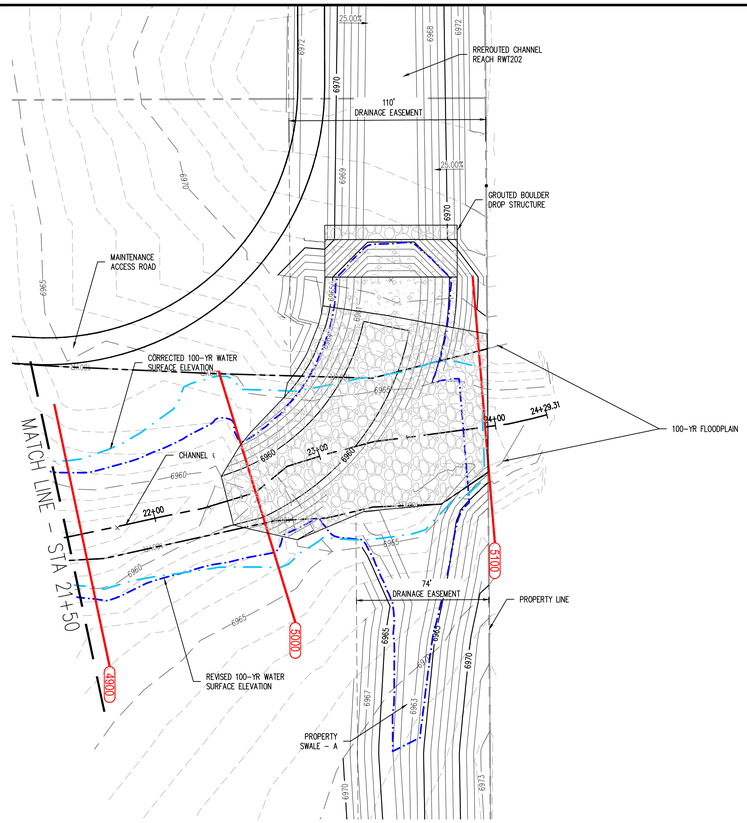
DR2.2
Sheet 2 of 3



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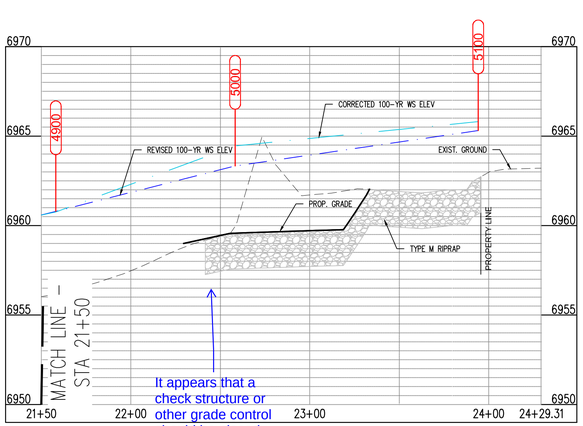

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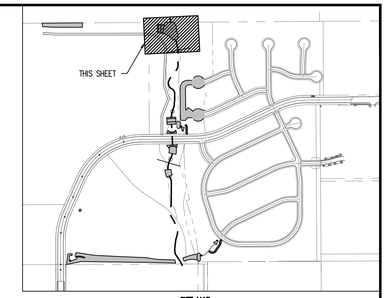

SITE MAP
SCALE: 1"=600'

LEGEND

- EXISTING MINOR CONTOUR
- EXISTING MAJOR CONTOUR
- PROPOSED MINOR CONTOUR
- PROPOSED MAJOR CONTOUR
- PROPERTY BOUNDARY
- 100 - YR FLOODPLAIN LINE
- CORRECTED 100-YR WATER SURFACE
- REVISED 100-YR WATER SURFACES
- HEC-RAS SECTIONS
- EXISTING STORM SEWER
- PROPOSED STORM SEWER
- PROPOSED RIPRAP
- PROPOSED GROUTED BOULDERS

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CHANNEL PLAN & PROFILE

DR2.3
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